C05025477
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Subj: Mission 7106, Preparation for

Ref: A. Preliminary Technical Description of Mission 7106, 3 June 1969

B. (Telemetry Description--actual title unknown)

1. The launch of POPPY Mission 7106 is scheduled for 261300Z Sept. Slippage of this date is probable and status reports will be forwarded in event of excessive delays. Precise lift off time will be forwarded via DEFSMAC message when available.

2. Field sites are requested to participate in an early ELINT collection coverage of known Soviet space surveillance radar systems expected to make the initial Soviet assessment of the 7106 Mission. This effort will take place in the first five orbits of the 7106 payloads and will not coincide with any 7105 passes.

3. Equator crossing positions (EQX) and times (EQT) and the participation of each site are: (EQT is given in HR:MIN:SEC from launch time. Simply add this to the lift off time you receive in the DEFSMAC alert message; then plot the orbit to determine the approximate acquisition time and position.)

| ORBIT | EQX | EQT | site | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 58.7E | 1:03:17 | X | | | X | X |
| 2 | 32.6E | 2:46:47 | X | X | | X | X |
| 3 | 6.5E | 4:30:17 | X | X | | X | X |
| 4 | 19.6W | 6:13:47 | | X | X | X | |
| 5 | 45.7W | 7:57:18 | | X | X | X | |

4. Tasking for the first orbit is preset in the payload prior to launch. [redacted] will reset and reinterrogate the payloads in the delayed activate mode prior to departure their area on orbits 1 and 2. [redacted] will interrogate the payloads in the normal mode upon arrival their [redacted] area on orbits 4 and 5. NRL engineers will be on board [redacted] to assist in these activities. No other interrogations should be attempted

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at this time unless directed by NRL.

5. 7106 tasking for orbits 1 thru 5, and SOIs are:

~~RAXLRAAEXEMANMELXBAND~~

| PAYLOAD | CHANNEL | PULSE BAND WIDTH | RF (MHZ) | COMMAND OPTION | SOI |
|---|---|---|---|---|---|
| A | B | [redacted] | 165-200 | none | [redacted] |
| A | B | | 1800-2100 | A & B Polarization | |
| A | B | | 350-450 | none | |
| A | C | | | | |
| B | B | | | | |
| B | C | | 154-165 | none | |
| B | C | | 2100-2580 | A & B Polarization | |
| B | C | | 920-1080 | none | |
| C | B | | 550-650 | none | |
| C | B | | 835-970 | none | |
| C | C | | | | |
| D | B | | | | |
| D | C | | 6700-7300 | none | |
| D | C | | 1205-1800 | none | |
| D | C | | 350-450 | CW/HI | |

6. Telemetry (channel A) will be recorded throughout the first 5 orbits. Sites should prepare a temporary configuration using spare receivers, convertors, etc., to record this information on channels 2 and 4 of the analog recorders. Note that a 24 KHZ receiver bandwidth is required. If sufficient equipment is not available to permit ~~hm~~ simultaneous recording of all four telemetry channels, samples from each payload should be recorde with identifying entries made in the operators' log. Channel 6 should be checked to insure that it is

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functioning properly. The modified configuration should be installed upon notification of the launch and removed following the fifth orbit. It is not necessary to remove the modification for any 7104 or 7105 passes that may occur during this time.

7. [redacted] analog recorder track assignments are:

| RECORDER | TRACK | TYPE | PAYLOAD | CHANNEL | SIGNAL |
|---|---|---|---|---|---|
| Primary | 1 | FM | A | B | Data |
| Primary | 2 | AM | A | A | Telemetry |
| Primary | 3 | FM | A | C | SLX |
| Primary | 4 | AM | B | A | Telemetry |
| Primary | 5 | FM | B | B | SLX |
| Primary | 6 | Specl. AM | | | Time Code & 50 KHZ Mixed |
| Primary | 7 | FM | B | C | Data |
| Secondary | 1 | FM | C | B | Data |
| Secondary | 2 | AM | C | A | Telemetry |
| Secondary | 3 | FM | C | C | Data |
| Secondary | 4 | AM | D | A | Telemetry |
| Secondary | 5 | FM | D | B | Data |
| Secondary | 6 | Specl. AM | | | Time Code & 50 KHZ Mixed |
| Secondary | 7 | FM | D | C | Data |

8. [redacted] analog recorder track assignments are:

| RECORDER | TRACK | TRACK | PAYLOAD | CHANNEL | SIGNAL |
|---|---|---|---|---|---|
| (Primary & | 1 | FM | A | B | Data |
| | 3 | FM | B | C | Data |
| Secondary) | 5 | FM | C | B | Data |
| | 6 | Specl. AM | | | Time Code & 50 KHZ Mixed |
| | 7 | FM | D | C | Data |
| Primary | 2 | AM | A | A | Telemetry |
| Primary | 4 | AM | B | A | Telemetry |
| Secondary | 2 | AM | C | A | Telemetry |
| Secondary | 4 | AM | D | A | Telemetry |

9. [redacted] digital assignments are: (Operate A/DDS in LE/TE mode.)

| POSITION | RCVR # | A/DDS CH # | PAYLOAD | CHANNEL |
|---|---|---|---|---|
| Primary | 0 | 0 | A | B |
| Primary | 1 | 4 | C | B |
| Primary | 2 | 2 | A | C |
| Primary | 3 | 6 | C | C |
| Secondary | 4 | 1 | B | B |
| Secondary | 5 | 5 | D | B |
| Secondary | 6 | 3 | B | C |
| Secondary | 7 | 7 | D | C |

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10. Following the initial surveillance effort, a one to two week domestic evaluation phase is planned to establish any engineering restraints within the payloads. Payload position and orientation adjustments may also be made during this period should they be needed. No site participation is required during this phase with the exception that [redacted] may be asked to assist in payload maneuvers.

