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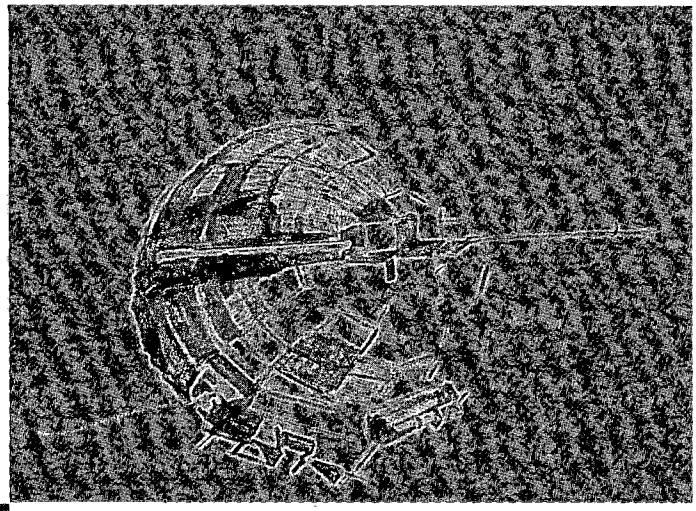
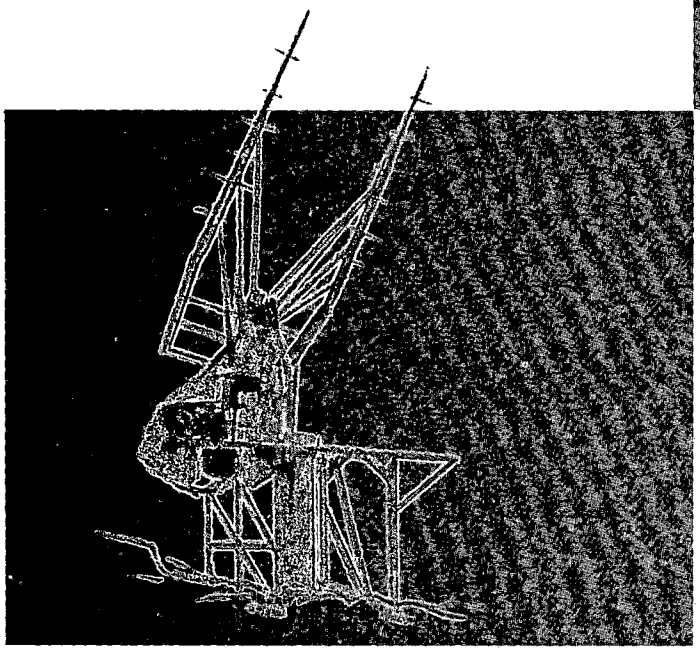
POPPY OPERATIONS SEMINAR 13-17 MARCH 1972





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DEPARTMENT OF THE NAVY
NAVAL SECURITY GROUP COMMAND HEADQUARTERS
3801 NEBRASKA AVENUE, N.W.
WASHINGTON, D.C. 20390

NSG/G54/mlh
BYE-52,383-72
12 April 1972

~~TOP SECRET~~ - EARPOP [redacted]

From: Commander, Naval Security Group Command
To: Distribution List

Subj: POPPY Project Operations Seminar - 1972

Encl: (1) POPPY Operations Seminar Report
(2) POPPY Operations Seminar Critique Sheet

1. Enclosure (1) contains a recapitulation of the POPPY Project Operations Seminar, held at Headquarters, Naval Security Group Command during the week of 13-17 March 1972.

2. The Seminar was highlighted by uniformly outstanding briefings and presentations covering a wide range of subjects, and by the overall strong participation by individuals representing the field stations as well as the management organizations in the Washington, D. C. area. Significant problems regarding Project operations (personnel, training, tasking, processing, and equipment) were discussed in great detail and actions for solution and improvement were identified in many instances. It was unanimously agreed that this first POPPY Project Operations Seminar had been extremely useful and informative, and it was strongly recommended that they be scheduled periodically, preferably on an annual basis.

3. The minutes, conclusions and appendices contained in the attached document were formulated from notes taken during the Seminar and are accurate within the context presented; however, no firm actions should be taken solely on the basis of this document or the recommendations or opinions expressed therein. In all cases, specific directives will be issued by the responsible office or agency for those items which require follow-up action. Any questions concerning the POPPY Operations Seminar may be referred to this Headquarters (Attn: G54), or the Program Director (CHNAVMAT PM-16).

4. Enclosure (2) is forwarded to provide a common Seminar critique vehicle. It is requested that all participating activities (and major sub-elements) complete the critique forms and return them to this Headquarters, Attn: G54 not later than 31 May 1972.

J. K. Everson
J. K. EVERSON
Acting

HANDLE VIA BYEMAN/~~TALENT/KEYHOLE CHANNELS JOINTLY~~ ~~TOP SECRET~~ [redacted]

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POPPY OPERATIONS
SEMINAR
13 - 17 MARCH 1972

BYE-52, 383-72

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~~TOP SECRET~~ - EARPOP [redacted]

TABLE OF CONTENTS

~~TOP SECRET~~ - EARPOP [redacted]

HIGHLIGHTS

SEMINAR:
- Extremely useful and should be continued on a regular basis.
- 60 personnel representing field stations, NSA, CIA, PM-16, NRL, NAVSTIC, NAVSPASUR, NIC, NRO, HRB-SINGER, and DIRNAVSECGRUPAC attended.

PERSONNEL:
- Personnel base of operations experience is extremely thin. POPPY Project relies mainly upon OJT. Formal training in both operations and maintenance aspects are sorely needed.

PROCESSING:
- Trend is definitely toward more processing and analysis at field station level. NSA processing/analysis resources are hard pressed.
- Because of the SEL-810 computer's limitations, field station processing tasks must be carefully considered by tasking authorities. Geolocation processing capability is easily overwhelmed in dense environment collected by 7107 satellites.
- SEL-86 computer system will further press already crowded processing spaces at [redacted] Approved building expansion does not include more space for processing operations.

REPORTING:
- New format for [redacted] reporting was developed with all recipients and field station representatives concurring.
- Weekly Location Supplementary Reports have been revised to include EOB update information.

TASKING:
- No major changes in Tasking concepts are anticipated. New SOI Priorities and Processing guidance has been received and is being implemented. Special Task concept will be used for short term exceptional collection and processing requirements.
- Special Tasks are being prepared for collection and field processing/reporting on a variety of outstanding SLM requirements.

~~TOP SECRET~~ - EARPOE [redacted]

POPPY OPERATIONS SEMINAR
MARCH 1972

SYNOPSIS

I. The first POPPY Operational Seminar was held at the Headquarters, U. S. Naval Security Group Command 13 through 17 March 1972. The primary goals of the seminar were:

A. To develop a more effective and responsive dialogue between the POPPY field stations, and between the field stations and the Washington area Program Management Community.

B. To identify any current or potential operational problem areas, and to establish specific courses of action for the overall improvement of POPPY operational performance in terms of field operations, operational management, and overall data exploitation.

C. To provide field station representatives with the available details of current planning for future development of the POPPY Program, and to present an opportunity for these representatives to influence future Program planning from a system's operations point of view.

II. The scheduled Agenda (Appendix A) was coordinated in detail with appropriately knowledgable individuals representing each of the participating organizations. Additionally, a number of common interest subjects, not specifically identified in the Agenda, were introduced and discussed to the extent required by the character of each subject. Briefing presentations and information exchanges were dynamic, based on thorough preparation and expertise, and were highly informative for all present. This report represents the gist of the Seminar Agenda discussions as recorded by members of the Naval Security Group Command Headquarters Staff.

III. Of the results achieved by the POPPY Operations Seminar, the most important were the areas of potential improvement which were highlighted, the decisions made upon which early action will be taken, and the identification of actions which will be necessary in the near future. All these areas were thoroughly discussed during the daily Agenda sessions and were recapitulated for the record during the Friday, 17 March afternoon wrap-up critique. The following were considered worthy of specific action and/or detailed follow-up research:

A. PROCESSING

(1) Currently, the primary computer systems must be used to perform essential, but non intelligence-producing housekeeping functions such as digital quality control editing (QCED), Program LOG, and generation of tapes for the Auto-track system. It may be possible to employ a much smaller, relatively inexpensive mini-computer system, similar to the machine now being used at [redacted] to perform such tasks, thereby relieving the primary computer system entirely to exploit data. This matter has been referred to the Program Director's Office (PM-16) for consideration and action as appropriate.

(2) Preliminary work is now being done on software for the System SEL-86. The system, and the initial software, is currently scheduled for shipment to [redacted] approximately 31 August 1972. The initial software (Phase I) will be off-line oriented and will use the output of the SEL-810/PDE combination [redacted] and produce geolocations [redacted] but there will be no Count and Plot options. Phase II of the system SEL-86 software development will incorporate [redacted] through [redacted] and complete the on-line capability for the SEL-86 to PDE interface. This will free the small SEL-810 system for off-line work. A potential problem area in deployment of the system SEL-86 is the physical space limitations in the computer room at [redacted] If the new system is only slightly larger than the current installation, the impact upon working conditions in this space will be significant because the existing 563.5 square foot computer room is now being fully used. This matter has been referred to NRL to insure that the planned installation's equipment density will not limit access or inhibit equipment operations.

(3) [redacted] has had difficulty with processing target emitters in some bands which include heavy concentrations of U. S. emitters. These heavy, friendly emitter data densities are especially prohibitive to the isolation of new or unusual emitter activity as well as subsequent Technical Intelligence analysis. NSA recommended that source filtering be considered and the matter will be referred to NRL and NSA for research and resolution.

(4) It was recognized that the field station personnel, particularly at [redacted] will not be able to continue to research software techniques in the field because field processing and reporting requirements have become far more demanding during recent months. This software development dialogue between the field stations and the Program writers at NRL and HRB Singer has been extremely effective in the past and should be continued to the maximum degree permitted by tasking assigned to each station. No specific action is required.

(5) The mobile van which houses the second computer system at has been granted a one year continuance of the temporary SAO accreditation by DIA. Firm plans must be made for the vacation and removal of this structure as soon as is possible since the National SAO security authority may not see fit to continue accreditation of an enclosure which does not meet minimum established construction criteria for structures housing SAO operations. This matter will be coordinated with the Program Director's Office (PM-16) for early, appropriate action.

B. OPERATIONAL TASKING

(1) It was generally recognized that the satellite collection system far exceeds the capability of the field processing systems, both analog and digital. For this reason, it is essential that all processing tasks, including routine, continuing and special, short term, must be implemented very selectively with knowledge consideration given to the overall processing load for a given field station. This consideration is particularly critical in tasking because that station faces the most dense emitter environment of any of the field stations, and is routinely the most heavily tasked with processing and reporting requirements. Conversely, it appears that both processing capabilities are not being put to full use because of the manner of their tasking. NSA has indicated that this will be reviewed to determine what additional processing tasks should be assigned to to more fully exploit the emitter environment in the Pacific area.

(2) Tasking of collection system RF bands must take into account the nature of the geographic environment at the time a particular grouping of RF bands is activated. The system currently in use (Task Group rotation cycles at each of the field stations) is generally arbitrary with respect to time of day, geographic area covered during a given pass, and unexpected collection opportunities (these factors are taken into account for many Special Tasks). For these reasons, a station's probability of collection against specific RF band/geographic area combinations may be very low without this fact being generally recognized. SAFSS (SOC) and NSG (G54) will review this, in coordination with NSA, to determine if collection of some RF band/geographic area combinations should be optimized.

(3) There are currently outstanding requirements for beam/power measurements against 40 different target emitters which can be collected by POPPY payloads. Special Tasks have been used in an attempt to fulfill these in the past; however, these have generally

required re-interrogation after the target signal is recognized on-line. This procedure is only partially successful since it automatically precludes the intercept of the lower beam levels. NSA and NSG (G54) are coordinating to provide specific guidelines to the appropriate field stations for collection of SLM data against a few target emitters at a time. It is anticipated that the desired bands will be activated in the SLM Mode upon initial acquisition during passes which have been carefully selected to provide maximum probability for intercepting the desired emitters and that this procedure will continue on a five percent of total collection basis until each of the requirements is fulfilled. As frequently as is possible, multiple SLM target emitter RF bands will be combined into a single SLM Task Group.

(4) The Comb Filter capability in the Alfa/Bravo payloads has not been operationally tasked at Task Groups will be established for Task Group Rota which will include Comb Filter segments of greatest potential value to the station's geographic area and processing tasks. NSG (G54) will take action to coordinate and implement this tasking.

(5) NSA advised that there will be a decreased emphasis placed upon Soviet ABM systems in 7107 mission collection and processing guidance. This guidance has been received at NSG for implementation and it is apparent that emphasis has been shifted to developmental signal technical intelligence. No specific action required with the exception of the implementation of the new processing guidance from NSA. This guidance document is now being reviewed and will be implemented in the near future.

(6) NSA representative officially requested that in the event a payload(s) suffer a catastrophic failure which necessitates the cessation of collection, all magnetic tapes in the "hold" bank be held and not recycled for collection of other payloads still operating. This policy has been implemented.

(7) Satellite was discussed and field station representatives indicated that they are often inhibited in locating high interest emitters, particularly s and weapons control emitters with small beams, due to insufficient or no simultaneous illumination of both payloads This contraint becomes more critical as is increased. Currently, an extensive study is being conducted to determine optimum of the system to follow 7107. This study will be completed in the near future and should permit SAFSS (SOC) to determine if the current 7107 payload should be changed.

(8) The highly seasonal character of Soviet Naval activity within [redacted] coverage area was stressed by the station's representatives and it was clear that the station should be given additional processing (computer oriented) tasking during the periods of minimum ocean surveillance support opportunity. This can most efficiently be done through use of the continuing Special Task concept and appropriate tasking is being developed by NSA (this will be considered carefully since the recently revised SOI requirements will load the station much more heavily with processing tasks than has been the case in the past).

