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HISTORY OF 9ADD

Jul-Dec 1967

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(DOC 1)

*ADCR 23-2

ADC REGULATION
NO 23-2

HEADQUARTERS, AIR DEFENSE COMMAND
Ent Air Force Base, Colorado
22 August 1966

Organization and Mission - Field

MISSION DIRECTIVE OF THE 9TH AEROSPACE
DEFENSE DIVISION

PURPOSE: This regulation prescribes the mission, organization, and responsibility of the 9th Aerospace Defense Division.

1. **Mission.** To operate and maintain assigned space surveillance/defense systems in order to:

a. Provide missile warning.

b. Detect foreign missile and satellite launches.

c. Maintain a satellite data base capable of discreet discrimination of all man-made objects in space.

d. Determine the size, shape, and orientation/stabilization of selected space objects.

e. Perform anti-satellite actions as directed.

2. **Organization.** The 9th Aerospace Defense Division is an Air Force controlled unit directly subordinate to HQ ADC. The 9th Aerospace Defense Division has subordinate units required to operate and maintain assigned USAF space surveillance/defense systems.

3. **Command Relationships:**

a. The Commander, 9th Aerospace Defense Division, is under the direct command jurisdiction of the Commander, ADC, for the operation, maintenance, administration, training, and support of assigned USAF space surveillance/defense systems.

b. CINCNORAD exercises operational control over the space surveillance and missile warning systems assigned to the 9th Aerospace Defense Division. CINCONAD exercises operational control of assigned space defense weapons and weapon systems.

4. **Responsibilities.** The 9th Aerospace Defense Division will:

a. Exercise command jurisdiction over assigned personnel, units, and facilities.

b. Organize, equip, train, operate, maintain, and assure operational effectiveness of assigned space surveillance/defense systems.

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*This regulation supersedes ADCR 23-2, 22 April 1964.
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7lst Survll Wg (BMEWS) 10
2 Survll Sq (Sensor) 10
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41)

c. Provide operational integration of designated non-ADC space surveillance systems so as to enhance mission performance.

d. Receive and/or develop, process (test and implement when appropriate) and monitor modifications to assigned space surveillance/defense systems in accordance with applicable regulations.

e. Develop and implement tactics, techniques, and procedures to maximize operational capabilities of assigned and designated contributing space surveillance/defense systems and forces.

f. Conduct studies, tests, and evaluations of assigned and designated contributing systems so as to attain and sustain maximum systems effectiveness and operational capabilities.

g. Develop implementation plans for the integration of programmed space surveillance/defense systems.

h. Insure reports of operational readiness status and capability are provided to HQ ADC/CINCNORAD/CINCONAD, as appropriate.

i. Participate in all Category II R&D testing of space surveillance/defense systems, acting as ADC representative when directed. Participate in all Category III testing, acting as ADC test director when directed.

j. Develop and establish training requirements necessary to accomplish the assigned missions, and implement approved individual and unit training programs.

k. Prepare statements of work for required O&M contracts. Implement and administer approved operations and maintenance contracts in accordance with ADC policy and command agreements.

l. Arrange for support of forces and facilities under provisions of AFR 11-4 and AFR 172-3, as appropriate.

m. Maintain liaison with US overseas commands on support matters for assigned units or facilities located outside CONUS, as specifically directed by the Commander, ADC.

n. Provide unilateral USAF support, as directed by HQ ADC.

o. Prepare budget estimates and administer approved financial plans to support directed mission activities.

p. Perform such other functions as may be directed by the Commander, ADC.

5. **Direct Communications.** Direct communication is authorized between the Commander, 9th Aerospace Defense Division and commanders of Air Force activities or other agencies designated by HQ ADC on matters pertaining to 9th Aerospace Defense Division responsibilities.

HEADQUARTERS AIR DEFENSE COMMAND
OFFICIAL

HERBERT B. THATCHER
Lieutenant General, USAF
Commander

GLADYS M. NELSON
Lieutenant Colonel, USAF
Acting Command Director of
Administrative Services

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USAF
SPACE DEFENSE
...FOR THE PRESS.
9TH AEROSPACE DEFENSE DIVISION (ADC)
UNITED STATES AIR FORCE

Maj. Gen. Johnson

For the Press

Man's entry into space will almost certainly be recorded as the most significant development during the second half of the 20th century. From the beginning, the United States Air Force has cooperated with the scientific community in this nation's space efforts. The work of the 9th Aerospace Defense Division has been an integral part of the North American Air Defense Command and USAF Air Defense Command.

This continuing effort is briefly outlined in this booklet. More detailed information is available from the 9ADD Office of Information, Ent AFB, Colo. 80912.

ORIS B. JOHNSON, Major General, USAF
Commander, 9th Aerospace Defense Div.(ADC)

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NORTH AMERICAN AIR DEFENSE COMMAND

AIR DEFENSE COMMAND

SHIELD of FREEDOM

9TH AEROSPACE DEFENSE DIVISION

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9ADD's Space Defense Mission

The principal mission of the 9th Aerospace Defense Division, headquartered at Colorado Springs, is to detect, identify and track satellites and missiles that pass over or are directed at the North American continent.

To perform this mission, 9th Aero operates the Ballistic Missile Early Warning System, the USAF SPACETRACK System, and the North American Air Defense Command Space Defense Center. A third detection and warning network, the Sea - Launched Ballistic Missile Detection and Warning System is being phased into the division during 1967.

Measures to improve the USAF space defense capability include continuous updating of present detection and tracking systems, installation of a new over - the - horizon radar system, and development of a new concept in radar called "phased array."

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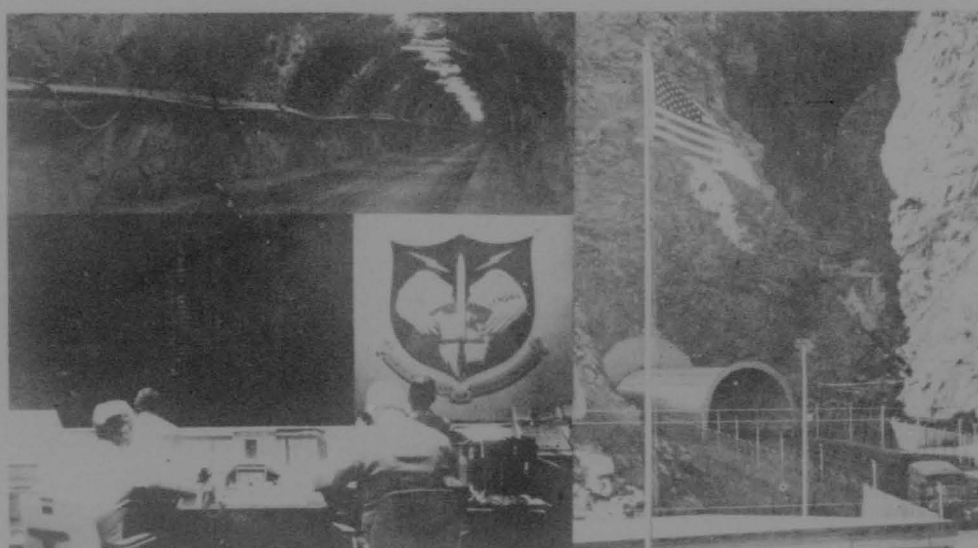

The Combat Operations Center and other key operating functions of the North American Air Defense Command are located deep inside the NORAD Cheyenne Mountain Complex near Colorado Springs.

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Key Defense System Functions Sheltered by Granite Mountain

A nuclear blast-proof and earthquake-proof city mounted on 24-inch diameter coil springs inside a granite mountain and protected by 30-ton steel doors -- this is the Cheyenne Mountain Complex, home of the NORAD Combat Operations Center, where the joint U.S.-Canada command directs the aerospace defense of North America.

Also located in this shelter is the NORAD Space Defense Center, nerve center of a world-wide space surveillance network.

Sharing this "city under the mountain" with the Combat Operations and Space Defense Centers are the Defense Communications Agency, Air Weather Service, Intelligence Data Handling System, Civil Defense National Warning Center . and supporting functions.

The hardsite is so designed and equipped that the entire complex could, if necessary, "button up" and remain self-sufficient in all areas for more than a month.

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The Space Defense Center in the NORAD Cheyenne Mountain Complex is the command post for a global network of space object sensors.

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THROUGH GLOBAL SURVEILLANCE NETWORK

Space Defense Center Keeps Satellite Census

The NORAD Space Defense Center (SDC), operated by 9ADD's 1st Aerospace Control Squadron, serves as command post for a global network of radar, radio and optical sensors used to detect, identify and track earth-orbiting satellites.

SDC computers automatically and instantaneously analyze data received from the sensor network, record it on magnetic tape, drum or core storage, upgrade satellite positions and relay refined orbital data back to the sensors in a never-ending space surveillance cycle.

Thus, a computerized catalog of orbital data is kept by the center so current positions of orbiting objects can be readily calculated. Keeping track of the number and location of such objects helps the center to detect when new satellites are launched.

In addition to detecting, identifying and tracking these man-made objects in earth orbit, the SDC also predicts the time and location decaying objects will "burn-in" to the atmosphere.

These "burn-in" predictions are amazingly accurate. Often the time has been predetermined to within three or four minutes.

In gathering its data, the Space Defense Center relies most heavily on the USAF SPACETRACK System, however, other systems and

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agencies also contribute.

These include the U.S. Naval Space Surveillance System, BMEWS, NASA, the Air Force Systems Command radars on the Eastern and Western Test Ranges, and the Navy's Pacific Missile Range.

Still other data sources include the USAF Satellite Control Facility at Sunnyvale, Calif.; Air Force Systems Command's Missile Test Center at Patrick AFB, Fla.; and optical devices operated by the Smithsonian Astrophysical Observatory.

Information on satellites no longer in orbit is filed for possible future reference in the National Archives.

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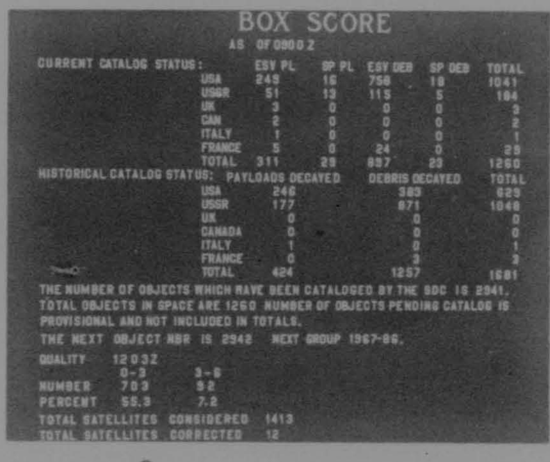
SDC Catalog Reflects Ever-Changing Satellite Inventory

More than 2,900 man-made objects have been orbited since Sputnik I was launched in 1957, according to the Space Defense Center catalog of orbiting space objects.

The SDC catalog is constantly being updated. As orbits change, old information is erased and new information is recorded.

Sometimes a breakup occurs, and instead of having just one object, SDC personnel could be faced with scores of objects, all of which have to be detected, tracked, identified and cataloged.



BOX SCORE

AS OF 0900 Z

CURRENT CATALOG STATUS:		ESV PL	SP PL	ESV DEB	SP DEB	TOTAL
	USA	249	16	758	18	1041
	USSR	51	13	115	5	184
	UK	3	0	0	0	3
	CAN	2	0	0	0	2
	ITALY	1	0	0	0	1
	FRANCE	5	0	24	0	29
	TOTAL	311	29	897	23	1260

HISTORICAL CATALOG STATUS:		PAYLOADS DECAYED	DEBRIS DECAYED	TOTAL
	USA	246	383	629
	USSR	177	871	1048
	UK	0	0	0
	CANADA	0	0	0
	ITALY	1	0	1
	FRANCE	0	3	3
	TOTAL	424	1257	1681

THE NUMBER OF OBJECTS WHICH HAVE BEEN CATALOGED BY THE SDC IS 2941. TOTAL OBJECTS IN SPACE ARE 1260 NUMBER OF OBJECTS PENDING CATALOG IS PROVISIONAL AND NOT INCLUDED IN TOTALS.

THE NEXT OBJECT NBR IS 2942 NEXT GROUP 1967-86.

QUALITY	1203Z	
	0-3	3-6
NUMBER	703	92
PERCENT	55.3	7.2

TOTAL SATELLITES CONSIDERED 1413

TOTAL SATELLITES CORRECTED 12

Primary PACETRACK radar surveillance is provided by 9ADD sites(l. to r.) at Shemya, laska, and Moorestown, N.J., and a contributing site at Diyarbakir, Turkey. The Eastern Test Range site at Trinidad is also a prime tracker.

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SPACETRACK Radar and Camera Sites Extend From Pacific to Middle East

Sensor sites of the USAF SPACETRACK System extend from the central Pacific across the Western Hemisphere to the Middle East.

Operated by 9ADD's 73rd Aerospace Surveillance Wing, the SPACETRACK System includes detection and tracking radars as well as optical sensors.

Principal SPACETRACK radar sites are located at Shemya Island, Alaska; Moorestown, N.J.; Diyarbakir, Turkey; and Trinidad, British West Indies. A new "phased array" radar system, now being tested at Eglin AFB, Fla., will join SPACETRACK in 1968.

SPACETRACK radar information is supplemented by optical data supplied by a network of Baker-Nunn cameras around the world.

Space observations from both the radar and optical sensors are concerned primarily with satellites rather than missiles and objects that are in sub-orbital flight.

SPACETRACK operates on a relatively simple principle. The Space Defense Center tells a particular SPACETRACK sensor where and when to look for a satellite, and the sensor sends the resulting data back to the center.

There, analysts aided by the computer, produce a set of elements which are sent to each sensor. The sites generate look angles from these elements on a daily basis. Look angles provide time, azimuth, elevation and range information the sensor can use to focus its narrow beam of radar energy or optical device on a tiny object hundreds of miles away.

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Precision Camera Insures Tracking Accuracy

The Baker-Nunn camera, developed for the Smithsonian Astrophysical Observatory, is the most sensitive and precise satellite-tracking instrument in the space defense system.

Baker-Nunn Camera

These telescopic, electronically controlled cameras can photograph light reflected from an object the size of a basketball 25,000 miles in space.

Baker - Nunn satellite photos are much more accurate than radar-produced data, and the cameras are regularly used to check the accuracy of such electronic sensors.

The Baker-Nunn is also capable of tracking small objects at far greater distances than electronic sensors, and it is much less expensive, and easier to operate and maintain.

But despite its sensitivity and preciseness, it is limited in that it can only photograph satellites reflecting sunlight during cloudless evenings.

Air Force Baker - Nunn cameras are located at Sand Island (near Johnston Island) in the Pacific and Edwards AFB, Calif. Additional sites are planned for Europe and the southern hemisphere. The Canadian Armed Forces operate a cooperating camera at Cold Lake, Alberta.

Twelve additional Baker-Nunns are owned and operated by the Smithsonian Astrophysical Observatory.

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New Radar System Will Have Multiple Capability

A new SPACETRACK sensor, the AN/FPS-85 phased array radar, is now being tested at Eglin AFB, Fla., by the Air Force Systems Command.

Steered electronically, rather than by mechanical movement, the new system will not only detect and track satellites, it will also maintain its own catalog of space objects--most of which will pass within its view at least twice daily.

In addition, the huge wedge-shaped radar system will also function as a south-facing missile warning radar.

Because of its electronic scanning techniques and thousands of computer-controlled transmitters and receivers, the phased array system can detect and track scores of space objects in microseconds, rather than the seconds or minutes required by conventional radars.

AN/FPS-85 phased array radar system at Eglin AFB, Fla.

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BMEWS surveys the northern approaches to North America and Western Europe.

BMEWS: The Front Line Of Missile Defense

The Ballistic Missile Early Warning System of 9ADD's 71st Missile Warning Wing is designed to provide North America with warning of any hostile missile attack that is launched across the northern approaches. BMEWS sites have direct computer-to-computer communications with the NORAD Combat Operations Center and Space Defense Center in the Cheyenne Mountain Complex near Colorado Springs.

This BMEWS electronic blanket spread across the northern skies is intended primarily to warn of missile attacks over the top of the world. However, the BMEWS radars have also proved to be an important source of data on orbiting satellites.

The system, which employs both detection and tracking radars, has USAF-opera-

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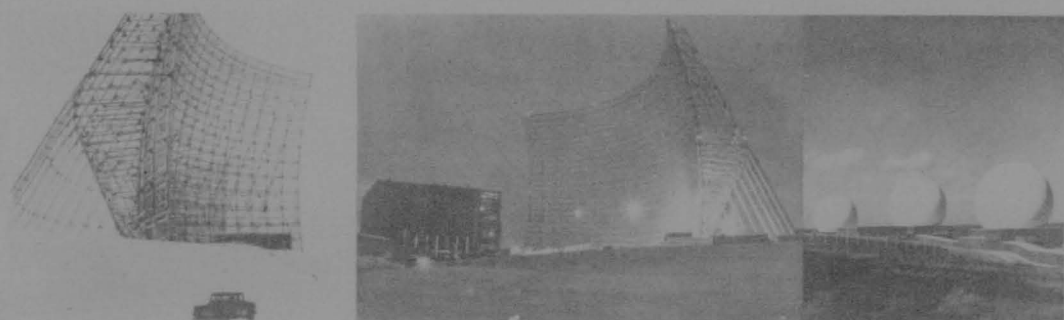

BMEWS sites(l. to r.): Clear, Alaska; Thule, Greenland; Fylingdales Moor, England.

ted sites at Clear, Alaska, and Thule, Greenland, and a site operated by the RAF Fighter Command at Fylingdales, England.

Some 25% of the 300,000 to 400,000 satellite observations processed by the Space Defense Center each month are provided by BMEWS sites. This information is extremely valuable in the routine maintenance of orbital elements on high-inclination satellites.

BMEWS detection radars, which look like huge baseball backstops, emit two fans of radar signals, one above the other, in the shape of a horizontal "V." The fan coverage extends to 3,000 miles.

A ballistic missile constituting a threat to the U.S. would penetrate both the lower and upper fans. By evaluating the time required for the missile to pass through both fans and points through which it passed, the on-site computers can accurately determine the site of launch and site and time of impact.

Tracking radars, designed to follow selected objects from horizon to horizon, employ a narrow, cone-shaped beam.

Because of this flexibility, a tracker can cover a longer data period than the detection radars, thus providing even more precise information on the trajectory or orbit of a space object.

New Over-the-Horizon Radar Net Will Boost Attack Warning Time

The Air Force is continuing to improve its missile detection systems in order to lengthen the warning time our BMEWS network now affords us. An Over-the-Horizon(OTH) radar network, now being developed, will help fill this need.

The OTH radar consists of a family of systems which bounce radar signals off the ionosphere and send them back to earth, far beyond the horizon, differing from normal radar detection which is limited to line of sight.

Designed to complement BMEWS, the new OTH system will substantially improve the warning time in the event of a ballistic missile attack.

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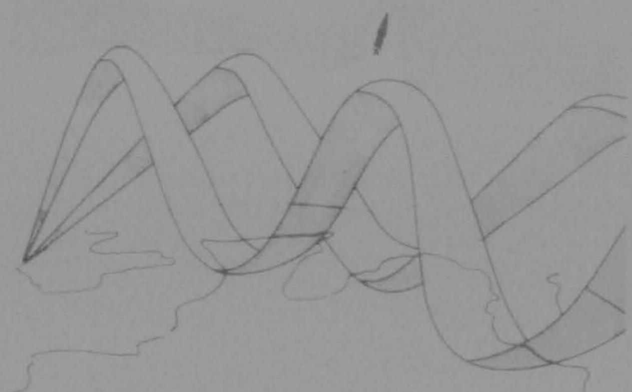

Over-the-Horizon radar waves transmitted across the Eurasian continent can detect disturbances in the ionosphere that are caused by the penetration of missiles.

SLBM Detection and Warning System To Provide Coastline Missile Watch

A new 9ADD radar network designed to fill the gap in the U.S. missile detection and warning system is being phased into NORAD during 1967.

Known as the Sea-Launched Ballistic Missile Detection and Warning System, the new network will supplement the missile radar coverage of BMEWS.

The new system, comprised of seven sites on the Atlantic, Pacific and Gulf coasts, will survey the eastern, western and southern approaches to the continent and detect any missile launched or approaching within 1,000 miles of our coastline.

Like the BMEWS sites, the SLBM radars will be operated by 9ADD's 71st Missile Warning Wing.

Using facilities at existing sites, the new system will employ modified SAGE (Semi-Automatic Ground Environment) radars capable of both searching and tracking. Each radar is mated to a data processing unit with direct communication to the NORAD Combat Operations Center in the Cheyenne Mountain Complex.

Operation of the radars is entirely automatic. Each sensor will operate in a search mode until a possible threat is detected, at which time it will be directed by its computer to begin tracking the approaching object.

As in BMEWS, the site computer will calculate launch and impact points for those detections which become threats and will transmit threat messages to the NORAD Combat Operations Center.

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Space Defense Needs of the Future

Adequate space defense requires not only that we can detect enemy satellites and missiles, but that, if required, they can be destroyed. At present, ADC has an anti-satellite capability, but not an effective anti-missile capability.

The Air Defense Command satellite interceptor system uses the Thor missile. Targeting data it would need to intercept a hostile satellite would be provided by the SPACETRACK System.

The most urgent task facing aerospace defense today is the problem of destroying a ballistic missile should it be launched against us.

As pointed out by Air Force Chief of Staff, General John P. McConnell, "The major problems facing us today in maintaining an adequate defense evolve from the survivability requirements in the missile age, the growing obsolescence of the current weapons systems, the need to counter the increasing missile threat and need to cope with the possibility of a threat from space. We are making progress in all areas. But further progress is needed."

Thor Missile

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Biography

UNITED STATES AIR FORCE

COLONEL DEAN W. DUTRACK

Colonel Dutrack graduated from the University of Illinois in 1938 with a B.S. degree in Accounting and entered the flying cadet program in November 1940, graduating as a 2d lieutenant in July 1941. He then served in various fighter aircraft assignments in Panama until 1944. After attending the Army Command and General Staff School, he proceeded to the Southwest Pacific Theater where he served with the 475th Fighter Group during and after hostilities. Upon his return to the U.S. in 1947, he was assigned to the 31st Fighter Group in Georgia. It was here that he married the former Virginia Jordan.

After attending the University of Pennsylvania, where he received his Master's degree in Business Administration, his assignments alternated between those with the USAF Auditor General and those in the Fighter Operations Field. In his assignments with the Auditor General, he was stationed in Philadelphia, New York, Fort Worth, and Norton AFB, Calif. His operational assignments included command of the 334th Fighter Squadron in Korea; a tour at Eastern Air Defense Force in operations and training; a tour as commander of the 507th Fighter Group at Kincheloe AFB, Michigan; and a tour as director of operations and vice commander of the 65th Air Defense Division, Spain.

After assignment in the Directorate of Aerospace Programs at Hq USAF, he was reassigned in July 1967 as vice commander, 9th Aerospace Defense Division, Colorado Springs. Colonel and Mrs. Dutrack reside in Colorado Springs with their son, Dale Alan, 17.

ADM-2
(DOC #4)

HEADQUARTERS
9th AEROSPACE DEFENSE DIVISION (ADC)
UNITED STATES AIR FORCE
ENT AIR FORCE BASE, COLORADO 80912

AREA CODE 303
TEL 635-8911
EXT: 2716

REPLY TO
ATTN OF: 9OTT

ca April 1965

SUBJECT: In-Service Operation of SPACETRACK Tactical Operations Room

TO: ADC (ADODC)

1. To reach the optimum in operational response and command control, it is mandatory that the operations function at the SPACETRACK radar sensors be militarily manned. After extensive research and consideration of the advantages and disadvantages given this subject by an appointed committee and inputs from the division staff, this position was reached.

2. The Tactical Operation Rooms (TOR) serve as the sensor nerve center which maintains absolute control over the outputs and inputs of the sensor. Because of increasing demands being made upon the sensors, minute-to-minute operational control of the sensor by military personnel is mandatory. Frequently, tasking of the sensor is based on classified projects, requiring special access clearances. Obtaining such clearances for contractor personnel is often difficult and time consuming. Therefore, the assigned military personnel are the only ones who can immediately accept tasking requests, make firm decisions as to deployment of the equipment, and process the required data.

3. Under contractor operation, the military "chain-of-command" stops with the Site Space Surveillance Officer (SSSO) position. Optimum conduct of the operations function is, therefore, completely dependent upon the ability of the two factions (military and contractor) to cooperate with each other. Personalities and human interface have a much greater bearing in contractor-military relationships than would normally be the case in sole military environment. Additionally, changes in operational procedures for contractor-operated equipment can result in lengthy contract negotiations with subsequent sacrifice of operational capability. With military manning, changes in operating procedures can be implemented immediately.

4. Operational response and command control problems existed in BMEWS before "Blue Suiting" was accomplished. A distinct increase in the operational product has been noted since implementation of military manning. Blue Suiting of the BMEWS TOR's

has proven highly effective in establishing positive military control of a high priority USAF aerospace system. An identical requirement exists within the USAF SPACETRACK System. With the "Blue Suiting" of the SPACETRACK Sensor TOR's, the same salient effect will result. Also, military manning will grant the Air Force a deeper understanding of the maximum operational capability of each sensor, thereby resulting in more effective deployment and utilization.

5. With the extensive effort being devoted to developing a Space Systems Career field, the experience gained by personnel at the sensors would be of significant benefit to the entire Air Force. Experienced personnel returning from the sites could be utilized in NASA, SSD, FTD, AF Headquarters at all echelons, and ZI SPACETRACK units and centers.

6. It is realized that there are several minor disadvantages to Blue Suiting the Sensor TOR's. The proposal would increase the Technical Training Center formal school requirements. Because of tax waivers, contractor personnel are more likely to remain 18 months at Diyarbakir compared to the average twelve months for military personnel. However, the advantages of improved operational response, command control and a better operational product, plus the input of experienced personnel into the Space Systems Career field for future USAF needs, far exceeds the disadvantages.

7. If the contractor continues to perform the major role in the operational response and command control functions, and realizing that the present accelerated growth of all space activities will continue, there will be a resulting, yet ultimate, decline of the military capabilities in space. A military resource must be developed which will, in future years, optimize the USAF control, direction, and operation of space systems at all echelons of command. The "Blue Suiting" of USAF SPACETRACK systems will help in providing the long term nucleus for cadres required to perform these vital functions in the space age.

8. The recommendation for military manning is consistent with USAF policy in that the Baker-Nunn cameras (except for Norway) are currently or proposed to be fully "Blue Suit" manned; the FPS-85 and the FSR-2 will be ultimately manned by military personnel; the FPS-95 and other advanced sensor systems likewise have full "Blue Suit" concepts. Studies are also again underway to fully Blue Suit the BMEWS radars as follow-on action to the successful "Blue Suiting" of the Tactical Operation Rooms at those sites.

9. Although the contractor effort at overseas sites entails a seven-day, twelve-hour-per-day work week, the problem of fatigue and decreasing efficiency resulting from the long hours is becoming more and more apparent, particularly, as equipment complexities and peak performance continues to advance. Recognizing these factors, General Electric has considered a three shift operation at both Shemya and Diyarbakir for FY 1966. While this in no way implies official sanction of the proposal, it does, nevertheless, highlight a requirement for ultimate adjustment of the contractor work week. The fatigue problem is particularly evident in the Tactical Operation Room due to the heavy tasking imposed by SPADATS/SPACETRACK, the evergrowing satellite inventory which imposes heavier burdens on the mission planning function, and the increased concentration required by console operators, data recorders, etc. The "Blue Suit" proposal will not, therefore, add significantly to the overall manning when weighed against the ultimate increase now proposed by the contractor.

10. The proposed UMDs for Det 2, Det 3, and Det 6, 2 Survl Sq, are reflected in attachments. Implementation of this proposal would result in a total increase of 19 personnel at Diyarbakir, 19 at Shemya, and 10 at Moorestown.

11. Excluding support requirement costs, and based on the present contractor two-shift configuration and an additive 19 operations personnel, some rough estimate of total costs may be derived for Shemya which is representative of identical operating costs at Diyarbakir.

a. Criteria (all based on TOR manning)

(1) Average contractor annual wage less tax - $20,000

(2) Average military annual wage (standard Msgt) - $5,555

(3) Total contractor in TOR - 18

(4) Total contractor reduction - 18

(5) Total military in present TOR - 8

(6) Total additive military - 37

(7) TOR contractor/military cost (present) - $404,440

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(8) TOR military manning cost (as proposed) - $249,975

b. Present Cost

$ 20,000	$ 5,555
18 contractor	8 military
$360,000	$44,440

Total: $404,440

c. Proposed Cost

$ 5,555
45
$249,975

d. Total Saving: $154,465

12. Combining Shemya and Diyarbakir (which have identical manning requirements), the total savings to be realized for these two sites by the proposal would amount to roughly $309,000. Considering the four-shift manning at Moorestown, the present TOR operating costs are estimated to be $385,000. By implementing the "blue suit" proposal in the TOR, estimated costs, using the military cost criteria reflected herein, would amount to $222,000; thereby resulting in a Moorestown total savings of $163,800. Consequently, a total annual dollar savings to be realized, through implementation of this study, would be approximately $473,000.

13. While the total additive 19 personnel required for each forward site (Diyarbakir and Shemya) will entail a slight increase in base support requirements, the overwhelming advantages to be realized in terms of increased operational effectiveness, tactical response, command control, exploitation of the military role in space, monetary savings, and numerous other salient advantages - all unequivocally support the conclusion reached in this study, namely, that the nerve centers of each SPACETRACK sensor should be "blue suit" manned.

8 Atch
1. Proposed AF Manning, Det 2, Det 6, 2 Survll Sq, TOR Ops Room.
2. Current Military/Contractor Manning of the TOR.
3. Summary of Det 2 and Det 6.
4. Proposed AF Manning Det 3, 2 Survll Sq.
5. Current Military/Contractor Manning Det 3, 2 Survll Sq.
6. Summary of Det 3, 2 Survll Sq.
7. Proposed Utilization of Operators within the TOR at Det 2 and Det 6.
8. Proposed Utilization of Operators within the TOR at Det 3.

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SUMMARY OF DET 2 and DET 6, 2SURVLLSQ IN-SERVICE MANNING

VS.

CONTRACTOR MANNING

Contractor Position	In-Service Manning
Operations Supervisor	No equivalent position
No equivalent position	Site Space Surveillance Officer (1716) (Currently Authorized)
No equivalent position	Site Space Surveillance Technician (273X1) (Request 1/[illegible])
System Controller	Site Space Surveillance Monitor (1744S)
Operations Specialist	Site Space Surveillance Technician (273X1)
Track Console Operator	Boresight/Off Boresight Console (273X0)
Track Console Operator	Boresight/Off Boresight Console (273X0)
Display Operator	No equivalent position
SOI Engineer	No equivalent position
No equivalent position	SOI Officer (262X/282X) (Two currently authorized)
Data Analyst	SOI Technician (294X0)

Atch #3

Note 1: With in-service manning, the contractor's operations supervisor position (Shift Leader) would continue to be required. Currently, the individual(s) filling that position are responsible for both operations and maintenance. The Site Space Surveillance Officer will assume all operations responsibilities but not the maintenance responsibilities. The contractor's position will then become that of Maintenance Supervisor instead of Operations Supervisor.

Note 2: Under in-service manning, the contractor's Display Operator position will not be required. The duties pertaining to that position can be performed by the Boresight/Off Boresight Console Operators.

Note 3: The SOI Engineer is tasked: (1) to assist the Space Object Identification Officers in the performance of special analyses; (2) to develop new techniques to be used in Space Object Identification. Although not reflected in the overall cost or manning of the "Blue Suit" TOE it might be advisable to continue the services of a highly competent engineer. The requirement, however, would be envisioned to terminate subsequent to 1968.

Note 4: The Site Space Surveillance Monitor will assume the duties currently performed by the Contractor's System Controller. He will be responsible for carrying out the Space Surveillance/Tracking mission of the site and for performing the necessary coordination with the contractor's maintenance activities.

Note 5: The Site Space Surveillance Technician will assume the duties of the Contractor's Operations Specialist.

Note 6: The Boresight/Off Boresight Console Operators will assume the duties of the Contractor's Tracker Console and Display Operators positions (see attachment 7).

Note 7: The 273X0's assigned to each crew will be qualified to fill each position to provide rotation of the personnel through each position (see attachment 7).

Note 8: The SOI Technician will assume the duties of the contractor's data analyst position.

SUMMARY OF DET 3, 2SURVLLSQ IN-SERVICE MANNING

VS.

CONTRACTOR MANNING

Contractor Position		In-Service Manning
Engineer	----------	No equivalent position
No equivalent position	----------	Site Space Surveillance Officer (1716)
No equivalent position	----------	Site Space Surveillance Technician (273X1)
Operations Director	----------	Site Space Surveillance Monitor (1744S)
Operations Technician	----------	No equivalent position
TR Console Operator	----------	Tracking Radar Console Operator (273X0)
SOI Engineer	----------	No equivalent position
No equivalent position	----------	SOI Analyst (283X) (282X/ 288X) (Two currently authorized)
SOI Technician	----------	SOI Technician (294X0)

Note 1: With in-service manning, the contractor's engineering position would continue to be required. Currently, the individual(s) filling that position are responsible for both operations and maintenance. The Site Space Surveillance Officer will assume all operations responsibilities but not the maintenance responsibilities.

Note 2: The SOI Engineer is tasked: (1) to assist the Space Object Identification Officers in the performance of special analysis; (2) to provide additional training to military personnel after they complete the SOI course at Keesler; (3) to develop new techniques to be used in Space Object Identification. Although not reflected in the overall cost or manning of the "blue-suit" TOE, it might be advisable to continue the services of a highly competent engineer. The requirement, however, would be envisioned to terminate subsequent to 1968.

Atch #6

Note 3: The Site Space Surveillance Monitor will assume the duties currently performed by the Contractor's Operations Director. He will be responsible for carrying out the Space Surveillance/Tracking mission of the site; performing the necessary coordination with the contractor's maintenance activities; and performing daily mission planning.

Note 4: The Assistant Site Space Surveillance Monitor will assist the SSM in carrying out the Space Surveillance/Tracking mission; conducting mission planning; operating the manual inputs (SSMI) flexowriter position, and will relieve TR/TRM Console Operators.

Note 5: The Site Space Surveillance Technician will assist the SSSO by annotating data; maintaining operations logs and records; updating operational status boards; receipting for and dispatching all operational reports, and manning the tracking consoles.

Note 6: The Tracking Radar Console Operators will assume the duties of the Contractor's TR Console Operator and TRM Console Operator. They will be trained to rotate between consoles as well as perform the functions of the SSST and Assistant SSM. (See Atch 6)

Note 7: The SOI Technician will assume the duties of the Contractor's SOI technicians including quick look analysis and recorder operation.

(DOC # 5)

HEADQUARTERS
AIR DEFENSE COMMAND
UNITED STATES AIR FORCE
ENT AIR FORCE BASE, COLORADO 80912

AREA CODE 303
TEL: 635-8911
EXT:

SHIELD OF FREEDOM

REPLY TO
ATTN OF: ADCMO-E

16 SEP 1965

SUBJECT: Blue Suit of Sensor TORs

TO: 9 Aerosp Def Div (9CMO)

1. Your request to blue suit the Tactical Operations Room (TOR) at the SPACETRACK Sensors was concurred in as an objective by Hq USAF.

2. However, since no military spaces are available by Hq USAF for in-house conversion, this requirement will be processed in a PCP. You will be kept advised on the status of this change.

FOR THE COMMANDER

C L Brooks

CHARLES L. BROOKS
COLONEL, USAF
CH, REQUIREMENTS DIV

DOC # 9010

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

REPLY TO ATTN OF: 9AAC　　　　　　　　19 Jan 1968

SUBJECT: CY 1967 Annual Objectives Briefing

TO: All 9ADD Staff Activities
ADMET

The CY 1967 Annual Objectives briefing for the Commander has been rescheduled for 9 February 1968 at 1000 hours in Conference Room #1. The briefing has been set up so that 9EDC will brief the objectives for which they are OPR and 9ODC will brief the remainder. Attached is a list of the Annual Objectives in the order in which they will be briefed.

FOR THE COMMANDER

W H Bagley
W. H. BAGLEY, Lt Col, USAF
DCS Comptroller

1 Atch
Annual Objectives
for CY 67

Cys to: 9CVC/9CCS

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19 Jan 68

SPECIFIC ANNUAL OBJECTIVES FOR 9ADD - CY 1967

Briefed by ODC

Objective No.	Description
1	Effect a reorganization of Hq 9ADD to improve management control of present and future 9ADD systems, to include: a. "Current Operations" and "Operations Plans" Directorates in 9ODC. b. Realignment of 9MDC functional and organization structure for more efficient personnel utilization. This action will result in transfer of the Chief of Maintenance functions from 9MDC to the subordinate Wings.
2	Accomplish the programming necessary to relocate the 71 Msl Wng and 73 Aerosp Survl Wg and effect the relocation of 73 Aerosp Survl Wg.
3	Establish a valid reporting system in the areas of quantity of satellite observations, system performance assessment, AFM 66-1 maintenance actions, and RPIE operating efficiency. This includes reporting methods that will be required when 71 Msl Wng Wg and 73 Aerosp Survl Wg are remotely located from Hq 9 Aerosp Def Div.
4	Accomplish all programming actions necessary to meet the 440L System FOC.
5	Establish control of software development throughout the 9ADD.
7	Develop and implement an operational plan for effective utilization of BMEWS sensors in support of SPACETRACK with minimum degradation to the BMEWS primary mission.
9	Develop and implement procedures and modifications which will improve system reaction to foreign space activities, satellite break-ups and uncorrelated observations.

10	Define the hardware and software requirements for on-site computer assistance to the SOI analysts
11	State requirements for routine, continuous SPACETRACK calibration methods and for a calibration satellite.
13	Obtain approval and funding for replacement of off-line printers (IBM 717) and associated equipment at the U.S. operated BMEWS sites.
14	State a requirement for on-site data processing and requisite intersite communciations.
15	State a requirement for long-term (post-1970) improvements to the Space Defense System and initiate studies to define specific Required Operational Capabilities (ROC).

Briefed by EDC:

Objective No.	
6	Prepare, publish and implement a BMEWS system surveillance capability guide containing indices for each possible radar outage configuration, based upon the latest approved NORAD/ADC raid model.
8	Determine sensor tasking requirements (based upon specific missions) and define an automated (computer) tasking system.
12	Reduce systematic errors to the limits defined in the following areas:

a. Timing - Millisec.

b. Dynamic refraction corrections - 4 decimal places.

c. Geodetic locations - 10 meters.

d. Tesserals - 8th order.

e. Resonance terms - 16,16.

f. Droop of radar dishes - different for each type of dish.

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DOC 7

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

REPLY TO ATTN OF: 9AAC

8 December 1967

SUBJECT: 9ADD Annual Objectives Progress Report (U)

TO: All 9ADD Staff Activities

(U) A review of the first status reports reveals that 9ADD has made excellent progress toward accomplishing its annual objectives for CY 67. The final reports of this project are due in 9AAC by 10 January 1968 and it is hoped that most of the objectives will be favorably completed by this time. Upon receipt of this report, a meeting of the Council will convene to determine how this material should be briefed to the Commander. Attached is a list of the objectives, their status as of 30 September 1967, and the OPR for each.

W H Bagley
W. H. BAGLEY, Lt Colonel, USAF
DCS/Comptroller

1 Atch
Annual Objectives Report

GROUP • 3
Downgraded at 12 year intervals;
Not automatically declassified.

Cy # 3 of 12 cys

9AMA-67-123

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OPR: ADMET

(U) Objective: Effect a reorganization of Hq 9ADD to improve management control of present and future 9ADD systems, to include:

a. "Current Operations" and "Operations Plans" Directorates in 9ODC.

b. Realignment of 9MDC functional and organizational structure for more efficient personnel utilization. This action will result in transfer of Chief of Maintenance functions from 9MDC to the subordinate wings.

(U) Status: In the area of operations, the DCS/Operations Reorganization Plan was submitted to ADCMO and coordinated with ADODC and ADCDC. The ADC position on the plan should be completed by 31 October 1967. On the maintenance side, both the 71st Missile Warning Wing and 73rd Aerospace Surveillance Wing have been authorized maintenance functions. In addition, MCC authorizations from 9MDC were reassigned to the wings. Effective FY 69, all maintenance actions will be completed.

OPR: 9MDC

(U) Objective: Accomplish the programming necessary to relocate the 71st Missile Warning Wing and the 73rd Aerospace Surveillance Wing and effect the relocation of the 73rd Aerospace Surveillance Wing.

(U) Status: The 73rd Aerospace Surveillance Wing was relocated to Tyndall AFB, Florida in July 1967 and is operational at that location. The 71st Missile Warning Wing is to move to McGuire AFB in FY 69-1. ADC PAD 67-8 has been distributed and preliminary planning actions have been initiated. 9MLP, with representatives of 9ADD staff and 71st Wing, have conducted negotiating meetings with McGuire AFB representatives for required support of the unit.

OPR: 9AAC

(U) Objective: Establish a valid reporting system in the areas of quantity of satellite observations, system performance assessment, AFM 68-1 maintenance action, and RPIE operating efficiency. This includes reporting methods that will be required when the 71st Missile Warning Wing and

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73rd Aerospace Surveillance Wing are remotely located from Hq 9th Aerospace Defense Division.

(U) Status: 9EDC is making a pilot study of the SPACETRACK system. The detailed tracking data accumlated in the study is being compared with the SOTTR report submitted by the sensor units to determine the completeness of this report. In the area of RPIE operating efficiency, an adequate reporting system is presently in effect. All RPIE equipment is considered as operational unless reported as an exception, i.e., scheduled or unscheduled maintenance. On the maintenance side, the 73rd Aerospace Surveillance Wing will assume the data handling function and maintenance analysis responsibility. The 71st Missile Warning Wing is looking into the possibility of having the Thule Base data services process Thule BMEWS data and Elmendorf Air Force Base data services process Clear's data. The analysis function will go to the 71st as soon as the 71MME staff is sufficiently manned.

OPR: 9ODC

(U) Objective: Accomplish all programming actions necessary to meet the 440L System FOC.

(S) Status: All actions have been accomplished requisite to the establishment of a 9ADD Early Warning Unit at Aviano and OL #1 is scheduled for activation on 1 December 1967. AFR 11-4, Host Tenant Agreements, are presently being staffed at 9ADD and at the host bases. In addition, civil engineering actions required as a result of site relocation and changing facilities criteria in the Far East have been accomplished. 9OTT will monitor ADC/ATC/ESD training activities to insure fully qualified ADC personnel are on site for Cat II testing. 9ODC developed revised manpower phasing schedules to serve as guidelines for 9PDC and 9OTT in establishing training schedules and phase in of 9ADD personnel. Also, a secure communication link between the 440L Correlation Center and the NCMC is scheduled for activation on 1 January 1968.

OPR: 9ODC

(U) Objective: Establish control of software development throughout the 9th Aerospace Defense Division.

Completed

(U) Status: Two control boards, the 9th Aerospace Defense Division Computer Program Review Board and the Delta Configuration Control Board have been set up during the period and presently monitor software development. In addition, ADCM 55-4 is being revised and it is anticipated that the implementation of this manual will require major changes to the current method of administrative procedures, processing and approval of computer changes. Projected progress includes a review of the revised ADCM 55-4 to determine impact on existing methods, regulations and plans; transfer of the Technical Supervisory function to ADPAC; and the combining of the 9th Aerospace Computer Program Review Board and the Delta Configuration Control Board.

OPR: 9EDC

(U) Objective: Prepare, publish and implement a BMEWS system surveillance capability guide containing indicies for each possible radar outage configuration, based upon the latest approved NORAD/ADC Raid Model.

(U) Status: Project was completed with publication of the BMEWS System Surveillance Capability Guide, 9EDC Analysis Memorandum 67-4, 15 March 1967 and the corresponding System Surveillance Performance Chart on 18 May 1967.

OPR: 9ODC

(U) Objective: Develop and implement an operational plan for effective utilization of BMEWS sensors in support of SPACETRACK with minimum degradation to the BMEWS primary mission.

(U) Status: Although an operational plan has not been published, RCA-DEP was tasked to "develop and implement in association with Hq ADC (ADPAC) a BMEWS tracking radar deployment doctrine which will permit increased BMEWS and SPACETRACK utilization with no BMEWS mission degradation". Results of this effort are an extended TR azimuth coverage capability at Site I, development of a new error model for Site II and reconfirmation of the models for the other sites, examination of Site III capability to provide early detection of satellites if expanded doppler filter banks were to be made available, and publication of 71MWWM 55-3, "BMEWS Operating Instructions for SPACETRACK Support" 7 August 1967.

OPR: 9EDC

(U) Objective: To determine sensor tasking requirements (based on specific missions) and define an automated (computer) tasking system.

(U) Status: Three documents that contribute significantly toward the automatic tasking goal have been published. They are "A Proposal for a Sensor Tasking System", 1st Aerospace Control Squadron Technical Memorandum No. 67-03; "Final Report on the Semi-Automatic Tasking Study", System Development Corporation TM-LX-281, and "Automated Mission Planning for Shemya", General Electric Company Engineering Report 66-2-200. In addition to these, a Delta system change proposal is titled "Sensor Tasking Program" and is the first step in the evolution of incorporating automatic tasking in the operating system. The approach is to maintain within the SDC computer (drum E file) a file of tasking category by satellite, by sensor. A program (TSKGN) will sort these filed inputs by sensor and within sensor by category and produce the consolidated tasking messages for each sensor. The tasking messages will be automatically transmitted to those sensors whose communications are normally routed through the ADR.

OPR: 9OSD

(U) Objective: Develop and implement procedures and modifications which will improve system reaction to foreign space activities, satellite break-ups and uncorrelated observations.

(S) Task 1: Develop scan patterns for trackers in the SPACETRACK and BMEWS system in order to detect a launch from TT, PL, or KY within rev Ø or 1.

(S) Status: Acquisition data for every 2° of inclination from 50° to 94° vs present fan coverage for altitudes of 200 dm, 500 dm, 1000 km and 1500 km has been generated. NELSON Also utilization of current trackers to fill gaps have been proposed and gaps have been analyzed for SPACETRACK modification required in the future. In addition, hardware/software modifications to BMEWS have been approved to reduce the number of UCTs. This task can be completed by 31 December 1967 if BMEWS hardware/software modifications are completed with sufficient time for testing (six weeks), UCTs are further reduced from BMEWS to a point acceptable to the SDC software, and the theoretical model and assumptions fit the practical world.

(S) Task 2: To develop and implement procedures for optimum utilization of existing SPACETRACK/BMEWS capabilities in early rev acquisition of high inclination USSR satellites.

(S) Status: Procedures have been developed and coordinated with 71st Missile Warning Wing and 1st Aerospace Control Squadron for implementing POIs at BMEWS Sites I and II. Alerting procedures will be coordinated with Hq ADC and NORAD during October. Procedures are being developed insofar as preventative maintenance recall and on-site operation of the detection/tracker radars during a POI are concerned. The study on optimum scan techniques, which is also a tie-in to BMEWS operating procedures, is expected to be accomplished by 31 December. This will not necessarily delay implementing POIs at the sites on a test basis.

(S) Task 3: Provide for aid in acquisition of ESVs and missiles which are within the Shemya tracker coverage but which do not penetrate the detection radar. The acquisition aid to be provided by obtaining antenna positioning data from the ELINT tracker at Shemya. The ELINT tracker has the capability to acquire and track the telemetry signal transmitter by the object.

(S) Status: The ADC ROC has been submitted. SMAMA has conducted a feasibility study and recommended to USAF that the modification be installed via sole source contract to General Electric Company. Funds are available at USAF (approximately $52,000). Upon receipt of USAF approval by AFLC negotiations will be initiated with the contractor.

(S) Task 4: Provide Diyarbakir generated elements on new foreign launches to other sensors to aid in early acquisitions.

(S) Status: The Diyarbakir Reaqu Modification was installed and tested in August 1967. The element accuracy is adequate for acquisition by other SPACETRACK sensors. The 9ADD Req 55-5, which directs transmission of the site generated elements, is being revised to include procedures for Diyarbakir. Publication was expected in October 1967.

(U) Task 5: Provide for increased support from the Trinidad and MIPIR radars.

(U) Status: OR 3500 is in final stages of coordination within 9ADD. The OR includes alerting, tasking and tasking response, maintenance reporting procedures and SOTTR reporting.

(U) Task 6: To define requirements for environmental data at satellite altitudes. The improved environmental data (primarily atmospheric density) will allow more accurate prediction of satellite orbits. The more accurate prediction capability will result in fewer UCTs and better discrimination. The overall result will be more positive reaction to new foreign launches.

(U) Status: A draft version of a ROC for environmental data has been written and is being forwarded to 9EDC, 9OEW, 4WW and 1ACS for coordination. The final version of the ROC will be forwarded by 30 October 1967.

OPR: 9ODC

(U) Objective: Define the hardware and software requirements for on-site computer assistance to the SOI analysts.

(U) Status: At the present time a Required Operational Capability (ROC), dealing specifically with this subject, is being written. This should be completed no later than November 1967.

OPR: 9ODC

(U) Objective: State requirements for routine, continuous SPACETRACK calibration methods and for a calibration satellite.

(U) Status: A calibration working group, composed of representatives from 9OSD, 9EDC and 1ACS, has been formed and will work on methods of improving current calibration procedures and defining requirements and procedures for future calibration methods. In addition, 9ADD participated with ADPAC in writing of a test plan to evaluate the Moorestown/BMEWS error model developed by RCA. The objective of this test is to determine the feasibility of proposed hardware/software modification to improve the Moorestown/BMEWS tracker data quality. With respect to calibration satellites, the Advanced Research Projects Agency is currently conducting a project to place satellites, whose properties are known, in space. This will allow the various SPACETRACK sites to calibrate their radars by comparing the actual return signals from these vehicles with the lobing patterns obtained from these vehicles on model ranges. ARPA awarded a contract on 5 December 1966 to TRW Systems, TRW, Inc. for the design of these vehicles. The first launch is scheduled for April 1968.

OPR: 9EDC

(U) Objective a: Achieve one millisecond timing throughout SPACETRACK system.

(U) Status: In February, 9EDC supplied information to 9ODC for the preparation of a ROC for installing FPQ-66 clocks at the radar sites. In June, timing situation at Diyarbakir and Shemya was analyzed by Lt Gordon and documented in an Analysis Memorandum 67-11. In September, 9ODC prepared a ROC, the Vice-Commander signed it, and it was sent to ADC. In October, Lt Riggi studied timing at Moorestown and Trinidad. This is 75% completed.

(U) Objective b: Install dynamic refraction correction at all 9ADD tracking radar sites to four significant places.

(U) Status: The mathematical models have been researched and experimental computer programs have been written by Dr. Thomas Hill and Mr. Donald G. Barnes.

(U) Objective c: Obtain for all 9ADD operating sites geodetic locations with an accuracy of 10 meters.

(U) Status: On 15 June, 9EDC documented to 9ODC the proposed geodetic requirements and applicable specifications. On 25 September, 9ODC stated its requirements to Hq ADC.

(U) Objective d: Install a computer program containing 8th order tesseral co-efficients pertaining to an up to date geopotential model such as SAO 1966 Standard Earth.

(U) Status: Change proposal number 203 has been submitted on 2 August 1967.

(U) Objective e: Determine values for geopotential resonance terms up to order 16.

(U) Status: Insufficient available staff to carry out task.

(U) Objective f: Install computer programs for the correction of droop and similar errors of the dishes of SPACETRACK System tracking radars.

(U) Status: RCA-DEP has prepared a mathematical model of such errors. ADPAC and 9ADD have revised the proposed test plan of this mathematical model.

OPR: 9ODC

(U) Objective: Obtain approval and funding for replacement of off-line printers (IBM 717) and associated equipment at the U.S. operated BMEWS sites.

OAC

(U) Status It was determined that in addition to printer replacement, off-line computing capability is required at Sites I and II. This headquarters prepared a Required Operational Capability (ROC) Request for a Class V Modification to obtain the optimum configuration, and Hq ADC forwarded the ROC to Hq Air Force on 10 April 1967. On 13 July 1967, Hq Air Force issued a Requirements Action Directive to AFLC (SMAMA) to perform a feasibility study. SMAMA is presently performing the study.

OPR 9OAC

(U) Objective State a requirement for on-site data processing and requisite intersite communications.

(S) Status The requirement for on-site data processing and requisite intersite communications has been stated in PCR 67-25 SPACETRACK, 4 August 1967. This document has been approved by Secretary of the Air Force and is now awaiting approval at DOD level. Hq ADC (ADLMD-E) is preparing a communications ROC which will incorporate a requirement for cross-tell capability between sensors. The ROC will be coordinated with this headquarters prior to submittal to Hq USAF. In addition, when contracts have been let for the replacement of the Diyarbakir data processing subsystem, 9OAC will submit a ROC for replacement of the data processing subsystems at Shemya and Moorestown.

OPR 9ODC SPTK- PCR 69-25

(S) Objective State a requirement for long-term (post 1970) improvements to the Space Defense System and initiate studies to define specific Required Operational Capabilities.

(S) Status: During July an extensive effort was made to provide material to Col Szczutowski to back up a PCR for major improvements to the Space Defense System. The PCR is presently awaiting approval by the Secretary of the Air Force. This is expected on 2 October 1967. Congressional approval would still be necessary, but work will start on the development phases of the system. One possible problem area might result from the re-evaluation of the sensor locations in view of a possible FOBs threat.

OPR: 9ODC

(U) Objective Identify and document operational missions and the consequent system performance criteria.

(U) Status: On 22 May 1967, Air Force Chief of Staff levied definite responsibilites on Air Defense Command for skin tracking of satellites and Terminal Impact Prediction and for providing the required data to other users. Headquarters ADC in response to this tasking, has published a SPACETRACK Users Manual (ADCM 55-7). This document outlines procedures for other agencies to use in establishing requirements for SPACETRACK data. Extensive distribution of the ADCM 55-7 was made and the full impact of the document on the SPACETRACK system has not been realized at this time. As additional workload and requirements are levied on ADC, these requirements will in turn be levied on 9ADD and the SPACETRACK system. Along with these changes future requirements generated by the FCR 67-25 and the current FOBs study must be determined.

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SECRET

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR DEFENSE COMMAND
ENT AFB CO 80912

REQUIRED OPERATIONAL CAPABILITY (ROC)

SUBJECT: SPACE CONTROL CENTER (U)

PREPARING OFFICE:
MISSILE AND SPACE SURVEILLANCE DIVISION
DIRECTORATE OF MISSILE AND SPACE DEFENSE
DEPUTY CHIEF OF STAFF/PLANS
HEADQUARTERS AIR DEFENSE COMMAND

SYMBOL: ADLMD-S

23 June 1967

ROC NO. ADC 1967

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GROUP 3
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90C067-26
CY 014 OF 015

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I. Deficiencies/Needs.

The Air Defense Command requires a USAF SPACETRACK Control and Direction Terminal Facility to process space and missile surveillance data, to exercise system management and technical control, and to produce and distribute processed information to a large number of authorized DOD and other National agencies. The facility will be responsive, on a preemptive basis, to NORAD/CONAD requirements for space and missile warning, data required for decision-making in terms of National defense, and weapons command and control for actual engagement or exercising. The present integrated NORAD/ADC Space Defense Center in the NCMC is operationally limited in the current environment and will become totally inadequate in the near future.

A. Factors which restrict the operational effectiveness of the integrated Space Defense Center in the present situation are:

1. Because of the use of the computational facilities for multi-purpose functions, thereby restricting utilization of the present equipment, the NCMC is barely able to handle the present workload. Preemption satisfies high-priority operational requirements, but other important work suffers delays. Outside facilities are used to provide additional capability. Any extended outage of data processing or communications routine computers disrupts operation, delays response, creates large backlogs, with resulting long recovery times. Space is not available for adding capacity beyond the inadequate extension possible through the installation of more peripheral gear without large downtime and cost to completely relocate the present computer equipment.

2. Limited office and working space also detracts from operational effectiveness. Overcrowding, noise, and other distractions, physical separation of closely related activities, and inefficient workflow are the end results.

3. Limitations in the utilization of the computational equipment, the multiplicity of the demands upon, and the inadequate engineering design of the software system decree a poor mix of data handling and processing in the space surveillance operation. The required manual handling of and dependence upon magnetic tape and separate off-line operations reduces and creates opportunities for error. The lack of sufficient high-speed random access storage limits the cyclic processing of data.

4. The NCMC integrated Space Defense Center has not been subject to adequate system engineering. Past and future adaptations and integration of new systems are characterized by a "brute force" engineering effort. The computational and communications equipments have little if any growth potential to meet future complex mission requirements. This is due to the NORAD/CONAD requirement to maintain a fixed configuration with established priorities for each system.

5. The NCMC is rapidly becoming saturated with raw data storage and manipulation as opposed to processed information and final products. Mere additions to the present system will continue to aggravate this situation such that command and control responsibilities exercised by the unified commander will be degraded.

6. The integrated Space Defense Center in the NCMC is equipped with inefficient time-consuming data storage devices (magnetic tape units). Proposals for mass, high-speed random access storage devices are complicated by the need for all the on-line processors to access all storage areas, a concept prevalent in NORAD/CONAD. While this general purpose approach has its merits, and is undoubtedly required, it ultimately compromises component functions and unilateral mission requirements. The concept has not yet had deleterious effect on the present USAF SPACETRACK System largely due to the other limitations described. Unless action is initiated now to design for the assigned mission to maximize the efficiency of the operating complex, and to insure effective integration of increased workload requirements, the necessity for real-time response and the demands for greater accuracy will compound themselves such that, ultimately, the cost of a deferred modification will be prohibitive. If this occurs, the USAF operational initiative in space will have been lost.

7. The integrated Space Defense Center in the NCMC is completely deficient in command and control and system management displays. Tabular printouts and card decks are the only means with which the situation or system performance can be viewed. This limitation adds further delays to the evaluation of data and the determination of actions to be taken in providing high quality products to NORAD/CONAD and the other National and DOD users in a timely manner. Methods have been devised to add additional computational facilities to the NCMC to overcome this limitation. These programs are costly adaptations of equipment design for other processes - gap fillers at best - with little or no growth potential. Significantly, the supportability of the "patchwork" engineering has been overlooked. Commonality of spares and maintenance documentation can never be achieved in the present configuration or the proposals for improvement.

8. As a result of late, virtually unfunded, action to establish the integrated Space Defense Center in the NCMC, and the physical and equipment limitations, the USAF SPACETRACK System software and aerospace operations are severely restricted in capability and response. The Delta program became operational in the NCMC complex on 6 Feb 67, following nearly 16 months of testing. The program design for Delta was frozen in February 1965. This would, therefore, represent the state-of-the-art inherent in the program at FOC. There is limited automation in the program, with all but the most routine of functions being performed on a job-scheduling basis. Combined with the primary storage, magnetic tapes, much operational/computational time is wasted. These limitations cannot be completely overcome by new computer programs or additions to the data storage areas.

B. Factors which affect the ability of the integrated Space Defense Center to meet the requirements of foreseeable growth and evolution in space surveillance are:

1. In October 1964, the DOD directed establishment of the integrated Space Defense Center in the NCMC as a result of an after-the-fact review of requirements. The preponderance of engineering for the NCMC was accomplished to accommodate the 425L System. All efforts following this decision have been frustrated by lack of funds, sound system engineering and physical space. Current and projected programs to add the AN/FPS-85, Systems 440L and 474N are bound by the same limitations. USAF SPACETRACK System will not be able to perform its assigned mission of supporting NORAD/CONAD defense mission, the National and DOD intelligence assessment of space threats, or a future International space treaty with the present resources, facilities and equipment allocated in the NCMC.

2. Future systems programmed for integration into the USAF SPACETRACK System assure saturation of the NCMC, or continued equipment additions which actually cause fragmentation of the integration process. These bring the overall system to the point where maximum utilization and association of data, production of quality outputs, and sound command and control decisions will be in jeopardy.

3. The data collection requirements of the National and DOD intelligence agencies exceed those of NORAD/CONAD due to the basic differences in mission and responsibilities. The USAF SPACETRACK System and the facilities of the integrated Space Defense Center are being tasked by agencies other than NORAD/CONAD to an ever-increasing extent for higher precision data. Research and Development activities of DOD and industry are similarly increasing in size, scope, and accuracy of their

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requirements. Coupled with ever-increasing space activity and, therefore, a larger population remaining in orbit, the integrated Space Defense Center will ultimately require an overflow facility to produce the products currently called for. The increased tempo of foreign space technology projects an order of magnitude growth in workload and accuracy to satisfy these requirements.

4. The use of space by many foreign powers and the requirement for accurate, timely data on these events, have a direct affect on the number and location of surveillance sensors providing surveillance data. In the past year, the three basic USAF SPACETRACK radars, plus the National Range Division's Trinidad tracker, have been augmented by eight other sensors located around the world, all in the Northern Hemisphere. The increased use of the higher orbital inclinations by the USSR has dictated expansion of the BMEWS to active space detection and tracking without penalizing the basic missile warning mission. The infinite number of launch inclinations available to the USSR (as well as France and, in the not too distant future, Communist China) have recently dictated a more real-time joint operation of the intelligence community ELINT sensors with USAF SPACETRACK System assigned and cooperative RADINT sensors. The communications and computational facilities of the NCMC cannot continue to accommodate this increased variety of inputs without major and costly modification. Further, any fix to the existing facilities will only produce an interim solution of short-lived usefulness.

5. The requirements for economy in research and development for Program 949 have created further fragmentation of proper data management and consolidation of all decision-making information. This situation must be overcome by merging the 949 System input with other warning and space surveillance data in a centralized facility. Combined and properly processed and managed, all such information provides a greater capability of new threat recognition and timely assessment and, in addition, prompt National warning.

II. Required Operational Capability.

The required capability is a separate system control, direction and management center, properly designed to overcome present deficiencies, and to permit continued growth and modular expansion without loss of efficiency, effectiveness, or system integrity. Cost effectiveness dictates a properly designed facility, engineered for growth and expansion, keyed to the USAF requirement in space. The following criteria are established to meet this capability:

A. The USAF SPACETRACK Control and Direction and System Management facilities must be capable of receiving data from assigned, USAF contributing and DOD and NASA cooperative sensors in near real time.

1. Data processing equipments and programs must be capable of high-speed assimilation of the observational or ephemeris data regardless of the input format.

2. Data processing equipments and programs must be capable of being multi-programmed so that the design will maximize the central processor operating efficiency.

3. Mass storage devices, buffers and high-speed computer work storage are necessary. These storage devices should be designed to operate within access time limits demanded by the Central Processor.

4. Core memory of the central processing unit must be large enough to store those programs used frequently, the data base, and the computational work area required.

5. Automation of a great majority of the functions presently performed by orbital analysts or operations personnel must be accomplished. The software system utilized by the Center must include this capability to the maximum extent to allow for sequential program execution of all processing functions without manual intervention or scheduling.

6. Computer-driven displays are required to permit monitoring of the computational and operational situation.

7. Output of the facility must be capable of accessing both storage and high-speed data and standard communications circuits which are routed directly to the user.

8. The USAF SPACETRACK Center must be capable of sending compressed data to NORAD/CONAD, SAC, and the NCMC with appropriate routine and force display commands. Identical requirements may exist for other National/DOD users.

B. The facility must be physically separated from the NORAD/CONAD COC and the computational facilities provided for operation of the 425L System. If an adequate structure is constructed within the Cheyenne Mountain, the Center could be located in the NCMC area, however, it must be functionally independent of the other defense activities taking place therein. The primary reason for the specified isolation from other NCMC functions is to provide system management integrity, accomplishment of the diversified workload and to preclude excessive and inapt merging of totally dissimilar functions and missions.

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C. The facility must be designed for growth, both in measurable workload and in complex operations. The best measure for workload growth is a function of the number of space events expected annually and projected forward. The residual workload is the number of objects remaining in orbit from each event, the majority of which requires only a routine but ever-growing effort. Both activities equal total workload and can be reasonably projected into the future. As of 1 June 1967, the system had detected and cataloged 2823 objects from all space events, 1215 remaining in orbit on that date. This workload data point compares favorably with the population growth and the projected number of space objects of 5000 by 1970. An important factor to be considered in such analysis is the trends in the use of space. The USAF SPACETRACK System routinely determines such trends based on past performance. Recent (1965-1966) trends indicate that space users are probing generally deeper into space, and near-earth orbits are higher and more elliptical. This signals a direct impact on the control center capability and growth requirement.

1. Perturbations over these types of orbits will differ pronouncibly; use of the perturbative factors in calculations increases computational processing time.

2. Such orbits will not avail themselves of routine sensor observation since the majority of the orbit may be beyond present radar range capability. Therefore, greater care must be exercised in processing observational data, and more computational time will be required to attain optimum orbital ephemerides.

3. These objects will remain in orbit longer than previous near-earth events requiring catalog maintenance to enhance more computational support over a longer period of time.

D. The preponderance of earth-orbiting objects are debris carried into space as a part of the event, or as the result of an explosion during orbital life. It is difficult to determine which problem causes the most difficulty. Consider, for example, the TITAN III C-9 launch of 3 Nov 66. This system, which did not explode, upon mission completion left 64 identifiable tanks, stages, shrouds, and payloads in orbit. The question often arises regarding the necessity to track all objects in space. Initially, this task was perfunctorily executed to comply with HQ USAF SPACETRACK mission directive, dated 10 Jan 63. Since that time, however, the population has grown to the figures indicated above.

1. In 1965, the GEMINI Program established the requirement for operation measurement and prediction as a result of unusual sightings by the astronauts. This requirement resulted in the development of a SPACETRACK capability to compare the manned vehicles' position with adjacent orbits, and calculation of the point of closest approach and crossing angle. NASA has established a requirement for similar measurement and prediction support for the APOLLO Program.

2. The primary reason that the catalog includes all orbiting objects is to facilitate system discrimination and correlation of observations acquired by the sensor. While there is presently a low probability of miss-association or cross-correlation, the probability will increase as the population increases. The data base requirements for this ROC continue to include calculations of the present and future positions of all man-made objects in space.

E. Orbital perturbations phenomena is a subject not too well understood outside the spacetracking community. The earth, due to its imperfect shape, irregular mass, and resulting irregular geopotential distribution, atmospheric drag and the interplay of solar flares, solar pressure, and luni-solar perturbations similar to the earth, affect all objects and tend to influence their orbits, such that actual positions and future predictions have considerable error unless these effects are accounted for in ephemeris calculations. Like any mathematical equation, the more factors included, the longer the time frame for convergence to a solution. The requirements of NORAD/CONAD, DOD and NASA are placing greater stress on the need for accurate effects calculation in producing precision orbital ephemeris. The computer facilities and programs included in this requirement must have the capacity to handle such factors routinely and possess the most current state-of-the-art knowledge of these phenomena and their effects on the operational data. Thereafter, the technology will be followed to produce changes and improved system accuracy.

F. Communications to and from the USAF SPACETRACK Control Center must include both dedicated and common user circuits. Ultimately, input/output formats, data rates, and message content will be standardized. The control center will be capable of handling a wide variety until such time as distant sensor capabilities permit a system-wide standardization effort.

G. The USAF SPACETRACK System output to NORAD/CONAD, SAC and the NMCC will be processed data, suitable for command and control actions. Data request circuits generating forced displays in the USAF SPACETRACK Center from these agencies are also required. Similar data transfer systems are required to operationally interface with DEF/SMAC. Provision is required for transmitting early warning information from the Center to any future Ballistic Missile Defense System.

III. Determination of Deficiencies/Needs and the Required Operational Capability.

A. The USAF SPACETRACK mission of the early 1960's directed that the system be capable of detecting and tracking earth-orbiting objects and maintaining a space catalog (data base). More specifically, the HQ USAF message of 10 Jan 63 specified the following system functions:

1. Detect, track, identify and catalog all man-made objects in space and provide ephemerides on such objects.

2. Provide CINCNORAD and other authorized user agencies with essential data and information obtained in the SPACETRACK System.

3. Provide data to intelligence gathering and other authorized USAF agencies.

4. Provide extremely accurate positional data for space defense weapons systems.

The above direction provided no specific quantitative or qualitative standards for the established functions; in fact, at the time of its issuance, none of the existing users could describe a specified standard. As is usual in evolutionary processes, the number of National and DOD agencies with an authorized mission in space have grown, and with them the requirement for more accurate data. In the early stages of intelligence community assessments of missions in space, fairly crude data could be utilized to develop an orbital vehicle's mode of operation and mission capability. Today's standards have narrowed, not just to show that it can be done or to push the state-of-the-art, but in direct response to the advancement of the technology in orbit control and vehicle performance. Whereas an orbiting vehicle's position relative to the earth (accurate to one degree of latitude and longitude) was adequate two years ago, the current requirement is approximately one-tenth of a degree. As of 1 Jun 67, the USAF SPACETRACK System is producing data to a variety of qualitative standards for more than 125 different DOD, National and authorized civilian users.

