

BIP003/2-005680-69
Revised 9-16-69
Sheet Count 24
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MISSING PAGES
7, 9, 11, 12, 50X1
29, 30, 32

BIP003/2-
Revised 2
Sheet C00
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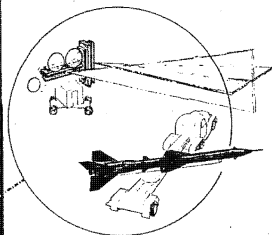
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SIGINT COLLECTION PROGRAM 770 (S)



ELINT SEARCH AND TECHNICAL MEASUREMENT

- EARLY IDENTIFICATION OF ELECTRONIC EMITTERS OF WEAPON SYSTEMS OF INTEREST
- TECHNICAL MEASUREMENTS TO DETERMINE EMITTER SUBSYSTEM PERFORMANCE WITHIN THE OVERALL SYSTEM
- DATA TO SUPPORT DESIGN OF ECM SYSTEM

EOB AND ELINT SURVEILLANCE

- PROVIDE CONTINUING ACCURATE LOCATION OF SOI'S OF OPERATIONALLY DEPLOYED SYSTEMS
- DETERMINE ACTIVITY LEVELS, INTERRELATIONSHIPS, AND USAGE PATTERNS
- PROVIDE A CONTINUING WORLDWIDE DATA BASE WITH HISTORY FILES FOR SELECTIVE ANALYSIS OF PRIORITY AREAS OF INTEREST

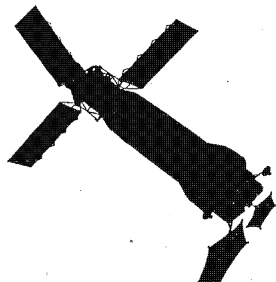


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THE TOTAL SYSTEM

FLIGHT EQUIPMENT



- DESIGN/DEVELOPMENT
- TEST
- OPERATIONS

REQUIREMENTS
& DIRECTION

SAFSP | SAFSS

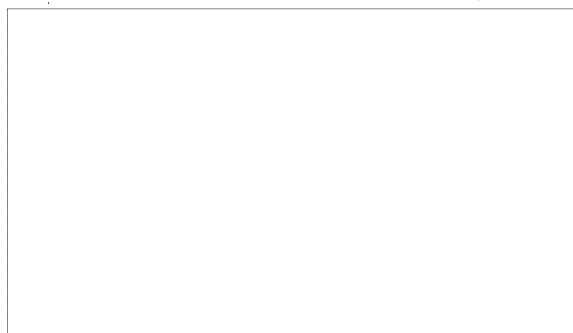
SIGINT REQ

INTELLIGENCE
COMMUNITY

COLLECTION
REQ

INTELL
DATA

RAW
DATA



DATA

NSA

PRIORITIES

- PROCESSING
- REPORTING

HIGHLIGHT

REPORTS

PRE-LAUNCH TEST
SUPPORT - DESIGN
FEEDBACK

50X1

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THE TOTAL SYSTEM

FLIGHT EQUIPMENT

- DESIGN/DEVELOPMENT
- TEST
- OPERATIONS

PRE-LAUNCH TEST SUPPORT - DESIGN FEEDBACK

REQUIREMENTS & DIRECTION

SAFSP SAFSS

SIGINT REQ INTELLIGENCE COMMUNITY

RAW DATA

COLLECTION REQ

INTELL DATA

NSA

- PROCESSING
- REPORTING

DATA

PRIORITIES

HIGHLIGHT

REPORTS

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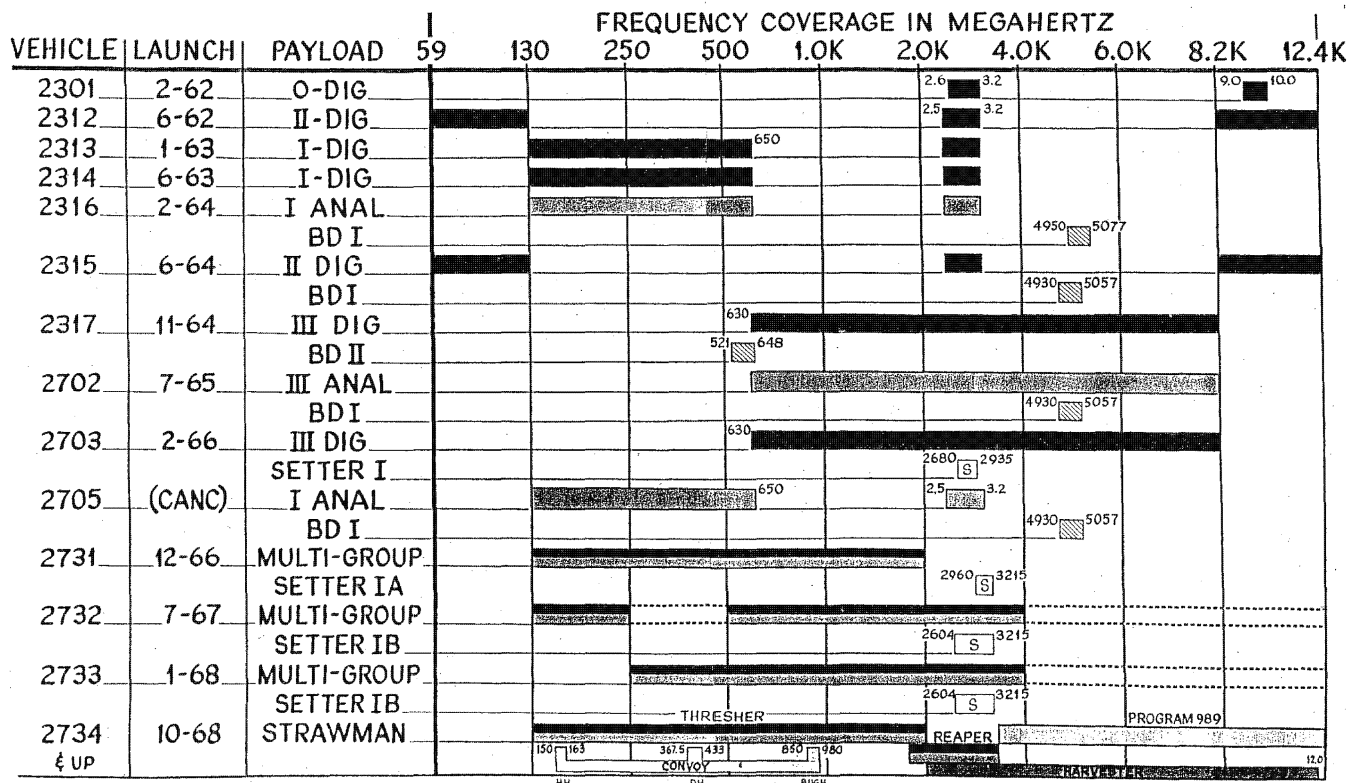
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PAYLOAD FREQUENCY COVERAGE (u)

1962-1970

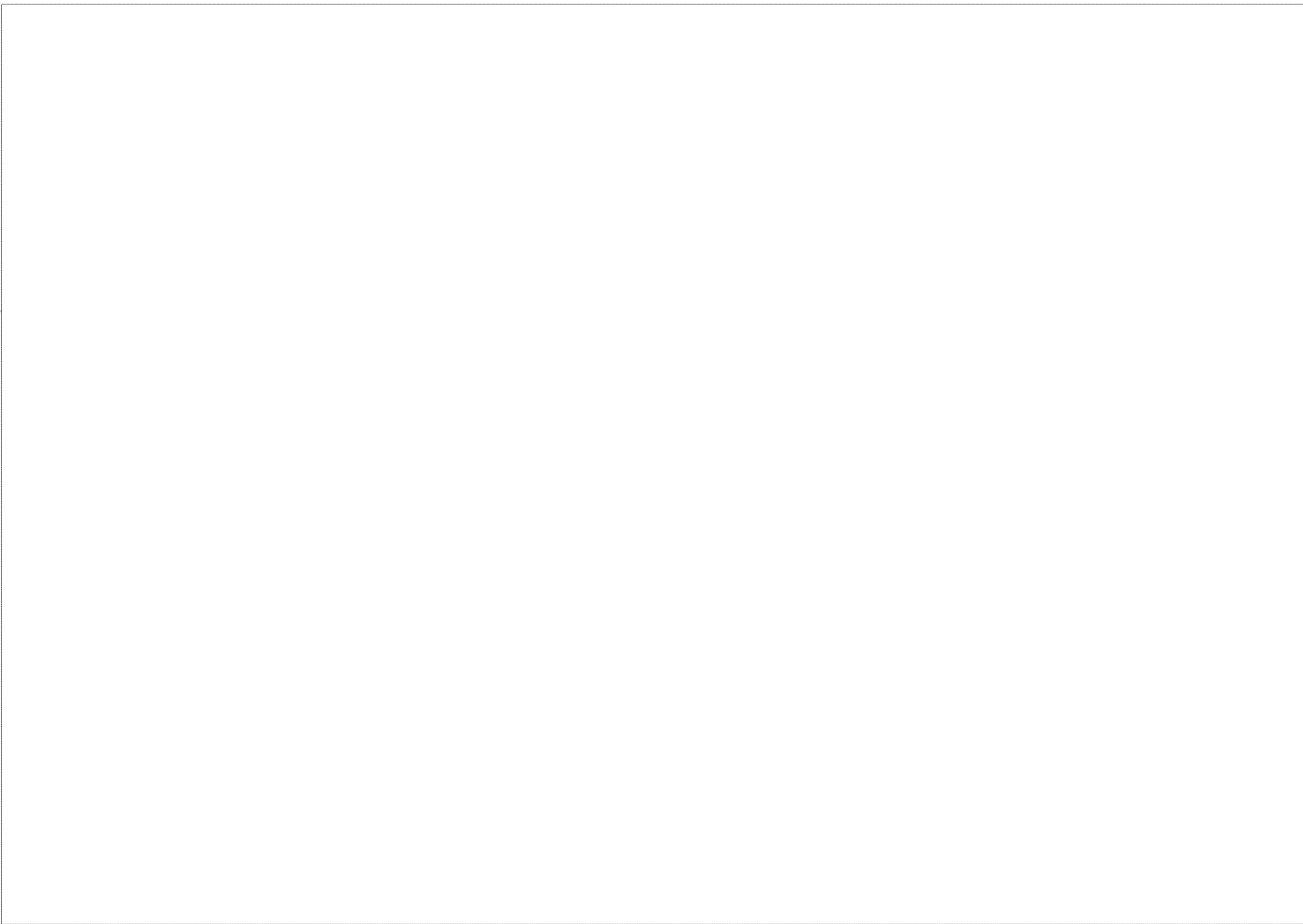


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Revised 7-10-70

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25X1



8

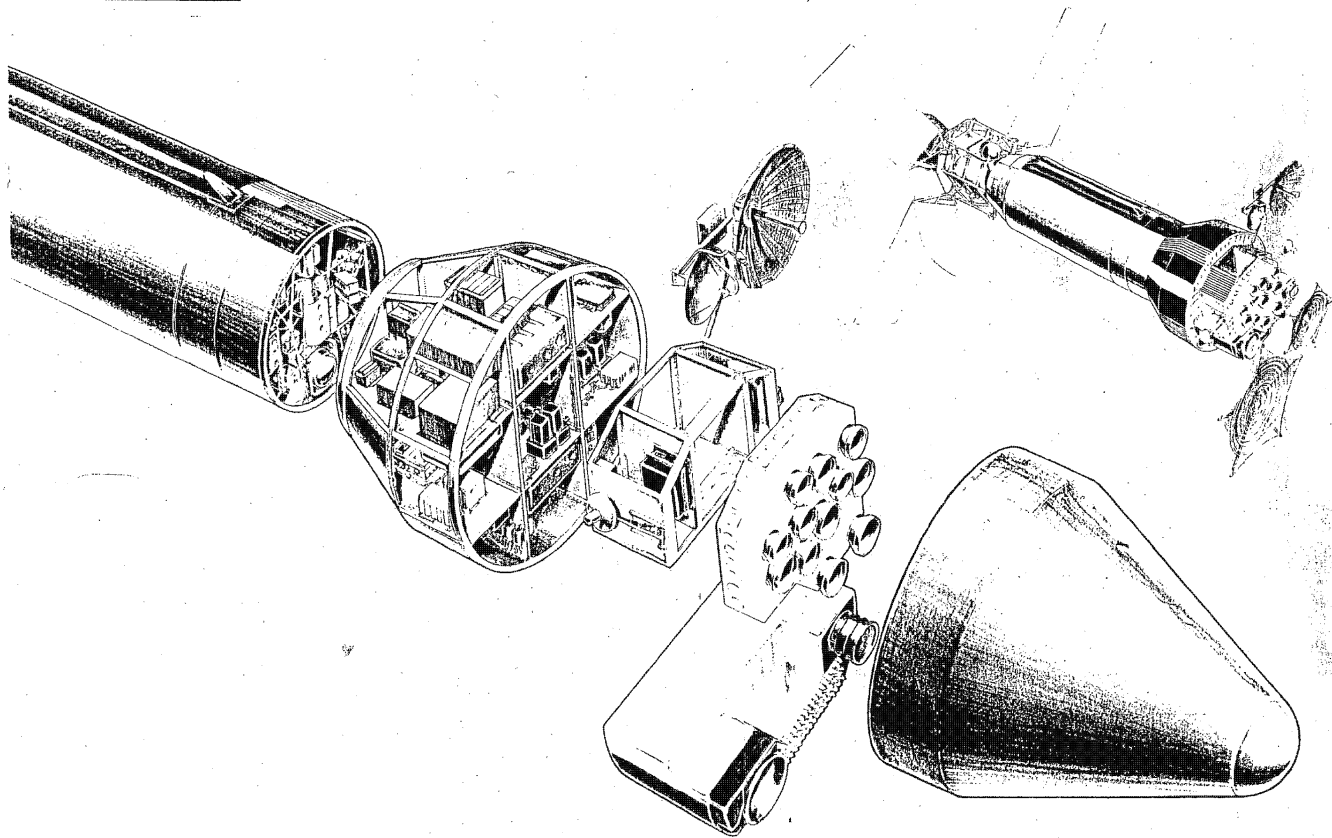
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Revised 7-10-70