C. EPHEMERIS. The NAVSPASUR five-line ephemeris elements have been erroneous on numerous occasions in the past due to garbles or hits in transmission. If these are detected, the stations may take alternate action, i.e., standard Brower elements can be used for geolocation processing instead of the Extended elements. However, if errors are introduced which are not apparent in the check sums, the results of processing will be erroneous without the processing station being aware. Since the data from the five-line data actually used in the geolocation processing data base is only a small percentage of that forwarded in the present format, communications and handling time is also greater than required. It was established that NAVSPASUR can change the formatting of ephemeris forwarded to POPPY stations, both ETE and Standard forms, to provide a single-line format which can be repeated three times for each data set, thereby significantly reducing the possibility of undetected errors. Implementation of single-line elements requires changes in the existing operating software. Accordingly, this matter has been referred to the Program Director's Officer for action by NRL and/or HRB Singer as appropriate.

D. ANALYSIS

(1) All the field station representatives felt very strongly that CRT display systems should be provided for the computer systems as soon as possible. These CRT units would significantly improve system I/O and operator analysis capabilities tasks far more tenable. This matter was referred to the Program Director's Office (PM-16) strongly recommending that early procurement action be taken.

(2) Increasing emphasis is being placed upon isolation of New/Unusual and Unidentified signal activity at the field station level, and the accelerating trend toward more, and more rapid, Technical Intelligence analysis exploitation in the field, has grown to proportions considerably greater than is appropriate to current manpower and analytic equipment resources. Accordingly, Resources

Change Proposals (RCP's) will be submitted for personnel increases at the most heavily tasked field stations to enhance their capability to perform Technical Intelligence analog and digital analysis. In addition, a recommendation will be forwarded to the Program Director's Office (PM-16) for the provision of additional analog analysis equipment at these stations.

(3) There is a recognized need to better define the nature of the "Technical Intelligence" analysis requirements for each of the specified target SOI's in order that field station analysis personnel may better direct their time and efforts to those requirements of highest priority. This deficiency has been recognized by the cognizant element at NSA and an effort will be made to provide definitive guidance wherever possible. (The most recent SOI requirements guidance, which has not yet been promulgated to field stations, provides some of these guidelines.)

(4) In discussing Special Tasks, it became apparent that time critical criteria are sometimes specified when it may in fact not be necessary. In some cases, it appeared that the desired data may well have been more appropriately processed at NSA after receipt of the digital tapes collected in response to a Special Collection Task. It was indicated that the necessity for time critical processing and reporting criteria would be more carefully considered in implementing future Special Tasks. NSA and NSG (G54) will provide continuing coordination on this matter.

(5) There is a need to review the requirement for computation and reporting of Azimuth and Elevation data. Requirements for this data will be limited to those emitters against which there is a valid need for such processing. NSG (G54) will coordinate with NSA to define this requirement.

(6) An operational concept for the use of the Priority Data Extractor (PDE) equipment has not been fully developed and it is expected that a policy of flexible application at the field station level will continue until the system's impact on field processing is better understood and documented. In the interim, field station representatives were encouraged to exchange their ideas and conclusions as the equipment is applied in varying conditions and roles. No specific action required at this time.

(7) The field stations, particularly [redacted] are not receiving many NSA produced ELT and ELO reports of the T/K/E classification series which are pertinent to their geographic areas and assigned mission. Mr. CONLON (NSA W242) indicated that he would take action to insure that the stations receive all technical ELINT product which is appropriate to their mission, including that in T/K/E channels.

E. PERSONNEL AND TRAINING

(1) Both [redacted] recommended that the field stations be authorized to make use of the 7105 and 7106 satellite systems on a flexible, local option basis for training and to make best use of time and resources when not fully occupied with 7107. This proposal was concurred in and has been implemented with SAFSS (SOC) guidance.

(2) All the field station representatives indicated that they are having difficulty maintaining effective experience levels in POPPY operations. This deficiency currently appears to be most imposing at [redacted] has a larger personnel base allowance to work with. There are a number of factors combining to influence this situation, including the drain-off of experienced personnel for manning [redacted] and the recent effort to channel experienced POPPY personnel into NSA analysis elements and Program "A" [redacted] BUPERS policy governing the transfer of enlisted personnel also appears to work against a very small, highly technical program such as POPPY in some instances. In addition, the lack of a focal point for formalized training in the past has forced the POPPY program to rely almost entirely upon on-the-job training for both its operators and maintenance personnel. The need for improved training for POPPY Program personnel has long been recognized and was an important factor in the decision to establish a new facility at [redacted] In addition to performing a full operational mission, the [redacted] site will conduct POPPY program dedicated operator and maintenance training at basic and advanced levels on a continuing basis. Planning for this training program is well underway and it is anticipated that actual training will commence during the 1st quarter FY73. NSG (G54) is in continuous contact with NRL and the Program Director's Office concerning the implementation of the [redacted] training program.

[redacted]

F. REPORTING

(1) Field station representatives indicated that a considerable amount of processing (geolocation) is done which is not productive because there is no requirement for EOB update information from the POPPY system. (NSA W41) expressed keen interest in this and indicated that the requirement would be reviewed. Subsequent request from NSA indicates that the information is desired and reporting procedures are being coordinated for early implementation.

(2) The possibility of authorizing the field stations to issue product reports was discussed and the NSA representatives indicated general approval. Should this procedure be implemented, it is expected that initial requirements will be for type reporting. It was agreed that field involvement in reporting, which requires a much more sophisticated signals analysis capability that is presently available in terms of personnel and analytic equipment, should be approached on a highly selective basis. NSA will take action to define the manner in which and/or product reporting from the field should be implemented.

(3) The Report series was discussed in detail and a new procedure was developed during the Seminar based on revisions proposed by This procedure was approved with minor modifications and will be implemented in the near future. The new procedure will involve a formatted daily report, a weekly summary and a special message series to be used in the event of payload or ground equipment failure.

G. GENERAL

(1) The SEL-810 computer system to be installed at will probably be the system now installed at NRL engineering facility. The actual deployment of this system is dependent upon the return of the second SEL-810 system from , which is in turn dependent upon initial deployment of the SEL-86 system to It is apparent then that installation of the computer system will be driven by the SEL-86 system's deployment to which is currently scheduled for August 1972. It was considered very important that the SEL-810 computer system be deployed to as soon as possible after the facility is made ready for occupancy and the collection system installed. Two possible alternatives are; 1) to ship the second system from early (leaving only the on-line computer), or 2) ship the SEL-810 system from as soon as the site is ready and make do without the system at for approximately two months. The latter

alternative would appear to be preferable for an operational point of view. This matter has been referred to the Program Director's Office (PM-16) for scheduling and resolution.

(2) In the past, NSG (G54) has maintained a system of accounting all Unidentified Signals of Interest reported by the POPPY field stations, and has forwarded machine listings to all the field stations to insure appropriate coordination of this important aspect of POPPY operations. The NSA W24 representative indicated that NSA would be willing to take over this function and would insure that the field station's Unidentified Signals of Interest status records are maintained current. NSG (G54) will continue to monitor all Unidentified Signals of Interest reporting and analytic feedback and will provide any assistance required.

(3) [redacted] representatives indicated that there were indications that considerable information is being produced by PACOM ELINT Center which is pertinent to their mission but is not routinely available to them. DIRNAVSECGRUPAC representative accepted action in this matter and indicated that he would coordinate with PEC and the POPPY field stations to insure that all information appropriate to their operations would be made available.

(4) All the field station representatives indicated a requirement for accurate charts of their geographic areas, updated ECAC publications, and new copies of Jane's Fighting Ships. Action is being taken by NSG (G54) to provide this material.

(5) Procedures for ordering re-supplies of magnetic tape were discussed and it was agreed that these requests should continue to be forwarded to NSG for coordination with NSA. However, Mr. CONLON (NSA W242) expressed an interest in being kept aware of magnetic tape orders and shipments and revised request procedures will be implemented by NSG (G54) in the near future.

(6) In order to implement that part of the approved new [redacted] Reporting procedure which will deal with Special reports of payload malfunctions/failures, it will be necessary that NRL provide specific channel Alfa and data link indications criteria which they feel would suggest a failure or malfunction mode of significant proportion. Mr. [redacted] (NRL) advised that NRL is extremely interested in being advised as soon as any such criteria are met; however, Mr. LORENZEN (NRL) indicated that it might not be possible for NRL to provide this information right away because the cognizant personnel are heavily involved in other projects. NSG (G54) will continue to coordinate with NRL on this matter and will provide the most definitive guidance possible as soon as it can be acquired.

~~TOP SECRET~~ - EARPOP [redacted]

POPPY PROJECT OPERATIONS SEMINAR
MINUTES

I. MONDAY, 13 MARCH

A. The first annual POPPY Operations Seminar was opened by the Commander, Naval Security Group Command, RADM Chester PHILLIPS at 0900 with a welcome to participants representing NSA, NRL, COMNAVINTCOM, CIA, CNM (PM-16), NSG, and the POPPY field stations. He stressed the "operational" character of the Seminar and the opportunity that it offers for an effective interface between the field operational perspective and the Washington tasking and management community. RADM PHILLIPS stressed the importance of the demonstrated POPPY system capability to support tactical, time-critical intelligence requirements, most importantly at present Ocean Surveillance support to U. S. Fleet elements. He emphasized the world-wide character of the Navy's Ocean Surveillance intelligence requirements and the POPPY system's success in providing responsive support to these requirements. RADM PHILLIPS concluded his discussion by recounting the Naval Security Group's historic role in the POPPY program and in the development of the Overhead Reconnaissance Ocean Surveillance concept which has used the POPPY program as its vehicle.

B. The Director, Program "C", CAPT Robert GEIGER, gave a brief discussion of the Program Director's role, responsibilities and relationship with the National Reconnaissance Office (NRO). He discussed the NRO's support to the military services' intelligence requirements, including tactical time-critical collection from ocean areas. He reiterated the POPPY Program's development of tactical overhead ocean surveillance and indicated that it has been this factor which has recently resulted in decisions to alter the character of POPPY to provide even greater ocean surveillance emphasis. CAPT GEIGER closed by stressing the importance of the interface between the system's designers, builders, managers, and the personnel who operate the system in the field.

C. [redacted] CNM (PM-16), gave an overview of the PM-16 organization, responsibilities and discussed the programs currently managed by PM-16. He discussed the Fleet Communications Satellite program, [redacted] and Program "C" (POPPY) in detail, showing development cycles and research efforts applicable to each. The future direction of the POPPY program was presented including current planning for an optimized [redacted], main beam system with an on-line mass processing capability for developing emitter locations. [redacted] emphasized that this new system is being developed as a total concept, including orbital and ground hardware and software, management organization, training for field personnel, and responsive communications and logistics services.

D. Mr. Howard O. LORENZEN, Superintendent Space Systems Division, Naval Research Laboratory, who has been prominently associated with the POPPY Program since its inception at NRL in 1959, gave a brief talk on the program's history of development to its current capability. Mr. LORENZEN stressed the "stepping stone" character of this development with each new phase building on the successes and lessons of the last. He emphasized the importance of the extremely effective team effort and spirit which has been carefully developed and sustained within the POPPY program and stated that it has been this team relationship which has made the Program the success that it is.

E. [redacted] POPPY Program operational coordinator, NRO Satellite Operations Center (SOC), gave a detailed briefing of the NRO organization and its procedures for controlling the various Overhead Reconnaissance programs. He discussed the character of each of the programs including POPPY, [redacted] STRAWMAN, TRIPOS/SOUSEA, URSALA and [redacted], explained the nature of the SAO compartmented classification systems as applicable to NRO programs. He reviewed the USIB SIGINT Overhead Reconnaissance Subcommittee structure and procedures and discussed USIB (SORS) guidance and priorities for the POPPY program.

F. The afternoon session was dedicated to operational briefings by each of the POPPY field station Project Officers. [redacted] U. S. Naval Security Group Department, [redacted] opened the session with a presentation of his station's geographic considerations, departmental and POPPY program organization and functions. During his presentation, [redacted] made the following points:

(1) The POPPY program at [redacted] moved into its new operations building in May 1971. The move was accomplished with a minimum of interruption to operational mission. The new SEL-810 computer system was installed concurrent with this move and after a Technical Phasing period of one month, the station was fully operational with a digital emitter geolocation capability.

(2) The current concept of RF band tasking does not give adequate consideration to geographic factors, i.e., station and potential target locations and satellite coverage opportunities. [redacted] suggested that the [redacted] may benefit from a revised concept which would give emphasis to specific targets and RF bands based on the equator crossing of the satellite orbit to optimize collection opportunities for high interest emitters in both ocean and land areas.

(3) The PDE at [redacted] is a very recent acquisition and the station has not yet fully assessed the equipment's application in the [redacted] environment. Initial indications are that the system will find less use at [redacted] than has been experienced at [redacted] due to the less dense emitter environment and the highly seasonal nature of emitter activity. [redacted] at the time of his briefing was

not fully familiar with the most recent NSA Signal of Interest (SOI) assignments. These assignments, which are far more extensive than those currently in the field, may have considerable impact upon the use of the PDE equipment at all the field stations.)

(4) Both expressed concern for the training and retention of POPPY program personnel. This subject was not discussed in detail at this time because training requirements and planning is to be dealt with separately on Thursday, 16 March.

(5) briefly recounted some of his station's more significant intercepts during the past 9 months including:

(a) Intercept of the in August 1971. This was the first location of this site from

(b) During August/September 1971, combatants of the Soviet Pacific Fleet deployed out-of-area and transited within close proximity to in route to the Hawaiian area and back to home fleet waters. During this transit, provided significant support in the form of reports which included the identifications and locations of these units. presented the track of the vessels, based on POPPY intercept alone, which accurately represented the movement of the units throughout the deployment.

(c) support to the first exercises was discussed briefly.

(d) On 9 December 1971, intercepted the system for the first time. This system has since been intercepted numerous times by and has been located at three separate sites in the Soviet Far East.

(e) On 19 December 1971, intercepted the 71 degree boresight of the site for the first time. (NSG (G54) is coordinating with NSA and SOC to provide more coverage of this sector from)

G. POPPY Operations Officer presented an operational and organizational overview of POPPY operations at He discussed the following points during his presentation:

(1) Effective area of coverage, based on intercept and geolocation histories, extends to 50 North, west along the Soviet Mongolian border, includes the eastern two-thirds of China, eastern Indian Ocean

(including Malacca), Pacific Ocean area (within radius approximately 3500NM), the Sea of Japan, Bay of Bengal, and Philippine Sea.

(2) Concerning the ELINT environment, the great number of U. S. emitters in South East Asia, and their high levels of activity tend to mask the 250-500, 1200-1800, 5200-5800, and I-band RF ranges. This masking often causes severe processing backlogs when attempting to process SOI's in these bands.

