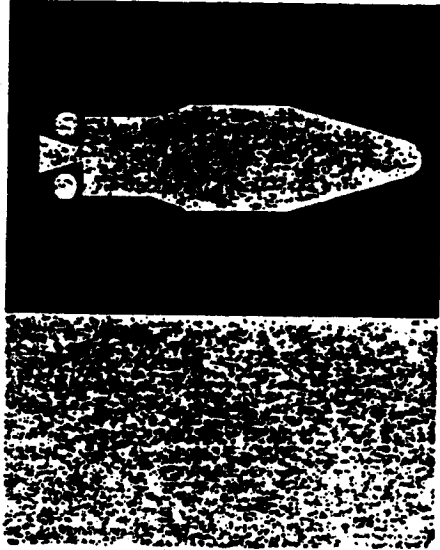


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# SAMOS

U.S. AIR FORCE SATELLITE RECONNAISSANCE SYSTEM

PHOTOGRAPHIC  
ELECTRONIC

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

DEVELOPMENT AGENCY  
UNITED STATES AIR FORCE

604018

SECRET

AF-59 0100 17335

# SAMOS SYSTEM ELEMENTS



**PAYLOAD**

VISIA  
FERRET

## VEHICLE

- AIRFRAME
- PROPULSION
- GUIDANCE AND CONTROL
- VEHICLE TELEMETRY
- VEHICLE COMMAND EQUIPMENT
- ORBIT CONTROL SYSTEM

## TRACKING AND ACQUISITION STATION

- VEHICLE TRACKING
- TELEMETRY
- COMMAND
- DATA ACQUISITION

## RECOVERY FORCE

DATA ACQUISITION

## SATELLITE LAUNCH

- LAUNCH
- ASSEMBLY AND CHECKOUT
- GROUND SUPPORT EQUIPMENT

## SATELLITE TEST CENTER

- SYSTEM CONTROL CENTER
- DATA DISPLAY AND ASSESSMENT
- DATA DISTRIBUTION TO USERS

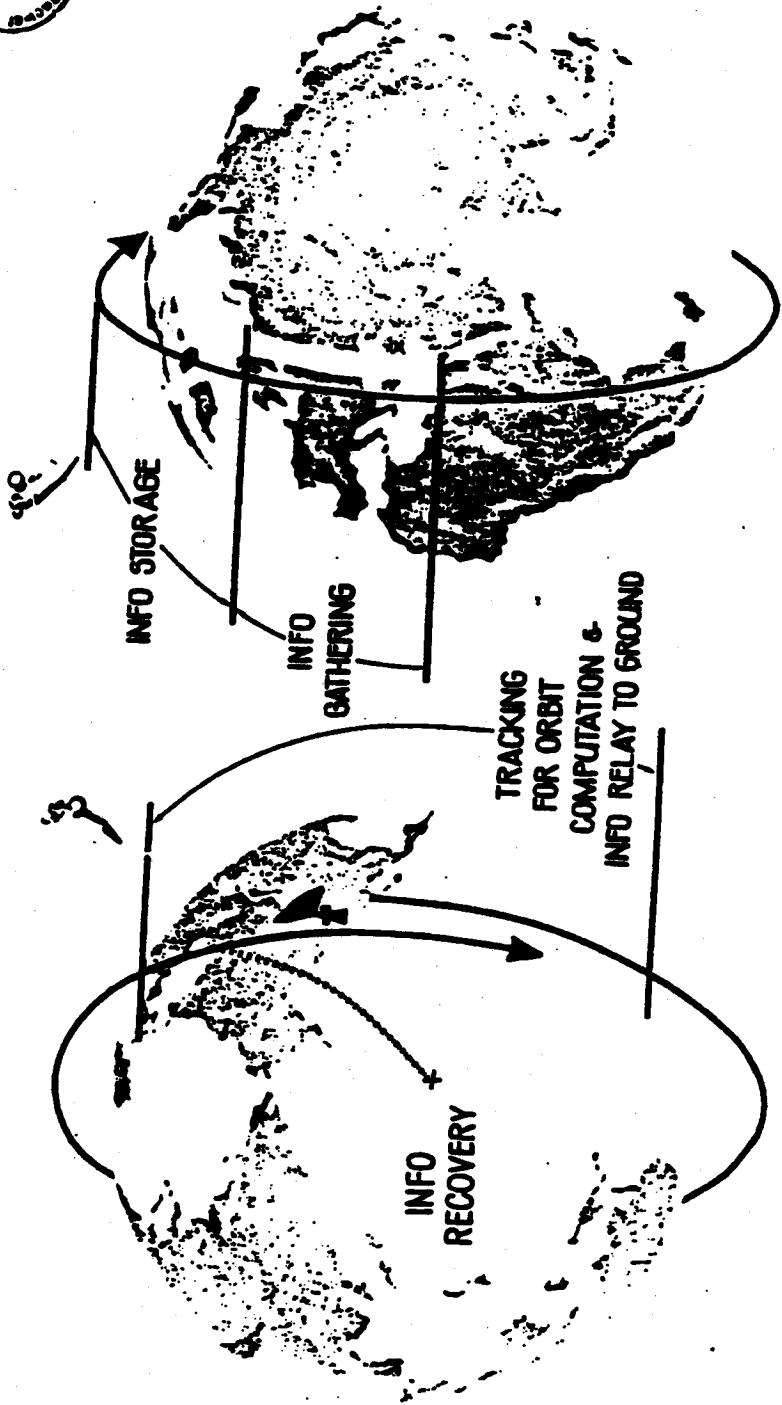
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# SAMOS CONCEPT