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STRAWMAN P/L VEHICLE ~~(S)~~



10

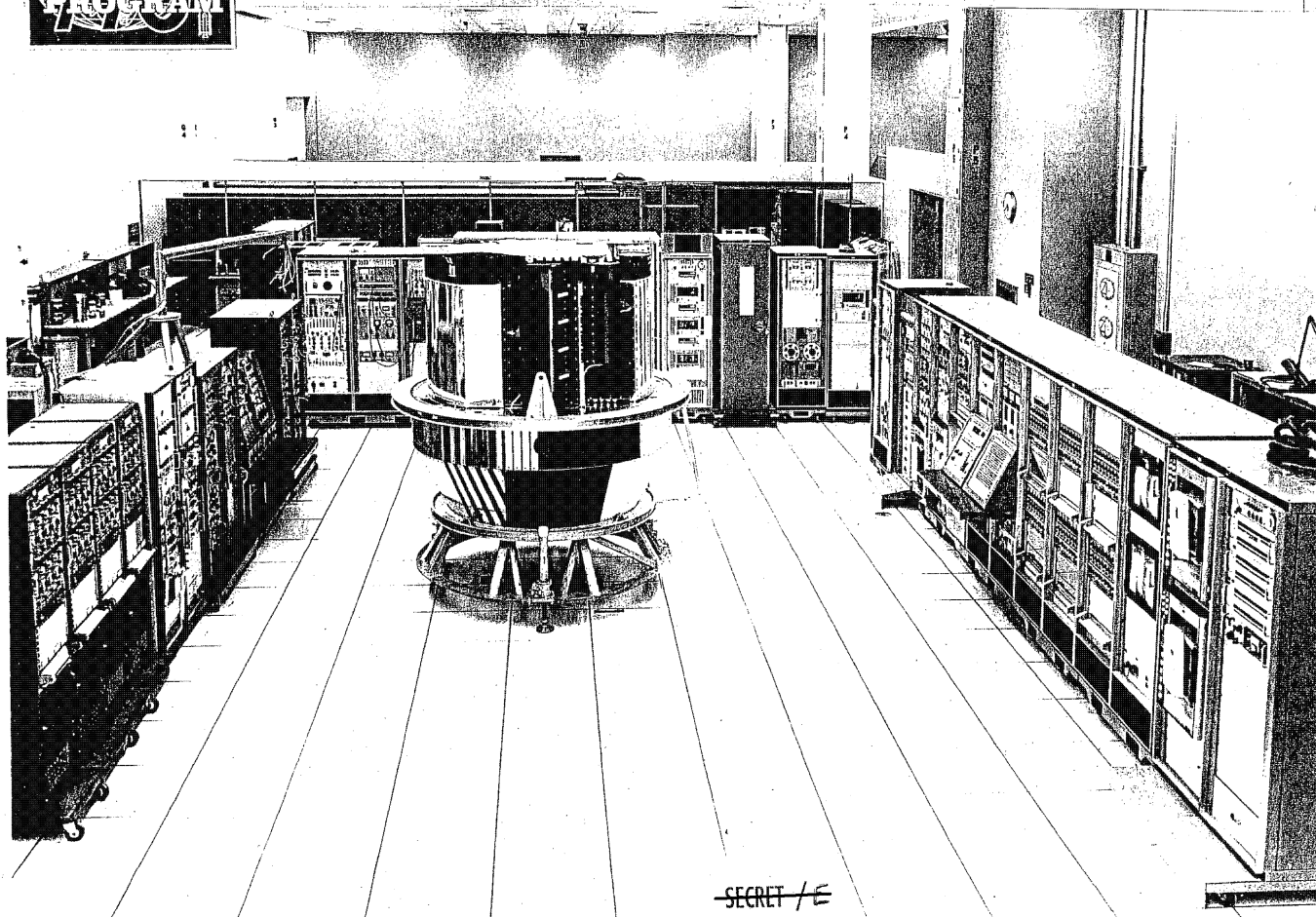
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Revised 7-10-70

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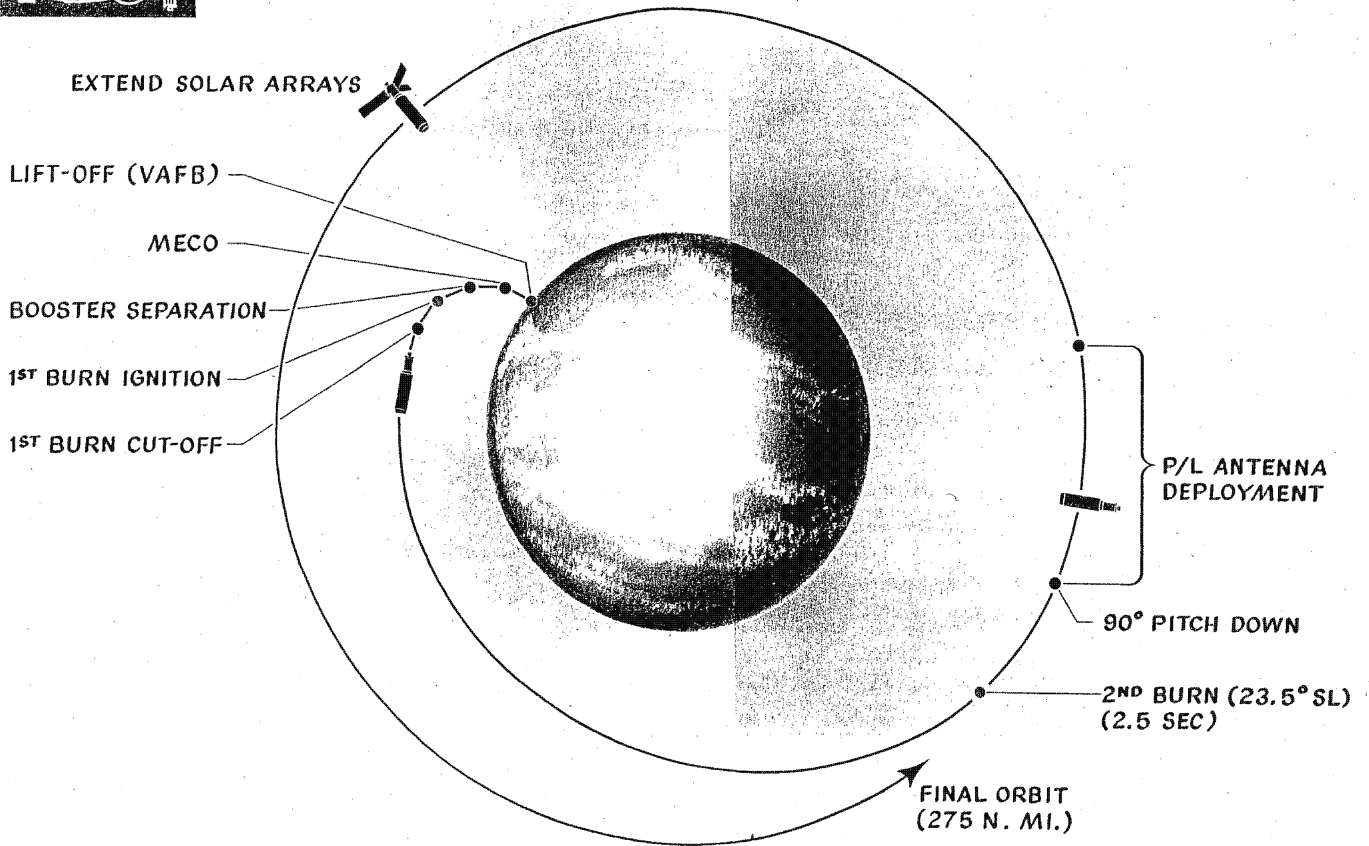
PAYLOAD VEHICLE



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TYPICAL INJECTION TRAJECTORY



14

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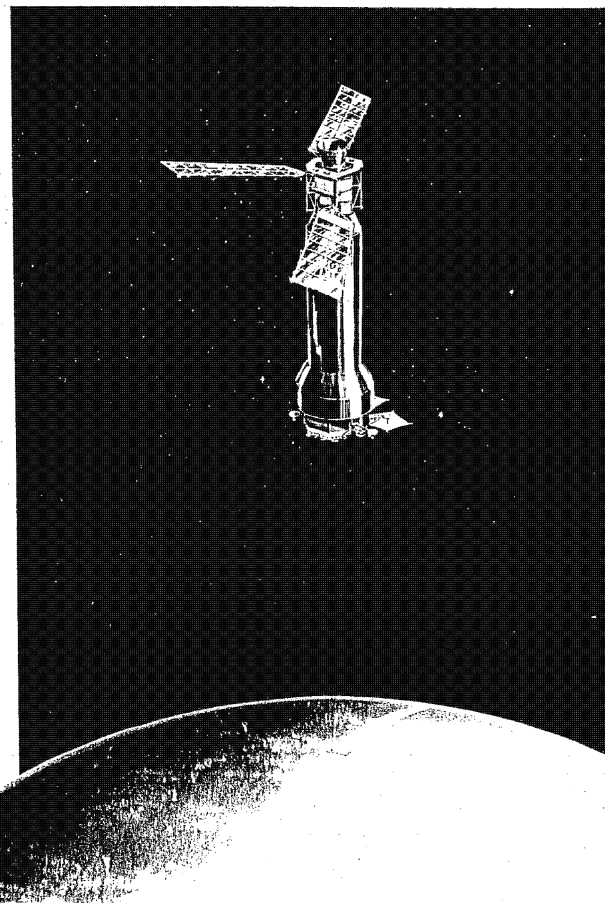
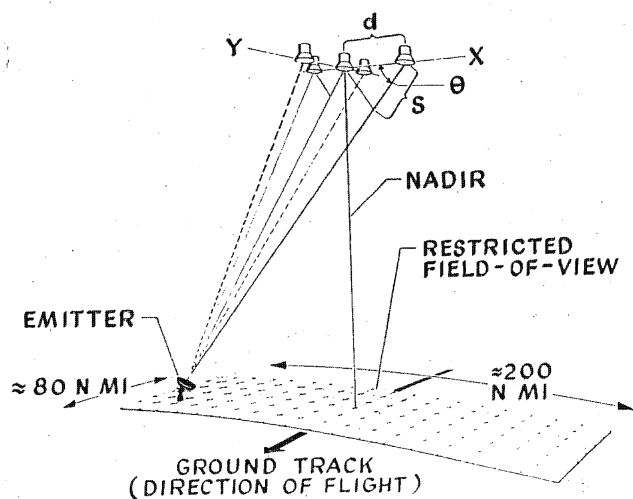
REAPER GEO-POSITIONING

INTERFEROMETER MEASUREMENT

$$\theta = \cos^{-1} \frac{s}{d}, \quad s = \frac{\phi \lambda}{360} \quad d = \text{CONSTANT}$$

ϕ = DIFFERENCE IN PHASE BETWEEN ANTENNA PAIR

RESOLUTION : \pm NAUTICAL MILES



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B1F003/2-00500000

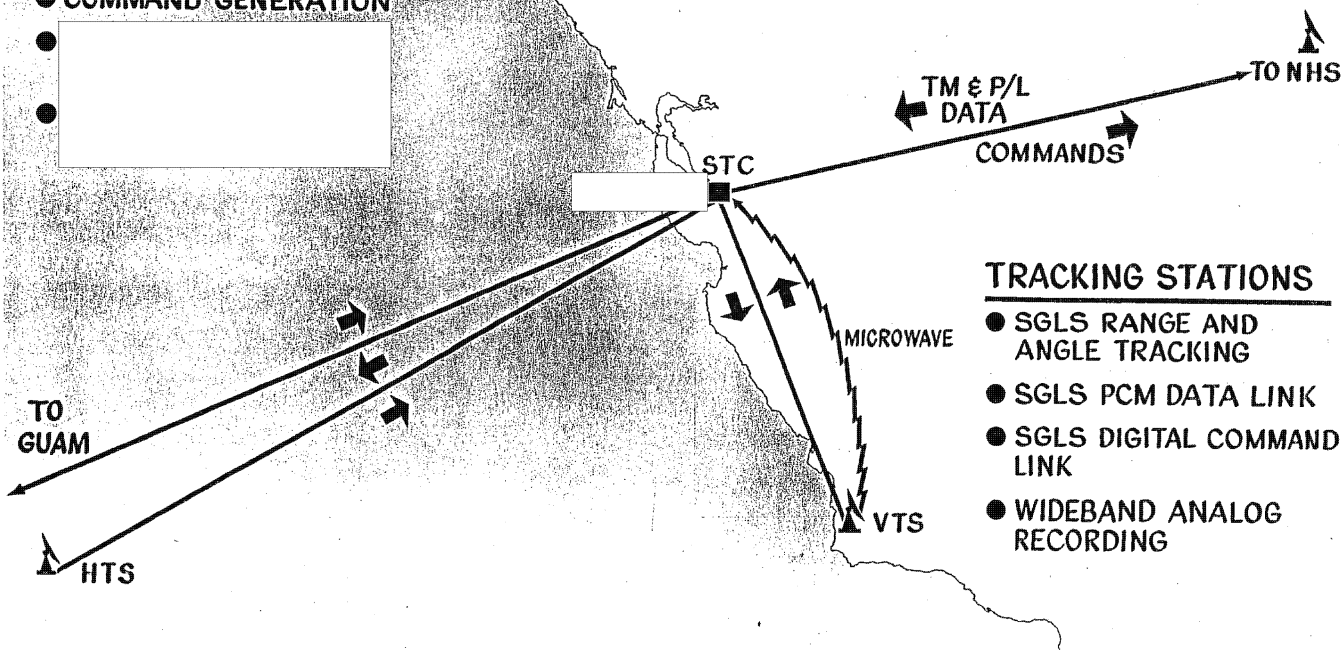
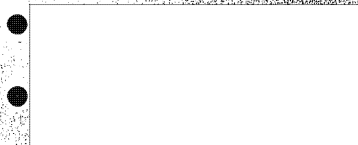
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SATELLITE CONTROL NETWORK