11. NRL engineers will be at all sites except [redacted] during the third and fourth weeks to conduct an overseas engineering evaluation. This effort will be conducted as in the past with program control under NRL's guidance from [redacted] During the overseas evaluation phase normal NRO tasking will begin, but it will not take precedence over engineering experiments being conducted.

12. Normal acquisition of 7106 data is with payloads ALPHA and CHARLIE collected at the Primary position while BRAVO and DELTA are collected at the Secondary position. Analog recorder track assignments in paragraph 7 are applicable for [redacted] except that telemetry will be replaced by 50 KHZ and Time Code on channels 2 and 4. Since the Primary and Secondary analog recordings are not duplicates, analysis must be performed on both tapes. Tapes to be forwarded to NSA should be run forward to the end of tape. [redacted] will be tasked to collect from one payload [redacted] at a time, i.e. 7106A/7106B or 7106C/7106D, and will record analog tapes as is presently done with 7105 passes. [redacted] digital assignments in paragraph 9 apply for 7105 and 7106 passes. Note this is different from present configuration. Until further directed operate the A/DDS in the PWD, 2-BIN mode for 7105 and PWD, 4-BIN mode for 7106 passes. Use the LE/TE mode when either SLX of PWX are tasked. PTS correlation selections should be made on evaluation of RF bands tasked.

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Launch Operation for Mission 7106

1. The POPPY Mission 7106 is expected to be launchen on 26 September or as soon thereafter as the countdown can be successfully completed. The particular "Time-of-day" for launch is determined by many thing but one of the most important is to place the spacecraft of Mission 7106 in an orbit which provides the minimum interference with the spacecraft from Mission 7105, the earlier POPPY mission. This and the other considerations dictate a 2½ hour period each day during which the launch can meet the major criteria. For planning purposes the center of this 2½ hour "Launch Window" is used as the basis for the predictions for the first 10 orbits given later in TABLE #1. This window moves about 15 minutes earlier each day so after four days delay of the launch this window will be about one hour earlier than it was on Sept 26th. There will almost certainly be delays, so each day each POPPY site will be in a state of readiness to initiate data collection on the first five orbits of this new Mission. In order to provide the sites with more exact information on the launch progress DirNAVSEC GRU will provide periodic progress reports, and DIRNSA will send a DEFSMAC message to all sites notifying the precise lift off time so that the site can adjust the times given in TABLE #1.

TABLE #1

BASIC PREDICTIONS FOR MISSION 7106 Equator Crossings and times relative to a predicted/1300Z 26 Sept Lift Off from the Launch site:

| ORBIT # | EQ-Crossing Longitude | T I M E Day HR-Min-SEC |
|---|---|---|
| 1 | 58.69°East | 26-14-03-17 |
| 2 | 32.59 | 15 46 47 |
| 3 | 6.49 | 17 30 17 |
| 4 | 19.61°West | 19 13 47 |
| 5 | 45.71 | 20 57 18 |
| 6 | 71.81 | 22 40 48 |
| 7 | 97.91 | 27 00 24 18 |
| 8 | 124.00 | 02 07 48 |
| 9 | 150.10 | 03 51 18 |
| 10 | 176.20 | 05 34 48 |
| 11 | 157.70°East | 07 18 19 |

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To correct for a Lift Off time different from the 261300Z time used for table #1, just subtract the hour & minutes for precise lift-off time (provided by NSA message) from 1300Z and then take this number of minutes thus obtained and move the predicted equator crossing times earlier by a like ammount.

2.

The purpose for having the POPPY sites prepared to take data on the first five orbits is to provide early ELINT collection coverage of the known major Soviet space surveillance radar systems (the basic ABM emitters) which are expected to make the initial Soviet assessment of this Mission. as it crosses their territory the first few times. Since several spacecraft will be separating at various rates it is reasonable to expect that the highest resolution measurement modes of these radar systems may be employed. Thus the Signal Amplitude Option [redacted] will be tasked on one data channel from each spacecraft of Mission 7106.

3.

The Launch of Mission 7106 will be very similar to those of past POPPY missions, that is they will be injected into orbit about 3 minutes after crossing the equator heading for Pakistan. At about 19°North Latitude and 64.5°E Longitude the spacecraft ordinance will fire, allowing the transmitting antennas to deploy...this will be accompanied by a great increase in the signal strength, particularily on the Data Channels. In order that the true state of Data-Command may be ascertained it is requested that the sites all attempt to record and log the Channel "A" telemetry while the spacecraft are within the stations horizon circle. The Recorder-track assignments are given in Table# 2; for the stations which have 8 data-link receivers. Table #3 is provided for the stations in [redacted] which will not have their full complement of receivers until about Thanksgiving time. Note the major departure from convention is the recording of Channel A data on the Track#2, and #4. This signal from each spacecraft will have a new voice and will require a 24 KC receiver bandwidth in order to preserve the information on IRIG channel #12 which is a PCM type channel. Attempt to get as good a recording of the channel A information as possible but it is not as important as the ELINT data of course.