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



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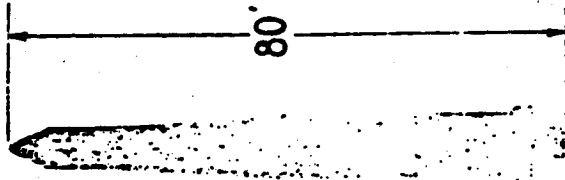
*[Handwritten signature]*

CONFIDENTIAL

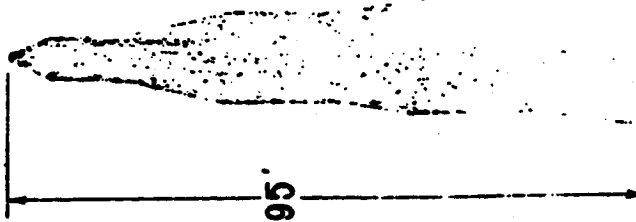
# TYPICAL SIZE AND WEIGHT



AI



**THOR  
AGENA B**



**ATLAS  
AGENA B**

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

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# 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  $\rightarrow$  3' OR LESS
  - ELECTROMAGNETIC: SIMPLE DIGITAL  $\rightarrow$  COMPLEX DIGITAL & ANALOG
  - ACTIVE LIFE: 1 WEEK  $\rightarrow$  4 MONTHS  $\rightarrow$  1 YEAR
- THE DEVELOPMENT PROGRAM WILL INCLUDE FAILURES IN THE COURSE OF THE DEVELOPMENT EFFORT

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# INTELLIGENCE REQUIREMENTS FOR SAMOS

**PRIORITY I**

PHOTOGRAPHIC - LOCATION OF OPERATIONAL ICBM SITES

**PRIORITY II**

- A. PHOTOGRAPHIC - DESCRIPTIVE INFORMATION ON HIGH PRIORITY TARGET LIST ITEMS
- B. ELINT - ANTI-BALLISTIC MISSILE RADARS, MISSILE TELEMETRY, EARTH TO SATELLITE TRANSMISSIONS

**PRIORITY III**

- A. PHOTOGRAPHIC - TECHNICAL CHARACTERISTICS OF HIGH PRIORITY LIST ITEMS
- B. ELINT - OTHER RADARS. SUCH AS EARLY WARNING, AAA, GCI, SHORAN, SAM

**PRIORITY IV**

COMINT - TO THE EXTENT DEVELOPMENT PROVES FEASIBLE

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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-5  
1ST FLT - SEPT '61



Classified by: [redacted]  
Declassify on: [redacted]  
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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

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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 RECON-  
NAISSANCE 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.*

**20 ft**

*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.*

**10 ft**

*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.*

**5 ft**

*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.*

**1 ft**

*DETAILED TECHNICAL INFORMATION ON AIR, NAVAL AND GROUND FORCES EQUIPMENT AND INDUSTRIAL PRODUCTION PROCESSES.*



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# CHARACTERISTICS PHOTO PAYLOAD SYSTEMS

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

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AT 10 0000 2-64

# 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

[REDACTED]

[REDACTED]

FREQUENCY COVERAGE SAME  
AS GENERAL COVERAGE SYSTEM

ONETIME COVERAGE OF 60%  
-70% OF SOVIET BLOC

COVERAGE OF ENTIRE SOVIET  
BLOC. EVERY FIVE DAYS

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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# SAMOS OUTPUTS

