

(U) A Partial History of ELINT at NSA

(b) (3) - P.L. 86-36

(U) Introduction

(U) What is electronic intelligence, or ELINT? It is primarily information derived from electronic signals that do not contain speech or text (which are COMINT). The "official" description, from the National Security Council Directive No. 17 in 1955, is "the term ELINT is defined as the collection (observation and recording), and the technical processing for later intelligence purposes, of information on foreign, non-communications, electromagnetic radiations emanating from other than atomic detonation sources."¹

~~(S)~~ ELINT has two major branches. One branch is technical ELINT (TechELINT), which describes the signal structure, emission characteristics, modes of operation, emitter functions, and weapons systems associations of such emitters as radars, beacons, jammers, and navigational signals. TechELINT intelligence products support DoD electronic warfare programs; weapons threat and vulnerability assessments; and the design, development, and updating of electronic protection systems. TechELINT is also critical to providing the necessary information to build OpELINT signal collections systems.

~~(S)~~ The other major branch is operational ELINT (OpELINT), which concentrates on locating specific ELINT targets and providing the operational timeline of the emitters. These locational results of OpELINT analysis are commonly called electronic order of battle (EOB). OpELINT also provides threat assessments, often referred to as "tactical ELINT." OpELINT intelligence products are an integral part of the military operations planning and tactics used by military commanders on the battlefield. OpELINT often provides the commander in the field with an indication of troop movement. Many of these products

are time sensitive - often measured in minutes and sometimes seconds.

(U) Background

(U) ELINT had its start in World War II, with the invention and use of radar by the Allies and the Axis. The U.S. Army Air Forces had a keen interest in ELINT since they used most German radars at the time to target Allied bombers over Germany, and the air forces wanted to know as much about these radars as possible - including how to evade, "jam," or "spoof" them. The Americans and the British started intercepting those radar signals, and ELINT was born.

~~(S)~~ Immediately after WWII, the USAF in Europe (USAFE) embarked on an aggressive TechELINT and OpELINT program, including establishing solid and expansive cooperative programs with several foreign partners. This program was called CREEK ARCH, and USAFE provided extensive financial and equipment support to several of the NATO countries.

(U//~~FOUO~~) When NSA was formed in 1952, consideration was given to including ELINT as well as COMINT as part of NSA's charter. None of the DoD military departments wanted that. It is well known that Lieutenant General Ralph Canine, USA, designated director of NSA at that time, felt that managing the DoD COMINT efforts would be enough of a challenge for NSA. Thus, at that time NSA received authority to process and analyze only COMINT signals, not noncommunication signals such as radar and telemetry.

(U//~~FOUO~~) DoD ELINT, however, was as much in need of coordination and management as COMINT in the 1950s, particularly a more cohesive signal analysis and processing effort. In

survey the status of "data processing" and visited several ELINT field sites, theater processing centers, and R&D activities, and published the results in 1960.

(S) NSA began various ELINT research and development activities. Some were at the direction of DoDR&E, Dr. Eugene Fubini, who was a staunch supporter of ELINT and of NSA having a strong role in guiding the DoD ELINT R&D activities. The NSA/R SIGINT Plans and Programs Group reviewed the new NSA ELINT responsibilities and several of the R&D activities of the military departments, but the departments were slow in responding to the NSA requests.⁶

(S) In addition to adding NTPC to the NSA organization, NSA also offered several people in the USAFE organization opportunities to join NSA; they took the lead to develop the first NSA National ELINT Plan (NEP), distributed on 8 February 1966. This plan was updated regularly and produced up until 1985. NSA also produced a comprehensive ELINT Manual in 1965 for community use, particularly in training new ELINT analytic personnel.⁷ Some of the DoD military departments and combat commands were not greatly enthused about NSA's new responsibilities, and many "management" problems and procedures developed.

(S) The Strategic Air Command (SAC) was long used to doing ELINT business "my way" but soon developed a productive and cooperative set of arrangements with NSA. SAC operated the RB-47 reconnaissance fleet and later the RIVET JOINT aircraft. It maintained an ELINT processing center operated by the 544th Strategic Reconnaissance Wing at Offutt AFB at Omaha, Nebraska.

(S) There were theater ELINT processing centers [redacted] that also eventually became an integral

part of the overall DoD ELINT structure developed by NSA.

(U) ELINT at NSA Gains Some Strength

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(U//~~FOUO~~) National Security Council Directive No. 6 was updated in 1972. It combined COMINT and ELINT, was retitled "Signals Intelligence (SIGINT)," and formed the foundation for NSA/CSS.⁸ The new NSCID No. 6 gave NSA/CSS even more ELINT powers.

