Central Intelligence Agency

Washington, D.C. 20505

13 December 2004

Mr. Russ Kick
[redacted]

Reference: F-2004-01193

Dear Mr. Kick:

This is a final response to your 12 April 2004 Freedom of Information Act (FOIA) request for records pertaining to the CIA's museum. We processed your request in accordance with the FOIA, 5 U.S.C. § 552, as amended, and the CIA Information Act, 50 U.S.C. § 431. Our processing included a search for records as described in our acceptance letter that were in existence as of and through the date of that letter, 26 April 2004.

We completed a thorough search for records responsive to your request and located the enclosed records. We have determined that Document 1158268 can be released in segregable form with deletions made on the basis of FOIA exemption (b)(3). Please note the copyright statement on the second to the last page of this document. An explanation of exemptions is enclosed.

Also be advised that Documents 428766 and 428767 were previously released under the Historical Review Program.

You have the right to appeal the decisions made concerning Document 1158268 by addressing your appeal to the Agency Release Panel within 45 days from the date of this letter, in my care. Should you choose to do this, please explain the basis of your appeal.

Sincerely,

Scott Koch
Information and Privacy Coordinator

Enclosures

Explanation of Exemptions

Freedom of Information Act:

(b)(l) applies to material which is properly classified pursuant to an Executive order in the interest of national defense or foreign policy;

(b)(2) applies to information which pertains solely to the internal personnel rules and practices of the Agency;

(b)(3) applies to information pertaining to the CIA Director's statutory obligations to protect from disclosure intelligence sources and methods, as well as the organization, functions, names, official titles, salaries or numbers of personnel employed by the Agency, in accordance with the National Security Act of 1947 and/or the CIA Act of 1949;

(b)(4) applies to information such as trade secrets and commercial or financial information obtained from a person on a privileged or confidential basis;

(b)(5) applies to inter- and intra-agency memoranda or letters which are predecisional and deliberative in nature, or consist of attorney work-product or attorney-client information;

(b)(6) applies to information, the release of which would constitute an unwarranted invasion of the personal privacy of other individuals; and

(b)(7) applies to investigatory records, the release of which could: (A) interfere with enforcement proceedings, (C) constitute an unwarranted invasion of the personal privacy of others, (D) disclose the identity of a confidential source, (E) disclose investigative techniques and procedures, or (F) endanger the life or physical safety of an individual.

Privacy Act:

(d)(5) applies to information compiled in reasonable anticipation of a civil action or proceeding;

(j)(1) applies to polygraph records; documents or segregable portions of documents, the release of which would disclose intelligence sources and methods, including names of certain Agency employees and organizational components; and documents or information provided by foreign governments;

(k)(1) applies to material properly classified pursuant to an Executive order in the interest of national defense or foreign policy;

(k)(2) applies to investigatory material compiled for law enforcement purposes;

(k)(5) applies to investigatory material compiled solely for the purpose of determining suitability, eligibility, or qualifications for Federal civilian employment, or access to classified information, the release of which would disclose a confidential source; and

(k)(6) applies to testing or examination material used to determine individual qualifications for appointment or promotion in Federal Government service, the release of which would compromise the testing or examination process.

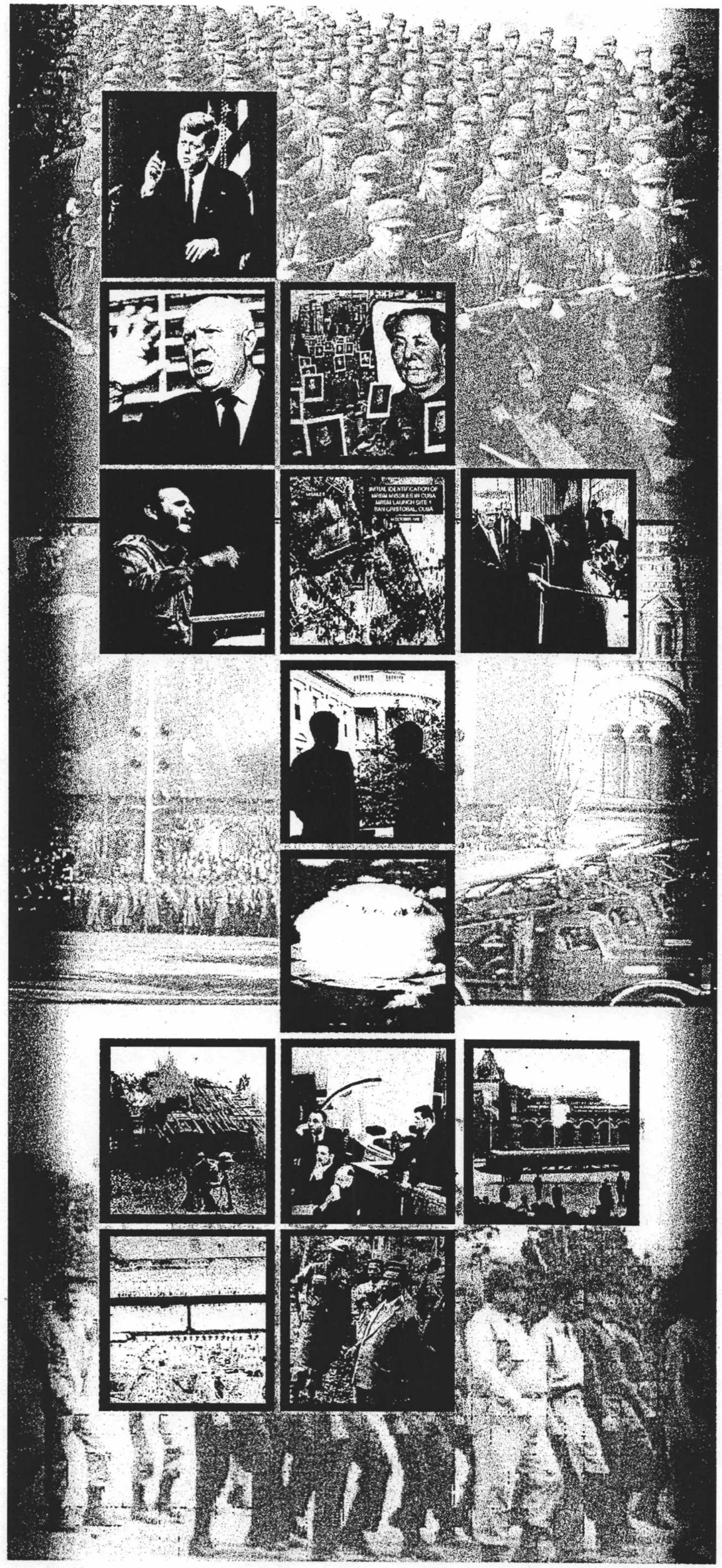
MORI DocID: 1158268

Directorate of Science & Technology

People and Intelligence in the Service of Freedom

(b)(3)

APPROVED FOR RELEASE
DATE: DEC 2004


INITIAL IDENTIFICATION OF
MRBM MISSILES IN CUBA
MRBM LAUNCH SITE 1
SAN CRISTOBAL, CUBA

The Directorate of Science & Technology

People and Intelligence in the Service of Freedom

CIA officers and intelligence scholars widely regard John A. McCone's tenure as Director of Central Intelligence during 1961-1965 as among the most effective in the Agency's history. McCone had graduated from the University of California's College of Engineering (at Berkeley) in 1922. After working for the next 15 years in the steel industry, he and fellow California graduate Stephen Bechtel formed the engineering firm Bechtel-McCone and designed and built factories, refineries, and power plants. During World War II, McCone was a major defense contractor building transports for the US Navy, and after the war he became one of the world's premier shipping magnates. In the 1950s, he served as Under Secretary of the Air Force and as chairman of the Atomic Energy Commission. After the Bay of Pigs fiasco, President John Kennedy chose McCone to be DCI because of his reputation as a decisive executive who could manage far-flung organizations, and for his connections to the Republican Party that would help protect the CIA from the Administration's critics in Congress.

The idea of using science and technology as part of the intelligence process originated during World War II with the Office of Strategic Services. Upon its founding in 1947, the CIA thus counted among its original employees a number of veterans ready to apply the latest scientific advances to support covert operators and analysts. During the following years, this initial support role changed dramatically. Inspired by Cold War fears of a Soviet surprise attack and encouraged by prominent government advisory commissions, the use of science and technology— emphasizing technical collection— quickly moved to a position of preeminence among CIA activities. The CIA assumed a paramount role in the development of state-of-the-art aerial, space-based, and ground technical collection systems, and field tradecraft devices in the 1950s and early 1960s. In recognition of the burgeoning role played by science and technology in this new aerospace age, forward-thinking individuals pressed for the creation of a single CIA entity responsible for all such related fields.

DS&T

This had led to the formation of the Directorate of Research in February 1962, the DS&T's immediate predecessor.

On 5 August 1963, DCI John A. McCone established the Directorate of Science and Technology (DS&T). This set the stage for the development of an unparalleled group of offices to advance the use of science and technology in intelligence collection, analysis, and dissemination.

In 1963, Dr. Albert "Bud" Wheelon, at age 34, was asked by DCI John McCone to organize and lead the new directorate during a time when science and technology issues were of paramount importance to the nation. Dr. Wheelon, a visionary architect of the application of technology to intelligence, organized the new directorate and provided the inspirational leadership that made the DS&T a major force in the US Intelligence Community. Dr. Wheelon ensured that CIA would play a major role in the National Reconnaissance Program.

While the original six-office DS&T changed in size and organization during the Cold War, it made many significant contributions toward overcoming the strategic threats posed by the Soviet Union and other adversaries of the United States. The DS&T helped launch and perpetuate the global post–World War II scientific and technological revolution, directly benefiting the nation's intelligence and defense communities, and all of humanity by maintaining peace in a dangerous world.

Today's DS&T continues to apply innovative approaches to its core mission areas of overhead reconnaissance, signals and electronic intelligence, scientific analysis, open-source monitoring, and research and development. Proud of its historic accomplishments, the DS&T is building on a foundation of excellence to meet the nation's future intelligence needs.

Open-Source Collection

Providing America's Leaders a "Window on the World"


Mediterranean Bureau - Main Radio


Bangkok Bureau Monitors

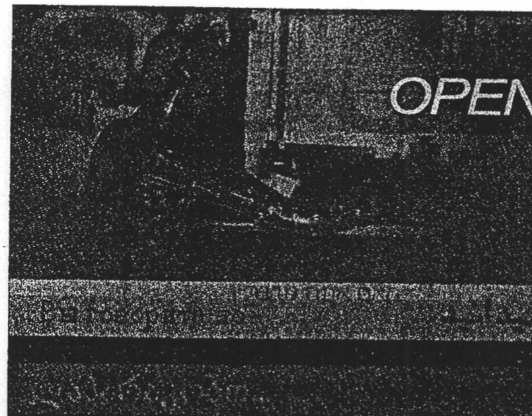

VNA radiophoto monitored at Okinawa Bureau, 20 December 1977.