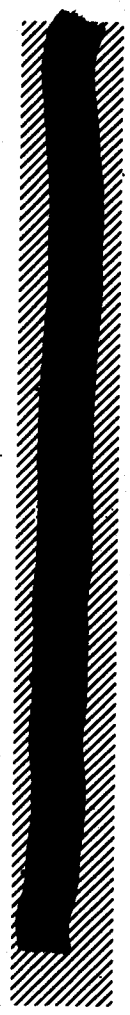


## READOUT

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

PER MINUTE OF READOUT - 800 8Q MILES 90 FT  
 OF 35 M PRIMARY RECORD = 12 - 9 1/2" X 18" PHOTOS

PHOTO E-2 (20')



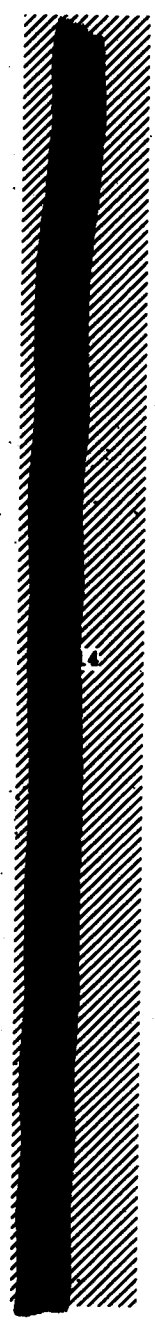
RECOVERY

PHOTO E-5 (5')

PER MISSION - 4.9 MILLION 8Q N MI

E-6 (8')