STC

● **COMMAND GENERATION**



TRACKING STATIONS

- SGLS RANGE AND ANGLE TRACKING
- SGLS PCM DATA LINK
- SGLS DIGITAL COMMAND LINK
- WIDEBAND ANALOG RECORDING

15

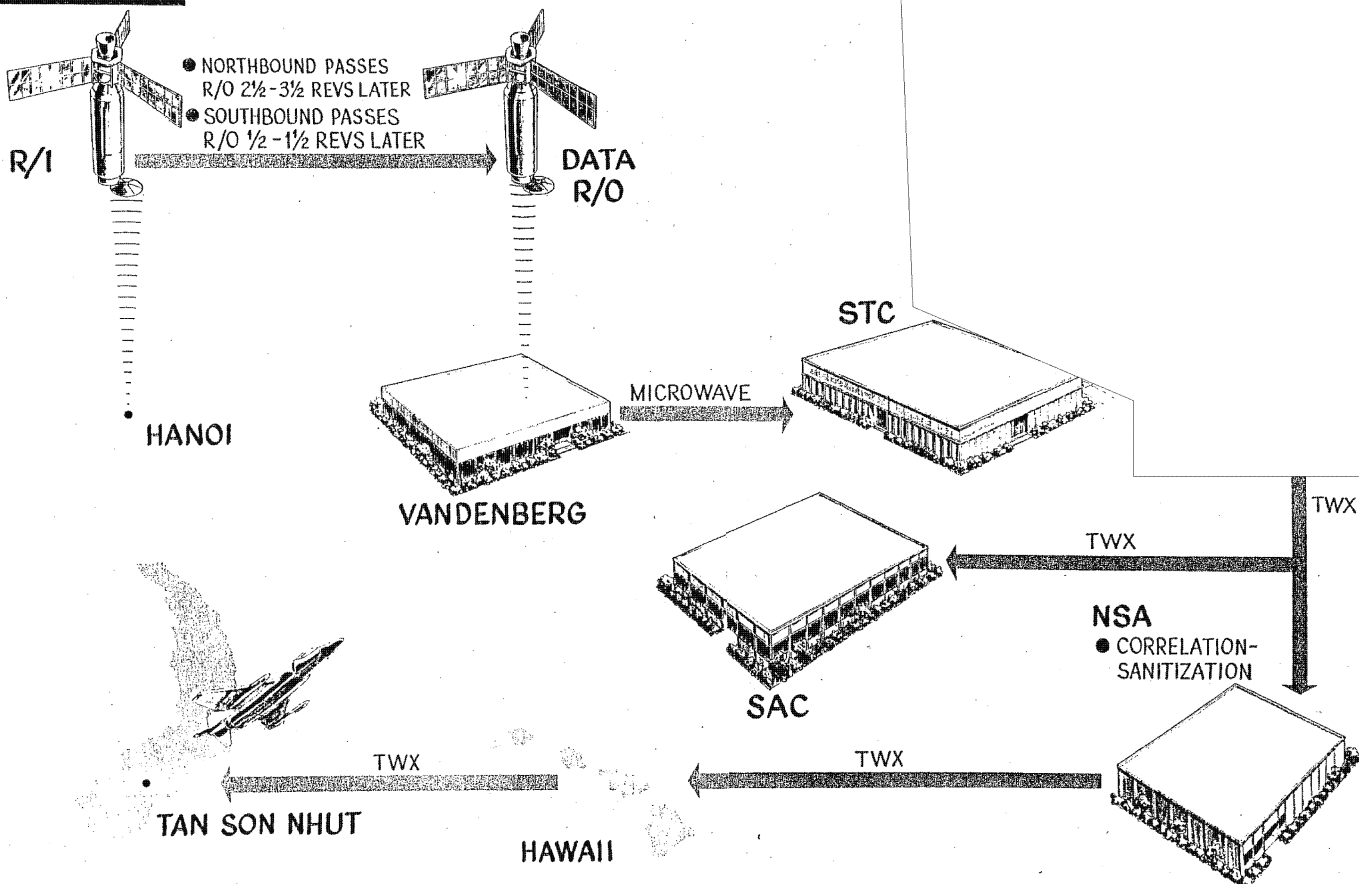
BIF003/2-005689-68
Revised 11-14-69

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DATA ACQUISITION TO DELIVERY

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16

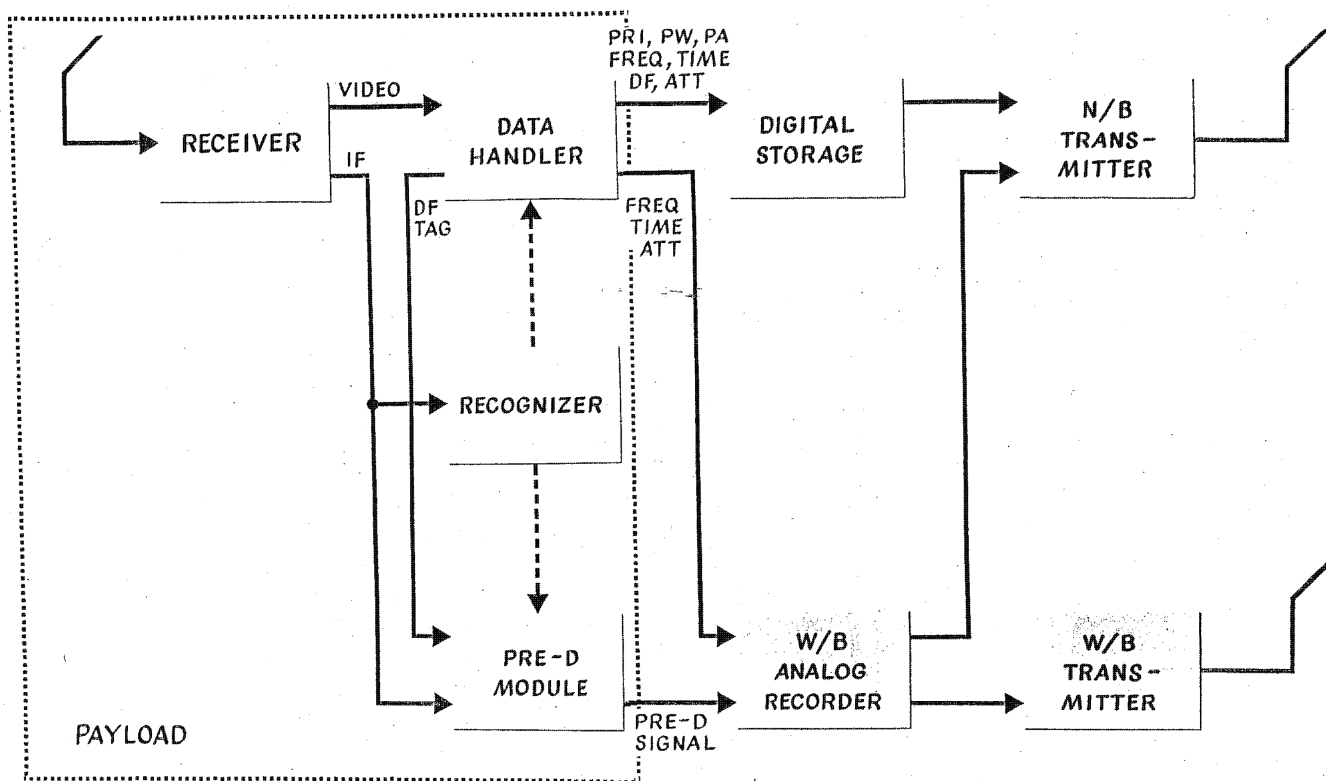
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TYPICAL 770 PAYLOAD (S)



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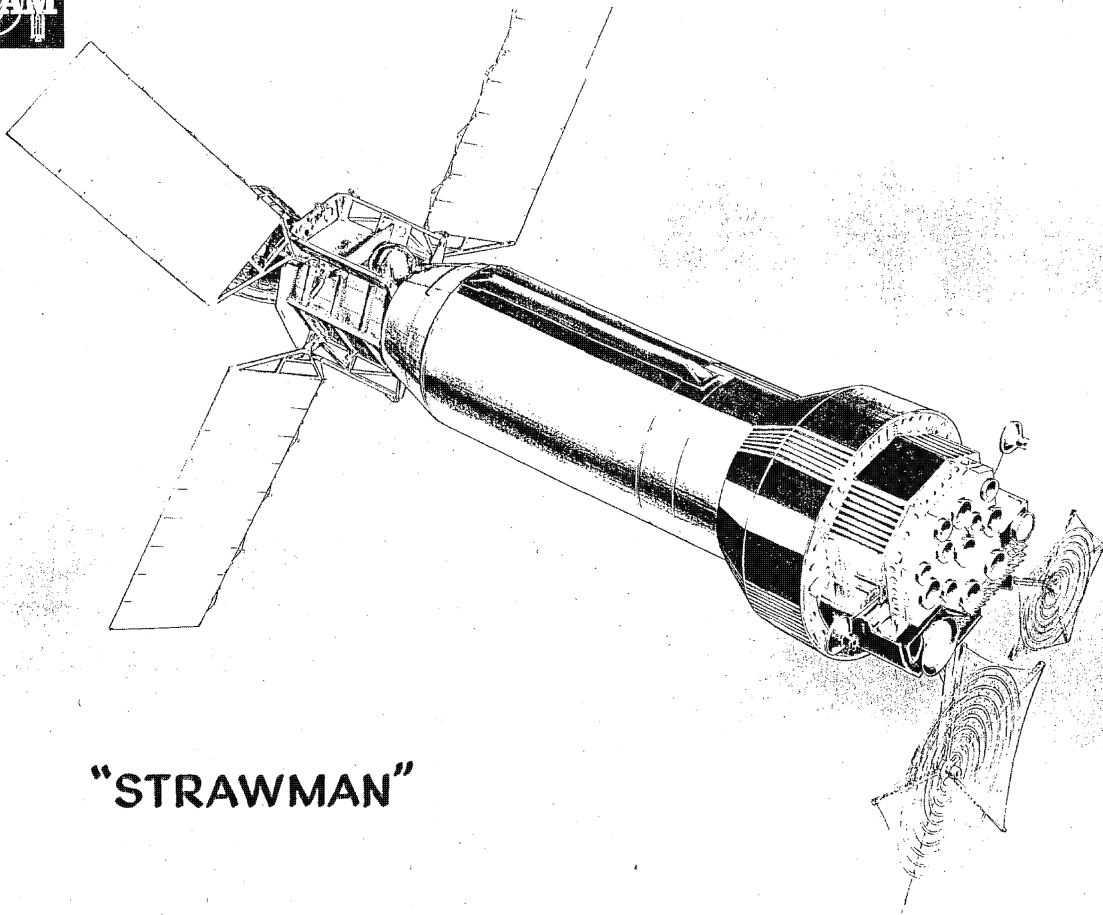
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Rev 10/1/77

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VEHICLE CONFIGURATION - 2734



"STRAWMAN"

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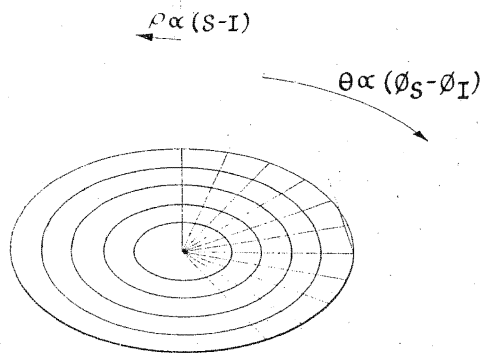
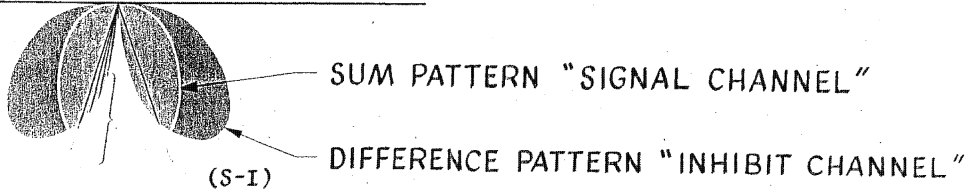
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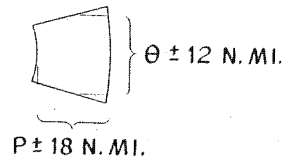
THRESHER GEO-POSITIONING