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SIGNAL-TO-RECORDER-TRACK assignment # I:(all sites with 8 data receivers)

| Site | RECORDER | | | SPACECRAFT | | |
|---|---|---|---|---|---|---|
| Recorder | Tr# | Type of Recorder | # | Data Channel | | |
| PRIMARY | 1 | FM (54 Kc) | 7106A | Channel | B | Std POPPY data |
| | 3 | " " | 7106A | " | C | [redacted] |
| | 5 | " " | 7106B | " | B | |
| | 7 | " " | 7106B | " | C | Std POPPY Data |
| | 2 | AM | 7106A | Channel | A | Telemetry |
| | 4 | " | 7106B | " | A | Telemetry |
| | 6 | " | ..... | | | Time Code + 50 Kc Mixed |
| SECONDARY | 1 | FM (54 Kc) | 7106C | Channel | B | Standard POPPY Data |
| | 3 | " " | 7106C | " | C | [redacted] |
| | 5 | " " | 7106D | " | B | |
| | 7 | " " | 7106D | " | C | Standard POPPY Data |
| | 2 | AM | 7106C | Channel | A | Telemetry data |
| | 4 | " | 7106D | " | A | Telemetry data |
| | 6 | " | ..... | | | Time Code + 50 Kc Mixed |

~~SIGNAL-TO-RECORDER-TRACK assignment #I (for sites with only 8 data receivers)~~

Table 2

NOTE That the "Signal to Recorder-Track Assignments" differ from the standard POPPY format in these several respects:

1. For the first time in history of POPPY the "Housekeeping" Telemetry Channel "A" signal is to be recorded for several reasons;(a) to determine the flight attitude, (b) the state of Data-Link Command and of course (c) for Autopsy purposes if needed.

2. The sites with eight receivers can record the data from all four spacecraft simultaneously and additionally those sites with the Field Digitizing complexes will ~~easily be able to~~ automatically identify or Flag all data as to the receiver channel from which each pulse is received. ~~from~~

3. The data from this Mission (7106) will be recorded on the first five orbits rather than awaiting a deliberate engineering evaluation and calibration phase which in the past has taken atleast four weeks.

4. The data taken during these first five orbits will enable the community to appraise the Technical Intelligence capability of this program. However this assessment will depend upon the sites ~~to be~~ doing a thorough job of evaluation of the Data and to especially Note the "Signals Of Interest" by electrical mag. tape BUEMAN Talent keyhole Control system only



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SIGNAL TO RECORDER-TRACK ASSIGNMENT # 2 (FOR SITES WITH 4 DATA RECEIVERS).

| RECORDER Track --Electronics | SPACECRAFT # data-channel | | Signal recorded |
|---|---|---|---|
| (PRIMARY & SECONDARY) | | | |
| #1-------FM 54 kc $F_c$ | 7106 A | Channel B | Standard POPPY Data |
| 3 " " | 7106 B | Channel C | Standard POPPY Data |
| 5 " " | 7106 C | Channel B | Standard POPPY Data |
| 7 " " | 7106 D | Channel C | Standard POPPY Data |
| 6 Analog | ---------- | | Mixture of 50 Kc and Time Code. |
| PRIMARY Recorder | | | |
| 2 Analog | 7106A | Channel A | Housekeeping Telemetry |
| 4 " | 7106B | Channel A | " " |
| SECONDARY Recorder | | | |
| 2 Analog | 7106C | Channel A | Housekeeping Telemetry |
| 4 " | 7106D | Channel A | " " |

Table #3

NOTE: The Format here offers the sites with only four data-receivers the opportunity to receive and record [redacted] spacecraft simultaneously during the first five orbits with minimum loss of critical data. The Information which is not recorded is from the parametric measurement SLX options (~~SLX~~). Thus there is a minimum sacrifice in the data from these analog-sites. The major difference in the record-Format is that on ~~one of the two tapes (which are made simultaneously)~~ the primary recorder the housekeeping telemetry data from 7106A and 7106B is recorded on track #2 and #4 respectively and on the other tape the telemetry data from 7106C and 7106D are recorded on track #2 and #4 respectively. The data on Tracks 1,3,5, and 7 is exactly the same on each of the tapes. This just provides the redundency in the tape recording systems. The site must be sure that the record electronics used in Track #6 is the "specially modified" analog-record amplifier with the accessory for recording the Reference/tone oscillator..... These should have been used in Track #6 for years... Just be sure both Time Code & 50 Kc are on the tape in usable levels.

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SPECIFIC INFORMATION ABOUT THE SPACECRAFT OF MISSION 7106:

TRANSMITTER FREQUENCY AND POWER RADIATED:

| Channel # | 7106ALPHA | 7106BRAVO | 7106CHARLIE | 7106DELTA | 7105B Ref. |
|---|---|---|---|---|---|
| [redacted] | | | | | |

Table #4

During the first five orbits the following spacecraft ELINT Collection receivers will be activated as now planned:

| Spacecraft BAND # | Range of Frequency | DATA Channel Pulse Width | Command Option | ABM Signal anticipated |
|---|---|---|---|---|
| 7106ALPHA--2 | 165-200MHz | [redacted] | none | [redacted] |
| 7106A------10 | 1800-2100 | | A&B Polarization | |
| 7106A------4 | 350 - 450 | | none | |
| 7106BRAVO--1 | 154 - 165 | | none | |
| 7106B------11 | 2100-2580 | | A&B Polarization | |
| 7106B------9 | 920 - 1080 | | none | |
| 7106CHARLIE-6 | 550-650 ~~14.6 - 14.9GH~~ | | ~~none~~ | |
| 7106C-------7 | 835 - 970 | | ~~[redacted]~~.. | |
| 7106DELTA---20 | 6700-7300 | | none..... | |
| 7106D-------9 | 1205-1800 | | none | |
| 7106D-------4 | 350-450 | | (HI sens) [redacted] | |

TABLE #5.