B. A growing number of nations are becoming increasingly interested in exploring and exploiting space. Already, seven major powers of the free world (including the U.S.) are vigorously pursuing space programs within their means. Smaller European countries have signed agreements to pool their resources to improve their scientific and technological capabilities in the space field. This has brought about an increased space activity and satellite population and, with it, the requirement for increased accuracy and timeliness of orbital data to satisfy space defense, intelligence community, National manned space flight needs, and increased requests for satellite tracking support from other agencies. This dictates a capability of incremental expansion as the space population increases. Therefore, the USAF SPACETRACK System must be capable of handling an ever-increasing number of earth satellite vehicles, with increasing accuracy, increasing signature analysis capabilities, and increasing sophistication in systems' outputs to satisfy increasing requirements by data users. The future "Space Defense System" must include capabilities for:

1. 95% probability of satellite detection, regardless of the launch site, and at injection and at extreme ranges (up to and including synchronous altitudes) by SPACETRACK sensors.

2. Collection of tracking data over the entire orbit by assigned and contributing sensors.

3. Detection of satellite maneuvers on the same orbit they are initiated.

4. Assessment of satellite size, shape, motion and mission during the injection revolution.

5. Near real time dedicated communication to and from the USAF SPACETRACK Center and assigned or contributing sensors. The data (discrimination/association processing, assigned and contributing system alerting and tasking, sensor acquisition and prediction calculation) will be transmitted in compressed form.

6. Satellite orbit calculation prior to first overflight of the United States to an inertial positional accuracy of 0.1 milliradian in plane and along track, and 50 meters in slant range from any designated earth relative position.

7. Maintenance of a satellite data base on all objects in space (up to 7000) with maximum element along track errors of $\pm$ 1.5 seconds.

8. Maintenance of satellite observational archives for the year preceeding the current central file elements - estimated capacity 300 million word bits.

9. Flexible data outputs to authorized users accessing dedicated data or common user communications circuits. Estimated 50,000 word groups per day.

C. It is vitally necessary that the SPACETRACK System be developed on an evolutionary basis allowing for continuing growth. The system should never be regarded as final or ultimate, but be designed around guidelines which permit a gradual growth without gaps in capability.

D. The ever-changing and incremently increasing characteristics of the ADC Space and Missile Warning/Tracking System will, in the near future, encompass some form of satellite sensing device. Advancing technology and techniques will provide this device with the capability of acquiring and transmitting substantial quantities of data. This operational data will be processed at the USAF/ADC Space Control Center (SCC), which will provide filtered operational data to user agencies for display, recording and actions, as required.

E. In order to fulfill the tasks and missions of the Required Operational Capability (ROC), the Space Control Center (SCC) should be located away from prime target areas. The data processing facility should encompass a floor area of approximately 25,000 square feet and provide the operating and life support space for ample operating personnel predicted on an around-the-clock operation. Data processing facilities should consist of the latest state-of-the-art third-generation, modular-expandable computers with high-speed peripheral equipment, all utilizing the latest in microminiaturized fabrication techniques.

IV. Solutions.

A. The apparent and obvious solution to the operational requirement described and desired is the establishment of a separate data processing center, geographically located apart from the existing Space Defense Center, constructed or situated in a survivable facility, and capable of performing the following functions:

1. SPACETRACK System sensor net control.

2. Data handling for high-precision tracking function.

3. Weapons system support.

4. Space catalog maintenance.

5. Surveillance satellite readout and data processing.

6. Missile warning system support for launch point determination, missile strike reporting and attack assessment.

7. Production and dissemination of SOI data.

8. Real-time processing, scientific computer operations, and computer program testing.

9. Historical archives data storage and retrieval.

B. The collocation of the space and missile data collection and processing facility, Program 949 readout and data processing facility; and ADC Space System Command Post will result in the establishment of a cohesive, easily manageable organization. The span of control problems diminish; the supervisory problems are ameliorated; and the Space Defense System is finally pulled together into a tightly knit organization.

V. Class V Modifications.

This section is not applicable.

VI. Harmonization.

A. Harmonization, as delineated in AFR 57-1, is involved. The end products developed in this facility will be disseminated to many users, including USAF and other agencies, and equipment interchangeability, increased cooperation in research and development, and increased effectiveness of logistics are included.

B. HQ CONAD will be furnished copies for harmonization purposes.

VII. Quantities Involved.

Only one type of the facility being described is planned to exist.

VIII. Aircraft and Munitions/Stores Compatibility.

This section is not applicable to this ROC.

IX. Special Comments.

A. Maintainability. The facility and its installed equipment must be capable of around-the-clock operations and comprised of duplexed components fabricated on a modular, quick replaceable basis. USAF will provide the operational capability, as well as the maintenance and logistic support.

B. Reliability. The facility and its installed equipment must have an inherent design flexibility and redundancy to provide space and missile warning data processing. Also, the facility will permit additional backup capability to the Space Defense Center (SDC), the value of which increases as the system complexity increases.

C. Survivability. Original intentions were to stipulate a hardened, survivable configuration, calling for capability of withstanding an overpressure of 150 PSI. When the configuration of the component facilities (which make up the SPACETRACK System as a whole) was considered, it was recognized that the hardened criteria should be no more stringent than that imposed upon the system components themselves. Consequently, specific hardening criteria are not being imposed nor stated at this time. This is in accord with the requirements stipulated in Annex L to the Joint Strategic Objectives Plan (JSOP-69-76), 8 Feb 67. The document states:

> "However, the various command centers comprising a subsystem may have varying degrees of survivability. For those command centers designed to operate primarily in periods of escalating crises and the period between detection of hostile intent and weapons impact, survivability requirements are accorded a low priority compared to the requirements for reliability and timeliness."

D. Supporting Equipment. The facility should be a self-contained entity, providing its own power production and life-support functions.

E. Communications Security.

1. Dedicated full-duplex, real-time, secure communications circuits are required to all assigned and designated contributing sensors. A transmission rate of 2400 BPS will be required from the data processing facility to the users of real-time data. Secure, high-speed, data

link circuitry between the data processing facility and the users is the most logical approach. The requirement also exists for automatic data interfaces, providing both primary and alternate routing paths, plus a multiplicity of switching modes.

2. Since the Space Control Center must interface with several different users, the data rate, message format, message length, etc., will vary between sensors and users and from sensor-to-sensor, and user-to-user. It is assumed, also, that several common user communications systems might be accessed; i.e., COMSAT, Airborne Survivable Comm, AUTOVON, AUTODIN, AUTOSEVOCOM, etc. Each of these systems have unique characteristics of data rate, format, etc. Therefore, it seems mandatory that this system be provided with some sort of universal modem which can accept or dispatch data in a manner compatible with all systems interfaced.

F. Facilities. The installation must be so located or configured as to provide for uninterrupted, preferably collocated, life support activities.

G. Initial Operational Capability (IOC) Dates. An IOC date of July 1970 is required.

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HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION
ENT AIR FORCE BASE, COLORADO

PCR 67-25 SPACETRACK

4 August 1967

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SUBJECT: PCR 67-25 SPACETRACK

Action Officer: Bernard J. Szczutkowski, Lt Col

Symbol: AFRDSC

1. The Air Defense Command, after coordination with ESD of the AFSC, submitted a proposal for expanding the SPACETRACK System. Their submission was received via the Command, Control and Communication Program (C^3P) route.

2. The Program Element Monitor (PEM) presented the proposal to the Air Defense and C^3 Panels. The former recommended approval as presented, while the C^3P recommended some rephasing before recommending that a Program Change Request (PCR) be prepared.

3. In coordination, AFXPD recommended review by the Air Staff Board (ASB). The ASB was briefed on 12 July 1967 and agreed that the SPACETRACK System needed to be improved. However, they recommended that the PEM further rephase the program with a particular view of reducing the FY-69 funding impact.

4. The revised PCR, as attached, has been briefed to the C^3 Panel and the Chairmen of the Air Defense and Space Panels. The C^3 Panel approved the program, and it was subsequently briefed to the ASB and approved.

RECOMMENDATION

5. Signature and approval of the PCR.

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PROGRAM CHANGE REQUEST

ISSUE PROGRAM ELEMENT TITLE: SPACETRACK
SUBMITTING DOD COMPONENT: USAF

Program Element Numbers			
1	24	24	F

SUMMARY:
This Program Change Request provides for modifications, relocations and replacements of assigned SPACETRACK System sensors and for the addition of facilities and sensors through 19[illegible]3.

As space activity continues and the satellite population grows, the existing system becomes less capable of continuing its responsibility for detecting, tracking, identifying, cataloging and processing satellite information. To assure that the SPACE DETECTION and TRACKING SYSTEM can maintain surveillance over satellite activity and be nationally responsive in the context of the assigned mission and particularly in the context of the Space Treaty, the existing system will require evolutionary growth as follows:

In FY 68, modification funds have been approved to increase the Diyarbakir radar's capability to handle satellites and to provide communications between Eglin's FPS-85 and the Space Defense Center. Also, as provided in (AFXOPN 91173) March 1967, the Baker-Nunn operation at Oslo will be discontinued and the operation moved to a new site in Spain; surveys are also planned in Australia to locate a new site for the Sand Island Baker-Nunn Camera..

FY 69, funds are requested: to modify the other radar sites at Fylingdales, Eglin, Trinidad, and Shemya, including their communications handling facilities; to initiate procurement of long lead time items for a new SPACETRACK center and to procure an optical telescope for the FSR-2 electro-optical sensor if a local research telescope proves inadequate. It is also proposed that in FY 69, as suggested by DDR&E, the RDT&E portions of this element be removed and combined with Laser Radiation Information Acquisition Technology (LARIAT) P.E. 6.34.09.54.4 into a new Program Element No. 6.34.09.XX.X called Space Object Surveillance, Tracking and Identification.

In FY 70-74, a separate system center would be established; new phased array type radars would be deployed at Ascension Island, in the S.W. Pacific, Shemya, the S.W. CONUS, and Diyarbakir; and subject to successful development, there would be deployed, in FY 74, three electro-optical sites in addition to the Cloudcroft site so that two would be in each hemisphere and longitudinally separated to provide optimum hemispheric and night-time coverage. This PCR does not identify all the specific sensor or center locations and characteristics. Accordingly, MCP and investment costs have been estimated on the high side. For example: MCP for the center could be reduced to $1 to $3 million if surplus SAGE, missile silo or other facilities are found; and site locations for the radars could be in areas whose costs would be less than the 2.5 factor used in pricing some elements of this program.

PROPOSED CHANGE SUMMARY: (Continued on next page)

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PROGRAM CHANGE REQUEST (Continued)

PROPOSED CHANGE SUMMARY:	FY 68	FY 69	FY 70	FY 71	FY 72	FY 73
To A (Millions of dollars)	+4.6	+60.9	+147.6	+135.3	+128.0	+64.0
Manpower - Military		+249	+1519	+1519	+1609	+2474
Manpower - Civilian		+46	+94	+94	+117	+159

Name and Title of Principal Action Officer:
BERNARD J. SZCZUTKOWSKI, Lt Colonel

Telephone Number:
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DESCRIPTION OF MISSION AND OBJECTIVES:

The current SPACETRACK System consists of radars originally acquired as prototype for BMEWS or as sensors for the AF Security Service. It also includes optical sensors (Baker-Nunn Cameras) obtained from the Smithsonian Astrophysical Observatory. The system control center is integrated with the CONAD/NORAD Combat Operations Center in the Cheyenne Mountain Complex. The responsibilities of the system are to provide space surveillance which will permit the detection, tracking, identification and cataloging of all man-made objects in space. In an action defense role for CONAD, the system provides the engagement information for the Program 437-Satellite Interceptor System. It also furnishes a wide spectrum of system products, with various accuracies, to CONAD/NORAD, NSA/DIA/USAF intelligence agencies and various DOD/USAF research and development agencies. Specialized satellite information and specific system support are provided NASA manned space flight operations. Improvements are required to permit continued performance of the system's responsibility, to fill specific system gaps, and to correct other operating deficiencies.

2. NATURE OF CHANGE:

A. Approved Program: This program has been approved to include a force of: four radars and five cameras in FY68 and beyond. The fourth radar is the FPS-85 phased array radar at Eglin AFB, Florida, whose development is to be completed in FY68 and the site placed into operational inventory at the same time. A determination to retain, relocate, or close the Moorestown FPS-49 will be made within a year after the FOC (1 April 1968) of the FPS-85. Of the five cameras, three are deployed and one is pending deployment to New Zealand subject to completed inter-governmental agreement. The fifth camera is really an electro optical sensor, the FSR-2, whose development is to be resumed in FY68 and which is anticipated to provide a long range surveillance capability (beyond radar ranges) by 1970. Also, and not reflected as a force addition, there is an R&D program leading toward the design of a system to do Space Object Identification (SOI) in terms of size, shape, motion and mass; and a Class V modification of the Diyarbakir site radar interface and data processing capability.

B. Proposed Change: The SPACETRACK System Program Change Recommendation contains a proposal for assigned sensor modifications/relocations/replacements; combination of this program's research and development with some laser development into a separate program element; and additions to the surveillance and tracking network. The change recommends:

(1) Modifications in FY69 to add expanded doppler filters to Fylingdales Site III, as recommended in the DATOS Report, and to improve extended range capabilities of the FPS-85, communications at Shemya, Trinidad, and Diyarbakir, and automation modifications to Moorestown, in 1970, if it is retained.

(2) Relocations of the Oslo, Norway, and Sand Island, Pacific Ocean Baker-Nunn cameras to Spain and Australia in FY 68-69 and a decentralization of SPACETRACK Center operations out of the NORAD CMC to a separate center (probably in deactivated SAGE sector or missile silos) by 1970.

(3) Replacement of the Shemya and Diyarbakir detection radars during FY 73-74.

(4) Research and Development will be removed from this program element, combined with the Laser Information Acquisition Technology (LARIAT) Program, redesignated as a new advanced development program, and provided a P.E.C. 6.3X.XX.XX.X. The new program will include the Research and Development which will:

(a) Complete the development of an electro-optical (FSR-2) sensor at Cloudcroft, N.M. by FY71, thereby providing a surveillance capability to synchronous altitudes.

(b) Complete the research and development on narrow and wide band radars in order to design and define a ground sensor system which can reasonably determine size, shape, motion and mass of satellites in orbit.

(c) Improve the programmed astrodynamic models and thematics employed in the integrated Space Defense and new center computers.

(d) Determine the system method for improved tracking of satellites to obtain higher accuracy and improved satellite discrimination.

(e) Continue the development of a laser system for precision tracking, ranging and imaging of satellites in orbit.

(5) Addition of sensors which would provide coverage necessary to detect satellite launches that evade current sensors and that could help provide southern hemisphere detections and tracking. These additions include: (1) operational FSR-2 electro optical sensors operational in New Zealand, South America, and Spain by FY74, and (2) phased array type radars for the Central Atlantic in FY72, the South Pacific in FY73, and the SW CONUS in FY74.

3. REASON FOR CHANGE:

A. The accuracy, reliability, and effectiveness of the SPACETRACK System's surveillance capability is the result of how well the system can perform the detection, tracking, satellite discrimination, computational and communications functions. These functions respond to and are uniquely affected by the space environmental workload which the system must process. Past and present workload together with its physical characteristics can be established from existing records and projected with reasonable confidence. These projections can be used to examine the future capabilities and limitations of the current system and to identify future requirements. Accurate evaluation of the current system's capability and its comparison with the projected workload has identified specific limitations which must be eliminated by programmed improvements in order for the system to continue to accomplish the assigned mission. Deferral of the proposed improvements will impact system capability causing degradation and eventually preclude accomplishment of mission functions. Late implementation of the improvements will result in a combination of complex mission compromises and increase future fiscal expenditure needs. Details of the space environment workload and of SPACETRACK System deficiencies, time phased as limitations or saturation factors occur, are contained in Tab 3. A general summation of these limitations and factors is as follows:

(1) Space Environmental Workload:

(a) The total space workload, which is composed of launches, decays, the in-orbit population, and space vehicle explosions, will saturate SPACETRACK System tracking, communications, and computational capacity in various and interacting ways such that certain improvements will be required in early FY70.

(b) The increased foreign space activity projects to more events that will be undetected because of limited coverage, functional and precision performance, and saturation of the existing system's capacity in the FY71 time period.

(2) Detection and Tracking:

(a) The infinite number of launch options available in terms of launch sites, injection maneuvers, inclinations, periods, ranges of apogee/perigee, and on orbit maneuvers have already exceeded system detection capability.

(b) Initial detection is limited to the finite space volume that the system currently surveys:

1. Early orbit detection of foreign launches is currently limited to the Shemya/Diyarbakir detection radars, which were originally sited for coverage of USSR ICBM testing.

2. Shemya and Diyarbakir coverage proved valuable during the early phases of the USSR space program. Recent operational experience indicates that the USSR is opening and expanding the use of operational bases for ICBM/space launches. Plesetsk, the newest and now most active site, has demonstrated the capability to evade existing SPACETRACK detection radars.

3. Other foreign powers (Japan, France, Italy, and the future China) will launch from dispersed hemispheric land masses. Their satellites could escape SPACETRACK System detection for long periods of time (up to two days) if the launch is at or near the equator (up to 25 degrees inclination) where no system detection coverage exists.

(c) The USSR has classically launched deep space probes on inclinations which avoid the coverage of the Shemya/Diyarbakir detection radars, and performed their transfer maneuver from the parking orbit on revolution zero while the vehicle is in the southern hemisphere.

(d) Highly elliptical orbits can escape detection for prolonged periods of time due to the geographical location of sensors and physical characteristics of such an orbit. By choice of inclination and orbital configuration, it is possible to launch in such a manner as to avoid detection by the present system for their initial and subsequent orbits.

(e) Maneuvers that occur cannot normally be detected within one circuit of the satellites new orbits.

(f) Accurate decay and re-entry predictions are precluded by lack of sensor coverage in the last phase of the orbit and due to limited knowledge of various terrestrial, atmospheric and gravitational models.

(g) Due to physical limitations, data processing and computer hardware deficiencies and limited communications capacity, the current SPACETRACK System trackers can produce a maximum of 300 satellites tracks per day. Including the increased capabilities of the AN/FPS-85, the system of trackers will be saturated in late FY72, and will be unable to produce the satellite observational data required to maintain the system data base.

(h) All the assigned SPACETRACK System tracking radars are located entirely in the northern hemisphere, thus providing for observation of approximately half of any of the orbits. While a few cooperative sensors are located so as to provide additional coverage, mission conflicts and functional limitations preclude attainment of the required observational coverage.

(i) The increasing space environmental population will require increased system data base accuracy, resulting in the need for increased orbital coverage, additional numbers of observations, tracking radar equaling or exceeding the data base accuracy needs.

(3) Satellite Discrimination:

(a) At present, there is no means for rapid discrimination between mission vehicles and orbiting debris or decoys.

(b) SPACETRACK sensor discrimination techniques currently depend on the accuracy of orbital elements produced by the System Control Center or other sensors (as a result of new event detections). In the projected space environment, lack of precision in the sensors will preclude dependable discrimination processes. This will raise the system's uncorrelated track reports and increase the computational demands upon the System Control Center. The more reports the more the tasking will increase.

(c) The analysis of signatures for discrimination is rudimentary and subject to human evaluation using manual processes. Inaccuracies can cause application of sensors to objects that are improperly identified as payloads.

(4) Computational Capabilities:

(a) The physical facilities allocated to the Integrated Space Defense Center in the NORAD Cheyenne Mountain Complex cannot provide for all the system operational and technical requirements existing or programmed.

(b) The computational and supporting peripheral equipment available in the NCMC are configured for interchangeable operation of the 425L/496L systems, but do not optimize either, and can comprise both.

(c) Computational efficiency, manpower, economy, and the necessary space system effectiveness and response cannot be achieved in the NCMC due to the lack of adequate buffering at the communications interface (ADR - Automatic Data Relay), the limited capacity of buffers (drums) configured to the Philco 2000 computers, the slow transfer rate of the tape drive storage units, the complete absence of random access high speed mass storage, the lack of space system data analysis displays, and the lack of fully automated computer programs.

(d) Current estimates for the space computational workload in the NCMC and the overflow into Group I facilities at Ent AFB indicate that saturation of four of the five Philco 2000 computers in Colorado Springs will occur in the mid-FY70 time period. This assumes that other overhead jobs would find computing time elsewhere.

(e) Since the NCMC facilities are currently operational for the 425L/496L system and programmed to remain so beyond the FY70 saturation date, a work-around improvement program, if feasible, would be very complex. The integration into the NCMC of data from systems 440L, 474N and, potentially 949, forecasts even greater engineering and computational problems.

(f) The lack of an efficient systems control and .nagement center interacts with other factors to degrade this system's capability.

(g) Computational facilities and software at SPACETRACK System sensors are totally inadequate. The computers allocated are generally different in capability, and deficient in capacity and access; computer software is not standard, is generally not well documented; and is not operationally responsive in terms of timeliness or accuracy.

(h) Reduction and analysis of Space Object Identification data (Radar Signature Analysis) is a time and manpower consuming process; although a valuable mission asset, present manual analysis techniques of raw amplitude strip graphs delays availability of mission data, and the painstaking evaluation process breeds errors. Insufficient computing capacity precludes programming many routine analytical functions.

(5) Communications:

(a) Data production of the SPACETRACK System Sensors will degrade and periodically saturate the allocated communications network in mid-FY 72 time period.

(b) System degradation from single access, lack of error protection, slow speed communications networks will occur in the late FY 69 time period.

(c) Communications interface with the data processing systems at sensor sites is totally lacking. Tape-to-card and other such manual conversion techniques are required to input/output data from the sites.

(d) The communications network links the sensors to the system center, but does not provide efficient and rapid cross-tell between sensors for high priority operational traffic such as is used in foreign launch data transmission. Currently, the system uses orbital elements produced by a dedicated sensor and transmits them through the Colorado Springs complex to other sensors for acquisition "down the orbit."

(e) Processing delays attributed to sensor data processing and high communications error rates compromises system orbit detection and tracking functions.

(f) Allocated circuits within the present SPACETRACK communications network are routed over marginal transmission subsystems within certain tail segments to the remote distant sensor site.

(g) The output of the ADR (Automatic Digital Relay) in the NORAD Cheyenne Mountain Complex (NCMC) cannot operate effectively or efficiently due to the queue time overflow conditions caused by data transmission into a slower speed communication system.

(6) System Accuracies:

(a) The growing satellite population creates the need for increased accuracy in the satellite data base to assure proper discrimination of objects by the sensors, and for correct association of the sensor observations at the System Control Center.

(b) With the overall increase in the space environmental population, the total demands on the system will combine to saturate the trackers, degrade the data base, and commence the trade-off between system functions. Commencing in FY70 with the forecast computational saturation, and continuing through FY72 with the tracker saturation, the system responsibilities will be degraded by excessive false alarms due to unknowns which are actually previously cataloged objects and whose orbital elements require upgrading. In a "snow balling" fashion, the entire scope of the system's functions will gradually degrade until no discrimination and association can be accomplished, and if new objects are detected, they become "lost" almost as soon as they are cataloged. Vehicles of interest will decay without notice, and foreign technology in space will be masked by the system's inability to "keep" track of all objects in space."

(7) System Reliability/Effectiveness:

(a) There is no capability to permit reliable and secure operation of the system when subjected to countermeasures.

(b) Operational availability is limited (90%) due to the lack of adequate equipment redundancy.

(c) There is a lack of near real time display devices at sensors and centers for monitoring and control.

(d) There is no capability to exercise the system to ascertain its effectiveness or for training personnel while concurrently conducting normal operations. Exercises and training can only be obtained by affecting the quality and quantity of data provided to the center or to users.

B. The above outlined system deficiencies suggest the following general system requirements. The primary requirement for the SPACETRACK System through 1970 and beyond is defined in NQR 2-66, approved by the JCS and DOD for planning. If implemented, the system would be integrated with other systems to provide a space surveillance capability which would keep track of all satellites, immediately detect all new foreign space objects and provide processed positional and SOI satellite data to satisfy defense requirements.

(1) The system must provide for early detection, tracking and identification of all space objects launched into earth orbits of 25° 155° inclinations with goals for probability of detection as follows:

(a) Prior to first pass over NORAD/CONAD areas of sponsibility - 99%.

(b) Prior to passage over other unified and specified command areas - 85%.

(c) Prior to completion of first circuit of earth - 90%.

(2) Specific System Requirements by time period are as follows:

ACTIVITY	REQUIREMENTS BY 1970	1970 - 1975
Altitude Coverage	70 nm to 20,000 nm ($1m^2$ target)	70 nm to 20,000 nm ($.1m^2$ target)
Orbit Inclination	25 degrees to 155°	0° to 180°
Detection of Maneuvers	Maneuverable only in orbit plane	Maneuverable in apogee, perigee, inclination, argument of perigee and node.
Weapon Support	$\pm$ 1 nm along track $\pm$ .5 nm across track	$\pm$ .5 nm along track $\pm$ .2 nm across track
taloging Arrival Time	16 seconds *	12.5 seconds (5.7 sec for 99.9% association)*
Inclination Angle	$\pm$ .05 degrees	$\pm$ .05 degrees
Period	$\pm$ .01 second	$\pm$ .005 second
Space Object Identification Capability	Gross physical characteristics, including length, mass and motion about center of mass, shape.	Body motion about center of mass, body configuration electrical properties, mass distribution, gross mission estimate.
System Response Time		
Detection	4 hours after launch or maneuver.	Detection of launch 5 minutes. Refined data 2 hours after launch.

* Note: This specification is explained in Tab 3.

ACTIVITY	REQUIREMENTS BY 1970	1970 - 1975
SOI	12 hours after launch or maneuver. Note: Both with 99% of success.	4 hours after launch or maneuver. Note: Both with 93% probability of success.

C. In general, the proposed requirements arise from the fact that the number of satellites remaining in orbit have increased approximately 33% during the past year with a year end in-orbit figure of about 1100. That, coupled with a continuing high rate of launch, and satellite break-up activity has led to an expanded Space Defense Center workload and an increasing demand for radar tracking time. To cope with the latter, there have been computer program modifications at contributing BMEWS sensors (MIP/SIP) and procedural innovations at SPACETRACK sensors. Additional equipment and software changes as proposed should extend the assigned SPACETRACK radars' capacities and capabilities. However, the ever increasing effort required to keep track of each satellite requires more and more accurate observations, more sophisticated computer programs and ever increasing amounts of computing time. More accurate observations will come from improved sensor calibration serviced by a more efficiently deployed Baker-Nunn system and by increased radar tracking time which cannot be obtained without the required sensor modifications/relocations or without a separate center (See Tab 1) which would provide the necessary computing capacity. While the FPS-85 will be equipped with the basic computer programs to perform fundamental Space Defense Center tasks in the event of a catastrophe, it will not have all the computer time and programs to do the total job (See Tab 2).

D. Modifications begun with FY69 funds requested in this program will, in 1970, eliminate data processing limitations at Shemya and provide BMEWS Site III with a satellite detection capability to fill some northern hemisphere gaps in the system coverage of the zero and number one revolutions. The rationale in making such modifications ahead of new sensor deployment is to fix the assigned system first, and achieve system survivability and better time phasing for later required additions. The SPACETRACK system has some capability to detect launch activity from USSR space ports. However, during the past year, more and more launches have followed non-standard paths or have been launched from new facilities thereby evading the present system's available coverage. The proposed new sensors and replacements consider these limitations.

With FY69 MCP funds, one phased array radar can be deployed and operational in 1972. The preference for a SW Pacific radar in 1972 is foregone because site selection and governmental agreements could not be assured without compromising the coverage that is needed by 1972. Ascension Island was selected as the earlier alternative to he SW Pacific. Its strategic location will, in addition to providing detection coverage and increased environmental workload capacity, provide southern hemispheric arc coverage to improve accuracy of the data base. It will also provide coverage of the USSR re-entry paths through the South Atlantic region.

FY70 MCP funds are required to prepare a site and provide facilities for the SW Pacific Phased Array to be operational in FY73. This sensor will provide corrections to the additional system capacity problems, orbital arc coverage for the ever increasing data base accuracy problem, and vital detection for the current foreign launch problem, particularly the southern launches from the USSR. Located near the antipodal point (southern hemisphere image of the USSR missile launch complex) this sensor could provide a confirmation of the launch warning provided by 440L and 949 (when deployed); determination of orbital or trajectory parameters and contribute data to any ABM system. The 1968 FOB capability granted by the NIE is one case in point.

Replacement of the existing Shemya/Diyarbakir sensors with phased array type radar systems is deferred to later years pending the completion of other survivability modifications and additions to assure the replacement action might not negate site participation in system operation through the critical 69-72 time period. Shemya is selected as the first site for replacement, over Diyarbakir due to the current unstable situation with Turkey over joint use negotiations. This choice would enable consideration of alternative sites for the system should the US position become untenable. Shemya will be upgraded commencing with FY71 MCP funds, to be operational in FY73. The sensor replacement at Shemya as planned would close present coverage gaps and would also provide for the advent of a Communist China space launch program, and to provide missile warning interfaces should a hard ICBM threat surface in the 1974 time period. It would also provide a highly desirable interface with a CONUS deployed ABM system. Diyarbakir is phased one year later, to be operational in FY74.

A SW CONUS Phased Array type radar is required for future system capacity and accuracy, but is deferred to an operational date of FY74 to allow operational and technical evaluation in the context of potential ABM system deployment decisions. Should the concept stabilize, the combination of the SW Pacific and SW CONUS would provide detection and hand-off to a CONUS ABM deployment for the FOB's threat.

Three additional electro-optical sensors will be deployed in the northern and southern hemispheres with FY71 funds, to be operational in FY74. These sensors will increase system coverage on objects currently beyond the range of electronic sensors, and improve data base accuracy. In addition, since more and more satellites are being launched into orbits which extend beyond present radar detection ranges, the SPASUR fence coverage beyond 2,000 nm altitude and up to approximately 6,000 miles will be integrated with the FPS-85; the first FSR-2 electro-optical sensor R&D system, which will be completed by FY71 and will provide the initial one-station optical surveillance capability out to 20,000 NM.

The proposed center would be designed to accept, and possibly control related space satellite surveillance and interceptor systems. The continuing advancements and the improvements in accuracy that will be achieved during this period will continue to permit the system to support manned space flights, to aid in development, testing and employment of advanced sensor systems, to participate in any deployed countermeasures, ABM, or other weapon systems, and to provide satellite/missile identification and discrimination for improved command control.

The SPACETRACK system still has a limited capability to accurately identify each satellite, and the SOI R&D effort is expected to determine the design of a system which would be recommended for the post FY70 period. The sensor design would probably be different from any of the sensors previously discussed and will incorporate a best mix of desirable characteristics identified from the narrow and wide band signature analysis studies performed under the SOI development project.

4. APPROVAL SPECIFICALLY REQUESTED FOR:

A. FY69 modifications to assure continued capability of the system to maintain its responsiveness in a growing satellite environment. These modifications include:

(1)	Communications upgrading from the SDC to Diyarbakir, Shemya, Moorestown and Trinidad	$3.000M
(2)	Shemya radar/data processing interface expansion	$3.500M
(3)	SPACETRACK Center long lead time items	$1.000M
(4)	Site III, Fylingdales, doppler filter expansion	$1.500M
(5)	Optical telescope for the FSR-2 electro-optical sensor	$1.917M

B. Combining the SPACETRACK and LARIAT R&D Programs into a new advanced development program element effective FY69. The new element to be identified as Space Object Surveillance, Identification and Tracking.

C. FY69/70 construction and investment funds to initiate actions for the preparation/construction of the Ascension and system center sites/facilities, and the definition and procurement of the computational radar, and related technical equipment. The necessary planning, engineering and evaluations that are required to define specific locations and characteristics for the proposed center and all sensors will be pursued in context with Phase IV of the NIKE-X operational impact studies -- reference JCS 2012/257-5, dated 12 May 1967, and with the studies for the Integration of Future Continental Defense Systems-- Reference Assistant Secretary of Defense (DDR&E) Memorandum to JCS and the service departments, dated 29 April 1967, and JCS message 5655/181937Z May 1967 to the unified and specified commands.

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EXTRACT

9ODC-A 6 Mar 68

Report of Staff Visit to the Pentagon (9ADD HOI 11-7)

1. Organizations Visited.

a. Space Directorate, DCS/Research and Development.

b. DCS/Plans and Operations.

2. Date: 29 February 1968.

3. Purpose of Visit: Determine significant trends and developments affecting 9ADD operations.

4. Person performing visit: Colonel Robert R. Lochry.

5. Principal persons contacted:

a. Weapon Control Branch (AFXOSN), DCS/P&O.

(1) Lt Col Larry Finn (Spacetrack, P437, Baker-Nunn).

b. Project Development Division (AFRDSC).

(1) Col Raymond R. Nelsen (Division Chief).

(2) Lt Col Richard R. Moore (P922).

(3) Lt Col David Parrish (P949).

(4) Lt Col Tommy Cobb (Spacetrack).

6. The following items of interest were noted:

a.

b. SPACETRACK.

(1)(S) $200,000 Master Plan (U). The Secretary of AF forwarded PCR 67-25 to the Secretary of Defense by memorandum on 25 August 1967. In the memo, he stated that he had asked for a Master Plan to be developed for the evolution of the Spacetrack Sensor System. OSD, in their subsequent PCD of 9 December, in response to our PCR, approved $200K in FY68

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funds for a Spacetrack Master Plan. The PCD deferred further Spacetrack expansion until after the review of the AF and JCS studies. (JCS and Army studies were included in the supplement to the Draft Presential Memorandum, 3 August 1967, and related to integrating the Spacetrack sensors into the Sentinel ABM development.)

(S) Hq USAF has directed AFSC to develop a Spacetrack Master Plan describing the efforts that should be taken over the next several years to improve the surveillance of objects in space (AFRDSC letter, "Spacetrack Master Plan (U)," 2 Feb 68). The plan is needed by 1 July 1968 as an aid in the deliberations on the PCR submission the AF will be making to OSD at that time.

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DOC # 11

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

REPLY TO ATTN OF: 9OCO

2 JAN 1968

SUBJECT: Trip Report (U)

TO: 9CCR

1. (U) Organization visited and authority: HQ USAF, TA-1179, 13 Dec 67.

2. (U) Date: 15 through 18 December 1967.

3. (U) Purpose of visit: To assist ADC and HQ USAF personnel in preparing reclama to a Program Change Decision (PCD) and a Program Budget Decision (PBD) with respect to PCR 67-25 (DOD Nr F-7-038).

4. (U) Principal persons contacted:

Colonel Nelsen	(AFRDSC)
Lt Colonel Hasert	(AFRDSC)
Mr Ward	(AF Budget)
Mr Williams	(AF Budget)

5. (S)(U) Discussion:

a. (U) On 13 Dec 67, 9ODC was contacted by HQ ADC to provide personnel to support the above effort. It was agreed that Majors Finkelstein and Butler would accompany Lt Col Jackson (ADOSD-S) and accomplish the necessary tasks. Since ADC (ADLMD) was OPR for this project, they determined that Majors N. Reed and R. Nottoli would provide the necessary Plans representation. Discussions were held with Colonel Minihan (ADOSD) to plan inputs based on what was then available from the PCD (attachment 1). As a result of this document, Colonel Minihan determined that personnel from 9EDC (Mr Landry and Lt Gutowski) should also attend. Colonel Minihan had further discussions with ADLMD and, as a result, late on 14 Dec 67, it was determined that Colonel K. Coleman and Lt Colonel R. Christy (ADLMD) would round out the party.

b. (S) On the morning of 16 Dec 67, a meeting was held in the Air Force Budget Office with Mr Ward and Mr Williams. Mr Ward indicated that the saturation statements in the original PCR did not clearly state that we would be degrading before 1970. However, after listening to our verbal discussions

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on the subject, he indicated that a strong impact statement should be included in both reclama papers. This was in addition to the information that the SCC would be located in the CMC. He also recommended that we remain in the area on 18 December in order to answer questions which might arise during coordination in the SAF's office.

c. (U) By the evening of 16 Dec 67, a draft working paper had been put together by Lt Col Jackson, Major Reed and Major Finkelstein. (Attachment 2 is the original draft; however, the summary page is not included.) This draft attempted to reclama not only the impact of the deferral decision, but also the possibility of combining SPACETRACK and Sentinel systems.

d. (U) On the morning of 18 December, without reference to the previous night's work, Col Coleman and Lt Col Christy wrote their own version, removing any major reference to the Sentinel system. Also, a version of our work in para 4c, removing that part on Sentinel, was prepared (attachment 3).

e. (S) The team left the Pentagon at approximately 1700 hours that afternoon, after which Lt Col Hasert and Col Nelsen put together their version of the reclama. This reclama (attachment 4) placed all the emphasis on locating the SCC in new facilities within the NCMC. Any strong statement of impact, such as a three-year period to FOC, was not included nor on workload saturation. The Pentagon personnel felt this to be the appropriate position to take and placed their whole position on the strength of the general-level correspondence attached to the PCR. In addition, the cover sheets and recommended memo for the Secretary of Defense was included (attachment 5).

f. (U) Attachment 6 contains two attachments which were to have been included as backup material to the PCR. This paper was developed by 9 Aerosp Def Div personnel and Major Nottoli. It indicates that saturation will occur as predicted in the basic PCR and a comparison of the Nike X radars with SPACETRACK capability. It is not known if this will be submitted as a part of the PCR.

g. (U) At the same time that the PCD reclama was being prepared, a PBD reclama was also in process. An original draft (attachment 7) was prepared. This included comments relating to the Sentinel system. The final version (attachment 8) deletes any reference to the capability of the SPACETRACK system with respect to the Sentinel system.

h. (S) On 18 Dec 67, both pieces of paper began processing through each of the chains of command. However, since the PCD reclama included an additional $3 million for FY 70, it was decided that the papers should be delayed in processing for a week to ten days in order not to confuse the issue. By the end of the day, the PBD reclama had been bundled up with other programs and forwarded to OSD without having formally processed through the Secretary of the Air Force. It was not known at the time what action could be expected or when.

5. (S)(U) Conclusions:

a. (S) Although it is not the intent of the undersigned to quarrel with the responsibilities of the Team Chief, nor the wisdom of Hq USAF personnel in determining what the best piece of paper is to forward through channels, previous experience on the original PCR and other study efforts (e.g., FOBS) indicates that a stronger position could have been stated. Part of the intent was to limit this to a document, 3 pages or less. Within this limitation, some discussion relating to the impact which deferral has, rather than just a restatement of what was already in the original PCR, (and a more thorough discussion of SPACETRACK's relationships to the Sentinel system and how it fits in with our other users) would have provided just as strong a stand as the fact that we could locate the Center in the CMC.

b. (U) The opinion was stated by several people and agreed to by the undersigned that this was only an exercise which the Air Force had to go through and that not much can be expected from it this year.

6. (U) This document is classified SECRET as it reveals the specific aspects of USAF long range plans.

Eugene S Finkelstein
EUGENE S. FINKELSTEIN, Major, USAF
Computer Staff Officer

Dennis L Butler
DENNIS L. BUTLER, Major, USAF
Space Systems Staff Officer

APPROVED:

Tommy Cobb
TOMMY COBB, Lt Colonel, USAF
Director of
Computer Operations and Requirements

APPROVED:

8 Atch
1. PCD SPACETRACK, 5 pgs, (S), w/4 pgs of Manpower and Cost Details, (S)
2. Draft, Description of Mission and Objectives (Original Version), 4 pgs, (S)
3. Draft, Description of Mission and Objectives (Second Version), 2 pgs, (S)
4. PCR FR-7-038 SPACETRACK, 5 pgs, (S), w/3 atch: Gen Reeves to Gen Agan Ltr (S), 12 Dec 67. Atch 2 - Gen Reeves to Gen Martin Ltr (S), 12 Dec 67; Atch 3 - Gen Martin to Gen Reeves Ltr (S), 30 Oct 67
5. DD Form 95 to AFRDS, w/1 atch: AFHQ Form 50, undtd (S), w/1 atch: Proposed Memo for Signature, (S)
6. Backup to PCR which includes: Atch 1 - Computer Utilization (S), w/2 Appendices: Appendix I (S), 4 pgs, Appendix II (S), 1 pg; and Atch 2 - SPACETRACK Sentinel Interface (S), 9 pgs
7. PBD Reclama Nr 118-R (S) (Draft)
8. PBD Reclama Nr 118-R (S) (Final Version)

Cy to: 9EDC

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PROGRAM CHANGE DECISION			PCD NUMBER F-7-038
SUBMITTING DOD COMPONENT DOD-USAF	ISSUE NUMBER	PROGRAM ELEMENT NUMBER(S) 1.24.24.F	Spacetrack

1

ADJUSTMENT REQUESTED

The USAF has proposed changes to the approved Spacetrack program to include the following:

1. Additional funds in FY 1968 for modifications and the purchase of major spares for the FPS-85 radar at Eglin AFB, Florida; site modifications at the Diyarbakir, Turkey radar ; Shemya, Alaska (engineering support changes) and the initiation of a master plan study for the future evolution of Spacetrack.

The RDT&E portion of the Spacetrack element will be removed and, combined with Laser Radiation Information Acquisition Technology (LARIAT) P.E. 6.34.09.54.4, redesignated as a new Program Element No. 6.34.09.59.F, called Space Object Surveillance, Tracking and Identification.

2. FY 1969 funds to modify data processing and communications at existing sites, initiate construction on a new Spacetrack center, begin site preparation and construction for a new phased array radar at Ascension Island, and procure construction and long lead time items for the Spacetrack center.

3. FY 1970 investment funds to procure a tracking telescope for the [illegible] electro-optical sensor at Cloudcroft, New Mexico, and modification funds to complete the upgrading of assigned sensors. Additional funds in FY 70-74 are requested for new phased array radars in the Southwest Pacific Ocean, Shemya, Southeast CONUS, and Diyarbakir, and, if development is successful, deployment of three additional electro-optical sites.

The approved and requested funding and manpower levels for each directly affected element is shown below:

	FY 68	FY 69	FY 70	FY 71	FY 72	FY 73
Spacetrack (124245) (million $)						
Approved TOA	38.141	37.423	34.904	31.395	32.993	-
Proposed TOA	38.318	74.629	110.289	105.514	176.331	119.075
Net Change	+.177	+37.206	+75.386	+74.119	+144.338	+119.075
Manpower-Military						
Approved	750	750	750	750	750	-
Proposed	784	937	1605	1605	1655	1655
Net Change	+34	+187	+855	+855	+905	+1655
Manpower-Civilian						
Approved	36	36	36	36	36	-
Proposed	23	63	74	74	74	74
Net Change	-13	+27	+38	+38	+38	+74

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PROGRAM CHANGE DECISION

PCD NUMBER: P-7-038

SUBMITTING DOD COMPONENT: DOD-USAF | ISSUE NUMBER: | PROGRAM ELEMENT NUMBER(S): 1.24.24.F | Spacetrack

ADJUSTMENT REQUESTED

	FY 68	FY 69	FY 70	FY 71	FY 72	FY 73
LARIAT (6.34.09.54F) (million $)						
Approved TOA	.500	.500	.500	.500	.500	.500
Proposed TOA	-.500	0	0	0	0	0
Net Change	0	-.500	-.500	-.500	-.500	-.500
Manpower	NOT APPLICABLE					
Space Object Surveillance, Tracking, and Identification (6.34.09.55.F) (million $)						
Approved TOA	-	-	-	-	-	-
Proposed TOA	+5.000	+12.000	+11.000	+7.500	+7.500	+7.500
Net Change	+5.000	+12.000	+11.000	+7.500	+7.500	+7.500
Manpower	NOT APPLICABLE					
NORAD-COC(12311F) (Transfers of personnel to Spacetrack) (million $)						
Net Change	-.197	-.203	-.203	-.203	-.203	-.200
Manpower	- 21	- 21	- 21	- 21	- 21	- 22

The net change in manpower levels for Program I Support Program Elements is shown below:

Manpower						
Military	- 11	+ 83	+ 685	+ 685	+ 725	+ 725
Civilian	+ 13	+ 19	+ 56	+ 56	+ 79	+ 85

Evaluation

The detection, tracking, and identification of objects in space is a function needed by an ABM system to prevent the possibility of a false attack warning. Spacetrack sensors to do this job have similar capabilities as those presently planned for the Sentinel ABM System deployment. The command, control and communications functions planned for the Ballistic Missile Defense Center are also similar to that of Spacetrack (and the SPADATS System). For these reasons we have requested the Army and the JCS to study the feasibility and implications of integrating Spacetrack into the Sentinel ABM deployment. (Supplement to the Draft Presidential Memorandum, 3 August 1967).

The number of objects in space which must be identified and catalogued is growing exponentially with time. We cannot continue expanding Spacetrack to account for these large numbers of objects. This PCD requests funds now to begin expansion and modifications to existing sensors and facilities to accept the growing work-load. The Secretary of the Air Force has asked for the development of a master plan for the future evaluation of Spacetrack.

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PROGRAM CHANGE DECISION			PCR NUMBER F-7-038
SUBMITTING DOD COMPONENT DOD-USAF	ISSUE NUMBER	PROGRAM ELEMENT NUMBER(S) 1.24.24.F	Spacetrack

ADJUSTMENT REQUESTED

We should consider the following alternatives:

Alternative 1: Approve the PCR.

Alternative 2: Approve the PCR for FY 68, FY 69, and FY 70 funds but defer future Spacetrack expansion (FY 70-74) until the completion of the Master Plan and the JCS Integrated ABM/Spacetrack studies (Sec. of Air Force position).

Alternative 3: Approve the FY 68, FY 69, and FY 70 funds for modification to existing sensors to handle the increasing space object traffic. Defer decision on a New Spacetrack Center and further expansion until after review of the Air Force and JCS studies. Approve the new program element, Space Object Surveillance Tracking and Identification (P.E. #6.34.09.[illegible].F).

Decision

Alternative 3 is approved. The expansion of Spacetrack sensor network cannot be justified without a logical plan for the future. The need for a new Spacetrack Center cannot be justified until the feasibility of combining Spacetrack and the Sentinel ABM system study is complete.

This decision specifically approves the following funds (all affected elements).

	Approved	Proposed	Change
		($ Millions)	
FY 1968 - Other Procurement, AF			+7.323
Spacetrack Master Plan	-	0.200	(+0.200)
Major Spares for FPS-85	0.721	6.544	(+5.823)
Diyarbakir, FPS-85, Shemya, modifications, and engineering support	2.900	4.200	(+1.300)
FY 1968 RDT&E			
Combining Spacetrack and LARIAT Programs into new Program Element, Space Object Surveillance, Tracking and Identification	8.000	5.500	-2.500

SIGNATURE AND DATE

SD FORM 428

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PROGRAM CHANGE DECISION			PCD NUMBER F-7-038
SUBMITTING DOD COMPONENT DOD-USAF	ISSUE NUMBER	PROGRAM ELEMENT NUMBER(S) 1.24.24.F	Spacetrack

ADJUSTMENT REQUESTED

	Approved	Proposed	Change
	($ Millions)		
FY 1969 - Other Procurement, AF			+7.591
Major Spares for FPS-85	0.100	2.191	(+2.091)
Equipment Modification	-	5.500	(+5.500)
a) Communication Upgrading between Space Defense Center and Diyarbakir, Shemya, and Trinidad	-	(1.000)	(+1.000)
b) Shemya radar/data processing interface expansion	-	(2.000)	(+2.000)
c) Site III, Flyingdales Doppler filter expansion	-	(1.000)	(+1.000)
d) FPS-85 OQTD	-	(1.500)	(+1.500)
FY 1969 RDT&E			
New Program Element (Space Object Surveillance, Tracking, and Identification)	12.000	12.000	-
FY 1970 - Other Procurement, AF			+8.467
Equipment Modification (Complete sensor upgrading)	-	6.550	(+6.550)
Add Optical Telescope to FSR-2	-	1.917	(+1.917)

A summary of the direct financial and manpower implications of this decision, and the addition of FY 73 to the program, is as follows:

	FY 68	FY 69	FY 70	FY 71	FY 72	FY 73
Spacetrack TOA ($ Millions)	+ .2	-3.1	+6.5	-3.6	-4.0	+27.1
LARIAT	0	- .5	- .5	- .5	- .5	- .5
Space Object Surveillance, Tracking & Identification	+5.0	+12.0	+11.0	+7.5	+7.5	+ 7.5
NORAD-COC	- .1	- .2	- .2	- .2	- .2	- .2
TOTAL	+5.1	+ 8.2	+16.8	+3.2	+2.8	+33.9
Manpower Changes (End Strength)						
Spacetrack & NORAD COC:						
Military	- 42	+158	+269	+269	+259	+1009
Civilian	-	- 7	- 4	- 4	+ 15	+ 57

The change in FY 68 is with respect to the 30 June 68 FYDP. This change is in accordance with the AF budget submission in which sources of funds are identified.

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PROGRAM CHANGE DECISION			PCD NUMBER P-7-038
SUBMITTING DOD COMPONENT DOD-USAF	ISSUE NUMBER	PROGRAM ELEMENT NUMBER(S) 1.24.24.F	Spacetrack

ADJUSTMENT REQUESTED

The details of the above manpower changes, and the changes in Program I Support Program Elements are shown in the attached summary of manpower changes.

The change required in USAF Foreign End Strengths as a result of this decision is as follows:

	FY 68	FY 69	FY 70	FY 71	FY 72	FY 73
Spain-Military	-	+ 24	+ 24	+ 24	+ 24	+ 24
All Other (Non SEA Prog. 5)						
- Military	+146	+179	+179	+179	+179	+179
- DHFN	+ 6	+ 6	+ 6	+ 6	+ 6	+ 6

Program/Budget Decisions, if different from the data in this Program Change Decision, override and supersede the data in this Program Change Decision. In addition, Program Change Decisions P-7-066 (RP,AF), P-7-082 (RDT&E, AF), P-7-084 (OP,AF) and P-7-092 (O&M, AF), if different from FY 1968 data in this Program Change Decision, override and supersede the data in this Program Change Decision.

SIGNATURE AND DATE 8 DEC 1967 RHW

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[illegible]

SUMMARY OF PROGRAM MANPOWER CHANGES

		CURRENT FY69	FY 70	FY 7[illegible]	FY 7[illegible]	FY 72	FY 73	FY
TOTAL NET CHANGES ALL ELEMENTS								
END STRENGTH	OFFICER		+23	[illegible]	[illegible]	[illegible]	[illegible]	
	ENLISTED		+225	[illegible]	[illegible]	[illegible]	[illegible]	
	TOTAL MILITARY		+248	[illegible]	[illegible]	[illegible]	[illegible]	
	DIRECT HIRE - U.S.		+19	[illegible]	[illegible]	[illegible]	[illegible]	
	DIRECT HIRE - FOR.		+6	+5	+4	+31	[illegible]	
	CONTRACT FOR.							
	TOTAL CIVILIAN		[illegible]	[illegible]	[illegible]	+227	[illegible]	
FOREIGN END STRENGTH	TOTAL MILITARY							
	TOTAL CIVILIAN							
PRIMARY ELEMENT CODE: 12[illegible]		SPACETRACK						
END STRENGTH	OFFICER	-3	21	8	8	27	215	
	ENLISTED	+31	141	125	142	119	102	
	TOTAL MILITARY	[illegible]	[illegible]	147	147	112	[illegible]	
	DIRECT HIRE - U.S.	-33	-12	-12	-12	-12	+26	
	DIRECT HIRE - FOR.							
	CONTRACT FOR.							
	TOTAL CIVILIAN	-33	-12	-12	-12	-12	+26	
FOREIGN END STRENGTH	TOTAL MILITARY							
	TOTAL CIVILIAN							
OTHER ELEMENT CODE: 125117		NORAD - CCC						
END STRENGTH	OFFICER	-11	-11	-11	-11	-11	-11	
	ENLISTED	-10	-10	-10	-10	-10	-10	
	TOTAL MILITARY	-21	-21	-21	-21	-21	-21	
	DIRECT HIRE - U.S.							
	DIRECT HIRE - FOR.							
	CONTRACT FOR.							
	TOTAL CIVILIAN							
FOREIGN END STRENGTH	TOTAL MILITARY							
	TOTAL CIVILIAN							
OTHER ELEMENT CODE: 12806F		BASE OPERATIONS (DEF)						
END STRENGTH	OFFICER	-1	+4	+1	+1	+1	+1	
	ENLISTED	-28	+69	+120	+120	+110	+110	
	TOTAL MILITARY	-29	+73	+121	+121	+111	+121	
	DIRECT HIRE - U.S.			+2	+2	+21	+22	
	DIRECT HIRE - FOR.		+5	+6	+5	+6	+6	
	CONTRACT FOR.							
	TOTAL CIVILIAN		+6	+8	+8	+27	+33	
FOREIGN END STRENGTH	TOTAL MILITARY							
	TOTAL CIVILIAN							
OTHER ELEMENT CODE: 128937		COMMAND (DEF)						
END STRENGTH	OFFICER	+9	+9	+9	+9	+9	+9	
	ENLISTED	+7	+7	+7	+7	+7	+7	
	TOTAL MILITARY	+16	+16	+16	+16	+16	+16	
	DIRECT HIRE - U.S.	+13	+13	+13	+13	+13	+13	
	DIRECT HIRE - FOR.							
	CONTRACT FOR.							
	TOTAL CIVILIAN	+13	+13	+13	+13	+13	+13	
FOREIGN END STRENGTH	TOTAL MILITARY							
	TOTAL CIVILIAN							

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PROGRAM CHANGE REQUEST
MANPOWER DETAIL

SUBMITTING DOD COMPONENT	[illegible] NO.	PROGRAM ELEMENT NO.
AF		12[illegible]

			CURRENT FY 68	FY 69	FY 70	FY 71	FY 72	FY 73
APPROVED	END STRENGTH	OFFICER	186	186	186	186	186	
		ENLISTED	564	564	564	564	564	
		TOTAL MILITARY	750	750	750	750	750	
		DIRECT HIRE, U.S.	36	36	36	36	36	
		DIRECT HIRE, FOREIGN						
		CONTRACT FOREIGN						
		TOTAL CIVILIAN	36	36	36	36	36	
	MAN YEARS	OFFICER	173	180	187	187	187	
		ENLISTED	465	536	566	566	566	
		TOTAL MILITARY	6[illegible]	716	753	753	753	
		DIRECT HIRE, U.S.	36	36	36	36	36	
		DIRECT HIRE, FOREIGN						
		CONTRACT FOREIGN						
		TOTAL CIVILIAN	36	36	36	36	36	
PROPOSED	END STRENGTH	OFFICER	10[illegible]	~~[illegible]~~ 207	~~[illegible]~~ 119	~~[illegible]~~ 190	[illegible]	[illegible]
		ENLISTED	595	~~[illegible]~~ [illegible]	~~[illegible]~~ [illegible]	~~[illegible]~~ [illegible]	[illegible]	[illegible]
		TOTAL MILITARY	734	~~[illegible]~~ [illegible]	~~[illegible]~~ [illegible]	~~[illegible]~~ [illegible]	[illegible]	[illegible]
		DIRECT HIRE, U.S.	23	~~63~~ 23	~~24~~ 24	~~24~~ 24	~~24~~ 24	~~24~~ 24
		DIRECT HIRE, FOREIGN						
		CONTRACT, FOREIGN						
		TOTAL CIVILIAN	23	~~63~~ 23	~~24~~ 24	~~24~~ 24	~~24~~ 24	~~24~~ 24
	MAN YEARS	OFFICER	175	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~
		ENLISTED	494	~~662~~	[illegible]	~~[illegible]~~	[illegible]	~~[illegible]~~
		TOTAL MILITARY	669	~~864~~	[illegible]	~~[illegible]~~	[illegible]	~~[illegible]~~
		DIRECT HIRE, U.S.	23	~~43~~	~~69~~	~~24~~	~~24~~	~~[illegible]~~
		DIRECT HIRE, FOREIGN						
		CO[illegible]ACT FOREIGN						
		TOTAL CIVILIAN	23	~~43~~	~~69~~	~~24~~	~~24~~	~~24~~
CHANGE	TOTAL P.E. END STRENGTH	MILITARY	+34	~~+287~~ +85	~~[illegible]~~ +148	~~[illegible]~~ +148	~~+905~~ +148	~~[illegible]~~ +[illegible]
		CIVILIAN	-13	~~+27~~ -13	~~+33~~ -12	~~+33~~ -12	~~+33~~ -12	~~[illegible]~~ + 24
	TOTAL P.E. MAN YEARS	MILITARY	+18	~~+245~~	~~+522~~	~~+857~~	~~+889~~	~~[illegible]~~
		CIVILIAN	-13	~~+47~~	~~+33~~	~~+33~~	+33	~~+74~~
	TOTAL CEILING END STRENGTH	MILITARY		See				
		CIVILIAN		Page 2				
	TOTAL FOREIGN END STRENGTH	MILITARY						
		CIVILIAN						

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PROGRAM CHANGE REQUEST COST DETAIL			SUBMITTING DOD COMPONENT: USAF		ISSUE NO. 67-25		PROGRAM ELEMENT NO. 12&247	
30 Jun 67 [illegible]			TOA IN $ THOUSANDS					
			CURRENT FY	FY 69	FY 70	FY 71	FY 72	FY 73
APPROVED	R & D	RDT & E	7500	11500	9500	6000	6000	
		MIL CON						
		TOTAL R & D	7500	11500	9500	6000	6000	
	INV.	PROC OTHER	3621	100	100	100	500	
		PROC						
		PROC						
		MIL CON	750					
		TOTAL INV	4371	100	100	100	500	
	OPER	O & M	20080	[illegible]	[illegible]	18506	18509	
		(Civ Pers)						
		MIL PERS AF	4331	4760	6441	[illegible]	[illegible]	
		PROC OTHER	650	[illegible]	1100	1100	[illegible]	
		PROC						
		RETIREMENT PAY	604	[illegible]	[illegible]	695	[illegible]	
		TOTAL OPER	25270	[illegible]	[illegible]	[illegible]	[illegible]	
		TOTAL APPROVED	38141	37421	[illegible]	31335	[illegible]	
PROPOSED	R & D	RDT & E						
		MIL CON						
		TOTAL R & D						
	INV.	PROC OTHER	10944	7601	[illegible]	[illegible]	[illegible]	[illegible]
		PROC						
		PROC						
		MIL CON AF	730	[illegible]	5620	[illegible]	[illegible]	[illegible]
				7591	13161	[illegible]	[illegible]	
		TOTAL INV	11004	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	OPER	O & M AF	20320	18306	18051	24633	[illegible]	[illegible]
		(Civ Pers)						
		MIL PERS AF	4431	[illegible]	7304	9574	[illegible]	[illegible]
		PROC OTHER	650	1600	1100	1100	[illegible]	9006
		PROC						
		RETIREMENT PAY	623	1012	1015	1733	1731	[illegible]
		TOTAL OPER	26024	28791	[illegible]	37265	46809	35910
		TOTAL PROPOSED	38918	74029	110069	105714	176331	[illegible]
CHANGE	R & D	RDT & E	- 7500	[illegible]	[illegible]	[illegible]	[illegible]	
		MIL CON						
		TOTAL R & D	- 7500	[illegible]	[illegible]	- [illegible]	- [illegible]	
	INV.	PROC OTHER	+ 7323	+ 7501	+ [illegible] + 8471	+ [illegible]	[illegible]	[illegible]
		PROC						
		PROC						
		MIL CON AF		[illegible]	+ 5620	[illegible]	[illegible]	[illegible]
				+ 7591	+ [illegible]	+ 410		
		TOTAL INV	+ 7323	[illegible]	[illegible]	+ [illegible]	[illegible]	[illegible]
	OPER	O & M AF	+ 240	- 100	+ [illegible]	+ [illegible]	[illegible]	+ [illegible]
		(Civ Pers)						
		MIL PERS AF	+ 100	+ [illegible]	+ [illegible]	+ [illegible]	+ [illegible]	+ [illegible]
		PROC OTHER		770	+ [illegible]	+	[illegible]	+ [illegible]
		PROC						
		RETIREMENT PAY	+ 14	+ [illegible]	+ [illegible]	+ [illegible]	+ [illegible]	[illegible]
		TOTAL OPER	+ 354	+ [illegible]	+ [illegible]	+ [illegible]	- [illegible]	+ [illegible]
		TOTAL CHANGE	+ 177	+ 37405	+ [illegible]	+ [illegible]	[illegible]	[illegible]

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		CURRENT FY 68	FY 69	FY	FY 71	FY 72	FY 73	FY
OTHER ELEMENT ICS								
CODE: 81611F								
OPER	MIL PERS, AF		+32	+171	+293	+302	+464	
	TOTAL		+32	+171	+293	+302	+464	
OTHER ELEMENT Household Goods								
CODE: 81612F								
OPER	MIL PERS, AF		+35	+172	+293	+309	+519	
	TOTAL		+35	+172	+293	+309	+519	
OTHER ELEMENT [illegible]								
CODE: 123[illegible]								
OPER	MIL PERS AF	-94	-177	-177	-177	-176	-176	
OPER	RET PAY	-13	-32	-32	-32	-32	-32	
	TOTAL	-107	-209	-209	-209	-208	-208	
OTHER ELEMENT [illegible]								
CODE: 6.34.03.[illegible]								
DEV	RDT&E		-500	-500	-500	-500	-500	
	TOTAL		-500	-500	-500	-500	-500	
OTHER ELEMENT Space Object Surveillance, Tracking and Identification								
CODE: 6.34.03.XX.F								
[illegible]	RDT&E	+5000	+12,000	+11,000	+7500	+7500	+7500	
	TOTAL	+5000	+12,000	+11,000	+7500	+7500	+7500	
OTHER ELEMENT								
CODE:								
	TOTAL							
OTHER ELEMENT								
CODE:								
	TOTAL							

[illegible] AT 12 YEAR INTERVALS; [illegible]
[illegible] DIR. 5200.10

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2

[illegible] OF PROJECT AND [illegible]:

The current SPACETRACK/SPADATS Space Defense Center in the NORAD Cheyenne Mountain Complex (NCMC) integrates SPACETRACK, SPADATS and cooperating sensors (NAVSPASUR, RAF, NASA, etc.) into an integrated world-wide space surveillance capability. This central computational capability provides a wide spectrum of system products to [illegible], [illegible], [illegible]/[illegible], USAF intelligence, DIA, NASA and DOD/USAF space research and development agencies. The Center is depended upon for support by such widely diverse activities as satellite position predictions necessary to the Coast and Geodetic Department for survey purposes, decaying satellite impact prediction for recovery of domestic satellite nuclear energy material and foreign satellite materials for intelligence and manned space flight emergency recovery. The State Department depends upon this system for determinations of ownerships of re-entered satellite materials for international legal purposes. Consequently, it can be recognized that this center represents the hub of national capability for space surveillance. Improvement actions are required now to permit continued responsiveness of this center to the growing national/DOD/USAF requirements for space surveillance products.

NATURE OF CHANGE:

a. Approved Program: With the exception of internal on-going procedural and software improvements, the decision of 10D ... has deferred approved program actions to overcome the foreseeable saturation of computational resources available to the SPACETRACK Center to the point where the

Working Paper

computational saturation problem overtakes possible solution. Specifically, the computers in the NSSC were saturated on 6 Feb 1967 when the center became operational. The center has since been augmented with the two compatible computers in the ADC programming and analysis center. The augmentation computer's capability will be saturated with space related activities (denying their utilization for their primary purposes) in ______. (See Atch 1) Subsequent to this date, requirements will increasingly exceed capabilities with a serious impact on national space related programs.

b. Proposed Change: The SPACETRACK System Program Change Recommendation proposes modification of the present NSSC center capability to provide additional space and computational capability as rapidly as possible.

1. Modification in FY-69 to add modification of the NSSC facility by additional construction in the presently empty caverns, and the provision for long lead time items.

2. Modification in FY-70 to add required computational and peripheral equipment to provide for an IOC in FY-71.

[illegible] FOR CHANGE:

a. The physical facilities allocated to the Integrated Space Defense Center in the NORAD Cheyenne Mountain Complex cannot presently provide for the required data processing and work space.

b. Current estimates for the space computational workload in the NSSC and the augmentation ADPAC facility indicate that all available compatible computational capability will be saturated in ______. (See Atch __)

working paper

this assures that other computational work assigned to the [illegible] facility will find computing time [illegible].

c. The proposed modification of the existing Cheyenne Mountain Complex facility would permit the earliest possible relief of the computational saturation while providing a capability for direct and effective interface with the [illegible] System [illegible] as that system deploys as programmed in the [illegible]. In this regard, the following understanding is necessary. The SPADATRACK Central program (Delta 5) presently utilizes [illegible] words for 150 programs, controlled by a three level executive and operating 10 automatic sequences.

d. Present coordination with the [illegible] indicates that, as specified in the [illegible] Command and Control Plan (Panel 1-6) Volume 5, page 26, the [illegible] will require 28,000 words for 9 programs. Consequently, it would appear that the present SPADATRACK computational system requirement is seventeen times that of the [illegible] and considerations of putting spacetrack programs into a facility designed for [illegible] would not appear feasible. Deferring approval action awaiting study of this program allows the saturation problem itself to become catastrophic in nature. Modifying the [illegible] structure to provide the required center capabilities provides the solution to the saturation problem, and the flexibility of choice of SPADATRACK/[illegible] interface as the Air Force/DOD studies may dictate.

e. Application of this program change will require three years to implement and . . .

Working Paper

This program change request provides for modification of the existing Cheyenne Mountain facility to provide the computational and analytic capability necessary to continue the processing of SPACETRACK (SPADATS) non-cooperative satellite data during the 1970-1975 period.

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3

Description of Mission and Objectives:

The current [illegible] ([illegible]) Space Defense Center in the [illegible] Cheyenne Mountain Complex ([illegible]) integrates world-wide [illegible] and cooperating sensors ([illegible], etc.) into an integrated world-wide space surveillance capability. This central computational capability provides a wide spectrum of system products to [illegible], USAF intelligence, [illegible], [illegible] research and development agencies, manned space flight support, including such timely diverse items as [illegible] position predictions to the [illegible] Department for [illegible] and decaying satellite impact prediction and recovery of [illegible] nuclear energy material and foreign satellite materials for intelligence. The State Department depends upon this system for determination of ownerships of re-entered satellite materials for international legal procedures. This center then represents the hub of national capability for space surveillance. Improvement actions are required now to permit continued responsiveness of this center to the growing national/DOD/[illegible] requirements for space surveillance products.

Nature of Change:

A. Approved Program: With the exception of internal on-going procedural and software improvements, the decision of [illegible] has [illegible] approved program actions to overcome the foreseeable saturation of computational resources available to the [illegible] Center to the point where the problem exceeds possible solution. Specifically, the [illegible] the ISSC were saturated on 6 Feb 1967 when the center became operational. The center has since been augmented with the two compatible computers in the ADC programming and analysis center. The augmentation computer's capability will be completely utilized for space related activities (assuming their utilization for their primary purposes) in ______________________ . (See Atch 1).

B. Proposed Change: The SPACETRACK System Program Change Recommendation proposes modification of the present ISSC center capability to provide additional space and computational capability as rapidly as possible.

Reason for Change:

a. The physical facilities allocated to the Integrated Space Surveillance Center in the NORAD Cheyenne Mountain Complex cannot presently provide for the required data processing and work space.

b. Current estimates for the space computational workload in the ISSC and the augmentation ADPAC facility indicate that all available compatible computational capability will be saturated in ______________ (See Atch ___). This assumes that other computational work assigned to the ADPAC facility will find computing time elsewhere.

c. The proposed modification of the existing Cheyenne Mountain facility would permit the earliest possible relief of the computational saturation while providing a capability for direct and [illegible] with the [illegible] System [illegible] as that System [illegible] with.

SECRET

PROGRAM CHANGE REQUEST	PROGRAM CHANGE REQUEST NUMBER: FR-7-038		
DOD PROGRAM ELEMENT TITLE: SPACETRACK	ISSUE NUMBER:		
SUBMITTING DOD COMPONENT: USAF	PROGRAM ELEMENT NUMBER(S): 1	24	24 F

SUMMARY

This Program Change Request Reclama is in response to Program Change Decision F-7-038. The original PCR requested a new separate Space Center. Subsequent to this Program Change Decision dated 9 Dec 1967, CINCNORAD, on 12 Dec 1967, made space within the hardened Cheyenne Mountain Complex available to accommodate the urgently needed computational facility.

This reclama provides for modifying and expanding the present SPACETRACK computational facilities. Specifically, it requests approval of $3 million MCP funds for FY-69 to rehabilitate existing vacant chambers within the Cheyenne Mountain Complex to house the computational facility expansion. It also requests FY-70 MCP funds ($3 million), and FY-70 Other Procurement and Investment funds ($17 million), to complete the expansion. Inasmuch as this is a most recent decision, to move into the NORAD Cheyenne Mountain Complex rather than to a separate new remote Space Center, it is expected that subsequent detailed analysis of manpower and communication requirements will yield a future offset in operating savings. The need for an expanded computational complex is as urgent now as when originally proposed in SPACETRACK PCR F-7-038. This PCR established that the existing computational capability would be saturated in 1970, and system operational capabilities and mission performance would become seriously degraded.