CAVITY-BACKED LOG SPIRAL ANTENNA



FOV = 150 N. MI. DIA.
ON THE EARTH

SPACE CELL
(ONE INTERCEPT)

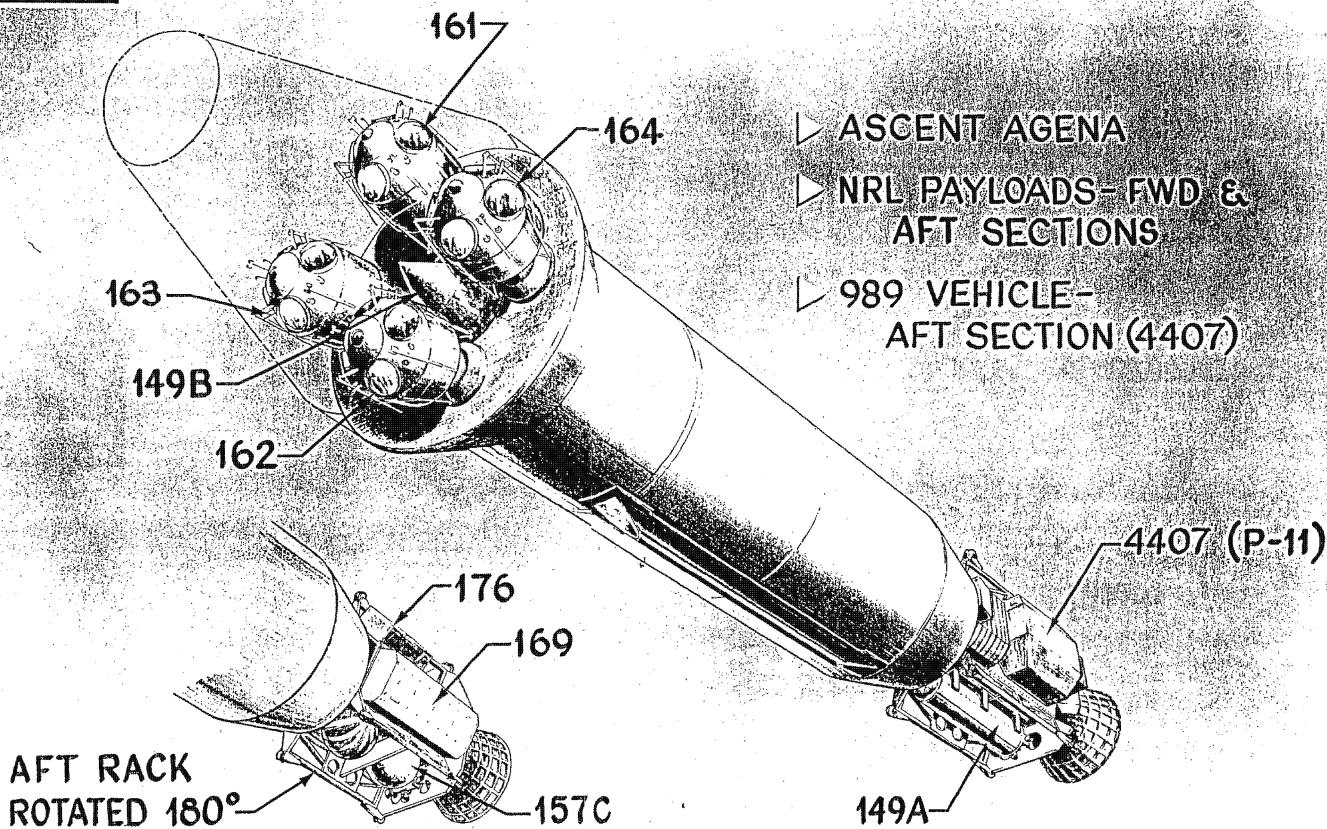


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VEHICLE CONFIGURATION - 2706

