[redacted] Cat Hatton

SECRET

AL 48 0000 25834

"SAFUS Presentation to NSC
25 August 1960"

[redacted]

SAMOS

NATIONAL SATELLITE RECONNAISSANCE SYSTEM

PHOTOGRAPHIC
ELECTRONIC

REQMTS PROVIDED BY:
UNITED STATES INTELLIGENCE BOARD
-SATELLITE INTELLIGENCE REQMTS COMMITTEE

DEVELOPMENT AGENCY
UNITED STATES AIR FORCE

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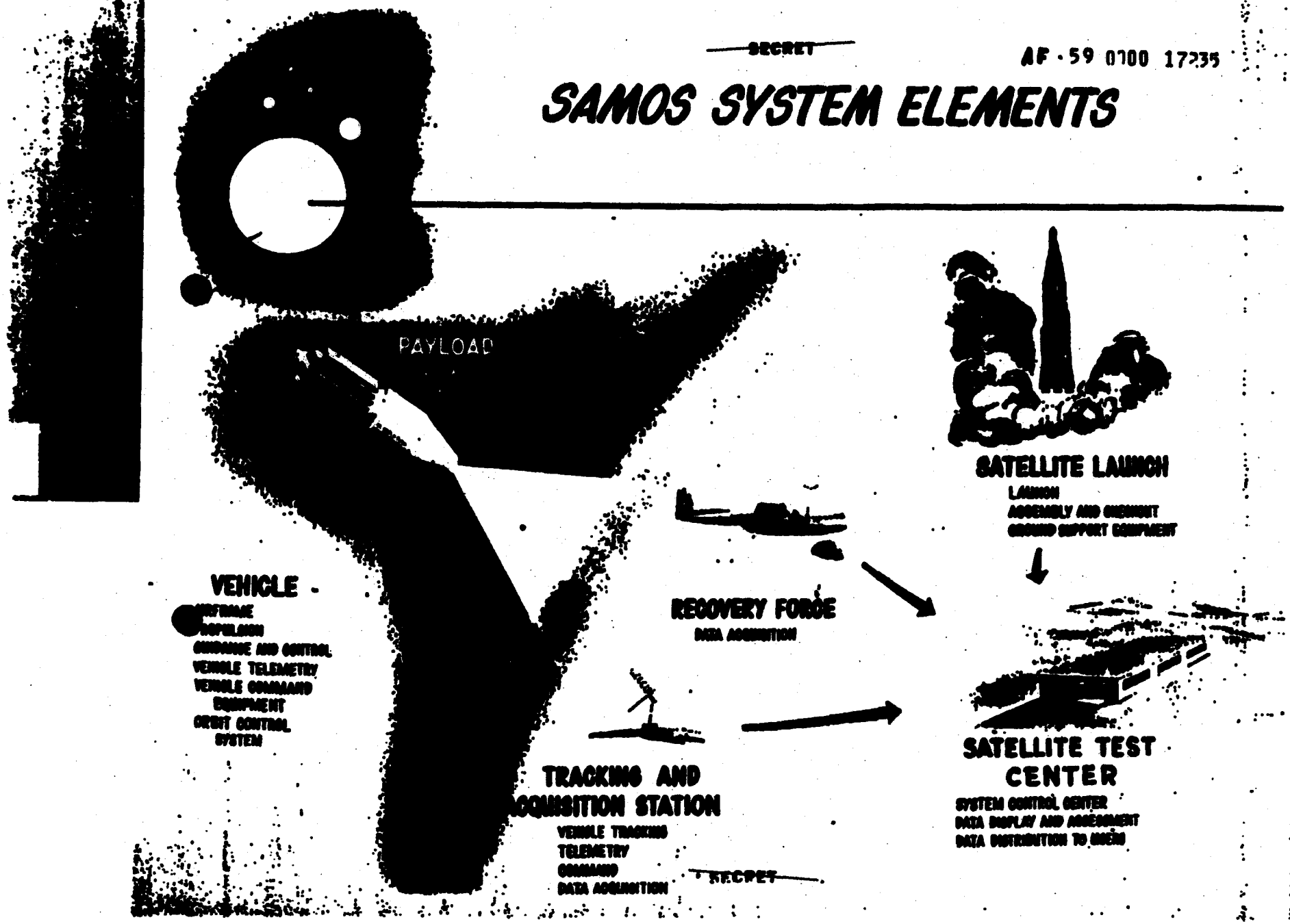
AF-59 0100 17235

