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- SOUTE NAVY SPACE PROJECT OFFICE --(S) NATIONAL RECONNAISSANCE OFFICE, PROGRAM C

WASHINGTON, D.C.

OFFICE OF THE DIRECTOR

### PME-106-542/pt

#### MAR 2 0 1975

MEMORANDUM FOR THE DIRECTOR, NAVAL RESEARCH LABORATORY (1000 and 7030) CHIEF OF NAVAL OPERATIONS (OP955) COMMANDER, NAVAL SECURITY GROUP COMMAND DIRECTOR, NATIONAL SECURITY AGENCY (A81, R24, W2 and W34) DIRECTOR, NRO STAFF (SS4, SS4A and SS7) DIRECTOR, CENTRAL INTELLIGENCE AGENCY (OSI)

Subj: POPPY Technical Operations Group (TOG) Meeting; report of

- Ref: (a) CONCH 302315Z Jan 75 CITE 0805 (NOTAL)
  - (b) COMNAVSECGRU 072215Z Feb 75 (NOTAL)
  - (c) COMNAVSECGRU 212100Z Feb 75 (NOTAL)
  - (d) COMNAVSECGRU 132027Z Feb 75 (NOTAL)
  - (e) COMNAVELEX Ltr BYE 59,416-75 of 19 Feb 75
- Encl: (1) Agenda
  - (2) List of Attendees
  - (3) Minimum Daily Voltage Plot
  - (4) Sun Exposure Plot
  - (5) Report on 7107A Battery Status
  - (6) Collection Highlights

1. A POPPY TOG Meeting was held at the Naval Security Station Washington (NSG) at 0930 on 27 February 1975. The Agenda and a List of Attendees are forwarded as enclosures (1) and (2).

2. The following specific topics were discussed:

a. Satellite Status. (NRL)

At the last TOG Meeting (see minutes for 30 January 1975), significant problems with 7107A were discussed; and a follow-up meeting was held on 31 January to pursue required actions. Reference (a) requested that 7107A tasking be restricted to daylight operations only. New task groups have been developed by the tasking authorities and have been promulgated to the sites by reference (b). The new task groups, implemented on 15 February, require approximately 400 ma power drain, compared to the previous task groups' 500 ma. The combination of a twenty percent reduction in power drain and daylight-only tasking has kept 7107A in a safe operating regime. The 7107A voltage plot of enclosure (3) graphically illustrates the beneficial result of reducing operations.

Marning Notice - Sensitive Intelligence Sources and Methods Javolved

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#### PME-106-542/pt

#### Subj: POPPY Technical Operations Group (TOG) Meeting; report of

As the month of February wore on, the opposite problem of potential overcharging became a cause of concern. Close coordination between the sites (through CNSG/G-54) and NRL engineers has led to the formation and proposal of some newer task groups that draw 200 - 250 ma. Further experimentation with these reduced-power (low yield) task groups was adopted for 7107A by reference (c). These task groups may be employed further during the upcoming extended low sun exposure period (see enclosure (4)) after day sixty eight.

Enclosure (5) was presented as the current 7107A battery array status.

The current satellite spacing is:

The approved limits are \_\_\_\_\_\_ and thrusting will be required soon to the \_\_\_\_\_\_. Because of failed options in the command matrix on 7107D, the C satellite must be thrusted. This maneuver is complicated by the fact that 7107C has no extended gradient boom and so is tumbling slowly (approximately two revolutions per orbit). When the satellite appears at \_\_\_\_\_\_\_ horizon, a rapid check of its attitude is made and, when the attitude is acceptable, micro-thrusting is commanded. This procedure requires many more revolutions to complete than if the satellite were always "upright" at acquisition. Thrusting will not begin until 3 March to avoid interference with current high priority tasking.

b. Ground Site Status. (NSG) ----

Ground site operations are unchanged since the previous TOG meeting. operations are being sustained with augmentation by experienced personnel TAD from will be able to maintain a full operational posture through October 75 barring unforseen schedule changes.

All other POPPY sites continue to operate at minimum manning because of the effect of training and transfers.

Implementation of the site-specific SOI list was promulgated to the sites by reference (d). This reorientation has somewhat eased the workload, although those sites that depend upon the SEL 810 are encountering difficulties in meeting reporting timeliness on Operational ELINT requirements. This is due to the densities of high priority SOI's in some task groups.

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Subj: POPPY Technical Operations Group (TOG) Meeting; report of

c. Collection Highlights. (NSG)

The CNSG representatives presented enclosure (6).

It was additionally mentioned that staffing is in progress for POPPY participation in USA exercise GALLANT SHIELD, to be conducted 18-22 April.

The NSA representatives informed the TOG that a new software modification, to ease the message reporting generation at \_\_\_\_\_\_ is being delivered. This package provides an automated capability to produce both OER (Operational ELINT Reports) and TER (Technical ELINT Reports). This is the final planned deployment of POPPY software.

d. Processing Highlights. (NSA)

The following individual item was provided:

The temporary designatorhas been issued tothe signal previously identified asThis is the 4GHZsignal that is suspected of being an additional RF component ofPrevious analysis has led to the conclusion that the 4GHZ is a

Analysis is complete on all 7107 data available. The final report is completed and, pending coordination, will be published as an ELT.