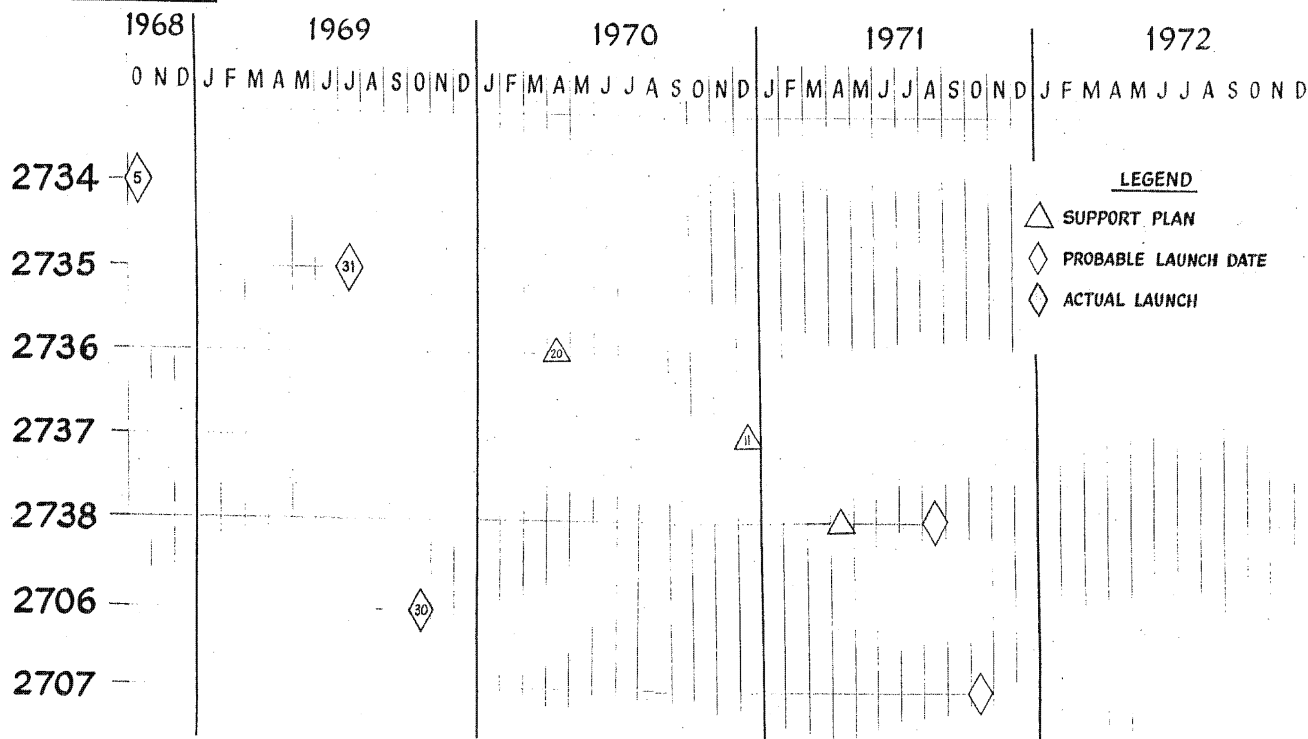


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PROGRAM 770 LAUNCH SCHEDULE

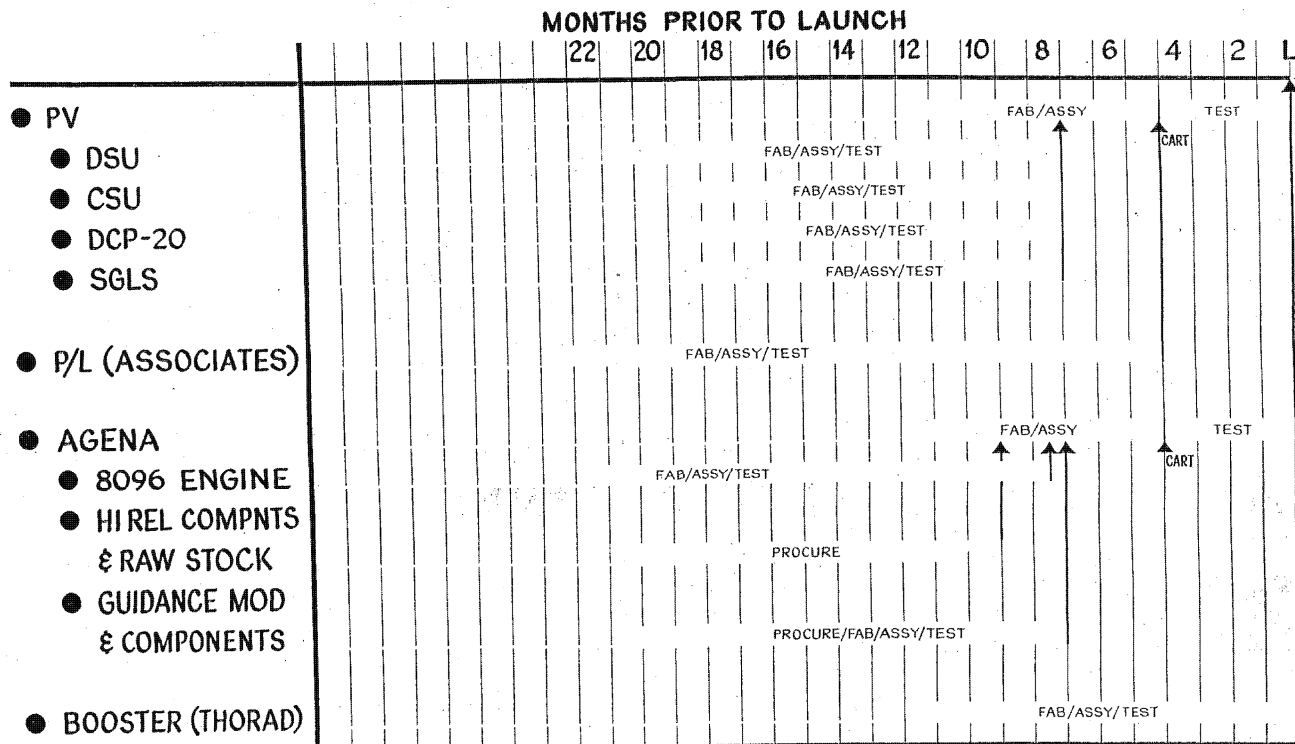


AS OF 12-15-69

REF ID: A66586-65
REVISED 5-12-70



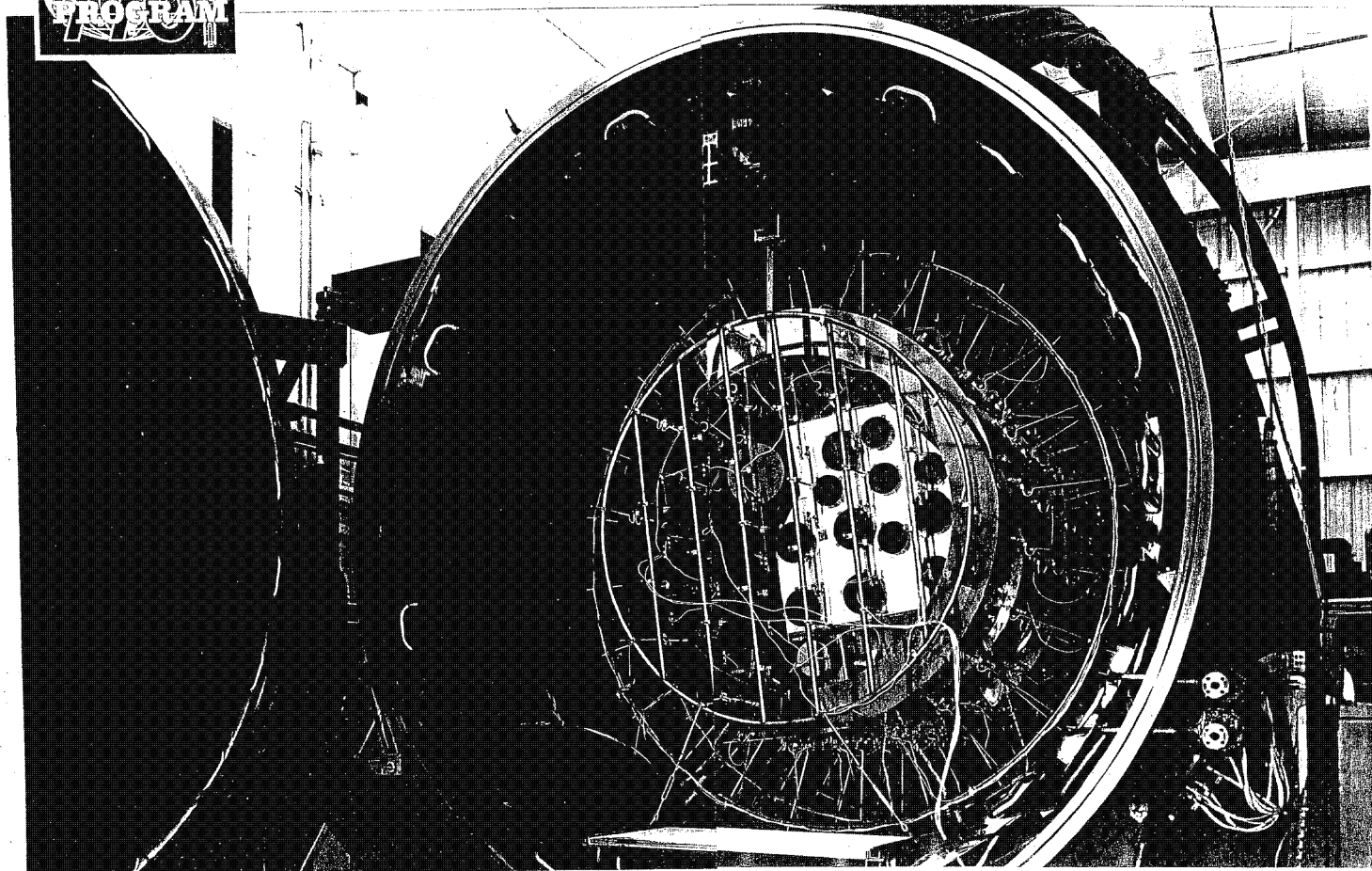
TYPICAL PROGRAM LEAD TIME



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THERMAL/VACUUM CHAMBER



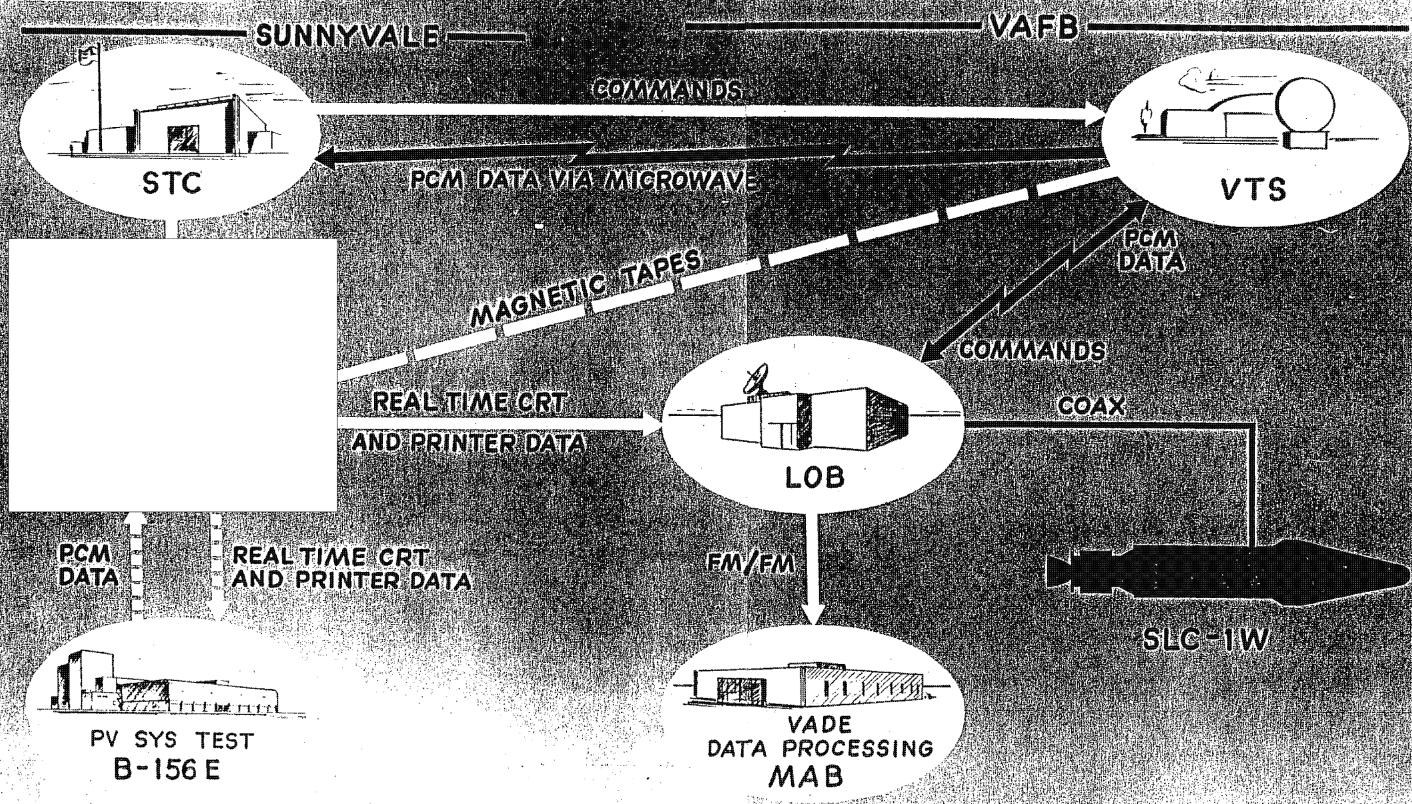
34

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ORBIT SEQUENCE REHEARSAL



50X1

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BTP 63-2-005056-05
Sheet Added 1-10-69



STRAWMAN CAPABILITY SUMMARY

GENERAL	<ul style="list-style-type: none"> ● AGENA WEIGHT - 1810 LBS ● PV WEIGHT - 2150 LBS
ORBIT	<ul style="list-style-type: none"> ● ALTITUDE - 270 NM ● ECCENTRICITY - CIRCULAR ORBIT ● INCLINATION - 75 DEGREES
POWER SYSTEM	<ul style="list-style-type: none"> ● TYPE: BATTERY/SOLAR ARRAY SYSTEM ● MINIMUM OUTPUT REQUIRED <ul style="list-style-type: none"> 230 AMP HRS/DAY BETA < 15 DEGREES 270 AMP HRS/DAY OTHER BETAS
ATTITUDE	<ul style="list-style-type: none"> ● CONTROL <ul style="list-style-type: none"> GRAVITY GRADIENT WITH CMG DAMPING ● SENSING ACCURACY <ul style="list-style-type: none"> PITCH $\pm 0.3^\circ$ ROLL $\pm 0.3^\circ$ YAW $\pm 0.5^\circ$* <p>* USING ATTITUDE DETERMINATION PROGRAM</p>

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STRAWMAN CAPABILITY SUMMARY

COMMAND SYSTEM

PRIMARY: INFLIGHT LOADABLE PROGRAMMER

(100 % REDUNDANT)

MEMORY CAPACITY - 1021 COMMANDS

COMMAND TYPES

256 DISCRETE CMDS (REAL OR STORED TIME)

11 VARIABLE STORED COMMANDS

BACK-UP: 375 MHz LINK WITH 32 DISCRETE COMMANDS

TELEMETRY SYSTEM

TYPE: SGLS - PCM - 128 KILOBITS PER SECOND

RATES: MAIN FRAME - 125 FRAMES/SECOND

SUB MULTIPLEXERS - 1 FRAME/SEC (REALTIME)

$\frac{1}{16}$ FRAME/SEC (STORED TIME)

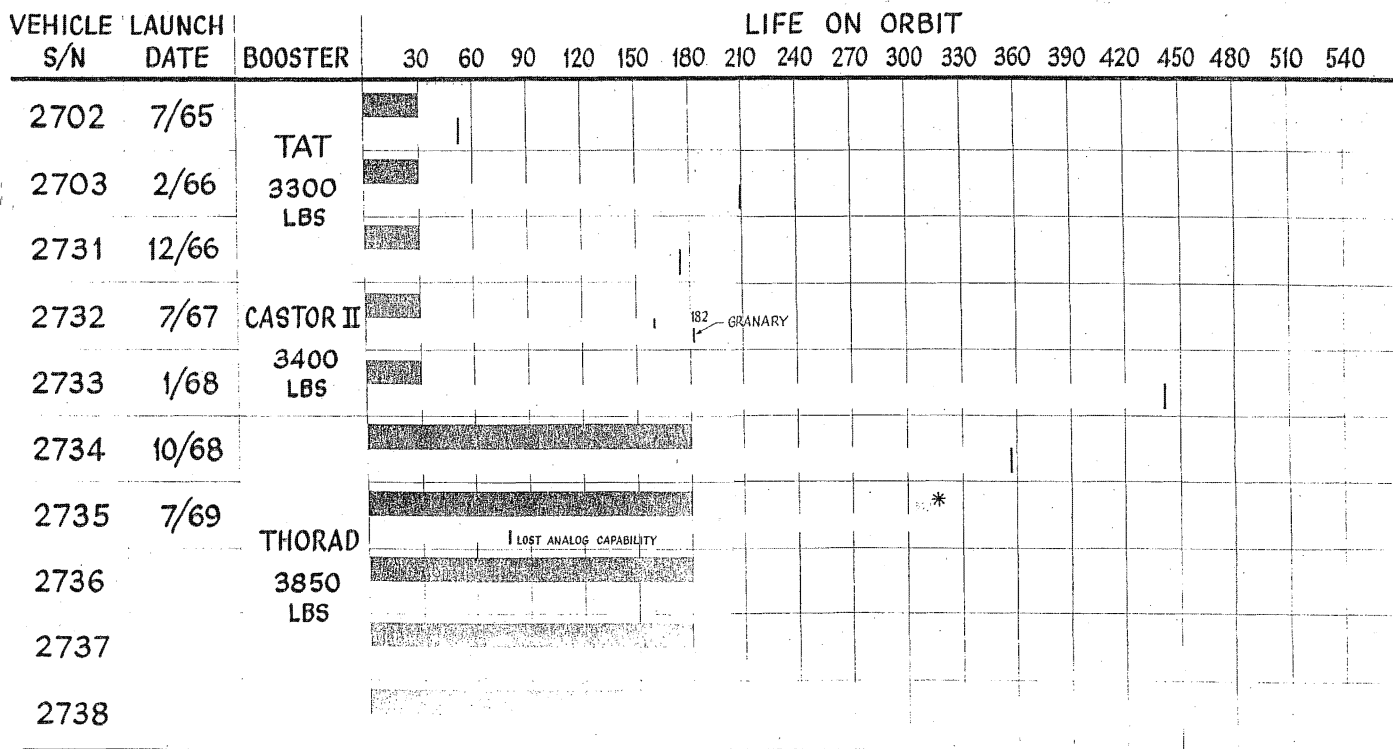
MEASUREMENT CAPACITY:

	DIGITAL WORDS	ON/OFF MONITORS	4-BIT ANALOG	8-BIT ANALOG
MAIN FRAME	11	12	28	13
SUB MULTIPLEXERS	0	728	190	221

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770 PERFORMANCE (U)



█ = PLANNED LIFE

| = ACTUAL LIFE *

* = AS OF 6-4-70

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SLP001/2-00560-18
Revised 7-10-71



PROGRAM 770 CONFIGURATIONS

STRAWMAN VEHICLES

- PAYLOAD MISSIONS
 - ORDER OF BATTLE
 - TECHNICAL INTELLIGENCE
 - GENERAL SEARCH
- LAUNCH RATE - TWO FLIGHTS PER YEAR

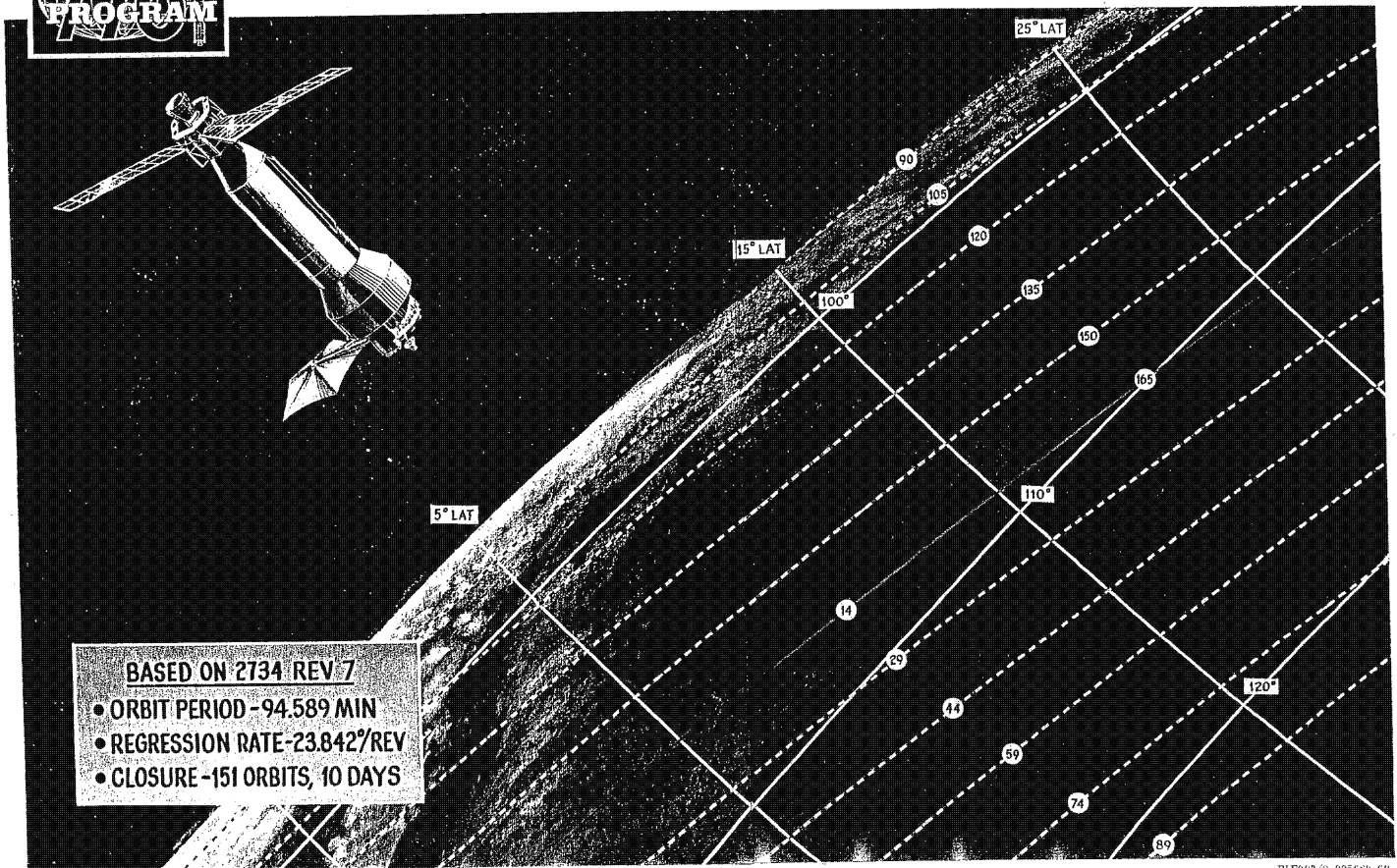
POPPY VEHICLES

- MISSION
 - PROVIDE LAUNCH VEHICLE CAPABILITY FOR REQUIRED PAYLOAD ORBIT INJECTION
 - PROVIDE LAUNCH VEHICLE SYSTEM ANALYSIS, DESIGN AND PAYLOAD SYSTEM INTEGRATION
- PAYLOADS
 - NAVAL RESEARCH LABORATORY PAYLOADS
 - GRAVITY GRADIENT 3-AXIS STABILIZED PAYLOADS
 - SECONDARY RESEARCH EXPERIMENTS
 - P-11 VEHICLES
- LAUNCH RATE - ONE FLIGHT EVERY 18 - 24 MONTHS