SAMOS SYSTEM ELEMENTS



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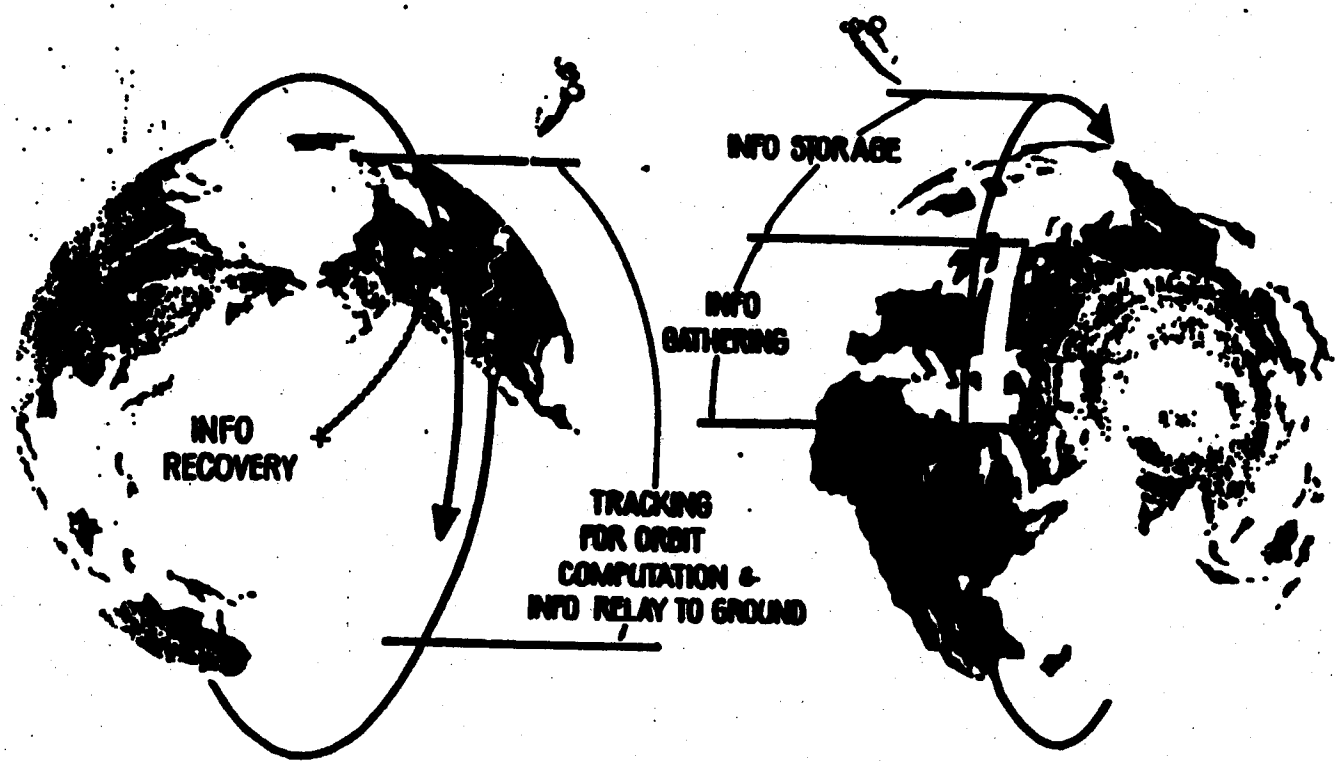
SAMOS CONCEPT

150-300 S.MI. ALTITUDE - PHOTO & ELECTRONIC



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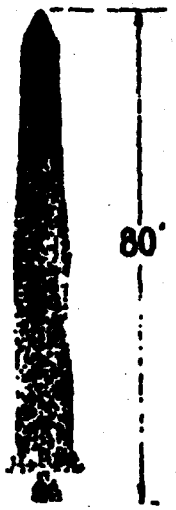
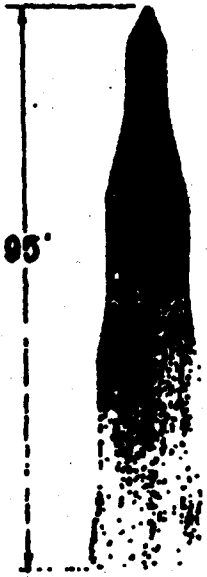
TYPICAL SIZE AND WEIGHT

THOR
AGENA B





ATLAS
AGENA B

AGENA B	EMPTY WEIGHT	1,400	AGENA B	EMPTY WEIGHT	1,400
	LAUNCH WEIGHT	16,150		LAUNCH WEIGHT	19,800
THOR	EMPTY WEIGHT	8,830	ATLAS	EMPTY WEIGHT	14,150
	LAUNCH WEIGHT	107,170		LAUNCH WEIGHT	258,130
TOTAL BOOSTER AND AGENA WEIGHT AT LAUNCH		123,320 LBS	TOTAL BOOSTER AND AGENA WEIGHT AT LAUNCH		277,930 LBS

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OUTLINE REQUIREMENTS
USIB - 6 JULY '60

PHOTOGRAPHIC

- "GENERAL SEARCH" - 20' "RECOGNIZABILITY"
  - 1ST PRIORITY - TO LOCATE SUSPECTED ICBM LAUNCH SITES BETWEEN NOW & END OF 1962
    REPETITIVE SEARCH - ONCE EACH MONTH INITIALLY

    E-2 (LIMITED SEARCH CAPABILITY) 1ST FLT - APR '61
    E-6 1ST FLT - JAN '62

"DESCRIPTIVE" INFORMATION - 5' "RECOGNIZABILITY"

- 2ND PRIORITY - COVERAGE OF HIGHEST PRIORITY TARGET CATEGORY & SUSPICIOUS LOCATION
  LAUNCH & CONTROL OF THESE - MISSION ON SHORT NOTICE

  E-6 1ST FLT - SEPT '61

"TECHNICAL CHARACTERISTICS" - BETTER THAN 5' "RECOGNIZABILITY"

- 3RD PRIORITY - HIGH RESOLUTION COVERAGE TO DETERMINE TECHNICAL CHARACTERISTICS OF HIGHEST PRIORITY TARGETS BY THE END OF 1962

ADVANCED RESEARCH UNDERWAY

[redacted]

SAMOS

- A SATELLITE RECONNAISSANCE SYSTEM IS COMPLEX WITH MANY ADVANCED DEVELOPMENTS REQUIRED, BUT IT CAN BE MADE TO WORK

- DEVELOPMENT PROGRESSION REQUIRED DUE TO PRESENT STATE-OF-THE-ART LIMITATIONS:

  PHOTOGRAPHIC: 20' GROUND RESOLUTION ___✓ 3' OR LESS

  ELECTROMAGNETIC: SIMPLE DIGITAL _____✓ COMPLEX DIGITAL & ANALOG

  ACTIVE LIFE: 1 WEEK ___✓ 4 MONTHS _____✓ 1 YEAR

- THE DEVELOPMENT PROGRAM WILL INCLUDE FAILURES IN THE COURSE OF THE DEVELOPMENT EFFORT

INTELLIGENCE REQUIREMENTS FOR SAMOS

PRIORITY I

[redacted] - LOCATION OF OPERATIONAL ICBM SITES

PRIORITY II

A. [redacted] - DESCRIPTIVE INFORMATION ON HIGH PRIORITY TARGET LIST ITEMS

B. [redacted]

PRIORITY III

A. [redacted] TECHNICAL CHARACTERISTICS OF HIGH PRIORITY LIST ITEMS

B. [redacted]

PRIORITY IV

[redacted] - TO THE EXTENT DEVELOPMENT PROVES FEASIBLE

SECRET

OUTLINE REQUIREMENTS
USIB - 6 JULY '60

· PHOTOGRAPHIC

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OUTLINE REQUIREMENTS

USIB · 6 JULY 60

ELINT/COMINT

LESS PRIORITY AND VALUE THAN PHOTOGRAPHIC RECONNAISSANCE. BUT SHOULD BE CARRIED ON WITH HIGHEST PRIORITY SHORT OF INTERFERING WITH PHOTOGRAPHY

IN VIEW OF THE UNCERTAINTIES OF A FULLY DEVELOPED ELECTRONIC RECONNAISSANCE SYSTEM, THERE IS A RELUCTANCE TO SPECIFY DETAILED REQUIREMENTS FOR THE SHORT TERM

MOST IMPORTANT IS THE SEARCH FOR EMISSIONS ASSOCIATED WITH ANTI-BALLISTIC MISSILE SYSTEMS

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EXAMPLE OF TARGET THAT MAY BE IDENTIFIED AT DIFFERENT GROUND RESOLUTION

100 ft

CITIES, FORESTS, RAIL ALIGNMENT, INDUSTRIAL COMPLEXES, MAJOR MILITARY INSTALLATIONS, AND LARGE BODIES OF WATER.

COMPONENTS OF MILITARY INSTALLATIONS, AIRBASE RUNWAYS, SUBMARINE BASES, MAJOR SURFACE TO AIR MISSILE SITES, ATOMIC ENERGY INSTALLATIONS, BALLISTIC MISSILE SITES, SURFACED SUBMARINES, LARGE AIRCRAFT AND MISSILE LAUNCHING PADS, IDENTIFICATION OF MAJOR SOVIET NAVAL FORCES.

LARGE AIRCRAFT AND KNOWN MISSILE CARRYING SUBMARINES, LOCATING SPECIAL WEAPONS, ABOVE GROUND ICBM AND IRBM FACILITIES, CAPACITY OF MILITARY STORAGE FACILITIES, IDENTIFICATION OF NAVAL SHIPS BY TYPES.

DETAILED INFORMATION ON MOST MILITARY AND INDUSTRIAL INSTALLATIONS, ALL AIRCRAFT, GROUND FORCES EQUIPMENT AND DISPOSITION, LARGE MISSILES, AAA SITES, STRUCTURAL SHIPBOARD CONFIGURATIONS, LEVELS OF MILITARY ACTIVITY.

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CHARACTERISTICS
PHOTO PAYLOAD SYSTEMS

SYSTEM	DATA RETRIEVAL METHOD	RESOLUTION	SWATH WIDTH	OPERATING LIFE	MAX DAILY COVERAGE MILLION SQ N MI	TOTAL COVERAGE MILLION SQ N MI
E-1	READOUT	100′	87 N MI	10 DAYS	.57 (1 STA)	5.7
E-2	READOUT	20′	14.5 N MI	4 MOS	.033 (2 STA)	4.0
E-5	RECOVERY	5′	53 N MI	15-30 DA	0.6	4.9
E-6	RECOVERY	8′	200 N MI	5 DA	3.0	14.0

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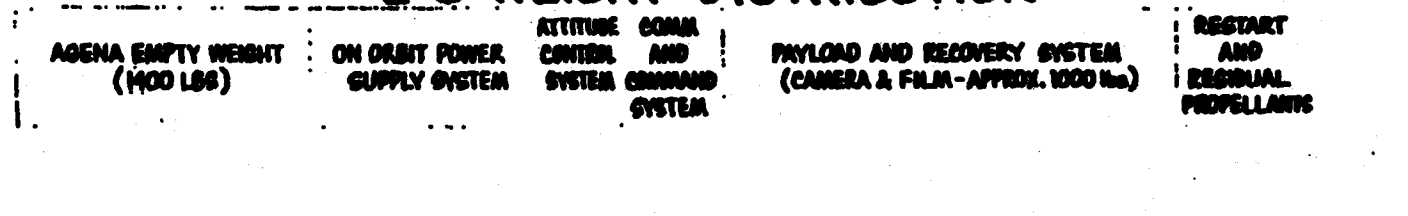
ORBITAL CAPABILITY

VEHICLE	WEIGHT ON ORBIT AT 150 N. MILES ALTITUDE:	WEIGHT ON ORBIT AT 261 N. MILES ALTITUDE:
THOR & AGENA B	2800 LBS	2600 LBS
ATLAS & AGENA B	6500 LBS	6200 LBS

