[redacted]

Volume VII
SUPPORTING DOCUMENTS
Docs. No. 386 - 440

FILE NUMBER 35

9 Feb 55

Lt General Frank F. Everest
Deputy Chief of Staff, Operations
Headquarters USAF
Washington 25, D. C.

Dear Hank:

For sometime, we have been concerned with the problem as to what degree of supervision and support should be provided the Air National Guard units which have mobilization assignments to us. Our actions have been guided in a large measure by an exchange of correspondence between General Chidlaw and General White, in which General Chidlaw stated our position as being firmly opposed to assuming more supervision and support of the ANG than presently rendered. I believe General White inferred agreement in his reply of 17 August 1954, which further went on to say that consideration of the matter should be deferred until completion of the calendar year 1954 active duty summer training evaluation.

It was our hope that in the evaluation of the summer training period, General Chidlaw's feeling on responsibilities of this command to the Air National Guard would be given full consideration. With this brief background in mind, I now refer specifically to the USAF Program Guidance Document dated January 1955 (PG-57-1) and to USAF letter, AFMSS-OP-1, 15 October 1954, Subject: (U) D-Day Support for Certain Air National Guard Units.

Paragraph E 23 of Section IV, and paragraph A.5.(c), Section V, of the former referenced document, give direct responsibility to ADC for the additional equipment augmentation, facilities, storage and maintenance necessary for prepositioning of war reserves at the bases of the 23 ANG fighter interceptor wings having an ADC mobilization mission. To support this requirement means not only pre-stocking of war consumables, but also building the necessary storage facilities and performing a continuing job of servicing and inspection.

No
M Gen H.S.Roth/bid (ADMDH)   Memo for the record not required
2342, 2343
8 Feb 1955

UNCLASSIFIED

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Lt General Frank F. Everest
Page two

This command does not have the capability of performing this function, unless the staffs at the various echelons are considerably augmented. Our personnel are devoting their entire time to the task of increasing our air defense capability with the resources currently provided, and at the same time, are programming more materiel, personnel, and facilities to increase the effectiveness of our regular units. Furthermore, the type of demands and pressures which, as you well know, the ANG can and does exert could, we believe, cause a staff workload disproportionate to the contributions of the Air National Guard to air defense.

If the Air Defense Command continues to have the responsibility for providing the additional equipment augmentation, the facilities, storage, and maintenance for pre-positioning war reserves at the bases of the 23 ANG fighter interceptor wings, we will, of necessity, have to detract from the effort currently put forward to increase the effectiveness of the regular ADC units. Augmentation, in terms of personnel, in the ADC Materiel field is not the only difficulty. In my opinion, it will be extremely difficult to defend Air National Guard procurement and facility dollars without jeopardizing the programs of the regular components.

I believe that the responsibility given to us in PO-57-1 is a proper responsibility of the National Guard Bureau.

In the second referenced document, this command was given the responsibility of refining the support requirements for those National Guard units which have D-Day air defense missions. In carrying out this responsibility, we were to have the assistance of the Commander, AMC, and the Chief, Air National Guard Bureau. Furthermore, I believe it is necessary that this headquarters provide the National Guard Bureau with the planning information necessary for them to develop a program for the procurement of equipment, facilities, storage, and maintenance at the bases of the 23 ANG wings on which will be pre-positioned war reserves.

It is my opinion that the responsibility given us in this directive is also the proper responsibility of the National Guard Bureau and that the Commander, AMC, and planning personnel from this headquarters be required to assist the Air National Guard Bureau in carrying out this responsibility.

UNCLASSI

[redacted]

At the present time, we are to some degree in competition with the Air National Guard for scarce resources. There have been instances where the capability of regular Air Defense Command units has been degraded as a result of supplying critical equipment items to the Air National Guard. Yet, their own air defense capability has not been correspondingly increased.

The responsibility assigned us by PG-57-1 and the referenced USAF letter will result in this headquarters becoming the focal point for requests from each State National Guard Commander for equipment, facilities, storage and maintenance. It is perfectly conceivable under the guide lines stated that we will be requested to construct alert hangars, for example, on the bases of the 25 wings assigned to ADC on D-Day. Such action would put General Chidlaw in the middle of the picture, and leave the National Guard Bureau out. Also this could readily result in every ANG difficulty or desire becoming a CINCONAD problem with state governors calling him and frequently placing him in the middle of ANG politics.

It is strongly recommended that ADC be relieved of the ANG support responsibility as outlined in the January Programs Guidance Document; that programming, budgetary and implementation responsibility be given to the National Guard Bureau; that the Air Defense Command be responsible for providing such information as needed by the National Guard Bureau to insure that plans for the use of these forces on D-Day can be realized.

Sincerely,

FREDERIC H. SMITH, JR.
Major General, USAF
Vice Commander

67

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387 2
387

HEADQUARTERS
ARMY ANTIAIRCRAFT COMMAND
Ent Air Force Base
Colorado Springs, Colorado

ADOAA-3 P&O 471.94 17 March 1955

SUBJECT: NIKE Dual-Control Batteries

TO: Commanding General, Western Army Antiaircraft Command
Fort Baker, California
Commanding General, 1st Antiaircraft Regional Command
Fort Totten 59, New York
Commanding General, 2nd Antiaircraft Regional Command
Fort George G. Meade, Maryland
Commanding General, 5th Antiaircraft Regional Command
Fort Sheridan, Illinois
Commanding General, 53d AAA Brigade, Ravenna Arsenal
Apco, Ohio
Commanding Officer, Central Army Antiaircraft Command
Grandview Air Force Base, Grandview, Missouri

1. Recission: Letter, ADOAA-3 PP&C 471.94, this headquarters, 2 December 1954, subject: "Requirements for NIKE Adjacent Batteries", is rescinded.

2. Definitions:

a. Dual-Control Battery. A NIKE missile battery (TOE 44-447), augmented by equipment and personnel, to provide two NIKE systems operating from a common launcher area.

b. Single-Control Battery. A NIKE missile battery (TOE 44-447) which contains only one NIKE missile system. Each such battery is scheduled to receive a second, or dual-control, NIKE system at a later date, except under one of the following conditions:

(1) When another NIKE battery is sited adjacent to it.

(2) When terrain precludes the installation of a second NIKE system at that site.

3. Concept: At any particular NIKE installation, a maximum of two NIKE systems will be emplaced. Previous plans which contemplated the employment of more than two NIKE systems at one installation are now invalid.

In the case wherein two NIKE batteries have been constructed adjacent to one another, and each battery has been provided separate administrative facilities, the two batteries will be regarded as two separate batteries. Present plans do not contemplate that either of such batteries will be provided a second NIKE system.

471.94

4. **Organization:**

a. The organization of batteries which occupy the sites listed below will be changed to reflect the formation of dual-control batteries. A Table of Organization and Equipment change is not contemplated at this time. Department of the Army orders effecting the reorganization will be published shortly before the dual-control equipment and personnel package are to be provided. Dual-control NIKE batteries will be located at the following sites:

Baltimore	18, 31
Chicago	44, 45, 80
Detroit	52, 54
Niagara-Buffalo	03, 05, 35, 44
New York	04, 30, 80, 93
Philadelphia	41, 75, 99
San Francisco	09
Seattle	13
Washington	64, 79

b. Each of the NIKE sites enumerated below will retain its present site designation, for administrative purposes, until the construction contracted for the site has been completed. At that time, the site will assume the designation of the site adjacent to it. (Example: Baltimore Site BA-13 C&L will ultimately become part of Site BA-18 C&L.)

Baltimore	05, 13, 30
Chicago	43, 47, 81
Detroit	53, 55
Niagara-Buffalo	04, 06, 34, 43
New York	05, 29, 79, 94
Philadelphia	43, 78, 97
San Francisco	08
Seattle	14
Washington	65

c. In the 61-NIKE Battalion Program, a battalion which contains one of the listed dual-control batteries will contain a total of three missile batteries. A battalion which contains two dual-control batteries will contain a total of two missile batteries.

5. Facilities: The following policies will govern the provision of facilities for dual-control batteries.

a. Administrative Area.

(1) Where battalion and/or group headquarters are to be collocated with missile batteries, provision of adequate messing facilities at the installation may require the construction of one or more of either or both of the two standard Special AAA messhalls. These messhalls are shown on Chief of Engineer Drawings Number 36-05-92 and 36-05-94.

(2) The messhall shown on Drawing Number 36-05-94 will be provided unless another type messhall is in existence.

(3) Housing will be provided for 168 enlisted men and 12 officers and warrant officers. Normally 68 enlisted men will be housed at the control area and 100 enlisted men will be housed at the launching area.

(4) Day rooms will be provided at the ends of barracks at the rate of approximately 8 to 10 square feet per man.

(5) The Standard Battery Administration, Recreation and Storage Building will be modified to provide approximately 50 percent more storage and arms room space.

b. Control Area. One (1) control area to accommodate two (2) NIKE IFC sets will be provided.

c. Launching Area.

(1) A total of six (6) underground missile storage structures will be provided, to consist of two (2) type "B" structures and four (4) type "C" structures.

(2) A single missile assembly and test building will be provided.

(3) A single fueling and joining area will be provided.

(4) A single acid storage shed will be provided.

(5) A single generator building large enough for five (5) generators with 1 spare space will be provided.

6. Siting Considerations:

a. Control Area.

(1) IFC radars should be emplaced so that they do not create unacceptable masks for the other radars at the site. NIKE contractor information in Bell Telephone Laboratories MEMORANDUM (CONFIDENTIAL), 11 October 1954, subject: "Siting Considerations for the NIKE I System", will be used as a guide to siting.

(2) The optimum siting of the IFC sets, where sufficient land is available, is as indicated by Inclosure 1. Such siting will preclude equipment masks of the two (2) target tracking radars being in the same direction.

(3) In exceptional cases where siting of the second IFC set is restricted to an area which would place the first set in the primary field of fire of the second set, the second set must be elevated so as to prevent masks being created by the set in the field of fire. This siting will create masks in the secondary field of fire of the forward set, but should be close to, or within the allowable limit of forty (40) mils in the secondary field of fire.

(3) Primary field of fire of each NIKE system in a dual-control battery need not coincide. Fields of fire for each system will be determined by the defense commander, based upon his analysis of the sector assignments necessary to obtain the most effective, balanced defense.

b. Launcher Area.

(1) Underground storage structures may be located in any arrangement which, when all missiles in the launcher area are erected, will provide clear line of sight from a particular missile tracking radar to the guidance unit of each erected missile on the radar's associated launchers. This means that the exact location of individual underground storage structures, and launchers, must be determined after the permanent location of the associated missile tracking radar has been determined; and that arrangement or alignment of underground storage structures may vary with each set of control equipment, depending upon the existence of clear line of sight to the proposed launcher locations. (Line of sight in this application is measured from the center of the missile tracking radar antenna to the longitudinal axis of the missile in the erected position. "Clear line of sight" here means that the line of sight from the radar through the longitudinal axis of a potentially masking missile clears the longitudinal axis of the proposed missile location by a specified distance.) See Inclosure 2.

(2) Engineer Drawing NE-16-06-172, sheet one, dated 18 February 1954, pertains where all missiles are NIKE I only. Where NIKE B missiles are involved, see Figure 3, attached.

7. Real Estate Acquisition:

a. At each dual-control battery site, acquisition of real estate will be restricted to that necessary to provide:

(1) Launcher area containing six (6) underground storage structures and associated missile processing area.

(2) Control area accommodating two (2) sets of NIKE IFC equipment.

(3) Administration area containing necessary housing and administrative facilities.

b. At each single-control battery site, real estate for future provision of dual-control for that site will be acquired subject to provisions of letter ADOAA-4 601, this headquarters, 10 December 1954, subject: "Acquisition of Real Estate for Dual Control".

c. Where real estate must be acquired to collocate battalion and/or group headquarters with a missile battery, see letter ADOAA-4 IN 370.5, this headquarters, 23 February 1955, subject: "Facilities for Battalion and Group Headquarters".

8. Personnel: Current plans contemplate that a NIKE dual-control missile battery will be composed of the personnel indicated in TOE 44-447, and augmented by the personnel indicated in Inclosure 3.

9. Distribution: Sufficient copies of this correspondence are furnished for distribution to AAA Group level.

BY COMMAND OF LIEUTENANT GENERAL MICKELSEN:

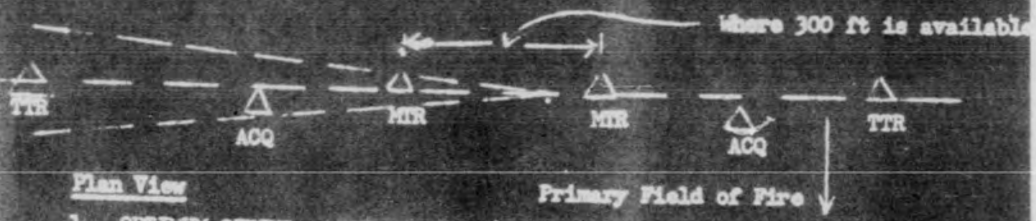
J C Chandler
J. C. CHANDLER
Major, AGC
Adjutant General

3 Incl
1. IFC Siting Considerations
2. Offset Required for Line of Sight
3. Personnel Augmentation

Copies Furnished

DEP LOG	(5)
ACofS G-3, DA	(5)
Chief of Engrs	(5)
Chief of Ord	(5)
CG, AAA and GM Center	(5)
CG, Redstone Arsenal	(5)

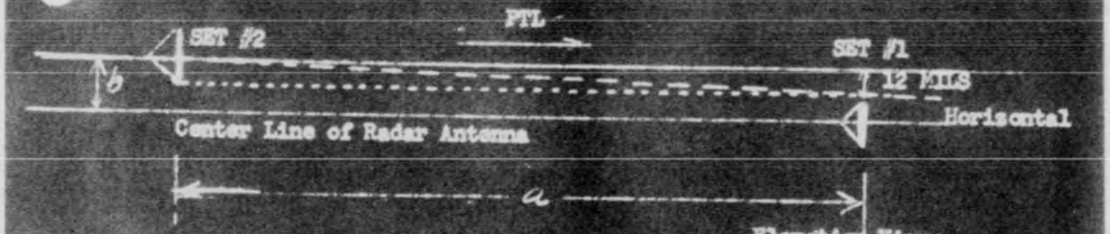
SUBJECT: NIKE Dual-Control Batteries



Plan View

1. OPTIMUM SITING, ASSUMING PRIMARY FIELD OF FIRE OF EACH SET IS IN SAME DIRECTION.

2. Elevation increase needed to preclude equipment mask if one set is emplaced behind another:



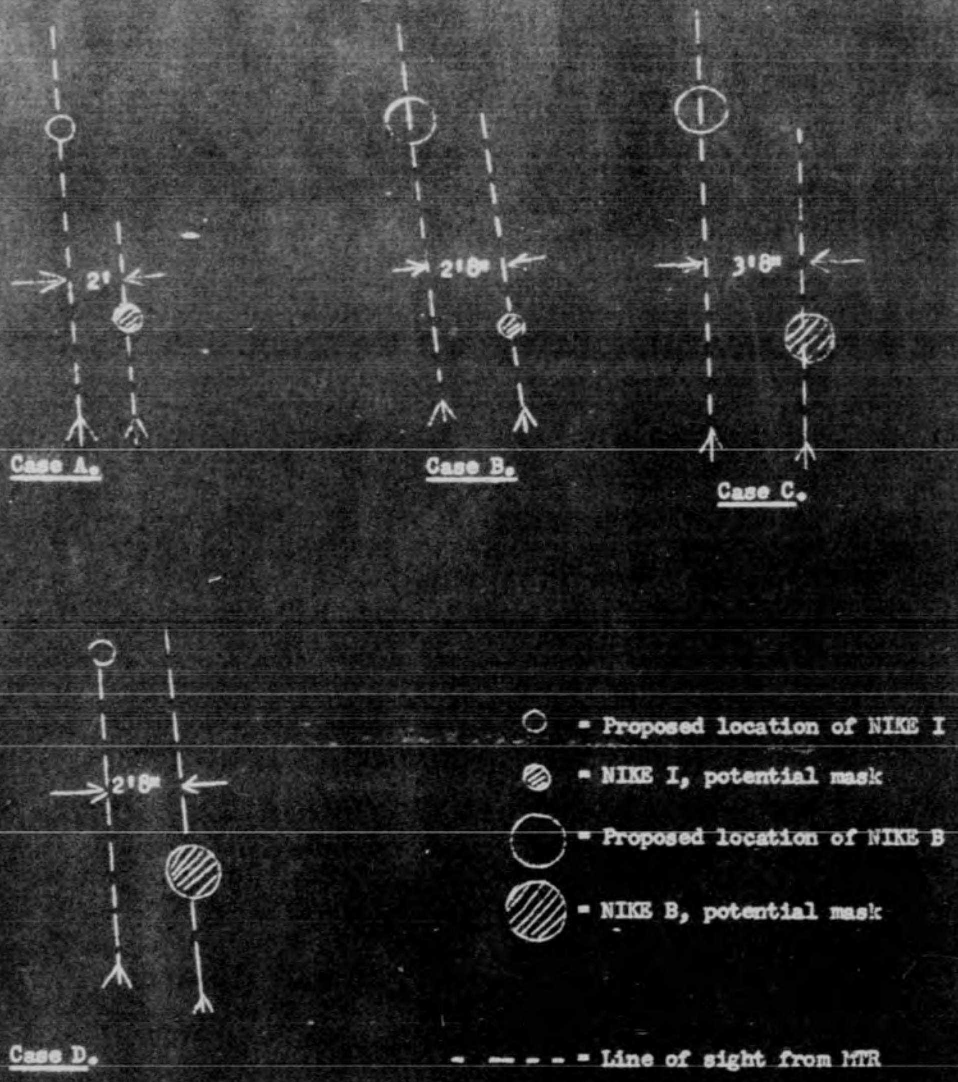
Elevation View

a - separation between radars

b - elevation increase needed for second IFC set

Ex. #1: When a - 200 ft, b - 4.4 ft. Set #2 creates 42 ¢ mask in secondary field of fire, Set #1.

Ex. #2: When a - 300 ft, b - 5.6 ft. Set #2 creates 32 ¢ mask in secondary field of fire, Set #1.



Case A: NIKE I, potential mask for NIKE I
Case B: NIKE I, potential mask for NIKE B
Case C: NIKE B, potential mask for NIKE B
Case D: NIKE B, potential mask for NIKE I

FFSET REQUIRED FOR LINES OF SIGHT

Incl 2

64

1. Personnel Augmentation to TOE 44-447 for NIKE Dual-Control Missile Battery.

JOB DESCRIPTION	IDENTITY	MOS	GRADE	NO.
a. Battery Headquarters.				
Cook	E	3060	E-4	1
b. Fire Control Platoon.				
Platoon Leader	O	1180	Lt	1
Asst Platoon Leader	O	1180	Lt	1
GM IFC	WO	1184	WO	1
Platoon Sgt	E	1512	E-7	1
GM IFC Mech	E	1512	E-6, E-5	2
GM Chief IFC Operator	E	4512	E-5	3
GM IFC Opr	E	4512	E-4,	8
			E-3	13
		Total Platoon:		30
c. Launching Platoon.				
(1) Platoon Headquarters.				
Missile	WO	1185	WO	1
SAM Elec Matl Specialist	E	1354	E-6	1
GM Mech	E	2353	E-5	1
SAM Firing Panel Opr	E	1350	E-4	1
Air Compressor Opr	E	4353	E-4	1
Swbd Operator	E	4641	E-3	1
		Sub-Total:		6

Incl 3

JOB DESCRIPTION	IDENTITY	MOS	GRADE	NO.
(2) **Three (3) Launching Sections:**				
Section Chief	E	1350	E-6	3
Senior SAM Launch Crm	E	1350	E-5	3
SAM Launch Crm	E	1350	E-4, E-3	3 15
SAM Firing Panel Opr	E	1350	E-4	3
SAM Assy Helper	E	4353	E-3	3
			Sub-Total:	30
			Launching Platoon Total:	36

2. **Recapitulation, Augmentation:**	OFF	WO	EM
Battery Headquarters			1
Fire Control Platoon	2	1	27
Launching Platoon		1	35
Total Augmentation	2	2	63
3. TOE 44-447:	6	2	99
Total Dual-Control Btry:	8	4	162
Aggregate:			174

STANDARD FORM NO. 64

46

Office Memorandum • UNITED STATES GOVERNMENT

TO AG DATE 15 March 55

FROM G-3

SUBJECT Reproduction of letter "NIKE Dual-Control Batteries"

1. Attached letter w/3 inclosures for signature, date, and reproduction.

2. Request distribution to addressees as follows:

WESTARAACOM - 10 Copies
1st AA Rgn - 15 Copies
2nd AA Rgn - 12 Copies
5th AA Rgn - 10 Copies
53rd Brig - 10 Copies
CENARAACOM - 8 Copies

R.W.F.

Distribution:

Addressees 65 Copies
[illegible] Rgn 30 "
[illegible] CCM 30 " See attached M/

File Number: ADCAA-3

15 March 1955
(Date)

Subject: Nike Dual-Control Batteries

EFERENCES AND BACKGROUND INFORMATION:

This letter is a follow-up to our policy message 5621, same subject. This letter presents in greater detail the policies which were outlined by message.

ACTION REQUIRED:

Policy letter.

ACTION TAKEN: (Summarize)

As required.

RECORD EVALUATION:

Temporary - Destroy After

Semi-Permanent - Return For Review After

X Permanent Record Material.

BUDGETARY AND PIO IMPLICATIONS

Coordination:

G-1
G-4
Engr
B&F
G-3 O&T

Copies Furnished:

G-1 (2)
G-4 (8)
Engr (3)
B&F (2)
G-3 (15)

Prepared By: W. I. KING
(Signature)

Lt Colonel 2239
(Rank) (Ext)

Action Completed:
File:
(Initials) (Date)

ARAACOM FORM 2
Revised 24 Nov 53

[redacted]

ARMY ANTIAIRCRAFT COMMAND
Ent Air Force Base
Colorado Springs, Colorado

389

ADOAA-3 O&T 471

SUBJECT: Utilization of Fuzes for AA Ammunition (U)

TO: Commanding General, Western Army Antiaircraft Command
Fort Baker, California
Commanding General, 1st Antiaircraft Regional Command,
Fort Totten 59, New York
Commanding General, 2d Antiaircraft Regional Command,
Fort George G. Meade, Maryland
Commanding General, 5th Antiaircraft Regional Command,
Fort Sheridan, Illinois
Commanding General, 53d AAA Brigade, Ravenna Arsenal,
Apco, Ohio
Commanding Officer, Central Army Antiaircraft Command,
Grandview Air Force Base, Grandview, Missouri

1. Letter (SECRET) ADOAA-3 OP 471.82, this headquarters, dated 2 April 1952, subject: "Utilization of Fuzes for Antiaircraft Ammunition" is rescinded.

2. The entire concept of relative effectiveness of AA fuzes is under comprehensive study by the Ballistic Research Laboratories, Aberdeen Proving Grounds. The purpose of this letter is to establish a realistic and practical fuze utilization policy for units of this command, pending publication of conclusive results by the Ballistic Research Laboratories.

3. Since World War II numerous studies have been accomplished by military and civilian agencies of this and allied countries to determine the relative effectiveness of various AA fuzes. As expected, there were wide areas of disagreement, centered mostly around the effectiveness of the PD fuze and the vulnerability of modern high-speed jet aircraft. There was, however, unanimity on one point. MT fuzes were found to be less effective than VT and MTSQ fuzes (without a flat fuze spot). No fixed set of relative values or standard rules for employment were determined because of the great number of variables involved.

4. The variables involved in selecting the most effective fuze for a specific engagement fall into the following general categories: State of training of personnel; condition of equipment; ammunition available; and the type, number and tactics of attacking aircraft. All of these items may vary greatly among units and defenses, and during attacks. The personnel who have the most intimate knowledge of these factors and who are best capable of selecting the most effective fuze are the AA unit and defense commanders.

REGRADING DATA CANNOT
BE PREDETERMINED

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[redacted]

ADOAA-3 O&T 471
SUBJECT: Utilization of Fuzes for AA Ammunition (U)

5. The following fuze utilization policy is established:

a. Fuze utilization SOPs will be published by major field commanders and AA defense commanders. Copies will be furnished this headquarters.

b. Final fuze selection for a specific engagement will be made by the fire unit commander in accordance with the SOP.

c. Pending publication of the results of the Ballistic Research Laboratory study, the proportions of fuzes for ammunition, basic and resupply loads, established in the AA-OP-US, will remain as now prescribed.

BY COMMAND OF LIEUTENANT GENERAL MICKELSEN:

E. T. ASHWORTH
Colonel, GS
Chief of Staff

Copies furnished:
- DEPLOGDA
- ACOFSG3DA
- CONARC
- CONARC, Bd #4
- CGARMYONE
- CGARMYTWO
- CGARMYTHREE
- CGARMYFOUR
- CGARMYFIVE
- CGARMYSIX
- AA&GMBR
- BRL, APG

[redacted]

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[illegible]

a. [illegible] this hq, [illegible] April 5[illegible], subject as above.
b. [illegible] COMAD [illegible] No. [illegible], 12 February 5[illegible], subject as above
c. Personal ltr [illegible] from Col Albergotti, Director of Gunnery & Material Dept., AA & [illegible], dated [illegible] February 5[illegible], concerning utilization of AA fuses.

2. Letter, ref 1a above, established the command policy concerning utilization of AA fuses. It [illegible] fuse and directs that [illegible] fuses be employed with a flat 5% [illegible]. At the CG's request, this policy was reviewed and comments were obtained from interested parties, see ref 1b and c, above.

3. The consensus appears to be that previous studies were not conclusive and that fiel[illegible] commanders are in the best position to determine proper fuse selection. Letter, ref 1[illegible] above, also stated that a comprehensive study is being conducted by the BRL, APG, with the hope that conclusive results will be obtained.

ACTION REQUIRED:

1. Send letter of appreciation to Col Albergotti.
2. Publish our revised AA fuse utilization policy.

ACTION TAKEN: (Summarize)

As required.

FILE

RECORD EVALUATION:

____ Temporary - Destroy After __________

____ Semi-Permanent - Return For Review After __________

X Permanent Record Material __________

BUDGETARY AND FIO IMPLICATIONS:

Coordination:
CS
P&O
Ord NMD

Copies Furnished:
CS - (27)
P&O - (28)
Ord - (29)
O&T, CONAD
G3 Policy File (30)
(Furnish Col Snodgrass a copy [illegible])
Central file (31)

Prepared By: P. P. GENERO
(Signature)

Major 2882
(Rank) (Ext)

Action Completed: 23 Mar
File:
(Initials) (Date

ARAACOM FORM 2
Revised 24 Nov 53

[redacted]

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[redacted]

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Suspense ____________

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	G-3						

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(Initials)

REMARKS:

ARAACOM Form 314
Rev 10 Nov 54

[redacted]

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74

DISPOSITION FORM

SECURITY [illegible]FICATION (If any)

[redacted]

FILE NO.
ADOAA-3 O&T 471

SUBJECT
Utilization of Fuzes for AA Ammo

TO C/S

FROM G3

DATE 14 Mar 55

COMMENT NO.

Maj Genero/jr/2882

1. References:

a. SECRET ltr ADOAA-3OP 471.82, this hq, subj as above, 2 Apr 52.

b. SECRET ltr ATBD-A 471.82, CONARC Bd No. 4, subj as above, 12 Feb 55.

c. Personal ltr to CG from Col Albergotti, Director of Gunnery & Materiel Dept., AA&GM Br, dtd 8 Feb 55, concerning utilization of AA fuzes. (Tab C)

2. At the CG's request, our fuze utilization policy, reference 1a above, was reevaluated. Comments were obtained from CONARC Board No. 4 and the AA School, reference 1b and c respectively. A summary of the comments are as follows:

a. The Ballistics Research Laboratories, APG, are conducting a comprehensive study on relative AA fuze effectiveness. Conclusive results are expected.

b. Great controversy exists over the relative effectiveness of the PD fuze and the vulnerability of high-speed jet aircraft.

c. Subordinate commanders have the most intimate knowledge of the variables involved in selecting the most effective fuze for a specific engagement.

3. Recommend approval of the following and return to G3 for finalization.

a. Draft letter to MFCs outlining our revised AA fuze utilization policy (Tab A).

b. Draft letter of appreciation to Col Albergotti (Tab B).

R.W.H.

To: CG From: C/S 25 Mar 55 #2

Recommend approval

OK [redacted]

To: G3

COPY 1 OF 2 COPIES

DD FORM 1 FEB 50 96 REPLACES NME FORM 96, 1 OCT 48, WHICH MAY BE USED

16—54891-3 U. S. GOVERNMENT PRINTING OFFICE : 1952 O -

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[redacted]

ADOAA-3 OGT 471 Utilization of Fuses for AA Ammo

C/S G3 14 Mar 55
Maj Genero/jr/2682

1. References:

a. SECRET ltr ADOAA-3OP 471.82, this hq, subj as above, 2 Apr 52.

b. SECRET ltr ATBD-4 471.82, CONARC Bd No. 4, subj as above, 12 Feb 55.

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b. Great controversy exists over the relative effectiveness of the PD fuse and the vulnerability of high-speed jet aircraft.

c. Subordinate commanders have the most intimate knowledge of the variables involved in selecting the most effective fuse for a specific engagement.

3. Recommend approval of the following and return to G3 for finalization.

a. Draft letter to RTCs outlining our revised AA fuse utilization policy (Tab A).

b. Draft letter of appreciation to Col Albergotti (Tab B).

R.W.E.

[redacted]

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[redacted]

D R A F T (Maj Genero/pk/2882)

ADOAA-3 O&T 471

Steno → (Send copy of this to Col Snodgrass; make copy for G3 Policy File - RWH)

SUBJECT: Utilization of Fuzes for AA Ammunition

TO: Major Field Commands

1. Letter (SECRET) ADOAA-3 OP 471.82, this headquarters, dated 2 April 1952, subject: "Utilization of Fuzes for Antiaircraft Ammunition" is rescinded.

2. The entire concept of relative effectiveness of AA fuzes is under comprehensive study by the Ballistic Research Laboratories, Aberdeen Proving Grounds. The purpose of this letter is to establish a realistic and practicable fuze utilisation policy for units of this command, pending publication of conclusive results by the Ballistic Research Laboratories.

3. Since World War II numberous studies have been accomplished by military and civilian agencies of this and allied countries to determine the relative effectiveness of various AA fuzes. As expected, there were wide areas of disagreement, centered mostly around the effectiveness of the PD fuze and the vulnerability of modern high-speed jet aircraft. There was, however, unanimity on one point. MT fuzes were found to be less effective than VT and MTSQ fuzes (without a flat fuze spot). No fixed set of relative values or standard rules for employment were determined because of the great number of variables involved.

4. The variables involved in selecting the most effective fuze for a specific engagement fall into the following general categories: State of training of personnel; condition of equipment; ammunition available; and the type, number and tactics of attacking aircraft. All of these items may vary greatly among units, and defenses, and [illegible] attacks. The personnel who have the

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most intimate knowledge of these factors and who are best capable of selecting the most effective fuze are the AA unit and defense commanders.

5. The following fuze utilization policy is established:

a. Fuze utilization SOPs will be published by major field commanders and AA defense commanders. ~~Copy~~ Copies will be furnished ~~[illegible]~~ this headquarters.

b. Final fuze selection for a specific engagement will be made by the fire unit commander in accordance with the SOP.

c. Pending publication of the results of the Ballistic Research Laboratory study, the proportions of fuzes for ammunition, basic and resupply loads, as established in the AA-OP-US, will remain ~~the same.~~ as now prescribed.

BY COMMAND OF LIEUTENANT GENERAL MICKELSEN:

Copies furnished
- Dep Log, DA
- ACofS G3, DA
- CONARC
- CONARC, Bd No. 4
- CG, Army One
- CG, Army Two
- CG, Army Three
- CG, Army Four
- CG, Army Five
- CG, Army Six
- AA&GM Branch
- BRL, APG

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BE PREDETERMINED

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D R A F T (Maj Genero/pk/2882)

(Personal letter to Col Albergotti)

I have received your very informative letter expressing your views on the relative effectiveness of the various antiaircraft fuzes and, specifically, the value of a flat fuze spot when using the MTSQ fuze.

I ~~heartil~~y agree with your ideas and especially that portion which recommends greater flexibility and control by defense commanders. It has been my contention for years that, although theoretical studies on relative fuze effectiveness are necessary and desirable, recommendations made as a result of such studies should not be adopted ~~until~~ confirmed by conclusive tests. My staff is now reevaluating our ~~entire~~ fuze utilization policy and your comments will assist them in arriving at the most practicable and effective solution.

I wish to take this opportunity to express my appreciation for your fine analysis of the problem and helpful recommendations.

SRM

ADOAA-3 O&T 471 22 March 1955

Utilization of Fuses for AA Ammo

1.

a. SECRET ltr ADOAA-3 OP 471.82, this hq, 2 April 52, subject as above.
b. SECRET ltr ATBD-A 471.82, CONARD Board No. 4, 12 February 55, subject as abov
c. Personal ltr to CG from Col Albergotti, Director of Gunnery & Materiel Dept., AA & GM Branch, dated 8 February 55, concerning utilization of AA fuses.

2. Letter, ref 1a above, establishes the command policy concerning utilization of AA fuses. It favors the PD fuse and directs that MTSQ fuses be employed with a flat 5% fuse spot. At the CG's request, this policy was reviewed and comments were obtained from interested parties, see ref 1b and c, above.

3. The consensus appears to be that previous studies were not conclusive and that fie commanders are in the best position to determine proper fuse selection. Letter, ref 1 above, also stated that a comprehensive study is being conducted by the BRL, APG, with the hope that conclusive results will be obtained.

1. Send letter of appreciation to Col Albergotti.
2. Publish our revised AA fuse utilization policy.

As required.

X

Gn
P&O
Ord HMF

Gn
P&O
Ord
O&T, CONAD
G3 Policy File
(Furnish Col Snodgrass
a copy informally)

P. P. GENERO

Major 2882

[redacted]

UNCLASSIFIED

CO FI [illegible]

Lt Gen Stanley [illegible]
[illegible]
[illegible]
[illegible] Springs, Colorado

[illegible]:

I am writing this letter in response to [illegible]

[illegible]

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[redacted]

Lilian Albergotti

[redacted]

82

C-O-P-Y

ORDNANCE CORPS
FRANKFORD ARSENAL
PHILADELPHIA 37, PENNA.

DERichter/mg/2[illegible]215

ORDBA FSM-10
FA

Jun 17 1955

330

SUBJECT: 75MM Gun, T83 Series (Skysweeper) at Tactical Locations

TO: Commanding General
Headquarters AAA Command
Ent Air Force Base
Colorado Springs, Colorado

1. This National Maintenance Point has been directed by the Office, Chief of Ordnance to effect the replacement of 75MM Gun Tubes T83E6, Stock No. D048-7306461 with the T83E7 (chrome-plated) type, Stock No. D048-7238923 at tactical locations.

2. It is, therefore, requested that all 75MM AA Weapons located at tactical sites be inspected in order to insure that the T83E7 tube only is utilized on Skysweepers. This inspection should also include Skysweeper tubes presently in storage at these locations.

3. In this connection, it is requested that action be taken to requisition a sufficient quantity of T83E7 Gun Tubes for utilization within your area. It is further requested that replacement of the T83E6 tubes with the T83E7 type be accomplished by ordnance personnel at the earliest practicable date.

4. Attention is invited to the fact that after replacement is effected, particular care should be exercised to make certain that the gun dials and the tube are aligned.

5. The exchanged T83E6 tube, if serviceable, should be returned to depots through normal supply channels for utilization in training and/or test requirements.

FOR THE COMMANDING OFFICER:

/s/ William H. Hankin
/t/ WILLIAM H. HANKIN
Assistant

-O-P-Y

Lt Col apman/jt/2402

AKOAA-O 472 (17 Jun 55) 1st Ind
SUBJECT: 75MM Gun, T83 Series (Skysweeper) at Tactical Locations

HEADQUARTERS ARMY ANTIAIRCRAFT COMMAND, Ent Air Force Base, Colorado Springs, Colorado

TO: Commanding General, Western Army Antiaircraft Command, Fort Baker, California
Commanding General, 1st Antiaircraft Regional Command, Fort Totten 59, New York
Commanding General, 2d Antiaircraft Regional Command, Fort George G. Meade, Maryland
Commanding General, 53d AAA Brigade, Ravenna Arsenal, Apco, Ohio
Commanding Officer, 5th Antiaircraft Regional Command, Fort Sheridan, Illinois
Commanding Officer, Central Army Antiaircraft Command, Grandview Air Force Base, Grandview, Missouri

1. Forwarded for your information, guidance and necessary action.

2. Submit requisitions through local supply channels.

BY COMMAND OF LIEUTENANT GENERAL MICKELSEN:

Alton N. Hicks
WALON N. HICKS
Capt, AGC
Asst Adj General

84

MEMORANDUM FOR RECORD

e Number: ADOAA-0472 21 Jun 55
(Date)

Subject: 75MM Gun, T83 Series (Skysweeper) at Tactical Locations.

REFERENCES AND BACKGROUND INFORMATION:

Information received from Frankford Arsenal that it had been directed by Office Chief of Ordnance to effect the replacement of 75mm gun tubes T83E6 with the T83E7 (chrome-plated) type at tactical locations.

By 1st Ind send to major field commands for necessary action.

ACTION REQUIRED: Ind to major field commands for info, guidance and necessary action.

TION TAKEN: (Summarize)

As above.

RECORD EVALUATION:

Temporary - Destroy After

X Semi-Permanent - Return for Review after 6 months

Permanent Record Material

BUDGETARY AND PIO IMPLICATIONS:

Coordination:

G4 S&M
G3

Copies Furnished:

G4 S&M
G3

H M Pruet
Prepared by for A. B. CHAPMAN
(Signature)

Lt Colonel 2402
(Rank) (Ext)

Action Completed:
File: 21 JUN 1955
(Initials) (Date)

ARAACOM FORM # 2

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HEADQUARTERS CONTINENTAL ARMY COMMAND
Fort Monroe, Virginia

ATDEV-4 471 94/9(C)(17 Feb 55) 17 February 1955

SUBJECT: Partial Report of Project Nr GM-651 (Test of NIKE I Target Radar Discrimination) (U)

TO: Chief of Research and Development
Department of the Army
Washington 25, DC
ATTN: Special Weapons and Air Defense

1. The inclosed report of test, Number 73 of the Engineer-User Test of NIKE I, is forwarded for information and guidance of all concerned. The results of the Board Nr 4, CONARC, tests indicate that the target tracking radar of NIKE I (Set Number 4) has a 90% probability of discrimination between two B-26 type aircraft as follows:

a. In range - 77 yds.

b. In azimuth - 23 mils.

c. In elevation - 26 mils

2. The test results confirm generally the expected performance, in this respect, as estimated by the contractor and point up the generally recognized need for improving the discrimination characteristic of target tracking radars. This headquarters recommends that the report be made available to interested agencies concerned in radar and warhead development.

FOR THE COMMANDING GENERAL:

1 Incl
(Over)

C. Z. SHUGART
Colonel, AGC
Adjutant General

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ARMY-CONARC-1385

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1 Incl
AFF Rept of Bd Nr 4, OCAFF,
Proj Nr GM-651, 28 Jan 55,
subj: "First Partial Rept of
Test Nr 73 of NIKE I Target
Radar Discrimination"

Copies furnished:
- CG, Army AA Comd
- Comdt
  - USMC
  - The Arty Sch
- Comd, Air Force Armt Cen
- Asst Comdt, The Arty Sch
  - AA&GM Br
- CO, ATB, CONARC
- Pres, Bd Nr 1; 2, 3, 4 (w/o incl), and 5, CONARC
- Dir
  - ORO
  - ASTIA
  - Marine Corps Dev Cen
- Associate Dir (Army), Navy Sp Devices Cen
- CONARC LNO's
  - Bell Telephone Lab
  - Redstone Arsenal
  - Jet Propulsion Lab, CIT
- British; Canadian; and Marine LNO's, CONARC

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ARMY FIELD FORCES

REPORT
of
Board No. 4 OCAFF Project No. [illegible]

[illegible]

28 JAN [illegible]

TABLE OF CONTENTS ATTACHED AS A FOLD-OUT TO BACK COVER

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BOARD NUMBER 4 (8576 DU)
OFFICE, CHIEF OF ARMY FIELD FORCES
Fort Bliss, Texas

PARTIAL REPORT OF PROJECT NR GM-651
FIRST PARTIAL REPORT OF TEST NUMBER 73
TEST OF NIKE I TARGET RADAR DISCRIMINATION

1. Authority

a. Directive: Letter, ATDEV-9, 471.94/152(C) (21 Sep 51), OCAFF, 21 Sep 51, subject: "Army Field Forces User Test of the NIKE I Surface-to-Air Missile System".

b. Purpose: To determine the ability of the target tracking radar to discriminate between two targets in range, in azimuth, and in elevation.

2. References

a. NIKE Technical Manual Nr 1, GMS, XSAM-A-7, Overall System Operation, dated 8 December 1952.

b. NIKE Technical Manual Nr 2.3, GMS, XSAM-A-7, Guidance and Control Equipment, GS 15502 - Vol III, dated 3 October 1953 (Revised).

3. Description of Material

a. The NIKE I target tracking radar is an X-band radar operating at a frequency of 8500-9600 megacycles with a maximum peak power output of from 250 to 400 kilowatts. The pulse repetition frequency is 1000 pulses per second, and its half power beamwidth is 21 mils.

b. This radar is a monopulse radar system which obtains position information from every transmitted pulse. A four feedhorn system coupled with hybrid tees (in the waveguide plumbing) generates signals of sum, azimuth difference, and elevation difference. The sum signal is used mainly for determining target range, while the azimuth and elevation difference signals are used to position the antenna system.

4. Background

a. The ability of the target tracking radar to discriminate between two or more targets should be a factor in determining the location of NIKE I firing batteries in a defended area. For example, if the radar has poor discrimination in azimuth, a group of planes flying abreast on an incoming course could not be individually distinguished. However, a radar on a line with the formation could distinguish each plane in range even though they were at the same azimuth and elevation. This situation occurred

[redacted]

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during the multiple target tests which were conducted in the fall of 1953 at White Sands Proving Ground. It was observed that the planes of a formation flying abreast of each other at a spacing of 400 feet and approaching a particular NIKE I fire unit could not be distinguished until they were within approximately 6000 yards of the target tracking radar. However, another NIKE I fire unit, situated some eight miles to the east of the first was able to discriminate in range at a range of 50,000 to 60,000 yards.

b. Informal conversation with Contractor's representatives has indicated that a theoretical range discrimination of from 50-75 yards and an angular discrimination of approximately 20 mils should be expected. However, up to this time, no specific tests have been made to determine accurately the degree of target discrimination for the NIKE I system.

5. <u>Summary of Tests</u>

a. Method:

(1) The target tracking radar of NIKE I Set Number 4 at Dona Ana Range Camp was used for this test. Two B-26 Type aircraft were employed as targets for determining the degree of discrimination of this radar.

(2) Courses were set up so that the degree of discrimination in each coordinate could be determined. For details of the tests and the courses flown, see Appendix A, Details of Tests.

(3) While flying these courses, separation between the two aircraft was varied in one of the three coordinates. The target tracking radar locked on one target, and as the separation between the two aircraft decreased, it was found that the target radar jumped from one target to the other at a certain critical spacing. Boresight cameras were used to determine the exact angular separation of the two aircraft when the target radar jumped from one to the other. To determine range discrimination, a Tektronix 511AD oscilloscope was connected to the range circuits, and photographs were made to determine the separation of target pips when the jump occurred.

b. Results

	SEPARATION FOR DISCRIMINATION		
Coordinate	50% prob of disc	90% prob of disc	Stand Dev
Range	61 yds	77 yds	15.4 yds
Azimuth	19 mils	23 mils	3.4 mils
Elevation	20 mils	26 mils	3.3 mils

[redacted]

[redacted]

6. <u>Discussion</u>

a. Inasmuch as the NIKE I target tracking radar is a monopulse system, and since the test results approximate contractor estimates of the beam-width at the half-power points, it was assumed that discrimination was independent of range obviating the necessity of running additional tests.

b. The results of this test, though performed on only one NIKE I system, confirm estimates obtained informally from the Contractor as to the degree of discrimination.

c. It was found from the original data, that no significant difference in the degree of discrimination exists when tracking the lead or lag, left or right, or upper or lower plane.

7. <u>Conclusions</u>: This Board concludes that the above data are representative of the degree of discrimination of the NIKE I system.

8. <u>Recommendations</u>: This Board recommends that:

a. The above data be considered in the development of tactical doctrine and techniques for combat use of NIKE I.

b. This data be considered in the design and development of future warheads for use against formation type targets.

APPENDICES
A - Details of Tests
B - Def & Sugg Mod (None)
C - Photos and Charts (None)
D - Coordination

[illegible] H. BENDER
Colonel, Artillery
President

[redacted]

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[redacted]

BOARD NUMBER 4 (8576 DU)
OFFICE, CHIEF OF ARMY FIELD FORCES
Fort Bliss, Texas

PARTIAL REPORT OF PROJECT GM-651

DETAILS OF TESTS

1. Purpose: To determine the ability of the target tracking radar to discriminate between two targets in range, in azimuth, and elevation.

2. Method

a. Range Discrimination

(1) Description of Course: Two B-26 target aircraft flew an incoming course radial to the target radar at a range of approximately 10,000 yards, one aircraft following the other. The trailing aircraft slowly opened and closed the range separation between the two aircraft as directed by the test officer. During successive courses, the target radar tracked the leading aircraft part of the time, and the trailing aircraft part of the time.

(2) Instrumentation: The range video information was displayed on a calibrated Tektronix 511AD oscilloscope. Continuous photographs were taken of the scope to determine the distance between target pips when the target radar jumped from one target to the other. The scope sweep was adjusted for ±100 yards, accurately readable to ±5 yards. Range discrimination was considered lost when the center of the range notch moved away from the aircraft being tracked, toward the second aircraft. The separation in range just prior to loss was considered the minimum range discrimination. Nineteen successful courses were run: thirteen on the lead plane, and six on the lag plane. A more even distribution on lead and lag planes was not obtained due to many of the course films being unreadable.

b. Azimuth Discrimination

(1) Description of Course: Two B-26 target aircraft flew a circular course at a range of 10,000 yards from the target radar, one following the other. The separation between the aircraft was varied as above, with each plane being tracked during part of the courses.

(2) Instrumentation: Boresight cameras were used on the target tracking radar whose angular field of view was accurately calibrated. The angular separation between the two aircraft at the time when the radar left the target it was tracking was measured. Twenty eight successful courses were run: fourteen on the right aircraft and fourteen on the left.

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c. Elevation discrimination

(1) Description of Course: Two B-26 target aircraft flew a circular course at ranges of 10,000 and 20,000 yards from the target radar, one plane above the other. The vertical distance between them was varied as above, with each plane being tracked during part of the courses.

(2) Instrumentation: Boresight cameras were used as above, with sixteen successful courses being run, eleven tracking the lower plane and five tracking the upper plane.

3. Results: The discrimination separations as determined by the above tests are detailed below:

	SEPARATION FOR DISCRIMINATION		
Coordinate	50% prob of disc	90% prob of disc	Stand Dev
Range	61 yds	77 yds	15.4 yds
Azimuth	19 mils	23 mils	3.4 mils
Elevation	20 mils	26 mils	3.3 mils

[redacted]

[redacted]

BOARD NUMBER 4 (8576 DU)
OFFICE CHIEF OF ARMY FIELD FORCES
FORT BLISS, TEXAS

PARTIAL REPORT OF PROJECT NR GM-651

FIRST PARTIAL REPORT OF TEST NUMBER 73
TEST OF NIKE I TARGET RADAR DISCRIMINATION

COORDINATION

The draft report of test was circulated to various commands and agencies for comment and recommendations.

a. Concurrences were received from the following:

(1) Assistant Commandant, AA&GM Branch, the Artillery School, Fort Bliss, Texas.

(2) Commanding General, 1st Guided Missile Brigade, Fort Bliss, Texas.

(3) Marine Corps Development Center Liaison Officer, Board Nr 4, OCAFF, Fort Bliss, Texas.

(4) Canadian Liaison Officer, Board Nr 4, OCAFF, Fort Bliss, Texas.

b. General Comments. British War Office, through British Liaison Officer, Board Nr 4, OCAFF, Fort Bliss, Texas.

(1) Comment:

"(a) It is noticed from the Partial Report of Test that the tests in discrimination, both in range and angle, were carried out at ranges approximately 10,000 yards from the tracking radar, the longest range, that of 20,000 yards, being used only in the elevation discrimination test.

(b) As the maximum intercept range of the system has been stated as being approximately 50,000 yards, it is considered that further tests at ranges of this order should be carried out."

(2) Board Reply: Reference is made to paragraph 6a in the Main Body of the Report of Test, wherein it is stated that, "it was assumed that discrimination was independent of range obviating the

[redacted]

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necessity of running additional tests". Observation of other tests at longer ranges has borne out the stated assumption.

(3) To date, no reply has been received from the Commanding General, White Sands Proving Ground, Las Cruces, New Mexico, on the Tentative Partial Report of Test. Comments will be forwarded if a Board reply is deemed applicable.

[redacted]

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Lt Col Colw ll/amh

21 APR 1955

[illegible] 413.44

SUBJECT: Procurement of Remote Indicators for AN/TPS-1D Radars in Use by the Antiaircraft Command

TO: Chief Signal Officer
Department of the Army
Washington 25, D. C.

1. This command has in use at the present time ninety-four (94) AN/TPS-1D radars to perform air surveillance for the various defense groups. In this regard, the importance of the role performed by these AN/TPS-1D radars in this command cannot be overemphasized. Generally, each radar is operated continuously for eight or more hours and, by operating during various portions of the 24-hour day, each defense has continuous air surveillance.

2. This command has determined that radar operator fatigue is a factor which influences to a great extent antiaircraft defense effectiveness. The PPI scope of the AN/TPS-1D radar which is small (approximately seven inches) is the greatest contributing cause of radar operator fatigue.

3. Recently, a ten-inch remote indicator (PPI) was purchased from the [illegible] Corporation and sent to Board Number 4 at Fort Bliss for evaluation. This indicator is a commercial product and is currently in [illegible]. [illegible] it can be procured for approximately [illegible] per unit, which is considerably less than the cost of [illegible] remote indicators. Board Number 4 tests have proven that the [illegible] is reliable, and this command believes the indicator, which [illegible] the designation of IP-[illegible]/UP, will greatly increase surveillance radar effectiveness.

4. Minor modifications are required in this commercial model to render it suitable for military (ARAACOM) use. They are as follows:

a. The reflection plotter must be of plain material instead of the present [illegible].

b. [illegible] must be equipped for IFF presentation.

c. A [illegible] must be provided for dimming the illumination of the [illegible].

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

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[illegible] 032357Z MAR 1955 CONFIDENTIAL

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[illegible]

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C

[illegible] 1st Brig and CG[illegible], requesting [illegible] as above new [illegible].

[illegible] See att msg.

[illegible] After 1 Sep 55.

[illegible] Material.

[illegible] None.

[illegible] Copies Furnished:

None

Prepared By: Charles L. Bartlett
(Signature)

Capt, SigC 2254
(Rank) (Ext)

Action Completed:
File: [illegible] 1 Mar 55
(Initials) (Date)

HEADQUARTERS
ARMY ANTIAIRCRAFT COMMAND
Ent Air Force Base
Colorado Springs, Colorado

ADOAA-S 311.24

MAR 12 1955

SUBJECT: Continuous Activation of the Tactical Teletypewriter Network

TO: Commanding General, Western Army Antiaircraft Command, Fort Baker, California
Commanding General, 1st Antiaircraft Regional Command, Fort Totten 59, New York
Commanding General, 2d Antiaircraft Regional Command, Fort George G. Meade, Maryland
Commanding General, 5th Antiaircraft Regional Command, Fort Sheridan, Illinois
Commanding General, 53d AAA Brigade, Ravenna Arsenal, Apco, Ohio
Commanding Officer, Central Army Antiaircraft Command, Grandview Air Force Base, Grandview, Missouri

1. Reference message, this headquarters, 5650 ADOAA-S, dated 8 March 1955.

2. Recent events have indicated the necessity for a review of the operating hours of the tactical teletypewriter network of this command. These events may be summarized as follows:

a. The inability of this headquarters to alert its subordinate units, direct and by message, in less than forty-five (45) minutes during periods when the network is inactive.

b. The desire of major field commanders to have a continuous means of message communication with their subordinate commands.

d. The relatively high cost for obtaining short periods of continuous activation for exercises.

e. The increase in message traffic within the command during the past year.

3. A study of recurring charges indicated that this command could obtain four times the number of activated hours for twice the cost through continuous activation. By further adjusting this difference in cost by the charge for the monthly exercise, it becomes obvious that continuous activation is economically sound.

ADOAA-S 311.24
SUBJECT: Continous Activation of the Tactical Teletypewriter Network

4. It may appear that continuous activation will require additional communication personnel. This headquarters does not believe additional personnel will be required. This belief is predicated on the following:

a. Daily traffic within a brigade or regional area can be moved within an eight-hour, or less, period as is presently being done. This eight-hour period can be the same as the normal working day.

b. During other periods the machines can be left unattended. The alarm feature can be used in case of priority or other traffic which must be moved. In this connection, the present one-way alarm feature will be made to operate in both directions. This change will be made on all circuits from brigades or regions to their defenses, as well as from Central Army Antiaircraft Command to its subordinate units.

c. The present cryptographic system does not require a crypto clearance for operation. Teletypewriters are not difficult to operate. All units can train clerk-typists to operate the teletype and cryptographic equipment. Duty officers should be made familiar with the communication system.

d. The Communications Centers of this headquarters, Western Army Antiaircraft Command, and the Army Antiaircraft Command Relay Center are presently manned on a continuous basis. Therefore, as long as daily traffic is confined to an eight- or ten-hour period, no additional personnel are needed at these locations. The reason for confining daily traffic to this one period is to make it possible to have minimum manning during the remainder of the 24 hours.

5. This headquarters has requested continuous activation of the entire tactical teletype network, starting at 1100 zebra on 15 March. This continuous activation will be observed over a four-month period. At the end of this period, all major commands will be solicited for comments and suggestions on further changes required to improve the tactical communication picture between units.

6. It is requested that all commanders make maximum use of the new hours of operation. The teletype should replace the long distance telephone whenever possible. Local exercises are encouraged. Conferences between staff members at different headquarters over the teletype could save both time and effort.

BY COMMAND OF LIEUTENANT GENERAL MICKELSEN:

E. T. ASHWORTH
Colonel, GS
Chief of Staff

Copy furnished:
OIC ARAACOM Relay Center

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MEMORANDUM FOR RECORD

8 Mar 55
(Date)

Subject: Continuous Actv of the TT Network

REFERENCES AND BACKGROUND INFORMATION:

1. Ref msg, this hq, 5650 ADOAA-S, dtd 8 Mar 55.

2. By ref msg, this hq notified the maj fld comds of continuous actv of the teletype ckt, 24-hrs per day, 7-days per week, starting 151002 Mar. They were informed that a ltr would fol containing instructions and info for their guidance.

3/10

ACTION REQUIRED: See att ltr to maj fld comds.

ACTION TAKEN: (Summarize) See att ltr.

0188449

ECT NAME
Signal

SUSPENSE DATE

NUMBER

DATE
8 Mar 55

TYPE LTR

FILE DESIGNATION
ADOAA-S 311.24

MARY
maj fld comds -
ubj: "Continuous Actv of the TT Network"

TO CG	TO	TO	TO
DATE	DATE	DATE	DATE

55

ED OR INDORSED TO | FILED (Place) | OTHER ACTION

3/10

Coordination:

G3

Copies Furnished:

G3 Policy File
AG

Prepared By: Colwell
(Signature)

Lt Col, SigC 2253
(Rank) (Ext)

Action Completed:
File: ______ 8 Mar 55
(Initials) (Date)

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HEADQUARTERS
ARMY ANTIAIRCRAFT COMMAND
Ent Air Force Base
Colorado Springs, Colorado

ADOAA-S 311

8 February 1955

SUBJECT: Use of Organic and Fixed Plant Cable, Guided Missile Batteries (NIKE)

TO:
Commanding General, Eastern Army Antiaircraft Command, Stewart Air Force Base, Newburgh, New York
Commanding General, Western Army Antiaircraft Command, Fort Baker, California
Commanding General, 1st Antiaircraft Regional Command, Fort Totten 59, New York
Commanding General, 2d Antiaircraft Regional Command, Fort George G. Meade, Maryland
Commanding General, 5th Antiaircraft Regional Command, Fort Sheridan, Illinois
Commanding General, 53d AAA Brigade, Ravenna Arsenal, Apco, Ohio
Commanding Officer, Central Army Antiaircraft Command, Grandview Air Force Base, Grandview, Missouri

Inclosed letter from Office of the Chief Signal Officer, dated 25 January 1955, subject as above, is forwarded for your information and guidance.

BY COMMAND OF LIEUTENANT GENERAL MICKELSEN:

J C Chandler
J. C. CHANDLER
Major, AGC
Adjutant General

1 Incl
Ltr, SIGAN, dtd
25 Jan 55, w/1 Incl
(4 Copies)

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DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF SIGNAL OFFICER
WASHINGTON 25, D. C.

SIGAN

25 January 1955

SUBJECT: Use of Organic and Fixed Plant Cable, Guided Missile Batteries (NIKE)

TO: Commanding Generals
Continental Armies (Except Fourth Army)
Military District of Washington

ATTENTION: Signal Officers

1. Reference is made to letter, file SIGAN-5, this office, 18 March 1954, subject: "Communications for Guided Missile Units."

2. The Department of Army policy with respect to the use of organic cables or a fixed plant cable between the launcher and control areas of guided missile batteries (NIKE) is as follows:

a. Organic cables will be used where practicable and not prohibitively expensive. The voice channels contained in the organic cables will be backed by field wire and two voice radio channels. The backup channels will be established using equipment available under existing unit TOE's and TA's of the Army Antiaircraft Command.

b. A fixed plant cable will be installed where organic cables can not be used for reasons outlined herein. The fixed plant cable will be backed by wire voice circuits where practicable, and in all instances, by voice radio equipment available under unit TOE's and TA's of the Army Antiaircraft Command.

3. Details for implementing the subject policy are outlined in inclosure 1.

FOR THE CHIEF SIGNAL OFFICER:

Walter B Larew
WALTER B. LAREW
Brigadier General, USA
Chief, Army Comm Svc Div

1 Incl
Implementation of Intra-Battery Cabling Policy

Copies furnished:
CG, AAA Command, ATTN: SigO
Chief, Army Field Forces
CG, Fourth Army, ATTN: SigO
CG, AAGM, Ft Bliss, Texas
CG, Redstone Arsenal, Huntsville, Ala.
President, AFF Board 4, Ft Bliss, Tex.
Chief, P & O Div, OCSigO, DA

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IMPLEMENTATION OF INTRA-BATTERY CABLING POLICY

1. Responsibility for Implementation of Policy.

The Department of the Army has directed that the Chief of Engineers and the Chief Signal Officer issue the necessary instructions required to implement the policy covered in broad terms in the basic letter. These instructions are detailed in the paragraphs that follow.

2. Definition of Terms.

a. Organic Cables. Those cables which extend from the data junctio box at the battery control van to the data junction box at the launcher contro van. These cables consist of one spiral four rubber-covered cable (CX-162/G-SigC) and two five-pair rubber-covered cables (CX-162/G-SigC). These meet the intra-battery requirement for three voice circuits, eight direct current signalling circuits, and two four-hundred-cycle data circuits, thereby permitting au matic operation of the NIKE system.

b. Fixed Plant Cable. A single fixed plant type cable containing a minimum of seven quads used in lieu of the three organic rubber-coveréd cables mentioned in paragraph 2a. above.

3. Determining Whethor to Use Organic Cables or a Fixed Plant Cable.

This determination will be made on an individual site basis by the Army Signal Officer acting in conjunction with representatives of the Army Antiaircraft Command. If a fixed plant cable is selected, the CG, Redstone Arsenal or his désignated representative will be requested to furnish appropriate technical clearance that system specifications will be met by the proposed installation. In determining whether to use organic cable or fixed plant cable, the following should be used as a guide:

a. Use organic cables where practicable or not prohibitively expensive. "Where practicable" is interpreted to mean:

(1) That the cables are not unusually subject to sabotage, damaged by small arms fire, brush fires, farm implements, or similar hazzards which might result in cable damage.

(2) That terrain features are suitable for installation of organic cables.

(3) That weather conditions will not result in rapid deterioratio of cables.

(4) That troop labor is available to install the cables.

NOTE: Prohibitively expensive is construed to mean that the cost of installing and maintaining organic cables for a period of ten years is comparable t charges for installing and maintaining a fixed plant cable over the same period of time.

7.

SUBJECT: Implementation of Intra-Battery Cabling Policy

b. Use a fixed plant cable where organic cables can not be installed for the reasons outlined in paragraph 3a above. This cable should be installed and maintained by the telephone company on a leased basis or may be government-owned and maintained. The Army Area Signal Officer will make this determination.

4. <u>Installation of Organic Cables.</u>

Where it is determined that organic cables are to be used, installation and maintenance will be performed by using troops. Army Area Signal Officers will assist as required in determining the most suitable cable route and advise the District Engineer as early as possible of the route selected so that rights-of-way, as required, can be obtained.

5. <u>Installation of Fixed Plant Cable.</u>

a. It is recommended that tape armored cable be used and the cable buried between the control and launcher vans. Where conditions dictate aerial construction, it is recommended also that tape armored cable be used.

b. The cable between the two vans will be used only to meet the requirements for the circuits specified in paragraph 2a. preceding.

c. When dual battery operation is planned, separate cables will be installed between vans, the same as for two separate batteries (information on dual sites should be obtained from the Army Antiaircraft Command representatives).

d. When a decision is made to lease a fixed plant cable, the Army Area Signal Officer will determine the most suitable cable route and will issue necessary orders to the telephone company as far in advance as possible for installation of the facility. As soon thereafter as practicable, the telephone company should be requested to advise whether the obtainment of rights-of-way by the Government is required. If so, the District Engineer should be notified immediately of rights-of-way to be acquired.

6. <u>Charges for Fixed Plant Cable.</u>

MCA funds available to the District Engineer will be sub-allotted to the Army Area Commander to cover the costs of installing fixed plant cables. To obtain these funds, the Army Area Signal Officer will submit to the appropriate District Engineer as early as possible estimated costs for installing these cables. These estimates should be accompanied with supporting justification. Monthly charges for leased facilities will be paid from Army area 3900 funds.

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SUBJECT: Implementation of Intra-Battery Cabling Policy

7. Fixed Plant Cable Terminations.

The cable will terminate within ninety feet of the battery control and launcher control vans in a weather-proof cable terminal box. This box is to be equipped with connectors matched to interconnect with the same type of plugs associated with the spiral four and the five-pair cables issued with the system. The telephone company will provide the terminal box and connectors. To extend the circuits from the cable terminal box to the data junction box on the side of the van, 100 feet sections of spiral four and five-pair cables with the appropriate plugs must be used in lieu of the 1,000 ft and quarter-mile sections issued with the system. To obtain the 100 ft lengths of cable, requisitions should be placed by AAA Command representatives on the Signal Corps Supply Agency, Philadelphia. By using the short lengths of cable, no modifications to data junction boxes are required.

[redacted]

9

IMPLEMENTATION OF INTRA-BATTERY CABLING POLICY

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[redacted]

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[redacted]

SUBJECT: Implementation of Intra-Battery Cabling Policy

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[redacted]

MEMORANDUM FOR RECORD

File Number: ADOAA-S

4 Feb 55
(Date)

Subject: Use of Organic and Fixed Plant Cable, GM Btries (NIKE)

REFERENCES AND BACKGROUND INFORMATION:

CSigO, in ltr SIGAN, subj as above, dtd 25 Jan 55, has established policy with respect to use of organic cables or fixed plant cable between launcher and control areas of gm btries (NIKE)) Details for implementing the subj policy are outlined in the Inclosure attached thereto.

CEN FILES

ACTION REQUIRED: Send copies of CSigO's ltr with incl to all maj fld comds for their info and guidance.

ACTION TAKEN: (Summarize) See att ltr.

RECORD EVALUATION:

____ Temporary - Destroy After __________

____ Semi-Permanent - Return For Review After __________

x Permanent Record Material. __________

BUDGETARY AND FHD IMPLICATIONS None.

Coordination: Copies Furnished:

G-3 PP+O Staff Distr Prepared By: Charles F. Bachtel
(Signature)

G-3 [illegible]

Capt Bachtel, SigC 2254
(Rank) (Ext)

Action Completed: 4 Feb 55
File: [illegible]
(Initials) (Date)

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HEADQUARTERS
ARMY ANTIAIRCRAFT COMMAND
Ent Air Force Base
Colorado Springs, Colorado

TRAINING MEMORANDUM
NUMBER 1

9 February 1955

ANNUAL ARMY ANTIAIRCRAFT COMMAND TRAINING PROGRAM

SECTION I

GENERAL

1. Purpose: This Training Memorandum prescribes the training required by this and higher headquarters for Antiaircraft units assigned to this command in order to attain the ultimate in proficiency in fulfilling requirements for the maximum air defense of the United States.

2. Objectives:

a. For all Army Antiaircraft Command units:

(1) To train personnel and maintain unit operating efficiency and combat effectiveness at the highest peak in performance of assigned missions.

(2) To organize and train personnel to function as a team.

(3) To conduct continuous training of key specialists and cadres so as to develop and maintain an adequate mobilization base as a foundation for a rapid expansion in the Armed Forces during periods of emergency.

(4) To develop required standards of organizational repair and maintenance of unit equipment so as to maintain all tactical equipment at one hundred percent of its operational capability.

b. For Special Category and High Priority units assigned the Army Antiaircraft Command, in addition to the requirements outlined in 2a above:

(1) To test and improve standing operating procedures for RSOP, preparation for overseas movement, and tactical requirements.

(2) To maintain units capable of being deployed and operating effectively as a part of a field Army.

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subject matter becomes available to the using organizations in official training publications issued by this headquarters, Department of the Army or other appropriate agencies. Expiration dates will normally be assigned Training Circulars; if not assigned, circulars will be considered effective until rescinded or superseded. Distribution normally will be made only to major antiaircraft field commands.

6. Organizations of this command will also make use of pertinent training publications issued by other appropriate headquarters.

7. Training publications of this headquarters published prior to 1955 which are currently in effect, are listed in Training Memorandum Number 2, this headquarters, dated 9 February 1955, and Training Circular Number 1, this headquarters, dated 10 January 1955.

SECTION III

TRAINING REQUIREMENTS

8. Requirements: The following minimum training requirements in subjects are established as a guide. Modification may be required based on availability of funds and on local weather, terrain and range facilities. Units in tactical positions will accomplish these requirements in such a manner as to minimize interference with their assigned air defense mission.

a. Annual requirements: (All ARAACOM units, including Special Category units and High Priority units).

(1) Army Training Test (Tactical Phase is omitted except for Special Category and High Priority units).

(a) Annually, each major antiaircraft field command will cause the appropriate Army Training Test (less tactical phase) to be administered to each Table of Organization and Equipment unit of their respective command. This headquarters has authority to postpone scheduled Army Training Tests for units concerned when unfavorable personnel situations exist in those units. This authority is not further delegated. When it is evident that postponement of scheduled tests will permit their administration under a more favorable personnel situation, unit commanders may submit requests through command channels to this headquarters for postponement of tests. Requests should include tentative date that unit will be ready to have tests administered.

(b) This headquarters will be notified at least thirty-five days prior to the date training tests are scheduled. Notification will include unit, place, phase of test and date (RCS ADCAA-3T-35). Inasmuch as conduct of the firing phase of training tests is dependent upon weather, range space, target availability and other similar conditions, notification of this phase not required thirty-five days in advance. It is requested, however, that s headquarters be notified as soon as firm dates have been established.

annually. When this adverse situation exists, permission is granted major field commanders to reduce the requirement to two practices annually for those units concerned.

(a) Twenty percent of all courses will be incoming for all gun batteries, if safety conditions permit.

(b) Service practices will be conducted in accordance with Training Memorandum 4, 13 and 28, this headquarters, 1953 series.

(c) Where climatic conditions and adequacy of ranges permit, each gun unit will conduct antiaircraft artillery record service practice once each four months, insofar as practicable.

(d) Antiaircraft units must maintain a capability to conduct effective fire under all weather conditions. Ability of personnel and equipment to function effectively under varying weather conditions must be the subject of frequent tests and will be given constant attention by commanders. However, prolonged absence of units from their on-site tactical positions while awaiting suitable weather to permit conduct of service practices at ranges will be avoided. Commanders will, prior to moving units to firing ranges, determine insofar as possible from seasonal weather conditions, forecasts, and past experience that absence from defense positions will not be excessive.

(e) When withdrawing batteries from tactical positions to participate in service practices, commanders will insure that a balanced defense is maintained at all times. The number of 90mm and 120mm batteries withdrawn will be compatible with retention of an effective defense. Only one battery of a 75mm battalion will be withdrawn at any one time to conduct a service practice.

(f) Use of common equipment for all service practices is authorized. When it becomes necessary to determine muzzle velocities for new lots of ammunition, organic equipment may be used; however, not more than one service practice a year is authorized with organic equipment.

(4) Two joint air defense exercises will be conducted annually from unit on-site positions of each defense area. At least one of these will be conducted by this headquarters.

b. Annual requirements for Special Category and High Priority type units in addition to those in paragraph 8a above are as follows:

(1) Army Training Test—Tactical Phase (scheduling, reporting, conduct, etc., as outlined in paragraph 8a(1) above for Army Training Tests, apply). A minimum of two gun batteries, where available, will also participate in the tactical phase of the test of a Battalion Headquarters and Headquarters Battery. Firing batteries to be withdrawn from tactical positions for field exercises will be so selected as to leave the best possible balanced defense. Major antiaircraft field commanders may, in certain cases, authorize

d. Weekly requirements:

(1) Artillery and Guided Missile (SAM) Drill and Tracking:

(a) Ten hours of radar tracking. On-the-job training and individual instruction will be given during this time.

(b) Two hours of coordinated artillery and guided missile (SAM) drill for the entire firing battery. These drills may be conducted during and in conjunction with the scheduled weekly Command Post Exercises, sub-paragraph 8d(8) below.

(2) Individual artillery and guided missile (SAM) instruction or section training:

(a) Ten hours will be devoted to artillery and guided missile (SAM) instruction for all firing personnel.

(b) Ten hours individual training will be given personnel in all other tactical and administrative sections.

(c) Five hours will be devoted to the training of all administrative personnel as alternates in specific key tactical positions.

(3) A minimum of ten hours of organizational maintenance to include normal daily "equipment stables."

(4) One hour of intelligence training. This training will encompass counter-guerrilla operations and anti-infiltration actions.

(5) Five hours of physical training except during field training periods.

(6) One hour ceremony such as formal inspections or retreat formations.

(7) One undivided hour of Troop Information and Education to be conducted during normal training hours.

(8) Two (2) one (1) hour Command Post Exercises to be conducted by this headquarters. This activity will be conducted during the normal hours of activation of the ARAACOM Tactical Teletype network.

e. A minimum of two hours tactical training per week will be scheduled during the hours of darkness. Periods when units participate in scheduled or non-scheduled battle station situations during the hours of darkness, will suffice in fulfilling this requirement.

f. Training in items listed in paragraphs 8c(3), (4) and (5) is of secondary importance to other training requirements listed in paragraph 8c.

*f. "Instruction in the Geneva Convention of 1949" will be presented to all personnel as directed in Department of the Army Training Circular 22, 26 July 1951. Department of the Army Pamphlet 20-141 will be used as a guide.

*g. Personnel of all units will be fully qualified in battle indoctrination training requirements for overseas service (POR). The provisions of Training Memorandum Number 24, this headquarters, 11 June 1953, will apply. Training charts will reflect the correct status of all individuals relative to these requirements.

*h. Military Justice training will be conducted for personnel who have not successfully completed courses prescribed by Department of the Army Training Circular Number 12, 16 April 1951.

*i. Orientation of enlisted personnel being released from active service. Department of the Army Pamphlet 20-139, "Separation Series," December 1951, will be used as the basis in presenting this orientation. Presentation will be made before the soldier leaves for a separation center or before beginning separation processing at a post, camp, or station and will not be a part of the separation processing.

*j. "Military Aspects of Psychological Warfare Training" will be conducted as prescribed in Training Memorandum Number 26, this headquarters, 3 August 1953.

*k. Cold weather indoctrination training applicable to personnel of this command will be conducted in accordance with Training Memorandum Number 6, this headquarters, 3 March 1952.

*l. Training in artificial respiration will be conducted as outlined in Department of the Army Field Manual 21-11, 8 March 1954, subject: "Artificial Respiration."

m. Air movement training will be conducted by Special Category and High Priority units of this command, as prescribed in Training Memorandum Number 19, this headquarters, 30 January 1953.

n. Mine warfare training will be conducted by all units of this command in accordance with Training Memorandum Number 2, this headquarters, 5 January 1953.

o. Military history indoctrination plan training will be accomplished in accordance with Training Memorandum Number 23, this headquarters, 25 February 1953.

*p. Evasion and escape training (phase I) will be conducted in accordance with Training Circular 23, Department of the Army, 3 November 1954.

SECTION V

MISCELLANEOUS

11. School Training:

a. Unit Schools:

(1) All officers up to and including the grade of Lt Colonel, assigned to 75mm, 90mm or 120mm units should be required to attend a two-hour weekly course in a Unit Gunnery as indicated in Training Memorandum Number 4, this headquarters, dated 9 February 1955.

(2) All officers assigned to a Guided Missile Battalion should attend a two-hour weekly refresher training course in Guided Missiles as indicated in Training Memorandum Number 4, this headquarters, dated 9 February 1955.

(3) Unit schools for enlisted personnel are indicated in Training Memorandum Number 4, this headquarters, 9 February 1955, should not be interpreted to limit the conduct of training schools and refresher training desired by the unit commander.

b. Service Schools:

(1) Maximum utilization will be made of school quotas by maintaining as many students as practicable in attendance at service schools in order to fill appropriate job positions with school trained specialists and to adequately train personnel nominated for cadre positions which require school training. Training Memorandum Number 18, this headquarters, dated 9 February 1953, (to be revised) will be utilized as a guide for scheduling attendance at service schools.

12. Training Status of General Reserve Units: Data from these reports are used by CONARC in keeping the Chief of Staff, U.S. Army, informed of the status of training and operational readiness of General Reserve Units. Reporting unit commanders and their respective higher headquarters will insure that these reports are carefully prepared to reflect, as accurately as possible, the true training and operational status of the units. Training Memorandum Number 6, this headquarters, 9 February 1955, will be used as a guide in preparing these reports.

SECTION VI

REFERENCES AND SUPERSESSIONS

13. References:

a. Training Memorandum 4, Army Field Forces, 19 March 1953.

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b. Training Memorandum 5, Army Field Forces, 11 March 1953.

14. Supersessions: Training Memorandum Number 2, this headquarters, 5 February 1954, subject: "Annual Army Antiaircraft Command Training Program."

BY COMMAND OF LIEUTENANT GENERAL MICKELSEN:

E. T. ASHWORTH
Colonel, GS
Chief of Staff

OFFICIAL:

J. C. CHANDLER
Major, AGC
Adjutant General

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San Francisco, Calif.

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HEADQUARTERS
ARMY ANTIAIRCRAFT COMMAND
Ent Air Force Base
Colorado Springs, Colorado

CHANGE 2
TRAINING MEMORANDUM
NUMBER 1

5 July 1955

ANNUAL ARMY ANTIAIRCRAFT COMMAND TRAINING PROGRAM

Training Memorandum Number 1, this headquarters, subject: "Annual Army Antiaircraft Command Training Program," dated 9 February 1955, is changed as follows:

* * * * * *

SECTION III

TRAINING REQUIREMENTS

8. Requirements:

* * * * * *

(f) (Superseded) Use of common equipment for service practices is authorized. However, at least one service practice a year will be conducted with organic equipment.

* * * * * *

BY COMMAND OF LIEUTENANT GENERAL MICKELSEN:

E. T. ASHWORTH
Colonel GS
Chief of Staff

OFFICIAL:

J. C. CHANDLER
Major, AGC
Adjutant General

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DISPOSITION FORM

SECURITY CLASSIFICATION (If any)

FILE NO.	SUBJECT
ADOAA-3 O&T	Change 2, TM Nr 1

TO C/S FROM G3 DATE 29 Jun 55 COMMENT NO. 1
Maj Genero/jr/2882

1. Par. 8a(3)(f) of Training Memorandum Nr 1, this hq, dated 9 Feb 55, as written, discourages the use of organic equipment during service practices. This policy was placed into effect in early 1954 for economy reasons. Information received from the Budget and Fiscal Section indicates that because of the fewer number gun battalions assigned to the command and because of the relatively small amounts of funds involved this is no longer a problem.

2. From operational, training and maintenance standpoints; it is essential that the units be encouraged to use their organic equipment whenever practicable and in any event at least once each year. The importance of using organic equipment can best be illustrated by the results of a past analysis which was made of 53 battery service practice reports. The reports indicated that 58% of the guns and 78% of the fire control equipment (M33 type) malfunctioned at the firing ranges. Of these percentages 23% of the gun malfunctions and 18% of the AAFCS malfunctions were such that they could only be discovered by actually firing the guns during a service practice.

3. It is recommended that the attached draft of Change 2 to Training Memorandum Nr 1, which changes our policy concerning use of organic equipment at firing ranges, be approved and returned to G3 for finalization.

R.W.H.

2 Incl
1. Draft Change 2, TM Nr 1
2. Cy TM Nr 1

G-3 approved
S.

cG Sau

DD FORM 1 FEB 50 96 REPLACES NME FORM 96, 1 OCT 49, WHICH MAY BE USED [illegible] U. S. GOVERNMENT PRINTING OFFICE [illegible]

D R A F T (Maj Genero/jr/2882

CHANGE 2
TRAINING MEMORANDUM
NUMBER 1

ANNUAL ARMY ANTIAIRCRAFT COMMAND TRAINING PROGRAM

~~[illegible]~~, Training Memorandum Number 1, this headquarters, subject: "Annual Army Antiaircraft Command Training Program," dated 9 February 1955, is ~~rescinded and the following substituted:~~ changed as follows:

* * * * * * * *

SECTION III

TRAINING REQUIREMENTS

8. Requirements:

* * * * * * * *

(f) (Superseded) Use of common equipment for service practices is authorized. However, at least one service practice a year will be conducted with organic equipment.

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BY COMMAND OF LIEUTENANT GENERAL MICKELSEN:

E. T. ASHWORTH
Colonel, GS
Chief of Staff

OFFICIAL:

J. C. CHANDLER
Major, AGC
Adjutant General

DISTRIBUTION:

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HEADQUARTERS
ARMY ANTIAIRCRAFT COMMAND
Ent Air Force Base
Colorado Springs, Colorado

CHANGE 1
TRAINING MEMORANDUM
NUMBER 1

9 June 1955

ANNUAL ARMY ANTIAIRCRAFT COMMAND TRAINING PROGRAM

Training Memorandum Number 1, this headquarters, subject: "Annual Army Antiaircraft Command Training," dated 9 February 1955, is changed as follows:

* * * * * * *

SECTION III

TRAINING REQUIREMENTS

8. <u>Requirements</u>:

Subparagraph d (7) is deleted.

* * * * * * *

SECTION IV

SPECIAL TRAINING

10. Requirements:

* * * * * * *

q. (Added) Troop Information and Education program will be established by Continental Armies. Organizations will comply with directives and policies issued by Continental Armies on this subject.

* * * * * * *

BY COMMAND OF LIEUTENANT GENERAL MICKELSEN:

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OFFICIAL:

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28

HEADQUARTERS
ARMY ANTIAIRCRAFT COMMAND
Ent Air Force Base
Colorado Springs, Colorado

TRAINING MEMORANDUM
NUMBER 1

9 February 1955

ANNUAL ARMY ANTIAIRCRAFT COMMAND TRAINING PROGRAM

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GENERAL

1. Purpose: This Training Memorandum prescribes the training required by this and higher headquarters for Antiaircraft units assigned to this command in order to attain the ultimate in proficiency in fulfilling requirements for the maximum air defense of the United States.

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(3) To conduct continuous training of key specialists and cadres so as to develop and maintain an adequate mobilization base as a foundation for a rapid expansion in the Armed Forces during periods of emergency.

(4) To develop required standards of organizational repair and maintenance of unit equipment so as to maintain all tactical equipment at one hundred percent of its operational capability.

b. For Special Category and High Priority units assigned the Army Antiaircraft Command, in addition to the requirements outlined in 2a above:

(1) To test and improve standing operating procedures for RSOP, preparation for overseas movement, and tactical requirements.

(2) To maintain units capable of being deployed and operating effectively as a part of a field Army.

(3) To continuously maintain personnel in a POR qualified status and to maintain units, in compliance with current directives, ready for overseas movement.

3. Emphasis in Training: The nature of the antiaircraft mission requires that the highest standards of training be achieved and maintained by close command and staff supervision. The mission of training individuals and special category and high priority units to operate in support of a field type army and qualified at all times for overseas service must receive emphasis commensurate with the mission of providing fully trained and completely equipped individuals and units prepared for immediate participation in the air defense of the United States.

4. Additional Training Time: This Training Memorandum prescribes that approximately 37 hours required training be conducted on a monthly basis (paragraph 8c below), and 59 hours training be conducted weekly (paragraph 8d below) for units participating in Post Cycle Training except during field training periods and range firing. The additional training time remaining will be utilized as directed by subordinate commanders. Units newly activated or converted will comply with training requirements as outlined in appropriate ATP's. (ATP 44-300, DA, dated 5 August 1954, will be utilized by Skysweeper and Gun Battalions. ATP 44-370 (tentative), dated 1 May 1953, will be used by NIKE Battalions. A new ATP and ATT for NIKE units will be released to the field during the second quarter of CY 1955).

SECTION II

TRAINING PUBLICATIONS

5. Training data published by this headquarters will be limited to two classifications:

a. Training Memoranda: Permanent or semi-permanent instructions issued by this headquarters, pertaining to training. They will prescribe subjects and hours, scope of training, and list essential references and training aids. Training Memoranda may be used to supplement Training Circulars issued in accordance with 5b, below, as well as other training data issued by Department of the Army and other appropriate agencies. Expiration dates may be assigned training memoranda; if not assigned, memoranda will be considered to be effective until rescinded or superseded. Numbering will be serially during each calendar year. Distribution normally will be made only to major antiaircraft field commands.

b. Training Circulars: Training data of short term application or of such a nature as to be incomplete in coverage of a subject, and thus not considered appropriate for Training Memoranda, will be published in Training Circulars. Training Circulars will contain instructional and informational material relative to training subjects on which no other publications are available. It is emphasized that Training Circulars are instructional and informational only (not directive), and will be rescinded or amended when the

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subject matter becomes available to the using organizations in official training publications issued by this headquarters, Department of the Army or other appropriate agencies. Expiration dates will normally be assigned Training Circulars; if not assigned, circulars will be considered effective until rescinded or superseded. Distribution normally will be made only to major antiaircraft field commands.

6. Organizations of this command will also make use of pertinent training publications issued by other appropriate headquarters.

7. Training publications of this headquarters published prior to 1955 which are currently in effect, are listed in Training Memorandum Number 2, this headquarters, dated 9 February 1955, and Training Circular Number 1, this headquarters, dated 10 January 1955.

SECTION III

TRAINING REQUIREMENTS

8. Requirements: The following minimum training requirements in subjects are established as a guide. Modification may be required based on availability of funds and on local weather, terrain and range facilities. Units in tactical positions will accomplish these requirements in such a manner as to minimize interference with their assigned air defense mission.

a. Annual requirements: (All ARAACOM units, including Special Category units and High Priority units).

(1) Army Training Test (Tactical Phase is omitted except for Special Category and High Priority units).

(a) Annually, each major antiaircraft field command will cause the appropriate Army Training Test (less tactical phase) to be administered to each Table of Organization and Equipment unit of their respective command. This headquarters has authority to postpone scheduled Army Training Tests for units concerned when unfavorable personnel situations exist in those units. This authority is not further delegated. When it is evident that postponement of scheduled tests will permit their administration under a more favorable personnel situation, unit commanders may submit requests through command channels to this headquarters for postponement of tests. Requests should include tentative date that unit will be ready to have tests administered.

(b) This headquarters will be notified at least thirty-five days prior to the date training tests are scheduled. Notification will include unit, place, phase of test and date (RCS ADOAA-3T-35). Inasmuch as conduct of the firing phase of training tests is dependent upon weather, range space, target availability and other similar conditions, notification of this phase is not required thirty-five days in advance. It is requested, however, that this headquarters be notified as soon as firm dates have been established.

Upon completion of each test, or phase thereof, the following report will be submitted (RCS ADOAA-3T-36) to arrive at this headquarters in duplicate within twenty-seven days after completion of the test; in pertinent cases, include explanation of failure to submit this report within the prescribed period of time.

*1. Unit

2. Phase of Test

3. Place of Test

4. Date or Period of Test

5. Score

6. Headquarters Administering Test

**7. Difficulties encountered, to include principle reasons for downgrading from 100%.

**8. Training items to be stressed.

* Reports of Tests for battalions will normally include results of tests for all appropriate batteries of that battalion. However, in the event that all batteries of a battalion do not complete the test or a particular phase thereof within a period of thirty days, reports of individual batteries will be submitted separately.

** Intermediate headquarters processing reports of results of training tests will furnish appropriate comments relative to items 7 and 8 of the report.

(c) An officially administered and satisfactorily completed firing phase of an Army Training Test will be considered as one of the required service practices of a unit. However, a previously conducted record service practice announced only as such cannot be declared afterward to be the firing phase of an Army Training Test.

(2) One annual firing practice for each NIKE battery.

(a) Instructions for service practice by guided missile units are contained in Training Circular Number 2, this headquarters, 10 January 1955, letter ADOAA-3 O&T, Headquarters ARAACOM, 8 November 1954, subject: "Training Firings, Surface-to-Air Guided Missiles at Fort Bliss and White Sands Proving Grounds," and letter ADOAA-4, Headquarters ARAACOM, dated 4 January 1955, subject: "Administrative Instructions, Training Firings, Surface-to-Air Guided Missiles at Fort Bliss and White Sands Proving Grounds."

(3) Three antiaircraft record service practices per gun battery, except when firing must be conducted at ranges where a combination of adverse weather and crowded range conditions preclude the conduct of three practices

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annually. When this adverse situation exists, permission is granted major field commanders to reduce the requirement to two practices annually for those units concerned.

(a) Twenty percent of all courses will be incoming for all gun batteries, if safety conditions permit.

(b) Service practices will be conducted in accordance with Training Memorandum 4, 13 and 28, this headquarters, 1953 series.

(c) Where climatic conditions and adequacy of ranges permit, each gun unit will conduct antiaircraft artillery record service practice once each four months, insofar as practicable.

(d) Antiaircraft units must maintain a capability to conduct effective fire under all weather conditions. Ability of personnel and equipment to function effectively under varying weather conditions must be the subject of frequent tests and will be given constant attention by commanders. However, prolonged absence of units from their on-site tactical positions while awaiting suitable weather to permit conduct of service practices at ranges will be avoided. Commanders will, prior to moving units to firing ranges, determine insofar as possible from seasonal weather conditions, forecasts, and past experience that absence from defense positions will not be excessive.

(e) When withdrawing batteries from tactical positions to participate in service practices, commanders will insure that a balanced defense is maintained at all times. The number of 90mm and 120mm batteries withdrawn will be compatible with retention of an effective defense. Only one battery of a 75mm battalion will be withdrawn at any one time to conduct a service practice.

(f) Use of common equipment for all service practices is authorized. When it becomes necessary to determine muzzle velocities for new lots of ammunition, organic equipment may be used; however, not more than one service practice a year is authorized with organic equipment.

(4) Two joint air defense exercises will be conducted annually from unit on-site positions of each defense area. At least one of these will be conducted by this headquarters.

b. Annual requirements for Special Category and High Priority type units in addition to those in paragraph 8a above are as follows:

(1) Army Training Test—Tactical Phase (scheduling, reporting, conduct, etc., as outlined in paragraph 8a(1) above for Army Training Tests, apply). A minimum of two gun batteries, where available, will also participate in the tactical phase of the test of a Battalion Headquarters and Headquarters Battery. Firing batteries to be withdrawn from tactical positions for field exercises will be so selected as to leave the best possible balanced

the withdrawal of more than two firing batteries of a 90mm battalion after giving due consideration to the capabilities of remaining units to maintain a balanced defense, distance between training areas and defenses, prevailing weather conditions and over-all training requirements. Only in exceptional cases, however, will all firing batteries of Special Category and High Priority units be withdrawn from on-site positions simultaneously. Under no condition will more than two firing batteries of a High Priority and Special Category 75mm battalion be withdrawn from action to participate in field exercises.

(2) One Field Artillery Practice for 90mm units. 75mm units have been excused from fulfilling this requirement until a solution has been resolved to overcome the present difficulties encountered in conducting direct and indirect surface fire.

(3) One Anti-mechanized Practice (required for 90mm and 75mm battalions).

(4) Combined arms exercises will be participated in by Special Category and High Priority units, commensurate with availability of funds, stationing of units, type and frequency of maneuvers and operational requirements. To prepare for this type of exercise, these units will conduct two (2) three to five (3-5) day field exercises stressing reconnaissance, selection, occupation and preparation of positions in simulated support of a field army. Where necessary, major field commanders will effect coordination with Continental Armies concerned. Two RSOP's will be conducted annually even though units do not participate in large scale CONAR field exercises.

c. Monthly requirements: (Applies to all units).

(1) One (1) twenty-four hour Command Post Exercise to be conducted by this headquarters.

(2) Radar tracking of aircraft employing electronic countermeasures as follows:

Defense with: 1-3 battalions, 2 hours with 2 aircraft.
4-6 battalions, 4 hours with 2 aircraft.
7 or more battalions, 6 hours with 2 aircraft.

(3) Two hours of squad tactical training. This training will include the fundamental principles of the triangular organizational concepts, careful analysis and use of terrain, small unit tactics and emphasis on local security.

(4) Two hours training in defense against airborne attack.

(5) One hour character guidance.

(6) Four hours of instruction in the tactics and technique of conducting surface missions for officers and key enlisted men assigned to battalions. This training will consist of classroom instruction and drills from on-site positions.

Training Memorandum Number 1 (Continued) 9 February 1955

d. Weekly requirements:

(1) Artillery and Guided Missile (SAM) Drill and Tracking:

(a) Ten hours of radar tracking. On-the-job training and individual instruction will be given during this time.

(b) Two hours of coordinated artillery and guided missile (SAM) drill for the entire firing battery. These drills may be conducted during and in conjunction with the scheduled weekly Command Post Exercises, sub-paragraph 8d(8) below.

(2) Individual artillery and guided missile (SAM) instruction or section training:

(a) Ten hours will be devoted to artillery and guided missile (SAM) instruction for all firing personnel.

(b) Ten hours individual training will be given personnel in all other tactical and administrative sections.

(c) Five hours will be devoted to the training of all administrative personnel as alternates in specific key tactical positions.

(3) A minimum of ten hours of organizational maintenance to include normal daily equipment stables.

(4) One hour of intelligence training. This training will encompass counter-guerrilla operations and anti-infiltration actions.

(5) Five hours of physical training except during field training periods.

(6) One hour ceremony such as formal inspections or retreat formations.

(7) One undivided hour of Troop Information and Education to be conducted during normal training hours.

(8) Two (2) one (1) hour Command Post Exercises to be conducted by this headquarters. This activity will be conducted during the normal hours of activation of the ARAACOM Tactical Teletype network.

e. A minimum of two hours tactical training per week will be scheduled during the hours of darkness. Periods when units participate in scheduled or non-scheduled battle station situations during the hours of darkness, will suffice in fulfilling this requirement.

f. Training in items listed in paragraphs 8c(3), (4) and (5) is of secondary importance to other training requirements listed in paragraph 8c.

Training in items listed in paragraphs 8d(4), (5) and (6) is of secondary importance to other training requirements listed in paragraph 8d.

SECTION IV

SPECIAL TRAINING

9. Department of the Army Certificate of Training, DA Form 87, January 1949, or mimeographed substitute therefor, will be completed and placed in the Field Military 201 file of those individuals who complete the training requirements marked in this section with an asterisk (*). Training in the items listed under paragraph 10, except paragraphs 10d and 10m, is considered to be of secondary importance to those requirements listed elsewhere in this Training Memorandum (except as indicated in paragraph 8f above).

10. Requirements:

*a. Cost consciousness indoctrination and training in supply and supply economy, and maintenance will be conducted as prescribed in Training Memorandum Number 5, this headquarters, dated 16 January 1953.

*b. Chemical, Biological and Radiological Warfare Training will be conducted as prescribed in Training Memorandum Number 6, this headquarters, dated 17 January 1953.

c. Marksmanship:

(1) High standards of marksmanship for both individual and crew-served weapons must be stressed continuously not only on known distance ranges, but also in field firings when facilities are available. Marksmanship training will be conducted in accordance with Army Regulation 775-10 as changed by Army Regulation 370-5, Table of Allowances 23-100, 16 September 1952, and appropriate field manuals.

(2) Marksmanship competition will be accomplished annually as prescribed in Training Memorandum Number 3, this headquarters, dated 9 February 1955.

d. Safety. Realism in training must be achieved without sacrifice of essential safety factors. Common sense is a basic rule of safety in any training program. Most accidents resulting from the use of live ammunition, weapons, vehicles and tools in training or in actual operations can be prevented by proper supervision and inspection. Safety training will be governed by Special Regulations 385 series and appropriate field and technical manuals. Safety training for guided missile units will include the provisions of Department of the Army Training Circular 25, 10 November 1953.

*e. "Behind Enemy Lines" instruction will be presented to all personnel as directed. Department of the Army Training Pamphlet 21-46 will be used as a guide for this instruction.

*f. "Instruction in the Geneva Convention of 1949" will be presented to all personnel as directed in Department of the Army Training Circular 22, 26 July 1951. Department of the Army Pamphlet 20-141 will be used as a guide.

*g. Personnel of all units will be fully qualified in battle indoctrination training requirements for overseas service (POR). The provisions of Training Memorandum Number 24, this headquarters, 11 June 1953, will apply. Training charts will reflect the correct status of all individuals relative to these requirements.

*h. Military Justice training will be conducted for personnel who have not successfully completed courses prescribed by Department of the Army Training Circular Number 12, 16 April 1951.

*i. Orientation of enlisted personnel being released from active service. Department of the Army Pamphlet 20-139, "Separation Series," December 1951, will be used as the basis in presenting this orientation. Presentation will be made before the soldier leaves for a separation center or before beginning separation processing at a post, camp, or station and will not be a part of the separation processing.

*j. "Military Aspects of Psychological Warfare Training" will be conducted as prescribed in Training Memorandum Number 26, this headquarters, 3 August 1953.

*k. Cold weather indoctrination training applicable to personnel of this command will be conducted in accordance with Training Memorandum Number 6, this headquarters, 3 March 1952.

*l. Training in artificial respiration will be conducted as outlined in Department of the Army Field Manual 21-11, 8 March 1954, subject: "Artificial Respiration."

m. Air movement training will be conducted by Special Category and High Priority units of this command, as prescribed in Training Memorandum Number 15, this headquarters, 30 January 1953.

n. Mine warfare training will be conducted by all units of this command in accordance with Training Memorandum Number 2, this headquarters, 5 January 1953.

o. Military history indoctrination plan training will be accomplished in accordance with Training Memorandum Number 23, this headquarters, 25 February 1953.

*p. Evasion and escape training (phase I) will be conducted in accordance with Training Circular 23, Department of the Army, 3 November 1954.

SECTION V

MISCELLANEOUS

11. School Training:

a. Unit Schools:

(1) All officers up to and including the grade of Lt Colonel, assigned to 75mm, 90mm or 120mm units should be required to attend a two-hour weekly course in a Unit Gunnery as indicated in Training Memorandum Number 4, this headquarters, dated 9 February 1955.

(2) All officers assigned to a Guided Missile Battalion should attend a two-hour weekly refresher training course in Guided Missiles as indicated in Training Memorandum Number 4, this headquarters, dated 9 February 1955.

(3) Unit schools for enlisted personnel are indicated in Training Memorandum Number 4, this headquarters, 9 February 1955, should not be interpreted to limit the conduct of training schools and refresher training desired by the unit commander.

b. Service Schools:

(1) Maximum utilization will be made of school quotas by maintaining as many students as practicable in attendance at service schools in order to fill appropriate job positions with school trained specialists and to adequately train personnel nominated for cadre positions which require school training. Training Memorandum Number 18, this headquarters, dated 9 February 1953, (to be revised) will be utilized as a guide for scheduling attendance at service schools.

12. Training Status of General Reserve Units: Data from these reports are used by CONARC in keeping the Chief of Staff, U.S. Army, informed of the status of training and operational readiness of General Reserve Units. Reporting unit commanders and their respective higher headquarters will insure that these reports are carefully prepared to reflect, as accurately as possible, the true training and operational status of the unit. Training Memorandum Number 6, this headquarters, 9 February 1955, will be used as a guide in preparing these reports.

SECTION VI

REFERENCES AND SUPERSESSIONS

13. References:

a. Training Memorandum 4, Army Field Forces, 19 March 1953.

Training Memorandum Number 1 (Continued) 9 February 1955

b. Training Memorandum 5, Army Field Forces, 11 March 1953.

14. **Supersessions**: Training Memorandum Number 2, this headquarters, 5 February 1954, subject: "Annual Army Antiaircraft Command Training Program."

BY COMMAND OF LIEUTENANT GENERAL MICKELSEN:

E. T. ASHWORTH
Colonel, GS
Chief of Staff

OFFICIAL:

J. C. CHANDLER
Major, AGC
Adjutant General

DISTRIBUTION: A,B,C & X
2-USAFFE APO 343
San Francisco, Calif.

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ACTION REQUIRED:

Change TM 9-1, this Ltr, as indicated above.

ACTION TAKEN: (Summarize)

As required.

RECORD EVALUATION:

____ Temporary - Destroy After ____

____ Semi-Permanent - Retain for Review After ____

XX Permanent Record Material ____

DISTRIBUTION AND FIO INSTRUCTIONS:

Coordination   Copies Furnished:

DIS   DIS   Prepared by: ____ (Signature)

CI   Maj   2882

(Rank)   (Ext)

Action Completed: 30 Jun

File:

[redacted]

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ARMY ANTIAIRCRAFT COMMAND
Ent Air Force Base
Colorado Springs, Colorado

ADOAA-3 O&T 360.1

3 JUN 1955

SUBJECT: Electronic Countermeasures Training (U)

TO: Commander-in-Chief
Continental Air Defense Command
Ent Air Force Base
Colorado Springs, Colorado

1. References:

a. SECRET letter, Headquarters, Eastern Army Antiaircraft Command, 15 December 1952, subject: "Electronic Countermeasures Training Missions," with 1st indorsement from this headquarters to HQ, Air Defense Command (DC&E) dated 22 December 1952 and 2d indorsement from HQ, Air Defense Command to this headquarters, dated 2 January 1953.

b. SECRET letter, HQ, Eastern Army Antiaircraft Command, 2 December 1952, subject: "Procurement of Chaff for ECM Training," with 3d indorsement from this headquarters to HQ, Air Defense Command, dated 3 February 1953, and 4th indorsement from HQ, Air Defense Command to this headquarters dated 12 February 1953.

c. SECRET (Downgraded to CONFIDENTIAL on 1 October 1953) letter, ADOAA-3 O&T 337 to Commanding General, this headquarters, from Lt Colonel Theisen, this headquarters, subject: "Report of Electronic Countermeasures (ECM) Meeting," 19 March 1953, copy furnished HQ, Air Defense Command.

2. References 1a and b above pointed out certain deficiencies in the ECM training (flight phase) received by the antiaircraft units in the Eastern Air Defense Force region. Generally these deficiencies were: insufficient air missions (about 25% of minimum requirements), unrealistic type missions (relative low altitude and low speed aircraft with only one (L and S Band) electronic jammer), and lack of "X" band electronic jamming.

3. As an indirect result of the above referenced letters, a joint conference was held at Fort Wadsworth, New York during the week 9-13 March 1953 to examine the entire antiaircraft ECM training program.

REGRADING DATA CANNOT
BE PREDETERMINED.

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ADOAA-3 OMT 360.1
SUBJECT: Electronic Countermeasures Training (U)

This conference was attended by representatives of this headquarters, HQ, Air Defense Command, Signal Corps Electronic Center, HQ, Eastern Air Defense Force, HQ, Eastern Army Antiaircraft Command and HQ, 52d AAA Brigade. The agreements reached as pertains to Air Defense Command responsibilities for the flight phase of ECM training are contained in paragraphs 6h and i of the reference 1c above, and are quoted below:

"h. The monthly flight-phase anti-jamming training schedule should be revised as follows:

Battalion Defense	Flying Time Over the Defense
1-3 battalions	2 hours with 2 aircraft
4-6 "	4 hours with 2 aircraft
7 or more battalions	6 hours with 2 aircraft

"i. The aircraft employed in this training should be equipped with S, L and X Band electronic jammers and chaff incorporating the latest developments in jamming techniques. The aircraft should possess flight characteristics which will approximate the performance of enemy aircraft."

4. At a conference on 30 November 1954 with C & E, ADC personnel, a great improvement in the ECM training program within a 60-90 day period was forecast. This was based on the assumption that additional B-29s, X-Band jammers and chaff allocation would be made available.

5. Attached as Inclosure 1 is a summary of survey of ECM training, flight phase, for all units of this command during the period 1 January 1955 to 1 April 1955. The results indicate the following:

a. There was only a slight improvement, in the first quarter Calendar Year 1955, over the Calendar Years 1953 and 1954 in the amount of ECM training, flight phase received (i.e., an increase from 25% to 44%).

b. There is still a complete lack of "X" band electronic jamming.

c. The policy for obtaining ECM missions in the 26th Air Division (Defense) area, see Inclosure 2, has resulted in a serious curtailment of missions received (15%) by the antiaircraft units in that area.

d. Antiaircraft units in the Joint Central Air Defense Force region are receiving no ECM missions from Air Defense Force units.

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ADOAA-3 O&T 360.1
SUBJECT: Electronic Countermeasures Training (U)

6. As the anti-jamming training of antiaircraft radar operators is of utmost importance, it is requested that the provisions of paragraph 3 above be implemented as soon as practicable.

7. It is further requested that future ECM missions include jamming and spoofing of Mark X IFF equipment.

FOR THE COMMANDING GENERAL:

E. T. Ashworth
E. T. ASHWORTH
Colonel, GS
Chief of Staff

2 Incl
- 1. A-J Tng, Flight Phase
- 2. Ltr from 26th Air Div (Def) dtd 5 Nov 54

Copies furnished:
CGWESTARAACOM
CG1AARGNCOMD
CG2AARGNCOMD
CG53AAABRIG
CO5AARGNCOMD
COCENARAACOM

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Ab File

HQ ARAACOM ADOAA-3 O&T 360.1 Subject: Electronic Counter-
measures Training (U)

ADODO (3 Jun 1955) 1st Ind 17 AUG 1955

HQ AIR DEFENSE COMMAND, Ent AFB, Colorado Springs, Colorado

TO: Commander, Headquarters, Army Antiaircraft Command, Ent AFB
Colorado Springs, Colorado

1. Reference is made to Paragraph 3h. This headquarters concurs with the minimum flight schedule as indicated and has used this as a standard for some time.

2. Reference is made to Paragraph 3i. This headquarters concurs with the requirement as outlined. A modification requirement was established in August 1954 to provide this capability in our TB-29 aircraft. Subject modification has been approved and equipment is on hand; however, installation of the equipment cannot properly be made until approved modification kits and installation drawings are available from our engineering agencies. These data and kits are forecasted to be available in July 1955. Installation may require from 90 to 180 days depending on depot capability.

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#353

3. Reference is made to Paragraph 3. This headquarters has submitted a requirement for 36 B-57 ECM training aircraft to meet the ECM training requirements of the command. This requirement is currently undergoing appraisal at Headquarters USAF by the Air Council. A General Operational Requirement for this aircraft is being prepared by Headquarters USAF and it is indicated our requirement will probably be approved. If this proves to be the case, these aircraft could possibly be in the hands of operational units during the latter part of calendar year 1957 or the first part of 1958.

4. Reference is made to Paragraph 4. This forecast was based on data available at that time. Slippages in the TB-29 modification program have precluded the anticipated increase in the time period indicated.

5. Reference is made to Paragraph 5a. This increase seems commendable, considering the number of units activated during the period mentioned that require ECM training with no commensurate increase in ECM training facilities.

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HQ ARAACOM ADOAA-3 O&T 360.1 Subject: Electronic Countermeasures Training (U)

ADODO (3 Jun 1955) 1st Ind (contd)

6. Reference is made to Paragraph 5b. See Paragraph 2 above.

7. Reference is made to Paragraph 5c. The general policy within this command is to allow the Radar Evaluation ECM Flights to schedule ECM training missions as they are in possession of data on the amount of training provided each unit, know the availability of aircraft and are in the best position to apportion their training effort. The situation within the 26th Air Division appears to be unique and action will be taken to correct it.

8. Reference is made to Paragraph 5d. The Radar Evaluation ECM Flight assigned to CADF has been severely handicapped by the loss of one of their two TB-25 ECM aircraft. With ECM equipment installed in the TB-29 aircraft authorized this unit, this situation will be alleviated.

9. Reference is made to Paragraph 6. This command is responsible for furnishing ECM training missions to the antiaircraft units of your command, the AC&W and interceptor units of the RCAF, and our own AC&W and interceptor units. We currently have the capability of providing approximately 25% of the ECM flight training required by these units. This figure is not expected to materially increase until we receive new ECM training aircraft (Reference Paragraph 3, above); however, the quality will increase with the installation of new equipment now on hand. (Reference Paragraph 2 above.) In light of this situation, we have continually striven to apportion our ECM training capability on a pro rata basis to all units concerned. In order to best serve the interests of an integrated defense system, we plan to continue this policy until such time as our ECM training capability is sufficient to meet individual unit criteria.

