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~~S E C R E T~~ 122249Z MAR 70 CITE CHARGE 1121.
WHIG
SECUR
CEBAR FOR: REID MAYO WHIG FOR: R. ROSE FROM: KRUMPE
SUBJECT: FACILITY VISIT
1. THE FOLLOWING NAMED INDIVIDUALS WILL VISIT YOUR FACILITY ON 18 MARCH 1970:
USAF
2. PERSONNEL ARE BRIEFED ECHO PHASE THREE.
3. PURPOSE OF THE VISIT IS TO DISCUSS THE FOLLOWING SUBJECTS TO GAIN INSIGHT INTO EMITTER IDENTIFICATION TECHNIQUES BASED ON THE EXPERIENCE OF PERSONNEL WITH BYEMAN ACTIVITIES AS WELL AS WORK ACCOMPLISHED BY THE RADAR DIVISION:
A. PULSE SIGNATURE

PAGE 2 CHARGE 1121 ~~S E C R E T~~
(1) PULSE RISE TIME CHARACTERISTICS
(A) MEASUREMENT OF
(B) HOW TO CHARACTERIZE MEASUREMENT
(C) BASIC UTILITY OF AS FINGERPRINT
(2) POLARIZATION
(A) MEASUREMENT OF
(B) ANTENNA CONFIGURATION FOR; ANTENNA PERFORMANCE REQUIRED.
(3) INCIDENTAL FM (IFM) ON PULSE, I.E. UNINTENTIONAL FREQUENCY MODULATION WHEN MODULATION ON-PULSE IS ABSENT.
(A) UTILITY OF AS FINGERPRINT
(B) METHODS OF MEASUREMENT
(C) SUMMARY OF OUR SURVEY EFFORTS AND ANALYSIS OF METHODS OF CHARACTERIZATION.
B. OPINIONS ON HOW TO CHARACTERIZE OR REPRESENT ITEMS-(1), (2), (3) ABOVE-FOR EFFICIENT UTILIZATION IN COMPUTER BATCH PROCESSING OF INTERCEPT TAPES.
C. A SUMMARY OF CHARGE STUDIES IN RESPONSE TO 1970-1980 COLLECTION REQUIREMENTS FOR EXOTIC OR FREQUENCY AGILE

TOP

PAGE 3 CHARGE 1121 ~~S E C R E T~~
SIGNALS (DEFINED AS FREQUENCY JUMP, SCAN AGILE, MOP OR PULSE GROUPS EMPLOYING EXOTIC CHARACTERISTICS.)
D. OPINIONS ON THE RECOVERY OF PHASE REVERSAL KEYING ON PULSE FROM SIDE LOBE VERSUS MAIN BEAM COLLECTION SYSTEMS (I.E. TO WHAT EXTENT IS A PRK SIGNAL COHERENT AS OBSERVED IN FBTST SIDELOBES VERSUS MAIN BEAM.)
~~S E C R E T~~
BT

Talent-Key Comint Control Systems Jointly

~~Top Secret~~

17 March

BRIEFING FOR NRO AND DIRECTOR PROGRAM "C" relative to 7107 concept:

1. OBJECTIVE= gain apprroval for aceelerated schedule for 7107 along with the minor reduction of capability from the approved or Standard 7107 concept.

AREAS WHERE CAPABILITY OF 7107 (QRC) would be less than 7107 (STD):

A- No Stored command system in Primary spacecraft

B- No New Spacecraft Structure that would have been a step toward another Booster; propose the 27" Multifade used in 7106.
   1. Only 16 Watts average power for recharging batteries from this solar-cell system (aimilar to that of 7106.
   2. significant constraint in payload volume availible.
   3. Limited space for mounting Vertically polarized monople antennas for use with Podarization monitoring.

C- Gravity Gradient Systems:
   1- Similar to that of 7106B = 2-Axis plus Reaction Wheel for use to stabilize during Thrusting operations as the Best of 7106.
      A- Monitor Attitude by ADCOL and Magnetic sensors Plus....
      B- On-board Memory System similar to that of 7106.
      C-

D- Micro-Thruster systems Fore and Aft along Flight-line to effect station-keeping operations. (AVCO Units)

E-RF System
   1- Improved Command system beyond 7106= 160 commands vs 80 for 06.
   2. Redundancy in Command System beyond that used in the past...
      A- Transistors (Quad Redundant type) to replace Relays where possible.
   3. Improved PCM Telemetry along with the old AM/FM analog type.
   4. 3 Data Transmitters
      A- DL antenna Gain to be used for the first time.