(U//~~FOUO~~) Based on the new NSCID No. 6 concepts, SIGINT within DoD was implemented by Directive 5100.20, already issued in 1971, and commonly referred to as the "NSA Charter."⁹ The DoD directive charged NSA with responsibility of managing SIGINT within DoD, and specifically defined SIGINT as including COMINT, ELINT, and TELINT. (Although never changed officially, the term TELINT has fallen into disuse and has been replaced by FISINT — short for foreign instrumentation signals intelligence — which includes telemetry, missile and satellite command signals, and missile and satellite beacons.)

(U//~~FOUO~~) COSA, which had changed its designator to "C," and elements of the R&D organization were merged to form W Group in 1971. The Group was named the Electronic Intelligence and Systems Management Group within the NSA "Production" (read SIGINT) organization and was headed by [redacted]

[redacted] Technical ELINT was centralized in W2, headed by [redacted] and included the [redacted] collection and analysis set of projects. General signals search and development, including ELINT signals, was worked in W3 under Mr. David Wolfand. Operational ELINT was focused in W4, headed by Mr. [redacted] All NSA systems development for ELINT was managed in W7, the Microwave, Space and Mobile Systems Office, headed by Mr. [redacted] W8, headed by Mr. [redacted]

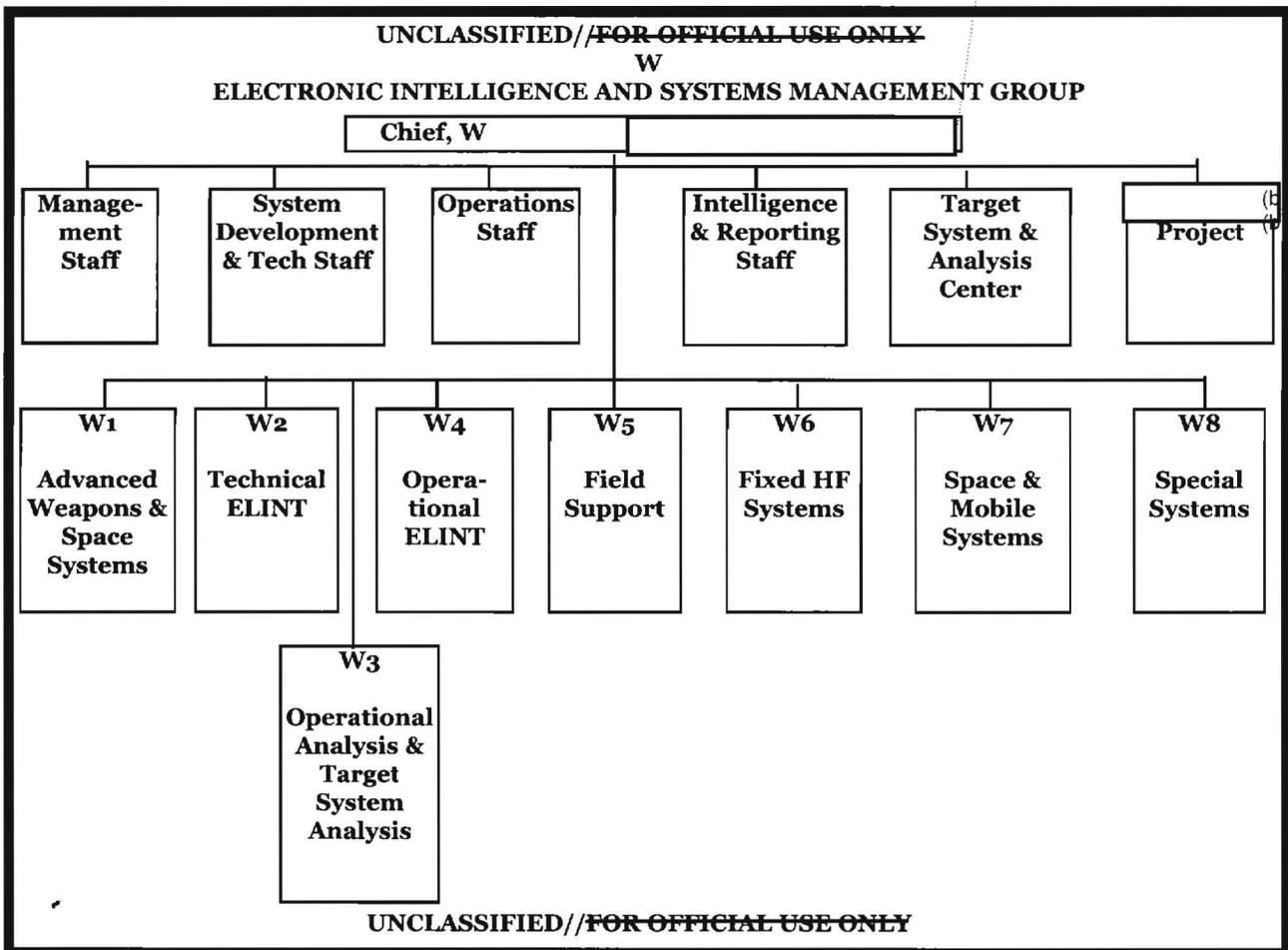
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[redacted] was the Special Systems Office (read "overhead").