FOR THE COMMANDER:

C R Bond Jr

CHARLES R. BOND, JR
Colonel, USAF
Acting DCS/Operations

2 Incls
n/c

Info cys:
Comdr CADF
Comdr EADF
Comdr WADF

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PROBLEM: Tab G, Problem 14: (Par 2e)

ACTION REQUIRED: Obtain sufficient "L", "S" and "X" Band ECM Training Missions

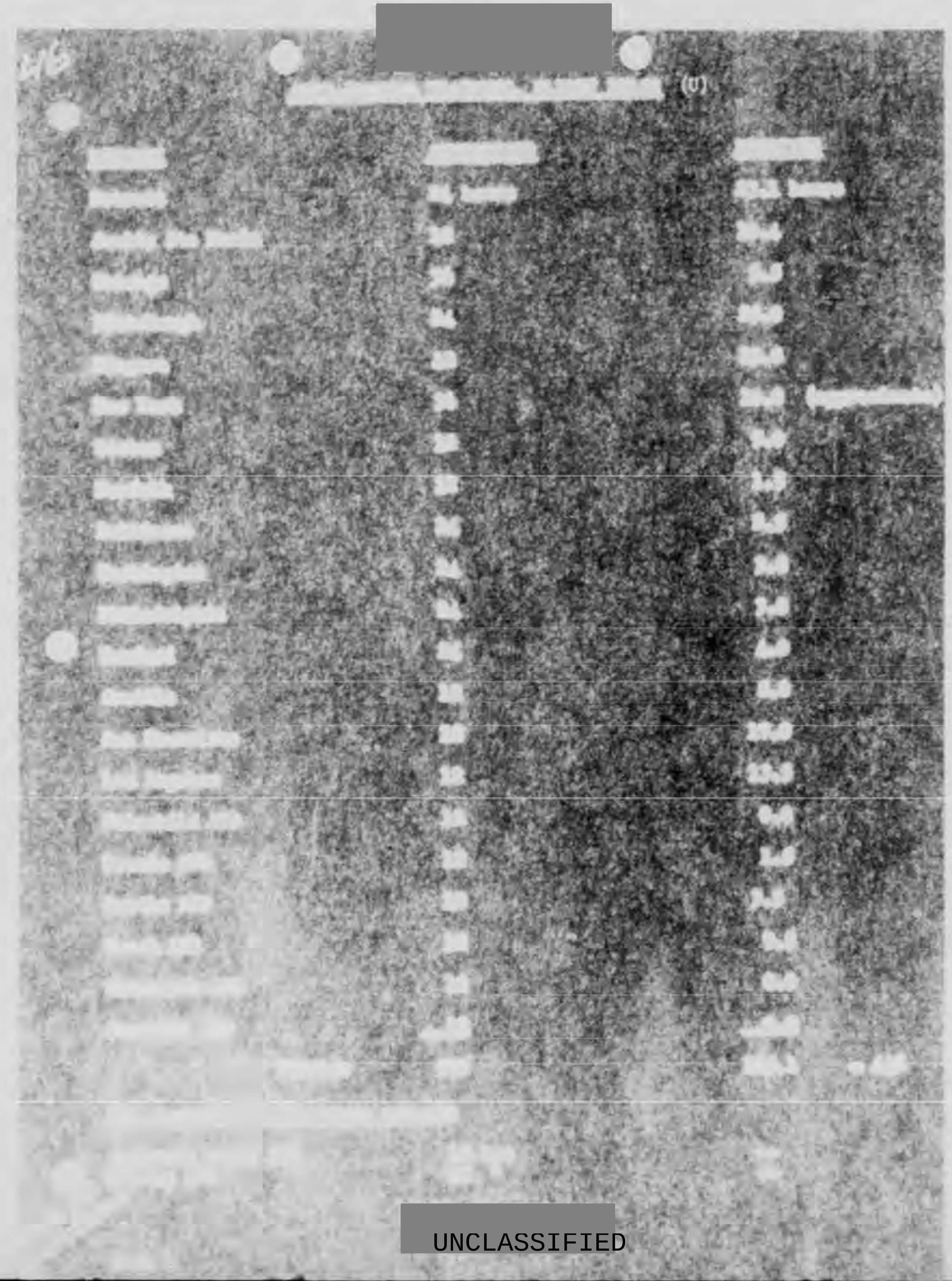
STATUS REPORTED 21 JUNE 55: A letter was forwarded to CONAD requesting more ECM training missions and a copy was attached.

PRESENT STATUS: A reply was received from Air Defense Command, dated 17 August 1955, copy attached. In summary, Air Defense Command stated they would probably be capable of furnishing "X" Band electronic jamming missions in 1956, but that there is little hope of increasing the overall number of missions until 1958.

EGRADING DATA CANNOT
E PREDETERMINED

[redacted]

[redacted]



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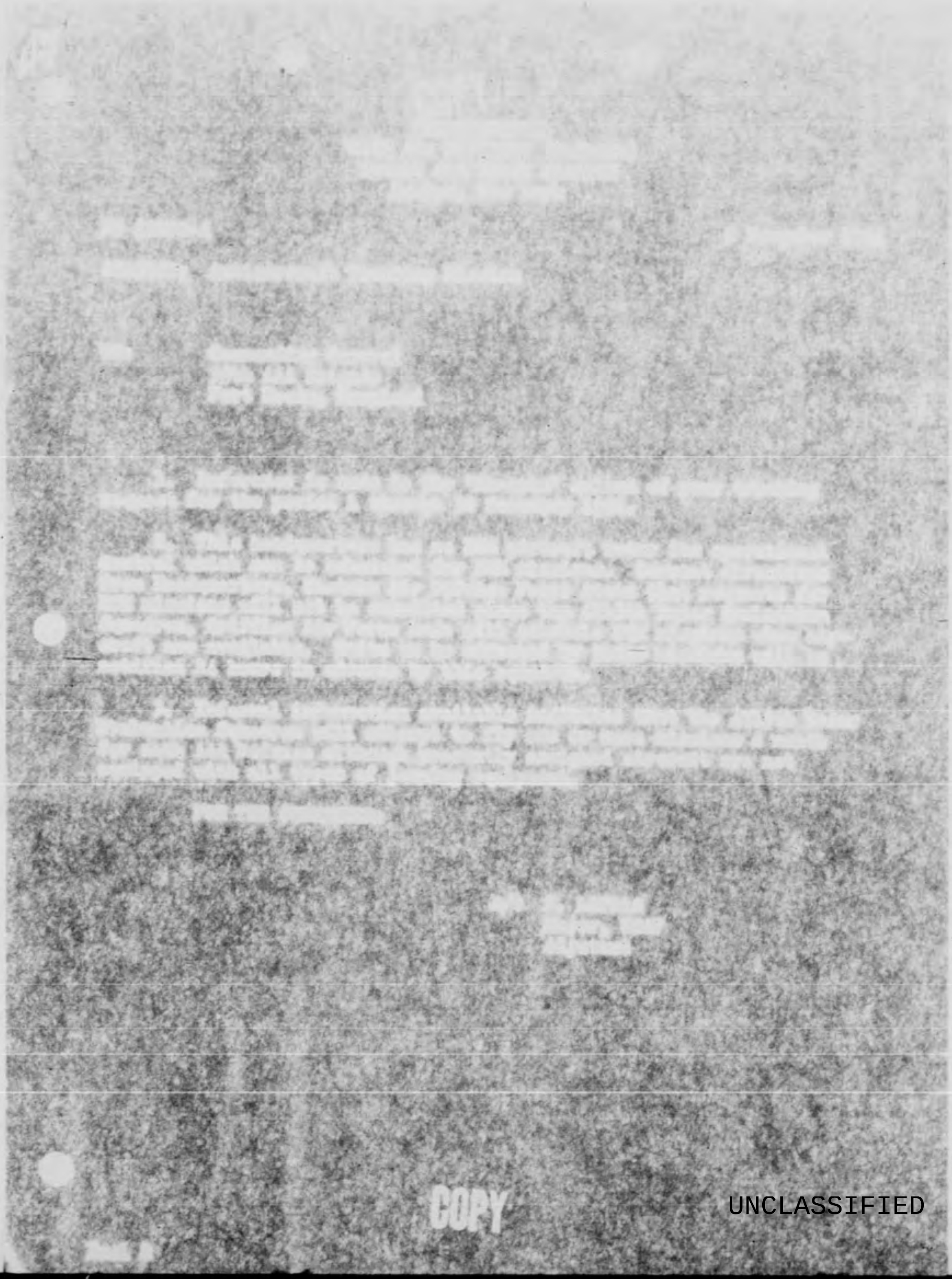

COPY

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DISPOSITION FORM

SECURITY CLASSIFICATION (if any) [redacted]

FILE NO. ADOAA-3 O&T

SUBJECT Antiaircraft Tracking Mission (U)

TO C/S

FROM G3

DATE 20 May 55

COMMENT NO. 1

Maj Genero/jr/2882

1. Headquarters, Air Defense Command is responsible for furnishing ECM training missions for antiaircraft units. Although many promises were made during the past two years, only a very small improvement in the situation was actually accomplished. In 1952 the units in the Eastern Army Antiaircraft area received about 25% of the authorized missions and a survey conducted from 1 January 1955 to 1 April 1955 indicatos that the units are now receiving only about 44% of the authorized missions. As late as 30 November 1954 C & E personnel, ADC, promised that a vast improvement in ECM training would take place in the next 60-90 days. This was based on the assumption that additional B-29s, X Band jammers and chaff allocations would be made available.

2. Because of the importance of anti-jamming training and since only a slight increase in the number of Air Defense Command ECM missions over the past two years was accomplished, it is believed that the facts should be made known to CONAD and request that necessary corrective action be taken.

3. Recommend approval of attached draft and return to G3 for finalization.

R.W.H.

1 Incl
a/s

G-3 approved

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UNCLASSIFIED

CONFIDENTIAL

[illegible]

Copies Furnished:

Prepared by: [illegible]
(Signature)

MAJ
(Rank)

2882
(Ext)

Action Completed:
(Initials)

25 May
(Date)

UNCLASSIFIED

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HEADQUARTERS
ARMY ANTIAIRCRAFT COMMAND
Ent Air Force Base
Colorado Springs, Colorado

GENERAL ORDERS
NUMBER 14

20 May 1955

SECTION I

DISCONTINUANCE OF EASTERN ARMY ANTIAIRCRAFT COMMAND

1. Headquarters, Eastern Army Antiaircraft Command, Table of Distribution 93-8577-1, Stewart Air Force Base, New York, is discontinued effective 31 May 1955.

2. Assigned military personnel will be transferred to the 1st Antiaircraft Regional Command, Table of Distribution 93-8577-4, Fort Totten, New York, with station at Stewart Air Force Base, New York, in accordance with current functional requirements of the Army Deputy to Commander, Joint Eastern Air Defense Force. Military personnel surplus to the requirements of the staff to the Army Deputy to Commander, Joint Eastern Air Defense Force, Stewart Air Force Base, New York, will be reassigned within the 1st Antiaircraft Regional Command.

3. Civilian personnel employed on the day of discontinuance of Eastern Army Antiaircraft Command will be transferred to and administered by the staff of the Army Deputy to Commander, Joint Eastern Air Defense Force, Stewart Air Force Base, New York.

4. Records Disposition: Current files will be transferred to and maintained separately by the staff to the Army Deputy to Commander, Joint Eastern Air Defense Force, Stewart Air Force Base, New York. Non-current files will be disposed of in accordance with current directives.

5. Final morning reports will be prepared in accordance with SR 335-50-1.

SECTION II

REALLOCATION OF MILITARY PERSONNEL SPACES

1. Military personnel spaces are reallocated to the units of the 8577th DU listed below effective 31 May 1955:

General Orders Number 14 (Continued) 20 May 1955

DESIGNATION, TD NR AND STATION	AUTHORIZED MILITARY PERSONNEL			
	Off	WO	EM	Aggregate
Headquarters, Army Antiaircraft Command, TD 93-8577, Ent Air Force Base, Colorado Springs, Colorado	43	6	48	97
1st Antiaircraft Regional Command, TD 93-8577-4, Fort Totten, New York	14	1	8	23

2. Morning report entries will be made in accordance with SR 335-50-1.

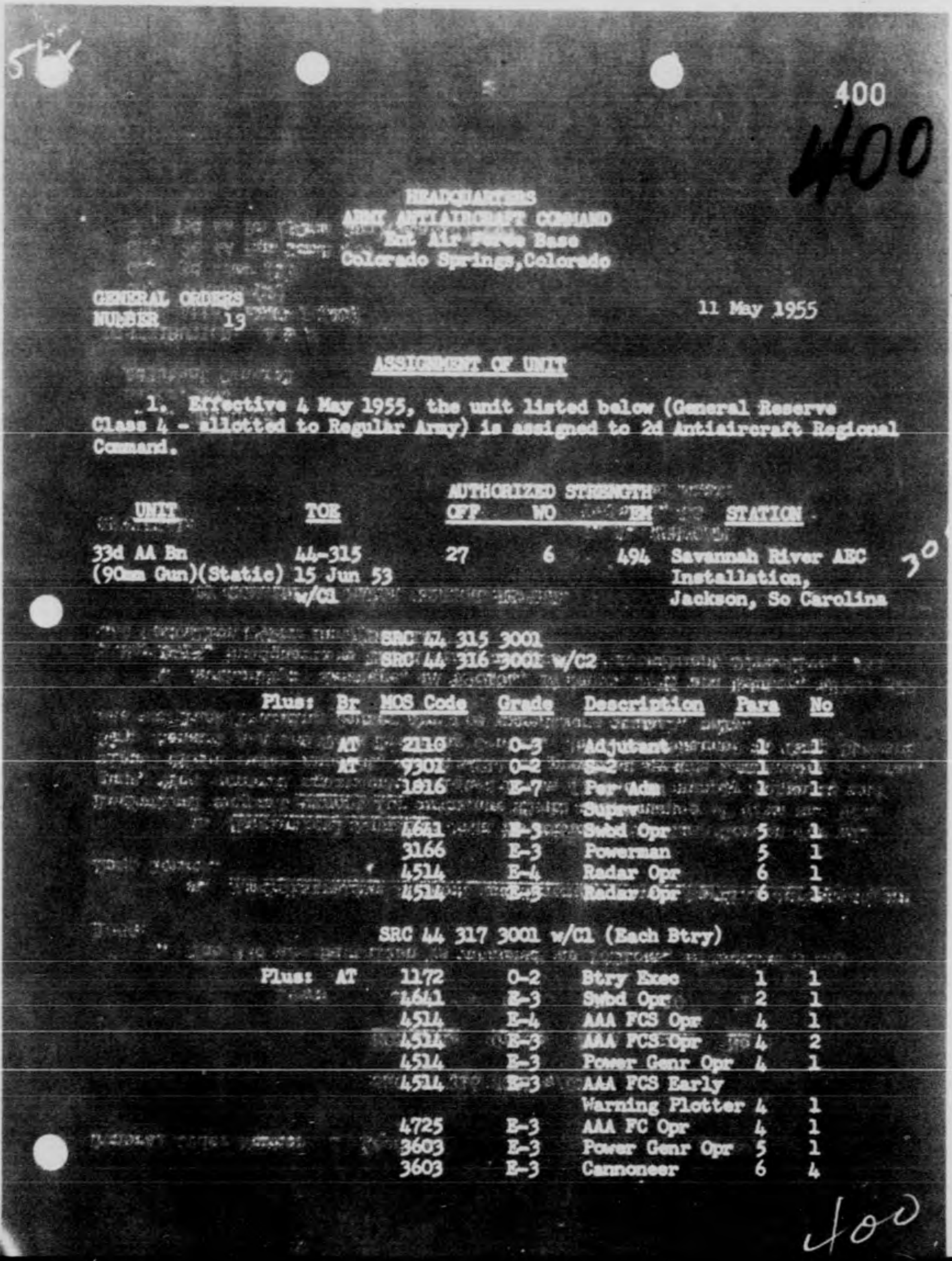
BY COMMAND OF MAJOR GENERAL HEWETT:

OFFICIAL:

E. T. ASHWORTH
Colonel, GS
Chief of Staff

J. C. CHANDLER
Major, AGC
Adjutant General

DISTRIBUTION: A, B, B-1 & X
TAG, ATTN: AGAO-I (20)
ACofS G3, DA (2)
CG, CONARC (1)
CINCONAD (1)
CG, 1st Army (2)



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HEADQUARTERS
ARMY ANTIAIRCRAFT COMMAND
Ent Air Force Base
Colorado Springs, Colorado

GENERAL ORDERS
NUMBER 13

11 May 1955

ASSIGNMENT OF UNIT

1. Effective 4 May 1955, the unit listed below (General Reserve Class 4 - allotted to Regular Army) is assigned to 2d Antiaircraft Regional Command.

UNIT	TOE	AUTHORIZED STRENGTH OFF	AUTHORIZED STRENGTH WO	AUTHORIZED STRENGTH EM	STATION
33d AA Bn (90mm Gun)(Static)	44-315 15 Jun 53 w/C1	27	6	494	Savannah River AEC Installation, Jackson, So Carolina

30

SRC 44 315 3001
SRC 44 316 3001 w/C2

Plus:	Br	MOS Code	Grade	Description	Para	No
	AT	2110	0-3	Adjutant	1	1
	AT	9301	0-2	S-2	1	1
		1816	E-7	Per Adm Suprv	1	1
		4641	E-3	Swbd Opr	5	1
		3166	E-3	Powerman	5	1
		4514	E-4	Radar Opr	6	1
		4514	E-3	Radar Opr	6	1

SRC 44 317 3001 w/C1 (Each Btry)

Plus:	AT	1172	0-2	Btry Exec	1	1
		4641	E-3	Swbd Opr	2	1
		4514	E-4	AAA FCS Opr	4	1
		4514	E-3	AAA FCS Opr	4	2
		4514	E-3	Power Genr Opr	4	1
		4514	E-3	AAA FCS Early Warning Plotter	4	1
		4725	E-3	AAA FC Opr	4	1
		3603	E-3	Power Genr Opr	5	1
		3603	E-3	Cannoneer	6	4

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General Order Number 13 (cont'd) 11 May 1955

SRC 44 316 3001 w/C2

	MOS Code	Grade	Para	Line	No
Less:	2200	[illegible]0	1	10	1

2. The 33d AAA Battalion is attached as follows, effective 3 May 1955:

a. Administrative Support and General Courts Martial Jurisdiction: Camp Gordon.

b. Logistical Support: Unit is attached to Camp Gordon for all logistical support except for ordnance field maintenance of 75mm and 90mm guns; fire control equipment; related Class II and IV supply support; and signal field radar support, which will be provided by the Commanding General, Camp Stewart AAA and Tank Training Center. Unit is attached to Camp Stewart AAA and Tank Training Center for the exceptions stated, only.

3. Authority: Message, DA 596104, 17 March 1955 and letter, AJFCD 322 4 May 1955, Headquarters Third Army, subject: "Attachment Directive, 33d AAA Battalion (90mm Gun)(Static.)"

BY COMMAND OF MAJOR GENERAL HEWETT:

E. T. ASHWORTH
Colonel, GS
Chief of Staff

OFFICIAL:

J. C. CHANDLER
Major, AGC
Adjutant General

DISTRIBUTION: A & X
TAG, Attn: AGAO-I (20)
CG, CONARC (2)
CG, 3d Army (1)
CG, 2d AA Rgn Comd (6)
CO, 33d AA Bn (90mm Gun)(Static) (6)

UNCLASSIFIED

401 [illegible]

5 APR [illegible]

[illegible] [illegible] 300GL [illegible] [illegible] 1 Apr [illegible]

[illegible] [illegible] 3 parts. Part 2 - [illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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	1 hr	[illegible]	[illegible]	[illegible]	[illegible]
	3 hr	[illegible]	[illegible]	[illegible]	[illegible]
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	[illegible]	400	[illegible]	[illegible]	[illegible]
	5 min	40	[illegible]	26	75
	1 hr	134	[illegible]	46	[illegible]
	3 hr	130	[illegible]	37	[illegible]

No

COMEBACK COPY

____ Not requested, not furni[redacted]

S17 Furnished 5 APR [illegible] [illegible]
(Date) (Initials)

2 of 4

A. E. Summons
A.E. [illegible], Maj, USAF/pe

[illegible] ([illegible]) [illegible]

B-657
45525-7

This correspondence is classified ______ in accordance with ______, AFR 205-1, 15 Dec 53, or for the reason (s) stated.

HECTOR C. DAU[illegible]
Captain, USAF

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[illegible]

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	3 hr	[illegible]	[illegible]	[illegible]	429

Page 2 of 4 Pages

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	30 min	40	13	16	69
	1 hr	64	16	32	112
	3 hr	291	80	61	432

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PARAPHRASE NOT REQUIRED,
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BEFORE DECLASSIFYING.

MEMO FOR THE RECORD: Above cited message requested [illegible] and fighter status information for the previous 4-month period.

MESSAGE TRANSMITTED
WITH FOLLOWING DATE TIME GROUP
052359Z B-14-5

[redacted]

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[redacted]

SEE CRYPTO SECTION BEFORE
DECLASSIFYING
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Reproduction of this messa
whole or in part is prohibited w
approval of action office

COPY OF INCOMING CLASSIFIED MESSAGE

AG 31
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HQA29
PP RJEDEN
DE RJEPHQ 148
P 152132Z
FM HEDUSAF WASH D C
TO CINCONAD ENT AFB COLORADO
BT

X-01250-B ACTION: O&T
INFO: CG, IG, DO
SUSP: 20 JUN 55

S E C R E T/FROM: AFOOP-OP-D 55116 REFERENCE CONADOOT-D 30061, 5 APR
55, TOTAL AIRCRAFT AVAILABLE ON 5 MINUTES ON 30 OCT 54 INDICATES 130
AIRCRAFT. THE NUMBERS FOR SUBSEQUENT MONTHS INDICATE A DECREASE OF APPRC
IMATELY 50 AIRCRAFT. DESIRE ,ASAP, REASONS FOR THIS APPRECIABLE CHANGE
IN ORDER THAT EXPLANATION MAY BE PROVIDED OSD. FURTHER, INFORMATION
REFLECTED ON REFERENCED MESSAGE INDICATES A DECREASE IN AIRCRAFT AVAILAB
WITHIN ONE HOUR FROM THAT SUBMITTED AS BEING AVAILABLE IN PREVIOUS
SIX MONTHS. DESIRE ANY INFORMATION WHICH MIGHT INDICATE REASONS FOR SUCH
DIFFERENCES.
BT
15/2145Z JUN RJEPHQ

FILE NUMBER 300

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RECEIVED
14 JUN 1955
DCS/O

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Hq-O-AG-Form 23
April 53

B-504-1X

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This document consists of ____ pa
This is copy No. ____ of ____ cop

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17 JUN 1955

SUBJECT: (Unclassified) Demonstration of "Hostile Intent" for
Air Defense Purposes

TO: Commander-in-Chief
Continental Air Defense Command
Ent Air Force Base
Colorado Springs, Colorado

1. Criteria contained in paragraph 1 of your letter, dated 27 May 1955, subject as above, has been reviewed.

2. It must be pointed out that the two-fold purpose of the policy concerning Intercept and Engagement of Hostile Aircraft is; a to afford this country the maximum air defense protection in the interest of national security and self preservation, and b to provide for the maximum protection, in the implementation of the Rules of Engagement, to aircraft of the United States and friendly nations.

3. Your proposal is concurred in by this Headquarters provided definite safeguards are established to prevent any action detrimental to the policy contained in paragraph 2 b above.

BY ORDER OF THE CHIEF OF STAFF:

SIGNED

JAMES E. BRIGGS
Major General, USAF
Assistant Deputy Chief of Staff,
Operations

8-530-2X

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ROC 406 ROCR 55a

406

[illegible] [redacted] 5 JUL 1955

SUBJECT: (Unclassified) "Hostile Intent" for Air Defense Purposes

TO: Chief of Staff as Executive Agent for the
Joint Chiefs of Staff
Headquarters USAF
Washington 25, D. C.

FILE NUMBER 315.3 B

1. Reference is made to your classified letter, subject as above, 17 June 1955, and our classified letter, subject as above, 27 May 1955.

2. A revised regulation has been drafted as a result of the proposals contained in our letter of 27 May 1955. The draft is currently circulating for staff comment and has been forwarded to HQAF/ADC for their comment and/or concurrence.

3. A draft of the revised regulation is attached (Incl #1). It is believed that the Regulation, as revised, complies with the intent of paragraph 2.b. of your letter of 17 June 1955.

FOR THE COMMANDER IN CHIEF:

CHARLES R. BOND, JR.
Colonel, USAF
Acting DCS/Operations

1 Incl
Revised Reg
CONAD REG 55-

MEMO FOR RECORD:

Maj Gordon/ls
7722,2814
7 June 55
[illegible]

[redacted]

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RCENG

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SUBJECT: Preliminary Planning for Production Acceptance Test of AN/GPA-37

TO: Commander
Air Defense Command
ATTN: Major H. M. Farmer, ADOPR
ENT Air Force Base
Colorado Springs, Colorado

FEB 25 1955

1. Reference is made to the production acceptance tests of Radar Course Directing Group AN/GPA-37 to be conducted prior to delivery of this equipment to Air Defense Command. It is the purpose of this correspondence to inquire as to what extent ADC could support such a program.

2. The AN/GPA-37 is designed to enable one (1) GCI controller to handle six (6) interceptions simultaneously (overlapping in time). It is the intent, during the course of this acceptance program, to evaluate the equipment under a full capacity environment. Besides voice controlled interception tests, it appears probable that limited data link interception flight tests, using the E-5 and/or E-4 fire control equipments, will also be conducted. This later environment is dependent on the availability of airborne data link and fire control equipments.

3. Details of the program have not as yet been established because it is not known, at this time, whether the aircraft and personnel necessary will be available. In addition to the regular tests, it is estimated that at least two or three flights should be conducted at the maximum capacity of six simultaneous interceptions. This infers at least six fighter aircraft being airborne for the "interceptor roles", and preferably six other high speed aircraft for the "target roles". The "target" aircraft need not necessarily be bomber aircraft, in fact they could also be fighters acting as targets.

4. In addition to the aircraft, trained AF controllers should be utilized to operate the equipment and direct the interceptions. It is preferable to use controllers who have already been trained in the operation of this equipment. Three such controllers would suffice for this program.

5. The present schedule calls for delivery of a pre-production AN/GPA-37 to RADC in October 1955 and the start of the flight test program November 1955. The site of operations has not as yet been decided upon; however, if ADC has a preference for a regular Air Defense AC and W site in or near the Rome area, consideration will be given in the formulation of the test program.

6. This headquarters desires information as to what extent ADC can support such a program in the following categories:

a. Aircraft
b. Controllers
c. AC and W site

7. During our laboratory tests of the engineering model AN/GPA-37 at Columbia University, the following named controllers were supplied by ADC in support of RADC's effort.

a. Paul F. Hart, Capt., AO-568515
750th AC and W Squadron
Boron, California

b. James I. Poole, Capt., AO-558683
646th AC and W Squadron
Highlands, New Jersey

c. Ray P. Meyers, Capt., AO-2086177
674th AC and W Squadron
Osceola, Wisconsin

8. These controllers spent several months at Columbia University Electronic Research Laboratories and became quite proficient in the operation of the AN/GPA-37 operator's console.

9. Details of a test program will be prepared when the availability and numbers of aircraft and GCI controllers are known, and when an operating site has been decided upon.

10. If ADC's participation and support of this program is in the affirmative, then it is suggested that a meeting be held between representatives of RADC and ADC in order that preliminary plans may be made to initiate necessary action. Furthermore, it appears advisable that Air Proving Ground Command and Air Training Command be invited to cooperate and witness those portions of the program which benefit their respective efforts. RADC understands that both these commands

are anxious to gather data on this equipment, and it is felt that this would be an opportune time for them.

11. Your comments and suggestions are welcomed in this matter.

FOR THE COMMANDER:

LEONARD N. PALMER
Colonel, USAF
Director
Directorate of Electronics

cc frnsd
Comdr, APGC
Eglin AFB, Fla
Comdr, ATC
Scott AFB, Ill.

31

B/L, RADC, RCFNG, Subject: **Preliminary Planning for Production Acceptance Test of AN/GPA-37**

ADOOT-C (25 Feb 55) 1st Ind 5

HEADQUARTERS AIR DEFENSE COMMAND, Ent AFB, Colorado Springs, Colorado

TO: Commander, Rome Air Development Center, Air Research and Development Command, Griffiss Air Force Base, Rome, New York

An Operational Suitability Test of the AN/GPA-37 system is presently projected for the period December 1955-January 1956 in the Eastern Air Defense Force area. As indicated in Air Proving Ground Command Message, DCS/O-TR-ADD 50083C, dated 21 February 1955, as revised by DCS/O-TR-ADD 50113-C, a conference involving representatives from your Headquarters and other interested commands will be conducted at Headquarters Air Proving Ground Command to develop the OST program. The factors outlined in your letter could be discussed in greater detail at this conference. In addition, integration of your proposed Production Acceptance Test, Air Proving Ground Command's limited field testing, and the OST could be formatively coordinated with the representatives of the interested commands.

FOR THE COMMANDER:

mdr
Asst Prog
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Adm
Rcds Mgt
Class
Hist
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md Surg
md Stf JA
md Chap
md IG
Insp Svs
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Bud
Fin
Mgt Anlys
Stat
CS/P
Civ Pers
Mil Pers
Amn Asgmt
Off Asgmt
Cols & Rcds
Spec Actions
GS
Pers Sv
PPR
WAF
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This correspondence is classified ____________ in accordance with Par_________, AFR 205-1, 24 Jul 53, or for the reason (s) stated.

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Hq USAF, AFOOP-OP-E, Subj: (U) GCI Computer Program, AN/GPA-37

ADOOP-A (27 Jan 55) 1st Ind

HQ AIR DEFENSE COMMAND, Ent Air Force Base, Colorado Springs, Colorado

TO: Director of Operations, Headquarters USAF, Washington 25, D. C.

1. Total ADC requirements and installation phasing of AN/GPA-37 and AN/GPA-23 equipment is shown in Inclosure 1. These figures include equipment for all ADC ACAW sites except those which are to retain only a surveillance function. One AN/GPA-37 and three AN/GPA-23's are included for each of the eight [illegible] sites.

2. This command has a requirement for AN/GPA-23 equipment in all control positions. The AN/GPA-35 scope shown as required in control positions at some sites is interim equipment and will be replaced when the AN/GPA-23 is available.

3. Firm requirements and installation phasing of AN/GPA-35 scopes will be forwarded upon completion of a review of the use of this equipment by ADC.

4. No firm requirement has been established for possible use of AN/GPA-37 equipment in the 4th Phase Program. This information will be sent to you when available.

5. Operations building annexes to house AN/GPA-37 equipment have been included in ADC Public Works Programs. The FY-57 program includes 35 manual equipment annexes.

FOR THE COMMANDER:

219.2

AV

6 Incls
1. GPA-23 and 37 Reqs
2. P-Site Reqs
3. 1st Phase Reqs
4. 2nd Phase Reqs
5. 3rd Phase Reqs
6. Texas Tow Reqs

Incls not rqrd for AG-C file.

MEMO FOR RECORD: Hq USAF asked for ADC scope requirements and time phasing for installation of AN/GPA-37. The inclosures to this letter were prepared from information furnished by ADC O&T.

BERT PATTERSON
Maj, USAF

Comdr
VC
Prog
C of S
Comd Adj
Adm
Recds Mgt
Class
Hist
Pub
Comd Surg
Comd Stf JA
Comd Chap
Comd IO
Insp Svs
PM
Flt Sfty
FLO
DCS/C
Bud
Fin
Mgt Anlys
Stat
DCS/P
Civ Pers
Mil Pers
Amn Asgmt
Off Asgmt
Cols & Recds
Spec Actions
GS
Pers Sv
PPR
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S & T
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2 Feb 55

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Q Form 11
54 Revised

This correspondence is classified ____________ in accordance with Par ________, AFR 205-1, 24 Jul 53, or for the reason (s) stated. ____________
SIGNATURE

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408

AFOOP-OP-D

SUBJECT: (U) GCI Computer Program, AN/GPA-37

TO: Commander
Air Defense Command
Ent Air Force Base
Colorado Springs, Colorado

1. References:

a. Your letter, dated 30 March 1954, Subject: "(U) GCI Tracker-Computer AN/GPA-23.

b. 1st Indorsement, this Headquarters, dated 18 June 1954.

c. 2nd Indorsement, your Headquarters, dated 1 September 1954.

2. Reference paragraph 2 of reference 1b above. This Headquarters has restudied the use of the AN/GPA-37 in both the manual and SAGE Systems. It has been concluded that this equipment is required on a continuing basis in both systems. This equipment will:

a. Provide the Air Force with a capability of increasing, threefold, the quantity of air weapons that can be controlled simultaneously in an air battle within any prime radar station area (ADDC) prior to implementation of the SAGE System.

b. Provide, at a minimum cost, an added semi-automatic capability at the prime radar stations in the event the SAGE Direction Centers become inoperative or overloaded from a capacity standpoint. With this increased capability the prime radars could revert to a decentralized semi-automatic control system, thus maintaining the highest possible kill capability within the system.

c. Provide a data link capability at prime radar stations (ADDC) during the interim period, and remain in place to become a part of the semi-automatic ground environment (SAGE).

3. This Headquarters has provided for your Command 21 AN/GPA-37's from FY-54 funds and 23 from FY-55 funds. Action is contemplated to increase the FY-55 Buying Program so that your allocation will be 42. This total of 63 AN/GPA-37 packages will contain 63 each AN/GPA-34's, AN/GKA-1's, and 252 AN/GPA-23's.

1-667-2

[redacted]

[redacted]

Ltr to ADC fr AFOOR-OR-D, Subj: "(U) GCI Computer Program, AN/GPA-37" (Cont'd)

4. Based on the new USAF Plan for utilizing this equipment, paragraph 2 above, and your requirements outlined in paragraph 1, reference 1c above, the FY-56 Budget Program is being reviewed. To assist this Headquarters, it is desired that your quantitative requirements be resubmitted in view of:

a. The recent elimination of programmed "M", "SM" and "TM" radar sites.

b. The approval of 21 prime radars in the 4th Phase Augmentation Program.

c. Your Headquarters not indicating whether or not the subject equipment is required at the 8 USAF REP Sites.

d. The FY-54 and FY-55 Buying Programs contain 343 AN/ARR-39's for the F-86D retrofit program. This number is based on Air Materiel Command's IRAN schedule.

5. It is further desired that your requirements be submitted not later than 1 March 1955, indicating the sites, control positions, and installation phasing. The planned delivery schedule of this equipment is 10 by April 1956, 53 more by December 1956 and the remainder at the rate of 10 per month. Based on this schedule, your FY-57 PWP to house this equipment should be adjusted accordingly.

BY ORDER OF THE CHIEF OF STAFF:

K667-3x

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HEADQUARTERS WESTERN AIR DEFENSE FORCE
HAMILTON AIR FORCE BASE
HAMILTON, CALIFORNIA

409

In Reply Refer To: WDOCE-F

28 JUN 1955

SUBJECT: BROFICON Transmitter Priority Requirement

FILE NUMBER 106.15

TO: Commander
Air Defense Command
Attn: Lt. Col. B. H. Aszman
Ent Air Force Base
Colorado Springs, Colorado

1. Reference is made to message from your headquarters, ADOCE-CR 3387, dated 25 June 1955.

2. Following is a list of stations requiring the installation of separate transmitters to permit BROFICON operation. The list is arranged in the order of priority:

a. K H Q, Spokane, Washington

b. K I T, Yakima, Washington

c. K X L Y, Spokane, Washington

d. K E X, Portland, Oregon

e. K N B C, San Francisco, California

f. K G A N, Kingman, Arizona

g. K V C V, Redding, California

h. - - - - Fallon, Nevada; no commercial broadcast station is located in or near Fallon. A suitable location for the BROFICON transmitter must be provided.

i. K Y U M, Yuma, Arizona

j. K B K R, Baker, Oregon

k. K A S T, Astoria, Oregon

l. K T A C, Tacoma, Washington

[illegible] San Diego, California

[redacted]

28

Hq WADF WDCCE-F Subj: BROFICON Transmitter Priority Requirement

n. K G O, San Francisco, California
o. K N X, Los Angeles, California
p. K G B, San Diego, California
q. K N P T, Newport, Oregon
r. K X L A, Pasadena, California
s. K O D L, The Dalles, Oregon
t. K S F O, San Francisco, California
u. K I R O, Seattle, Washington
v. K P U G, Bellingham, Washington
w. K M J, Fresno, California
x. K R A M, Las Vegas, Nevada
y. K E N O, Las Vegas, Nevada
z. K R L C, Lewiston, Idaho

3. The stations indicated in the above list are tentative only until such time as each has been contacted and permission secured for BROFICON use.

FOR THE COMMANDER:

P E Haupt

P. E. HAUPT
CWO USAF
ASST ADJUTANT

AG 14 July
Ana by Ind to Fi on FF F-18098
File AG/91
Mr. Dandaker

[redacted]

23

410

HEADQUARTERS
CENTRAL AIR DEFENSE FORCE
GRANDVIEW AIR FORCE BASE
GRANDVIEW, MISSOURI

P&R-P

30 JUN 1955

SUBJECT: BROFICON Plan

106.15

TO: Commander
Air Defense Command
Ent Air Force Base
Colorado Springs, Colorado

1. Reference Message AAOCE-CR 3387 dated 24 June 55, there is attached as Inclosure 1 a list of thirty (30) broadcast stations requiring Air Force transmitters in the order of priority for implementation of BROFICON. These transmitters will be located at the sites of broadcast stations selected for participation in BROFICON.

2. Attached as Inclosure 2 is the Central Air Defense Force Plan which provides one broadcast station for each AC&W site, operational and programmed, which has assigned Direction Center capability.

3. Transmitter powers shown for stations requiring Air Force transmitters are predicated on providing transmitters of 5 Kw output.

4. All broadcast stations selected for BROFICON are tentative, pending participation approval of the stations concerned.

5. Contacting of stations by FCC liaison personnel is being withheld pending receipt of administrative instructions relative to handling of funds for broadcast station equipment modification and spare parts.

FOR THE COMMANDER:

ROBERT D. HUFFMAN
1st Lt. USAF
Ass't. Adjutant

2 Incls
1. Stns Requiring AF Transmitters
2. Bcst. Stns Selected for BROFICON

AG 14 July
Ans by Ind to ltr FFF-18098
File AG 1yr

5M Zlandaker

CADF-3313 -55

[redacted]

1519-1

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STATIONS REQUIRING AIR FORCE TRANSMITTERS IN ORDER OF PRIORITY FOR DESIRED INTEGRATION

CALL	LOCATION	SITE	LOCATION
KOJM	Havre, Montana	P-25	Havre, Montana
KSJB	Jamestown, N. D.	P-29	Finley, N. D.
KOGM	Albuquerque, N. M.	M-94	West Mesa, N. M.
KCMO	Kansas City, Missouri	P-72	Olathe, Kansas
KIYI	Shelby, Montana	P-24	Cut Bank, Montana
KFYR	Bismarck, N. D.	P-28	Minot, N. D.
KLTZ	Glasgow, Montana	P-26	Opheim, Montana
KSOO	Sioux Falls, S. D.	P-18	Chandler, Minnesota
KMON	Great Falls, Mont.	SM-147	Great Falls, Montana
KATL	Miles City, Mont.	M-98	Miles City, Montana
KIUP	Durango, Colorado	P-8	Tierra Amarilla, N. M.
KOB	Albuquerque, N. M.	P-51	Moriarity, N. M.
KTRH	Houston, Texas	P-79	Ellington AFB, Texas
KVOO	Tulsa, Oklahoma	P-77	Bartlesville, Oklahoma
KWKH	Shreveport, La.	M-91	Texarkana, Arkansas
KALB	Alexandria, La.	M-125	Alexandria AFB, Louisiana
KEPO	El Paso, Texas	M-95	Las Cruces, N. M.
KXLO	Lewistown, Montana	TM-178	Lewistown, Montana
KGEZ	Calispell, Montana	TM-179	Calispell, Montana
KDIX	Dickenson, N. D.	TM-177	Dickenson, N. D.
KNOG	Nogales, Arizona	TM-182	Nogales, Arizona
KVKM	Monahans, Texas	TM-186	Pyote, Texas
KVLF	Alpine, Texas	TM-184	Valentine, Texas
KDLK	Del Rio, Texas	TM-188	Eagle Pass, Texas
KGKL	San Angelo, Texas	TM-187	Ozona, Texas
KVOZ	Laredo, Texas	TM-189	Zapata, Texas
KTBC	Austin, Texas	TM-192	Gary AFB, Texas
KGBT	Harlingen, Texas	TM-190	Port Isabel, Texas
KWBU	Corpus Christi, Texas	TM-191	Rock Port, Texas
KRBA	Lufkin, Texas	TM-193	Lufkin, Texas

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BROADCAST STATIONS SELECTED FOR [illegible]

CENTRAL AIR [illegible] FORCE

SITE	LOCATION	CALL	LOCATION	FREQUENCY	POWER
			29TH AIR DIVISION		
P-24	Cut Bank, Montana	KIYI	Shelby, Montana	690 Kc	5 Kw
P-25	Havre, Montana	KOJM	Havre, Montana	600 Kc	5 Kw
P-26	Opheim, Montana	KLTZ	Glasgow, Montana	730 Kc	5 Kw
P-27	Fortuna, North Dakota	KGCX	Sidney, Montana	1400 Kc	5 Kw
P-28	Minot, North Dakota	KFYR	Bismarck, North Dakota	550 Kc	5 Kw
P-29	Finley, North Dakota	KSJB	Jamestown, North Dakota	600 Kc	5 Kw
M-97	Rapid City, S. D.	KOTA	Rapid City, South Dakota	1380 Kc	5 Kw
M-98	Miles City, Montana	KATL	Miles City, Montana	760 Kc	5 Kw
M-99	Gettysburg, S. D.	KSDN	Aberdeen, South Dakota	930 Kc	1 Kw
SM-133	Hastings, Nebraska	KRVN	Lexington, Nebraska	1010 Kc	25 Kw
SM-134	Lake Andes, S. D.	WNAX	Yankton, South Dakota	580 Kc	5 Kw
SM-147	Great Falls, Mont.	KMON	Great Falls, Montana	560 Kc	5 Kw
TM-177	Dickenson, N. D.	KDIX	Dickenson, North Dakota	810 Kc	5 Kw
TM-178	Lewistown, Mont.	KXLO	Lewistown, Montana	840 Kc	5 Kw
TM-179	Kalispell, Montana	KGEZ	Kalispell, Montana	590 Kc	5 Kw
TM-201	Sun Dance, Wyoming	KDSJ	Deadwood, South Dakota	980 Kc	1 Kw
			31ST AIR DIVISION		
P-17	Wadena, Minnesota	WDAY	Fargo, North Dakota	970 Kc	5 Kw
P-18	Chandler, Minnesota	KSOO	Sioux Falls, South Dakota	1140 Kc	10 Kw
P-35	Osceola, Wisconsin	KSTP	Minneapolis, Minnesota	1500 Kc	50 Kw
P-69	Finland, Minnesota	WEBC	Duluth, Minnesota	560 Kc	5 Kw
P-71	Omaha, Nebraska	KFAB	Omaha, Nebraska	1100 Kc	50 Kw
P-81	Waverly, Iowa	KXEL	Waterloo, Iowa	1540 Kc	50 Kw
P-85	Hanna City, Illinois	WMBD	Peoria, Illinois	1470 Kc	5 Kw
SM-132	Beaudette, Minnesota	KNOX	Grand Forks, North Dakota	1310 Kc	5 Kw
SM-138	Grand Rapids, Minn.	WDSM	Superior, Wisconsin	710 Kc	5 Kw
SM-139	Wilmar, Minnesota	WCCO	Minneapolis, Minnesota	830 Kc	50 Kw

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BROADCAST STATIONS SELECTED FOR BROFICON

CENTRAL AIR DEFENSE FORCE

33RD AIR DIVISION

SITE	LOCATION	CALL	LOCATION	FREQUENCY	POWER
P-47	Hutchinson, Kans.	KFBI	Wichita, Kansas	1070 Kc	10 Kw
P-52	Tinker AFB, Okla.	KOMA	Oklahoma City, Oklahoma	1520 Kc	50 Kw
P-64	Kirksville, Mo.	WTAD	Quincy, Illinois	930 Kc	5 Kw
P-68	Fordlund, Mo.	KWTO	Springfield, Missouri	550 Kc	5 Kw
P-70	Belleville, Ill.	KMOX	St. Louis, Missouri	1120 Kc	50 Kw
P-72	Olathe, Kansas	KCMO	Kansas City, Missouri	800 Kc	50 Kw
P-75	Lackland AFB, Texas	WOAI	San Antonio, Texas	1200 Kc	50 Kw
P-77	Bartlesville, Okla.	KVOO	Tulsa, Oklahoma	1170 Kc	50 Kw
P-78	Duncanville, Texas	WFAA/WBAP	Dallas, Texas	820 Kc	50 Kw
P-79	Ellington AFB, Texas	KTRH	Houston, Texas	740 Kc	50 Kw
M-91	Texarkana, Arkansas	KWKH	Shreveport, Louisiana	1130 Kc	50 Kw
M-125	Alexandria AFB, La.	KALB	Alexandria, Louisiana	570 Kc	5 Kw
SM-143	Walnut Ridge, Ark.	KTHS	Little Rock, Arkansas	1090 Kc	50 Kw
TM-187	Ozona, Texas	KGKL	San Angelo, Texas	960 Kc	5 Kw
TM-188	Eagle Pass, Texas	KDLK	Del Rio, Texas	850 Kc	5 Kw
TM-189	Zapata, Texas	KVOZ	Laredo, Texas	890 Kc	5 Kw
TM-190	Port Isabel, Texas	KGBT	Harlingen, Texas	1530 Kc	50 Kw
TM-191	Rock Port, Texas	KWBU	Corpus Christi, Texas	1030 Kc	50 Kw
TM-192	Gary AFB, Texas	KTBC	Austin, Texas	590 Kc	5 Kw
TM-193	Lufkin, Texas	KRBA	Lufkin, Texas	780 Kc	5 Kw
TM-194	Lake Charles AFB, La.	KPLC	Lake Charles, Louisiana	1460 Kc	5 Kw

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BROADCAST STATIONS ECTED FOR BROFICON

CENTRAL AIR DEFENSE FORCE

SITE	LOCATION	CALL	LOCATION	FREQUENCY	POWER
			34TH AIR DIVISION		
P-7	Continental Divide, New Mexico	KGAK	Gallup, New Mexico	1330 Kc	5 Kw
P-8	Tierra Amarilla, New Mexico	KIUP	Durango, Colorado	930 Kc	5 Kw
P-51	Moriarity, New Mexico	KOB	Albuquerque, New Mexico	770 Kc	50 Kw
M-90	Walker AFB, New "	KBIM	Roswell, New Mexico	910 Kc	5 Kw
M-92	Tucson, Arizona	KCNA	Tucson, Arizona	570 Kc	5 Kw
M-94	West Mesa, New Mexico	KGGM	Albuquerque, New Mexico	600 Kc	5 Kw
M-95	Las Cruces, New "	KEPO	El Paso, Texas	690 Kc	10 Kw
TM-181	Ajo, Arizona	KOOL	Phoenix, Arizona	960 Kc	5 Kw
TM-182	Nogales, Arizona	KNOG	Nogales, Arizona	1030 Kc	5 Kw
TM-184	Valentine, Texas	KVLF	Alpine, Texas	540 Kc	5 Kw
TM-186	Pyote, Texas	KVKM	Monahans, Texas	720 Kc	5 Kw

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106.15

HEADQUARTERS
EASTERN AIR DEFENSE FORCE
STEWART AIR FORCE BASE, NEWBURGH, N. Y.

EAOOT-OS

26 JUN 1957

SUBJECT: (Confidential) BROFICON Implementation

411

TO: Commander
Air Defense Command
Ent Air Force Base
Colorado Springs, Colorado

1. Reference ADC message ADOCE-CR 3387. Seperate transmitters are needed in the areas listed below to satisfy current BROFICON requirements. The EADF order of priority is as follows.

1. WHDH, Boston, Mass.
2. WAGM, Presque Isle, Me.
3. WLBZ, Bangor, Me.
4. WABI, Bangor, Me.
5. WBZ, Boston, Mass.
6. WTAM, Cleveland, Ohio
7. WTOP, Washington, D.C.
8. WSOO, Sault Ste Marie, Mich.
9. WEAU, Eau Claire, Wisc.
10. WLW, Cincinnati, Ohio
11. WJR, Detroit, Mich.
12. WGNI, Wilmington, N. C.
13. WCSC, Charleston, S. C.
14. WTOC, Savannah, Ga.
15. WPTF, Raleigh, N. C.
16. WFLA, Tampa, Fla.

2. The above listings are tentative pending receipt of consent from the Licensees.

3. This letter is classified Confidential in accordance with paragraph 24a (8) AFR 205-1.

FOR THE COMMANDER:

Benet Moorhead
[illegible] MOORHEAD
Captain, USAF
[illegible] Adjutant

AC 1st July
Ans by Ind ltr FF F18098
File AC 191

14 [illegible]

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FILE NUMBER 106.15

C
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Y

DEPARTMENT OF THE AIR FORCE
Headquarters United States Air Force
Washington 25, D. C.

AFOOP-CC-F

26 Jun 55

SUBJECT: Broadcast Fighter Control (BROFICON) Implementation

TO: Commander
Air Defense Command
Ent Air Force Base
Colorado Springs, Colorado

1. Reference is made to your message ADOCE-CR 0941 of 17 March 1955, subject, Approved ADC-FCC BROFICON Plan.

2. Under the approved terms of the Plan, the commercial stations are to be modified at Air Force expense and supplied with control lines and equipment to permit control and modulation by your personnel. Your Command has been charged with the responsibility to provide the communications lines and control equipment. The money for the leased circuits has been put into the FY 1956 Financial Plan, which has not yet been approved. Action to make $75,000.00 available for control equipment, as requested in Part 2B of your message will be taken and you will be advised.

3. Another of your responsibilities is to provide the selected broadcast stations with an auxiliary 3 to 5 KW transmitter and/or antenna for CONELRAD use. This Headquarters is taking action to survey the availability of transmitters which are excess to all the services in the standard broadcast band, with 3 to 5 KW power output and preferably broadbanded for 20 KC to fit into future SAGE systems. You will be notified of the results of this survey.

4. At a meeting held at this Headquarters, the Federal Communications Commission representative furnished data indicating that seventy-three transmitters would be required to fully implement the BROFICON Plan. It is doubtful that the survey mentioned above will provide this quantity. It will have to be determined how many new transmitters must be procured. Inasmuch as availability of any transmitters will not be immediate, direct that you provide a schedule listing the names and locations of commercial stations to be supplied this equipment in order of priority. A phased plan for BROFICON is required.

5. Action to provide you with $250,000.00 to cover costs of antennas, antenna modifications and energy consultant costs is also being taken, in accordance with Part 2C of your message.

6. The matter of replacement parts, which Part 2A of your message indicates will require $100,000.00, is being evaluated. On-off modulation will cause more rapid deterioration to components of the commercial transmitters when BROFICON is being tested or actually operating than would be the case if the transmitters were left on. The Air Force is

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Bas Ltr to ADC subj: Broadcast Fur Cntl (contd)

obligated to reimburse the broadcasters when wear-out resulting from BROFICON test or operation occurs. Whenever a broadcaster claims that a component has been worn out as a result of BROFICON, the Air Divisions should validate the claim. Standard maintenance and operations procedures will then be taken to either replace the component if it is an item carried in Air Force stock or to provide the funds for local purchase. Further instructions will be furnished.

7. Immediate implementation of BROFICON should begin by using stations not requiring Government - furnished transmitters. When we receive the list of stations as outlined in paragraph four, and when the survey of availability of excess transmitters as outlined paragraph three is completed, a phased implementation will be possible.

BY ORDER OF THE CHIEF OF STAFF:

/s/t/ PAUL A. JONES
Colonel, USAF
Deputy
Operations & Commitments Div., D/

[redacted]

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Hq USAF AFOOP-CC-F Subj: Broadcast Fighter Control (BROFICON) Implementation

ADOCR-CR (16 Jun 55) 1st Ind 14 JUL 1955

Hq AIR DEFENSE COMMAND, Ent Air Force Base, Colorado Springs, Colorado

TO: Director of Communications, Headquarters USAF, Washington 25, D. C.

1. Reference paragraph 4, basic correspondence. Attached as inclosure one is a priority listing of BROFICON stations.

2. Reference paragraph 7, basic correspondence. Implementation of BROFICON at stations not requiring government-furnished transmitters is being held in abeyance pending receipt of information from your headquarters pertaining to policy regarding administrative procedures required in modification of the broadcasters' equipment, engineering, and equipment replacement resulting from equipment failure occurring during BROFICON operations.

FOR THE COMMANDER:

C. F. HUMPHREYS
Major, USAF
Asst Command Adj

1 Incl
Stn Priority List

Memo for record:Hq USAF has required this headquarters to furnish a priority list of stations requiring BROFICON and to immediately implement BROFICON at stations not requiring government-furnished transmitters.

DDI - N/R
Incls N/R for AG files
COMEBACK CY REQ.

COMEBACK COPY

..... Not requested, not furnished
CAE Furnished 14 JUL 1955 (Date) (Initials)

A-46619
0450

D. C. [illegible]/gk
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This correspondence is classified CONF in accordance with Par 24, AFR 205-1, 15 Dec 53, or for the reason (s) stated.

CONFIDENTIAL

413 *ADCR 50-12

ADC REGULATION)
50-12)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colo.
31 March 1955

TRAINING

Aircraft Controller's Standard Proficiency Directive

1. Purpose. This Regulation establishes the annual requirements for evaluation of the proficiency of aircraft controllers (AFSC 1644-1641), and minimum training requirements for new aircraft controllers (1641) within ADC. It establishes the progression controllers normally will follow and prescribes an Aircraft Controller's Qualification Record to be maintained for all aircraft controllers.

2. Scope. This Regulation applies to aircraft controllers (AFSC 1644-1641) assigned to ACW units of this command to include AEW&C units.

3. Responsibility. Air division (defense) commanders are responsible for:

a. A continuous evaluation of the proficiency of controllers and directors assigned to ACW or AEW&C units, to include the air division (defense) headquarters.

b. A training program designed to correct deficiencies revealed by this evaluation.

c. Insuring that, insofar as possible, the minimum training requirements are met by all controllers and directors.

4. General. a. Collectively, all officers holding an aircraft controller's AFSC (1644-1641) or performing duty within the career field will be known as "Aircraft Controllers."

(1) Controller: Any aircraft controller performing duty within the career field at an air defense wing, air division (defense), or higher headquarters.

(2) Director: Any aircraft controller performing duty within the career field at an ACW or AEW&C squadron or subordinate unit.

b. Due to the responsibilities of controllers and directors in the air defense of the United States, this command must insure that:

(1) Controllers and directors are highly skilled in the mechanics for the direction of fighter-interceptor

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*This supersedes ADCR 50-12, 23 December 1953.

aircraft in the intercept portion of the air defense mission.

(2) The background of the controller or director is adequate to insure that the best possible decisions are made in the evaluation of the existing air situation and in the commitment, direction, and use of forces for air defense.

c. For the purposes of this Regulation, direction center and airborne operations center are the same.

5. Minimum Interception Requirements. To attain and maintain a high degree of director proficiency, the minimum interception requirements listed below will be adhered to by all direction centers. These are minimum requirements and will not limit the directors in any way. Only under conditions of equipment or facility shortage, or limitations of equipment or facilities, will portions of this Regulation be waived. Officers performing duties as an instructor director will be credited with interceptions which they supervise.

	AFSC 1641		AFSC 1644	
	Actual	Synthetic	Actual	Synthetic
Total Annual	240	480	120	240
Day	(60)	(120)	(60)	(120)
Lead Collision	(180)	(360)	(60)	(120)

a. The minimum established in paragraph 5 should be programmed on a monthly basis to insure an even and continuous training program. Commanders will insure that directors have met their pro-rata minimums before transfer.

b. Day interception requirements may be substituted in their entirety by lead collision course interceptions. All lead collision course interceptions will be conducted using the air mass positioning technique. Actual interceptions may be substituted for synthetic interceptions when conditions permit.

c. Synthetic interceptions conducted as part of a command post exercise or systems training program (the exercising of all the elements of the ACW system within a given area) will be credited as actual interceptions. However, not more than 50 percent of the actual intercepts required may be so obtained.

d. AEW&C directors may complete up to 50 percent of the required minimum interceptions at ground radar installations.

6. Minimum Ascent and Recovery Requirements. To insure that each director is proficient in the ascent and recovery of fighter-

interceptors under adverse weather conditions, fighter-interceptors will be scrambled and recovered simulating IFR conditions whenever possible. The minimum annual requirements for directors will be sixty such ascents and recovery missions. In addition, each director will conduct a minimum of one hundred and twenty synthetic ascent and recovery missions in conjunction with the minimum synthetic interception requirements in paragraph 5. AEW&C directors are excluded from ascent and recovery requirements. Ascent and recovery practices will include all recovery conditions and may be conducted in conjunction with fighter-interceptor squadron profile missions.

7. Controller and Director Evaluation. Within three months of the date of initial assignment, and at least once each six months thereafter, the following factors will be evaluated by interview and by observation of each controller's and director's performance of operational duties by an instructor director. (Qualifications for an instructor-director are outlined in ADCR 50-22.) Observation will be made of a minimum of two lead collision course interceptions per director, with special attention being given to:

a. Knowledge of the operational capabilities and limitations of air defense organizations and equipment within the sector, to include all ADC operational fighters and augmentation forces scheduled for the sector of responsibility and antiaircraft artillery and ground observer units.

b. Knowledge of the effects of ECM and procedure for minimizing its effects.

c. Knowledge of air traffic control procedures and techniques.

d. Knowledge of capabilities and limitations of air navigation aids. Knowledge of frequency and call signs of all air navigation aids in the areas of possible recovery.

e. Knowledge of auxiliary airfields within fighter ranges and the recovery facilities available.

f. Skill in the ascent and recovery of fighter-interceptors under adverse weather conditions.

**g. Judgment in the assignment and use of weapons to counter any hostile air attack before attack reaches its objective. This requires a thorough knowledge of weapon capability, operating characteristics, deadliness against specified targets, numbers available, and the optimum tactics for their effective employment.

**Applies primarily to controllers.

***h. Skill in the evaluation of the operational effectiveness of radar and radio equipment and knowledge of remedial action necessary to eliminate sub-standard conditions.

***i. Skill in the evaluation of weather displays or data and the application of that information in the selection of a geographical area for the point of intercept.

j. Skill in the establishment and/or conducting of training programs for ACW operations personnel.

k. Skill in the use of R/T vocabulary and procedures.

l. Qualities of self-confidence, force, initiative, and aggressiveness in the use of air weapons under the stress of actual air defense missions, aircraft emergencies, and adverse weather conditions.

m. Diction and tonal qualities of voice.

n. Skill in conducting intercept operations under remote control conditions.

o. Knowledge and skill in conducting lead collision course interceptions using the air mass positioning technique.

8. Minimum Training (1641). The following minimum training requirements will be adhered to for all directors at the entry level:

a. Perform duty as a movements-identification officer at a direction center for a minimum of two months. This training may be extended over the mandatory year at the entry level.

b. Perform duty as a duty director at a direction center for a minimum of six months.

c. Perform duty as a surveillance officer at a direction center for a minimum of four months.

d. Performing duty in the positions listed above does not preclude training in the other positions in the direction center. Each officer should be systematically trained for each position.

9. Controller-Director Progression. To standardize the controller-director progression within the ADC and insure the maximum experience and ability at each level of responsibility, the following progression should be followed, insofar as possible, in the advancement of controllers and directors:

***Applies primarily to directors.

a. Movements-identification officer at a direction center.

b. Duty director at a direction center.

c. Air surveillance officer at a direction center.

d. Senior director at a direction center.

e. Surveillance officer at a control center.

f. Duty controller at a control center.

g. Senior controller at a control center.

h. Operations officer at a direction center.

i. COC operations officer at an air division (defense).

j. Defense force controller.

k. ADC command controller.

l. ACW staff or command position (includes chief controller at control center).

10. Controller-Director Qualification Records. To allow commanders to have ready access to the total experience and the qualifications of each controller and director, the Controller-Director Qualification Record (Attachment 1) will be maintained for all officers possessing AFSC 1641 or 1644. This form will be locally reproduced.

a. Initially, the information required in Column C of the Controller-Director Qualification Records will be obtained by interview with each controller or director and will be his estimate.

b. A monthly record of all applicable items will be maintained for controllers and directors at the employing unit. Controller-Director Qualification Records will be totaled at the end of each calendar year and a new form initiated to which totals in Column C will be posted.

c. Upon transfer within the ADC, Controller-Director Qualification Records will be forwarded with other personal records to the new organization commander.
(ADOOT)

BY ORDER OF THE COMMANDER:

OFFICIAL:
Walter W. Robinson
WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

GEORGE F. SMITH
Major General, USAF
Chief of Staff

1 Attachment:
Controller-Dir Qual Rec

DISTRIBUTION: A

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ADC CONTROLLER - DIRECTOR QUALIFICATION RECORD

19 __________

(Name) (Grade)

(AFSN) (AFSC) (Date awarded 1635)

(A) Item No.	(B) Item Description	(C) * Totals Previous Experience	(D) Totals This Year By Month					
			1 7	2 8	3 9	4 10	5 11	6 12
1.	Total Days Duty as Dir Cen Surveillance Officer							
2.	Total Days Duty as Mvmts Identification Officer							
3.	Total Days Duty as Dir (Actually Dir Acft or Conducting Intcps)							
4.	Total Days Duty as Sr Dir							
5.	Total Days Duty as Sq Oprs Off							
6.	Total Days Duty as Con Cen Surveillance Officer							
7.	Total Days Duty as Con Cen Duty Controller							
8.	Total Days Duty as Control Center Sr Controller							
9.	Total Days Duty as COC Opr Duty Officer							
10.	Total Days Duty as AC&W Staff or Command							
11.	Total Actual Intercepts (Day)							
12.	Total Actual Intercepts (All - Weather)							
13.	Total Synthetic Intercepts							
14.	No. of Comd Post Exercises Participated in (Con Cen only)							
15.	Total Hrs Cross Training w/ Asgd Ftr Intercept Units							
16.	No. Msns Navig Assist (Actual)							
17.	No. Msns Navig Assist (Simulated)							
18.	No. Msns Ascent and Recovery (Actual)							
19.	No. Msns Ascent and Recovery (Synthetic)							

* Expressed as months when totaling days of duty

NOTE: For the purposes of this Regulation, a day is considered as a shift. In the case of AEW&C operations, 6 hours is to be considered as a shift.

Attachment 1, ADCR 50-12, 31 Mar 55

UNCLASSIFIED

COPY #13

EAOOT-TS 30 August 1954

SUBJECT: Director-Pilot Cross-Training

TO: Commander
Air Defense Command
Ent Air Force Base
Colorado Springs, Colorado

1. Under the provisions of Air Defense Command Regulation 50-21, 5 April 1954, a cross-training period of one day every two months is required of each director and/or fighter-interceptor pilot of our units. This program has two major drawbacks.

a. The training given is limited both in scope and quantity. We feel that this training is of sufficient importance to warrant a program more detailed and intensive in nature than can be given in one day.

b. Direction centers are often many miles from their interceptor bases and travel time is sometimes twice as great as the training time actually realized. This works a hardship on both fighter-interceptor and aircraft control and warning squadrons. Their combat readiness is impaired by the loss of operational personnel for excessive periods.

2. To minimize time lost to travel and to improve the cross-training received by our directors and interceptor pilots, we propose to establish a three to five day period of instruction in the areas listed below. Subsequent cross-training should consist of no more than one day for each six months thereafter.

a. Directors:

(1) (Lecture and demonstration) Working facilities and internal communications on the fighter-interceptor base.

(2) (Lecture) Capabilities and limitations of the fighter-interceptor aircraft.

(3) (Lecture) Design characteristics and operating limitations of fire control system.

(4) (Learn by doing) A fire control system check-out both on the mock-up and in the applicable aircraft.

(5) (Learn by doing) Familiarization flights in F-94, F-89

or (for F-89D squadrons only) T-33 aircraft. Familiarization flights should include at least one training intercept under the control of the direction center to which the director is assigned.

b. Fighter-Interceptor Pilots:

(1) (Lecture and demonstration) Working facilities and Communications available to the directors.

(2) (Lecture and demonstration) Capabilities and limitations of direction center radio and radar.

(3) (Learn by doing) The surveillance and identification functions of the direction center.

(4) (Learn by doing) Organization of the control team within the direction center. This portion should include at least one training interception using aircraft from the squadron to which the pilot is assigned.

3. The training outlined above should be required for:

a. Directors not later than three months subsequent to:

(1) Date of assignment to a direction center.

(2) Date direction center assumes control of new fighter-interceptor squadron.

(3) Date fighter-interceptor squadron completes transition to a new type aircraft.

b. Fighter-interceptor pilots not later than three months subsequent to:

(1) Date of assignment to a unit scrambled by a direction center at which the pilot has had no previous training.

(2) Date a new direction center assumes control of the fighter-interceptor squadron.

4. We are asking our air divisions (defense) to consider and comment upon the above plan. It is requested that you review the provisions of Air Defense Command Regulation 50-21 to determine if such a program would meet your requirements for director-pilot cross-training.

FOR THE COMMANDER:

J. W. FOUNTAIN, JR.
Major, USAF
Asst Adjutant

COPY 41

HEADQUARTERS
AIR DEFENSE COMMAND
Ent Air Force Base
Colorado Springs, Colorado

ADOOT-C 13 September 54

SUBJECT: Director-Pilot Cross-Training

TO: Commander
Western Air Defense Force
Hamilton Air Force Base
Hamilton, California

1. Attached hereto is copy of Eastern Air Defense Force letter, subject as above, dated 30 August 1954, recommending changes in the Director-Pilot Cross-Training Regulation (ADCR 50-21), for your comments and/or recommendations.

2. Request your comments be forwarded to this command to arrive not later than 1 October 1954.

BY ORDER OF THE COMMANDER:

1 Incl
Cy EADF ltr
dtd 30 Aug 54

EAOOT-TS 30 Aug 54

SUBJECT: Director-Pilot Cross-Training

TO: Commander
Air Defense Command
Ent Air Force Base
Colorado Springs, Colorado

1. Under the provisions of Air Defense Command Regulation 50-21, 5 April 1954, a cross-training period of one day every two months is required of each director and/or fighter-interceptor pilot of our units. This program has two major drawbacks.

a. The training given is limited both in scope and quantity. We feel that this training is of sufficient importance to warrant a program more detailed and intensive in nature than can be given in one day.

b. Direction centers are often many miles from their interceptor bases and travel time is sometimes twice as great as the training time actually realized. This works a hardship on both fighter-interceptor and aircraft control and warning squadrons. Their combat readiness is impaired by the loss of operational personnel for excessive periods.

2. To minimize time lost to travel and to improve the cross-training received by our directors and interceptor pilots, we propose to establish a three to five day period of instruction in the areas listed below. Subsequent cross-training should consist of no more than one day for each six months thereafter.

a. Directors:

(1) (Lecture and demonstration) Working facilities and internal communications on the fighter-interceptor base.

(2) (Lecture) Capabilities and limitations of the fighter-interceptor aircraft.

(3) (Lecture) Design characteristics and operating limitations of fire control system.

(4) (Learn by doing) A fire control system check-out both on the mock-up and in the applicable aircraft.

(5) (Learn by doing) Familiarization flights in F-94, F-89 or (for F-86D squadrons only) T-33 aircraft. Familiarization flights should include at least one training intercept under the control of the direction center to which the director is assigned.

b. Fighter-Interceptor Pilots:

(1) (Lecture and demonstration) Working facilities and communications available to the directors.

(2) (Lecture and demonstration) Capabilities and limitations of direction center radio and radar.

(3) (Learn by doing) The surveillance and identification functions of the direction center.

(4) (Learn by doing) Organization of the control team within the direction center. This portion should include at least one training interception using aircraft from the squadron to which the pilot is assigned.

3. The training outlined above should be required for:

a. Directors not later than three months subsequent to:

(1) Date of assignment to a direction center.

(2) Date direction center assumes control of new fighter-interceptor squadron.

(3) Date fighter-interceptor squadron completes transition to a new type aircraft.

b. Fighter-interceptor pilots not later than three months subsequent to:

(1) Date of assignment to a unit scrambled by a direction center at which the pilot has had no previous training.

(2) Date a new direction center assumes control of the fighter-interceptor squadron.

4. We are asking our air divisions (defense) to consider and comment upon the above plan. It is requested that you review the provisions of Air Defense Command Regulation 50-21 to determine if such a program would meet your requirements for director-pilot cross-training.

FOR THE COMMANDER:

Hq ADC, ADOOT-C. Subject: Director-Pilot Cross Training

WDOTN-3 (13 Sep 54) 1st Ind 29 Sep 54

HQ WESTERN AIR DEFENSE FORCE, Hamilton AFB, Hamilton, California

TO: Commander, Air Defense Command, Ent AFB, Colorado Springs, Colorado

1. This headquarters generally concurs with the proposal contained in the inclosure to the basic correspondence. It is believed, however, that the training period for directors and interceptor pilots should be limited to a three day period. This would tend to minimize the periods of course inactivity. To compensate for any curtailment of activities due to inclement weather, provisions should be made to extend the course an additional two days.

2. The following additional suggestions are offered for your consideration:

a. Stipulate that the air division commander will be responsible for the overall supervision of the program.

b. Require air division commanders to appoint project officers who will be responsible for maintaining adequate briefing folders, to include lectures and graphic aids.

c. Limit the number of "students" per class commensurate with facilities available to adequately indoctrinate the personnel, yet maintain a high level of individual interest.

d. Require pilots to conduct at least one actual interception and let-down, preceded by as many synthetic missions as practicable.

e. Retain the training program as outlined in ADCR 50-21, adding those Eastern Air Defense Force suggested items that are not previously included.

f. To present defense wing and group staff operations officers with a more thorough indoctrination period, expand their initial training period to two days while retaining the program outlined in ADCR 50-21. Subsequent individual training periods can be reduced to one day.

g. Include ADCC controllers in the interceptor squadron cross-training program on the same basis as directors. Visits to defense wing or defense group operations may be conducted where possible. Provide for one day indoctrination tours by interceptor pilots to associated ADCC.

h. Amend the program outlined in ADCR 50-21 to include interceptor pilot participation in at least one RAND Systems Training Program exercise where equipment is available.

i. Require a record of cross-training be included in individual pilot training folder.

COPY

HEADQUARTERS
AIR DEFENSE COMMAND
Ent Air Force Base
Colorado Springs, Colorado

ADOOT-C 30 Aug 54

SUBJECT: Director-Pilot Cross-Training

TO: Commander
Central Air Defense Force
Grandview Air Force Base
Grandview, Missouri

1. Attached hereto is copy of Eastern Air Defense Force letter, subject as above, dated 30 August 1954, recommending changes in the Director-Pilot Cross-Training Regulation (ADCR 50-21), for your comments and/or recommendations.

2. Request your comments be forwarded to this command to arrive not later than 1 October 1954.

BY ORDER OF THE COMMANDER:

1 Incl
Cy EADF ltr
dtd 30 Aug 54

B/L fr Hq ADC, ADOOT-C, Subject: Director-Pilot Cross-Training

O&T-R (13 Sep 54) 1st Ind 22 Oct 1954

HQ CENTRAL AIR DEFENSE FORCE, Grandview Air Force Base, Grandview, Mo.

TO: Commander, Air Defense Command, Ent Air Force Base, Colorado
Springs, Colorado

1. Reference paragraph 1, Inclosure 1, the Director-Pilot Cross Training Program is not limited to one (1) day, as the regulation establishes this period of time as a minimum only.

2. Reference paragraph 2, Inclosure 1, concur with extending the period of training days as required, and recommend the refresher training be based on factors requiring subsequent cross-training, such as, complexity of control, navigation and flying conditions; modification of equipment or utilization of new type of equipment; and the experience level of Directors, Controllers and pilots. The experience level of personnel may determine the type of cross-training required to obtain the desired results. This training may be in a briefing form or actual visit by the individual concerned.

FOR THE COMMANDER:

1 Incl
n/c

ADC REGULATION)
50-21A)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colo.
11 March 1955

TRAINING

Controller/Director-Pilot Cross Training

ADC Regulation 50-21, 5 April 1954, is changed as follows:

* * *

5. Minimum Cross Training Requirements. The following minimum cross training requirements are established:

a. Each director will devote a minimum of three days each six months to cross training at an associated fighter-interceptor squadron.

b. Each fighter-interceptor pilot will devote a minimum of three days each six months at an associated ACW radar installation.

c. Each controller will devote a minimum of two days each six months to cross training at a defense wing, and/or a fighter-interceptor squadron.

d. Each controller will devote a minimum of two days each six months to familiarization at an associated direction center.

e. Each defense wing and defense group operations staff officer will devote a minimum of two days each six months at an air division (defense) control center.

f. Each defense wing and defense group operations staff officer will devote a minimum of two days each six months at an associated direction center.

g. Visits by directors to control centers for familiarization will be made whenever possible.

* * *

(ADOOT)

BY ORDER OF THE COMMANDER:

OFFICIAL:

Walter W. Robinson
WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

GEORGE F. SMITH
Major General, USAF
Chief of Staff

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ADC REGULATION)
50-22A)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colo.
17 March 1955

TRAINING

Evaluation of Directors

ADC Regulation 50-22, 26 July 1954, is changed as follows:

* * *

7. Classification of Directors. To reflect the proficiency of all directors assigned to ACW units, commanders will classify directors by their level of training. The number of directors reported in Item 4, Column B, sub-columns 1, 2, 3, 4, and 5 of ADC Form 75 will equal the number of directors assigned to the reporting unit as of the last day of the month. A director can be reported in only one category.

a. The categories are as follows:

(1) Below entry level.

(2) Entry Level: AFSC 1641 (directors will be carried in this category until awarded a 1644 AFSC.)

(3) Directors, AFSC 1644, requiring considerable training to be fully combat ready (commander's estimate).

(4) Directors, AFSC 1644, requiring little training to be fully combat ready (commander's estimate).

(5) Directors, AFSC 1644, fully combat ready.

Subparagraphs 7b, c, d, and e are deleted.

* * *

(ADOOT)

BY ORDER OF THE COMMANDER:

OFFICIAL:

GEORGE F. SMITH
Major General, USAF
Chief of Staff

Walter W. Robinson
WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

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(AF - ADC, Colorado Springs, Colo.)

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422 *ADCR 51-2

ADC REGULATION)
51-2)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colo.
1 July 1955

FLYING TRAINING

Standard Checkout and Transition

1. <u>Purpose</u>. This Regulation establishes transition training programs for aircrews checking out in Air Defense Command aircraft and simulators.

2. <u>Scope</u>. This Regulation applies to personnel checking out and transitioning Air Defense Command aircraft.

3. <u>Responsibility</u>. Commanders will insure that aircrew members of their command comply with this Regulation.

4. <u>General</u>. The exact requirements for checkout, re-checkout and transition in each type aircraft assigned to the Air Defense Command are contained in supplements to this Regulation. Subordinate commanders will establish local checkout, re-checkout, and transition requirements for those aircraft for which no Air Defense Command supplement exists. At any time an aircrewman in transition training fails to show satisfactory progress, he will be required to repeat any or all missions of the program.

5. <u>Current Status</u>. To retain current status in a particular type aircraft, a pilot must have flown one hour and accomplished two landings in that type aircraft during the preceding 60 days. Pilot's who have completed transition training but are not current will be re-checked out by an IP. Re-check flights are considered "transition flying" under the purview of ADCR 55-14.

6. <u>Standard Transition Briefing</u>. Data contained in this briefing guide will be covered prior to each transition mission.

a. <u>General Information</u>:

(1) Number and type of aircraft on mission.

(2) Designation of flight commander.

(3) Start engine, taxi, takeoff, and join-up procedures.

(4) Communication channels and call signs, radio security, navigational aids, and recognition signals.

b. <u>Weather Data</u>:

---

*This supersedes ADCR 51-2, 6 December 1954.

(1) Local and forecast

(2) Alternate and emergency landing fields

c. Operating Data:

(1) Fuel

(2) Oxygen

(3) Personal equipment

d. Emergency Data: Emergency and safety procedures

e. Mission Data: Cover all items listed for the applicable transition mission.

f. Critique:

(1) The critique will cover all items listed under applicable transition mission for the purpose of pointing out errors and general discussion of the mission.

(2) The instructor will certify satisfactory completion of each mission before the transition aircrewman is permitted to proceed to the next transition mission.

7. Transition Mission Card. A transition mission card will be produced locally for each transition mission in the program. These cards will be made up on 5"x8" cards in accordance with the sample format in Attachment 1. A card will be completed for each mission and filed in the transition aircrewman's training folder.

8. Certification. Upon satisfactory completion of the checkout or re-check, unit commanders will insert a certificate, to be locally reproduced in the format of Attachment 1 hereto, in the AF Form 5 of the transition student concerned, in accordance with paragraph 22c(7) AFR 60-25, and will insure such information is recorded in section 25, AF Form 5, in accordance with paragraph 18, AFR 60-25.

9. Weather. All pilot transition missions will be accomplished in accordance with Visual Flight Rules.
(ADOOT)

BY ORDER OF THE COMMANDER:

OFFICIAL:

GEORGE F. SMITH
Major General, USAF
Chief of Staff

WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

2 Attachments:
Certificate Format
Mission Format

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CERTIFICATE

____
(Unit Designation)

1.______________________________________ has completed initial
(Name)

_____________________ checkout requirements in the ________________
(crew position) (Type Acft)

on ________________________________ in accordance with ADCR 51-2.
(Date)

____
(Instructor's Signature)

____
(Opns Officer's Signature)

2. ____________________________________ has completed transition
(Name)

training in the ____________________ on ___________________________
(Type Acft) (Date)

in accordance with ADCR 51-2.

____
(Instructor's Signature)

____
(Opns Officer's Signature)

Attachment 1, ADCR 51-2, 1 July 1955.

3. ________________________ has been re-checked in
(Name)

________________ on ____________________ and found proficient
(Type Acft) (Date)

in accordance with ADCR 51-2.

____
(Instructor's Signature)

____
(Opns Officer's Signature)

SAMPLE TRANSITION MISSION CARD

TRANSITION MISSION # ________ TRANSITION PILOT/RO ____________

TYPE AIRCRAFT ______________ DATE ________________________

FLYING TIME THIS MISSION _____ TOTAL TIME THIS AIRCRAFT ________

MISSION PROCEDURES:

a.

b.

c.

d.

etc.

PATTERN GRADE _________

LANDING GRADE _________

INSTRUCTOR PILOT COMMENTS: ______________________________

____

____

____

____

____

____
(Instructor's Signature)

Attachment 2, ADCR 51-2, 1 July 1955.

SUPPLEMENT I)
ADC REGULATION)
51-2)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colo.
1 July 1955

FLYING TRAINING

Standard F-86D Checkout and Transition

1. Purpose. This directive establishes a transition training program for personnel checking out in Air Defense Command F-86D aircraft.

2. Scope. This directive applies to all personnel flying Air Defense Command F-86D aircraft.

3. Responsibility. Commanders will insure that the provisions of this directive are complied with.

4. Checkout. No pilot will be checked out in the F-86D until he has at least fifty hours of jet fighter or T-33 first pilot time, ten hours of which must have been flown within sixty days prior to checkout, and possesses a current jet instrument card.

5. Transition. a. Pilots falling under any one of the following three categories will complete the entire transition program in Attachment 1.

(1) Those who have never completed an F-86D transition program.

(2) Those who have not flown the F-86D in the preceding twelve months.

(3) Other pilots at the squadron commander's discretion.

b. Pilots whose currency has lapsed but do not fall in categories (2) or (3) above will complete as a minimum for re-checkout the following:

(1) ADC Standard F-86D questionnaire.

(2) Read PIF.

(3) A satisfactory T-33 proficiency check ride.

(4) Transition Missions 1, 2 and 7.

(ADOOT)

BY ORDER OF THE COMMANDER:

OFFICIAL:

Walter W. Robinson
WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

GEORGE F. SMITH
Major General, USAF
Chief of Staff

1 Attachment:
Std F-86D Checkout and Transition

DISTRIBUTION: A

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*This supersedes Supplement I, ADCR 51-2, 6 December 1954.

STANDARD F-86D PILOT CHECKOUT AND TRANSITION

1. The transition program will be divided into two phases, ground and flying. MTD training is desired. If this is not available, the ground phase program will be accomplished as outlined.

a. Ground Phase. Transitioning pilot will:

(1) Read, understand, and certify to the reading of the PIF and Flight Handbook.

(2) Receive instructions and engineering lectures covering the following:

(a)	Aircraft general	1 hour
(b)	Engine fuel system	1
(c)	Integrated electronic engine control system	1
(d)	Utility hydraulic system	1
(e)	Aircraft engine	1
(f)	Electrical system	1
(g)	Thermal anti-ice and pressurization system	1
(h)	Flight control systems	1
(i)	Oxygen system	½
(j)	Emergency procedures	2
(k)	Auto pilot	½
(l)	Communications	1
(m)	Flight characteristics, high and low speed	½
(n)	Pre-flight checklist and daily inspection	1
(o)	Flight simulator (complete missions listed in Supplement IA)	10
		23½ hours

Attachment 1, Supplement I, ADCR 51-2, 1 July 1955.

(3) Complete (ADC Standard F-86D) questionnaire and have it reviewed by the instructor pilot, in detail, with emphasis on emergency procedures.

(4) Receive a thorough briefing on local area and traffic pattern.

(5) Flight Line Indoctrination.

(a) Complete two hours cockpit time. Transition pilot will demonstrate ability to readily apply corrective aircraft emergency procedures to satisfaction of IP.

(b) Complete a blindfold cockpit check to satisfaction of IP.

(c) Complete exterior pre-flight, pre-start, start, A/B operation, and lockup checks to satisfaction of IP. Complete one emergency fuel system start for familiarization. All other starts will be made on the automatic system.

(d) Observe at least five F-86D takeoffs and landings from mobile control.

b. Flying Phase:

(1) All pilots will demonstrate their flying proficiency in a T-33 and complete three dual landings to the satisfaction of an IP prior to checking out in the F-86D. The trainee will receive dual and/or solo flights in the T-33 to meet the minimum flying requirements of this Regulation plus additional training if deemed necessary.

(2) The F-86D flying phase will consist of eleven missions which will be conducted in accordance with each mission outline.

(3) In no case will the transition pilot be permitted to fly any F-86D mission other than a transition mission until he has satisfactorily completed transition training.

2. Standard F-86D Transition Missions:

a. Mission #1 and #2 (Familiarization)

(1) Purpose. This mission will familiarize the transition pilot with flying characteristics of the F-86D.

(2) Instructor Pilot Requirements. Instructor pilots are required in chase aircraft, mobile control unit, and for supervision of walk-around inspection, start, briefing and mission critique.

(3) Fuel Requirements. Full internal and external fuel load. Entry on initial approach for landing will be made with at least 1000# fuel remaining.

(4) Briefing. Briefing for this mission will include all items listed in Standard Transition Briefing of this Directive. In addition, emphasis will be placed on stalls, spin recovery, traffic and landing pattern, and high sink rate of the F-86D on flare-out. IP will brief on the importance of all engine starts being made on the automatic system.

(5) Procedures. Transition pilot will:

(a) Takeoff with A/B and climb to 40,000' at TO climb speeds.

(b) At 40,000' come out of A/B.

(c) At 100% military power practice turns, shallow dives and climbs.

(d) Descend to 25,000 feet and practice general air work (turns, climbs, dives).

(e) Above 20,000 feet practice stalls.

#1. Aircraft clean 70% power.

#2. Gear, wing flaps, speed brakes extended 70%.

#3. High speed stalls at 100% power, 300K IAS.

(f) At 10,000 feet or higher, practice simulated landing pattern.

(g) Make simulated flame-out pattern, initiating go-around at 200 feet.

(h) Enter initial with 1500# fuel and make a landing approach with a go-around.

(i) Re-enter initial and make a full stop drag chute landing.

(6) Critique.

b. Mission #3 (Familiarization - High Altitude)

(1) Purpose. This mission will familiarize the transition pilot with F-86D high altitude flight characteristics.

(2) Instructor Pilot Requirements. Instructor pilots are required for mobile control unit, supervision of walk-around inspection and start, briefing and critique of mission.

(3) Fuel Requirements. Full internal and external tanks. Entry on initial approach for landing will be with at least 1000# fuel remaining.

(4) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on maximum A/B operation time, re-lighting A/B and aircraft flight characteristics at high altitude and high speeds.

(5) Procedures. Transition pilot will:

(a) Takeoff with A/B and climb to 45,000 feet using TO climb speeds.

(b) At 45,000 feet practice turns, climbs, shallow dives.

(c) Come out of A/B to 100% military.

(d) As aircraft begins to lose altitude, re-light A/B.

(e) Come out of A/B and descend to 25,000 feet at Mach .92.

(f) From 30 miles out at 25,000 feet simulate a flame-out gliding to home base and establishing flame-out pattern. Initiate go-around at 200 feet.

(g) Enter initial and make a full stop drag chute landing.

(6) Critique.

c. Mission #4 (Familiarization with Alternate Systems)

(1) Purpose. This mission will familiarize the transition pilot with F-86D alternate and emergency systems.

(2) Instructor Pilot Requirements. IPs are required for mobile control unit, briefing, and critique.

(3) Fuel Requirements. Full internal and external load. Enter initial approach with not less than 1000# fuel remaining.

(4) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on use of alternate flight control system, emergency fuel system, and manual operation of the variable nozzle.

(5) Procedures. Transition pilot will:

(a) Takeoff with A/B and climb to 40,000 feet using TO climb speeds and record the following:

ALT	V/S	IAS	FUEL FLOW	ELAPSED TIME
10,000	---	---	---------	------------
20,000	---	---	---------	------------
30,000	---	---	---------	------------
40,000	---	---	---------	------------

(b) Come out of A/B and descend to 20,000 feet.

(c) At 20,000 feet select alternate flight control system and perform turns, dives, and climbs.

(d) Return to normal flight control system.

(e) Retard throttle to idle and select emergency fuel system. Change power settings, closely observing exhaust temp during engine acceleration (max TPT 685°C).

(f) Return to electronic fuel control system.

(g) At 100% military place variable nozzle switch in manual.

(h) Manually open nozzles to full open. Observe decreased TPT and loss of thrust.

(i) Return nozzle switch to automatic.

(j) Return to base and practice simulated flame-out approach.

(k) Enter initial and make a full stop drag chute landing.

(6) Critique.

d. Mission #5 (Day Hooded Instruments)

(1) Purpose. This mission will familiarize the transition pilot with instrument flying in the F-86D.

(2) Instructor Pilot Requirements. IP required for mobile control unit, briefing, and critique. Chase aircraft required, but pilot need not be IP.

(3) Fuel Requirements. Full internal and external. Enter initial approach for landing with at least 1000# fuel.

(4) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on local jet departure and letdown procedures and instrument flying technique in the F-86D.

(5) Procedures. Transition pilot will:

(a) Simulate an ITO with A/B. (Hood will not be used)

(b) Come out of A/B at 5,000 feet.

(c) Climb to 25,000 feet using local IFR departure route.

(d) Practice basic instruments.

(e) Practice radio range orientation and aural null procedures.

(f) Make published jet letdown.

(g) Enter initial and make a full stop drag chute landing.

(6) Critique.

e. Mission #6 (Day Instrument)

(1) Purpose. This mission will give the transition pilot practice in low approaches.

(2) Instructor Pilot Requirements. IP required for briefing and critique. Chase aircraft required, but pilot need not be IP.

(3) Fuel Requirements. Full internal and external load. Enter initial approach with at least 1000# fuel.

(4) Briefing. Briefing for this mission will include all items listed in Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on power settings during GCA and ILAS patterns and approaches, GCI letdown procedures.

(5) Procedures. Transition pilot will:

(a) Simulate an ITO with A/B. (Hood will not be used)

(b) Come out of A/B at 5,000 feet. Climb to 25,000 feet.

(c) Contact GCI station for GCI letdown.

(d) Make GCI letdown to GCA pattern.

(e) Make GCA approach from GCI letdown and remain in GCA pattern for second approach.

(f) Make two ILAS approaches if ILAS approach facilities are available.

(g) Make a visual landing out of final instrument approach, if wind conditions permit, using drag chute after touchdown.

(6) Critique.

f. Mission #7 (Formation and Acrobatics)

(1) Purpose. This mission will familiarize the transition pilot with close formation and individual acrobatics.

(2) Instructor Pilot Requirements. IP required in lead aircraft, and for briefing and critique.

(3) Fuel Requirements. Full internal and external load. Enter initial for landing with at least 1000# fuel remaining.

(4) Briefing. Briefing will include all items listed in Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on stall, spin recovery, formation, join-up, and full explanation of airspeeds and power settings to be used during loops, Immelmanns and barrel rolls.

(5) Procedures. Transition pilot will:

(a) Make individual takeoff in A/B with IP leading.

(b) Come out of A/B at 5,000 feet.

(c) Join formation with IP.

(d) Climb to 25,000 feet in formation.

(e) At 25,000 feet maintain close formation with IP during climbs, dives, turns.

(f) Descend to 15,000 feet above terrain in formation.

(g) Separate and perform following individual acrobatic maneuvers under observation of IP: (Minimum recovery altitude is 10,000 feet above terrain.)

1. 3 barrel rolls to right

2. 3 barrel rolls to left

3. 2 loops

4. 2 Immelmanns

(h) Rejoin in close formation on IP.

(i) Maintain close formation onto initial approach.

(j) Follow IP on break (min 3 second interval).

(k) Full stop landing using drag chute.

(6) Critique.

g. Mission #8 (Auto Pilot Familiarization)

(1) Purpose. This mission will familiarize the transition pilot with auto pilot capability.

(2) Instructor Pilot Requirements. IP required for briefing and critique.

(3) Fuel Requirements. Full internal and external load. Enter initial approach for landing with at least 1000# fuel remaining.

(4) Briefing. Briefing for this mission will include all items listed in Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on auto pilot operation, and on landing without drag chute.

(5) Procedures. Transition pilot will:

- (a) Takeoff with A/B.
- (b) Come out of A/B at 5,000 feet.
- (c) With wings level, engage auto pilot.
- (d) Continue climb to 35,000 feet making slight turns to right and left using auto pilot.
- (e) At 35,000 feet make normal turns using auto pilot.
- (f) Reduce throttle to idle RPM. Auto pilot pitch control to max dive. At 400K IAS extend speed brakes and note auto pilot pitch control.
- (g) Pull out of dive at 20,000 feet using auto pilot pitch control.
- (h) Disengage auto pilot and engage at banks up to 60°. Note attitude change. Engage and disengage at different pitch attitudes and note auto trim.
- (i) Make jet letdown using auto pilot.
- (j) Make coupled ILAS approach if ILAS is available.
- (k) Enter initial and make full stop landing <u>without</u> drag chute.

h. Mission #9 (Cruise Control)

(1) Purpose. This mission will familiarize the transition pilot with fuel consumption during climb and cruise in the F-86D.

(2) Instructor Pilot Requirements. IP required for briefing and critique.

(3) Fuel Requirements. Full internal and external load. Enter initial approach for landing with at least 1000# fuel remaining.

(4) Briefing. Briefing will include all items listed in Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on use of mach indicator in maintaining proper climb schedule, cruise power settings, use of cruise control charts.

(5) Procedures. The transition pilot will:

(a) Takeoff with A/B and climb to 5,000 feet.

(b) Come out of A/B and climb at TO climb speeds.

(c) Continue climb to 35,000 feet and record the following:

ALT	V/S	IAS	FUEL FLOW	ELAPSED TIME
10,000	---	---	---------	------------
15,000	---	---	---------	------------
20,000	---	---	---------	------------
25,000	---	---	---------	------------
30,000	---	---	---------	------------
35,000	---	---	---------	------------

(d) Record pounds fuel remaining at 35,000 feet.

(e) Extract from Appendix I, TO 1F-86D-1 max range cruise data and compare with actual as follows: 5 min each alt

	DATA FROM T.O.			ACTUAL	
	IAS	%	LB/HR	IAS	LB/HR
35,000	---	---	-----	---	-----
30,000	---	---	-----	---	-----
20,000	---	---	-----	---	-----
15,000	---	---	-----	---	-----

(f) Practice simulated flame-out landing, initiating go-around at 200 feet.

(g) Make full stop landing using drag chute.

i. Mission #10 (Navigation)

(1) Purpose. This mission will familiarize the transition pilot with cruise control, flight planning and ARTC procedures.

(2) Instructor Pilot Requirements. IP required for briefing and critique. Chase pilot required, but pilot need not be an IP.

(3) Fuel Requirements. Full internal and external load. Instrument approach with 1000# fuel remaining on final approach.

(4) Briefing. Briefing will include all items listed in Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on proper power settings for climb and cruise, maintaining flight log, accuracy in ETA over check points, monitoring fuel consumption, and position reporting.

(5) Procedures. Transition pilot will:

(a) Accomplish a 500 nautical mile round-robin navigation flight. Prior to takeoff a navigation log will be prepared containing the following:

1. Time for climb

2. Distance for climb

3. Fuel for climb

4. Distance each leg

5. ETE between reporting points

6. Fuel remaining at reporting points

7. Fuel remaining home base letdown fix

8. Fuel remaining after 10 minutes holding at fix

(b) Distance between position reports will not be over 200 nautical miles.

(c) DD Form 175 will be filed.

(d) Instructor pilot will check ATEs against ETEs.

(e) Upon arrival over home base, flight will hold for ten minutes at 20,000 feet minimum altitude.

(f) Standard jet letdown will be accomplished.

(g) ILAS or GCA approach will be accomplished.

(h) Full stop landing using drag chute will be accomplished out of instrument approach if wind conditions permit.

(6) Critique.

j. Mission #11 (Night)

(1) Purpose. This mission will familiarize the transition pilot with night flying in the F-86D.

(2) Instructor Pilot Requirements. IP required for briefing, mobile control and critique.

(3) Fuel Requirements. Full internal and external load. Enter initial approach with at least 1000# fuel remaining.

(4) Briefing. Briefing will include all items listed in Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on aircraft cockpit and external lighting, field lighting, emergency procedures, and local area check points.

(5) Procedures. Transition pilot will:

(a) Takeoff with A/B.

(b) Come out of A/B at 5,000 feet.

(c) Climb to 25,000 feet.

(d) Fly round-robin flight over prime check points in local area.

(e) Full stop landing with drag chute.

*Supplement IA, ADCR 51-2

SUPPLEMENT IA)
ADC REGULATION)
51-2)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colo.
1 July 1955

FLYING TRAINING

Standard F-86D Simulator Checkout and Transition

1. Purpose. The purpose of this Regulation is to establish a checkout and transitional training program to be used in conjunction with the F-86D Simulator.

2. Scope. This directive applies to pilots who are scheduled for checkout in the F-86D aircraft.

3. Responsibility. Air defense force commanders will insure that the provisions of this directive are complied with.

4. General. Ten missions in the F-86D simulator will be accomplished prior to initial checkout in the F-86D aircraft. Simulator flights will be treated with realism, and each flight will be preceded by a thorough briefing on the training problem to be accomplished, including weather and flight planning. All pilots are required to use parachutes, bail-out bottles, helmets with oxygen masks, safety belts, and check-lists for first three simulator flights.

5. Simulator Instructor Pilots. Instruction in the flying phase of the simulator will be conducted by a Simulator Instructor Pilot appointed by the unit commander. All simulator flights will be followed by a critique by the Instructor Pilot.

6. Minimum Requirements for Acceptance of Simulator for Flight.

a. No trainer will be used for transition flights unless the following items are in operating condition:

(1) Turn-bank indicator.

(2) Airspeed indicator.

(3) Altimeter.

(4) Altitude gyro.

(5) Gyro compass.

(6) Rate of climb.

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*This supersedes Supplement IA, ADCR 51-2, 6 December 1954.

(7) Fuel flow meter.

(8) Tachometer.

(9) TPT gauge.

(10) Variable nozzle indicator.

(11) Fuel quantity gauge.

(12) Oil pressure gauge.

(13) Hydraulic pressure gauge.

(14) Realistic feel of controls.

(15) Alternate flight control system indicator light.

(16) Wing flaps.

(17) Landing gear control panel.

b. No trainer will be used for radio training aids unless it has equipment necessary for transition, plus:

(1) ARN-14.

(2) ILAS, if lesson requires it.

(3) ARN-6, if installed.

c. No trainer will be used for radar training unless it has the necessary equipment for transition, plus:

(1) Full radar panel.

(2) One plotting board.

(3) Hit-or-miss indicator.

(4) Third attack phase in proper sequence in beam attacks.

(5) Radio aids if lesson calls for it.

7. Items To Be Accomplished Prior to Flight Simulator Transition Training:

   a. Read and be familiar with F-86D pilot's handbook.

   b. Complete F-86D aircraft questionnaire.

8. Items To Be Accomplished Prior to Simulator Radar and Rocketry Training:

   a. Hughes Fire Control System Handbook.

9. Transition Program. Attached to this directive is the transition program to be completed prior to the first flight in an F-86D aircraft.
(ADOOT)

BY ORDER OF THE COMMANDER:

OFFICIAL:

GEORGE F. SMITH
Major General, USAF
Chief of Staff

Walter W. Robinson
WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

1 Attachment:
Transition Program

DISTRIBUTION:
A

F-86D SIMULATOR TRANSITION PROGRAM

FST-1 How to Check-out in F-86D Simulator

FST-2 How to Make a Normal Flight in the F-86D

FST-3 How to Fly IFR in the F-86D

FST-4 Emergency Procedures

FST-5 Emergency Procedures Involving Fuel System and Automatic Nozzle

FST-6 How to Cope with Emergency Procedures in the F-86D

FST-7 Review of F-86D Emergency Procedures

FST-8 How to Fly an ILAS Approach

FST-9 How to Track and Hold with Aid of VOR in F-86D

FST-10 F-86D Transition Progress Check

Attachment 1, Supplement IA, ADCR 51-2, 1 July 1955.

MISSION TITLE: HOW TO CHECK OUT IN F-86D SIMULATOR

TRAINING AIDS: F-86D Checklist
F-86D Simulator

REFERENCES: TO 1F-86D-1

1. <u>MISSION ACCOMPLISHMENTS</u>:

   a. Ability to perform cockpit check.

   b. Ability to start and shut down engine.

2. <u>DEVELOPMENT OF CONTENTS</u>:

   a. INTRODUCTION:

      (1) Why simulator training is desired.

         (a) F-86D is a very high performance and complicated aircraft.

         (b) Many students have low experience level.

         (c) Simulator teaches student proper flight procedures without dangers and expenses inherent in actual flight.

         (d) Simulator provides more training without operating expensive aircraft.

      (2) F-86D simulator is the best, most complete simulator.

         (a) Cost: Prototype $ 1,200,000.
         Our present type simulator - $ 690,000.

         (b) Very complicated -- consists of thousands of electrical circuits, resistors, etc. (You have all the control responses and instrument indications of normal flight in a simulator.)

         (c) Simulators procedures are almost exactly like those used in flying aircraft.

         (d) Simulators are maintained by highly skilled technicians.

b. BRIEFING:

(1) Dress in flying clothes and equipment. (Helmet and mask, parachute and Mae West, where applicable.)

(2) Simulator flight must have same care, preparation, and thought as actual flight in aircraft. (Otherwise training value lost.)

(3) Adhere to check list to make cockpit check before each flight in F-86D simulator. (Each cockpit check must be accomplished with check list to avoid cockpit mistakes).

(4) After instructor has explained the simulator overall, enter the cockpit.

(5) Carefully strap yourself in cockpit with seat belt and shoulder straps.

(6) Adjust seat and rudder pedals.

  (a) Have seat adjusted at least one notch from top to avoid springing canopy locking mechanism.

  (b) Adjust rudder pedals with levers on sides, using rudder lock.

(7) Check cockpit with use of check list (instructor will explain each control, switch, gauge, and differences between simulator and aircraft).

(8) Start simulator following the check list.

  (a) Make normal start.

  (b) Watch fuel flow meter and tailpipe temperature closely. (Difference in simulator and aircraft).

  (c) Handle the throttle very gently to avoid over-control and over-temperature.

(9) Shut down engine following checklist, and clean up cockpit.

(10) Repeat steps (8) and (9), making a manual start.

(11) Unfasten straps and climb from cockpit.

(12) Fill out time form as directed by instructor.

c. PERFORMANCE:

Student will perform simulator cockpit check, engine start and shutdown as directed.

d. EVALUATION:

(1) What are the most important instruments to watch on engine start? Why?

(2) Relate in steps, the throttle movements required for manual start.

(3) Why hold 65% - 70% for 2 minutes on shutdown before stop-cocking throttle?

(4) Why turn master switch to "off" ten seconds before turning battery switch to "off"?

(5) Question student on various ground emergency procedures.

MISSION TITLE: HOW TO MAKE A NORMAL FLIGHT IN THE F-86D

TRAINING AIDS: F-86D Checklist
F-86D Simulator

REFERENCES: TO 1F-86D-1

1. MISSION ACCOMPLISHMENTS:

   a. Skill in performing cockpit checks.

   b. Ability to take off and land F-86D.

   c. Skill in interpreting F-86D flight characteristics.

   d. Ability to cope with engine fires during start and after shutdown.

2. DEVELOPMENT OF CONTENTS:

   a. INTRODUCTION:

   On this first flight in simulator you will simulate the F-86D's reaction to trim, its airspeed, acceleration, rate of climb, and its arrangement of controls. To increase your safety and confidence, adhere to the checklist on this flight and all succeeding flights.

   b. BRIEFING:

   (1) Engine Fire during Start:

      (a) Close throttle.

      (b) Move engine master switch to "Off".

      (c) Keep engine turning for maximum of 20 seconds; however, if fire persists, depress stop-starter button.

      (d) Turn battery-starter and generator switches off.

      (e) Leave aircraft quickly.

   (2) How to taxi.

      (a) Engage the nose wheel steering.

         1. Align the rudder pedals with the nose wheel.

(3) How to perform the lockup check.

   (a) Open the nozzles to full open.

   (b) Alert relays after auto start.

   (c) Advance the throttle to 60% (allow to stabilize).

   (d) Fail the main inverter.

   (e) Note the time for lockup light to go on.

   (f) Retard throttle to idle.

   (g) Return nozzles to auto position.

   (h) Check elapsed time for lockup light to go out and nozzles and RPM to return to normal.

   (i) Recycle inverters.

(4) How to line up for takeoff:

   (a) Lock canopy.

      1. Check canopy light "out."

      2. Check holes on either side of canopy frame for yellow stripe and hole of locking hooks.

   (b) Get "clearance" to line up from tower. Call canopy locked and pins removed.

   (c) Taxi out onto active runway and line up with runway.

(5) How to make the emergency fuel check.

   (a) Advance throttle to 100% military.

      1. Check that RPM and TPT are stabilized.

      2. Select the takeoff position on the emergency fuel switch.

      3. Depress the emergency fuel test button and hold till stabilized.

4. Check drop in RPM (RPM should not exceed maximum or minimum limits for temperature of day as outlined in TO 1F-86D-1).

5. Release test button and allow recovery.

(6) How to take off.

(a) Advance throttle to A/B. (TPT not to exceed 870° on surge).

1. Check RPM (100% ± ½%).

2. Check TPT.

3. Check nozzles.

(b) Release brakes after receiving clearance.

(c) Maintain directional control with nose wheel steering until rudder is effective (approx 60K).

(d) Raise nose wheel off ground at 95 - 110K.

(e) Retract gear as soon as safely airborne (as soon as altimeter and R/C indicate a climb).

(f) Retract flaps after reaching 155K - 185K.

(g) Return T.O. switch to normal and retract engine inlet screens at 2500 feet above the ground.

(7) How to climb (to 40,000 feet).

(a) Establish speed of .83 mach (do not exceed 300K below 5,000 feet in the aircraft.)

(b) Continue climb at .83 mach.

(8) How to level off (at 40,000).

(a) Start level off, 500-1000 feet before reaching desired altitude.

(b) Start lowering nose (in aircraft, lead altitude approximately 500 feet).

(c) Establish desired A/S, then adjust throttle to a setting that will hold that A/S.

(9) How to descend from altitude.

(a) Adjust right trombone for canopy defrost five minutes before descending.

(b) Retard throttle to 75%. (Note: Minimum TPT 270°C).

(c) Extend speed brakes.

(d) Establish local penetration A/S.

(e) Establish a descent using A/S as primary pitch control.

(10) How to level off after descending.

(a) Anticipate level off altitude by 800 feet.

(b) Retract speed brakes.

(c) Adjust power to hold desired A/S.

(11) How to land.

(a) Retard throttle to 75%.

(b) Extend speed brakes.

(c) Extend landing gear at 185K IAS or below, and check gear down.

(d) Extend flaps at 185K or below.

(e) Establish rate of descent not to exceed 850 FPM.

(f) Adjust power 85-88% to maintain 150K and approximately 600 FPM.

(g) Lower nose of aircraft as soon as touch down is made (simulator only), retard throttle to idle.

(h) Slowup; maintain directional control by use of brakes and rudder.

(12) Complete after landing check aided by check list.

(13) Shut down engine aided by check list.

(14) Engine fire after shutdown:

(a) Connect external power to both receptacles.

(b) Stopcock throttle.

(c) Move Battery-Starter switch momentarily to "Starter."

(d) Check audibly that engine turns or note RPM.

(e) Crank engine to 6% RPM (20 sec maximum); then depress Stop-Starter button.

(f) If fire persists, abandon aircraft.

(15) The crash bell will ring in simulator when:

(a) Exceeding 6.5 g or -3g.

(b) Wings are more than 15° from level at T.O. or on landing.

(c) Touchdown rate is greater than 900 FPM.

(d) Touchdown with gear retracted.

(e) Dragging tailpipe.

c. MISSION:

(1) Perform preflight, engine start, and after start check as per check list. Engine fire after start will be simulated.

(2) Perform normal takeoff.

(3) Climb to 40,000 feet.

(4) Practice flying at specific power settings. (90%, 95%, and 100% RPM).

(5) Practice turns to predetermined headings.

(6) Descend to 25,000 feet at mach 1.0 dive.

(7) At 25,000 feet practice stalls with 75% RPM.

   (a) Clean aircraft.

   (b) Gear, flaps, and dive brakes extended.

(8) Practice penetration descent.

(9) Practice approach and landing.

(10) Accomplish after landing check.

(11) Follow procedure for engine fire after shutdown.

d. EVALUATION:

Did the student:

(1) Follow checklist on preflight, engine start, and after start checks?

(2) Adhere to lockup procedures?

(3) Stabilize before engine checks?

(4) Monitor TPT, RPM and nozzle setting?

(5) Maintain proper climb and descent airspeeds?

(6) Follow checklist on pre-landing and after landing and shutdown?

(7) Follow established procedures on engine fire after shutdown?

MISSION TITLE: HOW TO FLY IFR IN THE F-86D (SIMULATOR)

TRAINING AIDS: F-86D Checklist
F-86D Simulator
Chart GCA Pattern

REFERENCES: TO 1F-86-1; Manual, Lear F-5 Autopilot

1. MISSION ACCOMPLISHMENTS:

   a. Skill in performing an ITO.

   b. Skill in establishing climbs.

   c. Skill in controlling pitch, bank, and power.

   d. Ability to make standard jet descent.

   e. Ability to establish approach and landing configuration.

   f. Ability to control aircraft with autopilot.

2. DEVELOPMENT OF CONTENTS:

   a. INTRODUCTION:

   The important difference in flying the F-86D and other jet aircraft you may have flown is the slower reaction to pitch trim. In the simulator you will see the reaction of the instruments to the stick pressure and the trim changes you effect. You will fly the simulator through a complete flight in simulated weather and when you land you will feel you have performed an actual flight.

   This lesson will increase your capability to fly the F-86D safely as an all-weather pilot.

   b. BRIEFING:

   (1) How to make an instrument takeoff.

   (a) Align aircraft on active runway and set heading on slaved gyro.

   (b) Obtain 100% RPM and perform pre-takeoff check. Use afterburner.

(c) Release brakes and hold heading utilizing nose-wheel steering, or rudder.

(d) Establish T.O. attitude and fly off the ground.

1. Start assuming T.O. attitude at 110K.

2. Hold this attitude to fly off the ground at approximately 125K.

3. Hold climb attitude, wings level, on attitude gyro when airborne.

(2) How to establish initial climb.

(a) Obtain 500 FPM rate of climb and an altimeter increase.

(b) Retract gear.

(c) Obtain 155K-185K A/S.

(d) Retract flaps and adjust attitude for loss of lift.

(e) Retract screens.

(3) How to establish the desired climb A/S.

(a) Hold 1500 FPM rate of climb until desired climb A/S is reached.

(b) Trim aircraft as necessary.