The Foreign Broadcast Information Service (FBIS) has provided critical open-source intelligence to the US Government since 1941, when it began monitoring and analyzing Axis shortwave radio propaganda broadcasts to the United States. FBIS today has far outgrown its original mission.

FBIS joined the DS&T in 1976, and today is the U.S. Intelligence Community's primary collector of foreign open-source political, military, economic, and technical information, providing those informational resources to intelligence analysis, warning, and operations processes.

The end of the Cold War produced a major shift in the FBIS mission from a focus on public foreign radio, television, newspaper, and press agency sources toward a much broader exploitation of open-source information that appeared with the international expansion of information and communications media centered on computer technology and the Internet.

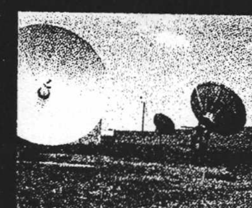
OPEN-SOURCE



FBIS now monitors approximately 2,000 publications, 300 radio stations, 235 television stations, 125 news agencies, and various Internet sources and databases in 161 countries and 82 languages. FBIS translates or transcribes this vast array of open-source material for daily electronic transmission to global customers.

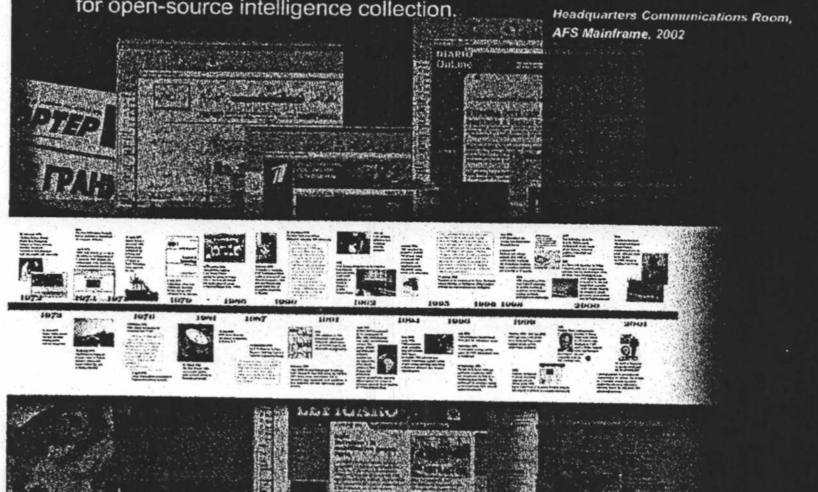
FBIS is a leader in the use of information technology within the CIA. Its electronically distributed softcopy products reach global customers in seconds rather than days. FBIS acquisition of advanced IT tools has resulted in a three fold increase of its production in terms of raw wordage since the end of the Cold War. FBIS continues to procure foreign and domestic media; provide linguistic and translation services; provide television program summaries and selected video programs, digital video stills, clips, and catalogs of electronic and print media information of specific countries and regions — setting the standard for open-source intelligence collection.

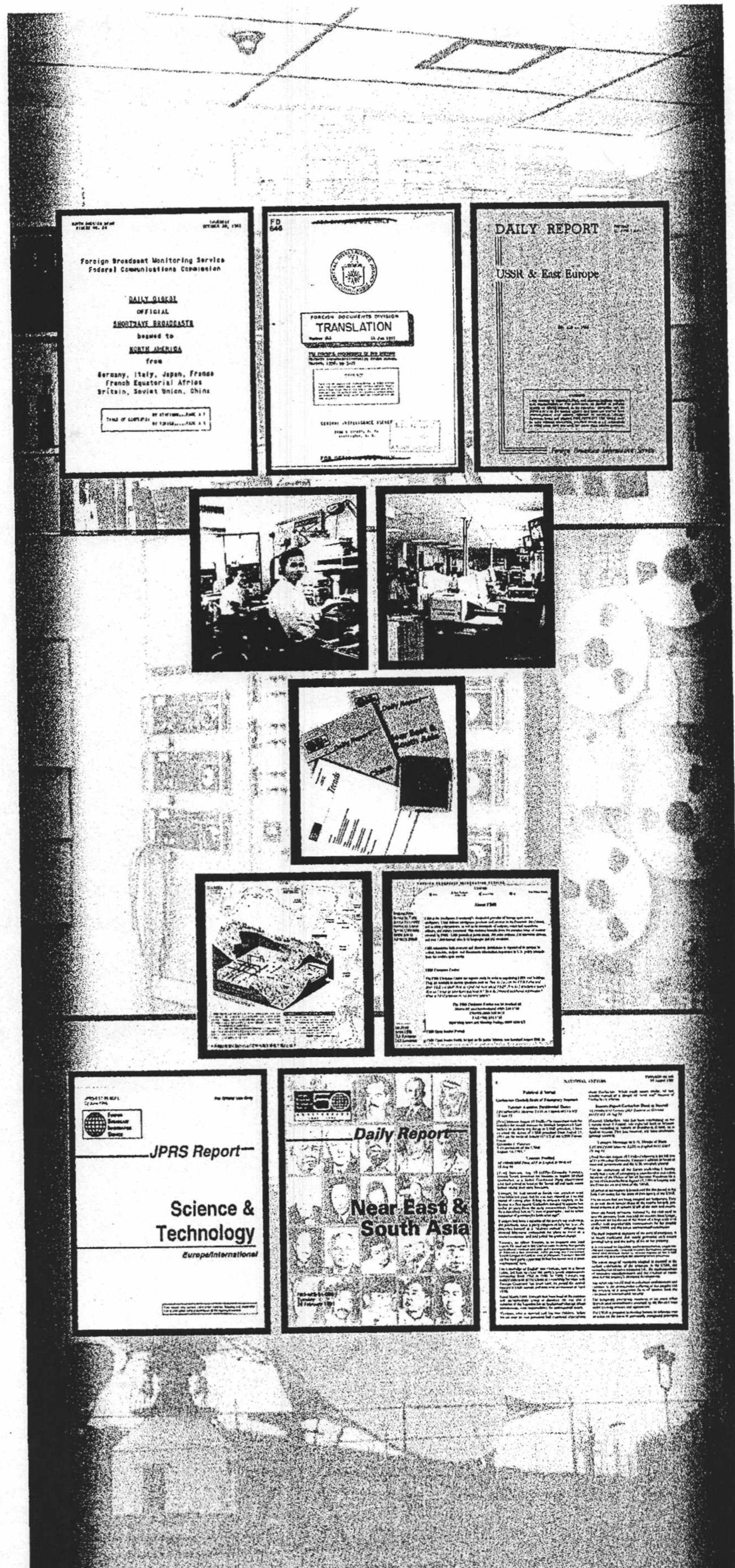
Nicosia Bureau, Cyprus, 1984



Nicosia ROSETS

Headquarters Communications Room, AFS Mainframe, 2002




Foreign Broadcast Monitoring Service
Federal Communications Commission
DAILY DIGEST
OFFICIAL
SHORTWAVE BROADCASTS
beamed to
NORTH AMERICA
from
Germany, Italy, Japan, France
French Equatorial Africa
Britain, Soviet Union, China
FOREIGN DOCUMENTS DIVISION
TRANSLATION
DAILY REPORT
USSR & East Europe
JPRS Report
Science & Technology
Europe/International
Daily Report
Near East & South Asia

Imagery Intelligence

A Strategic Eye in the Sky

Arthur C. Lundahl is recognized as the father of imagery analysis and the creator of a world class center for producing intelligence from overhead imagery. At a time when the country was struggling for intelligence tools during the Cold War, he formed the Photographic Intelligence Division of CIA and built his small group into the National Photographic Interpretation Center. From information derived by NPIC from airborne and satellite imagery, Mr. Lundahl was able to gain the confidence of four US Presidents.

While exploiting photography from a 14 October 1962 U-2 mission over Cuba, four NPIC photointerpreters – Vince DiRenza, Joe Sullivan, Jim Holmes, and Dick Rininger – identified SS-4 Soviet medium-range ballistic missiles (MRBMs) – offensive weapons.

President Kennedy addressing the American people on the Cuban Missile Crisis on 22 October 1962. The information NPIC provided, coupled with the deliberation and restraint exercised by US political leaders, drew the nation back from the brink of nuclear war.

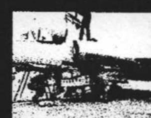
The creation of the National Photographic Interpretation Center (NPIC) in 1961 placed imagery analysts under joint CIA and DoD management. This organization, with its elevated national identity, soon allowed American leaders to literally see beyond the horizon into denied areas using NPIC-analyzed aerial and space-derived imagery.

NPIC proved its value to the nation soon after its creation when photo analysts, examining U-2 images, identified Soviet medium-range ballistic missiles in Cuba in October 1962. This NPIC triumph established a pattern of incredible analytical accomplishments in support of the intelligence and defense communities lasting for the next thirty-four years. Through the decades of the Cold War, imagery of areas behind the Iron and Bamboo Curtains grew in both quantity and quality, as increasingly sophisticated collection systems came on line. NPIC kept pace with major organizational changes and modernization programs. With the advent of computer technology, NPIC further enhanced its ability to provide accurate imagery analysis to meet a variety of intelligence, defense, and civilian needs.

In May 1973, NPIC became part of the DS&T. This consolidated the CIA's technical collection and imagery processing functions in one directorate. Following the collapse of the Soviet Union and the 1991 Gulf War, NPIC devoted more time and resources to military support efforts. On 1 October 1996, the Center merged with several defense and intelligence organizations to form the National Imagery and Mapping Agency under the Secretary of Defense.

MORI DocID: 1158268

Clarence "Kelly"Johnson, Lockheed's brilliant aeronautical engineer, pioneered design of CIA's U-2 AQUATONE, A-12 OXCART, and D-21 TAGBOARD.



A-2 camera system being loaded into a U-2. U-2 missions in 1956 and 1957 used the A-2 camera system. It consisted of three separate K-38 framing cameras and 9.5-inch film magazines using a 24-inch f/8.0 lens that resolved 60 lines per millimeter. After September 1958 the B camera replaced the A-2. The B camera used a 36-inch f/10.0 lens that resolved 100 lines per millimeter, providing much clearer imagery.

While the A-12 had much reduced vulnerability to enemy air defenses, the diplomatic opposition to overflights intensified following the initial U-2 operations in 1956, and the A-12 flew only a few dozen missions over North Vietnam and North Korea. In May 1967, President Lyndon B. Johnson approved limited overflights in the Far East, and CIA A-12s deployed to Kadena Air Base on Okinawa. The first BLACK SHIELD mission flew a week later over North Vietnam. Another BLACK SHIELD mission in January 1968, also from Kadena, took photographs of the USS Pueblo in Wonsan, North Korea, after its capture by the Communists.