NOTE* The second Data Link transmitter on each spacecraft will be devoted to the transmission of the Signal Amplitude Measurement [redacted] information where each pulse seen on the Standard POPPY data will be given a Binary (1,2,4,8) 16 level description following a SYNC Pulse. The pulse lengths of the SYNC pulse are 124 microseconds while the binary bits are each 62½ microseconds long. This same format as has been used for [redacted] and PWX in the past.

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TABLE #3

| SPACECRAFT | BAND # | RANGE OF FREQUENCY | WIDTH OF DATA FORMAT | COMMAND OPTION | DATA CHANNEL |
|---|---|---|---|---|---|
| 7106 ALPHA | #2 | 165-200MHZ | [redacted] | None | Bravo |
| " " | #10 | 1800-2100 | | A&B Polarization | " |
| " " | #4 | 350-450 | | None | Bravo |
| 7106 BRAVO | #1 | 154-165 | | None | Charlie |
| " " | #11 | 2100-2580 | | A&B Polarization | Charlie |
| " " | #9 | 920-1080 | | None | Charlie |
| 7106 CHARLIE | #6 | 550-650 | | None | Bravo |
| " " | #7 | 835-970 | | | " |
| " " | #10 | 1800-2100 | | None | " |
| 7106 DELTA | #20 | 6700-7300 | | None | Charlie |
| " " | #11 | 2100-2580 | | HI-Sens | " |
| " " | #9 | 1205-1800 | | None | " |
| " " | #4 | 350-450 | | [redacted] | Charlie |

Note: [redacted] is tasked on Channel Charlie of 7106A and 7106C spacecraft.
[redacted] is tasked on Channel Bravo of 7106B and 7106D spacecraft.

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8-25-69

DEPUTY FOR SPECIAL PROGRAMS
(CAPT/CDR)

BILLET NUMBER: NIC-011

The incumbent will work exclusively in a highly classified major national program for which ACNO (I) is designated Program Director. He will be Deputy for Special Programs to the designated Program Manager (a USN Captain). The primary duties will include managing, directing and participating in the activities of the Technical, Tasking, Plans and Operations Divisions of the Special Programs Office. This involves: (a) chairing a continuing series of conferences, working group sessions and meetings with technical representatives of the naval laboratories, industry and other government agencies relative to Special Programs, (b) working with current intelligence reports and estimates to develop tasking and operational plans that will be compatible with the technical capabilities of Special Programs, (c) developing long range plans to insure that Special Programs are responsive to Navy requirements.

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EXPERIENCE:
ELINT
ELECTRONICS
R&D
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"ROUGH DRAFT" "WORKING PAPER" 27 AUGUST 1969

SPECIAL TASK #1 ( FIVE ORBITS OF MISSION 7106)

1. Special Task #1 is designed to provide complete ELINT collection coverage of the major space surveillance radar systems of the Soviet ABM/AES complex during the first five obrits of the next POPPY launch MISSSION 7106, during late Septemmber. This launch will proceed much in the same manner of other prevéous POPPY Launches,i.e. down abound the tip of South America and Africa until it reaches the equator going Northward. About three minutes after crossing the equator the POPPY spacecraft (4 in number) will be injected into orbit, leaving the Agena vehicle much like MIRV. The Soviet Space Surveillance network will undoubtedly ~~find this in~~ observe these spacecraft sometime on the first ~~two~~ five orbits over their territory ~~but since~~ the POPPY spacecraft will not have been Flight Evaluated and calibrated, it is suggested that no less than Five orbits be tasked to collect ELINT data on the major radar surveillance system in the Soviet itenerary.

2. The following Tasking is suggested to be promulgated so that the Mission 7106 spacecraft can best be utilized...they will be unstabilized in flight attitude (possibly tumbling one revolution every 8 to 20 minutes), They may have some engineering restraints which will not be determined until days later in the flight, They will be so close together that it is not reasonable to expect that the [redacted] location technique can be used on this data. Also it is reasonable to expect that some of these major space surveillance radar systems may employ certain high resolution modes of operation which would not normally be employed so it is suggested that the Fullest use of the inherent Parametric measurement capability of this POPPY Mission be ~~xxxxxxx~~employed.

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Launch Operations, Nomi[redacted]n for (Mission 7106)

1. The special Task #1 for Mission 7106 is aimed at providing Early ELINT data collection coverage of the major space-surveillance radar systems which (basis of Soviet ABM/AES hardware) will make the initial Soviet observations on the spacecraft of this Launch. It is reasonable to assume that these radar systems may use their highest resolution modes in order that they might best assess the spacecraft-separation development of these spacecraft. For this reason The [redacted] (Signal Amplitude) parametric measurement capability of this POPPY Mission will be fully employed.

2. The pre-injection portion of the flight will proceed much like the recent POPPY launches, i.e. down past South America and then up off the East coast of Africa. At one hour and three minutes after "lift-off" the AGENA with all spacecraft still attached, will cross the equator at 58.7° East Longitude heading toward Pakistan. About 3 minutes after equator crossing the spacecraft will be separated from the Agena Launch vehicle and then in another three minutes the antennas will be deployed into flight attitude. This antenna deployment will result in a considerable increase in the Data signal-level. The Channel "A" signal will be operating at Lift-Off and should be of sufficient signal-strength for intercept even before the antennas are deployed.

3. The Channel "A" signal will have a slightly different sound and in order to record the IRIG #12 PCM type Telemetry the Site Receiver must be operated on a bandwidth of about 24 KC. A good signal-to-noise ratio is necessary for the recorded data to be usable so early in the intercept of the Channel "A" signal it may be found necessary to use a narrower bandwidth of reception but be sure to widen it out when possible.