(c) At 2,500 feet above terrain and 300K, switch to normal fuel.

(4) How to climb and level off (20,000 feet).

(a) Establish a .83 mach climb after reaching 5,000 feet.

(b) Lead level off by 1500 feet to 2000 feet.

1. Come out of afterburner in the first 1000 feet.

2. Adjust power to obtain desired A/S.

(5) How to descend and level off.

  (a) Descend at 250K and 75%, speed brakes out.

  (b) Lead level off 1000 feet.

  (c) After level off, adjust power 80-82% to hold 200K. Retract speed brakes 5-10K above desired A/S.

(6) How to establish various approach and landing configurations.

  (a) Establish 200K, 75% RPM, clean.

  (b) Turn onto base leg, extend gear and hold 175K, approximately 88% RPM.

  (c) Turn onto final approach.

  (d) Extend full flaps.

  (e) Extend speed brakes.

  (f) Maintain 140K minimum, 85% RPM.

  (g) Start descent by retarding throttle 1% per 100 FPM R/D desired.

  (h) Touchdown approximately 120K.

  (i) Shut down.

(7) Operation of autopilot.

  (a) Pre-flight check.

  (b) Limitations (pitch and bank).

c. MISSION:

(1) Obtain and read back ATC clearance.

(2) Perform normal pre-starting checks, start, and A/B takeoff.

(3) Climb 300K to 5000 feet.

FST-3

(4) Engage autopilot at 5000 feet, climb to 20,000 feet.

(5) Simulate night and weather conditions.

(6) Practice flight with and without autopilot.

(7) Practice flight with and without A/B.

(8) Practice climbs and descents and definite rates.

(9) GCI/GCA.

d. EVALUATION:

Did the student:

(1) Perform competent cockpit check and start?

(2) Read back clearance?

(3) Maintain heading on takeoff?

(4) Raise gear and flaps below 185K?

(5) Switch to normal fuel correctly and retract screens?

(6) Hold 1500 FPM climb to desired A/S?

(7) Descend as directed?

(8) Establish GCA aircraft configurations?

(9) Follow GCI and GCA instructions?

MISSION TITLE: EMERGENCY PROCEDURES

TRAINING AIDS: F-86D Checklist and Operational Guide
Charts on Emergencies
F-86D Flight Simulator

REFERENCES: TO 1F-86D-1

1. MISSION ACCOMPLISHMENTS: Ability to cope with

   a. Hot start.

   b. Generator and inverter failure.

   c. Trim failure.

   d. Utility hydraulic system failure.

2. DEVELOPMENT OF CONTENTS:

   a. INTRODUCTION:

   Your safety and confidence in flying the F-86D depend on your ability to perform in all practical conditions, including emergencies. This lesson emphasizes your best course of action when malfunctions occur.

   b. BRIEFING:

      (1) How to cope with a hot start.

         (a) Stopcock throttle.

         (b) Depress stop - start button.

         (c) Perform after-shutdown check.

         (d) Write hot start in Form I.

      (2) Single generator failure.

         (a) Indication: One generator warning light is ON.

         (b) What to do:

            1. Set voltmeter selector to failed generator.

2. If voltmeter reads 3 or 4 volts, hold generator switch to reset momentarily.

3. Turn generator switch ON. If warning goes out and voltmeter reads 27.5-28.5v., leave generator switch ON.

4. If warning light stays ON, turn generator switch OFF. Do NOT attempt to reset.

5. If voltmeter does not read 3 or 4 volts, turn generator switch OFF. Do not reset.

(3) Dual generator failure:

(a) Indications.

1. Two generator warning lights are "ON."

2. Two inverter warning lights and the lockup light are "ON."

3. All AC-powered instruments inoperative.

(b) What to do:

1. Assume flight on primary flight instruments.

2. Select alternate fuel system.

NOTE: If in A/B, retard throttle to start-idle, advance throttle to desired power cautiously, close nozzles manually to 1/4.

3. Move voltmeter selector to either generator position.

4. Reset one generator.

a. If successful, attempt to reset second generator ONCE only.

b. If unsuccessful, turn first generator switch off and attempt to reset second generator. DO NOT ATTEMPT TO RESET FIRST GENERATOR.

5. If successful in resetting both generators, wait two minutes, then select normal fuel system.

6. If generator reset procedures fail, advise mobile, return and land.

(4) Main inverter failure:

(a) Indications:

1. Amber inverter light will come ON.

2. Lockup light will come ON.

(b) What to do:

1. Abort takeoff if able to do so safely.

2. Notify mobile control.

3. Return to field and land.

(5) Double inverter failure:

(a) Indication: "Both" inverter light illuminates.

(b) What to do:

1. Assume flight on primary instruments.

2. Select and operate on emergency fuel system.

3. Move throttle cautiously to prevent compressor stall or flameout.

4. Remember: All a-c power is lost. Fuel-flow meter, fuel quantity, fuel pressure, oil pressure, and hydraulic pressure gauges deceptively indicate the condition that existed at the time of power failure.

(6) Normal trim failure.

(a) Indications: Unable to trim aircraft with trim switch.

(b) What to do:

<u>1</u>. Trim aircraft with alternate trim control on left console.

<u>2</u>. Return alternate trim switch to NORMAL intermittently to determine if normal trim is operating (unable to trim aircraft by normal system if alternate system is on).

<u>3</u>. Continue mission at your discretion.

(7) Utility hydraulic system failure.

(a) Indications (Primary inflight).

<u>1</u>. Speed brakes inoperative.

<u>2</u>. Utility hydraulic press reads approximately zero.

(b) Facilities you lose and what to do.

<u>1</u>. Speed brakes: adjust power as necessary.

<u>2</u>. Nosewheel steering: steer with brakes.

<u>3</u>. Rocket pod: ignore it in this present program.

<u>4</u>. Power brakes: increase pressure on brakes, land shorter on runway.

<u>5</u>. Normal gear extension fails.

<u>a</u>. Reduce A/S below 175K.

<u>b</u>. Lower landing gear handle.

<u>c</u>. Pull emergency extension handle. Hold it out until gear is down and locked.

<u>d</u>. Recheck gear indicators. If necessary, yaw aircraft to lock main gear, then release handle.

c. MISSION:

(1) Start engine (simulate hot start).

(2) Takeoff and climb to 30,000 feet.

(3) While in flight, perform emergency procedures for:

  (a) Single and dual generator failures.

  (b) Inverter failure.

  (c) Failure of utility hydraulic system.

  (d) Fail trim.

(4) GCI/GCA letdown.

d. EVALUATION:

Did the student:

(1) Follow established procedures on hot start?

(2) Take corrective action on his in-flight emergencies?

FST-5

MISSION TITLE: EMERGENCY PROCEDURES INVOLVING FUEL SYSTEM AND AUTOMATIC NOZZLE

TRAINING AIDS: Checklist
F-86D Simulator

REFERENCES: TO 1F-86D-1

1. MISSION ACCOMPLISHMENTS:

   a. Ability to cope with the following malfunctions:

      (1) Fuel flow fluctuation and failure.

      (2) Automatic nozzle failure.

      (3) Flameout.

   b. Ability to perform airstarts.

2. DEVELOPMENT OF CONTENTS:

   a. INTRODUCTION:

      Tension, fear, and anxiety are the result of inability to do the right thing.

      There are a number of protective devices and warning signals engineered into the F-86D for your benefit. Your proper interpretation of these warning signals followed by prompt and decisive action will modify an emergency to an alternate course of action.

   b. BRIEFING:

      (1) Fuel Flow Fluctuation.

         (a) Indications:

            1. Definite surges.

            2. Fluctuating fuel flow readings (limit... 40 PSI).

            3. Fluctuating RPM (limit...2%).

            4. Fluctuating TPT.

(b) What to do:

1. Retard throttle.
2. Select alternate fuel system.
3. Notify mobile.
4. Return to field and land.

(2) Fuel pressure failure.

(a) Indications:

1. Severe loss of thrust.
2. Drop in TPT and RPM.
3. Fuel flow drops to zero or nearly zero.

(b) Corrective action:

1. Retard throttle to idle. (Below 85% RPM).
2. Select alternate fuel system.
3. Notify mobile and land.

(3) Automatic nozzle failure.

(a) Indications:

1. Nozzle fails to move with throttle movement.
2. Incorrect TPT for power setting.

(b) What to do:

1. Reduce power if TPT is high.
2. Set nozzle at 1/4 position.
3. Readjust power as desired.
4. Jog nozzle to obtain desired TPT.
5. Set nozzle at 1/2 position for landing.
6. Do not use afterburner.

(4) Flameout and airstart.

(a) Indication of flameout:

1. Extreme loss of thrust.
2. Loss of TPT and RPM.
3. Loss of fuel flow.

(b) What to do:

1. Stopcock throttle.
2. Select "emerg fuel system" (ON).
3. Close nozzles manually (FULL CLOSE).
4. Airstart switch to AIRSTART.
5. Hold aircraft level for at least 5 seconds.
6. Attempt airstart as soon as possible (airstarts are more readily obtained below 40,000 feet).
    - a. At 40,000 feet or below, airstarts are obtained at engine speeds of 40% RPM or below.
    - b. Advance throttle to obtain fuel flow of 250 lbs. (at high alt), to 750 lbs. (at low alt).
    - c. After ignition, very cautiously regulate throttle to maintain 400 C until RPM is stabilized.
    - d. Advance throttle to desired setting, keep exhaust temp below 750 C.
    - e. At 37% RPM or above, generator operating, return airstart switch to NORM (down).
    - f. Return variable nozzle switch to NORM 2 minutes after generators are again operating.

g. Move emergency fuel system switch to NORM.

  (1) Allow at least two minute warmup before moving fuel switch to normal.

  (2) If RPM begins to drop, immediately switch Emerg Fuel "ON."

c. MISSION:

  (1) Start engine (simulate hot start).

  (2) Nozzle failure prior to coming out of A/B.

  (3) After level-off, fuel flow fluctuation, then failure. NOTE: If student does not follow prescribed procedures on fuel failures - give flameout.

  (4) Review generator and inverter failures.

  (5) Flameouts and airstarts (4).

  (6) Fly published jet penetration to local base GCI/GCA. (Utility hydraulic system failure).

d. EVALUATION:

Did the student:

  (1) Follow outline procedure on hot start?

  (2) Follow outline procedures on nozzle failure?

  (3) Execute airstarts as per checklist?

FST-6

MISSION TITLE: HOW TO COPE WITH EMERGENCY CONDITIONS IN THE F-86D

TRAINING AIDS: Checklist and F-86D Operational Guide
F-86D Simulator

REFERENCES: TO 1F-86D-1

1. MISSION ACCOMPLISHMENTS:

   a. Ability to cope with following malfunctions:

      (1) Aft fire warning.

      (2) Forward fire warning.

      (3) Engine failure during takeoff.

      (4) Engine failure immediately after takeoff.

   b. Ability to bail out.

   c. Ability to jettison drop tanks.

   d. Ability to eliminate smoke and fumes in cockpit.

2. DEVELOPMENT OF CONTENTS:

   a. INTRODUCTION:

      This lesson will teach and give you practice on procedures for a few remaining malfunctions that may be encountered in the F-86D.

   b. BRIEFING:

      (1) Aft fire warning.

         (a) Indications:

            1. Aft fire warning light glows "amber."

            2. Smoke trails from aircraft if fire exists.

         (b) What to do:

            1. Reduce throttle setting until light goes out.

a. Test warning circuit by testing switch next to light. If light fails to glow, the wiring has been burned out and fire probably exists.

b. Land immediately.

2. If light does not go out with power reduction, stopcock throttle.

a. Turn engine master switch off.

b. Turn generator and battery switches off. (NOTE: With battery switch off, light goes off).

c. Bailout if fire is evident.

3. If fire is out, land deadstick. (NOTE: 20 to 35% RPM for hydraulic operation).

(2) Forward fire warning.

(a) Indications:

1. Forward fire warning light glows "red."

2. Smoke in cockpit.

(b) What to do at altitude:

1. Stopcock throttle.

2. Turn engine master switch OFF.

3. Check for smoke or fire.

4. Bailout if warning light remains ON.

5. If light goes out, check warning circuit by depressing test switch.

6. If light remains out, deadstick aircraft or bailout. DO NOT RESTART.

7. If light remains on or fire is evident, bailout.

(c) What to do immediately after takeoff:

1. Maintain maximum power and jettison tanks.

2. Assume maximum rate of climb.

3. Unfasten seat belt and prepare to eject.

4. Abandon aircraft at minimum of 3,000 feet if that altitude can be reached.

(3) How to successfully abandon the F-86D (Ejection).

(a) Preparation - if time permits.

1. Unclip oxygen hose from parachute harness.

2. Disconnect oxygen hose, radio lead, and anti-G suit hose.

3. Stow all loose equipment.

4. At altitude, pull ball-handle on bailout bottle.

(b) Ejection procedure.

1. Raise either armrest to eject canopy and lock shoulder harness.

2. Hook heels in footrests and brace arms on armrest. Sit erect, head hard back against headrest, chin tucked in.

3. Squeeze either trigger.

4. After ejection, release safety belt and kick away from seat.

5. Delay opening chute as long as altitude permits.

(4) How to jettison drop tanks.

(a) Depress drop tank jettison button.

(b) A manual drop can be obtained by pulling drop tank emergency jettison handle to full extension (approximately 3").

(c) Armament master switch on jettison ready position, depress bomb release button on stick. (This procedure will also cause rocket package to jettison.)

(5) Engine failure during T.O. before leaving ground.

(a) Close throttle. (With throttle closed, utility system operated components will become inoperative after approximately 30 seconds.)

(b) Deploy drag chute.

(c) Apply brakes as necessary. (If unable to stop on runway, continue procedures (d) through (h).)

(d) Press drop tank jettison button.

(e) Move landing gear handle UP, depress and hold gear emergency retract buttons until gear retracts.

(f) Raise armrest to jettison canopy.

(g) After 1-sec. delay, move battery-starter switch to OFF.

(h) If time permits, turn generator switches OFF.

(6) Engine failure immediately after takeoff.

(a) Close throttle.

(b) Jettison drop tanks.

(c) Jettison canopy.

(d) Retract gear.

(e) Extend flaps.

(f) After touchdown, deploy drag chute.

(g) Turn engine master switch off.

(h) Lock shoulder harness.

(i) Land straight ahead, deviating only to miss obstacles.

(7) How to make a belly landing.

(a) Jettison canopy.

(b) Retain drop tanks, if they are empty.

(c) Extend flaps and speed brakes (landing gear up).

(d) Just before touch down close throttle and turn engine master switch off. After one second turn battery-starter switch to off, then turn generator switches off.

(e) Touch down in normal landing attitude.

(f) Deploy drag chute.

(g) Abandon aircraft immediately after it stops.

(8) How to eliminate smoke and fumes in cockpit.

(a) Move cockpit air switch to RAM.
NOTE: You lose cockpit pressurization.

(b) Set oxygen regulator to 100% oxygen.

c. MISSION:

(1) Fly ITO, Engine failure on T.O. run.

(2) Fly ITO, Engine failure immediately after takeoff.

(3) ITO, climb out as directed.

(4) After level-off, aft fire warning.

(5) Smoke and fumes in cockpit.

(6) Forward fire warning.

(7) Bailout.

d. EVALUATION:

Did the student follow outlined procedures for all emergency conditions?

FST-7

MISSION TITLE: REVIEW OF F-86D EMERGENCY PROCEDURES

TRAINING AIDS: Charts on Emergency Procedures
F-86D Operational Guide

REFERENCES: TO 1F-86D-1

1. MISSION ACCOMPLISHMENTS:

   Ability to cope with the following emergencies:

   a. Hot start.

   b. Engine fires during start and after shutdown.

   c. Engine failure on T.O.

   d. Engine failure immediately after takeoff.

   e. High fuel scheduling to A/B.

   f. Auto nozzle failure.

   g. Aft and forward fire warning.

   h. Flameout and airstart.

   i. Fuel pressure fluctuation and failure.

   j. Failure of normal flight control hydraulic system.

   k. Generator and inverter failure.

   l. Trim failure.

   m. Jettison of drop tanks.

   n. Bailout.

   o. Smoke and fumes in cockpit.

   p. Belly landing.

   q. Failure of utility hydraulic system.

2. MISSION BRIEFING:

   a. Same as for Missions 5 and 6.

3. MISSION.

   a. Fly ITO.

   b. Climb and fly VOR radials as directed in ATC clearance.

   c. Perform emergencies as required.

   d. Emphasis will be placed on procedures wherein student is weak.

4. EVALUATION:

   A careful analysis will be made of all normal and emergency procedures. A comprehensive critique will follow the flight to prepare student for the final check.

FST-8

MISSION TITLE: HOW TO FLY AN ILAS

TRAINING AIDS: F-86D Simulator
ILAS Charts

REFERENCES: AFM 51-45

1. MISSION ACCOMPLISHMENTS:

   a. Ability to fly an ILAS with ID - 249.

   b. Ability to fly a missed approach and ILAS backbeam.

   c. Ability to cope with engine failure during T.O. before leaving ground.

2. DEVELOPMENT OF CONTENTS:

   a. INTRODUCTION:

      (1) What would you do if you had flown two approaches to a field on GCA in a very low ceiling, thunderstorms and hard rain and had been lost both times turning final?

      (2) In this lesson you will assure yourself that you can fly low approaches without relying on anyone else.

         (a) You get approach information accurately and quickly from one instrument.

         (b) Your continuous interpretation of this one instrument permits rapid and small correction.

      (3) In this lesson you will learn how to fly ILAS approaches.

         (a) Most of the large airports will be equipped for ILAS.

         (b) Most CAA fields favor ILAS over GCA.

   b. BRIEFING:

      (1) Tune proper ILAS frequency.

(a) #2 needle of RMI is inoperative.

(b) Localizer and glide path red flags will disappear when within range of station.

(2) How to intercept localizer beam inbound.

(a) Set ILAS runway heading in window of ID-249.

(b) Intercept ILAS runway heading inbound from penetration or procedure turn.

(c) Center course line indicator.

(d) Maintain published ILAS altitude.

(e) Lower gear, flaps, and obtain final approach speed before reaching outer marker.

(3) How to interpret and fly the ILAS glide path.

(a) Keep course line indicator of ID-249 centered by flying toward needle (width of beam - 2 deg.)

(b) You will enter glide path range below glide path (glide slope - approximately 2½ deg.)

(c) Glide path indicator is above center until glide path is intercepted.

(d) Reduce power slightly and start descent.

(e) Keep both indicators centered on approach by flying toward indicators.

(4) How to know when you are near the ground.

(a) Over the touchdown point, the glide path indicator oscillates up and down, then goes to full up when touch down point is passed.

(b) The course line indicator operates in the normal manner as long as you correct to the runway heading within usable range of the station.

(5) Missed approach.

(a) If not VFR at minimum altitude, climb to missed approach altitude and follow approach control instructions.

(b) "Clean up" aircraft.

(6) How to fly an ILAS back-beam approach.

(a) Proceed to missed approach altitude on runway heading as directed by approach control. (Course line indicator is directional at this point).

(b) Fly procedure turn, disregarding indications of the course line indicator until you are inbound on the reciprocal runway heading (back-beam of ILAS).

(c) When inbound on back-beam, make corrections away from indicator.

1. When over approach end of runway, the glide path goes down to bottom of instrument.

2. Glide path indicator moves toward center as glide path is approached.

(d) One minute past outer marker, fly a procedure turn to inbound runway heading.

(e) Complete ILAS as described in (3) above.

c. MISSION:

(1) Perform ITO, climb 270 deg. to 15,000 feet.

(2) Reverse course (90 deg), continue climb to 20,000 feet. Report over station.

(3) Practice ADF tracking, inbound and outbound.

(4) Enter standard holding pattern, follow approach control instructions.

(5) Fly standard jet penetration and low approach using ILAS.

(6) Fly missed approach from minimum altitude.

(7) Fly ILAS back-beam on go-around.

(8) After procedure turn fly another ILAS.

(9) Make normal ILAS landing, 250 foot ceiling.

d. EVALUATION:

Did the student:

(1) Hold constant A/S on ILAS?

(2) Hold on centerline and glide path during approach?

(3) Make early small corrections?

Review with student the flight path on plotting board.

FST-9

MISSION TITLE: HOW TO TRACK AND HOLD WITH AID OF VOR IN F-86D

TRAINING AIDS: F-86D Flight Simulator
Jet Penetration Chart

REFERENCES: AFM 51-45,
TO 1F-86D-1

1. MISSION ACCOMPLISHMENTS:

   a. Ability to fly VOR in IFR conditions.

   b. Ability to fly penetration and low approach.

2. DEVELOPMENT OF CONTENTS:

   a. INTRODUCTION:

      (1) VOR is not affected by static.

      (2) VOR easy to tune.

      (3) VOR #2 needle always indicates magnetic bearing to station.

      (4) All information is presented visually.

   b. BRIEFING:

      (1) How to select channel.

         (a) Place switch on control box in tone position.

         (b) Rotate knobs (outer for whole numbers and inner for tenths), of the frequency selector until desired frequency appears in the frequency window.

         (c) Increase volume and listen for identification (voice or code).

         (d) Flag under the course line indicator ID-249 will disappear.

         (e) No. 2 needle becomes operative (swings to station and magnetic bearing to station).

(2) How to track inbound on VOR.

(a) Determine magnetic bearing to station (No. 2 needle).

(b) Select track to station.

1. Turn setting knob on ID-249 until desired course appears in window.

2. TO appears in TO-FROM window.

(c) Intercept desired track.

1. Turn aircraft until heading pointer (duckbill) is under course line indicator.

(The duckbill indicates the nose of the aircraft in relation to the heading selected in window).

2. As you approach "on course," the course line indicator moves toward center.

a. Keep duckbill under course line indicator by turning aircraft.

b. When duckbill and course line indicator are centered, you are on course, and #2 needle reads the bearing selected.

(d) Course line indicator indicates right or left deviations from selected course.

(e) For wind corrections keep course line indicator centered.

(3) How to track outbound on VOR.

(a) As you pass the station you get three indications:

1. Course line indicator moves from side to side.

2. TO-FROM window reads FROM.

3. No. 2 needle swings 180° to tail position.

- (b) When tracking outbound on same radial, no change in instrument setting or procedure is necessary.
- (c) When a different outbound radial is desired select the radial; center course line indicator.

(4) How to track on a reciprocal of selected heading.

- (a) Keep duckbill under the course line indicator.
- (b) Make corrections away from indicator.

(5) How to fly a procedure turn with VOR.

- (a) Turn 45° or 90° as desired.
- (b) Fly heading only, check time.
- (c) During procedure turn, rotate heading selector 180° to inbound heading.
- (d) Track as before.

(6) Holding with VOR.

- (a) Hold on bearing to the station.
- (b) Heading pointer is slightly off tail position outbound.
- (c) If drift correction is held inbound, it is held on same side of tail position outbound.

(7) Additional Facilities, VOR.

- (a) Localizer 108.0 - 111.9 mc.
- (b) VAR 108.3 - 110.3 mc.
- (c) Weather 111.0 - 111.9 mc.
- (d) VOR 112.0 - 117.9 mc.
- (e) Tower 118.0 - 121.9 mc.
- (f) General Communication 122.0 - 135.9 mc.

c. PERFORMANCE:

(1) ITO.

(2) Climb to 15,000 feet on 300° radial.

(3) Intercept 180° radial, climb from 15,000 feet - 30,000 feet.

(4) Report station passage.

(5) Practice tracking on inbound and outbound radials.

(6) Perform emergency procedures for normal flight control hydraulic system failure.

(7) Enter and fly a standard holding pattern to EAT.

(8) Fly the published jet penetration and low approach.

(9) GCA, missed approach.

(10) GCA, land.

d. EVALUATION:

Did the student:

(1) Tune VOR set as necessary?

(2) Track inbound on selected radials?

(3) Correct for wind?

(4) Intercept desired track?

(5) Track outbound on pre-determined track?

(6) Fly standard holding pattern?

(7) Follow procedures for failure of normal flight control hydraulic system?

(8) Arrive Platter at desired altitude?

FST-10

MISSION TITLE: F-86D TRANSITION PROGRESS CHECK

TRAINING AIDS: F-86D Checklist
F-86D Operational Guide

REFERENCES: TO 1F-86D-1

1. <u>MISSION ACCOMPLISHMENTS</u>:

   a. Ability to execute all normal procedures.

   b. Ability to execute all emergency procedures.

2. <u>MISSION BRIEFING</u>:

   a. Obtain and read back ATC clearance.

   b. Start engine.

   c. ITO. (Gear fails to retract).

   d. Climb out as directed by ATC.

   e. Normal fuel system failure coming out of takeoff fuel position. (Continue flight on normal).

   f. Relight A/B.)
)
   g. Nozzle failure.) on climb.
)
   h. Aft fire warning.)

   i. After level-off, VOR and/or ADF orientation.

   j. Thunderstorm, pitot icing (TPT rise).

   k. Generator and inverter failure.

   l. Normal hydraulic system failure.

   m. Fly penetration on local facilities.

      (1) Normal fuel system failure, flameout, and airstart.

      (2) GCA and missed approach.

(3) Forward fire warning.

(4) Bailout.

3. EVALUATION:

Instructor will critique all phases of the mission and sign release for student checkout in F-86D aircraft.

*Supplement II, ADCR 51-2

SUPPLEMENT II)
ADC REGULATION)
51-2)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colo.
1 July 1955

FLYING TRAINING

Standard F-94C Checkout and Transition

1. Purpose. This directive establishes a transitional training program for personnel checking out in Air Defense Command F-94C aircraft.

2. Scope. This directive applies to all personnel flying Air Defense Command F-94C aircraft.

3. Responsibility. Commanders will insure that the provisions of this directive are complied with.

4. Checkout. No pilot will be checked out in the F-94C until he has at least fifty hours of jet fighter or T-33 first pilot time, ten hours of which must have been flown within sixty days prior to checkout, and possesses a current jet instrument card.

5. Current Status.

a. Pilots: Current status in F-94C will be the same as paragraph 5, basic Regulation.

b. Radar Observers: To retain current status in the F-94C aircraft a radar observer must have flown one hour and accomplished four airborne intercepts during the preceding sixty days. R/Os who have completed transition but are not current will be rechecked by a qualified instructor.

6. Transition. a. Pilots falling under any one of the following three categories will complete the entire transition program in Attachment 1:

(1) Those who have never completed a F-94C transition program.

(2) Those who have not flown the F-94C in the preceding twelve months.

(3) Other pilots at the squadron commander's discretion.

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*This supersedes Supplement II, ADCR 51-2, 6 December 1954.

b. Pilots whose currency has lapsed but do not fall in categories (2) or (3) above will complete as a minimum for re-checkout the following:

(1) ADC Standard F-94C questionnaire.

(2) Read PIF.

(3) A satisfactory T-33 proficiency check ride.

(4) Transition Missions 1, 2 and 7.

c. R/Os will possess AFSC 1561 or 1564 before they will be permitted to participate in the transition training program contained in this directive.

d. R/Os falling under the following three categories will complete the entire transition program in Attachment 2.

(1) No experience with either the E-5 or E-6 FCS.

(2) Those who have not operated the E-5 and 6 system in a fighter aircraft within the past 12 months.

(3) Others at squadron commander's discretion.

e. R/Os who do not fall under any of the above categories (including those whose current status has lapsed) will complete as a minimum for re-checkout the following:

(1) APG 40 Radar Questionnaire.

(2) R/O Cockpit Questionnaire.

(3) Read PIF.

(4) A satisfactory B-25-M proficiency check ride.

(ADOOT)

BY ORDER OF THE COMMANDER:

GEORGE F. SMITH
Major General, USAF
Chief of Staff

OFFICIAL:

Walter W. Robinson
WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

2 Attachments:
1. F-94C Pilot Checkout
2. F-94C R/O Checkout

DISTRIBUTION:
A

F-94C PILOT CHECKOUT AND TRANSITION

1. The pilot transition program will be divided into two phases, ground and flying. MTD training is desired. If this is not available, the ground phase program will be accomplished as outlined.

a. Ground Phase. Transition pilot will:

(1) Read, understand, and certify to the reading of the PIF and Flight Operating Instruction Handbook.

(2) Receive instruction and engineering lectures covering the following:

(a)	Aircraft general	1 hour
(b)	Engine fuel system	1
(c)	Aircraft fuel system	1
(d)	Electrical system	1
(e)	Hydraulic systems	1
(f)	Aircraft engine	1
(g)	Afterburner	½
(h)	Emergency procedures	2
(i)	Auto pilot	½
(j)	De-icing, cockpit heat, and pressurization	1
(k)	Flight control systems	½
(l)	Oxygen system	½
(m)	Flight characteristics, high and low speed	1
(n)	Pre-flight checklist and daily inspection	1
		13 hours

(3) Complete ADC Standard F-94C questionnaire and have it reviewed by the instructor pilot, in detail, with emphasis on emergency procedures.

Attachment 1, Supplement II, ADCR 51-2, 1 July 1955.

(4) Receive a thorough briefing on local area and traffic pattern.

(5) Flight Line Indoctrination.

(a) Complete two hours cockpit time. Transition pilot will demonstrate ability to readily apply corrective aircraft emergency procedures to satisfaction of IP.

(b) Complete a blindfold cockpit check to satisfaction of IP.

(c) Complete walk around inspection, pre-start, start, and A/B operation to satisfaction of IP.

(d) Observe at least five F-94C take-offs and landings from mobile control.

b. Flying Phase:

(1) All pilots will demonstrate their flying proficiency in a T-33 and complete three dual landings to the satisfaction of an IP prior to checking out in the F-94C. The trainee will receive dual and/or solo flights in the T-33 to meet the minimum flying requirements of this Regulation, plus additional training if deemed necessary.

(2) The F-94C flying phase will consist of eleven missions which will be conducted in accordance with each mission outline. R/Os will not be carried on any pilot transition mission.

(3) In no case will the transition pilot fly any F-94C mission other than a transition mission until he has satisfactorily completed transition training.

2. Standard F-94C Transition Missions (Pilots):

a. Mission #1 and #2 (Familiarization).

(1) Purpose: This mission will familiarize the transition pilot with flying characteristics of the F-94C.

(2) Instructor Pilot Requirements. IPs are required in chase aircraft, mobile control unit and for supervision of walk around inspection, start, briefing, and critique.

(3) Fuel Requirements. Fuel internal and tip tanks. Enter initial for landing with not less than 1000 lbs.

(4) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on stalls, spin recovery, traffic and landing pattern, tail pipe temperature, high sink rate, and throttle manipulation at altitude.

(5) Procedures. Transition pilot will:

- (a) Take-off and climb with A/B to 40,000 feet (Max TPT 760°).
- (b) At 40,000 feet, 100% practice climbs, dives and turns. (Without A/B)
- (c) 160 K, throttle idle, place gear, wing flaps, and dive flaps down and glide to 25,000 feet.
- (d) 25,000 feet practice slow (140K) and high (360K) speed flying.
- (e) 25,000 feet general air work (turns, climbs, dives, power changes, extend and retract dive flaps).
- (f) Stalls at 20,000 feet.
  - #1 A/C clean idle RPM.
  - #2 Gear, flaps and five flaps extended, idle RPM.
  - #3 High speed stalls 100%, 300K
- (g) At 10,000 feet practice two or more simulated landing patterns.
- (h) Make simulated flame-out pattern initiating go-around at 200 feet.
- (i) Enter initial with not less than 1500# fuel, make a landing approach with a go-around.
- (j) Re-enter initial and use drag chute for full stop landing.

(6) Critique.

b. Mission #3 (Familiarization - High Altitude)

(1) Purpose. This mission will familiarize the transition pilot with F-94C high altitude flight characteristics.

(2) Instructor Pilot Requirements: IPs are required for mobile control unit, supervision of walk around inspection and start, briefing, and critique.

(3) Fuel Requirements: Full internal and tip tanks. Enter initial for landing with not less than 1,000 lbs.

(4) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on maximum A/B operating time, throttle manipulation, tail pipe temperatures, re-lighting A/B, aircraft flight characteristics at high altitude and high speed, and air start procedures.

(5) Procedures. Transition pilot will:

  (a) Takeoff and climb with A/B to 45,000 feet (Max TPT 760°).

  (b) At 45,000 feet with A/B practice climbs, dives, and high speed stalls with high and low elevator boost.

  (c) Descending turns to 15,000 feet at 75% with speed brakes extended, 250K.

  (d) Make simulated flame-out pattern, initiating go-around at 200 feet.

  (e) Make practice go-arounds until down to minimum fuel.

  (f) Enter initial and make a full stop drag chute landing.

(6) Critique.

c. Mission #4 (Familiarization with Alternate Systems)

(1) Purpose. This mission will familiarize the transition pilot with F-94C alternate and emergency systems.

(2) Instructor Pilot Requirements. IPs are required for mobile control unit, briefing, and critique.

(3) Fuel Requirements. Full internal and tip tanks. Enter initial for landing with not less than 1,000 lbs.

(4) **Briefing**. Briefing for this mission will include all items listed under Standard Transition Briefing of this regulation. In addition, emphasis will be placed on flying without control boost, operating on emergency fuel system, changing instrument inverters in flight, air start procedures, and simulated flame-out landing pattern.

(5) **Procedures**. Transition pilots will:

(a) Start aircraft on emergency system.

(b) Take-off and climb with A/B to 40,000 feet (Max TPT 760°) filling in the following:

Alt	V/S	IAS	Fuel Flow	Elapsed Time
10,000	---	---	---------	------------
20,000	---	---	---------	------------
30,000	---	---	---------	------------
40,000	---	---	---------	------------

(c) High speed dive to 20,000 feet with elevator boost high boost (11-1).

(d) 20,000 feet, throttle in idle position, manually change over to emergency fuel system, advance throttle slowly to 85%.

(e) Remain at 20,000 feet making power changes while closely observing TPT for five minutes.

(f) Retard throttle to idle position and return fuel to normal system.

(g) 200K, 20,000 feet, aileron boost on, elevator boost off make shallow dives and climbs.

(h) Elevator boost on, elevator boost to high ration (11-1), practice high speed dives, climbs and turns.

(i) 20,000 feet, elevator low boost (2.64-1), make normal turns and changes of airspeed while observing action of gyro compass.

(j) 20,000 feet, straight and level flight, check standby instrument inverter for proper operation, then return to normal inverter.

(k) 20,000 feet, make normal turns, immediately after inverter check and notice action of gyro compass.

(l) 20,000 feet, 85%, manually open and close eyelids.

(m) Practice simulated flame-out pattern (min alt 200 feet).

(n) With 2000# of fuel or less practice go-arounds, initiating go-around at 200 feet.

(o) Enter initial for final full stop drag chute landing.

(6) Critique.

Mission #5 (Day Instruments).

(1) Purpose. This mission will familiarize the transition pilot with instrument flying in the F-94C.

(2) Instructor Pilot Requirements. IP required for mobile control unit, briefing, and critique. Chase pilot required but need not be IP.

(3) Fuel Requirements. Full internal and tip tanks. Enter initial for landing with not less than 1000 lbs.

(4) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on proper use of Zero Reader for instrument take-off, climb, cruise and letdown.

(5) Procedures. The transition pilot will:

(a) Simulated ITO with A/B using Zero Reader (Hood will not be used for TO.)

(b) A/B off 2000 feet above terrain, climb to 25,000 feet using local IFR departure procedure.

(c) When level at assigned altitude turn Alt Cont-on.

(d) Utilizing Zero Reader practice basic instruments.

(e) Using Zero Reader, practice a range orientation and holding pattern. Practice aural null procedures (time and distance to station).

(f) Make standard jet letdown at home base and low approach.

(g) Enter initial and make a full stop drag chute landing.

(6) Critique.

e. Mission #6 (Day Instruments)

(1) Purpose. To practice instrument flying, ILASs and GCAs.

(2) Instructor Pilot Requirements. IPs required for briefing and critique. Chase pilot required, but need not be an IP.

(3) Fuel Requirements. Full internal and external tanks. Enter final instrument approach with not less than 1,000 lbs.

(4) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on errors made on Mission #5, power settings and speeds in GCA and ILAS patterns, minimum altitudes, and aircraft configurations.

(5) Procedures. Transition pilot will:

(a) Simulated ITO using Zero Reader and A/B climb to safe altitude (no hood).

(b) Climb to 25,000 feet using local IFR departure procedures. (Climb without A/B.)

(c) 25,000 feet practice basic instruments.

(d) Range orientation using Zero Reader at 25,000 feet.

(e) Practice ADF and aural null procedures (time and distance, and tracking).

(f) Perform range letdown with Zero Reader using aural range signals (Alt Con - Off)

(g) Make two Zero Reader ILAS, if available, or two or more GCA approaches.

(h) Make a visual landing when possible out of final instrument approach, use drag chute.

(6) Critique.

f. Mission #7 (Formation and Acrobatics)

(1) Purpose. This mission will familiarize the transition pilot with close formation, and individual acrobatics.

(2) Instructor Pilot Requirements. IP required for lead, briefing, and critique.

(3) Fuel Requirements. Full internal and tip tanks. Enter initial with not less than 1,000 lbs.

(4) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on stalls, spin recovery, formation, join up, and power settings and speeds for acrobatic maneuvers.

(5) Procedures. Transition pilots will:

(a) Individual take-off with A/B, IP leading.

(b) Join up out of A/B in close formation and climb to 25,000 feet.

(c) Practice close formation, mild turns, climbs, and dives.

(d) Climb to 35,000 feet and practice mild turns, climbs, and dives.

(e) Descend to 15,000 feet above terrain, then separate and perform the following: Individual acrobatic maneuvers under observation of IP: (Min recovery altitude is 10,000 feet above terrain).

1. 3 barrel rolls to right.

2. 3 barrel rolls to left.

3. 2 loops.

4. 2 Immelmanns.

(f) Perform simulated flame-out pattern under supervision of IP. (Min alt 200 feet)

(g) Join up in close formation and enter initial with not less than 1000# of fuel. (Min breaking interval will be three seconds.)

(h) Make full stop landing using drag chute.

(6) Critique.

g. Mission #8 (Auto-Pilot Familiarization)

(1) Purpose. This mission will familiarize pilot in use of auto-pilot and technique for employing it, and in landing without drag chute.

(2) Instructor Pilot Requirements. IPs required for briefing and critique.

(3) Fuel Requirements. Full internal and tip tanks. Enter initial for landing with not less than 900 lbs.

(4) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on operation of auto-pilot and techniques for employing it. Briefing will also include landing without drag chute.

(5) Procedures. Transition pilot will:

(a) Take-off and climb with A/B to 5,000 feet above terrain, A/B off.

(b) Wings level, engage auto-pilot.

(c) Continue climb to 35,000 feet making right and left turns with auto-pilot.

(d) At 35,000 feet make steep turns using auto-pilot.

(e) Reduce throttle to idle RPM. Turn auto-pilot pitch control to maximum dive. At 400K IAS extend dive flaps and note pilot pitch control.

(f) Pull out of dive at 20,000 feet using auto-pilot pitch control.

(g) Disengage auto-pilot and re-engage at banks up to 60 degrees. Note attitude change. Engage and disengage at different pitch attitudes and note auto trim.

(h) Make jet letdown using auto-pilot.

(i) Make coupled ILAS approach if coupler is installed.

(j) Enter initial and make full stop landing WITHOUT drag chute, if runway length permits.

(6) Critique.

h. Mission #9 (Climb and Cruise Control Exercise).

(1) Purpose. This mission will familiarize transition pilot with airspeeds and fuel consumption during climb and cruise.

(2) Instructor Pilot Requirements. IP required for briefing, checking accuracy of flight planning, and critique.

(3) Fuel Requirements. Full internal and tip tanks. Enter initial for landing with not less than 800 lbs.

(4) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on correct power settings for climb and cruise, and use of cruise control charts.

(5) Procedures. Transition pilot will:

(a) A/B take-off and climb to 2,000 feet above terrain.

(b) Without A/B continue climb to 35,000 feet at 100% (Max TPT 760 degrees) filling in the following:

ALT	IAS	R/C	LBS/HR	Elapsed Time
10,000'	285			
15,000'	270			
20,000'	255			
25,000'	240			
30,000'	225			
35,000'	210			

(c) Total fuel remaining at level-off (35,000 feet) ______________ lbs.

(d) Elevator boost to High Ratio (11-1), practice level flight for five minutes, return to Low Ratio (2.64-1).

(e) Extract from TO cruising data (Max range no wind) and record actual inflight data after five minutes at each altitude.

Data From TO				Actual Indication	
Alt	IAS	%	LB/HR	IAS	LB/HR
35,000'					
30,000'					
25,000'					
20,000'					
15,000'					

(f) Practice simulated flame-out approach (Min Alt 200 feet).

(g) Enter initial and make a full stop drag chute landing.

(6) Critique.

i. Mission #10 (Navigation).

(1) Purpose. This mission will familiarize the transition pilot with cruise control, flight planning, and ARTC procedures.

(2) Instructor Pilot Requirements. IP required for briefing, checking accuracy of flight plan, chase aircraft, and critique.

(3) Fuel Requirements. Full internal and tips. Enter initial for landing with not less than 800' lbs.

(4) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on proper power settings for climb and cruise, maintaining accurate log, closely monitoring fuel consumption, navigation, and position reporting.

(5) Procedures.

(a) A 500 nautical mile round-robin navigation flight plan will be prepared prior to take-off. The navigational log will contain the following information with all estimates and distances entered on the log prior to take-off:

Required	Estimate	Actual
Climb heading		
Time for climb		
Distance for climb		
Fuel for climb		
Magnetic heading, each leg		
Distance for each leg		
Time over each IFR position reporting point		
Fuel remaining over each reporting point		
Time of arrival over home base		
Fuel remaining over home base		

(b) Distance between check points will not be more than 200 nautical miles. Minimum of three position reports are required.

(c) A simulated IFR letdown and low approach will be accomplished after holding for ten minutes over home base. Record pounds of fuel remaining at the beginning of letdown and upon completion of low approach.

(d) Fuel permitting, practice GCA approaches.

(e) Join up in close formation on IP and enter initial for a full stop drag chute landing. (Min breaking interval is three seconds)

(6) Critique.

j. Mission #11 (Night)

(1) Purpose. This mission will indoctrinate the transition pilot with night flying in the F-94C.

(2) Instructor Pilot Requirements. IPs are required for briefing, mobile control, and critique.

(3) Fuel Requirements. Full internal and tips. Enter initial for landing with not less than 1000 lbs.

(4) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on internal and external aircraft lighting, field lighting, and prime check points within local area.

(5) Procedures. Transition pilot will:

(a) Take-off and climb with A/B to 5000 feet above terrain.

(b). Continue climb to 25,000 feet without A/B.

(c) Fly over briefed prime check points within the local area.

(d) Return to home base, enter initial, and make drag chute landing.

STANDARD F-94C R/O CHECKOUT AND TRANSITION

1. The transition program will be divided into two phases, ground training and flying training. MTD training is desired. If this is not available, the ground school program will be accomplished as outlined.

a. Ground Phase:

(1) Read, understand, and certify to the reading of the PIF and APG 40 Operating Instruction Handbook.

(2) Receive instruction and engineering lectures covering the following:

(a)	Aircraft general	1 hour
(b)	E-5 fire control system	2
(c)	Electrical system	1
(d)	Hydraulic systems	1
(e)	Emergency procedures	2
(f)	De-icing, cockpit heat, and pressurization	1
(g)	Flight control systems	½
(h)	Oxygen system	½
(i)	Flight characteristics, high and low speed	1
(j)	Pre-flight checklist and daily inspection	1
(k)	Communications	1
	Total	12 hours

(3) Completed standard ADC R/O questionnaire (cockpit and APG 40 test) will be reviewed by the instructor in detail, with emphasis on emergency procedures.

(4) Flight Line Indoctrination.

(a) Complete two hours cockpit time. Transition R/O will demonstrate ability to readily apply appropriate emergency procedures to satisfaction of instructor.

Attachment 2, Supplement II, ADCR 51-2, 1 July 1955.

(b) Complete a blindfold cockpit check to satisfaction of instructor.

(c) Complete walk-around pre-flight to satisfaction of instructor.

b. Flying Phase:

(1) All R/Os will, prior to first flight in the F-94C, demonstrate their ability to operate the E-5 FCS in the B-25-M, when available, to the satisfaction of the instructor.

(2) The F-94C flying phase will consist of three transition missions and will be accomplished under VFR conditions and in accordance with each mission outline.

(3) After completing three flights in the F-94C, the R/O may be scheduled for night flying.

2. Standard F-94C R/O Transition Missions:

a. Mission #1 (Familiarization)

(1) Purpose. To familiarize the radar observer with the flying characteristics of the F-94C aircraft and local flying area.

(2) R/O Instructor. The R/O instructor will supervise walk-around inspection, briefing, and critique.

(3) Briefing. Briefing for this mission will include all items as listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on R/O bail-out procedures, oxygen system, interphone system, and R/O responsibility during walk-around and cockpit inspection.

(4) Procedures.

(a) Pilot will demonstrate flying characteristics and aircraft operating procedures:

1. A/B climb.

2. Speed effects by extending gear, flaps, and dive flaps.

3. Acrobatics to include high speed stalls, chandelles, steep turns, lazy eights, and barrel rolls.

4. Simulated flameout demonstration.

(b) Familiarize the R/O with local area, indicating prominent landmarks.

(5) Critique.

b. Mission #2 (Navigation)

(1) Purpose. To familiarize the R/O with cross-country flight planning and use of radio and radar navigational aids.

(2) R/O Instructor. R/O instuctor required for briefing, checking accuracy of flight plan, and critique.

(3) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on proper power settings for climb and cruise, maintaining accurate log, closely monitoring fuel comsumption, navigating, position reporting, Notams and Racons.

(4) Procedures.

(a) A 500 nautical mile round-robin navigation flight plan will be prepared prior to takeoff. The navigational log will contain the following information with all estimates and distances entered on the log prior to takeoff:

Required	Estimate	Actual
Climb heading	______	______
Time for climb	______	______
Distance for climb	______	______
Fuel for climb	______	______
Magnetic heading, each leg	______	______
Distance for each leg		______

Required	Estimate	Actual
Time over each IFR position reporting point	________	______
Fuel remaining over each reporting point	________	______
Time of arrival over home base	________	______
Fuel remaining over home base	________	______

(b) Distance between check points will not be more than 200 nautical miles.

(c) The radar observer will make all position reports. A minimum of three position reports is required.

(5) Critique.

c. Mission #3 (Radar Intercept Familiarization)

(1) Purpose. To familiarize R/Os with standard ADC intercept procedures.

(2) R/O Instructor. R/O instructor required for briefing and critiques (target aircraft required for this mission).

(3) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasize safety intercept procedures and use of brevity code (ACP #165) relationship between GCI controller and airborne interceptor.

(4) Procedures. (After Takeoff)

(a) R/O will be given familiarization passes on the following types of attacks, while under control of GCI:

1. Beam

2. Stern

3. Headon

4. Identification

(b) R/O will demonstrate his ability to run an intercept on hand control using proper descriptive and directive commentary.

(5) <u>Critique</u>.

*Supplement III, ADCR 51-2

SUPPLEMENT III)
ADC REGULATION)
51-2)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colo.
1 July 1955

FLYING TRAINING

Standard F-89D Checkout and Transition

1. Purpose. This directive establishes a transitional training program for personnel checking out in Air Defense Command F-89D aircraft.

2. Scope. This directive applies to all personnel flying Air Defense Command F-89D aircraft.

3. Responsibility. Commanders will insure that the provisions of this directive are complied with.

4. Checkout. No pilot will be checked out in the F-89D until he has at least fifty hours of jet fighter or T-33 first pilot time, ten hours of which must have been flown within sixty days prior to checkout, and possesses a current jet instrument card.

5. Current Status.

a. Pilots: Current status in F-89D will be the same as paragraph 5 of basic Regulation.

b. Radar Observers: To retain current status in the F-89D aircraft, a radar observer must have flown one hour and accomplished four airborne intercepts during the preceding sixty days. R/Os who have completed transition but are not current will be rechecked by a qualified instructor.

6. Transition. a. Pilots falling under any one of the followig three categories will complete the entire transition program in Attachment 1:

(1) Those who have never completed an F-89D or C transition program.

(2) Those who have not flown the F-89D or C in the preceding twelve months.

(3) Other pilots at the squadron commander's discretion.

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*This supersedes Supplement III, ADCR 51-2, 6 December 1954.

Supplement III, ADCR 51-2

b. Pilots whose currency in the F-89D has lapsed, but who do not fall in categories (2) or (3) above, will complete as a minimum for re-checkout the following:

(1) ADC Standard F-89D questionnaire.

(2) Read PIF.

(3) A satisfactory T-33 proficiency check ride.

(4) Transition Missions #1, 2 and 7.

c. R/Os will possess AFSC 1561 or 1564 before they will be permitted to participate in the transition training program contained in this directive.

d. R/Os falling under the following three categories will complete the entire transition program in Attachment 2.

(1) No experience with either the E-5 or E-6 FCS.

(2) Those who have not operated the E-5 and E-6 system in a fighter aircraft within the past twelve months.

(3) Others at squadron commander's discretion.

e. R/Os who do not fall under any of the above categories (including those whose current status has lapsed) will complete as a minimum for re-checkout the following:

(1) APG 40 radar questionnaire.

(2) R/O cockpit questionnaire.

(3) Read PIF.

(4) A satisfactory B-25-M or the F-89D simulator proficiency check ride.

(ADOOT)

BY ORDER OF THE COMMANDER:

OFFICIAL:
WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

GEORGE F. SMITH
Major General, USAF
Chief of Staff

2 Attachments:
1. F-89D Pilot Checkout
2. Std F-89D R/O Checkout

DISTRIBUTION: A

(AF-ADC, Colorado Springs, Colo.)

F-89D PILOT CHECKOUT AND TRANSITION

1. The pilot transition program will be divided into two phases, ground and flying. MTD training is desired. If this is not available, the ground phase program will be accomplished as outlined.

a. <u>Ground Phase</u>: Transition pilot will:

(1) Read, understand, and certify to the reading of the PIF and Flight Operating Instruction Handbook.

(2) Receive instruction and engineering lectures covering the following:

(a) Aircraft general and operating procedures-1 hour

(b) Engine fuel system 1

(c) Aircraft fuel system 1

(d) Electrical system 1

(e) Hydraulic systems 1

(f) Aircraft engine 1

(g) Afterburner ½

(h) Emergency procedures 2

(i) Auto pilot ½

(j) De-icing, cockpit heat and pressurization-1

(k) Flight control systems ½

(l) Oxygen system ½

(m) Flight characteristics, high and low speed 1

(n) Pre-flight checklist and daily inspection-1

(o) Flight Simulator (if available) 10

23 hours

(3) Complete (ADC Standard F-89D) questionnaire and have it reviewed by the instructor pilot, in detail, with emphasis on emergency procedures.

Attachment 1, Supplement III, ADCR 51-2, 1 July 1955.

(4) Receive a thorough briefing on local area and traffic pattern.

(5) Flight Line Indoctrination.

(a) Complete three (3) hours cockpit time. Transition pilot will demonstrate ability to readily apply corrective aircraft emergency procedures to satisfaction of IP.

(b) Complete a blindfold cockpit check to satisfaction of IP.

(c) Complete walk-around inspection, pre-start, start, and A/B operation to satisfaction of IP.

(d) Observe at least five (5) F-89D takeoffs and landings from mobile control.

b. Flying Phase:

(1) All pilots will demonstrate their flying proficiency in a T-33 and complete 3 dual landings to the satisfaction of an IP prior to checking out in the F-89D. The trainee will receive dual and/or solo flights in the T-33 to meet the minimum flying requirements of this Regulation plus additional training if deemed necessary.

(2) The F-89D flying phase will consist of 11 missions which will be conducted in accordance with each mission outlined. ROs will not be carried on any pilot transition mission.

(3) In no case will the transition pilot fly any F-89D mission other than a transition mission until he has satisfactorily completed transition training.

2. Standard F-89D Transition Missions (Pilot)

a. Mission #1 and #2 (Familiarization)

(1) Purpose. This mission will familiarize the transition pilot with flying characteristics of the F-89D.

(2) Instructor Pilot Requirements. IPs are required for chase aircraft, mobile control, supervision of walk-around inspection and start, briefing and critique.

(3) Fuel Requirements. All tanks full, pylons empty. Enter initial approach for landing with not less than 2000 lbs.

(4) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on stalls, spin recovery, traffic and landing pattern, and use of decelerons.

(5) Procedures. Transition pilot will:

(a) Takeoff and climb with A/B to 40,000 feet.

(b) At 40,000 feet practice climbs, dives, and turns.

(c) 160K, throttle idle, place gear, wing flaps down and decelerons extended, glide to 25,000 feet.

(d) 25,000 feet practice slow (140K) and high (360K) speed flying.

(e) 25,000 feet, general air work (turns, climbs, dives, power changes, extend and retract decelerons).

(f) Practice stalls 20,000 feet as follows:

#1. A/C clean 70%.

#2. Gear, flaps, and decelerons extended, idle.

#3. High speed stalls, 100%, 300K.

(g) At 10,000 feet practice landing patterns.

(h) Make simulated single engine pattern at home base, initiating go-around at 200 feet.

(i) Enter initial with 3000 lbs of fuel and make one go-around.

(j) Re-enter initial and make full stop landing.

(6) Critique.

b. Mission #3 (Familiarization - High Altitude)

(1) Purpose. This mission will familiarize the transition pilot with F-89D high altitude flight characteristics.

(2) Instructor Pilot Requirements. IPs are required for mobile control, supervision of walk-around inspection and start, briefing and mission critique.

(3) Fuel Requirements. All tanks full, pylons empty. Enter initial for landing with at least 2000 lbs.

(4) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on maximum A/B operating time, throttle manipulation, tail pipe temperatures, relighting of A/B, handling characteristics at high altitude and high speed, and air start procedures.

(5) Procedures. Transition pilot will:

(a) Takeoff and climb to 45,000 feet with A/B.

(b) At 45,000 feet with A/B practice turns, dives, climbs and high speed stalls.

(c) Make descending turns to 15,000 feet, without A/B.

(d) At 15,000 feet, 350K retard throttle to idle position and fully extend decelerons. Close decelerons.

(e) Make simulated single engine (right engine idle) pattern at home base (Min altitude 200 feet).

(f) Make a single engine go-around with not less than 3000 lbs of fuel or more than 4500 lbs.

(g) Re-enter initial for final landing.

(6) Critique.

c. Mission #4 (Familiarization with alternate systems)

(1) Purpose. This mission will indoctrinate pilot in use of alternate systems while airborne.

(2) Instructor Pilot Requirements. IPs are required for mobile control, briefing and critique.

(3) Fuel Requirements. All tanks full, pylons empty. Minimum of 2000 lbs on initial.

(4) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on proper utilization of cross-feed, air start procedures, handling characteristics on single engine, use of manual trim, changing and checking instrument inverters, single engine landing, landing without decelerons and normal breaking system.

(5) Procedures. The transition pilot will:

(a) Takeoff and climb with A/B to 40,000 feet, filling in the following:

ALT	RATE OF CLIMB	IAS	FUEL FLOW	ELAPSED TIME
10,000'				
20,000'				
30,000'				
40,000'				

(b) .9 mach dive to 30,000 feet.

(c) Accomplish the following at 30,000 feet:

1. Feed both engines from left fuel tanks.

2. Feed both engines from right fuel tanks.

3. Return cross-feed to OFF. Fuel selector to all tanks position.

(d) Shut right engine down, glide to 10,000 feet and perform airstart.

(e) At 10,000 feet decelerons $\frac{1}{4}$ open, throttle right engine back to idle position, maintain flying speed with left engine, practice turns, descents and climbs with gear and flaps down simulating single engine landings. Repeat with left engine at idle.

(f) At 10,000 feet, 250K, sideslip augmenter - off, use emergency rudder trim as necessary. After five minutes neutralize rudder trim and turn sideslip augmenter - on.

(g) At 10,000 feet observe gyro compass during turns and while flying straight and level. Return aircraft to level flight and check operation of standby instrument inverter, return inverter switch to normal position, observe action of compass during turns.

(h) Fuel permitting, practice go-arounds.

(i) With right engine at idle, ¼ decelerons, make final full stop landing simulating a single engine landing.

(6) Critique.

d. Mission #5 (Day Instruments)

(1) Purpose. This mission will indoctrinate the transition pilot in F-89D instrument flying.

(2) Instructor Pilot Requirements. IPs are required for mobile control, briefing, and critique. Chase pilot required.

(3) Fuel Requirements. All tanks full, pylons empty. Minimum of 2000 lbs on initial.

(4) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on proper use of Zero Reader for instrument takeoff, climb, cruise and letdown.

(5) Procedures. Transition pilot will:

(a) Simulate an instrument takeoff. (Hood will not be used.)

(b) Come out of A/B at safe altitude, climb to 25,000 feet using local IFR departure procedure, and level off.

(c) When level at 25,000 feet turn altitude control on.

(d) Utilizing Zero Reader practice basic instruments.

(e) Using Zero Reader practice range orientation and holding pattern. Practice aural null procedures (time and distance to station).

(f) Make standard jet letdown at home base and low approach, followed by a full-stop landing.

(6) Critique.

e. Mission #6 (Day Instruments)

(1) Purpose. To practice instrument flying, ILAS and GCAs.

(2) Instructor Pilot Requirements. IPs are required for briefing and critique. Chase pilot required, but need not be an IP.

(3) Fuel Requirements. All tanks full, pylons empty. Minimum of 2000 lbs on initial.

(4) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on errors made on Mission #5, air speeds in GCA and ILAS patterns, minimum altitudes, and aircraft configurations.

(5) Procedures. Transition pilot will:

(a) Simulate ITO using Zero Reader (no hood). Use A/B for takeoff.

(b) Climb to 25,000 feet using local IFR departure procedures, climb without A/B.

(c) 25,000 feet practice basic instruments.

(d) Range orientation using Zero Reader at 25,000 feet.

(e) Practice ADF and aural null procedures (time and distance, and tracking).

(f) Perform range letdown using Zero Reader and aural range signals (Alt Cont off).

(g) Make 4 or more low approaches: Two or more Zero Reader ILASs (if available), and 2 or more GCAs. Do not go below GCA or ILAS minimums.

(h) Enter final low approach and make visual landing out of instrument approach when possible.

(6) Critique.

f. Mission #7 (Formation and Acrobatics)

(1) Purpose. This mission will familiarize the transition pilot with close formation, and individual acrobatics.

(2) Instructor Pilot Requirements. IPs are required for lead, briefing and critique. IP will observe performance of student for proficiency in individual acrobatics.

(3) Fuel Requirements. All tanks full, pylons empty. Minimum of 2000 lbs on initial.

(4) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on stalls, spin recovery, join-up, maintaining position, and acrobatic maneuvers to be performed.

(5) Procedures. The transition pilot will:

(a) Takeoff individually without A/B (if runway length permits) with instructor leading.

(b) Join-up in close formation and climb to 25,000 feet.

(c) Practice close formation during turns, dives, and climbs.

(d) Descend to 15,000 feet above terrain.

(e) Under supervision of IP, perform following maneuvers (Minimum altitude 10,000 feet above terrain):

1. Three barrel rolls to right.

2. Three barrel rolls to left.

3. Two loops.

4. Two immelmanns.

(f) Join-up in close formation, enter initial, and make full stop landing (minimum interval on break will be three seconds).

(6) Critique.

g. Mission #8 (Auto-Pilot Familiarization)

(1) Purpose. This mission will increase pilot proficiency in use of auto-pilot.

(2) Instructor Pilot Requirements. IPs are required for briefing and critique.

(3) Fuel Requirements. All tanks full, pylons empty.

(4) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on operation of auto-pilot. Also, rebrief on landing without decelerons.

(5) Procedures. Transition pilot will:

(a) Takeoff and climb with A/B to 5,000 feet. A/B off.

(b) Wings level engage auto-pilot.

(c) Continue climb to 35,000 feet, making right and left turns with auto-pilot.

(d) At 35,000 feet make steep turns using auto-pilot.

(e) Reduce throttle to idle RPM. Turn auto-pilot pitch control to maximum dive. At 400K IAS open decelerons and note auto-pilot control.

(f) Pull out of dive at 20,000 feet using auto-pilot.

(g) Disengage auto-pilot and re-engage at banks up to sixty degrees. Note attitude change. Disengage and engage at different pitch attitudes and note auto-pilot trim control.

(h) Make jet letdown using auto-pilot.

(i) Make coupled ILAS approach, if coupler is installed.

(j) Make full stop landing without using decelerons. Note extended landing roll.

(6) Critique.

h. Mission #9 (Climb and Cruise Control Exercise)

(1) Purpose. This mission will familiarize pilot with fuel consumption during climb and cruise in the F-89D.

(2) Instructor Pilot Requirements. IPs are required for briefing and critique.

(3) Fuel Requirements. All tanks full, pylons empty. Enter initial with at least 2000 lbs.

(4) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on correct power settings for climb and cruise, and recording of required information.

(5) Procedures. Transition pilot will:

(a) A/B takeoff and climb to safe altitude.

(b) Without A/B continue climb to 35,000 feet, 100%, filling in the following: (Climb not above 350K to 5000 feet, continue climb at T.O. climb speeds).

ALT	T.O. CLIMB SPEEDS	RATE OF CLIMB	FUEL FLOW	ELAPSED TIME
10,000'				
15,000'				
20,000'				
25,000'				
30,000'				
35,000'				

(c) Total fuel remaining at level off (35,000 feet) ______________ lbs.

(d) Practice climbs, dives, and turns at .8 mach.

(e) Extract from T.O. cruise data (prior to takeoff), maximum range, no wind and record actual inflight data after flying for five minutes at each altitude.

	DATA FROM T.O.			ACTUAL INDICATIONS	
ALT	IAS	%	LB/HR	IAS	LB/HR
35,000'	___	___	_____	___	_____
30,000'	___	___	_____	___	_____
25,000'	___	___	_____	___	_____
20,000'	___	___	_____	___	_____
15,000'	___	___	_____	___	_____

(f) Practice simulated flame-out approach, initiating go-around at 200 feet.

(g) Make full-stop landing out of a simulated flame-out approach.

(6) Critique.

i. Mission #10 (Navigation)

(1) Purpose. This mission requires transition pilot to apply cruise control knowledge gained from Mission #9 to a 500 nautical mile round-robin navigational flight simulating IFR.

(2) Instructor Pilot Requirements. IPs are required for briefing, checking accuracy of flight plan, and critique.

(3) Fuel Requirements. Full fuel load, including pylons, if available. Minimum for landing is 2000 lbs of fuel.

(4) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on proper power settings for climb and cruise, maintaining accurate log, closely monitoring fuel consumption, navigating, and position reporting.

(5) Procedures.

(a) A 500 nautical mile round-robin navigation flight plan will be prepared prior to takeoff by the transition pilot. The navigational log will contain the following information with all estimates and distances completed prior to takeoff:

	ESTIMATE	ACTUAL
Climb heading (Magnetic)		
Time for climb		
Distance for climb		
Fuel for climb		
Magnetic heading each leg		
Distance each leg		
Time over each reporting point		
Fuel remaining over each reporting point		
Time of arrival over home base		
Fuel remaining over home base		

(b) Distance between check points will not be more than 200 nautical miles. A minimum of three position reports is required.

(c) Upon arrival over home station radio fix the transition pilot will set up a holding pattern and hold for ten minutes.

(d) A simulated IFR letdown and low approach, simulated missed approach, and GCA or ILAS recovery will be accomplished.

(e) Fuel remaining upon completion of ILAS or GCA will not be less than 2000 lbs.

(f) Enter initial with 2000 lbs of fuel for landing, extend decelerons on landing roll.

(6) Critique.

j. Mission #11 (Night)

(1) Purpose. This mission is to indoctrinate the transition pilot in F-89D night flying.

(2) Instructor Pilot Requirements. IPs are required for briefing, mobile control, and critique.

(3) Fuel Requirements. All tanks full, pylons empty. Enter initial with not less than 2000 lbs.

(4) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on internal and external aircraft lighting, field lighting, and prime check points within local area.

(5) Procedures.

(a) Takeoff and climb with A/B to 5000 feet.

(b) Continue climb to desired altitude without A/B (25,000 feet).

(c) Fly over briefed prime check points within the local area.

(d) Return to home base and enter initial with not less than 2000 lbs of fuel.

(6) Critique.

STANDARD F-89D R/O CHECKOUT AND TRANSITION

1. The transition program will be divided into two phases, ground training and flying training. MTD training is desired. If this is not available, the ground school program will be accomplished as outlined.

a. Ground Phase:

(1) Read, understand, and certify to the reading of the PIF and APG 40 Operating Instruction Handbook.

(2) Receive instruction and engineering lectures covering the following:

(a)	Aircraft general and operating procedures	1 hour
(b)	E-6 Fire Control System	2
(c)	Electrical system	1
(d)	Hydraulic systems	1
(e)	Emergency procedures	2
(f)	De-icing, cockpit heat, and pressurization	1
(g)	Flight control systems	½
(h)	Oxygen system	½
(i)	Flight characteristics, high and low speed	1
(j)	Pre-flight checklist and daily inspection	1
(k)	Communications	1
(l)	Flight simulator (Trans Phase)	10
	Total	22 hours

Attachment 2, Supplement III, ADCR 51-2, 1 July 1955.

(3) Completed Standard ADC R/O Questionnaires (cockpit and APG 40 test) will be reviewed by the instructor in detail, with emphasis on emergency procedures.

(4) Flight Line Indoctrination.

(a) Complete two hours cockpit time. Transition R/O will demonstrate ability to readily apply appropriate emergency procedures to satisfaction of instructor.

(b) Complete a blindfold cockpit check to satisfaction of instructor.

(c) Complete walk-around pre-flight to satisfaction of instructor.

(5) All R/Os will demonstrate their ability to operate the E6 FCS in the F-89D simulator to the satisfaction of R.O. instructor.

b. Flying Phase:

(1) The F-89D flying phase will consist of three transition missions and will be accomplished under VFR conditions and in accordance with each mission outline.

(2) After completing three flights in the F-89D, the R/O trainee may be scheduled for night flying.

2. Standard F-89D R/O Transition Missions:

a. Mission #1 (Familiarization)

(1) Purpose. To familiarize the radar observer with the flying characteristics of the F-89D aircraft and local flying area.

(2) Instructor. Instructor will supervise walk-around inspection, briefing, and critique.

(3) Briefing. Briefing for this mission will include all items as listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on R/O bail-out procedures, oxygen system, interphone system, and R/O responsibility during walk-around and cockpit inspection.

(4) Procedures.

(a) Pilot will demonstrate flying characteristics and aircraft operating procedures:

1. A/B climb.

2. Speed effects by extending gear, flaps, and decelerons.

3. Acrobatics to include high speed stalls, chandelles, steep turns, lazy eights, and barrel rolls.

4. Single engine demonstration.

(b) Familiarize the R/O with local area, indicating prominent landmarks.

(5) Critique.

b. Mission #2 (Navigation)

(1) Purpose. To familiarize the R/O with cross-country flight planning and use of radio and radar navigational aids.

(2) R/O Instructor. R/O instructor required for briefing, checking accuracy of flight plan, and critique.

(3) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation. In addition, emphasis will be placed on proper power settings for climb and cruise, maintaining accurate log, closely monitoring fuel consumption, navigating, position reporting, Notams, and Racons.

(4) Procedures.

(a) A 500 nautical mile round robin navigation flight plan will be prepared prior to take-off. The navigational log will contain the following information with all estimates and distances entered on the log prior to take-off:

Required	Estimate	Actual
Climb heading	________	______
Time for climb	________	______

Required	Estimate	Actual
Distance for climb		
Fuel for climb		
Magnetic heading, each leg		
Distance for each leg		
Time over each IFR position reporting point		
Fuel remaining over each reporting point		
Time of arrival over home base		
Fuel remaining over home base		

(b) Distance between check points will not be more than 200 nautical miles.

(c) The radar observer will make all position reports. A minimum of three position reports are required.

(5) Critique.

c. Mission #3 (Radar Intercept Familiarization)

(1) Purpose. To familiarize R/Os with standard ADC intercept procedures.

(2) R/O Instructor. R/O instructor required for briefing and critiques (target aircraft required for this mission).

(3) Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing of this Regulation; in addition, will emphasize safe intercept procedures, and use of brevity code (ACP #165), relationship between GCI controller and airborne interceptor.

(4) Procedures. (After Takeoff)

(a) R/O will be given familiarization passes on the following types of attacks, while under control of GCI:

1. Beam
2. Stern
3. Headon
4. Identification

(b) R/O will demonstrate his ability to run an intercept on hand control using proper descriptive and directive commentary.

Critique.

SUPPLEMENT IIIA)
ADC REGULATION)
51-2)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colo.
1 July 1955

FLYING TRAINING

Standard F-89D Simulator Checkout and Transition

1. Purpose. This directive establishes a F-89D checkout and transitional training program in the F-89D Simulator.

2. Scope. This directive applies to pilots and ROs who are scheduled for checkout in the F-89D aircraft.

3. Responsibility. Commanders will insure that the provisions of this directive are complied with.

4. General. Ten missions in the F-89D simulator will be accomplished prior to initial checkout in the F-89D aircraft. Simulator flights will be conducted with realism, and each flight will be preceded by a thorough briefing on the training to be accomplished, including weather and flight planning. Crew members will be required to use parachutes, bail-out bottles, helmets with oxygen masks, safety belts, and check-lists for first three simulator flights.

5. Simulator Instructors. Instruction in the flying phase of the simulator will be conducted by a simulator instructor pilot and R/O appointed by the unit commander. All simulator flights will be followed by a critique.

6. Minimum Requirements for Acceptance of Simulator for Flight.

a. Trainer will be used for transition flights only where the following items are in operating condition:

(1) Turn-bank indicator.

(2) Airspeed indicator.

(3) Altimeter.

(4) Altitude gyro.

(5) Gyro compass.

(6) Rate of climb.

(7) Fuel flow meter.

(8) Tachometer.

(9) TPT gauge.

(10) Variable nozzle indicator.

(11) Fuel quantity gauge.

(12) Oil pressure gauge.

(13) Hydraulic pressure gauge.

(14) Realistic feel of controls.

(15) Alternate flight control system indicator light.

(16) Wing flaps.

(17) Landing gear control panels.

b. Trainer will be used for radio training aids only when it has equipment necessary for transition, plus:

(1) ARN-14.

(2) ILAS, if lesson requires it.

(3) ARN-6, if installed.

c. Trainer will be used for radar training only when it has the necessary equipment for transition, plus:

(1) Full radar panel.

(2) One plotting board.

(3) Hit-or-miss indicator.

(4) Third attack phase in proper sequence in beam attacks.

(5) Radio aids if lesson calls for it.

7. Items To Be Accomplished Prior to Flight Simulator Transition Training.

a. Pilot:

(1) Read and be familiar with F-89D pilot's handbook.

(2) Complete F-89D aircraft questionnaire.

b. Radar Observers:

(1) Complete APG 40 questionnaire.

(2) Complete F-89D R/O cockpit questionnaire.

8. <u>Items To Be Accomplished Prior to Simulator Radar and Rocketry Training</u>. Hughes Fire Control System Handbook.

9. <u>Transition Program</u>. Attached to this directive is the transition program to be completed prior to the first flight in an F-89D aircraft.
(ADOOT)

BY ORDER OF THE COMMANDER:

OFFICIAL:

GEORGE F. SMITH
Major General, USAF
Chief of Staff

Walter W. Robinson
WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

1 Attachment:
Transition Program

DISTRIBUTION:
A

F-89D SIMULATOR TRANSITION PROGRAM

FST-1	F-89D Flight Simulator Checkout
FST-2 & 3	F-89D Aircraft Checkout
FST-4	Emergency Procedures
FST-5	Instrument Transition (VOR ILAS Review)
FST-6 & 7	Instrument Transition (Techniques & Procedures)
FST-8	Auto Pilot Familiarization
FST-9	Climb and Cruise Control Exercise
FST-10	Navigation

NOTE: The Simulator Training Missions contained herein are commensurate with the F-89D standard transition missions.

Attachment 1, Supplement IIIA, ADCR 51-2, 1 July 1955.

MISSION TITLE: F-89D FLIGHT SIMULATOR CHECKOUT.

TRAINING AIDS: None.

REFERENCES: TO 1F-89-1

1. MISSION ACCOMPLISHMENTS:

a. To familiarize the aircrew with the F-89D Flight Simulator.

(1) Instructor's console.

(2) Pre-flight procedures.

(3) Familiarization flight.

2. DEVELOPMENT OF CONTENTS:

a. Instructor's console.

(1) Student aircrews will be briefed on instructor's operating panels and plotting boards.

(a) Instructor pilot's panel.

(b) Instructor radar observer's panel.

(c) Navigational panel (VOR and L/F).

(d) Plotting board.

(e) GCA.

(f) Automatic hit recorder.

b. Cockpit checkout and preflight procedures (pilot).

(1) Explain the following check lists as outlined in the Pilot's Handbook:

(a) Interior check.

(b) Ground starting procedure.

(c) Instrument check list.

(d) Pre-taxi check.

(e) Pre-take-off check.

c. Cockpit checkout and preflight procedures (R/O).

(1) Explain the following check lists as outlined in the dash one:

(a) R/O check list.

(b) Pre-taxi check.

(c) Pre-take-off check.

d. Familiarization flight.

(1) Explain the following check lists as outlined in the Pilot's Handbook:

(a) Take-off.

(b) After take-off.

(c) 5,000 foot check.

(d) Pre-landing check.

(e) Traffic pattern.

(f) After landing check.

(2) Explain the difference between aircraft and simulator flight characteristics.

(3) Radar turn-on and tuning procedure.

(4) Radar emergency procedures.

(5) Radar turn-off procedure.

MISSION TITLE: Aircraft Checkout (F-89D).

TRAINING AIDS: F-89D CHECK LISTS.

REFERENCES: TO 1F-89D-1

1. MISSION ACCOMPLISHMENTS: a. To familiarize the aircrew with operating procedures and flight characteristics of the F-89D aircraft through use of the F-89D Flight Simulator.

   (1) Preflight procedures.

   (2) Afterburner take-off.

   (3) In-flight procedures.

   (4) Use of VHF navigational equipment.

   (5) UHF D/F.

2. DEVELOPMENT OF CONTENTS: a. Mission will be the same as Mission 1 and 2 of the standard F-89D transition missions.

   (1) External preflight briefing may be omitted.

   (2) Emergency procedures will not be covered during this lesson.

MISSION TITLE: EMERGENCY PROCEDURES.

TRAINING AIDS: BLACKBOARD.

REFERENCES: TO 1F-89D-1.

1. MISSION ACCOMPLISHMENTS: a. To familiarize the aircrew with emergency flight procedures in the F-89D aircraft through use of the Flight Simulator.

2. DEVELOPMENT OF CONTENTS: a. Thorough briefing of all phases of single engine emergency procedures as outlined in the Pilot's Handbook.

b. Preflight, starting and pre-take-off procedures.

c. Take-off procedures.

(1) Instructor will flame-out right engine during the climb due to fuel starvation.

(a) Aircrew will follow corrective action and airstart procedures as outlined in the F-89D Pilot's Handbook.

d. Level off at medium altitude (20,000 - 25,000 feet).

e. Emergency procedures.

(1) Instructor pilot will set up the following in-flight malfunctions:

(a) Fuel system.

1. Tip tank malfunction.

2. Wing tank boost pump failure.

a. Warning light will come on.

b. Place Fuel Selector Switch on WINGS TANKS.

c. Fuel in tank will gravity feed to sump tank if aircraft is below 10,000 feet, and the other wing tank on the same side is either empty or the tank switch is OFF.

3. Sump tank boost pump failure.

   a. Place Fuel Selector Switch on WING TANKS. (Fuel will then be routed directly to engine.)

   b. Place Fuel Selector Switch on ALL TANKS after wing tanks are empty. (Nose tank must not be selected when sump tanks are more than two thirds full because of aft GG limitations.)

   c. Fuel will gravity feed from the sump tank to the engine if aircraft is below 10,000 feet.

4. Stuck float valve (sump tank).

   a. Indicated by fuel being dumped overboard under the inboard wing and usually occurs just after tips have gone dry and wing tanks start feeding.

   b. If this occurs when tip tanks are feeding, turn tip tanks OFF and allow fuel to burn out of sump tank.

      (1) After fuel has diminished in the sump tank, turn tips back ON. Refilling the sump tank by this method may unstick the float valve.

   c. If valve sticks while wing tanks are feeding, turn wing tank boost pump OFF and allow fuel to burn out of sump tank.

      (1) After fuel has diminished in the sump tank turn wing tank boost pumps back ON.

   d. If sump tank float valve continues to malfunction the sump tank may be by-passed and the wing tank fuel used by manually selecting the WING TANKS position with the Fuel Selector Switch.

5. Nose tank valve and/or pump failure.

   a. Indicated by illumination of nose tank warning light.

      (1) Crossfeed Switch - ON.

      (2) If light goes out, the nose tank shut-off valve has failed in the closed position. Engine will continue to receive fuel from opposite system through the crossfeed line.

      (3) If light remains on, the nose tank boost pump in the corresponding system is inoperative. The other pump will continue to supply fuel to both engines.

6. Crossfeed operation.

7. Fuel filter icing.

(b) Electrical System.

1. Generator failure (one, two and three).

2. Generator over voltage.

3. Power inverter failure.

   a. Should the main power inverter fail on Groups 1, 5 and 10 aircraft the spare power inverter will take over automatically.

      (1) If the automatic change-over fails, manually place the inverter switch to SPARE.

      (2) If the spare inverter fails, turn the inverter switch to OFF.

   b. Should the main power inverter fail on Group 15 aircraft place the inverter switch on SPARE.

      (1) If the spare inverter fails, turn the inverter switch OFF.

c. All engine instruments except the tachometers and exhaust temperature gauges will become inoperative if both the main and spare power inverters fail.

4. Instrument inverter failure.

a. Follow the prescribed procedures as outlined for power inverter failure.

b. If both the main and spare inverters fail the artificial horizon will tumble, the slave gyro will be inaccurate, and the Course Indicator and Flight Director will be inoperative.

5. Electrical fire.

(c) Hydraulic System.

1. Loss of left system.

a. Emergency gear extension.

b. With left engine windmilling above 13%, the landing gear can be lowered without dumping the left hydraulic system pressure by the following procedure:

(1) Move landing gear handle from the UP position to slightly past midpoint of travel.

(2) Pull landing gear emergency extension handle to full limit of travel. Gear will drop by its own weight and will automatically be moved into fully locked position by the bungee system.

(3) Check gear DOWN and LOCKED visually and by gear position indicators, then guide emergency release handle back to its STOWED position.

(4) Place landing gear level at DOWN to close main gear doors.

c. Emergency wing flap extension.

(1) Place emergency flap switch ON.

(2) Move wing flap lever to desired position.

NOTE: Wing flap operation on emergency system is considerably slower than normal operation (75 seconds for full flaps).

(3) Turn emergency flap switch OFF as soon as desired flap setting is obtained.

d. Emergency wheel brake operation.

(1) If landing gear is lowered as in b. above and left hydraulic system pressure has not been lost, approximately three brake applications can be obtained from main system accumulator pressure.

e. Speed brakes will be inoperative.

f. Left flight control system will be inoperative. Flight control system will operate on the right system pressure; however, degree and rate of surface movement will be limited.

2. Loss of right system.

a. Right flight control system will be inoperative. Flight control system will operate on left system pressure; however, degree and rate of surface movement will be limited.

b. Emergency flight control system will be inoperative if fluid is lost.

(d) Fire warning system.

1. Over heat warning.

2. Fire warning.

(e) Fuel filter icing.

f. Mission will terminate with a single-engine GCA.

MISSION TITLE: INSTRUMENT TRANSITION.

TRAINING AIDS: BLACKBOARD.

REFERENCES: TO 1F-89D-1
AFM 51-45.

1. MISSION ACCOMPLISHMENTS: To familiarize the student aircrew with the use of VOR.

2. DEVELOPMENT OF CONTENTS:

a. Familiarization.

(1) Characteristics of VHF Omni Range:

(a) Visual presentation with the exception of station identification.

(b) Static free (usually).

(c) Long range (line of sight).

(d) No irregularities such as swinging beams or fading signals, except in mountainous terrain where it is possible to have swinging beams.

(e) Any one of a number of courses can be selected.

(f) Areas of confusion at high altitude (above 20,000 feet) equidistant between stations using the same frequency. This is indicated by oscillations of the visual indicators and an aural whistle.

(2) Differences between LF/MF and VOR editions of Radio Facility Charts.

(3) Operation and use of the instruments presenting VOR information:

(a) Control box.

1. Power Switch.

2. Outer Frequency Selection Knob controls megacycles.

3. Inner Frequency Selection Knob controls tenths of megacycles.

4. Frequency Window indicates frequency selected (108-135.9 megacycles):

    a. ILAS frequencies (108-111.9 megacycles).

    b. VOR frequencies (112-117.9 megacycles).

    c. Voice reception on communication channels (118-135.9 megacycles) used to receive voice communications on VHF frequencies.

5. Volume Control Knob controls intensity of aural signals, station identification and voice reception.

(b) Course Indicator ID 249:

1. Course Set Knob selects any bearing desired.

2. Course Selector Dial indicates bearing selected.

3. TO-FROM Indicator shows whether the bearing selected will take the aircraft TO or FROM the station.

4. Course Deviation Indicator (Vertical Cross Pointer) indicates position of track in relation to aircraft.

5. Glide Slope Indicator (Horizontal Cross Pointer) operates on ILAS frequencies only.

6. Heading Indicator and Scale show aircraft heading relative to selected bearing.

7. Marker Beacon light.

8. Alarm flags indicate improper operation of instrument and signals received.

(c) Radio Magnetic Indicator (RMI):

1. Rotating Compass Card:

a. Actuated by Gyrosyn or Flux Gate Compass.

b. Magnetic heading of the aircraft indicated under index at top of RMI.

2. Double-barred Pointer (No. 2 Pointer) indicates magnetic bearing to the station.

a. With Rotating Compass Card inoperative, Double-Barred Pointer still indicates magnetic bearing to station.

3. ADF Pointer (No. 1 Pointer) connected to conventional Radio Compass.

a. ADF Pointer operative with RMI inoperative.

(4) Tuning:

(a) Power Switch ON.

(b) Select desired frequency.

(c) Adjust volume.

(d) Identify station - coded or voice identification.

(5) The equipment is not operating properly if one or more of the following indications is observed:

(a) Alarm flag of the Deviation Indicator (Vertical Cross Pointer) does not disappear.

(b) TO-FROM Indicator blank.

(c) Double-barred Pointer (No. 2 Pointer) circles aimlessly.

(d) Fluctuation of vertical alarm flag indicates marginal operation and should improve if due to weak signal strength.

(6) Intercepting in-bound bearings:

(a) Select desired bearing on the Course Selector Dial.

(b) Turn aircraft to this bearing.

(c) Turn the aircraft to place the Heading Indicator under the Deviation Indicator (turn toward the Vertical Cross Pointer).

1. If the Deviation Indicator shows a full scale deflection, the Double-barred Pointer should be used to compute required angle of interception (Double-barred Pointer used just as in ADF bearing interception).

(d) As the course Deviation Indicator moves toward the center, keep the Heading Indicator under the Deviation Indicator. If the Deviation Indicator stops moving toward the center with Heading Indicator underneath, this shows the wind-drift correction angle required to remain on track. Increase the angle of interception to get on track and then apply the wind-drift correction.

(e) Aircraft is on the desired track when Deviation Indicator is centered.

(7) Intercepting out-bound bearing:

(a) Same as intercepting in-bound bearings except:

1. TO-FROM Indicator reads FROM.

2. With Double-barred Pointer pointing to the tail of the aircraft corrections are the same as in ADF.

(b) Procedure for intercepting reciprocal of selected bearing may be taught as additional information.

(8) Tracking Procedure:

(a) Deviation Indicator centered when on track.

(b) Initiate a correction toward track when the Deviation Indicator moves from center by:

1. Making a turn placing the Heading Indicator under the Deviation Indicator (turn toward the Vertical Cross Pointer).

2. The remainder of the tracking procedure is the same as Paragraph (6)(d) above.

(c) Tracking out-bound from the station is accomplished as in Paragraph (6) and (7) above.

(9) Station Passage:

(a) TO-FROM Indicator changes to FROM.

(b) Double-barred Pointer moves to the tail position.

(c) At high altitudes the TO-FROM Indicator may change many times and the Double-Barred Pointer will oscillate just as indicated in Station Passage - ADF.

1. Cone of confusion may be as much as ½ mile wide at 1,000 feet and 2½ miles wide at 10,000 feet.

(10) Procedure Turns:

(a) Forty second type easiest to accomplish (known wind).

(b) Forty-five degree turn from the bearing may be made with the Heading Indicator.

(c) During procedure turn, rotate Course Selector Dial 180 degrees.

(d) Roll out on in-bound bearing and follow procedures as in tracking.

(11) Holding and Stacking:

(a) Tracking and Station Passage indications are as outlined in Paragraph (8) and (9) above. When flying the out-bound bearing in the holding pattern, do not change the selected in-bound bearing.

(b) Holding Pattern - same as used in ADF procedures. Maintain 220 knots at all altitudes.

(c) Stacking, Voice Transmissions, and Timing are the same as used in ADF procedures.

(12) Penetration, Low Approach, and Missed Approach.

(a) Make Standard Jet Penetration as published in appropriate Pilot's Handbook. Use 70%, ½ speed brakes, adjust rate of descent to maintain 250 knots throughout the penetration.

(b) Low Approach and Missed Approach as published in appropriate Pilot's Handbook.

(13) Explain why ILAS was designed.

(14) Information necessary for planning an ILAS approach is found in the following publications:

(a) Radio Facility Charts.

(b) Flight Information Manual.

(c) Airman's Guide.

(d) Pilot's Handbook - ILAS charts.

(15) Operation and use of instruments presenting ILAS information:

(a) Control Box (as outlined in (3)(a) above).

(b) Course Indicator as outlined in (3)(b) above except:

1. TO-FROM Indicator is blank.

2. Deviation Indicator (Vertical Cross Pointer) is directional (turn toward the Vertical Cross Pointer) when flying on the approach bearing and nondirectional (turn away from the Vertical Cross Pointer) when flying reciprocal of the approach heading.

a. Stop to stop on Course Deviation Indicator is only five degrees of travel when flying ILAS as opposed to twenty degrees when flying VOR.

3. Approach bearing is set on Course Selector Dial for informational purposes only. It has no effect on Deviation Indicator.

4. Glide Slope Indicator is directional at all times.

(c) Radio Magnetic Indicator (RMI) as outlined in (3)(c) above except the Double-barred Pointer (No. 2 Pointer) is inoperative on ILAS and VOR frequencies.

(16) ILAS procedure:

(a) Tuning:

1. Power Switch - ON.
2. Select frequency.
3. Adjust volume.
4. Identify station.
5. Set approach bearing on Course Selector Dial.

(b) Transition to outer marker from either Range or OMNI, 200 kts, 74%, 2,000 feet: (For VFR separation).

1. Tune Radio Compass to ILAS outer marker compass locator.
2. Identify the station.

(c) Both alarm flags should disappear over the outer marker if the instruments are functioning and the signals are reliable. Although, due to the position of the Antenna, it is possible to blank out glide path reception when out-bound.

1. ILAS is unreliable when:
    - a. Alarm flags are in sight.
    - b. Glide Slope Indicator fluctuates.
    - c. Course Deviation Indicator fluctuates.

(d) Upon approaching outer marker, bring the Deviation Indicator into the cross-check and intercept the reciprocal of approach heading by centering Course Deviation Indicator and/or ADF interception.

(e) Proceed thirty seconds beyond the outer marker on track prior to executing procedure turn.

(f) Procedure turn (within five miles of outer marker).

1. 90-270 type procedure turn.

2. Descend to desired altitude. Use speed brakes as necessary.

3. Intercept approach bearing.

(g) In-bound, required altitude.

1. On track. Course.

2. Perform landing check immediately after rolling out of procedure turn.

   a. Gear down.

   b. Thirty degrees flaps.

   c. Establish the final approach speed of 150 knots.

(h) Over outer marker:

1. Cross-check Deviation and Glide Slope Indicators.

2. Establish descent when glide slope is intercepted, airspeed primary for pitch until rate of descent is established, then Vertical Speed Indicator becomes primary for pitch control, Airspeed Indicator for power, and Heading Indicator for bank control. Glide Slope and Deviation Indicators support the primary pitch and bank instruments.

3. Notify approach control.

4. Apply corrections as needed to keep indicators centered.

   a. Localizer beam is five degrees in width. A full scale deflection as indicated by the Deviation Indicator at the outer marker, measured in feet from center line, amounts to 1,250 feet. A full scale deflection at the middle marker amounts to approximately 150 feet from the center line.

      (1) Average linear distance for 1 dot displacement at outer marker, 253

feet; middle marker, 92 feet; end of runway, 56 feet; based on 5,000 feet runway with outer marker 4-5 miles out and middle marker 3/4-1 mile out.

b. Glide slope is .8 degrees in depth. A full scale deflection is indicated by the Glide Slope Indicator when the aircraft is .5 degrees below glide slope and .3 degrees above glide slope.

(1) Dot displacement of Glide Slope Indicator at outer marker 22 feet high or 40 feet low; at middle marker, 5 feet high or 9 feet low; at end of runway, 1 foot high or 1½ feet low.

5. Corrections are made toward the indicators.

6. Do not bank more than the number of degrees to be turned.

7. Keep corrections small once inside outer marker (200-300 fpm) maximum glide slope correction and 2½-5 degrees maximum azimuth correction.

(17) Marker Beacons:

(a) Two marker beacons:

1. Middle marker 2/3 to 1 mile from end of runway (alternate dots and dashes).

2. Outer marker generally 4½ to 5½ miles from touchdown (continuous dashes).

(b) Marker beacons indicate distance to field, and provide the pilot with an altitude check.

(c) Compass locators are frequently installed at outer and middle markers. Use as a check on the Deviation Indicator.

(18) Missed Approach (VFR):

(a) 100% power - speed brakes closed.

(b) Gear up when Altimeter and Vertical Speed indicate a climb.

(c) 160 kts - flaps UP.

(d) 200 kts - power back to 85%.

(e) Return to outer marker for another approach.

(f) Contact approach control for clearance.

(19) Missed Approach (IFR): Under IFR conditions pilot will follow missed approach procedures as published.

FST-6 & 7

MISSION TITLE: INSTRUMENT TRANSITION.

TRAINING AIDS: BLACKBOARD.

REFERENCES: TO 1F-89D-1
AFM 51-45

1. MISSION ACCOMPLISHMENTS: a. To familiarize the student aircrew with instrument flying techniques and procedures in the F-89D Simulator.

(1) Flight Director.

(2) ILAS.

(3) Radio Range.

(4) UHF/DF.

2. DEVELOPMENT OF CONTENTS: a. Missions will be the same as missions 5 and 6 of the standard F-89D transition mission, with the following addition:

(1) Missions will be completed with a GCI-GCA.

b. Instruct aircrew to have Navigation Log completed before next scheduled reporting time.

FST-8

MISSION TITLE: AUTO PILOT FAMILIARIZATION.

TRAINING AIDS: NONE.

REFERENCES: TO 1F-89D-1

1. MISSION ACCOMPLISHMENTS: This mission will increase pilot proficiency in use of auto pilot.

2. DEVELOPMENT OF CONTENTS: Mission will be the same as mission #8 of the standard F-89D transition missions.

FST-9

MISSION TITLE: CLIMB AND CRUISE CONTROL EXERCISE.

TRAINING AIDS: NONE.

REFERENCE: TO 1F-89D-1

1. MISSION ACCOMPLISHMENTS: This mission will familiarize pilots with fuel consumption during climb and cruise in the F-89D.

2. DEVELOPMENT OF CONTENTS: Mission will be the same as mission #9 of the standard F-89D transition missions.

MISSION TITLE: NAVIGATION.

TRAINING AIDS:
E6D COMPUTER.
WEEMS PLOTTER.

REFERENCES:
RADIO FACILITY CHARTS (L/F AND VOR)
PILOT'S HANDBOOK, JET (EAST)
AFR 60-16
DD FORM 175
TO 1F-89D-1
IN-FLIGHT NAVIGATIONAL LOG

1. MISSION ACCOMPLISHMENTS: To familiarize the aircrew with cross-country flight planning, cruise control, and use of radio and radar navigational aids.

2. DEVELOPMENT OF CONTENTS: a. Mission will be the same as mission #10 of the standard F-89D transition missions.

(1) Instructor will insure that the aircrew is thoroughly familiar with the proper procedure for giving position reports and that all position reports are given in accordance with published procedures. (Reference last page Radio Facility Charts.)

(2) At some point during the navigation flight an emergency will be simulated (i.e., fuel system malfunction and/or single engine operation); which will require the student to change flight plan and re-compute course and fuel consumption back to home base. If single engine is simulated, student will complete mission with single engine penetration and GCA.

SUPPLEMENT XIV)
ADC REGULATION)
51-2)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colo.
1 July 1955

FLYING TRAINING

Standard T-33 Checkout and Transition

1. Purpose. This directive establishes a transitional training program for personnel checking out in Air Defense Command T-33 aircraft.

2. Scope. This directive applies to all personnel flying Air Defense Command T-33 aircraft.

3. Responsibility. Commanders will insure that the provisions of this directive are complied with.

4. Checkout. Any rated pilot of this command may be checked out in the T-33 aircraft by completing the applicable portion of paragraph 5 below.

5. Transition. a. Pilots falling under any one of the following three categories will complete the entire transition program in Attachment 1.

(1) Those who have never completed a T-33 transition program.

(2) Those who have not flown the T-33 in the preceding twelve months.

(3) Any pilot at the unit commander's discretion.

b. Pilots, previously checked out, whose currency has lapsed and who do not fall under paragraph 5a(2) or (3) above will complete as a minimum the following:

(1) Review ADC Standard T-33 questionnaire.

(2) Read PIF.

(3) A satisfactory flight check.

(ADOOT)

BY ORDER OF THE COMMANDER:

OFFICIAL:
Walter W. Robinson
WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

GEORGE F. SMITH
Major General, USAF
Chief of Staff

1 Attachment: T-33 Pilot Checkout

DISTRIBUTION: A

(AF-ADC, Colorado Springs, Colo.)

T-33 PILOT CHECKOUT AND TRANSITION

1. The pilot transition program will be divided into two phases, ground and flying. MTD training is desired. If this is not available, the ground school program will be accomplished as outlined.

a. Ground Phase. Transition pilot will:

(1) Read, understand, and certify to the reading of the PIF and Flight Operating Instruction Handbook.

(2) Receive instruction and engineering lectures covering the following:

(a) Aircraft - general	1 hour
(b) J33 engine	1
(c) Aircraft fuel system	1
(d) Electrical system	½
(e) Hydraulic system	½
(f) Flight characteristics	½
(g) Seat, oxygen, and pressurization	½
(h) Instrument system	½
(i) Communications	½
(j) Emergency procedures	1
(k) Cockpit check	½
(l) Review questionnaire	1
	8½ hours

2. Flight Line Indoctrination. The instructor pilot will insure that the following items have been accomplished by the transition pilot prior to the initial transition mission in the T-33:

a. Read current PIF and SOPs.

b. Questionnaire completed by pilot and review with IP.

c. Read Flying Safety File.

d. One hour cockpit time.

Attachment 1, Supplement XIV, ADCR 51-2, 1 July 1955.

T-33 PILOT CHECKOUT AND TRANSITION

1. The pilot transition program will be divided into two phases, ground and flying. MTD training is desired. If this is not available, the ground school program will be accomplished as outlined.

a. Ground Phase. Transition pilot will:

(1) Read, understand, and certify to the reading of the PIF and Flight Operating Instruction Handbook.

(2) Receive instruction and engineering lectures covering the following:

(a)	Aircraft - general	1 hour
(b)	J33 engine	1
(c)	Aircraft fuel system	1
(d)	Electrical system	½
(e)	Hydraulic system	½
(f)	Flight characteristics	½
(g)	Seat, oxygen, and pressurization	½
(h)	Instrument system	½
(i)	Communications	½
(j)	Emergency procedures	1
(k)	Cockpit check	½
(l)	Review questionnaire	1
		8½ hours

2. Flight Line Indoctrination. The instructor pilot will insure that the following items have been accomplished by the transition pilot prior to the initial transition mission in the T-33:

a. Read current PIF and SOPs.

b. Questionnaire completed by pilot and review with IP.

c. Read Flying Safety File.

d. One hour cockpit time.

Attachment 1, Supplement XIV, ADCR 51-2, 1 July 1955.

3. Flying Training. The flying phase will consist of ten missions; the first seven with an IP, and the last three solo. All missions will be conducted under day VFR conditions except No. 7.

Transition Mission #1

NORMAL FLIGHT PROCEDURES

1. Purpose. This mission will familiarize transition pilot with flying characteristics of the T-33 aircraft.

2. Instructor Pilot Requirement. An IP is required for briefing, walk-around, critique, and will fly the rear seat during mission.

3. Fuel Requirement. Take-off - Full internal and 100 gallons each tip.

Landing - Enter initial with 150 gallons minimum.

4. Briefing. Briefing for this mission will include all items listed under Standard Transition Briefing. In addition, emphasis will be placed on the following:

a. Walk-around inspection.
b. Cockpit checks.
c. Bail-out procedure.
d. Start - auto.
e. Pre-taxi checks.
f. Taxi procedures.
g. Pre-take-off checks.
h. Take-off procedures.
i. Normal flight procedures.
j. Airspeed and G-limitations.
k. Pre-landing checks.
l. Landing procedures.
m. Post landing and shutdown procedures.

5. Procedures. a. Transition pilot will enter front cockpit and make an auto start.

b. Transition pilot will make pre-take-off checks and then take off with instructions by the IP as necessary.

c. IP will demonstrate proper use of trim, speed brakes, and power settings. The instructor will also demonstrate turns, climbs and dives, and stalls. Transition pilot will then practice these maneuvers.

d. Instructor will demonstrate a landing pattern at altitude, after which transition pilot will make at least three practice patterns and landings at altitude.

f. Transition pilot will enter pattern with at least 150 gallons and complete full-stop landing. Transition pilot will accomplish post-landing and shutdown procedures.

6. <u>Critique</u>. IP will give detailed critique of the mission.

Transition Mission #2

AIRWORK AND TOUCH-AND-GO LANDINGS

1. Purpose. This mission will further familiarize the transition pilot with the flying characteristics of the T-33 and increase his landing proficiency.

2. IP Requirement. An IP is required for briefing, preflight, critique, and will fly the rear seat during mission.

3. Fuel Requirement. Take-off - Full internal and 100 gallons each tip tank.

Landing - Enter initial with 150 gallons.

4. Briefing. IP will include the following items in his briefing:

a. Pilot errors in Mission #1.

b. Manual start procedures.

c. Proper take-off procedures.

d. Stalls and spin recovery.

e. Landing procedures and techniques.

f. Go-around procedures.

g. Touch-and-go landings.

h. ADCR 60-1, Approach and Landing Pattern.

5. Mission Procedures.

a. Pilot will fly front seat and make an auto start.

b. Pilot will take off, climb to 20,000 feet, and practice steep turns, dives, and stalls.

c. Pilot will practice one pattern and landing at altitude prior to returning to base to shoot touch-and-go landings. At least five touch-and-go landings will be accomplished.

6. Critique. Mission will be followed by a detailed critique by IP.

Transition Mission #3

EMERGENCY PROCEDURES

1. Purpose. This mission will familiarize the transition pilot with emergency procedures while flying.

2. IP Requirement. An IP is required for briefing, preflight, critique, and will fly the rear seat during mission.

3. Fuel Requirement. Take-off - Full internal and 100 gallons each tip.

Landing - Enter initial with 150 gallons.

4. Briefing. The instructor pilot will include the following items in his briefing:

a. Pilot errors in Mission #2.

b. Emergency procedures:

(1) Airstarts - manual and auto.

(2) Hydraulic failure.

(3) Electrical failure.

(4) Review bail-out procedures.

(5) Forced landings.

(6) Dropping tip tanks.

(7) Armament doors.

c. Simulated flame-out patterns and landings.

5. Mission Procedures.

a. Pilot will explain a manual start to the IP. Transition pilot will then perform an auto start.

b. At altitude hydraulic flight control boost will be turned off, and pilot will practice turns at varying airspeeds without control boosts.

c. Instructor will set up aircraft for simulated flame-out, and pilot will practice flame-out pattern and landing. At least four of these patterns will be flown.

6. Critique. Mission will be followed by a detailed critique by IP.

Transition Mission #4

INSTRUMENT FLIGHT INDOCTRINATION

1. Purpose. This mission will give the transition pilot indoctrination in flying the T-33 on instruments.

2. IP Requirement. An IP is required to fly front seat.

3. Fuel Requirement. Take-off - Full internal and 100 gallons each tip.

Landing - Enter initial with 100 gallons.

4. Briefing. Instructor pilot will include in his preflight briefing the following items:

a. Technique of flying basic instruments.

b. Instrument take-off.

c. Aural null.

d. ADF letdown for jet aircraft.

e. Range letdown for jet aircraft.

f. GCA procedures.

g. Landing on wet runway.

h. Use of pitot heat and windshield defrosting.

i. Thunderstrom penetration.

5. Procedure. a. Pilot will fly mission under the hood in the rear cockpit. At discretion of IP, pilot will make an instrument takeoff under the hood. At altitude pilot will practice flying basic instruments, tracking, and aural null.

b. Pilot will practice both a range and ADF letdown. This will be followed by one or more GCAs.

6. Critique. IP will critique the mission in detail.

Transition Mission #5

NAVIGATION FLIGHT

1. Purpose. This mission will give the transition pilot practice in planning and executing a navigational flight in the T-33.

2. IP Requirement. An IP is required to supervise flight planning and fly the rear seat.

3. Fuel Requirement. Take-off - Full internal and tip tanks.

Landing - As required by AFR 60-16.

4. Briefing. Instructor pilot will include in his preflight briefing the following items:

a. ARTC procedures as pertain to jet aircraft.

b. ADCR 60-3, Cross-Country Flights Within the Continental United States.

c. Cruise control.

d. Flight planning.

e. Weather factors.

f. Take-off with full tanks.

5. Procedures. A 700-mile round-robin navigation flight will be planned with fuel consumed and time between check-points estimated. Flight will be made on an IFR clearance with pilot flying in front seat, performing all navigation and making position reports. Flight will be completed with a standard jet low approach at home base.

6. Critique. IP will give pilot detailed critique at completion of mission.

Transition Mission #6

NIGHT FLYING

1. Purpose. This mission will familiarize the transition pilot with techniques of flying the T-33 at night.

2. IP Requirement. IP will be required to fly in rear seat.

3. Fuel Requirement. Take-off - Full internal and 100 gallons each tip.

Landing - Enter initial with 100 gallons.

4. Briefing. Instructor pilot will include in his briefing the following items.

a. Night take-off techniques.

b. Cockpit lighting.

c. Night navigation techniques.

d. Night landing techniques.

e. Canopy frosting.

5. Procedures. Pilot and IP will take-off after dark and fly in the local area until tip fuel is exhausted. Pilot will complete at least three night landings, under close supervision by IP.

6. Critique. IP will give pilot detailed critique at completion of mission.

Transition Mission #7

ACROBATICS

1. Purpose. This mission will give the transition pilot confidence in the maneuverability of his aircraft.

2. IP Requirement. An IP will fly in rear seat.

3. Fuel Requirement. Take-off - Full internal and 100 gallons each tip.

Landing - 100 gallons.

4. Briefing. The instructor pilot will include in his briefing the following items:

a. Spin recovery.

b. Rolls.

c. Loops.

d. Immelmanns.

5. Procedures. IP in rear cockpit will demonstrate rolls, loops, and Immelmann turns, after which pilot will practice maneuvers.

6. Critique. IP will critique pilot's technique at completion of mission.

Transition Mission #8

SOLO AIRWORK AND LANDINGS

1. Purpose. This mission will develop the transition pilot's confidence in his ability to fly and handle the T-33 solo.

2. IP Requirement. An IP is required in mobile control.

3. Fuel Requirement. Take-off - Full internal and 100 gallons each tip tank.

Landing - 100 gallons.

4. Briefing. Instructor pilot will review the following items in his briefing:

   a. Pilot errors of prior missions.

   b. Pre-take-off checks.

   c. Normal flight techniques.

   d. Landing pattern and touchdown techniques.

   e. After-landing checks.

5. Procedures. Pilot will fly T-33 solo; instructor pilot will monitor flight from mobile control. Pilot will practice turns, dives, and stalls. Pilot will enter landing pattern at home base with at least 100 gallons of fuel aboard.

6. Critique. IP will critique pilot on his take-off, landing pattern, and touchdown.

Transition Mission #9

SOLO LANDINGS AND GO-AROUNDS

1. Purpose. This mission will further develop the transition pilot's confidence in his ability to handle and fly the T-33.

2. IP Requirement. An IP is required in mobile control.

3. Fuel Requirement. Take-off - Full internal and 100 gallons each tip tank.

Landing - 100 gallons minimum.

4. Briefing. Instructor pilot will review the following items in his briefing:

a. Pilot's take-offs and landings on prior missions.

b. Landing pattern and touchdown techniques.

c. Go-around procedures.

d. After-landing checks.

5. Procedures. Pilot will fly T-33 solo; instructor pilot will monitor flight from mobile control. Pilot will take-off and fly locally until all fuel is used from tip tanks. Pilot will re-enter traffic and shoot touch-and-go landings until fuel is down to 100 gallons. Pilot will then make a full-stop landing.

6. Critique. IP will critique pilot on his take-off, landing patterns, and touchdowns.

Transition Mission #10

SOLO NIGHT FLIGHT

1. Purpose. This mission will develop the transition pilot's ability to fly and land the T-33 at night.

2. IP Requirement. An IP is required in mobile control.

3. Fuel Requirement. Take-off - Full internal and 100 gallons each tip tank.

Landing - 100 gallons.

4. Briefing. IP will review the following items in his briefing:

a. Cockpit lighting.

b. Night take-off techniques.

c. Night landing techniques.

d. Canopy frosting.

5. Procedures. Pilot will fly solo and IP will monitor flight from mobile control. Take-off and landing will be made during the hours of darkness. After take-off pilot will fly locally and re-enter traffic for landing with a minimum of 100 gallons of fuel.

6. Critique. IP will critique pilot on take-off and landing pattern.

ADC REGULATION)
51-3)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colo.
22 August 1955

424

FLYING TRAINING

ADC Standard Fighter-Interceptor Unit Flying Training Program

1. Purpose. This program establishes standard yearly flying training requirements for fighter-interceptor units and aircrews.

2. Scope. The accomplishment of this program is mandatory for all fighter-interceptor units. The requirements of this Regulation apply to all assigned tactical interceptor aircrews, operations officers, and commanders of fighter-interceptor squadrons.

3. Training. Detailed instructions for the accomplishment of this program are contained in attachments. The training specified in this program is the minimum amount to be accomplished by each aircrew and fighter-interceptor unit and should be accomplished through a continuous program.

a. Two hundred forty flying hours are required per interceptor crew each year in order to maintain minimum proficiency required by AF UTS 10-2. Of this total requirement the individual flying training program specifies approximately 190 hours for expert crews, 216 hours for skilled crews and 231 hours for qualified crews. The remainder of the 240 hour minimum flying requirement will be used in the accomplishment of unit training, supervisory flying, and additional training in specific phases of flying, as the squadron commander may direct.

b. Aircrew flying training in this program will be recorded on Chart #1 in hours, sorties, intercepts, and approaches. Sorties and hours as required by this directive may not be logged concurrently and credit will be taken for only one type intercept, rocket firing attack, or approach at a time. However, an instrument approach and hourly instrument requirements may be logged concurrently. On a profile mission, separate credit will not be taken for the intercept, instrument time, or low approach flown. Individual training accomplished during instrument flight check and Standardization Flight Checks will be credited toward fulfillment of the aircrew flying training program.

c. Unit flying training in this program will be recorded on Chart #2. The date each mission is accomplished will be entered in the space allotted.

d. Ground training in this program will be recorded on Chart #2. This training will be scheduled in so far as possible so that it is accomplished in quarterly increments.

e. Charts 1 and 2 will be reproduced locally to conform with formats shown herein.