W1, headed by [redacted] the Advanced Weapons and Space Systems Office. Figure 2 shows the organizational chart for W Group in 1970.

(U//~~FOUO~~) The "W" organization structure provided a fairly cohesive set of people and managers that NSA used to manage DoD ELINT collection through processing, including the development of new systems for ELINT use. It also provided a central NSA focal point for the DoD Science and Technology (S&T) Centers and the JCS Joint and Specified Commands to interface with NSA. Similarly, W Group made for a cohesive way to develop the ELINT portion of the Combined Cryptologic Program (CCP) and budgets with the DoD military departments. TELINT, closely related to ELINT, was focused in

~~(S//TK)~~ With the advent of successful overhead ELINT, it became obvious the volume of data available from space collection presented new challenges to NSA. Intermixed with thousands of routine emissions were the high-interest military systems. In the mid-1960s NSA provided money and people (Mr. Claude LaPointe) to the USAF program office to develop the Mission Analysis and Data Services (MADS) subsystem. Proper exploitation of the collected data caused NSA to form the NSA Support Detachment (NSD)



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(U) Fig. 2. W Group, 1970

[Redacted]

A complete history of the development of the use of satellites for ELINT from the GRAB beginning until about 1975 can be found in NRO's *The SIGINT Satellite Story*, published in 1994.¹⁰

[Redacted]

~~(S)~~ In 1974 the USAFE CREEK ARCH program was fully integrated into the NSA system, and this effort was later combined with the NSA engineering support office [Redacted]

[Redacted]

~~(S//TK)~~
[Redacted]

~~(S)~~ In 1977 management of the CIA-sponsored SIGINT/ELINT arrangements with many other countries was transferred to NSA. CIA continued to have a smaller but active program under the Office of SIGINT Operations (OSO). Special ELINT data processing was performed by the SAD (Signal Analysis Division), now called the CAC (Collection Analysis Center). In the late 1970s and early 1980s at NSA, ELINT data were processed and analyzed by the W2 organization, headed by [Redacted] and later by Dr. [Redacted]

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~~(S//TK)~~ In 1970, to support the new challenges from overhead, NSA established a special APS (Advanced Processing System) budget for overhead [Redacted]

Significant effort was put on searching for new ELINT signals and processing such new data by the Office of Search, W3, headed by Dr. William Thayer. Operational ELINT was focused in W4, headed by [Redacted]

[Redacted]