The physical facilities allocated to the integrated Space Defense Center in the NORAD Cheyenne Mountain Complex are not now adequately providing for minimal essential data processing. The proposed modification of the existing Cheyenne Mountain Complex facility would permit relief of computational saturation. This would provide a survivable capability for direct and effective interface with the ABM Sentinel System BMDC as suggested in the PCD.

Approval of this request will not obviate implementation of on-going study efforts nor any future interface of the SPACETRACK and Sentinel Systems.

GROUP 3
Downgraded at 3 year intervals;
Declassified after 12 years

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(If more space is needed use plain paper and add "page 2 of ____" etc.)

PROPOSED CHANGE SUMMARY	FY 68	FY 69	FY 70	FY 71	FY 72	FY 73
TOA (Millions of dollars)	+5179	+11399	+32319	+7411	+7016	+40074
MANPOWER - MILITARY	+ 34	+ 85	+ 753	+ 753	+ 753	+ 1503
MANPOWER - CIVILIAN	- 13	- 13	- 2	- 2	- 2	+ 31

TYPED NAME AND TITLE OF PRINCIPAL ACTION OFFICER	TELEPHONE NUMBER
Charles Hasert, Lt Colonel	52864
SUBMITTING DOD COMPONENT SIGNATURE	DATE SIGNED

DD FORM 1 JUL 66 1570 REPLACES DD FORMS 1333 AND 1333-4 WHICH ARE OBSOLETE.

Page 1 of ___ Pages

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PROGRAM CHANGE REQUEST
COST DETAIL

SUBMITTING DOD COMPONENT | ISSUE NO. | PROGRAM ELEMENT NO.

TOA IN $ THOUSANDS

			CURRENT FY	FY 69	FY 70	FY 71	FY 72	FY 73
APPROVED	R & D	RDT & E	7500	11500	9500	6000	6000	
		MIL CON						
		TOTAL R & D	7500	11500	9500	6000	6000	
	INV.	PROC Other	3621	100	100	100	500	
		PROC						
		PROC						
		MIL CON	750					
		TOTAL INV	4371	100	100	100	500	
	OPER	O & M	20660	18404	18366	18366	18560	
		(Civ Pers)						
		MIL PERS	4331	4760	4941	4936	4930	
		PROC Other	650	1800	1100	1100	1100	
		PROC						
		Retirement Pay	603	859	856	893	894	
		TOTAL OPER						
	TOTAL APPROVED							
PROPOSED	R & D	RDT & E						
		MIL CON						
		TOTAL R & D						
	INV.	PROC Other	10944	7691	25567	500	500	500
		PROC						
		PROC						
		MIL CON	750	3000	3000			
		TOTAL INV	11694	10691	28567	500	500	500
	OPER	O & M	20920	18304	18931	18931	19134	19134
		(Civ Pers)						
		MIL PERS	4431	5530	8092	9643	9643	9643
		PROC Other	650	1800	1100	1100	1100	1100
		PROC						
		Retirement Pay	623	997	1597	2197	2197	2197
		TOTAL OPER	26624	26631	29720	31871	32074	32074
	TOTAL PROPOSED		38318	37322	58280	32371	32574	32574
CHANGE	R & D	RDT & E	-7500	-11500	-9500	-6000	-6000	
		MIL CON						
		TOTAL R & D	-7500	-11500	-9500	-6000	-6000	
	INV.	PROC Other	+7323	+7591	+24467	+400		+500
		PROC						
		PROC						
		MIL CON		+3000	+3000			
		TOTAL INV	+7323	+10591	+27467	+400		+500
	OPER	O & M	+240	-100				+19134
		(Civ Pers)						
		MIL PERS	+100	+770	+3151	+4707	+4713	+9643
		PROC Other						+1100
		PROC						
		Retirement Pay	+14	+138	+701	+1304	+1303	+2197
		TOTAL OPER	+354	+808	+3852	+6011	+6016	+32074
	TOTAL CHANGE		+177	-101	+21819	+411	+16	+32574

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SUMMARY OF PROPOSED COST CHANGES (TOA $ Thousands)

		PRIOR YEARS	CURRENT FY 68	FY 69	FY 70	FY 71	FY 72	FY 73	FY
TOTAL NET CHANGE - ALL ELEMENTS									
R&D	RDT&E		-2500		+ 1000	+1000	+1000	+ 7500	
Inv	Proc Other		+7323	+ 7591	+24467	+ 400		+ 500	
Inv	Mil Con			+ 3000	+ 3000				
Oper	O&M		+ 240	- 100				+19134	
Oper	Mil Pers		+ 100	+ 770	+ 3151	+4707	+4713	+ 9643	
Oper	Proc Other							+ 1100	
Oper	Ret Pay		+ 14	+ 138	+ 701	+1304	+1303	+ 2197	
	TOTAL		+5179	+11399	+32319	+7411	+7016	+40074	
PRIMARY ELEMENT SPACETRACK									
CODE: 1.24.24.F									
COST CAT.	APPROPRIATION								
R&D	RDT&E		-7500	-11500	- 9500	-6000	-6000		
Inv	Proc Other		+7323	+ 7591	+24467	+ 400		+ 500	
Inv	Mil Con			+ 3000	+ 3000				
Oper	O&M		+ 240	- 100				+19134	
Oper	Mil Pers		+ 100	+ 770	+ 3151	+4707	+4713	+ 9643	
Oper	Proc Other							+1100	
Oper	Ret Pay		+ 14	+ 138	+ 701	+1304	+1303	+2197	
	TOTAL								
OTHER ELEMENT SPACE OBJECT SURVEILLANCE, TRACKING, AND IDENTIFICATION									
CODE: 6.34.09.55.F									
COST CAT.	APPROPRIATION								
R&D	RDT&E		+5000	+12000	+11000	+7500	+7500	+7500	
	TOTAL								
OTHER ELEMENT LARIAT									
CODE: 6.34.09.54.F									
COST CAT.	APPROPRIATION								
R&D	RDT&E			- 500	- 500	- 500	- 500	- 500	
	TOTAL								
OTHER ELEMENT									
CODE:									
COST CAT.	APPROPRIATION								
	TOTAL								

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PROGRAM CHANGE REQUEST MANPOWER DETAIL			SUBMITTING DOD COMPONENT: USAF		ISSUE NO.	PROGRAM ELEMENT NO.: 1.24.24.F	
			CURRENT FY 68	BY 69	FY 70	FY 71	FY 72	FY 73
APPROVED	END STRENGTH	OFFICER	186	186	186	186	186	
		ENLISTED	564	564	564	564	564	
		TOTAL MILITARY	750	750	750	750	750	
		DIRECT HIRE: U.S.	36	36	36	36	36	
		DIRECT HIRE: FOREIGN						
		CONTRACT FOREIGN						
		TOTAL CIVILIAN	36	36	36	36	36	
	MAN YEARS	OFFICER	173	180	187	187	187	
		ENLISTED	468	536	566	566	566	
		TOTAL MILITARY	641	716	753	753	753	
		DIRECT HIRE: U.S.	36	36	36	36	36	
		DIRECT HIRE: FOREIGN						
		CONTRACT FOREIGN						
		TOTAL CIVILIAN	36	36	36	36	36	
PROPOSED	END STRENGTH	OFFICER	189	207	249	249	270	[illegible]
		ENLISTED	595	628	1254	1254	1233	[illegible]
		TOTAL MILITARY	784	835	1503	1503	1503	1503
		DIRECT HIRE: U.S.	23	23	34	34	34	34
		DIRECT HIRE: FOREIGN						
		CONTRACT: FOREIGN						
		TOTAL CIVILIAN	23	23	34	34	34	34
	MAN YEARS	OFFICER	175	198	223	249	259	270
		ENLISTED	484	561	870	1256	1256	1256
		TOTAL MILITARY	659	759	1093	1505	1515	1526
		DIRECT HIRE: U.S.	23	23	28	34	34	34
		DIRECT HIRE: FOREIGN						
		CONTRACT FOREIGN						
		TOTAL CIVILIAN	23	23	28	34	34	34
CHANGE	TOTAL P.E. END STRENGTH	MILITARY	+ 34	+ 85	+753	+753	+753	+1503
		CIVILIAN	- 13	- 13	- 2	- 2	- 2	+ 34
	TOTAL P.E. MAN YEARS	MILITARY	+ 18	+ 43	+527	+752	+762	+1526
		CIVILIAN	- 13	- 13	- 6	- 2	- 2	+ 34
	TOTAL CEILING END STRENGTH	MILITARY						
		CIVILIAN						
	TOTAL FOREIGN END STRENGTH	MILITARY						
		CIVILIAN						

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FORCES (Designate Force Unit):

	CURRENT FY 67	FY 68	FY 69	FY 70	FY 71	FY 72	FY 73	FY 74	FY	FY
APPROVED	7	9	9	9	9	9				
PROPOSED	6	8	8	10	10	11	11			
CHANGE	-1	-1	-1	-1	-1	-2	-11			

APPROVED MAJOR ITEM PROCUREMENT/ACCEPTANCE OBJECTIVES (Designate Item):

	PRIOR PROC.	CURRENT FY 67	FY 68	FY 69	FY 70	FY 71	FY 72	FY 73	BALANCE	TOTALS
AUTH PROCUREMENT	FY65		1		1				0	2
ACCEPTANCE										

PROPOSED PROCUREMENT/ACCEPTANCE OBJECTIVES

FISCAL YEAR PROGRAM	ACCEPTANCE FY									
	PRIOR YEARS	CURRENT FY 67	FY 68	FY 69	FY 70	FY 71	FY 72	FY 73	BALANCE	TOTALS
PRIOR 65			1[1]						3	4
CURRENT 68					1[2]				2	3
FY 69									2	2
FY 70					1[3]				0	1
FY 71										
FY 72										
FY 73										
BALANCE			3		1	1	0			
TOTALS			4		3	3	2			

REMARKS

1. The approved force structure is composed of radars, cameras and electro-optical sensors. Some of which have not been placed in the field. Attachment 1 reflects a detailed breakdown of the approved and proposed force with appropriate explanatory footnotes.

Footnotes:
1. FPS-85 Eglin, Florida
2. FSR-2 Cloudcroft, New Mexico
3. SPACETRACK Center (U.S.)

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1 2 DEC 1967

Lieutenant General Arthur C. Agan, Jr.
Commander, USAF Air Defense Command
Ent Air Force Base, Colorado 80912

Dear Sailor:

(S) In following up our discussions on the Space Computational Center (SCC), recent studies by my staff have indicated that construction in the three vacant chambers would yield from 41,000 square feet to 54,000 square feet of additional floor space in the Cheyenne Mountain Complex depending upon whether each building contains three stories or four stories. Thirty-five to forty thousand square feet of this space could be made available for the SCC or other uses.

(S) It would appear that floor space requirements for the SCC could be considerably reduced by location within the COC. It is recognized that facility construction costs would be higher than those presented in PCR 67-25. However, in comparing total costs, including establishment of new communications and relocation of existing facilities, the Cheyenne Mountain Complex option may still compare favorably. In any event it would provide a hardened facility which I consider highly desirable.

(U) I would appreciate your views on this matter at your earliest convenience. My staff is prepared to assist in the further development of such details as may be necessary and will continue to work with your staff on identification of SCC functions.

retyped/jcd/17 Dec 67

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(U) A copy of General Martin's 30 October 1967 letter and my reply outlining actions taken and required on this matter are attached for your information.

Sincerely,

SIGNED

R. J. REEVES
General, USAF
Commander-in-Chief

2 Atch
1. Ltr fr Lt Gen Martin 30 Oct 67 to Gen Reeves (S)
2. Gen Reeves' Reply (S)

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12 December 1967

Lieutenant General Glen W. Martin
DCS/Plans and Operations
Headquarters United States Air Force
Washington, D. C. 20330

Dear Glen:

(S) I appreciate the background and status of Air Staff actions on the Space Computational Center provided in your letter of 30 October 1967. In particular, I fully endorse your comments on use of the NCMC physical space, if available, for accommodating the Space Computational Center (SCC).

(S) Recent studies by my staff have established that substantial additional floor space can be provided in the NCMC by additional construction in the existing chambers. This construction will provide 41,000 to 54,000 square feet of space, depending on whether the new buildings contain three stories or four stories. Thirty-five to forty thousand square feet of this space is currently uncommitted. Considering common use of facilities such as support, computer and communications, I anticipate the space requirement for the SCC in the NCMC could be substantially reduced from the total 77,000 square feet estimated for a self-supporting external facility.

(S) I have advised General Agan of the availability of NCMC space for the SCC and have asked him to re-examine the requirement for a space data processing facility accommodated within the NORAD Cheyenne Mountain Complex.

retyped jed/17 Dec 67

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(U) Your continued interest and particiation in this matter will be most welcome.

Sincerely,

SIGNED

R. J. REEVES
General, USAF
Commander-in-Chief

Copy furnished:
Lt Gen A. C. Agan,
Cmdr, ADC

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30 October 1967

General Raymond J. Reeves
Commander, Continental Air Defense Command

Dear Bunky

In response to your comments expressing concern about the Air Force efforts to obtain a remote data processing facility for space related workloads associated with SPACETRACK, I would like to review the background Air Staff actions related to this problem.

Within the annual review of the Command, Control, and Communications Programs, the Air Defense Command proposed remote SPACETRACK Center was considered. The Air Defense and Command, Control, and Communications Panels recommended submission of a Program Change Request (PCR).

Secretary Brown approved the PCR on 25 August 1967, but noted in his memorandum to the Secretary of Defense that he had requested an amendment to the PCR requiring modification of an existing facility for the ADC data processing function rather than construction of a new complex.

The need for maintaining system integrity by the Air Force and the currently overcrowded conditions in the Cheyenne Mountain Complex have prompted the concept of a remote space system center. If physical space can be provided within the Cheyenne Mountain, it would be prudent to use it. By the first of the year, when ADC is able to identify a site location, the question of whether the additional facilities should be housed within the CMC or in a remote location can be resolved.

retyped/jed/17 Dec 67

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I am sure that this program if approved, can be the first real contribution to the current need for providing future space surveillance systems that are responsive to the military defensive posture of the United States.

Sincerely

SIGNED

Glen W. Martin
Lieutenant General, USAF
DCS/Plans and Operations

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MEMO ROUTING SLIP — Never Use for Approvals, Disapprovals, Concurrences, or Similar Actions

		ACTION
1 TO AFRDS (Gen Hedrick)	INITIALS	CIRCULATE
	DATE	COORDINATION
2		
		INFORMATION
3		NOTE AND RETURN
		PER CONVERSATION
4		SEE ME
		SIGNATURE

0730/18 Dec 67

REMARKS

1. (S) The attached is a Program Change Request (PCR) Reclama on SPACETRACK. The initial PCR was reviewed by OSD on 9 Dec and a Program Change Decision was rendered. The PCD approved our submission with the following exceptions:

a. Defers decision on a new SPACETRACK center and further expansion of sensors.

b. Disapproved-$3M for FY 69 for SPACETRACK center expansion.

c. Disapproved-$37M FY 69 for new Ascension phased array radar.

2. (S) We are going back for $3M for expansion of the existing data handling facility within the Cheyenne Mountain Complex.

Gp-1

FROM	DATE
AFRDSC (Col Nelsen)	PHONE 53700

DD FORM 1 OCT 61 95

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5

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DEPARTMENT OF THE AIR FORCE AIR STAFF SUMMARY SHEET

	TO	ACTION	SIGNATURE (Surname and Grade)		TO	ACTION	SIGNATURE (Surname and Grade)
1				6			
2				7			
3				8			
4				9			
5				10			

SURNAME OF ACTION OFFICER AND GRADE	SYMBOL	PHONE	TYPIST'S INIT.	SUSPENSE DATE
LtCol Charles Hasort	AFRDSC	52664	htg	

SUBJECT	DATE
PCR RF-7-038 for P.E. 1.24.24.F (SPACETRACK) (U)	

SUMMARY

1. (S) The initial PCR on SPACETRACK was forwarded to the Secretary of Defense by your office on 25 Aug 1967. OSD responded on 9 Dec 1967 with a Program Change Decision (PCD) (Atch 2). This PCD approved FY-68, FY-69 and FY-70 funds for modification of existing sensors but deferred decision on a new SPACETRACK Center and further expansion of SPACETRACK as directed in the Supplement to the Draft Presidential Memo, 3 Aug 1967. These studies will address possible sharing of data facilities by the SPACETRACK and Sentinel Systems. The PCD specifically did not approve $37 million FY-69 MCP funds for a new phased array radar for Ascension Island nor $3 million FY-69 MCP funds for modification of an existing complex to accommodate increasing data handling requirements.

2. cut (S) Program Budget Decision No. 118 on FY-69 MCP for SPACETRACK cut the FY-69 program for the same amount. In a separate action, AFOAP is processing a reclama on Program Change Decision 118-R for $3 million FY-69 MCP funds for the SPACETRACK data processing facility in the Cheyenne Mountain Complex (Atch 3).

3. (S) The basis for the attached reclama action is a recent ADC-NORAD agreement on placing the data processing facility, in the hardened environment at Cheyenne Mountain, i.e., CINCNORAD and Commander ADC, are in agreement on situating the Space Computational Center in the Cheyenne Mountain Complex in vacant chambers now available for such use (Atch 4, 5 and 6). The reclama in the attached PCR is intended to cover construction costs within the Mountain Complex beginning in FY-69, and also to provide for MCP, equipment, and operating costs of the Space Computational facility in the out-years.

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GROUP 4

AF HQ FORM 60 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

D32747

4. (U) These funds are vitally needed in FY-69 for expanding the data facility-otherwise the data processing will become saturated by 1970 degrading system capability.

RECOMMENDATION

5. (U) Recommend that the attached Memo for SecDef and PCR RF-7-038 be signed.

6 Atch
1. Proposed Memo for Sig, w/1 Atch: PCR RF-7-038 (S)
2. PCD SPACETRACK, 9 Dec 67 (S)
3. PCD Proposed Hoolama #118-R (S)
4. Ltr from Gen Reeves to Gen Agan, 12 Dec 67 (S)
5. Ltr from Gen Reeves to Gen Martin, 12 Dec 67 (S)
6. Ltr from Gen Martin to Gen Reeves, 30 Oct 67 (S)

DEPARTMENT OF THE AIR FORCE
WASHINGTON 20330

OFFICE OF THE SECRETARY

MEMORANDUM FOR THE SECRETARY OF DEFENSE

SUBJECT: PCR BF 7-038 for Program Element 1.24.24F
SPACETRACK

The attached PCR for SPACETRACK is a reclama to Program Change Decision (PCD) F-7-038 on the SPACETRACK Program. We have carefully studied the PCD on SPACETRACK and have determined that the system can accommodate the reductions and deferments which you have directed with some exceptions. We feel that the data handling capacity of SPACETRACK must be maintained at a sufficient level to accommodate the growth of space surveillance tasks.

On December 12, 1967, CINCNORAD made approximately 45,000 square feet of hardened space available within the Cheyenne Mountain Complex. We feel that use of this space is necessary and appropriate for this purpose. In order to do this, $3 million FY 69 MCP funds is needed for enlargement of existing data handling facility within the Cheyenne Mountain Complex. The attached PCR is our reclama for this

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amount. Deferring this construction until FY 70 or beyond, will seriously jeopardize the functional capacities of the SPACETRACK system and its role with the Army Sentinel ABM deployment.

~~1 Attachment~~
~~PCR-RF-7-038~~

cc: Deputy Secretary of Defense

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ATTACHMENT 1

COMPUTER UTILIZATION

As stated in Paragraph J, Section F, page 70 of PCR F-7-033, the computers available in the NCMC/Ent Complex, will become fully utilized by January 1969. (See Appendix 1). To bear out this fact, during the five-month period, March through July 1967, an average of 671 hours per month was used in the AIPAC facility, in addition to full utilization of the three NCMC computers. During the four month period, August through November 1967, this average increased to 1120 hours. This is total hours and includes other than SPACETRACK mission requirements. Based on these figures, the estimate that all five computers will be fully utilized prior to 1 January 1969 is still valid. In March 1968, a drum subsystem will be installed in the AIPAC facility. This will permit more efficient use of the computer system and some additional computer time will be realized. This computer time is considered vital to the SPACETRACK System in order to accommodate the projected increased workload.

PCR F-7-033 states that support activities will require curtailment after 1 January 1969. Of the five computers, four are required to perform the operational mission and maintenance of the SPACETRACK System. This projection is shown in Appendix 2. Since the system cannot long exist without training, this activity (although minimal) must be considered in the operational category. There will be no time available at this point for system management or program development.

The Air Defense Command has investigated the availability of additional space in the AIPAC facility or the feasibility of renting additional compatible computers or computer time. It was found that:

a. Space for additional computers does not exist in the AIPAC facility and construction of such space would be cost prohibitive for interim measures.

b. There are no Philco 2000/212 computers available for leasing. A minimum order of two would be required for cost effectiveness if it was desired to purchase the computers.

c. Rental of another type computer is not feasible. The current system is coded approximately 85% in machine oriented language. The remaining 15% cannot be transferred independently from the 85%, since the latter includes the astrodynamic modules and other mathematical processes. In order to transfer the entire system, it would be necessary to institute a massive and costly translation project to either a standard procedure oriented language or a new machine-oriented assembler language.

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Decentralizing some of the processing to the sensor sites may be possible in the mid to late 1970's when the sensors have been deployed as shown in PCR F-7-038. Present capabilities or those modifications approved in PCD #F-7-038 do not permit decentralization. Planning for decentralization is not feasible until completion and disposition of the Space Surveillance Master Plan.

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APPENDIX I

As of 1 Dec 67, a total of 397 hours per month of unused Philco 2000 computer time exists in the Colorado Springs area. The known programmed increases over the next 18 months by other than SPACETRACK functions (NORAD/ADC program development, training) is 72 hours, leaving 325 hours for expansion of the SPACETRACK function. Operational data has shown that each additional satellite requires approximately .6 hours of computer time per month. This gives a growth potential of approximately 542 satellites until the 325 hours will be utilized and the computer complex saturated. Referencing USAF PCR 67-25, Section A, page 35, the resident population is expected to reach the saturation figure of 1822 satellites in late 1968 or early 1969. At this future point, Space Defense operation will become seriously degraded as program development, system management and other selected tasks become affected.

By Jan 1970, other functions will be reduced approximately 240 hours of computer time.

By July 1970, this reduction in computer time must reach the vicinity of 600 hours. At this time all NORAD/ADC program development must be terminated and training will be seriously curtailed.

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FACT/ASSUMPTION

FACTS

1. That NORAD (425) and SPACETRACT will each continue to require one computer on line 24 hours per day in NCMC.

2. That program development for improvements in the operational system will continue to be performed at Colorado Springs.

ASSUMPTIONS

1. That the Philco computers will continue to perform as demonstrated over the past nine months.

2. That increased satellite orbital element accuracy requirements and the FPS-85 integration workload will be offset by operational improvements to the existing computer software.

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Fig #1

NCMC COMPUTER UTILIZATION
(Group III)
MAR 67 - NOV 67

1. 3 Philco 212 Computers (Gov't owned)
2. 720 hours/month/computer
3. 720 hours dedicated on-line to 496L
4. 720 hours dedicated on-line to 425L
5. 720 hours shared by 496L and 425L (off-line)

Computer #1

24 hrs/day

496L

Computer #2

24 hrs/day

425L

Computer #3

720 hrs/month

Utilization of 3rd Computer:

1.	Scheduled Maintenance	211 hours
2.	Unscheduled Maintenance	47 "
3.	Equipment Testing & Checkout	33 "
4.	Blue-suit Training	163 "
5.	ADC/NORAD Program Development	248 "
6.	Other (idle time, operator error, job setup, tape cleaning)	18 "
		720 hours

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.ig #2

GROUP I (ENT COMPLEX)

1. 2 Philco 212 Computers (1 Gov't owned - 1 leased)

2. 720 hours/month/computer

COMPUTER UTILIZATION (ESTIMATE)

	Mar 67-Nov 67 Comp #1 (owned)	Comp #2 (Leased)	Comp #2 (Dec 67-Jun 68)	Comp #2 (Jul 68-Dec 68)
a) Scheduled Maintenance	60 hrs	60 hrs	60 hrs	60 hrs
b) Unscheduled Maintenance	15	15	15	15
c) ADC/NORAD Program Develop.	350	--	25	40
d) SPACETRACK Support	225	122	362	455
e) AEROSPACE Support to ADC	10	--	12	14
f) Blue-suit Training	--	66	73	76
g) Other (Idle time, operator error, Job setup, tape cleaning)	60	60	60	60
	*720 hrs	323 hrs	607 hrs	720 hrs
		720	720	720
		-323	-607	-720
		**397 hrs	113 hrs	0 hrs
		30Nov67	30Jun68	31Dec68

* Comp #1 is presently saturated

** Computer time available per month

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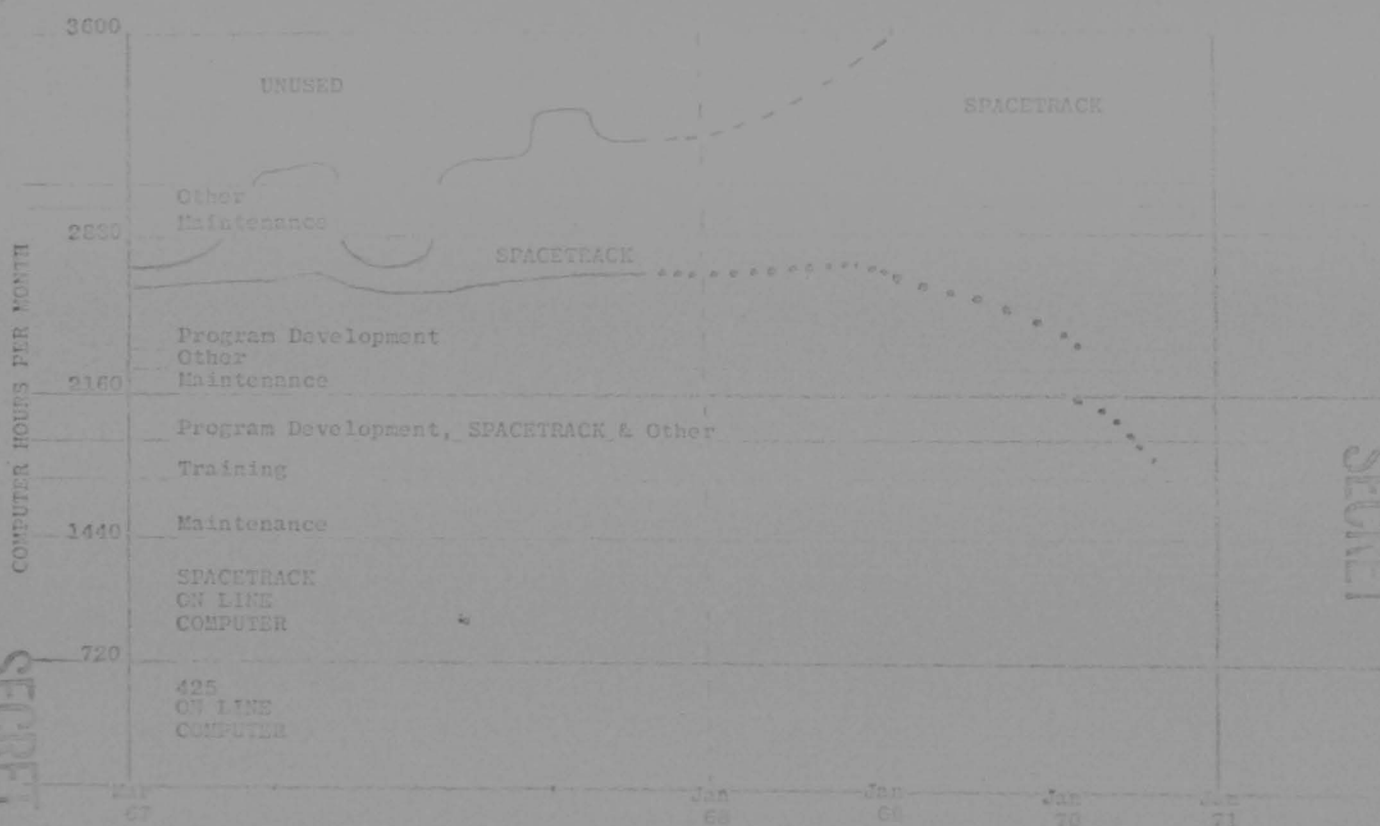
APPENDIX II



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ATTACHMENT 2

<u>SPACETRACK - SENTINEL INTERFACE</u>

Prior to the DOD decision to deploy the 1-67 configuration of the Sentinel ABM system, a preliminary study was made by ADC to determine the possible benefits which might be gained from mutual data sharing between SPACETRACK and the NIKE-X 2-67 configuration. A summary of established facts is given below.

The specified range of the Sentinel radars, PAR=6200 Km on 1M^2 target, TACMAR=2300 Km on 1M^2 target, and MSR=695 Km on 1M^2 target, indicates that the PARs should be able to observe satellites in altitude classes I, II and III throughout their range of perigee and apogee (See page 26, USAF FCR 67-25 for a discussion of classes), but would be capable of observing satellites in classes IV, V and VI only if the satellites were at or near perigee as they passed through the coverage, and they would never observe class VII and VIII satellites. The TACMARs should be capable of observing satellites in class I almost throughout the range of apogee and perigee, classes II, IV and V only when the perigee portion of the orbit occurs in the volume of radar surveillance and classes III, VI, VII and VIII would never be observed. The MSRs have too short a range capability to provide useful data.

The percentage of resident population in a given class that penetrates the coverage capability of an individual radar becomes primarily a function of the sensor latitude in relationship to the distribution of satellite inclinations within that class (See attached tables).

Due to the overall siting locations and characteristics of the Sentinel PAR equipment (2-67), 6% of the catalogued earth orbiting satellites will never be detected.

<u>What S/T can furnish Sentinel</u>

a. 1. S/T Elements

(a) Mean

(b) Osculating

2. Ephemerides

3. Pointing Angles

b. Trajectory Data (i.e., BMEWS, 440L, 949)

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c. Sensor Elements (See Table 3)

d. Decay Prediction Data

e. Other

1. Satellite Bulletins

2. Position Situation Report

3. SOI Sum

4. Information File

5. Satellite Catalogue

6. Nominal Acquisition Range

7. INCPR (Listing of satellite by inclination increments and by orbital period within inclinations)

8. SIGPR (Listing of satellite by peak and average radar cross-section and by object rotation within cross-section listing)

9. HANSA (Inventory of Element sets currently contained in the Element file)

10. COMBO (Relative orbit computation)

11. TRAIL (Ephemeris of the type)

(a) Position and Velocity

(b) Osculating Elements

(c) Satellite ground trace, generated at evenly spaced time intervals of a specified period.

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TABLE 1

SATELLITE DISTRIBUTION IN INCLINATION
BY ALTITUDE CLASS

(June 1967)

Class

Incl	1	2	3	4	5	6	7	Total
5	1	-	-	-	-	16	4	21
10	-	-	-	-	-	-	-	0
15	-	-	-	-	-	-	-	0
20	-	-	-	1	-	1	-	2
25	-	-	-	-	-	-	-	0
30	17	-	-	3	1	-	1	22
35	259	7	-	2	-	2	4	274
40	18	3	-	-	-	-	4	25
45	5	1	-	4	1	-	-	11
50	39	-	-	4	-	-	1	44
55	33	-	-	-	-	2	-	35
60	113	-	-	4	2	2	-	121
65	18	-	-	-	1	-	-	19
70	227	-	-	-	4	-	-	231
75	8	-	-	-	-	-	-	8
80	36	-	-	-	-	-	-	36
85	35	5	1	6	-	-	-	47
90	96	25	28	2	-	-	-	151
95	5	1	8	-	-	-	-	14
100	61	2	-	-	-	-	-	63
105	10	-	-	-	-	-	-	10
110	3	-	-	-	-	-	-	3
115	1	-	-	-	-	-	-	1
120	-	-	-	-	-	-	-	0
125	-	-	-	-	-	-	-	0
130	-	-	-	-	-	-	-	0
135	-	-	-	-	-	-	-	0
140	-	-	-	-	-	-	-	0
145	9	2	-	-	-	-	-	11

See USAF FCR No. 67-25, Page 26 for Altitude Class Description.

TABLE 2

NIKE-X Sentinel Radar (2-67 Deployment) Detection of Earth Orbiting Satellites Based on June 1967 Satellite Catalog (All satellites $1M^2$ in size, timing accuracy, sensor coordinates and earth model commensurate with existing capability).

ALTITUDE CLASS	1	2,3,4,&5	6	7	All Classes Combined
No. Satellites per Class	994	118	23	14	1149*
Maximum % of satellites radars could detect (if all perigees in areas of sensors)					
PAR	100	69.0	0	0	93.6
TACMAR	99.6	57.0	0	0	91.0
MSR	63.3	30.5	0	0	58.5
SPACETRACK Sensors	100	100	30.4	0	97.3
Maximum % of satellites radars could detect (if all apogees in area of sensors)					
PAR	100	0	0	0	86.5
TACMAR	94.0	0	0	0	81.3
MSR	19.0	0	0	0	19.0
SPACETRACK Sensors	100	70.2	0	0	93.8

*Total earth orbiting satellites with elements maintained.

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TABLE 3

SHEMYA ELEMENT ACCURACY (MEAN ELEMENTS)

ELEMENT	AVERAGE ACCURACY	MAX	MIN
Semi-major Axis	± .004 er	.03 er	.0002 er
Eccentricity	± .003	.01	.0001
RA of Ascending Node	± °05	°70	°0007
Argument of Perigee	±15°0	70°0	2°6
Inclination	± °05	°20	°00009
Mean Orbital Longitude	± °3	8°0	°01

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PCD for PCR Number F-7-033, Program Element 1.24.24.F, SPACETRACK, page 2, Evaluation states, "The detection, tracking and identification of objects in space is a function needed by an ABM system to prevent the possibility of a false attack warning."

This is a valid statement. The "identification" in the operational sense of the ABM sensor/computations systems will be accomplished through comparison of the location of a tracked item with the positions of all objects in space. Any item in space for which the position is not known will, when detected by the ABM system, provide an alarm. If the catalogue of objects is not complete and current, false alarms will occur with a frequency which grows with a growth of the number of objects not catalogued. Thus, any degradation of accomplishment of the SPACETRACK function will degrade the effectiveness of the ABM system by increasing the frequency of false attack warnings.

In addition to preventing false attack warnings, the SPACETRACK interface with the Sentinel system can also provide warning and targeting information to aid in countering actual attacks. Routine Sentinel system tracking data can provide some assistance in performing the SPACETRACK function.

The next sentence in the paragraph states, "The SPACETRACK sensors to do this job have similar capabilities as those presently planned for the Sentinel ABM system deployment." This statement is an over simplification of the true situation. The error of the SPACETRACK sensors is approximately half that of the Sentinel ABM Sensors. The Sentinel sensors do not have

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the accuracy required for proper performance of the SPACETRACK functions. The Space Object Identification (SOI) capability of the Sentinel sensors is also poorer, and they cannot provide the required global coverage, new launch observations and decay/impact predictions and observations.

The following statement in the paragraph is "The command, control and communications functions planned for the Ballistic Missile Defense Center are also similar to that of SPACETRACK (and the SPADATS System)." In addition to having heavier communication requirements, the SPACETRACK System has additional responsibilities which would be inappropriate for the BMDC to assume. These include SPACETRACK System sensor net control, maintenance of the data base, space catalogue maintenance, high precision orbital functions, foreign and domestic launch support, system calibration and quality control, manned space flight support, surveillance satellite readout and data processing and special category support to various other users.

"The number of objects in space ... is growing exponentially with time. We cannot continue expanding SPACETRACK to account for these large numbers of objects."

Because, as stated earlier, in the PCD, "The detection, tracking, and identification of objects in space is a function needed by an ABM system to prevent the possibility of a false attack warning," we <u>must</u> account for all objects in space. It is agreed that an orderly growth is necessary, but we cannot afford to lose the required capability of maintaining the required data base. If the expanded computational capability is not provided by Jan 1969, the completeness of the SPACETRACK surveillance of space will rapidly degenerate with resultant chaos in all of the functions, and negation of effective support to the Sentinel system. The SPACETRACK operation has always been "threadbare" rather than plush. Improvements in the hardware have been few and inexpensive. The FPS-85 soon to become operational at Eglin AFB will be the first sensor designed for the SPACETRACK function. Only through the continual dedicated efforts of highly competent technical personnel have sufficient software and operational improvements been made to permit the system to operate as the workload has increased. The limit of this bootstrap improvement is in view. If the expanded computational capability is not provided in sufficient time, the SPACETRACK system will be crippled.

Decision: "Expansion of the SPACETRACK sensor network cannot be justified without a logical plan for the future." The PCR provided a "logical plan" at the time it was written. Since that time a recognition of the FOBS/MOBS threat from space suggests that a more logical plan can be devised. Several proposals have been put forth by ADC, and the subject will be further studied, as noted in the PCR.[2]

"The need for a new SPACETRACK Center cannot be justified until the 'feasibility of combining SPACETRACK and the Sentinel ABM System' study is complete." The SPACETRACK Computational Center will be capable of providing required interface information not only to the proposed Sentinel system but also to any following area defense system (FOBS, MOBS,

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ICBM long range defense), as well as providing the increased computational capability required to fulfill the other SPACETRACK functions. In view of these and the before mentioned facts, the provision of FY-69 funds for the Space Computational Center should be provided.

Recommend your Alternative 2 (Secretary of the Air Force Position) be adopted rather than your Alternative 3.

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PROGRAM BUDGET DECISION-RECLAMA #118-R
FY 1969 Budget

Program Budget Decision: Military Construction-Air Force
Operational Facilities FY 1969
(SPACETRACK)

	Obligation Authority ($ millions) FY 1969
Service Estimate	40.167
Tentative Budget Allowance	----
Proposed Estimate to Request for Reconsideration	3.000
Proposed Change to Tentative Allowance	3.000

OSD Decision: Deletes construction funds at "various locations" with the statement: "This program is being slipped at least a year; therefore, this item should be deferred."

Air Force Evaluation: The OSD decision impacts on a proposed new sensor and a new and separate space center. Deferral of computational expansion will degrade SPACETRACK's capability to perform its mission by 1970 and would jeopardize its potential support of the Sentinel System. The "identification", in the operational sense of the ABM sensor/computations systems, will be accomplished through comparison of the location of a tracked item with the positions of all objects in space. Any item in space for which the position is not known will, when detected by the ABM system, provide an alarm. If the catalogue of objects is not complete and current, false alarms will occur with a frequency which will grow with increase of the number of objects not catalogued. Thus, any degradation of accomplishment of the SPACETRACK function will degrade the effectiveness of the ABM system by increasing the frequency of false attack warnings. The deferral of the radar does not alter the requirement for more data processing facilities in the 1970 time period. To assure continued system performance, the OSD decision should be re-evaluated.

a. Space Defense Center: On 12 December 1967, CINCNORAD made approximately 45,000 square feet available within the Cheyenne Mountain Complex, permitting expansion of the existing computer complex. Accordingly, the need for a new separate and remote Space Center is not now required. The FY 1969 SSR construction funds will be applied toward refurbishing this hardened space. The Space Defense Center computational facilities were saturated when NORAD COC began operations in February of 1967 subsequent to their move into the Cheyenne Mountain

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Complex. As a result, some work overflowed into the overseas facility at Ent AFB. Utilization of the overseas facility through November 1967 validates the estimates made in PCR F-7-036 that all available computational capability will be utilized by 1969. By 1970, the present data processing capability will be saturated and will not fully accomplish its mission. A reclama PCR has been prepared to reflect this recent change.

b. Phased Array Radar: In view of studies now directed, no objection is offered to the deferral of this item.

Recommendation: Recommend restoration of $3M in FY 1969 Military Construction funds.

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PROGRAM CHANGE DECISION-RECLAMA #118-R
FY 1969 Budget

Program Budget Decision: Military Construction-Air Force Operational Facilities FY 1969 (SPACETRACK)

	Obligation Authority ($ Millions) FY 1969
Service Estimate	40,187
Tentative SecDef Allowance	------
Proposed Estimate in Request for Reconsideration	3.000
Proposed Change to Tentative Allowance	3,000

OSD Decision: Defers construction funds at "various locations" with the statement: "This program is being slipped at least a year; therefore, this item should be deferred."

Air Force Evaluation: The OSD decision impacts on a proposed new sensor and a new and separate space center. Deferral of computational expansion will preclude SPACETRACK's capability to perform its mission by FY 70 and would jeopardize its potential support of the Sentinel System. The deferral of the radar does not alter the requirement for more data processing facilities in the 1970 time period. To assure continued system performance, the OSD decision should be re-evaluated.

Space Defense Center: The Space Defense Center computational facilities were saturated when NORAD COC began operations in February of 1967, subsequent to their move into the Cheyenne Mountain Complex. As a result, some work overflowed into the overhead facility at Ent AFB. Utilization of this overhead facility through November 1967 validates the estimates made in PCR F-7-038 that all available computational capability will be utilized by 1969. By late 1970, the present Center data processing capability will be saturated and will not fully accomplish its mission. On 12 December 1967, CINCNORAD made

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GROUP 4
Downgraded at 3 year intervals;
Declassified after 12 years

approximately 45,000 square feet available within the Cheyenne Mountain Complex, permitting expansion of the existing computer complex. Accordingly, the need for a new separate and remote Space Center is not now required. The FY 69 $3M construction funds will be applied toward refurbishing this hardened space. A reclama PCR has been prepared to reflect this recent change.

Recommendation: Recommend restoration of $3 million in FY 69 Military Construction funds.

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ROC: ADC 8-66

8 August 1966 (Revised 8 Sep 66)

I. (S) (U) Deficiencies/Needs.

A. (S) The radar and electronic equipment now installed at Diyarbakir, Turkey, was designed to fulfill intelligence community requirements in the 1958-1963 time period. ADC and intelligence community tasking of this sensor has increased to a point where the limited capabilities of this equipment are seriously affecting the operability, maintainability and mission performance of this strategically located missile detection and satellite tracking facility.

B. (S) The increase in foreign and domestic missile and satellite activity coupled with the more stringent requirements for speed, accuracy and completeness of data have created the situation where basic radar, radar data processing and data outputting improvements must be made for satisfactory mission performance.

II. (S) (U) Required Operational Capability.

A. (U) The following technical improvements must be accomplished in order to eliminate existing system limitations and to allow expansion to meet the increasing operational requirements:

1. Replacement of the Digital Data Processor.

a. (U) The existing Digital Data Processor (DDP) must be replaced with a computer system capable of greater speed, increased memory capacity, more efficient peripheral equipment, and direct input/output to the communications terminal. The availability of the entire missile detection and satellite tracking facility is dependent upon the performance of the DDP.

b. (S) The present operational computer program requires 11,400 words. The core memory of the computer is capable of only 8000 words in storage. This makes it necessary to store 8704 words of operational program on peripheral storage, thereby drastically increasing the time (2500 times the basic central processor speed) required to access the storage for execution of the operational program. The increasing space object catalog intensifies this problem.

c. (S) Response time to Space Defense Center (SDC) tasking is limited by the DDP system speed. DDP speed is directly related to storage capacity limitations. Data on track missions can be several hours old before it reaches the SDC.

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DOWNGRADED AT 3 YEAR INTERVALS; DECLASSIFIED AFTER 12 YEARS. DOD DIR 5200.10

90AC 66-001:4

d. (U) The peripheral equipments associated with the DDP are slow and inefficient. The ASR-28 TTY, for example, takes 7 seconds to type out each 6 second data sample. This creates serious backlogs in data, especially on long tracks.

e. (C) The DDP has a record of excessive and unacceptable outage time. During the period 1 July 1964 to 1 July 1966, the DDP accounted for 37.1 percent of all unscheduled site outage time.

2. (S) (U) Radar System Modifications. In addition to replacing the DDP, modifications to the radar system are necessary in order to provide the required system operability monitoring and Space Object Identification improvements.

a. (U) Increases in all aspects of sensor tasking make it necessary to minimize radar downtime. Hardware modifications and DDP program routines are required in order to automatically assess and account for radar performance deviations.

b. (C) Critical aspects of radar input signals must be automatically monitored and deviations flagged. Both hardware and software modifications are required to perform these vital tests routinely. The current method of assessing system performance is marginal and time consuming (50 minutes). With adequate hardware modification, DDP program and peripheral equipment, the whole routine could be performed in a matter of seconds.

3. (U) Space Object Identification. The radar must be modified to allow output of the required SOI data. New displays are required in the SOI analysis area.

4. (U) Communications Interface. Current torn tape procedures for handling input/output communications are completely unsatisfactory. The operations personnel workload will be reduced by 413 manhours per month by providing a direct tie between the on-site DDP and the Space Defense Center.

III. (S) (U) Determination of Deficiencies/Needs and the Required Operational Capability:

A. (S) The existing Digital Data Processor (DDP) Subsystem was designed and installed to meet an intelligence community requirement for cataloging and processing information on 50 objects. This capability was later expanded to 125 objects. The current satellite population is approximately 1150 and is projected to increase to 5000 by 1970.

B. (S) This simplexed subsystem is inadequate to fully meet the current demands for handling the number of objects of interest, performance of on-site correlation to properly tag unknowns, Space Object Identification (SOI) workload, communications with CONUS, and overall system reliability/maintainability. Headquarters ADC Cost Effectiveness Study, 7 Oct 65, concluded that modification or updating of the existing DDP is not advisable. Complete replacement of this system with a duplexed high-speed computer and interface equipments is required. The operational impact of the current limitations is manifested in the following areas:

1. (S) The inability of the current system to automatically perform a correlation on all objects detected and tracked in order to declare them as known or unknown results in unacceptable time delays and an excessive message rate to the Space Defense Center (SDC) computer (NORAD CMC). Excessive message rates at the SDC Computer result in a tie-up of that machine while the correlation is being performed. An on-site correlation capability must be provided to eliminate this situation.

2. (S) Current procedures for routine catalog updating with SDC bulletins are time consuming. A requirement exists for automatic catalog updating and a back-up capability (tape to card) for special update actions.

3. (S) The current mission planning effort requires one third of the Site Surveillance Officer's (SSO) time (240 manhours/month). Printouts of mission plan data now requires from 20 to 45 minutes depending on the number of objects appearing in the mission time period. An automated and more efficient mission planning effort must be provided to take care of the increasing workload.

4. (S) The efficiency and response time of the SOI effort is limited by the number and complexity of the calculations that must be performed by the analyst and by the inadequacies of the existing displays. The increased emphasis on the SOI effort in support of Weapons Systems makes it necessary that certain portions of the analysis function be automated and that improved displays be provided.

5. (S) A direct Communications tie between the Space Defense Center and the on-site computer must be provided. The time delays presently encountered in the "torn tape" operation are unacceptable. This direct tie would reduce the present operations personnel workload by 413 manhours per month.

6. (S) Diagnostics for the current computer subsystem require excessive system off-line time. This places restrictions on mission planning, SOI, and all other efforts dependent upon DDP availability. Diagnostics for estimation of radar parameters do not exist at present. This prevents assessment of equipment performance and prediction of system degradation.

7. (S) Any outage in the DDP subsystem results in a complete loss of data to the Space Defense Center and other users. A dual and versatile DDP configuration is required to provide the necessary degree of system reliability and flexibility.

C. (S) The Diyarbakir facility provides information on satellites and foreign launches to the intelligence community and the Space Defense Center. Due to its geographical location and long range radar capability, this site is heavily tasked to provide orbital observation and SOI data on approximately 90 percent of the current inventory. This percentage will hold true as the foreign launch technology develops. Deferral or disapproval of this plan in part or in whole will seriously impair the facility's capability to perform the assigned mission. This action will also seriously limit the expansion of that mission as foreign and domestic launch activity increases. Failure to provide this facility expansion will seriously affect the current performance and future technological refinêment of the entire Space Defense System.

IV. (S) (U) Solutions:

A. (U) The system deficiencies and limitations described can only be eliminated by replacement of the existing Digital Data Processor and providing the radar and interface modifications described. A Class V modification effort, under management by a single agency, is deemed the most effective method of accomplishing the required system improvements. Advantages of this approach are:

1. Configuration management by a single agency.

2. Simplification of interface engineering problems on this one-of-a-kind facility.

3. Closer coordination and faster solution to DDP programming problems.

4. System downtime for installation and test can be minimized by single agency control of equipment delivery, installation and test efforts.

B. (U) A Class IVB modification has been submitted to AFLC (SMAMA) for a temporary "quick-fix" solution to the data handling and output printer problems. This modification will provide tape deck and high-speed printer equipments which will be incorporated in the final system update effort. The "quick-fix" will not solve the problems related to DDP core memory capacity and processor speed.

C. (S) Headquarters ADC performed a cost-effectiveness study on modification of the existing DDP vs complete replacement. This study concluded that based upon (1) the workload increase of assigned space objects to the Diyarbakir radars, (2) potential increases of both RADINT vehicle launches, (3) the number of Soviet vehicles having inclination angles from 68 to 112 degrees, and (4) the high cost of expanding the existing DDP, that complete replacement of the DDP is required.

V. (U) Class V Modification.

A Class V Modification is submitted as Attachment 1 to this statement of ROC.

VI. (U) Harmonization:

It is proposed that serious consideration be given to procurement of DDP hardware of a type which will allow maximum utilization of the Air Force effort in the AN/FPS-85 development. This proposal is made for the following reasons:

A. This would be an initial step toward standardizing the Space Defense radar systems. The current lack of standardization causes support, reliability control and system performance problems. All of these problems contribute to the high cost of maintaining these one-of-a-kind systems.

B. Hardware Standardization will permit establishment of a central computer program revision and control facility. Program revisions and edits could be completely performed and tested before shipment to the sensor. This would minimize the total number of programming personnel required, reduce the overall cost, and minimize the sensor downtime now required for such efforts.

C. Personnel Retention. The AN/FPS-85 will be "blue-suit" O&M. Personnel trained on the AN/FPS-85 can be retained in the system (CONUS & OS) allowing further savings in training and contractor personnel reduction at OS sites.

D. Support, modernization and configuration control would be simplified.

E. The initial cost of a new computer system is minimized by taking advantage of existing engineering, programming and documentation efforts.

VII. (U) Special Comments.

A. Facilities: The development project must include building revisions and DDP environmental control. The operating command will provide planning assistance on all items of project support.

B. Control of Emanations: Facilities specifications must include room shielding and input/output line filtering in compliance with AFOCCCC-2 letter, and attachments, dated 30 March 1965.

C. Power Availability: Adequate prime power is available for this modification.

D. Initial Operational Capability: An IOC date of 1 January 1968 is requested.

E. Documentation: Full documentation is required for those portions of the modification which affect the Radar Signal Processor, radar receivers, SOI and interface modifications. Updated and revised commercial publications will suffice for the DDP proper.

F. Operational Availability: An operational availability of .99 is required as stated in ADC letter, 17 May 66, subject: Definitive Requirements in Support of NOR 2-66, 22 Apr 66, as approved by DOD on 4 June 1966. A duplex DDP system is necessary to meet this availability requirement.

2 Atch (S)
1. Class V Mod for Elimination of System Deficiencies/Limitations Diyarbakir, Turkey (U)
2. Storage Requirements (U)

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JOINT MESSAGEFORM

SECURITY CLASSIFICATION: UNCLASSIFIED

TYPE MSG: MULTI X

PRECEDENCE: ACTION ROUTINE

INFO

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Pulse Comp Mod-Moorestown
Cat II Test

900c

FROM: ADC

TO: ESD/ESG/L G HANSCOM FLD MASS

INFO: SMAMA/SMNC/MCCLELLAN AFB CALIF

9AEROSPDEFDIV/CCB/ENT AFB COLO(MESSENGER)

ADC COMD CON DEF SYS OFC/AD4CB/
L G HANSCOM FLD MASS

SPECIAL INSTRUCTIONS

UNCLAS/ADLOC

SUBJ: Category II Testing of the Pulse Compression modification to the Moorestown FPS-49. This msg in III parts.

PART I. Category II testing of the subject modification was conducted from 23 Oct through 1 Nov 67 and resulted in acceptance by Hq ESD with noted deficiencies. The modification was not accepted by Hqs ADC/AFLC because of the following major discrepancies: (1) System was not operable and maintainable by site personnel; (2) Technical documentation was inadequate; (3) Preliminary operating and maintenance procedures were inadequate;

DATE	TIME
7	0750
MONTH Nov	YEAR 67
PAGE NO. 1	NO. OF PAGES 2

DRAFTER TYPED NAME AND TITLE: LtCol Christy/ Missile & Space Surveillance

PHONE: 3266

RELEASER SIGNATURE: Signed

TYPED (OR STAMPED) NAME AND TITLE: LESTER L. KRAUSE, JR, Colonel, USAF
Deputy Chief of Staff, Plans

SECURITY CLASSIFICATION: UNCLASSIFIED

DD FORM 173

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CONTINUATION SHEET

SECURITY CLASSIFICATION
UNCLASSIFIED

PRECEDENCE | ACTION | INFO | DRAFTED BY

(4) System reliability was unsatisfactory. For the above reasons, Category II testing could not be considered complete. An ADC test report describing deficiencies in detail will be forwarded under separate cover.

PART II. Completion of Category II testing to satisfactorily resolve aforementioned major discrepancies is required before the modification can be accepted by ADC. Experience during the recent test period has confirmed that both extensive training of O&M personnel and a comprehensive R&M demonstration are essential to acquiring an operable and maintainable pulse compression capability.

PART III. Training of O&M personnel and satisfactory completion of the R&M demonstration appear to be pacing items. Request Hqs ESD expedite the negotiation of the training contract and that the earliest possible start date of training be secured. Request this Hqs be advised of new schedules at an early date.

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DD FORM 173-1

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DOC 1-

JOINT MESSAGEFORM

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SECURITY CLASSIFICATION

TYPE MSG	BOOK	MULTI	SINGLE
		X	

PRECEDENCE

ACTION PRIORITY

INFO

DTG

SPECIAL INSTRUCTIONS

9CVC READ FILE

FROM: 9AEROSPDEFDIV ENT AFB COLO

TO: DEFSMAC FT MEADE MD

FTD WRIGHT-PATTERSON AFB OH

INFO: 73AEROSPSURVLWG ENT AFB COLO (MESSENGER)

TUSLOG DET 8 DIYARBAKIR TURKEY

1 AEROSPCONSQ ENT AFB COLO

S E C R E T 9OSD 10700 JUN 67 for Col Mitchell at DEFSMAC, TDCAM at FTD. Subj: Installation of REAQU Modification c Diyarbakir (U). This msg in 5 Parts. Part 1. A program modification called REAQU is scheduled to be installed in the Diyarbakir computer starting 10 June 67. The modification will provide the following capability: (1) Computation and teletype punch tape output of orbital elements on uncorrelated targets in B-3 format. (2) Use of site generated elements to generate next pass look angles for acquisition. Part 2. The installation schedule calls for 12 hours per day degraded operation from 10 Jun 67 to 10 Jul 67 (1600Z - 0400Z). During the

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MONTH	YEAR
JUN	1967
PAGE NO.	NO. OF PAGES
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DRAFTER: TYPED NAME AND TITLE — RICHARD A. MILLER, Major, USAF, Chief of Radar Operations — PHONE 6152

RELEASER: SIGNATURE — SIGNED

TYPED NAME AND TITLE — CHARLES E. MINIHAN, Col, USAF, Deputy Chief of Staff Operations

SECURITY CLASSIFICATION

REGRADING INSTRUCTIONS 9OSD67-0268

DD FORM 1 NOV 63 173

REPLACES EDITION OF 1 MAY 55 WHICH MAY BE USED

ABBREVIATED JOINT MESSAGEFORM and/or CONTINUATION SHEET | SECURITY CLASSIFICATION

PRECEDENCE: PRIORITY | RELEASED BY | DRAFTED BY | PHONE

above periods the FPS-79 will have: (1) Capability to track objects and record data on digital/IF tape for playback. (2) SOI recording on objects tracked. Limiting factor will be no real-time data output. During the above periods, the FPS-17 will be in a manual mode of operation. 35MM film recording will be available. Limiting factor will be no real-time data output. In summary the limitation for both the FPS-79 and FPS-17 will be a delay in response time due to a non-operational program being installed in the M236 computer. Part 3. Recall during the installation downtime will be (1) One hour to be fully operational. (2) 15-20 minutes to be able to provide a real time data output on objects tracked. Part 4. Site will be responsive to DEFSMAC requested recall to full operational status during POI. The above recall times should be considered for planning purposes in order that intelligence requirements can be supported. Part 5. Request your comments/concurrence in proceeding with the modification and in consideration of anticipated activity and the recall prerogative you may employ in placing the site on POI. Further suggest you acknowledge

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PRIORITY			

the fact that recall may interrupt the program checkout and extend the overall modification period regarding the above procedures in meeting your requirements. Gp 3

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SECURITY CLASSIFICATION

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DOC #12

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

REPLY TO ATTN OF: 9EDC

SUBJECT: SPACETRACK Prediction Accuracy Model (SPAM III)

TO:

1. Numerous problems exist in the space defense system which require extensive evaluation and diagnostic study. There are limitations on the depth of study and scope of evaluation which can be practicably accomplished in the operating system. Therefore, a simulation model, SPACETRACK Prediction Accuracy Model (SPAM), has been developed. It has been operationally validated to a limited extent and found to be useful in studies of ephemeris prediction accuracy.

2. SPAM can be a useful tool provided the analyst is thoroughly cognizant of its capabilities and limitations. As with any model its use must be supplemented with adequate knowledge of the real-world system. All analysts are urged to exercise caution in designing studies, use of the program and interpretation of results.

3. The following is a simple description of the model characteristics and uses:

a. SPAM, when provided with the description of a real or hypothetical sensor system and the elements of a satellite orbit, will provide the error in predicted orbital elements for given periods of tracking and given prediction intervals.

b. The sensor system, up to a maximum of ten sensors (fifty for SPAM II), is described in terms of location, coverage pattern, and expected uncertainties. These uncertainties fall into four areas:

(1) Station location uncertainty (latitude, longitude, altitude).

(2) Observation bias uncertainty (azimuth, elevation, range, range rate).

(3) Random observation error uncertainty (azimuth, elevation, range, range rate).

(4) Time bias uncertainty.

c. The satellite elements may be represented in several different forms, each of which uniquely describes the orbit.

d. From the satellite orbit and sensor description SPAM generates the tracking times and, if desired, the observations for a specified period of time. Based upon the tracking times and the data uncertainties, SPAM performs a variance-covariance analysis and outputs the uncertainties in the elements for specified time points.

e. By varying the sensor description in terms of location, coverage, and accuracy, it can be determined which configuration produces the least uncertainty in the predicted elements of the specified satellite. By repeating this process with different element sets it is possible to determine which is the best of several postulated sensor systems.

4. SPAM is programmed in Philco TAC language and is operated on the Philco 2000 computer. Computer time for a typical case is approximately .2 minutes.

5. The attached programming document will be useful to users of the model as reference material. Suggested improvements and corrections are invited. All proposals should be directed to this office which will maintain the program and control all changes.

FOR THE COMMANDER

Arnold C McLean

ARNOLD C. McLEAN
Deputy Chief of Staff/
Evaluation

1 Atch
SPAM III Program
Documentation

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DOC #12

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

REPLY TO ATTN OF: CCB

[illegible] Dec 196[illegible]

SUBJECT: Required Operational Capability (ROC) for Environmental Data (U)

TO: ADC (ADLMD)

1. The attached copies of a Required Operational Capability (ROC) document are forwarded for your action in accordance with AFR 57-1 as supplemented.

2. This ROC defines the solar/geophysical data necessary for satellite position prediction. These data are becoming more significant because of the fact that a time of maximum solar activity, and hence increased atmospheric drag perturbations is approaching.

3. This Letter is unclassified when the attachment is removed or not attached.

ORIS B. JOHNSON, Major General, USAF
Commander

1 Atch
10 cys ROC (10 pgs)(S)

SECRET

9CSDG7-416

REQUIRED OPERATIONAL CAPABILITY (ROC) FOR ENVIRONMENTAL DATA (U)

1. (U) Deficiencies/Needs.

A. The present models of atmospheric density are not sufficiently accurate and solar/geophysical data that are adequate to support present or improved models are not available. Also, solar data adequate to discriminate effects of solar activity and hostile ECM on space defense electronics systems are not available. These deficiencies are compounded by the fact that a period of maximum solar activity is approaching, and drag perturbations and radio/radar interference will be increased.

B. Atmospheric Model Deficiencies. The most widely accepted dynamic atmospheric density model available today is the current one published by L. Jacchia of the Smithsonian Astrophysical Observatory. This model is now used by 9ADD. However this model has some deficiencies the most serious of which are

1. It assumes that the temperature and density are forever constant at 120 km.

2. The density between 120 km and 150 to 250 km (depending on the degree of solar activity) is not modeled properly.

3. It does not model the true response of density to geomagnetic variations at low altitudes and high latitudes.

4. The recently discovered polar bulge is not included in the model and there is uncertainty in the model of the equatorial bulge.

C. Solar Geophysical Data. Atmospheric density is quite sensitive to solar activity. The calculation and prediction of atmospheric density requires an extensive amount of solar/geophysical data. At present the following solar data are supplied by the 4th Weather Wing Solar Forecast Center: these data are neither accurate enough nor adequate in quantity to support either present density models or improved models:

1. A daily value of the 10 cm solar flux reading, F_{10}, from Ottawa, Canada.

2. A ninety day running mean of F_{10}.

3. An estimate of the planetary geomagnetic index Ap (accurate to 5 units) is available one hour after the close of the Zulu day. This value, however, is not disseminated via teletype until 2100Z of the following day.

4. Predicted values of the planetary geomagnetic index one, two, and three days into the future.

5. An estimate of the current day's Ap based on data collected at magnetometers located in Virginia. These data are neither accurate enough nor adequate in quantity to support either present density models or improved models:

D. Radio Data. No capability presently exists for discriminating between the effects of solar activity and hostile ECM at BMEWS sites. This deficiency results from the absence of real-time solar data and the lack of knowledge necessary to correlate solar flare predictions with radio/radar interference.

II. (S) (U) Required Operational Capability.

A. (U) The mission of the SPACETRACK system requires that the capability exist to predict accurately the positions of near earth satellites. In order to predict satellite positions it is necessary to be able to calculate the atmospheric density precisely because atmospheric drag is a major perturbing force.

B. (S) In order to satisfy mission support requirements the capability must exist to determine satellite position accurate to 200 mtr after an 8 hour prediction for all satellites with periods greater than 88.5 minutes. Also, for satellites with periods greater than 96 minutes, the position must be accurate to 18 km after a 21-day prediction.

C. (S) In order to achieve the above prediction accuracies the atmospheric density during a quiet sun must be accurate to 1.3% when predicted for 8 hours and accurate to 22% when predicted from 8 hours to 3 weeks. During a period of maximum solar activity the density must be accurate to .71% when predicted for 8 hours and 1% when predicted from 8 hours to 3 weeks.

D. (U) The following solar/geophysical data are necessary in order to achieve the required accuracy in atmospheric density

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1. Reports of the measured F_{10} with no more than 10 units uncertainty during periods of low solar activity and no more than 4 units uncertainty during periods of high solar activity. These reports should be available 3 hours after the measurement at Ottawa.

2. Reports of a_p which have less than one unit uncertainty. These reports should be available not later than 6 hours after the magnetometer readings have been made.

3. Six hour predictions of a_p which satisfy the following accuracy requirements:

	quiet sun	active sun
low a_p	3	12
high a_p	18	64

These reports should be available not later than 6 hours after the period for which the predictions have been made.

4. Three-week predictions of three-hourly values of a_p and daily value of F_{10} which satisfy the following accuracy requirements:

<u>a_p accuracy requirements</u>

	quiet sun	active sun
low a_p	9	2
high a_p	47	8

<u>F_{10} accuracy requirements</u>

quiet sun	active sun
26	4

E. (U) The following refinements to the atmospheric density model are necessary to achieve the required accuracy in atmospheric density:

1. The polar bulge must be included in the model to improve the prediction capability for high inclination satellites and the uncertainties in the equatorial bulge model must be resolved.

2. The density representation for the 120-250 km altitude regime must be improved.

3. The model must be modified to improve its representation of the response of atmospheric density at low altitudes and high latitudes to geomagnetic variations.

4. The model must be modified to account for the fact that temperature and density are not constant at 120 km.

F. (S) It is necessary to discriminate between solar activity and ECM. The following items are required for this task:

1. Radio burst data at the operational frequencies of SPACETRACK/BMEWS electronics systems to be reported within 2 minutes to the Space Defense Center and Missile Warning Division in order to identify solar interference.

2. A 24-hour forecast of expected solar generated interference to SPACETRACK and BMEWS electronic systems. (These forecasts should specify the time and duration of the occurrence of the interference with accuracies of one-half

hour and 10% respectively, and the system components which will be affected.)

III. (S) Solar/Geophysical Data. In this section the prediction capability is related to the solar/geophysical data requirement. The relationship is derived from the fact that the relative atmospheric density error is equal to the ratio of the allowable in-track error to the total in-track drag perturbation.

Accurate values of the atmospheric density are necessary for the execution of this analysis. The prediction requirement is stated at 200 km but the density tables are unreliable between 200-250 km. Therefore the following analysis is performed at 300 km. This does not invalidate the results because the density at lower altitudes is less sensitive to exospheric temperature changes than at the higher altitudes.

After 8 hours the total drag perturbation for an orbit with a 300 km perigee can be as high as 4.4 km for a quiet sun and 12 km for active sun.

Reference to density tables shows that such density errors correspond to the following errors in a_p and F_{10}.

F_{10} Accuracy Requirements

Height	T_{oo} = 1000°k	T_{oo} = 2000°k
Z = 300 km	10 units	36 units
Z = 600 km	26 units	4 units

Table 5

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a_p Accuracy Requirements (a_p = 10)

Height	T_{oo} = 1000°k	T_{oo} = 2000°k
Z = 300 km	3 units	12 units
Z = 600 km	9 units	2 units

Table 6

a_p Accuracy Requirements (a_p = 100)

Height	T_{oo} = 1000°k	T_{oo} = 2000°k
Z = 300 km	18 units	64 units
Z = 600 km	47 units	8 units

Table 7

There is a 5-8 hour lag from the time of geomagnetic disturbance until the atmospheric density is affected. Thus the geomagnetic data should be available within six hours of the magnetometer readings and six-hour predictions will be sufficient for twelve-hour position predictions.

B. (U) Density Model. Experimental evidence compiled from satellite drag studies show wide seasonal and diurnal density variations in the 120-250 km altitude range. It is impossible to model these variations with boundary conditions fixed at 120 km. Further evidence of a model deficiency in this regime is the fact that with increasing exospheric temperature the model density actually decreases. This decrease occurs between altitudes of 120 km and 150-250 km (depending on the time in the solar cycle) and is contrary to observed behavior.

Several investigators have observed a density bulge centered approximately over the North geomagnetic pole. During large magnetic storms this bulge can amount to a 50% increase in density. Such an anomaly can be quite serious for low altitude, high inclination satellites. At latitudes in the auroral zone it has been observed that the exospheric temperature is more sensitive to geomagnetic variations than at lower latitudes. This effect has not been properly modeled at the present time.

C. (S) Radio Data. The BMEWS ECM alarm system was triggered to a red level on 23-24 May 1967. The cause of the alarm was actually solar radiation--not ECM. On other occasions HF communications have been disrupted because of solar activity. The requirement for radio data stated in Section II is necessary to predict and assess the effect of solar activity in similar circumstances.

IV. (U) Solutions.

A. Solar/Geophysical Data. The logical source of solar/geophysical data is the Solar Forecast Center located in the NORAD Cheyenne Mountain Complex, operated by the 4th Weather Wing (AWS). The proposed solution to the solar/geophysical data deficiencies is that the Solar Forecast Center supply the required data to the Space Defense Center in the required time frames and with the required accuracies.

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B. Atmosphere Models. The 9ADD obtains some information about recent advances in density models from its participation in the AWS-CRL-ESD-SAMSO Density Forecasting Sub-Committee meetings. In addition to this, the AF Cambridge Research Laboratories have the resources to assist 9ADD with its specific atmospheric density model problems. It is proposed that AFCRL be consulted to help alleviate the model deficiencies.

C. Real-time Atmosphere. The SPACETRACK system is in the enviable position of having data available on many satellites in nearly real-time. The possibility of taking advantage of the available data to observe short period variations in the atmosphere and to make these data available in near real-time should be investigated.

V. (U) Class V Modifications.

A. Communications facilities available to the Space Defense Center must be modified so that the real-time solar/geophysical data can be reported to the ADR for entry into the automatic DELTA System.

B. The DELTA System data files must be modified to a file for historical and real-time data.

C. The orbit determination computer programs must be modified to include the required atmospheric model changes.

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D. Satellite operations at the AFETR and the AF Satellite Control Facility could possibly benefit from the improvements developed here. These facilities should be informed of the details of the resulting improvements.

VII. (U) Quantities Involved.

This is a one-time improvement to a single system, but a continuing effort in this area is necessary to keep abreast of the state-of-the-art.