4. Radar Observers. In interceptor squadrons equipped with two-place interceptors, all flying training, with the exception of the T-33 requirement, will be accomplished by the aircrew flying as a team in so far as possible. However, the following flying training requirements need not be recorded (although accomplished) by R.O.s: Hood, Weather-Day, Weather-Night, GCA-Weather, ILAS-Weather, all formation, Acrobatics and flame-out approaches. In addition, R.O.s may accomplish 25% of the required radar training in B-25M aircraft. The T-33 requirement will be accomplished by pilots only.

5. Implementation. a. The training will be a continuous yearly program, starting 1 July of each year and ending on 30 June of the following year. In so far as practical, flying training will be scheduled to insure continuous proficiency rather than accelerated training for short periods to accomplish minimum requirements.

b. Crews who enter training under the provisions of this directive after 1 July or who are not available because of TDY or temporary suspension from flying will complete a share of this program proportionate to the period of time they were available for flying.

6. Reporting. Reporting procedures for this training program are outlined in ADCR 55-53.

7. Records Disposition. Records created incident to this Regulation will be disposed of in accordance with paragraph 680, AFM 181-5.
(ADOOT)

BY ORDER OF THE COMMANDER:

OFFICIAL:

Walter W. Robinson
WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

GEORGE F. SMITH
Major General, USAF
Chief of Staff

6 Attachments:
1. Tng Program
2. Details of Aircrew Flying Tng Program
3. Details of Unit Flying Tng
4. Std Aircrew Grd Tng
5. Chart #1
6. Chart #2

DISTRIBUTION:
A

(AF-ADC, Colorado Springs, Colo.)

YEARLY PROGRAMMED FLYING TRAINING REQUIREMENTS

1. The following are yearly programmed flying training requirements for Expert, Skilled, and Qualified aircrew members:

a. Instrument Training:

Type of Sortie	Symbol	Requirement Ex	Sk	Qual	Recorded As
(1) Hood	I-H	6	12	24	Hours
(2) Weather - Day	I-WD	8	8	4	Hours
(3) Weather - Night	I-WN	4	4	2	Hours
(4) GCA - Hood	I-GH	12	24	24	Approaches
(5) GCA - Weather	I-GW	8	4	4	Approaches
(6) ILAS - Hooded	I-IH	12	24	24	Approaches
(7) ILAS - Weather	I-IW	8	6	4	Approaches
(8) VOR - Hood or Weather	I-V	2	4	4	Approaches
(9) ADF - Hood or Weather	I-A	3	6	6	Approaches
(10) Radar Approach	I-R	3	4	6	Approaches
(11) T-33 Instruments	I-33	6	18	18	Hours
b. Navigation Training.					
(1) Day	N-D	2	2	3	Sorties
(2) Night	N-N	2	2	6	Sorties
(3) Weather	N-W	3	3	3	Sorties
(4) Radar	N-R	2	2	2	Sorties
(5) Hood	N-H	3	3	4	Sorties
c. Formation Training.					
(1) Close - Day	F-D	2	4	6	Sorties
(2) Close - Night	F-N	1	2	3	Sorties

Attachment 1, ADCR 51-3, 22 August 1955.

YEARLY PROGRAMMED FLYING TRAINING REQUIREMENTS

1. The following are yearly programmed flying training requirements for Expert, Skilled, and Qualified aircrew members:

			Requirement			
	Type of Sortie	Symbol	Ex	Sk	Qual	Recorded As
a.	Instrument Training:					
(1)	Hood	I-H	6	12	24	Hours
(2)	Weather - Day	I-WD	8	8	4	Hours
(3)	Weather - Night	I-WN	4	4	2	Hours
(4)	GCA - Hood	I-GH	12	24	24	Approaches
(5)	GCA - Weather	I-GW	8	4	4	Approaches
(6)	ILAS - Hooded	I-IH	12	24	24	Approaches
(7)	ILAS - Weather	I-IW	8	6	4	Approaches
(8)	VOR - Hood or Weather	I-V	2	4	4	Approaches
(9)	ADF - Hood or Weather	I-A	3	6	6	Approaches
(10)	Radar Approach	I-R	3	4	6	Approaches
(11)	T-33 Instruments	I-33	6	18	18	Hours
b.	Navigation Training.					
(1)	Day	N-D	2	2	3	Sorties
(2)	Night	N-N	2	2	6	Sorties
(3)	Weather	N-W	3	3	3	Sorties
(4)	Radar	N-R	2	2	2	Sorties
(5)	Hood	N-H	3	3	4	Sorties
c.	Formation Training.					
(1)	Close - Day	F-D	2	4	6	Sorties
(2)	Close - Night	F-N	1	2	3	Sorties

Attachment 1, ADCR 51-3, 22 August 1955.

	Type of Sortie	Symbol	Requirement			Recorded As
			Ex	Sk	Qual	
(3)	Tactical	F-T	1	2	3	Sorties
(4)	Close - Weather	F-W	2	4	6	Sorties
d.	Profile Training.					
(1)	Day	P-D	24	24	24	Sorties
(2)	Night	P-N	24	24	24	Sorties
e.	Radar Training.					
(1)	Single Target Intercept	R-S	24	36	48	Intercepts
(2)	Identification	R-I	6	6	12	Intercepts
(3)	Multiple vs Multiple	R-M	8	8	12	Intercepts
(4)	ECM	R-E	24	24	24	Intercepts
(5)	Blacked-out Attack	R-B	12	12	24	Intercepts
(6)	Trail Formation Attack	R-TF	12	18	24	Intercepts
(7)	Evasive Target Tracking	R-ET	4	8	12	Sorties
(8)	Target Separation	R-TS	6	6	12	Intercepts
f.	Acrobatics and Curve of Pursuit Training.					
(1)	Acrobatics	A-A	4	8	12	Sorties
(2)	Curve of Pursuit	A-C	4	8	12	Sorties
g.	Weapons Training.					
(1)	Air-to-Air - Day	W-D	48	48	48	Sorties
(2)	Air-to-Air - Night	W-N	1	1	1	Sorties
(3)	Air-to-Ground	W-G	1	1	1	Sorties
(4)	Curve of Pursuit	W-C	4	4	4	Sorties
h.	Advanced Combat Tactics Training.					
(1)	Combat Tactics	C-T	24	24	0	Sorties

i. Simulated Flame-Out Approach.

	Type of Sortie	Symbol	Requirement Ex	 Sk	 Qual	Recorded As
(1)	Complete loss of power (F-86D and F-94C acft)	S-1	9	12	12	Approaches
(2)	Complete loss of power (F-89D aircraft)	S-1	3	4	4	Approaches
(3)	Power loss on one engine (F-89D acft)	S-2	6	8	8	Approaches

2. All training will be accomplished in the unit's UE aircraft with the exception of the T-33 portion of this training program. Fifty percent of required GCI recoveries and navigational flights will be accomplished using the auto pilot.

DETAILS OF AIRCREW FLYING TRAINING PROGRAM

1. Instrument Training. a. Instrument training is the practice of hooded or weather basic instruments, range orientations, ADF tracking, aural null, letdowns, and low approaches (GCA, ILAS, GCI-GCA/ILAS, ADF, range VOR, and airborne radar approaches) only. Qualified and skilled combat ready pilots will accomplish, as a minimum, 18 hours of instrument training in the T-33. Expert combat ready pilots will accomplish not less than 6 hours in the T-33.

b. The following is a breakdown of the types of instrument training and standard symbols to be used for recording purposes:

	Type of Instruments Flown	Standard Symbol	Recorded As
(1)	Hood (Day or Night)	I - H	Hours
(2)	Weather (Day)	I - WD	Hours
(3)	Weather (Night)	I - WN	Hours
(4)	GCA - Hooded (Day or Night)	I - GH	Approaches
(5)	GCA - Weather (Day or Night) ceiling must be below 1000' or visibility less than 3 miles	I - GW	Approaches
(6)	ILAS - Hooded (Day or Night)	I - IH	Approaches
(7)	ILAS - Weather (Day or Night) ceiling must be less than 1000' or visibility less than 3 miles	I - IW	Approaches
(8)	VOR Approaches (Hooded or Weather)	I - V	Approaches
(9)	ADF Approaches (Hooded or Weather)	I - A	Approaches
(10)	Radar Approaches (Hooded or Weather) will be accomplished using the ground map or beacon function of the UE aircraft airborne radar equipment.	I - R	Approaches
(11)	T-33 Instrument Training	I - 33	Hours

c. Accomplishments made under weather conditions may be credited toward hooded requirements, but hooded accomplishments will not be credited toward weather requirements. Instrument flying conducted under other types of training, other than instrument flight checks, will not be credited toward this portion of the program.

Attachment 2, ADCR 51-3, 22 August 1955.

2. Navigation Training. a. Navigation training flights are planned cross-country flights in which not more than 50% will be round robin flights.

b. In order to log a navigational sortie, the mission will be flown in UE aircraft with a minimum range of 600 nautical miles for F-86D, 650 nautical miles for F-94C, and 800 nautical miles for F89D aircraft.

c. The following is a breakdown of the types of navigation training and standard symbols to be used for recording purposes:

Type of Navigation	Standard Symbol	Recorded As
(1) Day	N - D	Sortie
(2) Night	N - N	Sortie
(3) Weather (Ceiling at destination must be below 1000' or visibility less than 3 miles. Ranges in 2b, above, are not applicable to weather flights, but such flights must be of at least one hour duration.)	N - W	Sortie
(4) Radar (Accomplish by using the ground map and/or beacon function of the UE aircraft radar equipment only.)	N - R	Sortie
(5) Hood (Accomplished under hooded flight.)	N - H	Sortie

3. Formation Training. a. Close formation is one in which one or more aircraft is flown in close proximity to another aircraft maintaining nose, tail, and wing tip clearance.

b. Tactical formation is one in which three or more aircraft are flown in a spread line abreast or spread fingertip formation which enables each member to cover the rest of the flight visually. The distance between aircraft will be that distance in which the aircraft serial numbers, located on the vertical stabilizer, can be distinguished individually but not readable.

c. In order to receive credit for a formation sortie, the aircrew will have flown as a wingman with the exception of tactical formation flights.

d. To receive credit for a weather close formation sortie, an aircrew must complete a close formation take-off and an ascent and descent through an overcast.

e. To receive credit for a close formation weather approach, an aircrew must complete a close formation GCA or ILAS with a landing out of a low visibility approach pattern.

f. The following is a breakdown of the types of formation training and standard symbols to be used for recording purposes:

Type of Formation	Standard Symbol	Recorded As
(1) Close - Day	F-D	Sortie
(2) Close - Night	F-N	Sortie
(3) Tactical	F-T	Sortie
(4) Close - Weather	F-W	Sortie

4. Profile Missions. A successful profile sortie, day or night, is accomplished by an interceptor aircrew under GCI control as follows:

a. Scramble take-off from a simulated "readiness" (5 minute) alert status.

b. Full power climb to a target altitude of 35,000' or above.

c. Complete a successful phase 3 lead-collision course interception on the first attempt.

d. Recover GCI-GCA/ILAS

e. The following is a breakdown of the types of profile sorties and the standard symbols to be used for recording purposes:

Type of Profile Sortie	Standard Symbol	Recorded As
(1) Day	P-D	Sortie
(2) Night	P-N	Sortie

5. Radar Training. (All programmed lead-collision course attacks will be recorded by scope camera or NADAR.)

a. A successful intercept against a single target is an attack, using the automatic feature of the airborne radar, which results in a phase 3 firing signal. Qualified aircrews will accomplish one-third of the required attacks against targets below 5000', one-third against targets above 40,000', and one-third against targets at intermediate altitudes. Expert and Skilled aircrews will accomplish one-third of the required attacks against targets below 5000' and two-thirds against targets above 40,000'.

b. A successful identification interception, for training purposes, is one in which the interceptor approaches the target from the rear and closes to a minimum safe distance (within the limitations of airborne radar), and converts to a beam attack without the aid of GCI. Qualified aircrews will accomplish one-third of the attacks against targets below 5000', one-third above 40,000', and one-third at intermediate altitudes. Expert and Skilled will accomplish one-third below 5,000' and two-thirds above 40,000'.

c. Multiple vs multiple attack is one in which a formation of not less than three interceptors attack a force of not less than three target aircraft. Target aircraft will be in loose formation with minimum distance of one mile between aircraft. Interceptors will maintain "in trail" formation through use of airborne radar, maintaining a distance between aircraft of not less than five miles. This formation will be maintained until such a time that a successful lead-collision course attack can be made, by individual aircrews, without danger of firing on or colliding with other interceptors. Upon reaching such a position, interceptors will carry the attack through to receipt of phase 3 firing signal. Reference ADCM 55-5.

d. Electronic and mechanical jamming sorties are interceptions flown under actual conditions of ECM, including electronic and window jamming of airborne radar and the jamming of communications channels insofar as practicable, in which the attack terminates with a firing signal or with a curve of pursuit simulated firing pass.

e. A blacked-out target interception is a lead-collision course attack, flown at night, which results in a phase three firing signal on a target which has its external lights extinguished. These attacks will be against ADC aircraft only. The first pass on each blackout intercept sortie will be with external lights ON on target aircraft.

f. A radar trail formation attack is one in which two or more interceptors maintain "in trail" position, through use of airborne radar, until such a time that a successful lead-collision attack can be made against an airborne target without danger of firing on or colliding with other interceptor aircraft and carried through to receipt of a phase 3 firing signal. Separation between interceptors will be 5 miles. Reference ADCM 55-5.

g. Evasive target tracking sortie. Radar tracking vs maneuvering targets has been included to teach the aircrew to recognize evasive maneuvers and to practice tactics required to counteract evasive maneuvers by reference to the radar scope. Minimum time required per sortie is 15 minutes.

h. Target separation attacks are lead-collision course attacks against a target aircraft which is positioned not more than 2000' behind and approximately 500' below a simulated tow target aircraft, and carried through to receipt of a phase 3 firing signal.

i. All interceptions, other than identification interceptions, attempted above 5000' will be performed at or above .8 mach.

j. The following is a breakdown of the types of intercepts, sorties, and standard symbols to be used for recording purposes:

Type of Sortie	Standard Symbol	Recorded At
(1) Attack against a single target	R-S	Intercept
(2) Identification intercept	R-I	Intercept
(3) Multiple vs multiple	R-M	Intercept
(4) ECM sortie	R-E	Intercept
(5) Blacked-out attack	R-B	Intercept
(6) Trail formation attack	R-TF	Interception
(7) Evasive target tracking	R-ET	Sortie
(8) Target Separation attack	R-TS	Interception

6. Acrobatics and Curve of Pursuit. a. In order to receive credit for an acrobatic sortie, the aircrew will accomplish the following maneuvers:

(1) Two barrel rolls in each direction

(2) Two loops

(3) Two Immelman turns

b. Limitations of the aircraft, as outlined in applicable aircraft Flight Handbook, will not be exceeded.

c. A curve of pursuit attack is a curved flight path flown in such a manner, against an aerial target, that the attacking aircraft is continuously in a position for firing at the target. In order to receive credit for a curve of pursuit sortie, an aircrew must complete a minimum of 5 simulated firing passes using the aircraft's standby sight.

d. The following is a breakdown of the types of sorties and standard symbols to be used for recording purposes:

Types of Sortie	Standard Symbol	Recorded As
(1) Acrobatic	A - A	Sortie
(2) Curve of Pursuit	A - C	Sortie

7. Weapons Training. a. Airborne radar air-to-air rocket firing sorties are actual lead-collision course phase 3 firing attacks against a towed aerial target using the automatic firing features of airborne radar equipment. To receive credit for an air-to-air rocket sortie, F-86D and F-94C crews will fire six rockets on each firing attack, and F-89D crews will fire eight rockets on each firing attack. The only exception to this is that each aircrew is required to fire a full load of rockets on an aerial target at night for familiarization purposes. To be counted as an effective sortie, at least 75% of the required number of rockets must fire.

b. Air-to-ground rocket sorties will be actual rockets fired at a ground or water target. In order for aircrews to receive credit for an air-to-ground sortie, each crew will fire 24 rockets.

c. Interceptions and attacks accomplished under this portion of the training program will not be credited toward requirements of any other type of training.

d. The following is a breakdown of the types of sorties and standard symbols to be used for recording purposes:

Type of Rocket Sortie	Standard Symbol	Recorded As
(1) Air-to-air (Day)	W - D	Sortie
(2) Air-to-air (Night)	W - N	Sortie
(3) Air-to-ground	W - G	Sortie
(4) Curve of pursuit (Air-to-air)	W - C	Sortie

8. Advanced Combat Tactics. a. The purpose of this portion of the training program is for experimentation purposes in developing new combat tactics which will improve the defense capabilities of the Air Defense Command. New procedures evolved will be reported through channels to the Commander ADC, Attn: O&T-E, for possible inclusion in or amendment to the ADC Tactics Manual.

b. Training accomplished during this portion of the program will not be credited toward other types of required training.

c. The following is the type of sortie and standard symbol to be used for recording purposes:

Type of Sortie	Standard Symbol	Recorded As
(1) Combat tactics	C - T	Sortie

9. Simulated Flame-Out Approach. a. A simulated flame-out approach is one in which the pilot causes his aircraft to simulate the complete loss of power on one or more engines and attempts to guide his aircraft to a point from which a safe landing could be effected on the desired runway.

b. Twin engine fighter-interceptor aircraft will perform two thirds of yearly requirements as single engine approaches and one third simulating complete power loss.

c. The following is the type of sorties and standard symbols to be used for recording purposes:

Type of Sortie	Standard Symbol	Recorded As
(1) Complete loss of power (simulated)	S - 1	Approach
(2) Power loss on one engine (simulated)	S - 2	Approach

DETAILS OF UNIT FLYING TRAINING

1. In addition to the flying training required for each individual aircrew, the entire squadron will participate in the following missions:

a.	Squadron show formations	- 3 per year
b.	Squadron tactical formations	- 3 per year
c.	Aircraft and crew deployment	- 4 per year
d.	Systems training exercises	- 24 per year

2. Details of Training. a. Squadron show formations will be logged only when at least 65% of the squadron's assigned aircraft are airborne and in formation at the same time. These formations will be employed to develop leadership, teamwork, and esprit de corps.

b. Squadron tactical formations will be flown in radar trail in accordance with procedures established in ADCM 55-5, with target aircraft at 35,000 feet or higher. At least 65% of the squadron's assigned aircraft must participate. All participating aircraft will be scrambled from readiness and will be recovered GCI/GCA or ILAS.

c. Deployment training will be scheduled by the air division (defense) so that each fighter-interceptor squadron deploys no less than 12 aircraft and crews simultaneously at least once each quarter. Deployments will be planned to insure that each squadron deploys to a different base on each occasion. A deployment will be considered accomplished after the squadron has landed 12 aircraft at another base, reserviced the aircraft, and returned to home station and reserviced there. Deployments may be logged during Air Defense Exercises or Systems Training Exercises providing no less than 12 aircraft have been deployed and returned to home station.

d. Each fighter-interceptor squadron will participate in 24 unannounced systems exercises per year. One of these exercises will be scheduled by Headquarters ADC, 11 by air defense forces, and 12 by air divisions. These systems exercises will be conducted as follows:

(1) Target route information will not be disseminated to ACW squadrons or fighter-interceptor squadrons prior to commencement of exercise.

(2) Fighter-interceptor squadrons may use aircraft which are airborne on training flights.

(3) In no case will fighter-interceptor aircraft or ACW squadrons discontinue normal training in preparation

for an exercise. Air division commanders will insure maximum participation of fighter-interceptor squadrons and ACW squadrons.

(4) Joint ADC-SAC exercises may be credited toward this requirement.

STANDARD AIRCREW GROUND TRAINING

1. Yearly Requirements	Hours	Hours
a. Operations		34
(1) Aircraft Operation	6	
(2) Instrument Flying Techniques	6	
(3) Tactics	12	
(4) Navigation	6	
(5) SARPS and ARTC Procedures	4	
b. Maintenance		28
(1) Reservice, Preflight, Daily Inspection	4	
(2) Aircraft Systems	24	
c. Communications and Electronics		16
(1) Fire Control System	12	
(2) Communications Equipment	4	
d. Meteorology		6
e. Intelligence		24
f. Personal Equipment		4
g. Survival Training		12
h. Physiology of Flight		12
i. Regulations and Forms		4
j. Flight Simulator or Synthetic Trainer		24
	TOTAL	164

2. Details of Ground Training.

a. Operations. These lessons will further train the assigned combat crew in the operation of the UE aircraft and its tactical employment.

Attachment 4, ADCR 51-3, 22 August 1955.

(1) Aircraft Operation. Reference: Applicable Dash One. In these lessons both normal and emergency operating procedures will be covered. Aircraft operational procedures to be used under adverse conditions of icing, wet or icy runways, strong or gusty cross-winds, and turbulent air will be carefully covered. Each six months each aircrew member will practice emergency lowering of the gear and ejection in the simulator or in an aircraft on jacks with the seat and canopy chargers disconnected.

(2) Instrument Flying Techniques. Reference: AFM 51-45, AFR 60-16. These lessons will include discussions of techniques for flying in thunderstorms, minimizing hail damage, use of airborne radar to avoid thunderstorms, and techniques for GCA, ILAS, and low-visibility approaches.

(3) Tactics. Reference: ADCM 55-5. These lessons will include review of ADCM 55-5 and discussion of new tactics evolved under the provisions of the requirement for Advanced Combat Tactics Sorties. Tactics to be used when fighter-interceptor units are supporting ground or sea forces will be taught. Instruction will also be given in techniques for use of standby optical sight.

(4) Navigation. Reference: AFM 51-43. These lessons will include instruction in pilotage, dead reckoning, radio and radar navigation. A portion of these lessons will be devoted to cruise control and flight planning.

(5) SARPS and ARTC Procedures. Reference: CAA Flight Information Manual; AFM 51-38. These lessons will review local SARPS and recovery procedures for alternate airfields. ARTC clearance procedures will be discussed, and the relationship between GCI Control and ARTC Control under IFR conditions will be reviewed.

c. Maintenance. Maintenance instruction will insure that each aircrew has a working knowledge of:

(1) Reference: Applicable Dash One and Two. Maintenance preflight and postflight inspections, and re-servicing aircraft with fuel, oxygen, oil, hydraulic fluid, rockets, and missiles, and procedures for servicing landing gear struts and hydraulic accumulators.

(2) Reference: Applicable Dash One and Two. All aircraft systems.

d. Communications and Electronics.

(1) Reference: AFM 51-6, Applicable Technical Orders. Instruction will be given in recognition of substandard radar performance, inflight malfunctions and their correction, recognition of radar jamming and evading target, and the techniques for minimizing effects of jamming and evading targets. Emphasis will be placed on the importance of detailed objective reporting of radar inadequacies in order to obtain peak radar performance.

(2) Reference: Applicable Technical Orders. Communications instruction will insure that each aircrew has a thorough knowledge of the operation and capabilities of all aircraft communications equipment.

e. Meteorology. Reference: AFM 51-38. These lessons will insure that aircrews can correctly interpret weather sequence reports, forecasts, weather maps, and adiabatic charts. They will include instruction in the structure and nature of cold, warm, and occluded fronts, and the weather associated with all air masses. Special instruction will be given on fog and associated meteorological phenomena.

f. Intelligence. Reference: AFM 50-40; AFRs 200-1, 200-2, 200-3, 200-4; ADCRs 50-14, 200-1, 200-3, 200-4, 200-7, 205-1; JANAP 1-16C; CONADR 200-2; ADCM 200-1. Training will include:

(1) Indoctrination in the aerial threat to the nation and the vital role the squadron is fulfilling in air defense.

(2) Proficiency in rapid, positive recognition of foreign and domestic long-range aircraft, civil and military. This will include night recognition by exhaust glow pattern where possible.

(3) Familiarization with performance characteristics of foreign aircraft. This will include instruction on defensive fire power, tactics, formations, evasive capabilities and speeds.

(4) Emphasis on security as it applies to airborne operations.

(5) Familiarity with "Hells Bells" procedures.

9

g. Personal Equipment. Reference: AFM 51-7, Applicable Technical Orders. Aircrews will be instructed in the use and proper care of all personal equipment.

h. Survival Training. Reference: AFM 51-7; AFM 64-5; AFM 64-26; AFR 50-5. These lessons will include instruction on survival in arctic, jungle, desert, and on water.

i. Physiology of Flight. Reference: AFMs 51-7, 52-13; AFR 50-27; AFM 160-30. Lectures on vertigo, hypoxia, decompression phenomena, and "G" forces will be given by the flight surgeon when possible. Lectures should include first aid procedures for frostbite, wounds, and application of splints and tourniquets. All aircrew members will undergo a low-pressure chamber flight and will receive formal seat ejection training at least once each year.

j. Regulations and Forms. Reference: AFRs 60-16, 60-2, 60-4, 60-11; TO 00-20A-1A; AF Form 781; AF Form 5; Regulations listed in ADCR 5-6. Aircrews will have thorough knowledge of all USAF flying regulations, ADC standardization directives, and other directives pertinent to operations. Particular emphasis will be placed on AFR 60-16, AF Form 781 and AF Form 5.

k. Flight Simulator. Each aircrew will receive two hours training in the flight simulator or synthetic trainer each month.

CHART NO. I

LEGEND

HOURS	
SORTIES	□
INTERCEPTS	○
APPROACHES	◇

	INSTRUMENT TRAINING											NAVIGATION				
	HOOD	WEATHER - DAY	WEATHER - NIGHT	GCA - HOODED	GCA - WEATHER	ILAS - HOODED	ILAS - WEATHER	VOR - HOOD OR WX	ADF - HOOD OR WX	RADAR APPROACH	T-33 INSTRUMENTS	DAY NAVIGATION	NIGHT NAVIGATION	WEATHER NAVIGATION	RADAR NAVIGATION	HOODED NAVIGATION
EXPERT CREWS	I-H	I-WD	I-WN	I-GH	I-GW	I-IH	I-IW	I-V	I-A	I-R	I-33	N-D	N-N	N-W	N-R	N-H
YEARLY REQUIREMENT	6	8	4	12	8	12	8	2	3	3	6	2	2	3	2	3
SKILLED CREWS																
YEARLY REQUIREMENT	12	8	4	24	4	24	6	4	6	4	18	2	2	3	2	3
QUALIFIED CREWS																
YEARLY REQUIREMENT	24	4	2	24	4	24	4	4	6	6	18	3	6	3	2	4

	FORMATION					PROFILE		RADAR TRAINING								ACROBATICS AND CURVE OF PURSUIT		WEAPONS TRAINING				ADVANCED COMBAT TACTICS	SIMULATED FLAME-OUT APPROACH
	CLOSE - DAY	CLOSE - NIGHT	TACTICAL	CLOSE - WEATHER	CLOSE - APPROACH	DAY-SORTIE	NIGHT-SORTIE	SINGLE TARGET INTCP	IDENTIFICATION INTCP	MULTIPLE VS MULTIPLE	ECM SORTIE	BLACKED-OUT ATTACK	TRAIL FORMATION ATTACK	EVASIVE TARGET TRACKING	TARGET SEPARATION	ACROBATICS	CURVE OF PURSUIT	AIR TO AIR - DAY	AIR TO AIR - NIGHT	AIR TO GROUND	CURVE OF PURSUIT	COMBAT TACTICS	FLAME-OUT APPROACH
EXPERT CREWS	F-D	F-N	F-T	F-W	F-A	P-D	P-N	R-S	R-I	R-M	R-E	R-B	R-TF	R-ET	R-TS	A-A	A-C	W-D	W-N	W-G	W-C	C-T	S-1-2
YEARLY REQUIREMENT	2	1	1	2	6	24	24	24	6	8	24	12	12	4	6	4	4	48	1	1	4	24	9
								L H	L H														S-1 S-2
SKILLED CREWS																							
YEARLY REQUIREMENT	4	2	2	4	6	24	24	36	6	8	24	12	18	8	6	8	8	48	1	1	4	24	12
								L H	L H														S-1 S-2
QUALIFIED CREWS																							
YEARLY REQUIREMENT	6	3	3	6	12	24	24	48	12	12	24	24	24	12	12	12	12	48	1	1	4	□	12
								L MH	L MH														S-1 S-2

Attachment 5, ADCR 51-3, 22 August 1955.

CHART NO. 2

1. UNIT FLYING TRAINING

MISSION NO. →	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
A. SQUADRON SHOW FORMATIONS				☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
B. SQUADRON TACTICAL FORMATIONS				☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
C. AIRCRAFT DEPLOYMENT					☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
D. SYSTEMS TRAINING EXERCISES																								

2. AIRCREW GROUND TRAINING

NAME	A. OPERATIONS	A.(1) AIRCRAFT OPNS	A.(2) INSTRUMENT FLY TECH	A.(3) TACTICS	A.(4) NAVIGATION	A.(5) SARPS & ARTC	B. MAINTENANCE	B.(1) SERVICE & INSPECTIONS	B.(2) AIRCRAFT SYSTEMS	C. COMM & ELECTRONICS	C.(1) FIRE CONTROL SYSTEM	C.(2) COMM EQUIPMENT	D. METEOROLOGY	E. INTELLIGENCE	F. PERSONAL EQUIPMENT	G. SURVIVAL TRAINING	H. PHYSIOLOGY OF FLIGHT	I. REGS & FORMS	J. FLIGHT SIMULATOR
YEARLY REQUIREMENT	☒	6	6	12	6	4	☒	4	24	☒	12	4	6	24	4	12	12	4	24
REQUIREMENT TO DATE																			

Attachment 6, ADCR 51-1, 22 August 1955.

ADC REGULATION)
55-2)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colo.
26 August 1955

OPERATIONS

Standards for Determining Skill Qualification and Operational Status of Fighter-Interceptor Aircrews

1. Purpose. This Regulation establishes the standards by which commanders will determine the skill qualification and operational status of aircrews.

2. Responsibilities. Commanders will insure that the provisions of this Regulation are complied with.

3. General. The three skill qualifications which an aircrew member may be awarded are "Qualified," "Skilled," or "Expert." These qualifications represent attainment of a specific proficiency level and do not denote current operational capability. The exact criteria for determining these skill levels are contained in the appendix of this Regulation applicable to the particular aircraft. Current operational capability will be denoted by placing an aircrew member in a "training," "alert-ready," or "operationally-ready" status as outlined in paragraph 4. Regardless of an aircrewman's skill qualification, he may from time to time be in any one of the above operational states. (See attached chart.)

4. Operational Status. An aircrew member is always considered to be in one of the following three states:

a. Training Status. While an aircrew member is undergoing transition training and combat crew training, he is considered to be in a training status. When in this status he will not be required to fulfill the requirements of the ADC Standard Fighter-Interceptor Unit Flying Training Program. Every effort will be directed toward training him to become a "Qualified" fighter-interceptor aircrew member.

b. Alert-Ready Status. An aircrew member who has completed combat crew training is then in an alert-ready status and fully capable of performing alert duties. He is then required to begin fulfilling the requirements of the ADC Standard Fighter-Interceptor Unit Flying Training Program (ADCR 51-3).

c. Operationally-Ready Status. When an aircrew member who is alert-ready successfully completes a rocket firing course at a Weapons Training Center, he is then considered to be in an operationally-ready status and fully prepared to engage and destroy enemy weapons.

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*This supersedes ADCR 55-2, 24 July 1953.

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d. Loss of Status. Any alert-ready or operationally-ready aircrew member who during any sixty-day period fails to accomplish at least four flights on each of which at least one intercept is accomplished and four hooded or weather low approaches in the UE aircraft will revert to training status until he has accomplished these requirements. In addition, any operationally-ready aircrew member who fails during any twelve-month period to complete a rocket firing course in the UE aircraft at a Weapons Training Center will be removed from operationally-ready status and placed in an alert-ready status until he accomplishes this requirement. Loss of alert-ready or operationally-ready status does not invalidate an aircrew member's certificate of qualification; his certificate will be invalid only under the provisions of paragraph 6. However, any aircrew member without a valid certificate of qualification cannot be considered to be in an alert-ready or operationally-ready status.

5. Alert Duty. No aircrew member will be scheduled for alert duty who is not in an alert-ready or operationally-ready status. This requirement does not preclude the use of any aircrew, under conditions of declared emergency, which the squadron commander considers capable of being effective in combat.

6. Certification. When an aircrew member has met the requirements for a particular skill qualification and has been so certified by the squadron commander, a completed certificate of qualification (ADC Form 237) will be placed in the aircrew member's training folder and a letter will be sent to the appropriate commander who will award the formal certificate of qualification, stating full name, grade, crew position, and qualification of the aircrew member and type aircraft in which qualified. The air defense force commander will award the aircrew member the formal certificate of qualification (ADC Form 235) for "Expert." The air division commander will award the certificate for "Skilled" and the certificate for Qualified aircrews will be awarded by the commander of the next higher echelon above squadron level. A certificate of qualification will be invalid at any time the aircrew member fails a Standardization Check or fails to complete a Standardization Check in the preceding six months.

7. Standardization Checks. The Standardization Checks required in paragraph 6 above will be accomplished in accordance with ADCR 55-9. Squadron standardization boards may give the check for the Qualified and Skilled aircrew member. The check for Expert will be given by the defense wing or higher standardization board.

8. Records. An ADC Form 236 will be maintained for each aircrew member. No entry will be made on this form until the crew member has attained a skill level of Qualified. Entries on this form will be recorded as accomplished by the flight commander. This form will be placed in the individual training folder and will accompany training records upon transfer of the individual. Scope recordings of an individual's Standardization Flight Check will be kept on file until he passes the next required Standardization Flight Check.

9. Examinations. All examinations required under paragraph 3a of each appendix to this Regulation will be conducted at squadron level and will be reaccomplished by all Qualified aircrew members once each six months. The Standard ADC Alert Readiness Examination, attachment 4, will be classified CONFIDENTIAL when filled in. This examination will be destroyed in accordance with AFR 205-1 after it has been graded, and a certificate of completion will be maintained in the individual's training folder denoting satisfactory completion.

10. Forms. ADC Forms 237 and 236 will be locally reproduced. ADC Form 235, Certificate of Qualification, will be requisitioned in accordance with paragraph 5a, ADCR 9-3.
(ADOOT)

BY ORDER OF THE COMMANDER:

MARSHALL S. ROTH
Major General, USAF
Acting Chief of Staff

OFFICIAL:

Walter W. Robinson
WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

4 Attachments:
1. Certificate of Qualification
2. Certificate of Qualification (Formal)
3. Aircrew Progress Folder
4. Std ADC Alert Readiness Exam

DISTRIBUTION:
A

CERTIFICATE OF QUALIFICATION

________________ Fighter-Interceptor Squadron

________ ____________________ of the _______________ Fighter-
Grade Name

Interceptor Squadron has this ____ day of ____________ completed
Month & Year

the requirements for ____________________________ All-Weather
Qualification

Fighter-Interceptor ________________ in the ____________ and is
Crew Position Type Aircraft

hereby so designated.

____________________________ ____________________________
Opns Officer's Signature Commander's Signature

1. Standardization Check successfully completed __________________,
Date

____
Signature of Check Pilot

2. Standardization Check successfully completed __________________,
Date

____
Signature of Check Pilot

3. Standardization Check successfully completed __________________,
Date

____
Signature of Check Pilot

ADC Form 237
26 Aug 55

Attachment 1, ADCR 55-2, 26 August 1955.

Certificate of Qualification

This is to certify that

____

of the

_____ Fighter-Interceptor Squadron, United States Air Force, has met the requirements for _____ Fighter-Interceptor _____ in the _____ aircraft and is hereby so designated.

In recognition of his proficiency and experience in tactical operation of All Weather Fighter-Interceptor Aircraft, this certificate is awarded. Given this _____ Day of _____ 195__ under the provisions of Air Defense Command, Regulation 55-2

Official:

ADC Form 235
26 Aug 55

UNCLASSIFIED

Attachment 3, ADCR 55-2, 26 August 1955.

MISCELLANEOUS PROFICIENCY (CONT'D)

	DATE OF INDOCTRINATION	DATE PROFICIENT
Airfield Data		
Traffic Pattern		
Go Arounds		
Deadstick or Single Eng a.e.		
Min. Fuel Req.		
Emergency Airfields		
Instrument Letdowns		
Comm. & Nav. Facilities		
AF Form 113		
Sqdn Call Signs		
GCI Control Areas		
GCI Call Signs		
GCI Procedures		
States of Alerts		
UHF/DF Procedures		
ARTC Procedures		
ADIZ Procedures		
Emergency Procedures		

AIRCREW PROGRESS FOLDER

________ FIGHTER INTERCEPTOR SQUADRON

Last Name First Name Middle Name

Service Number Grade Date of Rating

Age Date of Birth

FLIGHT COMMANDERS

NAME	Grade	INCLUSIVE DATES

QUALIFIED ________

SKILLED ________

EXPERT ________

ADC Form 236
26 Aug 55

____
Squadron Commander

UNCLASSIFIED

CREW TRAINING

	Date Complete	SUPERVISOR'S INITIALS
T-33 AIRCRAFT		
1. Questionnaire		
2. Cockpit Check		
3. Flight Check		
4. Transition		
U. E. AIRCRAFT		
1. Ground Training		
2. Questionnaire		
3. Cockpit Check		
4. Initial Checkout		
5. Transition Training		
6. MTD		
7. Rules of Engagement		
8. SARPS		
9. Combat Crew Tng		
SIMULATOR TRAINING		
- 10 Hrs		
- 20 Hrs		
- 30 Hrs		

MISSION PROGRESS

Trans No.	Missions Date	Combat Crew No.	Combat Crew Date	Combat Crew No.	Combat Crew Date	Combat Crew No.	Combat Crew Date
1		1		12		23	
2		2		13		24	
3		3		14		25	
4		4		15		26	
5		5		16		27	
6		6		17		28	
7		7		18		29	
8		8		19		30	
9		9		20			
10		10		21			
11		11		22			

MISSION AND DATES

SCOPE RECORDED INTERCEPTS	
Date	
Altitude	
Day/Night	
Blacked Out	
No. Success Atks Within One Dot	
No. Success Atks Within Two Dots	
ECM	
Date	
Alt.	
Day/Night	
Blacked Out	
No. One Dot	
No. Two Dot	
ECM	

WEATHER LOW APPROACHES Field Mins._____ Ceil _____ Vis

Date	
Weather	
Base	
No. Of Approach	
GCI/ILAS	

ROCKETRY	
Date	
Radar/ Visual	
Grnd/ Visual	
Grnd/ Air	
Assess	
Actual	

STDZN CHECKS

Date	Passed	Check Pilot's Signature

CONFIDENTIAL (when filled in)

STANDARD ADC ALERT READINESS EXAMINATION

I. States of Alert for Interceptor Aircraft. ADCR 55-5.

1. The aircrew is in the cockpit, aircraft is at end of runway with radio tuned to tower frequency and engine running. This is "________________" alert and the crew must be expected to take off immediately.

2. Aircraft and combat crews who are in a deferred state of preparedness with the capability of becoming airborne with not more than thirty minutes after notification are "__________ __________."

3. Aircraft and combat crews who are in a deferred state of preparedness with the capability of becoming airborne within not more than three hours are on "____________________."

II. Rules of Engagement. ADCR 55-10.

1. Action taken against hostile aircraft by means of interceptors, antiaircraft artillery, or other ground-to-air weapons is defined as "___________________________."

2. Interceptors will fly no closer to the intercepted aircraft than _______________.

3. The intercept will be completed under direct control by GCI only when the visibility at intercept altitude is more than _____ mile.

4. If an intercepted aircraft cannot be positively identified as friendly, the interceptor pilot will maintain surveillance and await instructions from the ____________________.

III. Control Procedures - Fighter Interceptor Aircraft. ADCR 55-30.

1. Visual or electronic contact with an airborne object by interceptor aircraft as a result of a pre-planned flight path is defined as _____________.

2. The radio transmission of air intelligence information concerning the enemy force for the purpose of independent interceptor attack is defined as ________________ control.

3. An aircraft designated to maintain airborne surveillance of hostile, unknown or other airborne objects is known as a ___________ aircraft.

Attachment 4, ADCR 55-2, 26 August 1955.

IV. Conditions of Air Defense Readiness.

1. An "air defense readiness" may be declared in his sector by the _______________ when the movement and/or pattern of actions of incoming unknown aircraft warrants.

2. An "air defense readiness" will be declared when it is desired to obtain ________________ for relatively short periods of time.

V. Air Defense Warnings.

1. When the patterns or actions of incoming unknown aircraft indicate beyond a reasonable doubt that a hostile raid is in progress or when current intelligence is available which indicates that aircraft are airborne and enroute to the United States, these aircraft may be classified as "____________________," by defense force commander or the Commander ADC.

2. "Warning Red" means that attack by hostile aircraft is _____.

3. "Warning Yellow" means that attack by hostile aircraft is ____________.

4. When one air division (defense) determines that conditions exist which warrant initiation of "Warning Red," or is directed to initiate "Warning Red," all other air divisions (defense) will initiate a warning of not less than "__________________."

VI. Air Defense Emergency.

1. A military emergency may be constituted by one of the following situations:

a. Presidential Proclamation and/or Congressional Declaration that ______________________________________.

b. A directive issued by ________________________________.

c. A declaration by the Commander ________________________ when intelligence indicates that a hostile air attack on the Continental United States is imminent.

2. When a military emergency is declared and a "Warning White" situation prevails, "__________________" will be automatically instituted Air Defense Command-wide.

CONFIDENTIAL (when filled in)

VI. Brevity Code. ACP 165.

	Brevity Code	Meaning
1.	________________	Controlled night interception without use of AI.
2.	________________	Enemy got through (part or all).
3.	________________	Need support, come to my assistance.
4.	________________	Fly at best endurance.
5.	________________	Switch off equipment indicated.
6.	________________	Fly at maximum cruising range.
7.	________________	Aircraft released from ground control.
8.	________________	The indication on my radar has faded.
9.	________________	Radar scope is clear of contacts other than friendly.
10.	________________	Area contaminated, radioactivity noted.
11.	________________	I have indication on my radar.
12.	________________	Ease rate of turn.
13.	________________	I will find out.
14.	________________	Fly at maximum speed.
15.	________________	Equipment indicated inoperative or unserviceable.
16.	________________	I have reached my maximum operational altitude.
17.	________________	Am orbiting visible orbit point.
18.	________________	As quickly as possible.
19.	________________	Visibility.
20.	________________	Fly at maximum continuous power.

*ADCR 55-14

ADC REGULATION)
55-14)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colo.
13 June 1955

427

OPERATIONS

Standard Mobile Control Unit Procedures

1. Purpose. This Regulation prescribes procedures, equipment, and experience level of personnel to be used for the supervision of flying and promotion of operational safety through use of mobile control units.

2. Scope. This Regulation applies to all units of this command conducting flying training in jet type aircraft.

3. Procedure. a. A mobile runway control unit will be in place and used at all bases when local flying training is being conducted in jet fighter type aircraft or solo transition in jet bomber or T-33 aircraft is being conducted.

b. The mobile control unit will be equipped with the following:

(1) Air-ground communications.

(2) Signal lamp.

(3) Pyrotechnic pistol and flares (with provisions for firing from within unit).

(4) Suitable tool for prying open or breaking canopy glass.

(5) Power source.

(6) Complete Flight Operating Instructions for appropriate aircraft.

(7) CO_2 fire extinguisher (15 lbs).

(8) First aid kit.

(9) Heating and cooling units.

(10) Binoculars.

---

*This supersedes ADCR 55-14, 10 December 1951, as amended.

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c. The unit will be in place near the end of the runway in use where take-offs and landings may be best observed and will not be closer than 150 feet to the near edge of the runway pavement. The control unit will be adequately marked and lighted for day and night operations and will be manned during daylight and darkness when local flying training is being conducted. The mobile control unit is not required for active air defense missions as defined in ADCR 55-30 or for aircraft returning from cross-country flights when all members of flight are qualified in accordance with ADCR 55-2, nor is the unit required for T-33 or jet bomber aircraft except for solo transition training. Mobile control is not required for maintenance test flights.

d. The mobile control unit will be manned by a pilot, alert-qualified in type aircraft being controlled. When solo transition flying in T-33 or jet bomber is being conducted, the unit will be manned by a T-33 or jet bomber instructor pilot as applicable. In the event the communications equipment in the mobile control unit is out of commission, the assigned duty officer will be stationed in the control tower. Mobile control officer will demonstrate a thorough knowledge of his duties as outlined in this Regulation, and of methods of emergency entrance into aircraft.

e. A local written policy agreement will be established with the local AACS commander or CAA official on the operation of the control unit. Agreement with local traffic control facility will include the following:

(1) Fighter-interceptor squadrons will coordinate the location, movement, and operational status of the mobile control unit with the control tower. Prior to changing runways, the control tower, when possible, will give sufficient advance notice to mobile of the impending change so that a tow vehicle can be obtained and airborne aircraft can be warned not to land except for emergencies or low fuel while mobile is moving.

(2) The mobile control officer will monitor the frequency being used by the tower to control military aircraft and guard channel.

(3) The mobile control officer will MAINTAIN RADIO SILENCE AT ALL TIMES except for acknowledging pre-take-off checks and when safety of flight is involved. In the latter case, he will transmit appropriate instructions or advice to the pilot on the frequency being used by the tower to control military aircraft, or guard channel.

(4) After coordination with the tower and aircraft, the mobile control unit may change to an alternate frequency for further communication. If this procedure is followed, mobile control unit must return to the tower frequency as quickly as possible.

(5) Fighter-interceptors on GCAs will monitor guard channel so that mobile control can contact them on this channel when necessary.

(6) UPON REQUEST, the mobile control officer will assist the control tower in every way possible.

f. The duties of the mobile control officer are as follows:

(1) Maintain Mobile Control Officer's Log with appropriate remarks. (See Attachment 1, Standard ADC Mobile Control Officer's Log.) Log will be turned in to squadron operations by last mobile control officer each day. Logs will be kept on file for a 30-day period.

(2) Observe the configuration of all aircraft prior to take-off, noting proper position of such items as flaps, speed brakes (decelerons), fairing doors, and checking for unusual conditions such as fuel siphoning, smoke, anti-personnel screens installed, etc.

(3) Observe aircraft after take-off, noting gear and flap retraction as practicable.

(4) Check landing pattern for proper spacing and conformance to ADC standards.

(5) Check landing configuration of each aircraft, noting such items as gear extension, fairing door position, speed brake (deceleron) extension, and wing flap position. When any doubt exists regarding the safe condition of a landing aircraft, the mobile control officer will advise the pilot to go around, by radio and/or by shooting a red flare ahead of the aircraft.

(6) If the landing appears to be excessively fast, or far down the runway, the pilot will be advised to go around as early as possible.

4. Conflicting Procedure. When arrangements within the provisions of this Regulation cannot be made with local authorities by any of the subordinate echelons of command, full particulars and recommendations will be forwarded to this headquarters.
(ADOOT)

BY ORDER OF THE COMMANDER:

GEORGE F. SMITH
Major General, USAF
Chief of Staff

OFFICIAL:

Walter W. Robinson
WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

1 Attachment:
ADC Mobile Con Off's Log

DISTRIBUTION:
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(AF-ADC, Colorado Springs, Colo.)

Attachment 1, ADCR 55-14, 13 June 1955.

ADC MOBILE CONTROL OFFICER'S LOG

Call Sign	Acft Nr.	Pre-Take-Off Checks	Time of Take-Off	Pre-Landing Checks	Time of Landing	Pattern Grade	Landing Grade	REMARKS

Grades: 1 - Excellent 2 - Average 3 - Poor 4 - Dangerous

*ADCR 55-23

ADC REGULATION)
55-23)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colo.
26 May 1955

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OPERATIONS

Fighter-Interceptor Standard Weather Reporting Procedures

1. Purpose. This Regulation establishes procedures for obtaining weather reports from pilots of fighter-interceptor aircraft and governs the use of weather forecasters as observers on weather reconnaissance missions.

2. Scope. This Regulation applies to all ACW and fighter-interceptor units of this command and all weather detachments of the 3d Weather Group supporting these units.

3. Procedures. a. The control center senior controller will, when deemed necessary by the control center met watch forecaster, request pilot weather reports within his area of responsibility. All requests will be made through the direction center senior director.

b. Direction center senior directors will:

(1) Obtain in-flight pilot weather reports as requested by the control center senior controller.

(2) Relay pilot weather reports to the parent control center in the form shown in paragraph 4.

c. Fighter-interceptor squadron commanders will:

(1) Schedule flights for the purpose of obtaining pilot weather reports when directed by the direction center senior director. Any conflict with normal flight scheduling and operations will be reported to the direction center senior director.

(2) Insure that all pilot weather reports are sent to the control center or direction center, as applicable, with the least practical delay and in the form prescribed by paragraph 4.

d. Met watch forecasters in the control center weather stations will:

(1) Advise the control center senior controller when and where pilot weather reports are desired.

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*This supersedes ADCR 55-23, 5 August 1953.

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(2) Evaluate all pilot weather reports for use in serving air defense units.

(3) Monitor the pilot weather reporting program within the air division (defense).

e. ADC fighter base weather stations will establish and maintain liaison with fighter-interceptor units concerned so as to receive post flight weather reports required to satisfy local needs, and will forward these reports to the control center weather station upon request from the control center duty forecaster.

f. Commanders of ADC fighter-interceptor squadrons serving in a tenant status will maintain liaison with the base weather station to insure adequate weather support. The request for weather service will be in accordance with established ADC MET WATCH procedures.

4. Format. Pilot weather reports will be given in the following sequence. Hazardous weather should be reported as soon as practicable:

a. Any unusual or hazardous weather.

b. Turbulence.

c. Icing, altitude encountered.

d. Precipitation, type and intensity.

e. Clouds, amount, type and height.

f. Temperature (if available).

NOTE: The above reporting sequence is contained in the Radio Facility Chart.

5. Aerial Weather Observers. Forecasters assigned to weather stations supporting ADC units are authorized to fly on a volunteer status in ADC tactical aircraft as aerial weather observers when such action is in the best interest of the air defense mission and when approved by the fighter-interceptor squadron commander. (ADOOT)

BY ORDER OF THE COMMANDER:

OFFICIAL:

GEORGE F. SMITH
Major General, USAF
Chief of Staff

Walter W. Robinson
WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

DISTRIBUTION: A

ADC REGULATION)
55-53A)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colo.
16 July 1955

OPERATIONS

Monthly Combat Training Status Report
E4, E5 and E6 FCS Equipped F/I Squadrons

ADCR 55-53, 28 August 1953, is changed as follows:

* * *

5. Reporting Data.

* * *

g. Classification: Unless the Commander's Commentary contains information warranting classification in accordance with AFR 205-1, this report will be unclassified. Pending publication of a revised ADC Form 74B (1 Sep 53), the notation "SECRET (When Filled In)" printed at the top and bottom of pages 3 and 4 thereof will be lined-out in ink. Hereafter when the Commander's Commentary warrants a security classification, the entire report will be classified accordingly, and the degree of classification will be marked on all pages in accordance with paragraph 27, AFR 205-1.

* * *

(ADCMA)

BY ORDER OF THE COMMANDER:

OFFICIAL:

GEORGE F. SMITH
Major General, USAF
Chief of Staff

Walter W. Robinson
WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

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(AF-ADC, Colorado Springs, Colo.)

430 *ADCR 55-54B

ADC REGULATION)
55-54B)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colo.
10 February 1955

OPERATIONS

Standard Display on Vertical Plastic Plotting and Status Boards

ADC Regulation 55-54, 19 January 1954, is changed as follows:

* * *

3. General. a. To standardize the display of air intelligence within the command, the Lambert conformal projection will be used on all plotting boards. All radar equipment will be oriented to magnetic north and the polar grid of the vertical plotting boards will be oriented to magnetic north.

b. The paints and colors specified in this Regulation were developed especially for use on plastic plotting boards and are centrally procured by AMC. These paints are listed in USAF Supply Catalog, Class 07, as prime depot regulated items, and requisitions will be submitted direct to Topeka Air Force Depot.

c. The following stock numbers and description are extracted from USAF Supply Catalog, Class 07:

STOCK NUMBER	NOMENCLATURE
7300-699266	PAINT, temporary, liquid Amber, Pittsburgh Plate Glass Co., No. NL28605 water resistant, for use in display of semi-permanent information on vertical edge-lighted plastic plotting boards, QUP (PD-XB3-PT) 1 pt can.
7300-699267	PAINT, temporary, liquid, Black, Pittsburgh Plate Glass Co., No. NL38605 water resistant, for use in display of semi-permanent information on vertical edge-lighted plastic plotting boards, QUP (PD-XB3-PT) 1 pt can.
7300-699269	PAINT, temporary, liquid Green, Pittsburgh Plate Glass Co., No. NL38605 water resistant, for use in display of semi-permanent information on vertical edge-lighted plastic plotting boards, QUP (PD-XB3-PT) 1 pt can.

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*This supersedes ADCR 55-54A, 1 April 1954.

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STOCK NUMBER	
7300-699269-5	PAINT, temporary, liquid Tan, Pittsburgh Plate Glass Co., No. NL28609 water resistant, for use in display of semi-permanent information on vertical edge-lighted plastic plotting boards, QUP (PD-XP3-PT) 1 pt can.
7300-699269-6	PAINT, temporary, liquid Violet, Pittsburgh Plate Glass Co., No. NL28609 water resistant, for use in display of semi-permanent information on vertical edge-lighted plastic plotting boards, QUP (PD-XP3-PT) 1 pt can.
7300-699268	PAINT, temporary liquid Blue, Pittsburgh Plate Glass Co., No. NL28609 water resistant, for use in display of semi-permanent information on vertical edge-lighted plastic plotting boards, QUP (PD-XP3-PT) 1 pt can.

* * *

(ADOOT)

BY ORDER OF THE COMMANDER:

OFFICIAL:

GEORGE F. SMITH
Major General, USAF
Chief of Staff

Walter W. Robinson
WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

DISTRIBUTION:
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8

431 *ADCR 55-55

ADC REGULATION)
55-55)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colo.
15 July 1955

OPERATIONS

Standard Monthly Aircraft Activity Report

1. Purpose. This Regulation establishes a means of exchange of information between organizations assigned similar type aircraft.

2. Scope. This Regulation applies to the following organizations:

a. All units operating fighter-interceptor aircraft.

b. All units operating radar calibration aircraft.

c. All units operating AEW&Con aircraft.

3. Responsibility. Commanders of units concerned are responsible for preparation and submission of reports as follows:

a. Frequency - once a month.

b. "As of" date - 2400 hours the last day of each month.

c. Due date - 5th working day following "as of" date.

d. Transmission - mail direct to activities indicated under distribution.

e. Distribution:

(1) Commander ADC, Ent Air Force Base, Colorado Springs, Colorado; two copies marked for DCS/O, one copy for DCS/P (PRT), one copy for ADHFS. These four copies to be mailed in one envelope addressed ATTN: Director of Statistical Services.

(2) Commander EADF, CADF, and WADF, three copies each, ATTN: DO, DP, and DM.

(3) Commander of each USAF squadron assigned like type UE aircraft, two copies each.

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*This supersedes ADCR 55-55, 12 February 1954, as amended.

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(4) Commanders of each ADC group, wing, and division assigned like type UE aircraft, one copy each.

(5) Commander AMC, Wright-Patterson Air Force Base, ATTN: MCMR, one copy.

(6) Other units as designated by this headquarters.

f. Security Classification. Reports will be unclassified unless information therein requires classification under AFR 205-1. Classified items in the report will be preceded by the degree of classification enclosed in parentheses, i.e., "(SECRET)," "(CONFIDENTIAL)."

g. Records Disposition. Reports will be disposed of in accordance with paragraph 58, AFM 181-5.

4. Report. This report will be prepared in accordance with attached format. Figures in the format are examples only.

5. Reports Control Symbol. ADC-A1.

(ADOOT)

BY ORDER OF THE COMMANDER:

GEORGE F. SMITH
Major General, USAF
Chief of Staff

OFFICIAL:

WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

1 Attachment:
Format

DISTRIBUTION:
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(AF-ADC, Colorado Springs, Colo.)

UNCLASSIFIED

COVER SHEET

Designed at the discretion of squadron, but will include name of squadron, squadron insignia, and the Commander, Operation Officer, and Maintenance Officers' names.

Attachment 1, ADCR 55-55, 15 July 1955.

UNCLASSIFIED

SAMPLE

____________ FIGHTER-INTERCEPTOR SQUADRON
Nowhere, Ohio

____
Date

SUBJECT: Monthly Activities Report (RCS:ADC-A1)

TO: Commander
Air Defense Command
Ent Air Force Base
Colorado Springs, Colorado

1. In compliance with ADCR 55-55, 15 July 1955, the following is submitted for the period 0001, 1 ________ 1955 to 2400, _____ 1955:

a. SUMMARY OF OPERATIONAL ACTIVITIES:

(1) _______ sorties were flown on division or larger exercises during this period.

(2) Hours and sorties flown in assigned aircraft this reporting period:

Acft Time	Total Hours	Total Sorties	Hours Night	Hours Hood Time	Hours Wea Time
F-86D	650	580	300	200	50
T-33	180	40	80	125	35
Simulator	80	80			

(3) NARRATIVE OF OPERATIONS: Record here operational problems and new methods of operations tried during reporting period.

(4) BRIEF OF AIRCRAFT ACCIDENTS: Narrate story of any accidents and probable causes. Also, give recommendations for prevention.

(5) NEAR-ACCIDENTS OR INCIDENTS: Same as (4) above for near-accidents or incidents. Report here also flame-outs, airstarts, and barrier engagements.

b. SUMMARY OF MATERIEL ACTIVITIES:

(1) MAINTENANCE STATUS:

(a)	Average Aircraft Assigned	20 - F-86D	3 - T-33A
(b)	Average Aircraft Possessed	18 - F-86D	3 - T-33A
(c)	Percent of time possessed aircraft were in commission	65%	
(d)	Percent of time UE aircraft were combat-ready	50%	___
(e)	Percent of time aircraft were AOCP	5%	8%
(f)	Periodic inspections completed	14	3
(g)	Engine changes	7	None

(2) GROUND HANDLING EQUIPMENT: Report here shortages of and difficulties with ground handling equipment which are hindering squadron maintenance.

(3) MAINTENANCE PROBLEMS AND SOLUTIONS: Report here any major aircraft maintenance problem and any recommended solutions to problems posed by other units.

(4) AIRCRAFT ELECTRONICS: Report here any major problems and shortages in the electronics field, in particular, shortages of test equipment.

(5) SUPPLY:

(a) Show supply action on all shortages of equipment mentioned in any action above.

(b) Show supply action on all items on AOCP or ANFE as of end of reporting period to include requisition number and date.

(c) Report other supply difficulties.

c. PERSONNEL: Report outstanding personnel shortage [illegible] overages.

d. MISCELLANEOUS: Squadron commanders will report here [illegible] items they wish which do not fall in any of the above categori

FOR THE COMMANDER:

432 ADCR 55-57A

ADC REGULATION)
55-57A)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colo.
1 August 1955

OPERATIONS

Emergency Assistance to Aircraft

ADCR 55-57, 25 May 1954, is changed as follows:

* * *

3. Procedures.

* * *

c.

* * *

(3)

* * *

NOTE: Pilots of tactical aircraft under the actual direction of a radar station will switch to emergency frequency in order that all interested agencies may monitor the progress of the emergency and be better prepared to render assistance. If communication loss occurs, procedures outlined in this paragraph will apply.

* * *

(ADOOT)

BY ORDER OF THE COMMANDER:

OFFICIAL:

GEORGE F. SMITH
Major General, USAF
Chief of Staff

Walter W. Robinson
WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

DISTRIBUTION:
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(AF-ADC, Colorado Springs, Colo.)

432

433 *ADCR 60-1

ADC REGULATION)
60-1)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colo.
16 May 1955

FLYING

Standard VFR Approach and Landing Patterns

1. Purpose. This Regulation prescribes the standard VFR approach and landing patterns for aircraft of this command.

2. Scope. This Regulation applies to all Air Defense Command pilots and will be incorporated in all Pilot Information Files.

3. Responsibilities. Air defense force commanders are responsible to insure that pilots of their commands comply with this Regulation.

4. Procedures. All fighter-interceptor and T-33 aircraft will use a racetrack pattern for landing. All conventional aircraft will normally use a rectangular pattern. However, conventional aircraft may make straight-in approaches with permission of tower to expedite traffic.

a. Jet Aircraft Pattern. Jet aircraft will enter on the initial approach at least three miles from the approach end of landing runway at an altitude of 1500' above field elevation. This altitude will be maintained throughout the pattern until aircraft reaches a point on downwind leg opposite runway threshold. If a left-hand pattern is to be flown, entry onto initial will be from a left-hand turn, and the initial approach will be aligned far enough to the right of the landing runway to clear path of possible aircraft turning final. For right-hand traffic, all directions are the reverse. Airspeed on initial will be from 250 to 300 knots. Approximately one-third of the way down runway aircraft will make a level break and execute a 180 degree turn onto downwind leg. Prior to completion of the turn to downwind leg, speed brakes (dive flaps or ¼ decelerons as applicable) will be extended. Gear will be extended on downwind leg, and wing flaps will be extended after gear is down and locked. The turn from downwind onto final will be a descending turn which will be completed at a point not less than 2,000 feet from approach end of runway and at an altitude of not less than 500 feet above terrain.

b. Conventional Aircraft Pattern. Conventional aircraft will enter a 45 degree initial at 1,000 feet above terrain and approximately three miles out from intended downwind leg. Initial will be so aligned as to intersect downwind leg opposite mid-point of landing runway. Gear will be lowered on downwind leg, and flaps at the pilot's discretion. A 90 degree level turn from downwind to base

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*This supersedes ADCR 60-1, 5 February 1954.

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leg will be executed and another 90 degree turn from base to final. Turn onto final will be completed at a point not less than 2,000 feet from approach end of runway and at an altitude not less than 500 feet above terrain.

5. Gear Check. Turning base leg, pilots will re-check gear down. If all indications show gear down and locked, pilots will call tower "GEAR DOWN AND CHECKED."

6. Power. Power will be carried on final approach until a safe landing is assured to preclude the possibility of the aircraft undershooting and to insure rapid acceleration should a go-around become necessary.

7. Formations. A flight will take interval for landing on the break. Interval between breaks will be at the discretion of the flight leader but in no case less than 2 seconds.

8. Radio Failure. In event of two-way radio failure, pilot will tune navigational radio receivers to tower frequency and make a standard pattern. The pilot will rock his wings on initial and downwind leg to alert tower. The pilot will receive clearance to land by a green light from the tower or through the navigational radio receivers.

9. Touchdown. All pilots will strive to touchdown at a point 500' beyond runway threshold. The optimum landing area is between a point 200 feet and a point 800 feet beyond runway threshold. The pilot of any aircraft that is not down within the first two thousand feet of the runway will normally initiate a go-around.

10. Emergencies. When an emergency arises, the pilot will inform the control tower of same as soon as possible, so that runways and local traffic may be cleared to permit an unobstructed pattern. Depending on the circumstance, the pilot may make any type of an approach for landing that he deems best. A pilot will declare "minimum fuel" at any time he has less than 450 lbs in F-86D, 450 lbs on low side in F-89D, 375 lbs in F-94C, or 50 gals in T-33.

11. Modifications. When local conditions make modification of the basic landing pattern desirable, proposed changes will be submitted to the Commander, ADC, for approval. Landing patterns at non-ADC bases will be flown in accordance with the local established traffic pattern.

12. Drag Chutes or Decelerons. Drag chutes and decelerons are considered essential supplements to the braking system on all fighter-interceptor aircraft. Drag chutes or full decelerons will be used on all landing rolls except where length of runway, wind, condition

of landing runway, and other existing local conditions determine that drag chute or deceleron utilization is unnecessary or dangerous.

13. Fuel Requirements. Flights will be planned so as to insure entry into landing pattern with not less than the following minimum fuel limits:

a. F-86D - 650 lbs.

b. F-89D - 800 lbs (low side).

c. F-94C - 650 lbs.

d. T-33 - 100 gals.

(ADOOT)

BY ORDER OF THE COMMANDER:

OFFICIAL:

GEORGE F. SMITH
Major General, USAF
Chief of Staff

W J Birmele
W. J. BIRMELE
Lt Col, USAF
Asst Comd Adj

DISTRIBUTION:
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ADC UNIT TRAINING STANDARD)
10-1)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colo.
22 August 1955

FIGHTER AND AIR DEFENSE UNITS

Training Standards for Fighter-Interceptor Squadrons and Fighter Groups (Air Def)

1. Purpose. This directive establishes specific training standards and objectives for fighter-interceptor squadrons and fighter groups (air def).

2. Scope. This directive applies to all fighter-interceptor squadrons and fighter groups (air def).

3. Unit Mission. The primary mission of Air Defense Command fighter-interceptor units is to destroy enemy airborne targets under all conditions of weather during periods of daylight and darkness. The secondary mission is to destroy enemy sea and surface forces.

4. Unit Training. To attain and maintain the operational efficiency necessary to accomplish the primary and secondary missions, the following standards will be met:

a. Administrative. All personnel and sections performing administrative functions within the unit will be at that level of proficiency which will enable the section to give complete administrative support to the unit in the accomplishment of its assigned mission.

b. Materiel.

(1) The efforts of each of the materiel and support sections must be directed toward maintaining the maximum possible number of possessed aircraft in a constant state of combat readiness.

(2) The squadron will be capable of completely reservicing each aircraft within fifteen minutes after its engine(s) stops, whether the squadron returns singly or en masse. "En masse" is interpreted to mean a maximum of eighteen aircraft with a minimum landing interval of thirty seconds between aircraft. Reservicing will include, but not be limited to, replenishment of fuel, oil, oxygen, armament, and camera film (if applicable). In addition, reservicing will include installation and/or replenishment of drag chute and external stores.

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*This supersedes ADC Training Standards 10-1, 2 July 1951; 10-2, 2 July 1951; 10-3, 2 July 1951; 10-4, 2 July 1951; 10-5, 2 July 1951; 10-6, 2 July 1951 and 10-9, 22 January 1952.

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(3) Proficiency in operating, maintaining, and servicing support equipment.

c. Tactical.

(1) The ability to employ single interceptors, flights, and squadron-size formations to destroy enemy airborne weapons coming within the range of its aircraft.

(2) Proficiency in sea search and anti-submarine operations.

(3) The development of an aggressive spirit in all personnel to accomplish the unit mission.

(4) The ability to conduct efficient combat crew briefing and interrogation.

(5) The ability to collect, process, and disseminate combat intelligence.

(6) The ability to defend and secure squadron personnel, aircraft, and equipment against enemy overt or covert ground attack.

(7) The capability of moving a combat team to and operating on an air base established for the support of similar type aircraft for sustained periods of time, without significant interruption in combat capability. A combat team will include aircrews, armament, communications, electronics, and aircraft maintenance crews sufficient to support the number of deployed aircraft.

5. Crew Training.

a. Fighter-interceptor crews will be capable of:

(1) Employing their aircraft singly, or as part of a formation under all conditions of weather, to destroy enemy airborne weapons.

(2) Becoming airborne on a three-aircraft intercept mission within five minutes after the scramble signal from readiness alert.

(3) Accomplishing interceptions and identification under all conditions of target speed, altitude, evasive action, and weather, within the capabilities of the

aircraft and the fire control system.

(4) Converting identification passes into beam attacks.

(5) Recognizing and minimizing the effects of ECM.

(6) Following and holding a target taking evasive action.

(7) Discriminating major geographical features by using available radar equipment as an aid to navigation.

b. Crews will:

(1) Have a thorough knowledge of the operation of the air defense system.

(2) Be fluent in the use of the established fighter-director vocabulary.

(3) Be capable of identifying all known friendly and enemy air weapons by silhouette and/or exhaust patterns.

(4) Have knowledge of the characteristics of all potentially hostile airborne weapons, and be thoroughly versed in the ADC standard tactics to accomplish their destruction.

(5) Have a thorough knowledge and understanding of the Rules of Engagement.

(6) Have a thorough knowledge of the operation and tactical employment of Remote Control.

(7) Be thoroughly indoctrinated in the principles of mutual cooperation and coordination between crew members and ACW directors.

(8) Have knowledge of the operation and capabilities of all communications equipment in the aircraft.

(9) Have a knowledge of the tactical employment of radio and radar countermeasures to jamming, the ability to recognize all types of jamming, and a knowledge of the capabilities and limitations of unit equipment for overcoming such jamming.

(10) Have a working knowledge of established emergency R/T procedures.

(11) Be capable of planning and accomplishing maximum range navigation flights at all altitudes, and of making good their ETA within five minutes per 500 nautical miles.

(12) Be proficient in the use of all navigational equipment installed in the unit aircraft.

(13) Have thorough knowledge of all flying regulations, air traffic rules, Radio Facility Charts, Radio Data Handbook, and other publications pertaining to flight and navigational facilities.

(14) Have a thorough knowledge of the care, use, and limitations of personal equipment, and methods of survival on land or sea under all climatic and geographical conditions.

(15) Have knowledge of the problems of high speed and high altitude flying, and an understanding of the physiological effects associated with high altitude flying.

(16) Have knowledge of the night vision problem and techniques for aiding vision under minimum light conditions.

(17) Have a thorough knowledge of meteorology, to include interpretation of weather symbols on maps, ability to read weather sequences and forecasts, and a basic understanding of air mass and frontal systems.

(18) Be proficient in performing a preflight inspection and complete re-servicing of assigned aircraft.

(19) Have a thorough knowledge of the aircraft and emergency procedures outlined in applicable aircraft Flight Handbooks.

(20) Be proficient in the preparation of all forms applicable to the operation of the aircraft.

6. Individual Training.

a. Pilot. The pilot will be trained to a standard enabling him to command and handle his aircraft and crew with skill and confidence. He will be proficient in:

(1) Taking off and landing under all conditions of weather commensurate with the operational limitations imposed by the accuracy of the aircraft instruments, and instrument landing and ground control approach systems.

(2) Executing instrument let-down procedures, using GCI-GCA, radio range, radio compass, aural null, and/or such other methods as may be incorporated through use of airborne radar and/or homing facility.

(3) Maintaining precise flying attitude and position in formation through extremes of speed, altitude, and intercept maneuvers under all conditions of weather by visual and/or radar methods.

(4) Taking off and climbing the aircraft to altitudes within the times specified in the Maximum Performance Climb Charts in applicable aircraft pilots' handbook.

(5) Responding to, and executing precisely, directions from radar observer and/or GCI director for changes in speed, altitude, and direction under all conditions imposed by the tactical operation.

(6) Accurately interpreting the indications on the pilot scope.

(7) Performing individual intercept and identification missions under all conditions of weather, visually or by electronic reference.

(8) Air-to-air rocketry using both manual and automatic firing systems.

(9) Assessing scope and wing camera film.

(10) Performing acrobatics within the limitations of the aircraft (day VFR only).

b. Radar Observer. The radar observer will be trained to proficiency in the airborne operation of unit airborne intercept equipment for all approved tactics and techniques of airborne interception. He will be capable of placing the interceptor in an advantageous position. He will be proficient in the use of airborne radar equipment as a navigational, homing, and let-down facility. The radar observer will attain and maintain the following requirements:

(1) Proficiency in:

(a) Interpreting and fluently translating for the pilot all forms of radar intelligence presented by the airborne radar equipment in order to permit the effective maneuvering of the aircraft through all phases of an interception.

(b) Recognizing and minimizing the effects of ECM and completing intercepts on hand control when necessary.

(c) Following and holding a target taking evasive action.

(d) Performing the necessary minor in-flight maintenance so as to insure maximum operating efficiency of assigned radar equipment.

(e) Flight planning, in-flight reporting, and airways, CAA and USAF instrument flying procedures.

(2) Knowledge of:

(a) The purpose, use, and availability of technical orders pertaining to aircraft radio and electronic equipment.

(b) The function and purpose of airborne intercept and associated installed airborne electronic equipment.

(ADOOT)

BY ORDER OF THE COMMANDER:

OFFICIAL:

GEORGE F. SMITH
Major General, USAF
Chief of Staff

WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

DISTRIBUTION:
A

(AF-ADC, Colorado Springs, Colo.)

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AIR DEFENSE COMMAND MANUAL

435

STANDARD INTERCEPT TACTICS FOR AIR DEFENSE

(LEAD COLLISION)

1 MAY 1955

UNCLASSIFIED

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AIR DEFENSE COMMAND

ENT AIR FORCE BASE
DPS, Ogden, Utah (3,800)

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ADC Manual)
55-5)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colorado
1 May 1955

FOREWORD

The ultimate goal of the highly integrated director-interceptor team is the defense of this nation through destruction of an airborne enemy. All of the planning, all the effort, and all of the expenditure within the Air Defense Command is based upon achieving that result. At the same time, needless loss of our own crews and aircraft cannot be tolerated.

The tactics outlined herein have been designed to accomplish maximum destruction of the enemy with minimum loss of defensive forces and are based on sound principles and proven procedures which insure the greatest kill probability.

Due to our capability of committing large numbers of interceptors to engage hostile targets, we have reached the point which requires exacting standardization if we are to achieve maximum effectiveness from our director-interceptor team.

At present a serious deterrent to the efficient use of our interceptors is the lack of common understanding between director and aircrew as to what each should expect of the other. The answer to this problem lies in standardized intercept tactics with which both aircrew and director are completely familiar.

This Manual is directive and is published to provide standardized intercept tactics for the employment of our lead collision course interceptors.

All commanders are encouraged to seek ways, improve these, or develop new tactics. It is desired that all proposed changes be forwarded to this headquarters, ATTN: ADOOT, for review prior to inclusion in this Manual.

BY ORDER OF THE COMMANDER:

OFFICIAL:

GEORGE F. SMITH
Major General, USAF
Chief of Staff

WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

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GENERAL.

1. In an effort to nullify any chance of misinterpretation by the director-interceptor team, these tactics are presented in simple word picture form. Success in using the tactics depends upon unit commanders insuring that each pilot, radar observer, and director is intimately familiar with the contents of this Manual.

2. Basically, these tactics are written on the following criteria:

a. Each director thinks of and directs his flight **as a flight,** coordinating with other directors for a systematic attack. The director controls **all** of the interceptors in the flight through scope interpretation and radio transmissions, using the standard maneuvers contained in this Manual.

b. Each interceptor is scrambled according to a standard procedure that will result in the prescribed separation between aircraft within a flight and between flights. The pilot maintains his position in combat trail during climb-out, cruise, and recovery, **primarily** by flying the interceptor on an exact heading and altitude as specified by the director, monitoring his position, when possible, on his A-I radar, and by close adherence to a standard speed for climb, cruise, and descent, using a standard bank for all turns; in effect, precision instrument flying.

c. Interceptors will be positioned in accordance with the "Air Mass Theory." Each intercept will be accomplished using a positioning aid. Interceptors will be scrambled in flights of three (3) or less with a maximum of one flight normally assigned to a director. A sufficient number of flights will be scrambled to insure complete destruction of the enemy. Tactics described herein will be used regardless of weather conditions.

3. Directors and aircrews will find that this criteria, followed completely, will place the responsibility for precision flying and directing on the proper persons and will materially reduce non-productive radio conversation.

TAKE-OFF SEPARATION AND FIRST TURN AFTER TAKE-OFF.

4. To a degree, the success of the mission will depend initially upon the accuracy of each pilot in starting his take-off roll at the correct time interval to establish a combat trail separation of 5 miles between aircraft within a flight and 20 miles between flights.

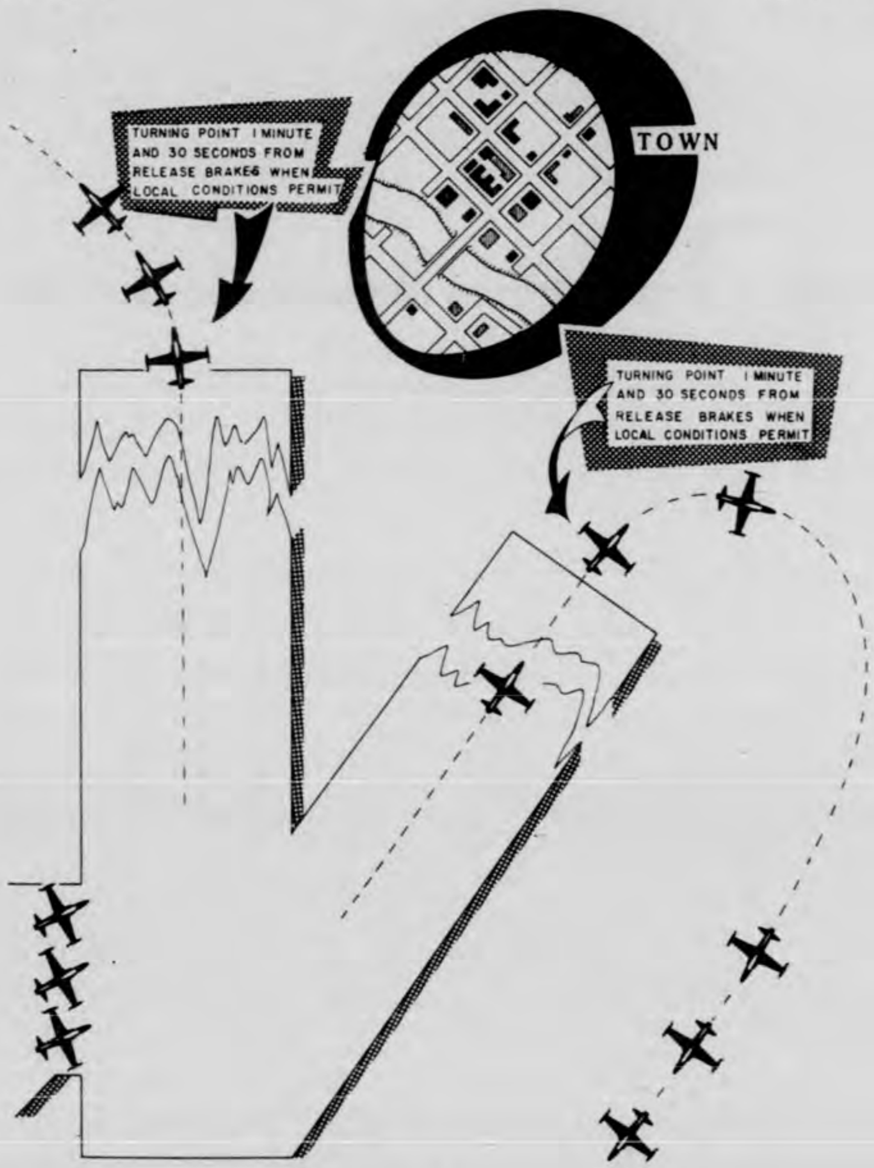
5. The time interval to establish a 5-mile separation between aircraft within a flight and a 20-mile interval between flights is dependent solely on the value of the climb airspeed. Aircraft configuration and use or non-use of afterburner have no effect on this interval so long as all aircraft are of the same type, have the same configuration, and are standard in the use or non-use of afterburner. A thirty (30) second interval between take-offs will closely approximate a five-mile separation for TO climb speeds of F-86D, F-89D, and F-94C. A two (2) minute interval will approximate a twenty mile interval. Technical order climb charts for the F-89, F-94 and F-86 are located in the appendix to this Manual.

6. To eliminate extraneous radio transmission, this take-off procedure should be clearly understood by base control tower personnel, then only the initial transmissions by the flight leader need be made; thereafter each pilot rolls **on his own timing** without further transmission. Radar and IFF must be on prior to starting take-off roll.

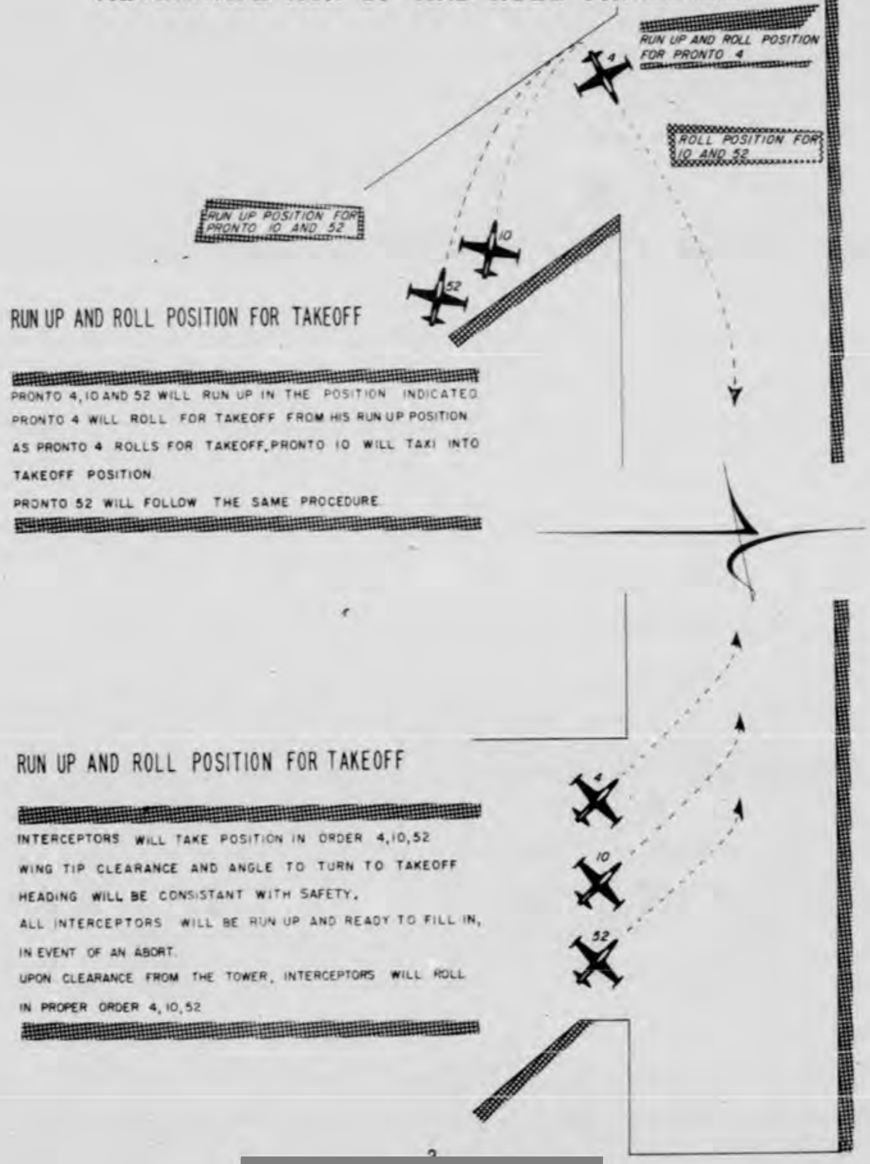
7. After take-off, the pilot is confronted with determining the proper point to establish a bank to turn to the first heading for the climb-out. Whether this heading is the scramble vector or part of a standard climb-out procedure, the turn must be started at **exactly** the same location in space by each pilot so that after the turn all aircraft will be lined up in combat trail and spaced properly. This is done using the following method:

a. Taking into consideration all factors, safety of flight, surrounding towns, housing, etc., a **standard time to turn,** starting from release brakes, must be established for each interceptor base. The standard time to turn should if possible be the same for all usable runways. Each pilot will establish a 30° bank turn in the proper pre-determined direction to the desired heading, after the standard elapsed time from release brakes.

b. In the event of late detection of


TURNING POINT 1 MINUTE AND 30 SECONDS FROM RELEASE BRAKES WHEN LOCAL CONDITIONS PERMIT
TOWN
TURNING POINT 1 MINUTE AND 30 SECONDS FROM RELEASE BRAKES WHEN LOCAL CONDITIONS PERMIT

ALTERNATE RUN UP AND ROLL PROCEDURES



RUN UP AND ROLL POSITION FOR TAKEOFF

PRONTO 4, 10 AND 52 WILL RUN UP IN THE POSITION INDICATED.
PRONTO 4 WILL ROLL FOR TAKEOFF FROM HIS RUN UP POSITION.
AS PRONTO 4 ROLLS FOR TAKEOFF, PRONTO 10 WILL TAXI INTO TAKEOFF POSITION.
PRONTO 52 WILL FOLLOW THE SAME PROCEDURE.

RUN UP AND ROLL POSITION FOR TAKEOFF

INTERCEPTORS WILL TAKE POSITION IN ORDER 4, 10, 52
WING TIP CLEARANCE AND ANGLE TO TURN TO TAKEOFF HEADING WILL BE CONSISTANT WITH SAFETY.
ALL INTERCEPTORS WILL BE RUN UP AND READY TO FILL IN, IN EVENT OF AN ABORT.
UPON CLEARANCE FROM THE TOWER, INTERCEPTORS WILL ROLL IN PROPER ORDER 4, 10, 52

high altitude targets, the separation between **flights** should be reduced to allow trailing flights additional time to gain altitude for attack. The word "EXPEDITE" will be used in the scramble order to indicate late detection plan. **All interceptors** will take off using the 30 second interval required to establish a 5-mile separation. The director provides the proper spacing between flights by use of diverging vectors and/or ordering flights to turn in opposite directions after take-off.

c. As soon as possible after take-off when local climb-out conditions permit, the flight leader will contact the director: "Agony, this is Dropkick 15, Airborne (1) (2) (3) chicken(s)."

d. The director will acknowledge the call, giving vector and angels. The remainder of the flight will establish contact with the director in proper order, giving pilot designator number.

8. Pilots should be aware that **exact** timing for "Take-Off Separation" and "First Turn After Take-Off" are as important to the mission as holding headings, airspeeds, altitudes, and bank angles to within minimum tolerances. "Sloppy" flying and/or timing by any flight member is easily interpreted on the director's scope; conversely, a flight that flies with precise exactness shows up on the director's scope as such, a precision flying team.

ALTERNATE RUN UP AND ROLL PROCEDURES

9. Because of runway conditions, heavy traffic, etc., it may not be possible for all interceptors in a flight to line up on the active runway for take-off; therefore, two alternate methods for run up and roll position are suggested and diagrammed.

a. In using these procedures for positioning interceptors for run up and roll, care must be taken to insure that the angle to turn to the runway heading is not excessive.

b. This method can be used to feed aircraft onto the runway from opposite sides to expedite take-off.

CLIMB SPEED SCHEDULE

10. Each pilot, using the standard time, has spaced his aircraft in the flight and turned to the initial vector. He must now accelerate to climb speed. The climb will be made according to procedures outlined in the applicable dash ones (-1's) and the TO climb schedule will be precisely followed. The TO climb charts for the F-86D, F-94C, and F-89D have been placed in the appendix of this Manual for easy reference. Pilots should commit to memory the applicable climb schedule.

COMBAT TRAIL

11. The following criteria for "Combat Trail Formation" is established:

a. Standard separation between aircraft in a flight is 5 miles.

b. Standard separation between flights is 20 miles.

c. All turns will be accomplished using a 30° angle of bank.

d. Responsibility for separation distance and alignment of **each** aircraft within a flight is delegated to the director.

e. As soon as trailing aircraft within a flight have AI contact with leading aircraft, aircrews will aid in maintaining an "in trail" position by centering the leading aircraft on the AI weapon; however, if no contact is established, aircrews will continue the mission and follow the director's instructions. **It is not necessary** for pilots to request the position of leading aircraft, as the director will insure that the flight is in combat trail formation. **It is not necessary** for pilots to take action to change their separation distance within the flight unless directed to do so by the director.

12. In order to compensate for inequities due to pilot proficiency level, inherent differences between aircraft, instrument error, etc., a standard method of informing pilots that their aircraft is closing on leading aircraft, or dropping back has been established.

a. Aircraft closing: If the director observes an aircraft closing on the aircraft ahead, the director will state, "Trumpet 14 BACKOFF." Trumpet 14 will position his speed brakes to open for 6 seconds and then return them to close position. This will cause the interceptor to drift back approximately one mile.

b. Aircraft dropping back: If a director observes an aircraft dropping back he will state, "Trumpet 20 MOVE UP."

The pilot will increase power if possible. It is appreciated that normally during a mission pilots are using maximum or near military power and that a correction for "MOVE UP" may not be within their capability; however, the term is established as the opposite to "BACKOFF" as a convenient method of informing the pilot of his speed and position status relative to other aircraft in the flight.

13. Normally, pilots receiving "BACKOFF" or "MOVE UP" from the director will realize that their precision instrument flying has "slipped" slightly. Applying the proper correction will put their aircraft in position again. As soon as the interceptor is in proper position, the director will state, e.g., "Trumpet 20, position correct."

14. The pilot or director may elect to abort the interceptor under the following conditions:

a. Pilot considers the interceptor unsafe for further extended flight.
b. Aircraft radio receiver failure.
c. Director unable to establish contact with the interceptor by radar or IFF.

15. The aborting interceptor will be broken out of the combat trail on a climbing heading 90° to the present vector and then away from the combat area. The pilot will be given "pigeons" to the recovery base, and the recovery director will complete the recovery on the designated channel.

FLIGHT MANEUVERS

16. The following maneuvers are designed to provide the director with a flexible means of controlling the combat trail formation throughout the mission. They are designed to aid in placing the interceptors in the most advantageous position for the attack. These maneuvers will assist in positioning and spacing subsequent combat trail flight formation(s) to insure a continuous flow rate to the target and/or the penetration fix.

IN TRAIL TURN

17. The "In Trail Turn" is used to change the direction of a flight in combat trail formation. **It is the director's function** to give **each** pilot directive commentary **individually** at the proper time so that all aircraft will be in combat trail after the turn. Each pilot and/or radar observer should be aware of the distance to the aircraft ahead by monitoring his AI radar. **If** after 45 seconds the director **has not** turned the next in trail aircraft to the new heading, the pilot concerned should take the initiative and turn to trail the aircraft ahead. All turns will be made using 30° of bank.

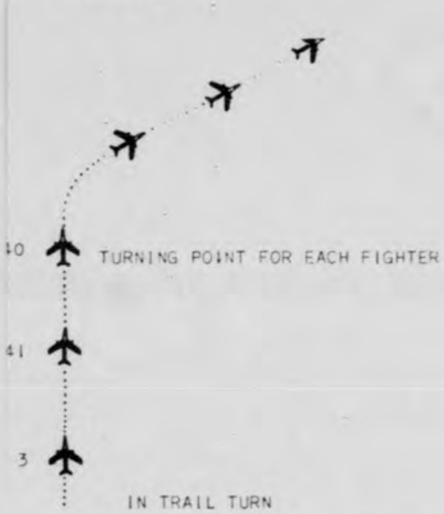
OBLIQUE TURN

18. For several reasons it may be desirable to quickly displace a combat trail track port or starboard. The director can accomplish this by using the oblique turn. The command, "Carnival 40 **Flight** Starboard 045 (or desired heading) **Now.**" Each pilot in the flight on the command **"Now"** establishes a 30° bank turn to the proper heading. When the flight has been displaced the proper distance, the command, "Carnival 40 **Flight** Port 360 (or desired heading) **"Now"** will line up the interceptors on the desired track but displaced the required distance. It should be noted that flanking maneuver turns, or **any turn that places the interceptors line abreast or out of airborne radar contact capability of the trailing interceptor for extended periods is undesirable,** i.e., an oblique turn through 67½° would put the leading interceptors out of the field or radar contact by trailing interceptors; however, if the turn were continued on through 112½° of turn, radar contact would again be established by trailing interceptors.

19. The director should bear in mind that the "oblique turn" heading should not be maintained for periods exceeding 3 to 4 minutes because the interceptors have a tendency to lose their proper spacing more readily than in combat trail.

20. It can be seen by reference to the related illustration that this maneuver can be used effectively to set up a flight for **airborne search** covering a large area quickly and efficiently while maintaining flight integrity.

21. A director may give a flight a check turn which is a function of the oblique turn, e.g., the command, "Carnival 40 **Flight** Check Starboard 40 **Now.**" On the command **"Now"** each interceptor in



IN TRAIL TURN

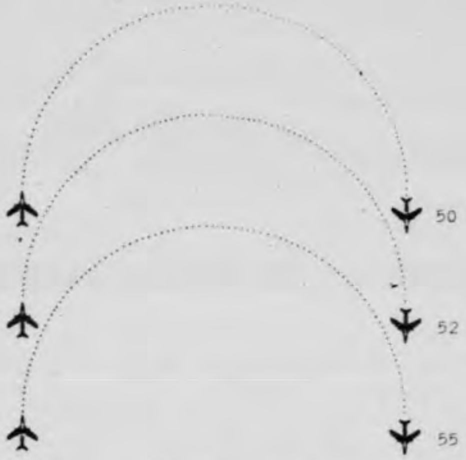
GCI, WILL DIRECT EACH FIGHTER <u>INDIVIDUALLY</u> TO TURN PORT OR STARBOARD, TO THE DESIRED HEADING, AS EACH FIGHTER REACHES THE TURNING POINT.

"CARNIVAL 40 STARBOARD 060"
"CARNIVAL 41 STARBOARD 060"
"CARNIVAL 3 STARBOARD 060"

OBLIQUE TURN

GCI WILL DIRECT THE FLIGHT COLLECTIVELY TO TURN PORT OR STARBOARD USING THE FOLLOWING R-T:

"CARNIVAL 40 FLIGHT STARBOARD 045 NOW."
"CARNIVAL 40 FLIGHT PORT 360 NOW."



180° IN PLACE TURN

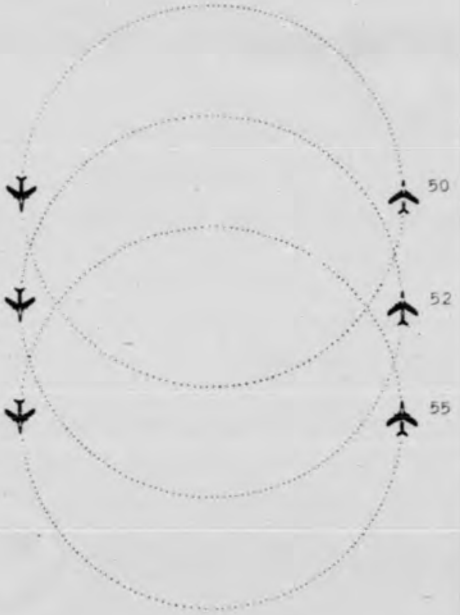
TO QUICKLY REVERSE THE DIRECTION OF THE ENTIRE FLIGHT, GCI WILL GIVE THE FOLLOWING COMMAND:

> "NEUTRAL 50 FLIGHT, STARBOARD OR PORT 180° (OR DESIRED HEADING) NOW."

AT THE COMMAND NOW, THE COMPLETE FLIGHT WILL SIMULTANEOUSLY ESTABLISH A 30° BANK, TURN TO THE PROPER HEADING AND ACKNOWLEDGE:

"ROGER 50"
"ROGER 52"
"ROGER 55"

GCI MUST NOW REMEMBER THAT NEUTRAL 55 IS LEADING AND GIVE FURTHER DIRECTIVE COMMENTARY ACCORDINGLY FOR IN TRAIL TURNS.



360° IN PLACE TURN

GCI CAN EFFECTIVELY CONTROL FLIGHTS TO INSURE THE PROPER FLOW RATE TO THE TARGET OR PENETRATION FIX BY USE OF THE 360° IN PLACE TURN. AT THE COMMAND:

> "NEUTRAL 50 FLIGHT, PORT OR STARBOARD 360 (OR DESIRED HEADING) NOW."

THE COMPLETE FLIGHT WILL ESTABLISH A 30° BANK, TURN TO THE PROPER HEADING AND ACKNOWLEDGE:

"ROGER 50"
"ROGER 52"
"ROGER 55"

SEPARATE VERTICAL

TO SEPARATE THE FLIGHT

THE COMMAND, "TRUMPET 31 FLIGHT SEPARATE VERTICAL NOW"

TRUMPET 31 DESCENDS 1000 FPM, 2000 FEET BELOW HIS ASSIGNED ALTITUDE, CHANGING POWER TO MAINTAIN STANDARD SPEED.

TRUMPET 33 CONTINUES ON COURSE AND ALTITUDE.

TRUMPET 35 CLIMBS 1000 FPM, 2000 FEET ABOVE HIS ASSIGNED ALTITUDE CHANGING POWER TO MAINTAIN STANDARD SPEED.

TO RETURN THE FLIGHT TO THE ORIGINAL ALTITUDE

THE COMMAND, "TRUMPET 31 FLIGHT, RETURN TO 22 ANGELS OR (ORIGINAL ALTITUDE) NOW."

TRUMPET 31 CLIMBS 1000 FPM TO THE ORIGINALLY ASSIGNED ALTITUDE, CHANGING POWER TO MAINTAIN STANDARD SPEED.

TRUMPET 33 CONTINUES ON COURSE AND ALTITUDE.

TRUMPET 35 DESCENDS 1000 FPM TO THE ORIGINALLY ASSIGNED ALTITUDE CHANGING POWER TO MAINTAIN STANDARD SPEED.

the flight establishes a 30° bank starboard turn until he has turned through 40°, at which time he rolls into a 30° bank port turn returning to the original heading.

IN PLACE TURN

22. The "In Place Turn" is a continuance of the "Oblique Turn" and can be used through 180° to quickly reverse the direction of a flight, or through 360° to efficiently delay a flight on course for approximately 4 minutes. The command "Neutral 50 **Flight** Starboard 180° (or desired heading) **Now,"** each pilot in the flight on the command **"Now"** establishes a 30° bank to the proper heading.

23. The director should bear in mind that after a 180° in place turn, the last aircraft in the flight is now leading and further directive commentary for in trail turns should be given accordingly. The **Flight** call sign will not change.

24. Both the 180° and 360° turns give the director greater flexibility of control. The 360° in place turn is in effect a four-minute holding pattern and is very effective when used to control separation between flights to insure an even flow rate either en route to attack a target or when returning flights to the penetration fix or GCI-GCA hand off point. The 180° in place turn can be used to set up a standard race track holding pattern away from traffic congested areas. Proper use of the 180° and 360° in place turns greatly simplifies the director's job.

VERTICAL SEPARATION

25. Vertical separation of interceptors within flights may be desirable for two primary reasons.

a. To increase the elevation search capability of a flight of interceptors if target altitude is unknown.

b. To expeditiously provide separation between interceptors within a flight **if** "stacking" at a penetration fix becomes necessary.

26. It is readily apparent that an altitude separation of **6,000 feet** between two flights of three aircraft will provide a 10,000 foot elevation search capability when interceptors are separated within flights.

27. Trumpet 31 flight is assigned an altitude of 22,000 feet and Pronto 5 flight is assigned an altitude of 28,000 feet; when Trumpet and Pronto flights "separate vertical" respectively, there will be a Trumpet flight interceptor at 20 - 22 and 24 thousand feet and a Pronto flight interceptor at 26 - 28 and 30 thousand feet.

28. To separate the flight: The command, "Trumpet 31 **Flight** separate vertical, **Now."** Trumpet 31 descends 1000 FPM, 2000 feet below his assigned altitude, changing power to maintain standard speed. Trumpet 33 continues on course and altitude. Trumpet 35 climbs 1000 FPM, 2000 feet above his assigned altitude changing power to maintain standard speed.

29. To return the flight to the original altitude: The command, "Trumpet 31 **Flight** return to angels 22 (or original altitude) **Now."** Trumpet 31 climbs 1000 FPM to the originally assigned altitude, changing power to maintain standard speed. Trumpet 33 continues on course and altitude. Trumpet 35 descends 1000 FPM to the originally assigned altitude changing power to maintain standard speed.

STRING OUT

30. When returning a flight to the penetration fix and/or for other reasons, it may be necessary to increase the spacing between aircraft. The director may accomplish this by giving the command, "DISPUTE 10 **Flight** string out (port or starboard) **Now."** On the command **"Now,"** pilots will accomplish the following:

a. The leading aircraft in formation will continue on course.

b. The second and third aircraft in formation will begin a (port or starboard) turn using a **45° angle of bank.**

c. The second aircraft in formation will continue turning through 360 degrees using a **45° angle of bank.**

d. The third aircraft in formation will roll out after 180 degrees of turn, hold this heading for **90 seconds,** and then make another 180-degree turn to resume original heading. Both turns will be accomplished using a **45° angle of bank.**

31. It is not anticipated that this maneuver will be used during declared

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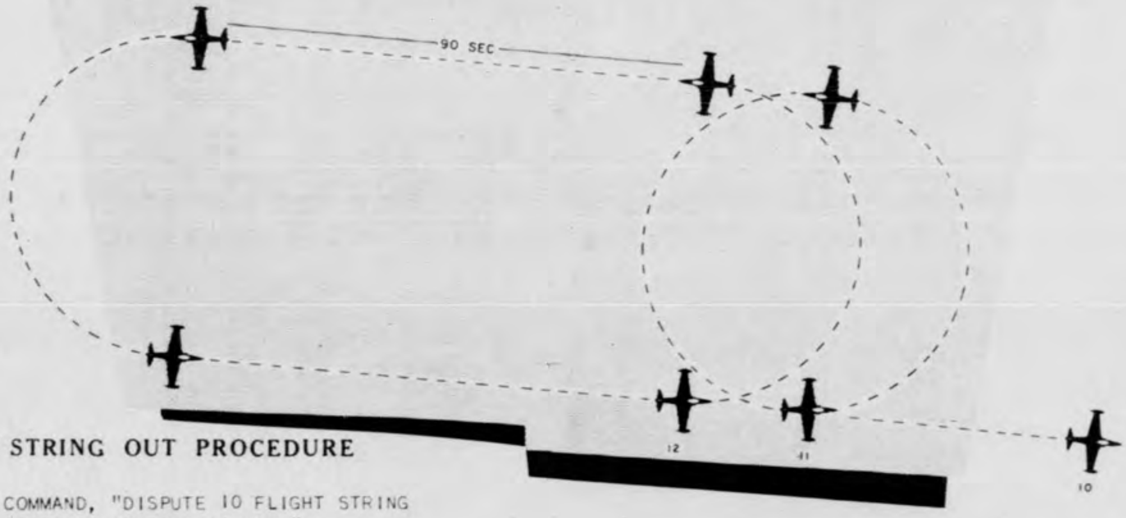

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STRING OUT PROCEDURE

THE COMMAND, "DISPUTE 10 FLIGHT STRING OUT (PORT OR STARBOARD) NOW."

DISPUTE 10 CONTINUES ON COURSE

DISPUTE 11 EXECUTES A 360° TURN USING A 45° ANGLE OF BANK.

DISPUTE 12 EXECUTES 90 SECOND DELAY 360° TURN USING A 45° ANGLE OF BANK.

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hostilities; however, during a practice exercise where weather penetrations are mandatory, this is a simple way for a director to increase spacing between aircraft to satisfy an ARTC requirement.

32. Pilots should note this is the only maneuver that requires a 45-degree angle of bank.

SOLVING THE LEAD COLLISION INTERCEPT PROBLEM

33. The problem of properly positioning the fighter interceptor for beam attack on the target has been of considerable concern to all persons working in the air defense operational field. Initial experience in lead collision positioning indicated that some error existed between the airborne radar system and the ground radar system, for even when the director was sure he had established a good beam attack, pilots reported they were in a head on or stern chase.

34. Considerable effort was expended on this problem and the result was the "Air Mass Theory" which explains a method of computing a course for the interceptor to fly that results in a true beam intercept on an airborne target. This problem can be solved on the E-6-D computer, or on paper, using a Weems Plotter. Using either of these methods, the director must transpose his solution of the problem to a piece of clear plastic to be used directly on the scope as a positioning aid. An effort to produce a dual purpose computer that could be used to solve the Air Mass Intercept Problem and also as a director's aid in positioning interceptors, produced the transparent computer referenced in this manual. Mechanically the computer consists of two clear plastic discs 8" in diameter fastened in the center with a grommet. The top disc is a compass rose and the bottom disc is a grid and angle offscale combination. The computer being transparent and flexible can be used as a positioning aid on the director's scope.

35. Before we go into a step-by-step solution of an "Air Mass Intercept Problem," let us look at a few "main points" to be remembered **while using the referenced computer in solving a problem.**

a. Target and intercept tracks are drawn as solid lines.

b. Lines of Position (LOP's) are drawn as solid lines.

c. Wind vectors are drawn as solid lines with an arrow at the head.

d. Heading T.A.S. lines for the target and the interceptor are dashed lines.

e. All heading and track lines are drawn **toward** the grommet.

f. The wind arrow **head** always touches the target and/or interceptor **heading T.A.S. line.** (dashed line).

g. The LOP's connect the target and interceptor track lines, (or heading lines in the abbreviated solution).

h. The target track line should extend beyond the grommet for rapid identification.

i. The problem is always solved so that attack can be made from either side of the target track, e.g., attack headings and LOP's are drawn on both sides of the target track.

Now follow the step-by-step instructions in solving the air mass theory problem on the computer involving the following known factors: A target is picked up on the director's scope, ground speed 400 knots, track 100 degrees, altitude 35,000 feet. Speed of the interceptors during attack will be .78 mach (450 knots TAS).

USING THE DIRECTOR'S POSITIONING AID

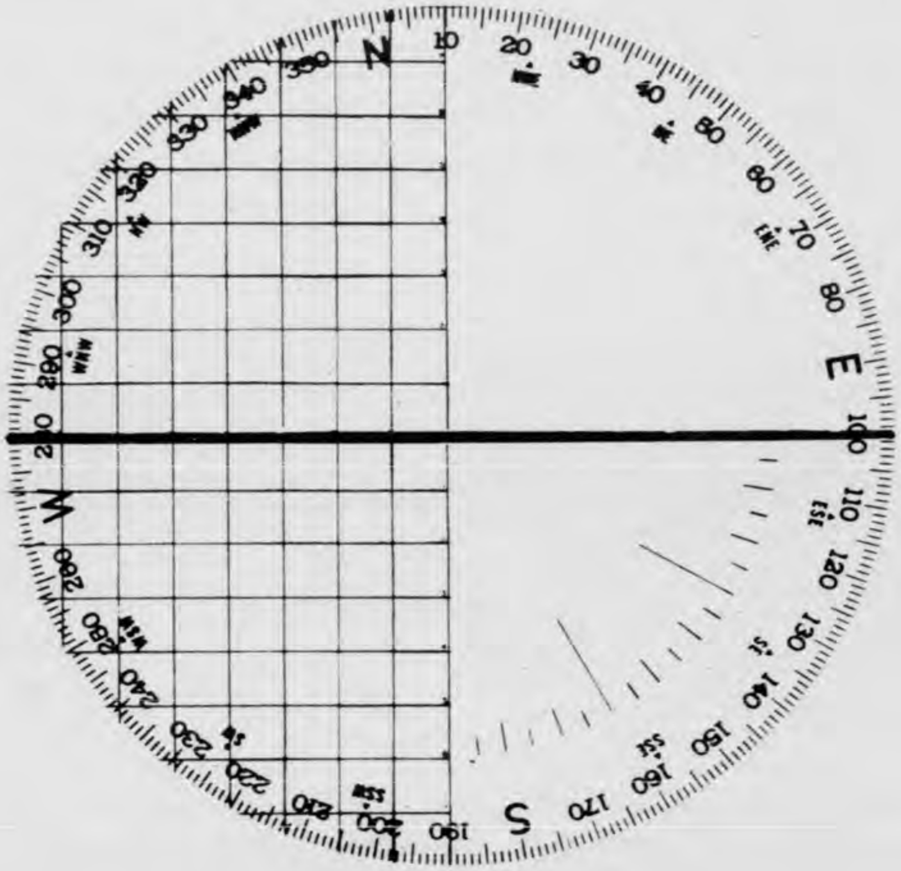
36. The computer is now ready for use by the director to position his interceptor(s) on the correct 90° beam heading.