SYSTEM	WEIGHT ON ORBIT AT 150 N. MILES ALTITUDE:	WEIGHT ON ORBIT AT 261 N. MILES ALTITUDE:
E-5	5700 LBS	
E-1 / F-1		4300 LBS
F-2		4100 LBS
F-3		4400 LBS
E-2		4900 LBS

E-5 WEIGHT DISTRIBUTION



VISUAL SENSORS CAPABILITIES

E-1 COMPONENT TEST PAYLOAD	E-2	E-5	E-6
TERRAIN FEATURES & COMMUNICATION CENTERS	IDENTIFY FEATURES & COMPLEXES	LEVEL OF MILITARY ACTIVITY	IDENTIFY FEATURES & COMPLEXES
AIRFIELDS	LARGE AIRCRAFT	IDENTIFY AIRCRAFT	LARGE AIRCRAFT
HARBOR FACILITIES & SHIPPING	SUBS-PIERS-SUPPORTING FACILITIES	IDENTIFY TYPES & USES ie. SHIPBOARD MISSILE FACILITIES	SUBS-PIERS SUPPORTING FACILITIES
LOCATE INDUSTRIAL COMPLEXES	IDENTIFY INSTALLATIONS	IDENTIFY MATERIAL PRODUCTION	IDENTIFY INSTALLATIONS
SUSPECT CONSTRUCTION OF MISSILE SITES	LOCATE MISSILE SITES	IDENTIFY TYPE OF MISSILE SITE	LOCATE MISSILE SITES
FIRST FLIGHT - SEP 60 3 FLIGHTS STRIP CAMERA 6" FOCAL LENGTH	FIRST FLIGHT - APR. 61 3 FLIGHTS STRIP CAMERA 36" FOCAL LENGTH	FIRST FLIGHT - SEPT 61 7 FLIGHTS PANORAMIC CAMERA 66" FOCAL LENGTH	FIRST FLIGHT - JAN 62 7 FLIGHTS PROBABLY A PANORAMIC CAMERA 24" TO 36" FOCAL LENGTH

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FERRET SENSORS CAPABILITY

F-1	F-2	F-3
RECOGNITION OF CONVENTIONAL GROUND, NAVAL & AIRBORNE RADAR SIGNALS	RECOGNITION OF KNOWN AND SUSPECTED SIGNALS	"FINE" LOOKS AT SIGNALS DISCOVERED BY GENERAL COVERAGE SYSTEM
LOCATION WITHIN 150 N.M. CIRCLE	IMPROVED LOCATION ACCURACY	"LOOKS" AT GIVEN SIGNALS FROM HORIZON-TO-HORIZON
FREQUENCY COVERAGE OF S AND X BAND	FREQUENCY COVERAGE FROM 59 TO 18,000 MC/S	FREQUENCY COVERAGE SAME AS GENERAL COVERAGE SYSTEM
ONETIME COVERAGE OF 60% -70% OF SOVIET BLOC	COVERAGE OF ENTIRE SOVIET BLOC EVERY FIVE DAYS	WIDE BAND WIDTH (6 MC/S) RECORDING OF ALL SIGNALS
1ST FLIGHT SEPT. 60 -3 FLTS. (IN COMBINATION WITH E-1)	1ST FLT. JUNE-61 2 FLTS.	1ST FLIGHT WILL BE SCHEDULED

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SAMOS OUTPUTS

READOUT

READOUT TIME { VAFB STA ONLY - 25 MIN PER DAY
VAFB & NEW BOSTON STA - 53 MIN PER DAY

PHOTO E-2 (20') · PER MINUTE OF READOUT - 800 SQ MILES 90 FT OF 35 M PRIMARY RECORD = 12 - 9½" X 18" PHOTOS

ELINT F-2 (DIGITAL) 10,000 INTERCEPTS

RECOVERY

PHOTO E-5 (5') PER MISSION - 4.9 MILLION SQ N MI

E-6 (8') PER MISSION - 9.0 MILLION SQ N MI

[redacted]