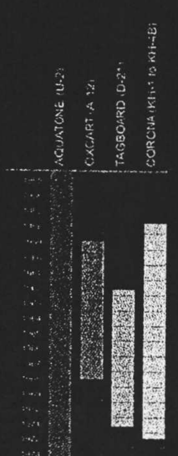
The prototype U-2 was delivered to the test site in July 1955. The first U-2 flight came less than eight months after the CIA issued a contract to the Lockheed Corporation under Project AQUATONE. The U-2 Program was under covert, civilian control at the Lockheed "Skunk Works" facility by order of President Dwight D. Eisenhower, but received support from Air Force Project OILSTONE. The CIA program manager was Richard M. Bissell, Jr., then Special Assistant to DCI Allen W. Dulles. Bissell's first deputy was Air Force Col. Osmund J. Ritland, whose successors were Col. Jack A. Gibbs and Lt. Col. Leo P. Geary. CIA Detachment A in Wiesbaden, West Germany, conducted the first operational U-2 mission in June 1956 over East Germany and Poland. The first overflight of the Soviet Union was 4 July 1956. Subsequent Detachment A missions overflew the Soviet Union and provided data refuting the existence of the "bomber gap." CIA Detachment B, based at Adana, Turkey, operated in the Mediterranean, and over the Soviet Union and China. Eielson Air Force Base in Alaska and Atsugi Naval Air Station in Japan served as home bases for Detachment C, which flew reconnaissance missions over North Vietnam, Laos, and North Korea. CIA U-2s operated from the continental United States, providing intelligence during the Cuban Missile Crisis and later crises in Latin America.

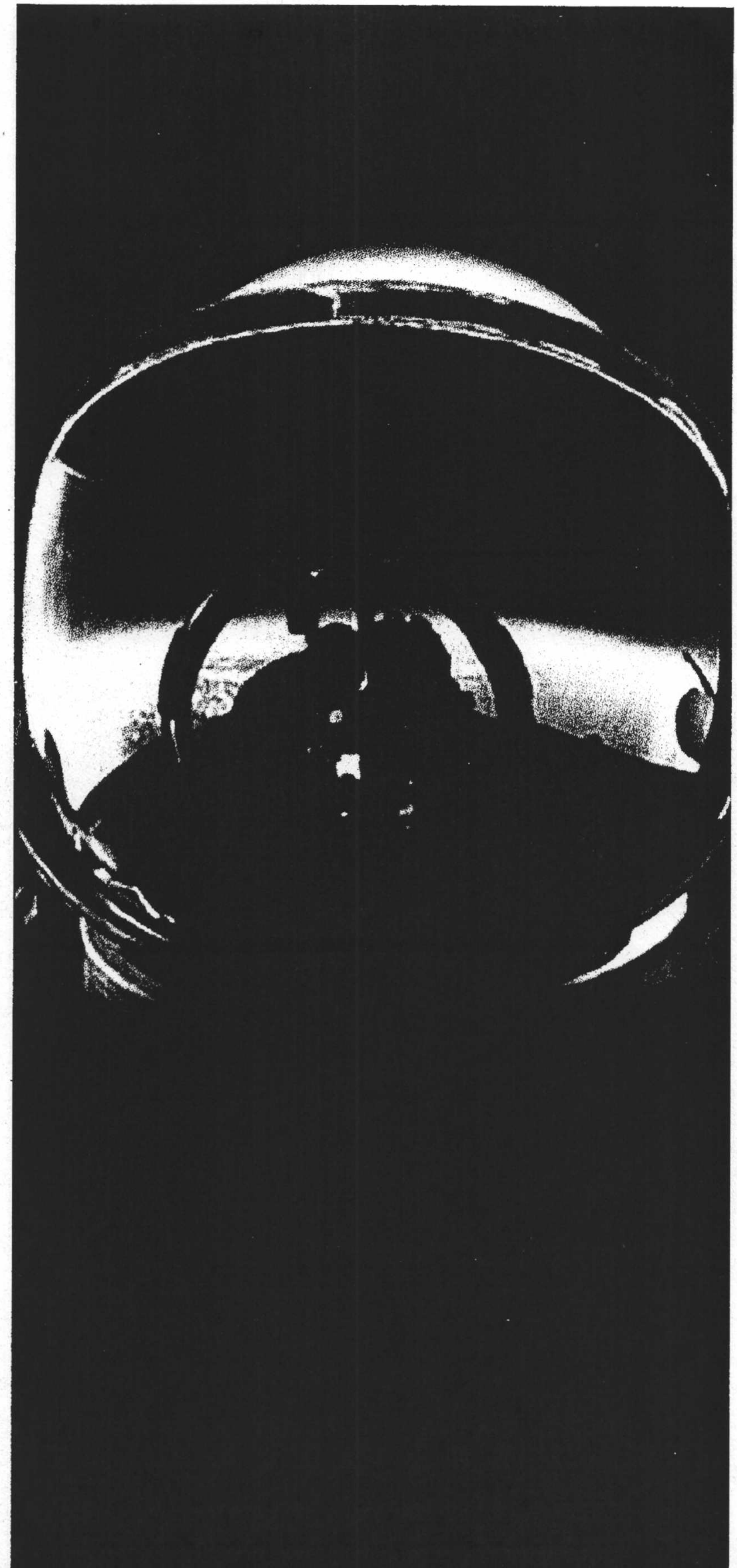
Detachment B provided President Eisenhower with intelligence about the situation in the Middle East preceding the Suez Crisis of 1956. U-2 photography shows Almaza airfield, Cairo, shortly before an attack by French and British bombers on 1 November 1956 during the Suez Crisis.

Almaza airfield, Cairo, shortly after it was attacked by British and French bombers on 1 November 1956. The photos were taken by a U-2 at 70,000 feet in altitude during one of the regular flights mounted by CIA's Detachment B over the Middle East.

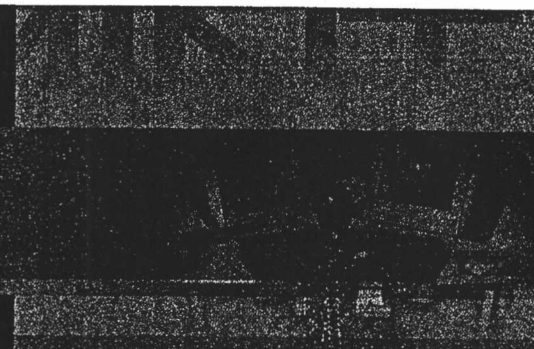
The vulnerability of the U-2 to interceptors and surface-to-air missiles prompted the CIA to develop a higher and faster flying reconnaissance platform. The CIA started Project OXCART at Lockheed Corporation in August 1959 to develop an aircraft capable of flying at 90,000 feet and at a speed of Mach 3. The resulting A-12 first flew in April 1962.

To avoid prohibitions on manned overflights, Project TAGBOARD sought to develop a Mach 3 drone using OXCART technology. The original concept called for a modified A-12, designated M-21 ("M" for Mother), to launch a D-21 drone ("D" for Daughter). The D-21 was powered by a Marquardt ramjet engine that had been developed and tested on the unmanned X-7 vehicle. The M/D-21 would take off and fly to speeds above Mach 3 at 80,000 feet. At this speed and altitude, the drone's engine could be ignited and the drone launched from the back of the mothership, to fly along a preprogrammed course, then jettison its camera pack over neutral or friendly territory before self-destructing. Shown here is the M-21/D-21 combination, which first flew in December 1964. The first launch of a D-21 from an M-21 occurred in March 1966. On the fourth launch, in July 1966, the D-21 collided with the M-21 on launch and both aircraft were lost. The pilot survived, but the launch system operator drowned. TAGBOARD continued with a B-52H as the launch platform, and four subsequent TAGBOARD missions took place in the Far East between 1969 and 1971. The program ended in July 1971.





IMINT



Advanced Technical Solutions to Intelligence Problems

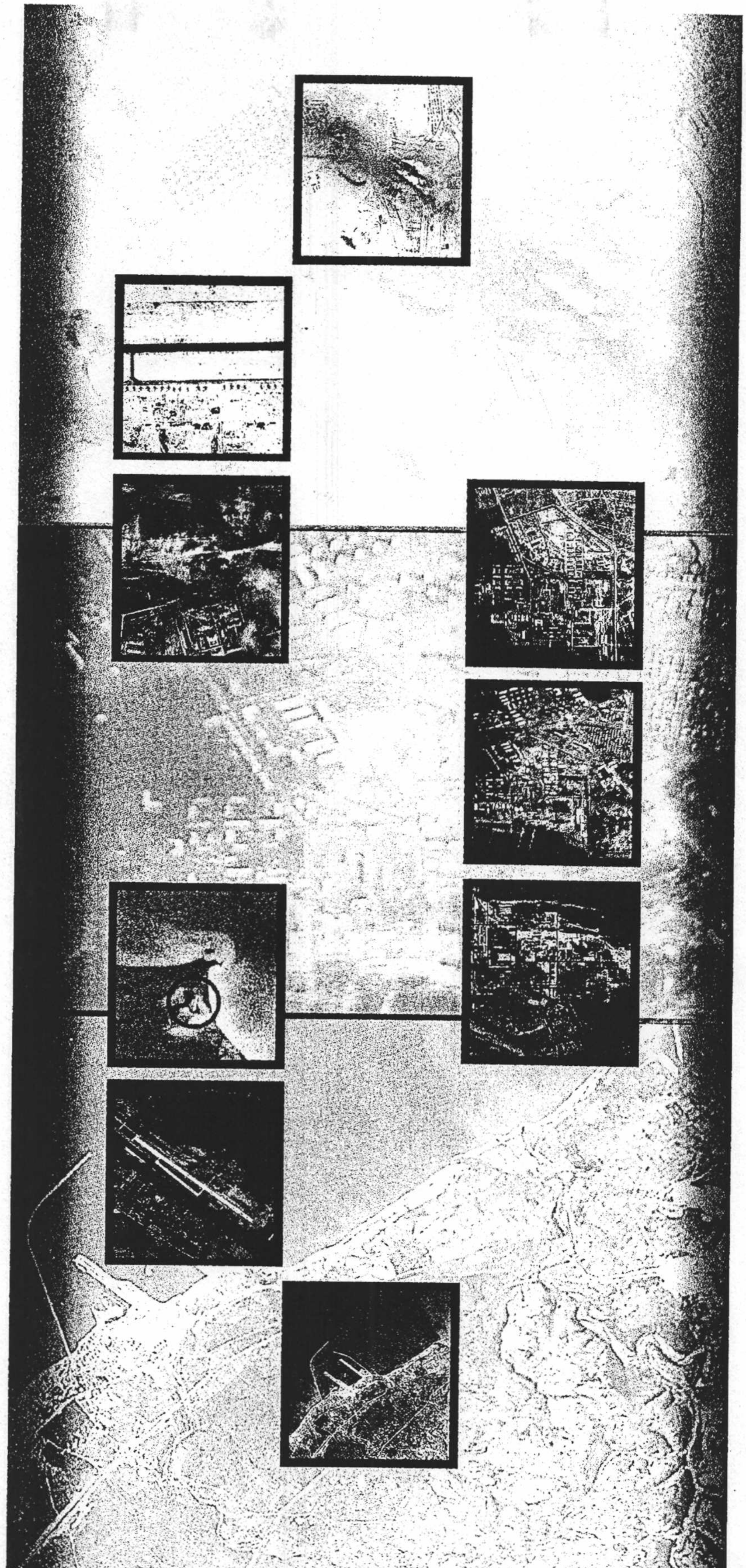
Classic IDEX II Workstation (1990-1998)

In the 1970s, the CIA's Office of Development and Engineering (OD&E) began developing a production softcopy system called Image Data Exploitation (IDEX). In 1981, the first IDEX system was installed at two NPIC locations. IDEX provided faster image receipt, access to the full range of image data, digital manipulation and enhancement to reveal subtle details, automatic stereo image registration, quick paper prints, easy reference image chips, and streamlined graphics. Innovations developed during the IDEX era helped set the standard for the next generation of softcopy exploitation systems, significantly enhancing the ability to support time-critical operations as well as accomplish analysis and research. Additional IDEX installations came on line as the IDEX I system was upgraded to handle new system capabilities in 1985, eventually replaced by the IDEX II system in 1991, and were deployed to 15 locations. In July 2003, the last two operational IDEX sites were deactivated.