VIII. (U) Special Comment.

A. Operational testing and evaluation of the resulting improvements must be conducted.

B. No special training will be necessary.

This ROC is Classified SECRET in accordance with Section IX of 496L Program Security Classification Guide.

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COORDINATION AND RECORD COPY

9CCR 1 Dec 1967

SOI Required Operational Capability (U)

ADC (ADLMD)

The attached ROC is forwarded for your action. This Headquarters will supply any further information or assistance required. This is part of our continuing effort to upgrade the capabilities of the SPACETRACK system.

ORIS B. JOHNSON, Major General, USAF
Commander

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9OSD-S
9OSD
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9EDC
MME

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ADC

STAFF SUMMARY

	ROUTE TO	ACTION	SIGNATURE	DATE
1	9MDC	Coord	[illegible]	[illegible]
2	9EDC	Coord	[illegible]	[illegible]
	9CCS		Rosey Nutrit	
4	9CVC			
5	9CCR			

SYMBOL	TEL. NUMBER	DATE
9OSD-S	6152	

SIGNATURE OF ACTION OFFICER: Allan C Greist

TYPED NAME AND GRADE OF ACTION OFFICER: ALLAN C. GREIST, Captain

INITIALS: ed

SUBJECT

Required Operational Capability for Space Object Identification

SUMMARY

1. PROBLEM: Space Object Identification (SOI) procedures and facilities need to be computerized in order to meet the growing demands of SPACETRACK.

2. FACTS:

a. SOI analysis, at present, is mostly manual and requires great experience and intuition on the part of the analyst to obtain adequate results.

b. Computerized equipment and developmental programs are presently available from various contractors which will greatly enhance the speed and accuracy of SOI.

3. ACTION: Required Operational Capability has been written requesting the acquisition of these programs and equipment. Copies will be sent to ADLMD.

Bill R Adams

BILL R. ADAMS, [illegible]
Deputy Chief of [illegible] Operations

ADC 172

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1 Dec 64

REQUIRED OPERATIONAL CAPABILITY (ROC)

FOR SPACE OBJECT IDENTIFICATION (SOI) (U)

I. (S) Deficiencies/Needs. Space Object Identification (SOI) operations are presently carried on at the various SPACETRACK sites. These operations are chiefly manual, and thus, by their very nature, time consuming and, in some respects, inefficient. The SPACETRACK system is capable, presently, of collecting more data than the SOI analyst can process due to his limited computational facilities. This necessitates a selection by the analyst of the portions of the data records that promise to be the most beneficial in his analysis. However, the complete utilization of all the data, made possible by computer assistance, will vastly improve the analyst's speed and accuracy. Thus the analyst will be able to cope with the growing requirements for SOI on the ever-increasing number of space objects. This applies to support of the U.S. space effort as well as the collection of information on foreign space objects for the intelligence communities.

II. (U) Required Operational Capability. Computer assistance must be provided to the SOI analysts at the various SPACETRACK sites in order to guarantee an SOI system capable of meeting growing operational requirements.

III. (S) Determination of Deficiency/Needs. Since the beginning of SOI operations at the SPACETRACK sites, there has been a continuing number of research programs which have developed many possible computational aids to the analyst. However, these programs have not been made operational due to the lack of hardware and software on-site. The addition of an SOI computational capability is necessary for the following reasons:

A. Speed. The time required to perform routine operations must be reduced. This will result in the following improvements:

1. The same number of analysts will be able to perform many more analyses. Thus, no increase in manpower will be required to handle the steadily increasing number of space objects for which SOI information is required.

2. Due to the press of routine tasks, the analyst is seldom able to devote his time to the comprehensive

905967-0434

analysis of a complex target. By lessening the time required for routine tasks, more time will be available to handle complex targets.

3. SPACETRACK will be able to respond faster to requests by outside agencies for SOI information.

4. Continuous monitoring of space objects can be conducted making possible early discovery of changes in target characteristics.

B. Accuracy. Computer data processing will enhance SOI accuracy in the following ways:

1. As was previously stated, the present manual techniques do not allow the analyst to utilize all of the data presently collected by the SPACETRACK system. The analyst can select only that portion of the data which he thinks will be the most useful in his analysis. Computer processing, on the other hand, will permit the use of some of the data to make an analysis and use the remaining data to refine and check the results of its analysis. Such a procedure will enhance accuracy considerably.

2. More precise formulations can be used, involving less simplifying assumptions and fewer approximations. Also, the present inexact graphical techniques will be replaced by the precise numerical techniques of the computer.

C. Scope of Capability. The analysis of complex targets will improve for the following reasons:

1. Advanced theoretical solutions involving complex formulations and extensive computations can be applied.

2. Improved methods of data presentation for analysis will become available.

3. Data from two or more sensors can be utilized for a complete analysis. This is required whenever the data available at each site is insufficient to provide a comprehensive analysis. This often occurs on limited duration missions such as missiles, new systems tests and manned launches.

D. Credibility. SOI, as presently practiced, is an inexact science. The present manual techniques rely heavily on the experience and intuition of the individual analyst.

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Thus, credibility of an analysis is difficult, and in some cases, impossible to determine. However, computer programs readily lend themselves to meaningful credibility tests.

1. The computational capability exists to provide reliable error estimates or tolerances for its analysis.

2. The computer is less likely to overlook or misinterpret input data, thus, providing more consistent results.

3. The computer can take the results of an analysis and synthesize the amplitude patterns that would be generated. A comparison of the synthesized data with the original will produce a correlation factor which can be used to determine a credence.

E. Standardization and Training. The use of standard programs at all of the SPACETRACK sites is necessary for the following reasons:

1. Program improvements through SOI R&D work can be implemented at all the sites at minimum cost and effort.

2. The training of SOI analysts can become standardized. Once a man is trained at any of the sites, he can work efficiently at any of the other sites. Reducing the requirement for intuition and experience by the analysts will shorten the training required to produce a fully qualified analyst.

IV. (S) Solutions. Provide the SOI analyst with the necessary hardware and software to effectively utilize existing SOI programs. All the necessary programs have been developed through R&D work. This software must be flexible enough to facilitate rapid and economical addition of new programs or modifications as they are developed. Although these programs will greatly aid in the analysis of space objects, it is still the analyst who must perform the vital interpretation of the data. The Concept of Operations is as follows: The radar tracks an object for SOI information. The data goes through the signal processor to the on-line computer. Here the data is formatted and recorded on a magnetic tape for later use and on the recorder for quick look analysis. A hard copy printout is also provided. The on-line tape will have a variety of tracks on various satellites. For future use, the tracks will be consolidated off-line to put all tracks from one satellite on one tape. For a detailed report, the analyst will examine the strip chart records to determine which off-line programs should be used for which records. After computation, the desired quantities will be plotted/printed for the analyst and recorded on magnetic tape for future use. The analyst will examine the plots and either make his report or request further computation. Most of the off-line work can be accomplished on a schedule. Only new launches would require immediate data reduction.

A. Hardware.

1. Computational Facility. A computational capability is required to accommodate the SOI function. The new programs introduced below require additional memory storage not presently available at most SOI radar sites. Possible solutions to this problem could be to share the on-site computer (or computers), or to have a separate computer for SOI use only. The acquisition of this hardware is vital for the rest of the SOI improvements to be implemented. If a separate computer is chosen, it should be a general purpose digital computer with approximately 13 K words of memory to satisfy both on-line and off-line SOI requirements.

2. X-Y Plotter. An X-Y Plotter is required as a means of plotting the outputs of several of the programs outlined below, in particular, the amplitude plots. This item should be a drum type plotter with a 30 inch plotting width and capable of handling rolls in excess of 100 feet. The basic plotting increment is .01 inches and maximum corresponding plotting speeds are shown below.

X-axis: 12,000 steps/minute

Y-axis: 12,000 steps/minute

Time Intercept: 600 operations/minute

3. Magnetic Tape Units. Three tape stations of 20 K characters/sec are needed for this configuration. One is used as a storage device for recording the historical records from the radar while the remaining two provide input data for off-line processing.

4. Input-Output Devices. A console is needed for the SOI analyst that will allow him to gain access to the computer containing the SOI programs. A standard remote

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console or a teletype keyboard unit with a paper tape reader and punch will be satisfactory.

5. Data-Recorders. Devices are needed to record and display the outputs of the computer programs. Items such as the Sanborn or Brush recorders are acceptable. An 8-channel device is required.

6. Radar Data Processing Buffering and Conversion Equipment is required to interface the computational/facility and the radar data.

B. Software.

1. Off-Line Programs.

a. Body Motion Solution Program. This program will calculate the following parameters which will describe the objects orientation in space. These parameters include precession angle, rate of rotation, orientation of the rotation axis, and aspect angle. Solutions for inertial and earth stable bodies as well as the general case of precession are required.

b. Amplitude plots.

(1) Amplitude vs. Aspect Angle. This program will utilize the outputs from the Body Motion Program to calculate the aspect angle as a function of time. The original amplitude data is available on tape as a function of time. The two are combined and plotted to give amplitude vs. aspect angle.

(2) Amplitude vs. Roll Angle. This incorporates the same ideas as amplitude vs. aspect angle plot, except that it is done against roll angle, thereby letting the analyst determine if the space body is roll sensitive (non-symetric about its longitudinal axis).

c. Size and Shape Programs.

(1) Two programs, the Geometric Optics Target Configuration, and the Fourier Transform Program will directly give the size and shape of the object to the analyst. It should be noted that these two programs, although they give the same information, are limited in that one will work when the other will not, depending on the body being observed.

(2) The Piecewise Fourier Analysis will give information to the analyst that will allow him to calculate the size and shape of the body by giving him the distance between the scattering centers.

(3) It should be noted that although these programs all give essentially the same information, they are each applicable for different problems. Consequently, all three programs are needed to cover all possible eventualities.

2. On-Line Programs.

a. Data Formatting. A program is required to convert the radar return signal to dbsm and total radar cross section and to determine the Right Ascension and Declination. This program is presently operational at 16 Survl Sq and needs only to be translated, to be used at the other SPACETRACK sites.

V. (U) Quantities Involved. This operational capability is required at all the SPACETRACK sites which perform SOI functions. These include: 16 Survl Sq, 17 Survl Sq, 19 Survl Sq, 20 Survl Sq, 13 Msl Wng Sq and Trinidad. Also, it should be implemented at any future SOI site mentioned in PCR 67-18.

VI. (S) Additional Comments.

A. An FOC date of July 1969 is desired.

B. No additional manning will be required at the sites.

C. A maintainability of 95% or better is required.

D. Additional training will be required to operate and maintain the SOI programs and equipment.

E. When the final determination as to which type of computational facility is to be utilized, the requirements as to additional power, air conditioning, and floor space will be ascertained.

SECRET

9EDC Memorandum for Record 67-144 19 Oct 1967

SUBJECT: Jupiter Tracking Site (U)

1. (U) Mr Piero Brovarone, Station Manager for SAO, has informed Major Damon that they have already removed the Baker-Nunn satellite tracking camera from their site at Jupiter, Florida. According to earlier information, this camera will be moved to Athens, Greece.

2. (S) For Project College Boy, as well as for other system and subsystem testing, we have used data from that site. It is very likely that there will be, in the future, more first overflight tests; for the proper evaluation of such tests an optical instrumentation site in Florida or vicinity is essential.

3. (C) A possible solution to the problem is that the Air Force reoccupies the Jupiter site either with one of the cameras in the warehouse or, still better, with the Kwajalein camera. The reoccupation of an existing site has numerous advantages, such as existing buildings, available utilities, knowledge of the precise location, etc. The Jupiter site could be supported out of Patrick AFB.

4. (U) This memorandum has been classified SECRET, Gp 3, because it documents a system deficiency and a planning option.

H. H. WACKERNAGEL
Chief, Theoretical Division

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

TOC 22

1967

(14) Q-3

REPLY TO ATTN OF: 9OSD

SUBJECT: Report of Staff Visit to Jupiter, Florida

TO: 9CCR

BG Bonavia/ get with the program

1. Organization visited and authority: SAO Baker-Nunn Camera facility at Jupiter, Florida. 9ADD S.O. TA-898, 27 October 1967.

2. Date: 30, 31 October 1967.

3. Purpose of visit: To determine adequacy of Jupiter site for possible future siting of USAF Baker-Nunn sensor.

4. Persons performing visit:

Col Fletcher (9DEC)
Lt Col Arnold (ADOSD)
Maj Damon (9OSD)
Maj Becker (ADC Liaison, Patrick AFB)
Capt Shackel (73OOP)
Capt Holtman (9DEC)
Lt Smith (9OSD)
Mr. Postlewaite (9MLP)

5. Principal persons contacted:

Mr. Thomas Butler - SAO Site Manager
Mr. Buchanan - State Area Civil Defense Director

6. Discussion:

Situation. SAO has vacated its Baker-Nunn site at Jupiter due to cutbacks in funds. The proposed siting dates in New Zealand and Europe are not until March and September of 1969. Therefore, it was felt that USAF can benefit by siting a camera at Jupiter as an interim facility. This proposal would utilize existing manpower and equipment while making a required contribution to the SPACETRACK mission.

CONFIDENTIAL

a. A visit was made to the SAO site at Jupiter, Florida to ascertain the suitability of the facilities for USAF use. The camera house and area for the timing system are located on top of an abandoned water storage tank. The tank is of reinforced concrete measuring 60' x 60' x 12' high. An entrance way has been built into the tank; it is presently used for bulk storage but could be converted into a technical support area. This site also consists of a small building which houses administrative space, a photo lab, operations area and an unsecure communications facility. The site is located in the Johnathan Dickinson State Park approximately 4 miles north of Jupiter, Florida. Due to its location, there is no background illumination problem.

b. Mr. Butler, the SAO Representative, escorted the team while in the area. He stated that SAO would be off the site by 1 December 1967. If we decide to take it over, many items such as refrigerators, stove, air conditioner, chemicals, etc., will be left. If not, they will be removed and put into storage. He further stated that SAO has signed a new five-year lease with the State of Florida.

c. There are no personnel support facilities in the area. If we were to locate at Jupiter the operation would have to be set up similar to the Moorestown operation. There is ample, adequate housing in the area. Palm Beach is 23 miles to the south and is connected to the site by U.S. 1; a four-lane divided highway. Host base support could be obtained from either Homestead AFB, 100 miles to the south, or Patrick AFB, 100 miles to the north.

d. The site water supply is furnished by a deep well on the site. The supply is potable and more than ample. Power is commercial 120/200v, 45kw. Additionally, back-up power is supplied by a 30kw, 120/208 diesel generator. Sewer is provided by a septic tank.

e. The only construction necessary prior to siting at Jupiter would be the pouring of a base pad to accommodate an Air Force camera. Additional minor maintenance could be accomplished by an ADC CEMIRT Team. Estimated cost for the entire preparation would be less than $10,000.

f. The team took a tour of the State Area Civil Defense Center. It was made in order to see a similar water tank that had been converted. Mr. Buchanan, the State Area Civil Defense Director, was very cooperative.

Recommendation: Based on the observations of the team it is recommended that action be initiated to locate a camera on an interim basis in the existing SAO facilities as soon as possible. Final decision to convert the water tank into a technical support area will be dependent upon the condition of the modified SAO camera and approval to operate a fifth Baker-Nunn site.

Robert E. Damon
ROBERT E. DAMON, Major, USAF
Chief, Optics Branch

APPROVED:

Warren E. Best
WARREN E. BEST, Lt Colonel, USAF
Director of Space Defense

APPROVED:

Bill R. Adams
BILL R. ADAMS, Colonel, USAF
Deputy Chief of Staff Operations

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JOINT MESSAGEFORM

SECURITY CLASSIFICATION

RESERVED FOR COMMUNICATION CENTER

TYPE MSG	BOOK	MULTI	SINGLE
		X	

PRECEDENCE
ACTION ROUTINE
INFO

DTG 29Nov67 18 14z

FROM: ADC

TO: CSAF/AFXOSNA/AFRDSC/

INFO: CINCNORAD/NOOP-S/
9AEROSPDEFDIV/DDC/ENT AFB COLO (MESSENGER)
73AEROSPSURVLWG/CCR/TYNDALL AFB FLA
AEROSP DEF NAT RANGE OFC PATRICK AFB FLA
SMAMA/SMNCO/MCCLELLAN AFB CALIF

SPECIAL INSTRUCTIONS
DIST:
ADMNE-CC
ADCMO-E
ADPDP-P
ADEEP-R

CONFIDENTIAL/NOFORN EXC CAN ADOSD

SUBJ: Interim Baker-Nunn Camera Site (U). This msg in four parts. PART I. Smithsonian Astrophysical Observatory (SAO) is vacating its Baker-Nunn camera site at Jupiter, Florida, on 1 Dec 67 due to cutback in funds. The Jupiter camera has already been removed and relocated in Athens, Greece. SAO has informally offered the Jupiter facility along with some remaining equipment to ADC.

PART II. ADC personnel visited Jupiter on 30 Oct 67 to determine adequacy of site for possible interim siting

DATE	TIME
29	1100
MONTH	YEAR
NOV	67
PAGE NO.	NO. OF PAGES
1	3

DRAFTER: TYPED NAME AND TITLE: ROGER A. MORRISON, CAPT USAF, SATELLITE OPERATIONS DIVISION — PHONE: 3583

RELEASER: SIGNATURE: Signed — TYPED NAME AND TITLE: GEORGE H. ARNOLD, Lt Col, USAF, Actg Dir of Space Defense Operations

SECURITY CLASSIFICATION | REGRADING INSTRUCTIONS

DD FORM 1 NOV 62 173 REPLACES EDITION OF 1 MAY 55 WHICH MAY BE USED

ABBREVIATED JOINT MESSAGEFORM
(out or CONTINUATION SHEET)

PRECEDENCE	RELEASED BY	DRAFTED BY	PHONE
ROUTINE ROUTINE			

SECURITY CLASSIFICATION

of a USAF Baker-Nunn camera. Findings are as follows: Site is located in the Johnathan Dickinson State Park approximately four miles north of Jupiter, Florida. Due to its location, there is no background illumination problem; SAO has just renegotiated a five-year lease with State of Florida; there are no personnel support facilities in area; nearest USAF bases are Homestead, 100 miles south and Patrick, 100 miles north; utilities are available; construction necessary to make site suitable for AF use would be minor, approximately 10,000 dollars.

PART III. ADC feels that sufficient SPACETRACK mission enhancement can be obtained to warrent siting a USAF Baker-Nunn camera at Jupiter on an interim basis, approximately two years. Justification is as follows: (1) New Zealand and Southern Europe Baker-Nunn sites will not be operational until Mar 68 and Sep 68 at earliest. One of these two cameras can be installed at Jupiter and operated until it is required at the overseas site. Refurbishment of one camera will be completed by SMAMA by Mar 68. (2) Jupiter facilities will be adequate with

CONTROL NO.	TOR/TOD	PAGE NO.	NO. OF PAGES	MESSAGE IDENTIFICATION	INITIALS
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only minor construction required. (3) Weather is acceptable and probability of simultaneous bad weather on both US east and west coasts is low. Thus, between Edwards and Jupiter, camera availability would be higher than present. (4) Jupiter could be used in conjunction with Edwards and in some instances Cold Lake to simultaneously photograph the same satellite. This would allow accurate orbit determination in a shorter time than present and would reduce SPACETRACK system workload. (5) Jupiter and the AN/FPS-85 could observe satellites simultaneously. This would produce more accurate orbits and aid in calibrating the FPS-85. (6) Experienced Baker-Nunn personnel rotating from Sand Island and Edwards could be better utilized and retained until overseas sites were operational. (7) One of the two cameras destined for the planned overseas sites can be effectively utilized rather than remaining in storage until required overseas. PART IV. Request USAF approval to establish an interim Baker-Nunn site at Jupiter providing suitable arrangements can be made with SAO. GP-4.

CONTROL NO.	TOR/TOO	PAGE NO.	NO. OF PAGES	MESSAGE IDENTIFICATION	INITIALS
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DOC# 24

HQ 9TH AEROSPACE DEFENSE DIVISION

PROGRAM PACKAGE

15 December 1967

Detachment 3

18th Surveillance Squadron

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JUPITER, FLORIDA BAKER-NUNN

1. (C)(U) Situation:

a. (C) Hq 9 Aerosp Def Div presently has two Baker-Nunn cameras undergoing refurbishment by Sacramento Air Materiel Area (SMAMA) at McClellan AFB, California. Plans are to site these cameras at Mount John, New Zealand and in Southern Europe. The cameras will be available in March and September of 1968. Present indications are that the Mount John site may not be complete in April or May of 1969, with the European site becoming available the latter part of 1969 or the first part of 1970.

b. (C) The Smithsonian Astrophysical Observatory (SAO) vacated its Jupiter, Florida, Baker-Nunn site in November of 1967. The site is located in the Jonathan-Dickinson State Park, approximately 23 miles north of West Palm Beach. It is under a five-year lease from the State Parks Division of the state of Florida. A lease agreement will be accomplished with SAO and the Florida State Parks Division by the Corps of Engineers.

2. (C) Justification: Locating a camera at Jupiter will aid the Baker-Nunn camera optical system in performing its assigned mission in the following ways:

a. (C) There would be better system acquisition. The chance of both the Edwards and Jupiter sites being inoperable due to weather during the same time period, is remote. Since there is a three hour time difference, there would be a much greater possibility of obtaining an optically desirable revolution over one of the two sites.

b. (C) The Jupiter site would aid in system calibration due to the 40° spread in longitude and the 8° in latitude. The position of the Jupiter site is extremely well-known (within 10 meters). This, coupled with the ability to make simultaneous observations, gives 9 Aerosp Def Div the capability to locate other sensors more accurately.

c. (C) All present USSR ESV first over-flights of the Continental United States pass within the view of the Jupiter site, making it a valuable tool in calibrating the electrical sensors in any future COLLEGE BOY-type programs.

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d. (C) The Jupiter site will enable 9 Aerosp Def Div to better utilize its manpower resources in the following ways: Personnel assigned to Sand Island (Det 2, 18 Survl Sq) undergo a six-weeks school at Edwards AFB, California. Once on-site, they require at least two to three months operation before they become proficient with the Baker-Nunn and SPACETRACK systems. In the past, there has been no place for the majority of them to rotate to. As a result, they have been lost from the system. This prospect provides very little incentive to stay within the SPACETRACK system. To provide a reasonable amount of stability to Baker-Nunn assignments and retain trained personnel in these critical fields, the manning criteria and operational concept provides for an additional accompanied CONUS assignment at Jupiter. By establishing this necessary location and having an accompanied assignment, competent and qualified Baker-Nunn personnel can look forward to a minimum of five years, and possibly seven years, between remote assignments, in the near future.

3. (C) Recommendations: Permission for the use of the Jupiter facility be obtained and the first available refurbished Baker-Nunn camera be sited there, as an interim facility. If the necessary permission can be obtained by 1 January 1968, it is feasible to have an interim operation at Jupiter by 5 June 1968. A fully operational site could be expected by September 1968 as the rotating Det 2, 18 Survl Sq personnel become available on-site.

4. (U) Concept of Operation. (See Atch 4)

5. (C)(U) Necessary Actions:

a. (U) Manning:

(1) (U) The Baker-Nunn installation will be a unit organized under the 73d Aerospace Surveillance Wing, 9th Aerospace Defense Division (ADC). Proposed manning is based upon the concept of a wholly military organization, promptly responsive to mission requirements, for special access programs, and directly responsible for following Command direction and control. Personnel grades, strength, and technical skills are based upon experience gained at other 73d Aerospace Surveillance Wing installations.

(2) (U) ADC (ADMET) has taken necessary actions with ADC manpower to obtain the following UMD. When Hq USAF

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approval is obtained, ADC manpower will immediately borrow spaces from New Zealand to man Jupiter. At the same time, ADC manpower will request Hq USAF for additional manning, which will take approximately 6 months. 9CBPO can supply approximately 15 men on site by 5 June 1968 to operate until additional men rotate from Sand Island.

REQUESTED UMD

DET 3, 18TH SURVL SQ

AFSC	RANK	NUMBER
2016	Major	1
2335	Captain	1
23590	CMSgt	1
23570	TSgt	1
23550	SSgt	3
23550	Sgt	3
31770	MSgt	1
31770	TSgt	1
40470	MSgt	1
40470	TSgt	1
40450	SSgt	1
32470	MSgt	1
23470	TSgt	1
64570	TSgt	1
70250	Sgt	1
29150	SSgt	1
29150	Sgt	2
29130	A1C	2
		24

b. (U) Functions to be performed by authorized AFSCs:

(1) AFSC 235XO (Camera Operators). The operation of the camera requires two positions to operate the camera for routine and simultaneous tasking; and three positions for synchronous operations per shift.

(2) AFSC 235XO (Photo Processing). This is a continuous dusk-to-dawn operation with processing continuing into the daytime.

(3) AFSC 234XO (Quality Control). Sensitometric operation utilizes film strips produced during photo processing for quality control of processing techniques.

(4) AFSC 235XO (Photo Reduction). This is a continuous dusk-to-dawn operation continuing into the daytime.

(5) AFSC 235XO (Precision Measurement). The site must maintain the capability to perform precision measurement twenty-four hours per day. All AFSCs are cross-utilized in this area; however, the 235XO is the prime expert.

(6) AFSC 404XO and 317XO (Maintenance). Performs preventive and organizational maintenance on the camera.

(7) AFSC 317XO and 324XO (Maintenance). Performs preventive and organizational maintenance on the timing system with VLF and HF signal inputs.

(8) AFSC 404XO and 324XO (Maintenance). Performs preventive and organizational maintenance of precision measurement equipment.

(9) AFSC 23470, 32470 and the senior 235XO (Quality Control). Performs quality control on a daily basis to maintain high standards of manual photographic efforts.

(10) AFSC 645XO (Supply). To handle all supply functions associated with the detachment. This will include approximately 500-600 line items including LP, GSA items and bench stocks, etc.

(11) AFSC 2016. Detachment Commander.

(12) AFSC 291XO (Communications). Operate one full period full duplex unsecure teletype circuit from/to the camera site - 20 Survl Sq on a twenty-four hour day, seven days per week basis.

(13) AFSC 2335 (Precision Photographic Services Officer). Supervises photographic functions/supervises camera functions and insures optical quality of camera, respectively. Functions as operations officer.

c. (C)(U) Communications.

(1) (C) A full period dedicated duplex teletype circuit from the Jupiter facility via the 20th Survl Sq to

the SDC and return will be needed for the site to function as an operationally responsive sensor of the SPACETRACK system. Additionally, a tactical AUTOVON circuit will be needed to provide voice service between the site and the SDC.

(2) (U) The full duplex unsecure teletype circuit will provide unclassified record communications service between the site and 20 Survl Sq Communications Center. Due to a NSA policy, unsecure circuits cannot terminate in the ADR, NCMC. Furthermore, floor space is critical within the Space Defense Communication Center to properly install and terminate this unsecure circuit and equipment in compliance with DCA Circular 300-175-1 (Red/Black Engineering-Installation Criteria). The 20th Survl Sq will act as a manual relay station in support of message traffic originated by and destined for the site.

(3) (U) The Tactical AUTOVON Circuit will provide unsecure voice service between the site, SDC, and other required locations. It is proposed that an off-premise extension (OPX) with an automatic dial-through capability to satisfy this type service, be provided from the 644 Radar Squadron (ADC), Homestead AFB, Florida.

(4) (U) Local telephone service will be provided to satisfy normal day-to-day administrative requirements.

(5) (U) All classified correspondence will have to be sent through the mails.

(6) (U) Order of magnitude non-recurring (installation) and monthly recurring charges are provided as follows.

(a) P-482. Unsecure teletype circuit and equipment: Non-recurring - $450.00; Monthly recurring - $1,610.00.

(b) P-482. Tactical AUTOVON Voice Service: Non-recurring - N/A; Monthly recurring - $370.00.

(c) P-458. Local telephone service: Non-recurring - $20.00; Monthly recurring - $25.00.

(7) (U) See Atch 1 for time phasing of actions required.

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d. (C)(U) Civil Engineering:

(1) (C) The Jupiter facility can be brought up to Air Force standards for a cash outlay of $28,500 ($24,500 MC and $4,000 repair). This estimate is based on (1) installation of a Versamat Automatic Film Processor (2) modifications to the camera building to accept the Mark II camera and (3) miscellaneous general repairs. Funds for this requirement have been included in the 9ADD First Revision to the FY 1968 Financial Plan, and project approval has been granted by Hq ADC, thus funds are available.

(2) (U) Civil Engineering Cost Estimate:

(a) Repair:

1 Inspect well casing, replace check valve and overhaul pump	New Construction
2 Inspect and repair water line and storage tank to building	New Construction
3. Clean furnace and replace shut-off valve	$150.
4. Repair air conditioners	250.
5. Repair existing flooring around camera base	550.
6. Inspect and repair electrical grounding system	200.
7. Rehabilitation of existing wiring (electrical distribution system)	2850.
	$4000.

(b) New Construction:

1. Modify concrete piers for camera (not using equatorial mount)	$400.
2. Automatic temperature mixing valve and hot water tank	900.
3. Install 3-ton A.C.	950.

4. Install chemical drain line and leaching well	$ 500.
5. Piping ductwork, vents, filters, drains for Versamat	3,500.
6. Power panel for Versamat	500.
7. Replace transformers and portion of underground cable	11,250.
8. New well	3,000.
9. Replace water line and storage tank	500
10. Darkroom modification and foundation for Versamat	3,000.
New Construction	$24 500.
Repair	$ 4,000.

(3) (U) Based on projected inputs, billeting units for twelve single airmen and government leased housing for three married families, are required. Based on acceptable criteria, these units will be located as close to the Jupiter facility as possible.

(4) (U) A Time-phasing of actions required is listed in Atch 2.

e. (C) Personnel Support: Jupiter, Florida, is 100 road miles from the nearest military installation (Patrick AFB to the north and Homestead AFB to the south). Therefore, all personnel will subsist on the local economy. This will require all enlisted personnel, including unmarried airmen in the lower three pay grades to be on separate rations. All efforts will be made to obtain leased quarters for single airmen. Furthermore, sufficient vehicles will be required to transport them from their quarters to and from work. (The normal site support vehicles should be adequate in number to perform this task.) Medical care will be provided under the provisions of AFR 160-53 for military personnel. For non-emergency in-patient care (care that can be scheduled), the Unit Commander will contact the host base and arrange for required care. All medical care for dependents will be provided under AFR 168-9 (Medicare). Vouchers for payment of civilian medical care will be prepared by the host base medical services per AFR 11-4 agreement (reference AFR 190-53, paragraph 2 d.)

f. (U) Logistics and Planning.

(1) (U) All site logistic support will be through the nearest Air Force base that can render the required support in accordance with normal procedures as outlined in AFR 11-4, except direct mission support items which will be requisitioned and shipped from SMAMA

(2) (U) Vehicles will be leased through GSA.

(3) (U) A mobile crane will be needed to aid in the unpacking and installation of the camera on its foundation. This crane may be obtained from the local economy.

(4) (U) The following data reflects the anticipated requirements breakout of supplies and equipment required to operate a Baker-Nunn camera operation with 24 personnel manning:

(a) Initial spares and equipment lay-in expenditures by SMAMA AFSD action $6,000.

(b) DSA and LPs reimbursement to the host base 200. Mo

(c) Automatic resupply by SMAMA such as:

1. Film

2. Cans and lids

3. Labels

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4. Cores $2,715.60

(d) Administrative Supplies:

Local purchase store 75.00 Mo.

(e) Unique items not in the system 1,000.00 Mo.

$3,990.60 Mo.

(f) Office equipment lay-in, 24 personnel:

1.	Desk Exec (6 each)	486.00
2.	Chair Exec (6 each)	118.00
3.	Desk Typist (3 each)	267.00
4.	Chair Typist (3 each)	58.00
5.	Chair Straight Arms (12 each)	107.00
6.	Table Office (4 each)	90.00
7.	Typewriter (3 each) (2 IBM, 1 Manual)	929.00
8.	Calculator	720.00
9.	Coat Rack, 12-Man (1 each)	18.00
10.	Coat Rack, 6-Man (2 each)	20.50
11.	Bulletin Board (1 each)	147.50
12.	Black Board (1 each)	22.50
13.	Cabinet, Filing (3 each)	150.00
14.	Bookcase, Section (10 each)	123.00
15.	Safe, 2-drawer (2 each)	630.00
16.	Easel, Display (1 each)	33.00
17.	Vacuum Cleaner (1 each)	218.00
18.	Floor Polisher (1 each)	91.00

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19.	Refrigerator (41102222190 1 each)	$1,310.00
20.	Refrigerator (41102669291 1 each)	110.00
21.	Storage Bins (8 each)	700.00
		$6,351.00

(g) Transportation requirements:

2 vehicles - lease from GSA (1500 mileage useage per vehicle monthly)	150.00

(5) (U) The totals are:

(a)	Initial lay-in for camera equipment and spares	$6,000.00
(b)	Initial lay-in for office equipment	6,351.00
(c)	Monthly supplies requirements	1,546.00
(d)	Transportation	150.00
	Total	$14,047.00

The above figures are based upon locating camera, Versamat and precision reduction equipment currently in storage.

(6) (U) See Atch 3 for Time Phasing of Actions Required

g. (U) Comptroller:

(1) (U) Include in the FY 68 First Revision those funding requirements that will be necessary for the remainder of FY 68. The First Revision was submitted to ADC on 13 December 1967.

(2) (U) Program those requirements in the Initial FY 69 Financial Plan that are necessary for the operation of the Baker-Nunn site. The Financial Plan will be submitted to ADC on 5 March 1968.

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(3) (U) The following is a recap for initial and continuing costs.

(a) Initial:

1. 9ADD funds:

a. Construction	$24,500.00
b. Repair	4,000.00
c. Communications	470.00
2. AFLC funds: Camera Equipment and Spares	6,000.00
3. Host Base funds: Office Equipment	6,351.00
Total	$40,221.00

(b) Recurring Monthly:

1. 9ADD funds:

a. Communications	$ 25.00
b. Supply requirements	3,990.60
c. Transportation	150.00
2. P482:	1,980.00
Total	$ 6,145.60

b. (U) This document is classified CONFIDENTIAL because it discloses future SPACETRACK planning.

4 Atch
1. Communications Time Phasing (U)
2. Civil Engineering Time Phasing (U)
3. Materiel Time Phasing (U)
4. Operational Concept (U)

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COMMUNICATIONS TIME PHASING

REQUIRED ACTION	START DATE	COMPLETION DATE
1. Service Order Request for unsecure full duplex teletype circuit and required terminal equipment.	27 Mar 68 D-70	6 Apr 68 D-60
2. Service Order Request for Tactical AUTOVON Service.	27 Mar 68 D-70	6 Apr 68 D-60
3. Service Order Request for local telephone service.	27 Mar 68 D-70	6 Apr 68 D-60

Atch 1

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CIVIL ENGINEERING TIME PHASING

REQUIRED ACTION	OPR	START DATE	COMPLETION DATE
1. Concept Approval and funds	9OSD	Immediate	1 Jan 68
2. Project Design	9DEC	1 Jan 68	15 Feb 68
3. Design Review	9DEC	15 Feb 68	1 Mar 68
4. Prepare Purchase Requests	9DEC	1 Mar 68	1 Mar 68
5. Solicit Bids	9DEC	1 Mar 68	7 Apr 68
6. Contract Award	9DEC	7 Apr 68	7 Apr 68
7. Construction	9DEC	7 Apr 68	1 Jun 68

Atch 2

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MATERIEL TIME PHASING

REQUIRED ACTION	OPR	START DATE	COMPLETION DATE
1. Obtain authority from ADC to negotiate direct with Major Air Commands for support of Det 3, 18 Survl Sq	9MLP	22 Jan 68 D-136	7 Mar 68 D-90
2. Develop Materiel Support Plan	9MDC	22 Jan 68 D-136	7 Mar 68 D-90
3. Establish supply procedures for direct support items.	9MDC Host Base SMAMA	5 Feb 68 D-121	21 Mar 68 D-76
4. Negotiate AFR 11-4 Agreement	9ADD 9MLP Host Base	21 Mar 68 D-76	22 Apr 68 D-44
5. Establish office and Administrative equipment requirements of Det 3	9MSS 73MDC	5 Feb 68 D-121	7 Mar 68 D-90
6. Obtain EAID listing and an account for Det 3 from ADC	9MDC ADC	7 Mar 68 D-90	21 Mar 68 D-76
7. Screen host base equipment assets and ADC for office and administrative equipment requirements	9MDC ADC Host Base 73MDC	21 Mar 68 D-76	6 Apr 68 D-60
8. Determine transportation requirements for Det 3	9MSS-T 73MDC	7 Mar 68 D-90	21 Mar 68 D-76
9. Obtain authority for leasing GSA vehicles and request funds for same	9MSS-T 9MDC ADC	21 Mar 68 D-76	6 Apr 68 D-60
10. Arrange with host base to provide TMO and packing and crating services	9MDC Host Base	21 Mar 68 D-76	6 Apr 68 D-60

Atch 3

REQUIRED ACTION	OPR	START DATE	COMPLETION DATE
11. Provide host base with Det 3's Kind Code	ADMSS-C	21 Mar 68 D-76	6 Apr 68 D-60
12. Provide host base with Det 3's priority and precedence rating	9MLP	6 Apr 68 D-60	22 Apr 68 D-44
13. Assemble and compile AFSC package	SMAMA	7 Mar 68 D-90	17 Apr 68 D-49
14. Ship AFSD to Det 3 through host base	SMAMA Host Base Det 3	22 Apr 68 D-44	20 May 68 D-16
15. Personnel in place. to receive AFSD and equipment	9CBPO	22 Apr 68 D-44	6 May 68 D-30
16. Arrange for delivery of GSA leased vehicles	9MDC	6 Apr 68 D-60	22 Apr 68 D-44
17. Ship camera and support equipment to Baker-Nunn site	SMAMA 9MDC ADC	22 Apr 68 D-44	20 May 68 D-16

OPERATIONAL CONCEPT

DET 3, 18 SURVL SQ

1. General.

a. Sensor System. The USAF SPACETRACK System is a component of the NORAD Space Defense System which consists of both military sensors and sensors of other agencies. The military sensors are composed of both radar and Baker-Nunn camera (optical) sensors. These sensors function collectively to:

(1) Provide observational data on man-made objects in space.

(2) Maintain a current catalog of all man-made objects in space and provide ephemerides as required.

(3) Collect, process, analyze, and display space information to provide CINCNORAD/CONAD with a capability for threat evaluation and decision making.

b. Operational Requirements. The current and projected operational requirements for locating the optical sensor are:

(1) To assist in providing the SPACETRACK System the maximum possible orbital coverage.

(2) To provide an additional calibration device for current and progmammed sensors.

(3) To provide additional capability to conduct the SDC simultaneous observations which will assist in the precise determination of current and anticipated optical sensors.

c. Mission.

(1) To operate and maintain the Baker-Nunn satellite tracking as a sensor of the USAF SPACETRACK System responsive to CINNORAD requirements.

(2) To track earth orbiting satellites and report all acquired data to all approved agencies in accordance with established priorities and procedures.

Atch 4

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(a) Obtain positional data on those satellites utilized for precision orbit determination for radar quality control purposes/calibration/special missions.

(b) Within system capability, obtain positional data on those satellites that can never be observed by assigned and cooperating radar sensors.

(c) Within system capability, obtain positional data on those satellites that cannot be currently observed by assigned and cooperating radar sensors.

(d) Obtain historical data on satellites to assist in general catalog maintenance.

(e) Obtain positional data on satellites for general scientific purposes associated with approved NORAD, ADC, 9ADD, and other agency (FTD, Intelligence Community, SAO) programs respectively.

(3) To perform other tasks associated with the tracking of space objects as directed by the Commander, 18 Survl Sq.

2. The Baker-Nunn Sensor. The Baker-Nunn tracking camera photographs sunlight-illuminated satellites against a star background. The position of the satellite can be calculated from the known positions of the stars. Position and velocity of the satellite can be calculated from precise measurements taken from successive photographs along the arc traversed by the satellite. Camera operation is limited to the hours of darkness because of the requirement for the star background. Cloud coverage and obstructions to vision, such as smoke, haze, fog and dust, decrease the effectiveness of the sensor. The requirement for good weather and a dark sky are key factors in location of the camera. The camera will be manned by U. S. Air Force military personnel seven days a week, 24 hours a day. Twenty-four personnel are required to operate the site.

a. Personnel. The senior officer present will be a Major. It is probable that most people will be married. A three year accompanied tour is required.

b. Crew Concept. The site will operate with four crews rotating every three days through day shift, swing shift, midnight shift, and off-duty time. To adequately cover all the operational functions and maintenance, each crew will

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be composed of operations personnel, maintenance personnel, and a communications center specialist. Therefore, there will be a minimum of five crew members on-site at any one time.

c. Operational Functions. The operational functions for this Baker-Nunn site are similar to those at other USAF Baker-Nunns. The operations are separated into integrated day and night functions as follows:

FUNCTION	NIGHT	DAY
Camera Operation	X	
Film Processing	X	X
Film Reduction	X	X
Mission Planning		X
Teletype Communications	X	X
Maintenance	X	X
Administration and Supply		X
Command and Supervision	X	X

(X - a full time operation)

d. Although the Baker-Nunn crew operates at night, its products and its employment require full daytime operation as well. A series of basic nightly tasks and daily tasks must be performed on a continuous integrated basis. In addition, the indirect mission support requirements must be met.

3. Nightly Functions.

a. Continuous dusk to dawn camera operation. This requires one man to operate the camera for routine efforts, two men for critically-timed observations and three men for special synchronous operation. Dusk to dawn operation is preceded by, and followed by equipment checkout and synchronization of the timing systems. Optimal tasking provides one camera setting every 6 to 8 minutes throughout all hours of darkness, plus secondary targets in the event of weather or other conflicts. The camera operator insures that observations are accomplished; in case of conflicts due to weather or moon positions, he uses secondary targets to insure the maximum utilization of the equipment. He insures sufficient personnel are in the camera house when special tasks are performed.

b. Continuous photo processing. During a night with optimal weather conditions and satellites to photograph, approximately 1,000 feet of film will be exposed. Priority observations that require immediate response to the Space Defense Center are taken out of the camera and processed immediately after exposure. Routine observations are normally removed from the camera after approximately 200 feet of film has been exposed. The darkroom operator must preplan his workload to insure that the equipment is not tied up with routine observations when priority observations are ready to process.

c. Continuous data reduction. The analog data on the film must be reduced to digital information so it can be passed electrically as an observation. This process is referred to as data reduction. There are two types of reductions: field reduction and precision measurements. Field reduction is relatively fast but accuracy is limited to approximately 60 seconds of arc. Normally, the first frame of a field reduced observation can be produced in 20 minutes. Succeeding frames take approximately two minutes each. Precision measuring is slower; however, an accuracy of 3 to 6 seconds of arc can be achieved. An experienced operator can precision measure 2 frames of film per hour. Each process is explained below.

d. Field reduction. The analyst starts with the knowledge of what portion of the sky was photographed. A sky chart, a transparent sheet containing the stars as dots, of the portion of the sky in question is used as an overlay on the film. Several stars around the satellite are identified by star number and the appropriate inclination and declination are recorded. The inclination and declination of the satellite is obtained from scales on the border of the sky chart. This information, along with the precision time, which is also recorded on the film, is the data which makes up the field reduced observation.

e. Precision measurement. In this process the relative position of the stars is measured on a David-Mann Comparator. This machine is a mechanical/optical device which measures with micron accuracy. Eight selected stars are measured in X and Y coordinates in relation to the satellite image. The comparator is coupled to a digitizer which automatically converts the analog information to digital information. In turn, the digitizer is coupled to a flexowriter which produces a punched paper tape. This tape contains formatted measurements which are sent into the Space Defense Center.

f. Communication of data. The field reduced and precision measured observations are forwarded to the Space Defense Center (via the 20 Survl Sq Communications Center) at a precedence level commensurate with the urgency of the situation. Relative priorities of coverage are assigned to each satellite by the SDC in their tasking messages. From experience gained at Edwards AFB, the teletype system is in operation approximately 50 per cent of the night.

4. Daily Functions.

a. Command and Administrative. The Unit Commander will operate and supervise the entire activity from the site. He will insure that adequate support is at the site and utilize personnel to update procedures and solve technical problems. A personnel NCO will be available at the site to accomplish all necessary personnel actions and perform administrative supervision.

b. Scheduling of observations. In order to optimize the efficiency of operations, the sequence in which observations are scheduled must be calculated each day. The SDC tasking order assigns objects for coverage in general terms. It is up to each site to optimize local coverage within the general limits imposed by the SDC. Local limits must be injected on-site. For example, moon conditions must be compared to the passes each satellite makes within the capability of the camera. The best pass will be selected. There are as many as 90 data forms necessary to accomplish the mission. The scheduler also produces an alternate schedule on high priority tasks to reduce the possibility of failing to obtain observations because of cloud coverage.

c. Special scheduling for search programs. When the precise location of an object is not known, a long term search routine may be used to determine the location of the object. A specific search pattern is followed each night until the object has been located or a specific segment of the sky has been scanned.

d. Continuation of night functions. The night crew cannot normally reduce all of the photographs to digital data. This function must be completed by the day crew.

e. Maintenance program. Camera and equipment maintenance is performed during the daylight hours. The normal overhaul and preventive maintenance that is required on any precision equipment is performed.

f. Quality control functions. An internal quality control function is performed to insure that the film is properly exposed, developed and reduced. This requires daily sampling of film and testing, reviewing and comparing the test data with the control data and taking corrective action when necessary.

g. Communications. The daytime communications load includes tasking messages, look angle schedules, observations and administrative messages. The total anticipated teletype communication load is 3,500 messages per month.

h. Supply Section. The site supply section will operate on-site, functioning both as supply and as a Materiel Control Center. The method for accounting for supplies will be left to the host base decision.

5. Building Space Required. Space will be required to house the camera and to perform the normal administrative, operational and support functions. Camera operation, film processing, film readout, precision measurement of film, communications, mission planning, maintenance, administration, supply and command are functions requiring space. Operational space for the camera requires a building with a sliding roof to permit a view of the sky.

a. Automatic processing of film requires quantities of water large enough to be of consideration in locating a camera. The processing equipment uses approximately three gallons of demineralized water per minute. The pressure must be between 45 and 55 psi.

b. Availability of electric power is also a factor that must be considered in selecting a site. Sixty cycle electric power is desirable; however, 50 cycle power can be used with proper interfacing. If primary power is not available on-site, additional personnel are required to operate and maintain a power system. Approximately thirty-five KW is the minimum power load required to operate mission equipment only. The maximum load depends on several variables such as the amount of air conditioning and humidity control necessary to maintain the proper environment for the precision data reduction equipment.

6. Baker-Nunn Camera Data Summary.

Weight	Approximately 3 tons
Height	10 feet
Width	9 feet
Depth	6 feet
Corrector cell diameter	20 inches
Diameter of primary mirror	31 inches
Speed of lens	F/1
Field of view	30° along satellite track 5° perpendicular to track
Range of photograph rates	1 frame per second to 1 frame every 32 seconds
Range of tracking speeds	Zero to 7,000 seconds of arc per second of time
Range of accuracy of satellite path determination:	
With precision reduction	2 to 6 seconds of arc
With field reduction	1 to 4 minutes of arc
Design precision of timing system	1/10,000 second
Film capacity:	
Feed magazine	1,000 feet
Take-up magazine	200 feet
Film size	55.625 mm
Film speed	Approx 1,200 ASA

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B-N Relocations

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JOINT MESSAGEFORM

CONFIDENTIAL

X

ROUTINE

B-N Relocation Spain/alternate Sites

9ODC

FROM: ADC

TO: CSAF

INFO: 9AEROSPDEFDIV ENT AFB COLO (MESSENGER)

CONFIDENTIAL ADOSD-S 02334 AUG 67.

FOR: AFXOPFN (CSAF); 9ODC (9ADD). SUBJ: BAKER-NUNN SOUTHERN EUROPE (U). Reference telecon between Lt Col Arnold (ADOSD-S) and Lt Col Finn (AFXOPFN) on 16 Aug 67. In view of 16 Aug 67 JUSMG-MAAG msg curtailing our Baker-Nunn relocation efforts in Spain until after September 1968, ADC is attempting to determine alternate locations. In order to minimize future delays of a political nature, request we be advised of other countries that would be suitable from a political point of view. Please advise at an early date. GP-4

18 | 02334
AUG | 67
1 | 1

ROGER A. MORRISON 3583
CAPT, USAF

Signed

H. R. EBBELER, COL, USAF
DIR, SPACE DEFENSE OPERATIONS

CONFIDENTIAL

DD FORM 173

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DOC 27

85

9EOC-R

Report of Staff Visit

9CCR

1. Organization visited: 496L SPO, Hanscom Field, Mass.

2. Date: 17-18 August 1967

3. Purpose of visit: To attend a meeting on the FPS-85 integration testing.

4. Persons performing visit: Lt Col Tommy Cobb and Mr. John Gabbard.

5. Persons contacted: Colonel Gabus, 20 Aerosp Survl Sq
Jack Plant, SDC
Dick McMurtrie, SDC
Joseph Koehane, SDC
Capt Jedlicka, SPO
Lt Marriott, SPO
George Harland, RADC
Richard Hastings, RADC

6. Discussion:

a. The integration testing meeting was attended by representatives of the 496L SPO, RADC, Systems Development Corporation, ADC, 9ADD, and the 20th Survl Sq. A briefing by Mr. Joseph Koehane of the Systems Development Corporation gave an overview of the Category 1 and 2 tests and the schedule of testing. A detailed review of the testing schedule was presented by Capt Jedlicka of the 496L SPO. A review of the AN/FPS-85 testing was presented by Mr. Hastings of RADC.

b. Interfacing the AN/FPS-85 to the Delta system will require one new computer program, two new subroutines and modifications to 14 existing Delta 1 programs. Category 1 test demonstrations will begin during the week of 21 Aug 67 under the test plan outlined in the SDC document TM-LX-272-300. Five tests, documented by TM-LX-272-401 through 405, are to be performed. Attachment 1 to this report contains the category 1 and 2 testing schedule.

DIST READ FILE

c. The scheduling interface between RADC testing of the AN/FPS-85 and the 83/Data Link/Delta integration testing contains only minor difficulties. It was decided that these difficulties could be resolved as they occur since some time flexibility is expected at the 83 as well as at the NCMC. Direct coordination between Capt Jedlicka (SPO) at the NCMC and Capt Higgins (RADC) at the FPS-85 will be necessary to resolve these conflicts.

d. A problem was discussed which could either preclude attaining the objectives of Cat. 2 test #6001, or dilute the results of the test. It is expected that the FPS-85 will detect objects in space that have not been cataloged and objects which were cataloged at one time and subsequently lost. Observations on these objects will be transmitted to the Space Defense Center as tagged unknowns and therefore, trigger Seq. 03. If an occasional unknown track triggers Seq. 03, the conduct of test 6001 will not be impaired. However, if the tracks are numerous the test cannot be successfully completed. A count of cataloged satellites in orbit with current elements not maintained shows that there are 24 which the FPS-85 should detect at one time or another. Detection of most of these will depend on whether the perigee of each, at the time, is within the FPS-85 coverage. Most of these satellites are highly eccentric with apogees ranging between 13,000 km and 192,000 km and perigees between 200 km and 8,000 km. In addition to these known objects, it is expected that numerous small uncataloged objects from four past satellite explosions will be detected. The explosions and expected altitude region of the small objects are:

1961 Omicron	300/2200 km
1963-20 Cosmos 61	200/1400 km
1963-82 Titan #3C-4	400/800 km
1965-112 Cosmos 103	400/700 km.

It is further expected that some small uncataloged objects from normal launches in the past will be detected. At the present time there are cataloged objects remaining in orbit from approximately 250 launches in the past. If we make the conservative estimate that the FPS-85 will detect one new small object from every 10th launch, 25 objects will become a source of unknown observations. The above estimates indicate that a plan to eliminate or reduce the unknown tracks prior to running the #6001 test should be devised. During the meeting, methods of approaching this problem were discussed and a draft plan involving ADC support was

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drawn up. Attachment 2 to this report is the draft plan. It is expected that the 496L SPO will submit a formal request to ADC for this support starting in mid November 1967.

e. A radio frequency interference problem with the NCMC/Eglin data link equipment had been reported previous to this meeting. It was stated during meeting that this problem will not hold up the installation and initial testing of the data link. Filters necessary to correct the problem will be installed prior to any operation involving the transmission of classified data.

JOHN R. GABBARD
SPACETRACK Division
Directorate of Reliability

2 Atch
1 - Testing Schedule
2 - Draft plan

APPROVED:

DISTRIBUTION:
1-9EDC (file)
1-90CO

JOHN A. KOSKELLA
Director of Reliability

APPROVED:

ARNOLD C. McLEAN
Deputy Chief of Staff/
Evaluation

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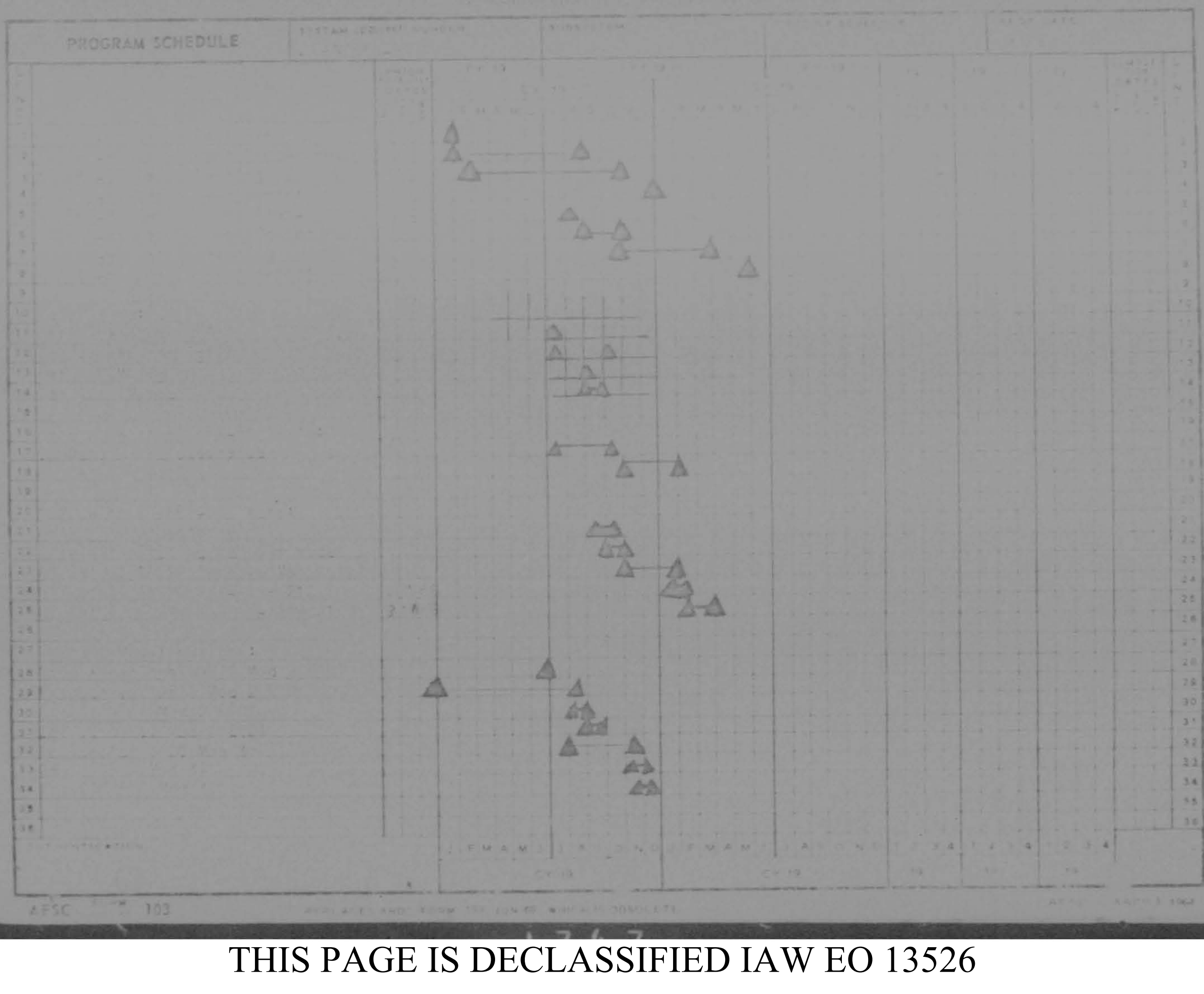
PROGRAM SCHEDULE

DOC #22 (5) 22 Dec 67

DEPARTMENT OF THE AIR FORCE
AN/FYS-85 MANAGEMENT AND TESTING FORCE (ADC)
EGLIN AIR FORCE BASE, FLORIDA 32542

19 December 1967

REPLY TO ATTN OF: ADMTF

SUBJECT: Potential Delay in AN/FPS-85 Operational Capability Date

TO: ADLMD

1. Attached for your information is ESD letter, dtd 11 Dec 67, subject as above, which indicates a potential delay in the AN/FPS-85 OC date.

2. With regard to paragraph 2 of the attached letter, this organization's position is that Category II testing cannot be accomplished in less than ninety days without deleting/sacrificing valid testing objectives as outlined in the approved Category II test plan. Further, ADMTF does not intend to agree to reduction or simplification of Cat II testing goals simply because the program is in difficulty. The [illegible] in test objectives are just as valid in this time frame as they were in May of this year when the test plan was coordinated.

3. Reference is made to paragraph 4. The contractor cannot possibly meet the established OC date (1 Apr 68) for any Category II start date after 1 Jan 68. In addition to the testing requirement, the 496L SPO is committed to furnish operational data (16 hours/day) from the system during this same 90 day period. This then requires that the contractor be on board to supervise the operation through what now appears to be from 1 Feb to 1 May 68.

4. Reference paragraph 5 of the attached letter. The suggestion certainly is open-ended and not definitive enough to satisfy our requirement. ADMTF will continue efforts to elicit a firm OC date from the 496L SPO.

JACK W. [illegible], Colonel, USAF
Director, AN/FPS-85
Management and Testing Force (ADC)

1 Atch:
ESSXS Ltr dtd 11 Dec 67

Cy to: ADC - ADOSD
ADLMD-S
ADMLP
ADOAC
ESD - ESSX
9ADD - 9OCR
9ODC
73ASW - CCR
20SS - CCR

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ELECTRONIC SYSTEMS DIVISION (AFSC)
LAURENCE G. HANSCOM FIELD, BEDFORD, MASSACHUSETTS 01730

REPLY TO ATTN OF: ESSXS (Maj R. J. McLeod, Jr./2705) 11 DEC 1967

SUBJECT: Potential Delay in AN/FPS-85 Operational Capability Date

TO: OL #11 4600 Support Sq (ADSIP) SMAMA (SMNCO/Mr. Schurter)

WRAMA ([illegible]/Mr. Vance)

1. The [illegible] Division of Bendix, prime contractor of the AN/FPS-85, has formally notified the [illegible] of an anticipated [illegible] of approximately one month in the Operational Capability (O.C.) date.

2. This [illegible] to [illegible] problems [illegible] delay [illegible] of Category II [illegible] until 1 February 1968.

3. It [illegible] Category II [illegible] significantly reduced below [illegible].

4. This office will continue to urge the contractor to meet his advertised O. C. date.

5. It is not possible at this time to establish the precise amount of delay in O. C. date. Therefore, this office suggests that contracts being definitized by your organization for follow-on contractor services stipulating 1 April 1968 as start date be amended to reflect the event rather than a specific date.

FOR THE COMMANDER

Robert R. Edge

ROBERT R. EDGE, [illegible], USAF
Director, Space Defense System Program Office
Deputy for Surveillance and Control Systems

Copy to:
USAF (AFRDDC)
AFSC ([illegible]/Maj [illegible])
ADC (ADLPD)
ADC ([illegible])
SMAMA (SMN-2)

20th SS 85th DOC ~~8th~~
Comm Ctr Operations
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"85" Manually tracked
Echo I
9 Aug

12 AUG 67

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MINUTES OF PROGRAM ACTION PLANNING COMMITTEE MEETING

13 December 1967

1. (U) Place and Time: Conference Room 1, HQ 9 Aerosp Def Div 1330 hours.

2. (U) Members Present and Organizations Represented:

Colonel Rossoff	9CCS
Colonel Gabus	ADMTF
Colonel Adams	9ODC
Colonel Yaden	9CIG
Colonel Ybarra	9MDC
Colonel Fletcher	9DEC
Colonel Derezinski	71MME
Lt Colonel Best	9OSD
Lt Colonel Parks	1CDF
Lt Colonel Coleman	9OSD
Lt Colonel Portrum	9CJA
Lt Colonel Drake	9MDC
Major Barkus	9OTT
Major Maxwell	9OEW
Major Cayer	9DEC
Major King	9AAC
Major Bigler	9OSD
Captain Josef	9OEW
Captain Jordan	10OP
Captain Bruno	71MDC
Captain Cooksey	ADMET
Lieutenant Smith	9OSD
Lieutenant Geyerhahn	9OSD
Lieutenant McTighe	9PDC
Mr. Smith	9OAC
Mr. Strong	9DEC
Mr. Stark	9DEC
Mr. Lane	9EDC
Mr. Koskella	9EDC
Mrs. Seese	9CIO

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3. (S) (U) SLBM (474N).

a. (U) Introduction: Major Maxwell, 9OEW.

b. (S) (U) Resume of Discussion:

(1) (S) (U) Significant Events:

(a) (S) ADC has received new schedules from ESD for Installation, Installation Testing, Category I Testing, and Category II Testing. Generally speaking, Category I Testing will be conducted from February 68 to June 68; Category II Testing from April 68 to mid-July 68. Operational date as mid-July 68. However, AVCO has emphasized that this schedule is the best current estimate (as of 1 November 67) based on the clearing of GFE site discrepancies. Difficulties encountered in computer program checkout may slip the end dates by one month (15 August 68). "Worst case" tube experience could slip the end date even further (31 August 68).

(b) (U) On 5 December 1967 ADC chaired a meeting to review the comments to ESD on the DIP Modification Statement of Work. Attendees represented CONAD, ADC, ESD, 9ADD, 1ACS and RCA.

(2) (S) (U) Program Progress. Only changes in program progress are reported:

(a) (C) #11/12/13 Equipment on Site, Installed, and Tested. Revised to extend through mid-April 1968.

(b) (C) #26 Category I Testing. Revised to extend from 1 February 1968 to 1 June 1968.

(c) (C) #28 Category II Testing. Revised to extend from 1 April 1968 to mid-July 1968.

(d) (S) #27/29 IOC/FOC (DASS). Revised to mid-July 1968.

(3) (S) (U) Critical Problem Summary.

(a) (U) Program Slippage. Official schedules arrived from ESD showing revisions briefed in para b above.

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(b) (U) Varian Tube.

1. The low early production yield, coupled with an anticipated high consumption rate during the "learning period" of use, continues to jeopardize the SPO acquisition schedule.

2. Users, other than SLBM, with higher priority are obtaining delivery of the Varian tube for their own purposes. It is expected this type of action will increase; availability for the SLBM program will suffer accordingly. On 9 November 67 the SPO sent a letter to USAF requesting action to prevent future diversion of the tubes.

3. As of 11 December 67 the production on the past twelve tube starts has been:

TUBE #	STATUS
37	Varian reworking
38	AVCO accepted as spec tube (11 Dec)
39	Failed
40	Apollo took priority
41	AVCO rejected - High gas
42	Scrapped - clamping*
43	Scrapped - clamping*
44	Scrapped - leaking
45	Scrapped - went to air
46	Testing - looks good
47	Testing - exhibiting clamping
48	Testing - clamping problem

*Clamping - with age must continually increase drive level to keep up proper output.

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(c) (U) Gear Problem. Kaydon shipped the two reconditioned assemblies on 8 December 67 to Mt. Laguna and Charleston. Installation at Charleston was completed on 11 December 67. ADMME anticipates installation at Mt. Laguna to be completed by 1 January 68.

(d) (U) Integration Problems. Three items have had significant progress:

1. Program revisions have been received.

2. The indoctrination tour by the ADC briefing team has been rescheduled to occur in early January 1968. Capt Juntunen (9OEW) will represent 9ADD.

3. ADC Civil Engineering gives the following status of the housing situation at the SLBM sites:

Charleston - will retain 204 units at Dow AFB.

Mill Valley, Mt. Laguna, Mt. Hebo - received authority for leases.

Ft. Fisher - 50 units included in FY 69 program.

MacDill - 300 units included in FY 69 program.

Laredo - 400 units approved for FY 68.

(e) (S) Missile Warning Display System. The DIP Modification Statement of Work was reviewed by ADC and CONAD for final comments to ESD. AVCO will furnish all user panels for the Display System and will install all panels except those for the NCMC. These will be installed by either RCA or GEEIA. The scheduled operational date for the panels is expected to slip approximately three months from December 68 date. ADC still expects the DIP Mod to be completed by December 68.

(f) (U) Program Status Summary. As a result of the revised program dates, all items are now either complete or on schedule.

4. (S) (U) 440L (AN/GSQ-93).

a. (U) Introduction: Capt Josef, 9OEW

b. (S) (U) Resume of Discussion:

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(1) (S) (U) Significant Events.

(a) (S) The draft Memorandum of Agreement reached on 8 December 67 pending ADC/ESD staff approval states interim responsibilities and relationships in the operation of the 440L System. Principles of Agreement:

1. ESD/440L SPO retains complete responsibility for and control of the 440L OTH System until system turnover.

2. ADC is responsible for release and dissemination to specified users of the tactical warning product from the CC.

3. ADC will, except for operational necessity, observe a policy of non-interference with ESD's development, modification and testing of the evolving 440L System. Operational necessity is defined as failure (operational capability red) of any one of the three BMEWS forward sites, or a national military defense readiness condition, DEFCON 3 or above (non-exercise); or maximum operational posture directed by the JCS (NMCC). The agreement will be distributed to the HQ 9ADD staff when it is finalized.

(b) (S) HQ USAF has informed the UK Ministry of Defense that the alternate Correlation Center, originally planned for Feltwell (R-6), has been deleted from the program. The UK intends to operate R-5 and R-6 under existing agreements pending formal negotiations with ADC. Data concerning IRBM/MRAM detections is being di[illegible].

(2) (S) (U) [illegible]

(a) (U) ODC: No change.

(b) (S) MDC: The preliminary 11-4s have been sent to all sites. Replies have been received from Aviano, Wallace, and San Vito. 9MLP has requested USAFE to expedite all agreements in anticipation of early manning requirements. Mr. Postlewaite will visit all European sites in January 68 for final coordination.

(c) (S) DEC: HQ USAF states that they will contact the Corps of Engineers in an attempt to expedite the Aviano July 69 BOD.

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(d) (S) OAC: ADC has secured funds to call up an unsecure voice circuit between NCMC and Aviano by March 68. A 100-WPM secure TTY from Aviano to NORAD and SAC will be available by 1 January 68.

(3) (S) (U) Critical Problem Summary. ADC still has not formulated a position as to the three alternatives of turnover of System 440L:

(a) Incremental turnover.

(b) Complete system turnover.

(c) Deferred incremental turnover.

A position is required to determine training and personnel requirements.

(4) (U) Program Status Summary.

(a) Budget - On schedule.

(b) Civil Engineering - Reflect revised BODs.

(c) Materiel - 11-4 negotiations in progress.

(d) Manpower - Pending acquisition directive and turnover date.

(e) Personnel - Awaiting training schedules.

5. (U) BAKER-NUNN Southern Hemisphere.

a. Introduction: Lt Smith, 9OSD.

b. Resume of Discussion:

(1) No change in Objectives, Hardware and Facilities.

(2) Significant Events: The University of Canterbury is concerned over changes that HQ USAF made in the lease and wrote General Agan to ask if the changes could be taken out.

(a) A lease for a period of five years must have clause to cancel on a yearly basis and renew on a yearly basis.

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(b) Modifications concerning claims arising from damages from our breech of the lease now provide for us to have control over determination of liability or the amount of damage.

(c) Modification concerning termination of the lease by either universities if they stop use as an Astronomical Observatory now gives us a more reliable tenure.

(d) U.S. may not legally agree to a contract containing a provision for arbitration where an arbitrator may decide questions of U.S. Goverment's liability. These matters must be solved through diplomatic channels.

General Agan replied that they could not. Due to this fact, the lease must be recirculated to all concerned agencies in New Zealand. ADC requested the United States Air Attache (USAIRA) to assist the University in any way possible to expedite lease.

(3) Program Schedule: All items slipping pending country-to-country agreement.

(4) Program Status Summary: New construction schedule has been received from Navy construction as shown:

A/E Contract	11 Dec 67
95% Design and Review	23 Feb 68
On Board Review	11 Mar 68
Complete Design	25 Mar 68
Advertise	8 Apr 68
Open Bids	4 Jun 68
Award Contract	19 Jun 68
Complete Construction	1 May 69

This schedule gives ADC more time to get lease and country-to-country agreement signed.