(3) The station provides little support to the Vietnam War intelligence effort. This is because few emitters in North Vietnam are designated as SOI's with the exception of occasional Special Task efforts. The stations effort to intercept and locate sites in North Vietnam has been inhibited by the very short (30 seconds or less) durations of radiation from these emitters.

(4) With the exception of out-of-area deployments the station's support to Ocean Surveillance is confined to intercepts from the Sea of Japan/Vladivostok area.

(5) The great majority of the locations of target emitters located by the site are not reportable because they equate to known EOB locations and there is no requirement for POPPY program EOB update reporting. For this reason, a very large proportion of all station computer geolocation processing is unproductive in terms of reportable product.

(6) The station's Project maintenance posture has been very good with little operational down time due to equipment failures. This fact can be attributed to responsive logistics support from NRL, technical engineering support from both NRL and HRB Singer, and increased emphasis placed upon maintenance training (usually at factory) over the past year. (The willingness exhibited by BUPERS to accommodate inter-station transfers of POPPY equipment trained maintenance personnel has also been a significant factor.)

H. LTJG Robert LENTZ presented the Naval Security Group Activity, operational briefing, including the Command organization, relationship with FRG Army units stationed at , and the organization of the Operations Department which is concerned exclusively with the POPPY Program. LTJG LENTZ graphically displayed the station's area of coverage, including target opportunities, and discussed the manner in which the station conducts POPPY collection, processing and reporting. During his briefing, LTJG LENTZ discussed the following:

~~TOP SECRET~~ - EARPOP [redacted]

(1) The station has two full computer systems, one interfaced with the PDE, for performing both Ocean Surveillance and other national processing tasks. These computers, both SEL-810 systems, are operated as efficiently as is possible; however, heavy tasking of the [redacted] project type easily saturates the total capability to the extent that considerable backlogs of routine tasks occur. When these "crunches" occur, the station adheres rigidly to the established priorities. Unident SOI analysis and reporting is never inhibited to perform other tasks.

(2) Special operational tasks which require the time critical processing and reporting of large numbers of parametrically different radar emitters confined to a small area of interest are particularly difficult for the stations because they require so much non-productive processing. Significant here is the fact that virtually all the emitters of a given type must processed entirely on the computer before locations are derived and after this processing has been completed it frequently occurs that none are located in the area of interest. This processing power might well be more productively used by directing emphasis to the few emitters of primary interest rather than tasking the station with processing all the emitter types which the interest area's EOB is known to include. (This rationale also applies to the other stations, but to a much lesser extent since they are not so heavily tasked with processing functions. At [redacted] such tasking may even be the most productive use of the field processing capability.)

(3) LTJG LENTZ described the Ocean Surveillance environment in which [redacted] operates in detail. Currently, there are known to be [redacted] platforms which routinely operate within [redacted] satellite horizons. [redacted] are routinely processed on-line using the PDE in either the [redacted] mode. With the exception of the last orbit pass of a series, there is not enough processing time to attempt [redacted] parameters. During the month of February, [redacted] including [redacted] reports, Project Flavor and daily location reports. Of these 436 were [redacted] report entries.

(4) The comb-filter on the Alfa/Bravo payloads has not proven to be a significant collection or analytic aid. As a matter of routine, the station intercepts [redacted] from the Charlie/Delta payloads which are not present in the Alfa/Bravo data immediately preceeding the Charlie/Delta collection pass. The reason for this lack of intercept from the Comb Filter has not been explained but the station feels it may be a matter of sensitivity. (According to the system technical descriptions, the Comb Filter bands should be more sensitive than the equivalent Crystal Video open bands in the Charlie/Delta payloads.)

(5) LTJG LENTZ stressed the "extreme" nature of the emitter environment at [redacted] to give emphasis to the critical facets which must be considered in providing processing guidance or tasking. In some cases, the processing of one emitter type alone is sufficient to overwhelm the entire processing system. An extremely significant aid to dealing with this environment, particularly with regard to Technical Intelligence Processing and Unidentified Signal Isolation, has been the recent addition of the [redacted] Filter equipment to the analog Quality Control Positions. This unit permits the analog scanner to process one RF band of data at a time, thereby greatly reducing the data densities which he must deal when attempting to recognize and analyze new activity. (A second [redacted] is being forwarded to the Station for use in the secondary analog processing position.)

(6) [redacted] has the Auto-track system installed and functioning well. This device, which is installed in the command/interrogation (BLUE) position, uses a pre-prepared paper tape and re-orients the collection antennas in 15 second increments. This frees the collection operators to perform on-line analysis functions and obviates the need for manual tracking of the antenna. The greatest gain achieved from using the auto-track system is probably the improvement in the quality of the data collected on the digital tapes. Previously, when manually tracking the satellites, the operator would often not re-orient the antenna until he could tell that the data was being degraded (payload out of the collection antenna beam pattern). By the time the collection operator was aware that the data was being degraded, it was already below the digital system thresholds thereby leaving gaps in the data.

(7) [redacted] feels that one of the station's more significant operational developments has been the use of a separate Evaluation and Reporting Group which correlates the processed data to EOB sites or shipborne units, maintains continuity and currency of reference material, and prepares final reports. This group works days (seven day per week) and provides definitive guidance and procedural instructions to the watch sections for all reporting functions. The group also performs functions in areas of statistical interest, and their records have often led to "break throughs" concerning patterns of operational acitivty.

(8) In closing, LTJG LENTZ discussed the tremendous capability of the 7107 system to collect data, relative to the ground station's limited ability to perform any form of processing or preliminary analysis. He strongly urged that, until a more powerful computer processing system is available to the field stations, tasking of the processing capability currently available be very selective with due regard to the system's saturation thresholds.

~~TOP SECRET~~ - EARPOP

I. presented a brief overview of the POPPY operation at Six men are associated with the effort and these also perform other functions at the site. One man (eight man-hour day) performs preliminary analog analysis and prepares technical SOI reports which are forwarded to NSA. Additional analysis is also performed on an "overtime" basis. The auto-track system is also installed at and has been of significant aid in freeing the limited number of personnel to perform analytic functions.

I. reported that the GR2800 analog tape recorders at are getting old and very troublesome and require an inordinate amount of maintenance. The station's maintenance personnel are generally of engineering caliber; however, operator's usually have little or no experience in ELINT or the POPPY system. is an exception in that while on active duty with the Naval Security Group, he worked in the POPPY project at To improve the experience level at it was recommended that operator personnel destined for duty at be routed through for a period of one to two weeks for familiarization with the hardware and the emitter environment, much of which is common to and . CDR Mc GRAW quickly agreed to this arrangement and suggested that personnel make fullest possible use of the POPPY maintenance and operator training program now being planned for

K. presented photographs of the POPPY facility now being constructed at The building, which will be very similar to those at is now 72 percent complete and should be ready for occupancy in July 1972. Seven men have already reported to the station for assignment to the POPPY project and these have had prior experience in POPPY operations. The full complement will be maintenance personnel. In addition to these permanently assigned personnel, others will be assigned to temporarily for project training purposes. indicated that his station is very enthusiastic about the prospect of commencing POPPY operations and is particularly interested in the planned training program.

POPPY OPERATIONS SEMINAR
MINUTES

II. TUESDAY, 14 MARCH 1972

A. The Agenda for the Second day of the POPPY Operations Seminar was designed primarily to provide for a dialog between the field station representatives and the NSA elements which are consumers of POPPY raw and field processed data. These included the W41 organization for Operational ELINT and W24 for Technical ELINT.

B. Mr. John DOHENY, Chief of the Office of Technical ELINT (W24) presented the organization of the NSA "W" group illustrating the involvement of each in the POPPY program. NSA's responsibility, under the USIB, includes the processing and analysis of all data collected from overhead resources, including the POPPY system. The NSA receives basic policy guidance from the USIB (SORS) which provides targets and priorities for each of the overhead programs and tailors this guidance to the peculiarities of each system. Since the processing systems used at the POPPY field stations are a part of the overall NSA processing resource, provision of specific field processing guidance is also an NSA responsibility. In this respect, Mr. DOHENY emphasized the primary technical search role of the POPPY 7107 system and the urgent need to more effectively exploit the system for Technical Intelligence during field processing.

C. Mr. DOHENY indicated that the importance of the Navy's Ocean Surveillance requirments are well understood and supported at NSA; however, he felt that the POPPY Field Station's efforts in support of this requirement should not be emphasized to the point that the continuity of Technical Intelligence search and analysis in the POPPY program is placed in jeopardy. He ennumerated several outstanding Technical Intelligence requirements particularly applicable to the POPPY system and indicated that these were being included in the latest processing guidance. This guidance will include detailed instructions to the field stations concerning what information and analysis is required for each of the Signals of Interest. It will also include for the first time, information concerning the primary Soviet and Chinese Radar Research and Development areas. Collection and processing against the Soviet ABM systems will be de-emphasized since other overhead systems are being designed specifically for that function.

D. Mr. DOHENY discussed Technical Feedback to the field stations briefly and stated that W24's effort in this important area is being re-emphasized. The field station representatives agreed that Technical support feedback in recent months has improved greatly. Through his discussion, Mr. DOHENY emphasized the need to find better and more

effective ways to process POPPY data. Specifically, NSA is trying to identify more clearly those processing functions which can most efficiently be performed at NSA and at the field stations, giving equal emphasis to Tactical, time-critical and Technical Intelligence requirements. Mr. DOHENY felt that these two requirements, though seemingly in conflict, are frequently complementary in that the systems of highest interest tactically can often be more fully exploited and understood during the equipment development and testing phase through effective Technical Intelligence processing. Examples of this concept are intercept and analysis of the Soviet SAM systems which still at the Research and Development test centers. He indicated that this approach is also highly valid for weapons systems designed for shipborne installation. Mr. DOHENY concluded by briefly discussing some of the POPPY systems more significant contributions during the past year. These were as follows:

1970
1970-1971
1971
1971
1971
1971
1971

1971
1972

E. Mr. John CONLON, NSA W242 (POPPY data analysis), discussed the most recent "Mission 7107 Processing, Analysis, and Reporting Requirements." (This document, recently received at COMNAVSECGRU, is being reviewed and will supersede the current SOP Module 4.0) These requirements are based on USIB (SORS) guidance for Mission 7107 which is included as Appendix C.

F. NSA Processing, Analysis and Reporting requirements have been documented in four sections as follows:

(1) ANNEX A - Lists target emitter SOI's giving RF, SEDSCAF Code, Emitter Name, and general deployment trend. (Total list may not be applicable to each field station.)

(2) ANNEX B - Analytic Worksheet which defines the specific analysis and processing requirement outstanding for each emitter SOI, together with appropriate background on each emitter or system's development.

(3) ANNEX C - Emitter SOI's in prioritized (rank of importance) order, with Data Handling and Reporting Factors (DHRF), and the nature of field processing or analysis required for each SOI, i.e., Parametic refinement, Goelocation, Activity Monitoring, etc.

(4) ANNEX D - Listing of Soviet and Chinese Research and Development facilities which have been associated with radar and electronic weapons systems testing.

The gist of Mr. CONLON's brief is included as Appendix D.

G. Mr. CONLON indicated that the new SOI priorities and requirements had been "tailored to the POPPY system" and had been aimed primarily toward satisfying outstanding Technical Intelligence analysis requirements against developmental signals. In a brief discussion of the trade-off between field and NSA analysis of POPPY data, both digital and analog, Mr. CONLON indicated that resources currently available to NSA (primarily manpower) were extremely limited and that unless high interest emitter activity was detected at the field station level, it might not be detected at all. Mr. CONLON also indicated that NSA would soon contract with ITT Corporation to have long term, fine-grain analysis of certain selected POPPY data done outside under NSA supervision.

H. Mr. BUSCH (NSA W41) presented a briefing detailing NSA role and requirement in "Operational ELINT" as opposed to Technical, signals analysis oriented ELINT. He discussed the various operational scenerios in which Operational ELINT is applied and described Soviet and Chinese EMCON Models (Appendix E). Mr. BUSCH emphasized that the essential elements in Operational ELINT are the target emitter's location, and the nature of the electronic environment in an interest area. The Special collection and processing, time-critical tasks levied on POPPY field stations over the past several months were discussed and Mr. BUSCH explained the nature of the requirements on which these tasks were based and discussed some of the results that were achieved by overhead reconnaissance generally. The following were among those discussed:

(1) PROJECT POTPOURRI - A WARSAW Pact ground forces exercise in which an amphibious landing on the East German Baltic coast was anticipated but did not materialize.

(2) ROPEVAL 3-71 - The majority of U. S. Naval Activity associated with this exercise took place off the Southern coast of California (SOCAL OP Area). STRAWMAN, TRIPOS/SOUSEA, and POPPY were tasked with Ocean Surveillance support. STRAWMAN/TRIPOS/SOUSEA were operated in the transponder mode with data transmitted directly to [redacted] and processed in the QRC mode at [redacted] A dedicated TTY link was established between [redacted] The POPPY facility at [redacted] was tasked with location of certain U. S.

emitters in the exercise [redacted] reporting these to the FCSC in essentially the same format as is used for [redacted] reporting. [redacted] simultaneously continued routine processing and reporting of established [redacted] targets.

(3) PROJECT LEMONWOOD - ("YUG") was a multiforce exercise conducted in the Black Sea/Crimean Peninsula area with an Amphibious landing anticipated. STRAWMAN, TRIPOSE/SOUSEA, and POPPY were tasked with overhead collection against this exercise with a time-critical reporting requirement of 6 hours. A large number of target emitters were listed in this collection requirement and all intercepts of these emitter types required processing in order to determine if those signals intercepted emanated from the exercise area. Very little output resulted from the overhead sensor system tasking, and subsequent analysis of the exercise activity revealed that most of the activity was airborne.

(4) PROJECT LONGBOAT ("ISTOK") was an exercise which was expected to take place in the Bulgarian area during August 1971. Overhead sensor tasking resulted in little output and subsequent analysis of all source data could not establish whether or not any exercise activity had actually taken place.

(5) PROJECT GRANADA - was implemented in May 1971 in response to U.S. Navy requests for Ocean Surveillance support from overhead sensors on a continuing basis. This Project applied specifically to the TRIPOS/SOUSEA and STRAWMAN systems since POPPY was already tasked with time-critical Ocean Surveillance reporting [redacted]. In response to Project GRANADA, [redacted] processes shipborne emitter data and forwards the results to NSA for dissemination into Navy intelligence channels. Occasionally, GRANADA report information is provided directly to U.S. Navy consumers rather than routed through NSA.