Contemporary IDEX II Workstation (1996-2003)

The Office of Development and Engineering (OD&E) is the CIA technical element within the National Reconnaissance Office (NRO). It is one of the oldest DS&T components, tracing its origins to the Special Projects Staff created in 1964 to oversee CIA satellite systems within the National Reconnaissance Program. In October 1965, the Special Projects Staff and the Systems Analysis Staff merged to form the Office of Special Projects (OSP). The OSP established the foundation and future direction for space-based satellite reconnaissance activities by fulfilling DDS&T Albert "Bud" Wheelon's single sentence mission statement of accepting responsibility "for the development, technical direction and management of certain highly sensitive technical collection programs." Through the OSP, the CIA established an early and on-going leadership role in the satellite reconnaissance business. In 1973 the OSP was renamed the Office of Development and Engineering.

For nearly four decades, OD&E scientists and engineers have played a crucial role in designing, constructing, and operating several generations of IMINT, SIGINT, and communications satellites. Today, OD&E still works within the NRO with technical collection requirements levied by the Intelligence Community to satisfy the nation's intelligence needs in the most effective and efficient way possible. OD&E continues to apply unique, state-of-the-art engineering to satellite reconnaissance to ensure that the NRO maintains its edge in providing timely and accurate intelligence from space.

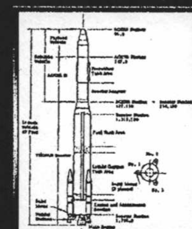


CORONA Mission Summary

	Camera	Missions	Period
KH-1	C	10	1959-60
KH-2	C' (C prime)	10	1960-61
KH-3	C''' (C triple prime)	6	1961-62
KH-4	M (Mural)	26	1962-63
KH-4A	J (J-1)	52	1964-69
KH-4B	J-3	17	1967-72
KH-5 (ARGON)		7	1962-64
KH-6 (LANYARD)		1	1963
KH-7			
KH-8			

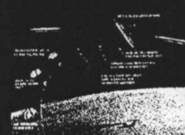
CORONA was the first US imaging satellite program. It operated under cover of the DISCOVERER scientific satellite project, and was jointly managed by the CIA, the Air Force, and ARPA. The first four versions of CORONA were designated KH-1 through KH-4 (KH denoted KEYHOLE). The camera in KH-1, first launched in 1960, had a nominal ground resolution of 40 feet. By 1963, improvements to the original CORONA had produced the KH-2 and KH-3, with cameras that achieved resolutions of 10 feet. The first KH-4 mission was launched in 1962 and brought a major breakthrough in technology by using the MURAL camera to provide stereoscopic imagery. This meant that two cameras photographed each target from different angles, which allowed imagery analysts to look at KH-4 stereoscopic photos as three-dimensional. The KH-4A satellite used the J camera, which differed from the M camera in having two film return capsules. By 1967, the J-3 camera of KH-4B had entered service with a resolution of 5 feet. This final version of CORONA continued to be launched until 1972. CORONA was succeeded by other programs, including ARGON, LANYARD, and others that have not been declassified.

CORONA On The Launch Pad



CORONA was launched by a THOR first stage and an Agena second stage. THOR was first developed as an IRBM, and its first successful test launch was 20 September 1957. It also served as a launch vehicle for several programs, and underwent improvements over the years. For KH-4B launches the Air Force used a version called THORAD, with lengthened fuel tanks and three strap-on solid-fuel boosters. The solid fuel motors burned out at 3 n.m. altitude and were ejected at 13 n.m. The THORAD booster burned out and separated from the Agena at 48 n.m. altitude. The Agena inserted the payload into orbit and remained attached until completion of the mission, after the last recovery vehicle was deorbited.

Re-Entry Process



When re-entry was to take place, the AGENA would be pitched down through 120 degrees to position the satellite recovery vehicle (SRV) for retro-firing. Then the SRV would be separated from the AGENA and be spin-stabilized by firing the spin rockets to maintain it in the attitude given it by the AGENA. Next the retro-rocket would be fired, slowing down the SRV into a descent trajectory. Then the spin of the SRV would be slowed by firing the de-spin rockets. Next would come the separation of the retro-rocket thrust cone followed by the heat shield and the parachute cover. The drogue (or deceleration) chute would then deploy, and finally the main chute would open to lower the capsule gently into the recovery area.

GENETRIX Balloon

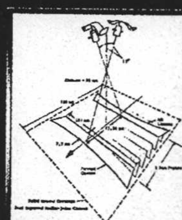
Development of the technique for air catch of CORONA recovery vehicles began during Project GENETRIX. In that program, 516 high altitude balloons carrying cameras were released from Germany, Scotland, Norway, and Turkey between 10 January and 6 February 1956, to drift eastward across the Soviet Union. Air Force aircraft homed in on beacons carried by the balloons as they approached Japan and Alaska and caught the gondolas, which were released from the balloon and descended to aircraft altitude on parachutes. Of 67 balloons that reached the recovery area, 44 gondolas were successfully recovered. GENETRIX was ended by President Eisenhower after strong Soviet protests.

Aerial Recovery of Corona Film Capsules

In 1958 the 6593rd Test Squadron was formed by the Air Force to catch CORONA re-entry vehicles. The 6593rd operated from Hickam AFB, Hawaii. A CORONA mission began with launch and ended when all the film had been exposed. When the satellite passed over a tracking station in Alaska, a signal was transmitted to begin the re-entry maneuver, and the re-entry vehicle began descent under the main parachute from about 55-60,000 feet. Five aircraft patrolled within an area 60x200 miles where the capsule was thought most likely to be (the "infield"), and nine aircraft covered the larger "outfield" area, 400 miles long. The first aircraft to site the parachute would make a visual inspection pass and would then line up for capture. It would turn, descend, and return to attempt to catch the parachute. The crew deployed two poles to spread a nylon rope into a loop which was dragged around the shrouds of the parachute by the motion of the aircraft. Once snagged, the rope was reeled in, bringing the shrouds and re-entry vehicle into the cargo compartment. It was sometimes necessary to make several passes before the parachute was snagged.

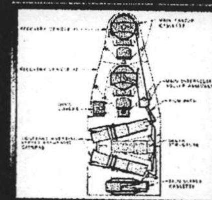
After many failures, on 10 August 1960 a CORONA satellite was successfully launched and its engineering payload was recovered. The first object recovered from orbit was the American flag shown by President Eisenhower in a ceremony at the White House. The first images from space were returned by CORONA on 18 August 1960, the same day that U-2 pilot Francis Gary Powers was convicted of espionage in Moscow.

Index and Panoramic Film Footprints



The MURAL and J-1 systems incorporated two pan cameras from the earlier "C" system, one facing 15° forward and one facing 15° aft. Each successive frame from a given camera overlapped the preceding slightly. The aft-facing camera imaged the same area on the ground that had been imaged about 6 frames earlier by the forward-facing camera, providing a stereo pair with a convergence angle of 30°. The index image was at a smaller scale, covering about 16 panoramic frames, and aiding the imagery analysts to relate the detailed panoramic images to maps.

KH-4B Payload



CORONA cameras were panoramic. They captured wide images of the ground by swinging the camera lens across the ground track. The long strip of film was exposed progressively, from one side to the other, rather than all at once, as in a conventional camera. Each frame of film measured about 2.2 x 30 inches. Each panoramic (pan) camera contained two horizon camera assemblies that allowed the photo interpreter to quickly determine the pitch and roll attitude of the camera during exposure. The horizon camera assemblies were mounted on each end of the film transport bridge. Beginning with the first of the MURAL flights (KH-4), an index camera was incorporated into the photographic system, and a stellar camera was added a few missions later. The short focal length index camera took a small-scale photograph of the area being covered on a much larger scale by successive sweeps of the pan cameras.

The small-scale photograph, used in conjunction with orbital data, simplified the problem of matching the pan photographs with the terrain. Photographs taken of stars by the stellar camera, in combination with those taken of the horizons by the horizon cameras, provided a more precise means of determining vehicle attitude on orbit. The J-3 system included the DISIC, or Dual Improved Stellar-Index Camera, that combined the functions of stellar and index cameras. The J-3 panoramic cameras were designed to use 3.0 mil, 70 millimeter, EK 3414 film (polyester base). Either camera would also operate with a split load of any two of the following types of film: 3414, SO-121, SO-180, SO-230, SO-380. CORONA films had a photographic speed of ASA 2 to ASA 8 (depending upon development) as compared to ASA 100 to ASA 400 for commonly used amateur films. Dynamic resolution was 80-110 lines per millimeter.

Intelligence Payoff of Corona

CORONA's initial major accomplishment was imaging all Soviet medium-range, intermediate-range, and intercontinental ballistic missile launching complexes. CORONA provided the first images of the Plesetsk Missile Rangehead north of Moscow. Repetitive coverage of centers like Plesetsk, Kapustin Yar, and Tyuratam provided information as to what missiles were being developed, tested, and/or deployed. The unequivocal fact of observation gave the United States freedom from concern over many areas and locations which had been suspect in the past.

Severodvinsk Naval Base and Shipyard 402 (seen in this image), the main Soviet construction site for ballistic-missile-carrying submarines, was first seen by CORONA. Now it was possible to monitor the launching of each new class of submarine and follow it through deployment to operational bases. Similarly, one could observe Soviet construction and deployment of the ocean-going surface fleet. Coverage of aircraft factories and airbases provided an inventory of bomber and fighter forces. Great strides were also made in compiling an improved Soviet ground order of battle.

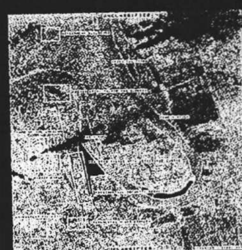
CORONA "take" was also used to locate Soviet SA-1 and SA-2 installations; later its imagery was used to find SA-3 and SA-5 batteries. The precise location of these defenses provided Strategic Air Command planners with the information needed to determine good entry and egress routes for US strategic bombers.

It was CORONA imagery which uncovered Soviet antiballistic missile activity. Construction of the GALOSH sites around Moscow and the GRIFFON site near Leningrad, together with construction of sites around Tallinn for the Soviet surface-to-air missile known as the SA-5, were first observed in CORONA imagery.