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ORBITAL CLOSURE



33

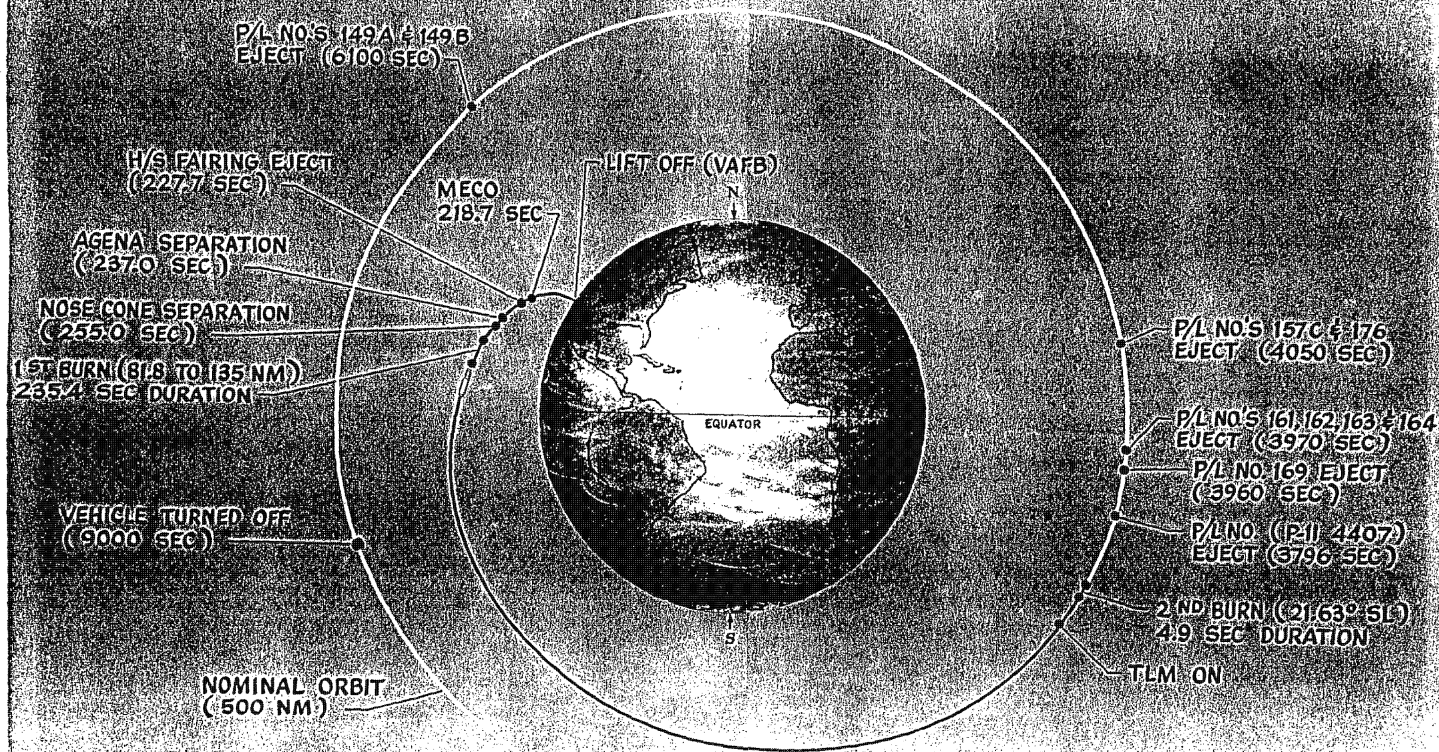
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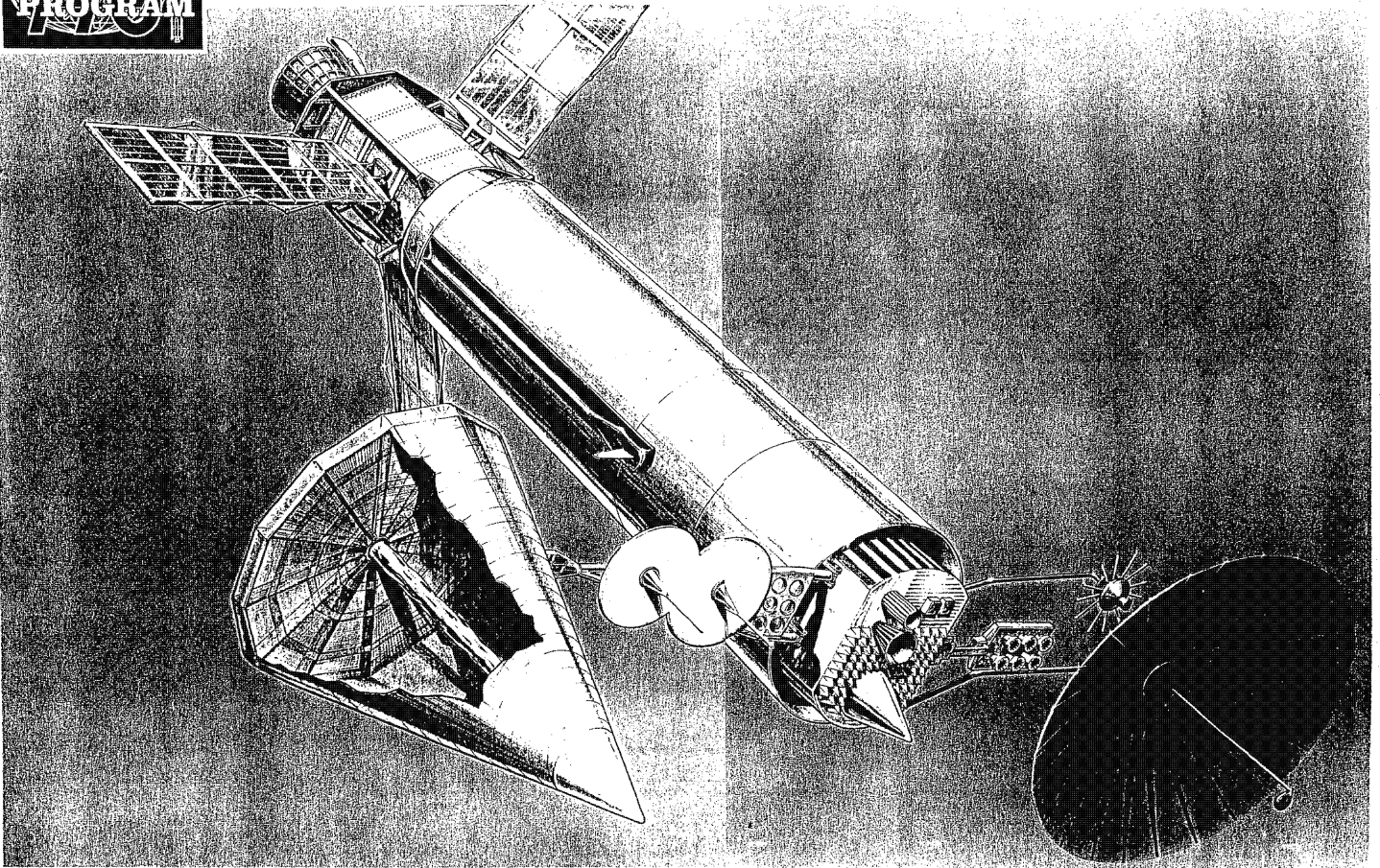
2706 SEQUENCE OF EVENTS



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VEHICLE CONFIGURATION-2732



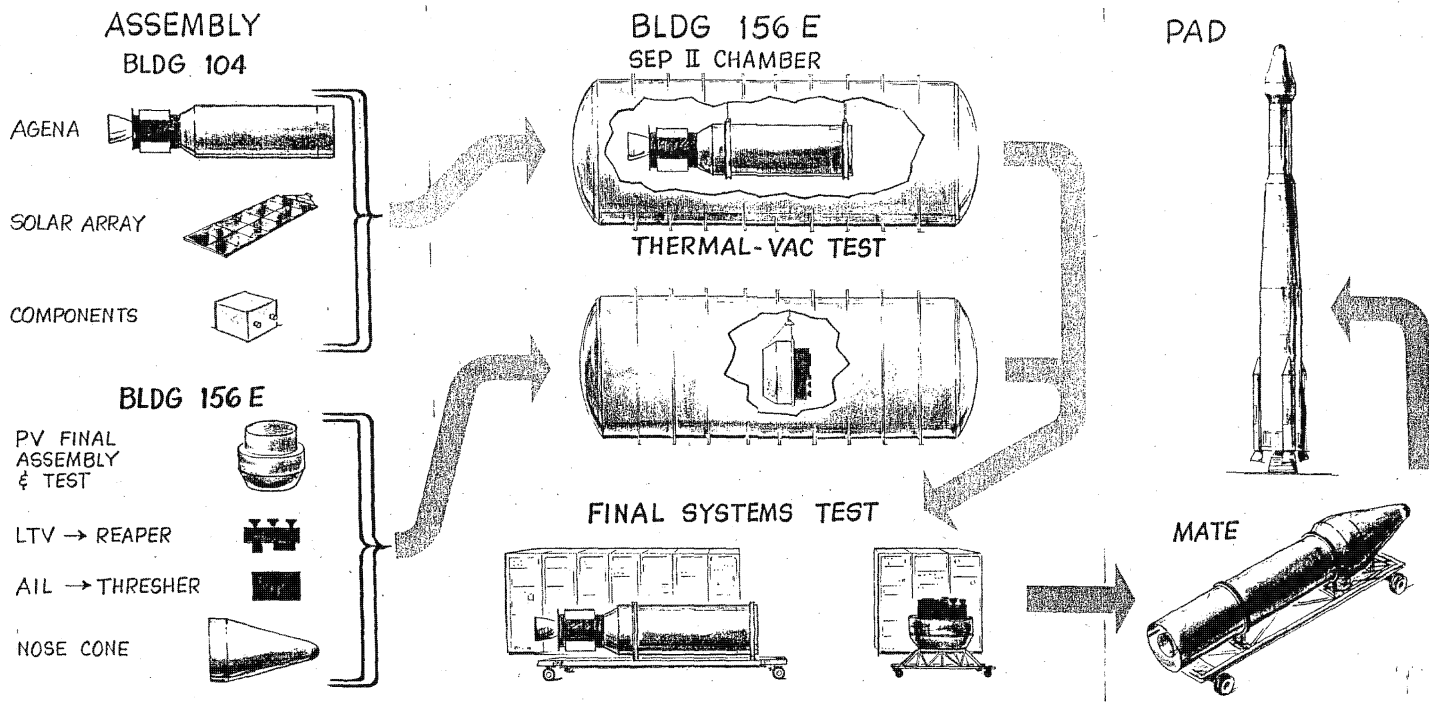
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ASSEMBLY & TEST SEQUENCE