(6) PROJECT ABSCOND - was implemented 24 September - 4 October 1971 in response to a CINCLANT requirement for support during the Royal Knight exercise. This exercise took place in the Norwegian Sea area and involved the reporting of both U.S. Naval and Soviet Naval emitter locations. NSA provided information from Program "A", through CSOC (A81), directly to CINCLANTFLT by dedicated TTY circuit. Results of the overhead sensor effort indicated that U.S. Naval emitters are more difficult to exploit, primarily because the systems and personnel are not familiar with them and no parametric or identification data bases have been established.

(7) PROJECT FLAVOR - Is a continuing task for the intercept and location of all Surface-to-Air Missile (SAM) fire control activity discussed the rationale behind this task and the importance of the inforamtion which has resulted. has participated in Project FLAVOR almost since its inception and has made very significant contributions. particular the intercept and location of the

(8) PROJECT MILLBOARD - Is an effort by NSA to routinely report tactical ELINT data. This task has only recently been levied on the POPPY system (exclusively and, in this case, participation is limited to the anticipated duration of a SAM system training exercise in the The task is to terminate 1 April 1972.

(9) PROJECT LUTE - Was implemented concurrently with MILLBOARD with the same target emitters but a different area of interest. Tasking of this type is generally more productive than a single task because a greater number of the geolocations generated will apply to the reporting requirements. LUTE is in response to a U.S. Air Force requirement to establish the areas of highest and lowest emitter density along defined areas of the Soviet Baltic and Barents Sea Costs.

I. discussed Operational ELINT requirements and its applicability to the POPPY system. He was particularly interested and knowledgeable concerning POPPY's limited capability to perform "mass" geolocation processing against large numbers of emitters in the field, and indicated that he was preparing to brief the UISB (SORs) regarding tasking the POPPY field stations in this manner.

J. The first of the Tuesday afternoon sessions was presented by who discussed the Soviet SA-6 system its technical significance and its deployment. Recently, the POPPY facilities at have intercepted this system in the Far East on the Soviet Mongolian border and in the general vicinity of Vladivostok. The initial indications that the system was deployed to the Far East was provided by in a 27 November 1971 intercept. indicated that there are still many gaps in our knowledge of the SA-6 system and that a continuing analytic attack is essential. The gist of his presentation is included as Appendix F.

K. , presented a briefing of the development and current status of the Soviet ABM system and indicated that POPPY has been the best intercept sensor for the installations in the Moscow area. He discussed the Sary Shagan and Moscow complexes in detail and illustrated the fact that each of the emitters uses a distinct PRF rate and that the emitter installations can reliably be identified by its pulse rate. This procedure can also be applied to the more recently correlated installations which operate at exactly twice the Pulse Rate of the associated

emitter. also discussed the system's propensity for operating when certain of the Soviet Group Five satellites are passing overhead through the "ballistic missile slot" in such a way that they simulate the geometry of a ballistics missile arriving from a launching point in the United States. The gist of presentation is included as Appendix G.

L. , discussed the recent intercepts of an unusual signals. These were discovered while analyzing activity potentially related to Soviet SA-5 activity and may be related to SA-5 missile firings in some way. A number of these unusual intercepts have been correlated to SA-5 firings from Sary Shagan. The most significant difference in these signals is that they illuminate the POPPY payloads for extended periods of time while the bi-directional sector scan continues. The implication here is that the beam widths are significantly greater than normally associated with Special Tasks have been implemented at all POPPY field facilities concerning these signals.

M. (NSA W242) discussed the exploitation of POPPY Signal Level Measurement option. He indicated that this capability is not duplicated in any other overhead sensor system and stressed the importance of fully exploiting this capability in POPPY. There are currently forty outstanding requirements for collection of target emitter beam power measurements and NSA has undertaken to fulfill these within the calendar year 1972. Tasking is now being prepared for Special Tasks to commence collection of the required SLM data. Data collection tasking in support of Special SLM Tasking is expected to comprise 3 to 5 percent of total collection. The gist of discussion is included as Appendix H.

N. presented a briefing on the Priority Data Extractor (PDE). The PDE was developed to improve the processing timeliness on all emitters requiring time-critical reporting. Historically, one of the longest processing delays has come from the need to reformat the data prior to performing any sorts. The PDE, in association with SEL-810 software, can reformat the data, perform PRI sorts (up to two windows per RF band), and perform on-line burst making on selected signals of interest. The PDE/810 can handle 16 of the 24 possible RF downlinks from a 7107 A/B or C/D pass. The PRI window limitation, fairly small computer core size, and downlink limitations require extremely careful selection of parameters and emitters to be processed in a timely fashion. A poor selection of sort parameters can easily result in numerous system overflows, thus greatly reducing the value of any data retrieved, when in the mode; however, in the PRISOL (PRI sort on-line) mode, overflows can be easily

accounted for by using the "finish" option in the pulse sorting program SORTRAN. The PDE is most often used routinely on shipborne emitters at [redacted] emitters are the primary targets of interest. Parameter selection came as a result of lengthy trials and experimentation at the site to account for varying emitter densities (and thus overflow conditions). Each site receiving a PDE should have a period of time devoted to wide experimentation with the PDE/810 system to determine the most optimum modes of operation to meet that site's particular needs. Processing of a meaningful amounts of 7107 data would be impossible at [redacted] without the aid of this processing tool.

[redacted]

~~TOP SECRET~~ - EARPOP [redacted]

POPPY OPERATIONS SEMINAR
MINUTES

III. WEDNESDAY, 15 MARCH 1972

A. Wednesday morning began with Mr. Lee HAMMERSTROM (NRL) and Mr. Dick WALES (HRB) presenting a discussion on the SEL-86 which is to be installed at [redacted] and the software to be used with it. The characteristics of the SEL-86 computer are shown in figures 1 and 2. The machine is a 32 bit word length machine and has a significant increase in disk capacity (2 fixed head discs per system).

B. Mr. HAMMERSTROM stated that up to the present, the software has been developed to fulfill the general search mission of the POPPY system. This has involved a very close man/computer relationship with each processing step dependent on the previous processing steps. The new approach is to develop "on-line" software to use with an SEL-86/PDE combination to process automatically tactical targets.

C. Mr. HAMMERSTROM presented the following schedule for the deployment of the first SEL-86:

15 March - Begin SEL-86 Acceptance Test at HRB.

31 May thru 15 August - [redacted] HRBLOC software, deliver and evaluate software.

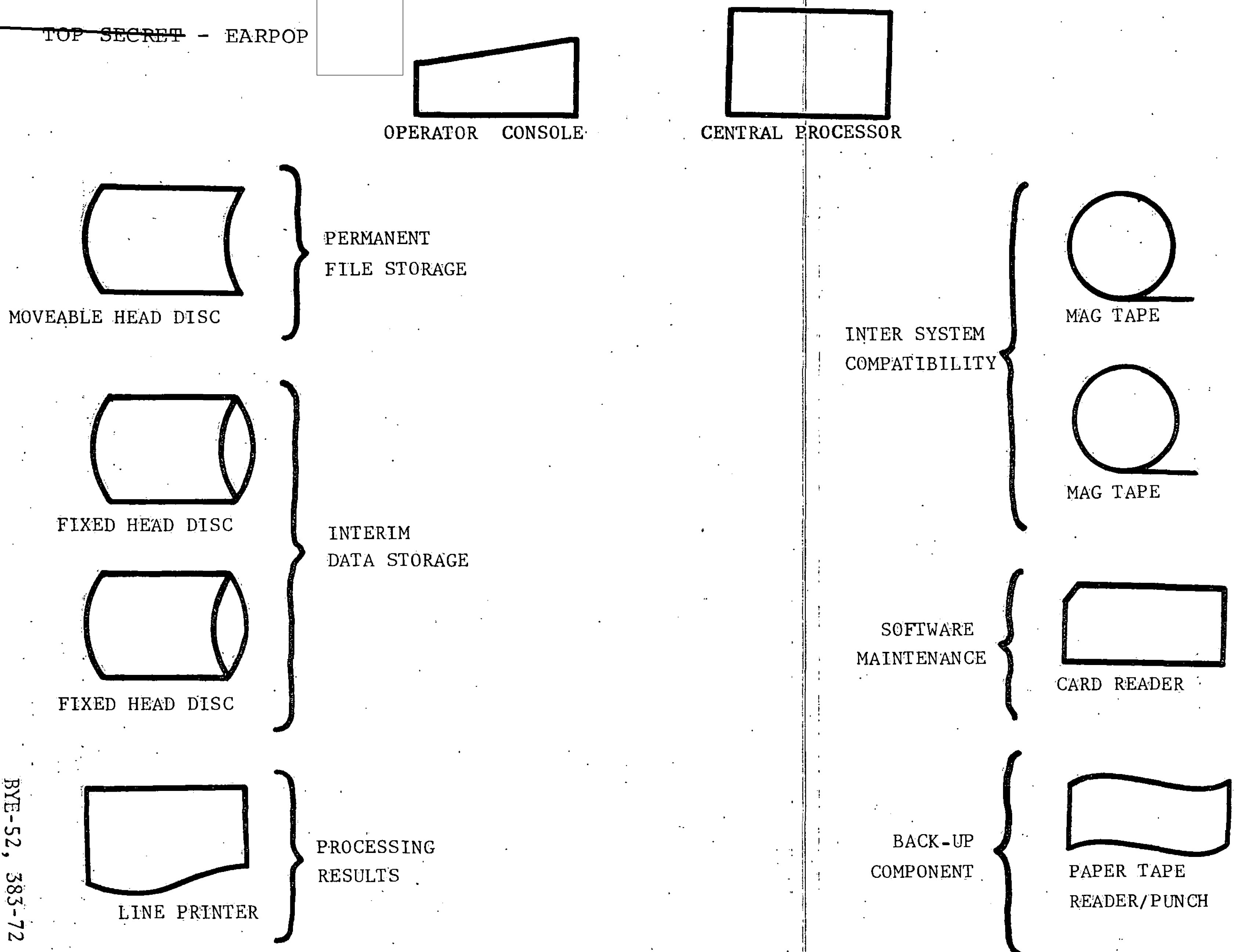
31 August - Ship SEL-86 system [redacted]

31 December - [redacted] field integration with PDE.

[redacted] expressed his concern over the physical size of the computer and whether it and the PDE can both fit in the present computer room at [redacted] Mr. HAMMERSTROM replied that 86 was not much larger than the present 810. Mr. WALES stated that at first the SEL-86 will replace the old SEL-810 in the computer van. [redacted] then questioned if this meant that the 810 would not be installed at [redacted] until after August. [redacted] replied that a decision had not been reached as yet but he doubted if [redacted] would be left with only one computer for any length of time. In reply to [redacted] he said that no decision had been made on the purchase of the SEL-86 for [redacted] but that they did have that purchase option.

D. [redacted] remarked that we must remember that accreditation of the computer van will become increasingly difficult and the possibility exists that we could lose the use of that van at some future date, if the national authority should choose not to concur with an additional continuancy of its accreditation.

[redacted]



SEL-86 CONFIGURATION

FIG-1

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SEL-86 COMPUTER

CENTRAL PROCESSOR

MEMORY SIZE - 48,000 WORDS
WORD LENGTH - 32 BITS (4 BYTES)
CYCLE TIME - 600 NANOSECONDS
INPUT/OUTPUT CHANNELS - UP TO 16

OPERATOR CONSOLE (TELETYPE)

TRANSFER RATE - 10 CHARACTERS PER SECOND

MOVEABLE HEAD DISC

CAPACITY - 6 MEGABYTES
TRANSFER RATE - 156,500 BYTES PER SECOND
MAX LATENCY TIME - 25 MILLISECONDS

FIXED HEAD DISC (2 PER SYSTEM)

CAPACITY - 3 MEGABYTES
TRANSFER RATE - 387,5000 BYTES PER SECOND
MAX LATENCY TIME - 33.3 MILLISECONDS

LINE PRINTER

LINE LENGTH - 132 CHARACTERS
MAX PRINT RATE - 600 LINES PER MINUTE

MAGNETIC TAPE DRIVES (2 PER SYSTEM)

TRACKS - 7
SPEED - 150 INCHES PER SECOND
DENSITY - 556 OR 800 BIT PER INCH

CARD READER

HANDLING RATE - 300 CARDS PER MINUTE

PAPER TAPE READER

TRANSFER RATE
SLEW MODE - 600 CHARACTERS PER SEC
ASYNCHRONOUS - 150 CHARACTERS PER SEC

PAPER TAPE PUNCH

TRANSFER RATE - 110 CHARACTERS PER SEC

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E. Mr. HAMMERSTROM advised that there will be no Technical Intelligence/Off Line software for use with the SEL-86 by the end of 1972 but the Technical Intelligence features are still in the on-line package. During Technical Intelligence processing, it is desired to keep the operator in the process as much as possible.

F. Mr. WALES discussed the software package design for the initial SEL-86 deployment (Fig. 3 and 4). It is geared to handle all of the "well disciplined" locatable signals provided by the present PDE/810 combination automatically. In response to LTJG LENTZ, Mr. WALES stated that this initial package will not be able to process unstable emitters. He also said that at present a [redacted] is not planned. LTJG LENTZ expressed his concern that problems with one of the fixed head discs could force the total system down.

G. [redacted] discussed the role that the Naval Space Surveillance System plays in generating and supplying ephermeral data to the POPPY sites. He discussed basic orbital parameters, different ephemeral elements that can be supplied, and the basis for the EXTENDED THEORY elements. The ephemeral five line elements supplied to the sites were then discussed. Each element of format was explained.

H. In the past, the sites have suffered from receipt of elements which had been garbled in transmission. A one line format, compacting an element set into one 69 character teletype line and transmitting the same thing three times, has been developed by NAVSPASUR and was proposed by [redacted] as a solution to the transmission garble problem. It would not degrade the accuracy of the results from the element set. PM-16, NRL and NAVSPASUR will discuss this proposal further. Limiting factor in implementing this procedure will be NRL/HRB's schedule for modifying existing field operating software to accommodate a new EPH format. The gist of [redacted] perscription of orbital element generation is included as Appendix I.