(5) Critical Problem Summary: If the lease and country-to-country agreement are not signed by 8 Mar 68, construction schedule could slip by as much as six months due to winter weather.

c. (U) Action Required: All items will be rescheduled after signing of the country-to-country agreement.

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6. (U) AN/FPS-85.

a. Introduction: Maj Bigler, 9OSD.

b. Resume of Discussion:

(1) Significant Events:

(a) While no formal acknowledgement has been made by ESD of a new date, the contractor notified RADC on 28 November that he would not be ready to start Category II until 1 February. Commander, ESD will make a formal announcement of the new IOC date after the total slippage has been determined. The earliest IOC date would be 1 May if Category II remains 90 days as previously agreed.

(b) On 2 December the AN/FPS-85 performed its first fully automatic satellite track. The target, Object #309 (TIROS-5), was tracked at an average range of 2000 KM for seven minutes. The size of the object is approximately one square meter. This was not the final software package; however, it does indicate that all system interfaces are functioning as required.

(2) Program Progress:

(a) Emergency Power Plant completion of testing delayed until 1 January 68. The switch gear is installed, however, the load bank indicator has not arrived on site and the check out will require about two weeks after the load bank indicator arrives.

(b) The 2400 BPS Data Link between Eglin and Hanscom is still losing data bits. Beckman has installed an additional 48 bit buffer to solve the problem.

1. The Beckman equipment was removed from CMC and shipped to Beckman on 15 November. Reinstallation is scheduled to be complete by 26 December and Category II test of the data link circuits is scheduled to start 4 January 68.

2. A problem involving the interface of data link and software interface has been revealed. The software cannot handle large blocks of continuous data from the data link (more than five seconds of data), and have enough

1758

time to control the radar. The contractor and ADMTF are analyzing the problem and will determine the corrective action required.

(c) Category start date, IOC and FOC dates will be determined with the announcement by Commander, ESD as stated in Significant Events.

(3) Critical Problem Summary:

(a) Category II start date is the principal item and the total delay will not be known until the ESD announcement.

(b) The Software/Data Link interface problem, covered above, requires corrective action prior to Category II.

(4) Program Status Summary:

(a) Civil Engineering:

1. Emergency Power to be completed 1 January.

2. Damage cable for both east and west banks to be replaced by 1 January 68. The cable for the east bank is being replaced now and the cable for the west bank is expected on site in time to meet the 1 January 68 date.

(b) Software: The RICE computer control package scheduled to be completed by 5 January 68. This package is required before testing of the software's control over the sensor can begin.

(c) Communications:

1. Data Link Category II to begin 4 January.

2. Internal communications are approved and funded, however, no date for completion has been announced.

3. The microwave installation is currently underway with completion scheduled for 15 December 67.

7. (C) (U) COMSAT.

a. (U) Introduction: Mr. Smith, 90AC.

b. (C) (U) Resume of Discussion:

(1) (U) The Objectives, Hardware, and Facilities remain unchanged.

(2) (C) Significant Events: A fire within the air-conditioning system of the Equipment Building, Radiation Laboratories, has necessarily delayed shipment of Ground Terminal #7 (Shemya) to an estimated date of 15 January 68. This fire caused soot and dirt particles to fall on component parts of the Terminal which necessitates thorough cleaning and inspection prior to assembly.

(3) (C) (U) Program Schedule:

(a) (U) Support construction is complete.

(b) (U) Personnel at site: Readjustment of PCS orders on personnel has been requested, insofar as practicable, due to delay in Terminal availability. (Two personnel have reported on-site).

(c) (C) Factory availability of Terminal equipment: 5-15 January 68.

(d) (C) GEEIA Installation: February 68.

(e) (C) Test and Acceptance: February 68.

(f) (C) FOC: February 68.

(4) (C) Critical Problem Summary: Terminal availability has slipped from October 1967 to January 1968.

(5) (C) Program Status Summary:

(a) Slippage of Terminal delivery to January 68.

(b) FOC: February 68.

c. (U) Action Required: Follow-up action by 9DEC to ascertain whether renovated barracks meets the minimum acceptable standards to quarter seventeen airmen being assigned the 16 Survl Sq. Providing barracks cannot be occupied due to unacceptable conditions, immediate action is required to assure quarters space is available to house these airmen. (9DEC)

8. (U) Summary of Required Action:

a. 9OSD. Reschedule all items in 9ADD PAD 65-1, Southern Hemisphere BAKER-NUNN, after signing of country-to-country agreement.

b. 9DEC. Follow-up action to ascertain whether renovated barracks meets the minimum acceptable standards to quarter 17 airmen being assigned to the 16 Survl Sq. Providing barracks cannot be occupied due to unacceptable conditions, immediate action is required to assure quarters space is available to house these airmen.

FOR THE COMMANDER

Bill R Adams

BILL R. ADAMS, Colonel, USAF
Deputy Chief of Staff Operations

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9MME

SEP 27 1967

Report of Staff Visit and Conference

9CCR

1. Organization visited: 20 Survl Sq, Eglin AFB Fla.

2. Date: 6 to 8 Sep 1967.

3. Purpose of visit: To attend a conference on establishing operability status parameters for the AN/FPS-85 (6 and 7 Sep 1967) and to discuss maintenance reporting procedures (8 Sep 1967).

4. Persons performing visit:

a. *Maj R. Miller, 9OSD.

b. Maj D. Sperling, 9MME.

c. *Mr. G. Marcu, 9OAC.

d. Mr. F. Thomas, 9MME.

*6 and 7 Sep 1967 only.

5. Principal persons contacted:

a. Operability conference:

(1)	Col Gabus	ADC (ADMTF)
(2)	Col Welhelmi	20 Survl Sq (20CCR)
(3)	Lt Col Bergstron	ADC (ADMTF)
(4)	Lt Col Kurtz	20 Survl Sq (20ODC)
(5)	Lt Col Green	20 Survl Sq (20OAC)
(6)	Maj Lagarde	73 Aerosp Survl Wg (73MME)

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(7) Capt Stute	ADC (ADMTF)
(8) Capt Saccoliti	20 Survl Sq (20ODC)
(9) Capt Mentler	73 Aerosp Survl Wg (73OPL)
(10) SMSgt Creager	73 Aerosp Survl Wg (73MME)
(11) Mr. Vahey (Civ)	ADC (ADMME)

b. Maintenance reporting meeting:

(1) Lt Col Green	20 Survl Sq (20OAC)
(2) Maj Lagarde	73 Aerosp Survl Wg (73MME)
(3) Capt Stute	ADC (ADMTF)
(4) SMSgt Browning	20 Survl Sq (20OAC)
(5) SMSgt Creager	73 Aerosp Survl Wg (73MME)
(6) SMSgt Leither	20 Survl Sq (20OAC)
(7) MSgt Jay	20 Survl Sq (20OAC)
(8) MSgt Benton	20 Survl Sq (20OAC)

6. Discussion:

a. Operability conference comments:

(1) The meeting convened at 0900 hours on 6 Sep 1967 with introductory remarks from Col Welhelmi and Col Gabus outlining the purpose of the meeting and offering guidance as to specific objectives. After the opening remarks the meeting was chaired by Lt Col Bergstron for time period 6-7 Sep 1967.

(2) The first day of the conference was spent in identifying significant operational functions of the AN/FPS-85 radar and peripheral equipments, and their relationships to the prime missions of the sensor site. These functions are identified in Attachment #1.

(3) The second day of the conference was spent in determining the relationship of real time, non-real time, and total non-availability of the sensor functions to operational status conditions Green, Yellow, and Red. These relationships are depicted in Attachment #1. Logic diagrams

depicting the above relationships were also developed and are depicted in Attachments #2 and 3.

(4) It should be noted from Attachments #1, 2, and 3 that no operability status conditions for the "power aperture" product (transmitter and array power and receiver array sensitivity) of the radar were determined during the meeting. While this subject was discussed at length, no firm decision could be reached in view of recent developments related to performance and life expectancy of the 4CPX250K final amplifier transmitter tube. This item will be the subject of a special classified report to be submitted at a later date. It is anticipated that AN/FPS-85 status as it relates to the power aperture product shall be established prior to IOC.

(5) It was the mutual and logical opinion of all conferees that the operational status conditions depicted in Attachments #1, 2, and 3 are at best a starting position subject to revision as operational experience is gained.

b. Maintenance reporting (ESR) meeting comments:

(1) During the third day of subject visit, a meeting was convened to discuss AN/FPS-85 ESRs.

(2) During this meeting it was mutually agreed that all AN/FPS-85 ESRs would be opened and closed by the 73 Aerosp Survl Wg MCC and that the 73 Aerosp Survl Wg V-25 Report would include AN/FPS-85 status information. All attendees also agreed that equipment outages of less than two minutes' duration would not be a reportable item, thereby applying the same criteria applied to the BMEWS and the rest of the SPACETRACK system.

(3) Mutual agreement was reached by all attendees that any further discussion and attempts to determine ESR procedures would be premature and dependent upon finalization of establishment of system operability parameters as covered in paragraph 6a above.

Frederick F. Thomas
FREDERICK F. THOMAS
Electronics Engineer

~~DANIEL P. SPERLING, Maj, USAF~~
~~Ch, Maint Mgmt Div~~

3 Atch
1. Operational Status of the AN/FPS-85
2. Diagram - Component Status
3. Diagram - SLBM Status

APPROVED:

Walter R. Livingston

WALTER R. LIVINGSTON, Lt Col, USAF
Director of Maintenance

APPROVED:

[illegible] BY

TOY B. HUSBAND, Col, USAF
DCS/Materiel

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1-20 Survl Sq (20CCR) (20OAC)
73 Aerosp Survl Wg (73MME)
(73OPL)

OPERATIONAL STATUS

OPERATIONS FUNCTION	REAL TIME	NON-REAL TIME	NOT AT ALL
SLBM Detection	Green	Red	Red
Unknown satellite detection	Green	Red	Red
Known satellite acquisition	Green	Red	Red
Tracking (Within Nominal)	Green	Red	Red
Extended Range Tracking	Green	Yellow	Yellow
Doppler	Green	Yellow	Yellow
40/200 cycle SOI	Green	Yellow	Yellow
1/10 cycle SOI	Green	Yellow	Yellow
SOI playback	Green	Yellow	Yellow
Data link SLBM	Green	Yellow	Yellow
Data link satellite	Green	Red	Red

9MME, Atch #1, Report of Staff Visit and Conference, 27 Sep 1967

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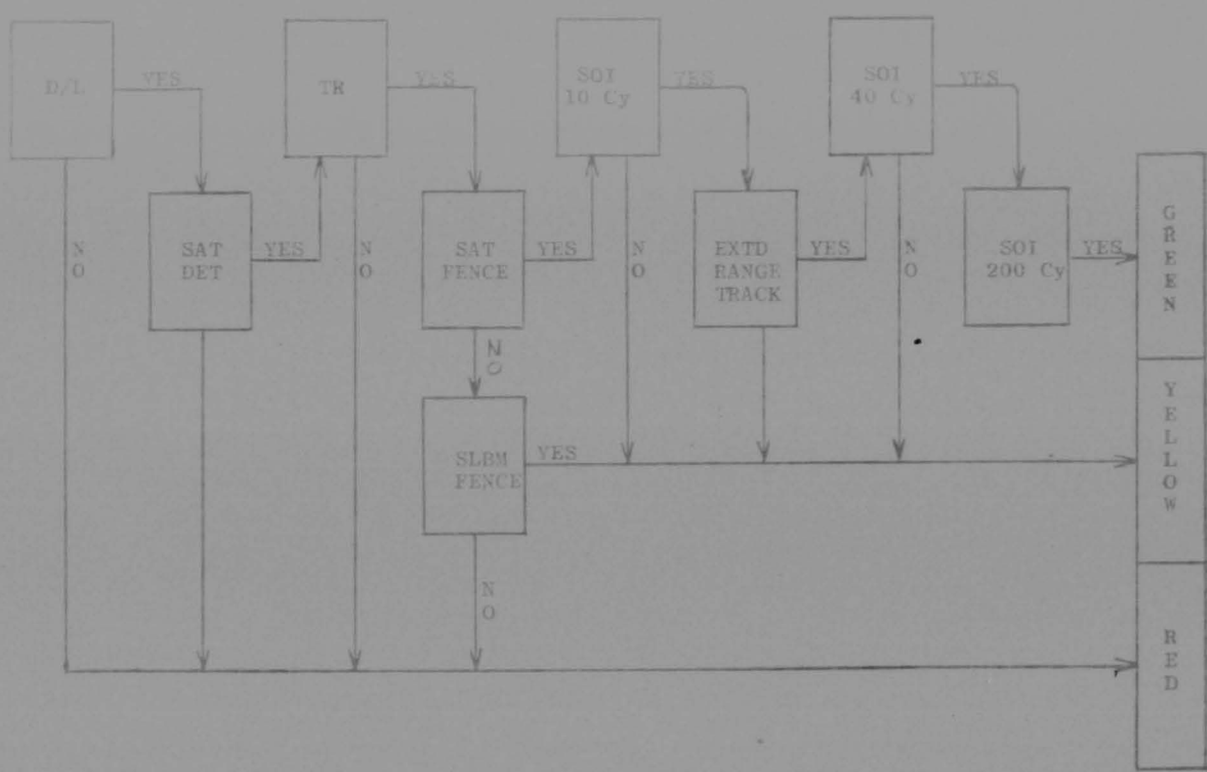
COMPONENT STATUS



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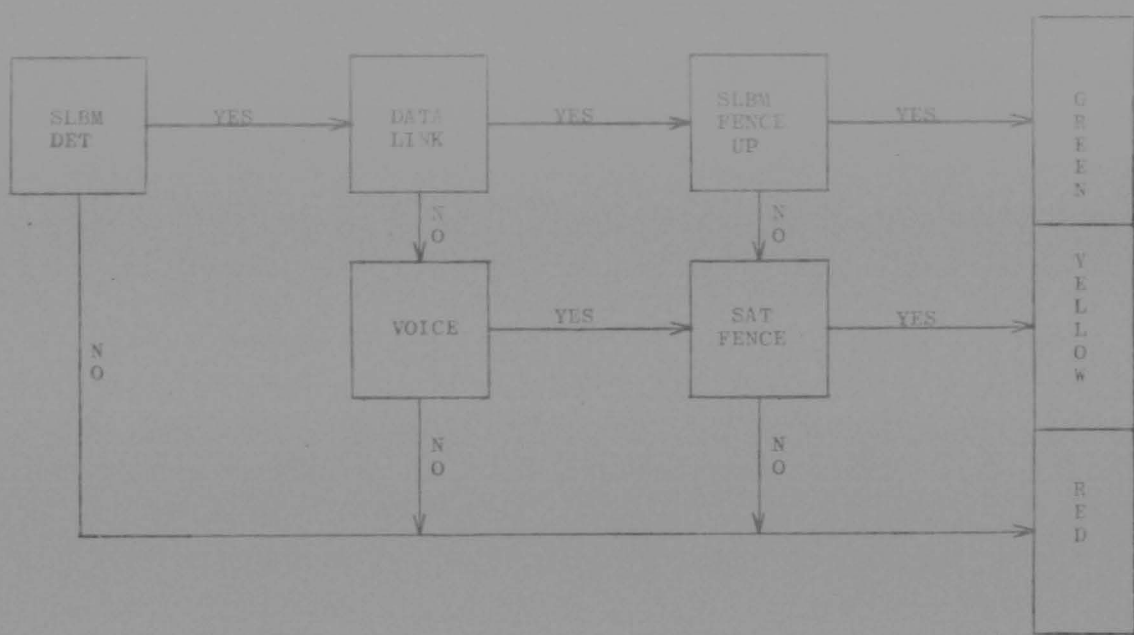
SLBM STATUS



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A STUDY REPORT ON BMEWS SUPPORT OF SPACETRACK

25 October 1967

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A STUDY REPORT ON BMEWS SUPPORT OF SPACETRACK

25 October 1967

FOREWORD

This report points out the many actions already taken to provide increased support of SPACETRACK by BMEWS Sites I and II. It also illuminates a number of procedural, equipment, and program limitations which restrict the sites from rendering even better support. Each limitation is accompanied by a recommendation.

I desire that the Commanders of 71 Msl Wng Wg and 1 Aerosp Con Sq, and the Deputy Chiefs of Staff of this headquarters, review this report with the thought in mind of eliminating the limitations listed, plus new problem areas that arise. Your personal continuing attention is required if we are to attain the desired objective: maximum utilization of BMEWS sensors as SPACETRACK contributors.

ORIS R. JOHNSON, Maj. General, USAF
Commander

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CONTENTS

This document is classified SECRET because it discloses operational data of BMEWS and the USAF ADC SPACETRACK System.

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CHAPTER I

B M E W S / S P A C E T R A C K

O P E R A T I O N S

SECTION A - INTRODUCTION

1. (S) (U) INITIAL DEVELOPMENT. BMEWS and the present SPACETRACK system were initially developed for completely different reasons. The following brief histories of the two systems were derived from 9ADD and ADC historical documents.

a. (S) BMEWS Development. Initially BMEWS was designed to detect and provide early, reliable warning of a mass ballistic missile attack against the Continental United States, Southern Canada, and the United Kingdom. Thule became operational on 1 October 1960, with four AN/FPS-50 detection radars (DR) and an AN/FPS-49 tracking radar (TR). Clear became operational on 30 June 1961, with three AN/FPS-50 DRs. USAF authorized the AN/FPS-49 TR for Thule until the Fylingdales site was operational (16 March 1964). Further testing of the Thule TR showed that a tracker increased warning time, minimized false alarms, and provided high confidence data, all of which helped confirm ADC's requirement for a TR at Clear. Nevertheless, it was late 1963 before USAF approved the TR for Clear, and late 1966 before the AN/FPS-92 TR became operational at Clear.

b. (U) SPACETRACK System Development. On 4 October 1957, the Soviet Union launched SPUTNIK I and the United States became aware of the fact that it had almost no capability to detect, track, or identify man-made space objects. On 19 December 1958, the Advanced Research Projects Agency called for the establishment by the USAF of a SPACETRACK Filter Center at Bedford, Massachusetts. The Air Research and Development Center (now AFSC) was delegated the SPACETRACK mission in early 1959 and immediately established a central data processing center at L. G. Hanscom Field. The Air Defense Command (ADC) was designated as the eventual operator and the first contingent of ADC personnel began training in space tracking at L. G. Hanscom Field in November 1960.

2. (U) BMEWS SUPPORTS SPACETRACK. SPACETRACK has continually increased its contribution to using agencies. The rapid increase in this contribution, together with the increasing satellite population, precipitated the requirement to consolidate and identify the Department of the Air Force operational responsibilities for space detection and tracking. This guidance was provided by the Air Force Chief of Staff on 10 January 1963, in a

message to all major air commands. The new concept provided that the Air Force facilities which could contribute directly or indirectly to aerospace defense would be integrated into the USAF SPACETRACK System if they were capable of providing a significant contribution. This led to the announcement of a secondary mission for BMEWS and started the planning for the integration of BMEWS into the SPACETRACK system.

3. (U) MISSION DIRECTIVES. The mission directives of the 1 Aerospace Control Squadron (9ADDR 23-1) and the 71 Missile Warning Wing (9ADDR 23-2) were reviewed and found to be satisfactory.

a. Particular emphasis was placed on the exact wording of the 71MWW directive in regards to its mission of providing SPACETRACK support. The SPACETRACK mission is a clearly defined function but the mission must be accomplished without degrading the missile warning mission. The rules regarding employment of the FPS-92 (Clear TR) and FPS-49 (Thule TR) to supplement the sites' detection radars should be thoroughly analyzed to determine the specific circumstances in which degradation of the missile warning mission would occur.

b. The Statement of Work that determines RCAS support to the missile warning squadrons was also examined. This document is considered adequate and is supported by military and contractor documents. The Satellite Group at Sites I & II have performed the SPACETRACK requirements well within the established criteria.

4. (U) ORGANIZATION.

a. The 1 Aerospace Control Squadron was reorganized on becoming fully operational in Cheyenne Mountain. At that time Missile Warning Operations (1CDF) was placed under Systems Operations (1ODC) and was a lateral organization with Space Defense Center Operations (1OSC). Upon the recommendation of the ADC Manpower Team, 1CDF was returned to the same level as 1ODC, which once again made it a separate branch reporting directly to the Commander of the 1 Aerospace Control Squadron. The relationship of the Space Defense Center Senior Director (SDCSD), the Missile Warning Officer (MWO) and the BMEWS Space Surveillance Officer (SSO) was not affected because of this reorganization. The MWO (representing 1CDF) exercises operational control of the forward site on all matters affecting missile warning operation. The SDCSD exercises operational control of the forward site on matters pertaining only to SPACETRACK-with information being passed to the MWO. All actions relating to SDC and BMEWS Sites I & II, with the exception of consolidated tasking, are accomplished by the SDCSD.

b. The organizational structure of the 12th and 13th Missile Warning Squadrons provides the SSO with 24-hour operational control over the technical site which includes Systems Controller, the Satellite Group, and the SOI Section. The SOI Section reports directly to the Operations Officer as does the SSO. This reporting is necessary because the SOI Section does not have sufficient personnel for 24-hour operation and is, therefore, considered a day section. (The discussion on augmenting the SOI Section for 24-hour operation appears under the section "SOI Manning.")

5. (S) (U) DEVELOPMENTS THAT IMPROVED BMEWS SUPPORT TO SPACETRACK. Since the establishment of the BMEWS SPACETRACK Mission, which was a previously unexpected by-product of BMEWS operations, the system has provided satellite information to the SPACETRACK Program in ever-increasing amounts and in an ever-more-refined state. The following is a brief list of the more important improvements made to the system which accounted for the increased BMEWS support to SPACETRACK:

a. (U) Satellite Information Processor (SIP). The Missile Impact Predictor (MIP) Operational Computer Program was expanded with the addition of SIP in September 1965. The MIP-SIP Program essentially provided three major improvements:

(1) SIP Identification of Q-Points. The program automatically attempts to identify all DR and TR observations (Q-Points) with the use of S-Points (predicted Q-Points) which are automatically fed into the computer from an S-Point tape. All identified satellite Q-Points are tagged with the object number and automatically transmitted to the SDC by data link if the SDC has requested observations on the object.

(2) Extended Manual Track. A new tracking option, extended manual track (M/T), was provided which enabled the TRs to better acquire and track satellites. M/T is initiated by computer card input to the operational program (MIP-SIP).

This action forces the TR to the predicted lock-on point at the appropriate time. The TR then automatically goes into a one degree circle scan search pattern for one minute. If the satellite is found, automatic acquisition and track follows. If lock-on does not occur, the TR is automatically released. It can be seen that accurate predictions are required to insure M/T success.

(3) SIP Automatic Track (Auto Track). Another change to the operational programs provided the sites with a second tracking option, i.e., auto track. Auto track requests can be made, by computer card input to the program, on specific satellites and/or on objects identified by SIP as uncorrelated targets (UCTs). Under this tracking option the TR will be automatically designated by MIP-SIP to track DR or TR scan Q-Points identified by SIP as the requested objects. Auto track is better than M/T when accurate predictions are not available, which is the case for new launches and decaying satellites.

b. (U) Advanced MIP-SIP. This change to the operational programs modified and improved the ability of SIP to identify Q-Points before they are automatically transmitted to the SDC by data link. This change was installed in June and July 1967, at Sites I and II, respectively.

c. (U) The Satellite Predictor, Tabulator, and Manual Track Punch (SMTP) Program. The Off-line SMTP Computer Program was developed and written by the members of the Satellite Group at Clear in 1966 and is in present use at Thule and Clear. The program has several features, but essentially it calculates the best lock-on point for TR acquisition and track of tasked objects, and produces the appropriate M/T computer request cards. The inputs to the SMTP Program are the element sets of the tasked objects.

d. (S) (U) Space Object Identification.

(1) (S) The purpose of the Clear TR was originally defined as a means of filling the so-called "Eastward Gap" in BMEWS between Clear and Thule. Later, System Evaluation established that this gap in DR coverage was more apparent than real. This evaluation plus the requirement to support SPACETRACK apparently precipitated the approval to install the current SOI facility as part of the Clear AN/FPS-92 installation. It is the only SOI facility to be installed at a BMEWS site. One of the factors leading to this installation was the fact that Clear is

in an excellent position to provide early SOI data on Soviet launches with a very high inclination angle.

(2) (U) The location of BMEWS Site I, Thule, has made it an impractical location for an SOI facility. By the time Thule is capable of gathering SOI information on a new launch, several other sensors have already had a number of opportunities. This is not to say that an SOI facility may not be practical some time in the future, as new Soviet launch sites are activated and totally new inclination angles are attempted.

SECTION B - SPACE DEFENSE CENTER DATA REQUIREMENTS

6. (U) PURPOSE OF TASKING.

a. The Space Defense Center requires observational data on the satellites it maintains because of the limited prediction capability inherent in all orbit representation theories existent today. The desired quantity, quality and space time distribution of these data varies with many parameters, i.e., inclination, eccentricity and semi-major axis, the type of orbital elements, and the importance of the object determine the quality and quantity of observations needed. Data required to maintain a precision orbit is greater than that required for routine maintenance of a stable object. In addition, multiple sensor observations throughout the entire orbit is an important consideration in precision orbit determination.

b. To ensure efficient use of limited Space Defense Center observational data storage, it is necessary that selective tasking be utilized. Selective tasking is the assignment of the satellite inventory to the sensors in such a manner that over-all catalog quality and individual quality standards are maintained without exceeding the limitations of the Space Defense Center. Another consideration is the imminent saturation of the capacity of system trackers.

c. SOI tasking is established to ensure an orderly flow of a specified number of reports from SOI capable sensors.

7. (U) TASKING PROCEDURES. Tasking is accomplished in accordance with the SDC Tasking Manual. SDC has recently updated this manual to include more realistic and better defined tasking procedures: this document is currently pending a decision by NORAD and ADC as to the publication agency. The tasking manual specifies the exact quantity of observational data and SOI reports that are required to accomplish a specified task.

SECTION C - OPERATING PROCEDURES

8. (S) (U) PRESENT. The following is a brief description of the present procedures used at Clear and Thule in response to various types of SDC tasking. These procedures are explained in detail in 71MWWM 55-3.

a. (U) DR Consolidated Tasking. Twice a month the sites are furnished with a list of objects for which the SDC desires DR Q-Points. When the list is received by the SSO, he relays it to the Satellite Group which modifies the S-Point tape to set the transmission bit for each object on the list. From this point on everything is automatic. When the program identifies a DR Q-Point as a tasked object, the Q-Point is automatically transmitted to the SDC by data link.

b. (U) TR Consolidated Tasking. Sites are also furnished twice a month with a list of objects for which the SDC desires TR Q-Points. When the list is received by the SSO, he relays it to the Satellite Group which, in turn, uses the SMTP program to generate M/T computer request cards for the objects on the list. They then deliver the M/T cards to the MIP duplex operator and deliver a printout of the predictions to the Tactical Operations Room (TOR). The TTC operator is responsible to the SSO for insuring that the proper M/T card is inserted into the computer at the correct time. To accomplish this the TTC operator calls the MIP duplex operator and requests, by card number, that the M/T card be inserted into the computer. Three M/T cards are produced for each pass of a tasked satellite. Thus, if the first card does not result in a successful track, the second card and, if necessary, the third card is used.

c. (U) Special Tasking. Frequently the sites receive special tasking on objects that are of a special interest to the SDC and for which the SDC desires TR Q-Points. Examples are decaying objects and SDC orbital analysts objects. This tasking is normally of higher priority than the consolidated tasking. All TR preventive maintenance is canceled for the time periods when high priority satellites are predicted to penetrate site coverage. M/T computer cards are prepared as described above. In addition, the TTC operator's prediction list is used to make auto track requests whenever possible. The SSM is responsible to the SSO for determining the best azimuth and range limits in making the auto track request. The SSM then instructs the TTC operator to manually put the TR into a scan pattern in the area of the expected site penetration of the satellite. The SSM then instructs the MIP duplex operator to insert the appropriate auto track request cards into the computer. This auto track procedure, of course, cannot be used if the expected area of site penetration is outside of the present restricted coverage of the TR. The M/T cards are used as backup. Thus, if a successful track is not accomplished as a result of the auto track requests, the M/T cards are inserted into the computer until the object is acquired and tracked. Once accurate element sets are received by the sites M/T is used exclusively.

d. (C) Automatic Tasking. The set procedures used to accomplish automatic tasking are the same procedures described in the preceding paragraph. All TR preventive maintenance is canceled while automatic tasking remains on a high priority basis.

(1) (C) Foreign Launches. Tasking is automatic upon receipt of a notification messages which indicates a nominal launch folder or upon receipt of a Shemya element set by Thule as specified in 9ADDR 55-5.

(2) (U) Domestic Launches. Tasking is automatic upon receipt of a notification message which contains pre-launch nominal elements and look angles transmitted at least 24 hours prior to launch.

(3) (U) System Readiness Test. Tasking is automatic upon receipt of a notification message which indicates the object number.

e. (U) SOI Tasking.

(1) Automatic Tasking. This tasking corresponds to that described above in paragraph 8d. In each case the SSO alerts the SOI analysts. The SOI analysts are recalled if the tasking occurs during their off-duty hours. Once tracking is accomplished, the SOI analysts analyze the TR radar return recording and transmit the appropriate SOI reports to the SDC in accordance with the SDC tasking system.

(2) Routine Tasking. The SOI section at Clear is required to submit weekly and monthly SOI reports on specific objects. M/T cards are prepared and tracking is executed as

described in paragraph 8b on the number of passes that the SOI analysts deem necessary to accomplish comprehensive SOI analyses.

(3) Special Tasking. Periodically the SOI section at Clear is tasked to submit a one-time SOI report on a special object. The tasking message may contain special instructions. For example, the analysts may be requested to determine if a boom had extended on a payload and to determine the length of the boom. Again M/T cards are prepared and tracking is executed as described in paragraph 8b on the number of passes that the SOI analysts deem necessary to accomplish a comprehensive SOI analysis.

f. (U) Double Flip. Clear has additional tasking during periods of Double Flip. The SSO is notified by the SDCSD that Double Flip is implemented. The SSO then requests the MIP duplex operator to insert the appropriate auto track request cards into the computer. When a DR UCT Q-Point is formed within specified azimuth and range limits, the TR is automatically designated to acquire and track the UCT. The SSO communicates with the SDCSD as outlined in 71MWWM 55-3. The SSO insures that the required messages are prepared and transmitted to the SDC. The SDCSD notifies the SSO when Double Flip is terminated.

9. (S) (U) FUTURE. The following is an analysis of the major limitations of the BMEW system to support SPACETRACK. Recommendations for eliminating these limitations are offered.

a. (S) Tracker Utilization. The tracking radars at both Thule and Clear have considerable potential for supporting the SPACETRACK program. However, only a part of this potential is being used. The problem lies not so much in site procedures or in the site personnel's knowledge of how to make the best use of the equipment, but in the current hardware configuration and the operational computer program which restrict the use of the TRs. This is the area which should receive the greatest attention. The following problems have been identified as the major causes of site inability to support SPACETRACK to a greater degree. Each problem statement is followed by a recommended change or a recommendation for further action.

(1) Single Fan Events (SF).

(a) Limitation. All DR and TR scan Q-Points presently undergo discrimination tests in MIP-SIP to determine if they are potential threat Q-Points. If such a Q-Point is determined by the program to be caused by a potential threat object, the observation is identified as a single fan event (SF).

1. SFs caused by DR Q-Points will interrupt a satellite track in progress since the TR is automatically designated by the program to track the potential threat object. Also, the program will not permit the TR to track for SPACETRACK for a period of 210 seconds after an SF is formed in a lower fan or 90 seconds after an SF is formed in an upper fan. Clear and Thule each generates approximately 35 SFs a day.

2. When the TR is scanning to acquire and track a satellite for SPACETRACK and a TR scan Q-Point generates an SF, all tracking is inhibited automatically by the program (except tracking of DR SFs) until the threat level is lowered to a normal value.

(b) Recommendation: SPACETRACK Mode for the TR. Since an over-all BMEW system operability concept has recently come into being and since sector one at Site II, for example, is not considered in determining site operability, the priority scheme for the operational program should be re-examined. Any priority scheme that would significantly reduce the pre-emption of certain SPACETRACK activities by SF events would certainly enhance the SPACETRACK mission. This study group recommends that this proposal be prepared in detail for presentation to the appropriate ADC agency. Toward this end, we recommend that a SPACETRACK mode for the TR be established. Data generated by the TR while in this mode will not undergo SF discrimination tests. This feature will not degrade the missile warning mission of BMEWS.

(2) TR Replacement of DR Sectors.

(a) Limitation. When the TR is required to replace or supplement Red or Yellow DR sectors, it cannot be used for SPACETRACK support.

(b) Recommendation. This study group recommends that the present requirements for the TR to replace or supplement DR sectors be re-examined in the light of the system operability concept.

(3) TR Coverage.

(a) Limitation. The present artificial azimuth and elevation coverage restrictions of the Clear and Thule TR severely restricts TR utilization.

(b) Recommendation. Remove the artificial limitations of the Clear and Thule TRs. Although this change is presently being processed for Clear, the limitation is mentioned here to emphasize its importance. This study group further recommends that the Thule TR coverage be expanded to the maximum and that the Thule TR be given a plunge capability.

(4) TR Scan in Auto Track Mode.

(a) Limitation. Presently the Clear and Thule TRs cannot scan above $22\frac{1}{2}^{\circ}$ in elevation or in the plunge mode at Clear. Presently the M/T tracking option must be used to attempt acquisition and track of satellites above $22\frac{1}{2}^{\circ}$ in elevation. Accurate predictions are required if M/T is to work successfully. Therefore M/T is not suitable for acquisition of new launches, decaying objects, and other satellites where accurate predictions are not available. Auto track employing the TR in the scan mode is the better tracking option for these cases and very often acquisition can only be accomplished at higher elevations than $22\frac{1}{2}^{\circ}$.

(b) Recommendation. Remove restrictions to enable the TRs to scan at all elevations, which includes the plunge mode region.

(5) Force-Acquisition Feature.

(a) Limitation. On occasions when the TR is scanning under the auto track tracking option in attempts to acquire a small target at a large range, a Q-Point is not formed even though one or more TR Data Take-Off (DTO) reports are formed. This will occur when the individual TRDTOs fail to associate in the computer because the radar returns from small targets at large ranges are assigned low credences.

Under the present criteria of the auto track tracking option a Q-Point of high credence must be formed before MIP-SIP will automatically designate the TR to acquire and track. Also, when several objects from a new launch are detected by the scanning TR, MIP-SIP automatically designates the TR to track the object that forms a Q-Point first.

(b) Recommendation: The Target Tracking Console (TTC) could be modified to enable the operator to override the program requirement for a high credence Q-Point, thus forcing the TR to attempt acquisition even on a single TRDTO. With the proposed modification, the TTC operator, under certain conditions, could force the TR to the object he wishes tracked.

(6) Stop-Track and Scan Feature.

(a) Limitation. Under the present criteria of the auto track tracking option a track on an object can only be stopped by the TTC operator in one of two ways: disable auto track by card input to MIP-SIP or request that the TR be put into the test mode and then back to the tactical mode. Both methods are time consuming.

(b) Recommendation. Equip the TTC with a stop-track and scan button. The TTC operator will then be able to stop track on an object and the TR will automatically go into a scan pattern where the track was stopped. This feature would be extremely useful during new launch tracking. When sufficient data has been received on one object in a new launch, the button could be depressed and the TR would immediately scan in search of another object associated with the launch.

b. (U) SIP Identification. In order that the SDC can process BMEWS observations on a real time basis, it is essential that the sites be capable of accurate identification of all Q-Points before they are transmitted automatically to the SDC by data link. This is especially true in the case of uncorrelated target (UCT) identification. Ideally, a Q-Point should be identified as an UCT only when formed on a new launch satellite or a satellite which has not been catalogued by the SDC. Thus, when a UCT Q-Point is transmitted to the SDC, it should serve as a means of alerting the SPACETRACK system that a new object is in orbit and enabling early orbit determination.

Accurate identification is also important to insure successful acquisition and tracking of new launch satellites at the BMEWS sites. Identification is accomplished automatically at the BMEWS sites by the SIP program. However, once SIP determines that a Q-Point is formed by a satellite and not by noise, aurora, etc., tagging the Q-Point with the correct SDC object number presents a problem. The following limitations of the SIP identification process have been identified as the major causes of this problem. Each limitation is followed by a recommended change which will eliminate the limitation.

(1) TR Q-Point Identification.

(a) Limitation. The computer program logic in SIP for identification of all Q-Points is very good. However, in order to identify satellite Q-Points, S-Points (predicted Q-Points) are required for the logic to work successfully. At present S-Points are generated only within DR coverage. These S-Points are extrapolated by SIP in its attempt to identify TR Q-Points which are formed outside of DR coverage. However, extrapolation stops after a certain point, and TR Q-Points formed beyond there are identified as UCTs. S-Points are presently generated from horizon-to-horizon for certain objects of special interest which eliminates the identification problem for those satellites. However, in order to eliminate the problem entirely, S-Points would have to be generated from horizon-to-horizon for each pass of every satellite that penetrates radar coverage. This cannot be accomplished since the computer buffer would be saturated with S-Points.

(b) Recommendation: Identify all satellite Q-Points from element sets. If the element set of each object were fed automatically into the computer each time the object was predicted to enter site coverage, the computer buffer would not be saturated. With the element set the program could generate S-Points as required for any point within site coverage.

(2) Daily Generation of S-Points.

(a) Limitation. Presently S-Points are generated for a 24-hour period using the most current element sets available. When updated element sets are received at the sites after the S-Points have been generated, these updated element sets are not used until the next 24-hour period S-Points are generated. Thus some S-Points are not the most accurate predictions available.

(b) Recommendation. When element sets are used in place of S-Points all updated element sets can be immediately entered into the site element set library, thus providing SIP with the most current information for better identification.

(3) Tape-to-Card Converter.

(a) Limitation. Presently element sets received from the SDC are hand punched at the sites. This delays the time when updated element set can be used by SIP to identify Q-Points which might otherwise be unidentifiable. Inevitably hand punching also introduces errors.

(b) Recommendation. A tape-to-card converter would eliminate these problems. This change is presently being processed but is included here to emphasize its importance.

(4) DR Q-Point Identification.

(a) Limitation. Errors are introduced into the DR Q-Points of satellites when they cross sector boundaries while still in fan coverage. These errors sometimes cause SIP to identify such Q-Points as UCTs when indeed they are catalogued satellites with current S-Points. These same errors also cause DR SFs.

(b) Recommendation. A change to the operational program, fine-report association, is presently being coded at Clear and will be incorporated into the Clear program in the very near future. The change will then be put into the Thule program. This change will eliminate the problem.

(5) Decaying Satellites.

(a) Limitation. It is very difficult for the SDC to continuously furnish the sites with current element sets on decaying satellites. Without current element sets, the SIP program will identify Q-Points formed on decaying satellites as UCTs, which is an undesirable identification for the automatic SDC processing of these Q-Points.

(b) Recommendation. SDC personnel know when a satellite is starting to decay. When the sites are notified, an indicator can be added to the element set of that object and it can be fed directly into computer memory and held there. Additional logic could be incorporated into the SIP identification

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process whereby every UCT would first be matched against that element set with the new indicator before being transmitted to the SDC. If the Q-Point matches within rather wide limits the Q-Point could then be reidentified with that object number and tagged as a decaying satellite and then be automatically transmitted to the SDC by data link. The values of the limits in the new logic would have to be determined experimentally. The major limit change would be the time of the observation.

c. (S) Period of Interest (POI) for Thule and Clear. Procedures are presently being formalized for putting Clear and Thule on POI prior to probable foreign satellite launches. The expected result is that the TRs will track the new launch objects on all initial site penetrations to accomplish early orbit determination. Both sites will be able to accomplish this mission with a high degree of success when the tracker utilization limitations and the SIP identification limitations outlined above are eliminated. Additionally, if the operational programs were given the capability to compute initial orbits, the sites could use them to make additional site penetration predictions. The orbital data could also be sent to other sensors to increase their chances of early acquisition and tracking.

d. (S) Pulse-Compression Modification. Pulse-compression would better enable the Clear and Thule TRs to isolate the returns from one object when more than one object is in the TR radar beam, which is a common occurrence for new launch objects. This feature would improve SOI analyses at Clear when more than one object is in the TR radar beam. Pulse-compression also improves the range accuracy for all TR Q-Points. This modification is presently being processed.

e. (C) Shemya and Diyarbakir Element Sets. The BMEWS sites will receive Shemya/Diyarbakir element sets as soon as 9ADDR 55-5 has been coordinated and published. At the present time only Sites I and III receive Shemya element sets.

f. (U) Sensor Calibration. Thule and Clear Q-Points contain large random errors, especially large time errors. The sources of these errors must be identified and the causes eliminated before BMEWS data can be used to its fullest potential. It is recommended, therefore, that the results from the 9ADD calibration working group be turned into proposals for the reduction/elimination of these errors.

g. (S) <u>TR Acquisition Anomalies</u>. Anomalies have been discovered in the Thule and Clear TR hardware when the radars switch from the acquisition mode to the track mode. Occasionally the TRs failed to acquire a target because of the anomalies. The anomalies were discovered as a result of studies conducted by RCA-DEP at Moorestown. A complete report was prepared by RCA-DEP with recommendations for eliminating the anomalies and was submitted to ADC for their consideration. It is recommended that the proposals made by RCA-DEP be supported and implemented on a timely basis.

h. (U) <u>Fine-Line Spectrum Analyzer</u>. This instrument differentiates between targets by their doppler return. The operator may designate a specific object among several on which he desires data. This piece of equipment is presently out of commission. Efforts at repair by site personnel have failed, and outside engineering aid has been requested. This headquarters opposed the installation of the fine-line spectrum analyzer prior to installation. The primary reason for our position was the fact that Moorestown had never found it useful. In fact, it was dismantled and has not been returned to service. The pulse-compression modification, which will differentiate targets by range return, provides additional reasoning to cease the extensive efforts which are being expended toward repair of this equipment. (It has been inoperative since very shortly after installation in August 1966.)

i. (U) <u>RCA-DEP/ADC Contract</u>. ADC has an operational engineering contract with RCA-DEP. A large number of the tasks which RCA-DEP was requested to accomplish under this contract deal with improving the BMEWS system to provide the best possible BMEWS support to the SPACETRACK program. However, many of these tasks were postponed indefinitely, lacking ADC approval to proceed. This study group recommends that ADC be made aware of the importance of having the tasks completed by RCA-DEP on a high priority basis. It is recommended that the contract be expanded, if necessary.

10. (U) <u>CONSOLIDATED LIST OF OPERATIONS RECOMMENDATIONS</u>.

a. <u>New Recommendations</u>. This study group advocates that the recommendations proposed in the above paragraphs be forwarded to the appropriate ADC agency for their consideration and necessary action on a high-priority basis.

(1) SPACETRACK mode of operation for the TR. Ref para 9a(1)(b).

(2) TR replacement for DR sectors. Ref para 9a(2)(b).

(3) Expansion of azimuth and elevation coverage of the Thule TR. Ref para 9a(3)(b).

(4) Removal of TR scan restrictions. Ref para 9a(4)(b).

(5) Force acquisition feature. Ref para 9a(5)(b).

(6) Stop-track and scan feature. Ref para 9a(6)(b).

(7) Element set identification of Q-Points. Ref para 9b(1)(b).

(8) Element set library updating. Ref para 9b(2)(b).

(9) Decaying satellite Q-Point identification. Ref para 9b(5)(b).

b. <u>Recommendations in Progress</u>. Some recommendations proposed in the above paragraphs are in various stages of implementation. It is suggested that all required actions necessary to complete these proposals be accomplished on a high-priority basis.

(1) Expansion of azimuth and elevation coverage of the Clear TR. Ref para 9a(3)(b).

(2) Tape-to-Card converter. Ref para 9b(3)(b).

(3) DR Q-Point identification. Ref para 9b(4)(b). Coding and verification by RCA-DEP being accomplished at Clear.

(4) Period of interest for Sites I and II. Ref para 9c. Pending approval and coordination from ADC/NORAD.

(5) Initial orbit computation at Sites I and II. Ref para 9c.

(6) Pulse-compression modification. Ref para 9d.

(7) Shemya and Diyarbakir element sets. Ref para 9e.

(8) Sensor calibration. Ref para 9f.

(9) TR acquisition anomalies. Ref para 9g.

CHAPTER II

P R O G R A M   M O D I F I C A T I O N S

SECTION A - SOFTWARE MODIFICATIONS

1. (U) HISTORY.

a. In early 1964, letters were being originated at various levels of 9 Aerosp Def Div to make changes to the operational programs at the sites and the SPACETRACK Center. Procedures for processing these change proposals through the chain of command were non-existent. Also, no directions existed on what information was required from the originator.

b. In November 1964, ADC Manual 55-4 was published and the ADC Space Systems Computer Program Review Board was established. The ADC board required 9 Aerosp Def Div to fully explain and justify each CPCR submitted by 9ADD and subordinate units. 9 Aerosp Def Div was never given an official vote at this ADC board; neither were we always organized to convincingly sell our requests. By establishing a computer program review board at the 9 Aerosp Def Div level on 7 May 65, many of these problems were resolved. Change proposals were staffed and representatives from subordinate units were invited to the meetings to determine if changes proposed by one organization impacted upon another.

c. During the development of the Delta-I programs, it became apparent that operator control was required in software development. A Configuration Control Board (CCB) was established at ADC with 9 Aerosp Def Div (9OCO) acting as Technical Supervisor of program supplements. One of the primary objectives of this board was to arrive at a method of meeting the FOC date. The CCB was continued after FOC of the Space Defense Center at the direction of HQ ADC; thus, effectively, bypassing 9 Aerosp Def Div CPRB control of operational programs. 1 Aerosp Con Sq was primarily involved with the CCB since this was the board that processed change proposals (CPs) for the Delta system. Their participation at the 9 Aerosp Def Div CPRB declined since this board now processed only change requests for the rest of the system.

d. The existence of two boards was an unfortunate development since changes at the sites are often required in reaction to proposed changes at the Space Defense Center. Although, approximately 95% of all changes are routine and have no effect outside of the center or site, the others can cause problems. For example, a relatively simple change approved by the CCB for the SDC to utilize 55000 and 80000 object numbers for special purposes has had an adverse effect on the site programs and has reduced their capability of incorporating more productive system changes.

e. The new ADC Manual 55-4 will combine the two existing boards into one. Implementation of this manual will help restore the system approach that was lost when two separate, independent boards existed.

2. (U) PRESENT PRACTICES.

a. Attachment II-1 shows the steps involved in processing a computer program change request (CPCR). A CPCR can be originated by anyone at any level in the chain of command. Upon receipt, the change is staffed at HQ 9 Aerosp Def Div to provide operating sections an opportunity to review and prepare comments prior to the 9 Aerosp Def Div board meeting. Board meetings are held as often as required. CPCRs classified as emergency changes and all others accumulated since the last meeting are reviewed.

b. A CPCR may be assigned one of three priorities:

(1) EMERGENCY change requests are processed first by direct telephone calls between the operating site and all agencies concerned. Once approval is received, the change is implemented immediately at site. Supporting documentation for this change is submitted within five working days from the site.

(2) URGENT changes require expeditious processing through channels and are processed through HQ 9 Aerosp Def Div within a week.

(3) ROUTINE is the lowest priority and does not require expeditious handling.

c. Most CPCRs fall into the routine category. The normal channel for processing these changes is time consuming, often requiring several months. Since the change can originate at the lowest level of the system, and with final approval authority held at HQ ADC, the channel is long and cumbersome.

d. At the present time, approved requests are forwarded from the ADC board to a programming agency - in the case of BMEWS, RCA-DEP. (RCAS on-site capability is primarily involved in computer program maintenance and not in computer program production.) With the present system, routine changes average two months in the administrative channels. An additional four to six months can pass while the changes are being developed by the programming agency.

e. This time lag is a major problem and is unacceptable insofar as 9 Aerosp Def Div interests are concerned.

f. Adequate, responsive programming capability is a perennial problem. As a part of this study, military programming was examined in light of present practices. Very little can presently be said to support "blue suit" programming at BMEWS sites, when considering existing policies, procedures and contracts. At best, experience would be gained by military personnel and we would not be completely dependent upon the advice of the contractor in areas of computer programming.

(1) The disadvantages are numerous:

(a) Extensive training required.

(b) Effort would be restricted to approved minor corrections and computer program maintenance.

(c) The limited amount of experience that can be effectively gained in a one year tour.

(d) Retainability in the system is poor.

(e) Limited availability of qualified personnel.

(f) Duplication of individual effort at each site.

(2) The AN/FPS-85 is being manned to provide a military programming capability. This effort, which will test the feasibility of the "blue suit" concept, should be carefully studied prior to augmenting or replacing RCA contractor efforts in this area.

3. (S) (U) RECENT DEVELOPMENTS.

a. (U) Advanced MIP/SIP (AMS-1). This program was placed on line at Site III on 14 May 67 and at Site I on 3 Jul 67. This has given the sites additional capabilities to support their satellite mission by providing improved satellite comparison and correlation techniques, high quality data on unknown satellites through the formation of non-threat vectors, and a significant reduction in the number of uncorrelated tracks (UCTs). (The Space Defense Center is presently testing a new SEQUENCE 03 off line to determine the impact of accepting BMEWS UCTs.)

b. (S) (U) Upcoming Changes. Changes recently processed by the 9 Aerosp Def Div board include:

(1) (U) CPCR-DEP-14, Credence, Based on Lost Lock-on Test. This change will avoid the possibility of a TR tracking into buffers during a constant velocity track test. This change should be as effective as the doppler drift test in detecting loss of lock-on during both real and test-tracks.

(2) (U) CPCR-DEP-15, Manual Track Satellite Identification from Cards. This change corrects the logic that identifies manual track from SAPCON track S-point predictions.

(3) (U) CPCR-71-002, Double Plus R-Dot Limit for Manual Track Cards. The present range rate acceptance criteria is based on scan rather than track criteria. A change of limits will increase the number of passes which can be designated for manual track.

(4) (S) OCPCR-77, Fine Report Association. This change was required for multiple target situations that have occurred as a result of satellite breakups. It is important for missile targets, since the occurrence of decaying objects along with missiles would result in target-cluster situations that could be improperly associated by existing program logic. The improved logic of this change also provides better satellite identification.

c. (U) Changes Being Designed. In addition to processed change requests, several proposals are in the design stage. (See schedule, atch II-2)

(1) The UTE technique will alter the time of an element set to correspond to the actual BMEWS observation. By correcting the time in the element set, it will remain valid for more passes. A known satellite will match its element set for a longer period of time and not fail the tests.

(2) The secondary satellite cycle correction will permit separate missile and satellite processing. This will primarily clean up missile processing. Satellite processing will be automatically inhibited by logic if a heavy environmental condition occurs. Consequently, no satellite processing will occur during these periods.

(3) An ADPAC test plan for calibration (error model) has been coordinated with 9 Aerosp Def Div. Even though this test is designed for Moorestown, it is being used as a test bed for BMEWS tracker improvements.

(4) Work on the initial orbit determination program will follow the implementation of sensor calibration improvements (Jun 68) in track data accuracy.

(5) The software change for Site II expanded azimuth coverage is presently being prepared by RCA-DEP.

4. (U) RECOMMENDATIONS.

a. Computer Program Change Processing. Recommend that a study be conducted to determine ways of shortening the current approval cycle for Computer Program Change Requests (CPCR). The efforts should result in recommended changes to ADCM 55-4. Such items as the following should be considered:

(1) The feasibility of delegating approval authority to lower command levels.

(2) The possibility of more frequent meetings of the several computer program review boards.

(3) The possibility of eliminating some of the existing review boards.

b. Installation of Approved Changes. All approved CPCRs should be installed as soon as possible; however, the more important CPCRs should be installed ahead of the less important ones. Each CPCR, as it is approved by the ADC CPRB, should be assigned a priority for production and installation.

c. Recommend a priority scheme be developed and submitted to ADC for consideration.

2 Atch
II-1. Routing Steps for Processing CPCRs (U)
II-2. Program Change Schedule (U)

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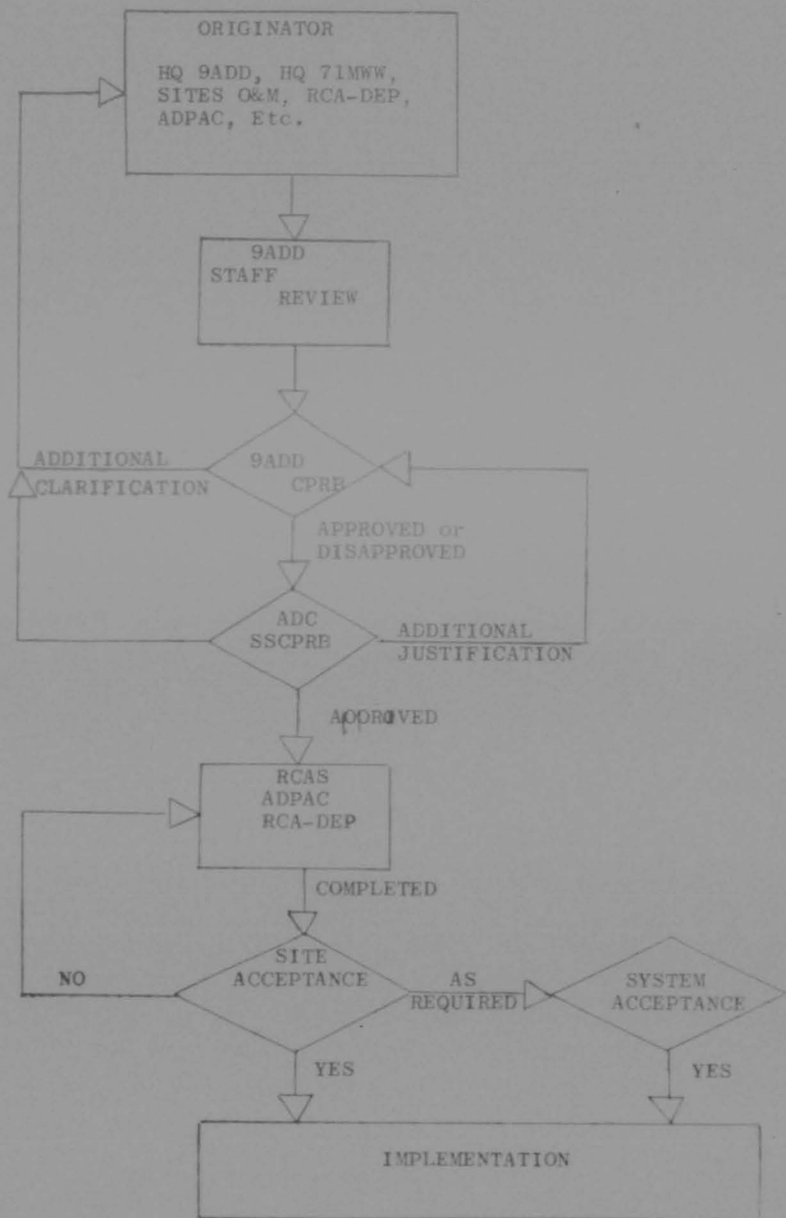

Atch II-1

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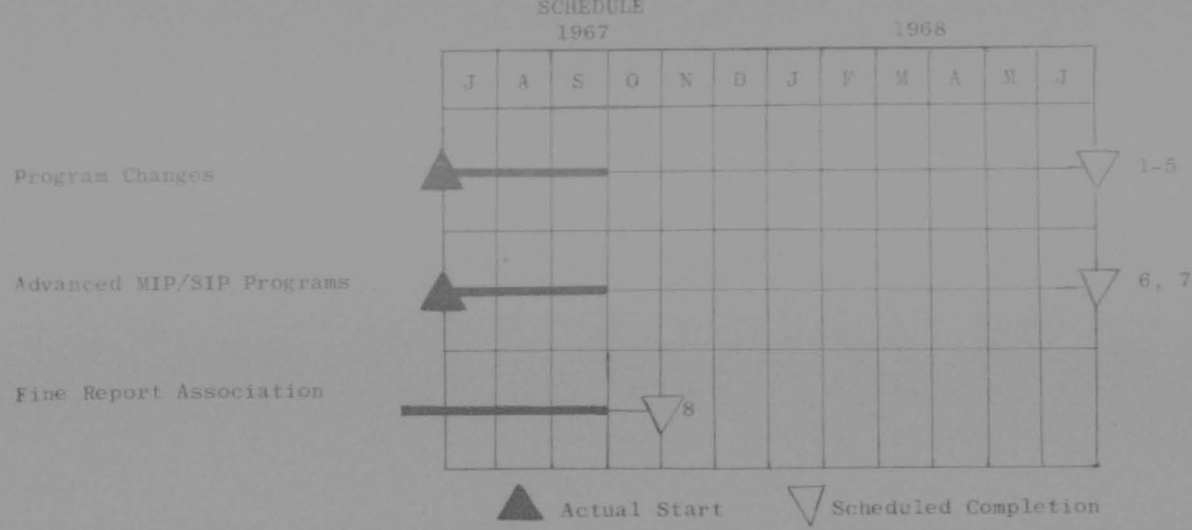
SCHEDULE



Atch II-2

1. New tracking and verification procedures in MIP.
2. Expanded TR angle coverage in MIP developed under 68-6.2.
3. Sensor error correction procedures.
4. MIP prefiltering discrimination tests.
5. MIP revisions for angle tracking improvements.
6. Develop and implement the UTE technique.
7. Develop and implement a secondary satellite data processing cycle.
8. Develop, checkout, and verify major report association changes to BMEWS Sites I and II.

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CHAPTER III

E Q U I P M E N T   M O D I F I C A T I O N

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SECTION A - EQUIPMENT MODIFICATION PROGRAM

1. (U) PRESENT PROCESSING PROCEDURES.

a. Modifications which are undertaken to permanently increase operational capability may originate at any operating level in the BMEWS and are processed as Class V modifications. Approval of a Class V modification requires development of a Required Operational Capability (ROC) study, which, with the recommended solution, is forwarded through command channels for approval. It is then sent to SMAMA for development of a cost-analysis study, returned to USAF, and funded. After funding, SMAMA takes procurement action, or SMAMA may, in the case of very simple changes, merely issue the modification as a Time Compliance Technical Order (TCTO). (See attachment III-1)

b. The process is time-consuming because of management and technical reviews at each level of command. In early stages of development, a modification which will increase operational capability is frequently processed as a temporary modification proposal in order to test and determine its operational effectiveness before submitting it as a Class V modification proposal. It is possible, in some cases, for a temporary modification to become permanent without development of a ROC. For example, the extended azimuth of the Site I TR was originally approved by SMAMA as a Class II (test) modification, and later, was continued as a temporary modification (Class IB, 6 months). SMAMA then secured USAF approval for its retention as a permanent modification.

c. A single SMAMA agency considers both BMEWS and SPACETRACK modification proposals; however, SMAMA identifies SPACETRACK support as a "secondary" BMEWS mission. There is some indication that more expeditious action could be expected if SPACETRACK support were formally recognized in programming documents setting out the BMEWS mission. SMAMA approved the extended azimuth modification proposal for the Site I TR on the basis that it would enhance the BMEWS mission and was, apparently, unaware that the primary purpose of the modification was BMEWS support of the SPACETRACK mission.

SECTION B - EQUIPMENT MODIFICATIONS INSTALLED IN SUPPORT OF SPACETRACK AT SITES I AND II

2. (S) INSTALLATION OF THE LOW NOISE AMPLIFIERS IN THE DETECTION RADAR AT SITES I AND II. The installation of the Low Noise Amplifiers has improved the detection range on a given size target. For example, if a certain target could be detected at a maximum range of 1600 NM, then this same target can be detected at 2020 NM by the Low Noise Amplifier improved system. This is greater than a 25% increase in detection range.

SECTION C - EQUIPMENT CHANGES CURRENTLY BEING PROCESSED

3. (U) REPLACEMENT OF OFF-LINE EQUIPMENT AT CLEAR AND THULE. The off-line data processing equipment was originally designed as an (off-line) printing system. Increased satellite population and the resulting increasing volume of printouts has resulted in non-real time production of orbital elements necessary to maintain the Space catalog. To efficiently support SPACETRACK, the BMEWS sites will therefore experience an increase in the off-line printout requirements proportionate to the growth of the satellite population. The existing off-line printing system (collectively, the IBM 717 line printer, the 757 control unit and the 729-1 tape transport) is to be replaced with the following:

a. One each Central Processor Third Generation Computer (modular expandable) 8K words (32K bytes) with integrated single disc storage drive (200K) for use for both I/O and system residence (programming support).

b. Two each Peripheral Storage (Tape Unit) with 7 track feature for compatibility with the IBM 7090s presently on site.

c. One each Card Reader/Punch (400 cards per min).

d. One each High Speed Printer (minimum speed 1100 lines per minute).

e. Necessary control units to interface peripheral equipment with central processor.

ROC #ADC 13-67 was submitted to USAF on 10 April 1967. SMAMA has been directed to conduct a cost analysis study and reply to USAF by 1 December 1967. The estimated completion date of the modification is November 1968.

4. (U) INCREASED AZIMUTH EMPLOYMENT OF THE AN/FPS-92 AT SITE II.

a. The present radiation restrictions imposed on the AN/FPS-92 are arbitrary and impose a tracking restriction in the SPACETRACK support role. The modification refers to tracking coverage only; scan coverage remains unchanged. The azimuth coverage will be increased from 215° to 180° and 55° to 100° for the left and right limits, respectively. The elevation limit will be 1.6° above the horizontal for 360° coverage.

b. The modification proposal was submitted in May 67 to ADC as a Class V modification. ADC agreed on 27 Sep to ask SMAMA for installation as a Class IB modification. RCA-DEP was tasked (6 Oct 67) to provide modification procedures. Complete installation of the modification is estimated to be 1 Nov 67.

5. (S) PULSE COMPRESSION FOR AN/FPS-92, SITE II. Due to the original mission, the AN/FPS-92 tracking radar was designed and built with very coarse range accuracy and range resolution capability. Its range resolution is 161 NM and range accuracy is on the order of .5 to 1.5 NM. The following specifications are included in the Pulse Compression ROC.

a. Range resolution of 1000 ft for targets of equal amplitude.

b. Range resolution of 1500 ft for targets differing in amplitude by 30 db.

c. Range accuracy of at least ± 300 feet. USAF was supposed to release funds on 3 Oct 67 to AFLC. Funding was delayed because the cost analysis was more than six months old. USAF has requested AFLC to verify the cost analysis is still valid. The modification should be completed in Sep 68.

6. (U) SWITCHING CAPABILITY AND/OR ADDITIONAL TAPE DRIVE UNITS AT SITES I AND II. Four (4) tape drive units are connected to each IBM 7090 computer. The tape drive units connected to the on-line computer contain:

a. S point tape.

b. Operational Program.

c. DATREC.

d. Recording tape.

When the on-line computer fails, the time required to bring the other computer on-line is approximately five (5) minutes. UCTs are generated for three (3) minutes because of the time lag involved in switching the S point tape. 710AC is investigating the problem and will submit definitive information on 18 Oct 67 to 9 Aerosp Def Div. From this information, the decision to provide: (1) a switching capability for two additional tape drive units; (2) a switching capability for two of the existing 8-tape drive units which will be determined.

7. (U) OFF-BORESIGHT TRACKING CAPABILITY FOR SITE II. A ROC is being prepared to provide an off-boresight tracking capability for the AN/FPS-92. Using off-boresight tracking, real time information can be recorded on two targets concurrently, provided they can be resolved and are in the range gate. Non-real time information can be recorded on additional targets provided they meet the same criteria as the primary target. The ROC will be submitted to ADC on 31 Oct 67.

8. (S) PULSE COMPRESSION AND OFF-BORESIGHT TRACKING FOR THE AN/FPS-49, SITE I. A ROC is being prepared that will add pulse compression and off-boresight tracking to the AN/FPS-49. The ROC specifies:

a. Range resolution of 1000 ft for targets of equal amplitude.

b. Range resolution of 1500 ft for targets differing in amplitude by 30 db.

c. Range accuracy of ± 300 ft.

Using off-boresight tracking, real time information can be recorded on two targets concurrently provided they can be resolved and are in the range gate. Non-real time information can be recorded on additional targets, provided they meet the same criteria as the primary target. The ROC will be submitted to ADC on 30 Oct 67.

9. (U) INSTALLATION OF TAPE-TO-CARD CONVERTER. SPACETRACK tasking of the BMEWS sites requires that each site update,

on a daily basis, orbital element sets. This data is received via teletype at the sites. Three major problems have developed with regards to this equipment.

a. At the time of procurement, it was not realized that the equipment requested (either the IBM 047 or the Instruments Corp C-750) involved a change to the BMEWS baseline configuration.

b. At the time of procurement, it was assumed that both pieces of equipment would be free-standing, that is, they would not have to be connected to existing equipment to perform their functions.

c. Due to cost and lead-time factors, the C-750 was procured. Two C-750s were bought and shipped to Clear and Thule. After the equipment arrived on-site, it was discovered that the C-750 is not free-standing equipment. A modification to the IBM-026 keypunch machine is required because the C-750 has to be connected to the 026 in order to function. Under the existing work statement, the contractor will not modify existing equipment or install this new equipment. The modification proposal was submitted to ADC in May 67 and is currently at SMAMA awaiting assignment of a TCTO number. Installation of the tape-to-card converter is estimated to be completed in Dec 67.

10. (U) ANGLE SERVO ANOMALIES MODIFICATION. Tracking anomalies appear when the Tracking Radar goes through transition from acquisition to tracking, coarse to fine tracking. Lock-on failures on SDC tasked objects, Single Fan Events and threat designations are attributable to tracking anomalies. A Class II (Test) Modification (9ADD (MP) M-017) is presently at SMAMA for funding approval. This modification is especially compelling in view of the proposal to install pulse compression at Site II.

11. (S) MODIFICATIONS REQUIRED TO UPGRADE THE SIGNATURE ANALYSIS SYSTEM AT SITE II.

a. Saturation of satellite cross-section signals occurs in the Signature Analysis System (SAS), which affects operation of the Sanborn Recorders. Due to circuit design deficiencies in the amplifiers located in the recorders, OFFSET and GAIN cannot be controlled at all levels. When the AGC reaches a predetermined level, the cross-section signals cause maximum deflection of the recording equipment, resulting in inaccurate recordings. UR 13MWS-R67-13, Subject: Data Converter Power Supply, which was sent to SMAMA 17 Jul 67, recommends redesign of amplifier circuitry to allow proper control of GAIN and OFFSET features.

b. Modification Proposal to provide increased credence to SOI recordings. MP 71-67-040 provides a design to add a Horizontal and Vertical AGC recording capability to the SAS recorder. Addition of these features will permit cross-section, horizontal and vertical AGC recordings, thus increasing credence given to SOI recordings. The modification is presently installed and operating. This modification proposal was submitted to ADC, 7 Jul 67, recommending that the present fix be approved as a permanent installation.

c. Design deficiency in SAS equipment which affects maintainability. Present design of the Power Supply Monitoring Panel prevents proper monitoring of SAS power supplies. UR 13MWS-R67-1, 23 Feb 67, identifies the problem and recommends redesign of Power Supply Monitoring Panel circuitry to permit a true sampling of power supply outputs.

SECTION D - REQUIRED EQUIPMENT MODIFICATIONS

12. (U) DIGITAL DISPLAYS TO REPLACE THE DATA ANALYSIS CONSOLE PRINTER AT SITES I AND II. Replacement of the DAC printer with a Digital Display System will substantially increase the operational data available to the SSO in near real-time and will provide him computer control of the equipment. This will replace the present cumbersome and time-consuming use of telephone, public address and card drop methods of communicating with the computer. It will provide any display from MIPOP and provide a means for the SSO to insert instructions from the TOR. RCA has submitted an unsolicited proposal for the addition of Digital Displays to replace the DAC Printer. The proposal is as follows:

a. A three digit Digiswitch will provide for the selection of up to 999 options to be inserted into the MIP-SIP program. This will enable the SSO to select any of the options which are presently selected by card input. The existing drop card feature will be retained as a backup and for maintenance diagnostic options.

b. The DAC printers will be removed and two RCA Divon Digital Displays will be installed in their place. One of the displays will show threat data and the other will present satellite information. To provide backup in the case of display failure, each display will be switchable so as to present either type data.

c. The monitor display in the computer room will be switchable to either data line.

d. The software requirements will be to code the present drop card routines into interrupt entrances for the Digiswitch. Output routines for the displays must be written. A feature can be programmed so the SSO can disenable the card reader from accepting drop cards. RCA personnel claim this program can be accomplished within the presently available 10K core space.

e. This proposal is currently being evaluated at 9 Aerosp Def Div.