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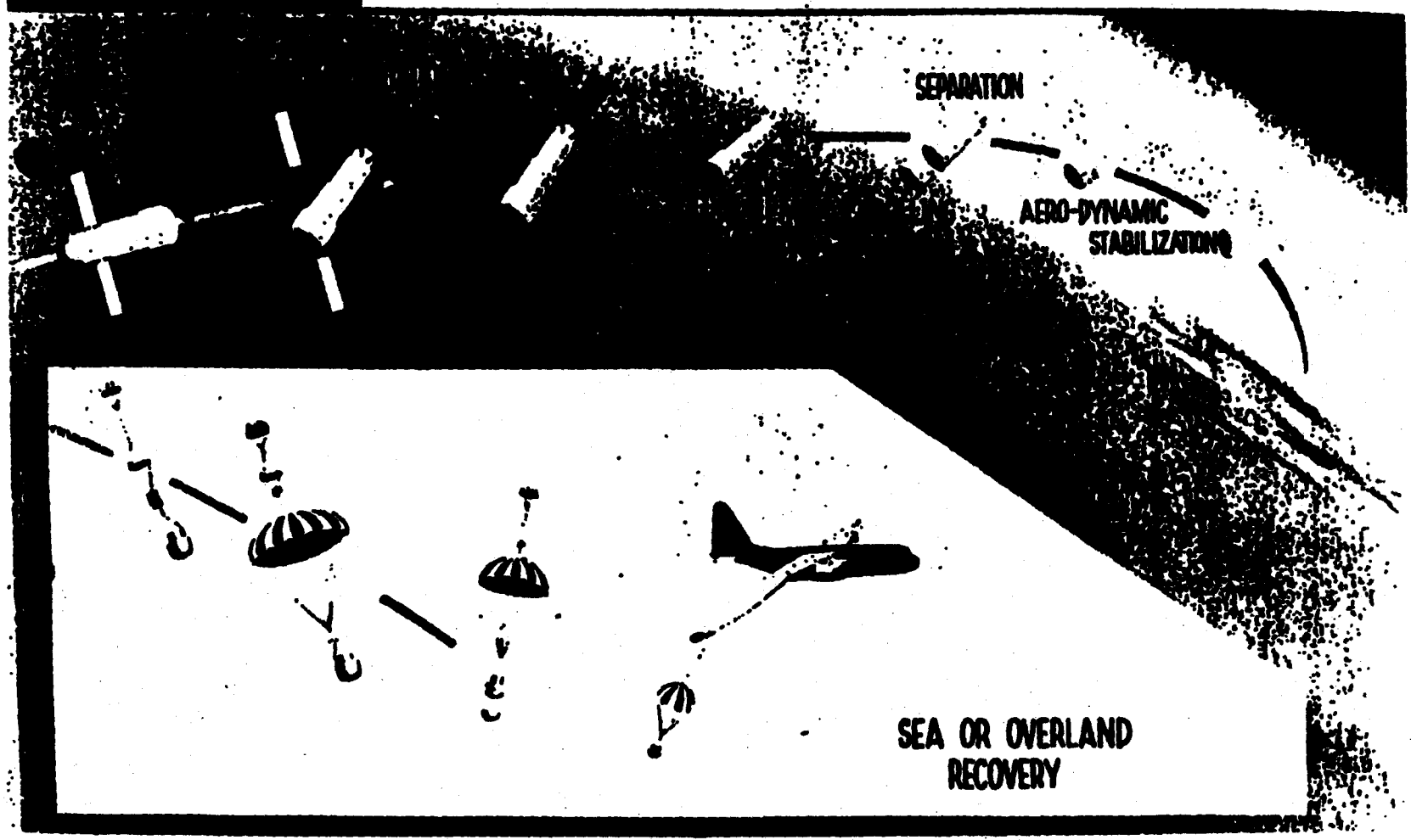
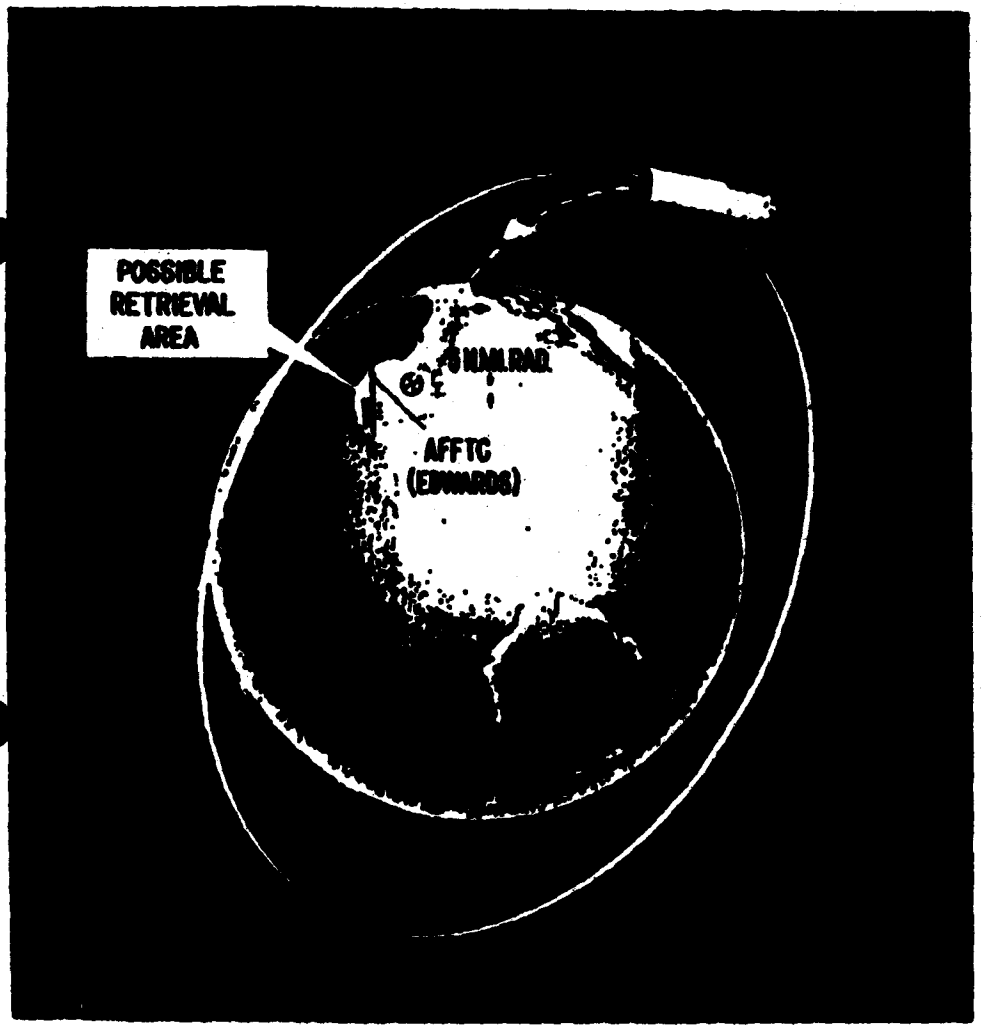
SAMOS E5 RECOVERY SEQUENCE