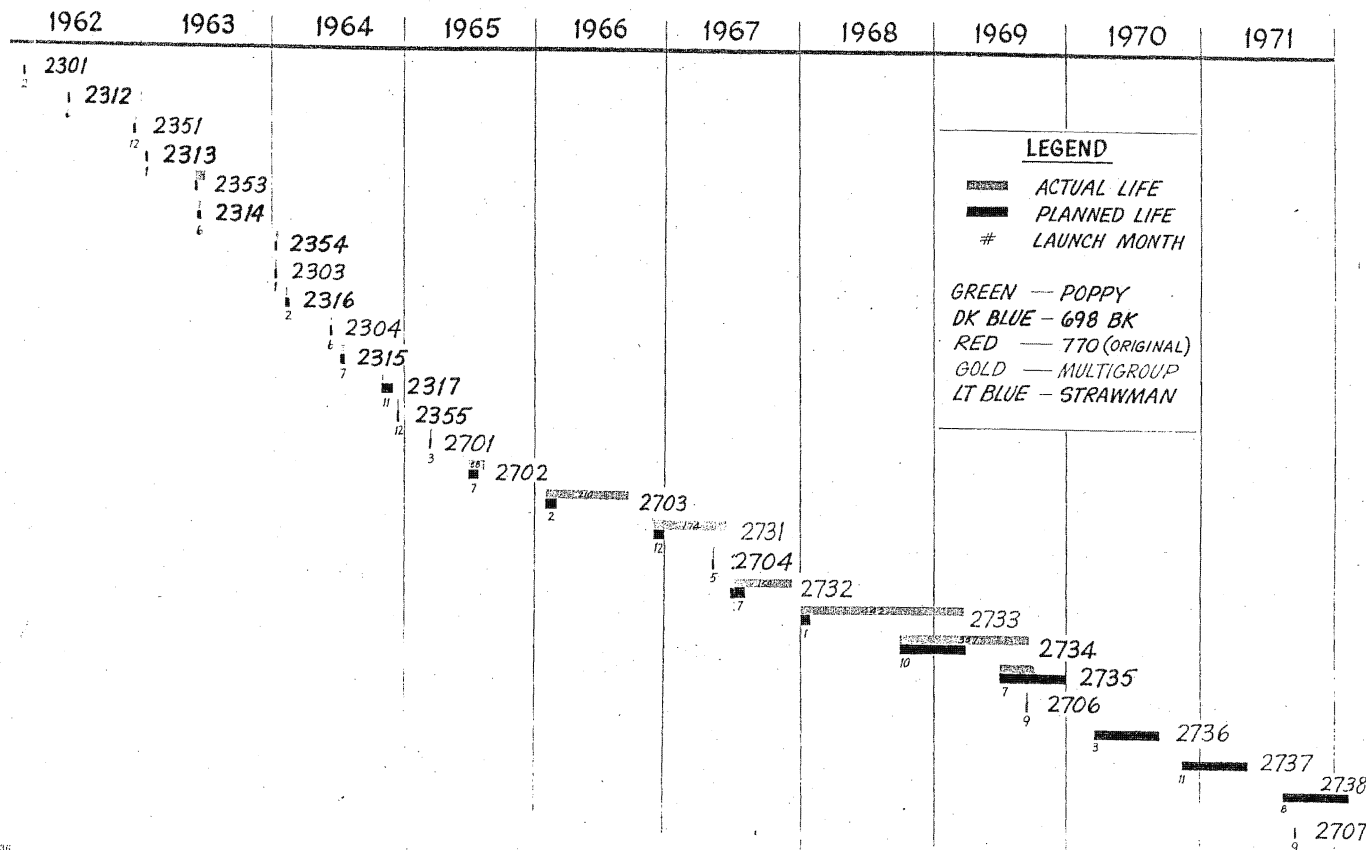


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770 PROGRAM FLIGHT HISTORY (U)



LEGEND

ACTUAL LIFE
 PLANNED LIFE
 # LAUNCH MONTH

GREEN — POPPY
 DK BLUE — 698 BK
 RED — 770 (ORIGINAL)
 GOLD — MULTIGROUP
 LT BLUE — STRAWMAN

36

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Added 11-14-68

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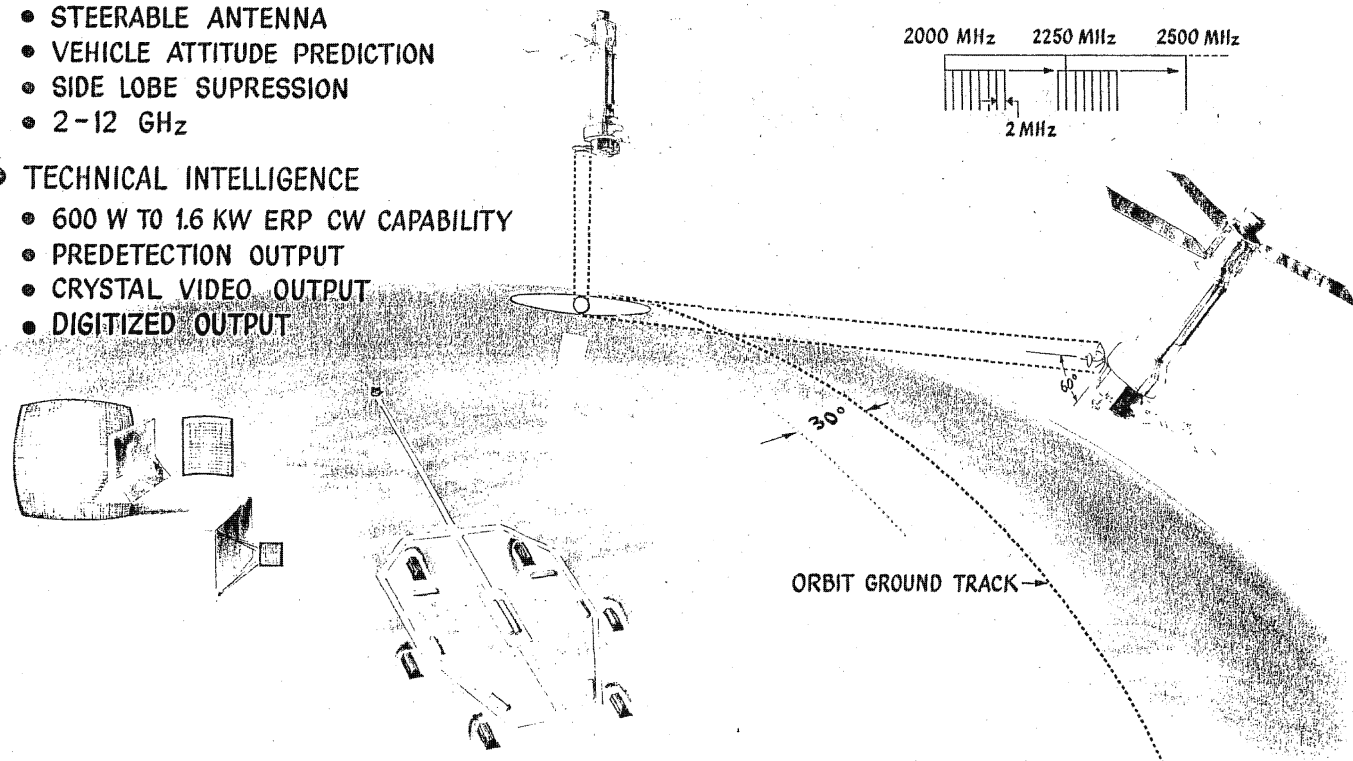
HARVESTER INTERCEPT CONCEPT

● DIRECTED SEARCH

- STEERABLE ANTENNA
- VEHICLE ATTITUDE PREDICTION
- SIDE LOBE SUPPRESSION
- 2-12 GHz

● TECHNICAL INTELLIGENCE

- 600 W TO 1.6 KW ERP CW CAPABILITY
- PREDETECTION OUTPUT
- CRYSTAL VIDEO OUTPUT
- DIGITIZED OUTPUT



37

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SIP005, (C-029621-002)
Rev. 12/80

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STRAWMAN CAPABILITY SUMMARY (U)

● REAPER PAYLOAD

FREQ RANGE 1800 MHz - 3300 MHz

LOCATION ACCURACY ±

● THRESHER PAYLOAD

FREQ RANGE 125 MHz - 2100 MHz

LOCATION ACCURACY B2 & B4
B3 & B5

50X1

● P69 TH PAYLOAD (2734)

FREQ RANGE 386 MHz - 426 MHz

SIGNAL OF INTEREST: DOGHOUSE

● CONVOY PAYLOAD (2735)

SIGNALS OF INTEREST: DOGHOUSE 380 MHz - 425 MHz

25X1

BUGH 853 MHz - 977 MHz

● HARVESTER - SIGNALS OF INTEREST:

SOVIET SA-5 & SA-6 MISSILE SYSTEM RADARS

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770 TT&C SYSTEM - CLOSED LOOP SECURE DIGITAL CMD AND TLM SYSTEM

- ENCRYPTED UP-LINK AND DOWNLINK SYSTEM
- CMD LINK REQUIRES CRYPTO VERIFICATION PRIOR TO CMD EXECUTION

PCOC GENERATES AND FORMATS DIGITAL CMD MESSAGES

KGR-29 ENCRYPTS DIGITAL CMD MESSAGES

BBAU CONVERTS DIGITAL CMD MESSAGE INTO CMD TONES WHICH MODULATE GROUND SGLS TRANSMITTER

VEHICLE SGLS RECEIVER DEMODULATE SIGNAL AND OUTPUTS THE RECEIVED DIGITAL MESSAGE

KGR-29 (IN PAYLOAD VEHICLE)

- DECRYPTS DIGITAL CMD MESSAGE
- SENDS CMD MESSAGE TO DCP-20 FOR EXECUTION
- SENDS CMD ACCEPT/REJECT INFORMATION VIA PCM UNIT TO PCOC

ALL PAYLOAD AND VEHICLE DATA (EXCEPT WIDEBAND DATA) DIGITIZED AND/OR ASSEMBLED BY PCM UNIT

PCM UNIT OUTPUTS A SERIAL NRZ-L SERIAL BIT STREAM WHICH IS ENCRYPTED BY KGT-28

BBAU CONVERTS ENCRYPTED BIT STREAM INTO BI-PHASE MODULATED 1.024 MC SIGNAL INPUT TO SGLS TRANSMITTER

SGLS GROUND RECEIVER RECEIVES THE TRANSMITTED SIGNAL

BBAU CONVERTS SIGNAL BACK TO SERIAL BIT STREAM

BIT SYNCHRONIZER SHAPES BIT STREAM

KGR-28 DECRYPTS SHAPED BIT STREAM

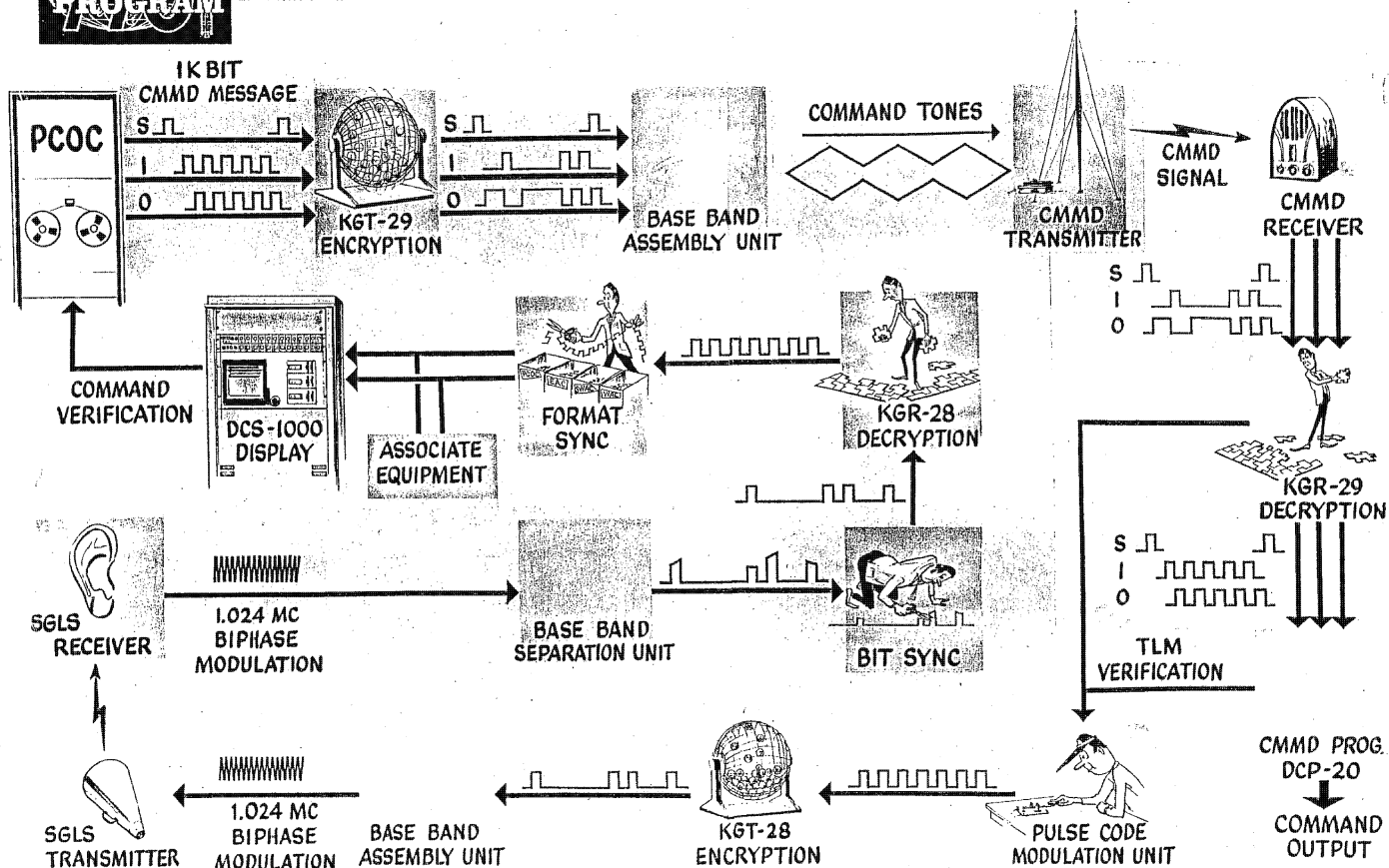
FORMAT SYNCHRONIZER SEPARATES AND ROUTES BIT STREAM TO VARIOUS USERS - DCS1000 AND ASSOCIATE CONTRACTOR COMPUTERS

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770 TT & C LOOP (U)



33

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Sheet added 7-10-70

PRE-TEST PREPARATION

PRE-TEST PREPARATION - PRODUCTION OF MATERIAL REQUIRED TO PERFORM TEST

RIP - PRIMARY PRE-TEST PROGRAM USED BY STDS COMPUTER

INPUTS

- MATH MODEL OF VEHICLE (CMD AND EFFECTS EQUATIONS)
- TIMED CMD SEQUENCE FROM TEST ROAD MAP
- TLM INSTRUMENTATION SCHEDULE AND CALIBRATION VALUES