37. The director tracks the target with a grease pencil on his PPI scope. After he has an inch or so of track on the scope, he places the computer on the scope face with the intersection of the target track and the LOP's over the target blip, and with the target track line on the computer aligned with the target track on the scope. As the target moves forward, the computer is also moved forward, keeping the track line on the computer aligned with the target track on the scope.

38. When the interceptor nears the LOP, the director maneuvers him so as to arrive **on the LOP on the correct attack heading.** Then as the LOP moves forward with the target, the interceptor proceeds on his attack vector and thus remains on the LOP until both the target and

STEP #1

A TARGET IS PICKED UP TRACKING 100° MAGNETIC - GROUND SPEED 400 KNOTS. REVOLVE THE COMPASS ROSE FACE SO THAT 100° IS PARALLEL TO THE GRID LINES. WORKING FROM 400 KNOTS TOWARD THE GROMMET, DRAW THE TARGET TRACK LINE ON THE COMPUTER. (THE TARGET TRACK LINE IS EXTENDED BEYOND THE GROMMET FOR IDENTIFICATION ONLY.)



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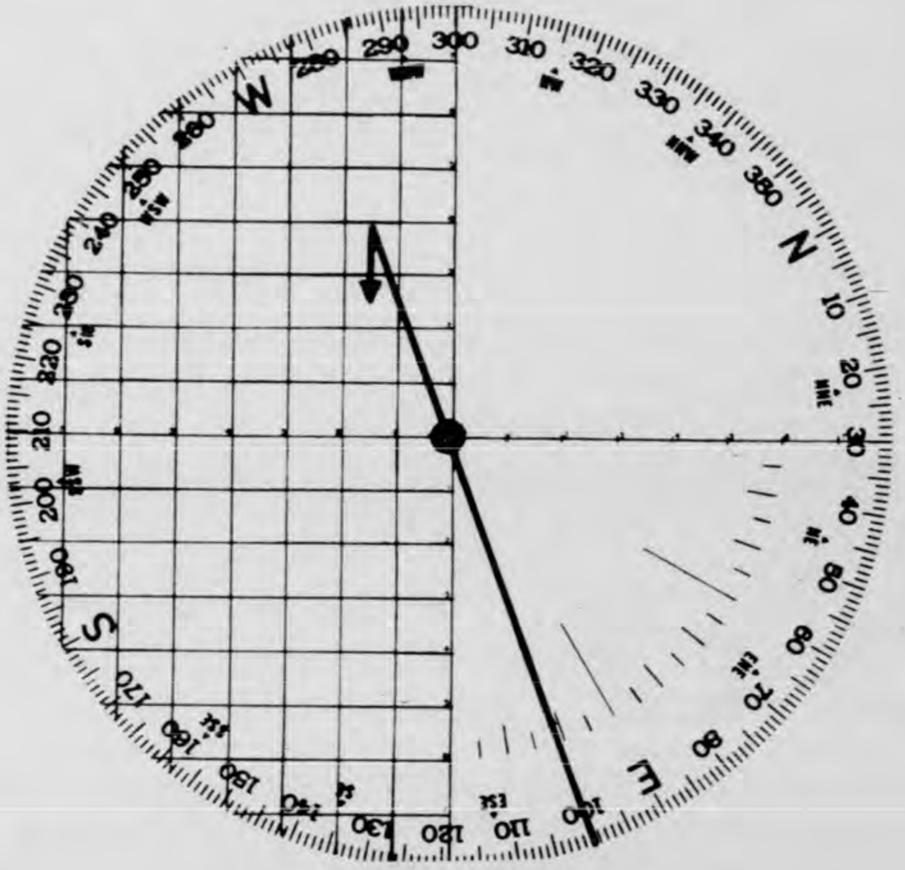
STEP #2

THE LATEST "METRO" WINDS ALOFT (CORRECTED FOR MAGNETIC VARIATION) INDICATE 100 KNOTS FROM 300°. REVOLVE THE COMPASS ROSE FACE SO THAT 300° IS PARALLEL TO THE GRID LINES AND DRAW THE WIND ARROW WITH THE TAIL ATTACHED TO THE TARGET TRACK LINE.



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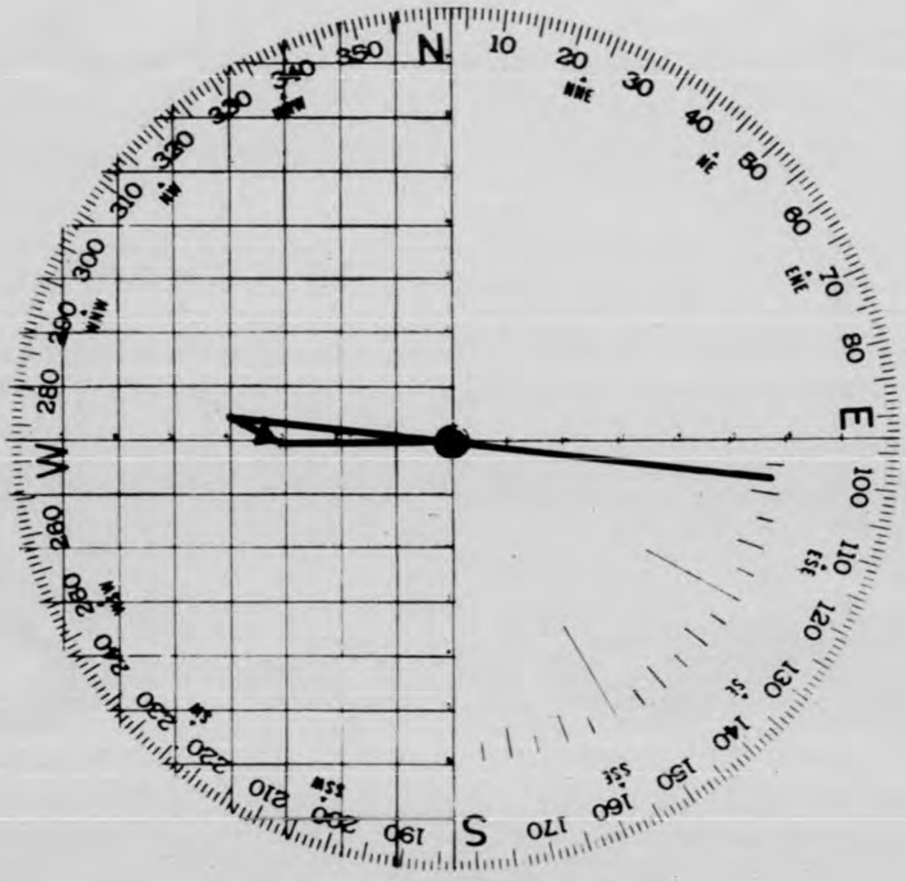
STEP #3

REVOLVE THE COMPASS ROSE FACE UNTIL THE WIND ARROW HEAD AND THE GROMMET ARE PARALLEL TO A GRID LINE. BY CONNECTING THESE TWO POINTS, DRAW IN THE TARGET T.A.S. AND MAGNETIC HEADING LINE.



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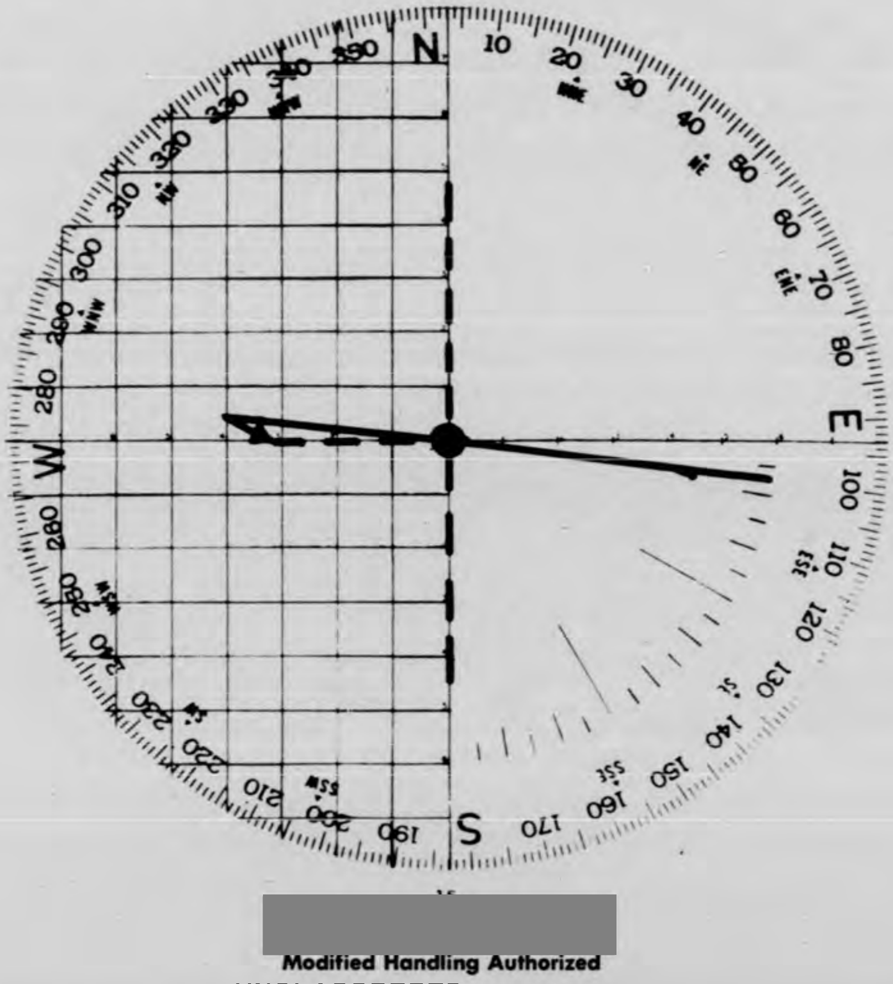
STEP #4

WITHOUT REVOLVING THE COMPASS ROSE FACE DRAW IN THE INTERCEPTOR "ATTACK HEADING" 90° TO THE TARGET HEADING LINE USING THE KNOWN T.A.S. OF THE "INTERCEPTOR"; IN THIS CASE, 450 KNOTS.



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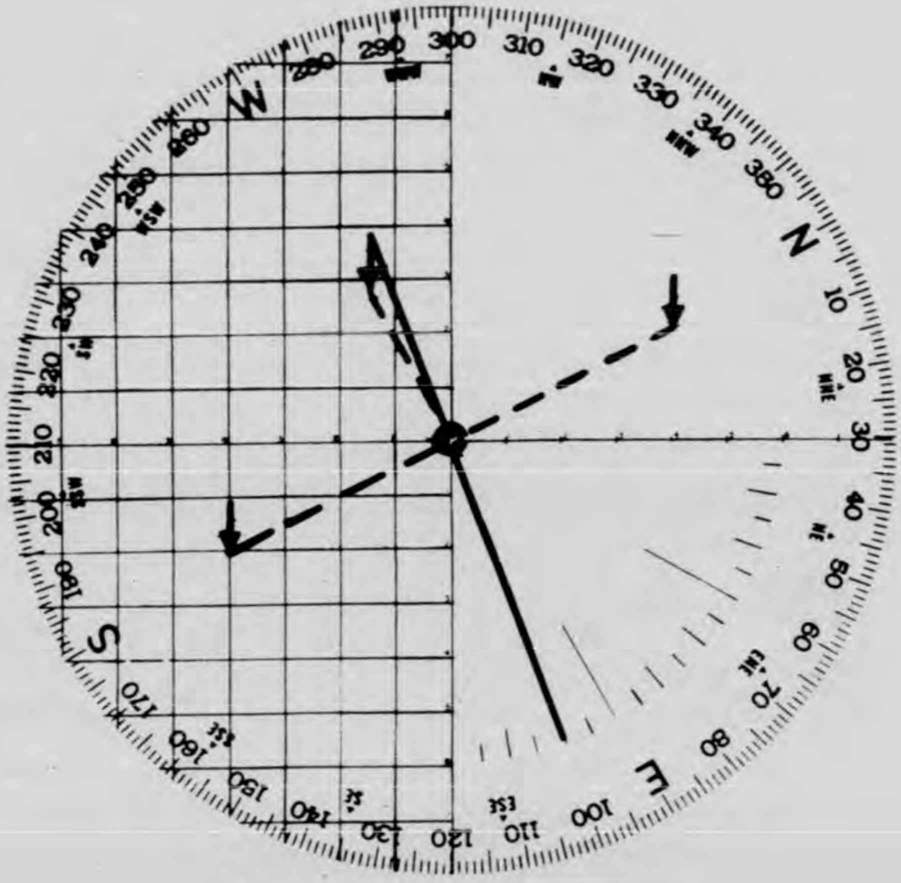
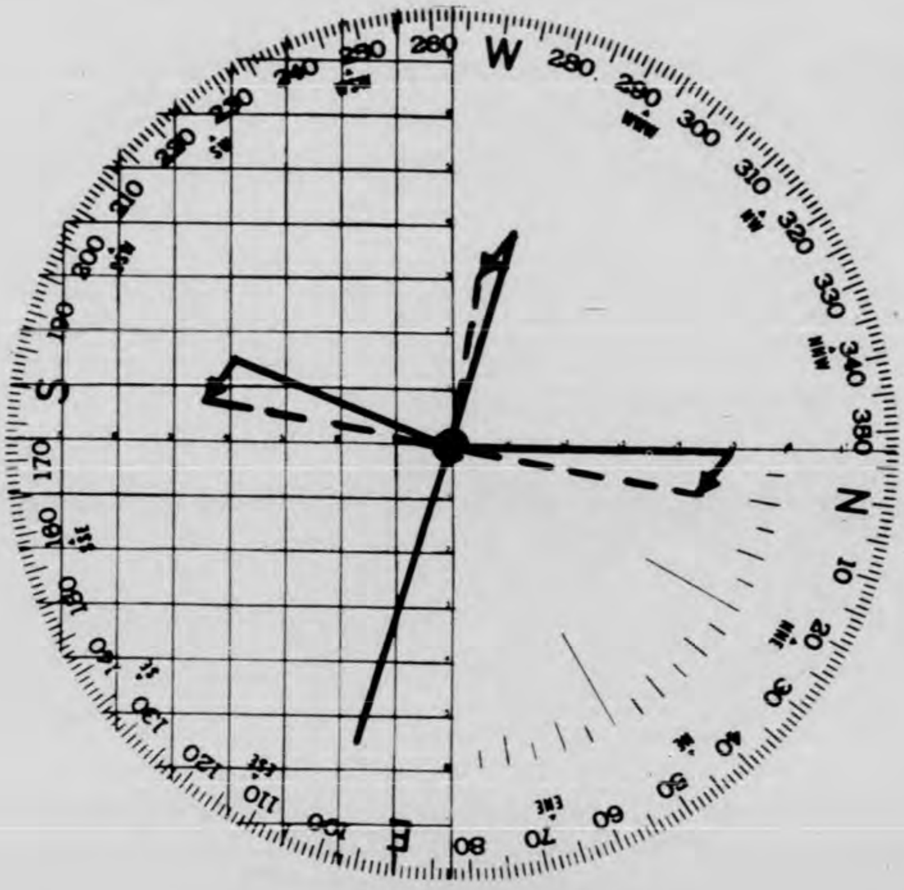
STEP #5

REVOLVE THE COMPASS ROSE FACE SO THAT 300° IS PARALLEL TO THE GRID. DRAW IN THE WIND ARROWS FOR THE INTERCEPTOR VECTOR TRIANGLE USING THE SAME WIND VELOCITY, 100 KNOTS, AND INSURING THAT THE HEAD OF THE WIND ARROW TOUCHES THE INTERCEPTOR T.A.S. AND ATTACK HEADING LINE. (THIS WILL REQUIRE TWO MOVES BECAUSE THE GRID COVERS ONLY ONE-HALF OF THE COMPASS ROSE.)



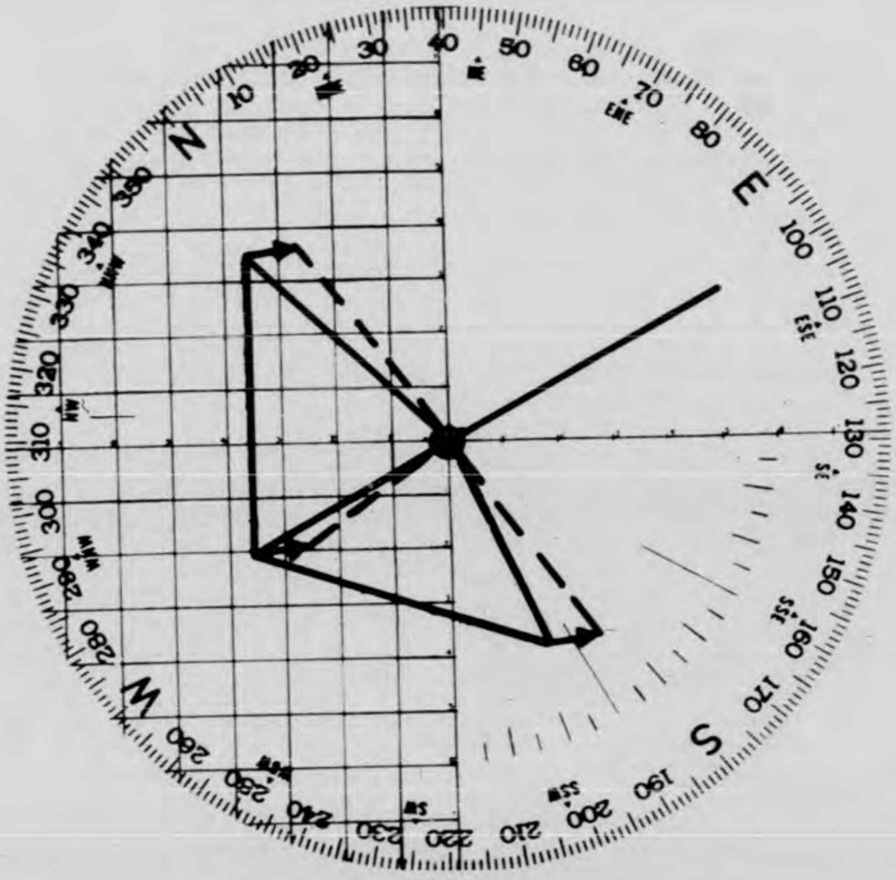
STEP #6

REVOLVE THE COMPASS ROSE FACE SO THAT THE TAIL OF THE WIND ARROW ON THE INTERCEPTOR'S ATTACK HEADING IS ON A GRID LINE PARALLEL TO THE GROMMET. CONNECTING THESE TWO POINTS WILL ILLUSTRATE THE INTERCEPTOR'S TRACK. (THIS WILL REQUIRE TWO MOVES.)



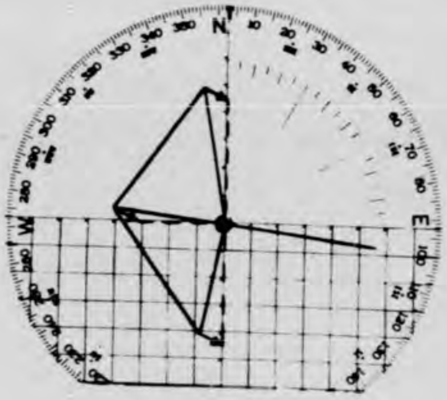
STEP #7

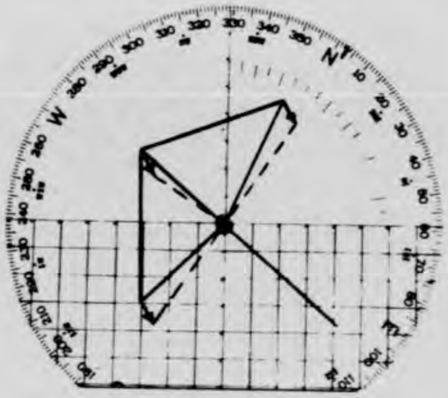
CONNECT THE TARGET AND INTERCEPTOR "TRACK" LINES. THESE LINES FORM THE LOPS. (THIS WILL REQUIRE TWO MOVES.)



COMPUTING ANGLE-OFF

IN ORDER TO DETERMINE THE ANGLE-OFF, INTERCEPTOR TO TARGET, WHICH THE AIRCREW WILL SEE ON THE AI WEAPON, PLACE THE INTERCEPTOR 003° ATTACK HEADING LINE ALONG THE 0° INDEX OF THE ANGLE-OFF PORTION OF THE COMPUTER. PLACE A REFERENCE MARK ON THE OUTER EDGE OF THE COMPASS ROSE AT THE 0° INDEX LINE. ROTATE THE COMPASS ROSE CLOCKWISE UNTIL THE LOP FOR THE 003° ATTACK HEADING IS PARALLEL TO THE GRID LINE. READ THE ANGLE-OFF ON THE GRID CARD AZIMUTH SCALE UNDER THE REFERENCE MARK ON THE OUTER SCALE OF THE COMPASS ROSE 34°. THE ANGLE-OFF REPRESENTS A RATIO BETWEEN TARGET AND INTERCEPTOR TRUE AIR SPEED AND WILL BE THE SAME FROM EITHER SIDE.





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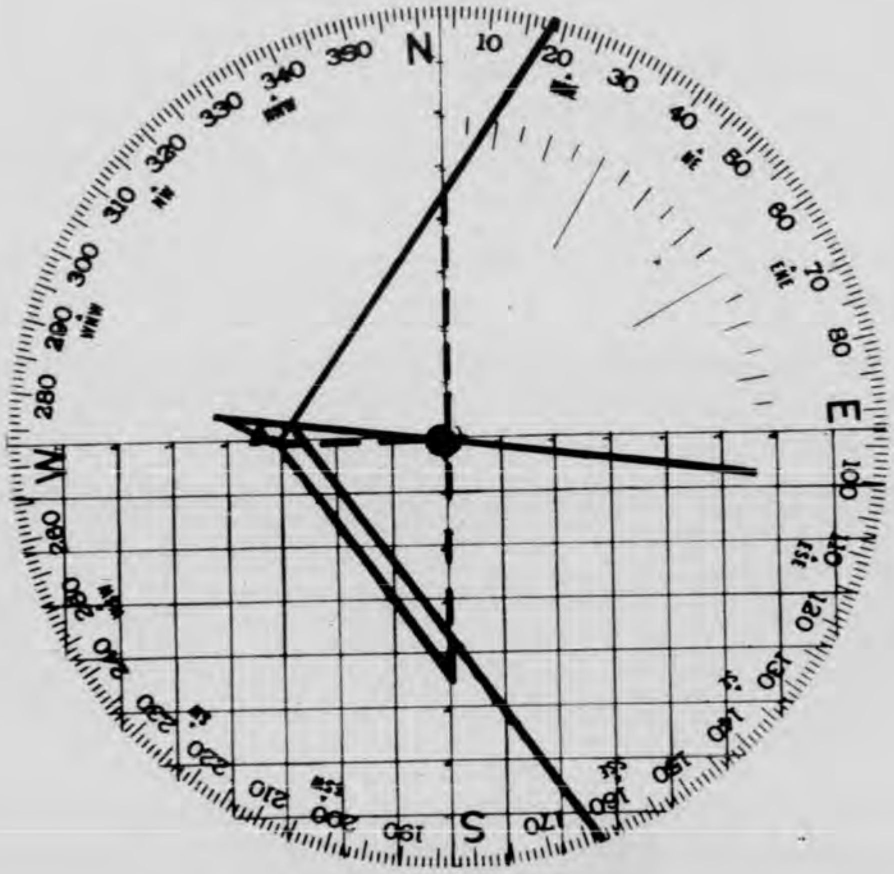
ABBREVIATED PROBLEM SOLUTION

ONCE THE DIRECTOR UNDERSTANDS THE COMPUTER PROBLEM, HE MAY STREAMLINE HIS COMPUTATIONS BY ELIMINATING STEPS 5 AND 6. HE THEN DRAWS HIS LOPS BY CONNECTING THE TARGET'S AND INTERCEPTOR'S HEADING T.A.S. LINES. IF THIS ABBREVIATED SOLUTION IS USED, THE DIRECTOR SHOULD INSURE THAT THE APEX OF THE ANGLE FORMED BY THE LOPS IS ON THE TARGET TRACK LINE; THIS REQUIRES THE DIRECTOR TO DRAW ANOTHER LOP PARALLEL TO THE LOP THAT DOES NOT INTERSECT THE TARGET TRACK. LOPS ARE EXTENDED FOR USE ON EXPANDED SCOPES.



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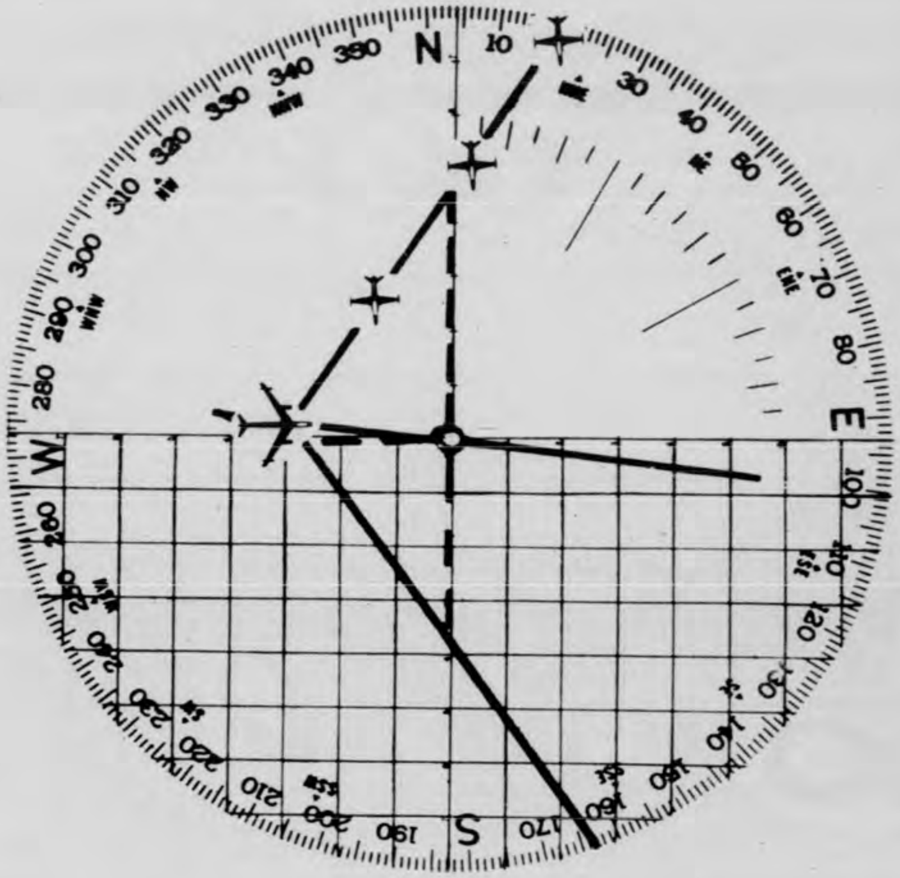
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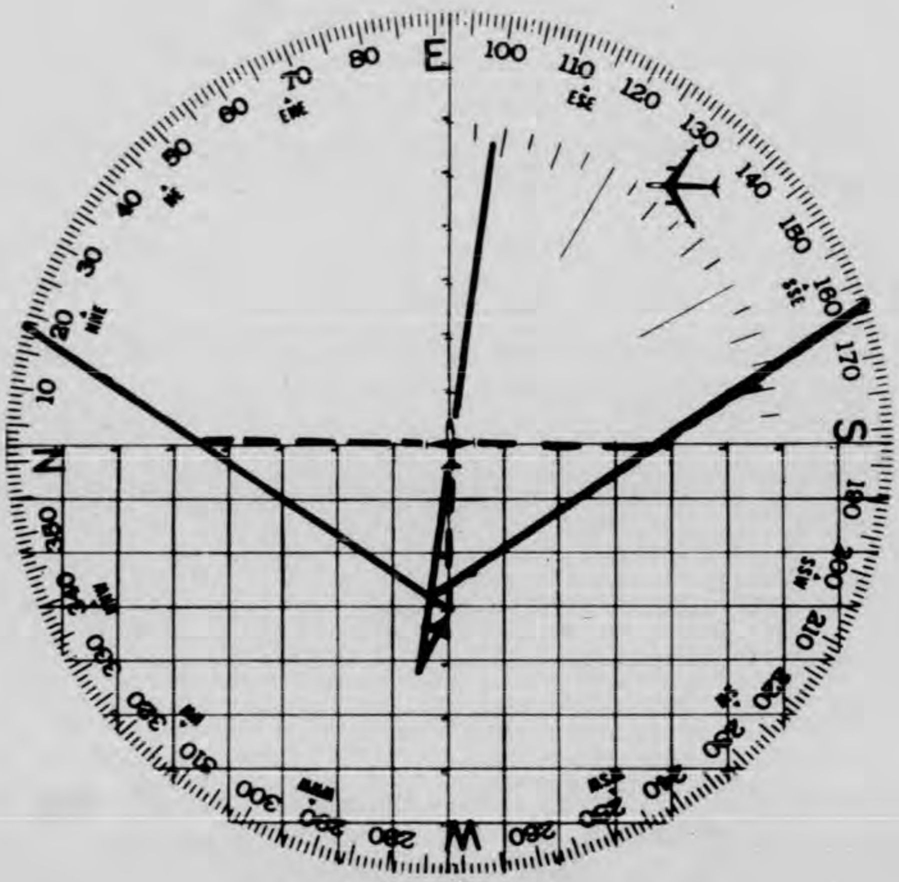
ANGLE-OFF INDICATOR

1. IN THE EVENT THE INTERCEPTOR IS NOT ON THE LOP, THE DIRECTOR CAN ACCURATELY DETERMINE THE ANGLE-OFF FROM INTERCEPTOR TO TARGET BY USING THE ANGLE-OFF SCALE.
2. PLACE THE GROMMET ON THE INTERCEPTOR BLIP WITH THE 0° ANGLE-OFF LINE PARALLEL TO THE INTERCEPTOR'S HEADING.
3. THE ANGLE-OFF AS IT WILL APPEAR TO THE AIRCREW ON THE AI WEAPON IS READ DIRECTLY FROM THE ANGLE-OFF SCALE. TARGET, 40° STARBOARD FROM INTERCEPTOR'S HEADING.



the interceptor's rockets reach the collision point.

COMPUTER USE FOR EVASIVE ACTION

39. Normally, the target **heading** should be lined up with the cardinal lines on the gridded portion of the computer. This enables the director to read target and interceptor heading from the compass rose on the opposite side of the grommet.

40. If the target track does not change more than 10°, port or starboard, it may be assumed that the target's heading has changed approximately the same number of degrees in the same direction. By rotating the compass rose to place the target's new heading on the cardinal line opposite the grommet, the interceptor's new heading may be read from the compass rose 90° from the target heading.

41. Any obvious change of more than 10° in target's track, depending on wind direction and velocity, will change the LOP's; therefore, a new problem should be computed. The new problem may be computed using the same ground speed; however, some error will result. The error, disregarded in the interest of expediency, will increase proportionately with the amount of track direction change and will be compensated for by changing the interceptor's attack heading sufficiently to keep the interceptors **on the LOP.** Thus the interception will be other than a 90° beam but the departure divergence from the 90° beam will not be so great as to cause an unacceptable interception.

THE ATTACK PLAN

42. A sample attack plan is diagrammed to stimulate thinking for coordinated attacks on the target and for subsequent recovery of interceptors.

POSITIONING FOR ATTACK

43. The director of the lead flight will set the attack pattern with a minimum of 30 miles' displacement from the target track prior to turn-in. Turn-in will normally consist of two turns, the first being such as to place the interceptors of the flight parallel to, and in front of the LOP. The second being an oblique turn to the attack vector just prior to the time when the LOP and interceptors coincide, thus placing the flight in combat echelon for the attack.

44. Any error in timing of turns may be corrected by oblique turns or check turns. It should be emphasized that check turns for correcting a positioning error which has caused the interceptors to fall behind the LOP is not effective against a high speed target. No advantage is gained because the time required to make the check turn will generally nullify the displacement gained by the check turn. An oblique turn to a cut-off vector, or to a vector which will allow the interceptors to overtake the LOP followed by an oblique turn to the attack vector, is accepted technique for correcting an error in positioning which has caused the interceptors to fall behind the LOP.

45. Check turns are quite advantageous for correcting an error in positioning which has caused the interceptors to be placed slightly in front of the LOP. Large errors of positioning in front of the LOP can best be corrected by two oblique turns which will replace the interceptors on the LOP on the correct attack heading.

ALTERNATE METHODS OF POSITIONING FOR ATTACK

46. The director may find it necessary, or elect, to turn interceptors to the attack heading individually.

a. By approaching the LOP at an angle off of approximately 20°, the interceptors will **intercept the LOP in combat trail** necessitating individual turns to the attack heading. This procedure is advantageous in placing each interceptor on the attack heading at a greater range from the target. This procedure should not be used when **interceptor target** speed is near equal, or high wind conditions exist which would cause the **last run** to the attack heading **to exceed 45°.**

b. Approaching the LOP at an angle off of approximately 20°, the interceptors are directed to accomplish an oblique turn that puts the flight in combat echelon parallel to the LOP. As the LOP moves forward each interceptor is directed to the attack heading individually so as to be on the LOP and the attack heading simultaneously.

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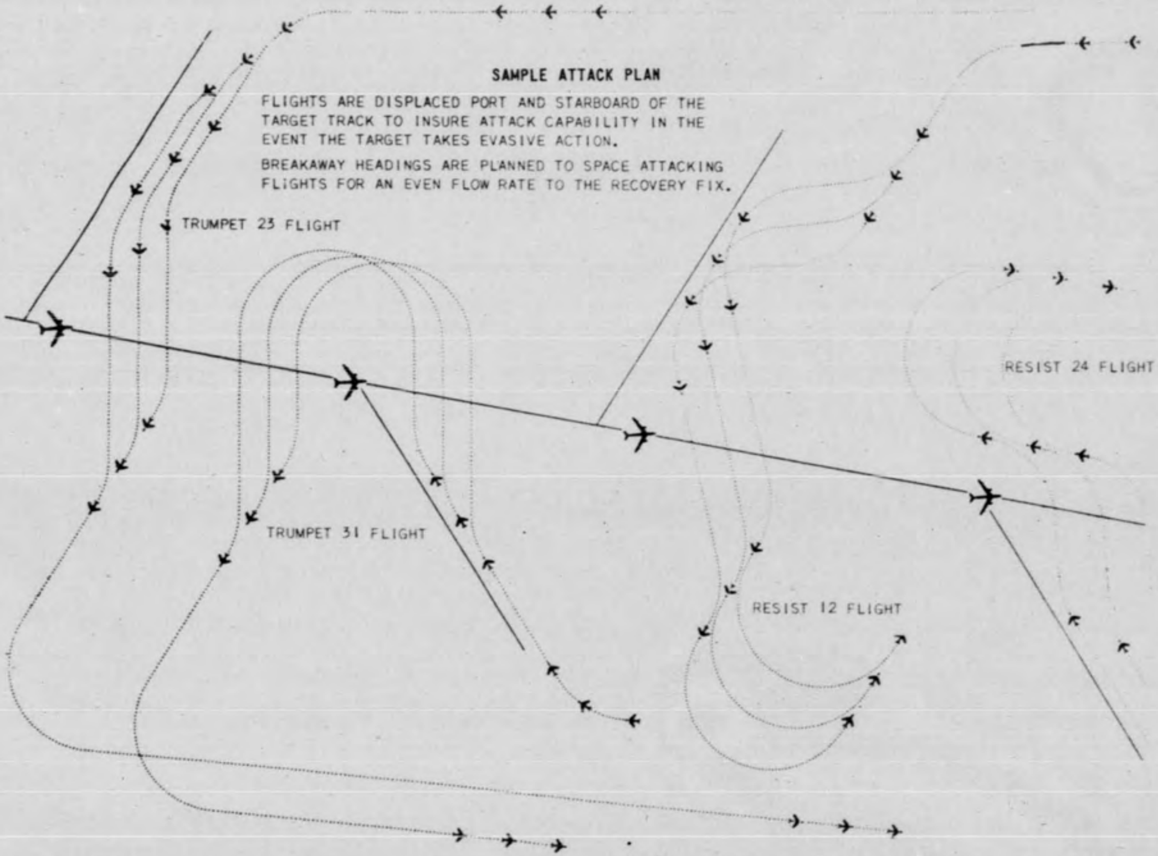
SAMPLE ATTACK PLAN

FLIGHTS ARE DISPLACED PORT AND STARBOARD OF THE TARGET TRACK TO INSURE ATTACK CAPABILITY IN THE EVENT THE TARGET TAKES EVASIVE ACTION.

BREAKAWAY HEADINGS ARE PLANNED TO SPACE ATTACKING FLIGHTS FOR AN EVEN FLOW RATE TO THE RECOVERY FIX.



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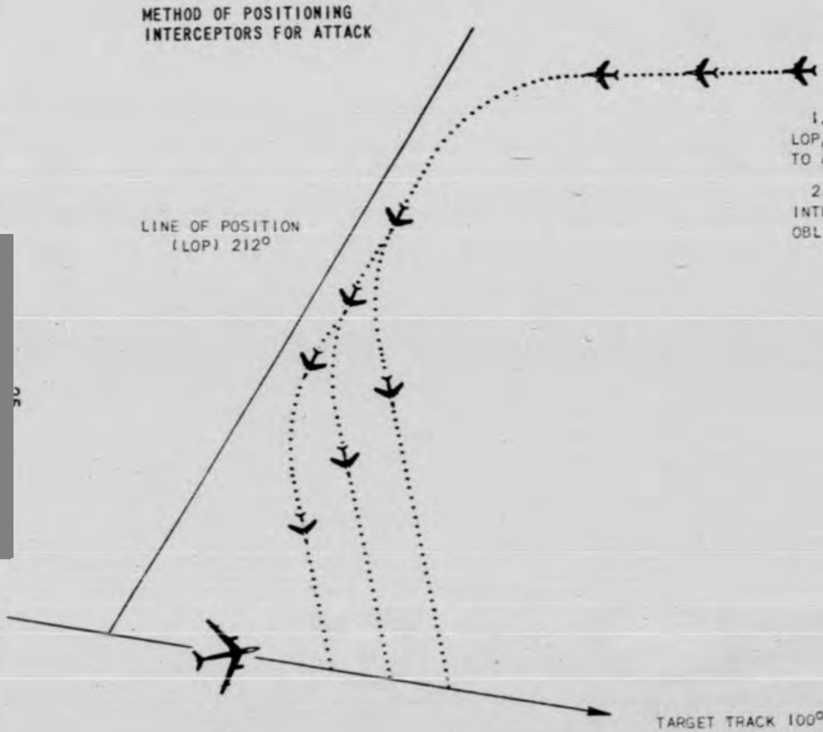
METHOD OF POSITIONING INTERCEPTORS FOR ATTACK



1. WHEN INTERCEPTORS APPROACH THE LOP, THE DIRECTOR USES THE IN TRAIL TURN TO A VECTOR THAT PARALLELS THE LOP (212°

2. AS THE LOP MOVES FORWARD TO THE INTERCEPTORS, THE DIRECTOR ORDERS AN OBLIQUE TURN TO THE ATTACK HEADING

TARGET TRACK 100°
TARGET HEADING 090°
METRO WINDS 100 KTS FROM 300° MAGNETIC

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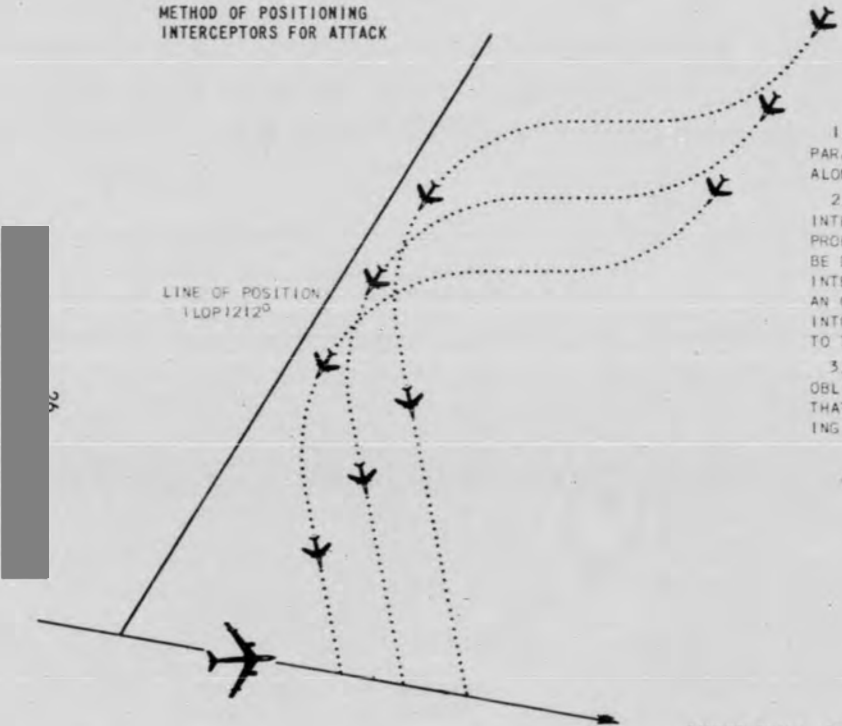
METHOD OF POSITIONING INTERCEPTORS FOR ATTACK



1. INTERCEPTORS APPROACH FOR ATTACK, PARALLEL TO THE LOP. THE LOP IS MOVING ALONG THE TARGET TRACK WITH THE TARGET.

2. IF POSITIONING IS NOT CORRECT, I.E., INTERCEPTORS ARE NOT <u>ON</u> THE LOP AT THE PROPER DISTANCE FROM THE TARGET TRACK TO BE DIRECTED TO THE ATTACK HEADING. THE INTERCEPTORS CAN BE DIRECTED TO ACCOMPLISH AN OBLIQUE TURN, OR, AN OBLIQUE CHECK TURN INTO THE LOP FOR PROPER POSITION TO TURN TO THE ATTACK HEADING.

3. THE DIRECTOR ANTICIPATES A FLIGHT OBLIQUE TURN TO THE ATTACK HEADING SO THAT INTERCEPTORS ARE ON THE ATTACK HEADING AND THE LOP SIMULTANEOUSLY.

TARGET TRACK 100°
TARGET HEADING 090°
METRO WINDS 100 KTS FROM 300° MAGNETIC

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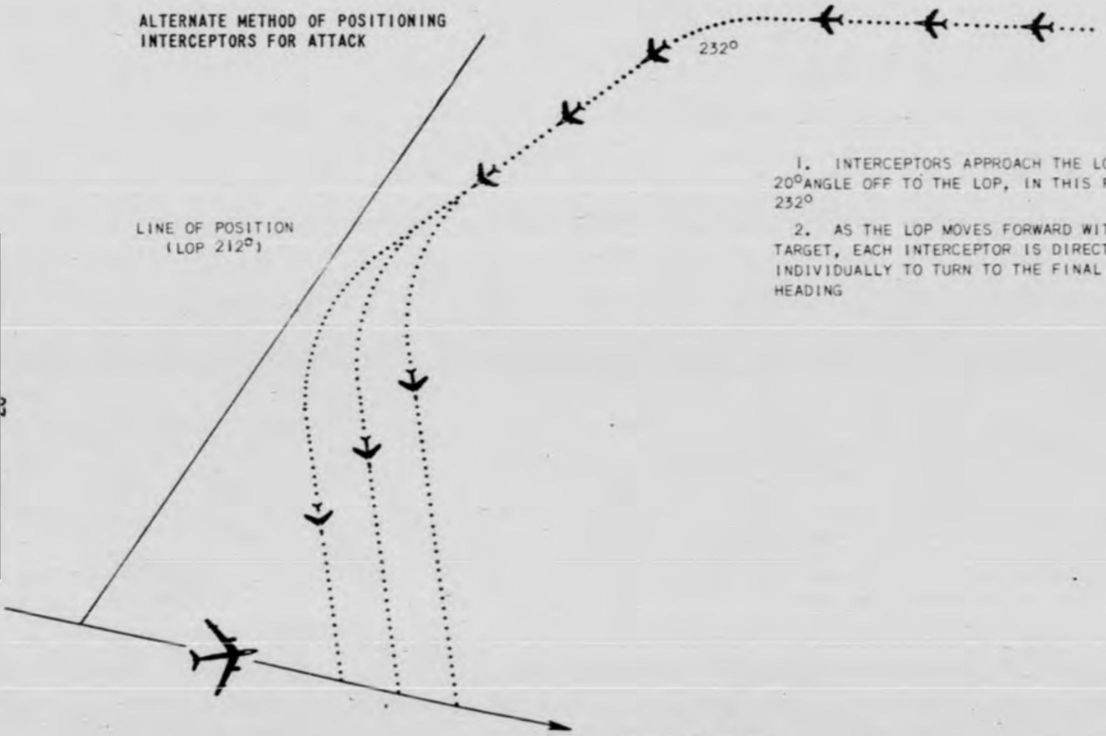
ALTERNATE METHOD OF POSITIONING INTERCEPTORS FOR ATTACK



1. INTERCEPTORS APPROACH THE LOP ON A 20° ANGLE OFF TO THE LOP, IN THIS PROBLEM 232°

2. AS THE LOP MOVES FORWARD WITH THE TARGET, EACH INTERCEPTOR IS DIRECTED INDIVIDUALLY TO TURN TO THE FINAL ATTACK HEADING

TARGET TRACK 100°
TARGET HEADING 090°
METRO WINDS 100 KTS FROM 300° MAGNETIC

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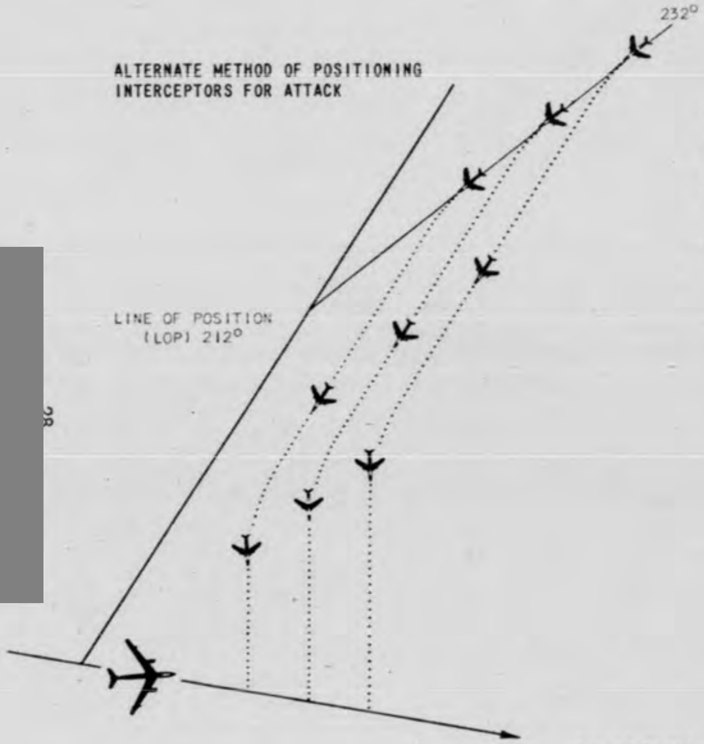
ALTERNATE METHOD OF POSITIONING INTERCEPTORS FOR ATTACK



1. INTERCEPTORS APPROACH THE LOP ON 20° ANGLE OFF TO THE LOP, IN THIS PROBLEM 232°

2. WHEN THE LEADING INTERCEPTOR IS APPROXIMATELY 12 MILES FROM THE LOP, THE ATTACKING FLIGHT IS DIRECTED TO ACCOMPLISH AN OBLIQUE TURN TO THE LOP HEADING

3. AS THE LOP MOVES FORWARD WITH THE TARGET, EACH INTERCEPTOR IS DIRECTED INDIVIDUALLY TO TURN TO THE FINAL ATTACK HEADING

TARGET TRACK 100°
TARGET HEADING 090°
METRO WINDS 100 KTS FROM 300° MAGNETIC

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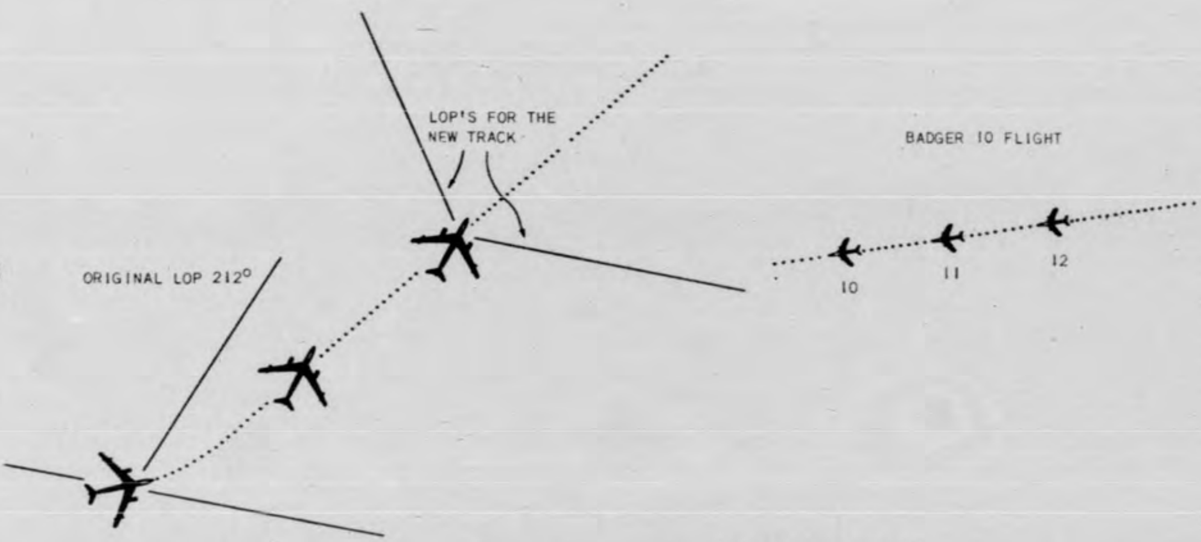
EVASIVE ACTION



TARGET TURNS PORT 45° FOR EVASIVE ACTION.

BADGER 10 FLIGHT CAN STILL BE POSITIONED FOR ATTACK.

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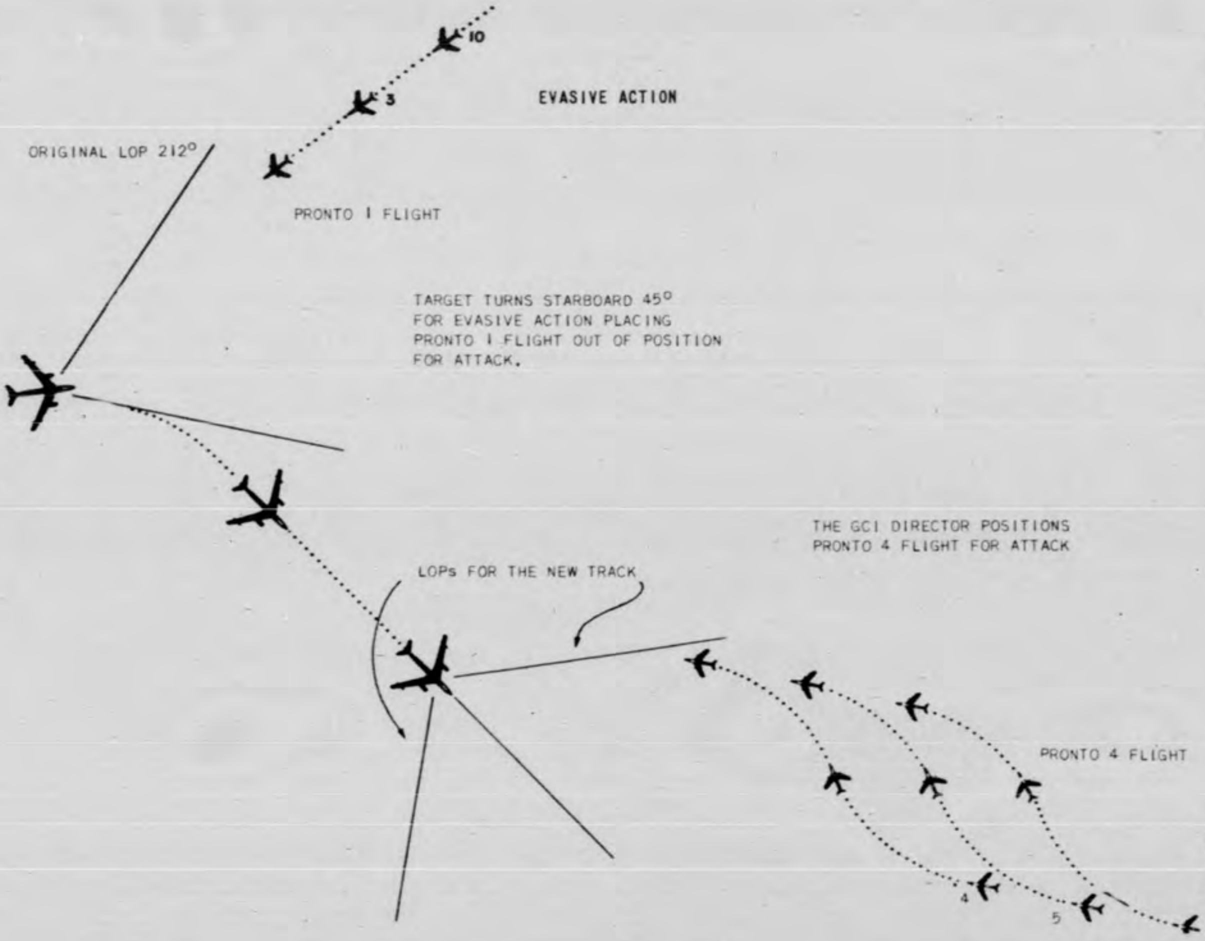
EVASIVE ACTION



EVASIVE ACTION

47. There is a possibility that the target aircraft will take evasive action or change course. In anticipation of such action the director should, if possible, deploy interceptors to both sides of the target track. Flights in combat trail formation should be positioned so as to "box" the target.

48. The amount and direction of target turn will dictate which flight is in the best position to attack. Flights placed out of position for attack should be repositioned if possible for later attack or directed to new targets.

a. The director may scramble or divert other interceptors to the new target track.

b. The director must, time permitting, compute the new LOP's and attack headings to compensate for the change of course of the target.

c. Coordination and timing by the director is of the utmost importance.

BREAKAWAY HEADINGS

49. In using short range interceptors in large numbers during **inclement weather,** it is of the utmost importance that they be returned to the penetration fix or GCI-GCA handoff position **in a manner just as orderly and preplanned as they were directed to the attack.** During **clear weather,** this is no more than good planning. Directors can appreciate that a breakaway heading starts leading aircraft in the flight toward the next phase of the mission, reattack or recovery, while allowing the director to concentrate on the final attack phase of trailing aircraft.

50. An efficient director will always plan ahead of the flight he is controlling. For reattack, or for smooth flow rate to the recovery fix, this planning must begin in advance of the initial **attack.** The director must give the pilot breakaway information shortly after giving the final heading for attack and prior to getting a "JUDY" from the pilot. Normally, all members of a flight will be given the same breakaway heading, e.g., the command "Overtone 2, **flight** breakaway will be (port or starboard) 270."

51. The breakaway heading may be a continuation of the attack heading or any vector not in excess of a 180° turn in the direction of target origin. Selection of the breakaway heading must be based on the next phase of the mission, recovery or re-attack; however, maintenance of flight integrity and interceptor spacing are of primary concern.

52. Interceptors will turn to the breakaway heading under any of the following conditions:

a. After armament release.

b. After breakaway signal appears on the AI scope.

c. When the director orders the interceptor to "break off" the attack.

53. The turn to the breakaway heading is a 30° bank turn; however, the pilot may elect to execute a break, consisting of a momentary hard climbing turn in the direction of target origin to increase target clearance distance. This momentary hard turn will not exceed 30° azimuth change or 1000-foot altitude change, and the pilot will then immediately establish a 30° bank turn to the breakaway heading and descend to his assigned altitude.

RECOVERY

54. The single factor of greatest importance in successfully controlling a number of interceptors during recovery is **pre-planning** - thinking ahead. We are all aware of standard ATC procedures for holding and stacking, but in air defense we may not have the fuel to stack our interceptors or we may not have the required number of altitudes available to stack the interceptors we have airborne. We must then carefully pre-plan to have our interceptors properly separated when they arrive over the **penetration fix.** This means we must have a pre-planned method of efficiently controlling separation within a flight and/or between flights while returning from the battle area to the recovery base. In short, we must have a flow rate to the penetration fix as well as to the battle area. Stacking and holding at the penetration fix should not be discounted but should be used only in an emergency.

55. On preceding pages, the "In Place" and "Oblique" turns were illustrated. Both or either can be used to control separation between flights en route to the

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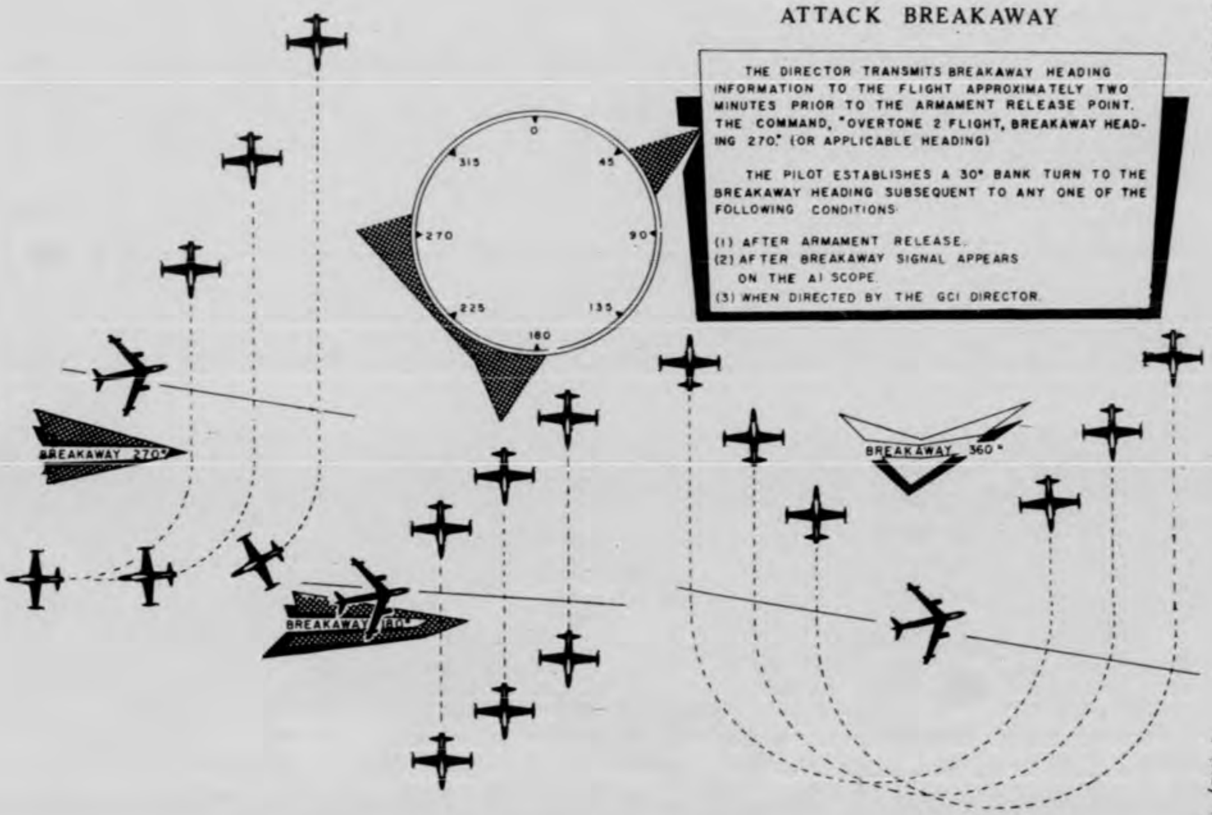
ATTACK BREAKAWAY



THE DIRECTOR TRANSMITS BREAKAWAY HEADING INFORMATION TO THE FLIGHT APPROXIMATELY TWO MINUTES PRIOR TO THE ARMAMENT RELEASE POINT. THE COMMAND, "OVERTONE 2 FLIGHT, BREAKAWAY HEADING 270." (OR APPLICABLE HEADING)

THE PILOT ESTABLISHES A 30° BANK TURN TO THE BREAKAWAY HEADING SUBSEQUENT TO ANY ONE OF THE FOLLOWING CONDITIONS:

(1) AFTER ARMAMENT RELEASE.
(2) AFTER BREAKAWAY SIGNAL APPEARS ON THE AI SCOPE.
(3) WHEN DIRECTED BY THE GCI DIRECTOR.

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penetration fix and still maintain flight integrity. A method of increasing separation between aircraft within a flight, the "String-Out Procedure," has been illustrated; "Backoff" and "Move Up" commands have been discussed - in effect, proper use of the tactics presented in this Manual allows the director great flexibility and complete control of all interceptors.

56. When interceptors are proceeding to the penetration fix, the director will notify the appropriate traffic control agencies at the recovery base, i.e., control tower, GCA, alert center, etc. These agencies will make preparations for approach, landing, and re-servicing.

SPEED CONTROL

57. In flight airspeed changes are necessary in some instances to allow the director greater flexibility for flight positioning. The following standard procedures are established for speed control of interceptors.

a. During the climb to altitude, the director will transmit to each flight the cruising airspeed they are to maintain, e.g., "Debate 16 Flight, when level at 30 angels indicate 260." In most cases the airspeed used to approach the target area will be the same as the best attack airspeed for that altitude and type interceptor. If a different airspeed is used to cruise to the target area, the director must give the flight a speed change to attacking airspeed as much in advance of the attack as practicable.

b. To reduce speed of interceptors: The command, "Debate **Flight**, speed 220 **Now.**" At the command "Now," pilots will open speed brakes until the desired speed is set. Pilots will then close the speed brakes and reduce power to hold the new speed.

c. To increase speed of interceptors: The command, "Debate **Flight** speed 300 Now." At the command "Now," pilots will increase power to military, holding this power until the required speed is set, then reduce power to hold the new speed.

d. To change power to Gate or Buster: The command, "Debate **Flight**, Buster Now." Pilots will increase (or decrease) power to military.

e. Power control for descent can best be determined by the flight leader. The director will give the command, "Debate Flight descend to 20 angels (or desired altitude) 3,000 feet per minute (or desired rate) speed 250 (or speed desired). The flight leader will give the command, "Debate Flight, power set ______________ percent or temperature (speed brakes, if required) **Now.**" On the flight leader's command **"Now."** pilots reduce power, (open speed brakes if applicable) and begin the descent to the directed altitude, maintaining the directed speed.

f. Directors and aircrews should be aware that during the descent the terms "Backoff" and "Move Up" still apply, and "In Trail" and "Oblique" turns may be given to the flight. While interceptors are running at Buster or Gate power, "Backoff" and "Move Up" are very important.

STANDARD PROCEDURE FOR IDENTIFICATION INTERCEPTION (TWO-PLACE INTERCEPTOR)

58. The director vectors the interceptor into a position to insure interception and identification in the shortest possible time using a quartering stern attack.

a. The director transmits to the aircrew at frequent intervals the following target information:

(1) Heading.
(2) Altitude.
(3) **Indicated** airspeed.
(4) Position relative to the interceptor (degrees port or starboard and range in miles).

b. The radar observer locks on the target, pilot gives "Judy," and the intercept is run by the pilot following the radar observer's directions.

c. Overtake speed will vary according to capabilities of interceptor crew. To prevent overshooting the target, pilot and radar observer will cross check on the overtake speed from their respective scopes.

d. Dead astern approaches should be avoided. Keep the target 30° port or 30° starboard until within close range. Final positioning of the interceptor to best identify the target will be left to the individual aircrews.

e. If contact is lost at minimum range, or the intercept is not under control at minimum range, the interceptor will break off and request repositioning for another attempt.

STANDARD PROCEDURE FOR IDENTIFICATION INTERCEPTION (SINGLE-PLACE INTERCEPTOR)

59. The director vectors the interceptor into a position 5 to 8 miles astern of the target.

a. The director transmits to the pilot at frequent intervals the following **target** information:

(1) Heading.
(2) Altitude.
(3) **Indicated** airspeed.
(4) Position relative to the interceptor (degrees port or starboard and range in miles).

b. Pilot locks on and displaces the steering dot to the 10 o'clock or 2 o'clock position, just outside the reference circle.

c. Pilot flies by reference to his **instruments**, bringing the radar scope into the cross-check as a reference only.

d. At approximately two miles from the bogey, the pilot produces the overtake speed to 50 knots. The pilot may elect to maintain a constant power and control speed with speed brakes.

e. Through cross reference with the radar scope, pilot establishes approximate heading and altitude to be maintained.

f. Pilot's jizzle band should be within five degrees of center at the beginning of the run, gradually increasing to 20° - 30° off at minimum range.

g. Pilot decreases overtake to 10-knot maximum at minimum range and continues heading and altitude until pull-out signal appears. At this point, the bogey should be 20-30° from the interceptor, three to five hundred feet above and approximately 200 yards away.

h. If visual contact is not established 15 seconds after the pull out signal appears, the pilot will break off the intercept and request repositioning for another attempt.

RAM PROCEDURES

60. Under certain conditions of emergency it may become necessary as a last resort to use our present-day interceptors as ram projectiles. This eventuality, though obviously hazardous to the aircrews involved, need not of necessity be fatal. The following discussion is intended to be used only as a guide and stimulant to further thought by the aircrews and, for obvious reasons, is based primarily on conjecture and premise, rather than on actual data or experience.

61. In a planned ramming the obvious goal is to inflict maximum damage on the target while minimizing as much as possible that incurred by the interceptor. The interceptor pilot can approach this goal and greatly increase his chances of survival by carefully selecting the points of contact between interceptor and target. Ramming areas to be avoided in a bomber type target include engines and propellers, main wing spars, landing gear stowage areas, armor plated areas, and other concentrations of heavy material. Conversely, the most desirable points for collision are outboard wing sections, empennage surfaces, particularly the vertical stabilizer, and pilot compartment. Of equal importance is the choice of that portion of the interceptor which is to receive the collision impact. A tiptank driven through a B-29 type tail, or the bottom of an interceptor fuselage flown through the canopy of a B-47 type target, should leave the odds considerably in favor of the interceptor crew.

62. In addition to the points discussed above, a number of other factors should be considered by the interceptor crew prior to initiating a ramming attack. Due to the laws of inertia, the interceptor's advantage should increase with his speed; however the design limitations of the particular interceptor and its susceptibility to disintegration on impact may limit the practical speed attainable. Of equal importance is the choice of a collision angle; a 90° beam collision of fighter wing with bomber vertical stabilizer should present the interceptor's strongest point against the target's weakest. It should be remembered that any impact perpendicular to the bomber's line of flight, though not in itself of a seriously crippling nature, tends to yaw the bomber broadside to his slipstream and may result in bomber disintegration.

63. Crew survival chances can be greatly enhanced by taking certain precautions, depending upon the situation. For high altitude, high speed attacks it is essential that the canopy be kept to prevent severe wind buffeting, loss of mask

and helmet, and hypoxia; however, against low level, low speed targets, it might be advantageous to jettison the canopy before the attack. Shoulder harness should be snug and locked and a double check made on all canopy and sea pins removed.

64. Although crew ejection may be necessary after the collision, it should be remembered that some present-day interceptors have been successfully landed with as much as three feet missing from the wing tip. Careful thought, prior to and during the execution of a planned ramming, materially improves the success of this tactic.

STANDARD RADIO TRANSMISSIONS

65. All radio transmissions by the director or aircrew must be short, concise, and contain only necessary information. They must be free from hesitation and unnecessary vocal noises. Directors must emphasize certain words in directing flights as a unit. If the entire flight is to execute a maneuver at the same time, the word **"Flight"** must be emphasized. The word **"Now"** has been adopted for use with flight maneuvers as an order of execution, e.g., "Resist 30 **Flight** port 360 **Now.**" The aircrew will acknowledge all information transmissions and repeat only directive transmissions.

66. All extraneous transmissions will be avoided as it is imperative to the success of the mission that the air be kept open for instructions from the direction center.

67. In the event the primary UHF control channel is jammed, pilot will select predetermined alternate control channels.

68. In the event all UHF channels are jammed, instructions will be received on the ARN-6 or ARN-14 which will have been tuned to predetermined remote control frequencies prior to take-off.

THE DIRECTOR

69. The senior director should plan the scramble vector for an attack with multiple flights so as to allow the last flight to obtain 30 miles' displacement prior to reaching the turn-in point.

a. Always have an intercept technician for each director.

b. Each director should have the leading flight, trailing flight and the target on his scope; do not over-expand nor fail to expand enough.

c. Use of **IFF**:

(1) Interrogate only in the sector in which your interceptors are located to prevent other directors from losing contact with their interceptors.

(2) After identifying your interceptors, return them to Mode I Normal.

(3) At times it is convenient to have the pilot switch to standby position for identification. You will be able to see your other interceptors while making your identification, and there will be no conflict between directors in mode interrogation.

(4) Switching the **IFF** to the low position when the interceptor nears the directing station will prevent circling of the station by the **IFF** blip and will provide better discrimination for close control.

d. After the final scope expansion is made, a good rule for measurement of range to the target may be constructed by laying the LOP across the range markers on the scope and scaling it off in 10-mile increments.

e. When using the computer on the scope, it is extremely important to keep the target track line on the computer aligned to the target track on the scope, also it will not be readily noted when the interceptor drifts from the correct position.

f. With the interceptor approaching the LOP from the rear of the target heading, it is not necessary to lead the LOP for turn-in. Turn on the line. Since the interceptor is closing the displacement, he will stay on the line throughout the turn.

g. Inform pilot of desired angle-off so that he may better know when a conversion is necessary.

h. Advise interceptor of **Mag** heading of target as well as altitude and true airspeed.

i. The director coordinating the attack must take timely action to break off flights or individual aircraft which may have gotten out of position so as not to interfere with trailing flights that are in a more favorable position for attack.

j. In event of evasive action, more than one turn may be made by the target.

Since a second turn may put the first flight into a good attack position again, be prepared to renew the attack with them.

k. The director coordinating the attack must pass intelligence gained by early flights, such as altitude, number and formation of the target, to succeeding flight directors.

l. After turn-in to attack, give pilot pigeons to nearest suitable airfield. In the event of emergency or combat damage, you may lose contact completely.

m. When pilot gives "Judy," monitor only, but be prepared to render additional assistance.

n. Always use positive statements. Never use **"about"** or **"should be"** in your transmissions.

o. Give your interceptors frequent pigeons. Then if you lose contact, he has a better chance of getting home alone.

p. The director should consider each interceptor in turn so as to give each one adequate and timely direction and information. After he gives directions or information to the first interceptor, he should not wait for that interceptor to execute the maneuver before considering the second and third interceptors in sequence. This procedure insures the best close control possible.

q. Check fuel and oxygen state frequently.

r. The positioning aid may be used to position interceptors for identification runs. Place the apex of the LOPs 2 miles behind the target. This will produce the desired quartering stern attack.

THE PILOT

70. For flight integrity, fly precision instruments **primarily** rather than trying to chase the AI blip in range. Bring radar in as just one more instrument in your cross check.

a. Rely on the director.

b. If the director instructs the aircrew to break off the attack, the pilot should immediately turn to the breakaway heading. The director can see all the aircraft in the vicinity and may be avoiding a collision.

c. The flight leader must always know the position of each aircraft in the flight. In the event of lost communications with the directing station, in weather, the flight leader will be able to direct the flight to the recovery fix using the maneuvers outlined in this Manual.

d. Know the proper antenna train angle for various relative airspeeds. As soon as contact is established, evaluate the intercept and make any necessary conversion.

e. Use all of your navigation aids and mentally dead-reckon between pigeons. Ask the director for pigeons when in doubt of your general position.

f. Be familiar with the mach-indicated airspeed relationship.

g. IFF and Radar "ON" prior to take-off roll.

h. Set rocket fire selector switch as advised by the director. Check rocket fire circuit breaker.

i. After turn onto attack heading, the director will give you pigeons to the nearest emergency field from the point of interception. Keep this in mind for use in case of emergency during the attack.

j. In the event of hostilities, don't forget to pull the trigger.

FUEL CONSUMPTION DATA CHARTS

71. Fuel consumption data charts are presented in the same manner for all interceptors and are compiled in this Manual for ready reference by the director.

72. Select the chart pertaining to the interceptor under control. (Check configuration.) The interceptor's altitude is found at the left-hand edge of the chart. Follow this line across to the proper power setting. Pounds of fuel consumed per hour is found at the bottom of the chart. At MAXIMUM power, fuel values **must** be multiplied by two for actual fuel consumption.

SPEED CONVERSION DATA

73. In applying the tactics in this Manual, the director is often required to convert indicated airspeed to true airspeed, true to mach and mach to indicated.

74. The Fire Control Systems, in lead collision interceptors, operate more accurately when the attack airspeed is within a certain range. The normal speed for lead collision interceptors in use today

expressed in terms of mach are:

F-86D - .83 mach
F-94C - .80 mach
F-89D - .80 mach

75. Using the speed conversion data chart, the director will advise the interceptor of the indicated airspeed required at intercept altitude. The "Speed Conversion Data" will not be used in an effort to gain a specific speed ratio, interceptor to target, but rather as a reference for the director in computing the lead collision problem. The **standard mach** for attack will be .8. This will be coordinated with the local direction center and the directors will adhere to this standard attack mach.

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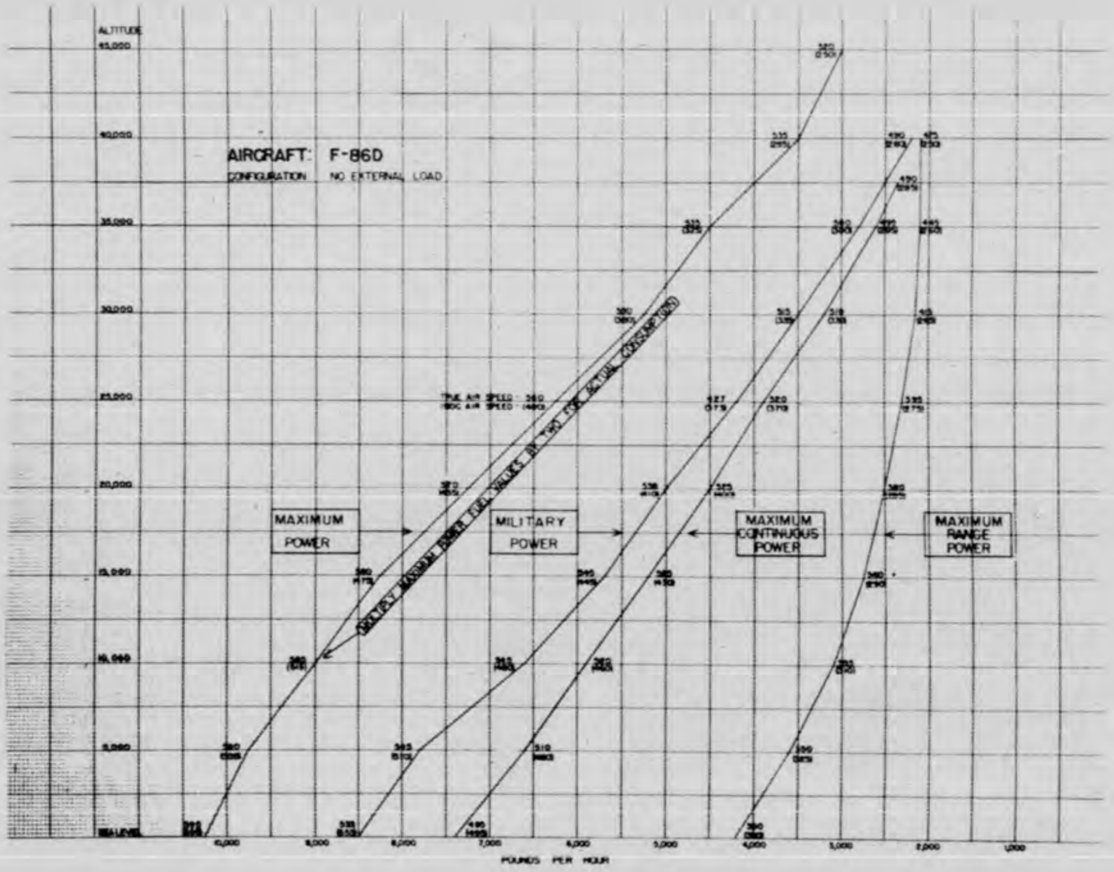

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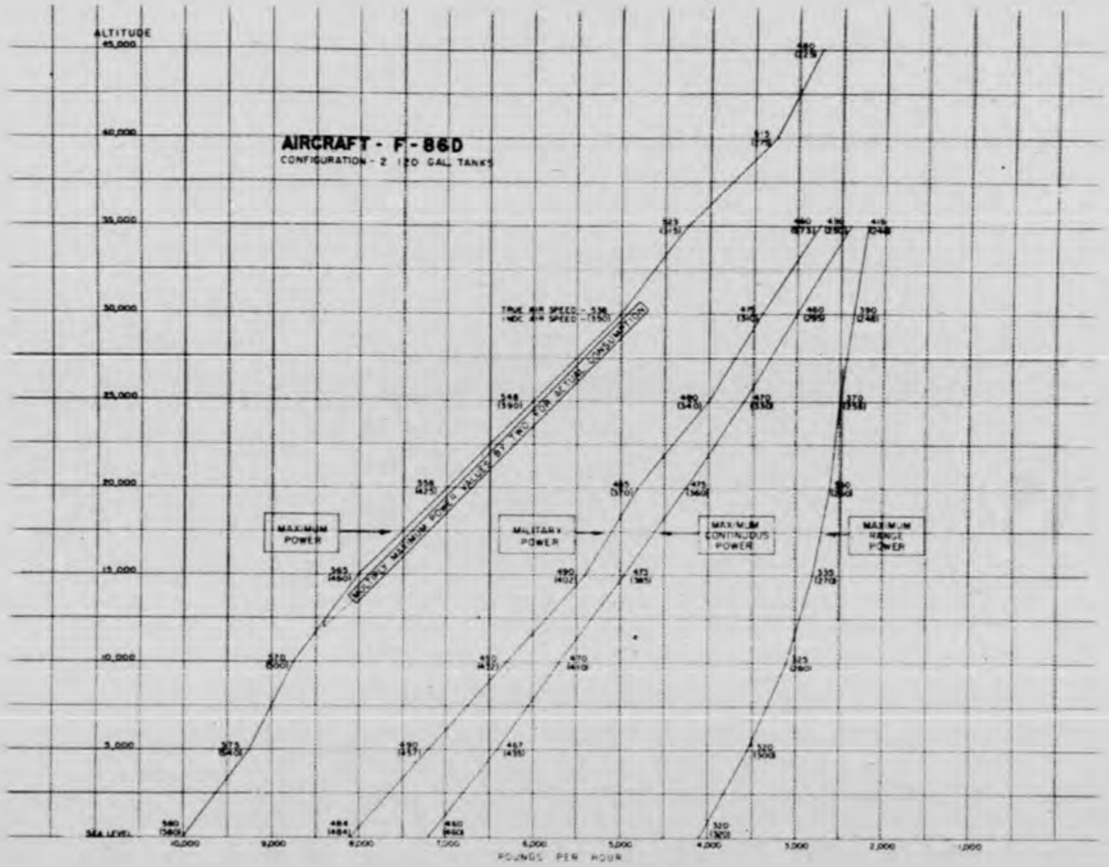

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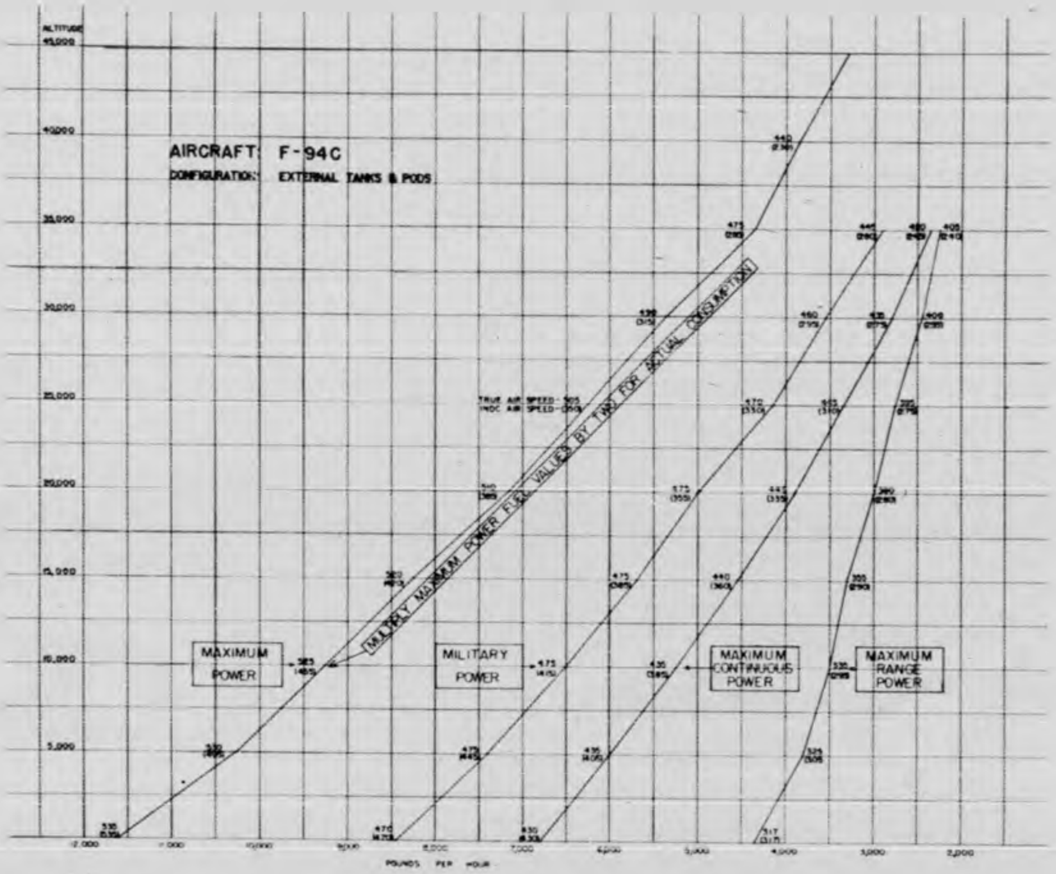

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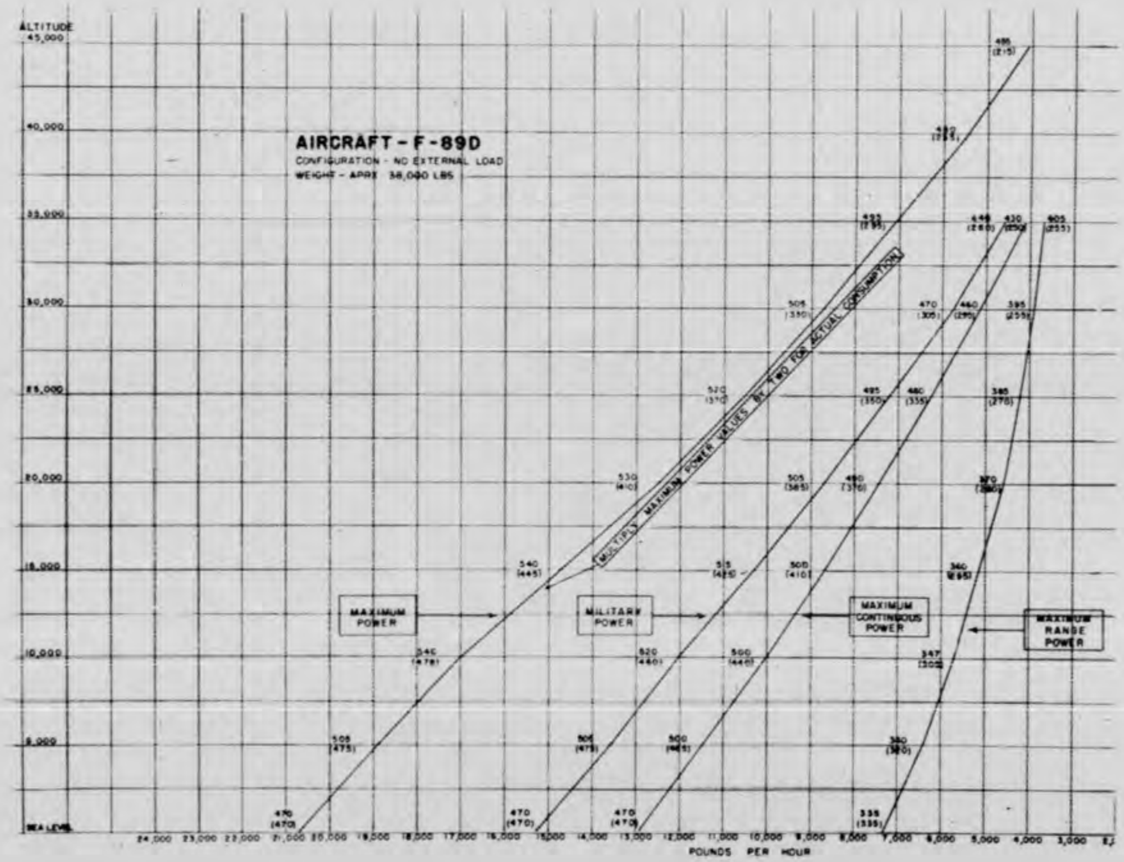

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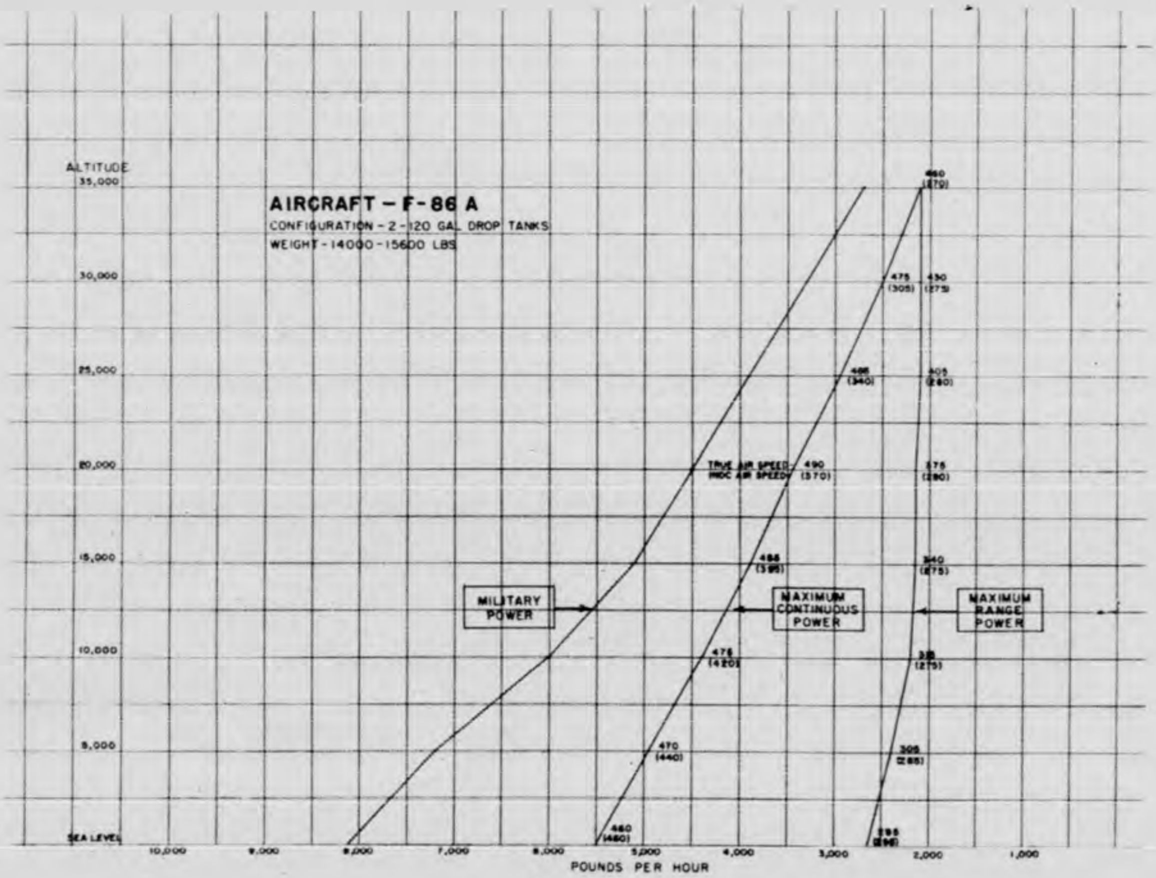

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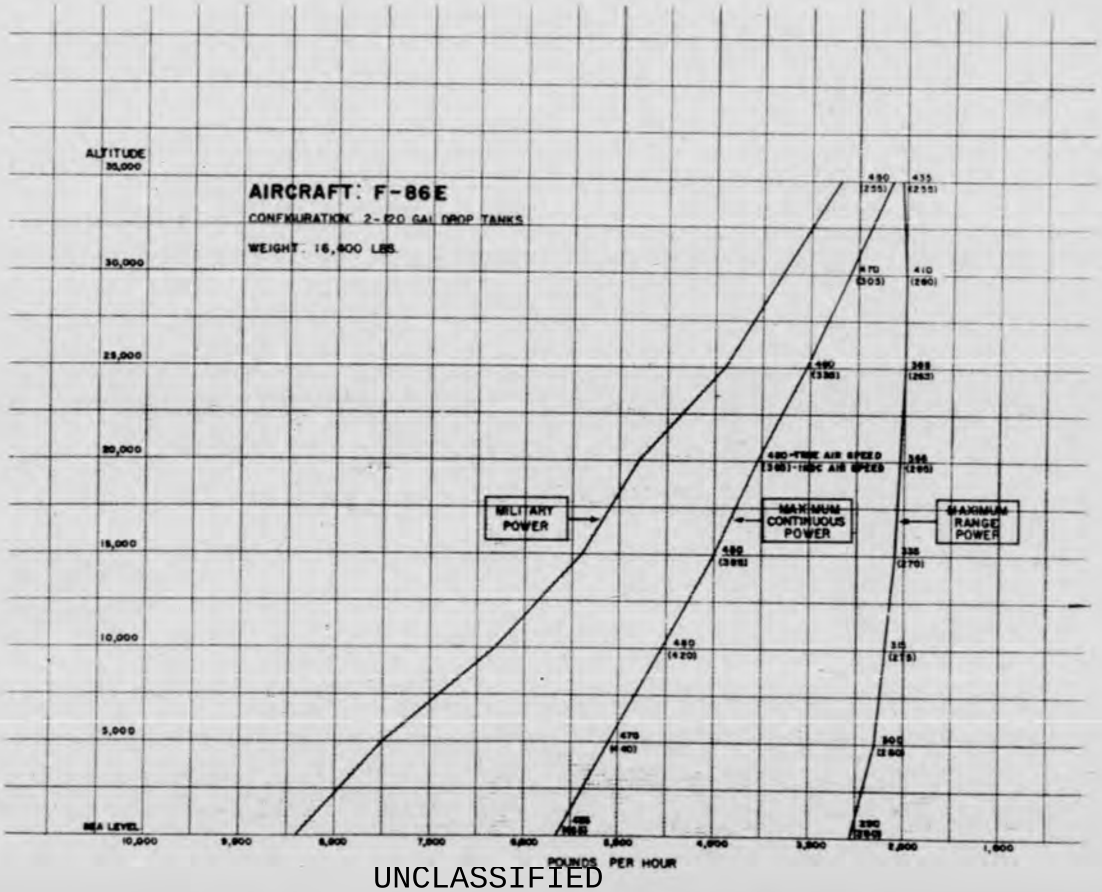
ALTITUDE
35,000
30,000
25,000
20,000
15,000
10,000
5,000
SEA LEVEL
AIRCRAFT: F-86E
CONFIGURATION: 2-120 GAL DROP TANKS
WEIGHT: 16,400 LBS.
MILITARY POWER
MAXIMUM CONTINUOUS POWER
MAXIMUM RANGE POWER
480-TRUE AIR SPEED
(360)-INDC AIR SPEED
490 (255)
435 (255)
470 (305)
410 (260)
480 (330)
385 (263)
366 (265)
480 (385)
335 (270)
480 (420)
315 (275)
470 (440)
300 (280)
465 (455)
290 (290)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
POUNDS PER HOUR

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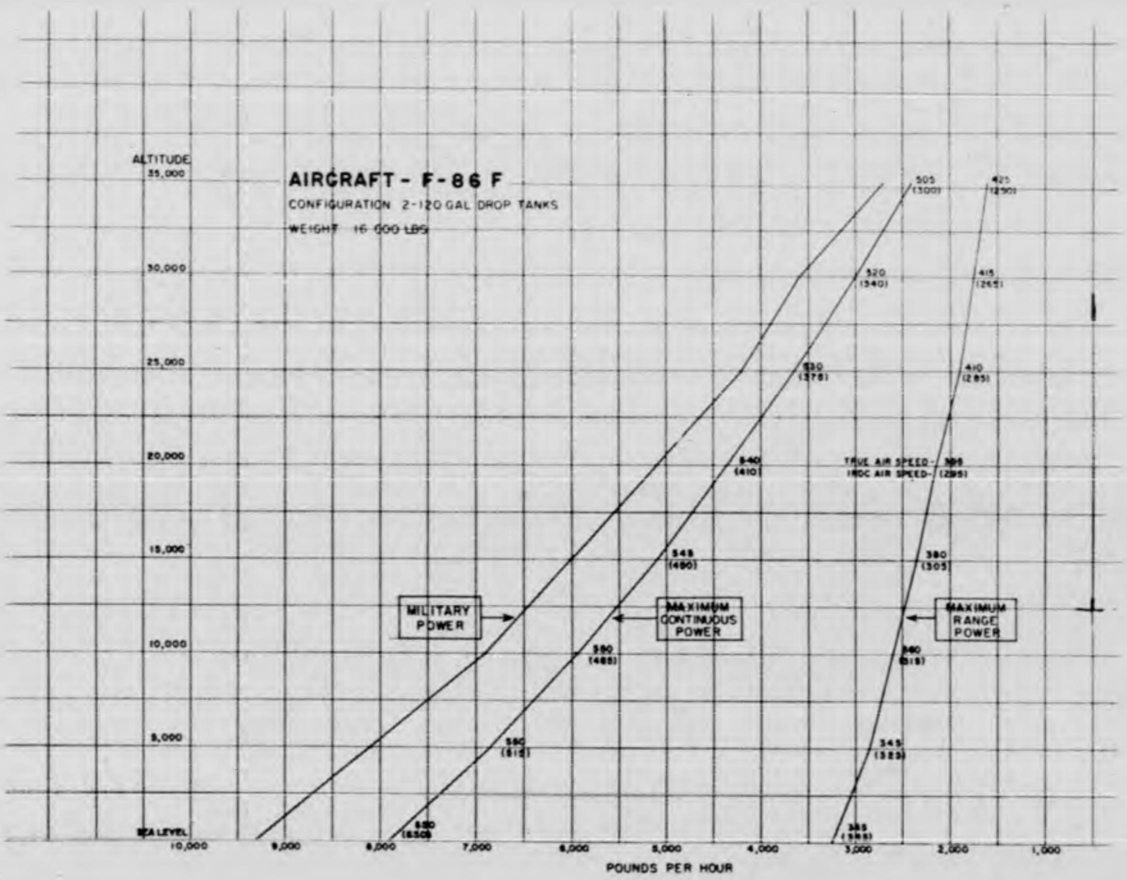

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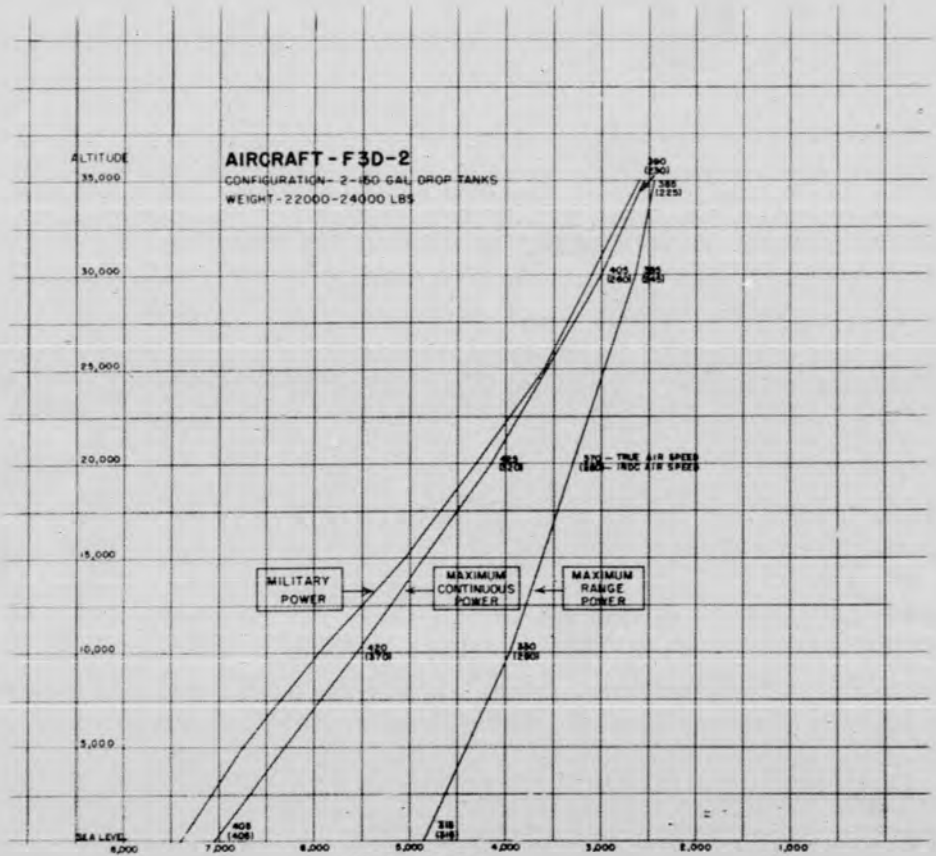

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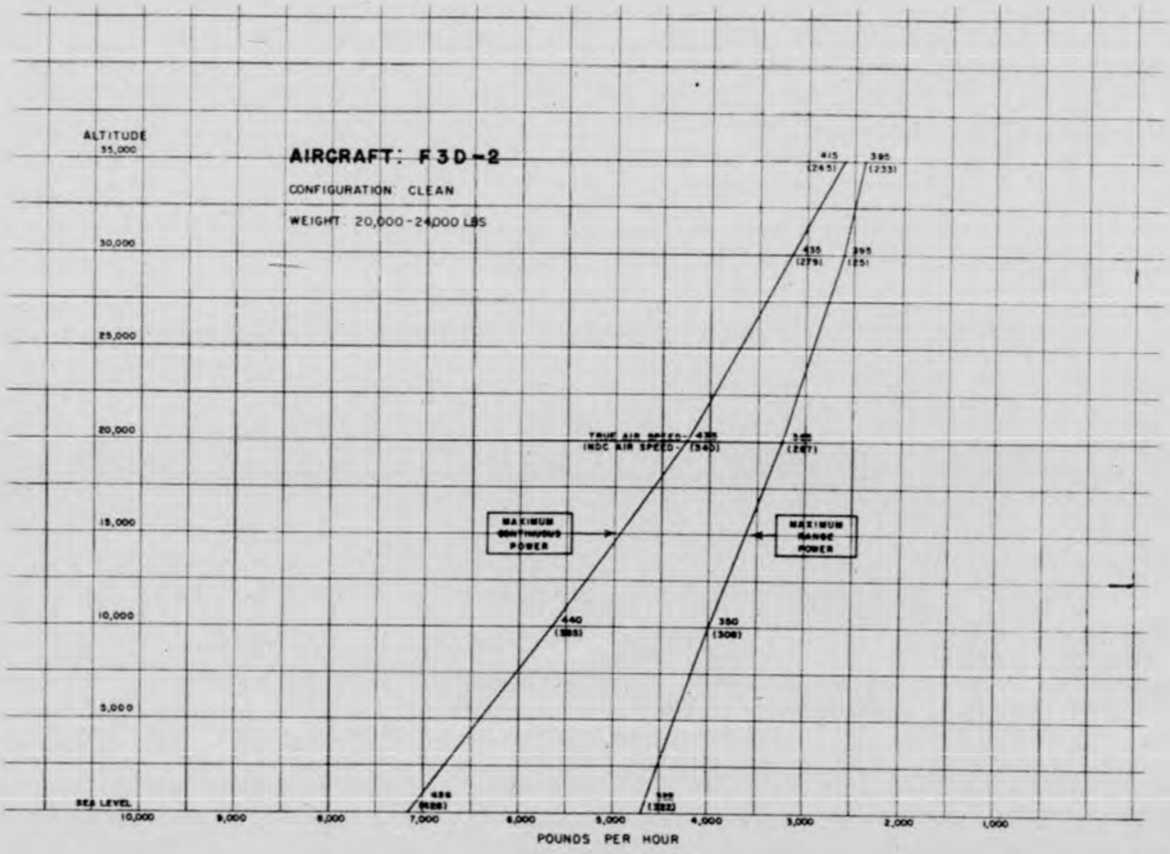
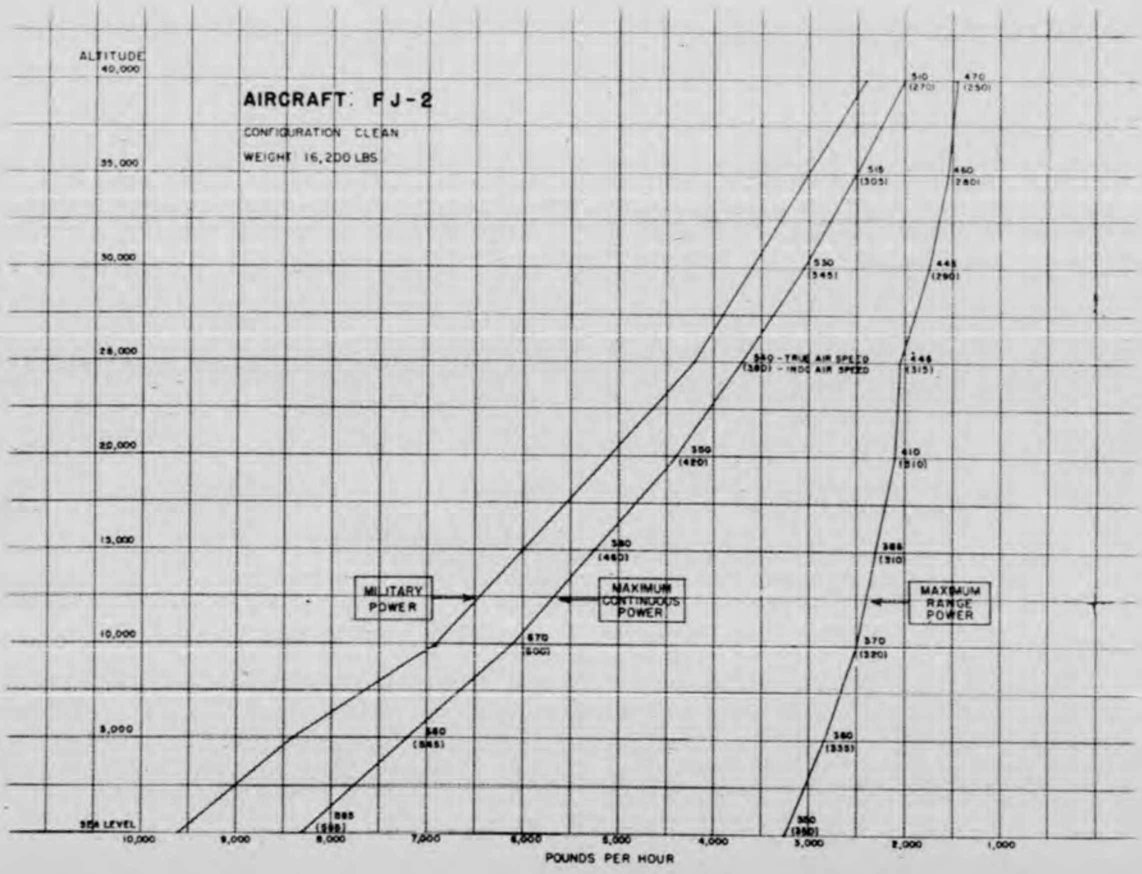
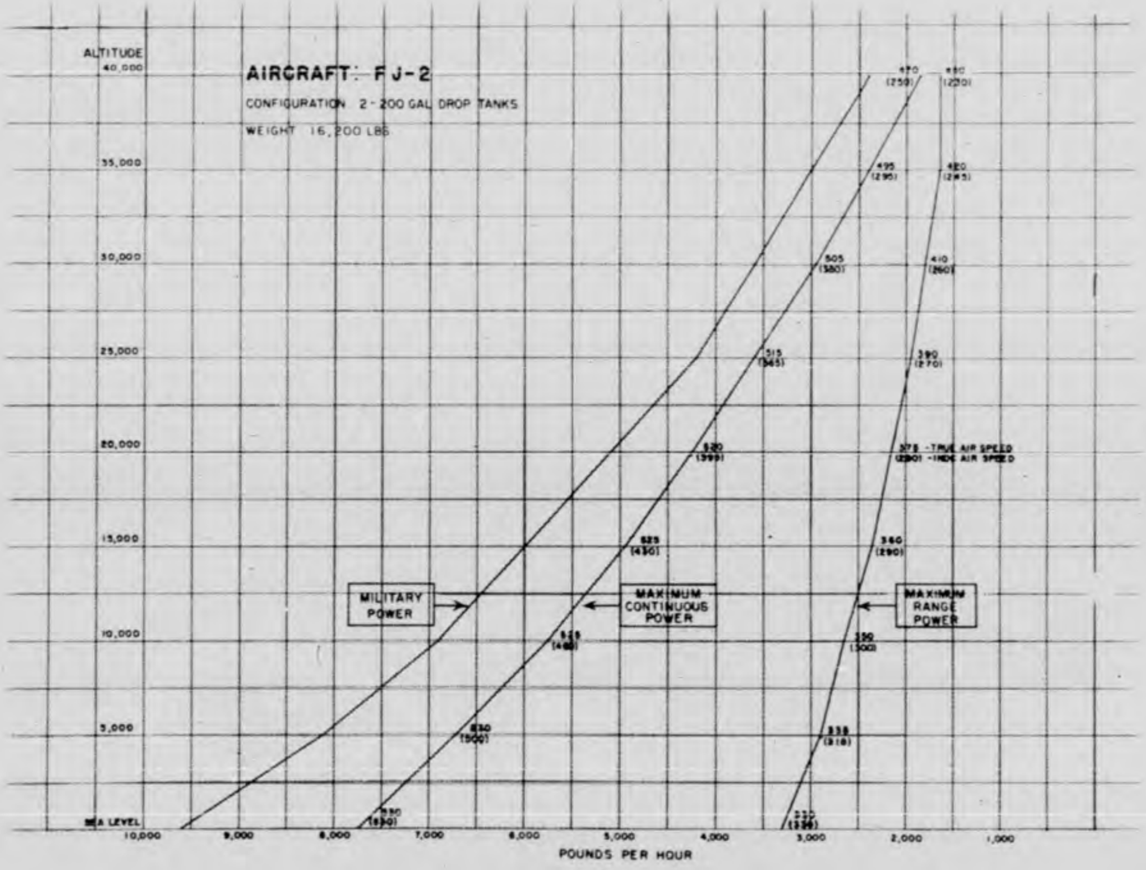