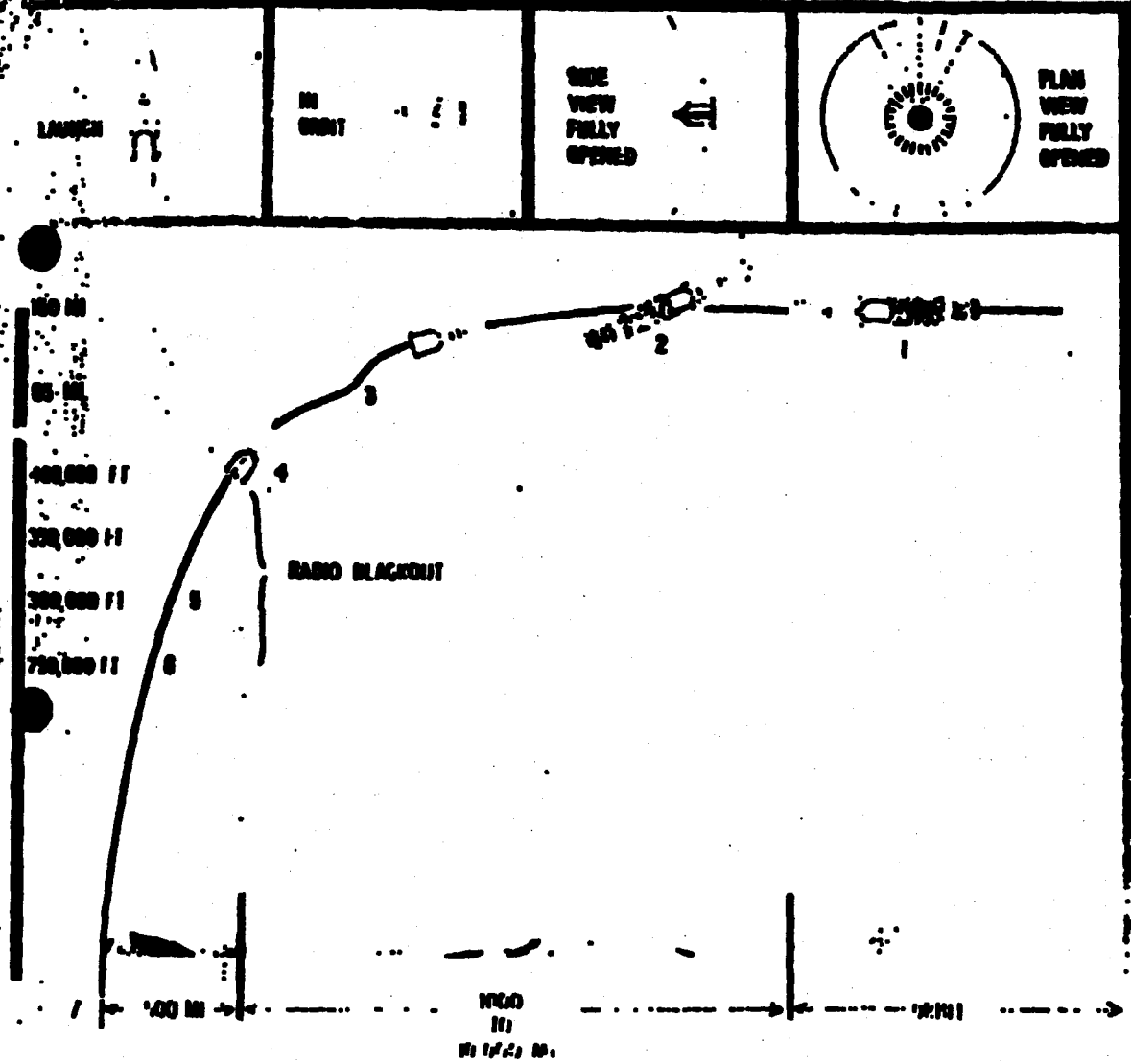


SAMOS E-6 — A NEW APPROACH



- RELIABILITY (SHORT LIFE)
- LARGE AREA COVERAGE
- HIGH RESOLUTION
- EARLY CAPABILITY
- PRECISE OVERLAND RETRIEVAL
- BROADENED CONTRACTOR BASE
- COMPATIBLE WITH DATA PROCESSING EQUIPMENT
- UTILIZE EXISTING GROUND FACILITIES