[redacted]

J. [redacted] then talked specifically about a proposed [redacted] concept now in the planning stages, to be presented for approval in some final form on 12 May 1972. This project will be

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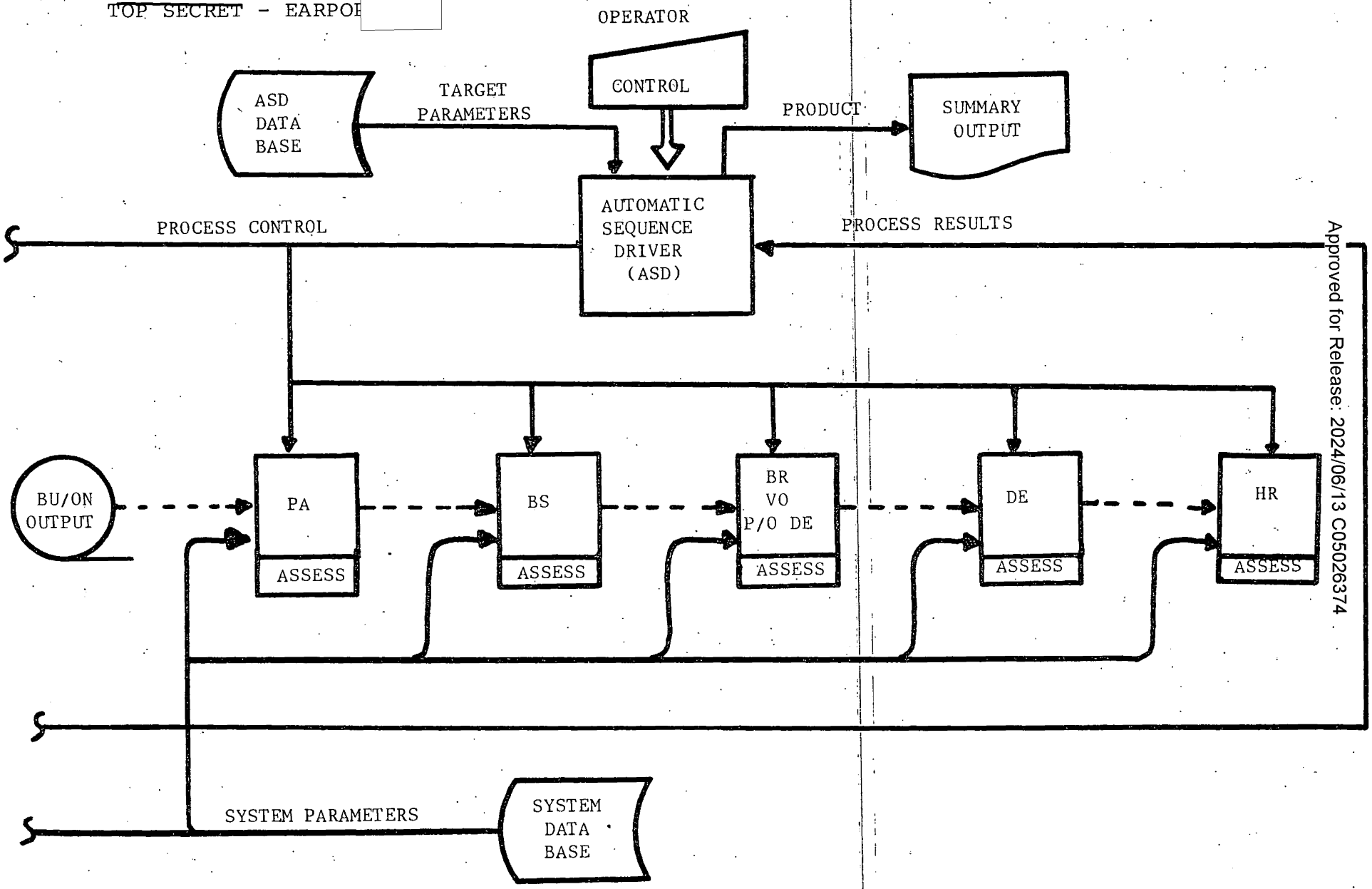

HANDLE VIA BYEMAN/TALENT/KEYHOLE CHANNELS JOINTLY TOP SECRET

INITIAL SEL-86 DEPLOYMENT

AUTOMATED LINKAGE

FIG-3

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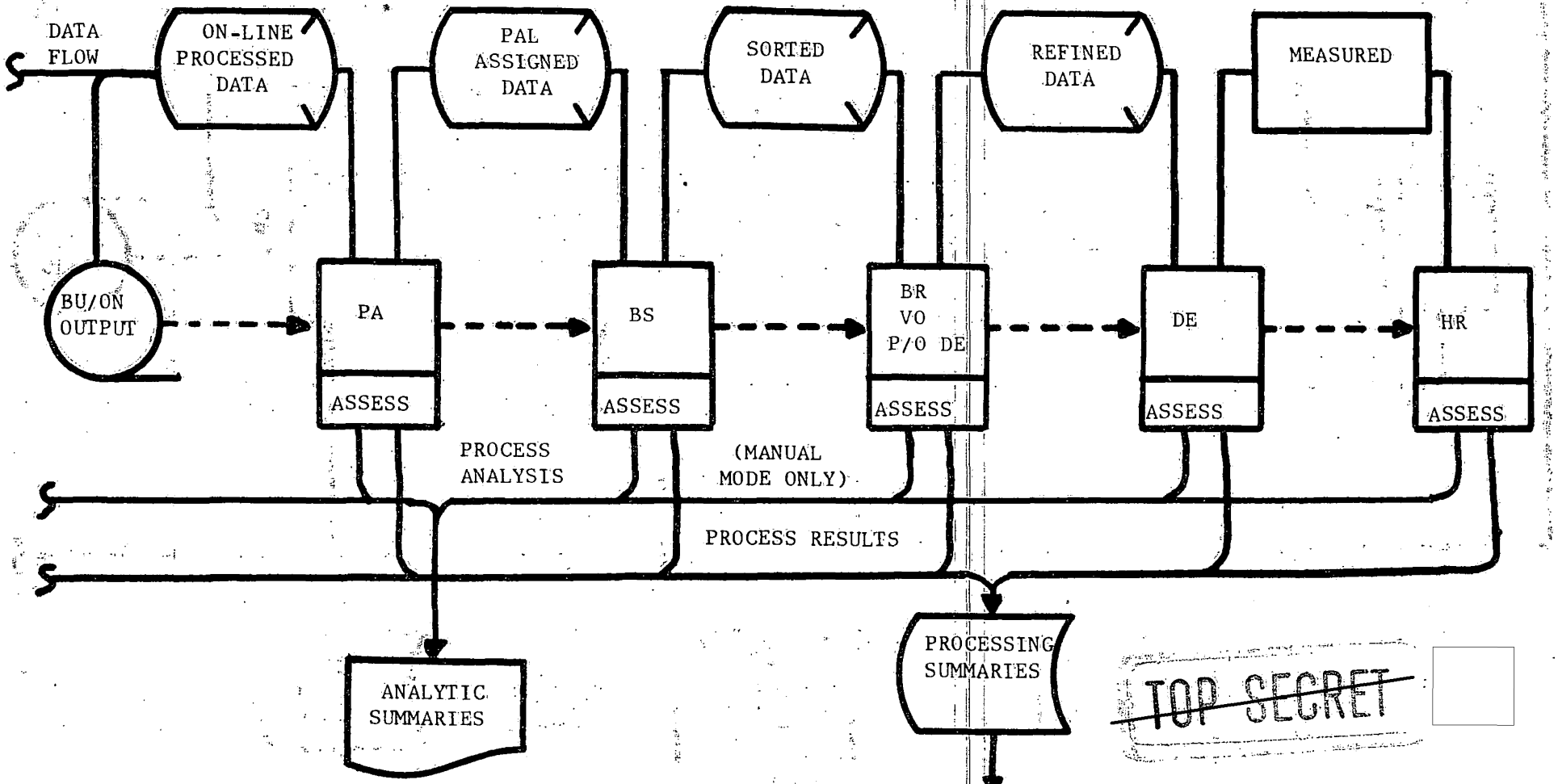
~~TOP SECRET~~ - EARPOP

HANDLE VIA BYEMAN/TALENT/KEYHOLE CHANNELS JOINTLY ~~TOP SECRET~~



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INITIAL SEL-86 DEPLOYMENT

PROCESSING FLOW

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FIG-4

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funded by both the Navy and the NRO. The planned system will meet the following criteria:

(1) The system will be dedicated to O/S, and make any parametric collections necessary to support this effort.

(2) The planning is in terms of a "total package" which includes not only the space craft, but processing software, equipment design, ground site facilities, as well as communication links to consumers. Separate working groups to analyze each problem have been established.

(3) Redundancy is being stressed, with payload estimated lifetimes of 4 to 5 years. Complex equipment will be on the ground, not in the air.

LT MORGAN (NSG) asked about RF band and emitter target selection for the new system, and replied that the RF bands of interest may change in 5 or 10 years or in a hot war environment, and that appropriate consideration was being given this aspect in the concept design phase of the current system's requirement study. Below is a listing of the emitters identified thus far as potential targets for optimized overhead ocean surveillance system:

These emitters were selected for the following reasons:

(1) They are used (surface search or early warning)

(2) They are deployed on major Soviet combatants

(3) They contain high potential information value (possibly fingerprintable)

(4) They have strong ERP vs background RF environment power levels

Other emitters in addition to those above have been considered and have been designated potential "Targets of Opportunity."

K. The next brief and discussion was presented by [redacted] (NAVSTIC). The Soviet Naval Electronic Signature and Photo Identification Catalog (SOVNESPIC) has just been published in an interim form (ships photos are not yet included). The inputs to this publication is all source, including sanitized POPPY information, and the publication is being disseminated at the Secret level. NAVSTIC anticipates that the document will be kept current at the "theater level" with overall data base supervision by NAVSTIC. Copies of the SOVNESPIC have been forwarded to all POPPY field stations to be used as a reference source in performing [redacted]

[redacted]

M. Mr. Howard LORENZEN (NRL) made the point that a good dialogue between the field stations and such organizations as NAVSTIC or area intelligence organizations is very important to the overall effectiveness of their mission performance. [redacted] (NSG) pointed out that for the past two years, the POPPY field stations have been receiving excellent cooperation and support from not only NAVSTIC, but NSA, CINCLANTFLT (LEC), PACOM ELINT Center and CINCPACFLT (N2).

N. ENS Robert KELLOGG (NSG) opened a discussion on current field site efforts to collect and process O/S radar targets. Each field site has its own unique environment and processing capability and, accordingly, should be tasked with that in mind. Although [redacted] has had a chance to experiement with [redacted] (and has

found PDE collection techniques more useful), the sites have not had a chance to exploit comb filter collection. feel this approach may be more suitable to their environment, and NSG will take action to implement appropriate tasking.

O. (NSA) presented a briefing of NSA effort to correlate intercept parameters to source platform identifications, and indicated that POPPY reports was one of the most valuable sources of current information. He discussed Soviet Naval practices in use of pennant numbers and advised the Seminar that generally, the Soviets use blocks of pennant numbers for defined geographic areas. At present these are as follows:

AREA	NUMBER BLOCK
BALTIC FLEET	500-520
BLACK FLEET	521-540
NORTH FLEET	541-560
PACIFIC FLEET	561-580

There are exceptions to this pennant number usage, such as the KRIVAK PN900, and these cannot now be explained.

~~TOP SECRET~~ - EARPOP [redacted]

POPPY PROJECT OPERATIONS SEMINAR
MINUTES

IV. THURSDAY, 16 MARCH 1972

A. Mr. GALLAGHER(NSA W241) opened the session with a discussion of POPPY signals of interest (SOI) analysis and reporting requirements and emphasized the extreme importance of preliminary signals analysis at the field stations. Because the POPPY analog tapes are not forwarded to NSA unless SOI's are detected in the field, significant data may be lost if not detected by the field analyst. This procedure places the primary responsibility on the field stations for the POPPY system's productivity in terms of response to SOI and Unidentified signals tasking. More importantly, the reliance placed on the field analysis effort to isolate new, unusual signals activity is almost total. Mr. GALLAGHER stressed that NSA processing of analog data is not designed as a total search of all analog data received. The primary emphasis at NSA is directed toward detailed, long-term analysis of specific, high-interest signal activity and systems using the field analysis and reporting effort as a precursor. He left little doubt that if significant SOI or Unidentified signal activity were missed by the field station analysts, it might not be recovered by NSA in the near timeframe.

B. Mr. GALLAGHER indicated that the data densities yielded by the 7107 system are difficult to deal with at NSA for the same reasons that they make field station analysis difficult. The time required to deliver magnetic tapes from the field stations to NSA is also a problem, and this has often made NSA less responsive in providing Technical Feedback than would be desired. In addition, since priorities must be assigned to analysis of signals at NSA, some Technical Feedback may be even less timely. Generally, NSA attempts to complete analysis and Technical Feedback on all Unidentified SOI's and unusual SOI activity as first priority.

C. There have been numerous occasions in the recent past when NSA has desired to have field stations review specific magnetic tapes, and the tapes had already been forwarded. This usually concerns digital tapes which current instructions require be forwarded in the first courier shipment possible after intercept. It was suggested that it might be worthwhile to have the field stations hold the digital tapes for some defined period of time in order to provide a time "buffer" in which subsequent field processing could be requested. This was not resolved and NSG(G54) will continue to coordinate with NSA to determine if new procedures should be implemented.

D. Mr. GALLAGHER and [redacted] discussed briefly the possibility of having the field stations issue ELT/ELO product reports based on field analysis/processing. It appeared that this procedure would enhance overall reporting effectiveness in some cases, but its implementation should be carefully phased to insure that the limited field station resources are used as effeciently as possible in the areas of analysis and reporting

that are of the greatest importance. Current personnel manning levels at the POPPY field stations would not accommodate a significantly increased processing and reporting load.

E. Mr. GALLAGHER indicated that 20 percent of the ELT/ELO reports written by W2 in 1971 were based either in whole or part on POPPY data and/or POPPY field station processing. The distribution of these reports, and other ELT/ELO product reports in SAO channels, was discussed and it was apparent that the POPPY field stations frequently do not receive information relavent to their mission. [redacted] indicated that distribution lists for such data are not standard and recipients vary depending upon a great number of factors, including the nature of the sensor system from which the data was obtained. Mr. CONLON(NSA W24) indicated that he would undertake to insure that POPPY field stations received all ELT/ELO report information relavent to their mission and tasking, including information derived from other overhead sensor systems.