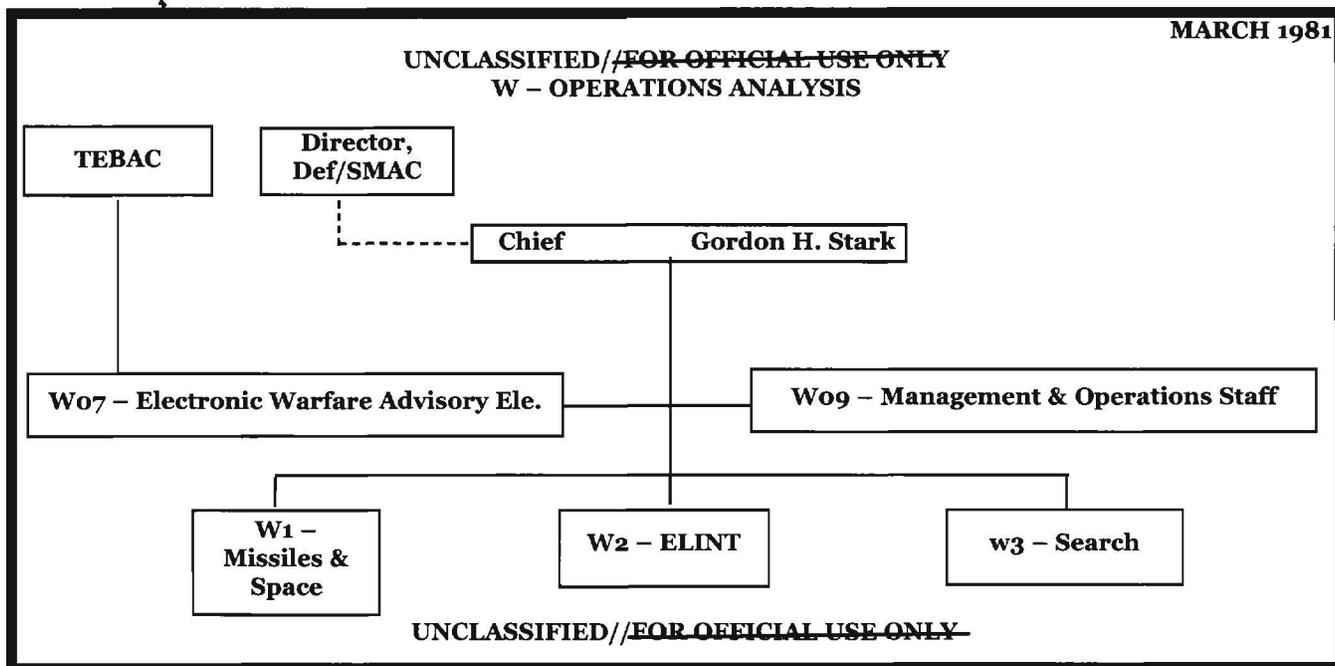
(U) The 1980s - The Highlight Years

~~(S)~~ The 1980s can be considered the golden age for ELINT. With NSA (W2) controlling the overall world of ELINT, this period led to many innovations. Figure 3 shows the NSA "W" Operations Analysis Group where TechELINT and ELINT search functions were focused. OpELINT had been placed back in the appropriate "country" SIGINT analysis organization, e.g., "A" Group for Soviet ELINT targets. Later in the 1980s OpELINT was brought back into W Group, as shown in Figure 4.

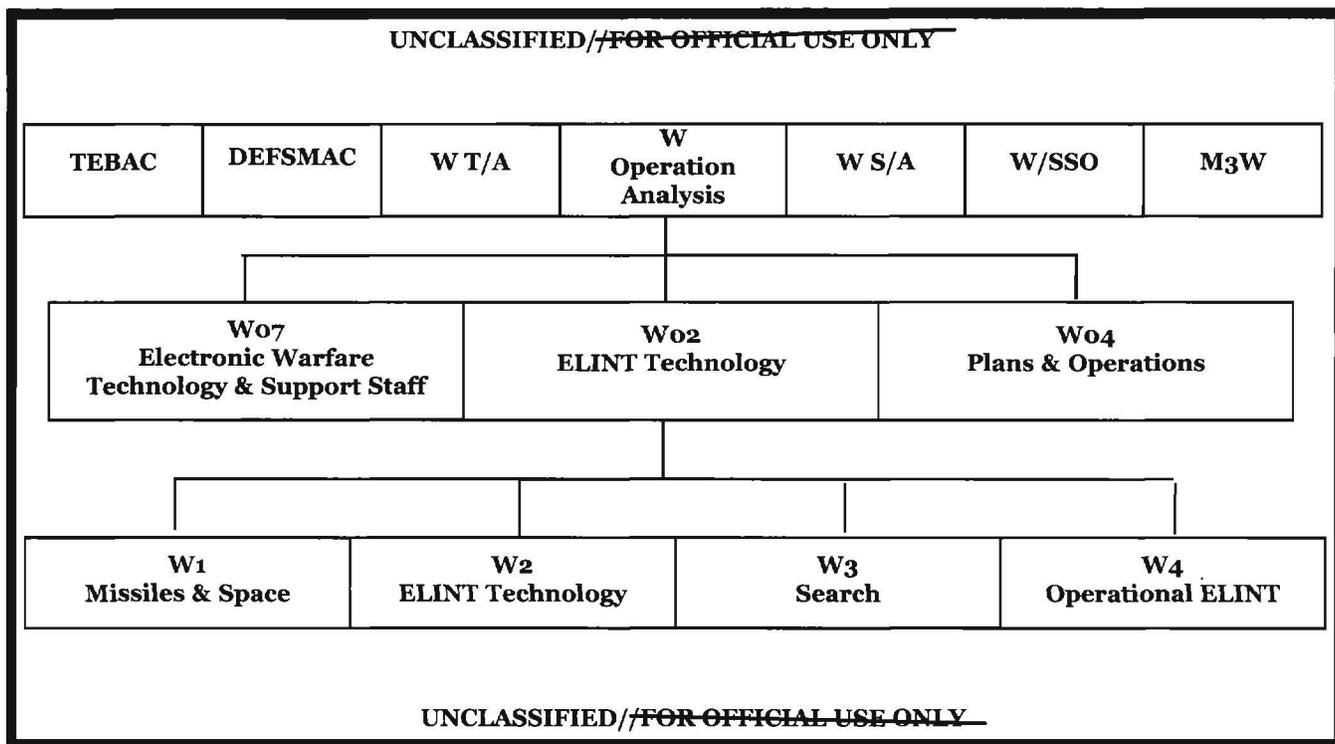
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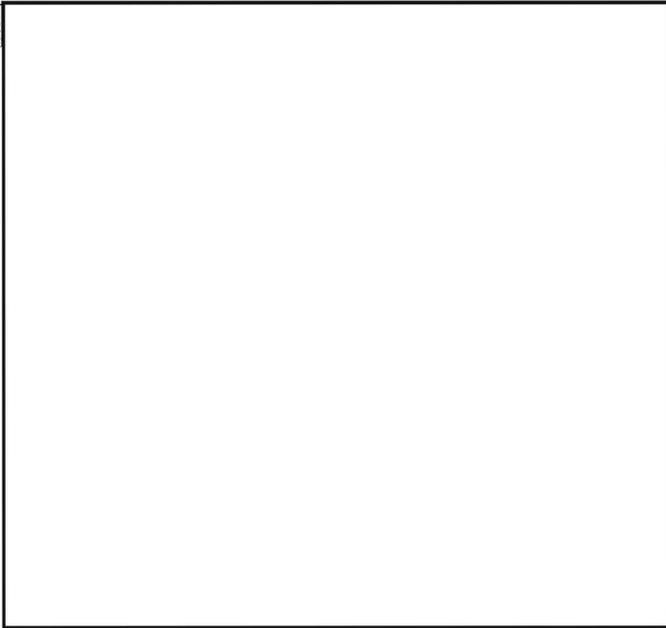
MARCH 1981