SECTION E - RECOMMENDED ACTIONS

13. (U) <u>FINELINE SPECTRUM ANALYZER CONSOLE, SUBSYSTEM OF SIGNATURE ANALYSIS SYSTEM AT SITE II</u>.

a. The Fineline Spectrum Analyzer Console was operational for several weeks after its installation and acceptance by ESD/ADC Aug 66, but has not been operational since that time. The technical documentation was unsatisfactory at the time of commissioning. A recent staff visit disclosed that the technical documentation is substandard to the extent that field maintenance is beyond the capabilities of contractor personnel. As a result of a recent request for technical assistance, SMAMA has two RCA-DEP engineers scheduled for a visit to Site II, 30 Oct 67. The Study Group listened to discussions which lead to conclusions that there is not now, nor was there at the time of installation, an operational requirement for this equipment. With the advent of the pulse compression modification for Site II, future requirements for the console are extremely doubtful.

b. <u>Recommendation</u>. That the present extensive maintenance effort be discontinued and that no funds be expended to raise the quality of the technical documentation to a satisfactory standard for field maintenance.

SECTION F - MODIFICATION SCHEDULES

14. (U) EQUIPMENT MODIFICATION AT A BMEWS SITE.

a. The attached schedules depict the status of equipment modifications believed necessary to increase the effectiveness of BMEWS in support of the SPACETRACK mission. It should be understood by the reader that many dates are best "guesstimates" which are based on past experience.

b. If nothing else, these schedules illuminate the point that there is an extremely long lead-time involved in the modification of BMEWS equipment.

9 Atch
III-1. Advanced cy TCTO
III-2. Off-Line Data Processing Equipment
III-3. Increased Azimuth Employment at Site II
III-4. Pulse Compression Site II
III-5. Additional and/or Switchable Tape Drives, Sites I & II
III-6. Off-Boresight Track Capability, Site II
III-7. Pulse Compression & Off-Boresight Tracking, Site I
III-8. Tape to Card Converter, Sites I & II
III-9. Digital Displays for TOR, Sites I & II.

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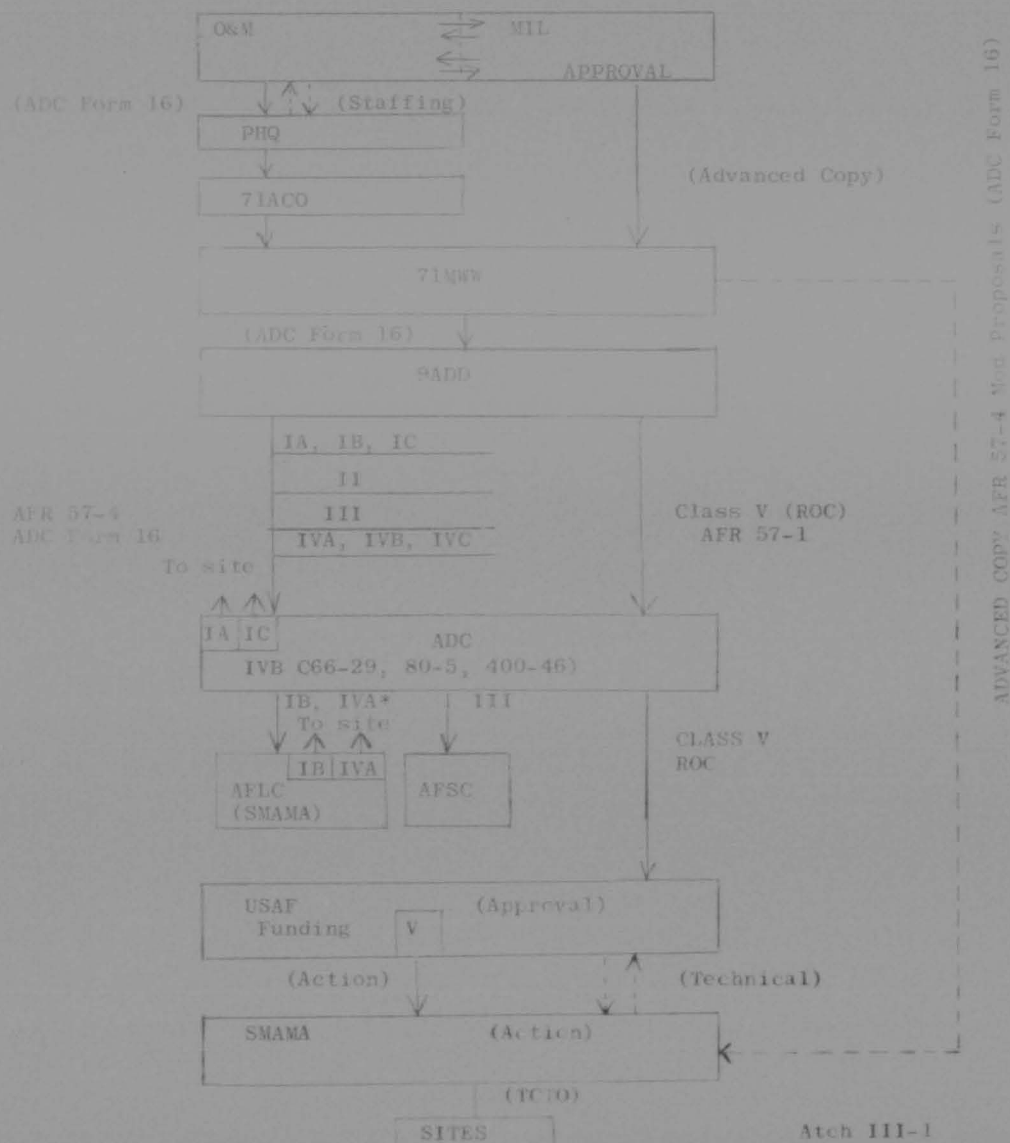
1. EQUIPMENT CHANGES

SITE I OR SITE II



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Atch III-2

OFF LINE DATA PROCESSING EQUIPMENT

SITES I & II

	Apr 67	Aug 67	Nov 67	Jan 68	Jun 68	Oct 68	Nov 68
1. ADC submitted ROC #13-67 to USAF	X						
2. ROC forwarded to SMAMA		X					
3. SMAMA performs Cost Analysis Study							
4. SMAMA Replies to USAF			X				
5. Funds Released				X			
6. RFP from SMSMA					X		
7. Start Implementation of Modification						X	
8. Modification Completed							X

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INCREASED AZIMUTH EMPLOYMENT
AT SITE II

	Oct 66	Jan 67	Apr 67	Sep 67	Oct 67	Nov 67
1. GEEIA performed Radiation Survey	X					
2. Submitted Mod Proposal to ADC			X			
3. ADC Requested Class IB Mod from SMAMA				X		
4. Action Initiated for CPCR and Procedures for Modification					X	
5. Modification Complete						X

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PULSE COMPRESSION

SITE II

	Jan 65	Apr 65	Jul 65	Oct 65	Jan 66	Aug 66	Nov 66	Dec 66	Jan 67	Mar 67	Oct 67	Jan 68	Mar 68	Jul 68	Sep 68
1. 9ADD submitted Mod Proposal		X													
2. ADC Submission to USAF			X												
3. ADC submitted additional justification to USAF				X											
4. USAF directed AFLC perform Feasibility Study						X									
5. ADC/RADC/SMAMA Preliminary F.S.							X								
6. Final F.S. due to AFLC								X							
7. AFLC submitted added Just to USAF										X					
8. Programmed Money Release to AFLC											X				
9. RFB to GE/RCA/AIL/HAZ.													X		
10. Start Implementation of Mod.														X	
11. Completed Modification															X

Atch III-4

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ADDITIONAL AND/OR
SWITCHABLE TAPE
DRIVES, SITES I & II

	Oct 67	Nov 67	Dec 67	Jan 68	Apr 68	Jul 68	Sep 68	Jan 69	Feb 69	Jun 69	Jul 69
1. ROC submitted to ADC	X										
2. ADC submits ROC to USAF		X									
3. USAF Direction to SMAMA for Cost Analysis Study					X						
4. SMAMA Replies to USAF						X					
5. Funds Released							X				
6. RFB from SMAMA								X			
7. Start Modification										X	
8. Modification Complete											X

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OFF-BORESIGHT
TRACK CAPABILITY, SITE II

	Oct 67	Nov 67	Jan 68	Mar 68	Apr 68	Jun 68	Aug 68	Jan 69	Apr 69	May 69	Jul 69
1. ROC will be submitted to ADC	X										
2. ADC submitted ROC to USAF		X									
3. USAF directs SMAMA to perform Cost Analysis Study				X							
4. SMAMA Replies to USAF						X					
5. Funds Released							X				
6. RFB from SMAMA								X			
7. Start Implementation of Modification										X	
8. Modification Completed											X

Atch III-6

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PULSE COMPRESSION &
OFF-BORESIGHT TRACKING
SITE I

	Oct 67	Nov 67	Jan 68	Mar 68	Jun 68	Aug 68	Jan 69	May 69	Jul 69
1. ROC submitted to ADC	X								
2. ADC submits ROC to USAF		X							
3. USAF directs SMAMA to perform Cost Analysis Study									
4. SMAMA Replies to USAF									
5. Funds Released						X			
6. RFB from SMAMA							X		
7. Start Implementation of Modification								X	
8. Modification Completed									X

Atch III-7

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TAPE TO CARD, CONVERTER SITES I & II	Feb 67	Jul 67	Aug 67	Nov 67	Dec 67
1. Operational Just Submitted	X				
2. Procurred					
3. Modification Prop. forwarded to ADC		X			
4. ADC Approval and forwarded to SMAMA			X		
5. Assignment of TCTO by SMAMA				X	
6. Installation Completed					X

Atch III-8

(This Page is Unclassified)

DIGITAL DISPLAYS
FOR TOR, SITES I & II

	Oct 67	Jan 68	May 68	Aug 68	[illegible] 68	Jan 69	Mar 69	Jul 69	Aug 69
1. ROC submitted to ADC	X								
2. ADC submits ROC to USAF		X							
3. USAF directs SMAMA to perform cost analysis			X						
4. SMAMA Replies to USAF				X					
5. Funds Released					X				
6. RFB from SMAMA							X		
7. Start Implementation of Modification								X	
8. Modification completed									

Atch III-9

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CHAPTER IV

PERSONNEL MANNING AND TRAINING

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SECTION A - SUMMARY

1. MANNING. Operational manning of the forward sites is considered totally adequate. Although it can never be guaranteed, BMEWS enjoys a high priority for 100% manning. Shortages of SOI personnel during 1967 are discussed in detail later in this paper.

2. BMEWS MAN-MACHINE RELATIONSHIP. Training in the complexities of the BMEWS is a never ending process. This is true to the point that site personnel are learning new things about the system at the time they complete a tour of duty. Examination has revealed that although site personnel may not be academically knowledgeable about all aspects of the SPACETRACK system, they do react satisfactorily to the requirements of the SDC. At the same time, it has been recognized that reaction may appear to be "mechanical," because, in fact, the great majority of actions required to support SDC are handled in an automatic or semi-automatic mode of operation. Manual processing at BMEWS sites is continually giving way to automaticity - including message generation and data transmission to SDC.

3. FORMAL TRAINING. In order to improve "knowledge," and the relationship of the BMEWS to the SPACETRACK mission, actions are underway to provide additional formal and OJT system training. Keesler concurs that the combining of BMEWS/SPACETRACK training courses for two thirds of the formal training cycle is feasible and acceptable. As a result of discussions with Keesler Technical Training Center, a proposed course outline has been prepared and will be instituted as soon as final arrangements are coordinated. The new course will place emphasis on total "aerospace surveillance system" knowledge and system interfaces.

4. BMEWS OPERATING INSTRUCTIONS FOR SPACETRACK SUPPORT. 71MWW Manual 55-3, dated 7 August 1967, provides detailed instructions for TOR, SOI, and Satellite Group reactions to SDC tasking. Procedures outlined in this manual are for the purpose of standardizing forward site SPACETRACK support activities, but is also a valuable tool for training purposes.

SECTION B - PERSONNEL MANNING

5. MILITARY PERSONNEL - EXPERIENCE AND BACKGROUND. This study group reviewed the individual records of every officer presently assigned to Sites I and II. The majority are college graduates. Military experience ranges from those who have only a background in SAGE, through those who have had computer training and missile training, to those who have had extensive SDC operations experience. (See atch IV-1) Although attrition at a remote site is always a

problem, it is concluded that, quantitatively and qualitatively, Sites I and II are more than adequately manned to discharge mission responsibilities. (Personnel manning figures are presented in atch IV-2.

6. CONTRACTOR SUPPORT. Manning of the RCA satellite group was examined with consideration being given to the possibility of "blue suiting". This particular group, as is shown by the extract from the current RCA-S Statement of Work (atch IV-3), provides support primarily in SPACETRACK programming/computer functions. System automaticity is such that there is little requirement for analyst experience. Nonetheless, stability of contractor personnel, as well as extremely good educational backgrounds (atch IV-4) have provided an analysis capability beyond contract requirements. It would be difficult, if not impossible, to replace the satellite group capabilities now in existence - particularly at Site II. Therefore, it is concluded that military manning in this area is not adviseable at the present time.

7. SOI - CLEAR. Site II has two 2d Lieutenants assigned in this area. One has had none, while the other had had only a portion of the required SOI training. (Why these officers were assigned to site without adequate training has not been determined.) This training deficiency is not considered serious inasmuch as the RCA SOI engineer has had lengthy experience at site and is considered to be most capable. Through his efforts, site capability has remained at a high level. The two USAF analysts have been undergoing OJT under his supervision and are progressing at a satisfactory rate.

SECTION C - TRAINING

8. FORMAL, OJT AND CROSS-TRAINING.

a. Formal Training. Officer personnel attending the present Keesler BMEWS course receive approximately 12 hours of space training in the following areas:

(1) BMEWS/SPACETRACK Functions.

(2) Orbital Mechanics.

(3) Look Angles.

(4) Launch Folders.

(5) Space Object Identification.

(6) Tasking.

A course outline proposing the combining of BMEWS/SPACETRACK formal training course has been forwarded to 9ADD subordinate units for concurrence and/or recommendations. When accepted and approved the new course will provide twelve days of common training on the aerospace surveillance system. Students will then be provided specialized training, for an additional four days, in SPACETRACK or BMEWS according to their end assignment. A two day field trip to the Cheyenne Mountain Complex will also be proposed to ATC. (A course outline is presented in atch IV-6) Keesler Training Personnel have informally advised that they are prepared to institute the new course on 15 November 1967 provided they receive ATC approval. The 9ADD goal is to secure this approval through command channels.

b. OJT. The on-site OJT program, currently consisting of 125 total hours, provides 7½ hours for SPACETRACK purposes. While it is recognized that each individual continues the learning process throughout the tour of duty, an expansion of OJT in the SPACETRACK area is necessary. Full utilization of the capabilities of the contractor satellite group personnel must be incorporated in this segment of the OJT program. The availability of one officer at each site who has had extensive experience in the SDC provides a means for all site personnel to gain further knowledge of the SPACETRACK system.

c. Cross-Training. Cross-training of site personnel to the 1ACS has been outlined in some detail by 71MWW Supplement 1 to ADCM 50-5 (atch IV-5). The value of this cross-training would be increased were trainees required to spend additional time in the SDC. This would lead to a better mutual understanding of the unique limitations, capabilities, relationships, and requirements of the "aerospace surveillance system". In addition, it is suggested that SDC personnel visit the forward sites for similar purposes.

SECTION D - 9ADD/71MWW/1ACS PARTICIPATION

9. STANDARDIZATION/EVALUATION. Future Stan/Evals will place added emphasis on BMEWS support of SDC. This will include: additional SPACETRACK-oriented questions in written examinations; increased tasking and performance during POIs, or on receipt of SPACETRACK Sensor Element Sets; and oral quizzes of TOR personnel to determine academic knowledge of space surveillance procedures and requirements. This approach takes into account the general feeling that mechanical, personnel actions, in a highly automated system, should not be the sole measure of the BMEWS capability to provide satellite observations.

10. NEWLY DOCUMENTED INSTRUCTIONS. The publication of 71MWW Manual 55-3, "BMEWS Operating Instruction for SPACETRACK Support" has added emphasis to the need for SPACETRACK support by BMEWS. This document provides detailed instructions for TOR, SOI, and Satellite Group reactions to all requirements of the SDC. It is a complete document in every respect as regards operational procedures for BMEWS support of SDC. It has provided additional information for development of the Stan/Eval procedures referred to above.

11. TRAVELING TEAMS. The Committee addressed the subject of providing ATC teams plus a 9ADD/71MWW/1ACS team to furnish SPACETRACK-type academic training to personnel currently at the forward sites. Considering the proposed expansion of the Keesler Technical Training Center training, the existing on-site capability, and the never-ending problem of attrition in a remote location, it has been concluded that there is not a requirement for either effort. The requirement that on-site personnel be knowledgeable of the overall system is recognized; however, it is felt that this knowledge or "education" can be gained on-site, utilizing site resources. Site Commanders must provide impetus and support the requirement that all BMEWS operator personnel be knowledgeable about every facet of our system. Immediate and continuing implementation of the training proposals outlined above will result in the attainment of the deserved educational level without the additional expense and time-consuming effort of traveling teams.

12. IADC - 71MWW RELATIONSHIP. Frequent meetings between personnel of the two concerned organizations and HQ 9ADD are deemed extremely important to provide complete understanding of the requirements of 1ACS and the ability of the 71MWW to respond. Similar meetings between the 73d (2SS) and 1ACS, termed the "Twenty-one Club" were a successful precedent. Initiation of a "Seven-eleven Club" will undoubtedly provide similar benefits.

SECTION E - RECOMMENDATIONS

13. Secure ATC approval for immediate implementation of the proposed BMEWS/SPACETRACK formal training course. (9ODC)

14. Implement necessary personnel procedures to insure that SOI personnel are identified with sufficient time to receive the necessary fifteen (15) weeks of formal training. (9PDC)

15. Immediate personnel action be taken to fill the existing SOI Technician vacancy at Clear. (9PDC)

16. Expand the on-site OJT program to provide additional academic training for SPACETRACK purposes. (71MWW)

17. Revise the cross-training for site personnel to place additional emphasis on the requirements of the SDC. (9ODC/71MWW/1ACS)

18. Organize operational meetings between HQ 9ADD, 71MWW and 1ACS to insure complete understanding of requirements, capabilities and limitations and to provide recommendations for system improvement.

6 Atch
IV-1. Military Personnel - Experience and Background
IV-2. Personnel Manning Figures
IV-3. Extract from RCA-S Statement of Work
IV-4. Contractor Personnel
IV-5. Aerosp Ground Environment Training
IV-6. Course Outline

MILITARY PERSONNEL - EXPERIENCE AND BACKGROUND AS OF 5 OCT 67

	DOR	Educational Background	Military Experience	DEROS
CLEAR				
Maj K.G. Keiser	3/10/65	60 hrs College Education	SAGE, Drones 1 Aero fm 7/22/64	12/29/67
Maj W.A. Flaherty	10/24/65	B.S. Math	Missiles Comp Prog	2/3/68
Maj W.W. Jackson	11/11/65	B.A. Math	RIO, Comp Prog	5/6/68
Capt C.J. Land	9/20/61	B.S. Bacterio-logy	SAGE	10/31/67
Capt R.L. Travis	3/26/67	Elec Eng	SAGE	10/6/67
Capt H.S. Hurst	4/1/67	Musical ED	SAGE	4/6/68
Capt J.P. Bigelow	12/26/67	B.S. Aero Eng	SAGE	12/5/67
1stLt G.W. Strong	8/15/66	Mining Eng	SAGE	9/25/68
1stLt G.W. Peitz	11/17/66	Chemistry	SAGE	5/25/68
1stLt D.R. Epprich	4/15/67	Chemistry	SAGE	7/1/68
2ndLt J.H. Brinn	2/6/67	B.S. Math	1ACS Analyst	10/1/68
ndLt E.R. Nadeau	3/17/67	B.S. Math	71MWW	8/6/68
CLEAR SOI				
2ndLt D.B. Grubbs	6/8/67	Chem Eng	1ACS SOI	7/5/68
2ndLt R.B. Duddine	1/4/67	B.S. Math	9Aero Orb Analyst	7/24/68
THULE				
Maj R.R. Magness	10/11/66	GED-College	SAGE	4/4/68
Capt F.J. Gingrich	9/11/62	Bus Admin	SAGE 1ACS from 5/31/63	7/1/68
Capt D.R. Oberdieck	9/20/62	High School	SAGE & Comp Prog	4/24/68
Capt S.C. Beamer	11/8/66	Recreation	SAGE	12/5/67
Capt G.E. Box	1/14/67	Elec Eng	Grd Envir Opns 3041	10/23/67
Capt J.L. Juntunen	2/13/67	Accounting	SAGE	10/5/67
Capt L.F. Chadwick	2/23/67	Business	SAGE	11/3/67
Capt J.B. Nichols	5/5/67	Engineer	SAGE	6/4/68
1stLt R.E. Piovanetti	3/1/67	Chemistry	SAGE	8/1/68
tLt R.M. Rosenman	4/1/67	B.S. Math	Drones	7/1/68
2ndLt J.C. Bernard	6/8/66	B.S. Ed	1ACS Analyst	
2ndLt J.W. Mentz	2/6/67	Biology	9 Data Control	9/1/68

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PERSONNEL MANNING FIGURES

	Authorized	Assigned
THULE		(5 OCT 67)
Officers	12	12
Airmen	40	34
CLEAR		
Officers (SOI)	12 (2)	12 (2)
Airmen (SOI)	34 (3)	29 (2)

Atch IV-2

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(EXTRACT FROM RCA-S STATEMENT OF WORK)

n. Receive orbital elements on selected catalogues space objects from the USAF Space Defense Center. Process these elements to generate satellite predictions which will be compared with Q-point and vector recorded data in order to identify specific satellites and determine causes for non-satellite Q-points such as aurora, aircraft, noise, etc. Additionally, this information will be used in preparing applicable sections of the Daily Operations Report (DOR) as specified by 71SWM 55-1. Copies of the satellite annotation and computation printout will be forwarded by airmail to agencies specified by 71 Surveillance Wing. Orbital elements will be processed further to furnish military TOR personnel, on a daily basis, with satellite predictions by sector, time, fan, range, azimuth, and other rate parameters and probability of detection indicators for each fan appearance. BMEWS will be responsive to special taskings imposed by the Space Defense Center. This will include, but will not be limited to, monitoring and collecting data on all fan penetrations by specific objects, i.e., new foreign and domestic launches, decaying objects, etc., reducing data as required and supplying such data to, and in the format, schedule and method specified by, the Space Defense Center. Time bias and other error reporting, as described in OMI-1/2-1023-01, will be accomplished on a continuous basis as errors in predictions are detected. This function is

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required for objects that are not yet precisely described and for those in a state of decay. The tasks described above are contemplated to be within the present equipment and program capabilities. The Contractor will, in support of the Site II SOI function, provide electronic engineer assistance to USAF SOI analysts. This service shall include equipment familiarization, data reduction, analysis procedures, and display interpretation on a one-shift basis. Tasks beyond existing and program capabilities may be provided by separate contractual actions.

o. In support of the Site II Space Object Identification (SOI) function, provide highly qualified (SOI) engineer services during the normal Contractor work week (one shift per day) and on a planned and scheduled recall during off duty hours, when necessary, in support of the Site II SOI mission. These services will include, but not be limited to, the following:

(1) Staying current with the state-of-the-art in SOI techniques.

(2) Instructing military analysts in new techniques.

(3) Assisting, as requested by the officer in charge of Site II SOI, during special events, periods of abnormal work load, and when data are of unusual and difficult nature.

(4) Assisting in briefings, as required.

(5) Assist in the development and conduct of a training program for USAF SOI analysts, both newly assigned and periodically thereafter to upgrade and reorient assigned USAF SOI analysts in new techniques. This training shall include equipment familiarization, data reduction, analysis procedures and display interpretation.

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CONTRACTOR PERSONNEL

CLEAR

Elmer Slaughter
Masters degree in mathematics with 2 years' experience at Trindad.

Fermen Murkami
Masters in mathematics with 7 years' experience at Clear. Attended SOI school.

Les Mortenson
High school graduate with 7 years' experience in satellite group work. Computer programming trained.

Dennis Rinaldi
Has 3 years' experience at Clear and is high school graduate. No SOI training.

Chuck Weiler
Has 4 years' experience in the satellite group at Clear is a high school graduate.

THULE

J.S. Rhin
Arrived on site 31 Mar 67. Estimated date of departure - 30 Sep 68. High school graduate. Completed AF Electronics School.

L.J. Cole
Arrived 14 Jul 65. Estimated date of departure - 16 Feb 68. High school graduate. Five (5) years college night work.

D.A. Danahy
Arrived 12 Jun 67. Estimated date of departure - 16 Dec 68. High school graduate. Two (2) years college night courses in Business Administration. Attended Industrial and Service schools (Computers and Statistics). Forty (40) college credits Correspondence courses.

C.E. Shirk, Jr.
Arrived 15 Aug 66. Estimated date of departure - 14 Feb 68. High school graduate. Two and one-half years college in Electronics Engineering. Attended several service electronics schools.

Atch IV-4

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71MWW SUPPLEMENT 1
TO: ADCM 50-5

HEADQUARTERS
71ST MISSILE WARNING WING
Ent Air Force Base, Colorado
13 June 1967

Training

AEROSPACE GROUND ENVIRONMENT TRAINING

ADCM 50-5, 15 December 1966, is supplemented as follows:

15-5a. Each Squadron Commander, Detachment Commander, Squadron Operations Officers and all Det 1 personnel will complete a two day orientation course at Ent AFB following the formal training course and prior to departure for their unit of assignment.

15-7b(1)(Added)

a. A message will be sent to 71ODC twelve (12) days prior to the crosstrainee's anticipated departure from the forward installation requesting permission for TDY on specified dates. Included in this TDY message will be the individual's name, rank, serial number, security clearance and quarters request. An information copy will be sent to 4600th Air Base Wing (WGCSP). When permission is granted by 71ODC, arrangements for VOQ reservations will be made.

b. All officers from subordinate units of the 71 Missile Warning Wing will comply with the following crosstraining schedule when on TDY to Ent AFB for the purpose of crosstraining in accordance with ADCM 50-5.

1st day:

Three (3) hours of Headquarters 71 Missile Warning Wing familiarization.

Two (2) hours of Headquarters 9 Aerospace Defense Division familiarization to include division briefing.

One (1) hour with 9CBPO to receive records check, OER review and subsequent assignment information.

This Supplement supersedes ADCM 50-5/71MWW Sup 1, 30 January 1967
OPR: 71ODC
DISTRIBUTION: S

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2nd day:

Four (4) hours of duty shift completion with the MWO.

Two (2) hours of duty shift completion with the SDCSD.

Two (2) hours of duty shift completion with the Command Director.

16-4c(1) (Added) Recommendations for the award of Skilled and Expert Ratings will be submitted to 71ODC in accordance with the following format:

a. Name, rank, serial number, organization, has completed the requirements for the award of the Space Surveillance Skilled/Expert rating.

b. This award of Skilled/Expert rating is in accordance with Chapter 16, ADCM 50-5. The accomplishments are summarized below:

a. Duty Title

b. Present Rating

c. Experience (time on site)

d. Examination Score

e. Waivers, if any

c. I recommend approval of this award.

Signature Block of
Approving Official

OFFICIAL

(Signed)

STEPHEN E. EWING, 2ndLt, USAF
Chief, Administrative Services

EDWIN BISHOP, JR., Colonel, USAF
Commander

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COURSE OUTLINE

Course material is SECRET.

Course is 108 hours (18 days) in length.

Course includes 16 days at Keesler with two days cross-training at Cheyenne Mountain Complex.

Course Diagram:

	4 days of 2035A-1	2-day field trip to the Cheyenne Mountain Complex
12 days of common training		
	4 days of 2035A-2	

Outline of "Common" Training Material (12 days)

1. Introduction to BMEWS/SPACETRACK System.
   a. Air Force Mission in Space.
      (1) Defense Mission.
      (2) SPACETRACK Mission.
   b. Our future role in space.
2. U. S. Space Programs
   a. Categories of Spacecraft.
   b. Payload Characteristics
3. Foreign Space Efforts.
4. History of Astronomy.
   a. Development of Astronomy.

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b. Kepler's Laws of Planetary Motion.

c. Newton's Laws of Motion and Gravity.

5. Satellite Orbits.

a. Four types of orbits.

b. Basic Trigonometry.

c. The ellipse.

(1) Coordinate Systems.

(2) Formulas.

7. Orbital elements.

a. Inclination.

b. Argument of perigee.

c. Mean anomaly.

d. Right ascension.

e. Period.

f. Epoch time.

g. Semi major axes.

h. Eccentricity.

i. Mean motion.

j. Rate of perigee and critical inclination.

k. Rate of right ascension.

8. SPACETRACK Bulletins.

a. Longitudinal crossings.

b. Grid.

c. Satellite course plotting.

9. Orbital Computations.

   a. Sensor requirements.

   b. Elements calculations.

   c. Look angles and calculations from elements sets.

   d. Nomographs.

   e. Earth/Sky charts.

   f. Early/late curves.

   g. Unknown satellites.

10. Domestic Launches.

   a. Types of boosters.

   b. Nominals.

   c. EODET calculations.

   d. EODET reporting.

11. Foreign Launches.

   a. Boosters and payloads.

   b. Launch folders.

   c. Launch analysis.

   d. Launch reporting.

12. Space Defense Center.

   a. Organization.

   b. Functions.

   c. Tasking requirements and response.

13. Mission Planning

    a. Scheduling and priorities.

    b. Search plots.

14. Tracking Radar Systems (General).

    a. Conical scan theory.

    b. Error signals and Servo response.

    c. Monopulse theory.

    d. Doppler effect.

    e. Pulse compression.

    f. Delayed frequency reference ramp theory.

15. Detection Radar Systems (General)

    a. Fan and Beam arrangements.

    b. Doppler shift.

Outline of BMEWS Training Material (4 days)

1. BMEWS Orientation:
   a. Organization of BMEWS Units.
      (1) Command and administration.
      (2) Operational
   b. Operational concepts of BMEWS.
2. Radar Fundamentals.
   a. Principles of pulsed radar systems.
   b. Functions of major components.
   c. Doppler effect on RF energy.
3. BMEWS Transmitters.
   a. Frequency generation.
   b. Power requirements
   c. Functions.
4. Signal Flow and Data Processing.
   a. TR.
   b. DR.
   c. MIP.
5. EW in BMEWS.
   a. Signal analysis.
   b. Operation of IA.
   c. ECCM capabilities.

6. Radar and Maintenance Displays.

   a. Tactical displays.

   b. Maintenance displays.

7. Performance Monitoring and Flexibility.

   a. AM/SCO.

   b. Flexibility.

8. Rearward Communication System.

9. AI Data Processing and Displayer.

10. TCD/BOI.

11. Measurement.

12. Critique of:

    a. Measurement.

    b. Course.

13. Graduation.

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Outline of SPACETRACK Training Material (4 days)

1. Computer Functions:
   a. Input/output.
   b. Limitations.
2. Space Object Identification.
   a. Organization.
   b. SOI Summary.
3. Special Projects.
   a. Spiral Decay.
      (1) Prediction
      (2) X, Y and Z look angles.
      (3) Calibration.
   b. Etc.
4. Measurement.
5. Critique.
   a. Measurement.
   b. Course.
6. Graduation.

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Outline of Cheyenne Mountain Complex Field Trip (2 days)

(To Be provided by 9th Aerospace Defense Divison.)

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DOC # 34

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1 NOV 1967

90TT

Proposal to Combine Portions of Keesler TTC Courses (OZR 2035A-1 and OZR 2035A-2)

ADC (ADPDP-P)

1. Request HQ Air Training Command consider combining the first portion of the BMEWS Surveillance Officer (OZR 2035A-1) and SPACETRACK Surveillance Officer Course (OZR 2035A-2) conducted by Keesler TTC. Specialized training in each system would be reduced in time span but would follow immediately upon completion of this combined course.

2. Attachment 1 is a recommended outline for the proposed course. Alterations and changes are solicited from the Keesler BMEWS/SPACETRACK instructors.

3. This course change is requested in order that total "system" knowledge will be directed to all personnel regardless of end assignment. Subjects which are common to both BMEWS and SPACETRACK Systems more readily lend themselves to commonality of instruction so that this proposal is considered operationally sound and cost effective.

4. Personnel completing training as proposed and completing a tour of remote duty in either system can more readily adapt to future assignments at terminal facilities and/or staff functions without a need to receive additional formal training.

5. Current BMEWS training (Course OZR 2035A-1) is almost totally oriented to the missile warning function. Advances in capabilities of this system, present and forecast, dictate a requirement for BMEWS personnel to be more knowledgeable in areas of orbital mechanics, signature analysis and data handling. The ever increasing demand for BMEWS units to provide satellite data dictates that personnel in this system continue to improve their understanding of the total space defense system. Expansion of the present BMEWS course structure would be duplicative of portions of an existing SPACETRACK course (Course OZR 2035A-2). Combining portions of the two courses is deemed the most economical and practical approach to the problem.

WRITE LAST NAME AND SHOW DATE COORDINATED
90TT Collins 31 Oct 67
90DC-AA
90DC-A Lockey 1 Nov 67
90DC Condon 31 Oct
71MWW Lt Col. Hoskins 27 Oct 67 73ASW T/P RRD
1Aero Col WATT LTR - 24 Oct RRD
90EW Vary 1 Nov
90SD Spreng for Lt Burt 31 Oct 67
ADC ADPDP-P MAJ Bradley 27 OCT 67 T/P RRD

NAME OF WRITER AND TYPIST'S INITIALS	TEL EXT	DATE	NAME OF REWRITER AND TYPIST'S INITIALS	TEL EXT	CONTROL NUMBER / DATE
Maj DIMENT/wkw	2422	31OCT67			Redfield 1 Nov 67

6. It is highly desirable for all students to conduct a two day field training trip to the Cheyenne Mountain Complex. It would be most beneficial for the students if this training were conducted at the completion of the general course and prior to the specialized course. This training should be under the control of Air Training Command. 1 Aerospace Control Squadron personnel will assist in conducting tours and lectures as requested and coordinated by Air Training Command. This portion of the training is flexible and must be scheduled according to available airlift and with no interference to NORAD special activities. Government quarters are not always available at the Ent Complex and in most cases the students will have to reside off-base. The additional cost for this field training trip is well justified for it provides a student with a working knowledge of the heart of the SPACETRACK/BMEWS/Weapons Systems. In the past, most students have been brought to Ent AFB using Government funds. This training is essential and our dollars expended would be better utilized if the NCMC training was conducted by Air Training Command, under formal training standards, rather than by cross-training on an individual basis.

7. Request the new course be established and classes conducted as soon as possible. It would be desirable to commence the first class on 15 November 1967. Although this is a very short time period, it is believed it can be accomplished. All course material and class outlines are presently available. The Plan of Instruction will require some changes in course schedule. With HQ ADC approval, a representative of the Training Division, 9 Aerospace Defense Division will visit Keesler TTC ASAP to review, comment, and approve the Plan of Instruction.

FOR THE COMMANDER

SIGNED

ROBERT R. LOCHRY, Colonel, USAF
Assistant
Deputy Chief of Staff Operations

1 Atch
Proposed Course
Outline

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Clear -
Flood: Emergency
Power

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X

PRIORITY

[illegible] ENT AFB COLO

[illegible] ENT AFB COLO ([illegible])

[illegible] CLEAR [illegible] ALASKA

INFO ADC

UNCLAS ADEGC-E 17 2.37 AUG 1967

FOR CCE INFO ADEDC ADOEN SUBJ: Emergency Commercial Power Tie-in to Clear Power Distribution System. Reference telecon of 15 Aug 67 between ADDC, 71CCR and 13CCE, relative to Golden Valley Power Company request for a temporary emergency tie-in to the Clear [illegible] power distribution system. Approval is granted to satisfy the power company request. However, the following conditions are mandatory: A. Requirements will not exceed 500KW. B. Power could be cut off without notice if necessary to meet defense mission requirements. C. Power Company to absorb all costs for the tie-in and disconnections. D. The Power Co will install the proper protective devices which will prevent surges from being reflected back to the BMEWS distribution system. E. Neither the Power Co nor the customers will be billed

17 1445
AUG 67
1 2

ANTHONY J FALLONE
Electrical Engineer

HAROLD A. STRONG
Asst DCS/Civil Engineering

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9AKCOSPDKFDIV

for power being provided by USAF. Request information be furnished this hq, Attn: 9DKE-E as to when power company interim standby power will become available and estimated time power company plant will be operational. It is to be understood the tie-in is to be temporary and subject to approval of AF engineers; power from AF source to cease upon installation of interim standby plant; tie-in equipment can remain in place and ready for use until Golden Valley Power ~~Kxxxxxxx~~ Company's plant is operational; and upon the lifting of the emergency, the tie-in will be disconnected and all equipment removed.

DOC # 36

Memo from the office of the

COMMANDER

9th AEROSPACE DEFENSE DIVISION 28 Aug 67

To: Lt Gen Agan, ADCCR

Following is an extract of the Statement of Work that outlines RCA's responsibilities insofar as power generation is concerned:

"--The Contractor shall assist in accomplishing, on a work order basis, all operating equipment repairs and overhaul in the Clear Power Plant which are beyond the capabilities of assigned power plant personnel."

"--The Contractor shall provide specialized engineering and technical services as required, either within his own capabilities as determined by the Contractor or separate contractual action."

ORIS B. JOHNSON
Major General, USAF

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23 Aug 1967

9CCR

Command Assistance, Clear MEWS Power Plant

ADC (ADCCR)

1. Recent incidents which resulted in interruptions in the supply of prime power to the technical equipment of the Clear MEWS site are a cause of extreme concern to me. A preliminary investigation of the causes in these incidents indicates a need for a more detailed and extensive examination of our procedures and practices in the generation and distribution of power at the Clear MEWS site. The scope of examination believed necessary makes it appropriate for such an examination to be conducted by an agency outside the control of this headquarters.

2. Request command assistance in having an examination made of the operating and maintenance procedures being used for the generation and distribution of electrical power at Clear MEWS site. Request this examination also evaluate the organization, manning levels, and qualifications of personnel currently involved in operating the power plant.

3. Request this assistance be considered as a matter of urgency.

ORIS B. JOHNSON, Major General, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

REPLY TO ATTN OF: 9CCR

28 Aug 1967

SUBJECT: Adequacy of Preventive Maintenance Programs

TO: 73 Aerosp Survl Wg (73CCR) *See below

1. A recent power outage at one of the 9ADD operating sites revealed that a critical element within the power system was not included in the preventive maintenance schedules.

2. The element in question was a dry-type transformer in the power distribution system. Although the transformer was located in the technical area, it would normally be expected to be on the Real Property maintenance list. In this case, however, it was being carried as part of the "system" power equipment and, thus, within the purview of the system maintenance program. For unknown reasons, it had been omitted from the preventive maintenance schedules prepared by the system maintenance activity.

3. Immediate and continuing attention must be given to insuring that the maintenance programs for both Real Property and Systems Equipment include all items which require periodic maintenance; that periods indicated for such maintenance are in accordance with applicable published guidance; and that the prescribed maintenance is, in fact, accomplished. An "end-to-end" survey at each site is in order to insure the adequacy of existing preventive maintenance lists. Specific attention must be directed to insuring that there is complete understanding between the Real Property Maintenance and the Systems Maintenance activities as to the specific items for which they are responsible.

ORIS B. JOHNSON, Major General, USAF
Commander

*NOTE: Identical Ltr fwded to 71 Msl Wng Wg (71CCR)

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D 27 9DEC-A

9DEM

BMEWS Power System Failure Analysis

71 Msl Wng Wg (71CCR) 9DEC-D

1. The attached HQ ADC evaluation of power generation and related factors at Clear and Thule BMEWS sites is forwarded for your study and corrective action.

9DEC

2. Reference paragraph 4 of General Agan's letter, I can see no real advantage to expanding the present RCA Service Company contract at Clear MEWS to include power generation and distribution. Our Squadron Commander is, in effect, the single manager. I would prefer to limit discussion of this subject to the staffs of the 71st Missile Warning Wing and this headquarters.

3. The problems defined by the ADC study show that we are not falling down on the job, however, it does point out weaknesses that must be corrected.

4. In line with ADC assignment of staff responsibilities in this instance, 9MDC is OPR. A progress report of corrective actions as required by paragraph 5 of attached letter will be forwarded to arrive at this headquarters (9MDC) not later than 1200 hours, 8 October 1967.

2 Atch
1. ADC Ltr, 29 Sep 1967, subj: BMEWS Power System Failure Analysis
2. ADC (ADMME) Ltr, undated, subj: Report of Power Analysis Team

Maj Faulkner/rw 6227 4 Oct 67

COMMAND SECTION FILE COPY NO. 1

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BMEWS

[illegible] 28 Nov 1967 9DEM-MM

9th Aerospace Defense Division Letter, BMEWS Power System Failure Analysis, 10 October 1967

ADC (ADOCM) 9DEM-UP

1. This progress report is a follow-on to our letter of 10 October 1967.

2. The three recommendations contained in paragraph 3 of 9th Aerospace Defense Division letter of 10 October 1967 have received a more detailed evaluation, and our findings are listed below. 9DEM-UM

a. Expansion of the present RCA Service Company (RCAS) contract at BMEWS Site II to include operation of the power plant by the operations and maintenance contractor has been reevaluated by 9th Aerospace Defense Division in every aspect. It is considered in the best interest of the Air Force and the BMEWS mission to continue to operate the power plant with the current organization (Civil Service). Action on this item is considered to be complete. 9DEM-UE 9DEM

b. Headquarters 9th Aerospace Defense Division does not concur in replacing the automated scheduling system with a manual method. The 13th Missile Warning Squadron has revised their list of power plant equipment requiring preventive maintenance, and is developing details of the individual maintenance requirements. This is preliminary to production of a new card deck to control their revised preventive maintenance schedules. A 9th Aerospace Defense Division four-man team will depart this headquarters 29 November 1967 to Clear AFS to assist site power plant personnel in finalizing the revised system to insure that it will provide proper equipment maintenance in accordance with AFM 66-18. Estimated completion date of this task is 15 January 1968. 9DHE 9HDC 9DEC-D

c. Headquarters 9th Aerospace Defense Division has reevaluated the requirement for retention of the Uninterrupted Power Supply (UPS) at BMEWS Site I. The decision to retain this mission support equipment was based on a restudy of the RCA Feasibility Study (FS-2-67-1), 4 May 1967. Action on this item is considered complete. 9DEC

Maj Faulkner/rm 6227 17 Nov 67 Maj Faulkner/rm 6227 27 Nov 67

3. Progress reports of corrective action directed by the 71st Missile Warning Wing (CCR) letter of 7 October 1967 to Thule BMEWS and Clear MEWS have been received. Their indicated actions have been reviewed and the status of each is listed in the attached report. Paragraphs in the attachment are numbered to correspond with paragraphs of the Hq Air Defense Command Report of Power Analysis Team, undated.

4. This report is late due to the complex and extensive nature of the BMEWS power system analysis. Increased power plant reliability is of the highest priority and will be pursued with utmost vigor by 9ADD.

ORIS B. JOHNSON, Major General, USAF
Commander

1 Atch
Progress Report

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3. Progress reports of corrective action directed by the 71st Missile Warning Wing (CCR) letter of 7 October 1967 to Thule BMEWS and Clear MEWS have been received. Their indicated actions have been reviewed and the status of each is listed in the attached report. Paragraphs in the attachment are numbered to correspond with paragraphs of the Headquarters Air Defense Command Report of Power Analysis Team, undated.

1 Atch
Progress Report

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PROGRESS REPORT

CORRECTIVE ACTIONS

IN RESPONSE TO

REPORT OF

ADC POWER ANALYSIS TEAM

a. Thule BMEWS -- Paragraph 6a, Civil Engineering.

(1) Power Plant Standard Operating Procedures. Standard Operating Procedures have been received from the site and are currently being reviewed by this headquarters. Review will be complete prior to 1 December 1967. Headquarters 9th Aerospace Defense Division will monitor this item until action is complete.

(2) Power Plant Personnel Turnover. RCAS, the contractor, has objected to providing a two week overlap time to allow OJT for new employees prior to their assuming operating duties. RCAS opinion is that "period of OJT varies from individual to individual depending on their experience, capabilities, and aptitude as indicated by supervisory evaluation. If each new employee is to receive two weeks OJT on a mandatory basis, one additional duty engineer will be required over and above that required by current SOW." RCAS intends to "continue new employee training" as they have in the past and "consider this acceptable." The procedures that RCAS now has in effect to provide OJT for new personnel are considered satisfactory. We consider that FY 68 Work Statement minimum manning requirements provide adequate personnel per shift to provide coverage for short intervals involving TDY, illness and other unforeseen personnel absences. This also includes short vacancies and OJT time for new hire. Because of this manning requirement on RCAS, there is no necessity for any new hire to assume shift responsibilities prior to becoming fully qualified. Action on this item is considered complete.

Attachment

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(3) Power Plant Preventive Maintenance (PM) Program. The PM program is under continual review by site and RCAS Project Headquarters, and they consider their current PM program to be responsive. Surveillance of the RCAS PM program is a continuing effort by this headquarters. Action on this item is considered complete.

(4) Diesel Spare Parts. Investigation has shown that funding is not a problem causing delayed delivery of parts. The requirement for specific parts must be determined and the items placed on order. The contractor is being requested to supply a complete IBM listing of parts on hand and required. This will be reviewed by 9th Aerospace Defense Division and requirements will be levied on the contractor. Action to be completed 15 January 1968.

(5) Power System Transients. An oscillograph was received at site on 10 October 1967 and was scheduled for connection into the system and operation on or about 20 October 1967. 9th Aerospace Defense Division will monitor this item and final action is withheld pending an evaluation of information obtained over a six months period.

(6) Circuit Breaker Maintenance. Branch circuit breakers in the low voltage switch gear were changed with reconditioned units. This action was started on or about 10 September 1967 and completed on 8 October 1967. Action on this item is complete.

(7) Relay Coordination. Approval for the revised relay setting and additional relays was forwarded to RCAS by 9th Aerospace Defense Division letter, 6 September 1967, subject: Power System Study, Site I. Relays will be set by 1 December 1967. Project for additional relays was developed and the 71st Missile Warning Wing Facility Utilization Board approved the work on 9 November 1967. 9th Aerospace Defense Division will monitor this item until all action is completed.

(8) Cable Tests. RCAS is proceeding with necessary preparations to test cables. Proposed tests shall be fully coordinated with the 71st Missile Warning Wing and 9th Aerospace Defense Division prior to implementation. We concur with action as stated. 9th Aerospace Defense Division will monitor this item until all testing has been completed and will then take whatever action is dictated. This item remains open.

b. Thule BMEWS -- Paragraph 6b, Technical Equipment.

(1) Distribution of Technical Load. Headquarters Air Defense Command reviewed the technical equipment distribution on the power feeders and considered it adequate from an operational standpoint and recommended no change. 9th Aerospace Defense Division concurs with the Air Defense Command recommendation and considers this item closed.

(2) Power System Protection. The Air Defense Command Power Survey Team could find no control switching or system operation problems in the power system protection at Thule BMEWS. An RCAS Feasibility Study (FS-4-67-1, March 1967) determined that no additional relay protection would be required for the power plant as a result of power ship removal and Class A power plant establishment at J-Site. 9th Aerospace Defense Division concurs and considers this item closed.

(3) Transmitter Interlock Power Supply. Special markings were affixed to the equipment on 7 November 1967 warning personnel of the impact that inadvertent tripping

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would have on the power supply. All personnel have been thoroughly briefed on the function of the 28 VDC power supply. 9th Aerospace Defense Division considers action taken adequate and this item is closed for the purpose of this report.

(4) Central Scanner Control Panel. Additional physical protection for the fuse holders and toggle switch will be provided as soon as design is completed and materials procured. Every effort will be made to avoid alteration of equipment configuration in designing and installing guards. Actions taken are adequate. Item remains open and estimated completion date is 1 December 1967. 9th Aerospace Defense Division will monitor this item until all action is completed.

(5) Master Synchronizer, Building Synchronizer. Additional physical protection for the exposed circuit breakers and switches for the master synchronizer and building synchronizer will be provided as soon as design is completed and materials procured. Every effort will be made to avoid alteration of equipment configuration in designing and installing guards. Actions taken are adequate. Item remains open and estimated completion date is 1 December 1967. 9th Aerospace Defense Division will monitor this item until all action is completed.

(6) Environmental Control Equipment. The operation of the environmental control equipment presents no significant impact on the power operation/distribution systems. 9th Aerospace Defense Division concurs with the Air Defense Command Power Analysis Team report and considers this item closed for the purpose of this report.

(7) Induction Regulator Operation. A Modification Proposal (MP 71-67-024) was submitted by Site I on 1 February 1967 and approved by SMAMA as a Class IV modification (reference AFLC 1 and 2 LOG-K277 Report for September 1967). A request for Command certification was processed to Headquarters Air Defense Command on 2 November 1967. Headquarters ADC certified this as a Class IVB modification under ADC control number 67-394 and returned it to SMAMA by ADC message 211651Z, Nov 67. 9th Aerospace Defense Division will monitor this item until notification that Site I has implemented the modification. Item remains open.

(8) Uninterrupted Power Supply (UPS). See 9th Aerospace Defense Division comment in paragraph 2c of this report. Item is considered closed for the purpose of this report.

(9) Technical Data/Documentation. A complete review of the Specialized Maintenance Technical Order routine is currently in progress. The 71st Missile Warning Wing, Headquarters 9th Aerospace Defense Division, and Headquarters ADC are working with SMAMA to develop and publish adequate Work Units Codes. No firm completion date is available at this time, and item remains open. 9th Aerospace Defense Division will monitor this until action is complete.

(10) Maintenance Control, Maintenance Analysis and Quality Control. Site I Quality Control Inspection, scheduling and documentation procedures have been reviewed and revised to comply with recommendation of the ADC Power Analysis Team. All reports are carefully reviewed for compliance with applicable directives, regulations, manuals, and CEMMOIs. Action taken is considered adequate by 9th Aerospace Defense Division. However, continuous monitoring will be accomplished by staff visits. Item is considered closed for the purpose of this report.

(11) Power Restoral Procedures. Headquarters ADC Analysis Team found existing procedures adequate. 9th Aerospace Defense Division concurs and considers this item closed for purposes of this report.

c. Clear MEWS — Paragraph 6a, Civil Engineering.

(1) Electrical System Responsibility.

(a) The RCA Service Company, operations and maintenance contractor, has proposed to have the interface of responsibility between RCAS and Government start at the exterior wall of the power plant, Building No. 111. 9th Aerospace Defense Division does not concur with the above recommendation. The responsibility interface will be established at the load terminals of the main circuit breaker from the ring bus in the power plant as directed by 71st Missile Warning Wing letter, 7 October 1967, to RCAS.

(b) Evaluation of the interface between RCAS Civil Engineering and Technical Operations is still under study by 9th Aerospace Defense Division. This item remains open.

(2) Power Plant Standard Operating Procedures. SOPs are being prepared by the power plant personnel with an estimated completion date of 1 December 1967. These SOPs are

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posted at each work station, and one set posted in the training room library. These will be forwarded to higher headquarters for evaluation and review. A 9th Aerospace Defense Division four-man team will depart Colorado Springs on 29 November 1967 for Clear MEWS. They will review SOPs on site. This item remains open pending 9th Aerospace Defense Division final approval of SOPs.

(3) Preventive Maintenance - Power Plant. Reference comments in paragraph 2a of this report.

(4) Feeder Relocation to Bus Segment No. 1. ADC Power Survey Team recommended preparation of a project to rearrange certain feeder cables in the power house. Pending receipt and evaluation of an RCAS feasibility study, directed during the 30 August 1967 meeting between 9th Aerospace Defense Division, RCAS, and site representatives, project action will be held in abeyance. Contractor expects to have feasibility study in our headquarters on or about 1 December 1967. This item remains open and will be closely monitored by 9th Aerospace Defense Division until action is complete.

(5) Power System Coordination. RCAS is preparing project documents (DD Forms 1391/1391c) to provide "ring bus differential protection." Project documents should be in this headquarters by 1 December 1967. 9th Aerospace Defense Division will pick up action when documents are received. This item remains open.

(6) Recent Power Outages. A review of the three power outages that occurred in August 1967 determined that there was no common source of failure. Headquarters ADC recommended that no future attempts be made to tie into power systems external to the site. 9th Aerospace Defense Division concurs with the recommendation, and considers this item closed.

(7) Change to 4-Wire Distribution System. Headquarters ADC recommended that the present ungrounded system be retained. 9th Aerospace Defense Division concurs and considers this item closed.

(8) Lightning Arrestors. The 3.0 KVA lightning arrestors destroyed by the 26 August 1967 power outage have been replaced with 4.5 KVA arrestors as recommended by the

Headquarters ADC Power Analysis Team. 9th Aerospace Defense Division message 17257 Sep 67 authorized RCAS to replace damaged lightning arrestors with ones of higher rating (4.5 KVA). The damaged arrestors have been replaced. This action is considered complete for the purpose of this report.

(9) Additional Diesel Generator. New operating procedures, written by power house personnel and posted on 1 November 1967, negate the requirement for an additional diesel generator. This SOP will be reviewed on-site by the 9th Aerospace Defense Division team scheduled to arrive Clear MEWS on 29 November 1967. Final determination on adequacy of SOP will be withheld pending the on-site review. This item remains open.

(10) Remote Control Console. A work request (R-281-8) AF Form 322 was submitted to RCAS on 19 October 1967 to "develop a project for the design, construction and installation of a station board with a mimic bus and circuit breaker lights but without controls or instrumentation." The project was forwarded through proper RCAS channels. Estimated completion date is 1 April 1968. Item remains open and will be monitored by 9th Aerospace Defense Division until completed.

(11) Power System Transients. Guide lines for recording of power plant transients were recommended to power plant personnel at a joint meeting between 9th Aerospace Defense Division, RCAS, and site representatives on 31 August 1967. A recording oscillograph installed on 22 October 1967 will remain for a two months test period. Should recordings indicate that voltage transient conditions exist, analysis will be made and corrective action taken. This item requires continued follow-up by 9th Aerospace Defense Division.

(12) Additional Instrumentation. Work Request 258-8 was approved by site Facility Utilization Board on 22 November 1967. Estimated cost for recording frequency meter is $4,000.00. This item remains open and will be monitored by 9th Aerospace Defense Division until subject has been completed.

(13) Power Plant Air Handling Equipment. RCAS, contractor, has placed air handling equipment back in operation in the heating and ventilating mode. The cooling

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mode requires new coils which have been requisitioned on a Priority 5. Estimated delivery date for new cooling coils is 3 January 1968. 9th Aerospace Defense Division will monitor this project until all action is complete.

d. Clear MEWS -- Paragraph 6b, Personnel, Civil Service.

(1) Organization and Duty Alignment. Letter received from 13th Missile Warning Squadron dated 15 November 1967 requested a change in their UMD to increase work shifts from four people to five people. 9th Aerospace Defense Division reviewed and concurred with the 13th Missile Warning Squadron request and forwarded this to Headquarters ADC (ADMET) on 13 November 1967 for final review and approval. Item remains open and will be monitored by 9th Aerospace Defense Division until action is complete.

(2) Employee and Supervisor Training. A program to systematically determine the training requirements of all power plant personnel has been initiated. On 23 and 24 October 1967, the Civilian Personnel Training Manager from Eielson AFB visited this installation to provide guidance and assistance in setting up a training program. Required courses and training records were established. The GS-2 clerk-typist started a formal training program on 25 October 1967. The training program used at Eielson AFB power plant has been obtained and is being adapted for use at Clear MEWS. The development of a comprehensive training program will be a continuing one with complete course development to be accomplished by 1 May 1968. A four-man team from 9th Aerospace Defense Division will go to Clear MEWS on 29 November 1967 to assist site personnel in developing their training program. This item remains open and will be monitored by 9th Aerospace Defense Division.

(3) Manning of Central Heating and Power Plant. Work is in progress to develop a master manning schedule for the power plant. Performance requirements for the coal crew were completed on 25 October 1967. A proposed master schedule for the coal crew will be forwarded to higher headquarters by 10 November 1967 for approval. The target date for the complete master schedule is 1 December 1967. This item remains open and will be monitored by 9th Aerospace Defense Division until a satisfactory and workable manning system is achieved.

(4) Pay and Recruitment. Headquarters ADC stated that "position classification and pay scales are proper and recruitment and retention are adequate." 9th Aerospace Defense Division concurs and considers this item closed.

(5) Work Shift Scheduling. A work schedule is being developed that will meet the operating needs, conform to regulations, provide training, and hopefully motivate the majority of the employees. This work schedule will be completed simultaneously with the master manning schedule developed under paragraph (3) above. Target date for implementation is 1 December 1967. This item remains open and will be monitored by 9th Aerospace Defense Division until completed.

(6) Incentive Awards Program. The incentive awards program has been revitalized. This will be a continuing program to insure that all personnel who perform in an exemplary manner receive due recognition. Supervisors have been motivated and are aware of the importance of proper administration of the incentive awards program. This item will remain an item of staff interest to 9th Aerospace Defense Division, however, for reporting purposes, this item is considered closed.

(7) Staffing of Key Positions. Headquarters ADC considered the staffing of key personnel to be satisfactory. 9th Aerospace Defense Division concurs, however, this item will continue to be an item of staff interest during visits. For the purpose of this report action is considered complete.

(8) Service by Support Central Civilian Personnel Office. Regular assistance visits are made by the CBPO at Eielson AFB and are considered by the Commander, Clear MEWS, to be satisfactory. 9th Aerospace Defense Division agrees and considers this item closed.

e. Clear MEWS -- Paragraph 6c, Technical Equipment.

(1) Transmitter Power Feeder. ADC Power Survey Team recommended preparation of a project to rearrange certain feeder cables in the power house. Pending receipt and evaluation of an RCAS feasibility study, directed at the 30 August 1967 meeting between 9th Aerospace Defense Division, RCAS, and site representatives, project action will be held in abeyance. Contractor expects to have feasibility study

in our headquarters on or about 1 December 1967. This item remains open and will be closely monitored by 9th Aerospace Defense Division until completion.

(2) Transmitter Interlock Power Supplies. Circuit breakers CB 4, 17, 3 and 18 have been marked with plastic embossing tape, with appropriate warnings. Action is considered adequate and item is closed for the purposes of this report.

(3) Central Scanner Control Panel. Additional physical protection for the fuse holders and toggle switch will be provided as soon as design is complete and materials procured. Every effort will be made to avoid alteration of equipment configuration in designing and installing guards. Actions taken are adequate. Item remains open and target date for completion is 1 December 1967. 9th Aerospace Defense Division will monitor this item until complete.

(4) Master Synchronizer, Building Synchronizer. Additional physical protection for the exposed circuit breakers and switches for the master synchronizer and building synchronizer will be provided as soon as design is completed and materials procured. Every effort will be made to avoid alteration of equipment configuration in designing and installing guards. Actions taken are adequate. Item remains open and estimated completion date is 1 December 1967. 9th Aerospace Defense Division will monitor this item until action is completed.

(5) Environmental Control Equipment. Headquarters ADC could find no significant impact on power generation/distribution systems. 9th Aerospace Defense Division agrees and considers this item closed.

(6) Technical Data/Documentation. A complete review of specialized maintenance technical order routine is currently in progress. The 71st Missile Warning Wing, Headquarters 9th Aerospace Defense Division, and Headquarters ADC are working with SMAMA to develop and publish adequate Work Units Codes. No firm completion date is available at this time, and item remains open. 9th Aerospace Defense Division will monitor this until action is complete.

(7) Maintenance Control, Maintenance Analysis, Quality Control. Increased emphasis is being placed on monitoring

all phases of quality control. Periodic visits by 13th Missile Warning Squadron communications-electronics personnel to the work centers, with QC Inspectors, have been increased. QC Inspection Reports and other QC documents are more closely reviewed to insure contractor compliance with the SOW and Air Force directives. Actions taken are considered adequate, however, this will remain an item of interest on 9th Aerospace Defense Division future staff visits. Item is considered closed for purpose of this report.

(8) Equipment Protective Devices. The test of all low voltage, 480 volt power circuit breakers was completed at Site I during the week ending 8 October 1967. One breaker had a defective part and the supplier estimated five weeks delivery time. The delivery time was not met and appropriate follow-up action was initiated by the site. The circuit breaker tester will be retained at Site I untillthe part for the defective breaker is received, installed and the breaker retested. At that time the tester will be shipped to Site II by air. The circuit breaker test plan previously developed by RCAS and used at Site I has been transmitted to Site II and will be used as a guide in writing the Site II plan. This plan coordinates the activities of the performing section with the Site SSO, Systems Controller, Power Dispatcher and requires clearance to proceed with the tests from CC&DF and other operational agencies. Actions taken are adequate. This item will be closely monitored by 9th Aerospace Defense Division until completed.

#31-7900-4

9CCR

9th Aerospace Defense Division Letter, BMEWS Power System Failure Analysis, 10 October 1967

ADC (ADCCR)

1. This progress report is a second follow-on to our letter of 10 October 1967. The first follow-on was dated 28 November 1967.

2. The purpose of this report is to present the status of items scheduled for 1 December 1967 completion; these are contained in the attachment. Items for other than 1 December 1967 completion will be discussed in ensuing reports. These will be prepared as of the first of each month, following receipt of progress reports from the sites. Reports are due from the sites on the last Thursday of each month, the next due date being 28 December 1967.

3. Actions being taken in response to the Power Analysis Team's recommendations are considered to be progressing satisfactorily. These actions will continue to receive the highest priority, and we believe we can anticipate that future reports will continue to reflect the same satisfactory progress. Therefore, future reports will be forwarded to ADEDC unless you desire otherwise.

ORIS B. JOHNSON, Major General, USAF
Commander

1 Atch
Findings

Cy to: 71 Msl Wng
Wg (CCR)

1862

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FINDINGS

Our findings on the items scheduled for 1 December 1967 completion are listed below. As was done in our 28 November 1967 report, we are referring to paragraph numbers in the Headquarters Air Defense Command Report of Power Analysis Team, undated.

a. Thule BMEWS -- paragraph 6a, "Civil Engineering," subparagraph (7), "Relay Coordination." Relay coordination was completed on 3 December 1967. This item is closed for the purpose of this report.

b. Thule BMEWS -- paragraph 6b, "Technical Equipment."

(1) Subparagraph (4), "Central Scanner Control Panel." Additional physical protection for fuse holders and toggle switch was provided on 3 December 1967. This item is closed for the purpose of this report.

(2) Subparagraph (5), "Master Synchronizer, Building Synchronizer." Physical protection for circuit breakers and switches was provided on 3 December 1967. This item is closed for the purpose of this report.

c. Clear BMEWS -- paragraph 6a, "Civil Engineering."

(1) Subparagraph (2), "Power Plant Standard Operating Procedures." The plant SOPs are typed on mats and are being reproduced. The final product will be forwarded to 9th Aerospace Defense Division on 15 December 1967 for review. This item remains open.

(2) Subparagraph (4), "Feeder Relocation to Bus Segment Number One." During the 30 August 1967 Power Survey meeting at this headquarters between representatives from 9th Aerospace Defense Division, RCA Service Company, and the site, the RCA Service Company was assigned the task of preparing a feasibility study on rearrangement of certain feeder cables in the power house. Our previous report stated that this study was scheduled for completion by 1 December 1967. However, this date has not been met, and the report is now scheduled for completion by 15 January 1968. This item remains open.

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(3) Subparagraph (5), "Power System Coordination." Project documents have been received by 9th Aerospace Defense Division and are to be reviewed by the 71st Missile Warning Wing and 9th Aerospace Defense Division Facility Utilization Boards for accomplishment as a P341 project. This item remains open.

d. Clear MEWS -- Paragraph 6b, "Personnel, Civil Service," subparagraphs (3), "Manning of Central Heating and Power Plant," and (5), "Work Shift Scheduling." The master manning schedule and work schedule are being developed simultaneously by 13th Missile Warning Squadron. The proposed 1 December 1967 completion date was not met as several variations have been presented to power plant personnel for implementation on a trial basis in order to select the best solution. Refinement of manning and scheduling details will be completed by the power plant before submission to 9th Aerospace Defense Division for review. A new estimated completion date has not been established, as the trial method for selecting the best manning and scheduling proposal is not conducive to accurate time estimating. This item remains open.

e. Clear MEWS -- paragraph 6c, "Technical Equipment."

(1) Subparagraph (1), "Transmitter Power Feeder." See paragraph 3c(2) above, "Feeder Relocation to Bus Segment Number One." The feasibility study has not been received. This item remains open.

(2) Subparagraph (3), "Central Scanner Control Panel." Additional physical protection for fuse holders and toggle switch was provided on 7 December 1967. This item is closed for the purpose of this report.

(3) Subparagraph (4), "Master Synchronizer, Building Synchronizer." Physical protection for circuit breakers and switches was provided on 7 December 1967. This item is closed for the purpose of this report.

(DOC 40)
9C10

ADC PROGRAMMED ACTION DIRECTIVE

AIR DEFENSE COMMAND

SHIELD of FREEDOM

PAD 67-8

AUG 67

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PROGRAMMED ACTION)
)
DIRECTIVE 67-8)

HEADQUARTERS AIR DEFENSE COMMAND
Ent AFB, Colorado 80912
10 August 1967

MOVEMENT

1. Subject: Movement of the 71 Missile Warning Wing from Ent AFB, Colorado to McGuire AFB, New Jersey.

2. Objectives:

a. To outline timely and coordinated staff actions that must be taken by all agencies involved to accomplish this programmed action in an orderly and effective manner.

b. To insure that every possible action is taken to minimize hardship to personnel affected by this action.

3. Authority: USAF Program, Bases, Units and Priorities (U) PD 69-2, April 1967.

4. General Information:

a. As indicated in USAF PD 69-2, the 71 Missile Warning Wing will move from Ent AFB, Colorado to McGuire AFB, New Jersey during FY 1 69.

b. The programmed operational date for the 71 Missile Warning Wg at McGuire is 15 July 1968, hereafter referred to as D-Day.

c. Transition of operational functions to McGuire will be so planned that there will be no delay in the operational responsibilities of the 71st.

d. The 71 Missile Warning Wg will occupy those portions of the existing SAGE Direction Center Bldg at McGuire as outlined in P341 Minor Construction Program, MCG 4-8 Hq, Wing (Conversion) (Bldg 1907), dated 9 June 1967.

e. Direct coordination between Hq 9 Aerospace Defense Division, 71 Missile Warning Wg and First Air Force is authorized to resolve matters which can be resolved at these levels. Staff agencies at Hq ADC will be kept informed of all matters which concern them.

f. This PAD will outline actions and responsibilities in three areas: Hq ADC, 9 Aerospace Defense Division, and First Air Force with appropriate breakouts to lower echelons.

5. Actions Required by Hq ADC:

a. DCS/Plans.

Programs Division.

(a) Publish the basic Programmed Action Directive (PAD) and amendments thereto, as necessary.

(b) Establish reporting procedures to insure successful implementation of this Programmed Action Directive and maintain a file of reports submitted.

(c) Notify, as necessary, staff agencies of Hq ADC and subordinate headquarters of program changes which may have an impact on this action.

(d) DCS/Plans Project Officer for this PAD is Lt Col Bernard T. Rudden, Jr., ADLPP-G, Ext 3201.

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b. DCS/Civil Engineering.

(1) No O&M projects associated with the 71 Missile Warning Wg at Ent AFB will be accomplished without prior Hq ADC approval.

(2) DCS/Civil Engineering Project Officer for this PAD is Mr. Lewis Shockey, ADSER-P, Ext 3960/3969.

c. DCS/Comptroller.

(1) Budget: Funding adjustments in the Operation and Maintenance area will be considered when developing the First Revision to FY 1968 Annual Financial Plan in November 1967.

(2) DCS/Comptroller Project Officer for this PAD is Major Kendall G. Lorch, ADAMA-S, Ext 3816/3378.

d. DCS/Materiel.

(1) Transfer EAID equipment presently used by the 71 Missile Warning Wg (BMEWS) with the unit to McGuire AFB, NJ. (ADMSS)

(2) Update the reporting file (ROF) to reflect PAD actions. (ADMSS)

(3) Initiate V-25 reporting in accordance with ADCR 100-1. (ADMME)

(4) Monitor transportation activities and provide assistance as needed (ADMTP)

(5) Obtain authorization for AFR 11-4 negotiations. (ADMLP)

(6) Supply coordinator for this PAD is Captain Robert L. Smith, ADMSS-S, Ext 7243/7394.

(7) DCS/Materiel Project Officer for this PAD is Major L. W. Lassen, ADMLP-P, Ext 7202/7234.

e. DCS/Operations.

(1) Communications and Electronics.

(a) Monitor minor C-E programming actions accomplished by 9th Aerospace Defense Division.

(b) Respond to 9th Aerospace Defense Division requirements for command programming actions.

(2) C-E Project Officer for this PAD is Capt D. W. Schilling, ADOAC-AP, Ext 3436.

(3) DCS/Operations Project Officer for this PAD is Lt Col George M. Arnold, ADOSD-S, Ext 3583/84.

f. DCS/Personnel.