SLM analysis of this signal is pending. Problems with digitizing analog tapes have been encountered. Action is being taken to

have placed on the SOI list and to request further SLM tasking.

e. Anomalous Payload Behavior. (SPO)

In response to an NRO Staff request, the SPO asked NRL and NSG personnel to research observed 7107 satellite payload anomalies that could have been caused by external hostile or non-cooperative sources. This research has been completed and the NRL representatives presented the coordinated results that will be forwarded to the NRO Staff.

Mission 7107 has registered more than sixteen thousand operational orbits with no known or suspected instances of tampering. All problems associated with the interrogation scheme used by the four satellites have been explainable; e.g. 7107 D improper interrogations because of improperly set command reset circuitry, and unfavorable AGC levels at some times in the

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#### POPPY Technical Operations Group (TOG) Meeting; report of Subj:

The one type of observed anomaly that cannot be explained relates to the use of the payload activation/reset timer, when set up by for

The NRL engineers have prepared a list of three hundred forty seven orbits over the CY 1974, during which at least one of the four satellites failed to activate/reset properly. One or more of the satellites either

> (1) arrived ir field of view already reset (off), or

field of view before the pass (2) reset while in the completion.

Both cases are attributed to the timer resetting early. It is also possible that some outside influence in the Indian Ocean area is responsible for this anomalous behavior. NRL engineers have attempted to discern a timer problem with on-orbit testing, to no avail. The only other possible personnel are not correctly commanding the satellites explanation is that a hypothesis that cannot be disproved, but one that has received considerable attention at

In summary, there are three hundred forty seven orbits, or four hundred eighty one individual satellite occurrences (multiple satellites on same orbits), on which this unexplained anomaly occurred in CY 74. This constitutes approximately eight percent of the times satellites could be activated for and less than one percent of total opportunities (all sites).

Three other miscellaneous announcements were made by the SPO representatives. 3.

Closing. This site is currently scheduled to close at the end а. of March, 1975, but planning is in progress to extend this date as far as practicable.

Emitter Parameter Measurement Analysis. NRL is doing an analysis task for which early results are promulgated by reference (e).

The next meeting of the TOG is scheduled for 27 March, to be hosted by NSA. 4.

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#### AGENDA

SATELLITE STATUS GROUND SITE STATUS COLLECTION HIGHLIGHTS PROCESSING HIGHLIGHTS ANOMALOUS PAYLOAD BEHAVIOR

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ENCLOSURE (1) BYE No. 59,430,75

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ENCLOSURE (2) to BYE No. 59,430-75

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#### Report on 7107 Battery Status

Recent problems with 7107A have required NRL engineers to more closely monitor power consumption on orbit, with respect to the variables of

A. Sun exposure

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B. Tasking by ground sites

C. Normal housekeeping



It appears that one of the eighteen 1.3 v (nominal) battery cells on the negative bank (arranged into nine cells positive in series and nine cells. negative in series) is probably leaking water. This water is condensed when charging and evaporates on discharge. As long as the cell is sealed, this process represents normal operation, but cell number fourteen exhibits behavior that can be explained assuming a loss of water. This process may be drying the insulating material between the cell terminals and may eventually cause a short circuit which would fail the entire battery.

Five plots from the daily telemetry dumps are included to show the effect of tasking on battery drain. The orbit (or revolution) number is annotated on the left, with the numbered columns reading 1975 day, hour, minute and second of reading. A reading is recorded for both the positive (P) and negative (M for minus) banks. The voltage levels vary from 11.114 v (M) to 12.888 v (P) depending upon the variables listed above. Darkness is indicated by the presence of "V" in column 21. Site tasking is also indicated just to the right of the DTG of the

Note: an occasional stray "V" shows up in the plots, but is a program error.

From regular, close scrutiny of plots such as these, NRL engineers have concluded the following:

The battery-array combination (negative side) does not appear adequate 1. to continue supporting substantial tasking during eclipses. The array current is low and battery cells are "wearing out".

To maximize spacecraft life, excessive overcharging, as evidenced by high individual cell voltages, should be minimized. Over discharge should be avoided.

3. To attain item 2, power system parameters may be monitored daily and tasking adjusted to either run down the batteries slowly, thereby preventing overcharge, or run-up the state of charge as low voltages on the battery (cells) are reached.

Due to battery age and use, battery voltages of approximately 10 volts 4. (1.1 volts/cell) would be allowable provided individual cells are not diverging greatly from the average. (A rapidly decreasing battery voltage under constant load is indicative of one cell failing,  $\Delta v \approx 1.0$  volt).