(U) Fig. 3. W Group, 1981

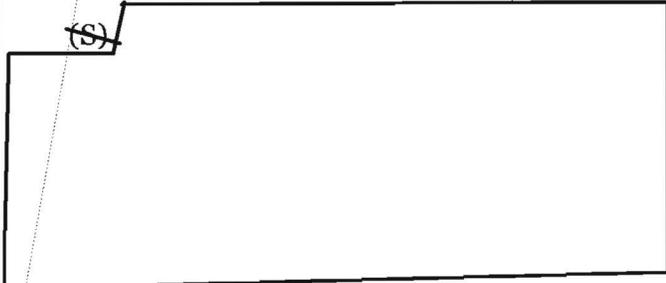


(U) Fig. 4. W Group, 1986



held to disseminate information, discuss current threat systems, and project potential future threats and ways to combat them.

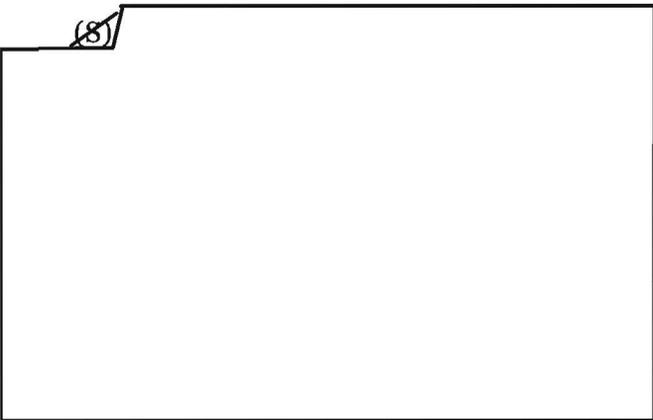
~~(C)~~ Excellent working relations were established with the tactical air warfare center (TAWC), which was responsible for developing tactics and testing radar warning receivers, jammers and missile "seekers" to destroy threat systems.



~~(S)~~ The need to keep track of U.S. and friendly force systems (blue forces) and other noncommunist-developed radars that could be threats (grey forces) was recognized and resulted in the creation of the Blue-Grey database. New databases were also created in the area of wartime reserve modes (WARM).

~~(S)~~ The synergy of this activity enabled the U.S. to define the USSR threat and develop war plans to defeat it.