(1) Officer Personnel.

(a) Obtain waivers for PCS to McGuire AFB.

(b) Identify replacements for personnel not eligible to move. Instructions to unit will insure reporting to McGuire prior to established operations date.

(c) Issue line numbers to CBPO.

(2) Airman Personnel.

(a) Stop PCS withdrawals except mandatory moves.

(b) Request waivers from USAF.

(c) Furnish line numbers to CBPO.

(3) Civilian Personnel.

ADPCP will instruct the servicing CCPO to comply with regulations governing transfer of function.

(4) DCS/Personnel Project Officer for this PAD is CMSgt R. J. Christopher, ADPDP-L, Ext 3651.

g. Command Director/Administrative Services.

Project Officer for this PAD is Lt Col Floyd T. Dunmire, ADCAS-A, Ext 3240/3257.

h. Command Chaplain.

Project Officer for this PAD is Chaplain (Col) Michael J. Finneran, ADCCH, Ext 7327.

i. Command Director Information.

(1) USAF letter of 17 November 1966 provided text of the following news release that was retransmitted to units concerned and authorized for release:

The AF earlier announced that the SAGE direction center at McGuire AFB, NJ would be inactivated by July 1968. It is now planned to continue use of the direction center building by relocating the 71st Missile Warning Wing, Ent AFB, Colo to McGuire AFB, NJ during the summer of 1968. In addition to the warning wing, the Ballistic Missile Early Warning System (BMEWS) contractor headquarters (The RCA Service Company), now located at Riverton, NJ will also relocate to the SAGE facility at McGuire in the summer of 1968. Colocation of the 71 Missile Warning Wing and the BMEWS project headquarters in the same facility will increase the efficiency of the BMEWS contractor/Air Force relationship, decrease operational expenses and permit continuing use of the vacated SAGE facility. Relocation of the 71 Missile Warning Wing will add approximately 130 military and civilian personnel to the McGuire population. In addition, RCA employs approximately 288 civilian personnel in its BMEWS support function.

(2) ADCIO will expeditiously forward text of additional DOD/USAF approved news release material as received from SAFOI.

(3) Project Officer for this PAD is Capt F. J. McHugh, ADCIO-P, Ext 2445.

j. Inspector General.

There are no Inspector General activities associated with this PAD.

k. Command Judge Advocate.

Project Officer for this PAD is Colonel Joseph M. Caffall, ADCJA, Ext 3916.

l. Command Director Manpower and Organization.

(1) Request a Movement Directive from Hq USAF for the movement of the Headquarters, 71 Missile Warning Wing from Ent AFB, Colo to McGuire AFB, NJ, effective 15 July 1968.

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(2) Issue ADC Movement Order upon receipt of Movement Directive from Hq. USAF.

(3) Submit the USAF RCS: HAF-01 Report to Hq USAF on 22 July 1968.

(4) Project Officer for this PAD is Lt Col F. T. Killeavy, ADCMO-F, Ext 3131.

m. Command Surgeon.

(1) There are no Command Surgeon responsibilities associated with this PAD.

6. Actions Required by 9 Aerospace Defense Division:

a. Comptroller.

(1) Budget.

(a) Specific funding adjustments by element of expense code will be identified in the First Revision to the FY 1968 Annual Financial Plan submitted to Hq ADC in October 1967. Narratives of the appropriate element of expense codes should fully justify increases and decreases related to this PAD action.

b. Materiel.

(1) Provide First Air Force and McGuire AFB with requirements of logistical and administrative support.

(2) Insure that supply responsibilities are terminated in accordance with AFR 67-10.

(3) Monitor all unit actions as listed in the SCP to insure compliance.

c. Operations.

(1) Communications and Electronics.

(a) Determine the tactical and non-tactical communications required to support the 71 Missile Warning Wing at McGuire AFB. Initiate necessary actions through ADC, in accordance with AFM 100-18, 100-22, and other applicable directives.

(b) Take frequency management actions as necessary to insure that frequency assignments are accurately accomplished in accordance with AFM 100-31.

(c) Take C-E program management action as necessary to insure that applicable equipment changes are accurately reflected in the Communications-Electronics Support Program (PCSP) in accordance with AFM 100-18.

(d) Establish a COMSEC account in accordance with AFKAG-2.

d. Personnel.

(1) Military Personnel.

(a) Insure 9CBPO accomplishes the following actions:

1 Identify personnel that will move with unit.

2 Request any waivers that may be necessary, DAPS, ODSD, etc.

3 Report personnel that will not be required to move with unit.

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4 Publish special orders.

5 Separate airmen who do not move and refuse to acquire needed service retainability and who cannot be effectively utilized at present station. Separation will be on or before DOS.

(2) Civilian Personnel.

(a) Insure CCPO counsels employees on transfer of function rights.

(b) Insure CCPO issues transfer of function notice to employees.

(c) Monitor CCPO to insure that employees declining transfer to new location but willing to relocate elsewhere are registered in DOD Computer Referral System and are referred to bases of choice in ADC and local DOD installations.

(d) Insure CCPO separates employees declining move to new location and not placed elsewhere.

e. Administrative Services.

(1) Instruct the 71 Missile Warning Wing to cancel departmental and field publications and forms accounts with Ent AFB sources and discontinue requisitioning from them.

(2) Have 71 Missile Warning Wing appoint an ADC Publications Distribution Officer and submit ADC Form 210, PDO Information, to the ADC Center.

(3) Insure that 71 Missile Warning Wing accepts from 35 Air Division responsibility for ADC PDO Account No. 39 and that the account provides service to 772 Radar Squadron and 46 Air Defense Missile Squadron.

(4) Instruct 71 Missile Warning Wing to establish a departmental forms and publications account with the Air Force PDO, McGuire AFB, NJ.

(5) Stocks of ADC publications and forms on hand in PDO Account 39 will be transferred along with the account to 71 Missile Warning Wing.

(6) Instruct the 71 Missile Warning Wing to take the following actions to insure continuous mail and message service to the unit and its personnel:

(a) Forward copies of reassignment orders to gaining and losing installation postal officers.

(b) Instruct personnel being reassigned to send change of address notices to correspondents and publishers.

(c) Request the Ent AFB Postal Officer to drop 71 Missile Warning Wing from the mail distribution scheme filed with the serving post office.

(d) Request the postal officer, McGuire AFB, to include the unit on the McGuire mail distribution scheme.

(e) Request the Chief of Administrative Services, McGuire AFB, to establish official mail, message and distribution service for the unit.

(7) Monitor the retirement, destruction, and movement to new location of the unit's records, including the retirement of eligible records from the staging area.

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f. ADC Management Engineering Team (Ent).

(1) The ADC Management Engineering Team, Ent will submit to Hq ADC (ADCMO-F) the RCS: HAF-01 Report on the effective departure and arrival dates of the unit.

7. Actions Required by First Air Force:

a. Materiel.

(1) Arrange with 9 Aerospace Defense Division representatives for logistical and administrative support as required and available.

(2) Advise Headquarters ADC of any problems arising in the Materiel area which are beyond the Numbered Air Force capability to resolve.

(3) Furnish ADC (ADMLP-P) the name, rank, office symbol and phone extension of project officer for this PAD as soon as possible.

b. Information.

(1) Monitor Information activities pertaining to this action.

(2) Advise Hq ADC (ADCIO) of any Information matters which cannot be resolved at First Air Force.

c. Operations.

(1) Communications and Electronics.

(a) Coordinate with 9 Aerospace Defense Division for the transfer of required communications facilities presently on hand at the 21 Air Division (35 Air Division after 25 June 1968) to the 71 Missile Warning Wing.

8. Reporting:

a. RCS: 1-ADC D11. The 1-ADC D11 Report will be submitted to Hq ADC in accordance with ADCM 27-1. In addition to normal reporting procedures, all problem areas or potential areas resulting from this action will be reported to this Hq. Attn: ADLPP-G, as soon as identified.

b. RCS: 2-ADC D11. A Master System Control Plan (SCP) listing major actions in time phased format is included as Attachment 1. First Air Force, 9 Aerospace Defense Division, and Hq ADC Staff Agencies will report only on those numbered action items assigned to them for reporting responsibility. RCS: 2-ADC D11, Program Revision Report, ADC Form 193, will serve as the reporting vehicle. This report will be addressed to ADLPP-G through ADAMA-S. On-time reporting by all responsible agencies is essential for proper control of the SCP. Procedures for the use of ADC Form 193 are outlined in ADCM 27-1.

c. PAD Supplements. Any 9 Aerospace Defense Division supplements to this PAD will be forwarded only to those ADC field units having actions/responsibilities concerning the basic PAD. Copies forwarded to Hq ADC for internal distribution will be sent to ADLPP-G.

FOR THE COMMANDER

James A. Darby

JAMES A. DARBY, Colonel, USAF
Director, Aerospace Plans and Programs

1 Atch
SCP

REPORTING RESPONSIBILITY FOR SCP ACTION ITEMS

(PAD 67-8)

ACTION ITEM	REPORTING AGENCY	ACTION ITEM	REPORTING AGENCY
1	ADOAC	29	ADPDO
2	9ADD	30	ADPDO
3	1AF/9ADD	31	ADMSS-ES
4	ADPDO	32	ADPDA
5	ADPDO	33	ADMSS-EM2
6	ADPDO	34	9ADD
7	9ADD	35	9ADD
8	9ADD	36	9ADD
9	9ADD	37	ADPDA
10	9ADD	38	ADPDA
11	ADMLP	39	ADCMO-F
12	9ADD	40	9ADD
13	ADOAC	41	9ADD
14	9ADD	42	ADCMO-F
15	9ADD	43	9ADD
16	9ADD	44	9ADD
17	9ADD	45	9ADD
18	ADABF	46	9ADD
19	9ADD	47	9ADD
20	9ADD	48	9ADD
21	9ADD	49	9ADD
22	9ADD	50	9ADD
23	9ADD	51	9ADD
24	ADMSS-ES	52	9ADD
25	9ADD	53	ADMME-CM
26	9ADD	54	9ADD
27	ADMSS-ES	55	ADCMO-F
28	ADMSS-EM2		

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SYSTEM CONTROL PLAN

AS OF DATE:

ADC PROJECT OFFICE: ADAMA-P

TITLE: Movement

SYSTEM DESCRIPTION: 71 Missile Warning Wing, Ent AFB, Colorado

EST COMPLETION DATE: 15 July 1968

NUMBER A	ACTIONS REQUIRED B	STARTING DATE C	COMPLETION DATE D	RESPONSIBLE AGENCY (ADC Monitor) E
1.	CEIP preparation-Long Haul Communications Circuit.		Completed	ADOAC
2.	Submit to ADOAC-CC a listing, with justification of Lease Communications required by the 71st.	Immediately	1 Sep 1967	9ADD (ADOAC)
3.	Arrange for storage of COMSEC equipment at 21 AD Com Center pending 71MWW COMSEC Acct activation.	Immediately	1 Jul 1968	1AF/9ADD (ADOAC)
4.	Furnish all ADC determined assignments to CBPO for action, for those officers not moving with unit.	Immediately	15 Jul 1968	ADPDO
5.	Freeze all personnel assigned to the unit so that no additional personnel are assigned to the unit unless essential to mission continuity and so that no further personnel are withdrawn from the unit unless they can be released without replacement.	Immediately	ASAP	ADPDO
6.	Divert personnel allocated to or enroute to the unit if they are not essential to mission requirements and identify those officers who are pending release or separation.	Immediately	ASAP	ADPDO

ADC FORM FEB 67 203 PREVIOUS EDITION WILL BE USED

SYSTEM CONTROL PLAN				AS OF DATE
ADC PROJECT OFFICE: ADAMA-P	TITLE: Movement			
SYSTEM DESCRIPTION: 71 Missile Warning Wing, Ent AFB, Colorado				EST COMPLETION DATE: 15 July 1968
NUMBER A	ACTIONS REQUIRED B	STARTING DATE C	COMPLETION DATE D	RESPONSIBLE AGENCY (ADC Mailing) E
7.	Report direct to ADPDO, date each officer pending release or separation is available. Date will be determined by unit commander based on mission, workload and manning. Report will be updated as required and ADPDO and Air Division and Numbered Air Force advised of revisions.	Immediately	15 Jul 1968	Unit (ADPDO)
8.	CBPO publishes orders on all officers in accordance with USAF and ADC assignment instructions.	Immediately	1 May 1968	CBPO (ADPDO)
9.	Funding adjustments by Element of Expense Code will be identified in First Revision to FY 68 Financial Plan.	Immediately	31 Oct 1967	9ADD (ADABF)
10.	Stop PCS withdrawals except for mandatory moves.	Immediately	15 Jul 1968	CBPO (ADPDC)
11.	Obtain authorization for AFR 11-4 negotiations.	Immediately	ASAP	ADMLP
12.	Provide the McGuire Base Supply Office Base Funded Supply and Equipment Cost Data, indicating by Federal Supply Group what it costs to support the 71 Missile Warning Wing for a 6 or 12 month period.	Immediately	8 Sep 1967	4600 AB Wg Base Supply (ADMSS-ES)
13.	USAF approval of Long Haul Ckt CEIP.	15 Aug 1967	1 Nov 1967	ADOAC

ADC FORM FEB 67 303 PREVIOUS EDITION WILL BE USED

SYSTEM CONTROL PLAN

AS OF DATE

ADC PROJECT OFFICE: ADAMA-P

TITLE: Movement

SYSTEM DESCRIPTION: 71 Missile Warning Wing, Ent AFB, Colorado

EST COMPLETION DATE: 15 July 1968

NUMBER A	ACTIONS REQUIRED B	STARTING DATE C	COMPLETION DATE D	RESPONSIBLE AGENCY (ADC Monitor) E
14.	Counsel employees.	1 Sep 1967	1 Oct 1967	CCPO (ADPCP)
15.	Issue transfer of function notice to employees.	1 Sep 1967	1 Oct 1967	CCPO (ADPCP)
16.	Negotiate AFR 11-4 Agreement.	Sep 1967	Jan 1968	9ADD (ADMLP)
17.	Provide outplacement assistance as required.	1 Oct 1967	15 Oct 1967	CCPO (ADPCP)
18.	Funding adjustments in O&M areas in First Revision to FY 68 Financial Plan.	31 Oct 1967	30 Nov 1967	ADABF
19.	Identify personnel that will move with unit.	1 Nov 1967	1 Dec 1967	CBPO (ADPDA)
20.	Request PCS waivers that may be necessary, DAPS, ODSD, etc.	1 Nov 1967	1 Dec 1967	CBPO (ADPDA)
21.	Report personnel that will not be required to move with unit.	1 Nov 1967	1 Dec 1967	CBPO (ADPDA)
22.	Initiate action to establish 71 MWW COMSEC account in accordance with AFKAG-2	1 Nov 1967	30 Jun 1968	9ADD (ADOAC)

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ADC FORM FEB 67 203 PREVIOUS EDITION WILL BE USED

SYSTEM CONTROL PLAN

AS OF DATE:

ADC PROJECT OFFICE: ADAMA-P

TITLE: Movement

SYSTEM DESCRIPTION: 71 Missile Warning Wing, Ent AFB, Colorado

EST COMPLETION DATE: 15 July 1968

NUMBER A	ACTIONS REQUIRED B	STARTING DATE C	COMPLETION DATE D	RESPONSIBLE AGENCY (ADC Mission) E
23.	Submit Service Order Inquiries (SOIs) to obtain leased communications facilities required.	1 Nov 1967	15 Dec 1967	9ADD (ADOAC)
24.	Furnish list of furniture and office equipment required by the 71st to host base.	1 Dec 1967	15 Dec 1967	ADMSS-ES
25.	Furnish ADMSS-EM a list of electronic scheme equipment to be supported by 71 Missile Warning Wg at McGuire.	1 Dec 1967	15 Dec 1967	Unit (ADMSS-EM)
26.	Furnish ADMSS-EM a list of AGE requirement to support Electronic Scheme Equipment.	1 Dec 1967	15 Dec 1967	Unit (ADMSS-EM)
27.	Receive list of available furniture and office equipment from host EMO.	1 Jan 1968	15 Jan 1968	ADMSS-ES
28.	Receive list of available AGE from host EMO. Equipment available as result of McGuire SAGE Center phase-out may be included.	1 Jan 1968	15 Jan 1968	ADMSS-EM2
29.	Report to Hq USAF all personnel who received a DLA payment within the current fiscal year of projected PCS.	1 Jan 1968	31 Mar 1968	ADPDO
30.	Receive specific USAF approval on each individual requiring a second DLA payment in current fiscal year.	1 Jan 1968	31 Mar 1968	ADPDO

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ADC FORM FEB [illegible] 03 PREVIOUS EDITION WILL BE USED

SYSTEM CONTROL PLA.

AS OF DATE

ADC PROJECT OFFICE: ADAMA-P

TITLE: Movement

SYSTEM DESCRIPTION: 71 Missile Warning Wing, Ent AFB, Colorado

EST COMPLETION DATE: 15 July 1968

NUMBER A	ACTIONS REQUIRED B	STARTING DATE C	COMPLETION DATE D	RESPONSIBLE AGENCY (Attic Symbol) E
31.	Direct turn-in of all equipment from 71st to support EMO.	16 Jan 1968	30 Jul 1968	ADMSS-ES
32.	Obtain RDOs on any equipment required by the 71st which is not available at host EMO and issue shipping instruction to Peterson Field EMO.	16 Jan 1968	1 Jun 1968	ADMSS-ES
33.	Request waivers from MPC.	18 Jan 1968	31 Jan 1968	ADPDA
34.	Issue AGE transfer instructions for turn over of AGE from 21 Air Division to 71 Missile Warning Wg.	1 Mar 1968	15 Mar 1968	ADMSS-EM2
35.	Submit request COMSEC equipment transfer to new 71 Missile Warning Wg account.	1 Mar 1968	1 Apr 1968	71MWW/21AD (ADOAC)
36.	Submit all applicable PCSP changes.	1 Mar 1968	15 Jul 1968	9ADD (ADOAC)
37.	Furnish line numbers to CBPO.	8 Mar 1968	8 Mar 1968	ADPDA
38.	Furnish disposition instructions on personnel not required to move with unit.	8 Mar 1968	8 Mar 1968	ADPDA
39.	Request for Movement Directive.	15 Mar 1968	10 Apr 1968	ADCMO-P

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ADC FORM FEB 67 203 PREVIOUS EDITION WILL BE USED

SYSTEM CONTROL PLAN

AS OF DATE:

ADC PROJECT OFFICE: ADAMA-P

TITLE: Movement

SYSTEM DESCRIPTION: 71 Missile Warning Wing, Ent AFB, Colorado

EST COMPLETION DATE: 15 July 1968

NUMBER A	ACTIONS REQUIRED B	STARTING DATE C	COMPLETION DATE D	RESPONSIBLE AGENCY (ADC Manual) E
40.	Publish Special Orders.	18 Mar 1968	31 Mar 1968	CBPO (ADPDA)
41.	Separate airmen who do not have and refuse to acquire needed service retainability and who cannot be effectively utilized at present station. Separation will be on or before DOS.	As Required	NLT D-Date	CBPO (ADPDA)
42.	Issue ADC Movement Order.	15 Apr 1968	15 Apr 1968	ADCMO-F
43.	Initiate Request for Change Orders to SMAMA changing the address of Office of Administration.	29 May 1968	1 Jun 1968	Unit (ADMPM-A)
44.	Separate employee who cannot be placed.	1 Jun 1968	15 Jul 1968	CCPO (ADPCP)
45.	Retire, destroy, move unit records.	1 Jun 1968	15 Jul 1968	Unit (ADCAS-AR)
46.	Initiate action to terminate Contracting Officers' Appointments (if applicable).	7 Jun 1968	16 Jun 1968	Unit (ADMPM-B)
47.	Close out Ent Publications Accounts; open McGuire accounts.	1 Jul 1968	15 Jul 1968	Unit (ADCAS-P)

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ADC FORM FEB 6_ 103 PREVIOUS EDITION WILL BE USED

SYSTEM CONTROL PLA.

AS OF DATE:

ADC PROJECT OFFICE: ADAMA-P

TITLE: Movement

SYSTEM DESCRIPTION: 71 Missile Warning Wing, Ent AFB, Colorado

EST COMPLETION DATE: 15 July 1968

NUMBER A	ACTIONS REQUIRED B	STARTING DATE C	COMPLETION DATE D	RESPONSIBLE AGENCY (ADC Manual) E
48.	Distribute reassignment orders and changes of address for mail purposes.	1 Jul 1968	15 Jul 1968	Unit (ADCAS-A)
49.	Initiate official mail and message service at McGuire AFB, and close out service at Ent AFB.	1 Jul 1968	15 Jul 1968	Unit (ADCAS-A)
50.	Confirm to Hq ADC (ADOAC) that all necessary C-E actions have been accomplished.	1 Jul 1968	15 Jul 1968	9ADD (ADOAC)
51.	Initiate action to appoint Contracting Officers (if applicable).	5 Jul 1968	12 Jul 1968	Unit (ADMPM-A)
52.	Initiate action to assign ACO to BMEWS Contract (if applicable).	5 Jul 1968	12 Jul 1968	Unit (ADMPM-A)
53.	Initiate V-25 Reporting IAW ADCR 100-3.	15 Jul 1968	15 Jul 1968	ADMME-CM
54.	All personnel proceed on reassignment on availability date.	As Required	15 Jul 1968	Unit ADPDC)
55.	Submit RCS: HAF-01 Report.	22 Jul 1968	22 Jul 1968	ADCMO-F

ADC FORM FEB 67 203 PREVIOUS EDITION WILL BE USED

DISTRIBUTION

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ADLPP-G	5
ADEER-P	1
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ADMSS	5
ADMPM	1
ADMME-B	1
ADMME-AVDO	1
ADMTP	1
ADODC	1
ADOTT	1
ADOOP	1
ADOOP-P	1
ADOOP-E	1
ADOOP-W	1
ADOAC-AP	1
ADOAC-CC	1
ADOIN	1
ADONX	1
ADOCP	1
ADPDC	1
ADPDA	1
ADPDO	1
ADPOP	3
ADCAS-A	1
ADCCH	1
ADCIO	1
ADCIO-H	2
ADCIG	1
ADCJA	1
ADCMO-F	1
ADCSA-F	1
ADCSG-A	1
USAF Res Aud Ent AFB CO 80912	1
CINCNORAD Ent AFB CO 80912	
NPPP	1
NPMO	1
NGAM	1
NOOP	1
NLOG	1
Hq USAF (AFOAPD)	2
Secretary of the AF (SAFLL) Wash DC 20330	1
AFLC (MCOOF) (MCSC)	2
AWS (AWSOP)	1
AFCS (OPS)	2
AU (CCG-O)	1
SMAMA (SSM)	2
APASTO, P O Box 1406, Santa Monica CA 90406	1
ADC Distribution:	
1AF (OPP) Stewart AFB NY 12550	15
4AF (OPP) Hamilton AFB CA 94934	2
10AF (OPP) Richards-Gebaur AFB Mo 64030	2
14AF (OPP) Gunter AFB AL 36114	2
21 Air Div (CCR) McGuire AFB NJ 08641	2
35 Air Div (CCR) Hancock Fld Syracuse NY 13225	2
9 Aerosp Def Div (CCR) Ent AFB CO 80912	25
438 AB Gp (CCR) McGuire AFB NJ 08641	5
71 Missile Warning Wg (CCR) Ent AFB CO 80912	15
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DOC 41

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

DEC 20 1967

REPLY TO ATTN OF: 9DEC

SUBJECT: Review of 71 Msl Wng Wg Ad Hoc Committee Study

TO: 9ODC

1. The 71 Msl Wng Wg study on movement of the wing and other functions to McGuire AFB has been reviewed. Comments regarding the 9DEC position are provided.

2. Discussion

a. The DAC facility currently planned for location at McGuire by ESD is in the FY 69 MCP and programmed at 500 K. The 6000 SF presently allocated to this facility by 9ADD would provide sufficient administrative space to house the BLSC and TBS. The DAC should not be considered as a factor in the move because regardless of its location ESD has programmed sufficient funds to build a new facility or modify an existing facility.

Recommendation: We should request ADC to advise ESD that the 6000 SF previously allocated for the DAC in the Sage Building at McGuire is no longer available since we now have a requirement to satisfy the relocation of BLSC and TBS.

b. The present P-341 project for McGuire was approved by the Air Staff for $150,000 and the Certificate of Urgency was signed by Hq 9ADD and Hq ADC. This project was justified on the basis of a savings incurred through the relocation and collocation of 71 Msl Wng Wg and PHQ at McGuire. If PHQ is not relocated to McGuire, we will require the reapproval by the Air Staff resulting in a probable slippage of the 71 Msl Wng Wg move beyond July 1968.

Recommendation: (1) PHQ should be relocated to McGuire Oct 68 as planned, (2) The project should be advertised with the modifications required in the DAC area included as an alternate and if the bid exceeds the funds available, we should request Hq USAF to provide the additional funds to support the relocation of BLSC and TBS with PHQ.

c. Since SMAMA has directed the relocation of BLSC to Riverton in February, 1968 and the phaseout of the BLSC warehouse by July, 1968, little or no warehouse space will be required at McGuire. Col Commontator the DM of the 21 AD has informed us by telephone that the 4000 SF first floor and mezzanine in the Sage Building has not been allocated as yet but will be soon.

Recommendation: 9MDC should inspect this area to satisfy the requirement for receiving and shipping and request this space be allocated to 71 Msl Wng Wg in the 11-4.

d. Removal of the DAC from the Sage Building will be in consonance with the Commander's request that the 440L be transferred to the 73 Aerosp Survl Wg. ESD estimated construction in the Sage Building would cost $180,000 and if the DAC remains at McGuire, the cost of an additional structure will approach the 500K programmed. Hq 14 AF has advised us that Bldg 751 at Tyndall AFB could be made available and the cost estimate to modify it to install the DAC would be approximately 100K.

Recommendation: Hq ADC should be furnished this information to further justify the transfer of 440L to 73 Aerosp Survl Wg.

3. Cases 1 and 3 are not considered valid since 9ADD has requested transfer of 440L system to 73 Aerosp Survl Wg.

4. Case 2 is recommended since we can proceed with our present plans without incurring further slippage.

5. Case 4 is considered impractical since the construction project must be revalidated and the Air Staff approval obtained thereby slipping the move of the 71 Msl Wng Wg.

6. Radical departure from approved programs this late in the game without very strong justification for the change will discredit the validity of 9ADD attempts to secure higher headquarters indorsement of future programs.

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Move 71st reports

9MLP SEP 29 1967

Report of Staff Visit and Meetings at McGuire AFB and Moorestown, New Jersey

9CCR

1. Organizations Visited: 438 Military Airlift Wing, 438 Air Base Group, 21 Air Div (ADC), and 17 Survl Sq, Moorestown, N.J.

2. Dates: 19 and 20 September 1967.

3. Purpose of Visits:

a. To determine capability and arrive at agreement for McGuire AFB to provide AFR 11-4 support to 71 Missile Warning Wing and BMEWS O&M contractor personnel being transferred to McGuire with the Wing.

b. Investigate the 21 Air Div phase-down program to determine when the McGuire Civil Engineering contractors can have access to the building to begin rehabilitation.

c. Spares provisioning for the Pulse Compression Modification and general logistic support problems at Moorestown.

4. Persons Performing Visits: See Attachment #1.

5. Principal Persons Contacted: See Attachments 2 and 3.

6. Discussion of matters pertaining to McGuire AFB; and recommendations or actions taken:

a. Colonel Anderson, DCS/Materiel, opened the meeting with a short dissertation on the purpose of the 9ADD visit and emphasized the importance of good host-tenant AFR 11-4 agreements. Representatives attending the meeting from McGuire AFB were introduced. The meeting was then turned over to Major Drake to chair the negotiating proceedings for support of the 71 Missile Warning Wing.

b. A proposed AFR 11-4 agreement, prepared by 71 Missile Warning Wing and staffed through 9ADD, was distributed to all McGuire staff activities represented. This document was then discussed item by item. Areas of question were noted for follow-on discussion and resolution between the principals having staff responsibility. Generally speaking, the agreement was very well received. Host base support requested for the 71 Missile Warning Wing and O&M contractor personnel was agreed to with only minor changes. One area, janitorial service for the 71 Missile Warning Wing and BMEWS O&M contractor personnel, could not be resolved and will have to be submitted to higher headquarters in accordance with procedures established in AFR 11-4.

c. Accounting and Finance.

(1) A discussion was held regarding allotments of funds to McGuire AFB beginning in FY69 in support of the 71 Missile Warning Wing. Funds allotted will support the pay of civilians, contractor and blue suit travel, office supplies, etc. The Finance and Accounting representatives expressed complete approval regarding our proposed action for financial support. They stated that there would be no problem in supporting our request.

(2) McGuire AFB was requested to be the disbursing office for the BMEWS O&M contractor, since the Administrative Contracting Officer (ACO) will be located at McGuire. This function is presently being handled at Stewart AFB, New York. The McGuire financial personnel gave their approval to this request.

(3) Since it was agreed that 9ADD will allot funds to McGuire AFB for support of the 71 Missile Warning Wing, it was also requested that funds be allotted to support the family housing program, transportation of household goods, electricity, and rental vehicles at Moorestown, New Jersey. McGuire's finance personnel approved our request.

d. Civil Engineering.

(1) Minor word changes in the proposed agreement were recommended and agreed to by the 9ADD representatives.

(2) Janitorial service as requested in the proposed AFR 11-4 agreement was not concurred in by McGuire's DCS/Materiel, Colonel Anderson; however, McGuire will provide the service providing 9ADD/ADC programs and supplies the funds. The estimated cost for contract janitorial service for the 71 Missile Warning Wing and the BMEWS O&M contractor is $30,000 per year. Although the McGuire representatives were advised that AFM 172-1 levies the responsibility for custodial services on the host

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base, their decision requiring 9ADD/ADC funding remained firm. Representatives concerned agreed to leave the janitorial requirement in the proposed AFR 11-4 agreement, thereby requiring official comments from McGuire. Action will be taken upon receipt of the McGuire position to prepare a reclama and forward it to Hq ADC for command assistance or decision.

(3) The 9DEC representative advised the AFR 11-4 group from McGuire, which included Civil Engineering representation, that McGuire Base would be expected to operate the mechanical system in the SAGE Building in support of the environmental mechanical requirements for 71 Missile Warning Wing and the BMEWS contractor. McGuire concurred in operation of all utilities.

(4) A discussion with the 21st Air Div project officer revealed no scheduling information on building evacuation other than close down of operations on 1 April 1968 and a deactivation date of 25 June 1968. Between these dates, actions in accordance with ADC's PAD 67-8 and PAD 67-3 as supplemented by 1st Air Force Supplement 1, will be accomplished. Many PAD actions have get well dates of 25 June 1968. 9DEP is preparing a letter to Hq ADC giving the required project schedule to meet the operational date of 15 July 1968 for the 71 Missile Warning Wing's move to McGuire in accordance with ADC's PAD 67-8. 9DEP will request that ADC levy this schedule on the 21st Air Div through 1st Air Force.

(5) The Redistribution and Marketing Office at Lakehurst NAS (USN), New Jersey will monitor both preparation and execution of the salvage contract for removal of computer equipment from the SAGE building. There will only be one contractor and the order of equipment removal can be specified. Preparation of the contract is anticipated by 25 December 1967 with an additional 30 to 45 days allowed for bidding. The estimated date for allowing the salvage contractor access to the building is 16 April 1968. The contractor will have a time limit of 90 to 120 days for removal of equipment, thereby completing his operation between 15 July and 15 August 1968.

e. Data Processing was discussed and it was determined that McGuire AFB has the capability for processing 10,000 AFTO 200 series forms per month and 600 ESR cards per month. However, these forms must be submitted in small increments throughout the month. If the 71 Missile Warning Wing data

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processing requirements exceed 20 to 25 thousand forms per month, 9ADD may be required to program key punch operators into the 71 Missile Warning Wing. McGuire operates a decentralized data processing system and units having a heavy data processing work load are required to furnish their own key punch operators to operate key punch and verification equipment provided by the base.

f. The Maintenance Control Center (MCC) console, constructed in accordance with ADC Supplement 3, AFM 66-1, meets the 71 Missile Warning Wing requirements. The console is scheduled for shipment to Montauk AFS upon deactivation of the SAGE center. A cost savings item was submitted and approved on moving the console to Montauk and a $90 award was presented.

RECOMMENDED ACTION: 71MME submit a formal request for the console.

g. Supplies, equipment and transportation.

(1) McGuire Base Supply advised that there was no problem in providing supplies to both the 71 Missile Warning Wing and the contractor. One account will be established with designated personnel authorized to obtain supplies through the account.

(2) The 71 Missile Warning Wing equipment requirements listing was provided McGuire's EMO (Mr. Bessler/Sgt Drews) and the 21st Air Div. However, the listing did not include contractor requirements as current planning is to move the equipment utilized by the contractor at Riverton to McGuire. The 21st Air Div has enough equipment on hand to fulfill the 71 Missile Warning Wing's requirement and McGuire's EMO intends to transfer this equipment in place to 71 Missile Warning Wing. Transfer action will necessitate PCS assignment of a 71st Materiel representative to McGuire by 1 May 1968.

RECOMMENDED ACTION: The 71 Missile Warning Wing and 9CBPO identify a supply NCO and insure that he is in place at McGuire by 1 May 1968.

(3) A requirementsexists for the 71 Missile Warning Wing to have representation and a Materiel overlap with the 21st Air Div in order to establish an equipment account, identify equipment required by the 71 Missile Warning Wing and assist in transferring property from the 21st Air Div

to 71 Missile Warning Wing. Hq 71st will be authorized 64570 and 64770 slots in the first quarter FY69. TSgt Warren Shelton, AF14439096 and SSgt Robert F. Jones, AF 14522591, both 64570, would like to transfer from the 21st Air Div to 71st. In addition, informal information received from 21st Air Div is that Hq ADC Personnel is planning a visit to the 21st Air Div during October 1967. The possibility exists for 9CBPO to visit 21st Air Div at the same time and effect a transfer of one of the above personnel to the 71st.

(4) McGuire Base Transportation indicated vehicle shortaged by type and that the three sedans and one station wagon requested in the host tenant agreement may not be filled; however, pick-up trucks could be provided as substitutes. It was decided to leave the requirement as is and the 71st CCR would submit a letter of justification to 438 TBSC to arrive no later than March 1968. Final approval or disapproval will be given at that time. All other transportation requirements for the 71 Missile Warning Wing and contractor can be provided.

RECOMMENDED ACTION: The 71CCR provide a letter of justification for desired vehicles.

h. Housing.

(1) McGuire AFB has 1955 family housing units and spaces for 50 trailers. Two hundred of these units, consisting of one, two, three and four bedrooms, are located at Fort Dix, adjacent to McGuire. Priority for on-base housing is (1) rank, (2) date of rank, and (3) family composition. The break-down of family housing according to rank is in Attachment #4.

(2) The waiting period for officer On-base housing varies according to rank. The waiting period for Senior and Field Grade officers will range from 30 to 90 days. For Junior Officers, the waiting period would be 60 days minimum and would possibly be as long as their tour at McGuire.

(3) Waiting period for enlisted. There should be no problems finding on-base housing for CMSgt through TSgt's. The estimated waiting period for TSgt and above is 30 days. SSgt and below may have to waite indefinitely.

(4) A proposal was made by Mr Ponticelli, Base Housing Services Officer, to lessen the time required to obtain on-base housing. If the 71st submits a roster of personnel with rank and date of rank to the housing office in advance of the move, the waiting period could be lessened

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by 30 days. Approximately 30 days before personnel begin to arrive, their names will be placed on the waiting lists for government housing.

RECOMMENDED ACTION: The 71st prepare a list of officer and airmen requiring government housing and submit to McGuire in advance of the move.

(5) The availability of dormitory space for airmen presently is very limited. The dormitory adjacent the Sage building will be vacated by the 21st Air Division by 25 June 1968. It is recommemded that 71st determine its NCO and Airmen billeting requirements and inform the 438th ABG of such requirements for space in dormitories being evacuated by 21AD. Requirements should be based on one NCO per room and a maximum of two Airmen per room.

(6) The BOQ will house 62 officers and the VOQ can accomodate 286. At present, the BOQ is full and this situation prevails year-round. The peak period for occupancy in the VOQ is the summer months.

(7) Off-base housing. Presently this service at McGuire is being re-organized. According to Captain Macdonough who is in charge, it will be 3 months before they will know the complete picture on off-base housing (rent, utilities, schools, transportation). At that time they hope to have enough information to enable personnel arribing to locate satisfactory off-base housing within a week.

(8) The Base Deputy Commander for Materiel stated that a commitment on priority assignment of base-housing for O-6's would have to be made by Col G. G. Smith, Commander, 438 Military Airlift Wing. Col Ybarra, in discussion with Col Smith, stated that we would like priority assignment for the Commander, 71st MWW, and for two (2) additional O-6's. The Commander will be assigned Colonel's quarters on a priority basis. The two additional O-6's must compete for Colonel quarters by date of rank with the many other O-6's assigned to the installation; however, they will be offered Lt Colonel quarters on a priority basis. (It was understood that the Commander, 21st Air Division is currently occupying General Officers quarters, which will be assigned to a General Officer when vacated).

(9) Colonel Smith stated that some of the base functions are now occupying inadequate facilities. When the incoming ADC functions are accomodated in the block house, he will be interested in any residue space which can be made available for other base requirements.

7. Discussion of matters pertaining to the 17th Survl Sq, Moorestown, New Jersey.

a. Pulse Compression Modification.

(1) Operational Spares Requirements.

(a) The initial lay-in of operational spares has been costed at approximately $60,000.

(b) SMAMA representatives have conducted a preliminary examination of the requirements listing. Their findings indicate that the listing may be heavy on assembly items as opposed to component spare parts. It was suggested that assembly requirements be thoroughly reviewed and that the review include an appraisal of operational impact on the system.

(2) Spares Provisioning.

(a) According to SMAMA representatives formal provisioning procedures will not be established for this system because of the low number (841) of items involved.

(b) SMAMA personnel are currently reviewing drawings and tech data at RCAS DEP to determine the adequacy of this data for provisioning and procurement purposes. The data reviewed to date has been found adequate and no problems are foreseen.

(c) Approximately 40 items have long lead times. Action will be taken to procure these items first. Approximately 70% of the 841 items have Federal Stock Numbers.

(3) Cat II Testing.

(a) Many of the items contained in the ESD Acquisition Spares Package have been received at the site.

(b) Information available at the site indicates that Cat II Testing of the Pulse Compression Modification has slipped to 22-23 Oct 1967.

b. Computer System Familiarization.

(1) The computer equipment configuration and census were verified.

(2) RCA Computer Technician, John Pere, maintains that the two IBM 7330 Magnetic Tape Units constitute a maintenance headache. Repeated tape failures have made frequent trimming and replacement of tape reels necessary.

Mr Pere believes that the decreased life span of the tapes is attributable to a poorly designed rotational mechanism. RCA is documenting all magnetic tape outages. An engineering study for conversion to a more reliable tape unit has not been conducted. MME will take follow-up action on this.

(3) RCA Engineer, Don Gorby, presented a detailed briefing to Lt Adsit on the limited capability of the Radar Converter (Rad Con) to back up the RCA 4102-S Computer.

c. Host Tenant Agreement. The Squadron Commander indicated that he did not have any special problems regarding the support agreement with the 438 Military Airlift Wing, McGuire Air Force Base. However, there was some confusion regarding Hq ADC(ADEEM-UPP)letter, subject: Civil Engineering Responsibility in Testing Grounding Systems, dated 12 July 1967. The 17 AS Sq requested the services fr:om McGuire AFB on an informal basis; the request was not honored without a formal change to the Host Tenant Agreement. A formal letter request had actually been prepared but had not found its way to the proper people at McGuire AFB. We have ascertained that a copy of the letter has been provided, so no problem is anticipated on arriving at a working arrangement.

ORIGINAL SIGNED BY:

CECIL R. YBARRA, Colonel, USAF
Asst DCS/Materiel

APPROVED:

[illegible]

TOY B. HUSBAND, Colonel, USAF
DCS/Materiel

4 Atch
1. List of Persons Performing Visit
2. List of Principal Persons Contacted at McGuire AFB
3. List of Principal Persons Contacted at Moorestown N. J.
4. Military Family Housing, McGuire AFB

DISTRIBUTION:
1-9MDC
1-9CIO-H
1-9OEW(LtCol Henry)
1-DEC
1-AAC
2-71st CCR

List of Persons Performing Visit

Col	Ybarra, Cecil R.	9MDC
Lt Col	Gross, Lawrence J.	9CJA
Maj	Drake, Edward C.	9MLP-P
*Maj	Percy, Bernard D.	9MSS
*Capt	Lavery, James C.	9MPM
Capt	Lewis, Thomas E.	9DEC
*1Lt	Gunderson, Edwin G.	9AAC
*2Lt	Martin, John C.	9MLP-P
*2Lt	Adsit, Ronald F.	9MME
Capt	Bruno, Joseph M.	71st MWWg Staff Supply
Capt	Stafford, Kirby C. Jr.	71st MWWg C&E Staff
1Lt	Cubbage, Dennis O. Jr.	71st MWWg Supply Operations

*Denotes personnel who visited 17 Survl Sq, Moorestown N. J.

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438th Military Airlift Wing, McGuire AFB

List of Principal Persons Contacted

Col	Smith, G. G. Jr.	438th MAW Commander
Col	Jacobs	438th ABGp Deputy Co
Col	Anderson	438th Director of Materiel
Maj	Wooley	438th Director Log Plans
TSgt	Williams	438th Log Plans (AFR 11-4)
Capt	Goldman	438th Transportation Sq
SMSgt	oe	438th Transportation Sq
Tsgt	Gardner	438th Transportation Sq
Mr	Winkler	438th Commercial Transportation
Capt	Hanratty	G 438 BAF
Mr	Fowler	G 438 BBU
Mr	Wrzeszczynski	G 438 PCFM
MSgt	Brewer	G 438 MSRE (EMO)
Mr	Garron	G 438 CES Sq
MSgt	Stockard	G 438 D
Maj	Friedman	G 438 C
Mr	Ponticelli	G 438 SVSq Housing Officer
Mr	Molsbury	G 438 SVSq Assist H. O.
Mrs	Holt	G 438 SVSq VOQ-BOQ
Capt	Macdonough	G 438 SVSq Off Base Housing
Mrs	Segal	G 438 BAF
SMSgt	Sebesta	2017 Comm Sq
MSgt	McPherson	2017 Comm Sq
SSgt	Huppman	2017 Comm Sq
Maj	Gibbs, J. R.	1611 Dispensary
Maj	Ross, C. S.	438th Operations & Training

21st Air Division (ADC), McGuire AFB

Col	Commenator, G. O.
Capt	Astwood
Mr	Nimms

17th Survl Sq, Moorestown, N. J.

List of Principal Persons Contacted

Maj	Dougherty	17 Survl Sq
Maj	McCauley	17 Survl Sq
Capt	Thompson	17 Survl Sq
2Lt	Gober	17 Survl Sq
Mr	Frank Sprinkle	RCA
Mr	Don Gorby	RCA
Mr	John Pere	RCA
Mr	Willi_m Goodheart	RCA
Mr	James Hague	SMAMA
Mr	Lavern Baker	SMAMA
Miss	Ann Cardinal	SMAMA

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Military Family Housing, McGuire AFB

Area & Type	Nr. Bdrms	Nr Dwellings
Falcon Courts North		
Generals	4	3
Base Commander	4	1
Colonels	4	21
LtCol & Maj	4	37
LtCol & Maj	3	108
Company Grade	4	69
Company Grade	3	272
Airman	4	92
Airmau	3	698
Airman	2	150
		1450
Falcon Courts East		
Colonels	4	2
Field Grade	3	34
Company Grade	3	68
Company Grade	2	16
Airman	3	108
Airman	2	72
		300
Circle Drive		
General	5	1
Colonel	3	4
		5
Total Units at McGuire		1755
*Units at Ft Dix (Kennedy Courts)		200
		1955
Trailer Spaces at McGuire		50
Total Available to McGuire		2005

*The 200 units at Ft Dix are for Airman only. They consist of 1, 2, 3, and 4 bedrooms. 1 bedrooms are on volunteer basis.

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DOC #43

AC/MPG

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 71ST MISSILE WARNING WING (ADC)
ENT AIR FORCE BASE, COLORADO 80912

REPLY TO ATTN OF: 71CCR

25 OCT 1967

SUBJECT: BMEWS Contractor PHQ Move from Riverton, New Jersey, to McGuire AFB

TO: 9 Aerosp Def Div (9CCR)

1. In view of current funding limitations and changes to the original planning factors cited in the Joint ADC-9ADD Staff Study on Collocation of the BMEWS Project Headquarters with Headquarters 71 Missile Warning Wing at McGuire AFB, it is deemed appropriate that the decision to relocate the BMEWS PHQ from Riverton, New Jersey be re-evaluated.

2. The initial cost estimates for the proposed collocation have proven to be grossly inaccurate. In almost all instances actual costs now expected are much greater than those originally forecast.

a. Initially, it was estimated that costs for altering the SAGE building at McGuire would be approximately $60,000. Design and modification estimates for this work are now $159,000 - an increase of $99,000.

b. The costs for relocating the contractor were forecast originally at $15,000. While all RCA Service Company costs are subject to negotiation, the O&M contractor has officially submitted a preliminary cost proposal of $84,552 (minimum) to $169,569 (maximum) for the movement from Riverton, NJ to McGuire AFB, NJ - an increase of $69,552 to $154,509.

c. The original yearly savings for cancellation of the leased facility occupied by the PHQ and reduction of O&M contractor personnel were predicted to be $260,912. It is probable that only $61,900 in annual leasing costs will be saved - excluding utilities and communications, which must be provided at McGuire also. The only personnel saving envisioned is the salary of one contractor liaison representative at 71 Msl Wng Wg Hqs involving a savings of approximately $25,000. I have been additionally advised that there will be an increase of approximately $2,000 per month in O&M contractor communication costs subsequent to the proposed move. These factors result in a decrease of the predicted savings of $198,912. Expected cost savings for the cancellation of the leased facility and reduction in O&M personnel now appear to be on the order of $62,000 per year.

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3. In addition to cost considerations, other pertinent factors exist which are also cause for concern.

a. Although space requirements within the SAGE facility are considered adequate for current PHQ personnel, serious concern is expressed that adequate space will not be available to provide for substantial growth in the PHQ population which is forseeable in the immediate future. For example, RCA Service Company on Oct 19, 1967 submitted a Value Engineering Change Proposal to collocate the BMEWS Logistic Supply Center from Rome, NY to the PHQ location. This proposal is presently being evaluated, however, it has been forwarded to Headquarters ADC with favorable comments from 71 Msl Wng Wg and 9ADD. If approved, PHQ strength would be increased by an additional 58 personnel. Current actions are also underway for the O&M contractor to assume various support functions at Thule AB. With the assumption of these support functions, the BLSC strength will be increased by an additional 31 personnel. If the Thule support functions are assumed by the BMEWS O&M contractor, as expected, and if favorable consideration is given to the collocation of BLSC with PHQ, then the PHQ population would increase by 89 personnel. Additional space must also be provided for the computer and the BLSC warehouse. These actions, if concurred in, will result in very substantial cost reductions but will be, in large measure, compromised if sufficient space cannot be provided.

4. In summary therefore, although it was originally forecast that substantial cost savings would result from the move, it now becomes apparent that cost savings in the area of only approximately $62,000 per year would result. When the costs of the move ($84,500 - $169,569) plus the proportionate costs of altering the SAGE building for PHQ are related to the expected savings, it is evident that it would take from $2\frac{1}{2}$ to $4\frac{1}{2}$ years to amortize the costs incurred. In addition to these cost considerations, there is also serious concern over the availability of space to allow for foreseeable expansion to accomodate additional substantial cost savings. In view of these considerations, it is strongly recommended that an immediate re-evaluation of the previous decision to collocate the BMEWS PHQ to McGuire be made.

Edwin Bishop Jr

EDWIN BISHOP, JR., Colonel, USAF
Commander

CONFIDENTIAL

DOC 94

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR DEFENSE COMMAND
ENT AIR FORCE BASE, COLORADO 80912

REPLY TO ATTN OF: ADLPP-G/3201

1967

SUBJECT: ADC PAD 67-8, Movement of the 71 Missile Warning Wg from Ent AFB Colo to McGuire AFB NJ (9DEP-RA ltr, 19 Oct 1967)

TO: 9 Aerosp Def Div (9DEP-RA)

1. (C) Actions have been initiated by this Hq to expedite discontinuance of the 21 Air Div McGuire AFB NJ.

2. (U) This revised schedule should release those portions of the SAGE building programmed for the 71 Missile Warning Wg in adequate time to insure meeting your proposed construction schedule.

FOR THE COMMANDER

[illegible] USAF

DOWNGRADED AT 3 YEAR INTERVALS
DECLASSIFIED AFTER 12 YEARS
DOD DIR 5200.10
Group 4

CONFIDENTIAL

SECRET

DOC #45

COORDINATION AND RECORD COPY

21 JUN 1967

9OKW

AN/FPS-85 Statement of Work Addendum for SLBM Implementation (U)
(Your Ltr, 2 June 1967)

ADC (ADLMD-S)

(S)(U) The following comments are submitted in response to the referenced letter:

a. (S) 3.5.9.1 and 3.5.9.1.5. The AN/FPS-85 will not perform its variety of missions simultaneously. It will perform them in a predetermined consecutive sequence so rapidly as to give the impression of simultaneous operation. We feel that enough misunderstanding has been created by this technicality that it warrants a more explicit definition.

b. (S) 4.11. It is indicated that the contractor will support system testing of the AN/GSQ-89 system as part of the AN/FPS-85 Category II test program. It is recommended that the contractor support the AN/GSQ-89 system testing whenever it is conducted; not only during and as part of the AN/FPS-85 Category II test program.

c. (S) Attachment #1. The longitude and latitude points form a line and not a polygon as indicated. The points are apparently in error insofar as latitude.

d. (S) Data Link Testing. It is recommended the AN/FPS-85 - NORAD data link testing for both the 496L (SPACETRACK) and 474N (SLBM) data transmission be conducted concurrently.

e. (C) Data Link Message Flow. It is recommended the addendum be made more specific on the following points to assure message flow efficiently supports mission requirements:

(1) Whether the data links will carry combined SLBM and SPACETRACK data or have a separate link for each function.

(2) Which mission will have priority in event of data link failure which limits the transmitted data.

FOR THE COMMANDER

SIGNED
CHARLES E. MINIHAN, Col, USAF
Deputy Chief of Staff, Operations

DOWNGRADED AT 12 YEAR INTERVALS;
NOT AUTOMATICALLY DECLASSIFIED.
DOD DIR 5200.10

SECRET

9OKW-A 20 Jun
9OKW
9ODC
ADC
9OSD
9OCO
9OKR
9OAC 20 Jun 6
71MSW
73AS 20 Jun
1CDF
9OOD-A
9OOO

9OKW 67-50

NAME OF WRITER AND PHONE'S INITIALS	TEL. EXT.	DATE
Major Maxwell/aq	6237	20Jun67

ADC FORM NOV 55 132

(U) In [illegible]

[illegible] the [illegible] under paragraph 3.5.9.[illegible], the following additional paragraphs shall be added to the [illegible] of [illegible]:

3.5.9. (U) [illegible] Detection and Warning Implementation

3.5.9.1. (S) [illegible] Capability

[illegible] The contractor shall provide the [illegible] necessary for the [illegible] function simultaneously [illegible] in the [illegible] system [illegible] in the [illegible] system ([illegible]) [illegible] either [illegible] and [illegible] to the [illegible] shall be [illegible] by the radar using "[illegible]" [illegible] sufficient tracking [illegible] shall be obtained to [illegible] to site and the [illegible] warning message. [illegible] formatted, it shall be sent to [illegible] via the existing communications [illegible]. [illegible] detection, tracking, message generation, and message transmission functions shall operate continuously and automatically. Specific requirements are as follows:

3.5.9.1.1. (S) Fence Configuration and [illegible] – The [illegible] search fence (lower fence) shall be oriented due south as follows:

a. (S) Between the azimuth limits of plus or minus 60 degrees (with reference to boresight), the elevation angle, with respect to a plane tangent to the earth at the site, shall be a maximum of 5.0 degrees.

b. (S) The maximum minimum range for detection and tracking shall be 165 n.m. with a design goal of 40 n.m. for the power allocation, target size and P_d and P_t specified.

[illegible] DOWNGRADED

GROUP-4
DOWNGRADED AT 3 YEAR INTERVALS;
DECLASSIFIED AFTER 12 YEARS

SECRET

[illegible]

[illegible] allocated to the [illegible]

[illegible] (utilizing [illegible]

[illegible] shall be [illegible] provided [illegible]

[illegible] allocation [illegible]

[illegible]

[illegible] the following [illegible]

[illegible] following [illegible]

a. (S) [illegible]'s launched [illegible] range [illegible]

[illegible] from the radar will [illegible] in an Impact Message [illegible]

[illegible] CLAN [illegible]

b. (S) [illegible]'s launched with [illegible]

from the radar will [illegible] in an Impact Message on [illegible]

the total [illegible] of the [illegible].

3.5.5.1.4 [illegible] - The following [illegible]

for the accuracy of the [illegible] and impact [illegible]

a. (S) The accuracy for the [illegible]

[illegible] C.E.P. or less.

b. (S) The accuracy for the impact point will be 150

n.m. C.E.P. or less.

-[illegible]-

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[illegible] shall not limit the [illegible] which can be [illegible] shall [illegible] [illegible]

[illegible] vided in [illegible] (1) [illegible] be expanded to the extent that the [illegible] rate [illegible] be appreciably decreased.

[illegible] shall be [illegible] from an [illegible] nature of the object [illegible].

[illegible] (S) Following the [illegible] observation [illegible] or object of interest [illegible] satellite, by velocity [illegible].

3. (S) If, as a result of (a), the object [illegible] interest, then following the third observation, all three observations shall be [illegible] to obtain the velocity of the object from a Herrick-Gibbs [illegible] velocity discrimination tests shall again be applied. If the object is still of interest, an osculating set of orbital elements shall be computed from the observations and the Herrick-Gibbs velocity.

4. (S) Using the orbital elements [illegible] the [illegible] of the [illegible] object's trajectory shall be [illegible] that it might be classified as either a satellite or a missile.

5. (S) For missiles, the [illegible] and [illegible] times shall be computed using an elliptic motion predictor. [illegible] tests shall be made to determine if the predicted impact point lies within the

[illegible]

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[illegible]

3.[illegible].2 [illegible]

a. [illegible] Missile [illegible] shall be [illegible] to the [illegible] for [illegible] "[illegible]" or "[illegible]." [illegible] of the [illegible] shall [illegible] to the [illegible] for "[illegible]" [illegible] the "[illegible]" indicator shall be set in the [illegible]. For "[illegible]" missiles, the "[illegible]" indicator shall be set in the [illegible]. For "[illegible]" missiles, the "[illegible]" indicator shall be set in the [illegible].

c. [illegible] Orbital elements [illegible] for all new objects of [illegible] unknown satellites [illegible] shall be transmitted to the [illegible] using the existing [illegible].

3.5.0.2.1 [illegible] - [illegible] produced by the [illegible] shall be:

a. [illegible] - The [illegible] shall be transmitted from the [illegible] in the same [illegible] as that transmitted by the other [illegible] sites, although the content of specific fields may be fixed for the

- 4 -

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[illegible]

[illegible] (telemetry) [illegible] (canned message) [illegible] [illegible]

[illegible] during the system [illegible]. A capability shall exist to store up to [illegible] canned messages which shall be transmitted to the [illegible] at the [illegible] time [illegible] will be the telemeter [illegible]. The system computer programs will ensure that the canned impact message is transmitted with the correct parity and control bit settings.

3.5.9.3 [illegible] Unknown Object Displays - [illegible] unknown objects shall [illegible] be displayed. The [illegible] unknown shall not be displayed until after the [illegible] has been taken and the object determined to be of interest. All [illegible] data shall be displayed in the same manner regardless of whether or not a determination has been made to send an impact message to the [illegible] (except for an indication of the missile type). If the object is determined to be a missile, then the data trans[illegible]

[illegible] information, and the [illegible] object, [illegible] shall [illegible] missiles, of the [illegible] corresponding to the most recently [illegible] observation. [illegible] of the object shall be [illegible] continuously updated, not to exceed a rate of [illegible]. The assigned object identity shall [illegible] with the [illegible] single [illegible] the [illegible]. An indication will be made on the display of whether [illegible].

a. (S) A "[illegible]" [illegible] impact message [illegible].

b. (S) A "[illegible]" [illegible] message [illegible].

c. (S) A "non-[illegible]/illegal launch" missile impact message sent to [illegible]. "Non-[illegible]/illegal launch" is defined as a missile not impacting on [illegible] and not launched from Cape Kennedy. Missiles whose launch or impact points cannot be specified within the message format are also in this category. The tabular data for launch and impact shall consist of the predicted latitude, longitude, and time of each of these events. A maximum of five [illegible] of tabular data shall be presented at one time.

3.5.9.4 (U) [illegible] Capability, as stated in paragraph 3.5.9 shall be obtained with no hardware changes and no major software changes and work shall be absorbed and integrated within that time on the prime AN/FPS-85 project. The following additional paragraphs shall be added to Section 4 of the Statement of Work.

[illegible] Category [illegible] target, under the direction of the [illegible] Director.

[illegible] of the [illegible] paragraph [illegible] and [illegible] simulated [illegible] [illegible] (ICBM), [illegible]. This test shall include [illegible] missile [illegible] of the [illegible] fence from the minimum [illegible] range [illegible] to the [illegible] maximum range in increments of no more than [illegible] n.m. for all three [illegible] load conditions. The [illegible] time for the [illegible] of the [illegible] and for the [illegible] of the [illegible] impact [illegible] shall also be measured for the three [illegible] load conditions.

(b) [illegible] - The [illegible] under paragraph [illegible] shall include the [illegible] of five missiles of opportunity [illegible] environment. The capability shall exist during the [illegible] Category [illegible] period to modify the computer program in non-real time such that [illegible] missiles detected in the [illegible] fence [illegible] change to the NORAD and [illegible] detection and warning [illegible] regardless of the [illegible] and impact point of the missile. [illegible]

[illegible]

(2) [illegible] of the total number of [illegible]

[illegible]

(4) [illegible]

[illegible]

[illegible] reports.

NOTE: All the appropriate [illegible] documentation shall be [illegible] this requirement. These shall include, but not be limited to, the following: Categories I and II [illegible] Plans, Drawings, [illegible] Reports and Training [illegible] if required.

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Dec 74

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

REPLY TO ATTN OF: 9OEW

SUBJECT: 440L Performance Report, Jul - Dec 1967 (U) 19 Jan 68

TO: 9CIO-H

	LAUNCHED	DETECTED	RATE
ICBM	44	35	79.55%
ESV	29	28	96.55%
Totals	73	63	86.30%

Total No. Reports	72
Total No. False Reports	9
False Report Rate	12.50%
Average Response Time	8.38 Min
Average Comm Time	7.83 Min

James L. Maxwell
JAMES L. MAXWELL, Major, USAF
Chief, Missile Early Warning

9COP-161

DOC 47

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MEMORANDUM OF AGREEMENT
440L INTERIM OPERATION

1. (S) INTRODUCTION

DOD has directed the USAF to establish an interim tactical warning capability with the 440L system in February 1968. The 440L system is currently scheduled to achieve the initial operational capability (IOC) configuration in late CY 69. The need for this memorandum of agreement stems from the requirements of ADC and ESD to provide the directed interim warning capability and concurrently attain the full operational system capability within the programmed schedules and funds. The purpose of this agreement is to establish interim responsibilities and relationships of ADC/ESD in operation and maintenance of the 440L system, control of the output for tactical warning purposes, and support the acquisition of the defined/approved operational system.

2. (S) BACKGROUND

The 440L OTH System is being developed by ESD in accordance with pertinent AF Regulations with the Raytheon Company as the prime contractor. The System has a capability to detect and report the launch of missiles and earth satellites from within the Soviet Union. The System also possesses the capability to detect and report nuclear air burst detonations by any nation within the coverage afforded by the existing system. The 440L OTH System has an existing capability for reporting warning information of a surprise attack against CONUS. As warning information becomes available during the interim period, it will be provided to ADC/NORAD/SAC/DEFSMAC/NMCC/UK-MOD. The interim period will provide for:

a. Full development of the system as specified in the System Package Program.

b. ADC developing a full blue suit capability in the operational and maintenance functional areas.

c. ESD final testing as specified by AFR 80-14.

d. ESD development of the final automated display for users.

e. ESD turnover of the final 440L System to ADC in accordance with AFR 375 series procedures.

DOWNGRADED AT 12 YEAR
INTERVALS; NOT AUTOMATICALLY
DECLASSIFIED. DOD DIR. 5200.10

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3. (S) DEFINITIONS

a. The Interim 440L Over-the-Horizon Radar System (440L OTH). The existing five receiver (RX) and three transmitter (TX) sites and associated equipment, the Correlation Center (CC), communications between the RX, TX, CC and the equipment necessary to transmit the warning data from the CC to NORAD Cheyenne Mountain Complex and to other users. The 440L tactical warning data will be routed without delay to designated users.

b. Initial Display. Hard copy teletype printouts at designated user locations.

c. Final Display. Automated displays which will provide BMEWS, 440L, [illegible] warning and system status information at designated user locations.

d. Tactical Warning Product. The final output of the 440L System from the Correlation Center to specified users.

e. Operational Necessity. Operational necessity is defined as failure operational capability [illegible] of any one of the three BMEWS forward sites; or a national military defense readiness condition, DEFCON 3 or above (not exercise); or maximum operational posture directed by the [illegible] (NORAD).

4. (U) OBJECTIVE

To establish ADC/ESD intercommand relationships and define responsibilities for operation and maintenance of the existing and evolving 440L System during the interim phase described in paragraph 2 above. It is recognized that from time to time, modifications and/or additions to this agreement may be negotiated as required between ADC/ESD.

5. (U) PRINCIPLES OF AGREEMENT

This agreement is based on the following principles:

a. ESD/440L SPO retains complete responsibility for and control of the 440L OTH System until system turnover.

b. ADC is responsible for the release and dissemination to specified users of the tactical warning product of the 440L System.

c. ESD/440L SPO exercises sole responsibility for direction of contractor personnel.

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d. ADC will, except for operational necessity, observe a policy of non-interference with ESD's development, modification and testing of the evolving 440L OTH System.

e. In the event of operational necessity, ESD will respond to ADC direction to restore the 440L System to its maximum capabilities within equipment and time constraints.

f. ADC manning of the 440L System in response to the directed interim capability date (1 March 1968) will be consistent with the responsibility for control of the tactical warning product. Full ADC manning of the system will be completed by IOC. ADC will, with ESD concurrence, integrate additional personnel into the system (Transmitter-Receiver sites) between 1 March 1968 and the start of Category II testing. The purpose of this advanced manning is to provide ADC with system experience and the capability to verify and finalize operational/technical procedures, manpower requirements, and personnel skills, and logistic and materiel requirements. ADC personnel introduced into the system earlier than the start of Category II testing will be trained by the ESD System contractor and utilized in system operation and maintenance under ESD control.

g. Procedures for systems operation and formats for transmitting tactical warning data to designated users will evolve with modifications to attain the final 440L System configuration and capability. Standardization of established procedures and timely coordination of changes are imperative ingredients of credible tactical warning. ESD will insure the use of standard procedures and output formats, and allow ADC adequate time for coordination of any changes to those procedures prior to use in tactical warning operations.

h. Recognize that imposing operational requirements may adversely impact on development, modification, and testing that is required to fully develop the existing 440L System into its final configuration. Specifically, delays in final Ops dates caused by imposing operational requirements on the network will be accepted by ADC.

6. (S) RESPONSIBILITIES

a. ESD will:

(1) Continue development, modification, testing and facility construction to evolve the existing R&D configured 440L System to the configuration as specified by the System Package Program or other applicable documents. During this process, assure that the existing 440L System will provide operational data to the maximum extent possible, and assure that the contractor operate and maintain the 440L System to this end.

(2) Be responsible for requesting additional funds required to offset increased program costs resulting from delays and disruptions to the 440L program caused by the demand for tactical warning information.

(3) Assure that the contractor accomplishes on-the-job training of ADC personnel at the Correlation Center and Receiver/Transmitter Sites. ESD/Contractor will train and certify that the ADC on-site personnel are qualified in their assigned duty positions. Target date for completion of training and certification of the initial ADC complement at the CC is [illegible] March 1968.

(4) Assure that the contractor will be responsive to ADC [illegible] requirements with respect to operation, maintenance, development, modifications, and testing of the existing 440L system, as dictated by and in accordance with the basic principles outlined in paragraph [illegible] above.

(5) [illegible] and provide to ADC by the [illegible] day of the [illegible] a monthly plan setting forth scheduled 440L network activities [illegible] which may affect system capability.

(6) Advise the senior ADC duty officer at the CC of all hardware and software maintenance, testing and modifications to the 440L System which may affect the credibility of the final output. This advice must include the implications which could contribute to a false alarm, degree of degradation to the total system capability and any other effects which could influence the credibility of the working product.

(7) Advise the ADC duty officer at the CC of all hardware and software maintenance, testing, and modifications to the 440L System not later than one hour prior to the time shown in the ESD published schedule indicating that such actions will be occurring.

(8) Provide administrative and support space, as available, at the CC to satisfy ADC requirements.

(9) Direct all efforts of contractor personnel engaged in the operation, maintenance, development, modification, testing or other activities related to the 440L OHR System.

(10) Make available, for ADC reporting, all necessary information required to complete the following:

(a) Abnormal Event Reports;

(b) Daily Operations Report.

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b. ADC will:

(1) Be solely responsible for the release of the Tactical Warning Product from the CC to designated users, upon certification by ESD (ref paragraph 6(a)(3) above) that at least five ADC duty officers are qualified.

(2) Justify ESD's request to USAF for additional funds to offset delays and disruptions in the 440L program caused by the demands for tactical warning information.

(3) Provide, within existing and mutually agreed upon ceilings, ADC personnel at the CC for operational control of the tactical warning product from the existing and evolving 440L System.

(4) Notify ESD as soon as possible when operational considerations dictate that modifications be made to the 440L monthly activities schedule. Normally, such notification will be provided to the 440L SPO; if time considerations dictate, however, direct contact with the ESD network manager at the CC is authorized.

(5) Determine when tactical requirements, with respect to the total ADC warning systems status, dictate that ADC request that a modification be made to the ESD published monthly schedule.

7. (U) PERIOD OF AGREEMENT

This agreement is effective from 1 January 1968 until the evolving 440L System requires that this agreement be incorporated into the transition and turnover plan. This action will be based upon mutual agreement between ADC/ESD.

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VVVCZCVFA429 18 Jul 67 13 21

PP RUWMFVA

DE RUWRNL35302 1990243 /2/ [illegible] DIN-1

ZNY SSSSS DAC-2

P 1902452 JUL 67 ZEX DCP-1

FM [illegible] DSD-1

TO ADC NINE FIVE FIVE ADC, 9ADD 9ADD-2

[illegible] INT AF3 COLO 71MWN-1

BT

[illegible] ... TELEMETRY INTERCEPTS ... THIS IS ... FRAGMENTARY REPORT NO. 166-67, ... SUBJECT: LAUNCH OF SPUTNIK 237(5). THE SOVIET UNION CONTINUED TESTING THEIR FRACTIONAL ORBIT BOMBARDMENT SYSTEM BY LAUNCHING ANOTHER SS-9 (FORMERLY DESIGNATED AS THE SS-X-6) AT 1643Z ON 17 JULY 1967. THE 440L OVER THE HORIZON DETECTION SYSTEM DETECTED THE LAUNCH OF SPUTNIK 237, AND

PAGE 2 RUWRNL35302 S E C R E T NOFORN EXCEPT US, UK & CANADA TELEMETRY INTERCEPTS CONFIRMED THAT THE VEHICLE ACHIEVED ORBIT. THE SATELLITE WAS ALSO TRACKED BY THE TRADER (301 RAWUN) RADAR DURING REVOLUTION ZERO. INDICATIONS ARE THAT THE VEHICLE WAS PLACED INTO A 49 DEGREE INCLINATION, HAVING A PERIOD OF APPROXIMATELY 87 MINUTES. AT APPROXIMATELY 1815Z, IGNITION OF THE RETRO-PACKAGE TOOK PLACE. THIS WAS ALSO DETECTED BY THE 440L SYSTEM. AT THIS TIME, IT IS NOT CERTAIN AS TO WHETHER THE RE-ENTRY WAS SUCCESSFUL OR NOT. THE ASSESSMENT OF THE LATEST SOVIET LAUNCH AS A FRACTIONAL ORBIT BOMBARDMENT SYSTEM IS BASED ON TELEMETRY INTERCEPTS, ORBITAL PARAMETERS, AND OTHER INDICATIONS. THIS LAUNCH HAS BEEN OFFICIALLY CATALOGED BY THE SPACE DEFENSE CENTER AS OBJECT 2878 AND THE LAUNCH WAS ANNOUNCED BY THE SOVIET UNION AS COSMOS 169. AS MORE DATA BECOMES AVAILABLE IT WILL BE RELEASED. 16

GP-1.

