file 73-11

DRAFT [redacted] cab/24 August 1965

MEMORANDUM FOR COMOR

50X1

SUBJECT: P-11 Mission to Satisfy ABM Radar Intercept Requirement

25X1

The NRO has under development an equipment called PLICAT

[redacted]

[redacted] Other NRO missions now on orbit are designed to collect data for both location and rise time.

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Mission 7311 could be flown on a P-11 early in 1966. It is understood that the COMOR SIGINT working group is reviewing the requirements forwarded to the NRO in April 1965. It is requested that the requirement for intra-pulse modulation intercept on the ABM radar signals be confirmed and forwarded to the NRO by 1 September 1965.

7311

DEPARTMENT OF THE AIR FORCE
WASHINGTON

OFFICE OF THE ASSISTANT SECRETARY

8 Sept 1965

MEMORANDUM FOR GENERAL STEWART

SUBJECT: Mission 7310

Mission 7310, DF TAKI, renamed LIEGE, is planned to be flown on P-11 number 4404 in early 1966 along with PLICAT. This payload covers the frequency range from 166 to 177 mcs and is designed to optimize EOB coverage of TALL KING early warning radars. This frequency range is in both the top priority EOB and GENERAL SEARCH bands and thus LIEGE techniques once proven on known targets have a much wider application.

Our present spinning DF capability for P-11 subsatellite payloads is in the 4000-8000 mc band. This same location technique is not practical below about 500 mc because of required antenna size. Therefore, for VHF frequencies, a different technique must be used for P-11's. [redacted], however, this is presently limited to only a few target emitters. DF TAKI uses a phase measuring system which, with sun and horizon sensors, will allow determination of the [redacted] This technique should permit location accuracies on the order of the required [redacted] Ground processing techniques for DF TAKI are being developed by NSA. The entire collection system will be compared with the [redacted] technique.

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Coverage of the TALL KING band is presently being provided by the [redacted] 698BK Mission 7159 would also have provided TALL KING coverage later this year with much less location accuracy. The fact that the LIEGE/PLICAT P-11 is planned was one of the factors influencing the recommendations for cancellation 7159.

In summary, LIEGE will give us a P-11 VHF emitter location technique and provide TALL KING coverage prior to the launch of the first MULTIGROUP next summer.

[redacted]

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7311

8 Sept 65

DEPARTMENT OF THE AIR FORCE
WASHINGTON

OFFICE OF THE UNDER SECRETARY

MEMORANDUM FOR DR. McMILLAN

SUBJECT: P-11 Missions 7310, 7311 for EOB and ABM Radar DIRECTED COVERAGE

A P-11 vehicle with two VHF ELINT missions is proposed based on SAFSP studies of two new ELINT satellite collection techniques. R&D Mission 7310, now called LIEGE, was approved. It will test a VHF spinning interferometer location finding system against the known TALL KING EOB environment.

The proposed Mission 7311 called PLICAT would test a new predetection recording technique in satisfaction of the USIB requirement for intrapulse modulation determination on the suspected ABM radars. This requirement recently has been reconfirmed by the CSWG and is beyond that which is being satisfied by the presently active P-11 Mission 7312. The technique utilizes a folded spectrum concept thoroughly studied for SAFSP by Stanford Electronic Laboratories and tested for processing by NSA. A multiple local oscillator using a frequency synthesizer divides the 9 mc wide intercepted RF spectrum into IF bands all of which can be superimposed and recorded on two channels of a 150 kc recorder. The relatively sparse RF environment in which the USSR ABM frequency scanned array radar has been intercepted allows such processing of these unique signal characteristics. A satellite platform is the only means for intercepting the Sary Shagan radar with predetection data quality capable of resolving intrapulse modulation.

The LIEGE payload is in final stages of fabrication. PLICAT could be built at a cost of $129,000 for launch on the same P-11 vehicle. This has been coordinated with [redacted] 50X1

It is recommended that the attached message be released to SAFSP to approve Missions 7310, 11.

JAMES T. STEWART
Brigadier General, USAF
Director, NRO Staff

Ok'd by Dr M 22 Sept
JS

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EIGHT NINE NINE GUARD

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THE FOLLOWING PAYLOAD FOR VEHICLE P-11 4404 IS PROPOSED AS A COMPANION TO LIEGE. THIS PAYLOAD WAS FORMERLY KNOWN AS LONG JOHN PRE-D.

A. RECEIVING EQUIPMENT WILL CONSIST OF A DUAL CHANNEL, ZERO IF, SUPERHETERODYNE RECEIVER WITH PREDETECTION OUTPOUTS FOR RECORDING ON TWO TRACKS OF A TAPE RECORDER WITH A 150 KC FREQUENCY RESPONSE; AN FM RECEIVER CHANNEL WITH A 9 MC RF BANDWIDTH FOR COARSE FREQUENCY MEASUREMENT; AND AN AM RECEIVER CHANNEL COMBINED WITH HORIZON SENSOR MARKERS FOR COARSE DIRECTION-FINDING MEASUREMENTS. DESIGN GOALS ARE:

1. RF BANDPASS: 153.5 MC TO 162.5 MC.
2. SENSITIVITY: SIGNAL-TO-NOISE RATIO EQUALS 1 AT MINUS 90 DBM.
3. RF DYNAMIC RANGE: 55 DB WITH ONE 20 DB STEP OF ATTENUATION.
4. IF DYNAMIC RANGE: 33 DB.
5. NO. OF LO'S: 30.
6. LO FREQ STABILITY: 1 PART PER MILLION PER DEGREE C.
7. REFERENCE OSC FREQ: 25 KC.
8. REF OSC STABILITY: SHORT TERM; 1 PART PER MILLION PER DEGREE C
9. RECOGNITION CRITERION:
   (A) THRESHOLD ADJUSTABLE FROM MINUS 78 DBM TO MINUS 65 DBM.
   (B) PULSEWIDTH QUAL.- GREATER THAN 25 MICROSEC.
   (C) PRF QUAL. - GREATER THAN 20 PPS.
10. FM CHANNEL DEVIATION SENSITIVITY: 0.55 VOLTS/MC OVER A 9 MC RANGE.
11. AM CHANNEL: PROVIDE LEFT OR RIGHT OF GROUND TRACK INFORMATION

B. THE PRESENT LEACH 100 KC TAPE RECORDER WILL BE MODIFIED TO INCREASE ITS BANDWIDTH TO 150 KC.

C. THE ANTENNA WILL CONSIST OF TWO MONOPOLES SPACED ONE-FOURTH WAVELENGTH APART AND COMBINED BY USING A 90-DEGREE PHASE SHIFT IN ONE FEEDLINE.

D. PRESENT PLANS CALL FOR A DEC FLIGHT SUBJECT TO APPROVAL OF THIS SYSTEM. SUGGEST MISSION NUMBER 7310 BE ASSIGNED. EARLY APPROVAL IS REQUIRED TO MEET THIS FLIGHT DATE.

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JOINT MESSAGEFORM

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File 7311

TYPE MSG: BOOK | MULTI | SINGLE

PRECEDENCE
ACTION: ROUTINE
INFO:

DTG:

FROM: WHIG 0415

TO: WORTH

SPECIAL INSTRUCTIONS

1. Comm
2. SS-2
3. SS-6
4. RF#1
5. RF#2

REF WORTH 8566

DNRO HAS APPROVED THE LIEGE/PLICAT PROPOSAL AS OUTLINED IN REF WITH THE CHANGES AS DISCUSSED AT TD MTG 18 AUG TO IMPROVE THE LOCATION FINDING CAPABILITY AND INCLUDE AN XTAL VIDEO CHANNEL FOR THE DF DATA SO AS NOT TO MODULATE THE PRE DET RECORD WITH A DEEP NULL. FUNDS WILL BE ABSORBED WITHIN PROGRAM APPROVALS. MISSION NUMBER 7310 WAS ASSIGNED TO LIEGE; PLICAT WILL BE MISSION 7311. WITH THE CANCELLATION OF MISSIN 7159, THE EARLIEST POSSIBLE FLIGHT DATE FOR 7310, 11 IS REQUESTED. PLEASE ADVISE.

DATE	TIME
[illegible]	[illegible]
MONTH	YEAR
[illegible]	[illegible]
PAGE NO.	NO. OF PAGES
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DRAFTER — TYPED NAME AND TITLE: [redacted] — PHONE: 78812

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RELEASER — SIGNATURE: Signed

TYPED (or stamped) NAME AND TITLE: [illegible]

SECURITY CLASSIFICATION: [illegible]

REGRADING INSTRUCTIONS

DD FORM 1 NOV. 63 173 — REPLACES EDITION OF 1 MAY 58 WHICH MAY BE USED.

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SAFSS

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TWO EIGHT SIX WORTH

T O P S E C R E T 062027Z
PRIORITY WORTH INFO PRIORITY MARGO CITE WHIG 4410.
EARPOP
REF MARGO 2465-5
REQUIREMENT FIRM FOR LOCATION OF POSSIBLE [redacted] SITE IN
LIFE TIME PERIOD MISSION 7311. REQUEST CARDIOID DF CHANNEL BE
KEPT WITH VERY NARROW BANDWIDTH IF NECESSARY, IN PARALLEL
SO AS NOT TO MODULATE PRED DATA, OR USE CARDIOID ON COMMAND
BASIS. IF NOT POSSIBLE, REQUEST REF OSCILLATOR BE OF SUFFICIENT
STABILITY TO ENABLE PRF DOPPLER MEASUREMENTS ON DATA.
T O P S E C R E T
CFN: 4410 EARPOP MARGO 2465-5 MISSION 7311 CARDIOID DF CHANNEL
PRED DATA CARDIOID
BT

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TWO SEVEN TWO WORTH

S E C R E T /
WORTH WHIG/CITE MARGO 2465-5
EARPOP

1. REQUEST CARDOID D/F ANTENNA OUTLINED TO MEETING NOT RPT NOT BE USED ON PLICAT.

2. FURTHER REQUEST PLICAT ANTENNA BE LOCATED ON PAYLOAD SPIN AXIS TO PROVIDE MAXIMUM REDUCTION OF AMPLITUDE VARIATIONS TO BE ENCOUNTERED FROM SPIN MODULATION.
SECRET/
060