Welcome to the IDEX II Analyst Workstation

IDEX II
1983 - 2003

How IDEX Changed the Imagery Community



Baghdad, April 2003

Baghdad, April 2003

IDEX II display and exploitation capabilities have been modified and downgraded for this unclassified demonstration.

1-meter resolution images used for this unclassified demonstration of IDEX II were taken by Quickbird and supplied courtesy of NIMA.

In the 1970s, the CIA's Office of Development and Engineering (OD&E) began developing a production softcopy system called Image Data Exploitation (IDEX). Prior to IDEX, imagery was processed using film. Even when images were collected digitally, they were converted into silver-based film negatives that were developed and then duplicated into multiple film positives using standard wet processing. Duplicate positives were then cut into flats, packaged, and shipped to customers. Not only did this procedure delay exploitation, but also some of the original digital image data was lost. With IDEX, film-processing delays were eliminated, and the full dynamic range of collected image data was available for exploitation in softcopy. It also was possible to see subtle details that were all but invisible on film.

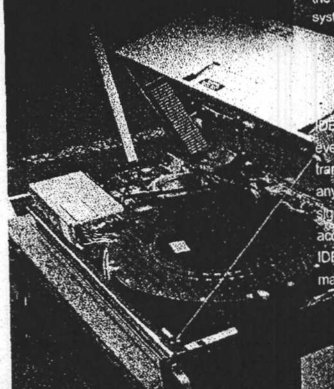
IDEX facilitated digital "chipping," annotation, storage, and retrieval of small reference images of point targets. Then, when new images of those targets were exploited on IDEX, older reference chips of previous activity could be queued up to aid in comparative analysis of new versus old. This was a vast improvement over the old system, which relied on local manual files called "shoeboxes" and nearby large archival files, both containing hundreds and sometimes thousands of previous film flats of a given target, many with pen annotations. In addition, millions of historical film images (in both roll and flat form) not available locally or on IDEX were stored in a remote repository and could be retrieved in a few days.

If measurements were needed, there were several options. If a high level of accuracy was not critical, measurements could be made on film using a simple scaling magnifier or a light-table mensuration system-or more easily, quickly, and accurately in softcopy using IDEX. When more accuracy was needed, expert photogrammetrists using special software could employ precision comparators for film or IDEX images.

Prior to IDEX, stereo viewing was a tedious and time-consuming manual procedure in which two film images had to be registered using a stereoscopic microscope. The image pair had to be re-registered each time the microscope's field of view was changed. IDEX made stereo viewing easy with automatic registration.

Producing reports in both paper and on-line forms was simplified by IDEX. Using modern composition software, graphics specialists no longer had to deal with film images. Rather, digital IDEX images could now be obtained on line and easily manipulated, annotated, and inserted into reports. For informal "working" purposes, good-quality 8-by-10-inch paper prints could be made.

Despite the significant advantages provided by the modern IDEX II, it had its limitations. Because of high initial and recurring costs, only a relatively small number of workstations could be purchased. Thus, IDEX workstations were special tools that had to be shared. IDEX was suited to looking at point targets but not areas, which still required film. Even with high-speed data communications, the large number of queued images threatened to clog the system. Finally, the system occasionally crashed, which impeded exploitation – a rare problem with film.



Regardless of its limitations, IDEX was still considered a much-needed improvement over manual legacy systems. In 1981 the first IDEX system was installed at two NPIC locations. Additional IDEX installations came on line as the IDEX I system was upgraded to handle new system capabilities. IDEX I was eventually replaced by the IDEX II system in 1991. With the advent of electronic transfer, IDEX imagery could be made available to multiple users at their desktop, anywhere in the world. IDEX had a positive impact on the Intelligence Community, significantly enhancing its ability to support time-critical operations as well as accomplish analysis and long-term research. In July 2003, the last two operational IDEX sites were deactivated, but the IDEX legacy will continue to reap benefits for many years to come.

IDEX II - Image Data Exploitation II

IDEX II Specs

Manufacturer: Lockheed Missiles and Space, Sunnyvale, California

Data Processing: 100 Mbits/second or 22 Fast Access Format (FAF) blocks/sec

Data Compression: 4.3 bits per pixel Huffman and DPCM (differential pulse code modulation)

Data Display: Monochrome Monitor 1408 x 1408 pixel display area @ 100 dpi (dots per inch), color monitor 1024 x 1024 pixel display area @ 100 dpi

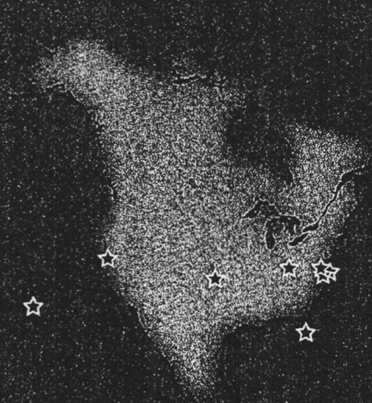
Exploitation Capabilities: auto search, seamless roam, zoom, rotation 1:128, reduction to 8:1 magnification, mensuration, dynamic range adjustment, digital terrain elevation data (DTED), secondary and hardcopy output

Data Staging Time: 1-3 minutes from IA request

Largest installed on-line data cache: 6+ TeraBytes (TB) (TB = 10 Bytes)

Estimated final size of imagery archive processed by IDEX II:
> 1 PetaByte (PB) (PB = 10 Bytes)

IDEX II Was There



- Northern Virginia/ Washington, D.C. 1990 - 2002/2003
- Omaha, NE 1990 - 2002
- Hampton/ Norfolk, VA 1991 - 1998/1999
- Dayton, OH 1992 - 2003
- Oahu, HI 1992 - 1999/2001
- Tampa, FL 1996 - 2002
- Sunnyvale, CA 1983 - 1999
- Customer System Support Center Newington, VA 1989 - 2003

Analyst Workstation

Developed in the 1980s and fielded in 1990 to replace earlier IDEX I and Ia versions, IDEX II was a modern softcopy image exploitation system widely used by the US imagery intelligence (IMINT) community to supplement the predominant hardcopy systems that used light tables and stereoscopic microscopes to view imagery in film form.

IDEX II brought digital images directly to a softcopy display system. In comparison to film on light tables, exploiting softcopy imagery on IDEX II had a number of advantages. Film processing was bypassed to speed image receipt. Image manipulation and enhancement allowed subtle details to be seen that were not always visible on film. Measurements could be made more easily and accurately. Automatic image-pair registration made stereo viewing much easier. Digitally "chipping," annotating, and storing small reference images was extremely useful. Good-quality paper prints could be made quickly.

The IDEX II system included data processing and dissemination functions, temporary on-line and permanent off-line storehouses of full images, an on-line archive of reference chips, exploitation workstations, and interconnecting wide-band communications.

What you see displayed is a typical exploitation workstation. More than 100 were in use across the US and abroad during the 13 years of IDEX II operations.

IDEX II was retired on July 1, 2003.

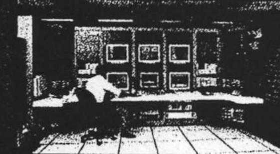
Electronic and Signals Intelligence

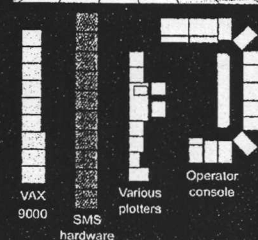
The System That Helped End the Cold War

In April 2002, the CIA's Collection Analysis Center (CAC) retired its Real-time Interactive Signal Exploitation (RISE) system. RISE kept the Intelligence Community abreast of our Cold War opponents' development of weapons of mass destruction. In the 1980s, it represented a successful marriage between the Directorate of Intelligence's need for timely data, the Directorate of Science & Technology's state-of-the-art engineering savvy, and the CAC's history of innovative Type-E telemetry analytical processing techniques. This simulated RISE configuration displays key components such as the digital recorder, the Transmultiplexer Interface Canceller, one-of-a-kind data acquisition hardware, and the VAX9000 computer. Arranged in a configuration of approximately 936 square feet of lab floor space, this system supported the real-time flow of data from raw intercepted telemetry to finished sensory products.

You Are Looking at a Symbolic Subset of the RISE Position.

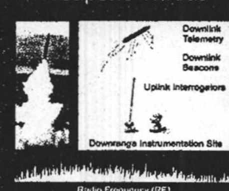
The actual RISE position looked like this:





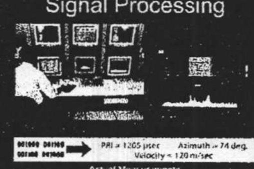
How Does Foreign Instrumentation Signal Collection Get to the Policymaker?

Weapons Threat

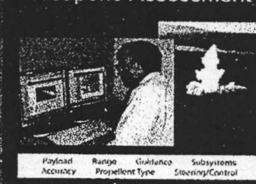


Telemetry Collection

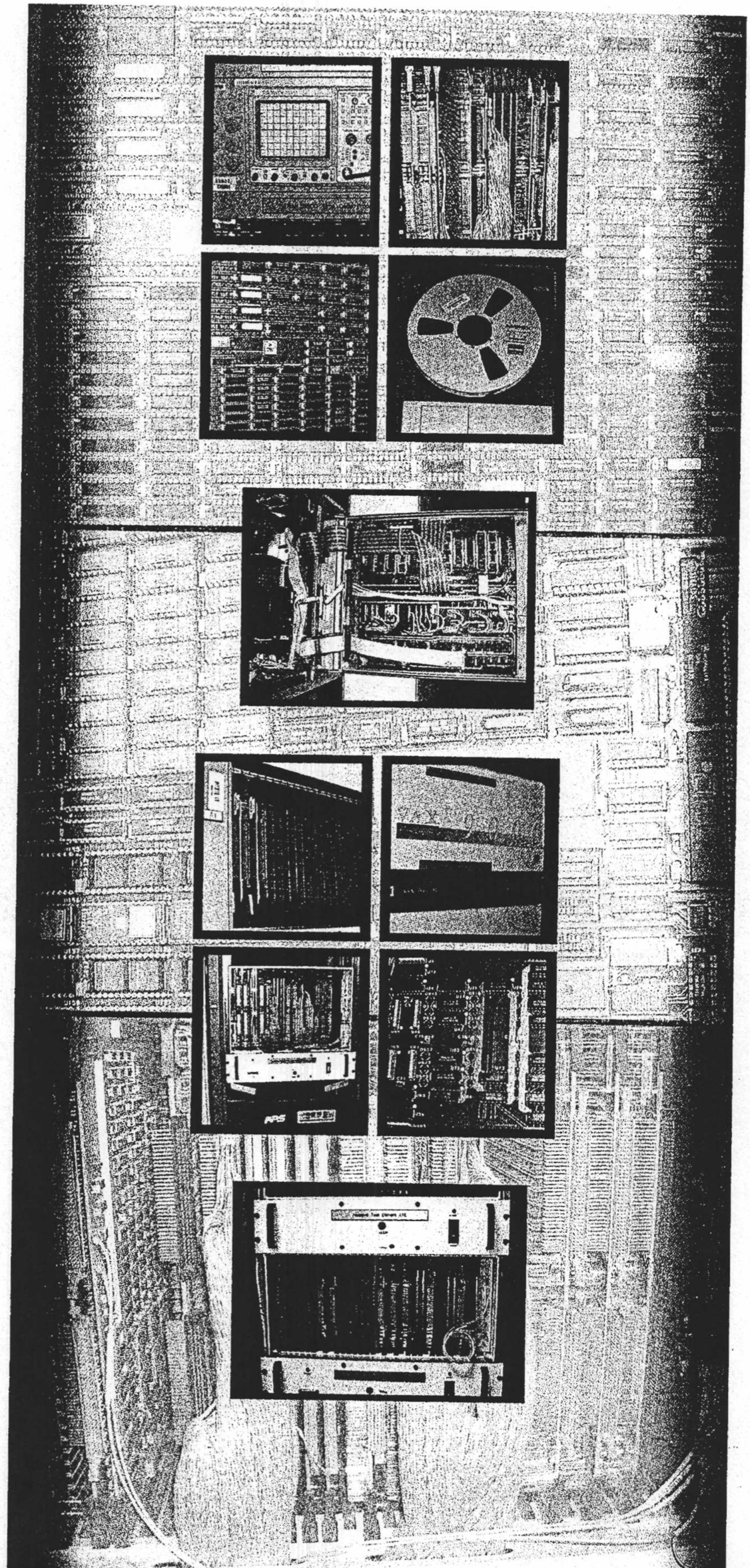
Foreign Instrumentation Signal Processing