ALTITUDE
35,000
30,000
25,000
20,000
15,000
10,000
5,000
SEA LEVEL
AIRCRAFT: F3D-2
CONFIGURATION: CLEAN
WEIGHT: 20,000-24,000 LBS
415
(245)
395
(233)
435
(279)
395
(251)
TRUE AIR SPEED- 435
INDC AIR SPEED- (340)
380
(287)
MAXIMUM CONTINUOUS POWER
MAXIMUM RANGE POWER
440
(385)
350
(308)
436
(426)
355
(322)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
POUNDS PER HOUR


ALTITUDE
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
SEA LEVEL
AIRCRAFT: FJ-2
CONFIGURATION CLEAN
WEIGHT 16,200 LBS
510
(270)
470
(250)
515
(305)
460
(280)
530
(345)
445
(290)
580 - TRUE AIR SPEED
(380) - INDC AIR SPEED
446
(315)
550
(420)
410
(310)
580
(460)
385
(310)
MILITARY POWER
MAXIMUM CONTINUOUS POWER
MAXIMUM RANGE POWER
570
(500)
370
(320)
580
(565)
360
(335)
585
(590)
350
(350)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
POUNDS PER HOUR


AIRCRAFT: FJ-2
CONFIGURATION 2-200 GAL DROP TANKS
WEIGHT 16,200 LBS
ALTITUDE
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
SEA LEVEL
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
POUNDS PER HOUR
MILITARY POWER
MAXIMUM CONTINUOUS POWER
MAXIMUM RANGE POWER
470 (250)
450 (220)
495 (295)
420 (245)
505 (380)
410 (260)
515 (345)
390 (270)
520 (399)
375 - TRUE AIR SPEED
(280) - INDC AIR SPEED
525 (430)
360 (290)
525 (460)
350 (300)
530 (500)
338 (310)
530 (530)
330 (320)

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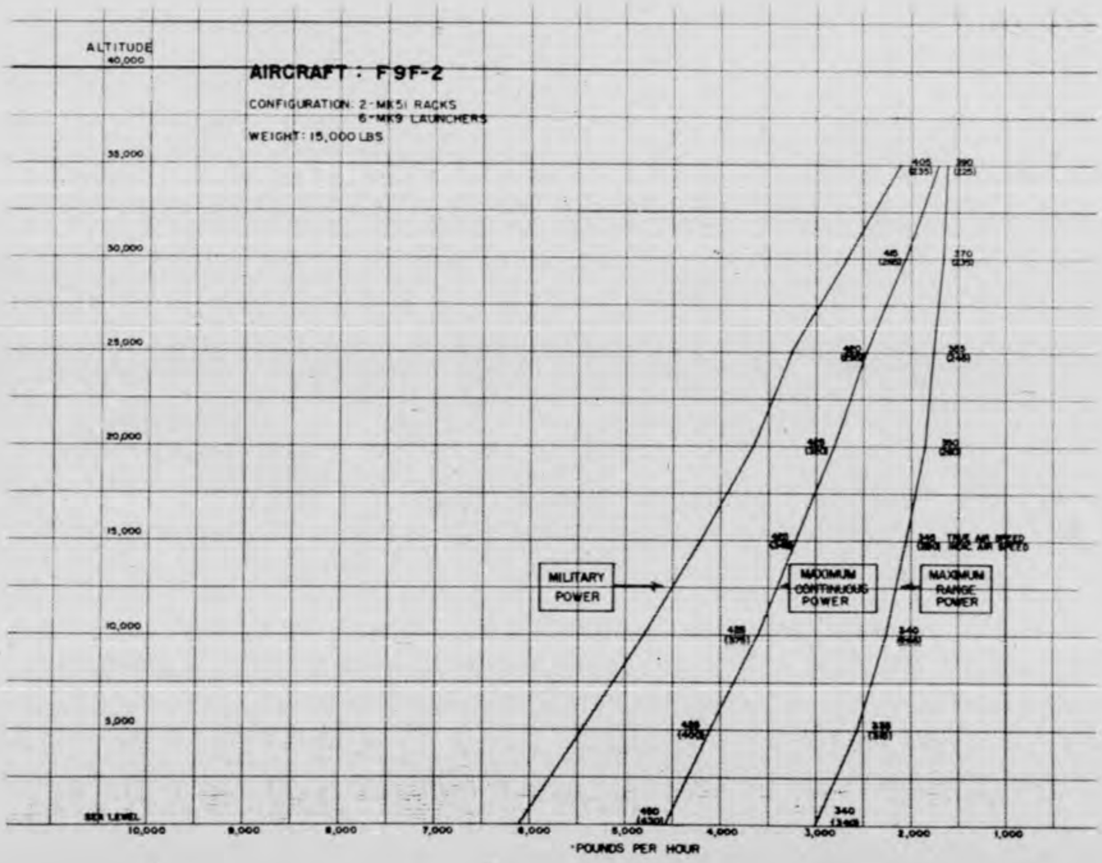

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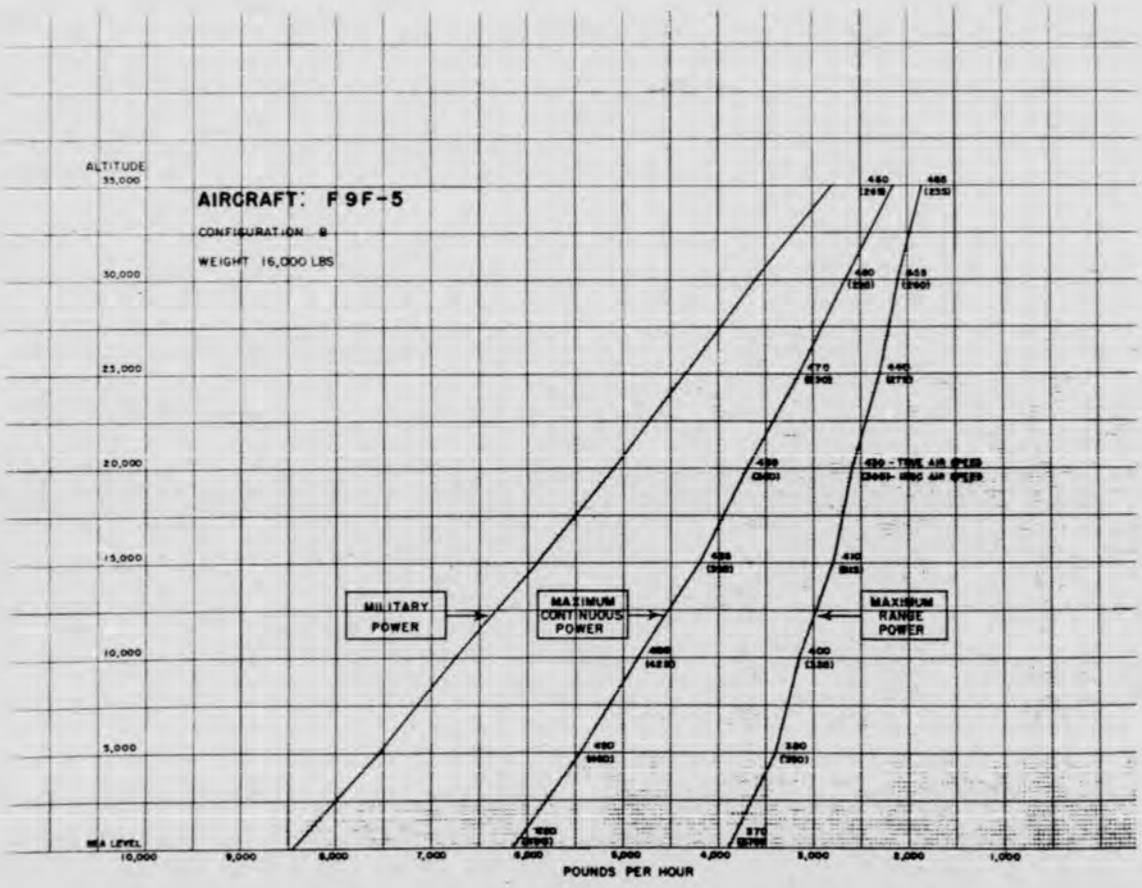
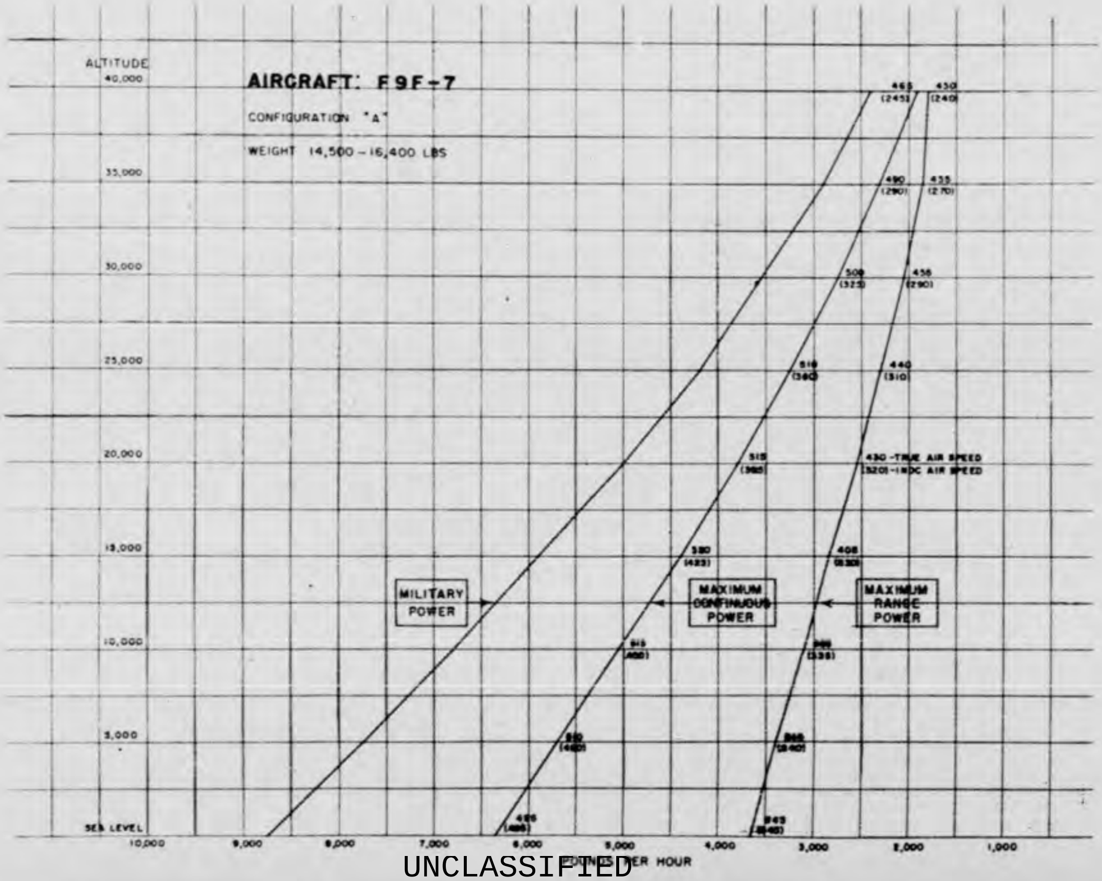

ALTITUDE
35,000
30,000
25,000
20,000
15,000
10,000
5,000
SEA LEVEL
AIRCRAFT: F9F-5
CONFIGURATION B
WEIGHT 16,000 LBS
MILITARY POWER
MAXIMUM CONTINUOUS POWER
MAXIMUM RANGE POWER
450 (265)
465 (235)
480 (250)
470 (300)
440 (270)
430 - TRUE AIR SPEED
(300) - INDIC AIR SPEED
400 (330)
490 (460)
380 (350)
370
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
POUNDS PER HOUR

UNCLASSIFIED



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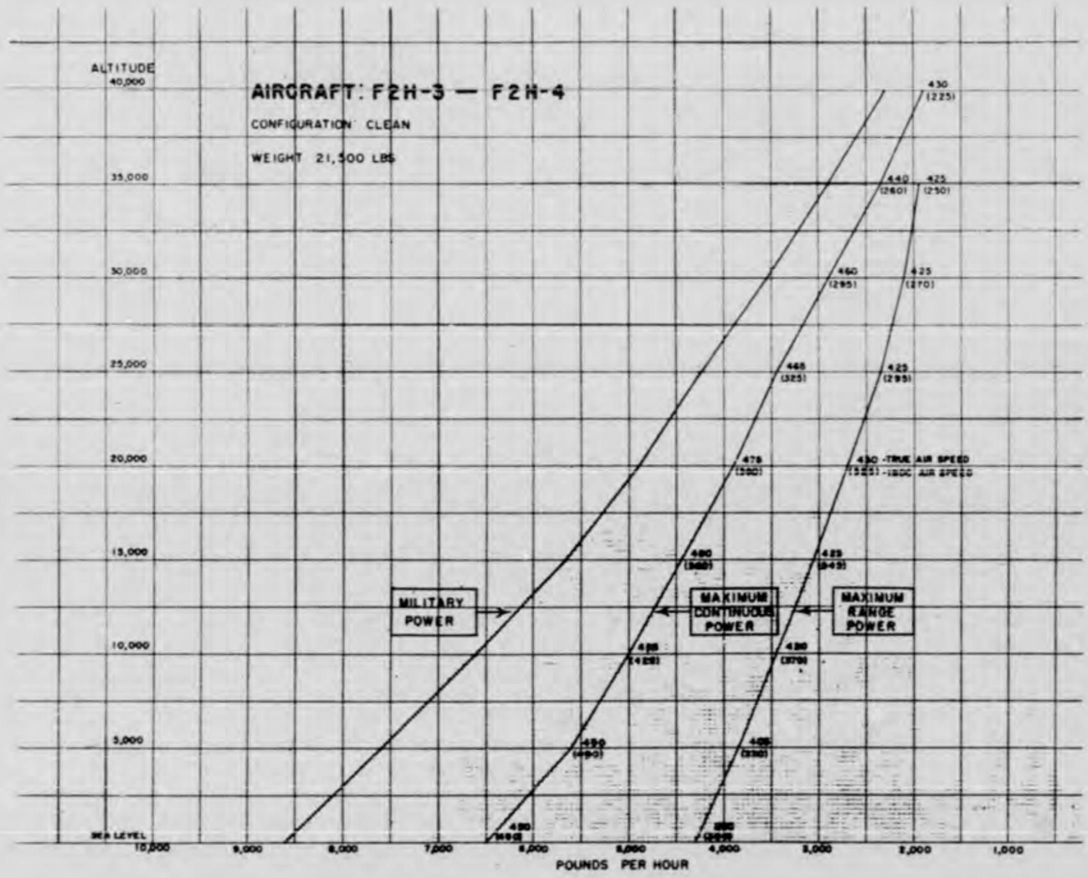
AIRCRAFT: F2H-3 — F2H-4
CONFIGURATION CLEAN
WEIGHT 21,500 LBS
ALTITUDE
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
SEA LEVEL
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
POUNDS PER HOUR
MILITARY POWER
MAXIMUM CONTINUOUS POWER
MAXIMUM RANGE POWER
430 (225)
440 (260)
425 (250)
460 (295)
425 (270)
465 (325)
425 (295)
475 (360)
430 -TRUE AIR SPEED
(325) -INDC AIR SPEED
480 (390)
425 (345)
485 (425)
430 (370)
490 (460)
405 (330)
480 (480)
380 (295)

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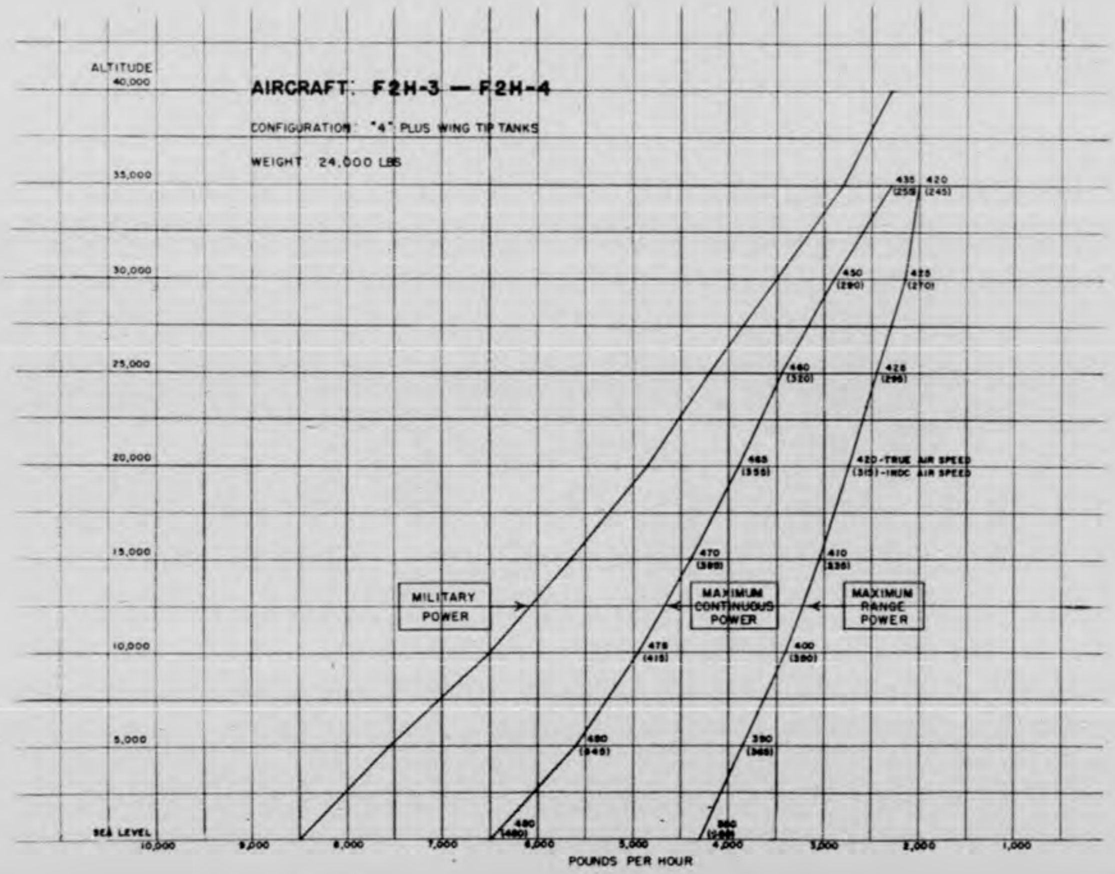

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90° LEAD COLLISION

ANGLE OFF FIGHTER TO BOGEY

TARGET SPEED

FIGHTER SPEED	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600	625	650	675	700	FIGHTER SPEED
200	37	41	45	48	51	54	56	58	60	62	63	65	66	67	68	69	70	71	72	72	73	74	74	200
225	34	38	42	45	48	51	53	55	57	59	61	62	63	65	66	67	68	69	69	70	71	72	72	225
250	31	35	39	42	45	48	50	52	54	56	58	60	61	62	63	65	65	66	67	68	69	70	70	250
275	29	33	36	39	42	45	47	50	52	54	55	57	59	60	61	62	63	64	65	66	67	68	69	275
300	27	30	34	37	40	43	45	47	49	51	53	55	56	58	59	60	61	62	63	64	65	66	67	300
325	25	28	32	35	38	40	43	45	47	49	51	53	54	56	57	58	59	61	62	63	63	64	65	325
350	23	26	30	33	36	38	41	43	45	47	49	51	52	54	55	56	58	59	60	61	62	63	63	350
375	22	25	28	31	34	36	39	41	43	45	47	49	50	52	53	54	56	57	58	59	60	61	62	375
400	20	24	27	29	32	35	37	39	41	43	45	47	48	50	51	53	54	55	56	57	58	59	60	400
425	19	22	25	28	30	33	35	37	39	41	43	45	47	48	50	51	52	54	55	56	57	58	59	425
450	18	21	24	27	29	31	34	36	38	40	42	43	45	47	48	49	51	52	53	54	55	56	57	450
475	17	20	23	25	28	30	32	34	36	38	40	42	43	45	46	48	49	50	52	53	54	55	56	475
500	17	19	22	24	27	29	31	33	35	37	39	40	42	44	45	46	48	49	50	51	52	53	55	500
525	16	18	21	23	25	28	30	32	34	36	37	39	41	42	44	45	46	48	49	50	51	52	53	525
550	15	18	20	22	25	27	29	31	32	34	36	38	39	41	42	44	45	46	48	49	50	51	52	550
575	15	17	19	21	24	26	28	29	31	33	35	36	38	40	41	42	44	45	46	47	48	50	51	575
600	14	16	18	21	23	25	27	28	30	32	34	35	37	38	40	41	42	44	45	46	47	48	49	600
625	14	16	18	20	22	24	26	27	29	31	33	34	36	37	39	40	41	43	44	45	46	47	48	625
650	13	15	17	19	21	23	25	27	28	30	32	33	35	36	38	39	40	42	43	44	45	46	47	650
675	13	15	16	18	20	22	24	26	27	29	31	32	34	35	37	38	39	40	42	43	44	45	46	675
700	12	14	16	18	20	21	23	25	27	28	30	31	33	34	35	37	38	39	41	42	43	44	45	700

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SPEED CONVERSION DATA

5,000 FEET				10,000 FEET				15,000 FEET				20,000 FEET				25,000 FEET			
MACH	IAS	TAS	NM/MIN	MACH	IAS	TAS	NM/MIN	MACH	IAS	TAS	NM/MIN	MACH	IAS	TAS	NM/MIN	MACH	IAS	TAS	NM/MIN
.9	550	585	9.7	.9	507	570	9.5	.9	465	560	9.3	.9	424	550	9.2	.9	385	540	9.0
.87	532	565	9.4	.87	490	555	9.2	.87	450	545	9.1	.87	406	534	8.8	.87	370	520	8.7
.85	520	555	9.3	.85	478	540	9.0	.85	437	530	8.8	.85	398	520	8.7	.85	360	508	8.5
.83	505	535	8.9	.83	466	525	8.7	.83	426	515	8.6	.83	388	510	8.5	.83	350	495	8.3
.8	488	520	8.7	.8	450	510	8.5	.8	410	500	8.3	.8	373	490	8.2	.8	338	477	8.0
.78	475	505	8.4	.78	436	495	8.3	.78	400	485	8.1	.78	362	475	7.9	.78	327	465	7.8
.75	456	485	8.1	.75	420	475	7.9	.75	383	465	8.0	.75	348	457	7.6	.75	315	450	7.5
.73	445	475	7.9	.73	408	465	7.8	.73	372	455	7.6	.73	338	445	7.4	.73	305	435	7.3
.7	426	455	7.6	.7	390	445	7.4	.7	356	435	7.3	.7	324	430	7.2	.7	292	418	7.0
.65	395	420	7.0	.65	361	412	6.9	.65	336	405	6.8	.65	298	395	6.6	.65	270	390	6.5
.6	363	387	6.5	.6	332	380	6.3	.6	303	375	6.2	.6	278	370	6.2	.6	248	358	6.0

SPEED CONVERSION DATA

30,000 FEET				35,000 FEET				40,000 FEET				45,000 FEET				50,000 FEET			
MACH	IAS	TAS	NM/MIN	MACH	IAS	TAS	NM/MIN	MACH	IAS	TAS	NM/MIN	MACH	IAS	TAS	NM/MIN	MACH	IAS	TAS	NM/MIN
.9	345	529	8.8	.9	310	517	8.6	.9	272	517	8.6	.9	241	517	8.6	.9	216	517	8.6
.87	329	510	8.5	.87	298	500	8.4	.87	264	500	8.4	.87	234	500	8.4	.87	210	500	8.4
.85	322	500	8.4	.85	292	488	8.2	.85	257	488	8.2	.85	228	488	8.2	.85	204	488	8.2
.83	314	487	8.1	.83	286	477	7.9	.83	251	477	7.9	.83	222	477	7.9	.83	200	477	7.9
.8	303	470	7.8	.8	275	460	7.7	.8	243	460	7.7	.8	215	460	7.7	.8	190	460	7.7
.78	296	458	7.7	.78	263	448	7.5	.78	236	448	7.5	.78	210	448	7.5	.78	186	448	7.5
.75	284	440	7.3	.75	251	430	7.2	.75	229	430	7.2	.75	201	430	7.2	.75	179	430	7.2
.73	277	429	7.2	.73	246	420	7.0	.73	224	420	7.0	.73	196	420	7.0	.73	173	420	7.0
.7	264	410	6.8	.7	236	402	6.7	.7	214	402	6.7	.7	187	402	6.7	.7	165	402	6.7
.65	244	382	6.4																

Modified Handling Authorized [redacted]

BREVITY CODE

VOICE	MEANING
ALOFT	I have reached my maximum operational altitude.
ALTITUDE	Altitude of aircraft, **in fact.**
AMMO MINUS	Have less than half of ammunition left (caliber may be specified).
AMMO PLUS	Have more than half of ammunition left (caliber may be specified).
AMMO ZERO	Have no ammunition left (caliber may be specified).
ANCHORED	Am orbiting a visible orbit point.
ANGELS	Altitude in thousands of feet.
ANY FACE	AEW Aircraft.
BANDIT	Aircraft identified as enemy.
BASE	Home airfield or home carrier.
BENT	Equipment indicated inoperative or unserviceable.
BLANKET	Amount of clouds (with a number, amount in tenths).
BOGEY	Unidentified aircraft (implies: Investigate with caution - may be friendly).
BOXCAR	Heavy/very heavy bomber aircraft.
BUSTER	Fly at maximum continuous speed (power).
BUZZER	Guided Missile.
CATSEYE	Night visual air interception.
CENTER	Center of unit or of indicated part of unit.
CHECK PORT	Alter heading.........degrees to left momentarily for airborne radar search and then resume heading.
CHECK STARBOARD	Alter heading.........degrees to right momentarily for airborne radar search and then resume heading.
CHICKENS	Friendly fighter aircraft.
CLARA	Radar scope is clear of contacts other than those known to be FRIENDLY.
CLIMBING	Aircraft gaining height.
CLOUD	Cloud or other atmospheric echo on radar scope.
CLOSING	Range appreciably decreasing.
CLUTTER	Contact has entered scope clutter.
CONFUSED	Intense activity, individual tracks not identifiable.
CONFIRM	Verify existence of designated raid or track.
CONTACT	I have an indication on my radar.
CRAMBO	No contact on voice radio.
DROP	Release bombs or weapons (previously specified).
EAGLES	Medium bomber aircraft.
EASE TURN	Ease rate of turn.
ESTIMATE	Provide a quick estimate of the altitude and size of designated contact.
EXPEDITE	As quickly as possible - "Hurry up."
FADED	Contact has disappeared from reporting station radar.
FAMISHED	Have you any instructions for me.
FEW	Two to ten aircraft.
FINDER	I will find out.
FREE LANCE	Aircraft released from close ground control. Pilot may attack targets of opportunity. (Used in EMERGENCY ONLY where ground control system is saturated or ineffective. Latest PIGEONS will be given).
FRIENDLY	Friendly aircraft or ship.
FUEL	Amount of fuel remaining (number of gallons, pounds or minutes, specify as necessary, e.g., "Fuel forty-two gallons").
GATE	Fly at maximum possible speed (power). (To be maintained for a limited time only, depending on type of aircraft. Use of afterburners, rockets, etc., in accordance with local doctrine).

VOICE	MEANING
GRAND SLAM	All enemy aircraft originally sighted shot down.
GRIDIRON	Jamming signals appear on my PPI scope. (See GRIDIRON ______ ______ Section 8).
HAYRAKE	Radio homing beacon (YE, YG, etc.)
HEADS UP	Enemy got through (part or all).
HEY RUBE	Need support, come to my assistance.
HIGH	Between 25,000 and 40,000 feet.
I GO	I am going now or in ______ minutes.
I STAY	I am remaining with you as indicated. (A number will indicate the number of hours remaining).
JUDY	Take over (or, am taking over) the interception (used only with airborne radar interceptors).
LEFT	Alter heading to left by indicated number of degrees.
LEVEL	Enemy is at your altitude.
LEVEL OFF	Level off immediately at present ANGELS.
LIGHTS	Make your recognition signal now. (Not to be confused with IFF).
LINER	Fly at speed giving maximum cruising range.
LOW	Between 2,000 and 10,000 feet.
MACK NO	I have reached compressibility and am not closing my target.
MACK YES	I have reached compressibility and am closing my target.
MANY	Eleven or more aircraft.
MATTRESS	Below clouds (with a number, height of cloud base in thousands of feet).
MAYDAY	Distress call.
MIDNIGHT	Change over from Close to Broadcast Control.
MONSTERS	Cargo/transport aircraft.
MIX-UP	Mixture of friendly and hostile aircraft.
MOTHER	Radar homing beacon.
MUGS	External fuel tanks.
MUSHROOM	Atomic-bomb explosion.
MYPOS	Where am I.
NEGAT	Cancel, cease.
NO JOY	Cannot find the raid assigned me.
ON THE DECK	At minimum altitude.
ORANGES SOUR	Weather is unsuitable for aircraft mission.
ORANGES SWEET	Weather is suitable for aircraft mission.
ORBIT	Circle and search. (Limit orbit diameter to smallest practicable for type aircraft).
PANCAKE	Land, refuel, rearm.
PANCAKE AMMO	Returning short of ammunition. Wish to land.
PANCAKE FUEL	Returning short of fuel. Wish to land.
PANCAKE HURT	Returning wounded or damaged. Wish to land.
PIGEONS	The magnetic bearing and distance of your controlling unit from you is ______ degrees and ______ miles.
PILLOW	Visibility (with a number, visibility in miles).
POPEYE	In clouds or area of reduced visibility.
PRONTO	As quickly as possible.
PUNCH	You should very soon be obtaining a contact on the aircraft that is being intercepted. (Used only with airborne radar interceptions).
QUILT	Above cloud (with a number, height of cloud top in thousands of feet).
REAR	Rear of unit or indicated part of unit.
REQUEST HOMING	Give me a magnetic heading to steer to reach you (or ______)

VOICE	MEANING
RESUME	Resume last patrol ordered.
SALVOS	Am about to open fire. Keep clear (magnetic bearing may be indicated).
SAUNTER	Fly at best endurance.
SCAN	Search .... to .... and report any contact.
SCRAMBLE	Take off as quickly as possible (usually followed by course and altitude instructions).
SINGLE	One object.
SKIP IT	Do not attack, cease attack, cease interception.
SKUNK	Enemy or unidentified ship or surface craft.
SOUR	Equipment indicated is operating at reduced efficiency.
SPEED	Fly at indicated air speed ordered.
SPLASHED	Enemy aircraft shot down (followed by number and type).
SPLITTING	Contact is dividing.
STEER	Set magnetic heading indicated to reach me (or ....).
STEADY	Am on prescribed heading, or straighten out immediately on present heading.
STRANGLE	Switch off equipment indicated.
SWEEP	Keep all around search and report any new contacts.
SWEET	Equipment indicated is operating efficiently.
TAKE	Take over and intercept raid/track designated.
TALLYHO	Aircraft sighted (presumably the aircraft I have been ordered to intercept). (This should be followed by initial contact report as soon as possible.)
TIGHTEN TURN	Tighten rate of turn to maximum.
TOO NEAR	Contact has entered scope clutter.
TOUCH	In touch of homing beacon.
TOWARDS	Aircraft is flying towards controlling station.
THROTTLE BACK	Decrease speed .... knots.
TRACK	A series of related contacts displayed on a plotting board.
TRACTORS	Towing aircraft.
UNKNOWN	Information not available (not used to mean unidentified).
VECTOR	Alter heading to magnetic heading indicated (must always be used with three digit group, e.g., "Vector zero six zero", NOT "Vector six zero", NOR "Vector sixty"). (For homing heading use STEER).
VECTOR HARD PORT	Alter heading to magnetic heading indicated, turning left in a tight turn. (May be abbreviated to HARD PORT).
VERY HIGH	Above 40,000 feet.
VERY LOW	Below 2,000 feet.
VISUAL	Visual contact.
WEAPON	Airborne intercept radar.
WHAT LUCK	What has been the result of assigned mission.
WHAT STATE	Report amount of fuel and ammunition remaining.
WINDMILLS	Helicopter aircraft.

CLIMB CHART FOR MAXIMUM POWER

100% RPM WITH AFTERBURNING
STANDARD DAY
TWO ENGINES OPERATING

MODEL: F-89D

ENGINES: (2) J35-A-35 OR J35-A-47

CONFIGURATION: WITH PYLON TANKS
WEIGHT: 46,638 LB

CONFIGURATION: WITH PYLON TANKS
WEIGHT: 42,000 LB

APPROXIMATE				CALIBRATED AIRSPEED KNOTS	PRESSURE ALTITUDE FEET	CALIBRATED AIRSPEED KNOTS	APPROXIMATE			
RATE OF CLIMB FEET PER MINUTE	FR SEA LEVEL						FROM SEA LEVEL			RATE OF CLIMB FEET PER MINUTE
	AIR DIST NAUT MILES	TIME MINUTES	FUEL POUNDS				FUEL POUNDS	TIME MINUTES	AIR DIST NAUT MILES	
6630	0	0	1460(3)	456	SEA LEVEL	456	1460(3)	0	0	7450
5930	6	0.9	2000	437	5,000	437	1960	0.9	6	6690
5160	13	1.6	2490	413	10,000	413	2410	1.5	12	5820
4380	20	2.7	2970	387	15,000	387	2860	2.5	20	4980
3530	30	3.8	3450	356	20,000	356	3280	3.5	28	4130
2680	40	5.1	3930	325	25,000	325	3710	4.6	36	3280
1920	52	6.9	4410	292	30,000	292	4130	6.2	48	2390
1260	69	9.0	4940	257	35,000	259	4610	8.0	61	1660
610	92	12.2	5500	217	40,000	220	5060	10.6	80	1000
					45,000	187	5780	15.5	115	240
					50,000					

CONFIGURATION: WITH PYLON TANKS
WEIGHT: 38,000 LB

CONFIGURATION: WITH PYLON TANKS
WEIGHT: 34,000 LB

APPROXIMATE				CALIBRATED AIRSPEED KNOTS	PRESSURE ALTITUDE FEET	CALIBRATED AIRSPEED KNOTS	APPROXIMATE			
RATE OF CLIMB FEET PER MINUTE	FROM SEA LEVEL						FROM SEA LEVEL			RATE OF CLIMB FEET PER MINUTE
	AIR DIST NAUT MILES	TIME MINUTES	FUEL POUNDS				FUEL POUNDS	TIME MINUTES	AIR DIST NAUT MILES	
8310	0	0	1460(3)	456	SEA LEVEL	456	1460(3)	0	0	9450
7460	5	0.8	1910	437	5,000	437	1860	0.6	5	8450
6510	11	1.5	2310	413	10,000	413	2210	1.3	10	7340
5650	17	2.3	2710	387	15,000	387	2550	2.0	15	6470
4730	25	3.1	3080	356	20,000	356	2880	2.7	21	5480
3820	31	4.1	3460	325	25,000	325	3200	3.6	27	4460
2850	42	5.5	3820	293	30,000	294	3510	4.7	36	3480
2090	55	7.0	4210	260	35,000	262	3830	6.2	46	2570
1320	70	9.3	4630	224	40,000	226	4200	8.0	60	1760
560	96	13.0	5170	193	45,000	197	4630	10.9	82	910
					50,000	167	5260	16.5	120	140

REMARKS:

1. Climb at CAS shown regardless of ambient temperature.
2. Rate of climb and CAS based on constant gross weights as shown in headings.
3. Fuel allowance for taxi, take-off and acceleration to best climb CAS.
4. Air distance, time, and fuel values shown include the effect of weight decrease during climb.
5. Fuel, time, and distance are corrected for variation in kinetic energy with altitude.
6. Fuel consumption increased 5% to allow for service variation.
7. For each 10°C above NACA standard temperature, decrease rate of climb as follows:

ALTITUDE	RATE OF CLIMB
Sea Level	750 fpm
15,000 ft	300 fpm
30,000 ft	150 fpm

8. Exhaust temperature limit: 750°C for J35-A-35 engine, 735°C for J35-A-47 engine; time limit: 15 minutes.
9. Approximate time (not including taxi) to take-off and accelerate with MAX power to best climb CAS is 2.0 min.
10. Engine air inlet screens retracted.

DATA AS OF: 1 MAY 1954
DATA BASIS: FLIGHT TEST

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/US GAL

[redacted]

CLIMB CHART FOR MAXIMUM POWER

100% RPM WITH AFTERBURNING
STANDARD DAY
TWO ENGINES OPERATING

MODEL: F-89D

ENGINES: (2) J35-A-35 OR J35-A-47

CONFIGURATION: NO EXTERNAL LOAD
WEIGHT: 42,000 LB

CONFIGURATION: NO EXTERNAL LOAD
WEIGHT: 38,000 LB

APPROXIMATE				CALIBRATED AIRSPEED KNOTS	PRESSURE ALTITUDE FEET	CALIBRATED AIRSPEED KNOTS	APPROXIMATE			
RATE OF CLIMB FEET PER MINUTE	FROM SEA LEVEL						FROM SEA LEVEL			RATE OF CLIMB FEET PER MINUTE
	AIR DIST NAUT MILES	TIME MINUTES	FUEL POUNDS				FUEL POUNDS	TIME MINUTES	AIR DIST NAUT MILES	
8020	0	0	1460(3)	475(11)	SEA LEVEL	475(11)	1460(3)	0	0	9030
7160	6	0.8	1960	453	5,000	453	1890	0.7	5	8040
6270	12	1.5	2390	431	10,000	431	2270	1.4	11	7090
5470	19	2.3	2710	400	15,000	400	2610	2.0	16	6210
4300	25	3.1	3120	362	20,000	362	2940	2.8	23	5200
3600	33	4.2	3480	329	25,000	329	3260	3.7	30	4240
2690	44	5.5	3880	296	30,000	296	3600	4.8	39	3210
1870	57	7.3	4300	263	35,000	263	4000	6.4	50	2330
970	77	9.9	4810	226	40,000	228	4360	8.5	65	1430
280	110	14.7	5490	193	45,000	198	4870	11.8	91	600
					50,000					

CONFIGURATION: NO EXTERNAL LOAD
WEIGHT: 34,000 LB

CONFIGURATION: NO EXTERNAL LOAD
WEIGHT: 30,000 LB

APPROXIMATE				CALIBRATED AIRSPEED KNOTS	PRESSURE ALTITUDE FEET	CALIBRATED AIRSPEED KNOTS	APPROXIMATE			
RATE OF CLIMB FEET PER MINUTE	FROM SEA LEVEL						FROM SEA LEVEL			RATE OF CLIMB FEET PER MINUTE
	AIR DIST NAUT MILES	TIME MINUTES	FUEL POUNDS				FUEL POUNDS	TIME MINUTES	AIR DIST NAUT MILES	
10,260	0	0	1460(3)	475(11)	SEA LEVEL	475(11)	1460(3)	0	0	11,780
9240	5	0.6	1850	453	5,000	453	1810	0.6	4	10,530
8150	10	1.2	2180	431	10,000	431	2110	1.0	8	9380
7130	15	1.7	2470	400	15,000	400	2350	1.5	12	8290
5950	20	2.5	2760	362	20,000	362	2590	2.2	18	6970
4960	27	3.3	3030	329	25,000	329	2830	2.9	25	5810
3860	35	4.2	3330	296	30,000	296	3070	3.7	30	4680
2900	44	5.5	3630	263	35,000	263	3310	4.7	39	3560
1910	56	7.1	3970	230	40,000	232	3600	6.0	49	2500
1060	75	9.7	4350	201	45,000	204	3880	7.9	62	1560
210	113	15.9	4920	174	50,000	177	4290	11.5	88	600

REMARKS:

1. Climb at CAS shown regardless of ambient temperature.
2. Rate of climb and CAS based on constant gross weights as shown in headings.
3. Fuel allowance for taxi, take-off and acceleration to best climb CAS.
4. Air distance, time, and fuel values shown include the effect of weight decrease during climb.
5. Fuel, time, and distance are corrected for variation in kinetic energy with altitude.
6. Fuel consumption increased 5% to allow for service variation.
7. For each 10°C above NACA standard temperature, decrease rate of climb as follows:

ALTITUDE	RATE OF CLIMB
Sea level	850 fpm
20,000 ft	450 fpm
40,000 ft	200 fpm

8. Exhaust temperature limit: 750°C for J35-A-35, 735° for J35-A-47, time limit 15 min.
9. Approximate time (not including taxi) to take-off and accelerate with MAX power to best climb CAS is 1.9 min.
10. Engine air inlet screens retracted.
11. Corresponds to 470 kn IAS limit airspeed.

DATA AS OF: 1 MAY 1954
DATA BASIS: FLIGHT TEST

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/US GAL

[redacted]

WADC
Form 2412
(11 Jun 51)

MAXIMUM POWER CLIMB CHART

STANDARD DAY

MODEL: F-86D

ENGINE(S): (1) J47-GE-17

CONFIGURATION: TWO 120-GALLON DROP TANKS
GROSS WEIGHT: 19,400 POUNDS

CONFIGURATION: TWO 120-GALLON DROP TANKS
GROSS WEIGHT: 17,000 POUNDS

APPROXIMATE				CAS (KNOTS)	PRESSURE ALTITUDE (FEET)	CAS (KNOTS)	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL						FROM SEA LEVEL			RATE OF CLIMB
	DISTANCE	TIME	FUEL				FUEL	TIME	DISTANCE	
11,400	0	0	300 (2)	470	SEA LEVEL	485	300 (2)	0	0	13,000
10,400	5	.5	500	445	5,000	445	500	.5	5	12,000
9,400	10	1.0	700	420	10,000	420	650	1.0	5	10,800
8,200	15	1.5	900	395	15,000	395	850	1.5	10	9,500
7,100	20	2.0	1100	370	20,000	370	1000	2.0	15	8,200
6,000	25	3.0	1300	345	25,000	345	1200	2.5	20	7,000
4,800	30	4.0	1500	315	30,000	315	1350	3.5	25	5,700
3,700	40	5.0	1750	285	35,000	285	1550	4.5	35	4,500
2,400	55	7.0	2000	255	40,000	255	1750	5.5	45	3,100
					45,000					

CONFIGURATION: NO EXTERNAL LOAD
GROSS WEIGHT: 17,700 POUNDS

CONFIGURATION:
GROSS WEIGHT:

APPROXIMATE				CAS (KNOTS)	PRESSURE ALTITUDE (FEET)	CAS (KNOTS)	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL						FROM SEA LEVEL			RATE OF CLIMB
	DISTANCE	TIME	FUEL				FUEL	TIME	DISTANCE	
14,600	0	0	300 (2)	535	SEA LEVEL					
13,600	5	.5	450	500	5,000					
12,300	5	1.0	650	465	10,000					
10,900	10	1.0	800	430	15,000					
9,400	15	1.5	950	395	20,000					
8,000	20	2.0	1100	355	25,000					
6,500	25	3.0	1250	330	30,000					
5,100	30	4.0	1450	295	35,000					
3,600	40	5.0	1600	260	40,000					
					45,000					

REMARKS:

1. Multiply nautical units by 1.15 for conversion to statute units.
2. Fuel column includes allowance of 300 pounds for warm-up and take-off.
3. Continuous operation of afterburner is limited to 20 minutes, exhaust temperature limit 705°C.

LEGEND

RATE OF CLIMB - FEET PER MINUTE
DISTANCE - NAUTICAL MILES
TIME - MINUTES
FUEL - POUNDS
CAS - CALIBRATED AIRSPEED - KNOTS

DATA AS OF: 4-13-51
BASED ON: ESTIMATED DATA

FUEL GRADE: ALL GRADES
FUEL DENSITY:

CLIMB CHART FOR MAXIMUM POWER

NACA STANDARD DAY

MODEL: F-94C **ENGINES: J48-P-5 or -P-5A**

CONFIGURATION: TWO 250 GALLON TIP TANKS
WEIGHT: 19,800 LB.

CONFIGURATION: TWO 250 GALLON TIP TANKS
WEIGHT: 16,550 LB.

APPROXIMATE				CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL						FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL				FUEL	TIME	DIST.	
9,000	0	0	700(1)	460	**S. L.**	460	700(1)	0	0	10,800
8,450	4	0.5	900	430	**5,000**	430	850	0.5	4	10,200
7,750	9	1.0	1100	400	**10,000**	400	1000	1.0	8	9,450
7,000	14	2.0	1300	370	**15,000**	370	1200	1.5	12	8,600
6,150	20	2.5	1500	340	**20,000**	340	1350	2.0	16	7,650
5,300	26	3.5	1700	310	**25,000**	310	1500	3.0	22	6,600
4,300	34	4.5	1900	280	**30,000**	280	1700	3.5	28	5,500
3,300	44	6.0	2100	250	**35,000**	250	1850	5.0	34	4,300
1,800	58	8.0	2400	220	**40,000**	220	2050	6.5	46	2,700
600	90	12.5	2900	195	**45,000**	195	2350	9.0	64	1,300

CONFIGURATION: TWO 250 GALLON TIP TANKS
AND ROCKET PODS
WEIGHT: 20,575 LB.

CONFIGURATION: TWO 250 GALLON TIP TANKS
AND ROCKET PODS
WEIGHT: 17,325 LB.

APPROXIMATE				CAS KNOTS	PRESSURE ALTITUDE FEET	CAS KNOTS	APPROXIMATE			
RATE OF CLIMB	FROM SEA LEVEL						FROM SEA LEVEL			RATE OF CLIMB
	DIST.	TIME	FUEL				FUEL	TIME	DIST.	
8,650	0	0	700(1)	460	**S. L.**	460	700(1)	0	0	10,300
8,100	4	0.5	900	430	**5,000**	430	850	0.5	4	9,700
7,450	10	1.5	1150	400	**10,000**	400	1050	1.0	9	8,950
6,700	15	2.0	1350	370	**15,000**	370	1250	1.5	13	8,100
5,900	21	3.0	1550	340	**20,000**	340	1400	2.5	18	7,200
5,000	28	4.0	1750	310	**25,000**	310	1600	3.0	24	6,200
4,050	36	5.0	1950	280	**30,000**	280	1750	4.0	30	5,100
3,100	46	6.0	2200	250	**35,000**	250	1900	5.0	38	4,000
1,600	61	8.5	2500	220	**40,000**	220	2150	7.0	49	2,450
450	99	14.0	3050	195	**45,000**	195	2500	10.0	70	1,100

REMARKS:
(1) FUEL ALLOWANCE FOR TAXI AND AFTERBURNING TAKE-OFF.
(2) MULTIPLY NAUTICAL UNITS BY 1.15 FOR CONVERSION TO STATUTE UNITS

RATE OF CLIMB: FEET PER MINUTE
DISTANCE: NAUTICAL MILES
TIME: MINUTES
FUEL: POUNDS
CAS: CALIBRATED AIRSPEED
KNOTS: NAUTICAL MILES PER HOUR

DATA AS OF: 11-1-53
DATA BASIS: FLIGHT TEST

FUEL GRADE: MIL-F-5624A (JP-4)
FUEL DENSITY: 6.5 LB/GAL

*ADCR 55-9

ADC REGULATION)
55-9)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colo.
2 April 1955

436

OPERATIONS

Standardization of Operating Procedures

1. Purpose. This Regulation outlines the procedures within the Air Defense Command for the standardization of:

a. Aircraft operating procedures.

b. Simulator operating procedures.

c. ACW operating procedures.

d. Training and proficiency of interceptor and ACW units.

2. Responsibilities. a. Headquarters Air Defense Command will publish, for command-wide use, criteria for training, proficiency, and operating procedures for the ACW, interceptor, and support units, in the form of ADC manuals, regulations, and supplements thereto.

b. Air defense force commanders will be responsible for the implementation of the standardization program outlined in this Regulation.

3. Procedures. This Regulation and other directives establishing Air Defense Command criteria will form the Air Defense Command operational standardization program.

a. Supervisory and directive control of the standardization program is vested in Headquarters Air Defense Command.

b. Modification of standardization directives will be made only by direction of the Commander, Air Defense Command.

6. Air Defense Forces. Air defense force commanders will be responsible for the standardization checks which will insure that their commands are conforming to the standardization criteria established by the Commander, Air Defense Command.

7. Standardization Check.

a. Pilots and Aircrew:

(1) Written and oral examinations to determine an aircrew member's knowledge of the aircraft or air-

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*This supersedes ADCR 55-9, 17 November 1954.

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borne equipment, operating procedures pertinent to his duty, emergency procedures, and relevant ADC directives.

(2) Flight checks in which the aircrew member must demonstrate his ability to perform his duties in compliance with ADC standards.

b. Controllers and Directors.

(1) Written and oral examinations to determine controllers' or directors' knowledge of proper aircraft control procedures, ACW site operating procedures, and pertinent ADC directives.

(2) Actual missions in which the director must demonstrate his ability to control aircraft in the intercept and recovery phases of flight.

8. Modifications. The procedure for effecting modifications to existing standardization directives will be as follows:

a. The unit initiating recommended changes will forward them through channels to the commander of the appropriate air defense force.

b. The air defense force commander will examine the validity, desirability, and feasibility of each recommendation before forwarding it to Headquarters Air Defense Command for approval.

9. Weapons Employment Centers. The Weapons Employment Centers at Yuma, Arizona, and Moody AFB, Georgia, will provide all units and controller/directors training in approved ADC standard procedures pertaining to weapons firing and lead collision course tactics and techniques. Weapons Employment Centers will evaluate each such unit and controller's proficiency, forwarding a detailed report to Headquarters Air Defense Command and the air defense force concerned not later than the 15th working day following completion of the unit's and controller's training.
(ADOOT)

BY ORDER OF THE COMMANDER:

OFFICIAL:
Walter W. Robinson
WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

GEORGE F. SMITH
Major General, USAF
Chief of Staff

DISTRIBUTION: A

MAINTENANCE **ADCM 65-**

AIR DEFENSE COMMAND MANUA

433

FIGHTER-INTERCEPTOR SQUADRON MATERIEL ORGANIZATION

1 JANUARY 1955

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AIR DEFENSE COMMAND

ENT AIR FORCE BASE (2,000)

ADC MANUAL)
65-1)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colorado
1 January 1955

FOREWORD

1. *Purpose.* This Manual establishes a standard materiel organization for fighter-interceptor squadrons.

2. *Scope.* This Manual applies to all Air Defense Command fighter-interceptor squadrons.

3. *Responsibility.* Fighter-interceptor squadron commanders are responsible for implementing and enforcing the organization prescribed by this Manual. Approval for deviations from the prescribed organization will be obtained from Headquarters Air Defense Command prior to initiation for organizational change.

4. *Changes to Manual.* Proposed changes to the Manual will be submitted through command channels to the Deputy Chief of Staff for Materiel, Headquarters Air Defense Command, Ent AFB, Colorado Springs, Colorado.

BY ORDER OF THE COMMANDER:

OFFICIAL:

GEORGE F. SMITH
Major General, USAF
Chief of Staff

WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

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CHAPTER 1

INTRODUCTION

The introduction by newly developed, more complex aircraft into fighter-interceptor squadrons makes difficult the job of maintaining aircraft combat -ready at all times. Once we have overcome the newness of the aircraft and the initial problems in supply, facilities, and training personnel for the support of these aircraft, our mechanics and technicians have the capacity to do an outstanding maintenance job. To do the job, both the aircraft and its electronic systems must be maintained in commission. One without the other is not enough if the aircraft is to be ready to perform its Air Defense Mission.

We know that sound management at all echelons of the command is essential to proper support of weapons at squadron level. While not all management problems start at or can be corrected by the squadron, our experience indicates that the solution of problems of organization, planning, and supervision, training and utilization of personnel which arise at squadron level can contribute substantially to the improvement and maintenance of a high combat capability for the command. Problems in supply, facility, and other support areas which are beyond the scope of squadron management, of course, must be identified and reported promptly to higher headquarters.

Another management area which has a direct but difficult to measure effect on the production of combat-ready aircraft is the orientation of personnel to the Air Defense Command Primary Mission. Every individual in the Air Defense Command regardless of position, grade, or duty assignment, must constantly keep in mind that combat-ready aircraft constitute the principal weapon of the 'Combat Force in Being' for the Air Defense of the United States.

The orientation of our personnel to the Air Defense Mission as a remedial action to remove obstacles to production of combat-ready aircraft can be accomplished only through the aggressive leadership and management of every commander, staff officer, and supervisor. Every current procedure, directive, and policy must periodically receive a thorough and searching analysis, with these questions in mind: Is the procedure, directive, or policy necessary? Is it aiding or obstructing the accomplishment of the mission? Can it be improved? Are the requirements established by the procedure, directive, or policy based on a real need and within the capability of the organizations to which it is directed? Appropriate aggressive action, based on the analysis must then be initiated to modify or revoke the procedure, directive, or policy. Proposed procedures, directives, or policies must be subjected to an even more searching analysis before publication. Duplication of directives must be eliminated.

Recent studies of critical areas in the support of our fighter-interceptor aircraft indicate that the organizational structure of the supply and maintenance functions at squadron level has not kept pace with the changing requirements generated by the increased complexity of our airborne weapons. We must have a materiel organization, designed to maintain a sufficient number of complex weapons systems (combat-ready aircraft) in each fighter-interceptor squadron to perform their Air Defense Mission and accomplish their operational training program. The term "Materiel Organization," which will be used hereafter to described supply and maintenance functions, is defined as all elements of supply, maintenance, services, and facilities, merged and directed by a single managing head, *for the maximum productive support of combat-ready aircraft.*

Under the present fighter-interceptor squadron organization, the squadron commander is the coordinator of supply and maintenance activities, and in some instances is the coordinator between various elements of the maintenance organization. As a commander, he should only be required to coordinate and supervise Operations, Materiel, and Administration.

We find that aircraft maintenance is responsible for such electronics maintenance functions as electronics fuel controls, electrical and electronic instruments and electrical systems which are almost entirely an integral part of the electronic system of the aircraft. It is also responsible for the quality control of its own production and for supplying its own needs. The maintenance of communications and navigation equipment is performed in a separate small section which conducts its own quality control. It revises radio facility charts which is an operation function. It also shares responsibility with the aircraft maintenance section for the maintenance of some navigation equipment. The fire control systems maintenance section is responsible for supplying its own needs and performs quality control on its own work.

We also find that effective overall coordination of materiel matters is practically non-existent in most squadrons with operations sections controlling the scheduling of aircraft maintenance in some squadrons. Electronics maintenance personnel have been taken out of fire control and communications maintenance sections to perform electronics maintenance at aircraft maintenance sections without qualified supervision. All of these arrangements are not conducive to the high rate of production of combat ready aircraft required by the Air Defense Mission.

A fighter-interceptor squadron materiel organization designed to meet current and foreseeable future requirements of the Air Defense Mission has been developed and is set forth in this Manual. It takes the commander out of the business of coordinating supply with maintenance and gives him a materiel officer who will be responsible for coordinating the squadron's total materiel effort in producing combat-ready aircraft. It also takes the squadron operations section out of the scheduling of maintenance and removes quality control from under production supervisors. It takes the maintenance sections out of the supply business and relieves such sections of administrative responsibilities including the maintenance of files, libraries, and final preparation and submission of correspondence and reports. In short, the new organization keeps maintenance sections in the business of performing maintenance.

The new organization provides also for the consolidation of like maintenance functions. Mechanical maintenance functions are assigned to an aircraft maintenance section. Electrical and electronic maintenance functions are assigned to an electronics maintenance section. All supply operations are put into a supply section which provides required supply support direct to the individual consumer. Lastly, it places the job of radio facility chart revision in the operations section.

The new organization will enhance the commander's control and management of the materiel support required by his mission. However, it only provides a more satisfactory arrangement of the functions that must be performed to provide the required support. To assure its success, aggressive leadership and proper administration and management must be exercised. What we mean by this is that all supervisors at every level within the squadron must manage the carrying out of his responsibilities in order to meet operational demands for quality, quantity, and timely maintenance.

When we speak of leadership we are talking about supervising people in a manner which will result in their enthusiastic cooperation and progress toward accomplishing a particular job. Likewise, proper administration requires the assembling of men, equipment, and materials and the provision of accurate administrative data, in such manner and form as is required to permit management to function properly. Proper management is the supervision of the performance of an assigned responsibility in such manner as will assure the most efficient utilization of men, equipment, and materials. Such management is accomplished by planning, directing, and controlling the operations involved.

An individual assigned responsibility for the supervision of a maintenance activity is responsible for the proper exercise of all functions of management. Such responsibility requires that the application of sound principals of management to the job be planned rather than exercised spasmodically and only over some part of the maintenance operation. It is recommended that all supervisory personnel read Air Force Manual 35-15, "Air Force Leadership."

Chapter 2

SECTION I

THE SQUADRON COMMANDER

1. **Material Responsibilities.** A part of the squadron commander's command responsibilities is the materiel support of his squadron's Air Defense Mission. He will accomplish this function by appointing a materiel officer, delegating authority, and directing him to organize, direct, and manage all squadron maintenance, supply, and related activities as prescribed by this Manual. The delegation of authority to the materiel officer must include the authority to:

a. Establish and enforce squadron materiel policies and procedures.

b. Coordinate the materiel support of the squadron with the support base materiel staff and organizations.

2. The responsibilities of the squadron commander demand that close relationships be established and maintained with higher headquarters and the support base staff. Without these relationships, the perspective of the commander is limited and poor decisions will result from the lack of understanding and acknowledgement of mutual problems. Sound relationships on the part of the squadron commander are indicative of good management and organization. Proper relationships with others will determine the successful execution of the squadron commander's responsibilities.

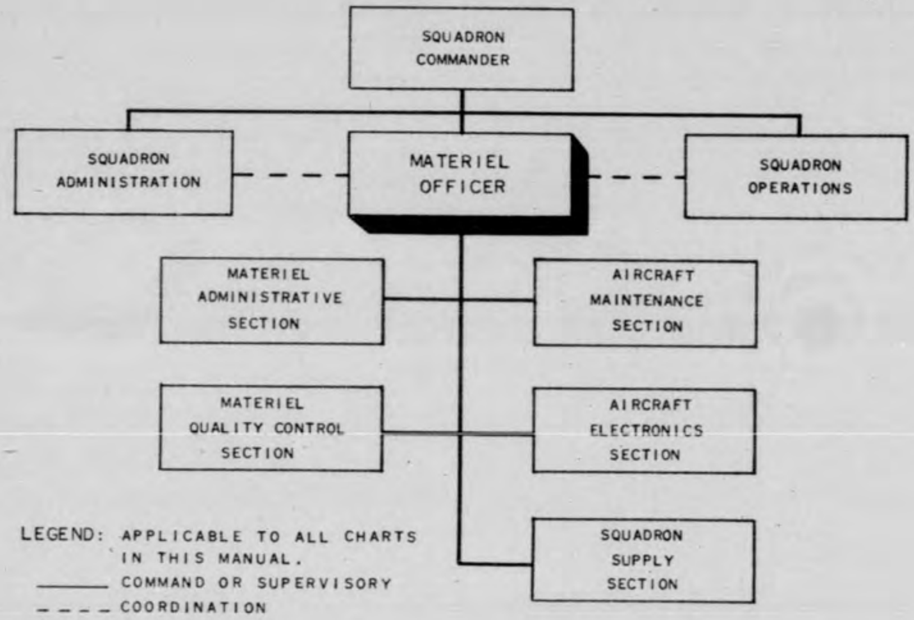
3. **Management.** The squadron commander must continually survey his organization to insure that the balance between *materiel capability* and *operational requirement* is maintained. This balance is delicate and must be carefully controlled. An overbalanced condition favoring either Materiel or Operations will gradually and surely result in loss of squadron effectiveness. Some indications of an unbalanced condition are: Aircraft not available for flight, excessive overtime by maintenance personnel to maintain required combat-ready rate, increased abort rate, untrained air and ground crews, low morale, etc. The organizational balance may be destroyed by excessive requirements placed on either Materiel or Operations, therefore, the squadron commander must correlate all activities so this condition does not occur.

4. **Quality of Maintenance.** The squadron commander should be aware of the quality of maintenance required and accomplished by the squadron. High quality maintenance is mandatory, but caution must be exercised in establishing maintenance quality standards. Such standards can be set so high, so far beyond the requirements for safety of flight and mission accomplishment, that the aircraft will rarely be available for flight. Excessive inspection and maintenance requirements, in the name of high quality maintenance, produces an excessive wear-out rate of the aircraft and its equipment, and excessive overtime imposed on maintenance personnel in an effort to meet combat-ready aircraft requirements. Long periods of continued overtime are normally unnecessary and should be carefully analyzed to determine and eliminate the causes.

SECTION II

THE SQUADRON MATERIEL ORGANIZATION

5. **Function.** The Squadron Materiel Organization plans, directs, coordinates, and accomplishes all functions of supply, maintenance, and related activities for the maximum support of the squadron's Air Defense Mission.



6. **Responsibilities.** The materiel officer is responsible to the squadron commander for:

a. Establishing the materiel organization in accordance with this Manual.

b. Effective and economical management of the materiel organization, facilities and supplies, in support of the ADC mission and keeping the commander informed of the unit's materiel potential at all times.

c. Appointing the chief clerk of the administrative section, quality control officer, aircraft maintenance officer, aircraft electronics officer, and squadron supply officer with the approval of the commander, and delegating sufficient authority to these section heads to enable them to effectively manage their sections in support of the squadron mission.

d. Establishing a contact with the squadron operations section for the daily requirements of *combat-ready aircraft* necessary to accomplish the primary mission and training commitments.

e. Section assignment of supply, maintenance, and administrative personnel prescribed by the table of organization as modified by paragraph 8 of this chapter, and maintaining a personnel status board.

f. Coordination with the support base materiel staff and organizations to obtain adequate supply, maintenance, transportation, and services support for the squadron.

g. Establishing and enforcing squadron materiel standing operating procedures (SOP's) and policies, and enforcing current directives of higher authority.

h. Administration of the materiel organization, including the preparation and submission of correspondence and reports.

i. Appointing a squadron aircraft weight and balance officer.

j. Providing technical advice to the commander and his staff on ground and flight operation of aircraft.

k. Advising the squadron training officer in programming for:

(1) Ground safety program.

(2) I&E Program.

(3) Organized athletics.

(4) Formal school quotas.

(5) OJT.

l. Materiel planning for the acceptance and conversion to new equipment.

m. Supervising the activities of assigned contractor technicians and technical representatives to insure full use of their skills.

n. Periodic visits to other organizations, bases, and higher echelon to study new equipment, materiel methods, and procedures.

o. Advising and assisting the squadron operations officer in preparing and maintaining the squadron mobility plan.

p. Establishing an SOP for periodically checking completeness and adequacy of authorized equipment and tools assigned each mechanic and shop, including the turn-in of excess tools and parts found in tool kits.

q. Monitoring timely receipt and adequacy of authorized test, ground handling, and individual equipment.

7. **Narrative.**

a. The materiel officer must act as the balance wheel of the squadron materiel organization. He must listen to and pass upon the major disagreements which arise between maintenance, electronics, and supply sections. He must attempt to solve these problems to the satisfaction of all concerned, giving prime consideration to the squadron mission. This action will free the squadron commander of all possible need for arbitration. He must insure that the materiel organization is held firm and the chain of command is followed to avoid a breakdown of organizational structure and control.

b. He must require that maintenance, electronics, and supply officers keep him informed of their section's capabilities so that he in turn may inform and advise the squadron commander and operations officer. He must insure that operations planning is in consonance with the capabilities of materiel. In this connection, he must establish with coordination of the commander and operations officer a flying schedule which will maintain balance between operations and materiel so that maximum squadron effectiveness is realized.

c. The materiel officer must coordinate the needs of the materiel organization with the materiel activities of the supporting organization. He must, with the aid of the commander, obtain support in consonance with the materiel requirements of the squadron. In this function, he will be required to maintain close relationships with the supporting base materiel officer and the base accountable officer. The importance of these relationships to the success of the squadron materiel organization is obvious.

8. **Personnel.** Personnel allocated to the squadron materiel organization will be assigned as indicated below:

a. Three of the clerical personnel presently authorized by current tables of organization to maintenance, armament, and communications, will be assigned to the materiel administrative section.

b. Inspection personnel authorized by current tables of organization will be assigned to the quality control section. One additional airman, AFSC 32271, 30170, or 30171 will be assigned from electronics maintenance section to the quality control section for duty as electronics inspector.

c. Armament Systems Officers AFSC 3234, and Air Electronics Officers AFSC 3054, will be assigned to the electronics maintenance section.

d. All warrant officers and airmen with the AFSC's listed below will be assigned to the electronic maintenance section.

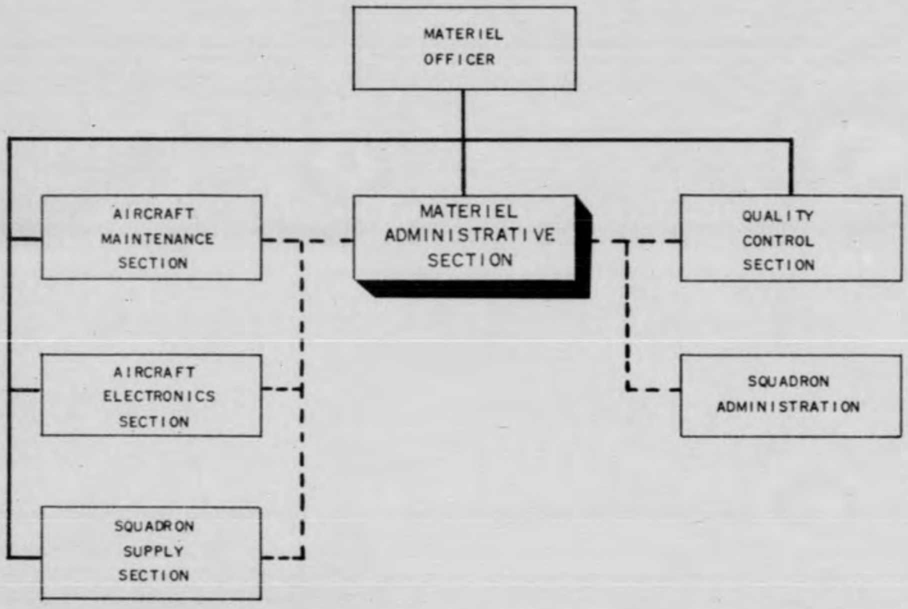
30100
30130
30131
30150
30151
30170
30171
32000
32230 ( )
32250 ( )
32270 ( )

34000
34230
34270
42250
42270
42352
42372
42350
42370
46230
46250
46270

e. All personnel with Supply AFSC's will be assigned to the supply section.

SECTION III

THE MATERIEL ADMINISTRATIVE SECTION



9. **Function.** The Materiel Administrative Section prepares, processes, distributes, and files correspondence; maintains the materiel personnel file, central library of SOP's, regulations, and other directives except technical orders (TO) for all sections of the materiel organization.

10. **Responsibilities.** The chief clerk is responsible to the materiel officer for:

a. Establishing and maintaining the materiel central correspondence file.

b. Maintaining the incoming and outgoing correspondence log.

c. Routing of correspondence to materiel activities for action and coordination.

d. Maintaining a correspondence suspense file and reports control register to insure timely submission of correspondence and reports.

e. Final preparation of correspondence for all sections of the materiel organization.

f. Maintaining personnel records containing information required for management and utilization of assigned airmen, and charts reflecting personnel assigned in relation to personnel authorized.

g. Maintaining a central library of SOP's, regulations, and other directives except Technical Orders, and routing the publications to all other sections for reading before filing.

h. Requisitioning and distribution, with the assistance of the materiel quality control section, of all publications and directives required by all sections of the materiel organization.

i. Supervision, utilization, and training of assigned clerical personnel.

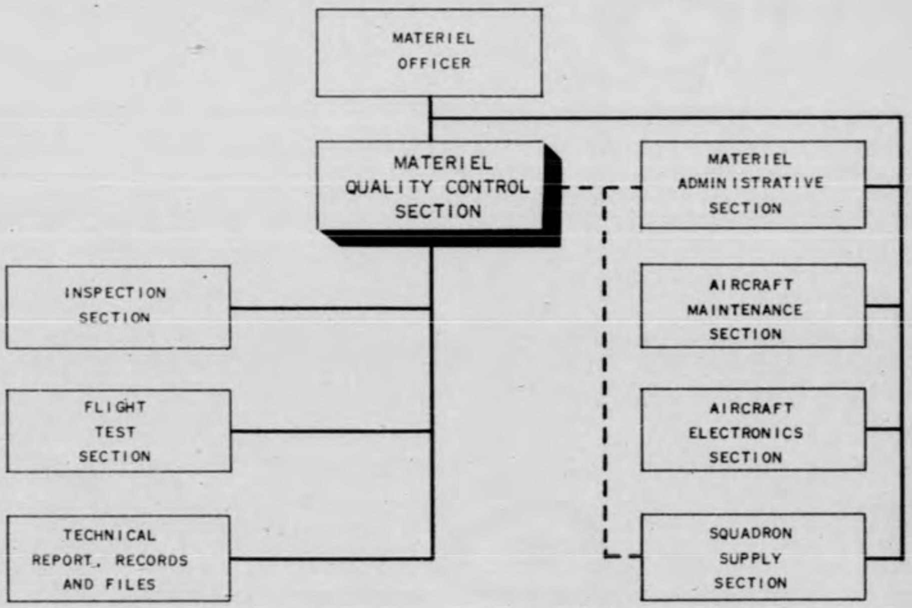
j. Enforcing compliance with squadron and materiel policies and other applicable directives within the materiel administrative section.

k. Proper housekeeping of the materiel administrative offices.

11. **Narrative.** The purpose of the materiel administrative section is to consolidate the paper work, correspondence files, libraries of administrative directives, and centrally control and prepare correspondence from the technical sections of the materiel organization. The attention of supply, maintenance, and electronics sections must not be diverted by administrative burdens from the primary mission of producing combat-ready aircraft. The chief clerk of the administrative section in establishing the administrative procedures for the materiel organization must keep in mind that the mission of his section is service--administrative service.

SECTION IV

THE MATERIEL QUALITY CONTROL SECTION



12. **Function.** The quality control section inspects aircraft and equipment to insure a high quality of maintenance; conducts flight tests as prescribed by current directives; reviews, analyzes, and processes all Unsatisfactory Reports; maintains, requisitions, and distributes technical publications.

13. **Responsibilities.** The quality con-

trol officer is responsible to the materiel officer for:

a. Accomplishing a quality control inspection on each aircraft completing periodic or major type maintenance.

b. Accomplishing spot, quality control inspections of 25 per cent of flight line aircraft each month.

c. Maintenance of a set of master aircraft records, as prescribed by current directives, for each type aircraft assigned.

d. Submitting requests for technical order compliance kits or components, and maintenance of technical order compliance charts and records in accordance with existing directives.

e. Performing inspections of ground handling equipment, maintenance shops and facilities once each ninety days.

f. Conducting such special inspections as directed by the materiel officer or as required by higher authority.

g. Maintaining a master information file and current file of technical publications. ADCM 123-1 and 123-2 should be included.

h. Preparation and submission of inspection reports. Clerical assistance will be obtained from the administrative section.

i. Performance of flight tests, in accordance with current directives, to insure capability of aircraft to perform combat missions.

j. Review, analysis, and processing of all Unsatisfactory Reports.

k. Insuring proper disposition of Unsatisfactory Report exhibits.

l. Maintaining current aircraft weight and balance records in accordance with current directives and applicable technical orders, and monitoring the weighing of aircraft.

14. Narrative.

a. The Quality Inspection, Flight Test, and Unsatisfactory Report functions were combined in this unit because of the relation of each to safety of flight and quality of maintenance. Quality must be continually observed through inspection of aircraft in all phases of maintenance, investigation of maintenance procedures, analysis of equipment failures, and the actual flight test of the end product of the materiel organization - A COMBAT-READY AIRPLANE.

b. It is through this section that the materiel officer, maintenance supervisors, and commander receive the information by which the quality of maintenance may be evaluated. The materiel officer must recognize that quality inspections play an important part in the improvement of maintenance. The chief inspector must be the most capable, qualified, and experienced individual available.

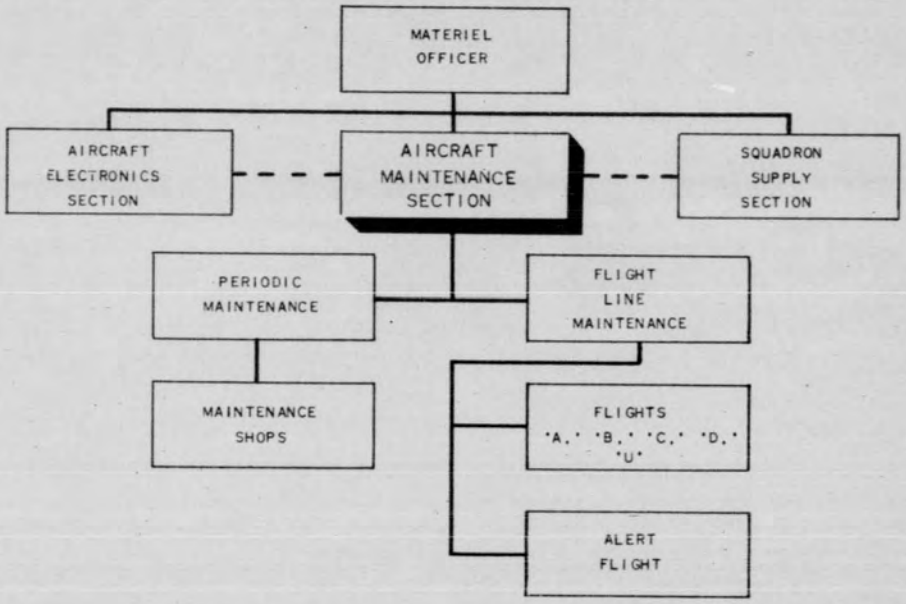
c. The success or failure of quality control depends on command action taken on inspection reports. This emphasizes the importance of the relationship between the quality control section, materiel officer and commander. The action taken on inspection reports is a measure of effectiveness of this section. The quality control officer should have frequent meetings with the squadron commander, materiel officer, supply, aircraft, and electronic maintenance officers to determine whether his inspection coverage is adequate, whether inspection reports are helpful, and if inspectors are of assistance. Where possible, the inspectors should assist maintenance personnel by instruction in correct methods, procedures, and techniques.

d. If the quality control section is to receive the complete and unqualified support of the materiel officer, which is imperative, it must be earned through gaining the respect and confidence of all maintenance personnel. To merit confidence and active support, the quality control section must render complete and accurate reports with *practical* and *intelligent recommendations* that will aid in correction of deficiencies and irregularities.

Chapter 3

SECTION I

THE AIRCRAFT MAINTENANCE SECTION



1. **Function.** The Aircraft Maintenance Section inspects, repairs, and services aircraft and associated ground handling equipment.

2. **Responsibilities.** The aircraft maintenance officer is responsible to the materiel officer for:

a. Organization of the aircraft maintenance section as prescribed in this Manual.

b. Maintenance, repair and adjustment of:

(1) Aircraft structures.
(2) Hydraulic systems.
(3) Pressurization, heat, and vent systems.
(4) Aircraft engine and auxiliary systems with assistance of electronics maintenance.

(5) Ejection systems with the assistance of electronics maintenance.

(6) Ground handling and auxiliary powered equipment.

c. Delegation of authority to those who are appointed as supervisors of specific phases of aircraft maintenance.

d. Assignment of personnel to obtain maximum utilization of technical and supervisory skills.

e. Development and execution of a training program, with assistance of the squadron training officer, to constantly increase the capability of each assigned individual.

f. Constant review of personnel requirements, equipment requirements, maintenance policies, procedures, techniques, and directives; and initiation of appropriate action to correct deficiencies noted.

g. Control and scheduling of all aircraft maintenance, repair, cannibalization, and technical order compliance on a planned basis which will insure maximum availability of safe, combat-ready aircraft.

h. Coordination with, and assistance to, the electronics maintenance officer in performance of electronics maintenance of assigned aircraft.

i. Close coordination with the supply officer in all matters which will affect supply support.

j. Development and implementation of sound maintenance policies and procedures for effective supervision and operation of the aircraft maintenance section.

k. Compliance with policies, procedures, and technical directives established by the materiel officer and higher authority.

l. Implementing a vigorous and continuing program for the timely submission of Unsatisfactory Reports.

m. Preparation and maintenance of reports, records, publications files and correspondence as necessary to provide information essential to management of the maintenance section.

n. Maintaining a master aircraft status board that must show, not only the status of the airplane general, but also all allied systems that affect the *combat-ready* status. The information thereon must be kept up-to-the-minute at all times so that the true squadron combat potential is available to the commander.

o. Maintaining a bulletin board which will be used to publish current, permanent, and immediate action information to the maintenance section.

p. Maintaining a current list of ground crewmen authorized to operate and taxi aircraft in accordance with existing directives.

q. Direction of maintenance and housekeeping activities in such a manner as to minimize, to the greatest extent possible, all hazards to personnel.

3. **Narrative.** The aircraft maintenance officer is the executive production manager of the aircraft maintenance organization. This officer must be highly qualified in *leadership, management,* and *organization*. Because this is the top active management position of the aircraft maintenance organization, the application of leadership and management principle must be paramount here if it is to be required of subordinate maintenance supervisors. It is a big job. It requires delegation of authority to key supervisory personnel in order to establish a logical chain of command and insure close supervision of all specific phases of the maintenance organization. It is particularly important that personnel selected to fill supervisory positions in the maintenance organization be the best qualified personnel available for those positions. These assistants must be dependable, trusted with authority, and willing to assume responsibility.

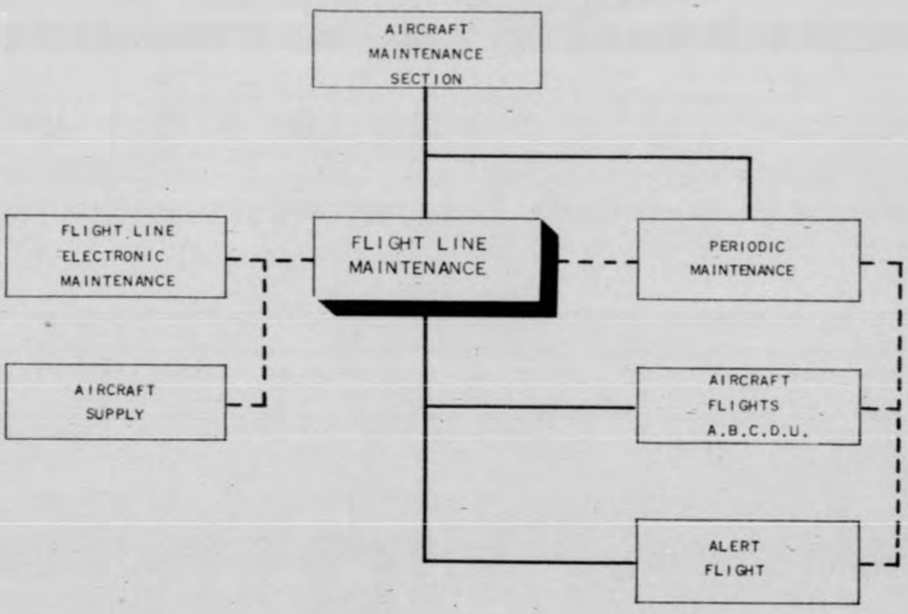
a. The responsibilities of supervisory personnel must be clearly defined and assigned to specific functions of the organization. The selection of inefficient supervisory personnel, or failure to properly delegate authority and specifically assign responsibility, results in over-control and inefficiency. It is the responsibility of the maintenance officer to ascertain through frequent personal interviews that key supervisors have a complete and thorough knowledge of the organization and their *responsibilities, duties,* and *authority.* He must be helpful and emphasize this attitude by definite acts of assistance.

b. Planning and scheduling of the over-all maintenance function is vital to the success of the mission. Every action, every decision, must be based on careful analysis of the facts. The maintenance officer must be constantly on the alert to the balance of work within the maintenance section. When any one function fails, the structure becomes unbalanced. Production and quality will decrease and maintenance capability will not be adequate to meet operational and alert commitments. Immediate action must be taken to forestall or correct any unbalanced situation.

c. The maintenance officer must insure that the assigned technical representatives are fully and properly utilized in accordance with current directives. He should know each one personally and utilize his ability to the maximum in the maintenance training program.

SECTION II

FLIGHT LINE MAINTENANCE



4. **Function.** Flight Line Maintenance performs preflight and postflight inspections, servicing, and unscheduled maintenance of aircraft.

5. **Responsibilities.** The line chief is responsible to the aircraft maintenance officer for:

a. Establishing the flight line maintenance organization as prescribed in this Manual.

b. Effective and economical management of personnel and resources in support of the ADC Mission, and keeping the main-

AIRCRAFT MAINTENANCE

tenance officer informed of the flight line maintenance potential at all times.

c. Delegating sufficient authority to his subordinates, responsible for phases of the flight line maintenance organization, to accomplish the mission by providing adequate *combat-ready aircraft* necessary for alert and training commitments.

d. Supervision of assigned personnel responsible for aircraft flight line maintenance and repair.

e. Daily assignment of aircraft to operations by serial number as required by the contract, thus in effect scheduling maintenance.

f. Enforcing maintenance standards and policies established by technical orders, squadron SOP's, directives, and publications of higher authority.

g. Coordination with Aircraft Supply for supply support of aircraft on the flight line.

h. Assigning combat-ready aircraft and maintenance personnel to the Alert Flight.

i. Scheduling duty hours of flight line maintenance personnel so that the Air Defense Command requirements for number of available combat-ready aircraft are met.

j. Establishing ground safety procedures to insure conformance with current safety directives.

k. Insuring flight line maintenance personnel read and understand applicable technical orders and SOP's.

l. Assembling the necessary data required for the preparation and submission of correspondence and reports.

m. Advising the maintenance officer of the requirements for:

(1) I&E Programs
(2) OJT
(3) Training at Formal Schools
(4) Ground safety programs
(5) Changes to the table of organization.

n. Monitoring the maintenance personnel OJT program to determine its adequacy in qualifying personnel.

6. **Narrative.** a. The line chief is the manager of the flight line maintenance organization and is responsible to the aircraft maintenance officer for efficient operation of this activity. He is subordinate to the maintenance officer and is responsible for assisting him in the accomplishment of his assigned functions. With the concurrence of the maintenance officer, he will be responsible for the proper placement and duty assignment of personnel. He must have daily knowledge of personnel authorized, assigned, and present for duty. To carry out his functions properly, the line chief must have a clear understanding of the standards and policies as established by the materiel officer and the maintenance officer, and must instill in the airmen under him a desire to accomplish these policies just as though they were his own. In the accomplishment of his mission, the line chief must insure that he, and each individual of the flight line organization, adheres to the established chain of command.

b. To obtain balance and provide skill level up-grade training, the line chief should insure that lesser trained personnel are assigned to work with skilled personnel. He must accomplish frequent checks to the extent required to determine the need for additional training. By close observation of assigned personnel and analysis of available data, he can determine the need for additional quality control coverage or maintenance standardization investigation. He should use to maximum advantage individual training at squadron level in obtaining real improvement in his organization.

c. In coordination with the flight and alert chiefs, the line chief must plan and schedule the periodic and unscheduled maintenance to meet the flight contract established by the materiel officer. He should refer all problems to the maintenance officer for action that he cannot resolve.

d. The line chief must periodically check flight line maintenance accomplished within the organization to determine quality. He must do this as a supervisory check to insure that established standards are met and that areas of maintenance deficiency are determined. This supervisory check is in addition to the quality control inspections performed by the inspection section. The line chief and his designated qualified subordinates should normally check and clear the majority of items falling within the scope of their authority. Whenever the line chief or his designated subordinates feel they are not qualified to check a particular item or installation, it is essential that they request additional coverage from the quality control section.

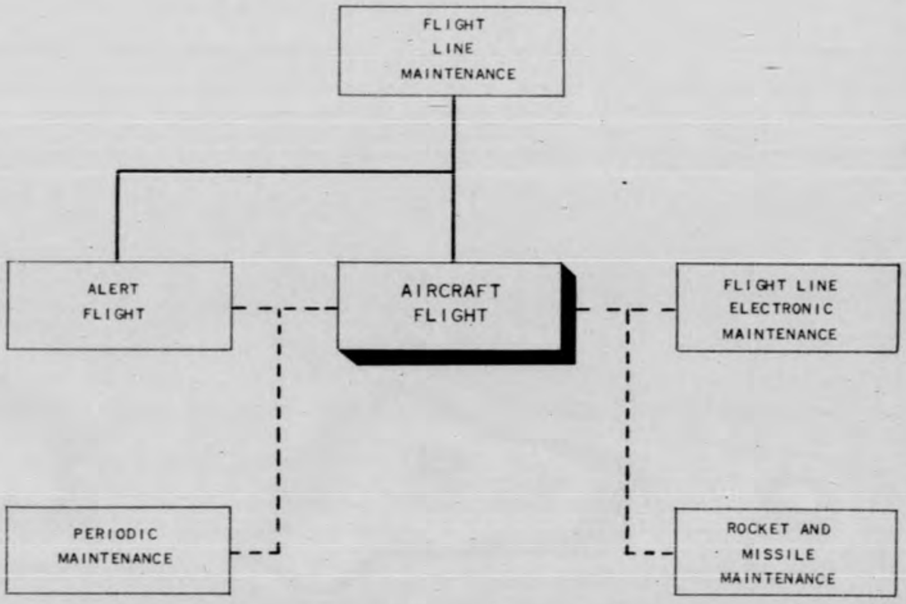
e. The line chief should inspect the Form 1 on each aircraft weekly, paying particular attention to accuracy of entries and delayed discrepancy entries. Delayed maintenance entries should be investigated and causes determined. Every effort must be made to hold the delayed discrepancies to the minimum. Particularly vital is the necessity to insure that maintenance is not deferred because of an approaching periodic inspection.

f. The line chief is responsible for the direct supervision of the flight line and the effective and efficient utilization of assigned personnel. He must institute the controls necessary to keep personnel on the job. In order to get the job done under heavy work schedules, the usual tendency is to work the personnel longer hours; however, the judicious use of personnel and equipment in accordance with a carefully prepared plan and schedule should accomplish the job without consistently working overtime. The line chief through the alert and flight chiefs, should strive to substitute good management, planning, and personnel utilization for overtime.

g. During the course of his supervision, the line chief must insure that adequate emphasis is placed upon the normal housekeeping functions. He must insure that aircraft and parking areas are kept as clean as is practicable, that equipment is in good repair and safe for use, and that reparable property is expeditiously processed to squadron supply. (See Chapter 5).

Section III

THE AIRCRAFT FLIGHT



7. **Function.** The Aircraft Flight performs preflight and postflight inspections, unscheduled maintenance, and servicing of aircraft assigned to the flight.

8. **Responsibilities.** The flight chief

is responsible to the line chief for:

a. Assigning crew chiefs with the concurrence of the line chief.

b. Assigning mechanics to the crews.

c. Delegating sufficient authority to crew chiefs to enable them to effectively manage the maintenance of their aircraft.

d. Assembling data on all defective or unsatisfactory equipment, material, and procedures, encountered by the Flight, for preparation of Unsatisfactory Reports.

e. Reporting up-to-the-minute status of assigned aircraft to the master aircraft status board.

f. Maintaining assigned aircraft maintenance records as prescribed by current directives.

g. Supervision and instruction of personnel, in consonance with the established training program, emphasizing proper maintenance procedures.

h. Insuring that all assigned personnel are instructed in the proper use and care of ground handling and auxiliary power equipment.

i. Ordering parts sufficiently in advance to insure compliance with the replacement schedule, taking into consideration the authorized time extension if a functional test can be passed.

j. Recommending additions or deletions in personnel and equipment authorizations that will aid in the increase of available combat-ready aircraft.

k. Checking authorized individual aircraft installed or loose equipment, as required by current directives.

l. Maintenance of a roster for scheduling flight personnel to duty with the alert flight and other flight functions. Insuring the presence of sufficient personnel to service arriving and departing assigned aircraft during all periods of operation.

m. Performing supervisory maintenance inspections on red cross conditions and clearing them upon completion of proper corrective maintenance.

n. Insuring that property control is used by his crews in handling all recoverable and nonrecoverable items, and that reparable tags are attached to all recoverable items with a *description* of the malfunction and *signed* by an authorized inspector.

9. **Narrative.** a. The flight chief works directly for the line chief and must maintain close coordination with him. The supervision and management of the flight must be in accordance with the policies and procedures established by the maintenance officer and line chief. The line chief must be currently informed of the status and work progress on all assigned aircraft.

b. Regular spot checks of maintenance performed must be made by the flight chief to insure that it is performed in a satisfactory manner and according to established quality standards. These spot checks, together with the supervisory inspections performed in clearing red maintenance symbols, will reveal areas requiring additional training. Recommendations can then be made to the line chief for training necessary to overcome these deficiencies.

c. The flight chief is responsible for managing the activities of assigned personnel. The most skilled should be assigned as crew chiefs, and those of lesser experience assigned as helpers. He must have current knowledge of personnel authorized, assigned, present for duty, and status of training. Suitable rosters must be maintained to schedule duty with alert flight, time off, and other flight functions such as night flying, etc., that all such duties will be assigned on an equitable basis. These rosters should be made or posted so that they are available for personnel to see so that they may plan their activities accordingly.

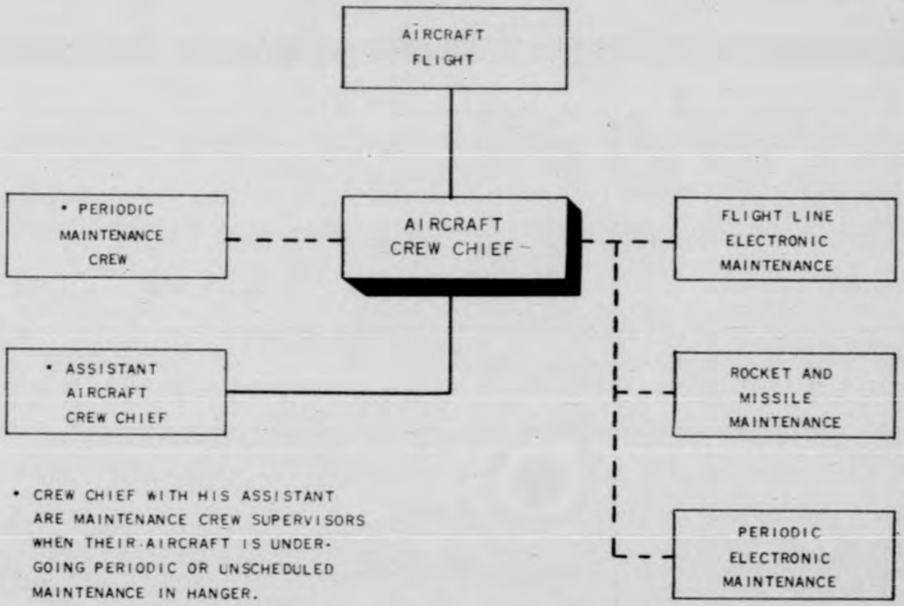
d. The flight chief must be constantly alert for unsatisfactory parts or equipment, and require prompt submission of Unsatisfactory Reports.

e. Through his constant supervision of the flight, he can insure that housekeeping practices of assigned personnel are effective and efficient in maintaining their tools, equipment and working areas.

f. Effective maintenance management exercised by the flight chief is the most important factor in the production of combat-ready aircraft. Expeditious solving of troubles and their immediate correction on the flight line, insofar as possible, is of utmost importance. Close cooperation and coordination with personnel in electronics and supply are of prime importance to insure the prompt accomplishment of functions in their areas of responsibility.

Section IV

THE CREW CHIEF



• CREW CHIEF WITH HIS ASSISTANT ARE MAINTENANCE CREW SUPERVISORS WHEN THEIR AIRCRAFT IS UNDERGOING PERIODIC OR UNSCHEDULED MAINTENANCE IN HANGER.

10. **Function.** The crew chief inspects, maintains, repairs, and services his individually assigned airplane.

11. **Responsibilities.** The crew chief is responsible to the flight chief for:

a. Maintaining his aircraft in a safe, dependable, clean, combat-ready condition.

b. Supervising all scheduled and unscheduled maintenance performed on his aircraft. He will come under the direct supervision of the maintenance superintendent when his aircraft is undergoing periodic or unscheduled maintenance beyond flight line capability.

c. Supervising all crew members, and insuring that they are fully qualified in every job to which they are assigned.

d. Recording all maintenance performed as required by current directives.

e. Insuring conformance to aircraft inspection requirements as prescribed by current aircraft inspection directives.

f. Keeping him fully informed on all changes in status of his aircraft, and the progress of the inspection or maintenance being performed.

g. Insuring that property control is

used by him or his crew in handling of all recoverable and nonrecoverable items, and that reparable tags are *attached* to all recoverable items with a *description of the malfunction* and are signed by an authorized inspector.

h. Estimating and submitting supply requirements to the flight chief for coordination with the aircraft supply section.

i. All installed or loose equipment authorized for his aircraft, and if not on hand, that appropriate action is initiated to obtain the equipment as prescribed by current directives.

j. Instructing and supervising his crew in the proper care and operation of ground support equipment.

k. Enforcing compliance with all squadron materiel SOP's, maintenance policies, technical orders, and other applicable existing directives.

l. Recommending the most qualified personnel to be upgraded through OJT and acting OJT supervisor when directed by the flight chief.

m. Making frequent checks of aircraft forms, records, and TOC data applying to his aircraft to insure these forms and records conform to the actual status of his aircraft.

n. Insuring that qualified personnel are present to care for the airplane during all scheduled flying.

12. **Narrative.** a. The crew chief performs the role of a working supervisor. He must have a complete knowledge of the maintenance inspection requirements for his aircraft, and a working knowledge of all systems to enable him to request assistance from the proper maintenance specialist.

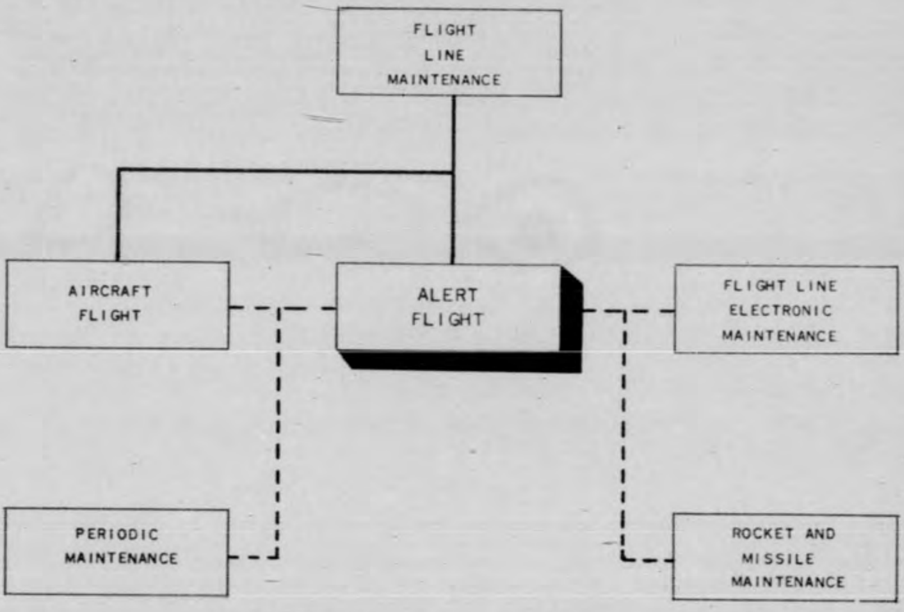
b. As the supervisor of personnel assigned to aid him in the maintenance of his aircraft, he becomes an instructor in his particular field. He must insure that proper methods are used in the accomplishment of maintenance on his aircraft.

c. The role of inspector also becomes one of his duties. Prior to calling for a supervisory inspection, he should check the work that has been accomplished by his crew for any deficiencies.

d. There is no substitute for a crew chief's pride in his aircraft and the resultant spirit of competition between aircraft crews. Meticulous maintenance of aircraft and allied records cannot be overemphasized.

SECTION V

THE ALERT FLIGHT



13. **Function.** The Alert Flight performs servicing, care, and minor maintenance on aircraft assigned for the squadron Air Defense Mission alert commitment.

14. **Responsibilities.** The alert flight chief is responsible to the line chief for:

a. Maintenance and servicing of aircraft, and supervision of personnel assigned to the alert flight.

b. Maximum efficiency in the turn around of alert aircraft.

c. Maintaining close coordination with the operations alert flight commander so that he can intelligently plan support of the squadron's Air Defense Mission as established by the air division combat operations center.

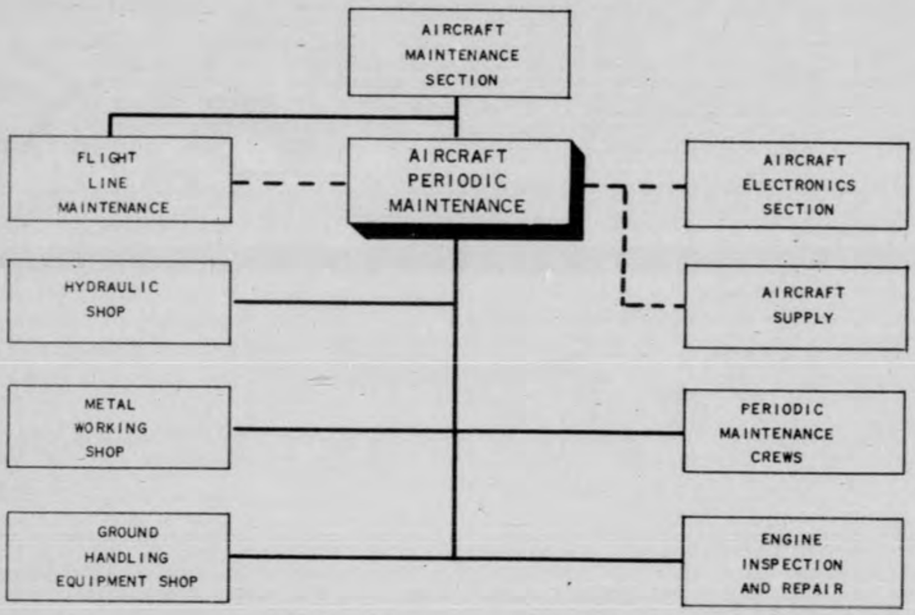
d. Obtaining additional combat-ready aircraft in the event of change in the status or required number of aircraft for alert.

e. General housekeeping and adherence to safety practices in the alert area.

15. **Narrative.** The responsibility of the alert flight chief is one of considerable magnitude. He must be alert and prepared to support a combat mission with no previous warning, and with only the facilities immediately available. He must constantly review the facilities available to him, ascertaining that they are adequate and will support his mission. Any deficiencies must immediately be brought to the attention of the line chief and the alert flight commander. Close coordination with Periodic Maintenance is necessary to insure expeditious dispatch of specialists to alert flight when required. Strict coordination must be effected between the specialists to insure complete turn-around of aircraft in a minimum period of time; including minor adjustments, fuel, oil, and oxygen service, rocket and missile loading, and prompt reporting of status to the alert flight commander.

SECTION VI

AIRCRAFT PERIODIC MAINTENANCE



16. **Function.** Aircraft Periodic Maintenance performs scheduled maintenance inspections of air frames, engines, hydraulic, pressurization, and ejection systems; maintenance and repair of ground handling equipment.

17. **Responsibilities.** The superintendent of aircraft periodic maintenance is responsible to the aircraft maintenance officer for:

a. Establishing periodic maintenance facilities as prescribed by this Manual.

b. Maintenance and inspection of aircraft as required by current directives.

c. Assisting flight line maintenance in accomplishing unscheduled maintenance.

d. Appointing supervisors of the periodic maintenance activities, and delegating sufficient authority to enable them to effectively manage their functions.

e. Coordination with, and assistance to, the aircraft electronics section in maintenance of aircraft electrical and electronic systems.

f. Enforcing maintenance standards and policies established by technical orders, squadron SOP's, and directives of higher authority.

g. Enforcing ground safety procedures in conformance with current directives.

h. Maintaining the hangar, maintenance area, and facilities in a clean, orderly, and serviceable condition, and submitting work orders for needed repair.

i. Effecting timely audits of all authorized equipment, and keeping the aircraft maintenance officer informed of deficiencies and requirements for changes in authorization tables.

j. Enforcing the materiel policies on controlled consolidation of supply shortages on aircraft.

k. Establishing hangar and maintenance SOP's, and insuring that assigned personnel read and understand applicable technical orders and SOP's.

l. Constant review of personnel and training requirements, maintenance policies, procedures, techniques, and initiating appropriate action to obtain improvement or correct deficiencies.

m. Insuring an adequate OJT program for personnel assigned to aircraft maintenance shops, crews, and ground handling equipment maintenance.

n. Performing frequent personal inspections of the maintenance shops to insure adequacy of facilities, cleanliness, proper bench stock levels, and proper handling of all property.

o. Enforcing personal appearance standards for assigned personnel.

p. Establishing levels and collecting consumption data for fuel, oil, paint, cleaning compound, etc., and insure that all safety regulations are enforced in the storage areas of these items.

18. **Narrative.** a. The superintendent of aircraft periodic maintenance must organize and manage the resources of his activity for the efficient, high quality maintenance of aircraft. He is responsible for meeting maintenance schedules and the quality of maintenance performed. To assist him he has subordinate supervisors to whom he must delegate specific responsibilities and authority. The maintenance facilities must be arranged to minimize lost motion and inefficiency. Assigned personnel must be delegated specific duties to be accomplished at definite periods to prevent work area congestion, confusion, and loss of time. Planning must include consideration of all phases of inspection, including aircraft electronics systems maintenance. The goal of planning and scheduling must be the increase of available combat-ready aircraft.

b. The periodic maintenance superintendent, in conjunction with the various maintenance supervisors, should establish bench stocks of nonrecoverable bits and pieces in each of the shops, and a bench stock of commercial hardware, such as bolts, nuts, washers, and cotter keys, maintained in the aircraft maintenance area and available to maintenance crews during any work period. He should direct the supervisor of the ground equipment section to establish and maintain levels of cleaning solvents, fuel, oil, lubricants, chemicals, etc., to be used in the normal performance of maintenance.

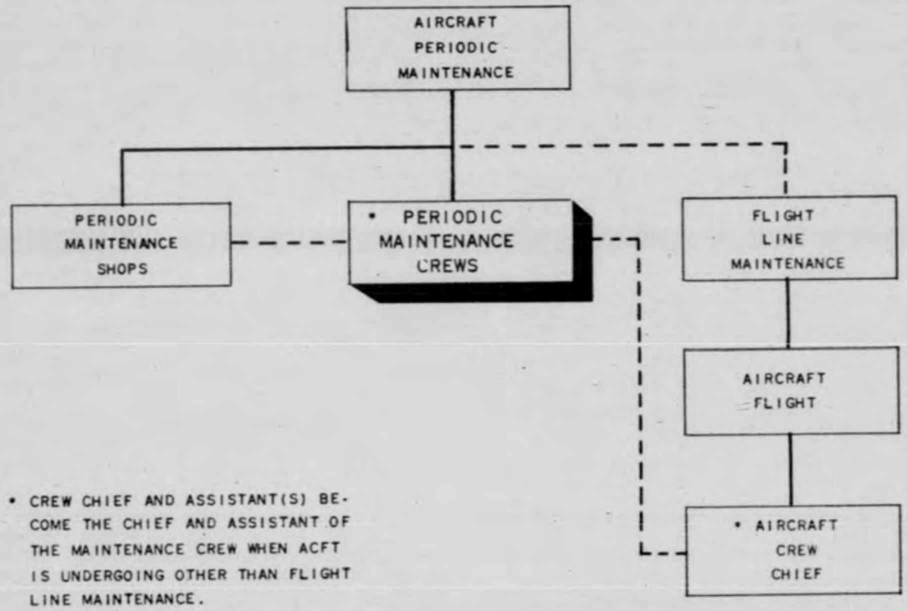
c. The periodic maintenance superintendent must have current knowledge of personnel assigned, authorized, and present for duty, and constant attention must be given to the status of maintenance in progress so that he will be aware of his position in relation to the established schedule. It is necessary that he constantly plan and schedule to insure that specialist requirements, supply needs, etc., are known and prepared for as far in advance as practicable.

d. The periodic maintenance superintendent cannot reside on a "pedestal" expecting and demanding compliance with directives and accomplishment of high quality maintenance; he must frequently inspect the quality of maintenance being performed to detect the weakness in his organization, well remembering the necessity to provide tools, equipment, parts, and personnel for the job. It is an ever present challenge to raise the qualifications of all personnel and the quality of maintenance being performed. Each assigned person should know what to do, when to do it, how to do it, and *whom to call upon for assistance.*

e. Adequate maintenance of assigned ground support and motorized equipment is essential to the accomplishment of the maintenance organization mission. The maintenance superintendent must take a personal interest in the assigned equipment, and insure that equipment maintenance is accomplished in a manner to provide maximum availability of serviceable equipment.

SECTION VII

THE PERIODIC MAINTENANCE CREW



• CREW CHIEF AND ASSISTANT(S) BECOME THE CHIEF AND ASSISTANT OF THE MAINTENANCE CREW WHEN ACFT IS UNDERGOING OTHER THAN FLIGHT LINE MAINTENANCE.

19. **Function.** Periodic maintenance crews perform inspection, maintenance, and repair of aircraft in accordance with current directives.

20. **Responsibilities.** Periodic maintenance crews are responsible to the maintenance superintendent for:

a. Accomplishment of high-quality maintenance and repair of aircraft in accordance with policies and procedures established by the maintenance officer and maintenance superintendent.

b. Completion of required paperwork in connection with the maintenance performed.

c. Proper housekeeping of the working area and compliance with safety directives.

21. **Narrative.** Maintenance crews, as such, are composed of the airplane crew chief and his assistant(s), such additional mechanics as are available and detailed by the maintenance superintendent, and specialists from the hydraulic and engine shops. The metal working specialists will perform their inspection as required, but will not be an integral part of a crew. From this it can be ascertained that main-

tenance crews are very flexible and only sufficient personnel are detailed as the job requires. The remaining specialists will be available in the shops for repairing and maintaining components and equipment.

SECTION VIII

PERIODIC MAINTENANCE SHOPS

22. **Function.** Periodic Maintenance Shops accomplish inspection and repair of aircraft components.

23. **Responsibilities.** The supervisors of the individual periodic maintenance shops are responsible to the maintenance superintendent for:

a. Organization of their respective maintenance shops to effect expeditious inspection and repair of aircraft and components coming within the scope of their capabilities.

b. Fabrication, where possible and necessary, of test equipment, mockups, and other items required to increase accuracy and simplicity of maintenance.

c. Training of personnel in each shop to increase their capability and utilization potential.

d. Coordinating with supply on stock levels of expendable nonrecoverable supplies required to perform their function, correct procedures for requisitioning, turn-in, storage, and identification of supplies.

e. Scheduling the working hours of each individual to insure availablity at the required time to perform his work.

f. Coordination with other maintenance facilities, assisting, and receiving assistance for maintenance of shop and ground handling equipment.

g. Bench checking components as required by current directives.

h. Establishing procedures and SOP's for the effective and efficient operation of each shop.

i. Maintaining historical and inspection records relative to shop and ground handling equipment, and such other records as are necessary for the accumulation of data for reports.

j. Instruction of personnel in performance of their duties in such a manner as to place the greatest possible emphasis on proper use of tools and equipment to reduce ground accidents to a minimum.