PER MISSION - 9.0 MILLION 8Q N MI

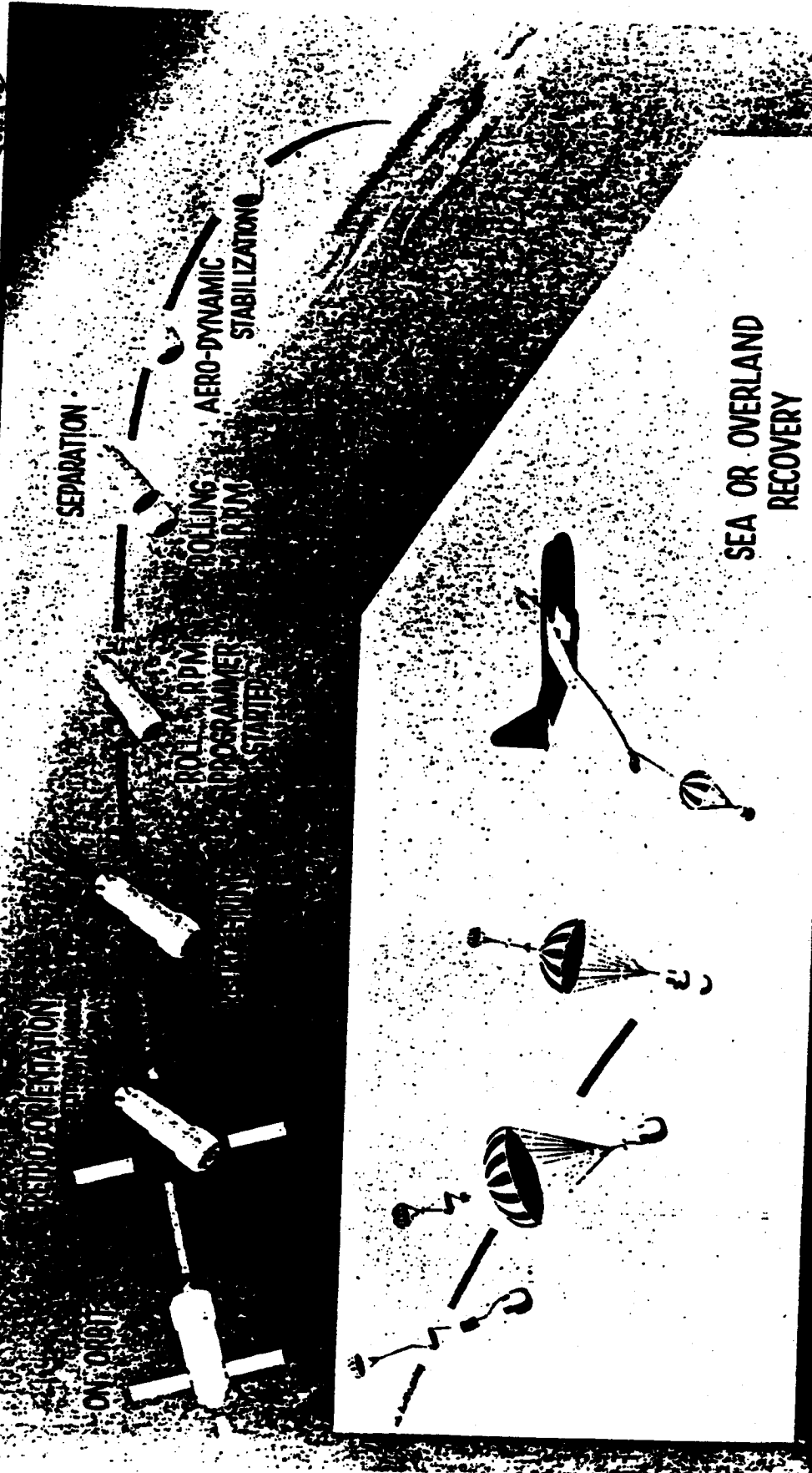


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# SAMOS E5 RECOVERY SEQUENCE



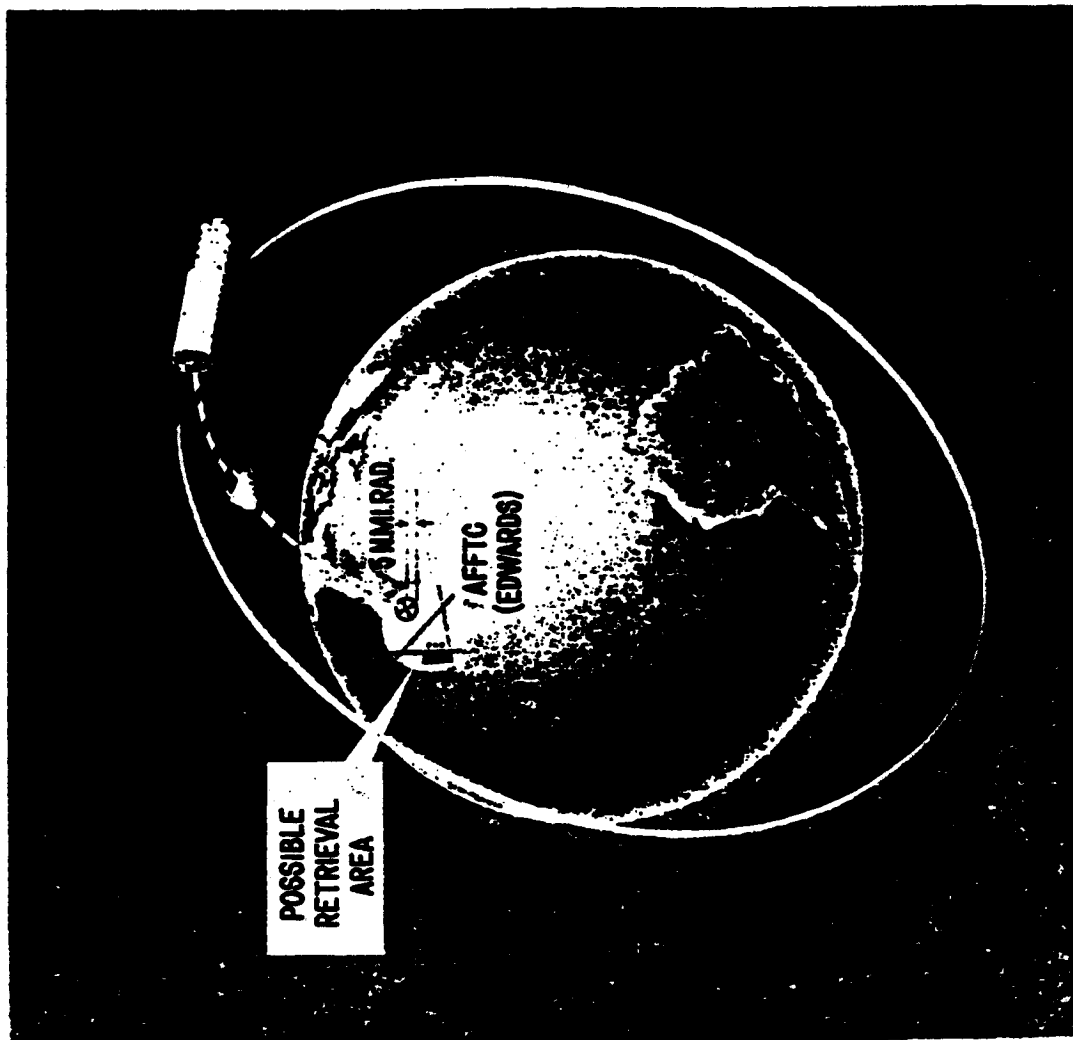
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# SAMOS E-6 — A NEW APPROACH