(U) The Early 1990s - And The Soviet Target Collapsed



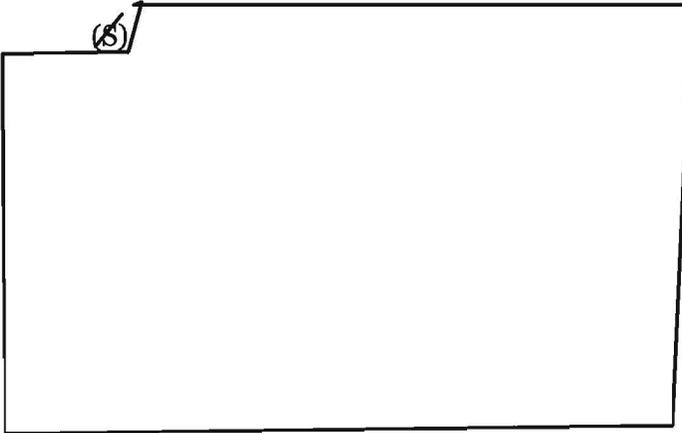
~~(U//FOUO)~~ In the early 1990s there were several changes to ELINT analysis focus within W Group. In 1991 W Group had a major reorganization that created several target-focused divisions. These divisions were responsible for analysis and reporting using all available ELINT, FIS, and PROFORMA on their targets. The divisions comprised both signals and intelligence analysts from the former W Group offices. While detailed technical reporting of signal characteristics remained as part of the divisions, overall analysis based on all SIGINT, and appropriate supporting collateral, was added to their mission.

~~(C)~~ A workable shared analysis effort was established among the service science and technology centers, and W2. The W2 National Technical Processing Center (NTPC) developed many new in-house analysis programs and techniques that were disseminated to the S&T analysis centers, and new techniques came from the S&T centers to NSA. Yearly conferences, addressing both technical and operational ELINT, were

~~(U//FOUO)~~ In 1994 W Group had another major reorganization and formed a number of intelligence topic focused offices. FIS and Tech ELINT were focused in W9W, the Space and Weapons Technologies Office. Responsibility for

OpELINT was primarily in W9M, the Military Applications Office.

months to achieve due to the need to develop a database to direct and monitor the activity.



(S) In 1997 the community held a TechELINT and FISINT review co-chaired by Lieutenant General John Gordon, USAF, the assistant DCI for military support, and Ambassador Lynn Hansen, National Intelligence Council vice chairman for evaluation. The meeting, titled "The Technical Weapons Intelligence Meeting," also deplored the general analytic situation and called for action on the budget and personnel fronts and on community ELINT and FIS management and processes.¹² Things were soon to get even worse.

(U) ELINT in Trouble

(C) By 1996 it was clear that the fiscal and personnel reductions in the intelligence community had severely affected the community's capability to conduct TechELINT. A DoD-CIA task force conducted a study for the Weapons and Space Systems Subcommittee (WASSC) of the National SIGINT Committee (SIGCOM) and showed that the community had reduced the ELINT budget of