5. No valid estimate can be made for battery life under circumstances like these.

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	COLLECTION HIGHLIGHTS	INRL
- · .	OCEAN SURVEILLANCE: (28 Jan - 24 Feb 75)	
· ·	Since the last TOG meeting, there have been a total of four thousa five hundred seven ocations. Four hundred thirty four of the were equated to major combatants and/or auxiliaries. Three hundred intercepts were combatant associated, but could not be correlated to a hull. Seventy emitters were intercepted, including three in the Norwegian Sea, one off the Kuril Islands, and one East of Hokka Three thousand six hundred forty six intercepts of Merchant associate were reported. Other items of interest are:	nd se seven specific one ido. d radars
· · · ·	1activity was at a moderate level in the EUR/LANT Area the first half of the reporting period, and at a high level in the PACIFI the last half of the period.	s during C during
	2. Kashin DLG Obraztsovyy exited the Med for a brief surveillan the USS Saratoga in the Gulf of Cadiz, and then returned to the W. Me	ce of 1.
	3. Kotlin DDG Bravyy entered the Med from the Black Sea.	• ,
	4. Two Chinesewere interceptedin the Northern Yellow Sea on 8 Feb byand on 15 Feb by	d
. <sup>.</sup>	5. Two Krivaks, Storoschevoy and Svirepyj departed the Med, e to Cuba. Current location is north of the Bahama Islands, heading tow the Florida Straits.	nroute vards
•	6. SSOCS Korolev transited from the Atlantic to the Caribbean, a now making a Caribbean to Med transit, and is located near the Canar	nd is y Islands.
	7. intercepts reflect the Icebreaker Dobrynya Nikitich an Ivan Susanin conducting operations off the Kuril Islands.	d AGSB
` <b>.</b>	8. Kanin DDG Bnevnyy is making a Sea of Japan to Indian Ocean and was last intercepted going through the Straits of Malacca.	transit,
	9. A total of five intercepts were made of the had three intercepts on 17, 19, and 20 Feb, all geolocated to the of Japan. had the other two intercepts on 30 Jan and 11 Feb, and were geolocated to the Barents Sea.	e Sea nd
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1	ENCLOSURE (6)	to
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11. PROJECT SMOKEY BLUE: Three intercepts were reported in the area of interest during the report period. Two intercepts reflected the Krivaks transiting the Atlantic to Cuba. Task was levied by CINCLANTFLT on 19 Feb and will run through 2 Mar. Purpose is for coverage of Soviet movement in an area of U.S. Special Operations in the Atlantic.

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#### TECHNICAE INTELLIGENCE AND EOB:

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Special SLM collection task produced three intercepts of

Project FLAVOR - Seven intercepts were reported in support of task. All were intercepts of \_\_\_\_\_\_ Five intercepts were geolocated

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On 30 January there was an intercept of a possible which exhibited a four element stagger. PRI's were 1047.7, 952.5, 1015.9 and 889.0 USEC for a median PRF of 1024.37 PPS. All PRI's equate to the 94.5 KHZ crystal. During portions of the intercept the emitter appeared to use a bidirectional sector or two bar raster scan.

An intercept of \_\_\_\_\_\_ on 03 Feb exhibited an STI PRF of 5120.88 PPS and an apparent CCW circular scan. PRF equates to the 96th division of the 81.9 KHZ crystal.

again intercepted a probable radar in a stagger mode of operation. Unlike two previous intercepts which revealed median PRF's of 2889 PPS, this intercept exhibited a median PRF of 2999 PPS. Stagger was two position with PRI's of 322.3 and 346.3 USEC. PRI's equate to the 26th and 28th divisions of the 80.9 KHZ crystal.

#### PROJECT OUTLAW HAWK:

TASK was implemented at on 19 Feb and will continue through 31 Mar. TASK is for coverage of U.S. and allied exercises and transits taking place between the West Coast and Hawaii. Data output to date has reflected CVA and Destroyer activity but is considered light compared to past coverage of allied exercises. This is expected to be a direct result of ALFA payload collection restrictions plus the fact that activity is light as vessels are still in process of transiting to OP Area. In past exercises the bulk of product has come from intercept. Since all coverage is from the here has been considerable loss, however, payloads will be in 100% sunlight during exercises off Hawaii and we will have full coverage. It is difficult to assess the impact on reporting of the darkness restrictions on ALFA payload. Soviet surface activity has been relatively light through the report period. was able to maintain a consistent track on the KRIVAK transit to the Caribbean

with no apparent problems.

#### IMPACT OF 7107 TASKING RESTRICTIONS:

Soviet surface to air missile activity is usually light to non-existant during hours of darkness so there has been little, if any loss on those targets. There has been no effect on general search per se, except for the geolocation capability, as the BRAVO payload has continued to be fully operational. The implementation of low yield task group coverage with the ALFA payload has restored near full coverage of major surface combatant activity. Routine EOB reporting totals have not been reduced greatly as the ALFA restrictions have allowed for increased processing time on CD payload intercept. In summary, the overall impact of ALFA restrictions appears to be minimal.

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