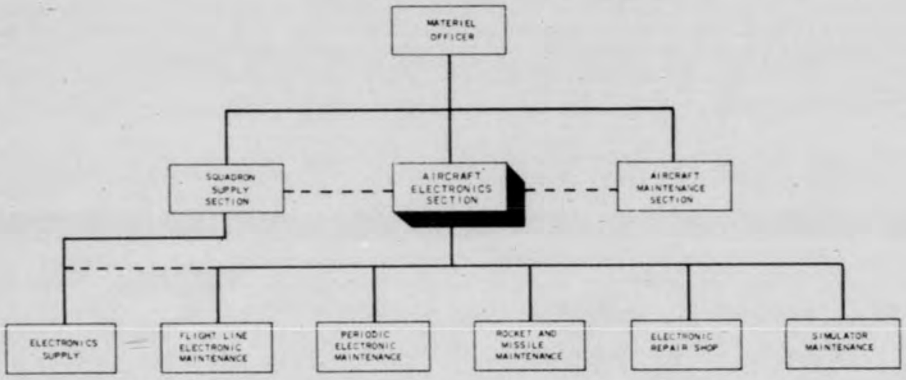
24. **Narrative.** a. The periodic maintenance shops must be organized in such a manner as to provide the maximum support of the squadron mission. The only limit to what can be done in these shops is the ingenuity of the personnel and available equipment. To attain maximum support of the squadron mission, the spirit of complete cooperation must prevail. Personnel assigned must constantly strive toward the improvement in procedures, methods, and their employment; directing their efforts toward effective production in support of quality maintenance.

b. All supervisors must continually survey existing conditions of facilities and maintenance workload in establishing schedules and forecasting requirements, and making known immediately to higher authority all conditions beyond their scope of control.

CHAPTER 4

Section I

AIRCRAFT ELECTRONICS SECTION



TO BE INCLUDED WHEN SIMULATOR MAINTENANCE IS RESPONSIBILITY OF THE INDIVIDUAL FIGHTER-INTERCEPTOR SQUADRON

1. **Function.** The Aircraft Electronics Section is charged with the maintenance, repair, and servicing of all aircraft electrical and electronic systems and equipment, instruments, rockets and missiles, cameras, and recording equipment, electrical and electronic test equipment, electrical and electronic mockups or test stands, electrical and electronic training devices, communications systems, and small arms possessed by the squadron.

2. **Responsibilities.** The aircraft electronics officer is responsible to the materiel officer for:

a. Organizing the aircraft electronics section in accordance with this Manual, and establishing the organizational structure, below the sub-section level indicated on the aircraft electronics section organization chart, to meet the local situation.

b. Consolidation of all electrical, electronic systems, equipment and instrument repair facilities in a single electronic repair shop. The missile and simulator repair facilities will be the only exceptions to this consolidation, and they will be located in the buildings specifically prepared for missile processing and housing simulators.

c. Maintenance, repair, and adjustment of:

(1) Aircraft electrical systems.
(2) Fire control systems.
(3) Communications and navigation systems.
(4) Jet engine electronic fuel control systems.
(5) Stability augmenter systems.

(6) Auto pilot systems.
(7) Control surface tie-in systems.
(8) Aircraft instruments.
(9) Electrical and electronic fuel quantity systems.
(10) Data link systems.

d. Installation, removal, inspection and flight line storage of rockets and missiles.

e. Inspection, maintenance, repair and adjustment of rocket and missile launcher components.

f. Inspection and maintenance of organizational small arms.

g. Assisting the aircraft maintenance section in the maintenance of ejection systems, and electrical and electronic portions of ground powered support equipment.

h. Exercising the best possible management of resources under his control in support of the primary mission.

i. Duty assignment of each assigned individual, without regard to AFSC, to obtain the maximum utilization of each individual's technical and supervisory potential.

j. Maintaining a training and cross-training program for assigned personnel, without regard to AFSC, to constantly increase the capability of each mechanic, technician, and supervisor in fighter-interceptor electronics maintenance.

k. Effecting close coordination with the aircraft maintenance section in assignment of workloads to produce the maximum number of combat-ready aircraft.

l. Effecting close coordination with the squadron supply section in all matters of supply affecting, or which will affect, electronics support of the primary mission; and assisting in establishment of stand-by and bench stock levels for the electronics supply.

m. Providing technical advice to the squadron in the proper operation and use of electronic equipment.

n. Constantly reviewing electronic maintenance policies, procedures, techniques, equipment requirements, personnel requirements, and directives; and initiating appropriate action to correct deficiencies and obtain the maximum maintenance support of the primary mission.

o. Enforcing squadron materiel policies, standing operating procedures, applicable maintenance directives, and maintaining electronics maintenance records in accordance with existing directives.

p. Reporting electronic equipment status to the aircraft maintenance section master aircraft status board.

q. Maintaining the electronic systems status board.

r. Submitting Unsatisfactory Reports on defective equipment maintained by the aircraft electronics section.

s. Insuring that proper safety procedures are observed, and good housekeeping of shops, working and storage areas is maintained in accordance with existing directives.

3. **Narrative.** The air electronics section and the aircraft maintenance section exist for the sole purpose of maintaining sufficient combat-ready aircraft to support the squadron mission. Neither section occupies a superior organizational position, and one section's work is just as important as the other, because a fighter-interceptor which is not fully operational in every function is useless as a combat weapon. Rocket and missile handlers (weapons mechanics) were assigned to electronics due to close association of rockets and missiles with the electronic systems. The aircraft maintenance responsibilities were divided between the two sections on the basis of technical fields of work (homogenous assignment of functions), supervisory requirements and qualifications (span of control), and similarity of tools, test equipment, and training requirements. This division of maintenance responsibility will require close coordination and association between the maintenance officers, and the air electronics officer must require his key supervisory personnel to maintain a similar association with their counterparts in aircraft maintenance.

a. The air electronics officer must aggressively apply the principles of management to his organization to successfully discharge his maintenance responsibilities. He must place responsibility on, and delegate commensurate authority to his key supervisors for operation of the subsections. Only through assignment of responsibility and delegation of authority can the air electronics officer relieve himself of detailed supervisory work, and place himself in a position to exercise energetic and dynamic management of his section.

b. The air electronics officer must insure his supervisors are enforcing the highest maintenance standards in working on aircraft, equipment, and in use of test and ground handling equipment. He must also keep in mind that mechanics must have the proper equipment and supplies to do first class maintenance, thus the availability of adequate facilities, supplies, and equipment must be given constant attention.

c. Effective management of personnel resources is the biggest single factor which will contribute to high quality maintenance and high combat-ready aircraft availability. Assignment, training and utilization of personnel must be given priority attention at all times. Realistic training programs must be established, and obstacles to operation of the programs removed. Duty assignment of personnel must be governed by the needs of the various sub-sections, and the individual's capability. The maximum utilization of each assigned individual must be realized. To obtain maximum utilization of electrical and electronics maintenance personnel, he must consider all electrical and electronics systems and equipment installed in aircraft as one system, and all personnel maintaining this electronic system to be eligible to learn and become proficient on any part of the system, with due consideration given to the individual's capability. The various sub-sections of the aircraft electronics section must have personnel assigned who are duty specialized to maintain all equipment for which the sub-section is responsible. This means, for example, that personnel duty specialized on fire control systems, personnel duty specialized on communications and navigation systems, personnel duty specialized on electrical systems, and personnel duty specialized on fuel control, auto pilots and instruments, will be assigned to the flight line electronics maintenance sub-section. A similar assignment of personnel to the other sub-sections must be made to fit their functions and responsibilities. The aircraft electronics officer must advise all squadron personnel on the technical operation of electronics equipment and systems.

Section II

FLIGHT LINE ELECTRONIC MAINTENANCE

4. **Function.** Flight Line Electronic Maintenance performs preflight inspection, postflight inspection, and unscheduled maintenance of instruments, electrical and electronic systems and equipment installed in aircraft.

5. **Responsibilities.** The superintendent of flight line electronic maintenance is responsible to the aircraft electronics officer for:

a. Organization of flight line electronic maintenance as directed by the aircraft electronics officer.

b. Preflight and postflight inspection of instruments, electrical and electronic systems, and equipment installed in aircraft.

c. Unscheduled electrical, electronic, and instrument maintenance and repair with the assistance of the periodic electronic maintenance and electronic repair shop.

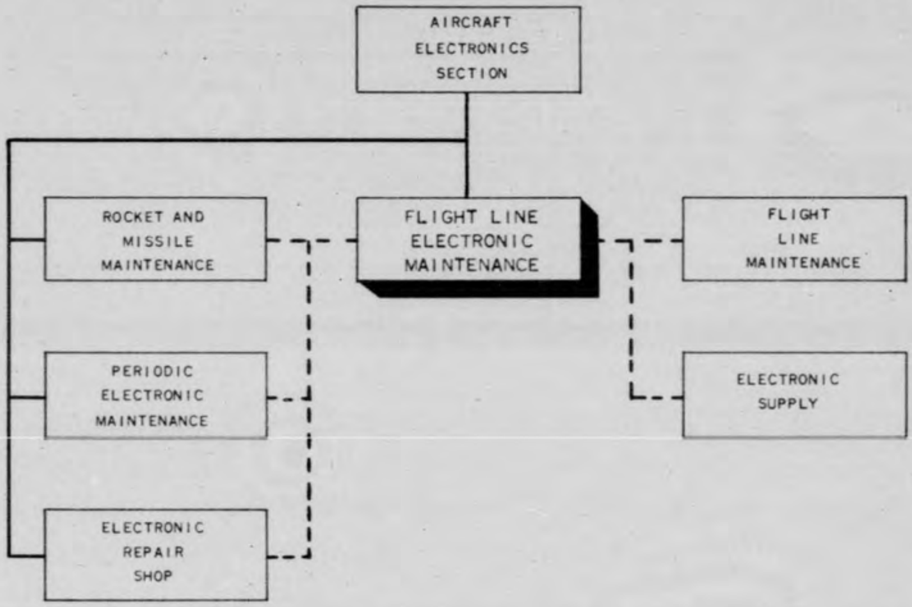
d. Direction and management of personnel and equipment resources under his control to maintain the maximum number of aircraft combat-ready.

e. Programming and operating an effective flight line maintenance training program with special emphasis on systems malfunction analysis, and effecting cross training of flight line electronic maintenance personnel to obtain the maximum development and utilization of supervisory and technical skills.

f. Availability and proper care and utilization of tools, equipment, and supplies required by flight line electronic maintenance crews.

g. Close coordination with the line chief and flight chiefs in scheduling preflight and postflight inspection, and flight line maintenance, and reporting the status of instruments, and electrical and electronic systems.

h. Close coordination with the superintendent of rocket and missile maintenance for installation and removal of rockets and missiles.



i. Devising improved procedures, methods, and techniques for flight line inspection and maintenance of instruments, electrical and electronic systems, and submitting to the aircraft electronics officer for approval before implementing.

j. Enforcing squadron materiel, and section maintenance policies, procedures, techniques, and other applicable directives.

k. Reporting aircraft electrical and electronic systems status to the aircraft maintenance section master aircraft status board, and to the electronic systems status board.

l. Preparing Unsatisfactory Reports on defective equipment and improper or obsolete preflight and postflight inspection procedures.

m. Maintaining maintenance records as required by directives.

n. Insuring that all flight line electronic maintenance personnel are properly instructed in safety practices and procedures to be observed in working in and around aircraft, and that personnel are complying with safety practices and procedures.

o. Adequate housekeeping of flight line electronic maintenance working areas, cleanliness of installed electrical and electronic equipment, and the installed equipment areas in the aircraft.

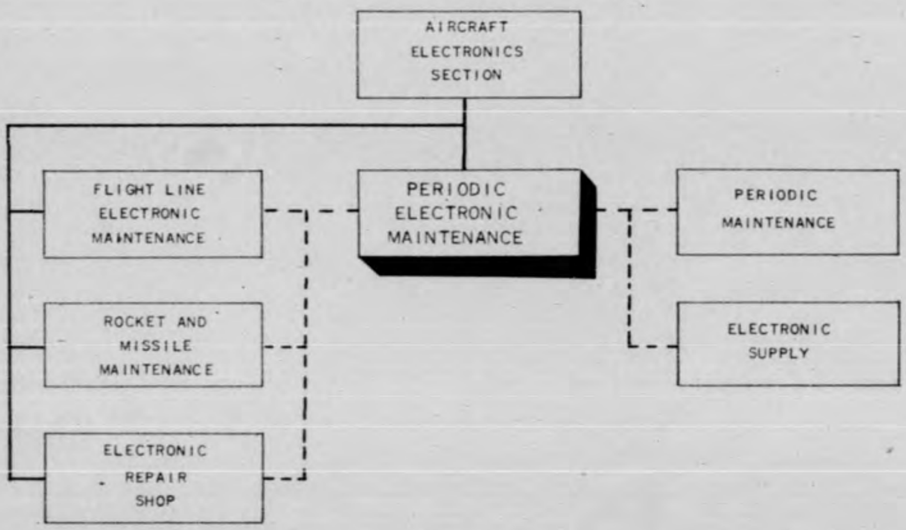
p. Insuring flight line electronic maintenance personnel provide adequate protection to the aerodynamic surfaces of aircraft to prevent scratching, and damage while performing their work.

6. **Narrative.** a. The superintendent of flight line electronic maintenance has a job of great responsibility; a fast moving job which requires constant coordination with aircraft maintenance and with the other sub-sections in aircraft electronics; a job which requires decisions. The decisions made by the superintendent, his technicians and mechanics, have a direct and immediate effect on the squadrons capability to perform the Air Defense Mission. Are the aircraft electrical and electronic systems capable of *fully* performing their intended functions; are they combat-ready? If, during a preflight inspection, a malfunction or out of tolerance condition is observed, a decision based on intelligent analysis must be made by the technician or mechanic; can the unsatisfactory condition be corrected on the spot or will the condition require further analysis, with correction to be delayed until after preflight of other aircraft are completed? Such decisions must be made, and made rapidly and accurately; for on these decisions rest the availability of sufficient numbers of combat-ready aircraft for the squadron to perform its mission.

b. The superintendent of flight line electronic maintenance must be a manager in every sense of the word. The technicians and mechanics assigned to him must be the best available, and he must train them to be aircraft electrical and electronic systems analysts. He must train the technicians and mechanics to be critical; to be capable of rapid, intelligent, trouble-shooting; trouble shooting based on thorough understanding of their system and its inter-relation with other systems; to have pride in their work. He must insure his technicians and mechanics are equipped with sufficient tools, test equipment, ground power, maintenance stands, etc., to rapidly and efficiently perform their work. He must fully utilize his personnel to the maximum of their capability. If a fire control systems technician can preflight communications and electrical equipment while he is in the cockpit, he should do so. He must insure his personnel coordinate and cooperate with their counterparts in aircraft maintenance. The superintendent of flight line electronic maintenance must anticipate his needs, he must plan, he must coordinate; he is a key manager in an important position.

Section III

PERIODIC ELECTRONIC MAINTENANCE



7. **Function.** Periodic Electronic Maintenance performs periodic (scheduled) inspection and maintenance of instruments, electrical and electronic systems, and equipment installed in aircraft.

8. **Responsibilities.** The supervisor of periodic electronic maintenance is responsible to the aircraft electronics officer for:

a. Organization of periodic electronic maintenance as directed by the aircraft electronic officer.

b. Periodic inspection and maintenance of all instruments, electrical and electronic systems and equipment installed in aircraft.

c. Assisting flight line electronic maintenance crews in performing unscheduled maintenance.

d. Providing, as required, electrical and electronic technical assistance to the aircraft periodic maintenance supervisor for maintenance of ground powered equipment.

e. Direction and management of personnel, equipment, and facilities resources under his control to produce the maximum number of combat-ready aircraft.

f. Programming and operating an effective periodic electronic maintenance training program, and effecting cross training of periodic electronic maintenance personnel to obtain the maximum development and utilization of supervisory and technical skills.

g. Availability, and proper care and utilization of tools, equipment, and supplies required by the periodic electronic maintenance crews.

h. Close coordination with the aircraft periodic maintenance supervisor in scheduling workloads, and insuring cooperation and coordination of his crews with the aircraft, engine, and hydraulic technicians in accomplishing joint maintenance responsibilities.

i. Close coordination with the superintendent of rocket and missile maintenance in scheduling periodic maintenance of rocket and missile launching systems.

j. Close coordination with the supervisor of the electronics repair shop in scheduling of the workload to and from the electronic periodic maintenance operation.

k. Close coordination with the electronic maintenance supply coordinator in forecasting periodic maintenance supply support requirements.

l. Devising improved procedures, methods and techniques for periodic maintenance of instruments, electrical and electronic systems and equipment, and submitting to the aircraft electronics officer for approval before implementing.

m. Enforcing squadron materiel, and section maintenance policies, procedures, techniques, and applicable directives.

n. Reporting status of electrical and electronic systems maintenance status to the electronic systems status board.

o. Preparing Unsatisfactory Reports on defective equipment, and improper or obsolete inspection procedures.

p. Maintaining maintenance records as required by directives.

q. Insuring all periodic electronic maintenance personnel are properly instructed in safety practices and procedures to be observed in working in and around aircraft, and that personnel are complying with the safety practices and procedures.

r. Adequate housekeeping of periodic electronic maintenance working area, cleanliness of installed electrical and electronic equipment, and the installed equipment areas in aircraft.

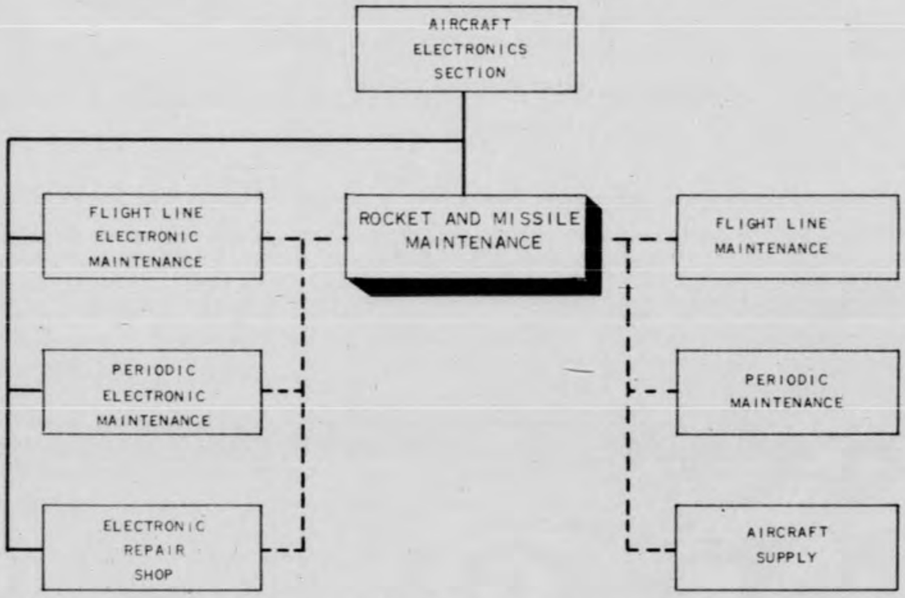
s. Insuring periodic electronic maintenance personnel provide adequate protection to the aerodynamic surfaces of the aircraft to prevent scratching and damage while performing their work.

9. **Narrative.** a. The supervisor of periodic electronic maintenance is responsible for producing excellently maintained, reliable, aircraft electrical and electronic systems. His technicians and mechanics must be trained to make searching inspections and to be meticulous in making checks, adjustments, and in performing maintenance work. He must utilize his personnel to their maximum capability. His technicians and mechanics, in addition to their duty specialization proficiency, must gain an over-all knowledge of the aircraft electrical and electronic system, and must learn to work in teams.

b. The supervisor of periodic electronic maintenance must maintain constant close coordination and cooperation with the periodic maintenance supervisor, and insure his personnel establish and maintain a similar relationship with their counterparts in aircraft maintenance. He must anticipate his needs, plan his work, and insure his technicians and mechanics are equipped with sufficient tools, test equipment, ground power, maintenance stand, etc., to rapidly and efficiently perform their work.

Section IV

ROCKET AND MISSILE MAINTENANCE



10. **Function.** Rocket and Missile Maintenance is charged with organizational inspection and maintenance of all rockets, missiles, hand weapons, and the launching systems associated with rockets and missiles.

11. **Responsibilities.** The superintendent of rocket and missile maintenance is responsible to the aircraft electronics officer for:

a. Organization of rocket and missile maintenance as directed by the aircraft electronics officer.

b. Installation, removal, inspection, and flight line storage of rockets and missiles.

c. Inspection, maintenance, and repair of rocket and missile launching systems.

d. Maintenance and repair of missiles.

e. Inspection and maintenance of organizational small arms.

f. Assisting aircraft maintenance in the maintenance and inspection of ejection systems.

g. Direction and management of personnel, equipment, and facilities resources under his control.

h. Programming and operating an effective rocket and missile maintenance training program, and effecting cross training of rocket and missile maintenance personnel to obtain the maximum development and utilization of supervisory and technical skills.

i. Availability, proper care and use of tools, equipment, and supplies required by rocket and missile maintenance crews.

j. Close coordination with the line chief, periodic maintenance supervisor, superintendent of flight line electronic maintenance, and supervisor of electronic periodic maintenance in scheduling his workload.

k. Close coordination with aircraft supply in obtaining adequate quantities of combat and training rockets and missiles to support the primary mission.

l. Devising improved procedures, methods, and techniques for rocket and missile maintenance, inspection and handling, and submitting to the aircraft electronics officer for approval before implementing.

m. Enforcing squadron materiel, and section maintenance policies, procedures, techniques, and applicable directives.

n. Reporting status of rocket and missile launching systems and loading to the electronic systems status board.

o. Preparing Unsatisfactory Reports on defective equipment, weapons components, and improper or obsolete inspection procedures.

p. Maintaining maintenance records as required by directives.

q. Insuring that all rocket and missile maintenance personnel are properly instructed in safety practices and procedures to be observed in working in and around aircraft, handling and loading weapons components, and that personnel are complying with the safety practices and procedures.

r. Insuring squadron storage of rockets and missiles meets the safety criteria for such explosives, or preparation of request for waiver of safety criteria where the local flight line explosive storage facilities cannot feasibly be arranged to meet the safety criteria requirement.

s. Adequate housekeeping of rocket and missile maintenance working areas.

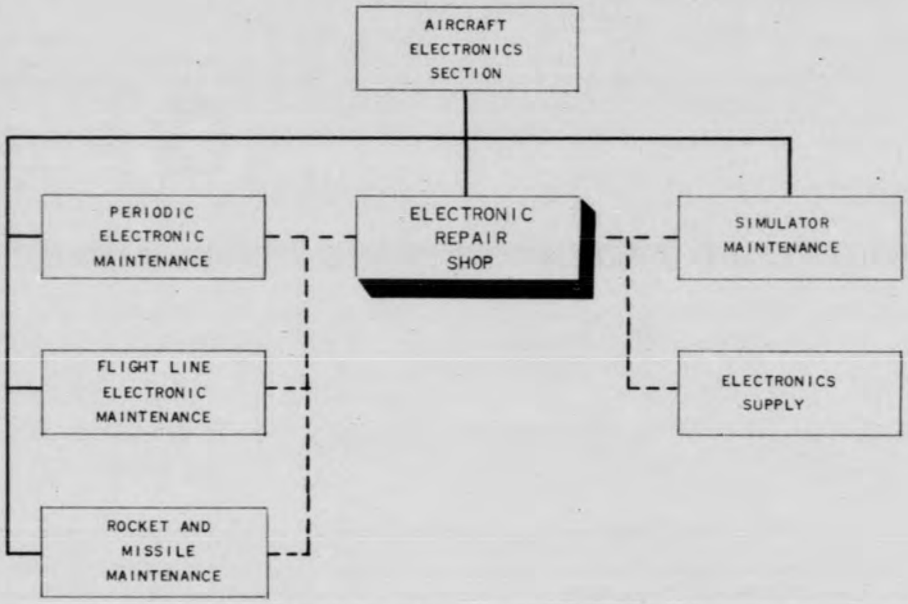
t. Insuring rocket and missile maintenance personnel provide adequate protection to the aerodynamic surfaces of the aircraft to prevent scratching and damage while performing their work.

12. **Narrative.** a. Fighter-interceptor aircraft do not become a weapon until properly inspected and maintained weapons components are properly installed. Perhaps the foregoing is a trite sentence and too obvious, but it contains the essence of the rocket and maintenance missile superintendent's responsibilities. Sloppy maintenance of weapons launching systems and sloppy installation of weapons components produces accidents and not combat-ready aircraft. The supervisor of rocket and missile maintenance is responsible for the final task which makes an interceptor a combat-ready aircraft. All other work on the interceptor aircraft is in preparation for the loading of weapons components. The rocket and missile maintenance scope of work includes periodic maintenance, flight line maintenance, and turn around servicing of aircraft.

b. The superintendent must train his personnel in all elements of his work area, he must emphasize accuracy and safety in work performance, and he must regularly exercise weapons components loading crews in aircraft turn around servicing. He must maintain close coordination with aircraft maintenance, flight line electronic maintenance, aircraft supply, and squadron operations in scheduling his maintenance workload and aircraft weapons servicing operations. He must insure his personnel are equipped with sufficient tools, test equipment, ground power, maintenance stands, weapons handling equipment, and facilities to rapidly and efficiently perform their work.

Section V

THE ELECTRONIC REPAIR SHOP



13. **Function.** The Electronic Repair Shop is charged with inspection and repair support of the flight line electronic, periodic electronic, and rocket and missile maintenance sub-sections; supply coordination for the aircraft electronics section; and installation and repair support for any other electronics or associated equipment possessed by the squadron.

14. **Responsibilities.** The supervisor of the electronic repair shop is responsible to the aircraft electronics officer for:

a. Organization of the electronic repair shop as directed by the aircraft electronics officer.

b. Inspection and repair of all instruments, test equipment, electrical and electronic systems components, cameras, and scope recording and associated equipment in accordance with existing directives.

c. Designating an electronic technician as electronic supply coordinator for the aircraft electronics section. The electronic supply coordinator will constantly keep the electronic supply supervisor advised of the electronic maintenance supply support requirements for tools, test equipment, spare parts and components, and will give him technical assistance in inspection and identification of electrical and electronic test equipment, spare parts and components.

d. Assisting rocket and missile maintenance in the inspection and repair of missiles, missile auxiliaries, and test equipment.

e. Direction and management of personnel, equipment, and facilities resources under his control for support of combat-ready aircraft.

f. Programming and operating an effective electronic repair training program, and effecting cross training of electronics repair shop personnel to obtain the maximum development and use of supervisory and technical skills.

g. Availability, proper care, and use of tools, equipment, mockups, and supplies required by electronics repair shop personnel.

h. Close coordination with the squadron operations officer for installation of scope recording and camera equipment in aircraft scheduled for training flights requiring use of such equipment.

i. Close coordination with the supervisor of periodic electronic maintenance and superintendent of flight line electronic maintenance in supporting unscheduled and scheduled electronic maintenance.

j. Devising improved procedures, methods, and techniques for inspection and repair of all electrical and electronic equipment, instruments, test equipment, cameras, and scope recording and associated equipment, and submitting to the aircraft electronics officer for approval before implementing.

k. Enforcing squadron materiel, and section maintenance policies, procedures, techniques, and other applicable directives.

l. Preparing Unsatisfactory Reports on defective equipment.

m. Maintaining maintenance records as required by directives.

n. Insuring all electronic repair shop personnel are properly instructed in safety practices and procedures to be observed in working with electrical and electronics equipment, and that personnel are complying with the safety practices and procedures.

o. Adequate housekeeping of the electronic repair shop working areas.

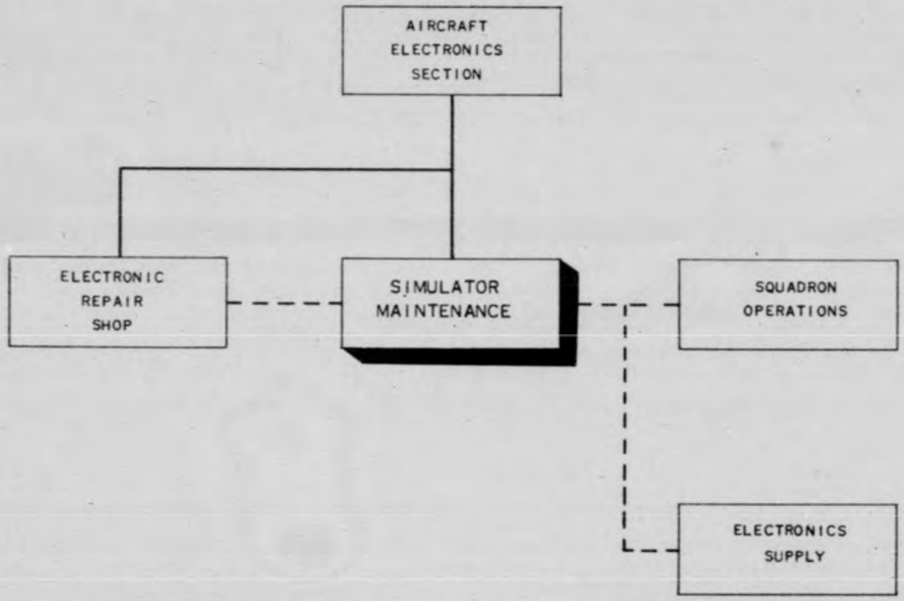
15. **Narrative.** a. The electronic repair shop is the basic support element of the aircraft electronics section. The shop will contain mockups for many types of equipment, and the mockups must be arranged for the most efficient flow of work through the shop. Personnel assigned to the electronic repair shop must be carefully trained in repair procedures and techniques; they must produce only the highest quality of work. It may be desirable for some technicians assigned to electronic periodic maintenance, such as those maintaining electronic fuel controls, to bring their components to the electronic repair shop and effect repair themselves. While personnel of the electronic repair shop will have a duty specialization, they, in addition, must be cross trained on other equipments to obtain maximum utilization of assigned personnel.

b. Repair shop personnel must be trained to be inquisitive, to carefully investigate each subtle deviation of equipment operation as well as the more apparent defects. The equipment they repair must meet the design specifications of that equipment in every respect. The supervisor of the electronic repair shop must insure quality repair and restoration of equipment--if the equipment is dirty, that it is cleaned; if paint is chipped on a box, that the chipped place is painted; if a screw is missing or damaged, replace the screw; in short, restore the equipment to a new and fully serviceable condition.

c. The supervisor of the electronics repair shop must strive to increase the capability of his shop, in both facilities and personnel, to repair the equipment for which he is responsible. He must insure that his technicians and mechanics are equipped with sufficient tools, test equipment, mockups, and facilities to efficiently and rapidly perform their work. He must exercise a high degree of technical judgment.

Section VI

SIMULATOR MAINTENANCE



16. **Function.** The simulator maintenance sub-section is charged with inspection, maintenance, and repair of fighter-interceptor simulator training devices.

17. **Responsibilities.** The supervisor of simulator maintenance is responsible to the aircraft electronics officer for:

a. Organization of simulator maintenance as directed by the aircraft electronics officer.

b. Inspection, maintenance, and repair of simulators, and providing technical supervision and assistance at the simulator during its hours of operation.

c. Direction and management of personnel, equipment, and facilities resources under his control to provide the maximum availability of the simulator for pilot training.

d. Programming and operating an effective simulator maintenance training program.

e. Availability and proper care and use of tools, equipment, parts, and supplies for simulator maintenance personnel.

f. Advising the electronic supply of tools, equipment, and parts requirements for support of the simulator.

g. Close coordination with the squadron operations officer in scheduling simulator maintenance workload for the least interference with pilot training schedule.

h. Devising improved procedures, methods, and techniques for maintenance and repair of simulators, and submitting to the aircraft electronics officer for approval before implementing.

i. Enforcing squadron materiel and section maintenance policies, procedures, and techniques, and applicable directives.

j. Reporting the status of the simulator to squadron operations as directed.

k. Preparing Unsatisfactory Reports

on defective simulator equipment and systems.

l. Maintaining maintenance records as required by directives.

m. Insuring all simulator maintenance personnel are properly instructed in safety practices and procedures to be observed in working in and around the simulator, and that personnel are complying with the safety practices and procedures.

n. Adequate housekeeping of the simulator, and the simulator building and facilities.

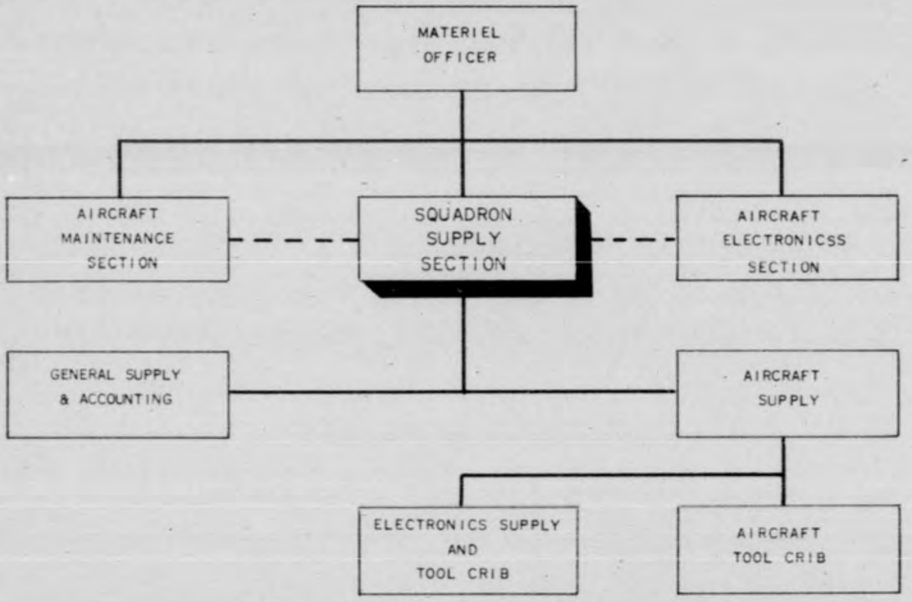
18. **Narrative.** The simulator is designed to teach combat crews procedures in fighter-interceptor operation. A simulator that is properly simulating only a part of the fighter-interceptor operation function is useless as a training device. The supervisor of simulator maintenance must plan his work and supply requirements, and manage his personnel and facilities to maintain a *fully* functioning simulator to fully meet the combat crew training requirements.

Chapter 5

SQUADRON SUPPLY

Section I

THE SQUADRON SUPPLY SECTION



1. **Function.** The Squadron Supply requisitions, receives, issues and stores all authorized materials and equipment for the squadron. It provides facilities for issue of serviceable materials and equipment and turn-in of reparables. Included is the maintenance and preparation of necessary property records and reports.

2. **Responsibilities.** The squadron supply officer is responsible to the materiel officer for:

a. The organization and operation of the supply section as prescribed in this Manual, and delegating authority to subordinates commensurate with their responsibilities.

b. Developing and executing a training program, with the assistance of the training officer, to constantly increase the capabilities of each assigned individual.

c. Constant review of personnel requirements, supply policies, procedures, techniques, and directives; initiating appropriate action to correct the deficiencies noted.

d. Assuring that the duty schedule of all supply functions coincides with the needs of all maintenance activities.

e. Determining jointly with representatives of each squadron activity their need for bench stock levels, component stand-by levels, office and housekeeping supplies.

f. Exhausting every possible method of locating and acquiring the supplies and equipment required for operation of the squadron.

g. Maintaining supply discipline, custody of property; enforcing supply policies and procedures; storing and inspections of all property not on custody receipt.

h. Maintaining correspondence files, administrative publications, and supply catalogues.

i. Preparing reports and correspondence and maintaining personnel records and suspense file.

j. Complying with good housekeeping and safety procedures in all branches of supply.

3. **Narrative.** a. The supply section determines to a very great extent the combat capability of the squadron. It is essential that it be organized in a manner to most expeditiously process all supplies and equipment.

b. Action to locate and acquire items on priority requisitions, through base supply, must include a squadron offer for use of pilot pick-up and lateral supply assistance. However, the most important factor in avoiding the necessity for requisitions of this nature is anticipating requirements as far in advance as possible. This action requires close cooperation with all phases of maintenance.

c. While it is true that supply has other functions than support of aircraft and aircrews, such functions must of necessity be given a proper relative priority. The prime consideration -- the ultimate goal--must be combat-ready airplanes and aircrews.

Section II

THE SUPPLY SUPERINTENDENT

4. **Function.** The Supply Superintendent assists the supply officer in managing the squadron supply.

5. **Responsibilities.** He is directly responsible to the supply officer for:

a. Implementing policies and procedures of the supply officer and higher authority.

b. Indoctrination and training of personnel.

c. Directing activities of the supply expediters.

d. Coordinating between the various branches of supply.

e. Conducting such surveys as required.

Section III

THE GENERAL SUPPLY AND ACCOUNTING

6. **Function.** The General Supply and Accounting prepares and maintains property accounting records and the central control register.

7. **Responsibilities.** The chief of general supply and accounting is responsible to the supply officer for:

a. Maintaining the UAL and allied documents.

b. Requisitioning organizational supplies and equipment.

c. Preparing and maintaining custody receipts.

d. Preparation and maintenance of the central control register.

e. Compiling information for reports and correspondence that comes within the scope of the branch.

f. Maintaining organizational accounting records.

g. Accomplishes inventories as required.

h. Establishing a system for clearing personnel in and out of the squadron supply.

i. Warehousing and inspection of UAL property not on custody receipt.

Section IV

THE AIRCRAFT SUPPLY

10. **Function.** The Aircraft Supply requisitions, receives, and issues spare parts and components for aircraft and allied equipment.

11. **Responsibilities.** The chief of the aircraft supply is responsible to the supply officer for:

a. The preparation and submission of all priority requisitions.

b. Compiling information for AOCP/ANFE reports or coordination.

c. Maintaining the supply action file on priority requests.

d. Maintaining the blocks of central control register numbers assigned for requests for aircraft spares.

e. Maintenance of an AOCP/ANFE status record.

f. Close liaison with the squadron maintenance and electronics sections; the base supply priority and aircraft supply section.

g. Organizing and operating the following functions:

(1) Aircraft maintenance tool crib and bench stock.

(a) Bench stocks to include a 15-day level of expendable nonrecoverable supplies required to support the needs of an active function.

(2) Electronic supply, including bench stock, tools, test equipment, components, and sub-assemblies peculiar to electronic maintenance. (Stand-by level).

(a) Bench stock to include a 15-day level of expendable nonrecoverable supplies required to support the needs of an active function.

(b) The term stand-by components refers to those expendable recoverable aircraft and electronic type spare parts issued on loan by base supply and using organizations in advance of actual requirements.

h. Monitoring the issue and return of tools and equipment from the aircraft maintenance tool crib and the electronic supply, insuring an adequate custody receipt system.

i. Assembling and issue of individual tool kits. Insuring that custody receipts are accurate and returned to property accounting.

j. Establishing and maintaining a program for the processing of tools and test equipment for repair and calibration.

k. Aiding the general supply and accounting in periodic inventories.

l. Establishing facilities and bins properly identified to accommodate storage and issue of bench stock items, stand-by components, sub-assemblies, tools, and test equipment.

m. Turn-in of reparable and excess serviceable aircraft spares.

n. Assisting maintenance personnel in research for proper stock numbers for materials required.

o. Maintaining supply discipline by conserving and protecting Government property. This can best be observed through the media of control over hoarding, infractions of supply procedures, promiscuous use of property and negligence in individual responsibilities. (AFR 67-10).

CHAPTER 6

Section I

STANDARDIZATION STATUS BOARDS

1. **General.**

a. The boards presently in use in the Air Defense Command to indicate the status of maintenance, electronics, and compliance with technical orders do not fill the need.

b. They are usually very large and not easily moved. The information contained on them is not sufficiently complete nor cumulative. It is difficult to separate any particular item of information due to the considerable number of entries visible.

c. The Air Defense Command has developed status boards of the Kardex type to offset the above disadvantages.

d. The Kardex type boards are low in initial cost and maintenance. Manhours are saved in posting them. More complete information is correlated in a permanent and cumulative form. Preparation of several reports is expedited and simplified. They are smaller and easily transportable.

2. **Supplies.**

a. The following expendable supplies are used with the standard status boards. Replacements will be requisitioned from AF stock by individual organizations as required:

(1) Signal - visible file card - Graph-A-Matic, orange S/N 8700-747878

(2) Signal - visible file celluloid crimped 1/4 in. transparent plain

Black and White Vert Stripe S/N 8700-748073

Blue .... S/N 8700-748075
Dark Green .... S/N 8700-748083
Orange .... S/N 8700-748090
Red .... S/N 8700-748101

(3) Pocket - visible file lug style, 11 x 8 in. x 1/4 in. exposure S/N 8700-574120

3. **Forms.**

a. Initial distribution of the forms listed below, will be made concurrently with this Manual, as well as the status boards. Resupply will be requisitioned (AF 104B) from the Director of Publications, Headquarters, Air Defense Command:

(1) TOC Status ....ADC Form 206
(2) TOK Reqn Data ADC Form 207
(3) Maint Record ..ADC Form 208
(4) Flight Record ADC Form 209
(5) Installed Electronic Systems and Equip Record .... ADC Form 210
(6) Electronic Systems Status ..ADC Form 211

b. The header cards for all status boards will be reproduced locally as required after initial distribution.

4. **Supply of Forms and Status Boards.** Fighter-Interceptor and field maintenance squadrons activated after the publication date of this Manual will request shipment of status boards applicable to their organization direct from Headquarters, Air Defense Command, DCS/M, ATTN: ADMAC-2. The forms and status boards will be requisitioned in accordance with Par 3 above, with a statement to the effect that this is an initial distribution to a newly activated or assigned squadron.

Section II

MASTER AIRCRAFT STATUS BOARD

5. **Master Aircraft Status Board.** The Master Aircraft Status Board, by extracting data from Parts I & II of the AF Forms 1, is designed to correlate information for certain reports as indicated below, as well as visually indicating the current aircraft combat-ready status.

a. RCS: 1-AF-A1, Aircraft Status and Selected Flight Operations, AF Form 110A.

(1) Information to complete columns A through M of the AF Form 110A can be compiled from the maintenance and flight record cards. This will alleviate the necessity for keeping work sheets.

b. RCS: 1-AF-A10, Aircraft Engine

Removal or Loss Report, AF Form 250.

(1) Information to complete columns A, B, C, E, F, G, I, L, N, and P is available on the flight record card when the engine removal codes indicated on the header card are used as directed.

c. RCS: 4-AF-A10, Installed Aircraft Engine Report, AF Form 245.

(1) Columns A through E of the AF Form 245 can be completed from the information available on the flight record card.

6. **Instructions for ADC Forms 209 and 208.** Following are instructions for each column entry on the flight and maintenance record cards:

a. Flight Record Card, ADC Form 209.

(1) Entries at the very top of the card will show the organization, crew chief's name and grade, and the complete type and serial number of the aircraft.

(2) Column 1

(a) The card number is composed of a serial number, last two numbers of the year, and a letter "A" to indicate the face side and a letter "B" to indicate the obverse side; e.g. 1-54-A and 1-54-B. Serial numbers will start with number one each calendar year.

(b) Indicate date flights were performed. In addition when a card is made out upon receipt of aircraft, the time of receipt will be indicated by dividing the column horizontally; e.g., $\frac{\text{13 Aug 54}}{\text{1000 (hrs)}}$. By the same token, closing out a card upon transfer, the time will be indicated. This will allow for computation of total hours aircraft were on hand (AF Form 110A).

(3) Column 2

(a) The total time flown each day will be entered in the upper half and the total number of landings made in the lower half of the line.

(4) Column 3

(a) In the upper half indicate total aircraft hours as carried in AF Form 1.

(b) Indicate total gallons fuel consumed during day's flying on the lower half of the line.

(5) Column 4

(a) In the upper half indicate aircraft hours next periodic inspection due.

(b) The lower half of the line will indicate the date next calendar inspection is due.

(6) Columns 5 and 6

(a) Engine type will be entered in the top half of the first line on the card only, unless the type changes prior to initiating a new card. In this event, the new type will be indicated, as well as the engine time, in the upper half of the block indicating engine change. The upper half of each following line in the column will show total engine hours since overhaul.

(b) In the lower half of first line on the card, enter engine serial number. No entry need be made in the lower half until the engine(s) is changed. The upper half will show engine time at removal; the lower half will be coded to show status of removed engine/reason for removal/and maintenance required; e.g., $\frac{\text{205:20}}{\text{B/BB/B}}$. The codes and explanations are shown in paragraphs 11b, (5), (6), and (11) of AFR 65-20, and appear on status board header card.

(c) The next line will have the new engine serial number entered in the lower half of space; and the time since overhaul, plus the first day's flying, in the top half; e.g., $\frac{\text{2:10}}{\text{047777}}$.

(7) Columns 7 and 8

(a) The upper half of the first line on the card will be used to indicate the type afterburner(s) if applicable. In the case of F-94-C, it may be desirable to indicate 8x8 or 9x9 spray bars until they are all one configuration. Succeeding upper halves of lines in these columns will show total time.

(b) The lower half of the first line will indicate the serial number. No other entries need be made in lower portion of each line until the afterburner is changed, when the same procedure for engine removal will be used except the coding for cause of removal, unless requirements are changed in the future.

(8) Columns 9 through 16 are repetitions of above.

(9) On the line below the column

numbers, indicate the inclusive dates that are entered on each card. This entry need be only on the "A" side of the card. Enter date of latest weight and balance computation on DD Form 365 (Old Form F).

(10) The last four numbers of serial number of the aircraft preceded by a letter designating the flight to which assigned, will be entered in the lower left corner; e.g., B 3555, U 1507.

(11) The blocks indicating location and combat-ready status of aircraft are explained as follows:

(a) ALERT - Flag this block to indicate aircraft on primary alert.

(b) FLT LINE - Flag this block to indicate aircraft is on flight line.

(c) HGR - This block is used to indicate aircraft in the hangar.

(d) FLD MAINT - This block, when flagged, will show aircraft to be in the base field maintenance activity.

(e) PER - Indicates aircraft not combat-ready - periodic inspection in progress.

(f) AOCP/ANFE - This block will be used when aircraft is not combat-ready for lack of parts.

(g) TOC - Indicates aircraft not combat-ready due to necessity for technical order compliance (Red X T. O.'s, etc.)

(h) APG This block will indicate aircraft not combat-ready due to malfunctioning item or system in the airplane general (items or systems not appearing in other blocks).

(i) ENG - Aircraft not combat-ready due to engine, afterburner, or components thereof not operating correctly.

(j) FCS - When the fire control system is not operational, this block will be flagged.

(k) ARM - Flag this block to indicate guns, rocket, or missile systems not operational.

(l) COM - This block will indicate communications and navigational aids are not operational.

(m) A/P - When auto-pilot is not functional, flag this block.

(n) INST - This block is used to indicate malfunction of instruments not a part of fire control or communications-navigation aids systems.

(o) General.

1. Flag one of the location blocks (a, b, c, or d, above) with proper colored signal to show status and location of aircraft.

2. When aircraft is assigned but not on the base, indicate this condition with a black and white signal in the Alert block.

3. If the signal indicating location and status is other than green indicating combat-ready, a red signal will be placed in the appropriate block(s) to show the reason for this condition.

(12) At the bottom right half of the card, the signal will be placed to indicate hours remaining until next periodic. Time up to 100 hours is available.

b. Maintenance Record Card, ADC Form 208.

(1) On first line at top of card enter organization on left and complete aircraft type and serial number on right.

(2) Column 1

(a) Enter all codes indicating reason aircraft is not combat-ready (two lines are provided). These codes are letters designating columns on AF Form 110A.

(3) Column 2

(a) Enter date aircraft became not combat-ready in the top half of the line.

(b) The time of this event is entered in the lower half.

(4) Column 3

(a) The use of this column is optional. If used, should indicate *estimated* date and time aircraft will become combat-ready. In many cases, this will be almost impossible.

(5) Column 4

(a) Enter in this space the ACTUAL date and time combat-ready.

(6) Columns 5 and 6

(a) In these columns break down the total time not combat-ready (indicated by "T") into separate codes as applicable.

(7) Column 7

(a) Use for necessary remarks and explanations. To conserve space, a line may be drawn through or a remark erased when no longer applicable. All outstanding remarks must be transcribed to new card. The effective date must be entered before each remark.

(8) Assignment Code and Possession.

(a) Enter proper assignment code and major air command possessing aircraft.

(9) Show inclusive dates in the "From"-"Thru" spaces.

(10) These cards are numbered as the Flight Record Cards.

7. **File.** A file of flight and maintenance record cards need be maintained only as long as the information thereon is required. They may be included with the aircraft file if desired but need not be transferred with the aircraft.

Section III

ELECTRONIC SYSTEMS STATUS BOARD

8. **Electronic Systems Status Board.** The Electronic Systems Status Board, described herein, is designed to replace the wall mounted daily status boards which have been in general use in maintenance sections for many years, and to provide an improved method of recording electronic equipment status information for management purposes. The electronic systems status board is a Kardex visible margin system in book form. Through the use of colored signals on the margin of the card, the status of electronic systems installed in aircraft will be available at a glance. Status of electronic systems will be recorded on two cards.

a. The card in the lower pocket, "Electronic Systems Status," ADC Form 211, is used to record the location and status of the aircraft, the status of electronic systems, the hours to go before inspection, time and date a system goes out or comes in commission, a remarks space for recording the reason a system went out of commission, and electronic ANFE data for the aircraft.

b. The card in the upper pocket, "Installed Electronic Systems and Equipment Record," ADC Form 210, is used to record the electronic systems and equipment installed in the aircraft, and a record of electronic equipment modification status.

9. **Scope.** Each fighter-interceptor squadron aircraft electronics section will maintain the electronic systems status board in accordance with the instructions below. The method and means for collecting and posting the data on the cards will be determined by the aircraft electronics officer.

10. **Suggestions.** Suggestions for revision of the card formats and contents will be made directly to Headquarters, Air Defense Command, Attention ADMAC-5.

11. **Instructions for ADC Form 211.** Instructions for use of the Electronic Systems Status Card (ADC Form 211) appear below:

a. Completed Electronic Systems Status Cards should be destroyed as soon as they no longer serve a useful management purpose. Retention in files of completed cards will not exceed six months, at which time they will be removed and destroyed.

b. The organization, complete aircraft type and serial number, date the card is initiated and terminated (on each side) will be entered in the appropriate spaces at the top of the card.

c. Column A. The time and date a system goes out of commission will be recorded opposite the beginning of the remark in Col B explaining the reason. The time and date the system comes in commission will be entered immediately below the time and date out of commission. A time and date out and in commission will be entered for each remark indicating a system or equipment has failed.

d. Column B. A remark explaining the reason for each system or equipment failure will be entered in this column. As many lines as necessary, for clarity, can be used for each remark. When a system or equipment remains out of commission for a part, the appropriate supply symbol ANFE or AOCP will be entered in the remarks column and the appropriate entries made in columns C, D, E, and F.

e. Columns C, D, E, F. When the aircraft electronics systems or equipment is AOCP or ANFE for a part, entries will be made as indicated below for each part. Anticipated ANFE or AOCP will also be entered and designated by placing ANTCP in column F.

(1) Column C. The noun or other suitable description will be entered for the part ANFE or AOCP.

(2) Column D. The date of the requisition or issue slip submitted to base supply will be entered.

(3) Column E. The squadron requisition or issue slip number will be entered.

(4) Column F. The date the ANFE or AOCP part is received in the squadron will be entered. In the case of anticipated ANFE or AOCP, the symbol ANTCP entered when the requisition is made will be erased when the item is received and the date of receipt entered.

f. Column G. Column G is open and can be used for any purpose designated by the aircraft electronics officer.

g. The combat-ready status of the aircraft and the electronic systems status will be recorded by use of colored signals. The appropriate entry must be made in columns A, B, C, D, E, or F at the time the colored signals, indicating a change in electronic systems status, are changed or moved. Code and instructions for use of signals is detailed below:

(1) Signal color code:

(a) Green -- Aircraft combat-ready.

(b) Blue -- Test hop required, indicate system affected.

(c) Orange - Flyable - Not combat-ready, indicate system affected.

(d) Red - Not combat-ready, not flyable, indicate system affected.

(e) Black and White - Aircraft cross country, loan, etc.

(2) Reading from left to right along the bottom margin of the card the blocks are:

(a) AC SER NO: Enter last four digits of aircraft serial number, and flight assignment if desired.

(b) ALERT, FLT LINE, PER MAINT. These blocks refer to aircraft physical location and combat-ready status and mean respectively alert aircraft hangar or parking area, flight line parking area, and periodic maintenance (hangar) or field maintenance activity area.

(c) AOCP-ANFE. Refers to aircraft AOCP or ANFE for electronic systems part.

(d) FIRE CONT. Refers to fire control radar, synchronizing, computer, presentation, and utility systems.

(e) FLT CONT. Refers to auto pilot, control surface tie in, stability augmenter, etc. systems.

(f) MISS RKT. Refers to missile and rocket launching systems, missile auxiliary systems, and the missile or rocket loading on the aircraft.

(g) COMM NAV. Refers to communications sets, radio compass, zero reader, instrument landing, gyrosyn compass, marker beacon, DME, omni-directional, and associated equipment.

(h) APX. Refers to any equipment with the APX prefix in its type designator.

(i) ELECT. Refers to any portion or component of the aircraft electrical system.

(j) FUEL CONT. Refers to electronic jet engine fuel control systems.

(k) INST. Refers to all aircraft instruments *except* instruments directly associated with fire control, flight control, missile and rocket, communications and navigation, APX, and electronic fuel control systems.

(l) ACFT MAINT. Refers to aircraft out for air frame or engine maintenance.

(m) Hours To Go Before Inspection. Refers to aircraft flight hours to go before the next inspection.

(3) Use of signals for indicating status.

(a) When the aircraft is combat-ready, a green signal will be inserted over the appropriate physical location block.

(b) When the aircraft is not combat-ready, not flyable, a red signal will be inserted over the appropriate location block and over the system affected. If the aircraft is ANFE or AOCP, a red signal will also be inserted over the ANFE-AOCP block.

(c) If the aircraft is not combat-ready for aircraft maintenance other than electronic systems, the red signal will be over the proper location block and also over the AFCT MAINT block.

(d) Aircraft not combat-ready awaiting test hop will have a blue signal over the proper location block, and also over the system requiring test hop.

(e) Aircraft flyable, not combat-ready, will have an orange signal over the proper location block and a red signal over the system affected and over the ANFE-AOCP block when appropriate.

(f) Aircraft flyable not combat-ready, because it is loaded with practice rockets or missiles, will have an orange signal in the proper location block and also over the MISS RKT block.

(g) Aircraft cross country will have a black and white signal over the FLT LINE block.

12. **Instructions for ADC Form 210.** Instructions for use of the Installed Electronic Systems and Equipment Record Card (ADC Form 210) appear below:

a. The Installed Electronic Systems and Equipment Record card will be forwarded with the Aircraft Records file when the aircraft is transferred to another organization.

b. The appropriate entries will be made across the top margin of the card for organization, and complete aircraft type and serial number.

c. Columns A and B. Record of Installed Systems and Equipment. The nomenclature of each installed electronic system or equipment will be entered under A with the type number or designator under B. Aircraft instruments will be recorded if variations occur between aircraft of the same type and series. Old entries in columns A and B will be lined through when not longer valid. Old entries will not be erased. When a new entry is made, the old date of last entry will be erased and the new date entered.

d. Columns C and D. Modification Status. This space has been provided to keep a record of the status of modification for critical electronic systems and equipment components. Entries made in these columns will be determined by the aircraft electronics officer. As a general rule, only those components having a modification status which must match other components, and components which are being modified in all aircraft but are not completed in all aircraft, should be entered. Entries in these columns will not be erased. If the modification status on an old entry changes, the old entry will be lined out and a new entry will be made. When a new entry is made, the old date of last entry at the bottom of the columns will be erased, and the new date of last entry will be entered.

13. **Use.** The installed electronic systems and equipment record card must be kept up-to-date to be of any value. The card is a management tool, and if properly used, can save many manhours in determining the equipment, and status of equipment, installed in aircraft for operational, reporting, and requisitioning information purposes.

Section IV

TECHNICAL ORDER COMPLIANCE BOARD

14. **Technical Order Compliance Board.** The Technical Order Compliance Board is designed to afford a quick visual reference regarding kit requisitioning and status of compliance with technical orders.

15. **Use.** All entries are self-explanatory. If insufficient space is afforded on the Requisitioning Data Form, make additional entries on bond paper and place in the rear thereof. Entries on both forms may be made in pencil, then erased when compliance with each technical order is completed. Forms may then be re-used until worn. If a more permanent record of the requisitioning data is desired, entries may be made with a typewriter or pen on that form. No point is served in making permanent entries on the TOC Status Forms.

CHAPTER 7
MANAGEMENT AND LEADERSHIP

Section I
MATERIEL MANAGEMENT

1. **Introduction.** There is an ever increasing demand for quality and quantity in fighter-interceptor squadron supply and maintenance. Our materiel support must be *modern, efficient* and *effective* to meet this demand. This goal can only be acquired by every man knowing and applying the principles of leadership and management.

2. **Purpose.** This chapter of the Materiel Manual is to provide you with the proven practices of management and leadership and how they can be applied to aircraft maintenance.

3. **General.** You will not become an efficient supervisor by reading this Manual or any other publication. You can, however, learn to be a good maintenance or supply supervisor by studying and practicing the principles on which this Manual is based. The principles of management are proven, but to get the most out of these proven methods, you must adapt your own techniques of leadership and managerial ability to your own particular problems. The highly successful supervisor of today will be a failure in the days to come if his methods and techniques do not develop with the times. Improvement in management *can* and *must* be made if we are to maintain our record of consistently meeting the demand for combat-ready aircraft in the quantity necessary to meet operational requirements.

4. **Materiel Management.**

a. Materiel management incorporates three closely related but separately definable aspects. These are: Leadership, Administration, and Management. Each is a function which every maintenance supervisor must carefully apply. They are overlapping to a great degree but must be separately applied in each case. Although the functions of management can be separately treated, they are so closely related that it would be repetitious to do so. This Manual will attempt to treat each function with equal emphasis and show how it is employed.

(1) **Leadership.** Leadership is the act of supervising people in a manner which will result in their enthusiastic cooperation and progress toward accomplishing a mission.

(2) **Administration.** Administration is the process of assembling men, equipment, and materials and providing accurate administrative data by which management can function.

(3) **Management.** Management is supervision in a manner which will insure the most efficient utilization of men, equipment, and materials in the performance of the assigned responsibility. Management is accomplished by planning, coordinating, organizing, directing, and controlling.

b. As a supervisor, you are responsible for all three functions of management. You are the executive of your own responsibility and must accept this responsibility willingly. The authority necessary to carry out your responsibility is delegated to you. You must apply the principles of management to use manpower, equipment, and materials so that the maximum contribution will be made toward accomplishment of the Air Defense Mission.

c. Most supervisors subconsciously apply the principles of management to a certain extent. However, a planned application of management has been the exception rather than the rule. Application of the principles presented herein will provide the solution to many materiel problems and place within the grasp of every supervisor the ultimate objective of quality and production with maximum efficiency.

d. To achieve maximum uniformity and quality in aircraft maintenance and obtain the efficiency inherent in the maintenance system, it is essential that maintenance supervisors use factual production and time information as the primary tools of management. It has been clearly demonstrated that this has not been done. The reason why production and time information is essential to maintenance planning and scheduling is not generally appreciated. This lack of understanding, and the failure of maintenance activities to assemble and use factual data, has prevented the realization of the benefits that can be derived from a properly managed organization. Once the principles of management are firmly fixed in the minds of supervisory personnel and accepted as a mandatory requirement, the value of factual data will be immediately recognized.

e. In addition to not obtaining maximum productivity and efficiency in maintenance, we have failed to assemble data by which responsibility can be accurately assigned and the maintenance organization properly manned. Generally speaking, maintenance supervisors have no means of measuring efficiency and productivity. You must have accurate information to manage properly. You cannot depend on experience. There are countless variables of the man, the job, the tools, and the materials which diminish the value of experience. Even when situations appear to be the same, each problem must be carefully studied. Facts and conditions must be analyzed before experience can be applied to determine a solution. Get the facts! This is the most important part of administration (paragraph 4a(2), and is mandatory prior to attempting any phase of management.

f. A good organization chart will not make an efficient organization. You must, however, have good organization planning before the administration essential to good management can be obtained. The structure of the materiel organization was planned and developed to provide clear channels of command and specific assignment of functional responsibility. This is of paramount importance to the management of the organization and decentralization of authority. In addition to sound organization, you must *staff each unit* with *competent* and *capable* personnel.

g. The higher the supervisor progresses in the organizational structure, the more important are the intangible and indefinable aspects of management. You cannot prepare a specific job description for the Maintenance Officer as simply as that of a supervisor of a small group who is required to do a specific job. Yet, the same objectives are required of both. Each must use leadership, administration, and management to accomplish the assigned function.

h. To be a good supervisor, you must accept and assume responsibility willingly. You cannot delegate your responsibility to any other individual. You must specifically and clearly assign responsibility for every job performed under your supervision. Duties must be "clean-cut" and consistent with the individual's ability. Scale the assignment of responsibility according to qualifications and delegate authority commensurate with that responsibility.

i. Your men must have confidence in your ability as a leader and manager. YOU must have confidence in THEIR ability to share in YOUR responsibility. Confidence and trust in your assistants must be so strong that you are willing to delegate a part of your authority and be ready to sustain that authority by supporting their decisions. If you cannot trust an assistant with authority, you have the wrong man for the job.

j. As a leader, your choice of assistants must be made without bias. You will lose the respect and initiative of your men, plus loss of efficiency, if you make "Joe" a supervisor because "Joe" is your pal. The better you choose the man for the job, the less supervision will be required. Don't assign a strong assistant and a weak chief. You will destroy the unity of your organization and plant the seeds of prejudice. Responsibility and authority properly assigned and delegated inspires initiative and willingness that will reduce the requirement for supervisory inspections and controls. This will insure *quality* and *quantity* of work produced.

5. The Fighter-Interceptor Squadron Materiel Organization.

a. The materiel organization established by this Manual was developed to provide centralized control of materiel functions and organizational unity. We have not centralized authority but we have centralized responsibility for administration and management. Many personnel have interpreted centralized control to mean that all authority is vested in the materiel officer. This is not correct and is one of the major management errors to guard against.

b. In the well managed organization, authority must be decentralized. There is a natural tendency, particularly in the military service, to overcentralize authority. Supervisors hestitate to relinquish authority because of their feeling of pride and the sense of power obtained by authority. This may be a natural tendency but must be religiously avoided. Authority is not the right to dominate. It is the *privilege* of coordinating and directing the efforts of a group to accomplish a specific mission. Over-centralization of authority to act and make decisions will do more to destroy an organization than any other single factor.

c. Our materiel organization is a system that requires close team-work and cannot be "bogged down" by floods of detailed paper directives. Over-centralized authority is the sign of a weak, poorly trained unit that requires a directive or a control device from higher authority to be able to carry out an assigned mission. What happens to the group of men assigned to a "one-man-show" who have only one supervisor capable of making a decision or giving orders? When the "boss" is gone, the men wander aimlessly without purpose. We must stress to every supervisor the urgent need of de-centralizing authority to the maximum.

d. Efficiency is not a goal that you can reach and then relax. You must work constantly to maintain and increase efficiency. Personnel must be trained constantly. Relationships must be made firm through coordination and cooperation with lateral functions. *Morale* and *discipline* of personnel must be maintained at a high level. You must know the status of every materiel function, the availability of manpower and equipment, rates of production, and watch the quality of work being performed. With these facts, you can then begin to manage and arrange the flow of work to conform to mission requirements and orderly sequences of operations.

6. **Manpower.**

a. Controlling manpower is one of the keys to successful management. It is an accepted fact that most people will account for money with reasonable accuracy but few, if any, will account for time or how it is spent. This establishes the fact that every person is by nature cost conscious with respect to expenditures of material things, but too few are aware of the cost of time.

b. The expenditure of time in accomplishment of work normally costs far more than materials. It is essential, therefore, that gainful production be obtained for every manhour expended. You, as a supervisor, must be acutely aware of the value of manpower and have a knowledge of exactly how your men are being utilized if the effectiveness of manpower is to be determined and the inherent collective efficiency obtained. Supervisors must be aware of the manpower utilization and distribution in order that planning and scheduling can be accomplished.

c. The requirement for time information extends below the supervisor. Every man employed by the materiel organization must be aware of how his time is spent. This is not only necessary from the standpoint of time accounting, but is also important to the individual . Each man in the organization must develop a sense of responsibility toward proper utilization of time. It is an indisputable fact that personnel take pride in doing a good job. When held responsible for the accounting of time, a sense of duty is created which will be reflected in the efficiency of the organization.

d. Proper management of manpower not only encompasses the job of accounting for the time of each man and the work every man produces, but incorporates other important features. For example, the analysis of production and time data indicates to a supervisor that a specific number of men and certain skills are necessary to perform a job in the most efficient manner. This should immediately be recognized as the optimum requirement for this job and any lesser number of personnel should be avoided. Every supervisor must recognize this as a basic principle of manpower management and assign work accordingly.

e. Another manpower management principle which supervisors must apply is the proper distribution of skills. The fact that there is an optimum number of personnel required to perform a job necessitates the proper distribution of skills. A group requiring a skilled technician will not operate efficiently if a semi-skilled technician is employed. The same applies to the assignment of a highly skilled technician where his ability will not be fully utilized. In either case, there is a definite waste of manpower and training of personnel is neglected.

f. Improper management of manpower has a great effect on the quality of work performed. *Quality in aircraft support can never be sacrificed.* Therefore, constant vigilance must be maintained to insure correct assignment of personnel. There is a homogeneous assignment for every man in the organization and it is the responsibility of each supervisor to ascertain that assignments are in consonance with the job requirement. Homogeneous assignment of personnel is not difficult. It is merely common sense but important to the morale of personnel and the efficiency of the organization. Before you make or change an assignment - think! You must consider each individual as an individual and make the assignment accordingly. This is one of the important ways in which *you* can create respect for your ability and fairness. Assign the man to the job where he is best suited to work and he will be interested and have the initiative to do a better job for you.

g. Do not fail to recognize the achievements of your men, but never attempt flattery. You must be sincere and frank in complimenting as well as criticizing. Just as you recognize success, you must let others know when they have failed. When you criticize, do so in private, but listen to what the man has to say for himself. Never criticize unless you can give constructive criticism. Treat others in the manner you want superiors to treat you. The fact that you have responsibility and authority makes you no less human than the man you supervise. There is one rule in assigning personnel that you, as a supervisor, must never forget: Accept a man at his face value. Give that man responsibility and authority until he proves to you that he is not able to carry out the assignment. To do otherwise is to assume a man is guilty of irresponsibility.

h. A first mistake can be gainful but a second mistake is always wasteful. If you commit an error, be the first to admit it. Experience is gained by making mistakes and you can profit from an error. Don't feel remorseful when you are wrong. Take it on the chin and get back on course again. This does not mean to imply that negligence and careless maintenance are to be condoned. In the performance of aircraft maintenance, there is only one standard: Perfection.

i. As previously mentioned, you, as the supervisor, are responsible for the continuous training of your personnel. The proper distribution of skills throughout the organization will institute a training program which is simple to control and highly effective. Here again you must know your men well enough to make the proper assignment. Group the skills in a manner which will provide highly trained personnel working with a lesser trained group.

j. Still another factor in manpower management must be considered. With the assignment of functional responsibility designate the area in which a man will work and establish his line of lateral responsibility. Every man in materiel must have a definite working area. It is true that some personnel are required to move from one location to another, but each such location can be specifically defined. To keep the man within this working area is one of the supervisor's most important jobs. The motion required to move from one area of work to another is a part of the job. You, as the supervisor, must schedule and plan the work to reduce this motion to a minimum. It is recommended that supervisors read AFP 25-3-2 titled "Work Simplification."

k. A vigorous effort must be made by you to locate within the working area every possible facility to preclude the men from leaving the area of work for any reason. This not only includes tools, supplies, and other equipment essential to the job, but all possible facilities for the worker's comfort. Industry has proved again and again that the gains in production and quality far exceed the original cost for improving working conditions. This is not a principle for industry alone and is not expensive. A supervisor who is interested in the man on the job will, by observation, find ways to improve working conditions. Never fear that you will "plush line" your working conditions to a point where your men will not have the ability to do the same job under field conditions because it takes ingenuity and attention to details to improve working conditions and methods.

l. Carefully study the job of every man working for you and then make suggestions for improvement. Talk it over with the man and see if there is not some way that you can help him to do a better job. If you foster the development of better working conditions and methods, the idea will be contagious. Better working conditions improve morale; morale increases interest; interest increases initiative; and initiative is the seed of creative accomplishment.

m. In the interest of creating better working conditions and faster methods of doing work, you must use and teach job methods improvement. Watch your men work. Study their motions. You will find that there are many changes in the location of tools, materials, and equipment which will improve working conditions and speed up the operation. There is always room for improvement. If you supervise properly, you will constantly improve.

n. Manpower is important. It is the

foundation of every organization. Remember, good management merely demands that common sense and respect for others be transmitted into mutual coordinated action.

7. Management Check List.

a. To assist you in supervision, a management check list is provided. It is desired that this check list be used daily until you become proficient in its application. In addition, it is recommended that all supervisory personnel read AF Manual 35-15, "Air Force Leadership."

(1) Management of Time.

(a) Delegate routine work.

(b) Do regular work efficiently.

(c) Accept special assignments.

(d) Accomplish creative work.

"Never be too busy to find out how to become less busy."

(2) **Principles of Management.**

(a) Unit of command.

1. Each person knows his boss and whom he bosses.

2. Each person reports to only one supervisor.

(b) Span of control.

1. Numbers. There is a limit to the number of men a supervisor can control.

2. Distance. Work must be close to the one who does it.

3. Time. Work cannot be processed through too many desks or hands.

(c) Homogeneous Assignment.

1. Duties of employees must not overlap.

2. Duties must be specific and clear cut.

3. Each function of every unit must be the responsibility of one individual.

4. Every assignment must be within the range and capabilities of the individual to which assigned.

(d) Delegation of Authority.

1. Delegate authority equal to the assigned responsibility.

2. Establish definite line of authority (organization).

3. Decentralize authority to the maximum.

(3) **Functions of Management.**

(a) Planning

1. Why? - What?

2. When? - Where?

3. Who? - How?

(b) Organizing

1. Determine the jobs to be performed.

2. Set up the organizational structure.

3. Make initial allocation of personnel, functions, responsibilities, and authority.

(c) Coordinate

1. Hold weekly meeting of all key personnel.

2. Interpret policies and regulations.

3. Invite recommended changes to policy and procedures.

(4) **Personnel Management.**

(a) Get the right man on the job.

1. Establish the job requirement, then get the man.

2. Use the tools of personnel classification.

3. Reassign the unfit to jobs within the range of their skill and capabilities.

(b) Increase the time available.

1. Control the absent time.

2. Keep the man on the assigned job.

(c) Stimulate the will to work.

1. Improve the working conditions.

2. Control the overtime.

3. Furnish the right incentives and prescribe adequate punishment.

(d) Obtain maximum utilization of men and skills.

1. Give the man a full day's work.

2. Schedule the man efficiently.

3. Question the requirement for every task. (Is this job necessary?)

4. Improve the procedure or method of doing the work.

(5) **Personnel Relations.**

(a) Apply the principles of leadership. (AFM 35-15)

(b) Take an interest in the individual.

(c) Fully utilize the man's abilities.

(d) Appraise the work of groups and individuals and take appropriate actions.

(e) Train the man to meet the job and jobs of higher skills.

(f) Show the man a method of improvement when correcting a fault.

(g) Build the individual's confidence in the organization.

"Principles cannot be ignored."

Section II

8. Leadership.

a. Leadership is the art of influencing people to progress with cooperation and enthusiasm toward the accomplishment of a mission.

The sole objective of leadership is *to accomplish a mission.*

b. There are three elements of leadership: 1. the leader, 2. the men, and 3. the situation. These elements are interdependent at all times. Of course, there are an infinite number of combinations of these three variable elements. Only a sound understanding of all elements, plus good judgment, will result in good leadership.

c. Insofar as you, the leader, are concerned, integrity of character is considered your fundamental requirement. The brand of leadership required in the Air Force is not that of Cesare Borgia, Adolf Hitler, or Genghis Khan, but rather the brand practiced by George Washington, Stonewall Jackson, and President Eisenhower. Your honesty must be unquestioned, your word relied upon and trusted with complete confidence, your *loyalty to the mission* unchallengeable, and your moral strength as sound as bedrock.

9. Leadership Check List.

a. The following check list is presented to recall to your mind the basic principles of leadership.

(1) What is leadership?

(2) Leadership is a way of life.

(3) There is no divine right of leaders.

(4) Leadership is not the perogative of a class.

(5) The successful leader is a man who has learned to put first things first.

b. Mission - The goal of leadership is accomplishment of the mission.

c. Responsibility of Command.

(1) To decline responsibility is to renounce leadership.

(2) Suggestions on attitude towards superiors:

(a) Make sure you understand his orders; if possible, his intent.

(b) Be punctual.

(c) Be tactful and considerate.

(d) Be loyal.

(e) Be honest.

(f) Be accurate.

(g) Recognize superior ability; compliment success tactfully.

(h) Avoid flattery, bootlicking, and servility.

(i) Never go over the head of your immediate superior.

(j) Be tolerant of your superior's shortcomings and eccentricities.

(k) Retain a sense of humor.

d. Team Membership.

(1) In improving organization unity a good leader will:

(a) Recognize that a good organization often prevents discipline trouble.

(b) Always examine his organization when an excessive number of problems present themselves.

(c) Always conform to the rules of the organization himself.

(d) Never permit anyone to violate the rules of the organization.

(e) Develop a technique of questioning to discover weaknesses of his organization.

(2) In enlisting cooperation a good leader will:

(a) Never criticize an officer or noncommissioned officer to the men, or before the men.

(b) Take his junior officer into his confidence.

(c) Say "we" instead of "I" whenever possible.

e. Individual Recognition.

(1) Suggestions on attitude toward your equals and juniors in rank:

(a) Get the reputation of being cooperative for the good of the command.

(b) Be sociable.

(c) Be friendly.

(d) Be fair.

(e) Recognize the ability of your associates ungrudgingly.

(f) Cooperate.

(2) In giving recognition, the leader:

(a) Gives praise only when praise is due. He does not flatter.

(b) Is always available to his men.

(c) Encourages his men to prepare for advancement.

(d) Sees to it that he is the first person to whom a man might turn in case of trouble.

(e) Has respect for the feelings of men of all ranks.

(f) Expresses sympathy and interest in a man's cause even though he might disagree with him.

(g) Is interested in the men's quarters and mess.

(h) Studies his men.

f. Individual responsibility.

(1) In giving commands observe that:

(a) A command must be definite.

(b) A command must be given in a tone of voice that leaves no doubt that the leader expects it to be executed.

(c) The leader must look at the men when giving a command.

(d) A command must not contain so much that the men cannot remember it.

(2) In giving orders a good leader will:

(a) Not only tell what he wants done but advise as to how it can be accomplished if the men cannot be expected to devise methods of accomplishment themselves.

(b) Never talk down to the men in giving instructions.

(c) Give his instructions to the man in charge and not to the group. He should follow the chain of command.

(d) Not club or coax his men. He should lead and coach.

(e) Remember that the man is serving his country, not him.

(f) Not get into a position where he has to "pull rank" to have his orders executed.

(g) Get across a feeling of "let's go" instead of "get going."

(h) Avoid an overbearing attitude.

(i) Always act as though he expects his men to do a good job in carrying out his orders.

(3) In improving the feeling of security, a good leader will:

(a) Let his men know just what is expected of them.

(b) Let his men know when he is satisfied with their work.

(c) Let his men know what is in store for them in the future, if possible. If not possible, he tells them so.

(d) Never make a promise which he, at that time, cannot expect to keep.

(e) Grant favors willingly, if deserved.

(f) Keep in constant touch with the morals of his men.

(g) Never "pick on" a man for an insignificant infraction.

(h) Always be certain that a man understands why he is being censured.

g. Confidence.

(1) In fostering respect, a good leader will:

(a) Take unusual care that he makes a good impression on his men with the first contact.

(b) Never act as if he thinks he is good.

(c) *Be interested in the promotion of his men.*

(d) Give praise when praise is due. He knows that a very effective occasion to give praise is soon after the laudable act has been performed.

(e) Give his juniors credit even when he is mainly responsible for a successful piece of work.

(f) *Always stand behind his junior supervisors.*

(g) Watch his bearing.

(h) Always be polite and considerate.

(i) Assume the same attitude toward the service that he expects his men to assume.

h. Discipline.

(1) In disciplinary situations a good leader will:

(a) Praise in public and censure in private.

(b) Always give the man the benefit of the doubt.

(c) Avoid mass disciplining of his men.

(d) Take into account whether or not an infraction of discipline was intentional.

(e) Consider a man's record before disciplining him.

(f) Be impersonal in giving discipline.

(g) Never take an infraction of discipline as a personal matter.

(h) Inspire enthusiasm for discipline rather than fear.

(2) In handling punishments a good leader will:

(a) Get all the facts bearing on the misconduct.

(1) Interview witnesses and those concerned to determine facts.

(2) Review rules and customs.

(3) Study the record of the accused.

(4) Talk with the accused.

(5) Determine the underlying cause for the offense.

(b) Weigh and decide his actions.

(1) Forget revenge.

(2) Punish so as to:

(a) Improve unit discipline.

(b) Reform the offender.

(3) Always take some corrective action.

(4) Act promptly.

(5) Punish humanely.

(6) Administer punishment personally and objectively.

(7) Try to have punishment accepted.

i. Morale.

The following principles of leadership are time proven, and though their application to specific cases will vary in some degree with the individual and with the situation, we may consider them immutable. In that each will become a FACTOR in your ultimate success in leading men, they are worthy of your continued study, thought, and application. As FACTORS they are listed below:

Factor A: KNOW YOUR MEN, and by knowing human nature and yourself, learn how to handle them. Know their viewpoint. Know the capabilities and limitations of each. Handle each as an INDIVIDUAL where possible.

Factor B: TAKE CARE OF YOUR MEN.

Factor C: SHARE THE PROBLEMS OF YOUR MEN (and when indicated, the HARDSHIPS). If you do, you will share their exultations and triumphs.

Factor D: SEE FOR YOURSELF. Get around.

Factor E: DEVELOP UNIT SPIRIT. Dominate and feed your "UNIT'S OPINION." Implant high ideals and standards. Affirm your faith in your men and in your unit. Foster pride.

Factor F: BUILD RESPONSIBILITY: Organize mentally each task given you. Delegate responsibility to carry out the several component parts of that task. In so doing, develop INITIATIVE AND RESPONSIBILITY in your subordinates.

Factor G: KEEP YOUR MEN "IN THE KNOW."

Factor H: BE KNOWN AND BE SEEN.

Factor I: SENSE THE CRITICAL POINT, and be at the critical point at the critical time, ready to take decisive action.

Factor J: KNOW YOUR JOB. (It includes a working knowledge and understanding of these listed FACTORS.) Know also the job of your subordinates, and your immediate commander.

Factor K: FOLLOW UP ORDERS. Before giving them, think them through. Then give them precisely and in the proper manner. Enforce them by "follow-up."

Factor L: KNOW YOURSELF--BE YOURSELF.

Factor M: SET THE EXAMPLE. Fully understand the power of example (for good; for bad). Use it POSITIVELY in your daily dealing.

Factor N: FOSTER LOYALTY -- Up and down--and to the job.

j. For a complete review of the principles of leadership, it is recommended that AFM 35-15 be studied by all supervisory personnel.

10. **Safety - A Function of Management.**

a. Philosophy: A job well done is inherently safe.

(1) Safety in itself is not a goal. It is the by-product of good management and efficient leadership. Safety in itself is no special way of doing anything. Instead it is the logical and simple approach to any maintenance problem; deriving safety as a by-product.

(2) To do this we have consideration, evaluation, and handling of personnel, equipment, and facilities.

(3) *Consideration, evaluation, and handling of personnel.* We must consider everything about the individual; his training, his background, his working conditions, his *morale* and psychological makeup. We must evaluate each individual's capability based on background and present performance and we must have the capability of qualitatively measuring the individual on a *continuing basis.* Handling is that portion which supervises the individual in performance of the job.

(4) *Consideration, evaluation and handling of equipment and facilities* must be treated much the same and at all times the complexity and capability of the equipment must balance the productive capability of the maintenance personnel. This is a true measure of effectiveness and the supervisor can expect no more. The sum total of all these considerations, of course, is *management.*

(5) We must put safety in management. Safety is a paramount part of good operating practice and, therefore, a management function which will be given priority at all times. Further, safety is the only consideration which must be an integral part of every operation every minute of the day. It is the only factor of its kind that applies to all of us continuously. If we as individuals did not consider safety in some sort of priority, we would probably not survive crossing the street. The same thing is applicable to all maintenance personnel of the Air Defense Command.

(6) Direct responsibility for the safety of an operation must rest with the supervisor of that operation. This is the only place the direct responsibility for safety can exist. To go along with a minute by minute consideration of safety, the only man who could possibly do any good would be the supervisor who is on the job continuously. "Supervisory efficiency" will be judged by accident prevention records as well as other standards. A supervisor's 201 file should reflect this periodically to establish the importance of safe efficient maintenance.

(7) *Management* shall provide the means for prompt corrective action and the elimination of unsafe acts, conditions, equipment or mechanical hazards.

(8) When potential accidents or accidents occur, immediate action must be taken by the supervisor not only to ascertain the true facts but to take steps to institute immediate corrective engineering.

(9) Accidents do not happen, they are caused; caused by responsible individuals or responsible conditions. True corrective engineering is applied to responsible conditions or responsible individuals to implement safety. This will produce more efficient operation deriving continued safety as a by-product. We have *eliminated a hazardous condition* or retrained a *responsible* individual. Corrective engineering is applied to our system -- not just the operator.

(10) Disciplinary action is to be avoided when applying true corrective engineering, because it has no value in reducing the accident potential. It merely serves to create fear, destroy moral, and if anything, increases the accident potential. Disciplinary action has its place, but only after other means have failed. When corrective engineering is blocked by lack of adherence, lack of acceptance, or lack of accomplishment, then and only then should disciplinary action be applied. This applies particularly to supervisors who refuse to accept their responsibility toward safety.

UNCLASSIFIED

MAINTENANCE **ADCM 66-**

AIR DEFENSE COMMAND MANUA

438

FIELD MAINTENANCE SQADRON
AND/OR
FLIGHT ORGANIZATION

1 APRIL 1955

UNCLASSIFIED

439

AIR DEFENSE COMMAND

ENT AIR FORCE BASE (2,000)

ADC MANUAL)
66-3)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado Springs, Colorado
1 April 1955

FOREWORD

1. **Purpose.** This Manual establishes a standard maintenance organization for field maintenance activities.

2. **Scope.** This Manual applies to all air defense field maintenance organizations.

3. **Responsibility.** Commanders of field maintenance organizations are responsible for enforcing and implementing the organization prescribed by this Manual. Approval for deviation from the prescribed organization will be obtained from Headquarters Air Defense Command prior to initiation of organizational change.

4. **Changes to Manual.** Proposed changes to this Manual will be submitted through command channels to the Deputy Chief of Staff for Materiel, Headquarters Air Defense Command, Ent Air Force Base, Colorado Springs, Colorado.

BY ORDER OF THE COMMANDER:

GEORGE F. SMITH
Major General, USAF
Chief of Staff

OFFICIAL:

WALTER W. ROBINSON
Colonel, USAF
Command Adjutant

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FIELD MAINTENANCE SQUADRON AND/OR
ADC MANUAL 66-3
FLIGHT ORGANIZATION

CONTENTS

CHAPTER 1

INTRODUCTION

1. This Field Maintenance Manual is designed to standardize the operation, organization, and responsibilities of all field maintenance squadrons and flights assigned to air defense groups of the Air Defense Command. In accomplishment of the field maintenance mission within the Air Defense Command, two organizational concepts are used. The prevailing concept is a field maintenance flight assigned to a materiel squadron, the materiel squadron commander being responsible to an air defense group commander. The second concept is that of a separate field maintenance squadron whose commander, the field maintenance officer, is directly responsible to an air defense group commander.

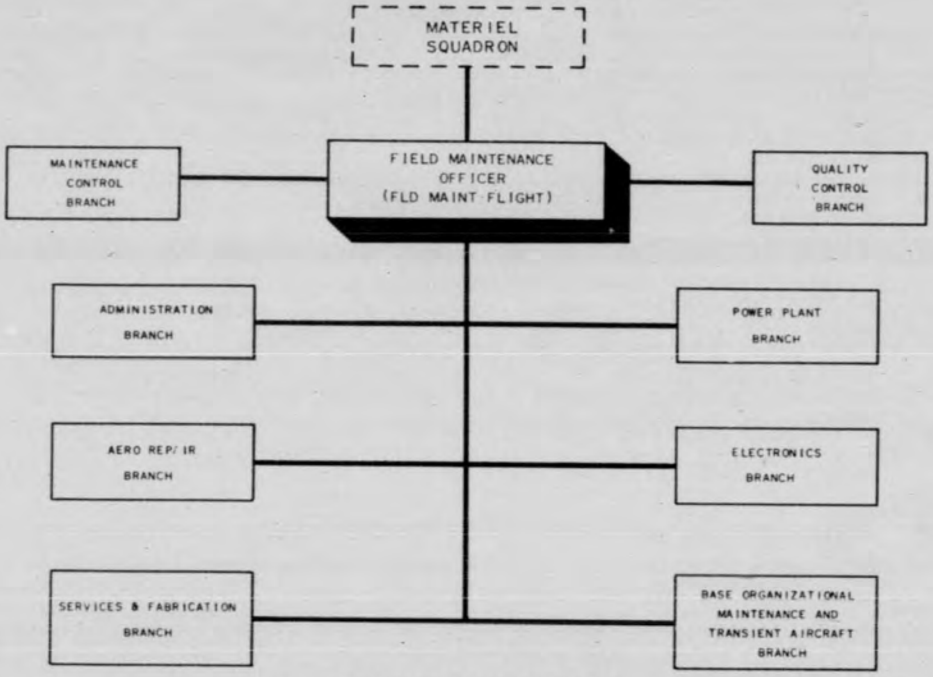
2. The materiel squadron or the maintenance squadron will insure the following support to the local field maintenance facility:

a. Command channel coordination.
b. Personnel actions.
c. Disciplinary actions.
d. Housing.
e. Messing.
f. Unit supply.
g. Operational control.
h. Liaison with lateral command functions.

3. The functions and duties of the field maintenance officer will be the same regardless of the type squadron supported. In one case he is responsible to the materiel squadron commander for operation of the field maintenance facility; in the other case he is the maintenance squadron commander. The administration of the field maintenance squadron will be delegated to the executive officer.

CHAPTER 2

FIELD MAINTENANCE



FIELD MAINTENANCE OFFICER

1. **Function.** The field maintenance officer provides field maintenance support for all base assigned and attached aircraft, organizational maintenance for base assigned aircraft, transient aircraft facilities, and support to base supply for reparable items.

2. **Responsibilities.** The field maintenance officer is responsible to the commander of the materiel squadron or in the case of the field maintenance squadron, to the air defense group commander. He is responsible for the organization, management, and delegation of responsibility within the field maintenance activity. As manager of this activity, he will:

a. Organize his activity in accordance with the principles outlined in this Manual. Consolidation of shops or expansion of shops to meet a local need is authorized, as long as homogeneous assignment patterns are followed.

b. Delegate responsibility and authority to his branch chiefs commensurate with the mission of the branch.

c. Supervise his activity through the branch chiefs to whom authority has been delegated.

d. Maintain direct liaison with other base aircraft maintenance activities to better understand their problems and provide more efficient service to them.

e. Maintain liaison with base supply in the interest of the reparable parts program.

f. Insure proper utilization of personnel through a direct interest in their assignment and job progress.

g. Insure training of assigned personnel through Technical Training Command, factory or base schools, or by on-the-job training. Such training should be planned to meet the needs of the individual and the organization rather than to make random use of all training opportunities.

h. Insure quality field maintenance support to all other activities by observation and supervisory checks of maintenance accomplished.

i. Keep the commander informed of the status of maintenance in progress and make recommendations for improving the quality and accomplishment of field maintenance support.

j. Insure, through a vigorous supply discipline program, that all materiel, equipment, and facilities are obtained, properly distributed and used to the best advantage.

k. Continually review equipment requirements to determine trends of under or over equipment as well as adequacy of equipment.

l. Establish procedures for the operation of all the branches, coordinate the established operating procedures of the branches, centrally publish, review, and cause to be brought up to date all operating data.

m. Insure compliance with all directives from higher headquarters.

n. Insure that all required reports to higher headquarters are prepared and submitted in accordance with existing directives.

o. Institute and monitor an effective ground safety program.

p. Delegate authority for proper housekeeping and check for proper compliance.

3. **General.**

a. The field maintenance facility is manned to provide a pool of skilled technicians to support the tactical squadron's prime mission. This means that support must be available 24 hours a day, 7 days a week. All branches will be organized and given responsibilities commensurate with the skills and facilities available. Field maintenance support will be provided in the following categories: Aero repair, power plant, electronics, services and fabrication, and base and transient maintenance.

b. The field maintenance officer, being responsible to the air defense group or the materiel squadron commander, must manage the organization consistent with the commander's policies and requirements, keeping him advised of major difficulties encountered. In the accomplishment of these policies, the field maintenance officer must maintain close coordination with the maintenance control branch, quality control branch, equipment review board, supply agencies, and other maintenance officers. He must have harmonious relationship with the other maintenance officers so that problems are easily resolved and all participate in accomplishment of the mission.

c. Field maintenance supervision is an important job and occupies a vital position in the support organization. The application of management principles, to a large extent, determine the organization's capability.

d. The field maintenance officer is responsible for insuring accomplishment of quality field maintenance and the proper use of assigned personnel. He, with the assistance of the branch chiefs, will monitor all activities and will be alert for inefficiencies or maintenance that is below acceptable standards of quality. Particular attention should be given to the selection of supervisors so that management ability, as well as technical ability, is recognized. Supervisors will assign duties and responsibilities to their subordinates and will delegate authority commensurate with responsibilities. Job descriptions will be prepared for each individual and supervisors should conduct personnel interviews to determine that each individual knows and understands his duties, responsibilities, and authority. Organizational charts will be displayed in each shop and office to outline the structure of the field maintenance activity and its position in the over-all support organization. The field maintenance officer must follow the established organizational structure and supervise through his branch chiefs so as to retain continuity throughout the activity.

e. Effective accomplishment of the field maintenance function requires that the field maintenance officer know the current manpower status in the organization. Absence of personnel will be investigated and action taken to eliminate contributing factors. A manpower status board will be maintained to depict personnel assigned, those present, TDY, etc. The field maintenance officer and his supervisors must be aware of jobs to which specialists are dispatched, applicable priorities, time allowance, and other factors. It must be emphasized that specialists are assigned to the field maintenance activity for dispatch to other activities as required. For this reason, the cooperative attitude of all supervisory personnel is important.

f. The field maintenance officer and his supervisory personnel will periodically inspect maintenance accomplished to insure that established quality and performance standards are being met and to determine existing areas of maintenance deficiencies. Supervisory personnel and the quality control branch are jointly responsible for the maintenance of quality standards.

g. The field maintenance activity is also responsible for providing the maximum practicable maintenance assistance to the base supply activity. Reparable property will be processed through field maintenance for bench check, repair, and return to service as expeditiously as manpower, equipment, facilities, and time will permit. All reparable processing will be accomplished in accordance with repair priorities established by the maintenance control branch. Backlogs of property should not be allowed to accumulate in the shops. The maintenance control unit must be kept informed of the status of reparable property in general and make recommendations for off-base shipment, contractual repair, etc., as appropriate. Maximum support will be given to the TOC requirements of base supply on items contained in their stocks.

h. A large quantity of machine equipment, test equipment, and ground support equipment is authorized the field maintenance activity. Its capability is to a large extent determined by its serviceability. The field maintenance officer will insure that all authorized equipment available is maintained in accordance with current directives.

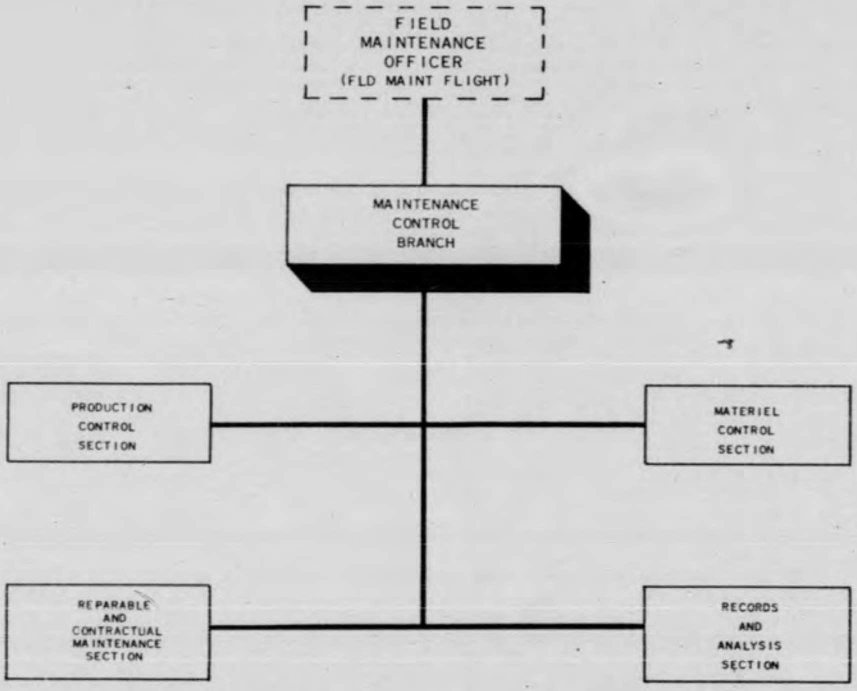
i. The field maintenance officer will require each shop of the field maintenance section to assist the materiel control section in the establishment of bench stocks.

j. The field maintenance officer, or his designated representative, will be appointed to:

(1) Base Aircraft Accident Board.
(2) Maintenance Standardization Board.
(3) Equipment Review Board.
(4) Materiel Control Board.

CHAPTER 3

MAINTENANCE CONTROL



SECTION I

MAINTENANCE CONTROL BRANCH

1. **Function.** The maintenance control branch is the nerve center of the field maintenance organization. As such it must know the exact capabilities of field maintenance, the support required by tactical squadrons, other assigned aircraft and base supply. It should arrange these requirements and capabilities into a workable priority system.

2. **Responsibilities.** The maintenance control officer is responsible to the field maintenance officer for coordination of all the production facilities of field maintenance to insure proper support of all base aircraft activities, and will:

a. Organize and direct the work of the production control section, materiel control section, reparable and contractual maintenance section, and records and analysis section.

b. Maintain liaison with all base units requiring field maintenance support.

c. Provide master priority schedules for guidance of the production control section.

d. Provide sufficient historical data so that it may be used for future planning on such items as manpower, materiel, production estimates, and master schedules.

e. Prepare and maintain necessary operating procedures for the guidance of the various branches in the accomplishment of the mission.

f. Assure himself that pertinent directives are not by-passed or improperly interpreted, and that all work accomplished by the field maintenance facility is approved and authorized.

3. **General.**

a. The maintenance control branch is the planning, scheduling, coordinating and historical section of field maintenance. The maintenance control officer is actually the production manager of the organization and not only must have an up-to-date knowledge of present capabilities, but should be able to project plans into the future with reasonable accuracy.

b. For most efficient production capability, the maintenance organization must have one section specifically charged with the responsibility for collecting factual and statistical data; establishing performance standards; planning, scheduling, and coordinating maintenance activities; and analyzing maintenance efficiency. To provide this, the maintenance control branch should operate as a compact unit occupying space adjacent to the office of the field maintenance officer. This arrangement permits ready access to all maintenance data and promotes better relationships and personnel utilization.

SECTION II

PRODUCTION CONTROL SECTION

4. **Function.** Production control is the work acceptance, planning, status and delivery section of the maintenance control branch.

5. **Responsibilities.** The production control supervisor is responsible to the maintenance control officer for proper scheduling of all work through field maintenance, and will:

a. Provide an adequate and convenient work order acceptance facility.

b. Provide for acceptance and processing of "bench check" items with minimum of delay.

c. Schedule work through the field maintenance (F/M) branches so that maximum production is achieved.

d. Establish realistic work priorities and review them daily.

e. Establish estimated dates of completion on all projects.

f. Maintain status of all work orders so that inquiries may be answered intelligently.

g. Keep the maintenance control officer informed of work capabilities.

6. **General.**

a. Production control must provide job scheduling for all maintenance supervisory personnel. Efficient use of maintenance facilities will be obtained by the establishment of carefully prepared maintenance plans and schedules coordinated with all activities directly or indirectly concerned. Such planning and scheduling, when well conceived and executed, results in more efficient use of facilities and manpower, and a smoother flow of high quality maintenance.

b. Before scheduling can take place or a work plan can be formulated, the maintenance control branch must obtain current and accurate information which will permit determination of the maintenance requirements. Information must be obtained on operational requirements, total number of aircraft and special purpose vehicles, manpower availibity, performance standards, the time available to accomplish the job, the availability of materials, etc. The effective use of maintenance assets depends entirely on the ability of the production control section to analyze available information and to formulate workable plans. This section must monitor all maintenance activities continually to insure compliance with established schedules. Every effort must be made to insure that each F/M branch is accomplishing the maintenance for which it is responsible.

SECTION III

MATERIEL CONTROL SECTION

7. **Function.** The materiel control section of the maintenance control branch is the supplier to all the branches of the field maintenance organization. The supply officer is in charge of this section and will have sufficient personnel, housing, and

transportation at his command to adequately support the mission of the organization.

8. **Responsibilities.** The materiel control section officer is responsible to the maintenance control officer for the procurement and distribution of supplies, tools, equipment, etc., to the operating branches of field maintenance, and will:

a. Establish a library of publications pertinent to the ordering of support supplies, tools, and equipment.

b. Provide a convenient and complete requisitioning facility to relieve production personnel of time consuming, nonproductive parts ordering procedures.

c. Provide expert research assistance so that the proper aircraft parts and/or substitute items are expeditiously ordered.

d. Provide well equipped tool cribs conveniently located for efficient use by production personnel.

e. Assist the branches in establishing proper bench stock levels.

f. Verify priority requisitions and maintain the status of required items by aircraft serial number, work order number, or equipment serial number.

g. Keep the maintenance control officer advised as to the status of supplies, tools and equipment as they effect the mission of the organization.

h. Recommend consolidation of aircraft shortages (controlled cannibalization) as necessary in the best interests of the mission.

i. Recommend priority scheduling of critical items.

j. Prepare internal supply directives for the field maintenance officer.

k. Maintain necessary records to properly accomplish his mission.

9. **General.** The establishment of an effective materiel control section is mandatory. Any laxity in this section is directly reflected in lost man-hours, slowing down of schedules, reduction of total capabilities, and uncontrollable backlogs.

SECTION IV

REPARABLE AND CONTRACTUAL MAINTENANCE SECTION

10. **Function.** The reparable and contractual maintenance section of maintenance control maintains liaison between base supply, production control, and materiel control for the prompt and efficient channeling of reparable items.

11. **Responsibilities.** The reparable and contractual maintenance supervisor is responsible to the maintenance control officer for the prompt return of reparable items to a serviceable condition, and will:

a. Visit the reparable warehouse of base supply daily to ascertain the number of reparable items generated during the past twenty-four hours.

b. Visit the priorities section of base supply daily to determine locally critical ANFE and AOCP items.

c. Deliver all reparable items that can be repaired on base to the maintenance activity daily.

d. Coordinate priority handling with production control for AOCP, ANFE, and critical items in reparable channels.

e. Determine the items which will be repaired or reworked by contract maintenance.

f. Comply with current directives relative to reports and property control of all items on or being scheduled for contract maintenance.

g. Initiate all required purchase requests and administrative details for items scheduled for contract maintenance.

h. Furnish the contracting officer all necessary production schedules, work specifications, etc., in accordance with pertinent directives.

12. **General.** The effective use of the reparable section in properly funneling items for repair will reduce AOCP's, maintenance delays, ANFE's and quantities of parts on hand. Proper transportation facilities for this section must be provided to insure expeditious movement of items between supported operating units and branches of the field maintenance organization.

SECTION V

RECORDS AND ANALYSIS SECTION

13. **Function.** The records and analysis section of maintenance control provides all the historical data necessary for correct planning of future projects and routine work.

14. **Responsibilities.** The supervisor of the records and analysis section is responsible to the maintenance control officer for a complete breakdown by work order, section, manhours, materiel, etc., of the activities of the field maintenance organization, and will:

a. Maintain a file of completed work orders.

b. Prepare such records and reports as required by existing directives.

c. Extract information from work orders that will aid the maintenance control officer and branch supervisors in better utilization of manpower, facilities and materiel.

d. Furnish base supply a monthly listing of all items processed through operation "Bench Check."

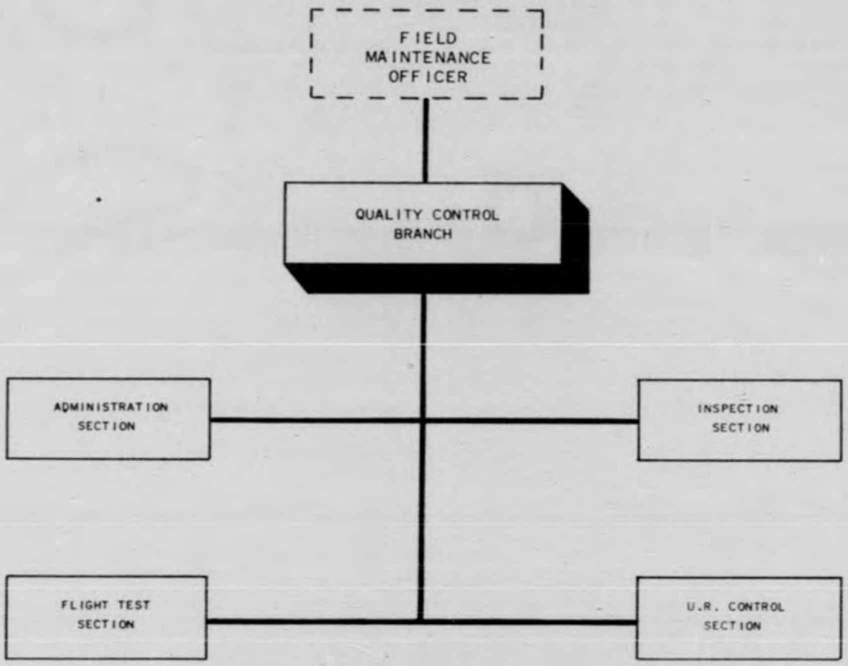
e. Make a cost analysis of major work items.

f. Prepare a monthly breakdown of work accomplished.

15. **General.** The proper use of this section will result in dollar savings to the field maintenance activity by intelligent analysis of work accomplishment, scheduling and rejection as necessary. The initiative displayed by the supervisor of this section will be reflected in maximum utilization of available manpower and facilities.

CHAPTER 4

QUALITY CONTROL



SECTION I

QUALITY CONTROL BRANCH

1. **Function.** The quality control branch assists in and monitors inspections pertaining to all phases of the field maintenance activity, is responsible for base UR control, supports the TOC program, and accomplishes flight tests on aircraft as required.

2. **Responsibilities.** The quality control branch, headed by a flight test officer, is responsible to the field maintenance officer for the efficient accomplishment of the assigned functions, and will:

a. Organize the quality control branch in accordance with this Manual.

b. Assist in and monitor inspections pertaining to all phases of the field maintenance activity, rendering reports on discrepancies and deficiencies noted.

c. Test fly aircraft assigned to or repaired by the field maintenance organization.

d. Render technical assistance to branches of the field maintenance organization, supported squadrons and organizations, and review boards, in resolving maintenance problems, developing techniques, and development of peculiar support equipment.

e. Review all UR's submitted to determine critical failures, materiel and design deficiencies. Maintain central base UR station serial number control register. Monitor all UR correspondence routing.

f. Appoint a qualified weight and balance officer.

g. Keep the field maintenance officer informed of quality trends and recommend corrective action.

3. **General.** a. The value of the quality control branch will be improved by harmonious relations with all activities of the maintenance organizations. The importance of coordinated action, factual unbiased reports, and tactful contacts cannot be overemphasized. To insure willing cooperation throughout the maintenance organizations, relations must be friendly, cooperative, and courteous, as this branch has no command or directive authority.

b. The inspection, flight test, and unsatisfactory reports functions are combined in the branch because of their relationship to aircraft safety of flight and quality of maintenance performed. Quality must be continually observed through inspection of all phases of maintenance, investigation of maintenance procedures, analysis of equipment failures, and the actual flight test of the end product of the aircraft maintenance activities.

c. Through this branch, the commander or the field maintenance officer, and branch supervisors receive the information by which the quality of maintenance may be evaluated. The quality control branch must be staffed with the best qualified and experienced personnel available. The success or failures of the branch depends on the action taken on quality control reports. This emphasizes the importance of the relationship between the branch and other maintenance officers responsible for maintenance accomplished. Quality cannot be inspected into any product but must be achieved in the end product through earnestly and diligently accomplished maintenance.

d. The quality control officer should make frequent visits to each field maintenance branch to insure that his inspection coverage is adequate, that his reports are helpful, and that his inspectors are providing the necessary assistance. Where possible, inspectors should help and assist maintenance personnel by instructing in correct methods, procedures, or techniques. A very close relationship with maintenance personnel must exist. The quality control branch can be a valuable tool to maintenance supervisors; however, it must be used properly to realize its full benefits.

e. The quality control officer and inspectors will review all inspection reports, flight test reports, and any corrective action comments entered thereon to ascertain the quality of inspection coverage. A constant cross check of inspection reports against flight test reports will indicate areas of low quality. Such review is essential to insure complete coverage of all productive areas and to point out deficiencies in the quality control branch.

SECTION II

ADMINISTRATIVE SECTION

4. **Function.** The administrative section of the quality control branch provides the administrative support to the branch, and maintains files, records, charts, graphs and a technical library, as required.

5. **Responsibilities.** The appointed chief clerk of this section is responsible to the quality control officer, and will:

a. Maintain correspondence and publication files, including control and suspense registers, in support of the quality control branch's activities.

b. Administratively support the quality control sections.

c. Establish and maintain a technical library in accordance with the demands of the branch.

d. Maintain Kardex files, charts, and graphs as required by the Branch to intelligently administer quality control matters.

e. Provide lateral assistance to the field maintenance administrative branch when required.

6. **General.** This section is provided to relieve the inspectors of the numerous "paper work" duties which are required in a quality control branch, thereby permitting the assigned inspection personnel to better perform their duties of quality control inspection.

SECTION III

INSPECTION SECTION

7. **Function.** The inspection section performs such inspections as required to determine the quality of maintenance performed, condition of maintenance forms, records, files, reports, and serviceability, status and safety condition of equipment and facilities assigned to the field maintenance organization.