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SIGNAL-TO-RECORDER-TRACK assignment # I:(all sites with 8 data receivers)

| Site Recorder | Tr# | Type of Rec | RECORDER # | SPACECRAFT Data Channel | |
|---|---|---|---|---|---|
| PRIMARY | 1 | FM | 7106A | Channel B | Std POPPY data |
| | 3 | " | 7106A | " C | [redacted] Data |
| | 5 | " | 7106B | " B | [redacted] Data |
| | 7 | " | 7106B | " C | Std POPPY Data |
| | 2 | AM | 7106A | Channel A | Telemetry |
| | 4 | " | 7106B | " A | Telemetry |
| | 6 | " | ..... | ..... | Time Code + 50 Kc Mixed |

SIGNAL-TO-RECORDER-TRACK assignment #I (for sites with only 4 data receivers)

| | | | | | |
|---|---|---|---|---|---|
| SECONDARY | 1 | FM | 7106C | Channel B | Standard POPPY Data |
| | 3 | " | 7106C | " C | [redacted] DATA |
| | 5 | " | 7106D | " B | [redacted] data + 50 |
| | 7 | " | 7106D | " C | Standard POPPY Data |
| | 2 | AM | 7106C | Channel A | Telemetry data |
| | 4 | " | 7106D | " A | Telemetry data |
| | 6 | " | ..... | ..... | Time Code + 50 Kc Mixed |

NOTE That the Signal to Recorder-Track assignments differ from the standard POPPY format in only several respects:

1. For the first time in history of POPPY the "Housekeeping" Telemetry signal is to be recorded for several reasons;(a) to determine the flight attitude, (b) the state of Data-Link Command and of course (c) for Autopsy purposes if needed.

2. The sites with eight receivers can record the data from all four spacecraft simultaneously and additionally those with the Field Digitizing complexes will easily be able to identify or Flag all data as to the receiver channel which each pulse is received from.

3. The data from this Mission (7106) will be recorded onthe first five orbits rather than awaiting a deliberate engineering evaluation and calibration phase which in the past has taken atleast four weeks.

4. The data taken during these first five orbits will enable the community to appraise the Technical Intelligence capability of this program. However this assessment will depend upon the sites to do a thorough job of evaluation of the Data and to e[redacted]ally Note the"Signals Of Interest"

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OVERVIEW

OF SPECIAL TASK # 1 FOR MISSION 7106

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1. The first five or [redacted] of the flight of Mission 7106 are to be devoted to an attempt to collect ELINT data on certain major Space Surveillance radar systems of the Soviet ABM/AES complex, as they are engaged in monitoring the first orbits of this Mission across their territory.

2. The Launch Phase of this Mission will proceed as those of the last five POPPY Missions, i.e. southward down the coast of California and south America then up Northward off the east coast of Afrina, where some 56½ minutes into the [redacted] flight the Agena Second stage ignites for the Second Burn in order that the spacecraft may be placed into a circular orbit at an altitude of 500 mautical miles. The spacecraft of the POPPY Mission will separate from the Agena about three minutes after the launch vehicle crosses the equator or just one hour and six minutes after Lift Off from the launch pad at Vandenberg. The on-board Data-collection-system timer will actuate the collection systems and deploy the Data-transmission antennas on the spacecraft about six minutes after crossing the equator. At this time the site at [redacted] will receive the data signals with greatly increased strength. The deployment of the antennas must necessarily wait until the four spacecraft are sufficiently separated so the clearance is adequate. Until the antennas are unfurled or deployed the radiated power will be disturbed considerably and the resultant signal strength will be much lower than normally experienced in flight. The Channel "A" (telemetry) signal level will be changed very little by the deployment of the antennas so the data-recordings should be started when the first signal of the Channel "A" is detected.

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SOP for the sites durin [redacted] Special Task #1:

1. Table #1 provides the list of times and longitudes of the orbital equatorial crossings for the first 100 orbits, based on an estimated time of "LIFT-OFF" of 1300Z on 26 September. The precise LIFT-OFF time will be promulgated by NSA using the DIRNSA DEFSMAC network and priority so that the crossing times of Table #1 may be adjusted or offset to account for any delays in the Launch operations. These are inevitable and must not be assumed that launch will occur either on 1300Zor on the 26th of September. The information plotted in Figure #1 shows how the LAUNCH WINDOW will get earlier for each day the launch is delayed. Note for instance if the launch is delayed until 1 October the will open on 1054Z and close on about 1332Z giving about 15 minutes per day shift(earlier)in the launch window for each day delayed. When the DIRNSA DEFSMAC message arrives it should have the precise launch time of LIFT-OFF and the difference in Hours Minutes and Seconds which the times of Table #1 must be shifted toward earlier times). Understand that this all presupposes that the launch operation will be perfect and that the orbit will be exactly 500 n.mi. high but if there is an eccentricity both the period and the crossing times will be different from those given in Table #1 and the time-sift will accumulate so that for a lower orbital altitude the times of equator crossings will gradually shift earlier and earlier since the period of the orbit is less for lower altitudes than for the 500 n. mi. orbit altitude desired for Mission 7106. So many things could be different than the orbital specifications or goals which are specified for this Mission it can not be treated here, so just look for the spacecraft to cross the equator at 58.69°East Longitude,(heading for Pakistan) at the time which results from the above guidance. The second orbit may depart from these estimates (predictions) if the orbit characteristics are not optimum so allow for both early and late arrival of the spacecraft.