F. [redacted] and members of his staff, discussed the formatting of POPPY location reports and offered a machine format system which would more effectively meet W41's requirements. An example of this format is shown in Figure 5. Figure 6 gives the breakdown of the data in the format. In discussion, it became apparent that the proposed format would not meet the many different requirements within NSA, let alone those of other consumers of POPPY data. Much of the data currently needed by W24 for analysis purposes was not included. [redacted] indicated that his primary interest lay in putting the information in some form which could be machine manipulated with minimum manual interface. He was not committed to any particular format or content and will coordinate with other elements at NSA and NSG to determine if a single machine format can be established which will satisfy all currently established requirements.

G. LT MORGAN (G54) presented a proposal for the revision of the [redacted] reporting system which is used as a management mechanism within the POPPY system. The series of reports is in three parts as follows:

(1) Daily [redacted] collection reports are forwarded by each of the field stations, [redacted] which include an orbit by oribt breakdown of collection activities during the past 24 hours. On a weekly basis other more specialized information is included in the collection report, i.e., Special Task status, report of analog tapes forwarded, and other information as required.

(2) [redacted] supplementary reports are forwarded by the field stations giving complete details whenever collection cannot be performed as tasked.

(3) [redacted] special reports are forwarded by the field stations whenever payload activations are other than as tasked.

While the [redacted] reporting system has been generally effective for the purpose for which it was designed, recent improved payload performance, changes in operational procedures and tasking, and field station tasking loads have made it highly desirable to further refine the reporting system to incorporate all the data actually required and eliminate that data now being reported which is not needed. In coordination with other users of [redacted] report information,(NSA, NRL, and SAFSS(SOC)) it becomes apparent that considerable of the detailed information in the daily reports is not being used and can be eliminated without detrimental effect. Other required information is not being reported in sufficient detail to keep responsible users fully advised.

H. LT MORGAN presented an alternate procedure, based primarily on recommendations prepared by the [redacted] representatives, which would reduce the daily reports to a machinable format with minimum redundancy. This would be complimented by a weekly summary report which would include Special Task status, an RF band activity summary, analog tapes forwarded, and any pertinent narrative concerning the period's collection activities. A special series of reports would be used exclusively to alert the management and support community of either ground system or satellite operational failures or malfunctions which significantly impact upon a station's ability to perform its mission.

I. The Seminar attendees offered several recommendations for minor changes to the proposed [redacted] reporting procedure and ensorsed its early implementation. The procedure will be implemented by NSG(G54) in the near future.

J. [redacted] NSG G54) discussed briefly the communications resources available for dissemination of POPPY processed information and performing overall coordination of the POPPY program. The requirement for responsive communications, including OPSCOMM circuitry,are now under study and it is clear that there are a number of alternative possibilities which would offer overall improvement. These are being considered on the basis of their capacity to respond to current and known future requirements. Specific actions to improve POPPY associated communications will be taken as decisions are made.

THERE WAS NO SEMINAR AFTERNOON SESSION ON THURSDAY.

POPPY PROJECT OPERATIONS SEMINAR
MINUTES

V. FRIDAY, 15 MARCH 1972

A. [redacted] presented a briefing on current planning for the POPPY Project training program which is to be established at [redacted] as soon as possible after the facility becomes fully operational. Historically, the great majority of all POPPY training has been accomplished within the project on a field station OJT basis, with assistance and support from NRL and HRB Singer. Occasionally, both operator and maintenance personnel have been given equipment training at the manufacture's plant whenever this was available and considered useful. However, it has become increasingly apparent that a well conceived and managed, central training focal point is needed if POPPY program personnel are to be expected to continue to develop and perform in fashion that has long been associated with the Program and the NSG POPPY field stations. The exact course outlines have not yet been documented; however, training goals have been set, and these are as follows: (See Appendix J)

(1) Develop a systematic and concrete approach to Analog, Digital and Maintenance equipment training.

(2) Develop training aids for on site use, including Standard Operating and Training Procedures applicable to on-site training, instruction manuals and visual aids.

(3) Provide for on-site visits by experienced personnel and technical representatives to update the field station's base experience level and expertise on a continuing basis.

(4) Allow for periodic conferences and seminars to bring together qualified personnel within the POPPY operations and analytic community to identify deficiencies and recommend solutions related to personnel training.

The proposed courses at [redacted] include four operations classes per year, with 12-13 operations trainees and 3 digital trainees per 8-12 week course. Three maintenance classes will be conducted per year with 5 trainees per 12 week course.

B. In response to [redacted] explained that appropriate consideration is being given to the size of the classes, and the demands that will be made upon space, time, and machinery to insure that the station will remain fully effective in its operational mission while maintaining a viable training program.

C. LTJG LENTZ expressed concern that second generation personnel should go through for additional training after their initial field station experience and before reporting to their next POPPY duty station. agreed with this concept generally, but indicated that current planning was aimed at the first-timer coming directly from Pensacola Class C instruction and on his way to an initial POPPY project assignment. More advanced training will be undertaken when the initial program is underway and operating and it is expected that this will be designed to provide further technical depth for personnel who have had project experience. LCDR COLE (NSG) emphasized that before the courses are firmly established, all field stations will have an opportunity to provide comments and guidance to influence the character of the instruction.

D. A general discussion of the proposed training program followed and a number of useful suggestions were offered. LTJG LENTZ suggested use of qualified Naval Officers rather than civilian technical representatives to support and sustain the training program at (a part of the PM-16 training concept called for providing two civilian specialists at who would be dedicated to the training program's implementation and continuity). agreed with this in principle but considered it infeasible in view of current trends in DOD for cutbacks in personnel, particularly the Officer Corps. concluded the discussion of the training program by showing the first years estimated cost at $378,000. He indicated that an annual recurring cost of $87,000 is expected.

E. (NSG) discussed briefly the SISS ZULU parts and equipments supply mechanism. Responding to requests from NRL, procedures were established in July 1971 and revised in February 1972 governing the administration of this important support mechanism. stressed that all shipments from should be by Commercial Air rather than MAC whenever this procedure is possible. (There are few options for and there appears to be little difference in the two for shipments from .) Any equipments sent to NRL for repair which is intended for subsequent return to the site should be clearly marked indicating this. Any equipments received by the sites in a damaged condition should be photographed and sent back to NRL in order that claims processing may be initiated.

F. discussed the problems encountered by his station with analog tape shipments. He indicated that in the summer 1971, received a shipment of degaussed but unrehabilitated tapes which were totally unusuable at the site. questioned whether the tapes could be destroyed at rather than incur the expense of shipping them back to NSA. Action has been taken, in coordination

with NSA, to authorize this action. Discussions with NSA representatives subsequent to the Seminar have established guidelines in the NSA tape lab which will result in only new, or once-used, rehabilitated analog tapes being sent to POPPY field stations. also expressed concern over the quality of analog tapes forwarded to . The procedures established for the Navy POPPY stations will also be applicable to

G. LCDR COLE (NSG) emphasized that any station have difficulty with logistics or supply of POPPY related materials should advise COMNAVSECGRU (G54) in order that early action may be taken. (This offer specifically includes)

H. (NSG) made a presentation on reference material and documentation sent to the POPPY stations. To keep TKE traffic at the sites at a minimum, while insuring that all pertinent reference material is made available, NSG (G54) extracts appropriate data from virtually all sources or forwards it to the appropriate stations as "technical support." Routinely, all ELINT reference material not in SAO channels required by the field stations is channeled through NSG (G54) in order to prevent direct association between the POPPY project and an ELINT exploitation/collection mission. NSG (G54) has established continuing distribution requirements for sufficient numbers of all the documents currently required by the field stations. As other data becomes available, it is reviewed, usually by the field station personnel, and continuing requirments are established if the information is of continuing value to the POPPY program.

I. emphasized that many of the support efforts undertaken by NSG (G54) require some period of time to complete. Frequently the success of these efforts requires the cooperation of one or more agencies outside NSG and that this coordination must be accomplished with some care in order to insure the continued responsiveness of sources upon which we depend. An example of this problem is the recent request from that more definitive information concerning the Soviet Inland Waterway be provided. Although the information desired is generally available, the personnel who must prepare an updated response are heavily involved in many other tasks and have not been able to devote enough time to our request to complete the task as soon as would probably have liked. There are many other such examples and requests from the station's and NSG (G54) coordinates each as effectively as possible.

J. indicated that NSG (G54) is currently setting up a analytic library for forwarding to This information, and complete documentation concerning the system's operation, will be forwarded when the station has a capability for SAO storage. Other support documentation being done at NSG (G54) is maintenance of an SOI and UNIDENT SOI intercept accountability system. A computer file

has been established and listings indicating the current status of all POPPY field designated UNIDENT SOI's can be provided at any time they are required. This file is maintained current on a daily basis. has requested distribution of this information and is being forwarded an initial copy to determine its usefulness. (NSA W242 (Mr. CONLON) indicated that this function could be taken over with no extra effort and NSG concurred. However, NSG will continue to maintain its data to the field stations, including

K. All field station representatives (Navy stations only) indicated a requirement for a current volumn of Jane's Fighting Ships. These are being procurred and will be forwarded in the near future. indicated that the weeks discussions indicated a need for precise and up-to-date charts and maps representing the satellite horizons at each of the field stations. These will be procurred and forwarded by NSG (G54). questioned whether the CINCPAC, FICPAC, and PEC Daily ELINT intelligence summaries could be made available. NSG will coordinate this through DIRNAVSECGRUPAC, is already on distribution for this information.) LTJG LENTZ indicated that the EUDAC summary reports have been extremely helpful at , but very careful interpretation is sometimes required to prevent cycling one's own information back into the local data base. LT MORGAN expressed concern that the recipients of POPPY data do not always fully understand the information's method of generation and potential. For this reason, highly accurate and timely POPPY data may often not be put to good use or be ignored in favor of other sensor data which is better understood by intelligence staff analysts. It is very important that POPPY reporting continue to be as descriptive and free of technical "jargon" as reporting tasks will permit.

L. ENS KELLOGG (NSG, G54) presented an interim report on the Confidence Ellipse Evaluation now in progress. The purpose of this study is to determine the validity of the geolocation error ellipse algorithm in use in POPPY software and to assess this system's ability to describe the quality and/or accuracy of POPPY location fixes. Ellipse parameters and the previous verbal rating system seem to agree closely for data evaluated "Outstanding" and "Excellent" in the verbal system. However, those rated "Good" or "Poor" show little correlation with ellipse parameters. The most probable ellipse (95% confidence) for shipborne emitters is 7.5 X 12.0 NM. However, preliminary analysis of landbased emitters shows a most probable miss of 4-5 NM. Thus we are left with the problem that statistically the current verbal rating is probably not valid for any but the highest quality data (Outstanding and Excellent). Another factor which has come to light during the evaluation period is that the currently used ellipse error parameters (satellite position, burst quality) reduce to a confidence region which is too large compared with the actual capability of the system. The geolocation fixes are routinely much more accurate (as compared to

emitters of accurately known location) that the confidence ellipse express. It appears initially that the ellipse error parameters could be "tightened-up" by perhaps 30-40 percent and still maintain 95 percent confidence of containment.

M. The Friday afternoon Seminar session was devoted to a wrap-up critique of the weeks activities wherein recommendations, conclusions, and required actions were specifically identified. These have been capsulized in the Synopsis section of this report.

APPENDIX A

POPPY OPERATIONS
SEMINAR

AGENDA

~~TOP SECRET~~ - EARPOP [redacted]

POPPY OPERATIONS SEMINAR
AGENDA

MONDAY, 13 MARCH

0900 - INTRODUCTION - RADM PHILLIPS (COMNAVSECGRU)

- PROGRAM DIRECTOR'S REMARKS - CAPT GEIGER (PM-16)

- PROGRAM MANAGEMENT OVERVIEW - [redacted] (PM-16)

1030 - OPERATIONAL OVERVIEW NRO/NRP AND POPPY PROGRAM TASKING GUIDANCE - LCDR [redacted] (SAFSS SOC)

- LUNCHBREAK

1300 - FIELD OPERATIONS BRIEFING BY EACH FIELD STATION REPRENSENTATIVE IN THE FOLLOWING ORDER:

[redacted]

- QUESTION/ANSWER SESSION RELATIVE TO FIELD STATION PRESENTATIONS

TUESDAY, MARCH 14

0845 - TECHNICAL INTELLIGENCE PROCESSING AND ANALYSIS POLICY - MR. JOHN DOHENY (NSA W24)

- POPPY SOI ASSIGNMENTS - MR. JOHN CONLON (NSA W24)

1000 - OPERATIONAL SPECIAL TASK REQUIREMENTS - [redacted] (NSA W41)

1030 - SIGNIFICANT POPPY EXPLOITATION EFFORTS AT NSA

[redacted]

- LUNCHBREAK

1300 - SIGNIFICANT POPPY EXPLOITATION EFFORTS AT NSA

[redacted]

1345 - PDE OPERATIONAL PROCESSING - LTJG LENTZ [redacted]

- GENERAL DISCUSSION FIELD STATION TIME CRITICAL AND BACKLOG PROCESSING SCENARIO [redacted]

BYE-52, 383-72

Copy [redacted] of [redacted] copies

Appendix A

HANDLE VIA BYEMAN/~~TALENT/KEYHOLE CHANNELS JOINTLY~~ ~~TOP SECRET~~

~~TOP SECRET~~ EARPOP [redacted]

WEDNESDAY, 15 MARCH

0900 - SOFTWARE DEVELOPMENT (NRL/PM-16)

- ELLIPTICAL LOCATION RATINGS (NSG - ENS KELLOGG)

1030 - [redacted] MODELS (NAVSPASUR)

- LUNCHBREAK

1300 - OCEAN SURVEILLANCE MISSION, INCLUDING:

- PM-16 O/S STUDY AND CONCLUSIONS - [redacted]
- NAVSTIC DOCUMENTATION EFFORT - [redacted])
- EMITTERS ASSIGNED FOR O/S PROCESSING - ENS KELLOGG (NSG)
- ALL SOURCE SUPPORT FEEDBACK - [redacted]
- DISCUSSION OF PROCESSING CONSIDERATIONS - [redacted]

THURSDAY, 16 MARCH

0900 - TECHNICAL FEEDBACK TO FIELD ANALYSIS - MR. GALLAGHER (NSA W24)

- SOI REPORTING, MEDIA PREPARATION AND FORWARDING - MR. K. GALLAGHER (NSA W24)

1030 - REPORTING AND FORWARDING, INCLUDING:

- [redacted] REPORTING - LT MORGAN (NSG)
- LOCATION REPORTING - [redacted] (NSA W41)
- COMMUNICATIONS - LCDR COLE (NSG)

OPEN AFTERNOON

FRIDAY, 17 MARCH

0900 - OPERATOR AND MAINTENANCE TRAINING CONCEPT - LCDR COLE (NSG)

- LOGISTIC SUPPORT TO FIELD STATIONS - LT MORGAN (NSG)

- REFERENCE MATERIAL AND DOCUMENTATION SUPPORT - [redacted]

- LUNCH BREAK

1300 - AFTERNOON WRAPUP OF CONCLUSIONS AND ACTIONS ANTICIPATED. DURING THIS SESSION WE EXPECT TO FIRM-UP SEMINAR RESULTS AND REACH FINAL AGREEMENT REGARDING SEMINAR RECOMMENDATIONS.