SAMOS E-6 – DRAG BRAKE RE-ENTRY SEQUENCE



1 VEHICLE IN ORBIT

2 REORIENTATION, RETRO FIRING & SEPARATION

3 MODULATE FOR RANGE CORRECTION

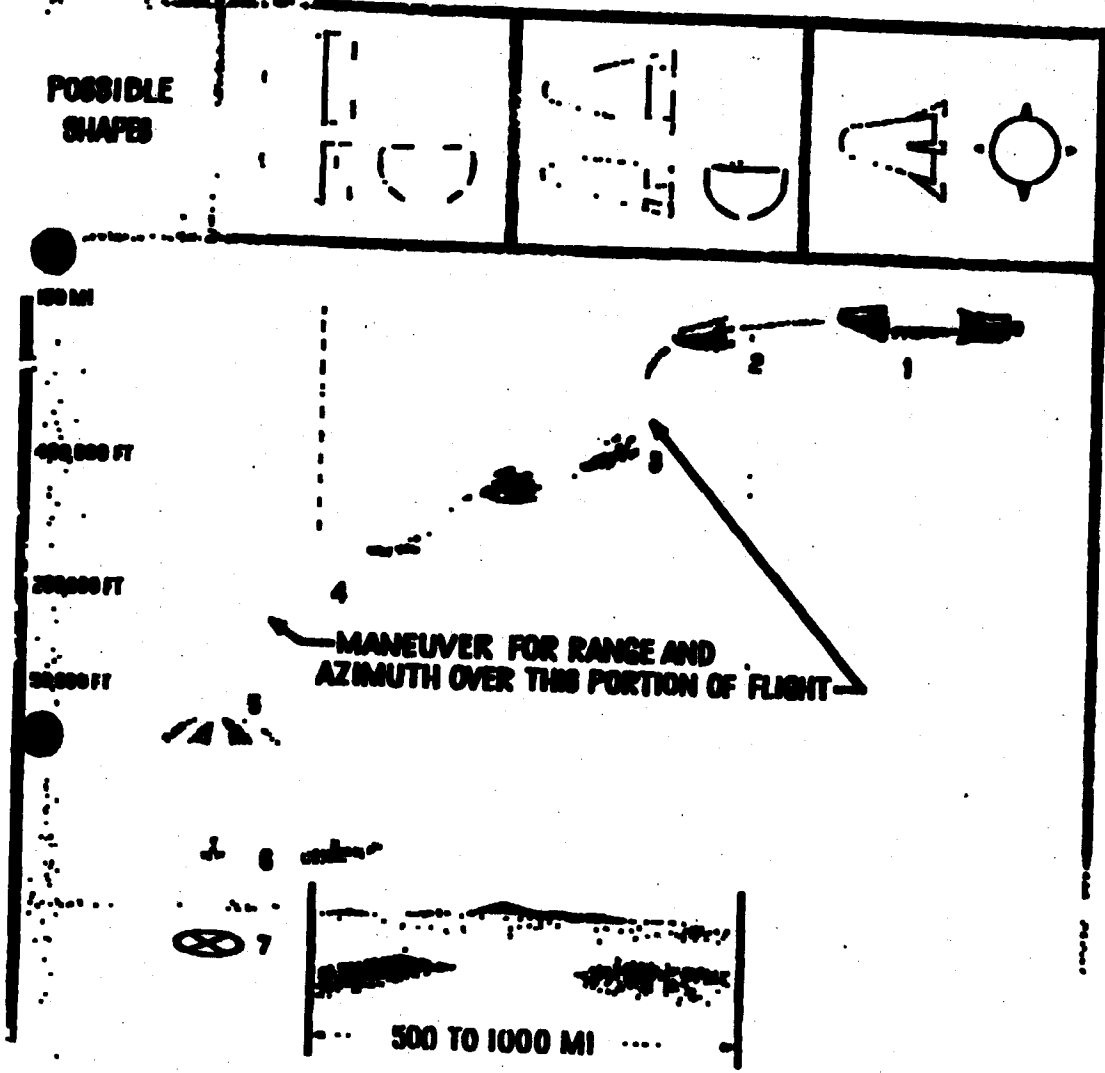
4 FULL OPEN

5 PEAK HEATING

6 PEAK DECELERATION

7 LANDING - 40 F.P.S.

SAMOS E-6 - TYPICAL LIFT RE-ENTRY SEQUENCE



1 VEHICLE IN ORBIT

2 RETRO-ROCKET FIRING AND SEPARATION

3 RE-ENTRY AND RADIO BLACK-OUT-START RANGE AND AZIMUTH CORRECTIONS

4 POST-BLACKOUT-MACH 15 COMMUNICATE FOR TERMINAL GUIDANCE

5 PARACHUTE OPEN-MACH 0.6 TO 1.0

6 AIR PICKUP ATTEMPT POSSIBLE

7 IMPACT - 25 F.P.S.

INTERIM READOUT R&D DATA FLOW

SECURITY CONTROLLED
WITHIN R&D FACILITIES

T&A
STATIONS
[redacted]

[redacted]
35 MM PRIMARY RECORD
AND FERRET MAGNETIC TAPE
VIA ARMED FORCES OR SPECIAL COURIER
[redacted]

TRACKING DATA VIA 100 W/M TT

STC
SUNNYVALE, CALIF

COMMAND & CONTROL

DATA PROCESSING

EPHEMERIS

FEEDBACK

[redacted]

PHOTO-RECONSTRUCTED & TITLED TRANSPARENCIES & PRIMARY RECORDS (SINGLE MASTERS FOR SUBSEQUENT DUPLICATION)

FILM PROCESSING ORGANIZATION "DUPLICATING"

REPRODUCTIONS AS REQUESTED & DISTRIBUTION TO USERS

FERRET TABULAR PRINTOUT OF INTERCEPTS

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SUMMARY

ELEMENTS OF SAMOS RESEARCH AND DEVELOPMENT PROGRAM

- RECOVERY
  - E-5 PHOTO 5' RESOLUTION - 7
  - E-6 PHOTO 8' RESOLUTION - 7
  - DIAGNOSTIC RECOVERY - 4
- READOUT
  - COMPONENT TESTS PHOTO-ELINT E-1/F-1 3
  - E-2 PHOTO 20' RESOLUTION - 2
  - F-2 ELINT DIGITAL - 1