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~~SECRET~~ [redacted]

ANTICIPATED [redacted] FOR "TOG".... MEETING OF 28 AUGUST 1969

I. Current Operations of Mission 7105
Noise Triggering of K-Band System at end of last 100% sunlight period.
Suspect that other bands may get increasingly temperature sensitive.
2. SPACECRAFT:

SITES: [redacted] adding a PCM Decomutator to each site to speed and expedite the Interrogation processes...should allow interrogation of four spacecraft in less than two minutes.

Need wider IRIG Channel Telemetry discriminators Plug ins.

Command antennas have ground screen which shape the pattern and reduce the ammount of energy which spills out the vack of the antenna.

DATA ANALYSIS COMPLEXES::::::

[redacted]

NSA report on data analysis.

II: MISSION 7106 Report;;;;

Launch and evaluation-calibration Team to depart on 7 Sept for west.

Expect a Launch on or about 26 Sept, at a time when the 7105 and 7106 missions will cross the equator at points about 180° apart, thus minimizing the interference between the two operational missions using a series of dedicated ground sites.....

Launch Description

First Five ORBITS....Suggested TAsking will minimize the difference between the analog and thedigital sites by using SLX or PWX options in each spacecraft and allowing the digital sites to provide the additional capability of receiving and recording and digitizing the SLX or PWX data in addition to the Normal POPPY data which the analog sits can also get. The [redacted] main reason for SLX is to take advantage of the special HIGH-resolution Mode which the Soviet Sapce Surveillance radars might utilize to resolve the nature of the spacecraft deployment during the first obbit.

The Analog sites are being readied with four additional receivers so they can make two tape recordings simultaneously instead of serially as was done with mission 7105. It is understood that NSA cannot be expected to relate in any Location-analysis way, data from different tapes. It is also understood that the entire PROGRAM must provide the maximum use of the site in indicating the content of the tapes collected on Mission 7106, so that NSA can most easily analyse those tapes which have been labled as most urgent(by contents) by the site QC analysists.

URGENTLY need the capability to make 14 Track recordings at all sites so that data from any bird or any Channel may be easily related with that from any other bird or channel. After all this is the reason why we have Four-Ball commonality in over ten of the collection bands...so that the [redacted] even the most brief observations of the HIGH PRIORITY signals may be locatable by providing multiple Delta-TOA opportunities for a single pulse. If the QC operator must relate one pulse on this tape with the same pulse on another tape this is impossible with todays equipment andtiming system. Thus if the [redacted] data from the Mission is capable of being placed on one [redacted] tape recording with 14 tracks, then this coorellation is posible.

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We need three recorders at each of the digital sites and ( one for NSA's tape and one f QC tape and another for the QC position.....
The analog which have 8 receivers could also use 3 recorders.
could use two of these machines.....total of 17@$25Keacch

Mission 7106 Concept over 2½ years ago was obtained with full community knowledge and approval. Thus the

is that we must attempt to fully utilize the design capability of the mission or the trouble and expense in design and development can never be justified. WE submit that the Tasking community must start out to first do the "JOB"at the top priority slot and then if the analysis can not be solved, beef up the ground based data systems and only then relax the tasking if inadequate improvement is found in either the sites or NSA's equipment.

The only valid excuse for not being able to separate these pulse widths lies in the situation where inadequate signal strength is experienced. Several areas of improvement have been developed for Mission 7106.
(1) the Spacecraft will have vastly improved signal strength UNIFORMITY... no deep nulls in the transmitting patterns
(2) the Ground station Polarization Selection switching will be automatic at the digital sites clamped or
(3) the Data receivers will have a/compressed output to reduce the dynamic range requirements on the recording media.

CONSISTENCY IS THE NAME OF THE MAJOR IMPROVEMENT IN SIGNAL STRENGTH.

The 14 track recorders would pull tape at twicethe speed of thepresent analog recording systems in use and would have Duall-Bandwidth type FM recording electronics with special $\overline{\cos}$ filter shapes to improve the resolution of wave shape and to reduce the ringing now found on the pulse during Reproduce mode on thes present recorders.....



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This presentation is aimed at providing (1) a Review of the past, (2) a statement of the contemporary and (3)Future of the NAVY ELINT satellite program under the NRO known as Program C.

Tod date there have been 18 successful Navy ELINT satellites placedin orbit with three which failed to achieve orbit making the total of 21 At this time there are four more in the last stages of completion for a launch attempt scheduled to take place soon after 12 September 1969. The evolution of the spacecraft has spanned a wide range of complexity from the extremely simple first one(flown two months after the U-2 Disclosure) and weighed about 40 pounds, covered 750 Mhz of S-Band and worked for only 90 days. Constrasted with this beginning over 10 years ago is the spacecraft of Mission now being prepared for launch which weighs in at over 250 lbs, contains not one collection band but rather 20 or 22 discrete ELINT collection receiving systems. Instead of only 850 Mc range of the spectrum the new ones embrace the total spectrum from 154 to 10,000 Mcs with an exciting capability between 14.4 and 15.1 GHz. Sensitivities have increased which now make possible the successful intercept of radar signals at the higher microwave frequencies. Experimental hardware now in hand will allow the extension of the upper frequency of space ELINT collection to be raised to above 35 GHZ for the next generation in this Program.