APPENDIX B

SEMINAR ATTENDEES

APPENDIX C

USIB(SORS) GUIDANCE
FOR THE POPPY PROGRAM
(7107 SYSTEM)

HANDLE VIA BYEMAN/TALENT
KEYHOLE CHANNELS JOINTLY

BYE-1571/71

UNITED STATES INTELLIGENCE BOARD SIGINT COMMITTEE
SIGINT OVERHEAD RECONNAISSANCE SUBCOMMITTEE

MEMORANDUM FOR: DIRECTOR, NATIONAL RECONNAISSANCE OFFICE
DIRECTOR, NATIONAL SECURITY AGENCY

SUBJECT: Mission Guidance for POPPY Mission 7107

The SIGINT OVERHEAD RECONNAISSANCE SUBCOMMITTEE (SORS) recommends the following mission guidance for POPPY Mission 7107:

1. Collection operations, utilizing geopositioning capabilities whenever possible, should be conducted in accordance with the geographical area/radio frequency band relative frequency of tasking assignments contained in ANNEX A. Primary collection emphasis should be given to target emitters in the Soviet Union, Communist China, Eastern Europe, Southeast Asia, North Korea and the Middle East. Collection of ocean surveillance data should be accomplished against Soviet and Communist Chinese naval units whenever practicable. Ocean surveillance collection should be optimized against shipborne emitters operating in the frequency ranges of 550-970 MHz, 2680-2930 MHz and 9200-9600 MHz.

2. The signal level, polarization and threshold measurement options should be utilized whenever a signal if interest appears against which, in the opinion of the National Security Agency (NSA), the use of these options would assist in the satisfaction of data needs. The NSA is requested to advise the NRO and the SORS, on a routine basis, of those signals against which the NSA recommends that these options be utilized.

3. Simultaneous collection efforts should be conducted as practicable against multiple emitters which are associated with the same specific weapon system/complex.

4. Processing, analysis and reporting shall be in consonance with the current USIB Guidance for the NRP SIGINT Five Year Program. Emphasis should be placed on the processing, analysis and reporting of new/unusual signals and the target emitters and signals emanating from the high interest target areas listed in ANNEX B. Processing and reporting of EOB data for ocean surveillance purposes are required within six hours; processing and reporting of EOB data from Middle East radars are required on a time critical basis. EOB data from other areas and for other purposes may also be required on a time critical basis. Processing and reporting of other EOB data and data for surveillance purposes should be accomplished on a routine basis. Processing and reporting of redundant EOB data (e.g. available from collection by other SIGINT satellites, are not desired. The DIA, in collaboration with the NSA, will advise the SORS of those emitters which need not be processed and reported for EOB purposes from POPPY Mission 7107 collection.

5. Intercept data from POPPY Mission 7107 reported in NSA end-product reports should clearly identify POPPY Mission 7107 as the source.

6. The NSA is requested to provide the SORS with copies of listings of the signals of interest (SOIs) that are transmitted to POPPY Support sites for processing guidance.

[redacted]
EXECUTIVE SECRETARY
SIGINT OVERHEAD RECONNAISSANCE SUBCOMMITTEE

ANNEX A

GEOGRPAHICAL AREA/RADIO FREQUENCY BAND
RELATIVE FREQUENCY OF TASKING ASSIGNMENTS

(The Relative Frequency of Tasking Assignments means that collection should be conducted on a random time basis over the frequency bands listed in ANNEX A in accordance with the noted figures, i.e., collection against the 154-165 MHz band should be conducted five times as often against the 200-350 MHz band on the average.)

BAND	RADIO FREQUENCY	WESTERN/CENTRAL USSR AND MID EAST (West of 90degrees East Longitude)	EASTERN USSR MONGOLIA AND CHINA (East of 90 degrees East Longitude)
1	154-165	5	5
2	165-200	2	10
3	200-350	1	1
4	350-450	7	2
5	450-550	1	9
6	550-815	5	5
7	815-970	6	5
8	970-1205	6	1
9	1205-1800	10	1
10	1800-2100	10	3
11	2100-2580	9	1
12	2580-2680	8	5
13	2680-2930	6	5
14	2930-3120	7	10
15	3120-3300	5	1
16	3300-3600	2	1
17	3600-4050	2	2
18	4050-4850	2	2
19	4850-5250	10	7
20	5250-5850	1	3
21	5850-6725	10	9
22	6400-6727	10	9
23	6700-7900	10	9
24	7900-8600	10	9
25	8600-9100	3	5
26	9100-9340	9	10
27	9200-9600	9	10
28	9340-9400	8	10
29	9400-9600	8	10
30	9600-10500	2	2
31	12500-14500	8	4
32	14500-14800	10	10
33	14800-15100	10	10

BAND	RELATIVE FREQUENCY	WESTERN/CENTRAL USSR AND MID EAST (West of 90 degrees East Longitude)	EASTERN USSR MONGOLIA AND CHINA (East of 90 degrees East Longitude)
34	15000-16000	8	6
35	16000-17000	8	4
36	17000-18000	8	4
37	34700-35000	7	5

APPENDIX D

POPPY SYSTEM
SOI ASSIGNMENTS

TOP SECRET - EARPOP [redacted]

POPPY SYSTEM SOI ASSIGNMENTS

This presentation is based on two policy documents: (1) the mission guidance paper generated by the SORS Subcommittee for POPPY Mission 7107, and (2) the NSA paper that provides detailed processing and analysis and reporting requirements. The SORS Subcommittee recommended in their mission guidance report paper that certain general guidelines be followed and that emphasis be placed on the processing, analysis and reporting of new and unusual signals and to target emitters in the USSR, CHINA, EUROPE, SOUTHEAST ASIA, NORTH KOREA, and MID EAST;

And that ocean surveillance be optimized against certain shipboard emitters in the frequency ranges of:

550 - 970
2680 - 2930
9200 - 9600

And that processing reporting of this data is required within six hours.

That the signal level measurement option be tasked and utilized whenever a signal of interest appears which in the opinion of the NSA the use of this option would assist the analysts in the satisfaction of data needs.

The paper also stated that simultaneous efforts be conducted against multiple emitters which are associated with the same weapon system or complex;

And that certain EOB data from such places as the MID EAST are required on a time critical basis. There are also words in the document that state there is no requirement for processing and reporting redundant EOB data (e.g. [redacted], that is available from collection by other SIGINT satellites.

The NSA document is arranged in four sections or four parts called annexes, and should be used by the Naval Security Group to up-date the current field SOP POPPY guidance.

A considerable amount of time was spent in the generation of the paper especially in the area of technical guidance and this was due somewhat to our lack of first hand knowledge on some of the emitters and targets. We must confess, during our research that published ELT's, ELO's and other publications did not always contain enough information or background data so in those cases it was necessary to dip into other areas and elements in NSA and talk with other analysts in order to obtain the specifics on some of the signals.

Again I repeat the document is in four parts:

(1) ANNEX A (PART ONE) is a list of the target emitters of interest and are arranged by frequency bands covering all the POPPY bands in Mission 7107. The code of the emitter and its name appear in column form and in the last column is the general location of the emitter and its location either west or east of ninety degree east. This bit of geography splitting is necessary since the total list may not be applicable to all the POPPY field sites, in other words [redacted] will not hear the same signals heard by [redacted] because of the emitter deployment.

(2) ANNEX B (PART TWO) is the work sheet of the document we believe. It was made to show, in analyst language, the technical requirements needed for all the emitters listed in Part One. Each emitter is treated, although we missed a few, we hope to get these missing ones out as soon as possible. The work sheet as I see it, can be used by the operator for background material and functions of all the emitters. Background states certain things not in the EPL such as when was it first observed, where it was deployed, what function it might serve and sometimes how many. It might also state that the emitter is unique to such places as SS or MOSCOW only, and therefore could only be heard by stations in that field of view.

Then the work sheet might indicate the primary interests of the intelligence community, and most important, the technical intelligence gaps that we believe POPPY might answer. A few of these are-- What type of scan does the [redacted] utilize? What are the various stagger or pulsing modes? What is the radiated power? Or in the case of the [redacted] which POPPY has never seen, we could look very carefully in the data during times when the large [redacted] are active. The work sheets will discuss what the small [redacted] looks like and how we believe that a common clock is used to generate the PRF since it appears at twice the PRF of the large [redacted]

We believe the work sheets will assist the operator in his day-to-day scanning operations of the POPPY data for Tl material.

Lastly is the analog requirements.

(3) ANNEX C (PART THREE) contains seven columns of processing and reporting requirements in what we call a "quick scan" sheet for the operator's use.

The first column again lists the signals, however, now they appear in priority order or rank of importance.

A word on how we arrived at the priorities. These were established based on an internal NSA working aid document called the TEPL (Tech ELINT PRI List). This document is a mix of signals and radar systems in priority order and aids the NSA analysts and managers to arrive at decissions on signals considered most important to the ELINT community. It served here as an excellent base for establishing the priorities.

NSA analysts continually up-date this document on a monthly basis.

The DHRF, this caused us a great deal of concern and we confess we do not have all the answers here. The reason for this confusion was conflicts on what gets processed first. You will see in this column the DHRF, high in some cases with a priority on the same emitter low. We believe these conflicts will continue since there is no well defined mix between the DHRF and the priorities. We must say that, in the event conflicts arise then the priority of the emitter must govern its processing cycle. Your judgements are needed here.

The rest of the columns are message reporting or when to report, geoposition, when to do this job. Parameter refinements - some of this work can be done at NSA.

Special collection SLM if needed and finally, forwarding of the analog tape.

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(4) ANNEX D (PART FOUR) - In the last part of the document we realize some words were needed to give the field personnel a good working aid on geographical areas of high technical interest both in the USSR and in CHINA.

Again we did some homework on operational and system test facilities, R and D difficulties, launch sites and their impact areas. We included them as part of this section.

When you receive this, take a good look at the cities or areas mentioned. Use it as an expansion to Part Two of the work sheet. It should serve you to identify other emitters that are co-located and possibly will bear fruit on better insight to a weapon system. A lot of this data is from the photo people. Some of the areas mentioned are:

[redacted]

Again, I might add we hope to up-date this document as rapidly as we can and as new technical requirements arise.

Appendix D

BYE-52, 383-72

APPENDIX E

EMISSION CONTROL
MODEL

TOP SECRET - EARPOP [redacted]

TACTICAL ELINT STUDY PANEL

EMISSION CONTROL (EMCON) MODEL

Date: 13 March 1972

By: [redacted]
NSA Member

BYE-52, 383-72

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Page 18 of 102 pages

EMISSION CONTROL (EMCON) MODEL

The term Emission Control (EMCON) implies control of emissions. EMCON silence means complete elimination of emissions.

This paper examines the EMCON practices of the Soviet Union, People's Republic of China, North Korean and North Vietnamese military forces. It is sub-divided into landbased, shipborne and airborne emitters.

Except for the data collected during the war in southeast Asia and the Czech Invasion, all statements in this paper refer to the existing "peacetime" model.

LANDBASED MODEL:

Radar operations in the Soviet Union, People's Republic of China, North Korea and North Vietnam are so similar that they can be discussed by type of radar.

Early Warning (EW) and Height Finding (HF) Radars:

The normal pattern of activity for all air surveillance (EW & HF) radars is two hours on and two hours off. [redacted] at a site will work an inter-dependent schedule to provide continuous coverage. Periods of maintanence will cause a given radar to be off the air for longer periods. Conversely, stimulation of the air space will produce out-of-schedule activity. [redacted] radars are believed to operate 24 hours continuously. In China, the [redacted] radars deployed along the coast operate continuously, whereas the [redacted] radars in the air defense network conduct a 3 hours on and 3 hours off schedule.

GCI Radars:

Operating times for GCI radars is largely a function of the air training program. Activity can be observed any time of the day or night.

SAM Radars:

The acquisition radar for a SAM system will operate from as little as 3 minutes to over an hour. Average operating times will be approximately 45 minutes. The tracking and guidance components of the missile control radar will operate from 1 to 30 minutes each time its activated with 5 to 10 minutes being the norm.

The times of activity will usually be early in the morning and most activity will be during daylight. During exercise activity the same on-times will be observed but the time of day will be determined by exercise play.

AAA Radars:

On-times for fire control radars will vary from one minute to one hour with the peak falling between 5 and 10 minutes.

Meteorological Radars:

[redacted] radars in support of general weather reporting will be active 4 times a day for 45-60 minutes each time. This time-on is a function of time required for the balloon to reach bursting altitude. [redacted] in support of artillery, CBR or missile units will only be active during times when the unit is engaged in exercise play and for approximately 15 minutes as they do not require weather data for great heights.

Battlefield Surveillance/Counter-Mortar/Counter-Battery Radar:

Army direct support radars are only active during training cycles and for periods of a couple of minutes to an hour. They will be turned on and off many times during the exercise. Battlefield surveillance radars are used to monitor the battle area for moving targets. They may be on for extended periods (interspersed with short down times). Counter-mortar and counter-battery radars are only on for 2 to 5 minutes at a time.

SHIPBORNE MODEL:

The EMCON practices of Communist Navies is sufficiently different to justify listing each separate.