  24 PLUS 5 UNASSIGNED
- SPECIAL COMPONENT TESTS — ATLAS/AGENA(THRU 1962)
- LAUNCHINGS FROM PT. ARGUELLO
- TRACKING STATIONS
  - VANDENBERG AND NEW BOSTON, INCL. READOUT
  - HAWAII AND ALASKA VHF ONLY
- CONTROL - SATELLITE TEST CENTER - SUNNYVALE
- DATA PROCESSING
  - DEVELOPMENT LABORATORY - DENVER
  - INTERIM PROCESSING OF R&D TAKE - SUNNYVALE
- RECOVERY CENTER - HAWAII

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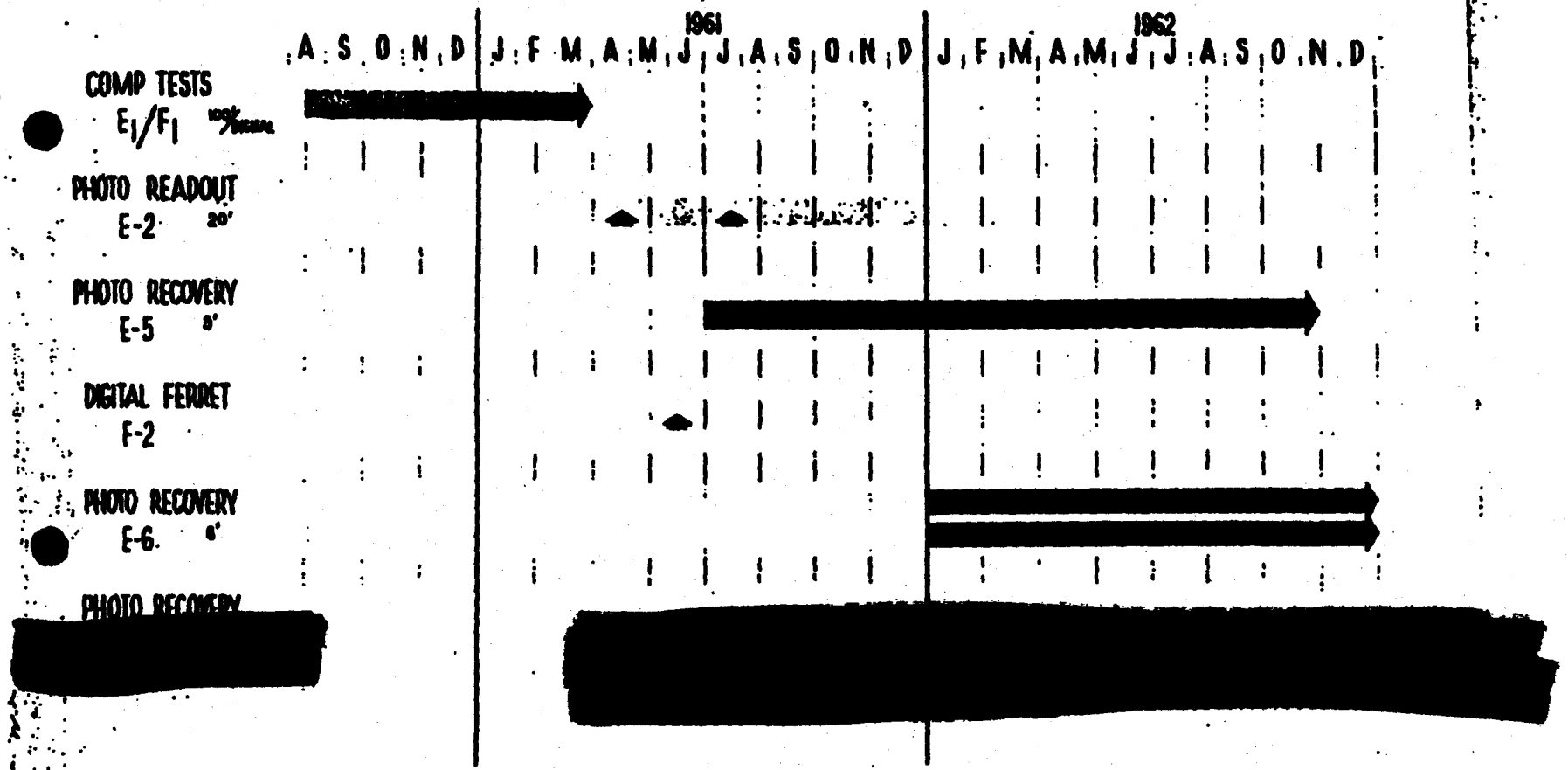
SAMOS LAUNCH SCHEDULE

11 AUG 60 DEV PLAN



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● DIAGNOSTIC FLIGHTS

CONFIDENTIAL

SAMOS FUNDING STATUS [redacted]

FY 1961 FUNDING REQUIREMENTS

REALIGNMENT OF PRESENT PROGRAM.
TECHNICAL DIRECTION AND SYSTEM INTEGRATION FOR PRESENT PROGRAM.
TOTAL PRESENT PROGRAM FOR FY 1961.
NEW RECOVERY PROGRAM.
ADDITIONAL BACK-UP TECHNICAL EFFORT.
ADDITIONAL BOOSTERS & AGENAS FOR FLEXIBILITY.
AGENA GROUND SUPPORT EQUIPMENT FOR NEW STANDS.
TOTAL ADDITIONAL PROGRAM

TOTAL REVISED FY 61 SAMOS PROGRAM

[redacted]

CONFIDENTIAL