Weapons Assessment

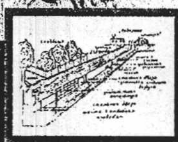


Policymaker



Electronic and Signals Intelligence

Capture and Exploit Invisible Information



The "Berlin Tunnel Project" was one of the most ambitious operations undertaken by the CIA in the 1950s. This joint SIS and CIA signals intelligence operation tapped into an under-ground cable junction to eavesdrop on all Soviet military communications throughout Eastern Europe, which were routed via East Berlin. In all, about 40,000 hours of telephone conversations were recorded, along with 6,000,000 hours of teletype traffic. Most of the useful information dealt with Soviet orders of battle and force dispositions—information that was invaluable in the days before reconnaissance satellites and other, more sophisticated means of collection became operational.

The Office of Technical Collection traces its origins to Division D in the CIA's Directorate of Plans and to the former Office of ELINT (OEL). Division D was a small—but effective—intercept organization whose notable accomplishments included the Berlin Tunnel operation, which tapped into Soviet military communications networks in Berlin in the mid-1950s. OEL was the DS&T entity charged in 1962 with supporting electronic intelligence collection through clandestine technical means. During the 1960s and 1970s, OEL operated labs and processed raw data produced from CIA projects. It also made considerable progress toward automating and miniaturizing intercept gear.

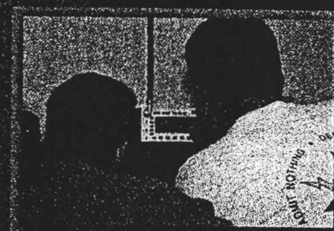
A consolidation of technical collection activities in 1977 resulted in the founding of the Office of SIGINT Operations (OSO). OSO focused on Soviet and Communist Bloc targets, weapons system and satellite development, third party access, and support to Agency bases.

OTC provides technical support for counternarcotics and counterterrorism operations.

ELINT/SIGINT

Another reorganization in 1988 created the Office of Special Projects (OSP) from the "measurement and signature analysis" [MASINT] activities in OTS, a special element of OD&E, and a small cadre from OSO.

Post-Cold War reorganizations led to a merger of OSO and OSP and the establishment of the Office of Technical Collection on 23 August 1993. Today's OTC contains five offices continuing the earlier missions of processing and analysis of specialized signals, signatures, and electronic intelligence targeting. OTC continues to pursue the most challenging intelligence targets, while constantly working to maintain its lead in clandestine technical collection.



OTC engineering and operational capabilities are target driven.

OTC officers are key players for every Incident Response Team.

Telecommunications and Information Technology give our targets greater capability, but give us new opportunities for technical collection.

Human Intelligence

Communicate the Enemy's Secret Intentions and Thwart His Plans

New England inventor and businessman Stanley P. Lovell headed the Office of Strategic Services' Research & Development Branch, the wartime precursor of CIA's Office of Technical Service.

For more than 50 years, the Office of Technical Service (OTS) has provided technical products and global support to both human intelligence collection and covert action. Technical support to HUMINT collection provides US policymakers with strategic information that is not available from other DS&T platforms–***an enemy's secret intentions.*** Covert action support provides America's leaders with options for low intensity conflict and the technical means to subvert or disrupt an enemy's efforts to wage war.

The wartime organization that preceded CIA, the Office of Strategic Services (OSS), pioneered the use of science and technology in intelligence collection and covert operations. These included, but were not limited to, secret writing, photography, documents & authentication materials, audio surveillance, and concealment devices. From the outset, CIA technical service officers engaged in basic research and development (R&D), based in the belief that American technology, applied to clandestine operations, would significantly affect the struggle against totalitarian adversaries.

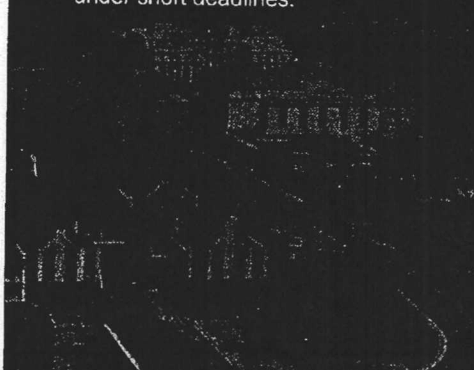
HUMINT

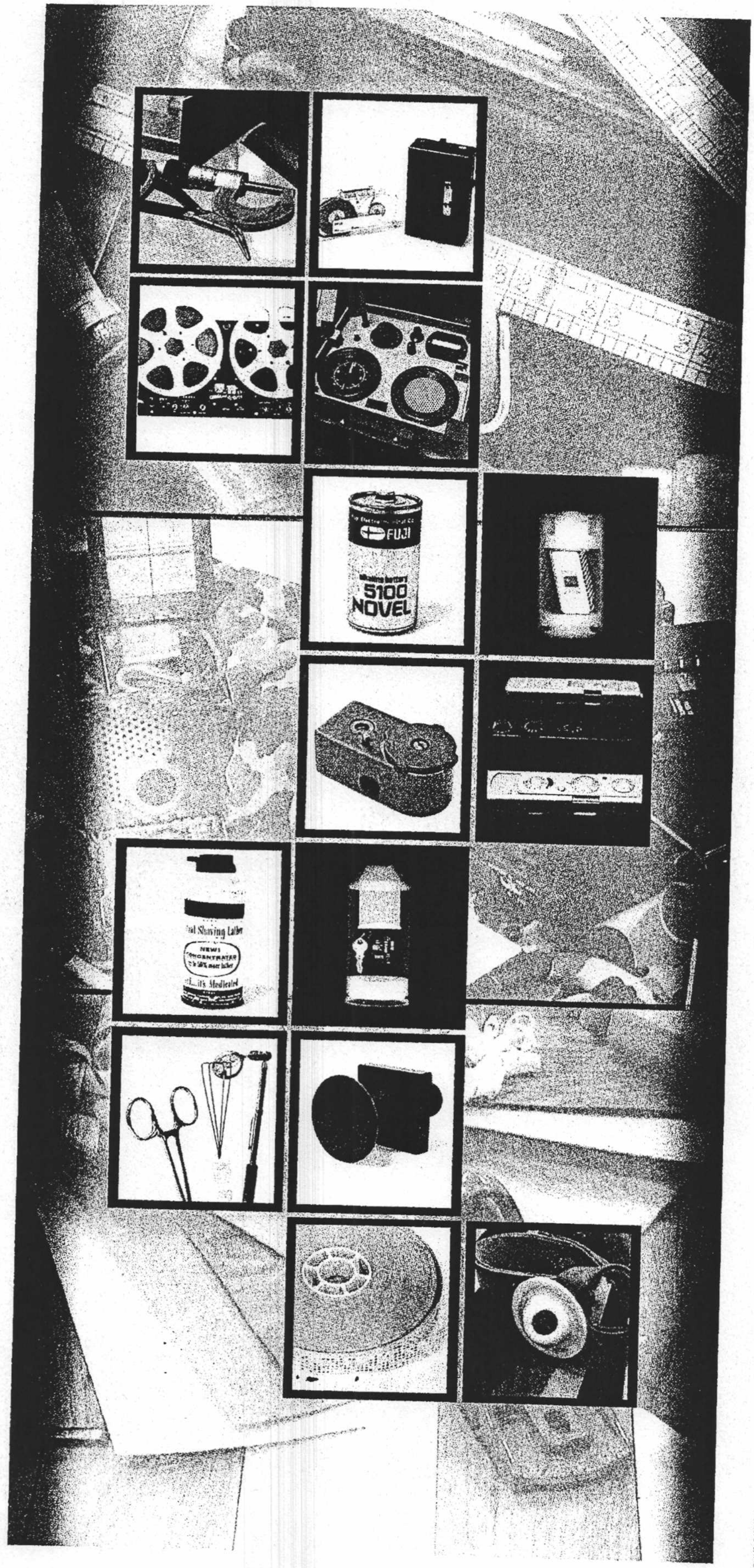
OTS personnel work full-time, side-by-side with case officers and military personnel overseas to create uniquely tailored equipment for paramilitary, covert action and psychological warfare operations. Members of OTS, many of whom possess advanced degrees in engineering, in all of the sciences, and in specialty fields such as acoustics, optics, and psychology, also engage in cutting-edge research in cooperation with private industry and federal laboratories. Master craftsmen, graphic artists, and other artisans refine their expertise throughout their careers.