F- R & D Spacecraft not yet finalized but it will probably contain those items where the POPPY State of the Art must be pushed forward in order to go forward with a significant improvement.

E- ELINT SOLLECTION SYSTEMS:
   1- In Primary spacecraft No coverage in 35 GMz region
   2- " " " " " in the 10.5 to 14.6 GHz region
   3- " " " " " in the 15.1 to 18 GHz region
   4- " " " " " in the region below 154 MHz.

NOTE that the RF Collection coverage for General Search may be extended into these areas by the inclusion of an R & D Spacecraft...the restraint is that the sources of the flight hardware is one of the most crutial schedule limitations in this concept so that the R & D effort can provide an improved schedule only by reducing the quantity and variety of component for this 7107 Effort.

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5- Every part of the spectrum included in the Table #1 for proposed ELINT Coverage for 7107 (QRC) the coverage is duplicated in at least two spacecraft....Four places in the spectrum the duplication is complete with all four of the Primary spacecraft having coverage in common. One place in the 5800 to 6725 MHz band there is partial four way commonality.

~~Top Secret~~

~~Top Secret~~

The dialog which has been very active between NRL and the various facets of the community relative to the ELINT Coverage for the accelerated as well as the standard concept for Mission 7107 has established a confidence that the major advantages of the Standard Concept for 7107 have been included in the accelerated concept as well.(1)....Significant four-way common collection capability has been provided where the"High Priority Target" provides a significant challenge to the POPPY type system

(2) Frequency Tailoring of the various collection systems has been balanced against the development time required...Thus the first two spacecraft ELINT systems could be characterised by the common attribute that their subsystems are either in-hand, ready to be re-worked for 7107, or represent no particular challenge to the schedule by a requirement for extensive redesign. The distribution of the collection sub-systems among the various spacecraft is constrained by many things:

A- Collection antenna compatibility

B- Power requirements

C- Volume requirements

D- Most important of all is the schedule factor.

Thus emitter geopositioning is offered as a potential capability through out the 154 to 10,500 Mhz region along with that between 14.6 and 14.9 GHz, without a gap in these two regions. These Frequency band-edges are only design goals and may shift slightly in the execution of the final design into hardware but these are in most cases the safe or conservative estimate and the final hardware will be slightly wider in coverage. The exception is where the band-edge is critical in order to differentiate against some offending emitter family. So that one emitter will be found in only one collection band and not because of too wide coverage in the band determining Band-Pass Filter design has allowed the emitters to be seen in the next adjacent collection band. It is for this reason that the very best resolution of emitter RF values has been used in the determination of the RF Bands for this concept.....It is possible by having some variation in the measurement accuracy of the many sources of the value of RF given in the EPL so these are used as only general guidelines and only those sources with obvious tolerances in RF Frequency measurement are used.

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Secret [redacted]

MEMO 17 March 1970

TO Code 5610, 5620, 5650

From 5614

Subj: Visit to NRL of 3 Men from SAMSO seeking info on [redacted] certain exotic emitters of the future. cite charge WR-1

1. Capt Donald E Schumacher, [redacted] attached to the staff at SAMSO are visiting NRL Wed. 18 March for the purpose of discussing the following subjects to gain insight into Emitter identification techniques based on experience of NRL programs.

[redacted]

5. NRL opinions on ;how to characterize or represent items (2,3, &4) above for efficient utilization in computer Batch processing of intercept tapes.

6. A summary of WEST COAST studies in response to 1970=80 collection requirements for exotic or Frequency Agile signals (defined as ~~Jumpx~~ frequency jump, scan agile, Modulation on Pulse or Pulse groups employing exotic characteristics.)

7. NRL Opinions on the recovery of Phase Reversal Keying on Pulse from side Lobe versus Main Beam collection systems (i.e. to what extent is the phase reversal keying signal coherent as observed in FBTST sidelobes versus main beam.)

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Secret [redacted]

Illustrations for SORS Briefing due in ~~MXX~~ March 15-20th.....