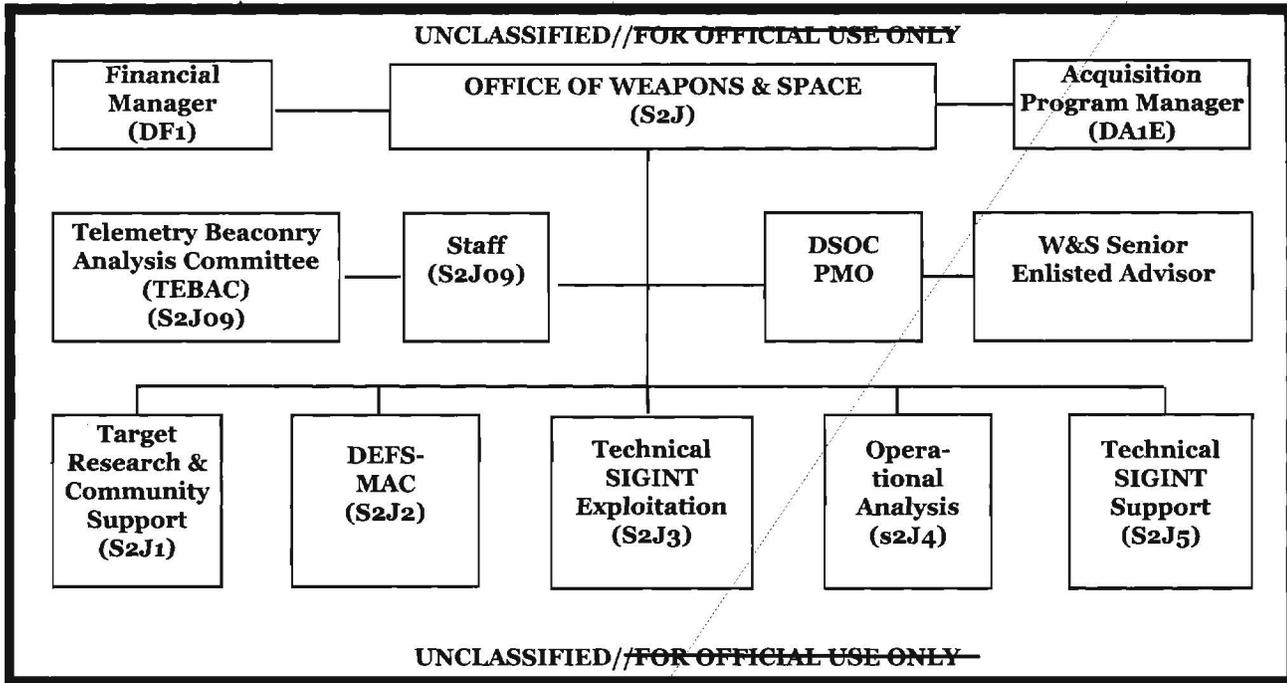


One aspect was the recognition that the Shared Analysis Agreement between DIA, CIA, and NSA, which had governed ELINT analysis responsibilities for many years, was no longer appropriate. A community team was organized to develop a new construct to better serve the needs of customers under the severe resource constraints that existed. The outcome was the Community ELINT Signals Analysis Partnership (CESAP), in which ELINT data distribution, analysis, and reporting were assigned to a specific analytic center based on a combination of factors. These factors included the analytic center mission, resources to do the work, and successful progress on already assigned work. All of the centers accepted responsibility to do all of what needed to be done on a particular data set, even if some of the results were in support of another center's customers. Actual implementation of the CESAP took many

(U) A Reinvigorated Community Approach

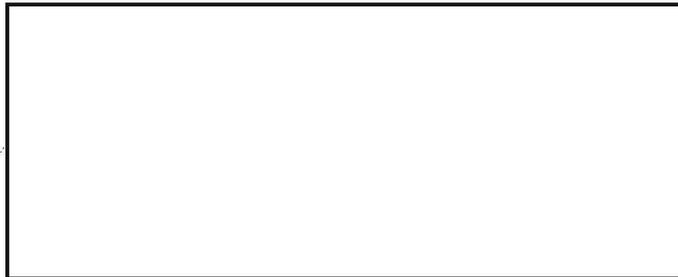
(U//FOUO) In April of 1998, Congress directed an ELINT study, and the A/DCI for Collection, Mr. Charles Allen, was assigned the action. The DCI staff and SecDef staff conducted the study. A key action from the resulting study was for NSA to prepare an ELINT Business Plan, which was accomplished in October 2000. The primary outcome took place January 2001 when OASDI and the DDCI directed that a Community ELINT Management Organization (CEMO) be housed at NSA.¹³ The OASDI letter started out: "Electronic Intelligence (ELINT) is a major cornerstone of America's Information Superiority." One of the several functions of the CEMO is to insure that the ELINT architecture is consistent with the Unified Cryptologic Architecture (UCA) and integrated into the Cryptologic Mission Management (CMM) activities and actions.

(S) During 1999 the NSA Business Plan that includes ELINT (as well as COMINT, FIS, and PROFORMA) was completed and forwarded to the Community Management Staff. In 2000 the NSA Office of Weapons and Space was restructured to be better aligned with the ELINT business plan and the TechELINT process. TechELINT, OpELINT, FISINT, and PROFORMA were all included within PIW. This office is



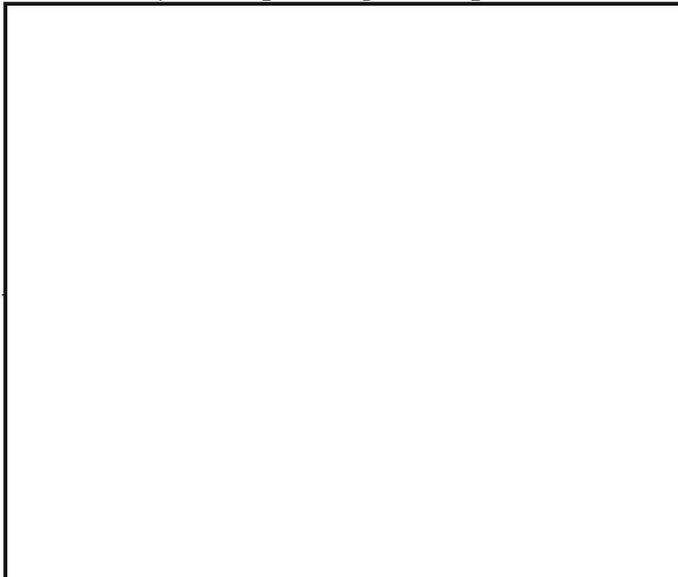
(U) Fig. 5. OWS, 2003

now designated S2J, the Office of Weapons and Space, initially headed by [redacted] With little change in mission or function except to include the elements of the Research and Technology Directorate that were transferred to the SIGINT Directorate in 2001. Figure 5 shows the current organization of the office.