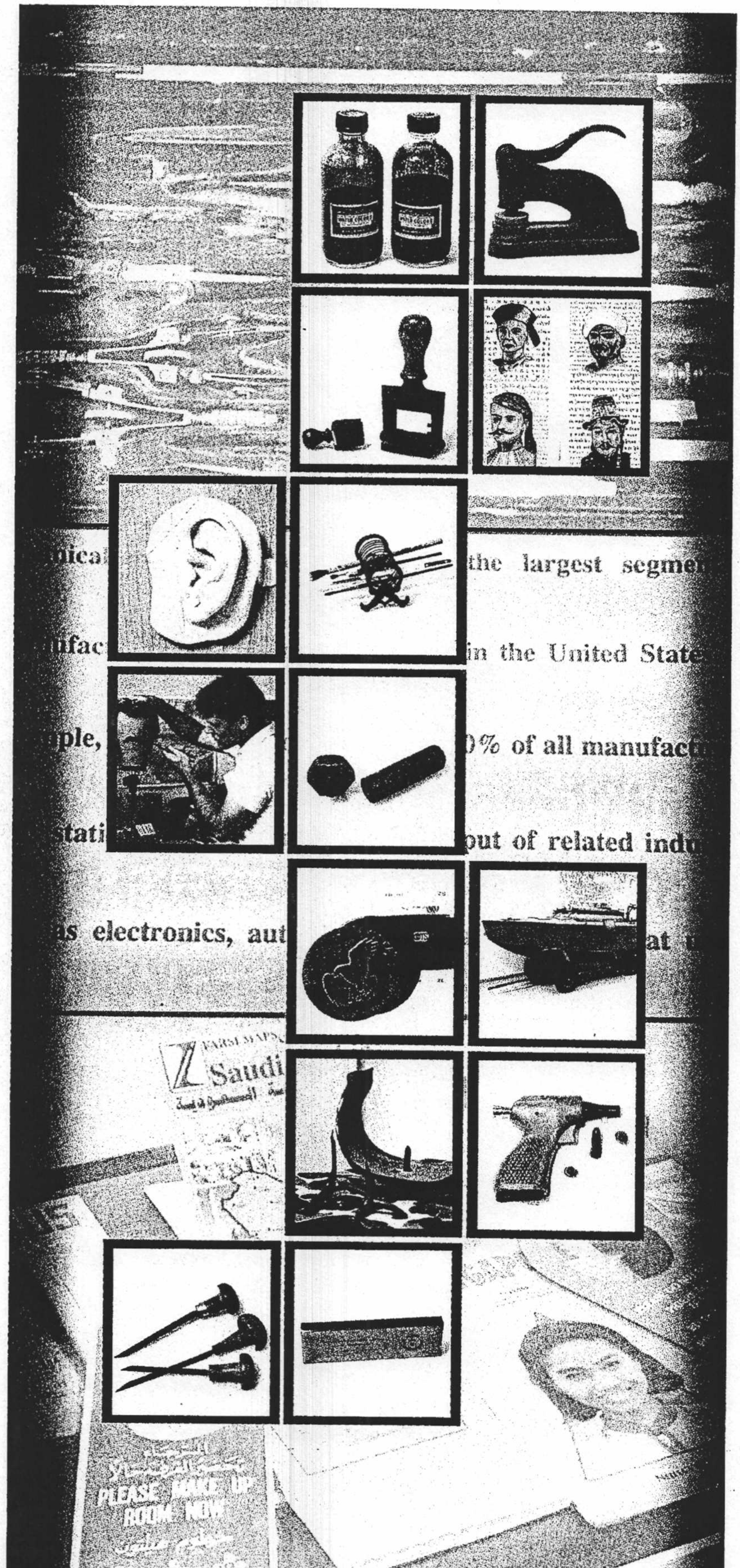
Today, OTS fully utilizes twenty-first century technology in combination with firsthand knowledge of foreign environments to provide custom, clandestine technical systems to operational personnel. A diverse work force of skilled, inventive, and flexible people–***technical specialists with an interest in "hands-on" problem solving***–stand ready to produce amazing "one of a kind" items of unequalled quality under short deadlines.

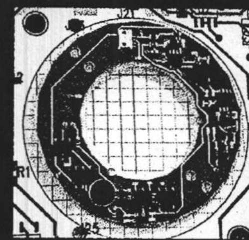
OTS and its predecessors, the Technical Services Staff (1951-1960) and the Technical Services Division (1960-1973) originally worked out of buildings scattered around the nation's capital eventually consolidating in the 2430 E Street buildings that housed senior CIA leaders until they moved to their newly constructed headquarters in Langley, Virginia. The Technical Services Staff began as an understaffed and underfunded technical unit supporting CIA's fledgling clandestine services—the Office of Special Operations and the Office of Policy Coordination. Today, the Office of Technical Service is a national intelligence asset that serves not only the Central Intelligence Agency, but also the US armed forces and the entire Intelligence Community. Its capabilities never cease to amaze.

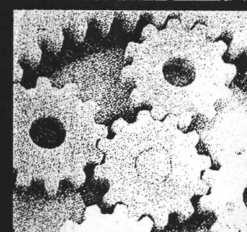
In 1951, Allen Dulles, then Deputy Director for Plans, ordered that a small State Department research and development (R&D) unit run by John J. Jeffries be combined with a CIA operational aids unit under Col. James "Trapper" Drum. Retired Admiral Luis de Florez came to Washington in July 1951, and worked with Mr. Jeffries and Col. Drum to give structure to the new organization. Three months later, the Technical Services Staff came into existance.




FUJI
5100
NOVEL
Shaving Lather
NEW!
CONCENTRATED
...it's Medicated

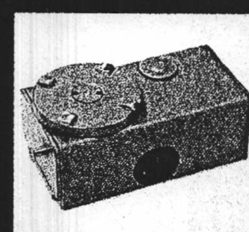

the largest segme
in the United State
of all manufact
out of related indu
as electronics, aut
Saudi
PLEASE MAKE UP
ROOM NOW



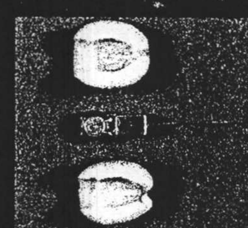


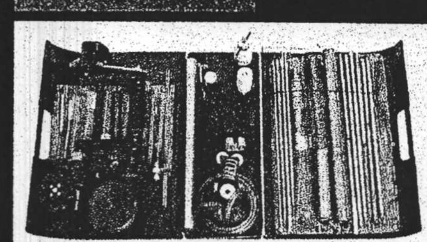
Operational engineering makes it possible to hide the tools and techniques used by America's spies from the hostile gaze of terrorists and totalitarian governments. As in TSS and TSD, the skills of OTS artisans, scientists, and engineers are refined over the lengths of careers. Early on, OTS embraced computer-aided design (CAD), as well as computer-aided manufacturing (CAM) to solve CIA-unique problems.

In the late 1970s, the responsibility for agent covert communication (COVCOM) was transferred into OTS from the Office of Communications. In TSS, TSD, and OTS, the word "communication" involves many technical fields, including chemistry, physics, and optics. Doctorate level scientists, engineers, and field operators in OTS have worked with intelligence collectors to make photons, molecules, and reagents into an information pipeline- one that helped America win the Cold War.



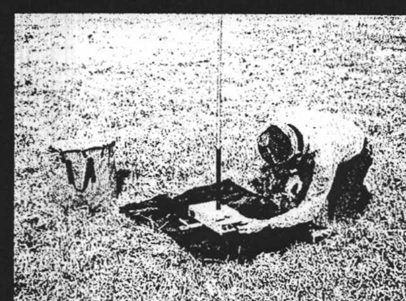
Clandestine audio surveillance benefited from the (commercial) invention of the transistor. Audio surveillance and other microelectronic products made for HUMINT collection by TSS, TSD and OTS were smaller and more robust because of rigorous quality control. The knowledge gained from in-house tests and operational deployments established a continuous refinement of performance and workmanship standards that are still used today.

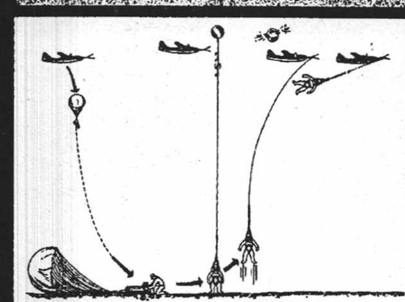




Identity specialists in OTS can directly trace their elite heritage back through TSD and TSS, to the OSS. Graphic artists, disguise experts, linguists, and a myriad of other specialists work together to deliver products of unequalled quality by their attention to details invisible to the naked eye. Their products and personalized service make it possible for intelligence collectors to carry out dangerous missions, and brave members of the resistance to escape the ruthless grip of totalitarian regimes.

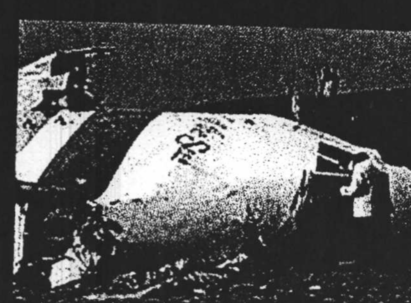
Elite technical support to paramilitary operations provided by the OSS has continued, uninterrupted, through TSS, TSD, and OTS. Specialists in unconventional warfare and field operations have served bravely at "hot" spots all over the world, wherever and whenever America's political leadership has directed their deployment. Responding to "surge" and diverse requirements over the decades has been possible because dedicated OTS special operations officers have been extensively trained to employ paramilitary weapons and continuously adapt to harsh and changing foreign environments.

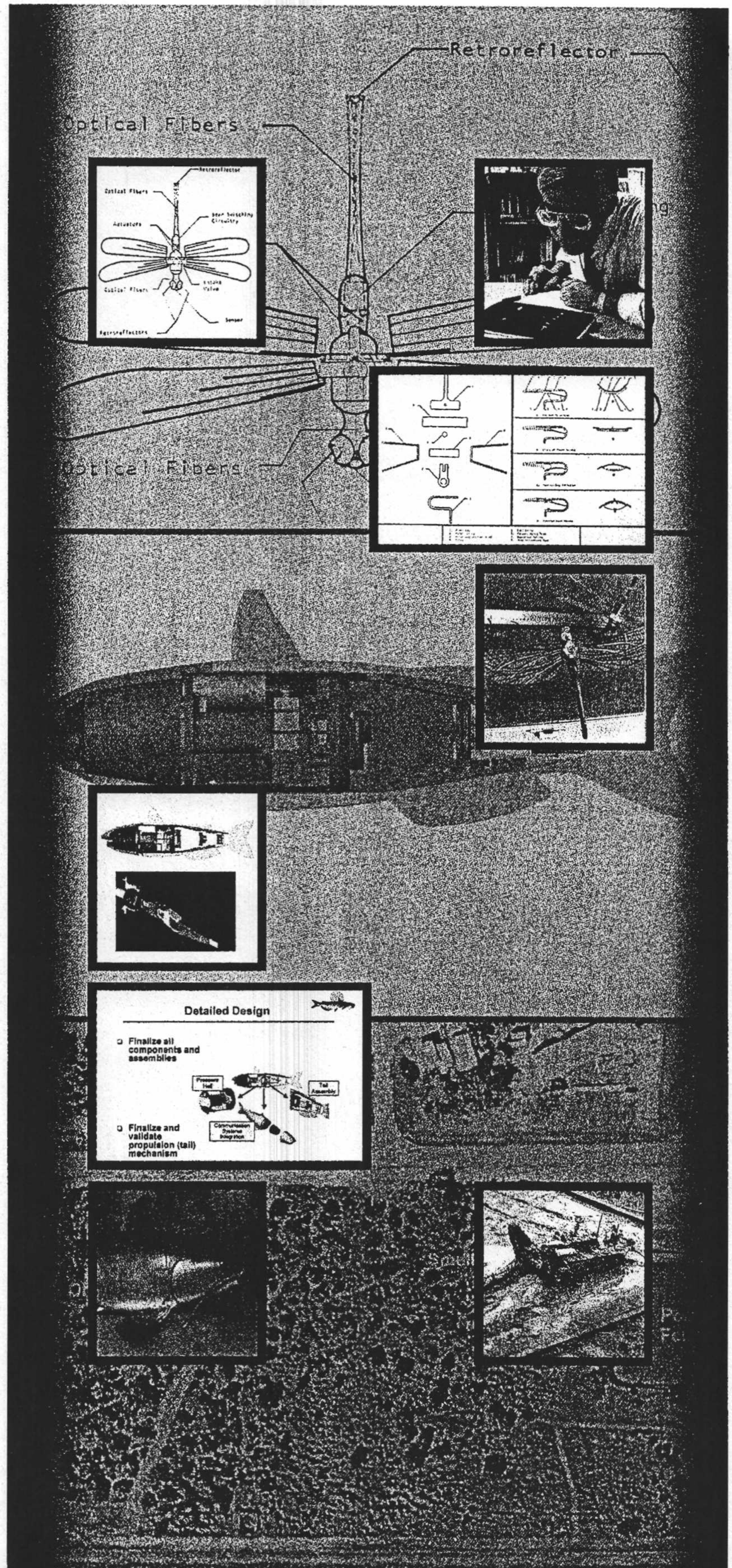




Terrorists have always operated in secrecy, in part because America and its allies devote advanced technical resources to uncovering and thwarting their plans. Technical experts called in after a terrorist incident provide valuable assistance to those who seek justice, but OTS experts in weapons, ordnance, electronics, and other fields also work in the shadows to ***prevent*** terrible calamities. ***To these subject matter experts, accustomed to anonymity, it is a matter of pride that so few people know the details of their lifesaving contributions to combating terrorism.***