Soviet Surface Navy:

In Port

Soviet ships in port, except for the ready duty group, do not normally radiate. Routine repair and maintenance occurs and prior to departure for operations particularly of long duration, calibration of all radars takes place.

At Anchorage

When laying in an anchorage ships will normally be silent. However, depending upon the location, they may use air surveillance or surface search radars.

Operations in Coastal Waters:

Ships operating in confined waters will operate a surface search and/or a navigational radar continuously.

Steaming in Open Seas:

Very little data is available for analysis and that which we have is biased by three factors; (a) weather conditions, (b) the Soviet ship Captain's desire to remain undetected, and (c) whether a single ship or task group is involved.

When several ships are traveling in company in a tight formation (1000 yards or less) in inclement weather or at night they will use a surface search radar for station keeping. In clear weather and daytime this will not be required.

When traveling in spread formation (greater than 1000 yards) the lead ship will normally maintain the radar guard. This will be one air surveillance radar operating at least once an hour for a period of as little as 5 revolutions of the radar to 5 minutes. Soviet combatants have displayed a capability to operate on the high seas for prolonged periods with minimum radiations. However, once detected by U.S. aircraft they will go into full radar operation.

Fleet Operations:

During Soviet fleet operations many radars will be active on all ships. Air surveillance, surface search, navigation, missile control and fire control radars for AA guns will all be active.

It appears that Soviet ship emitter activity, including duration and scheduling is unique to each ship. It is probably a function of geography, i.e., threat from opposing forces, and how EMCON conscious the Captain is and how sensitive his mission is.

Soviet Submarines:

It is well known that submarines seldom use their radars. Standard procedure upon coming to the surface is to turn on their [redacted] for 3 revolutions (7 to 22 seconds) and go silent.

Chinese Navy:

The Chinese navy has only a coastal defense mission and therefore their ships have only been observed steaming in coastal waters. Because they operate so close to shore they are able to rely heavily on shore-based radar coverage for warning of approaching

boats. Surface search and navigational radars are detected but no on-time information is available.

North Korean Navy:

North Korean boats do not normally radiate when in port or anchorage. When at sea they use those radars related to their mission, e.g., surface search radars searching for hostile boats, or navigational radars in bad weather.

Summary:

There is evidence that all communist navies practice EMCON to some degree while operating at sea. Therefore, to track ships, an ELINT collection system should be able to detect and locate an air surveillance, surface search or navigational radar signal that may radiate for as little as 5 minutes.

AIRBORNE MODEL:

Soviet, Chinese, North Korean and North Vietnamese air forces all display the same basic EMCON model.

Airplane Parked on Apron:

No emitters active except during engine warmup prior to takeoff or when on strip alert where pilot is in cockpit and ground power is in use. Time on will be from a few seconds under combat conditions to 4 minutes in normal training. All emitters will be checked.

Airplanes in Flight:

When aircraft fly, not all emitters radiate during the entire flight. Airborne emitters can be organized into two groups for discussion; those required for flight safety and air traffic control, and those that are combat mission related. Emitters in the first group include IFF, beacon transponders, radio altimeters, navigational radars and distance measuring equipment and will normally radiate during the entire flight. Bombers will normally use their tail warning radar during the entire flight.

Combat mission related emitters include tail fire control, intercept (AI), search and bombing, range only, missile guidance, homing and jammers. These emitters radiate long enough to accomplish a combat aircraft's mission. AI radars normally are on for 10 minutes or less. Airborne search and bombing radars have been seen operating for extended periods, depending on mission (e.g., ASW) and, in combat might well be on continuously while in combat area. Jammers may be observed operating between one and two hours in

training, however, during the Czech invasion it lasted over six hours. During actual combat in North Vietnam we have observed MIG's trying to fly with nothing radiating, although this gave them considerable difficulty. They also tried sporatic and infrequent transmissions of one or two seconds duration of beacon transponder or IFF to enable their GCI radars to identify them. The AWAC is observed with its air search radar [redacted] activated during its entire flight.

Summary:

To best track aircraft an ELINT collection system must be able to collect one or more of the following classes of emitters: IFF, beacon transponders, radio altimeters, navigational radars or distance measuring equipment.

APPENDIX F

ANALYSIS [redacted]

19 Nov 1967 12 seconds 7105 & FACADE
~~22~~ 22 Dec 1967 5+ minutes 7105.
Feb 1968 7105

[redacted] Emitter location of significant consequence.

APPENDIX G

ANALYSIS
SA-6 RADARS

APPENDIX H

POPPY SIGNAL
LEVEL MEASUREMENTS

APPENDIX I

NAVSPASUR
EPHEMERIS
GENERATION

NAVSPASUR BRIEF FOR POR[redacted]RATION SEMINAR

In their simplest form, orbital elements consist of a time and six values which describe the shape of the orbital ellipse and the position of the plane relative to the earth at the stated time. These are called Keplerian orbital elements and can be formatted in a variety of different ways for transmission.

Eight years ago NAVSPASUR used a relatively simple mathematical model to derive orbital elements. In 1965 a more sophisticated model, the Brouwer Theory, was introduced. In 1970 the Extended Theory, which was developed by Mr. Smith of NAVSPASUR, was initiated for this project. Although different versions of the Extended Theory are used for internal work at NAVSPASUR, so far this project is its only operational appalication. The reason for this is simply due to its complexity. The present computer program requires too much core to run in a time sharing mode along with the live space data programs which must be continuously available. Therefore, a second, off-line, computer is used to generate the ETE elements.

Generally speaking the early orbit determination and orbit improvement models that were used by NAVSPASUR to compute elements until about 1965, accounted for the generally known fact that the earth bulged in a pear-shaped configuration. The effect on satellite orbits is complex and results in a number of element changes, which in turn affect other elements. For example, the longitude of ascending node is moved by the bulge, but the amount and direction of movement is determined by the inclination and other orbital factors.

Going on beyond this, the earth is not even a nicely shaped pear. Of course there are mountains and valleys, oceans and plateaus. Possibly the most important, there are large areas of high density material which exert a higher gravitional attraction than some adjacent area of lower density. If highly accurate satellite positions are to be derived, these must be taken into account in the mathematical models that are used to determine the orbital elements and their changes.

The Five Line Element format which is currently used for both Extended Theory and Normal Elements was developed years ago by the Air Force. Some time ago it became apparent that there was a Navy requirement for an element format which could be used for ships at sea. A technique of compacting an element set into one teletype line (69 characters) and transmitting the same thing three times was developed. This required that many items in the Five Line Element set be eliminated, but as the Five Line Element set contains redundant data, the compacted one line element set can transmit just as much information.

A few months ago, NAVSPASUR was advised that support of this project suffered to a considerable extent from receipt of elements which had been garbled in transmission. The one line technique seems to be a solution. Obviously, project computer programs would have to be modified; however, it appears that the effort would be justified by the results.

Another possibility is to provide each station a set of elements for each pass of each satellite. In this case the epoch for an element set would be the time of closest approach. Presumably, this would improve the accuracy of the orbital elements. However, the number of element sets transmitted per day would increase considerably. Therefore, this procedure would not be wise unless it is determined that the accuracy improvement would be worth the added effort. Also, this procedure should be dependent upon using the one line element format for communication reliablity.

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APPENDIX J

OUTLINE
OF
TRAINING CONCEPT

BRIEF

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PROJECT TRAINING: PLANS TO IMPROVE ON GOOD OLD NAVY "CAN DO"

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Appendix J

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PREVIOUS PROJECT "TRAINING"

1. ANALOG AND DIGITAL ANALYSIS
   - A. LARGELY OJT AND APPRENTICESHIP
   - B. SOME PERSONNEL IN PROJECT WITH RELATED NAVY EXPERIENCE (E.G. TGU) OR CIVILIAN TRAINING (E.G. DATA PROCESSING).
   - C. OCCASIONAL TAD FOR SENIOR PERSONNEL TO CONTRACTOR/NRL---PAID FOR "OUT OF HIDE" BY NSG/NRL.
2. DIGITAL/TTC EQUIPMENT MAINTENANCE
   - A. ENTIRELY OJT
   - B. VERY OCCASIONAL TAD FOR SENIOR PERSONNEL TO CONTRACTOR/NRL--AGAIN PAID FOR "OUT OF HIDE" BY NSG/NRL.
3. PREVIOUS PROJECT SUCCESSES DUE RESOURCEFULNESS OF PROJECT PERSONNEL DESPITE LACK OF FORMAL TRAINING.

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UNCLASSIFIED

PLANNING GOALS FOR TRAINING

1. PROVIDE FOR SYSTEMATIC SCHEDULED TRAINING OF NEW PROJECT PERSONNEL--ANALYTICAL AND MAINTENANCE.

2. DEVELOP USEFUL TRAINING AIDS FOR PERSONNEL ALREADY AT SITES.

3. PROVIDE FOR REGULAR VISITS TO SITES OF EXPERTS TO LEND TECHNICAL ASSISTANCE AND UPDATE PROCEDURES.

4. ALLOW FOR PERIODIC CONFERENCES/SEMINARS AMONG SITE PERSONNEL AND EXPERTS WITHIN COMMUNITY.

UNCLASSIFIED

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HIGHLIGHTS OF THE TRAINING PLAN

1. TRAINING EFFORT WILL BE CONCENTRATED AT
2. 2 FULL TIME CIVILIAN TECH REPS WILL BE STATIONED AT
   A. 1 MAINTENANCE REP
   B. 1 OPERATIONS REP
3. 4 6-8 WEEK CLASSES FOR OPERATIONS EACH YEAR.
   A. 12-13 MEN PER CLASS TOTAL.
   B. 3 DIGITAL, 9-10 ANALOG TRAINEES/CLASS.
4. 12 WEEK CLASSES FOR MAINTENANCE EACH YEAR.
   A. 5 MEN PER CLASS
5. SEMI ANNUAL TRIPS TO SITES BY OPS TECH REP.
6. ANNUAL TRIP TO SITES BY MAINTENANCE TECH REP.

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POSSIBLE OPERATOR TRAINING COURSE

WEEK	FACILITY	% IN CLASSROOM
1	ANALOG ANALYSIS POSIT	80
2	COMMAND POSIT	30
3	COLLECTION POSIT	25
4	ANALOG ANALYSIS POSIT	30
5	COMPUTER REVIEW (END FOR ANALOG OPERATORS)	80
6	COMPUTER OPERATION	50
7	OFF LINE PROCESSING	
8	ON LINE PROCESSING	
9	REVIEW	

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POSSIBLE MAINTENANCE TRAINING COURSE:

NON-DIGITAL

WEEK	FACILITY	% IN CLASSROOM
1	OPERATING DEMONSTRATIONS	
2	ANALOG COLLECTION POSIT (MAINTENANCE ON BENCH)	40
3		
4		
5	ANALOG RECORDER	30
6	COMMAND POSIT	40
7		
8	ANALOG ANALYSIS POSIT REVIEW	30

* 2-3 MEN PER 8 PER WEEK COURSE
3 COURSES PER YEAR

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POSSIBLE MAINTENANCE TRAINING COURSE:

WEEK	FACILITY	% IN CLASSROOM
1	OPERATING DEMONSTRATIONS	
2 3 4	DIGITAL COLLECTION POSIT A/DDS, BTS, PM PROCEDURE	40
5 6 7 8 9 10	COMPUTER CPU, MAG TAPE DRIVES, CONTROL UNITS, DISKS PM PROCEDURES: DIAGNOSTICS, MACHINE LANGUAGE PROGRAMMING SOFTWARE FAMILIARIZATION	40
11	PDE	40
12	REVIEW	

* 2-3 MEN PER 12 WEEK COURSE
3 COURSES PER YEAR

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ON SITE TRAINING SUPPORT

1. VIDEO TAPE SYSTEM TO BE INSTALLED AT
   A. FULL TIME MAINTENANCE TECH REP WILL MAKE VIDEO TAPES OF PROPER MAINTENANCE PROCEDURES.
   B. PLAYBACK DEVICES FOR SITES USED TO SHOW TAPES TO MAINTENANCE PERS.
2. MAINTENANCE REP WILL WRITE UP SOP MAINTENANCE PROCEDURES.
3. OPERATIONS TECH REP WILL WRITE UP SOP FOR STANDARD COLLECTION/ CALIBRATION AND DIGITAL/ANALOG ALALYSIS PROCEDURES.
   A. OPS REP WILL MAKE VIDEO TAPES IF AND WHEN APPROPRIATE.
4. TECH AND NAVY PERS WILL PROBABLY PROVIDE TECH SUPPORT AND GUIDANCE FOR ALL SITES.

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15 MONTH COSTS

1.	TRAINING EQUIPMENT	
	MULTICOUPLER	5.0K
	POLARIZATION SWITCH	5.0K
	SCU	6.0K
	CHANNEL A RCVR	3.0K
	VIDEO DISC	18.0K
	SYNTHESIZER	9.0K
2.	VIDEO SYSTEM (PRODUCTION AND PLAYBACK)	11.0K
3.	COURSE PREP	124.0K
4.	PRESENTATION AND TRAVEL	66.0K
5.	OPERATIONS	
	PREPARATION OF SYLLABUS, DOCUMENTATION, INSTRUCTOR TRAINING	54.0K
	PRESENTATION, TRAVEL	76.0K
	TOTAL INITIAL CYCLE COSTS	378.0K
	RECURRING ANNUAL COSTS	87.0K

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FUTURE CONSIDERATIONS

1. NEED TO PROCURE SEL 86 COMPUTER FOR OPERATIONS AND TRAINING PURPOSES AT [redacted]

2. DESIRABILITY OF INCREASED EMPHASIS ON DIGITAL ANALYSIS FOR OPERATIONS TRAINING.

   A. NEW O/S SYSTEM WILL HAVE MUCH DIMINISHED T/I, ANALOG ANALYSIS ROLE.

3. PRESENT LACK OF DEFINITION IN ROLE FOR SENIOR NAVY PERS AT SITE IN TRAINING.

   A. PROJECT EXPERIENCED NAVY PERS HAVE IMPORTANT POTENTIAL IN TRAINING PROGRAM.

4. EXTENT TO WHICH TRAINING MAY INTERFERE WITH [redacted] OPERATIONAL MISSION.

   A. PROPER SCHEDULING AND EXPERIENCE WILL REDUCE CONFLICTS.

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Appendix J

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APPENDIX K

ELLIPTICAL
CONFIDENCE REGION