(S//TK) In the fall of 2001, Weapons and Space (W&S), in cooperation with the Community ELINT Management Office (CEMO) and the ELINT Program Management Office (PMO), embarked on an initiative to create a technical SIGINT Center of Excellence in Denver. This initiative was part and parcel of ongoing plans to rebuild and revitalize the nation's Technical SIGINT mission to improve support to both national-level customers and the tactical war fighter.

(S//TK) Following discussions with NSA seniors in early 2003, planning and implementation



(S//TK) In January 2002, after several months of study and analysis, culminating in a community meeting chaired by the DCI assistant director for collection, Mr. Charles Allen, it was decided to focus and significantly strengthen

[] will be a place where actionable intelligence requirements are addressed. It will also become a center of "Technical SIGINT" (ELINT, FIS, and PROFORMA) knowledge and expertise where future analysts will be trained.

(U) Notes

1. "(U) QUIS CUSTODIET IPSOS CUSTODES?" *Cryptologic Almanac: 50th Anniversary Series*, 2 May 2002, David A. Hatch. (TS/SI) (Discusses the Herbert Hoover Commission report of 1954 and the Baker report of 1957)

2. (U) *American Cryptology during the Cold War, 1945-1989*, CCH-E32-95-03 (TCS- 54-649-95), CCH-S54-98-01, and CCH-S54-99-01, Thomas R. Johnson. (TS/SI/TK)

3. (U) NSCID No.17, *Electronic Intelligence* (ELINT), dated 16 May 1955. (First national policy document specifically outlining ELINT policy. Established the National Technical Processing Center as a joint DoD/CIA organization administered by DoD.)

4. (U)(Revised) DoD Directive S-3115.2 "Electronic Intelligence (ELINT)," dated March 19, 1959. (S) (Replaced DoD Directive S-3115.2 of July 13, 1955, and spelled out NSA, JCS, Joint Commands, and Military Departments functions on ELINT.)

5. (U) DoD Directive S-5100.20, "The National Security Agency," dated March 19, 1959. (S) (Implemented NSCID No. 6 of September 15, 1958, within DoD. Among other actions, transferred the National Technical Processing Center and the Electronic Intelligence Coordinating Group established by DOD Directive S-3115.2 of July 13, 1955, to NSA.)

6. (U) Introductory Report on ELINT Data Processing - A sub-task of ANEQ Task 350- 7704 (BERLIN) of R/D Project 04-08 (Advanced Processing Techniques), 27 March 1961. (S)

7. (U) ELINT Manual, published by NSA in June 1965. (S) (One of the actions as a response to NSA's training responsibilities under DoD Directive S-3115.2)

8. (U) (Revised) NSCID No. 6 of 17 February 1972, and retitled as "Signals Intelligence." (S) (Among other

responsibilities, it charged NSA to conduct ELINT activities to support electronic warfare activities in a manner that permitted immediate operational use of the information.)

9. (U)(Revised) DoD Directive 5100.20 "The National Security Agency and the Central Security Service," dated December 23, 1971. (U) (Replaced S-5100.20 of March 19, 1959, and S-3115.2 of February 4, 1967. The 1971 version was completely declassified by DoD on May 22, 1990. Defined TELINT as part of SIGINT and clarified NSA's responsibilities.)

10. (U) *The SIGINT Satellite Story*, NRO BYE 9197/94, December 1994. (TOP SECRET NOFORN ORCON Handle via BYEMAN-TALENT-KEYHOLE-COMINT Control Channels Jointly)

11. (U) WASSC Study, "Coping With the Electronic Battlefield: A Review of Technical Electronic Intelligence Production Processes," 1 April 1996. (S) (Note: The WSSAG functions are now performed by the National Emitter, Weapons, and Space Subcommittee (NEWSS) of the National SIGINT Committee (SIGCOM) of the United States Intelligence Board (USIB).)

12. (U) Lt Gen John A. Gordon, USAF, Memorandum for the Record, "(U) Results of the Technical Weapons Intelligence Meeting," dated 21 April 1997 (TS//COMINT/TK//X1)

13. (U) Arthur L. Money, ASDC3I and Joan A. Dempsey DDCI/CM Letter, "Creation of the Community ELINT Management Office (CEMO) (FOUO)," dated 4 January 2001. (Letter to CIA and DoD components - Military Departments, JCS, NSA, DIA, and NRO) establishing CEMO and directing CIA and DoD components to support the effort; NSA DIRGram -159: "Establishment of the Community ELINT Management Office (CEMO)," issued 12 February 2001, Lt Gen Michael Hayden, USAF (U//FOUO)