A few counterterrorism successes utilizing OTS products and expertise have been made public. Creating a dummy film production company in Hollywood, an OTS team rapidly delivered disguises and documents that made the escape of six US diplomats from Iran possible. The February 2001 prosecution of a Libyan terrorist for the Pan Am Flight 103 bombing was based on the testimony of an OTS electronics expert who matched a circuit board fragment that survived the explosion with a timing device from an earlier Libyan terrorist attack thwarted by the CIA.

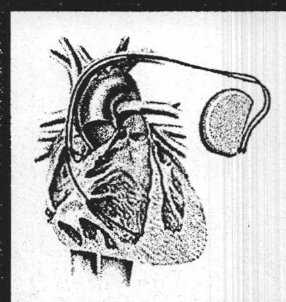



Retroreflector
Optical Fibers
Optical Fibers
Detailed Design
Finalize all components and assemblies
Finalize and validate propulsion (tail) mechanism

Cutting Edge Technologies

Exceeding "State of the Art" Today and Investing in America's Future

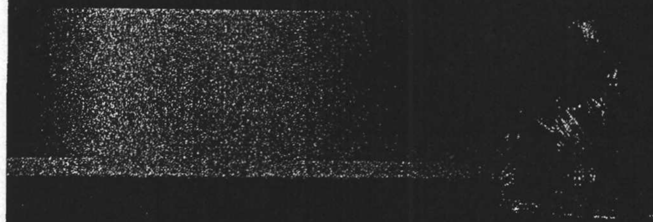
After the Cold War, the DS&T's mission expanded beyond its traditional role of building space-age technical collection systems aimed at a narrow set of strategic targets. To address new threats springing from rogue states and terrorist groups, the DS&T expanded its partnerships with the academic and business communities to discover and develop the most up-to-date scientific and technological innovations available. The DS&T's overall mission remains constant: to utilize science and technology in the service of national security. Today's DS&T, however, has expanded its capabilities and resources to leverage technical innovations and information technology to collect information, and to support the implementation of the nation's foreign policy by confidential means.

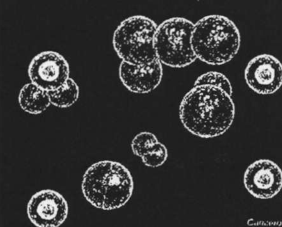


In the 1970s, the CIA shared with the medical community research it had done on lithium iodine batteries. This research had been conducted to improve the reliability and longevity of technical surveillance operations, and to ensure the prolonged operation of reconnaissance satellites. This same technology is used in heart pacemakers today.

In the mid-90s, with funding from the Intelligence Community's Advanced Research and Development Council (ARDC), engineers from CIA's Office of Research and Development (ORD) and the Southwest Research Institute in San Antonio, Texas designed and developed a testbed for small robotic vehicles. The testbed was created as an objective way to answer many questions about robots: what kinds of obstacles can small robots climb over; how easily do the robots break; how far can robots travel? Program managers in the Intelligence Community, at the Defense Advanced Research Projects Agency (DARPA), and the Defense Department use the test results to assess claims made by manufacturers and to decide what research and development work to fund in the future.

CUTTING EDGE





Cancerous Cell Division

When national security requires the invention or development of a collection or support tool, the DS&T delivers. Officers in the Directorate frequently work with concepts and technologies that are still theoretical, looking for ways to apply them to real-world situations. The outstanding men and women of today's DS&T– like their predecessors in the OSS and the accomplished scientists and engineers who served CIA during the Cold War– are some of the most creative people in the US Government. As long as the world remains a dangerous place, the Directorate of Science and Technology will remain a vital part of our nation's defense.

Early in the 1990s, the CIA, NRO, and the Community Management Staff sponsored research into the use of intelligence technologies for medical purposes. In July of 1994, the Office of Research and Development (ORD) along with the National Information Display Laboratory (NIDL) began to explore advanced image-processing techniques that might be applied to mammography. An OD&E employee was assigned to ORD to manage this activity. A key asset to the advancement of mammography would be the introduction of digital imagery technology. Digitizing very high-resolution imagery, applying computer-assisted change detection methods, and comparing pre- and post-magnetic resonance scans using multisensor alignment techniques had already been developed for the analysis of reconnaissance imagery. OD&E and ORD saw the possibility of improving mammography by making use of imagery intelligence processing techniques and developments. By combining research efforts, the devices manufactured would eventually help with the early detection of breast cancer and save women's lives.

The Office of Advanced Technologies and Programs (ATP) traces its history back to the founding of the Deputy Directorate for Research in 1962, and the creation of the Office of Research and Development (ORD). For thirty-five years, ORD served as the Agency's dedicated, centralized research organization. ORD technicians, engineers, and researchers made significant contributions to the national security and the successful fulfillment of DS&T and Agency missions.

Today, ATP leads scientific innovation and drives important new national collection efforts that are based on applying tomorrow's technology today. ATP combines the Agency's most advanced research efforts with its most innovative technical activities to establish a center of applied scientific excellence within CIA for the creation and application of new, "world's first" advanced technologies to address current and future intelligence problems.

In-Q-Tel is a private, independent, enterprise funded by the Central Intelligence Agency. Its mission is to identify and invest in companies developing cutting-edge technologies that serve United States' national security interests. Working from an evolving strategic blueprint that defines the CIA's critical technology needs, In-Q-Tel engages with entrepreneurs, established companies, researchers, academia, and venture capitalists to deliver technologies that pay out in superior intelligence capabilities for the CIA and the larger Intelligence Community.

*Partial listing

The Chief Scientist gives the DS&T a single focal point to formulate technology strategies for the Directorate and Community, assisting the DS&T in leveraging the vast array of Intelligence Community, private industry, academic, and other government talent to identify and address critical technical needs. The Chief Scientist identifies Intelligence Community technology requirements, facilitates information and technology exchanges, and supports integrated Intelligence Community planning for advanced research and development. The Chief Scientist also establishes National Foreign Intelligence Program (NFIP) advanced research and development fiscal guidance, and manages the approval of the yearly National Foreign Intelligence Program advanced research and development strategy and investment plan.

Acknowledgements

The Directorate of Science & Technology wishes to thank the following for their assistance in preparing this publication: Visual Information Staff; CIA Museum, CIA History Staff and the Center for the Study of Intelligence; Dr. Albert D. "Bud" Wheelon; H. Keith Melton; [redacted] National Imagery and Mapping Agency; Lockheed Martin; Beale Air Force Base, Office of Public Affairs; and the many men and women of the DS&T who identified photographs and historical equipment for the DS&T 40th anniversary project.

DIRECTORATE OF SCIENCE & TECHNOLOGY

MORI DocID: 428767

[redacted]

Executive Registry
72-3799/6

28 SEP 1972

MEMORANDUM FOR: Deputy Director for Intelligence
Deputy Director for Plans
Deputy Director for Science and Technology
Deputy Director for Support

SUBJECT : Intelligence Museum

1. The Agency needs a program for conserving and, when appropriate, exhibiting material which has been significant in the development of CIA and its operations, before such material is lost or dispersed.

2. In order to accomplish this, an Intelligence Museum Commission will be established, which will be responsible for establishing and supervising the following program:

a. Identifying, cataloguing and conserving documents, photographs, hardware and other materiel, and miscellaneous memorabilia which have been significant in the development of CIA and its operations;

b. Arranging for their declassification when appropriate on terms agreed to by whichever directorate used the material operationally; and

c. Exhibiting the material when exhibition would have a salutary effect on employee morale, on training, or on special problems the Director identifies.

3. The Commission will be responsible to the Executive Director, but as noted in 2b above, it must also be responsible to the operational security needs of each of the directorates. Therefore, each directorate is requested to nominate one or more referents with special interests in this field, or in offices which might have a special responsibility. NPIC, TSD, and OC seem to me to be such units, particularly because most of them already have developed similar programs on their own.

CLASSIFIED BY Signer
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4. The Chairman will be appointed by the Executive Director. The Agency Historian, the Curator of the CIA Historical Intelligence Collection, and a representative of the Fine Arts Commission will be ex officio members, the last in order to establish coordination between these two Commissions. Other members will be appointed by the Executive Director as appropriate, or as nominated by the Deputy Directors. The Agency's Historical Staff will act as Secretariat for the Intelligence Museum Commission.

5. The Intelligence Museum Commission will not take physical possession of material that it identifies and catalogues for the historical collection. Offices which have the space and interest in housing their own historical material will retain custody of it so long as it remains available to the Intelligence Museum Commission and is not destroyed or dispersed without the Commission's sanction. Other material may be transferred to the Agency's Archives. Finally, the functions assigned to the Commission shall in no way interfere with the historical and archival (records management) functions already assigned in the Agency.

/s/ W. E. Colby

W. E. Colby
Executive Director-Comptroller

[redacted]

[redacted]

[redacted]

Executive Registry
72-3799/1

20 November 1972

MEMORANDUM FOR: Deputy Director for Intelligence
Deputy Director for Plans
Deputy Director for Science & Technology
Deputy Director for Support

SUBJECT : Intelligence Museum Commission

REFERENCE : Memo to the Deputy Directors from ExDir dtd 29 Sep 72, Subj: Intelligence Museum

In accordance with referent memorandum, an Intelligence Museum Commission has been established, with membership as follows:

Chairman and Office of the Director Member

[redacted]

DD/I

Walter Pforzheimer

DD/P

[redacted]

DD/S&T

[redacted]

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§ 5B(1), (2) ... (circle one or more)
AUTOMATICALLY DECLASSIFIED ON
______
(unless impossible, insert date or event)

[redacted]

[redacted]

DD/S

[redacted]

Secretary

Bernard Drell

W. E. Colby
Executive Director-Comptroller

cc: [redacted]

[redacted]