8. **Responsibilities.** The chief inspector is responsible to the quality control officer, and will:

a. Accomplish quality inspections on aircraft and associated equipment undergoing field maintenance.

b. Periodically perform quality and safety inspections on ground handling, servicing and motorized equipment.

c. Conduct such inspections as required to keep the field maintenance officer informed of the quality of maintenance; conformance to established procedures; condition of maintenance forms, reports, records, and files; serviceability status and safety condition of equipment and areas; acceptance inspections for contract maintenance items, etc.

d. Prepare and submit inspection reports.

e. Periodically inspect aircraft weighing procedures and weight and balance records.

f. Review and disseminate applicable technical information to the field maintenance organization and all other activities supported.

g. Coordinate, supervise, and monitor the technical order compliance program through a central technical order compliance control office responsible for ordering and distribution of aircraft and associated parts TO kits. This central control is applicable only to ADC organizations. Tenant units on ADC bases are responsible for ordering and distribution of their own TOC kits.

h. Maintain master inspection guides for aircraft assigned and/or attached to all ADC organizations located on base.

9. **General.** This section will determine whether or not the maintenance performed by activities of the field maintenance organization meet AF standards of quality maintenance.

SECTION IV

UNSATISFACTORY REPORTS CONTROL SECTION

10. **Function.** The unsatisfactory reports control section is the clearing and control agency for all unsatisfactory reports submitted by activities assigned and/or attached to the base.

11. **Responsibilities.** The supervisor in charge of the UR control section is responsible to the quality control officer, and will:

a. Monitor and process all unsatisfactory, failure, and teardown deficiency reports submitted by activities assigned to the base.

b. Assign station serial number to all UR's, check for completeness, accuracy of preparation, and coordinate with the quality control sections.

c. Provide advisory assistance to all activities, when requested, in preparation and submission of UR's.

d. Process UR exhibits in accordance with current directives.

e. Be alert to detect unsatisfactory equipment trends and disseminate pertinent information to individuals, sections, or activities, as applicable.

f. Formulate recommendations for corrective action to UR's submitted for the quality control officer, and indicate such action to higher headquarters by indorsement.

g. Establish and operate a system to expedite the coordination and forwarding of UR's submitted.

12. **General.** This section provides the necessary control for the product improvement system. This will include unsatisfactory, failure, and teardown deficiency reports. Personnel of this section must insure that all product improvement reports processed by the base are as complete and accurate as possible to enable Air Materiel Command activities to resolve the reported difficulties. When replies to previously submitted UR's have been received, they must advise the submitting agency of the corrective action to be taken.

SECTION V

FLIGHT TEST SECTION

13. **Function.** The flight test section performs flight tests on aircraft assigned to or repaired by the field maintenance activity.

14. **Responsibilities.** The flight test section is responsible to the quality control officer. This section will be headed by a flight test officer, who will:

a. Perform flight tests on aircraft in accordance with the provisions of Technical Orders and pertinent directives to insure the aircraft are safe for flight and capable of performing their assigned mission.

b. Appoint additional crews as may be required to accomplish flight testing.

c. Insure that crews appointed are qualified and current in the type of aircraft tested and are placed on flying orders.

d. Ascertain that quality maintenance has been accomplished, using a prepared check list, and performing a ground functional check of the aircraft systems prior to flight.

a. Review with inspection personnel all pertinent aircraft records and flight test forms.

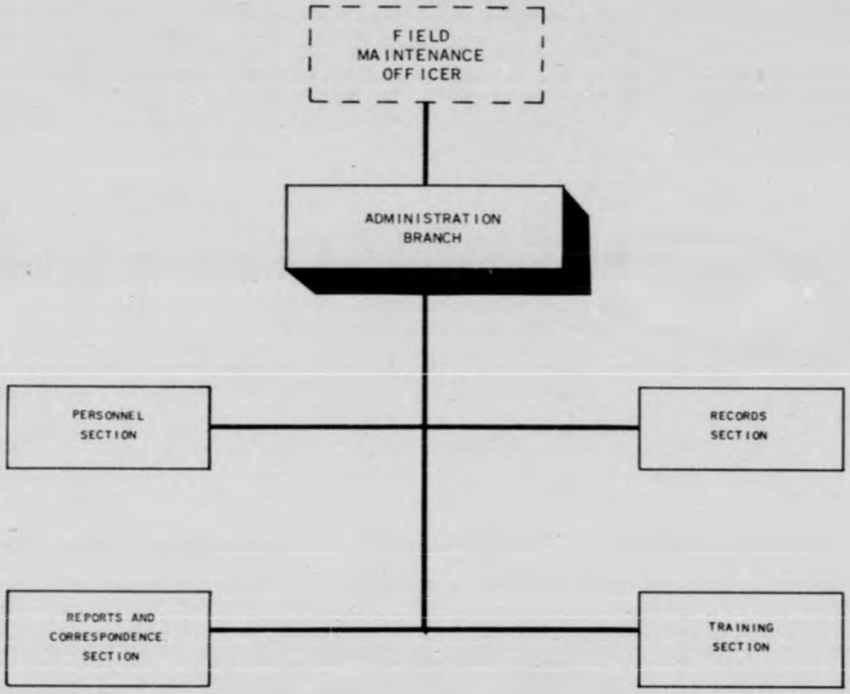
f. Assist the maintenance personnel in analyzing malfunctions disclosed by flight test.

g. Insure clearance of discrepancies and determine that aircraft meet the AF standard of quality control prior to release to the using activity.

15. **General.** This section is the final stage in the aircraft repair and inspection system. It must determine, through thorough and complete flight testing, that the finished aircraft is safe for flight and capable of performing its assigned mission. When personnel from other activities are called upon to perform flight tests, the section must insure that these personnel are adequately briefed on the condition of the aircraft and the checks to be performed during the flight. Each crew member must know his specific duties and how to perform them. Every effort must be expended to insure that the flight is performed in the safest possible manner.

CHAPTER 5

ADMINISTRATIVE BRANCH



1. **Function.** The administration branch is charged with the administrative and clerical support for the field maintenance activity.

2. **Responsibilities.** The chief clerk of the administration branch is responsible to the field maintenance officer, and will:

a. Maintain all reports, records, correspondence, and files required for the administrative support of the field maintenance activity.

b. Maintain reports control register and suspense files, as directed.

c. Keep current personnel information cards on all personnel.

d. Prepare and/or review all correspondence, reports, and records forwarded by the field maintenance activity to higher echelons of command or to other activities.

e. Assist clerical personnel assigned to other branches of the field maintenance activity in procedures and training as may be required.

3. **General.** a. This branch provides the administrative assistance to the field maintenance officer. Administration of personnel is an important factor in the field maintenance organization, as the quantity and quality of maintenance performed is largely determined by the availability and assignment of qualified personnel, and their proper administration.

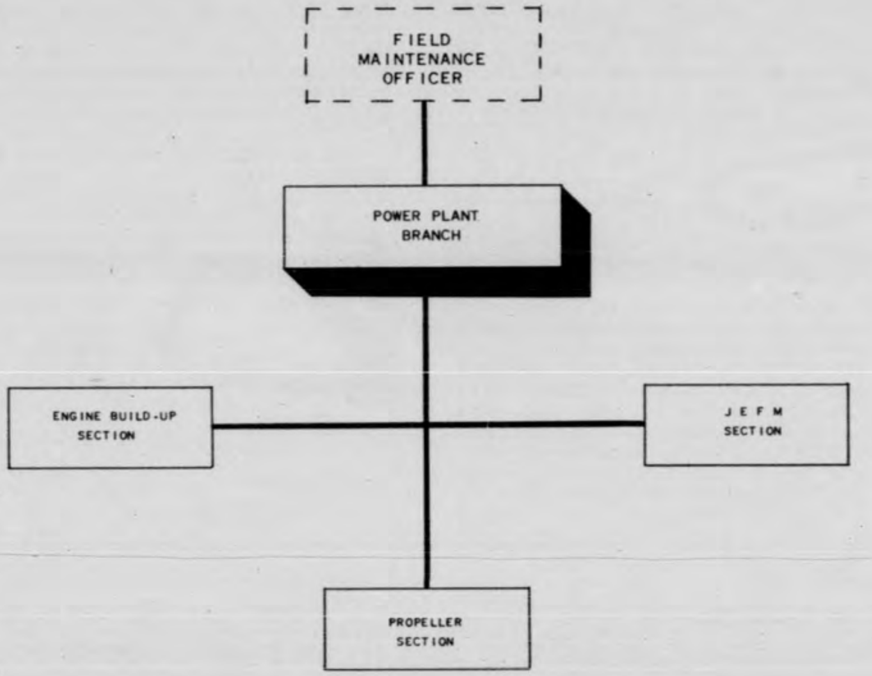
b. The maintenance of training records in accordance with existing directives is an important function of this branch. In order to up-grade personnel, proper training records are as necessary as the actual training. The training section must work closely with all other activities of the field maintenance organization to insure that all personnel assigned are receiving the necessary training to accomplish the assigned mission. Great care must be employed in utilizing training authorizations to prevent unnecessary training, while at the same time taking full advantage of opportunities offered that will increase the mission capability.

c. In organizations utilizing civilian personnel, all records pertaining to their employment will be maintained by this section.

d. The field maintenance officer must refer frequently to files and correspondence maintained by this section; therefore, files, records, and correspondence must be properly segregated to provide ready and speedy access at all times, and maintained in strict accordance with existing directives.

CHAPTER 6

POWER PLANT BRANCH



1. **Function.** The power plant branch provides central build-up, teardown, and jet engine field maintenance facilities for aircraft engines, propellers, and allied units.

2. **Responsibilities.** The power plant branch supervisor is responsible to the field maintenance officer, and will:

a. Organize the power plant branch with the following sections as listed below. Variations from this listing may be made, consistent with current manning, equipment authorization and mission assignments, provided homogenous branch assignment is retained:

(1) Engine Build-Up Section.

(2) Jet Engine Field Maintenance (JEFM). (JEMR is now JEFM).

(3) Propeller Section.

b. Supervise the branch in a manner consistent with the policies of the field maintenance officer, and keep him informed of major difficulties encountered.

c. Promptly accomplish all work orders in accordance with established priorities.

d. Build-up, teardown, replace, and repair propellers and component accessorcessories.

e. Build-up, teardown, replace, and repair propellers and component accessories.

f. Repair and recondition power packs.

g. Order and maintain bench stocks and necessary stand-by levels of supplies.

h. Assist with reclamation activities as directed by the field maintenance officer.

i. Maintain records, files, technical and other publications pertaining to the branch.

j. Insure expeditious and continuous corrective action on reported discrepancies to maintain a high level of quality maintenance.

k. Perform organizational maintenance on all assigned tools and equipment.

l. Insure that all available personnel, tools, and facilities are used to the best ability to accomplish the highest quality of maintenance.

m. Prepare and submit teardown deficiency reports.

3. **General.** a. The power plant branch is established to provide a central build-up, teardown, and jet engine field maintenance facility for aircraft engines, propellers, and allied units, as directed by the maintenance control branch. This branch has a function which is readily adaptable to production line techniques. The layout of the physical facilities should be based upon industrial standards of efficiency and production. Each station or dock of the build-up and teardown lines will be provided with all the tools, parts, and accessories essential to efficient operation. Operation of the branch is most effective when high performance standards are established and the work is carefully planned and sequenced. Due to the critical nature of the end product, close inspection is required at every stage of engine and propeller build-up.

b. Reparable engines and components will be processed for off-base shipment or station repair in the most expeditious manner. Speed and efficiency in reparable processing is essential because many of the units removed will be the sole source of supply for the build-up line. Engines will be processed so as to be available for expeditious shipment off the base after removal. Specialist assignments should be made to the power plant branch in the quantity required to maintain production in accordance with the standards and schedules established by the maintenance control branch. Reparable processing will be accomplished in accordance with current directives.

c. The branch chief is the manager of the branch and is responsible to the field maintenance officer for the efficient accomplishment of all work assigned. He will assist him in every manner in accomplishing the field maintenance function. He must have daily knowledge of the personnel authorized, assigned, and present in the shop and on dispatch from each shop.

d. The branch chief is responsible for the effective and efficient utilization and training of assigned personnel. He will perform frequent checks, in conjunction with the shop foreman, to determine the need for additional training. He should then request the necessary training, as required. Emphasis should be given to training in areas of deficiency rather than general training.

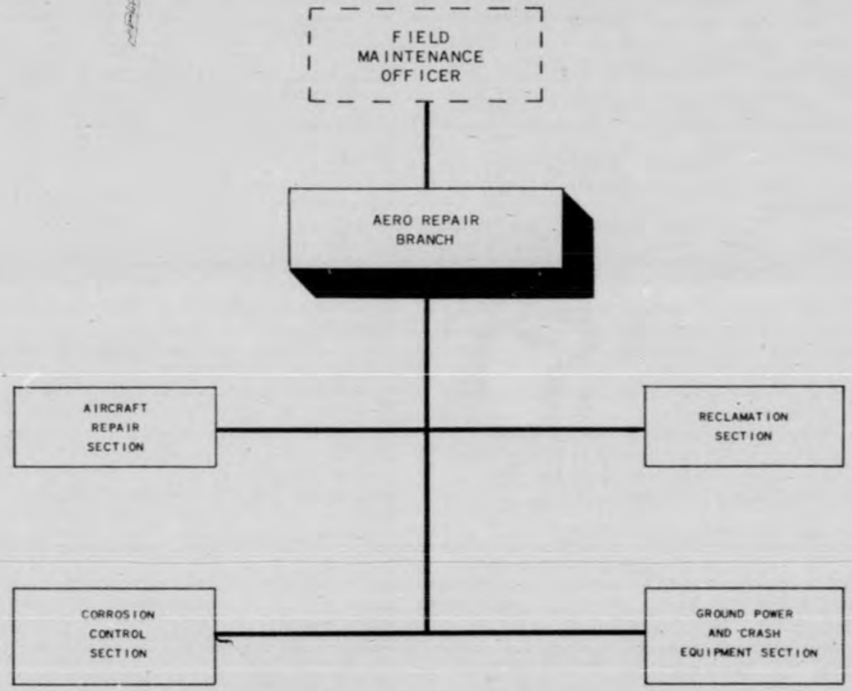
e. In coordination with the shop foreman, the branch chief will plan and schedule maintenance to meet the master schedule established by the maintenance control branch. He will monitor the progress of maintenance to insure that the schedule is being met. Insofar as possible, he will anticipate delays, supply needs, etc., and take appropriate action to prevent delays or slowdowns.

f. The branch chief will inspect periodically the maintenance accomplished by assigned personnel to insure proper standards of quality and to determine areas of maintenance deficiency. These inspections will be accomplished in addition to any prescribed or requested quality control inspections. Whenever the branch chief feels that he is not qualified to check and clear a particular item, he will request assistance from the quality control branch.

g. Ground servicing, test, and motorized equipment assigned the branch is vital to the successful accomplishment of the assigned mission. The branch chief must insure that all such equipment is maintained in a manner which will insure maximum availability of serviceable and safe equipment.

CHAPTER 7

AERO REPAIR BRANCH



1. **Function.** The aero repair branch controls the movement of complete aircraft through the field maintenance facility.

2. **Responsibilities.** The supervisor of the aero repair branch is responsible to the field maintenance officer for the efficient and expeditious processing of reparable and reclaimable aircraft through the field maintenance facility, insuring proper preservation, safeguarding and disposition of all parts and equipment. In carrying out these responsibilities, he will:

a. Establish and properly man an aircraft repair section.

b. Establish and properly man a reclamation section in accordance with existing directives.

c. Provide washing and corrosion control facilities for all aircraft assigned to the base.

d. Provide manpower, space, etc., for the proper utilization and maintenance of ground handling, ground power, and crash equipment assigned field maintenance.

e. Provide for the movement of aircraft within the field maintenance area.

f. Accomplish field maintenance on the airframe of the aircraft, prepare the airframe for work by other branches and evacuate to various shop facilities all parts requiring bench checks, repairs, or specialist shop tests.

g. Replace, repair, and re-rig control surfaces, landing gear, fuel cells, deicer and installed systems.

h. Properly maintain all assigned equipment and tools.

i. Make a study of repetitious discrepancies and take whatever corrective action is necessary to prevent further recurrence.

j. Order and make available by coordination through materiel control branch, all tools, supplies, and equipment necessary to accomplish the mission of the branch.

k. Coordinate with other branches of field maintenance through production control to insure expeditious return of the aircraft to an in-commission status condition.

l. Prepare and publish necessary work procedures so that the branch is an integrated unit.

m. Insure that all pertinent directives are available to and followed by assigned personnel.

n. Prepare such reports as are necessary to inform the field maintenance officer of the status of aircraft within the activity.

o. Provide proper work areas, stands, docks, and related equipment so that personnel can work with a maximum safety factor.

p. Insure all assigned work areas are properly maintained.

q. Supervise the branch in a manner consistent with the policies of the field maintenance officer and keep him informed of major difficulties encountered.

3. **General.**

a. The aero repair branch is established to provide field maintenance support for the airframe, and to prepare the airframe for maintenance to be accomplished by other branches of field maintenance. The branch will provide unit change crews for control surfaces, and similar units, as directed by the maintenance control officer. Reclamation activities will be accomplished in accordance with current directives. Maximum security and protection will be provided to prevent pilferage and unauthorized removal of parts or accessories. Maximum practicable reparable processing will be accomplished in accordance with current directives.

b. The branch chief is the manager of the branch and is responsible to the field maintenance officer for the efficient accomplishment of all work assigned. The branch chief will assist him in every manner in accomplishing the field maintenance function. He must have daily knowledge of the personnel authorized, assigned, present, and to what extent available personnel are being utilized.

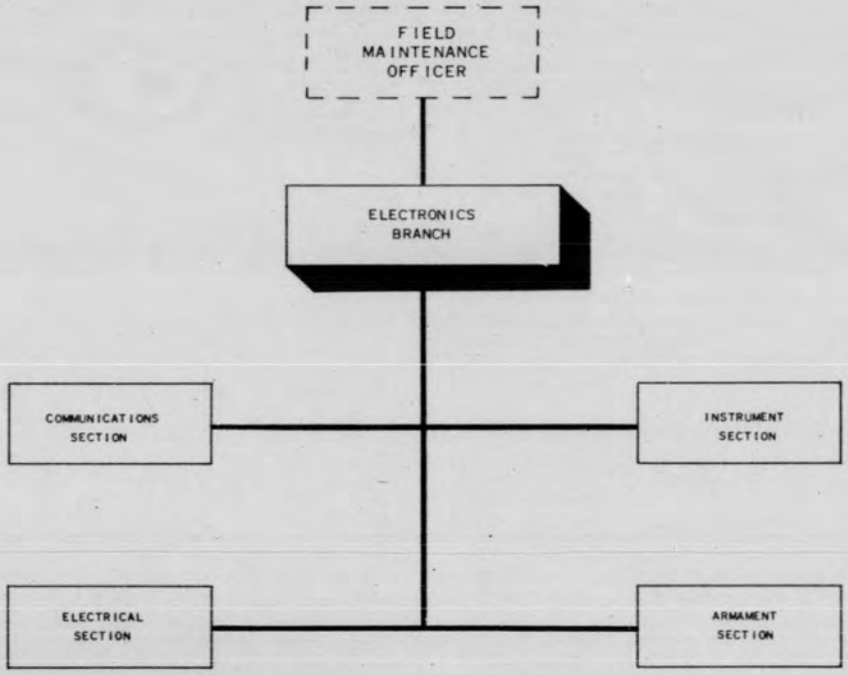
c. The branch chief is responsible for the effective and efficient utilization of assigned personnel. Sign out sheets, status boards, or similar devices will be maintained to record the location of assigned personnel to insure expeditious dispatch of specialists as directed by the maintenance control branch.

d. The branch chief will inspect periodically the maintenance accomplished by assigned personnel to determine the quality of work being produced. He will accomplish these supervisory inspections to insure that established performance and quality standards are being met, and to determine areas of functional deficiency. These inspections will be accomplished in addition to any prescribed or requested quality control inspections. Whenever the branch chief feels he is not qualified to check and clear a particular item of repair, it is essential that he request assistance from the quality control branch.

e. Ground servicing, and test of motorized equipment assigned the branch, is vital to the successful accomplishment of the assigned mission. The branch chief must insure that all such equipment is maintained in a manner which will insure maximum availability of serviceable equipment.

CHAPTER 8

ELECTRONICS BRANCH



1. **Function.** The electronics branch provides electrical, electronic, instrument and armament field maintenance support that is beyond parent unit capability to assigned and/or attached aircraft and electronic field maintenance for vehicular and associated ground radio communications equipment.

2. **Responsibilities.** The electronics branch officer is responsible to the field maintenance officer for the supervision and management of the electronics maintenance branch shops, and is responsible for:

a. Organization of the electronics maintenance branch in accordance with the organizational chart.

b. Field maintenance, inspection, repair, and adjustment of:

(1) Aircraft electrical systems, equipment, and accessories.

(2) Aircraft instruments, auto pilots, and associated equipment.

(3) Communications and navigation equipment.

(4) Vehicular communications equipment.

(5) Electronic fuel control systems.

(6) Electrical and electronic test equipment.

(7) Electrical portions of ground powered equipment used for servicing and maintenance of aircraft.

(8) Ground radio communications equipment assigned to or used by base support activities.

c. Insuring prompt accomplishment of work orders in accordance with established priorities.

d. Dispatching specialist personnel to aero repair to accomplish electrical and electronic systems and equipment repair in aircraft as required.

e. Performing organizational maintenance on vehicular communications equipment assigned to base support activities.

f. Reclamation of electrical and electronics equipment in accordance with current directives.

g. Coordination with maintenance control in scheduling electronics maintenance workload.

h. Accomplishing bench check of electrical and electronic components in accordance with existing directives.

i. Supervision and utilization of assigned personnel.

j. Maintaining records and technical files as required by current directives.

k. Enforcing field maintenance squadron SOP's and maintenance policies.

l. Availability and proper use of tools, test equipment, test stands, mockups, and facilities required by the electronics branch.

3. **General.** a. The electronics branch is subdivided into three shops. The maintenance responsibility among the shops may be divided as indicated below; however, this division is not mandatory and may be adjusted to fit the local situation of personnel and facilities. Furthermore, where the workload or physical facilities do not favor separate shops, the entire electronics function may be combined in one shop. In many cases this will facilitate supervision, interchange of equipment and better utilization of personnel.

(1) **Instrument Section.** This section normally will be responsible for inspection, maintenance, repair, and TOC of all aircraft instruments, auto pilots, zero readers, stability augmenters, fuel quantity measuring systems, etc. This section should be located immediately adjacent to the communications section shops to facilitate use of common items of test equipment, and to closely coordinate maintenance and repair of equipment associated with other electronics equipment maintained by the communications section.

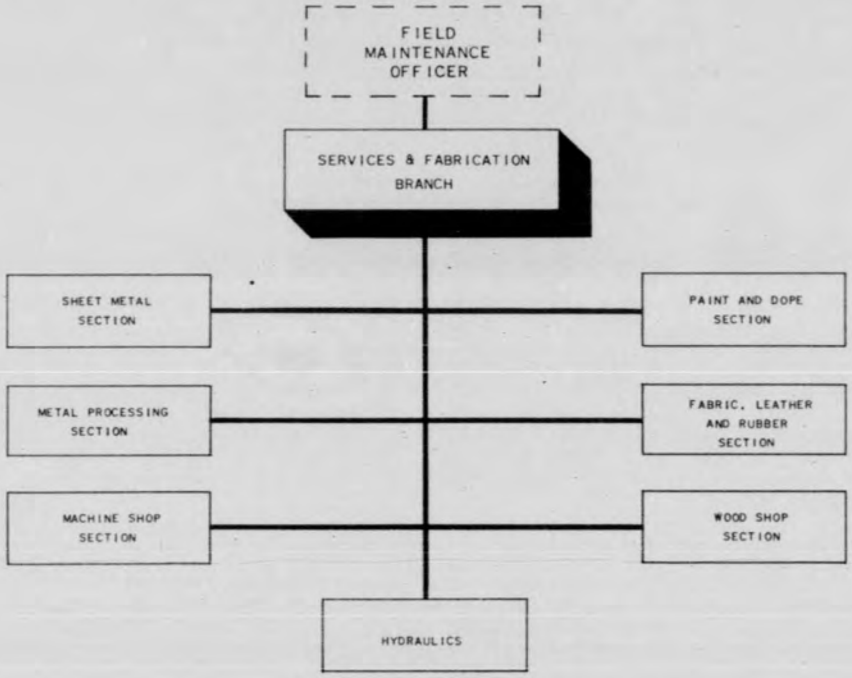
(2) **Communications Section.** This section normally will be responsible for inspection, maintenance, repair, and TOC of all airborne communications and navigation equipment, vehicular and ground radio communications equipment, electronic fuel control equipment, electrical and electronic test equipment.

(3) **Electrical Section.** This section is responsible for inspection, maintenance, repair and TOC of all aircraft electrical systems, accessories, batteries, electrical power generating systems of engine driven ground powered equipment for servicing aircraft, and motor generator ground powered equipment for servicing aircraft.

b. The chief of the electronics branch must manage the resources under his control for the maximum support of the primary mission aircraft. He must delegate responsibility and authority to his shop foremen for operation of their shops. He must constantly analyze the operation of his branch and initiate the appropriate action to correct deficiencies and obtain the maximum utilization of the shops productive capability.

CHAPTER 9

SERVICES AND FABRICATION



SECTION I

SERVICES AND FABRICATION BRANCH

1. **Function.** The services and fabrication branch of field maintenance consists of shops as outlined, and normally will be concerned with support of the other branches of field maintenance, base supply reparable units, special fabrication work orders, and dispatch of specialist assistance to tactical units.

2. **Responsibilities.** The supervisor in charge of services and fabrication will be responsible to the field maintenance officer for expeditious handling of all work orders and specialist dispatching so as to make full use of manpower, equipment, and materiel assigned. In the accomplishment of this mission, he will:

a. Insure prompt accomplishment of specialist dispatch and work orders in accordance with established priorities.

b. Manufacture and/or repair aircraft parts and assemblies fabricated from sheet metal, bar stock, plastic materials, glass, cloth, canvas, leather, wood, tubing, and cable, when directed by the maintenance control branch.

c. Fabricate and repair wood parts and structures pertinent to maintenance, not including buildings or other real property.

d. Weld, heat treat, and/or electroplate aircraft parts, assemblies and items pertinent to aircraft maintenance, in accordance with equipment authorizations and available facilities.

e. Operate required and authorized foundry, metal testing, and sandblasting facilities.

f. Paint aircraft, parts, assemblies,

and equipment pertinent to aircraft maintenance.

g. Repair and install fabric on aircraft control surfaces.

h. Manufacture and repair jigs, dies, parts, and special equipment allied to aircraft maintenance.

i. Inspect, clean, repair, and repack parachutes, life rafts, and associated personal equipment.

j. Repair and refinish furniture.

k. Reclaim appropriate items in accordance with current directives.

l. Accomplish organizational maintenance on all assigned equipment and tools.

m. Maintain pertinent maintenance records and limited technical files.

n. Organize the services and fabrication branch, normally composed of the following shops:

(1) Sheet metal shop.
(2) Metal processing shop.
(3) Machine shop.
(4) Paint and dope shop.
(5) Aircraft woodworking shop.
(6) Fabric, leather, rubber, and parachute shop.
(7) Hydraulic shop.

Variations from this listing may be made, consistent with current manning and assigned equipment, provided homogeneous branch assignment is retained. Where it is advantageous to the mission in the interest of facilities and economy, some installation engineer shops may be consolidated with the field maintenance shops.

o. Supervise the branch in a manner consistent with the policies of the field maintenance officer and keep him informed of major difficulties encountered.

p. Maintain a direct supervisory relationship with the shop foreman of the branch.

q. Maintain a close relationship between other branch chiefs and maintenance supervisors so that substandard maintenance is expeditiously reported and corrected.

r. Insure expeditious and continuous corrective action on reported discrepancies to guarantee high quality maintenance at all times.

s. Insure that all shops and assigned equipment of this branch are maintained in a neat, serviceable, and safe condition.

3. **General.** a. The services and fabrication branch is composed of those shops which accomplish major repair and fabrication as directed by work orders and specialist dispatches issued by the maintenance control branch. The majority of shop work and reparable items will be processed through this branch. Large backlogs of work will accumulate if this activity is not closely monitored. The branch chief will recommend distribution of work to other functions of field maintenance and/or to be shipped off the station when pertinent, to production control. The work assigned this branch will be closely scrutinized to insure that only work essential to the accomplishment of the mission is being accomplished. Reclamation will be accomplished when and as requested by the aero repair branch.

b. Aircraft parts and assemblies required to return an aircraft to a combat-ready status will be processed in accordance with established priorities. The shops of this branch will provide maintenance support to all other base activities as directed by the maintenance control branch. Work of any nature will be accomplished only when directed by work order or instruction slip issued properly by production control.

c. The branch chief is the manager of the branch and is responsible to the field maintenance officer for the efficient accomplishment of all work assigned. The branch chief will assist him in every manner in accomplishing the field maintenance function. He must have daily knowledge of the personnel authorized, assigned, present, in the shop, and on dispatch from each shop.

d. To maintain a workload vs personnel balance and provide training in each shop, the branch chief will insure that all personnel are assigned duties commensurate with their qualifications. He will perform frequent checks, in conjunction with the shop foreman, to determine the need for additional training. He will request the necessary training as required.

e. In coordination with the shop foreman, the branch chief will plan and schedule maintenance to meet the master schedule established by the maintenance control branch. He will monitor the progress of maintenance to insure that the schedule is being met. Insofar as possible, he will anticipate delays, supply needs, etc., and take appropriate action to prevent delays or slowdowns.

f. The branch chief will inspect periodically the maintenance accomplished by assigned personnel to determine the quality of work being performed. He will accomplish these supervisory inspections to insure that established standards are being met, and to determine areas of maintenance deficiency. These inspections will be in addition to any prescribed or requested quality control inspections. Whenever the branch chief feels he is not qualified to check and clear a particular item, it is essential that he request assistance from the quality control branch.

g. The branch chief is responsible for the effective and efficient utilization of assigned personnel. Sign out sheets, status boards, or similar devices will be maintained to record the location of assigned personnel to insure expeditious dispatch of specialists as directed by the maintenance control branch.

h. Ground servicing, test, and motorized equipment assigned the branch is vital to the successful accomplishment of the assigned mission. The branch chief must insure that all such equipment is maintained in a manner which will insure maximum availability of serviceable equipment.

CHAPTER 10

THE SHOP FOREMAN (BRANCHES)

4. **Function.** The shop foreman is the direct supervisor of all personnel assigned his unit.

5. **Responsibilities.** The shop foreman is responsible to his branch chief for the proper utilization of all assigned personnel, tools, and equipment in the accomplishment of the assigned workload. To carry out this mission, he will:

a. Supervise and manage his shop in a manner which will insure the fast and efficient accomplishment of high quality maintenance in compliance with current directives and SOP's.

b. Schedule the work to insure full utilization and maximum training of assigned personnel.

c. Insure complete and accurate recording of all maintenance accomplished.

d. Report the status of all work in progress as required.

e. Perform periodic checks of maintenance accomplished to insure quality and determine areas of deficiency requiring closer supervision.

f. Maintain the shop and all assigned equipment in a neat, serviceable, and safe condition.

g. Insure that all property, material, and supplies are secure and protected, and that reparable property is expeditiously processed.

6. **General.** a. The shop foreman works for and is responsible to the branch chief. He is the top technical man in his specialty in the field maintenance activity and will keep the branch chief informed of the technical and practical capabilities of the shop. He will supervise and manage the shop in a manner which will insure the expeditious and efficient completion of all specialists dispatch, repair, TOC, or local manufacture work directed by the maintenance control branch.

b. To insure efficiency, the shop foreman must have current knowledge of the personnel authorized, assigned, and present for duty. In addition, he must know which individuals are currently on specialist dispatch or are working in the shop. He must also review the shop daily attendance reports and take necessary action to increase his manpower availability. The shop foreman will plan his work in a manner which will insure that each subordinate individual knows what jobs he is to perform and the time allotted to them.

e. Constant attention will be given to the status of all work in progress so that the foreman is constantly aware of his work capabilities in relation to the schedules of the maintenance control branch. It will be necessary for him to plan constantly and to schedule the work of the shop to insure that priorities are met, full personnel utilization is achieved, and specialists are dispatched as directed by the maintenance control branch. A delay in specialist dispatch may result in disruption of the schedules of other maintenance activities and personnel.

d. The shop foreman is responsible for insuring that high quality maintenance is accomplished by his personnel. He will periodically inspect the maintenance work accomplished to determine quality and areas of maintenance deficiency. He will accomplish these inspections in addition to any prescribed or requested quality control inspections. These inspections will aid him in insuring high quality maintenance and will put him in the position of knowing the strength and weakness of his shop. In this way, he is supervising and assisting his personnel to produce with quality.

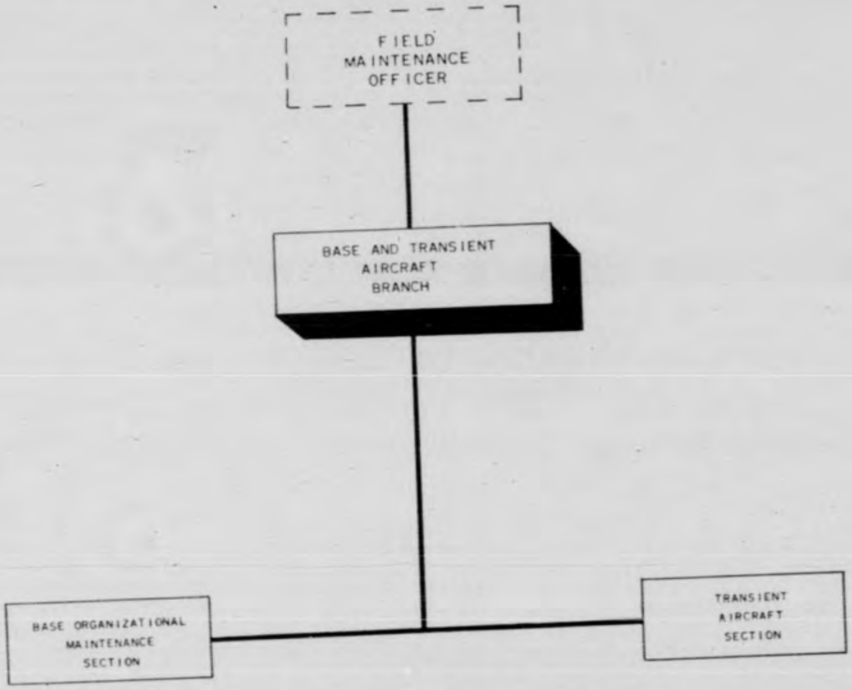
e. Much of the efficiency and effectiveness of the shop will be determined by the serviceability of assigned equipment and availability of authorized equipment. The shop foreman must be aware of his equipment authorization and insure that he has that equipment on hand or that the responsible supply officer has it on requisition. The equipment available will be maintained in accordance with current directives. Insofar as practicable, the shop foreman will assign specific responsibilities for equipment maintenance to designated individuals. In addition, he should maintain a schedule, and insure compliance with that schedule, for routine preventive maintenance operations (lubrication, cleaning, etc.) of assigned equipment and shop area facilities.

f. Supply discipline, as well as maintenance discipline, must be practiced and taught by the shop foreman. All supplies, parts, or materials in the shop will be maintained in a secure manner adequately protected from unauthorized use and the elements. They will be clean and correctly tagged or stored in appropriately identified bins or containers. Hoarding will be discouraged by action and attitude. Care should be exercised to insure that authorized stock levels are not exceeded.

g. Because of the testing facilities available, and the technical knowledge of shop personnel, every effort should be made to assist others in the proper and complete preparation of UR's. Reports from the shops can be of great value to the Air Force in improving equipment, parts and components, and this program should be enthusiastically supported.

CHAPTER 11

BASE AND TRANSIENT AIRCRAFT



SECTION I

THE BASE AND TRANSIENT AIRCRAFT BRANCH

1. **Function.** The base and transient branch provides the organizational maintenance for assigned aircraft, personnel, and facilities for service and maintenance of transient aircraft on a 24-hour basis.

2. **Responsibilities.** The base and transient aircraft officer is responsible to and works for the field maintenance officer. For expedient maintenance accomplishment, he will be authorized to work directly with the maintenance control branch in operation of the maintenance activity, and will:

a. Organize the base and transient aircraft maintenance activity as outlined in this Manual consistent with current manning authorizations and assigned aircraft.

b. Accomplish flight line and periodic maintenance on assigned aircraft, and prepare the aircraft to meet scheduled assignments.

c. Maintain active liaison with base operations officer to insure proper use and scheduling of aircraft flying time.

d. Provide essential maintenance and service for transient aircraft in accordance with current directives.

e. Account for, inventory, and safeguard all assigned aircraft 263 property in accordance with current directives.

f. Establish and maintain a system for anticipating adequate supply requirements.

g. Perform organizational maintenance on assigned equipment.

h. Maintain forms and records for daily operation of the assigned aircraft.

i. Provide the inspection section with

necessary information to maintain permanent records for the assigned aircraft.

j. Prepare and submit UR's on equipment, parts, and conditions as required.

k. Assign available personnel to provide qualified and competent supervisory and maintenance personnel to the base and transient aircraft branch.

l. Insure that all equipment, special vehicles and tools and facilities authorized the branch are available and maintained in a serviceable and safe condition.

3. **General.** a. The base and transient aircraft branch officer has a vital function within the field maintenance organization. It is his responsibility to provide flyable aircraft and engineering personnel to perform the numerous administrative and training flights required by the base. He has in addition the responsibility of providing and maintaining a transient aircraft section that is qualified and capable and that will make a favorable impression on transient crews. Transient crews make their first and last contact with the base through this section, and their general opinion of the base and its facilities are often formed from the manner in which they are treated by the transient aircraft personnel.

b. In consideration of the flying schedule of the base, the base and transient maintenance officer must plan and schedule maintenance accomplishment as far in advance as practicable. He should monitor the progress of maintenance constantly to insure that the schedule is being met and that necessary action is being taken to obtain assistance, parts, etc., as required. Insofar as possible, he will anticipate delays and take corrective action. He will insure that the maintenance is accomplished in accordance with current directives and that it is properly recorded on the aircraft records.

c. Organizational charts and job descriptions will be displayed in each section and unit of the branch. The branch officer, through the organization of his activity, must decentralize authority by assigning responsibility and delegating appropriate authority. He will observe the chain of command and supervise through his line chief to retain supervisory continuity within the branch.

d. The branch officer will appoint as the line chief his best qualified NCO considering grade and experience. The line chief will inspect the maintenance accomplished by the branch periodically to insure that established performance and quality standards are being met, and to determine areas of maintenance deficiency. These checks will be in addition to any prescribed or requested quality control inspections. The line chief, and his designated supervisor, will check and clear the majority of items falling within the scope of their authority. Whenever they feel that they are not qualified to check a particular item or installation, assistance will be requested from the quality control branch.

SECTION II

BASE ORGANIZATIONAL MAINTENANCE SECTION

4. **Function.** The base organizational maintenance section provides preflight, postflight, periodic and unscheduled maintenance on assigned administrative aircraft.

5. **Responsibilities.** The supervisor of the base organizational maintenance section works for and is responsible to the base and transient aircraft officer, and will:

a. Organize and operate the base organizational maintenance section to provide "ready for flight" aircraft for the base.

b. Assign ground crews to each aircraft to accomplish preflight, postflight, and periodic maintenance.

c. Plan and schedule aircraft maintenance to insure that aircraft are available for the base flight schedule.

d. Insure that the aircraft maintenance is accomplished in accordance with AF standards and current directives, and that this maintenance is properly recorded on the aircraft forms.

e. Insure that only qualified personnel are authorized to operate engines and taxi aircraft, and that appropriate authorization orders are published.

f. Appoint and place on appropriate orders qualified flight crews as required and directed.

g. Insure that all information for the preparation of aircraft reports is promptly furnished to the administration branch.

h. Insure that all equipment, special

vehicles, and tools authorized the section are maintained in a serviceable and safe condition.

6. **General.** a. The base organizational maintenance section is a vital function of the field maintenance organization. Personnel using assigned administrative aircraft will be impressed, favorably or unfavorably, by the condition of the aircraft and facilities, and whether or not the aircraft is ready on time to meet the flight schedule.

b. This section must be organized and controlled to achieve the maximum use of assigned aircraft. It is essential that personnel be assigned and utilized for the full working day in direct support of the maintenance effort. It is mandatory that specialist support be requested when maintenance required is beyond the capabilities of assigned personnel and equipment, or which will exceed available time. However, strict control must be maintained in order to prevent the use of specialists for the performance of maintenance which is within the accomplishment capabilities of the section.

c. Close coordination with the maintenance control branch and the quality control branch must be maintained to accomplish quality maintenance. Inspection personnel authorized the section will be assigned for duty with the quality control branch. The quality control branch will provide the same inspection and flight test coverage for the base and transient aircraft branch, as previously outlined for other maintenance activities.

SECTION III

TRANSIENT AIRCRAFT SECTION

7. **Function.** The transient aircraft section provides necessary personnel and equipment to service and maintain transient aircraft in accordance with existing directives.

8. **Responsibilities.** The transient aircraft supervisor is responsible to the base and transient aircraft officer, and will:

a. Organize and maintain the transient aircraft section to insure maximum service to transient aircraft on a 24-hour basis, in accordance with current directives.

b. Insure that expeditious maintenance is performed on transient aircraft as required.

c. Insure that transient aircraft are serviced and ready for takeoff at the time desired by the pilot.

d. Authorize only qualified personnel to run-up and taxi transient aircraft, and that appropriate authorization orders are issued these personnel.

e. Coordinate with the maintenance control branch to insure specialist support when required.

f. Determine that assigned personnel are adequately qualified and trained prior to their assignment to the transient aircraft section.

g. Maintain records, publications, directives, and files as may be required to support the section.

h. Insure that adequate equipment is available and maintained to effectively service and maintain transient aircraft.

9. **General.** The importance of the transient aircraft section and its effect on the reputation of the base cannot be overemphasized. Transient personnel make their first and last contacts with the base through this activity, and these contacts long remain in their minds. Accordingly, this activity has a psychological mission as well as a maintenance and service mission. The transient aircraft supervisor must, through the field maintenance officer, ascertain that only those personnel who are fully qualified are assigned to duties within this section.

UNCLASSIFIED

MAINTENANCE **ADCM 66-**

AIR DEFENSE COMMAND MANUA

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VEHICLE AND EQUIPMENT MAINTENANCE

APRIL 1955

UNCLASSIFIED

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AIR DEFENSE COMMAND

ENT AIR FORCE BASE (1,000)

ADCM Manual)
66-4)

HEADQUARTERS AIR DEFENSE COMMAND
ENT AFB, COLORADO SPRINGS, COLORADO
1 APRIL 1955

FOREWORD

1. **Purpose.** This Manual provides a standard maintenance organization for vehicle maintenance activities and supplements procedures established in Chapter IV, AFM 77-1. It establishes uniform responsibilities and serves as a medium for improved management and supervision of vehicle maintenance activities.

2. **Scope.** This Manual applies to all ADC vehicle and equipment maintenance organizations.

3. **Responsibility.** Commanders responsible for vehicle and equipment maintenance will implement and enforce the provisions of this Manual. Deviations from this Manual may be made only upon approval by Headquarters Air Defense Command.

4. **Changes to Manual.** Proposed changes, suggestions for improvement, or errors found in the text of this Manual, will be submitted through channels to the Deputy Chief of Staff for Materiel, this headquarters.

BY ORDER OF THE COMMANDER:

OFFICIAL:

George F. Smith
Major General, USAF
Chief of Staff

Walter W. Robinson
Colonel, USAF
Command Adjutant

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CONTENTS

CHAPTER 1

INTRODUCTION

1. The vehicle and equipment maintenance function within the Air Defense, Command is accomplished as directed in AFR 20-15 under two organizational concepts. Where a motor vehicle squadron is assigned to an air defense group, the vehicle maintenance and equipment officer is directly responsible to the motor vehicle squadron commander. Where an air defense group organization does not contain a motor vehicle squadron, a vehicle and equipment flight is assigned to the materiel squadron. In this instance, the vehicle and equipment maintenance officer is directly responsible to the materiel squadron commander.

2. The functions and duties of the vehicle and equipment maintenance activity will be the same under either organization indicated above.

3. Normally, all maintenance (less operator and motor pool maintenance) will be accomplished by the vehicle and equipment maintenance flight. Aircraft control and warning squadrons may be located at a distance from the support base which would make it impractical for the support base to provide all vehicle and equipment maintenance. In such instances, limited vehicle maintenance will be accomplished by aircraft control and warning squadron personnel as outlined in Chapter 2, paragraph 1e. Maintenance of diesel powered generators at all ACW sites will be the responsibility of the ACW squadron commander and support base, as outlined in appropriate Air Defense Command 85 series directives. This does not relieve the vehicle maintenance and equipment officer from his responsibility established in Chapter 4, AFM 77-1, Paragraph 34b.

CHAPTER 2
ORGANIZATION
VEHICLE AND EQUIPMENT MAINTENANCE ORGANIZATIONAL CHART

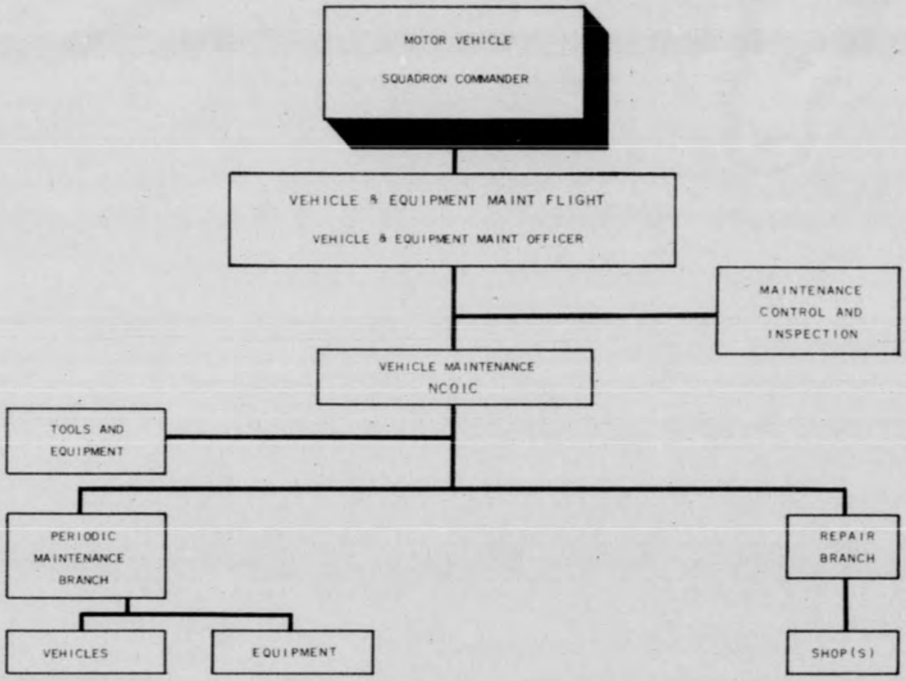


Chart 1

Functions:

The vehicle and equipment maintenance activity will accomplish all organizational (less operator) and field maintenance, including intermediate and major preventive maintenance service and inspections on all assigned vehicles and equipment with the exception of that maintenance described in paragraph 3, Chapter 1. (Vehicles and equipment as referenced in this Manual includes all vehicles as defined in Chapter 2, AFM 77-1 and all powered ground equipment including aircraft starting units.)

VEHICLE AND EQUIPMENT MAINTENANCE ORGANIZATIONAL CHART

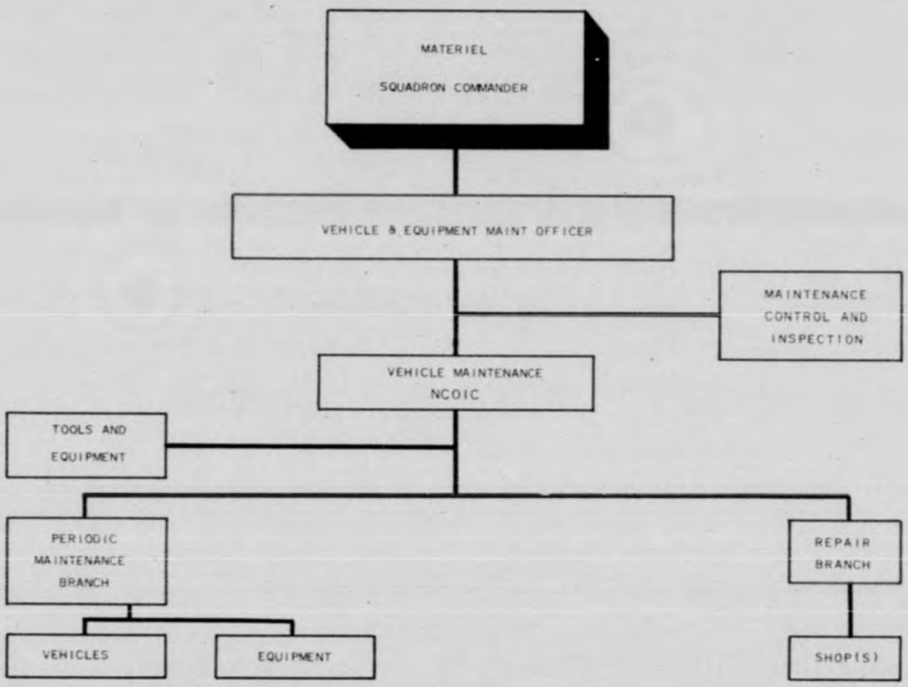


Chart 2

Functions:

The vehicle and equipment maintenance activity will accomplish all organizational (less operator) and field maintenance, including intermediate and major preventive maintenance service and inspections on all assigned vehicles and equipment with the exception of that maintenance described in paragraph 3, Chapter 1. (Vehicles and equipment as referenced in this Manual includes all vehicles as defined in Chapter 2, AFM 77-1 and all powered ground equipment including aircraft starting units.)

1. **Organization.** a. Under the vehicle maintenance officer and the vehicle maintenance NCOIC, the vehicle and equipment maintenance activity will be organized to provide two branches: periodic maintenance branch and repair branch. The periodic maintenance branch will perform all periodic maintenance (less operator and motor pool) on base vehicles and equipment. The repair branch will consist of a number of shops, consistent with personnel and equipment authorizations, which will perform all field maintenance on wing or group vehicles and equipment. Shops for maintenance of specialized equipment (e.g., aircraft starting units, engineer construction equipment, etc.) may be established under the repair branch when required.

b. Under the direct supervision of the vehicle maintenance officer, the maintenance control and inspection section will schedule, direct, and control the performance of all vehicle and equipment maintenance, including commercial maintenance consistent with existing policy. This activity will be required to analyze maintenance reports and statistics, man-hour information, etc; advise and recommend corrective action; and insure that all maintenance activities receive necessary supply support. The officer in charge of vehicle maintenance will emphasize to all vehicle maintenance activities that the maintenance control and inspection section is the nerve center and will be the central control point for all vehicle equipment maintenance.

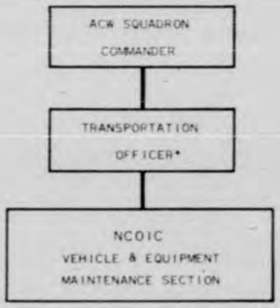
c. The tools and equipment section will operate under the direct supervision of the vehicle maintenance NCOIC. This section will operate the tool crib and will accomplish operator maintenance on vehicles and equipment assigned to the vehicle maintenance activity.

d. A branch chief will be appointed for each branch and a foreman for each shop or section within the branch. Each of these supervisors will be delegated authority commensurate with his responsibility.

e. The vehicle maintenance activity may support aircraft control and warning squadron vehicles. In those instances where the distance from the aircraft control and warning squadron to the support maintenance activity makes it impracticable to evacuate vehicles for periodic maintenance; this maintenance will be performed by aircraft control and warning squadron personnel. These aircraft control and warning squadrons will establish a periodic maintenance section at the site for the purpose of accomplishing organizational maintenance of assigned vehicles and motorized equipment. Maintenance tools, equipment, and facilities will be limited to a degree commensurate with the quantity of vehicles and equipment assigned.

f. The support vehicle maintenance activity will perform field maintenance at the site location through exchange of assemblies or sub-assemblies and/or through commercial maintenance contract whenever such maintenance is more economical and expedient. Commercial contract maintenance must be obtained in accordance with Chapter IV, Air Force Manual 77-1, and Air Force Regulation 70-16.

2. **Aircraft Control and Warning Squadron Vehicle and Equipment Maintenance.** a. The following organization and function is applicable only to aircraft control and warning squadrons referenced in paragraph 1e, above.



* ADDITIONAL DUTY OF OFFICER DESIGNATED BY ACW SQUADRON COMMANDER.

Chart 3

Function: The vehicle and equipment maintenance section will accomplish organizational maintenance, including intermediate and major preventive maintenance service and inspections on all assigned vehicles and powered ground equipment with exception of diesel powered generators.

b. **Organization:** The vehicle and equipment maintenance section will be organized directly under the designated transportation officer at the aircraft control and warning squadron.

c. **Responsibility and Authority:**

(1) **Transportation Officer.** The designated transportation officer is responsible to and works for the aircraft control and warning squadron commander. He will supervise the vehicle maintenance activity to insure that:

(a) Maintenance facilities, tools, and equipment are adequate to perform the assigned maintenance function and that sufficient support is provided by the vehicle and maintenance equipment section.

(b) Necessary liaison with the applicable support base is established to obtain required field maintenance of assigned vehicles and powered ground equipment.

(c) A close coordinating and operating relationship exists between the aircraft control and warning squadron vehicle maintenance NCO and motor transportation NCO.

(d) That maintenance standards are maintained on all assigned vehicular and motorized equipment in accordance with Chapter IV, AFM 77-1, and applicable technical orders.

(2) **Maintenance NCOIC.** The motor vehicle maintenance NCOIC works for and is responsible to the transportation officer for:

(a) Establishment of working schedules for maintenance personnel and assignment of routine duties. He will monitor the progress of maintenance to insure that schedules are being met.

(b) Establishment of maintenance procedures and schedules in accordance with current directives and insuring that maintenance inspection records and periodic work inspection sheets are properly maintained.

(c) Submission of requests for spare parts and tools to maintain authorized levels. Insofar as possible, he will anticipate delays, supply needs, etc., and take appropriate action to prevent delays or work-stoppages.

(d) Establishment of safety measures in accordance with AFM 32-3.

(e) Keeping the support base informed of requirements for maintenance beyond the aircraft control and warning squadron capability, and coordination with the support base as required to obtain necessary maintenance.

CHAPTER 3

RESPONSIBILITY AND AUTHORITY

1. **Vehicle Maintenance Officer.** a. The vehicle and equipment maintenance officer is responsible to, and works for, the motor vehicle squadron commander when organization is in accordance with Chart 1. When the vehicle activity is organized in accordance with Chart 2, the vehicle and equipment maintenance officer is responsible to, and works for, the materiel squadron commander.

b. **The Maintenance Officer Will:**

(1) Organize the vehicle and equipment periodic and field maintenance activity generally as outlined in this Manual, consistent with current manning and equipment authorizations.

(2) Determine what organizational and/or field maintenance services can be accomplished more expediently and economically by commercial or other Government facilities. The extent to which commercial or other Government facilities can be more economically and feasibly used will be a predominant factor in determining required motor vehicle maintenance facilities, tools, and equipment.

(3) Manage and supervise, through the branch chiefs, in a manner which will insure maximum utilization of personnel, equipment, and facilities.

(4) Accomplish periodic and field maintenance (less operator and motor pool) on base vehicles and equipment, including intermediate and major preventive service and inspections on the basis of established schedules, in accordance with AFM 77-1 and other pertinent directives.

(5) Conduct frequent supervisory checks of the maintenance accomplished to insure high quality production and insure efficient utilization of personnel, tools, and equipment.

(6) Coordinate with other maintenance and management activities in the development of procedures and techniques to improve the quality of the product.

(7) Keep the materiel squadron commander or the vehicle squadron commander (as applicable) informed of the status of all maintenance in progress and advise of any change in status.

(8) Insure proper and adequate records of all maintenance accomplished.

(9) Advise the motor pool officer of evidence found indicating vehicle or equipment abuse or misuse.

(10) Establish vehicle and equipment schedules in coordination with organizations using such equipment and insure compliance with those schedules.

(11) Establish procedures and insure expeditious processing of reparable property for repair and return to serviceable stock in supply channels.

(12) Insure proper establishment and maintenance of required publication and technical order files.

(13) Insure immediate preparation of unsatisfactory reports on unsatisfactory conditions discovered within or by the maintenance activity.

2. **Maintenance NCOIC.** a. A good NCOIC possesses both qualities of leadership and a thorough understanding of operating techniques. He has the ability to instruct his subordinates properly in their duties and to mold his organization into a well-ordered, productive unit. Proper planning and elimination of duplicate or needless processes depends on thorough knowledge of the job to be accomplished. The NCOIC increases the productivity of his unit and gains the confidence of his men by instructing them well in their efforts.

(1) The maintenance NCOIC is responsible to, and works for, the vehicle and equipment maintenance officer.

(2) He will assist the maintenance officer in the management and supervision of the shops, insuring maximum utilization of personnel and equipment.

(3) He will act on all maintenance problems for or in the absence of the maintenance officer. To insure quality and maximum production, he will keep the maintenance officer informed of the status of all maintenance in progress and advise of any change in status.

(4) He will insure that the scope and limit of the responsibilities and authority of each shop supervisor are clearly defined and made available to all personnel concerned.

(5) He will establish shop standing operating procedures, rules, and regulations and insure compliance through his shop supervisors. These shop standing operating procedures, rules, and regulations should be published in written form. Copies of each must be made available to all shop supervisors and should be posted conspicuously in the various shops for ready reference of all concerned.

(6) The NCOIC will establish clearly defined channels of supervision to be observed by all personnel under his direction. These channels will be defined in

writing and personnel will follow the established channel of supervision at all times in official matters.

(7) He will coordinate closely with the maintenance control and inspection section in order to maintain a constant balanced shop workload. The effectiveness of the entire vehicle maintenance activity will depend largely upon the cooperation of the maintenance NCOIC and the maintenance control unit in accomplishing the over-all objective.

(8) Supervise and manage in a manner which will insure expedient and efficient accomplishment of high quality maintenance in compliance with AFM 77-1 and applicable technical orders.

3. **Branch Supervisor.** a. The branch chief is the manager of the branch and is responsible to the field maintenance NCOIC for the efficient accomplishment of all work assigned. With the concurrence of the maintenance NCOIC, the branch chief will be responsible for the proper placement and assignment of branch personnel. He must have daily knowledge of the personnel authorized, assigned, present, in the shop, and on dispatch from each shop.

b. To maintain balance and provide training in each shop, the branch chief will insure that lesser qualified personnel are assigned with skilled personnel and will perform frequent checks, in conjunction with the maintenance NCOIC, to determine the need for additional training as required.

c. In cooperation with the maintenance NCOIC, the branch chief will plan and schedule maintenance to meet the master schedule established by the maintenance control unit. He will monitor the progress of maintenance to insure that the schedule is being met. Insofar as possible, he will anticipate delays, supply needs, etc., and take appropriate action to prevent delays or slowdowns.

d. The branch chief will periodically inspect the maintenance accomplished by assigned personnel to determine quality. He will accomplish these supervisory inspections to insure that established performance and quality standards are being met, and to determine areas of maintenance deficiency. These inspections will be accomplished in addition to any prescribed or requested quality control inspections. Whenever the branch chief feels he is not qualified to check and clear a particular item or repair, it is essential that he request assistance from the Maintenance NCOIC.

e. The branch chief is responsible for the effective and efficient utilization of assigned personnel, and will institute controls necessary to keep personnel on the job. In coordination with the maintenance officer, specific break periods will be scheduled and controlled. Sign out sheets, status boards, or similiar devices must be maintained to record the location of assigned personnel. This is important to the expeditious dispatch of specialists directed by the maintenance control unit.

f. Ground servicing, test and motorized equipment assigned the branch is vital to the successful accomplishment of the assigned mission. The branch chief must insure that all such equipment is maintained in a manner which will insure maximum availability of serviceable equipment.

CHAPTER 4

GENERAL MANAGEMENT AND MAINTENANCE PRACTICES

SECTION I

RELATIONSHIPS

1. **Responsibility.** The vehicle and equipment maintenance officer is responsible to, and works for, the squadron commander. He must manage the activity in a manner consistent with the policies and requirements of the commander and must keep the commander informed of major maintenance difficulties encountered.

2. **General.** A close working relationship must exist between the maintenance officer and the maintenance control and inspection unit as it is through these two that all vehicle and equipment maintenance support is directed and provided. Routine maintenance directives and instructions must be fully complied with immediately. Both parties must be constantly aware of the over-all maintenance schedule and the existing workload in order to insure maximum effectiveness.

3. **Other Maintenance Officers.** The vehicle and equipment maintenance officer must establish and maintain a close, harmonious relationship with other maintenance officers and vehicle or equipment users which he supports. This relationship is essential to resolving maintenance problems and to the cooperative accomplishment of the base support mission.

4. **Training.** The maintenance officer must actively participate in training evaluation and scheduling for personnel assigned to his activity and must insure that all trainee personnel meet the established schedules.

5. **Base Motor Transport Officer.** A close coordinating and cooperating relationship must be maintained with the base motor transport officer to insure that established maintenance schedules are met. This relationship cannot be over-emphasized since the motor transport officer is the user, or "customer." Insofar as practicable, the maintenance schedule and the utilization schedule for vehicles and/or equipment should be correlated to insure minimum disruption to either schedule.

SECTION II

PROCEDURES

6. **Group Maintenance Relationships.** a. The vehicle and equipment maintenance officer is responsible to the vehicle or materiel squadron commander for the organization and functioning of the maintenance activity and for the accomplishment of quality maintenance. However, because of the complexity and scope of the maintenance activity, the defense group maintenance officer performs staff supervision over all group maintenance activities. The vehicle and equipment maintenance officer must establish and maintain close personal relationship with the group maintenance officer in order to keep abreast of the overall policies and major problems of the maintenance organization. The relationship must be active since the commander must be assured of equitable maintenance support as required.

b. It is not intended under this maintenance concept that the group maintenance officer usurp or assume any of the commander's responsibilities or prerogatives. Neither is it intended that he be an intermediate commander between the squadron commander and the group commander. The vehicle and equipment maintenance officer and the group maintenance officer should maintain a relationship of mutual coordination and cooperation. If maintenance problems or difficulties cannot be resolved between these officers or the director of materiel, it is logical for the matter to be referred to the group commander for decision.

7. **Maintenance Coordination.** It is important that the squadron commander be actively interested in maintaining balance in the maintenance organization. He must insure the same state of maintenance balance as the other maintenance organizations and utilization of assigned personnel for the full working day in direct support of the maintenance effort. In this respect, the maintenance officer and all maintenance supervisors must assume active responsibility. Certain maintenance on vehicles and ground equipment will require the assistance of maintenance specialists from other maintenance activities (such as aircraft, communications, electronics, or installations). It is mandatory that such support be requested when required, however, strict control must be ex-

ercised in order to prevent the use of these specialists for the performance of maintenance which is within the capability of the vehicle maintenance section.

a. Reports submitted by the quality control unit will be reviewed and analyzed by the squadron commander to insure that adequate corrective action has been taken and the coverage meets his requirements. He will require the maintenance officer to insure positive and continuous corrective action on reported discrepancies. He should, by personal action, encourage a cooperative attitude toward the quality control unit and its inspectors.

b. The maintenance officer, as manager of the vehicle and equipment maintenance activity, occupies an important position in the maintenance organization. His application of sound management principles will be reflected in the maintenance efficiency of the wing or group. The importance of this position is emphasized by the realization that this activity, in effect, controls the number of serviceable vehicles and items of equipment available to support the over-all mission.

8. **Supervision.** a. The maintenance officer will control his organization in such a manner that each supervisor is permitted to manage his own function in a manner consistent with established policies. The selection of personnel to fill supervisory positions should be based on supervisory ability as well as technical ability. Insofar as practicable, the maintenance officer will supervise the activity through the chain of command which will be definitely outlined and followed. Each man should have but one "boss" and all instructions should come from the "boss."

b. In providing adequate supervision, the maintenance officer will place emphasis on definite job assignments, fixed work areas, and sequenced jobs, preferably in written form, so that individual mechanics are not subject to hurried instructions from his supervisor or congested work areas. Job instructions should be devised so that delays and interruptions are minimized.The time spent in job study and sequencing will result in increased efficiency and effectiveness. Detailed planning is a requirement for the effective operation of the maintenance activity and the efficient utilization of assigned personnel. Assigned mechanics are skilled, trained craftsmen whose normal responsibility is merely to do an assigned job. There is no question that they should be employed in the most efficient, effective, and economical manner possible.

9. **Facilities, Tools and Equipment.** In addition to personnel management, the maintenance officer will continually study his facilities, tools, and equipment with a view toward improvement and modernization. Particular emphasis should be placed on the use and location of speed tools and maintenance equipment. The supervisory personnel of this activity must insure that, whenever practicable, all required tools, parts, and materials are brought to the mechanic to keep him on the job.

a. Job descriptions will be prepared for each individual, and organization charts will be prominently displayed in each shop or office. Frequent checks must be conducted to insure that all personnel know and understand individual responsibilities, duties, and command channels. All newly assigned personnel should be made aware of their duties, responsibilities, and place in the organization. The maintenance officer will continually observe personnel working within his activity to determine inefficiencies or below-standard performance. When such situations are discovered, immediate corrective action will be taken. Particular attention will be given to the performance of trainee and semi-skilled personnel to assist them in performing quality maintenance and to prevent the formation of undesirable work habits.

b. Absence will be monitored and action taken to eliminate all contributing factors. A manpower status board depicting personnel assigned, present, TDY, etc., should be maintained. It is the specific responsibility of the maintenance officer that he have daily knowledge of the personnel authorized, assigned, and present for duty. The span of control is such that this officer will have the opportunity to know "first-hand" at all times the status of personnel, equipment, etc. He must inform the squadron commander when he believes that squadron duties, or similiar causes, are reducing his effectiveness.

10. **Supply.** A program will be established to insure that all supply requirements of the maintenance activity are anticipated as far in advance as practicable and made known to the appropriate supply agency. Adequate shop stocks are vital to the success of the maintenance activity. The maintenance officer will require frequent inventories to insure that required supplies are available in established levels. Insofar as practicable, these supplies should be made available to the worker at his lo-

cation. The philosophy should be adopted that the mechanic should not leave his work area for parts but should have them available when and where required. Also, the maintenance officer must instill a supply discipline program that will insure the expeditious processing of reparables and protection of supplies from pilferage. Hoarding will be discouraged.

11. **Control.** It is essential, for planning and scheduling, that the maintenance officer know the status of maintenance in progress, difficulties encountered, and the relation of maintenance progress to the established schedule. Action will be taken to report status changes at intervals required by the maintenance control unit and to eliminate "bottlenecks" or factors delaying maintenance. Personnel shifts between shops, or requests for specialist support, will be made when maintenance status indicates inability to meet the established schedule.

a. The maintenance officer must have current knowledge of the status and availability of authorized tools and equipment. When equipment is inadequate or deficient in any manner, he will initiate corrective action in accordance with current directives. Organizational maintenance on assigned shop equipment will be scheduled and accomplished in accordance with current directives.

b. The maintenance officer must require his supervisors to be continually alert to unsatisfactory conditions discovered in the accomplishment of maintenance or in the repair of vehicles, equipment, accessories, and components. Unsatisfactory reports in this activity must be emphasized because of the testing and repair facilities available. The maintenance officer will review unsatisfactory reports submitted to insure completeness and accuracy and to be cognizant of unsatisfactory conditions as they occur.

c. The vehicle and equipment maintenance officer is responsible for insuring the accomplishment of quality maintenance. He, and his supervisory personnel, will periodically inspect the maintenance accomplished by assigned personnel. He will accomplish this supervisory inspection to insure that established standards are met and that areas of maintenance deficiency are determined. The supervisory check is in addition to any quality control inspection. Whatever these supervisors do in this connection is in line with actually producing quality maintenance; whereas, the quality control inspectors will only determine and report the quality produced. These supervisory checks of maintenance will be accomplished in accordance with current directives.

d. The maintenance officer will establish a system authorizing a limited number of designated personnel to sign serviceable parts tags since, because of testing requirements, it is frequently impractical for someone outside the shops to certify serviceability. This will be accomplished in the form of a letter of authorization signed by the maintenance officer and bearing specimen signatures of the designated personnel. Copies of the letter will be furnished the base supply officer, materiel control branch. In addition, one current copy of the letter will be posted in each shop. In this way he may maintain high quality without delay awaiting inspectors.

12. **Maintenance Assistance.** Under this maintenance concept, the vehicle and equipment maintenance activity is primarily a support activity to all maintenance activities and users of vehicles and equipment. However, this activity is also responsible for providing the maximum practicable maintenance assistance to the base supply activity. Reparable property will be processed through the maintenance activity for repair and return to service as expeditiously as manpower, equipment, facilities, and time will permit. All reparable processing will be accomplished in accordance with repair priorities established by the maintenance control unit. Large backlogs of reparable property will not be permitted to accumulate in the shops. The maintenance control unit must keep informed of the status of reparable property, in general, and make recommendations for off-base shipment, contract maintenance, etc., as appropriate. The maintenance officer should be aware of the contract facilities availible and insure the use of contract maintenance when conditions exist which require use of commercial facilities, or at any time contract maintenance is determined to be more advantageous to the Government than military maintenance.

13. **Maintenance Capabilitiy.** Vehicles and equipment will be maintained in accordance with pertinent directives to the fullest extent of the capabilities of authorized personnel and equipment. Items beyond the capability of the wing or group will be promptly reported to the next higher maintenance organization and will be evacuated from the base only as directed.

SECTION III

VEHICLES HEADLINED FOR PARTS

14. **"Out of Commission Time for Parts"** The responsibility for the "out of commission time for parts" does not rest solely with the base supply officer. In factual operation, it can be easily stated that this responsibility rests primarily with the maintenance officer who, being in a position to observe first-hand conditions, can use the various means at his disposal to relieve a deadline.

15. **Procedures.** The methods of relieving a vehicle from deadline depends upon the nature of the deadlining situation. These methods follow:

a. **Emergency Action** - In accordance with paragraph 27a, AFR 70-16.

b. **Comparable Cost Purchase** - In accordance with paragraph 27b, AFR 70-16.

c. **Non-personal Services** - In accorddance with paragraph 2c, AFR 70-16, and paragraph 34b, AFM 77-1.

d. **Contractual Maintenance** - In accordance with Technical Order 00-25-68.

e. **Controlled Cannibalization** - In accordance with paragraph 45, AFM 77-1.

16. **Emergency Purchase.** Provisions of AFR 70-16 require that a statement of emergency be prepared and furnished the base supply officer indicating the conditions surrounding the deadline. This will justify the director of materiel and base commander's approval for use of base funds where centrally procured items are required. Extreme caution, of course, should prevail when resorting to this method of obtaining parts so that thorough emergency action will be possible when needed.

17. **Local Purchase.** AFR 70-16 prescribes an economical and speedy method of obtaining items which are normally centrally procured and whose purchase price locally is less than that of the centrally procured item, after consideration is given for handling, shipping, requisitioning, and issue procedures. This prerogative rests with the base supply officer; however, action on the part of the maintenance officer can usually influence him to use this method to relieve deadlines and further increase the economy of maintenance.

18. **Non-Personal Services.** Non-personal services for repairs beyond the capabilities of the maintenance shop which can restore certain items of equipment to serviceable condition will not only, in many cases, relieve the deadline but will result in economy when remove and replace procedures are in effect (for example, the rebuilding of a small auxiliary engine vehicle motor or sub-assemblies, crank shaft regrinding or line boring of bearings). AFR 70-16 and AFM 77-1 make it clear that the maintenance officer may use funds for local purchase of this type service.

19. **Contract Maintenance.** Contract maintenance is used on certain equipment and is listed by stock classes in Technical Order 00-25-68. A thorough understanding of this procedure by the maintenance officer will permit the local repair on contract of assemblies for which a depot maintenance responsibility rests. The prime depot cites funds for use by the local commander for the purchase of these maintenance services. These funds are not to be confused with normal local purchase funds available, as they are not reflected in the reduction of the base central fund. It should be mandatory for all supervisory personnel to have complete working knowledge of the provisions of this technical order.

20. **Controlled Cannibalization.** Controlled cannibalization is another method of reducing "VOC". The maintenance officer must acquaint himself with all the conditions surrounding the requirement for the vehicles and obtain permission for the commander of the vehicle from which the parts are to be cannibalized before taking action. It is necessary, for consumption data, to effect a turn-in slip of the item removed and an issue slip charging the item against the vehicle on which the part is installed. It should go without saying that an immediate requisition will be made against the vehicle which has been cannibalized.

a. Certain factors, other than the decision to make the change, must be considered. For instance, the amount of manhours involved in the transfer of parts; will cannibalization reduce the value of the vehicles to a condition beyond economical repair, would the removal of the part cause further damage to the major assembly from which it was removed. These are but a few.

b. Unlike small assemblies should not be causing a simultaneous deadline on two vehicles. An example of this would be allowing two Chevrolet pickups to stand idle while one has a voltage regulator out and the other a generator out. The necessary part could be cannabilized to get one of these pickups off VDP status. This is but a simple illustration of cannibalization.

21. **Deadlining Vehicles.** The shop supervisor recommending vehicle deadline must ask himself first whether he has taken all necessary action to restore an assembly to service by use of various methods available to him through shop effort, such as local manufacture, repair by allied trades, etc. It is only after he has exhausted all of the tools at his disposal that he should submit the recommendation to the maintenance officer. In instances where the responsibility for the maintenance of specific types of equipment, such as general purpose, special purpose, and ground powered equipment, rests with a specific supervisor; the supervisor of this type of maintenance will be held directly responsible when recommending deadline. In the foregoing discussion, it is assumed that all normal supply action had previously been taken and the maintenance officer advised that the parts were not available on the station by the base supply officer.

CHAPTER 5

PRODUCTION CONTROL

SECTION I

GENERAL

1. **Purpose.** The purpose of the production control system for automotive maintenance, outlined herein, is to provide a standard system for controlling all vehicles and equipment which require scheduled maintenance or repair and which are a responsibility of the vehicle maintenance section. In addition, this system is established in order to effect improvement in economy, efficiency, quality of repair work, and productivity through better management of all automotive maintenance activities in this command. This system supplements procedures outlined in AFM 77-1 and TO's 00-20B-2 and 00-20B-3. The related operating procedures will assist in perfecting control and coordination of a planned automotive maintenance program.

2. **Organization.** The production control system is designed to operate in connection with a standard maintenance organization as described in Charts 1 and 2. The responsibility for directing the functions of this system will normally be delegated to the automotive maintenance officer. The units and departments within the automotive maintenance section are designated as such for the purpose of establishing a standard organization and operating procedure. It is not intended that such designation be construed to imply that personnel authorizations will automatically be changed as a result of establishing this system. In addition, it should be noted that in the establishment of this system, the number of personnel assigned to the various units will differ between bases according to factors peculiar to each base or its assigned mission, i. e., the number of vehicles and pieces of equipment assigned, facilities available, etc.

3. **Responsibility.** The responsibilities of individual activities comprising the automotive maintenance section as administratively related to this system are outlined below:

a. **Maintenance Control Office.** This office functions as the central management agency for all automotive maintenance operations. All matters pertaining to the scheduling of vehicles for preventive maintenance services and accomplishment of necessary repairs on automotive equipment assigned are monitored and coordinated by this office. Data is continuously supplied to the maintenance officer concerning production capability, accomplishment, and the quality of related work performance. These functions are further delegated to three inter-dependent functional units. The functions of each of these units are described below:

(1) **Inspection Unit.** This unit will be responsible for performing inspections on vehicles and equipment as required in Chapter 4, AFM 77-1. Serviceability standards as outlined in paragraph 37, Chapter 4, AFM 77-1, will apply for all inspections performed. This unit will establish initial parts requirements based on inspections performed.

(2) **Administration and Production Unit.** This unit is responsible for coordinating all matters pertaining to scheduled maintenance services and repair of vehicles and equipment with the using activities and other operating activities of the automotive maintenance section. The responsibility for maintaining all records and production data concerning maintenance and repair of vehicles and equipment also rests with this unit. Other functions of this unit are listed as follows:

(a) Continuously maintains data on work performance, maintenance requirements, and status of all vehicles and equipment in the process of repair.

(b) Controls movement of vehicles and equipment through the shops for repair and preventive maintenance services or inspections.

(c) Maintains a continuous review of all technical orders, Air Force and Department of the Army Manuals and other technical publications to determine applicability to assigned vehicles and equipment and program work required therein.

(d) Assigns work priorities according to established policy and requirement stated by the using unit.

(e) Periodically requests a listing of reparable parts and minor assemblies on hand in the reparable warehouse together with an indication of items listed thereon which are currently in short supply.

(f) Schedules reparable parts and assemblies for repair action in accordance with requirements and shop workload.

(3) **Materiel Supply Unit.** Responsible for establishing requirements, expedi-

ting receipt, delivery, and disposition of all parts and materials required for the maintenance and repair of vehicles and equipment. This includes handling and binning of parts for a particular job order, obtaining parts from a service stock or supply activity, delivering parts to the maintenance shop concerned, and preparation of issue slips for parts as required. Also, assists the base supply activity in conducting a continuous review of parts stock levels to insure adequacy for future requirements, and in exploiting all possible sources for supply of parts and materials for deadlined equipment.

b. **Automotive Shops.** The various shops within the automotive maintenance section are responsible for accomplishment of all maintenance and repair work assigned by the production control office. All work will be accomplished by shops in accordance with existing directives and regulations.

SECTION II

PRODUCTION CONTROL PROCEDURE

4. **Records and Forms.** In maintaining the job order control system the following records and forms will be used.

Records	**Forms**
Master Jacket File	AF Form 648
Work Order	AF Form 646
Limited Technical Inspection	DA Form 461-5
Turn-in Slip	AF Form 447
Issue Slip	AF Form 446

5. **Procedure.** The control procedure and progress flow within the administration and production unit is accomplished through the use of tub file. The operation of the tub file is illustrated on the chart appended as Figure 1. The routing of the "Work Request and Job Order," AF Form 646, is shown in the flow chart appended as Figure 2. Operational procedures for the various shops contained in Figure 1 stipulate that reports are sent to the administration and production unit periodically to operate the tub file. Procedures for routing vehicles, equipment and job orders are contained in the steps outlined below:

a. **Step 1.** At the discretion of the vehicle maintenance officer, the requesting or using organization will prepare and sign a locally improvised job order request form in duplicate for each item or group of similar items to be repaired. All known deficiencies, from an operational viewpoint, will be listed on the locally improvised job order request form by using activity and this form and vehicle or item of equipment will be presented together to the inspection unit for an acceptance check. The acceptance check will include verification that the using organization has already performed all services and repairs within the scope of operator's maintenance. Upon acceptance of the requested work, both copies of the locally improvised job order request form will be assigned a "Job Order" number from the job order register and signed by the inspector. The duplicate copy will be returned at this time to the requesting organization as a receipt for the item or vehicle to be repaired. The inspection unit will then perform a thorough and searching inspection on the vehicle to determine the existence of additional deficiencies. This additional data will be inserted on the locally improvised job order request form for later inclusion in preparation of the AF Form 646. Spare parts requirements as determined during the inspection will be listed on an attachment to the locally improvised job order request form for further supply action to be taken. During the inspection, close coordination must be maintained with technical supply and shop supervisory personnel for information on shop capabilities, method of repair, and proper identification of each spare part required. The completed locally improvised job order request form will be forwarded to the administration and production unit for preparation of AF Form 646.

b. **Step 2.** The administration and production unit will prepare all copies of AF Form 646 and assign a priority number (see priority definitions (page 19). The complete vehicle or equipment nomenclature and registration number, organization to which assigned, work order priority number, shop designated to perform the work, "Control Office Data" pertaining to man-hour estimates, date item of equipment was received, and all items to be repaired will be indicated on all copies of the AF Form 646. The estimated man-hours required for completion of a job order must be computed as accurately as possible. This may be accomplished by obtaining information from shop personnel, inspectors, and by reference to previous man-hour expenditures or by using local or published Unit Replacement and Repair Time Guides. A ledger will be kept by the administration and production unit to indicate estimated backlog of man-hours of work awaiting processing. Backlog data may also be obtained by a review of the tub file when required. A secondary purpose of this ledger will be for comparison of actual man-hours expended against potential productive man-hours for a particular period. Copy 4 of the AF Form 646 will be forwarded to the requesting organization, copy 2 will be forwarded to the technical supply unit, copies 1 and 3 will be attached to AF Form 648 and at this time placed in the supply portion of section 1 of the tub file, which is illustrated in Figure 1. Copy 3 will be used by the administration and production unit as a work flow record and will only be removed from the tub file for the purpose of indicating the progress of work as it changes within the various shops or sections of the automotive maintenance activity.

c. **Step 3.** Upon receipt of copy 2 of each AF Form 646, the materiel supply unit will be responsible for the progress of the job order until the necessary parts and materials are received and will immediately take one of the following three courses of action:

(1) **Course No 1.** If all parts and materials are determined by materiel supply to be available, they will be immediately obtained. Upon notification that parts are available, the administration and production unit will have the parts delivered to the appropriate shop with copy number 1 of AF Form 646. Copy 3 of AF Form 646 and the AF Form 648 will be advanced within the tub file, as outlined in Figure 1, to indicate actual status of the job order and to show a change of responsibility for continuous progress. Copy 2 of the AF Form 646 will be forwarded by the materiel supply unit to the administration and production unit to indicate that parts are available for completion of the job order.

(2) **Course No. 2.** If all parts and or materials are not immediately obtainable through the country store and or petty cash, required Issue Slips, AF Form 446, with proper work order number, will be initiated, recorded in the Issue Slip Control Register, and forwarded to the base supply organization for appropriate action. A suspense copy of the Issue Slip will be attached to the copy 3 of AF Form 646 in the tub file. This copy of Issue Slip (AF Form 446) will be posted with all information received from the base supply officer regarding supply action, including "voucher number," "due outs," "parts received," and "parts backordered." This information will be taken from the completed document (valid voucher) and the document filed in the unit control file. Any parts or materials which are available will be obtained and properly binned. Each bin will be identified with the job order to which it pertains. This action will be recorded on copy 3 of AF Form 646. Following the above action, AF Form 648, suspense copy of the Issue Slip, AF Form 446, and copy 3 of AF Form 646 will be moved to the "awaiting parts" section of the tub file. When parts and materials become available, action prescribed in Course No. 1 will be taken.

(3) **Course No. 3.** A vehicle "Awaiting Parts" may also require repairs not involving replacement of parts or materials. In such cases, dependent on shop workloads, these repairs may be accomplished by following action prescribed in subparagraph (1) above, with the AF Form 648 and other records attached thereto being moved in the tub file to the "Vehicle in Process" section. If parts and/or materials previously requested by Issue Slip are not available prior to completion of other repairs, the AF Form 648 and records attached thereto will be returned to the "Awaiting Parts" portion of the tub file and the procedure prescribed in sub-paragraph (2), above, will be followed.

d. **Step 4.** During the processing of job orders, reports will be submitted by each shop to the administration and production unit as indicated in Figure 1. Upon completion of each repair item indicated on copy 1 of AF Form 646, the individual accomplishing the repair will place his initials to the right of the entry. Notations will also be made on the copy 1 of AF Form 646 to fully explain each repair item accomplished and also show actual man-hours expended. This information will give a complete summary on the record copy of AF Form 646 by describing work accomplished and the labor expended.

e. **Step 5.** After a vehicle has been processed to a shop for repair, it may be necessary to obtain additional parts not included in the initial inspection requirements. In such an instance, a complete list of all additional parts will be compiled in a written form and expeditiously hand-carried to the material supply unit and the administration and production unit will be advised accordingly. In the event parts are not available immediately, the job order will be suspended. Copy 1 of AF Form 646 will be returned to the administration and production unit and the procedure prescribed in Course Number 2, above, will be followed.

f. **Step 6.** When a vehicle has been repaired, the shop concerned will forward copy 1 of AF Form 646 and the vehicle, or item to be repaired, to the inspection unit. The administration and production unit will be advised at this time in order that copy 3 of AF Form 646 may be moved to the "Final Inspection" portion of the tub file to show the change of responsibility for status of the job order.

g. **Step 7.** If the vehicle passes final inspection, copy 1 of AF Form 646 will be signed by the inspection unit, and the vehicle, or item of equipment, will be released to the using organization. In the event the vehicle does not pass final inspection, the vehicle and copy 1 of AF Form 646 will be returned to the shop concerned and the administration and production unit will be so advised. When all necessary repairs on a vehicle are satisfactorily completed, a representative of the using organization will sign copy 1 of AF Form 646 as a receipt for the vehicle or item of equipment. Copy 1 of AF Form 646 will then be given to the administration and production unit.

h. **Step 8.** Upon receipt of copy number 1 of AF Form 646 signed by the final inspector and a representative of the using organization, the administration and production unit will close the entry in the job order register. The cost of repairs may be computed at this time and recorded on copies 1 and 3 of AF Form 646. All necessary information to support completion of work required will be entered on copies 1 and 3 of AF Form 646. Copy 1 will then be placed on AF Form 648 which will be properly filed, and copy 3 will be placed in an office file.

SECTION III

MAN-HOUR ACCOUNTING PROCEDURE

6. **Procedure.** An accounting of all man-hours assigned to the automotive maintenance section is a necessary administrative requirement of the production control system. The utilization of assigned and available man-hours is probably the largest single factor that can be controlled by the automotive maintenance officer. Effective utilization of available man-hours tends to discount the adversities of limited facilities, etc., which so often cannot be controlled.

a. Appended as Figure 3 is a copy of a "Man-Hour Control Card" which is to be reproduced locally at each base. The card will be completed daily by all assigned personnel, and each department foreman or supervisor will forward the cards daily to the administration and production unit, where the information will be consolidated and recorded in the man-hour control ledger (see Figure 4). Each supervisor and foreman will complete a man-hour control card for each employee who is absent for any reason.

b. Direct man-hours are those hours or fractions thereof of labor directly chargeable to a job order. Indirect man-hours are those hours or fractions thereof of labor which cannot be charged directly to a specific job order, but which are necessary to support the automotive maintenance section. Indirect man-hours will be recorded on the man-hour control card and identified by use of the symbol "UN" in the manner prescribed in Appendix A, Chapter III, of AFM 170-5. The additional designation "UN 10M" is established for the purpose of reporting all regular duty time of airmen that is used for squadron or military duty. It can be readily noted that a ratio of direct to indirect man-hours will be one of many criteria of shop operating efficiency. A periodic check will be made between direct man-hours reported on the man-hour control cards and AF Form 646 to insure that the direct man-hours reported are accurate. It is recommended that active man-hour control cards be placed in a suitable rack centrally located for ready access by personnel to which they pertain. In this manner, defacement or loss of the cards will be minimized. The cards will also be available to the foreman or supervisor for ready reference to current work assignments, etc. Man-hour reporting on this card will be in increments of fifteen minutes or less subject to local determination.

c. Continual review of the man-hour control ledger will assist in evaluating the cost of the various applications of direct and indirect labor necessary to support the automotive maintenance section. Over-all costs of operation may be reduced from time to time through improved managerial practices and the full utilization of all personnel assigned.

SECTION IV

CONTROL PROCEDURE FOR PREVENTIVE MAINTENANCE

7. **Records and Forms.** The following records and forms are used for processing vehicles and equipment in this system:

DD Form 110
DD Form 314
DD Form 315
DD Form 316
AF Form 646
AF Form 648

8. **Scheduling Inspections.** All periodic inspections of vehicles and equipment, except daily inspections, will be scheduled by the administration and production unit of the production control office. This unit will determine whether preventive maintenance services will be performed on vehicles and equipment in the field or within a specific shop, excluding weekly inspections which are performed by using activities. In all cases this unit will coordinate arrangements with the activities using the vehicles or equipment to insure that timely inspections are conducted. All using activities must be advised of the date each scheduled preventive maintenance service is due prior to the time an item is to be inspected, so that using activities may reconcile weekly inspection schedules and plan operational requirements. The using activity will forward a completed copy of DD Form 110 or other appropriate forms to the administration and production unit to establish a record indicating that weekly inspections have been completed. When prior arrangements have been completed for inspection of an item, the administration and production unit must take appropriate action to insure that the vehicle or piece of equipment is available at a predesignated location in order that the preventive maintenance service may be performed without delay. Vehicles and equipment will be scheduled for preventive maintenance services by use of DD Form 314. In this connection, vehicles will be divided into two general categories. The first will include vehicles which are not normally operated more than 2,000 miles in a ninety day period or 12,000 miles in a six-month period. The second category will include those vehicles which are normally operated more than 2000 miles in a ninety-day period or 12,000 miles in a six-month period. In establishing the scheduling of vehicles, where daily mileage readings are obtainable, those vehicles in the first category will normally be scheduled on the basis of time only. Therefore, only in exceptional cases will deviations in scheduling become necessary. Vehicles in the second category will be scheduled on the basis of 2,000 miles or ninety days and 12,000 miles or six months, whichever occurs first. Mileage or accumulated operating time will be obtained from the activity to which the vehicle or equipment is assigned. This only applies to vehicles where mileage readings are obtainable. When mileage readings cannot be obtained from a vehicle or piece of equipment, those items will be inspected at the appropriate operating time or calendar period. The intent of the general policies described above is to provide for clearly defined responsibility for scheduled inspections and to allow maximum preplanning of workloads with regard to preventive maintenance services.

9. **Procedure.** The following steps will be taken in accomplishing preventive maintenance services:

a. By reference to the date that a vehicle or piece of equipment is to receive the preventive maintenance service, the administration and production unit will prepare the applicable forms, inserting all pertinent information regarding nomenclature of the vehicle, or item of equipment to be inspected. In addition, a job order number will be assigned to the form from the job order register. The prepared form will be issued to the shop responsible for conducting the inspection at least twenty-four hours in advance of the date on which the inspection is to be performed. At this time, the using activity will be advised to present the vehicle or piece of equipment to the shop concerned, or that the vehicle or piece of equipment will be inspected at a predetermined location.

b. The shop section receiving the prepared form, on which the type inspection is indicated, will perform the services on the date scheduled. This will be accomplished by shop personnel or by a field crew, depending upon the practicability of moving certain types of equipment. During the inspection, the form will be completed by maintenance personnel, as outlined in TO 00-20B-2.

c. Upon completion of the inspection, one of the following courses of action will be taken:

(1) If during the inspection it was noted that discrepancies existed which could not be corrected at that time, the job order will be closed in the job order register. An AF Form 646 will be processed in accordance with the production control procedure outlined in Section II, a-

bove.

(2) In the event no discrepancies exist on the vehicle upon completion of the inspection, the completed form will be hand-carried to the administration and production unit to indicate that the inspection has been completed.

d. The administration and production unit will promptly notify the using activity that the inspection has been completed and an entry will be recorded in the job order register to indicate that the work has been accomplished.

PRIORITY DEFINITIONS

Priority Number 1

EMERGENCY - Disaster, life, and health of the military complement and supporting personnel, instances where the mission of the base is affected directly, or when specifically assigned by higher headquarters. - Directs immediate assignment of all available and usable manpower and facilities regardless of stoppages of other work already in process. This work priority, as a result of its implications, is seldom used.

Priority Number 2

PREFERRED - Failure to accomplish work within prescribed time limits will materially affect the conduct of the primary mission either directly or through its supporting elements. Or, completion of work within a definite time limit is necessary to maintain the morale of the military complement. - Directs immediate stoppage of all lower priority work, within practical applications, that is already in process by the activities that normally accomplish the type of work involved. Over-use of this priority will obviously tend to reduce its effectiveness.

Priority Number 3

ROUTINE - Work requirements have been anticipated sufficiently in advance so that completion in normal order of receipt will be satisfactory. Also included would be the local repair of parts and assemblies for stock that are current items of consumption but are not, however, in "short supply." - Work assigned this priority is accomplished in the order of its receipt when higher priority work is not on hand for which supplies and materials are available. This work priority does not direct the stoppage of "deferred" priority work that has been started within a respective shop section.

Priority Number 4

DEFERRED - Work of a nature that is accomplished during periods of low workload and will prevent or allay future breakdowns and otherwise insure higher productivity at times of peak workload. - Accomplished when no "routine" or higher priority work is on hand that can be processed.

AUTOMOTIVE MAINTENANCE CONTROL SYSTEM

Purpose. The tub file provides a specific location for consolidation of data, arranged in a chronological order, concerning the current work assigned to the automotive maintenance section.

TUB FILE ARRANGEMENT

Operational Requirements for Support of the Tub File

(1) ADMINISTRATION & PRODUCTION UNIT WILL FILE DAILY THE NR 3 COPY OF AF FORM 646 (JOB ORDER) FOR EACH VEHICLE THAT HAS PASSED INITIAL INSPECTION.

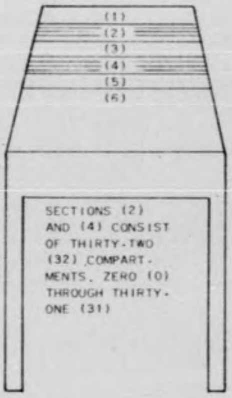
(2) SUPPLY UNIT WILL FURNISH A DAILY LISTING OF ALL VEHICLES FOR WHICH PARTS HAVE BEEN PREDETERMINED AND REQUISITIONED.

(3) SUPPLY UNIT WILL FURNISH A LISTING OF ALL JOB ORDERS FOR WHICH PARTS HAVE BEEN RECEIVED.

(4) SHOP CONCERNED WILL MAKE DAILY REPORT LISTING ALL VEHICLES ENTERING THE SHOP FOR REPAIR.

(5) SHOP CONCERNED WILL MAKE DAILY REPORT LISTING ALL VEHICLES COMPLETED AND TURNED OVER TO THE INSPECTION DEPARTMENT.

(6) INSPECTION DEPARTMENT WILL FURNISH A DAILY LISTING OF ALL VEHICLES THAT HAVE PASSED FINAL INSPECTION AND HAVE BEEN DELIVERED TO USING ACTIVITY.



SECTIONS (2) AND (4) CONSIST OF THIRTY-TWO (32) COMPARTMENTS, ZERO (0) THROUGH THIRTY-ONE (31)

Procedure for Operating the Tub File

(1) VEHICLES INSPECTED AWAITING PARTS.

(2) VEHICLES AWAITING PARTS (NOTE: IF PARTS ARE NOT RECEIVED ON DATE REQUESTED, THE JOB ORDER WILL BE MOVED FORWARD DAILY UNTIL PARTS ARE RECEIVED).

(3) PARTS RECEIVED, VEHICLES AWAITING ENTRY INTO THE SHOP.

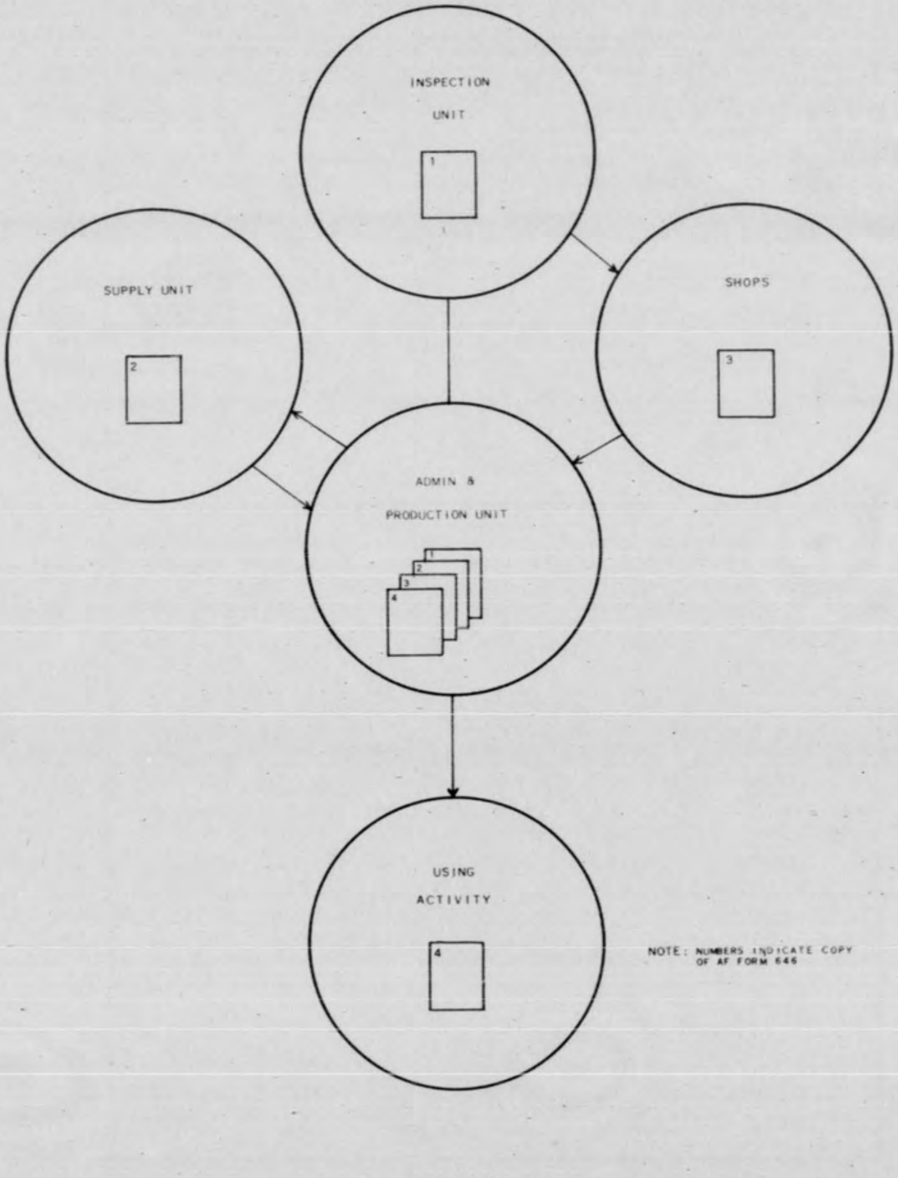
(4) VEHICLES IN PROCESS (NOTE: JOB ORDER FILE ENVELOPES ARE MOVED FORWARD DAILY UNTIL VEHICLES HAVE BEEN COMPLETED).

(5) VEHICLES COMPLETED AWAITING FINAL DISPOSITION.

(6) VEHICLES INSPECTED AND TO BE RELEASED TO USING ACTIVITY.

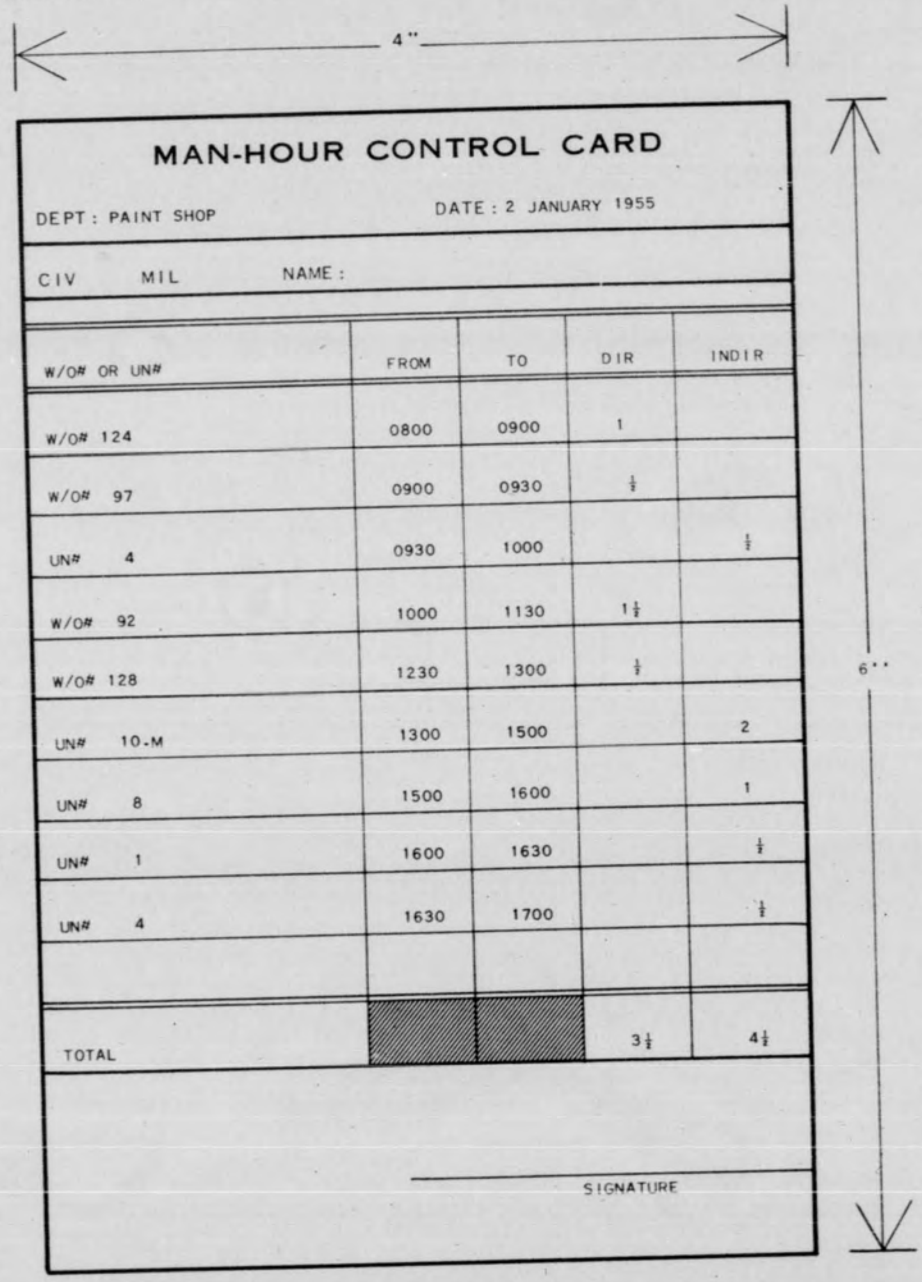
Figure 1

WORK REQUEST & JOB ORDER, AF FORM 646
-FLOW CHART-



NOTE: NUMBERS INDICATE COPY OF AF FORM 646

Figure 2



MAN-HOUR CONTROL CARD

DEPT: PAINT SHOP DATE: 2 JANUARY 1955

CIV MIL NAME:

W/O# OR UN#	FROM	TO	DIR	INDIR
W/O# 124	0800	0900	1	
W/O# 97	0900	0930	½	
UN# 4	0930	1000		½
W/O# 92	1000	1130	1½	
W/O# 128	1230	1300	½	
UN# 10-M	1300	1500		2
UN# 8	1500	1600		1
UN# 1	1600	1630		½
UN# 4	1630	1700		½
TOTAL	▨	▨	3½	4½

SIGNATURE

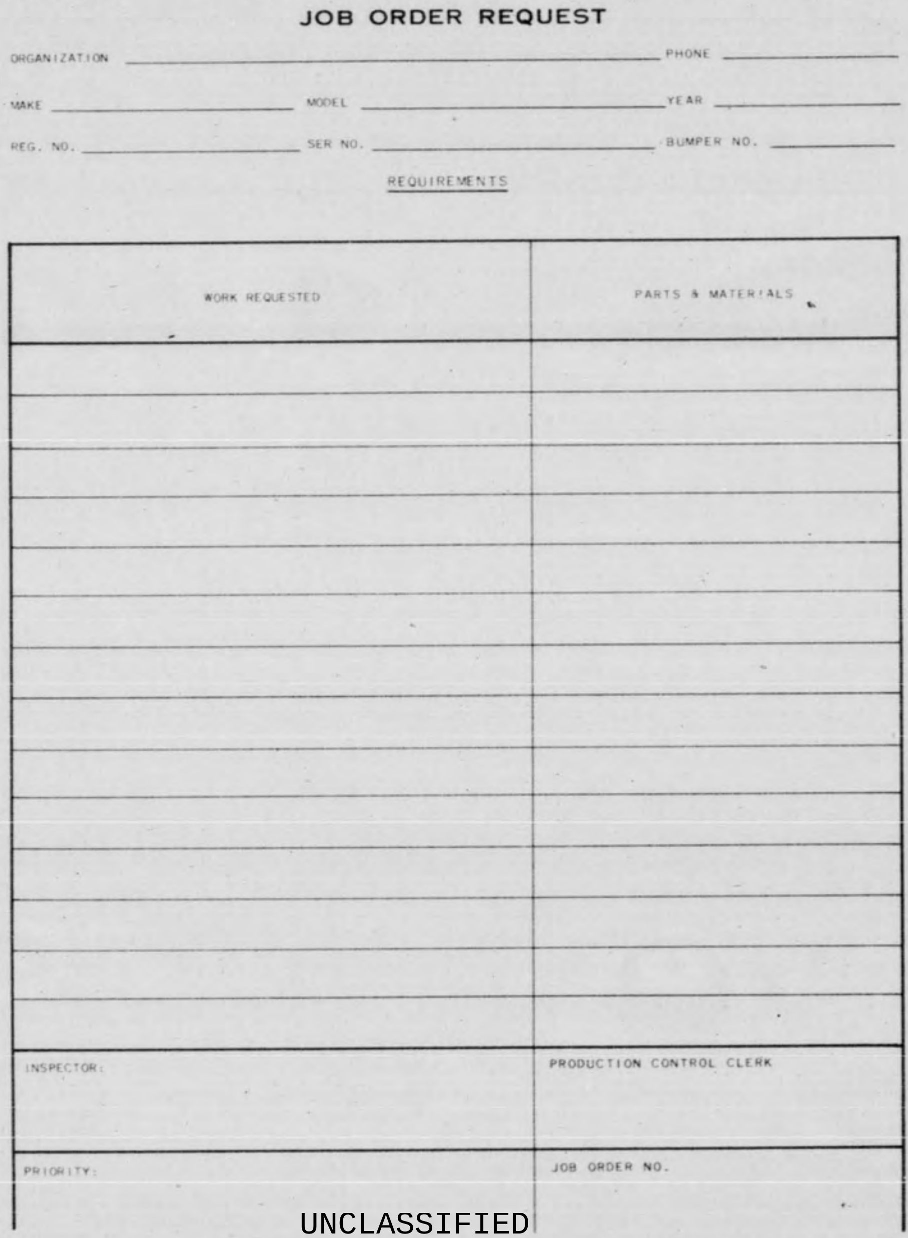
Figure 3

MAN-HOUR CONTROL LEDGER

DATE: 12 JANUARY 1955

TOTAL NO. PERSONNEL ASSIGNED: MIL 52	CIV 30		MONTHLY ACCUMULATIVE	
TOTAL ASSIGNED MAN-HOURS: MIL 416	CIV 240			
	NO HOURS	COST	NO HOURS	COST
UN# 1	90		900	
UN# 2	20		200	
UN# 3	30		300	
UN# 4	10		100	
UN# 8	20		200	
UN# 10A	10		100	
UN# 10M	60		600	
UN# 10S	2		20	
UN# 19	10		100	
UN# 21	10		100	
INDIRECT MAN-HOURS	262		2620	
DIRECT MAN-HOURS	394		3940	
TOTAL	656		6560	

Figure 4



JOB ORDER REQUEST

ORGANIZATION ______________________ PHONE __________

MAKE __________ MODEL __________ YEAR __________

REG. NO. __________ SER NO. __________ BUMPER NO. __________

REQUIREMENTS

WORK REQUESTED	PARTS & MATERIALS
INSPECTOR:	PRODUCTION CONTROL CLERK
PRIORITY:	JOB ORDER NO.

Figure 5