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SATELLITE TECHNIQUES BRANCH

| LAUNCHES | SATELLITES | NAME | PURPOSE | WT. | VEHICLE | LAUNCH DATE | USEFUL LIFETIME | COMMENTS | COSPAR NUMBER | SPADATS NUMBER |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | SR I | Solar X-rays | 42 | Thor-Able-Star | 22 June '60 | 10 mo. | First Solar Satellite | 1960 ETA II | 46 |
| 2 | 2 | SR II | Solar X-rays | 40 | Thor-Able-Star | 30 Nov. '60 | - | Vehicle Failed | | |
| 3 | 3 | LOFTI I | Low Freq. Radio | 57 | Thor-Able-Star | 22 Feb. '61 | Decayed 36 days | No Separation | 1961 ETA I | 87 |
| 4 | 4 | SR III | Solar X-rays | 40 | Thor-Able-Star | 29 June '61 | 5 mo. | No Separation | 1961 OMICRON II | 117 |
| 5 | 5 | SR IV A | Solar X-rays | 55 | Thor-Able Star | 24 Jan. '62 | - | | | |
| | 6 | LOFTI II A | Low Freq. Radio | 60 | Thor-Able-Star | 24 Jan. '62 | - | Vehicle Failed | | |
| | 7 | Surcal I | Spasur Calib. | 5 | Thor-Able Star | 24 Jan. '62 | - | | | |
| 6 | 8 | SR IV B | Solar X-rays | 55 | Scout | 26 Apr. '62 | - | Vehicle Failed | | |
| | 9 | SR V | Solar X-rays | - | - | - | - | Never Launched | | |
| 7 | 10 | PL 120 | Classified | 55 | Thor-Agena | 13 Dec. '62 | 36 mo. | Operation Satisfactory | 1962 BETA TAU 5 | 513 |
| | 11 | PL 121 | Classified | 55 | Thor-Agena | 13 Dec. '62 | 36 mo. | Operation Satisfactory | 1962 BETA TAU 1 | 502 |
| | 12 | Surcal II | Spasur Calib. | 9 | Thor-Agena | 13 Dec. '62 | 36 mo. | Operation Satisfactory | 1962 BETA TAU 4 | 508 |
| | 13 | Calsphere I | Object Identification | 3 | Thor-Agena | 13 Dec. '62 | Passive | Decayed 6 mo. | 1962 BETA TAU 3 | 507 |
| 8 | 14 | SR VI | Solar X-rays | 85 | Thor-Agena | 15 Jun. '63 | Decayed 47 days | Operation Satisfactory | 1963 21C | 599 |
| | 15 | LOFTI II B | Low Freq. Radio | 65 | Thor-Agena | 15 Jun. '63 | Decayed 33 days | Operation Satisfactory | 21B | 601 |
| | 16 | PL 112 | Classified | 60 | Thor-Agena | 15 Jun. '63 | Decayed 42 Days | Operation Satisfactory | 21E | 598 |
| | 17 | Dosimeter | Radiation Counter | 85 | Thor-Agena | 15 Jun. '63 | Decayed 45 days | Operation Satisfactory | 21D | 600 |
| | 18 | Surcal III | Spasur Calib. | 9 | Thor-Agena | 15 Jun. '63 | Decayed 19 days | Operation Satisfactory | 21F | 597 |
| 9 | 19 | SR VII A | Solar X-rays | 89 | Thor-Agena | 11 Jan. '64 | 23 mo. | Operation Satisfactory | 1964 01D | 730 |
| | 20 | GGSE I | Grav. Grad. Exp. | 84 | Thor-Agena | 11 Jan. '64 | 48 mo. | Operation Satisfactory | 01B | 728 |
| | 21 | PL 135 | Classified | 65 | Thor-Agena | 11 Jan. '64 | 21 mo. | Operation Satisfactory | 01E | 731 |
| 10 | 22 | Dragsphere I | Drag Experiment | 2 | Thor-Able-Star | 6 Oct. '64 | Passive | Operation Satisfactory | 1964 63C | 900 |
| | 23 | Dragsphere II | Drag Experiment | 21 | Thor-Able-Star | 6 Oct. '64 | Passive | Operation Satisfactory | 63E | 902 |