BT

SPECIAL HANDLING REQUIRED NOT RELEASABLE TO FOREIGN NATIONALS EXCEPT CANADA

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CONFIDENTIAL

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DOC 51

JOINT MESSAGEFORM

SECURITY CLASSIFICATION: CONFIDENTIAL

TYPE MSG | BOOK | MULTI | SINGLE

PRECEDENCE

ACTION: ROUTINE

INFO

DTG

RESERVED FOR COMMUNICATION CENTER

FILE CODE 25 F
MMR-B
MMR-DC
MMR-ED
MMR-OS
REMARKS

SPECIAL INSTRUCTIONS

FROM: 6595 AEROSPTESTWG VANDENBERG AFB CALIF

TO: HQ SAMSO LOS ANGELES CALIF
HQ ADC ENT AFB COLO
4000TH SUPPORT GROUP OFFUTT AFB NEBR
HQ 10ADG VAFB (MAIL)
HQ 9TH AEROSPACE DEF DIV ENT AFB COLO

CONFIDENTIAL VWZED ____________ OCT 67

FOR SAMSO (SMUH AND SMVEE), ADC (ADOSD), 4000TH SUPPORT GROUP (SGO), 9TH ADD (90SD). SUBJECT: FIVE DAY REPORT OF LV2F/BURNER II VEHICLE, AFWTR OPERATIONS NUMBER 1264. THIS MESSAGE IN FOUR PARTS.

PART I: TIMES SUBMITTED IN THE QUICK LOOK REPORT ARE REPEATED FOR REFERENCE AS FOLLOWS: (*INDICATES REFINED TIMES OF EVENTS)

A. COUNTDOWN START - 0233:00Z

B. LIFTOFF - 0757:56.4Z

C. ROLL START 1.7 STOP 15.8 (THOR E-14)

D.

PITCH	START	STOP	
1ST	16.0	39.7	(THOR E-15)
2ND	40.0	69.7	(THOR E-15)
3RD	70.0	99.7	(THOR E-15)
4TH	100.0	125.0	(THOR E-15)

E. MECO CMD 158.55 (FM-C); ACT 158.75 (FM-A)

DATE: 10 | TIME:
MONTH: OCT | YEAR: 1967
PAGE NO. 1 | NO. OF PAGES 7

TYPED NAME AND TITLE: JOHN C. ERICKER, MAJ USAF
CHIEF, THOR/BURNER II PROJECT OFFICER

PHONE: 6-9023

SIGNATURE: [signature] Lt Col

TYPED (or stamped) NAME AND TITLE: ROY H. WORTHINGTON, JR., COLONEL
CHIEF, SPACE PROGRAMS DIVISION

REGRADING INSTRUCTIONS: GROUP 3

SECURITY CLASSIFICATION: CONFIDENTIAL

JOINT MESSAGEFORM - CONTINUATION SHEET

SECURITY CLASSIFICATION CONFIDENTIAL

FROM
6595 AEROSPTESTWG VANDENBERG CALIF

HEATSHIELD SEP ACT - MECO +2.1 (BII FM-12)

G. VECO CMD 167.50 (THOR FM-C) ACT 168.0 (THOR FM-13) 63% DECAY OF VE # 2 CHAMBER PRESSURE.

H. BII SEPARATION 167.85 (BII FM-12)

I. FIFTH PITCH START 180.05 STOP 557.4 (BII A-10)

J. BII IGNITION CMD 595.15 (BII A-12); ACT 595.2 (FM-C)

K. BII M.E. BURNOUT ACT 637.67 (BII FM-12), 63% DECAY OF VELOCITY METER PULSES.

L. *BII VERNIER BURNOUT COMMAND 597.4 (BII A-7)

M. PAYLOAD ORIENTATION START 650.0 (BII A-10)

N. PAYLOAD SPIN-UP COMMAND 790.0 (BII A-8)

O. PAYLOAD SEPARATION 792.35 (BII FM-12)

PART II: (VELOCITY METER PULSES)

	TIME	V/M COUNT
A. MECO COMMAND	153.55	2578.2
B. MECO ACTUAL	158.75	2586.0
C. VECO COMMAND	167.50	2597.6
D. VECO ACTUAL	168.0	2598
E. BII MAIN ENGINE CUTOFF	637.67	4096.0
F. *BII VERNIER ENGINE CUTOFF	597.4	2636.0

G. **TOTAL VELOCITY METER PULSES COUNTED WERE 4127. NOMINAL 4135.25

* BII VERNIER BURNOUT COMMAND FROM THE VELOCITY METER WAS EARLY. NO VERNIER BURN WAS OBTAINED AFTER BII MAIN ENGINE BURN. ** ONE CON-

SYMBOL V ID | PAGE NO 2 | NO OF PAGES 7 | SECURITY CLASSIFICATION CONFIDENTIAL | INITIALS

DD FORM MAY 55 173-1

ARMY MESSAGEFORM - CONTINUATION SHEET

SECURITY CLASSIFICATION

FROM

6595 AEROSPTESTWG VANDENBERG CALIF

EIGHTH VELOCITY METER PULSE WAS COUNTED DURING 5TH PITCH PROGRAM. THREE VELOCITY METER PULSES OCCURRED AFTER 643.2.

PART III: PITCH AND YAW ANGLES FROM DII A-16 AND A-17 AND CUMULATIVE VELOCITY METER COUNT FROM FM-12 TABULATED AT EVERY ½ SECOND FROM T + 595.2 TO 643.2. (SUSPECT CONSIDERABLE [illegible] ON THESE CHANNELS BASED ON GROUND TEST PERFORMANCE.)

L/O +	VM COUNT	PITCH DISPLACEMENT	YAW DISPLACEMENT
595.2	2599	+.05	-.30
595.7	2605	+.05	-.20
596.2	2614	+.15	0
596.7	2623	+.10	-.10
597.2	2632	+.10	-.05
597.7	2641	+.10	-.10
598.2	2650	+.15	-.05
598.7	2660	+.20	-.10
599.2	2670	+.05	-.10
599.7	2680	+.15	-.10
600.2	2690	+.15	-.15
600.7	2701	+.10	-.10
601.2	2712	+.20	-.15
601.7	2723	+.40	-.10
602.2	2734	+.20	-.10
602.7	2746	+.10	-.10
603.2	2757	+.10	-.10

FROM	PAGE NO	NO OF PAGES	SECURITY CLASSIFICATION	DATE
[illegible]	3	7	CONFIDENTIAL	

D. FORM 173-1

JOINT MESSAGEFORM - CONTINUATION SHEET

SECURITY CLASSIFICATION

FROM

6595 [illegible] VANDENBERG [illegible] CALIF

D +	VM COUNT	PITCH DISPLACEMENT	YAW DISPLACEMENT
603.7	2768	+.20	-.05
604.2	2789	+.10	-.10
604.7	2793	+.05	-.10
605.2	2804	+.30	-.10
605.7	2817	+.30	-.10
606.2	2829	+.20	-.10
606.7	2841	+.05	-.20
607.2	2853	+.35	-.20
607.7	2866	+.20	-.10
608.2	2879	+.20	-.20
608.7	2891	+.25	-.10
7.2	2901	+.20	-.15
609.7	2918	+.40	-.20
610.2	2931	+.22	-.10
610.7	2945	+.40	-.20
611.2	2958	+.30	-.15
611.7	2973	+.20	-.15
612.2	2987	+.30	-.15
612.7	3002	+.30	-.15
613.2	3016	+.20	-.10
613.7	3031	+.35	-.15
614.2	3046	+.35	-.20
614.7	3062	+.10	-.15

SYMBOL VAFED | PAGE NO. 4 | NO. OF PAGES 7 | SECURITY CLASSIFICATION CONFIDENTIAL | INITIALS

DD FORM 1 MAY 50 173-1

JOINT MESSAGEFORM - CONTINUATION SHEET

FROM

6595 AEROSPTESTWG VANDENBERG CALIF

L/O +	VM COUNT	PITCH DISPLACEMENT	YAW DISPLACEMENT
615.2	3078	+.35	-.20
615.7	3094	+.10	-.10
616.2	3110	+.15	-.15
616.7	3127	+.20	-.20
617.2	3143	+.05	-.15
617.7	3161	+.25	-.15
618.2	3179	+.15	-.15
618.7	3196	+.30	-.15
619.2	3214	+.40	-.15
619.7	3233	+.25	-.10
620.2	3251	+.30	-.10
620.7	3270	+.30	-.15
621.2	3289	+.20	-.10
621.7	3309	+.40	-.20
622.2	3329	+.30	-.10
622.7	3349	+.30	-.10
623.2	3370	+.30	-.20
623.7	3390	+.25	-.10
624.2	3412	+.25	-.15
624.7	3433	+.30	-.10
625.2	3455	+.30	-.20
625.7	3477	+.20	-.20
626.2	3500	+.35	-.20

DOC	PAGE NR	NO OF PAGES	SECURITY CLASSIFICATION	INITIALS
VIZED	5	7		

DD FORM 173-1

JOINT MESSAGEFORM - CONTINUATION SHEET

FROM

6595 AEROSPTESTWG VANDENBERG CALIF

L +	VM COUNT	PITCH DISPLACEMENT	YAW DISPLACEMENT
626.7	3522	+.20	-.15
627.2	3546	+.30	-.15
627.7	3569	+.30	-.10
628.2	3594	+.35	-.20
628.7	3618	+.30	-.15
629.2	3643	+.25	-.15
629.7	3668	+.30	-.15
630.2	3694	+.30	-.15
630.7	3721	+.35	-.15
631.2	3747	+.35	-.20
631.7	3774	+.35	-.20
[illegible].2	3802	+.30	-.15
632.7	3830	+.35	-.25
633.2	3860	+.35	-.15
633.7	3889	+.35	-.20
634.2	3919	+.25	-.15
634.7	3949	+.30	-.15
635.2	3979	+.30	-.20
635.7	4010	+.40	-.20
636.2	4040	+.40	-.15
636.7	4066	+.30	-.15
637.2	4084	+.35	-.20
637.7	4096	+.25	-.20

TOR	PAGE NO	NO OF PAGES	SECURITY CLASSIFICATION	INITIALS
VWZED	6	7		

DD FORM MAY 55 173-1

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JOINT MESSAGEFORM - CONTINUATION SHEET

SECURITY CLASSIFICATION CONFIDENTIAL

FROM

6595 AEROSPTESTWG VANDENBERG CALIF

L/O +	VM COUNT	PITCH DISPLACEMENT	YAW DISPLACEMENT
638.2	4105	+.20	-.20
638.7	4111	+.20	-.25
639.2	4115	+.05	-.20
639.7	4118	+.20	-.40
640.2	4120	+.15	-.30
640.7	4122	+.20	-.50
641.2	4122	+.20	-.25
641.7	4123	+.10	-.25
642.2	4123	+.30	-.40
642.7	4123	+.15	-.25
643.2	4124	+.05	-.25

PART IV: THIS MESSAGE IS CLASSIFIED CONFIDENTIAL DUE TO REVEALING OF ACTUAL EVENT TIMES AND ASSOCIATION OF ADDRESSES. (GROUP - 3)

SYMBOL VWZBD | PAGE NO 7 | NR OF PAGES 7 | SECURITY CLASSIFICATION CONFIDENTIAL | INITIALS

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JOINT MESSAGEFORM

SECURITY CLASSIFICATION SECRET

TYPE MSG | BOOK | MULTI X | SINGLE

PRECEDENCE ACTION PRIORITY

RESERVED FOR COMMUNICATION CENTER

DTG 21Dec67 23 36z

FROM: ADC

TO: SMAMA/SMNC/MCCLELLAN AFB CALIF
9AEROSPDEFDIV/OSD/ENT AFB COLO (MESSENGER)

INFO: 10AEROSPDEFGP/CCR/VANDENBERG AFB CALIF

SECRET ADOSD

SUBJ: GGS-1 Demonstration and Acceptance (U).

Reference: a. Your Msg 192030Z Dec 67. b. Your Msg 192035Z Dec 67. 1. Ref Part 1 of a above. ADC's position remains unchanged. As long as printed circuit boards are relocated and the computer is operating in a mode other than normal, ADC does not feel that it is being provided with the system as prescribed in applicable tech data. Accordingly, testing and acceptance can continue only when the system is operating in its proper mode and configuration. 2. Ref Part 2 of a above. ADC cannot realistically establish further testing criteria until a determination has been made by SMAMA as to the cause of the malfunction and what action was

DOWNGRADED AT 12 YEAR INTERVALS; NOT AUTOMATICALLY DECLASSIFIED. DOD DIR 5200.10

DATE DEC 67

PAGE 1 OF 2

3397
WILLIAM A. GRIBBLE, Lt COL, USAF
CH, LAUNCH OPERATIONS DIVISION

SECRET

DD 173

050-67-7062

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ABBREVIATED JOINT MESSAGEFORM
and/or CONTINUATION SHEET

SECURITY CLASSIFICATION: SECRET

PRECEDENCE	RELEASED BY	DRAFTED BY	PHONE

taken to correct it. When you provide this information, we will establish a testing requirement. We do not anticipate a major retesting effort in this area. 3. Ref Part 1 of b above. ADC re-emphasizes that 25ADS will maintain GGS-1 radar only during interim period. No support will be provided for computer area as indicated in our Msg 19/0004Z Dec 67. 4. Ref Part 2 of b above. ADC has no objection to using 25ADS GGS-1 crew members on Island to support, under the technical supervision of SWAMA/DET personnel, whatever tests or demonstrations that may be required to provide data for evaluating GGS-1 computer problem. 5. It is suggested that this matter be an additional item for resolution at 27 Dec meeting in Colo Springs concerning reflection problem (Ref our Msg 13/1750Dec 67). GP3

CONTROL NO.	TOR/TOD	PAGE NO.	NO. OF PAGES	MESSAGE IDENTIFICATION	INITIALS
		2	2		

SECRET

DD FORM 173-1

SECRET

DOC 33
ODC
MDC
RF ✓

SECRET

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RC

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-32

18 July 1967

1. The following personnel, this hq, this stn, are awarded the Small Arms Expert Marksmanship Ribbon.

Lt Col Harry J. Tiernan, FR38067
Major Daniel P. Sperling, FR25280
Major James C. Sager, FV723732
Major Joseph T. Roihl, FV2226118
Major Joseph D. Price, FR30494
2nd Lt Ralph C. Berry, Jr., FV3192690
2nd Lt Henry D. Webb, Jr., FR3193504
2nd Lt Ralph R. Gutowski, FV317565
2nd Lt John W. Mentz, FV3205249
2nd Lt Philip R. Trubelhorn, FV3183693

2. The following personnel of the 71 Msl Wng Wg are awarded the Small Arms Expert Marksmanship Ribbon.

Colonel Max Sansing, FR32956
Captain Kirby C. Stafford, FR46089
1st Lt John C. Wagner, FR80719
2nd Lt Thomas C. Jasper, FV3205691
2nd Lt Robert G. Mitchell, FV3205696

3. Captain Daniel J. Thelen, FV3109915, 73 Aerosp Survl Wg, is awarded the Small Arms Expert Marksmanship Ribbon.

4. 1st Lt Michael J. Gray, FR79031, 1 Aerosp Con Sq, is awarded the Small Arms Expert Marksmanship Ribbon.

5. The following personnel, 10 Aerosp Def Gp, (ADC) Vandenberg AFB, California 93437, are awarded the Small Arms Expert Marksmanship Ribbon.

Major Paul L. Harrison, FR57595
Major Robert W. Walton, FR37768
1st Lt Louis G. Weigand III, FR78369
2nd Lt Theodore I. Meyers, FV3174641
2nd Lt Tim A. Taylor, FV3170757

SO G-32, 18 Jul 67, Hq 9 Aerosp Def Div, Ent AFB, Co 80912

6. The following personnel, 25 Aerosp Def Sq (ADC), Vandenberg AFB, California 93437, are awarded the Small Arms Expert Marksmanship Ribbon.

Lt Col Robert T. Ebey, FR34928
Major Thomas O. Englehardt, FV2219789
Major Gilbert E. Johnson, FR51290
Major Richard D. Williams, FV2249834
Capt William E. Cheney, FR59541
Capt Lucian K. DeMott, FR29985
Capt Larry L. King, FR73656
Capt Elmer E. Kirchner, FV67774
1st Lt Lawrence A. Nelson, FV313
CWO-4 Clark J. Horner, FR954876

HEADQUARTERS
OFFICIAL
9th Aerospace Def. Div.

ORIS B. JOHNSON, Maj Gen, USAF
Commander

LEON [illegible], Capt., USAF
Director of Administrative Services

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G-32

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-33 24 July 1967

1. By direction of the Secretary of the Air Force, each of the following named personnel is awarded the Air Force Commendation Medal or appropriate Oak Leaf Cluster for Meritorious Service during the periods indicated.

COL WILLIAM E. BUCK JR, FR1996, 28 Jul 66 - 15 Jul 67 (1st OLC)
LT COL LAWRENCE R. FINN, FR37890. 3 Aug 63 - 9 Mar 67 (1st OLC)
LT COL ROBERT G. TRUITT, FR14685, 17 Mar 65 - 15 Jul 67 (1st OLC)
MAJ THOMAS W. C. BIRGE, FR45499, 24 Jun 63 - 19 Apr 67 (1st OLC)
CAPT ALEXANDER A. LEVINE, FV3008977, 1 Jul 66 - 15 Jul 67 (1st OLC)
1ST LT LOYD K. THRASHER, FV3161945, 1 Jul 64 - 23 Jun 67
CMSGT RICHARD L. SCHAR, AF17050072, 2 Jun 66 - 19 May 67
CMSGT ELMER J. STEMAN, AF35135205, 17 Jun 63 - 20 Mar 67 (1st OLC)
SMSGT ROBERT R. CREVISOUR, AF25250819, 3 Aug 64 - 18 May 67 (1st OLC)
MSGT PAUL E. FRYMAN, AF16286755, 13 Feb 62 - 26 May 67
MSGT RICHARD C. RUTH, AF13485383, 17 Aug 64 - 15 Jul 67
TSGT HARRY T. BUSHNELL, AF19332918, 15 Jul 66 - 6 Jun 67
TSGT GEORGE SCHRANK, AF16442518, 31 Oct 63 - 13 Apr 67
SSGT JAMES A. GOODELL, AF17192894, 31 Aug 66 - 24 May 67
SSGT GEORGE F. MOSLEY, AF14382918, 11 Jul 66 - 20 Jun 67
SSGT HARRY G. TELENKO, AF13334269, 30 Sep 66 - 12 Jun 67
A1C RONALD L. KING, AF17501261, 29 Jul 66 - 13 Jul 67
A1C DAVID L. MONGSON, AF12722650, 7 Jul 66 - 30 Jun 67

2. By direction of the Secretary of the Air Force, CAPT PETER G. FRIEDMAN, FR49833, is awarded the Air Force Commendation Medal for Outstanding Achievement during the period 1 Jun 66 to 15 May 67.

3. By direction of the Secretary of the Air Force, CAPT NEEDHAM B. JONES, FR77422, is awarded the Combat Readiness Medal for sustained professional performance as a combat crew member from 16 Apr 63 to 6 Jun 67.

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9th Aerospace Def. Div.

ORIS B. JOHNSON, Major General, USAF
Commander

LE[illegible] ON, Captain, USAF
Director, Administrative Services

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-34

24 July 1967

1. A1C Kenneth J. Solek, AF11408861, 24 Spt Sq, APO San Francisco 96305, is awarded the Missileman Badge. Auth: AFR 35-5.

2. The following personnel, 10 Aerosp Def Gp, Vandenberg AFB, Calif 93437, are awarded the Master Missileman Badge. Auth: AFR 35-5.

TSgt Kenneth A. Hammerberg, AF12435256
TSgt Marland E. Lee, AF25727229
TSgt Mark R. Long, AF13450594
SMSgt David E. Guest, AF19360791

3. The following personnel, 10 Aerosp Def Gp, Vandenberg AFB, Calif 93437, are awarded the Senior Missileman Badge. Auth: AFR 35-5

MSgt Richard E. Demay, AF13495653
SSgt Michael A. Malone, AF19523186

4. The following personnel, 25 Aerosp Def Sq, Vandenberg AFB, Calif 93437, are awarded the Senior Missileman Badge. Auth: AFR 35-5.

TSgt Edgar E. Mcree, AF14541507
A1C Robert Smith, AF12682141

ORIS B. JOHNSON, Maj Gen, USAF
Commander

HEADQUARTERS OFFICIAL 9th Aerospace Def. Div.

LEO B. PATTON, Captain, USAF
Director of Administrative Services

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-35

25 July 1967

1. Each of the following named personnel, 10 Aerosp Def Gp, Vandenberg AFB, Calif 93437, are awarded the Small Arms Expert Marksmanship Ribbon.

TSgt James H. Bundy, AF14314442
TSgt (P-2) Robert D. O'Hare, AF12399263
SSgt Troy A. Adkins, AF25636005
SSgt Lionel Gordon, AF18302507
SSgt (P-2) Larry R. Walker, AF13567197
SSgt (P-2) David D. Westover, AF1562[illegible]2[illegible]0
A1C Peter J. Pavone, AF11432708
A1C Daniel R. Wittern, AF19747745

2. Each of the following personnel, 25 Aerosp Def Sq, Vandenberg AFB, Calif 93437, are awarded the Small Arms Expert Marksmanship Ribbon.

MSgt (P-2) Frank S. Carnathan, AF19169475
MSgt (P-2) Edward Godak, AF23744701
TSgt (P-2) Barclay F. Hailstone, AF19338977
TSgt (P-2) Billie J. Willis, AF19490000
TSgt (P-1) Dan W. Wohlenberg, AF18416782
SSgt Harlan J. Compton, AF17589082
SSgt (P-2) Robert E. Jackson, AF14707069
SSgt (P-2) Robert B. Langford, AF13530456
SSgt (P-2) Rudolph N. Soto, AF18555491
A1C (P-2) James L. Early, AF25348622

3. Each of the following personnel, Hq 9 Aerosp Def Div, Ent AFB, Colorado 80912, are awarded the Small Arms Expert Marksmanship Ribbon.

TSgt Leonard M. Haynes, AF18298015
A1C Gerald V. Edney, AF19816909
A1C William E. Elliott, Jr., AF17672086
A2C Richard A. Inman, AF11464611
A2C Sam W. Johnson, AF14931067

4. A2C Frabcus T. Fahey, AF12719959, 73 Aérosp Survl Wg, Tyndall AFB, Fla, 32401 is awarded the Small Arms Expert Marksmanship Ribbon.

ORIS B. JOHNSON, Maj Gen, USAF
Commander

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9th Aerospace Def. Div.

LEON B. PATTON, Captain, USAF
Director of Administrative Services

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-36 1 August 1967

1. The following personnel, this hq, this stn, are awarded the Small Arms Expert Marksmanship Ribbon:

Capt William P. Beighle, FR79654
2nd Lt Curtis L. Nelson, FV3206781
2nd Lt Paul R. Jagger, FV3208543
2nd Lt Frank D. Mugavero, FV3207103

2. The following personnel, 1 Aerosp Con Sq, this stn, are awarded the Small Arms Expert Marksmanship Ribbon:

1st Lt Durand E. Cleveland, FV3162573
2nd Lt Richard A. Denore, FV3209029
2nd Lt Ernest K. Faust, FR3192815
1st Lt Bruce O. Klein, FR3174891
1st Lt Lillard G. Stearns, FV3161426

3. MSGT MARVIN E. SKOGEBO, AF17370555,25 Aerosp Def Sq, Vandenberg AFB, Calif 93437, is awarded the Master Missileman Badge. Augh AFR 35-5.

4. TSGT HOWARD D. BALL, AF18389892, 10 Aerosp Def Gp, Vandenberg AFB, Calif 93437, is awarded the Master Missileman Badge. Augh: AFR 35-5.

5. TSGT JAMES M. DRIVER, AF12387203, 10 Aerosp Def Gp, Vandenberg AFB, Calif 93437, is awarded the Senior Missileman Badge. Augh: AFR 35-5.

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9th Aerospace Def. Div.

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Commander

LEON B. PATTON, Captain, USAF
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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-37

7 August 1967

1. MSGT DONALD L. KIZER, AF17354664, 10 Aerosp Def Gp, Vandenberg AFB, Calif 93437, is awarded the Senior Missileman Badge. Auth: AFR 35-5.

2. MSGT DONALD L. KIZER, AF17354664, 10 Aerosp Def Gp, Vandenberg AFB, Calif 93437, is awarded the Master Missileman Badge. Auth: AFR 35-5.

ORIS B. JOHNSON, Maj Gen, USAF
Commander

HEADQUARTERS OFFICIAL 9th Aerospace Def. Div.

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Director of Administrative Services

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G-37

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-38 22 August 1967

1. TSGT Levi H. Miller, AF13420967, 10 Aerosp Def Gp, Vandenberg AFB, Calif 93437, is awarded the Senior Missileman Badge. Auth: AF[illegible]

ORIS B. JOHNSON, Maj Gen, USAF
Commander

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[illegible], Captain, USAF
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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G- 39

24 August 1967

By direction of the Secretary of the Air Force, each of the following named personnel is awarded the Air Force Commendation Medal with First Oak Leaf Cluster for Meritorious Service during the periods indicated.

LT COL LLOYD B. WATTS, FV590318, 7 Sep 65 - 31 Jul 67
MSGT DON[illegible]H, AF16041566, 15 Apr 66 - 31 Jul 67

HEADQUARTERS
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9th Aerospace Def. Div.

ORIS B. JOHNSON, Major General, USAF
Commander

LEON B. PATTON, Captain, USAF
Director, Administrative Services

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DEPARTMENT OF THE AIR FORCE

HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)

ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-40

25 August 1967

1. The following personnel, 10 Aerosp Def Gp, Vandenberg AFB, California 93473, are awarded the Missileman Badge. Auth; AFR 35-5.

SSGT DAVID D. WESTOVER, AF15625280.
TSGT ANGELO R. SEREAN, AF33064384.

2. SMSGT GARLAND H. JEFFERS, AF19017754, 10 Aerosp Def Gp, Vandenberg AFB, Calif 93473, is awarded the Master Missileman Badge. Auth: AFR 35-5.

3. SSGT DAVID D. WESTOVER, AF15625280, 10 Aerosp Def Gp, Vandenberg AFB, Calif 93473, is awarded the Senior Missileman Badge. Auth: AFR 35-5.

ORIS B. JOHNSON, Maj Gen, USAF
Commander

HEADQUARTERS OFFICIAL 9th Aerospace Def. Div.

LEON B. PATTON, Captain, USAF
Director of Administrative Services

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9C10-H

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-41

[illegible] September 1967

1. By direction of the Secretary of the Air Force, each of the following named personnel is awarded the Air Force Commendation Medal for Meritorious Service during the periods indicated.

COL KENNETH COLEMAN, FR15737, 11 Jul 66 - 7 Jul 67 (3rd OLC)
LT COL RUSSELL F. HENRY, FR13391, 17 Jun 64 - 30 Jun 67
LT COL WESLEY W. MATHIAS, FR40823, 20 Jun 66 - 19 Jun 67
MAJ TROY G. ALCORN, FR45282, 1 Jul 66 - 15 May 67 (1st OLC)
MAJ LAWRENCE E. BROCKMAN JR, FR54462, 1 Jul 63 - 1 Jun 67
MAJ RICHARD C. BUND, FV2080644, 29 Jun 65 - 23 Jun 67
MAJ EARL B. DOEREN, FV2036104, 1 Sep 63 - 31 Oct 67 (1st OLC)
MAJ ROBERT W. LACY, FR60267, 3 Jun 66 - 31 May 67
CAPT GERALD L. BOYNTON, FV3129634, 1 Oct 66 - 29 Jul 67
CAPT GAYLORD H. ELLEFRITZ, FV3056271, 1 Jul 65 - 23 Jul 67
CAPT WILLIAM M. STEWART, FR67608, 19 Feb 64 - 21 Mar 67
CAPT WILLIAM A. WOLFE, FV1848969, 1 May 64 - 1 Feb 67
1ST LT PETER M. FROLICK, FV3155775, 30 Jun 65 - 22 May 67
1ST LT TERRY D. MILLER, FV3155117, 9 Jul 65 - 9 Jul 67
MSGT FRANK R. GUDSON, AF12331017, 2 Aug 66 - 1 Jul 67
MSGT DALE C. HUX, AF18460266, 16 Sep 61 - 30 Jun 67
MSGT BRUCE B. MCMAHAN, AF16332805, 26 Sep 64 - 10 Jun 67
MSGT JOE W. TOMBERLIN, AF18321767, 18 Jul 66 - 12 Jul 67
MSGT MAURICE A. BERGERON, AF11222418, 30 Jun 66 - 18 Jun 67 (1st OLC)
TSGT CARL V. HEBERLING, AF15432463, 31 May 61 - 5 May 67
TSGT DONALD F. LAYMON, AF18357488, 10 Apr 64 - 15 Mar 67
TSGT EDWARD W. SABLE, AF17217526, 10 Aug 66 - 7 Jul 67
TSGT LARRY D. SPRADLEY, AF17377315, 19 Jan 66 - 10 Jan 67
SSGT FRED S. MCNEAL, AF14628564, 1 Aug 66 - 1 Apr 67
SSGT HAROLD F. SMITH, AF14464906, 1 Jul 66 - 1 May 67
SSGT KEITH I. SPINDLER, AF19706229, 29 Apr 66 - 18 Aug 67
SSGT GERALD J. WEIMAN, AF19589632, 30 Jun 66 - 15 Jun 67
A2C RICHARD A. INMAN, AF11464611, 15 May 66 - 28 Jul 67

2. By direction of the Secretary of the Air Force, 1ST LT LARRY K. GEISEL, FV3170576, is awarded the Air Force Commendation Medal for Outstanding Achievement during the period 6 Feb 67 thru 30 Jun 67.

ORIS B. JOHNSON, Major General, USAF
Commander

HEADQUARTERS
OFFICIAL
9th Aerospace Def. Div.

LEON B. PATT[illegible]ain, USAF
Director, Administrative Services

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G-41

REQUEST AND AUTHORIZATION FOR CHANGE OF ADMINISTRATIVE ORDERS

(If more space is required, continue on reverse, identifying items by number)

TO:	FROM:
9CAS	9CBPO-QC

ORDERS PERTAINING TO THE INDIVIDUAL(S) LISTED IN ITEM 3 ARE ☐ REVOKED ☐ RESCINDED ☒ AMENDED AS SHOWN IN ITEM 4

1. IDENTIFICATION OF ORDER BEING AMENDED *(Issued by this Headquarters unless otherwise stated in item 5.)*

A. PARA	B. ORDER (Type and No.)	C. DATE	D. EDCSA	E. RELATING TO (TDY, PCS, Short Tour of AD, etc.)
1	G-41	7 Sep 67		Air Force Commendation Medal

2. PREVIOUS AMENDMENTS ISSUED BY THIS HEADQUARTERS.

A. PARA	B. ORDER (Type and No.)	C. DATE

3. IDENTIFICATION OF INDIVIDUAL(S) TO WHOM CHANGE ACTION PERTAINS

A. GRADE	B. LAST NAME, FIRST, MIDDLE INITIAL	C. AFSN OR POSITION TITLE (Civilian)	D. ORGANIZATION
MSGT	McMAHAN, [illegible] E B.	AF16332805	9ADD

4. AMENDMENT *(Identify item in order being amended)*

A. ITEM	AS READS	IS AMENDED TO READ

ITEM	IS AMENDED TO INCLUDE
	(1st OLC)

5. REMARKS

6. DATE	7. APPROVING OFFICIAL (Typed name, grade and title)	8. SIGNATURE	9. PHONE NO.
8 Sep 67	[illegible]Y C. MILLER, 2ND LT OIC, Quality Control	for [signature]	6102

10. DESIGNATION AND LOCATION OF HEADQUARTERS	11. ORDER (Type and No.)	12. DATE
DEPARTMENT OF THE AIR FORCE HQ 9 AEROSP DEF DIV ENT AFB, CO 80912	-15	11September67

13. FOR THE COMMANDER

14. DISTRIBUTION	15. SIGNATURE ELEMENT OF ORDERS AUTHENTICATING OFFICIAL
	OFFICIAL LEON B. PATTON, Captain, USAF Director of Administrative Services

AF FORM FEB 67 973

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-43

14 September 1967

1. The following personnel, 10 Aerosp Def Gp, Vandenberg AFB, California 93473, are awarded the Master Missileman Badge. Auth: AFR 35-5.

MAJOR JOHN BAZAN, FV716038.
MSGT HARRY A. GIRARD JR, AF14353259.

2. The following personnel, 24th Support Squadron (ADC) APO San Francisco 96305, is awarded the Senior Missileman Badge. Auth: AFR 35-5.

MSGT ALFRED G. FOSTER, AF12350643.
SSGT BRUCE A. ACHEY, AF13749751.

HEADQUARTERS
OFFICIAL
9TH AEROSPACE DEF. DIV.

ORIS B. JOHNSON, Maj Gen, USAF
Commander

LEON B. PATTON, Captain, USAF
Director of Administrative Services

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REQUEST AND AUTHORIZATION FOR CHANGE OF ADMINISTRATIVE ORDERS

(If more space is required, continue on reverse, identifying items by number)

TO: 9CA[illegible]

FROM: 9CBPO-QC

ORDERS PERTAINING TO THE INDIVIDUAL(S) LISTED IN ITEM 3 ARE ☐ REVOKED ☐ RESCINDED ☒ AMENDED AS SHOWN IN ITEM 4

1. IDENTIFICATION OF ORDER BEING AMENDED (Issued by this Headquarters unless otherwise stated in item 5.)

A. PARA	B. ORDER (Type and No.)	C. DATE	D. EDCSA	E. RELATING TO (TDY, PCS, Short Tour of AD, etc.)
1	[illegible]-41	7 Sep 1967		Air Force Commendation Medal

2. PREVIOUS AMENDMENTS ISSUED BY THIS HEADQUARTERS.

A. PARA	B. ORDER (Type and No.)	C. DATE

3. IDENTIFICATION OF INDIVIDUAL(S) TO WHOM CHANGE ACTION PERTAINS

A. GRADE	B. LAST NAME, FIRST, MIDDLE INITIAL	C. AFSN OR POSITION TITLE (Civilian)	D. ORGANIZATION
Major	[illegible], RICHARD C.	FV2080644	12 Msl Wng Sq APO NY 09023

4. AMENDMENT (Identify item in order being amended)

A. ITEM	AS READS	IS AMENDED TO READ

ITEM	IS AMENDED TO INCLUDE
1	1 OLC

5. REMARKS

6. DATE	7. APPROVING OFFICIAL (Typed name, grade and title)	8. SIGNATURE	9. PHONE NO.
20 Sep[illegible]	[illegible] C. MILLER, 2nd Lt., USAF Quality Control	[signature]	6102

10. DESIGNATION AND LOCATION OF HEADQUARTERS	11. ORDER (Type and No.)	12. DATE
DEPARTMENT OF THE AIR FORCE HQ 9 AEROSP DEF DIV ENT AFB, CO 80912	G-44	20 September67

13. FOR THE COMMANDER

14. DISTRIBUTION

G

15. SIGNATURE ELEMENT OF ORDERS AUTHENTICATING OFFICIAL

OFFICIAL

AEROSPACE DEF. DIV

[illegible] B. P[illegible], Captain, USAF
Director of Administrative Services

AF FORM FEB 67 973

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-45

20 September 1967

1. The following personnel, 10 Aerosp Def Gp, Vandenberg AFB, California 93473, are awarded the Master Missileman Badge. Auth: AFR 35-5.

MSGT Charles H. Fuller Jr., AF12367486
MSGT Richard E. DeMay, AF13495653
SSGT Tracy J. Banks, AF14594666

2. The following personnel, 10 Aerosp Def Gp, Vandenberg AFB, California 93473, are awarded the Senior Missileman Badge. Auth: AFR 35-5.

MSGT Charles H. Fuller Jr., AF12367486
SSGT Albert L. Cook Jr., AF21769767
SSGT James R. Jeffrey, AF13425984

3. The following personnel, 10 Aerosp Def Gp, Vandenberg AFB, California 93473, are awarded the Missileman badge. Auth: AFR 35-5.

A1C Robert A. Angell, AF18652116

ORIS B. JOHNSON, Maj Gen, USAF
Commander

HEADQUARTERS OFFICIAL 9TH AEROSPACE DEF. DIV.

LEON B. PATTON, Captain, USAF
Director of Administrative Services

DISTRIBUTION
G

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-46

20 September 1967

1. The following personnel, this hq, this stn, are awarded the Small Arms Expert Marksmanship Ribbon:

2nd Lt David J. Connelly, FV3180631
2nd Lt Lawrence A. Odau, FV3209371
2nd Lt Guy C. Miller, FV3193769
2nd Lt James B. Allen, FV3220426
2nd Lt Stanley G. Hrncir Jr., FV3220437
2nd Lt Warren R. Barrett Jr., FV3172857
Maj Myron G. Bigler, FV931771
2nd Lt David K. Stubbs, FV3182755
Capt John A. Palmer, FR62461
Maj Ben P. Lee, FR46062
Maj Robert H. Reed, FV714174
LtCol Lloyd B. Watts, FV590318
Capt Thomas E. Lewis Jr., FR77004
Capt Allan C. Greist, FR79711
2nd Lt Ronald F. Adsit, FV3180156
Maj Raymond W. Sprenger, FR43494
Capt Robert E. Korllner, FV3056637
Capt John C. Veteikis, FV3147633

2. The following personnel, 1 Aerosp Con Sq, this stn, are awarded the Small Arms Expert Marksmanship Ribbon:

Capt Leonard C. Tatum, FR3130577
2nd Lt Stuart E. Mitchell, FV3171621
2nd Lt Deborah G. Johnson, FV3180680
2nd Lt Glenn J. Eschrich, FV3181462
Capt Thomas J. Cross, FV3109388
Capt Charles F. Converse, FV3135807
Capt Dick A. Cable, FR59892
1st Lt Dillon E. Vanderford, FV3153404
2nd Lt Donald R. Larson, FV318175
2nd Lt James R. Elrod, FV3181467
2nd Lt Paul W. Bartlett, FV3178383
Capt George S. Danforth, FR77514
Capt Robert D. Cooke, FV3146057
2nd Lt Jonathan W. Whittaker, FV3191882

3. The following personnel, 71 Msl Wng Wg, this stn, are awarded the Small Arms Expert Marksmanship Ribbon:

Maj Delbert C. Phillips, FV1865968
Maj Harold L. Van Derryt, FV3007706

ORIS B. JOHNSON, Maj Gen, USAF
Commander

HEADQUARTERS OFFICIAL 9TH AEROSPACE DEF. DIV.

LEON B. PATTON, Captain, USAF
Director of Administrative Services

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G-46
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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-47

29 September 1967

1. By direction of the Secretary of the Air Force, CAPTAIN WAYNE H. MEADOWS, FV3008850, is awarded the Air Force Commendation Medal with 1 Oak Leaf Cluster for Outstanding Achievement during the period 16 March 64 thru 15 September 1967.

HEADQUARTERS
OFFICIAL
9TH AEROSPACE DEF. DIV.

ORIS B. JOHNSON, Major General, USAF
Commander

LEON B. PA[illegible], Captain, USAF
Director, Administrative Services

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-48

2 October 1967

1. CAPTAIN THOMAS E. LEWIS, JR., FR77004, 9 Aerospace Defense Division, Ent AFB, Colorado 80912, is awarded the Missileman Badge. Auth: AFR 35-5.

2. SSGT CHARLES E. SLATER, AF13678718, 10 Aerospace Defense Group Vandenberg AFB, California 93437, is awarded the Senior Missileman Badge. Auth: 35-5.

3. The following personnel, 10 Aerospace Defense Group, Vandenberg AFB, California 93437, are awarded the Master Missileman Badge. Auth: 35-5.

TSGT DRIVER, JAMES M., AF12387203
TSGT MASON, ELLIS B., AF24569675

4. The following personnel, 10 Aerospace Defense Group, Vandenberg AFB, California 93437, are awarded the Missileman Badge. Auth: AFR 35-5.

CAPT LOUIS G. WEIGAND III, FR78369
MSGT DONALD H. BRADSHAW, AF28785878

HEADQUARTERS
OFFICIAL
9TH AEROSPACE DEF. DIV

ORIS B. JOHNSON, Maj Gen, USAF
Commander

LEON B. PATTON, Captain, USAF
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R.C.

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-49

3 October 1967
4 OCT 1967

MAJOR GENERAL ORIS B. JOHNSON, FR5025, 9 Aerospace Defense Division, Ent AFB, Colorado 80912, is awarded the Senior Missileman Badge. Auth: AFR 35-5.

ORIS B. JOHNSON, Maj Gen, USAF
Commander

HEADQUARTERS
OFFICIAL
9TH AEROSPACE DEF DIV

LEON B. PATTON, Captain, USAF
Director of Administrative Services

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-50

5 October 1967

1. By direction of the Secretary of the Air Force, each of the following named personnel is awarded the Air Force Commendation Medal for Meritorious Service during the periods indicated.

CAPT JOHN B. CLARK JR., FR3146913, 27 Sep 63 - 7 Sep 67
CAPT RAYMOND W. VOLKWINE, FV3115413, 23 Sep 66 - 31 Aug 67
MSGT HERMAN L. AUERBACH, AF12410367, 15 Jul 63 - 15 Oct 67
TSGT LARRY E. HODSON, AF17434188, 16 May 66 - 8 Sep 67
TSGT LEVI H. MILLER JR., AF13420967, 8 Jul 63 - 5 Sep 67
TSGT LEONARD T. STEINER, AF13448798, 12 Jun 65 - 1 Dec 66

ORIS B. JOHNSON, Major General, USAF
Commander

HEADQUARTERS
OFFICIAL
AEROSPACE DEF. DIV.

LEON B. PATTON, Captain, USAF
Director, Administrative Services

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-52

6 October 1967

By direction of the Secretary of the Air Force, COLONEL NOEL D. AUSTIN, FR15825, is awarded the Air Force Commendation Medal (Second Oak Leaf Cluster) for Meritorious Service during the period [illegible] August 1966 to 6 October 1967.

ORIS B. JOHNSON, Major General, USAF
Commander

HEADQUARTERS
OFFICIAL
9TH AEROSPACE DEF. DIV.

LEON B. PATTON, Captain, USAF
Director, Administrative Services

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-52

16 October 1967

1. The following personnel, 1 Aerosp Con Sq, this stn, are awarded the Small Arms Expert Marksmanship Ribbon:

MSGT Paul F. [illegible], AF11247163
MSGT Harold K. Brown, AF27548409
MSGT James R. Shuman, AF21190974
TSGT Carl E. Hook, AF15271504
TSGT Richard A. Payne, AF13386386
TSGT Dawson K. White, AF24608787
TSGT James H. Wimmer, AF13490020
SSGT Ralph Benjamin, AF18538800
SSGT Eugene F. Deges, AF17591758
SSGT Isaac E. Marshall, AF17542743
A1C Joseph F. Binette, AF11289475
A2C Robert S. Steffenson, AF17304058

2. The following personnel, this hq, this stn, are awarded the Small Arms Expert Marksmanship Ribbon:

MSGT Frank J. Dolezal, AF17344266
TSGT James J. Kinderknecht, AF17298497
SSGT Silvion Henson, AF16453536
A1C Charles C. Brown, AF13545567

3. The following personnel, 73 Aerosp Survl Wg, this stn, are awarded the Small Arms Expert Marksmanship Ribbon:

TSGT James W. Oliver, AF15258268

ORIS B. JOHNSON, Maj Gen, USAF
Commander

HEADQUARTERS
OFFICIAL
9TH AEROSPACE DEF DIV

LEON B. PATTON, Captain, USAF
Director of Administrative Services

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-53

20 October 1967

The following personnel, 10 Aerosp Def Gp, this stn, are awarded the Small Arms Expert Markmanship Ribbon:

SMSGT ROBERT W. MILLER, AF14262770
SMSGT LEWIS E. SINGLETON, AF13035589
MSGT WILLIAM P. BOGGS, AF19564633
MSGT JACK L. BROWN, AF15456056
MSGT OLEN G. MYERS, AF17361243
MSGT GEORGE E. THOMPSON, AF37254302
TSGT EARL D. BROWN, AF17298543
TSGT THEODORE J. FELLOWS, AF17523519
TSGT EMILE P. HASTERT, AF19335352
TSGT LLOYD W. KINGSLEY, AF16348460
TSGT LEVI H. MILLER JR., AF13420967
TSGT JOE ORR JR., AF14546783
TSGT LOUIE M. SHIVER, AF14225028
TSGT FRONKLYN VENABLE, AF15468874
TSGT WILLIAM C. WILDMINE, AF16412283
TSGT RONALD L. WILSON, AF19388309
TSGT ERVIN Q. WRIGHT, AF18450986
SSGT FRANKIE BLACKBURN, AF13534886
SSGT REX D. BOWLES, AF17375567
SSGT NORBERT R. JACOBS, AF17351640
SSGT JOHN A. KAYS, AF15539418
SSGT LAWTON S. KING, AF14506500
SSGT RONALD A. KNAUSS, AF13682065
SSGT EUGENE M. KOPLASKI, AF14315116
SSGT MICHAEL A. MALONE, AF19523186
SSGT KENNETH V. VANITER, AF16205422
A1C JAMES BROM, AF18687775
A1C ROBERT C. EMERSON, AF15706823
A1C ANDREW G. GUGGENBERGER, AF17598146
A1C JERRY L. MATTI, AF19836363
A2C DONALD C. COMPBELL, AF14967391

ORIS B. JOHNSON, Maj Gen, USAF
Commander

OFFICIAL

LEON B. PATTON, Captain, USAF
Director of Administrative Services

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DEPARTMENT OF THE AIR FORCE

HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)

ENT AIR FORCE BASE COLORADO 80912

RC

SPECIAL ORDER
G-54

20 October 1967

2 0 DEC 1967

1. CAPTAIN LARRY L. KING, FR73656, 10 Aerospace Defense Group Vandenberg AFB, California 93437, is awarded the Master Missileman Badge. Auth: AFR 35-5.

2. TSGT WILLIAM A. DAHN, AF17367335, 10 Aerospace Defense Group Vandenberg AFB, California 93437, is awarded the Senior Missileman Badge. Auth: AFR 35-5.

3. The following personnel, 9 Aerospace Defense Division, Ent AFB, Colorado 80912, are awarded the Missileman Badge. Auth: AFR 35-5.

COLONEL JOHN F. FLETCHER, FR52862
MSGT VERNON L. DISCHELL, AF11177354

4. The following personnel, 10 Aerospace Defense Group Vandenberg AFB, California 93437, are awarded the Missileman Badge. Auth: AFR 35-5.

SMSGT RUSSELL C. GORDON, AF57222037
TSGT PHILLIP E. BROWN, AF24548519
TSGT KENNETH L. CATT, AF16576238
TSGT ALBERT L. ROCKHILL, AF16181591
SSGT WARREN R. SLACK, AF12485592
A1C JAMES E. BEAVER, AF13630547
A1C JOHN DAHL, AF12547164

HEADQUARTERS 9TH AEROSPACE DEF DIV OFFICIAL

ORIS B. JOHNSON, Maj Gen, USAF
Commander

LEON B. PATTON, Captain, USAF
Director of Administrative Services

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-55

25 October 1967

1. The following personnel, this Sq, this stn, are awarded the Small Arms Expert Marksmanship Ribbon:

LT COL JOHN YAWORSKI, FR21707
CAPT PETER M. V. NELSON, FV3182139
2/LT MARIA GOMEZ, FV3206643
2/LT JOHN W. HUTSON, FV3220935
2/LT KENNETH L. WALL, FV320[illegible]
2/LT JOHN F. WEIBEL, FV320[illegible]

2. The following personnel, [illegible] Com Sq, this stn, are awarded the Small Arms Expert Marksmanship Ribbon:

2/LT WILLIAM C. W. POWERS, [illegible]
2/LT FREDERICK A. [illegible], FV3205690

3. The following personnel, [illegible] Wg, this stn, are awarded the Small Arms Expert Marksmanship Ribbon:

2/LT TIMOTHY E. FALK, FV3208608

ORIS B. JOHNSON, Maj Gen, USAF
Commander

HEADQUARTERS
OFFICIAL
9TH AEROSPACE DEF. DIV

LEON B. [illegible], Captain, USAF
Director of Administrative Services

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G-55

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-56

26 October 1967

1. By direction of the Secretary of the Air Force, each of the following named personnel is awarded the Air Force Commendation Medal for Meritorious Service during the periods indicated.

COL ROBERT T. EBEY, FR34928, 20 Sep 63 - 31 Aug 67
LTCOL MARVIN R. WALLACE, FV2095922, 15 Dec 64 - 17 Oct 67
MAJ WILLIAM SWEDERSKAS, FV818454, 27 Jul 64 - 31 Oct 67
SMSGT ROBERT S. YOPPKE, AF18000066, 1 Oct 64 - 1 Sep 67
TSGT FREDDIE J. DORNAK, AF18436288, 26 May 63 - 1 Aug 67
TSGT EMMITT C. EISON, AF14395253, 23 Aug 65 - 27 Jun 67
TSGT JOHN L. NORTHCUTT JR, AF25266375, 3 Oct 66 - 1 Sep 67
TSGT KENNETH I. TODHUNTER, AF13290286, 12 Sep 66 - 31 Oct 67

2. By direction of the Secretary of the Air Force, each of the following named personnel is awarded the Air Force Commendation Medal (First Oak Leaf Cluster) for Meritorious Service during the periods indicated.

LTCOL JOHN YAWORSKI, FR11707, 29 May 66 - 10 Oct 67
SMSGT ARTHUR H. BOISSELLE, JR, AF11235280, 1 Oct 62 - 29 Sep 67
MSGT ROBERT E. L. LUMPKINS, JR, AF19470271, 1 Oct 63 - 30 Oct 67

ORIS B. JOHNSON, Major General, USAF
Commander

HEADQUARTERS
OFFICIAL
9TH AEROSPACE DEF. DIV.

LEON [illegible] PATTON, Captain, USAF
Director of Administrative Services

DISTRIBUTION
G

REQUEST AND AUTHORIZATION FOR CHANGE OF ADMINISTRATIVE ORDERS

(If more space is required, continue on reverse, identifying items by number)

TO:	FROM:
9CAS	9CBPO-QC

ORDERS PERTAINING TO THE INDIVIDUAL(S) LISTED IN ITEM 3 ARE: ☐ REVOKED ☐ RESCINDED ☒ AMENDED AS SHOWN IN ITEM 4

1. IDENTIFICATION OF ORDER BEING CHANGED *(Issued by this Headquarters unless otherwise stated in item 5.)*

A. PARA	B. ORDER (Type and No.)	C. DATE	D. TED	E. RELATING TO (TDY, PCS, Short Tour of AD, etc.)
	G-56	26 Oct 1967	☐ PCS W/ PCA ☐ PCS W/O PCA	TSgt Kenneth I. Todhunter

2. PREVIOUS AMENDMENTS ISSEUD BY THIS HEADQUARTERS:

A. PARA	B. ORDER (Type and No.)	C. DATE

3. IDENTIFICATION OF INDIVIDUAL(S) TO WHOM CHANGE ACTION PERTAINS

A. GRADE	B. LAST NAME, FIRST, MIDDLE INITIAL	C. AFSN OR POSITION TITLE (Civilian)	D. ORGANIZATION
TSGT	TODHUNTER, KENNETH I.	AF13299386	9 ADD

4. AMENDMENT *(Identify item in order being amended)*

A. ITEM	AS READS	IS AMENDED TO READ
Para 1	AF13290286	AF13299386

B. ITEM	IS AMENDED TO INCLUDE

5. REMARKS

6. DATE	7. APPROVING OFFICIAL (Typed name, grade and title)	8. SIGNATURE	9. PHONE NO.
31Oct67	ALBERT N. WHITE, MSgt, USAF		6102

10. DESIGNATION AND LOCATION OF HEADQUARTERS	11. ORDER (Type and No.)	12. DATE
DEPARTMENT OF THE AIR FORCE Hq 9 Aerosp Def Div Ent AFB, CO 80912	G- 57	31 October 1967

13. TDN: FOR THE COMMANDER

14. DISTRIBUTION	15. SIGNATURE ELEMENT OF AUTHENTICATING OFFICIAL
G	LEON B. PATTON, Captain, USAF Director, Administrative Services

HEADQUARTERS OFFICIAL 9TH AEROSPACE DEF DIV

AF FORM 973 PREVIOUS EDITION WILL BE USED

AC

REQUEST AND AUTHORIZATION FOR CHANGE OF ADMINISTRATIVE ORDERS

(If more space is required, continue on reverse, identifying item by number.)

TO:	FROM:
DCAS	9CDPXO-F

ORDERS PERTAINING TO THE INDIVIDUALS LISTED IN ITEM 3 ARE [illegible]

XX [illegible]

1. IDENTIFICATION OF ORDER BEING CHANGED (Issued by this headquarters unless otherwise stated in Item 5.)

A. PARA	B. ORDER (Type and No.)	C. DATE	D. TDN	E. RELATING TO (PCS, TDY, Award, etc.)
1	G-56	26 Oct 67	PCS W PCA / PCS W/O PCA	Award of the Air Force Commendation Medal

2. PREVIOUS AMENDMENTS ISSUED BY THIS HEADQUARTERS

A. PARA	B. ORDER (Type and No.)	DATE
1	G-57	31 Oct 67

3. IDENTIFICATION OF INDIVIDUALS TO WHOM CHANGE ACTION PERTAINS

A. GRADE	B. LAST NAME - FIRST NAME - MIDDLE INITIAL	C. SERVICE NUMBER	D. [illegible]
LTCOL	LEVY ROBERT L	FR11928	9AOD
MAJ	SKEIVERSKAS WILLIAM	FA518154	9ADS
TSGT	NORTHCUTT JOHN L JR	AF25266375	9ADP

4. AMENDMENT [illegible]

A. ITEM	B. READS	C. CHANGE TO
	COL ROBERT L LEVY FR11928	LTCOL ROBERT L LEVY FR11928
	MAJ WILLIAM SKEIVERSKAS FA518154	DELETE
	TSGT JOHN L NORTHCUTT JR AF25266375	DELETE

ITEM	ADDITIONAL CHANGES

8. REMARKS

6. DATE	7. REQUESTING OFFICIAL (Typed name, grade and title)	8. SIGNATURE	9. PHONE NO.
30Nov67	ALBERT N. WHITE MSgt USAF Chief, Quality Control		6102

10. DESIGNATION AND LOCATION OF HEADQUARTERS	11. ORDER (Type and No.)	12. DATE
DEPARTMENT OF THE AIR FORCE HQ 9 AEROSP DEF DIV ENT AFB, CO 80912	G 60	1 December 1967

13. FOR: FOR THE COMMANDER

14. DISTRIBUTION	15. SIGNATURE ELEMENT OF ORDERS AUTHENTICATING OFFICIAL
"G"	OFFICIAL 9TH AEROSPACE DEF DIV HQ [illegible] NANCY D. CONVERSE SSGT USAF Asst Dir of Admin Svs

AF FORM 973 [illegible]

1058

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-58

20 November 1967

The following personnel, this hq, this stn, are awarded the Small Arms Expert Marksmanship Ribbon:

MSGT EDWARD R. DUDGEON, AF17356601
SSGT AUSTIN BOX, AF17101370
A1C WILLIAM D. HALL JR., AF14971046

ORIS B. JOHNSON, Maj Gen, USAF
Commander

HEADQUARTERS
OFFICIAL
9TH AEROSPACE DEF. DIV.

LE[illegible]TTON, Captain, USAF
Director of Administrative Services

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G-58

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-59

28 November 1967

1. The following personnel, this hq, this stn, are awarded the Small Arms Expert Marksmanship Ribbon:

2ND LT WILLIAM T. NESHEM, FV3209463
2ND LT JOHN C. MARTIN, FV3194243

2. The following personnel, 10 Aerospace Defense Group, Vandenberg AFB, California 93437, are awarded the Small Arms Expert Marksmanship Ribbon:

COL WILLIAM R. JOYNER, FR21462
MAJ THEODORE E. BAUMANN, FR12070
CAPT ROBERT L. KOFLLNER, FV3056637
2ND LT MARSHALL J. JOHNSON, FV3242287
2ND LT BOYD L. DEARDEN, FV3170755

ORIS B. JOHNSON, Maj Gen, USAF
Commander

HEADQUARTERS
OFFICIAL
9TH AEROSPACE DEF. DIV.

LEON B. PATTON, Captain, USAF
Director of Administrative Services

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G-60 AC

REQUEST AND AUTHORIZATION FOR CHANGE OF ADMINISTRATIVE ORDERS

TO: 9CAS

FROM: 9CBPO-OC

ORDERS PERTAINING TO THE INDIVIDUAL(S) LISTED IN ITEM 3 ARE: X AMENDED AS SHOWN IN ITEM 4

1. IDENTIFICATION OF ORDER BEING CHANGED (Issued by this headquarters unless otherwise stated in item 5.)

a. PARA	b. ORDER (Type and No.)	c. DATE	e. PERTAINS TO
1	G-56	26 Oct 67	Award of the Air Force Commendation Medal

2. PREVIOUS AMENDMENTS ISSUED BY THIS HEADQUARTERS

a. PARA	b. ORDER (Type and No.)	c. DATE
1	G-57	31 Oct 67

3. IDENTIFICATION OF INDIVIDUAL(S) TO WHOM CHANGE ACTION PERTAINS

a. GRADE	b. LAST NAME, FIRST, MIDDLE INITIAL	c. AFSN OR POSITION TITLE	d. ORGANIZATION
LTCOL	ELEY, [illegible]	FR33928	9ADD
MAJ	SWEDERSKAS, WILLIAM	[illegible]818151	1ACS
TSGT	NORTHCUTT, JOHN L JR	[illegible]25260375	9ADD

4. AMENDMENT

a. ITEM	b. READS	c. CHANGED TO READ
	COL ROBERT T. ELEY, FR33928	LTCOL ROBERT T. ELEY, FR33928
	MAJ WILLIAM SWEDERSKAS [illegible]818151	DELETE
	TSGT JOHN L. NORTHCUTT, JR., AF25260375	DELETE

5. ITEM / AMENDED TO INCLUDE

6. REMARKS

6. DATE	7. APPROVING OFFICIAL (Typed name, grade and title)	8. SIGNATURE	9. PHONE NO
30Nov67	ALBERT N. WHITE, MSgt, USAF Chief, Quality Control	[signature]	6102

10. DESIGNATION AND LOCATION OF HEADQUARTERS

DEPARTMENT OF THE AIR FORCE
HQ 9 AEROSP DEF DIV
ENT AFB, CO 80912

11. ORDER: G-60 — 12. DATE: 1 December 1967

13. FOR THE COMMANDER

14. DISTRIBUTION

"G"

15. SIGNATURE ELEMENT OF AUTHENTICATING OFFICIAL

OFFICIAL — 9TH AEROSPACE DEF DIV

NANCY B. CONVERSE, Capt, USAF
Asst Dir of Admin Svc

AF FORM AUG 64 973 PREVIOUS EDITION WILL BE USED

R.C.

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER [illegible] December 1967
G-[illegible]

By direction of the Secretary of the Air Force, each of the following named personnel is awarded the Air Force Commendation Medal for Meritorious Service during the periods indicated.

MAJOR RICHARD [illegible] [illegible], FV798160, 20 Nov 1967 thru 31 Dec 1967
TSGT CARL [illegible] [illegible], AF15132463, 31 May 1964 thru 5 May 1967

OTIS P. JOHNSON, Major General, USAF
Commander

HEADQUARTERS
OFFICIAL
9TH AEROSPACE DEF DIV

[illegible]
[illegible]

G-[illegible]

C10-H

DEPARTMENT OF THE AIR FORCE

HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)

ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-62

5 December 1967

1. The Following personnel 25 Aerosp Def Sq Vandenberg AFB CA are awarded the Basic Missileman Badge. AUTH: AFR 35-5

GRADE	NAME	AFSN
CAPT	DAVID R. DUBOSE	FR79346
CAPT	JOHN M. LOTZ	FR79434
TSGT	JOHN H. FOSTER	AF18390985
TSGT	ROBERT D. O'HARE	AF12399263
SSGT	DONALD J. CENKNER	AF13649497
SSGT	QUINCY E. CLARK	AF13574589
SSGT	JOHN F. HENDERSON JR	AF18513513
SSGT	ROBERT B. LANGFORD	AF15550456
SSGT	JAMES F. SWAIN	AF13345999

2. SGT DAVID C. BAUS, AF 19871066 10 Aerosp Def Gp, Vandenberg AFB CA, is awarded the Basic Missileman Badge. AUTH: AFR 35-5.

3. The following personnel 25 Aerosp Def Sq Vandenberg AFB CA are awarded the Senior Missileman Badge. AUTH: AFR 35-5.

GRADE	NAME	AFSN
SSGT	JAMES H. BLACKMON	AF24527988
SGT	JOHN R. HOFFMAN III	AF13803723

4. The following personnel 10 Aerosp Def Gp Vandenberg AFB CA are awarded the Senior Missileman Badge. AUTH: AFR 35-5

GRADE	NAME	AFSN
TSGT	CLARENCE E. BEVIER	AF17301320
TSGT	DONALD F. CHRISTOPHERSON	AF17523578
TSGT	GEORGE A. ROCK	AF19533517
SSGT	DOUGLAS J. BROOKS	AF12601804
SGT	JOSEPH OLIVER	AF15550705

5. MSGT LYMAN M. GOOD, AF 13278933, 25 Aerosp Def Sq, Vandenberg AFB, CA, is awarded the Master Missileman Badge. AUTH: AFR 35-5.

6. The following personnel, 10 Aerosp Def Gp, Vandenberg AFB, CA, are awarded the Master Missileman Badge. AUTH: AFR 35-5.

GRADE	NAME	AFSN
MSGT	ROBERT K. COX	AF14084519
MSGT	MARVIN E. MCCOIN	AF38404098
TSGT	DONALD E. CHRISTOPHERSON	AF17523578
TSGT	CLARENCE W. PATTON	AF13165006

HEADQUARTERS OFFICIAL 9TH AEROSPACE DEF. DIV.

ORIS B. JOHNSON, Major General, USAF
Commander

NANCY B. CONVERSE, Capt, USAF
Director of Administrative Services

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DEPARTMENT OF THE AIR FORC[illegible]

HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)

ENT AIR FORCE BASE COLORADO 80912

RC

SPECIAL ORDER
G-63

13 December 1967

1. By direction of the Secretary of the Air Force, Each of the following named personnel is awarded the Air Force Commendation Medal for Meritorious Service during the periods indicated.

CAPTAIN RICHARD W. PETERSON, FV3137245, 1 Oct 1965 thru 5 Oct 1967

CAPTAIN FRANKLIN J. GINGRICH JR, FR58642, 23 Apr 1963 thru 24 [illegible] 1967

2. By direction of the Secretary of the Air Force, Each of the following named personnel is awarded the Air Force Commendation Medal (First Oak Leaf Cluster) for Meritorious Service during the periods indicated.

MAJOR [illegible] C. PHILLIPS, FV1865268, 2 May 1966 thru 31 Dec 196[illegible]

CAPTAIN CHARLES W. MCNICHOLS, III, FR79747, 1 Oct 1965 thru [illegible] Oct 1967

CAPTAIN PETER C. PINTLER, FR50291, [illegible] Jul 1963 thru 10 Jul 196[illegible]

MASTER SERGEANT PAUL F. BINGHAM, AF11247163, 4 Aug 1965 thru 14 Nov 1967

OFFICIAL

HEADQUARTERS 9TH AEROSPACE DEF. DIV

ORIS B. JOHNSON, Major General, USAF
Commander

W[illegible], Captain, USAF
[illegible] of Administrative Services

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DEPARTMENT OF THE AIR FORCE

HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)

ENT AIR FORCE BASE, COLORADO 80912

[illegible]CIAL ORDER [illegible]

15 December 196[illegible]

By direction of the Secretary of the AF, LTCOL LAWRENCE J. [illegible]ROSS, [illegible] is awarded the Air Force Commendation Medal [illegible] Meritorious service during the period 12 Aug 1967 thru 31 Dec 196[illegible].

HEADQUARTERS OFFICIAL 9TH AEROSPACE DEF. DIV.

ORIS B. JOHNSON, Major General, USAF
Commander

[illegible] USAF [illegible] Administrative Services

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-65

29 December 1967

The following personnel, 18th Surveillance Squadron, Edwards Air Force Base, California 93523, are awarded the Small Arms Expert Marksmanship Ribbon:

SMSGT HAROLD O. STROUD, AF18272201
SSGT LLOYD A. HEINEMEYER, AF17474245
A1C DAVID R. HENNEKE, AF15955904
A1C GARY L. HULL, AF15955905
A1C ROBERT D. VANOVER, AF18772247

ORIS B. JOHNSON, Maj Gen, USAF
Commander

HEADQUARTERS
OFFICIAL
9TH AEROSPACE DEF. DIV.

WILLIAM C. COLE, Captain, USAF
Director of Administrative Services

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH AEROSPACE DEFENSE DIVISION (ADC)
ENT AIR FORCE BASE, COLORADO 80912

SPECIAL ORDER
G-66

29 December 1967

1. The following personnel, this hq, this stn, are awarded the Small Arms Expert Marksmanship Ribbon:

MAJ SHELDON E. BRINK, FV2234471
2ND LT ROBERT M. BUSH, FV3221937
2ND LT WILLIAM W. DEANE III, FV3220429

2. The following personnel, 20th Surveillance Squadron, Eglin Air Force Base, Florida 32542, are awarded the Small Arms Expert Marksmanship Ribbon:

2ND LT SPENCER W. WILKSON, FV3193561
2ND LT CURTIS W. ROBB, FV3220446
2ND LT ROBERT ELSER, FV3220799
2ND LT REUBEN S. YOSHIKAWA, FV3179281

ORIS B. JOHNSON, Maj Gen, USAF
Commander

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9TH AEROSPACE DEF. DIV.

WILLIAM C. COLE, Captain, USAF
Director of Administrative Services

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G-66

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S.O. G-66, Hqs 9th Aerospace Defense Division, was the last of the [illegible] 1967.

REQUEST AND AUTHORIZATION FOR CHANGE OF ADMINISTRATIVE ORDERS
(If more space is required, continue on reverse, identifying items by number)

TO: 9CAS

FROM: 9CAS 4 JAN 1968

ORDERS PERTAINING TO THE INDIVIDUAL(S) LISTED IN ITEM 3 ARE: ☐ REVOKED ☐ RESCINDED ☐ AMENDED AS SHOWN IN ITEM 4

1. IDENTIFICATION OF ORDER BEING AMENDED (Issued by this Headquarters unless otherwise stated in item 2.)

A. PARA	B. ORDER (Type and No.)	C. DATE	D. EDCSA	E. RELATING TO (TDY, PCS, Award, Tour of AD, etc.)
1	G-66	29 December 67		"G"

2. PREVIOUS AMENDMENTS ISSUED BY THIS HEADQUARTERS.

A. PARA	B. ORDER (Type and No.)	C. DATE

3. IDENTIFICATION OF INDIVIDUAL(S) TO WHOM CHANGE ACTION PERTAINS

A. GRADE	B. LAST NAME, FIRST, MIDDLE INITIAL	C. AFSN OR POSITION TITLE	D. ORGANIZATION
[illegible]	[illegible]	FV3221927	DAIG

4. CHANGE(S) (List by item as order being amended)

A. ITEM	B. READ	C. AMENDED TO READ
	FV3221937	FV3221927

A. ITEM	IS AMENDED TO INCLUDE

5. REMARKS

6. DATE	7. REQUESTING OFFICIAL (Typed name, grade & title)	8. SIGNATURE	9. PHONE NO.
3 Jan 68	LOUIS A. KUCERA, SMSGT, USAF Superintendent of Admin Svc	Louis A Kucera	6005

10. DESIGNATION AND LOCATION OF HEADQUARTERS
DEPARTMENT OF THE AIR FORCE
9th Aerospace Defense Division
Ent AFB, Colorado 80912

11. ORDER (Type and No.): G-1

12. DATE: 3 January 1968

13. FOR THE COMMANDER

14. DISTRIBUTION
"G"

15. SIGNATURE ELEMENT OF ORDERS AUTHENTICATING OFFICIAL

OFFICIAL

WILLIAM C. COLE, Captain, USAF
Director of Administrative Services

DOCUMENT TO ROLL INDEX

Frame Number	Classification Number	Date Period	Vol	Pt	Title	[illegible]	[illegible]
4	[illegible]	[illegible]			[illegible]		
184							
649		Jan-[illegible]	1				
785			[illegible]				
1433		Jul-Dec67	1				
1538			[illegible]				
1974		Jan-Jun68	1				
1977	[illegible]		2		[illegible]		
2315	Index				[illegible]		
	[illegible]						