OUTPUTS

- PRINTED TEST PROCEDURES
- COMPUTER CONTROL TAPES (COP) - CONTAINS TLM MONITOR LIMITS
- PCOC TAPE - PROGRAMS PCOC CMD GENERATION DURING TEST
- OPERATIONAL INSTRUCTIONS FOR CONSOLE OPERATORS
- DATA ANALYSIS AIDS

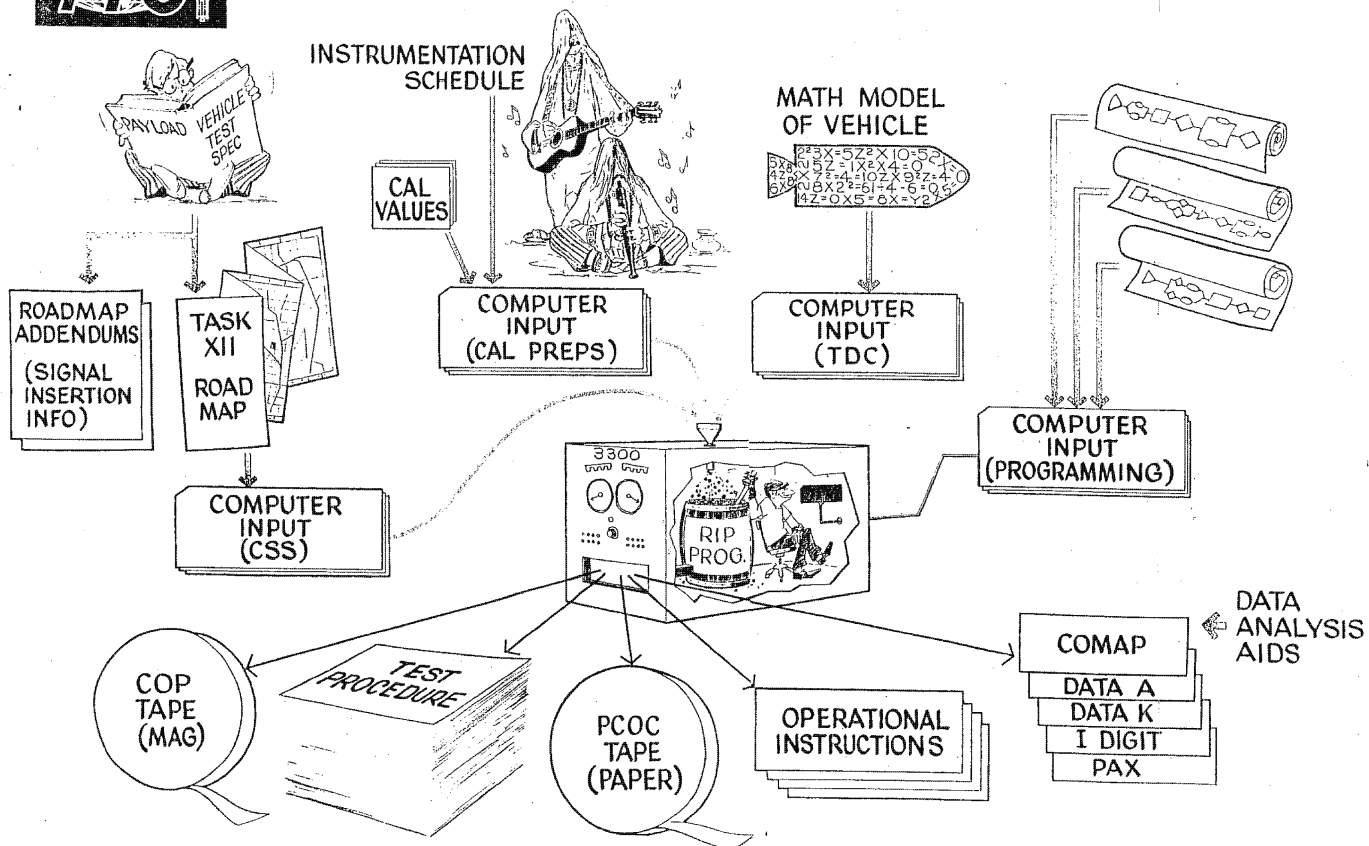
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770 P/L VEH. PRE TEST PREPARATION (S)



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REAL-TIME TEST PERFORMANCE

PROGRAMMER CHECKOUT CONSOLE (PCOC) CONTROLS PAYLOAD VEHICLE DURING TEST

- GENERATES ALL VEHICLE AND AGE COMMANDS

SGLS DATA LINK

- TRANSMITS VEHICLE AND PAYLOAD STATUS MONITORS
- TRANSMITS THRESHER AND REAPER EOB DATA (DIGITAL)

T/I DATA (VIDEO) TRANSMITTED VIA V/BDL



50X1

WBDL AND SGLS DATA RECORDED IN GDPE

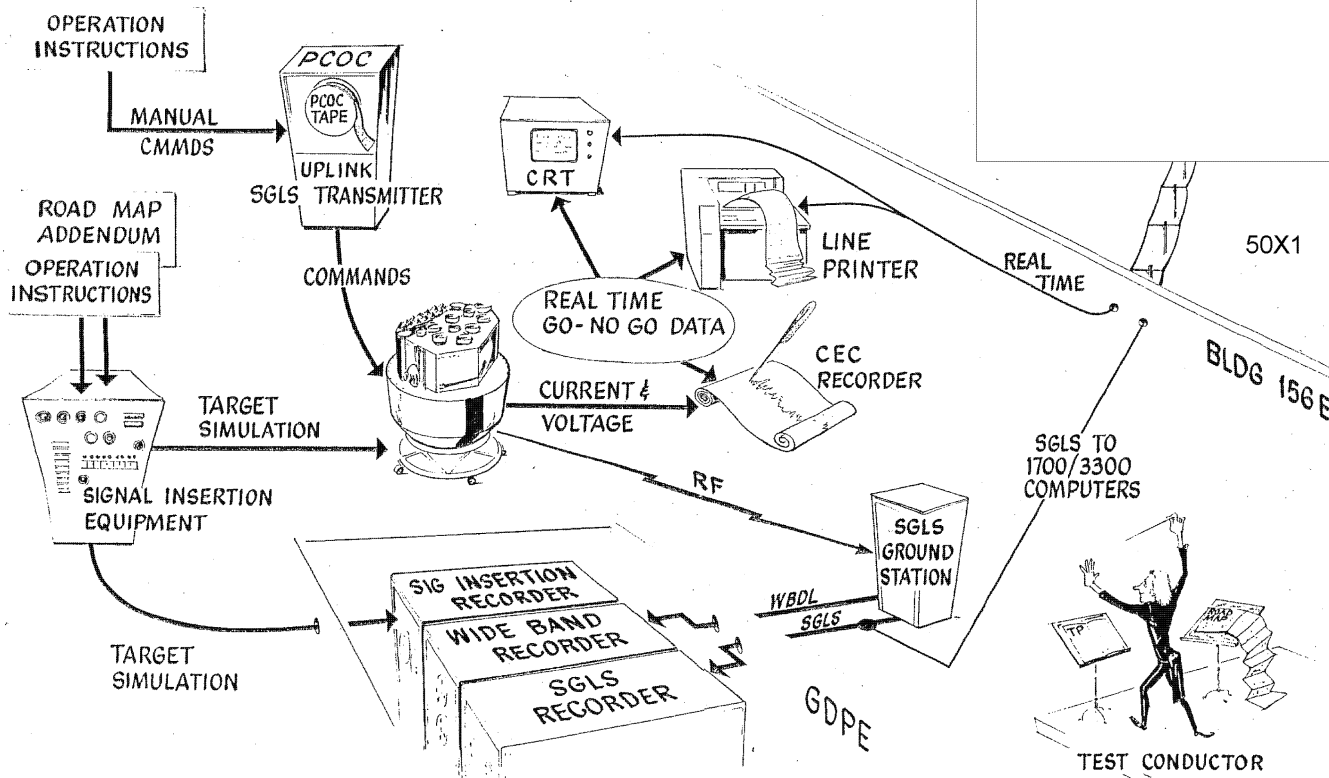
TARGET SIMULATION

- HARDLINED TO REAPER AND THRESHER PAYLOADS
- RECORDED IN GDPE FOR POST TEST PROCESSING OF PAYLOAD DATA

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REAL-TIME TEST PERFORMANCE



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POST TEST OPERATIONS

STDS 1700/3300 COMPUTER PROCESSES MOST DATA IMMEDIATELY FOLLOWING TEST

COMPUTER PROGRAMS

- SYNCY - SEPARATES DATA FOR VARIOUS COMPUTER PROGRAMS
- D-LIST - DATA LISTS FOR COMPUTER OPERATIONS PERSONNEL
- DIM - DCP INSCOE AND MARKER WORD PROCESSING
- D-SORT - VEHICLE AND PAYLOAD STATUS DATA
- BOGIE - REAPER AND THRESHER EOB DIGITAL DATA
- SPUR - COMPUTER PROCESSED WIDEBAND DATA

COMPUTER INPUTS

- DOC TAPES
- SIGNAL INSERTION TAPES
- WIDEBAND DATA TAPES

COMPUTER OUTPUTS

- MARKER WORD LISTS
- P/L INTERCEPT LISTS
- DCP AND INSCOE LISTS
- CSU SORT LIST
- STATUS SORT LISTS

AUTOMATIC PROCESSING EQUIPMENT (APE)

- PRODUCES 35 MM SCANNER FILM OF WIDEBAND ANALOG DATA

DATA ANALYSIS

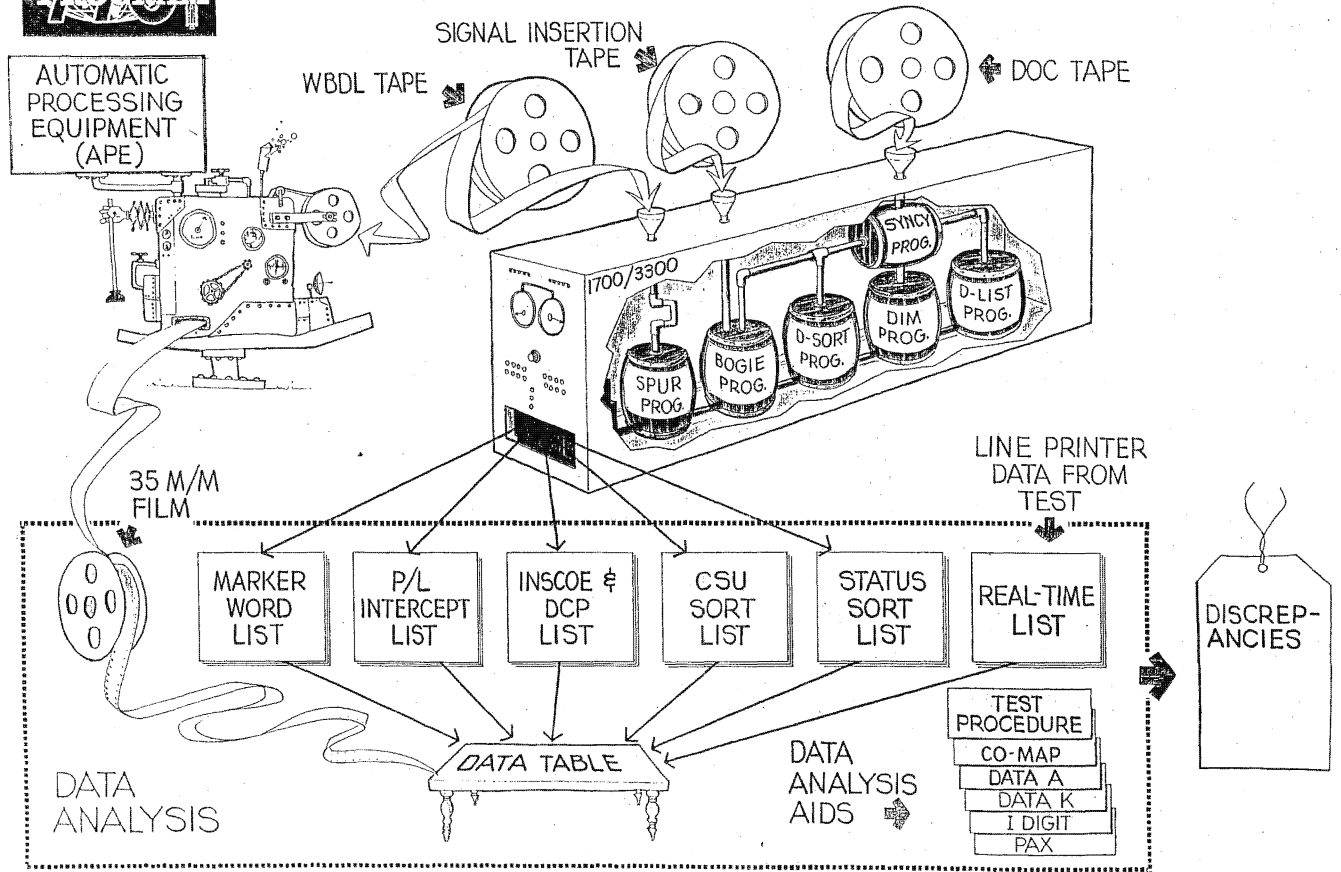
- ALL COMPUTER OUTPUT DATA ANALYZED FOR DISCREPANCIES
- TEST RESULTS COMPILED IN THE DATA TABLE

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770 P/L VEH. POST TEST OPERATIONS(S)



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