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| LAUNCHES | SATELLITES | NAME | PURPOSE | WT. | VEHICLE | LAUNCH DATE | USEFUL LIFETIME | COMMENTS | COSPAR NUMBER | | SPADATS NUMBER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 24 | SR VII B | Solar X-rays | 103 | Thor-Agena | 9 Mar. '65 | 52 mo. | Operation Satisfactory | 1965 | 16D | 1291 |
| | 25 | PL 142 | Classified | 106 | Thor-Agena | 9 Mar. '65 | 15 mo. | Operation Satisfactory | | 16A | 1271 |
| | 26 | GGSE II | Grav. Grad. Exp. | 130 | Thor-Agena | 9 Mar. '65 | 44 mo. | Operation Satisfactory | | 16B | 1244 |
| | 27 | GGSE III | Grav. Grad. Exp. | 130 | Thor-Agena | 9 Mar. '65 | 16 mo. | Operation Satisfactory | | 16C | 1292 |
| | 28 | Surcal IV | Spasur Calib. | 10 | Thor-Agena | 9 Mar. '65 | Operating | Operation Satisfactory | | 16H | 1293 |
| | 29 | Dodecapole | Object Identification | 9 | Thor-Agena | 9 Mar. '65 | Passive | Operation Satisfactory | | 16E | 1208 |
| 12 | 30 | Tempsat I | Thermal Design Exp. | 19 | Thor-Able-Star | 13 Aug. '65 | 3 mo. design life | Operation Satisfactory | 1965 | 65E | 1512 |
| | 31 | Long Rod | Object Identification | 6 | Thor-Able Star | 13 Aug. '65 | Passive | Operation Satisfactory | | 65G | 1515 |
| | 32 | Surcal V | Spasur Calib. | 11 | Thor-Able-Star | 13 Aug. '65 | Operating | Operation Satisfactory | | 65L | 1577 |
| | 33 | Calsphere II | Object Identification | 8 | Thor-Able-Star | 13 Aug. '65 | Passive | Operation Satisfactory | | 65H | 1520 |
| | 34 | Dodecapole II | Object Identification | 9 | Thor-Able-Star | 13 Aug. '65 | Passive | Operation Satisfactory | | 65C | 1510 |
| 13 | 35 | SR VIII | Solar X-rays | 125 | Scout | 19 Nov. '65 | 24 mo. | Operation Satisfactory | 1965 | 93A | 1738 |
| 14 | 36 | PL 137 | H.F. Wave Prop. | 90 | Atlas-Agena | 18 Mar. '66 | 5 day design life | 50% Satisfactory | 1966 | 22B | 2112 |
| 15 | 37 | PL 151 | Grav. Grad. Exp. | 115 | Thor-Agena | 31 May '67 | Operating | Operation Satisfactory | 1967 | 53G | 2873 |
| | 38 | GGSE IV | Grav. Grad. Exp. | 187 | Thor-Agena | 31 May '67 | Operating | Operation Satisfactory | | 53C | 2828 |
| | 39 | PL 153 | Grav. Grad. Exp. | 169 | Thor-Agena | 31 May '67 | Operating | Operation Satisfactory | | 53H | 2874 |
| | 40 | GGSE V | Grav. Grad. Exp. | 231 | Thor-Agena | 31 May '67 | Operating | Operation Satisfactory | | 53D | 2834 |
| | 41 | TIMATION I | Navigation | 85 | Thor-Agena | 31 May '67 | 24 mo. | Operation Satisfactory | | 53F | 2872 |
| | 42 | Calsphere III | Object Identification | 10 | Thor-Agena | 31 May '67 | Passivie | Operation Satisfactory | | 53B | 2826 |
| | 43 | Calsphere IV | Object Identification | 7 | Thor-Agena | 31 May '67 | Passive | Operation Satisfactory | | 53J | 2909 |
| 16 | 44 | SR IX | Solar X-rays | 197 | Scout | 5 Mar. '68 | Operating | Operation Satisfactory | 1968 | 17A | 3141 |
| 17 | 45 | Orbis Cal I | H.F. Wave Prop. | 67 | Atlas-Burner II | 16 Aug. '68 | - | Vehicle Failed | | | |
| 18 | 46 | Orbis Cal II | H.F. Wave Prop. | 85 | Atlas-OVI | 17 Mar. '69 | 7 day design life | Vehicle Poorly Oriented | 1969 | 25D | 3826 |
| 19 | 47 | PL 161 | rav. Grad. Exp. | 220 | Thorad-Agena | | | | | | |

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| LAUNCHES | SATELLITES | NAME | PURPOSE | WT. | VEHICLE | LAUNCH DATE | USEFUL LIFETIME | COMMENTS | COSPAR NUMBER | SPADATS NUMBER |
|---|---|---|---|---|---|---|---|---|---|---|
| | 48 | PL 162 | Grav. Grad. Exp. | 223 | Thorad-Agena | | | | | |
| | 49 | PL 163 | Grav. Grad. Exp. | 225 | Thorad-Agena | | | | | |
| | 50 | PL 164 | Grav. Grad. Exp. | 227 | Thorad-Agena | | | | | |
| | 51 | TIMATION II | Navigation | 137 | Thorad-Agena | | | | | |
| | 52 | PL 176 | Classified | 50 | Thorad-Agena | | | | | |
| | 53 | TEMPSAT II | Thermal Design Exp. | 30 | Thorad-Agena | | | | | |
| | 54 | Cone | Object Identification | 7 | Thorad-Agena | | | | | |
| | 55 | Cylinder | Object Identification | 6 | Thorad-Agena | | | | | |

19 LAUNCHES 55 SATELLITES

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PROPOSED TASKING FOR FIRST FIVE REVS OF MISSION 7106

| SPACECRAFT | FREQ BAND NO. | FREQUENCY RANGE | DATA CHANNEL | | COMMAND OPTION | | REMARKS |
|---|---|---|---|---|---|---|---|
| 7106 ALPHA | 2 | 165-200 MHz | B | | None | | |
| | 10 | 1800-2100 MHz | B | | Dual Polarization | | Dual Polarization because vehicle is tumbling. |
| | 4 | 350-450 MHz | B | | None | | |
| | | | C | | | | |
| 7106 BRAVO | 1 | 154-165 MHz | C | | None | | |
| | 11 | 2100-2580 MHz | C | | Dual Polarization | | Dual Polarization because vehicle is tumbling. |
| | 9 | 920-1050 MHz | C | | None | | |
| | | | B | | | | |
| | 6 | 550-650 | B | | | | |
| 7106 CHARLIE | 7 | 835-970 MHz | B | | None | | |
| | 10 | 1800-2100 MHz | B | | None | | |
| 7106 DELTA | 2 | 6700-6900 MHz | C | | None | | |
| | 11 | 7145-7250 MHz | B | | High Sensitivity | | |

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WORKING DRAFT

| SPACECRAFT | FREQ. BAND NO. | FREQUENCY RANGE | DATA CHANNEL | COMMAND OPTION | TARGET EMITTER | REMARKS |
|---|---|---|---|---|---|---|
| 7106 DELTA (Continued) | 9 | 1205-1800 MHz | C | None | SA-5 2 | |
| | 4 | 350-450 MHz | C | CW/High | | |
| | | | B | | | |



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