Must focus on Mission 7106 and its capabilities particularly those which are not yet being exploited:

#I = [redacted] capability as demonstrated back in October 1968

Lee____ Are there other better examples than the one on the viewgraph???
What will the status of TOOT be by late March????
What are the evolutionary steps to full exploitation of TOOT???

II= Main justification for Computer processing capability overseas is be able to do the job that can't wait to get back to NSA or in the case of the higher priority jobs those that NSA is not yet ready to carry out. ~~xxxxxxx~~ PERISHABLE PROCESSING must equate with [redacted]

III= Computer's first justification is to carry on a near real-time assessment of the A-to-D data conversion processes to assure that they are being done with the greatest accuracy and least data degradation possible.

LEE What were the first few jobs that [redacted] was given to do by NSA???
Now after a couple of year can you tell us how well they did???
What new improvements are on the horizon???

IV= Statement of Timliness
Accuracy
Productivity

V = Computer System Description.... Equipment List
Space and Power Required
Critical Environmental Req'ments.

VI = Future for Computer/Digital systems

VII= Concept for Mission 7107
Schedule " " "
Pace-setting Items

VIII= [redacted] demands

IX = "UNKNOWS FILE" from NSA, significance of, evolution of this list.

X = "Emitter Family of the Month" so that each site will have
(1)tasking opportunity periodically
(2)Analytic Opportunity to thoroughly evaluate
1-Location
2-PRF
3-Antenna Scan Characteristics
4-Transmittor Antenna Beam shape and Power.
5-

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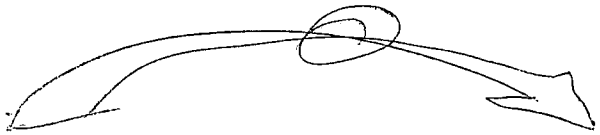

Redo !!

Peter

± of launches.
Tech breakthroughs in each.

TOO ~~Defsmac~~ Alert. Capability

[redacted] statement to [redacted]

[redacted] 6 – Feb 65.

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OUTLINE FOR NRL TO DIR PROGRAM C

~~SECRET~~ [redacted]

Ref (a) NRL concept Pa[redacted] May 1969.
(b) NRO approval msg.

Subj: Factors relative to consideration of Accelerated schedule for Mission 7107.

1. The/~~xxxxxxx~~ concept for Mission 7107 which has been under consideration since May 1969 (Ref-a) was approved by the NRO by Reb (b). A series of three very constructive meeting have been held under the auspices of the NRO staff for the purpose of evolving the best compromise of all potential capabilities for Mission 7107. These meetings have shaped the most recent ~~xxxxxx~~ detailed design goals for mission 7107. However, the loss of two satellites from the recent Mission 7106 after only five months in orbit has severely reduced the POPPY/7106 operational capability, in the following manner:

A- Geo-positioning now is only possible in those parts of the spectrum where 7106 had [redacted]

1539 - 165	550 - 650	2085 - 2593	3105 - 3315
165 - 200	836 - 923	2680 - 2930	6690 - 6790
350 - 450	1793 - 2100	2922 - 3125	5220 - 5260

B- [redacted] on Option lost with 7106D.

C- High Sensitivity Option lost 1790 - 2593 MHz

D- K_u Band coverage 14.6 to 14.97 GHz.

2. It is noteworthy that The Geo-positioning capability still covers a major portion of the frequency spectrum assigned to ABM threat emitters but it does not cover the higher microwave portions.

3. It is imperative that the POPPY sites have at all times, several working satellites or risk disbandment of personnel and deterioration of the electronic and environmental control equipment.

4. Early loss of part of the capability of mission 7106 by loss of two satellites after 5 months...one can extrapolate that the remaining two satellites may be subject to a similar fate. For this reason and the loss of operational geo-positioning capability it is the recommendation of NRL that Mission 7107 schedule and design be subjected to an acceleration so that launch can be in late 1971.

5. NRL strongly recommends that even in the face of an approved plan for Mission 7107, it should be ~~xxxxxxxxxx~~ accelerated and NRL will be prepared to Brief Director Program C and ultimately the NRO concerning the Quick Reaction Con[redacted] (QRC) 7107 design features.

~~SECRET~~ [redacted]

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