RELIABILITY (SHORT LIFE)

LARGE AREA COVERAGE

HIGH RESOLUTION

EARLY CAPABILITY

PRECISE OVERLAND RETRIEVAL

BROADENED CONTRACTOR BASE

COMPATIBLE WITH DATA

PROCESSING EQUIPMENT

UTILIZE EXISTING GROUND

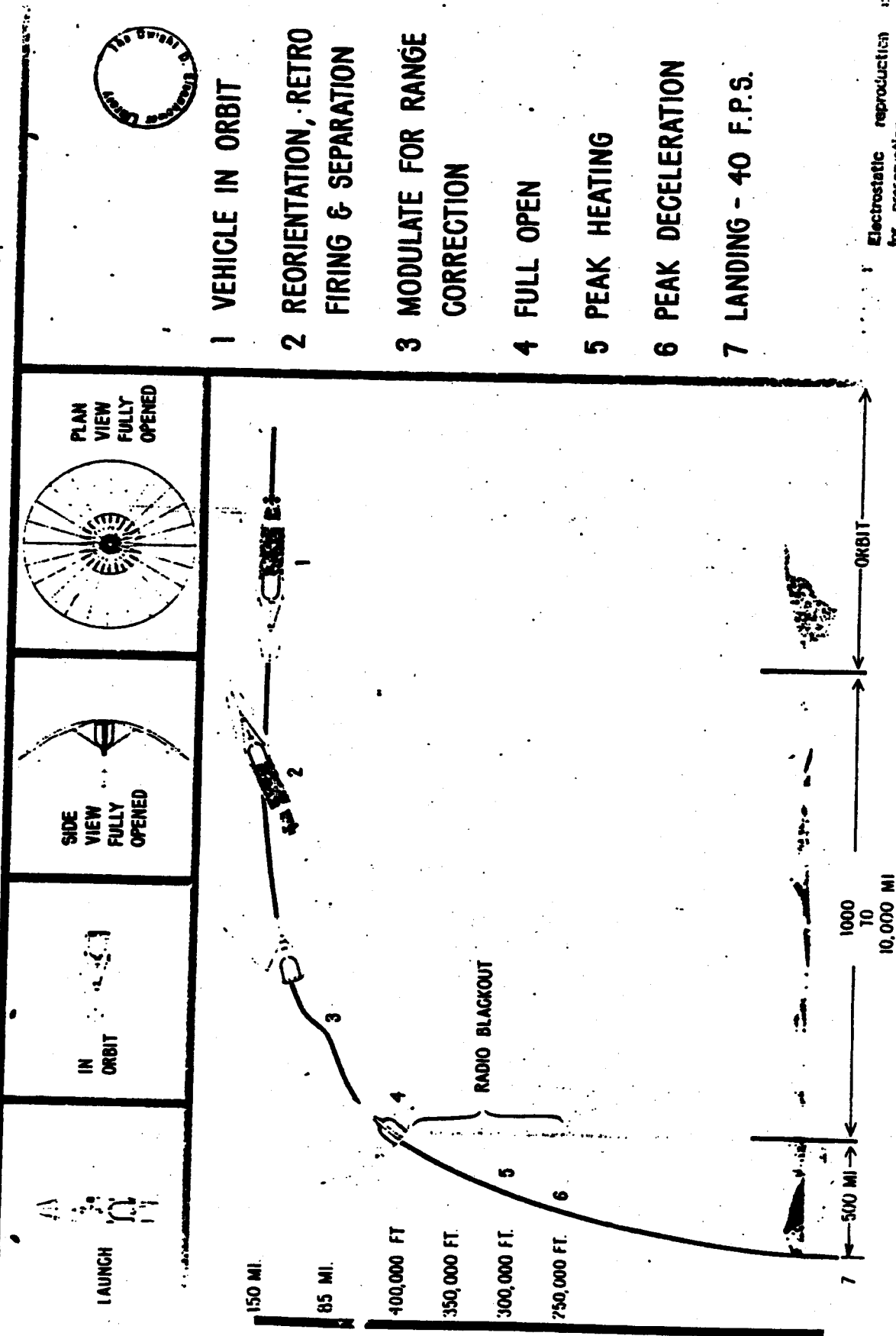
FACILITIES

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# 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.

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# SAMOS E-6 - TYPICAL LIFT RE-ENTRY SEQUENCE



1 VEHICLE IN ORBIT

2 RETRO-ROCKET FIRING AND SEPARATION

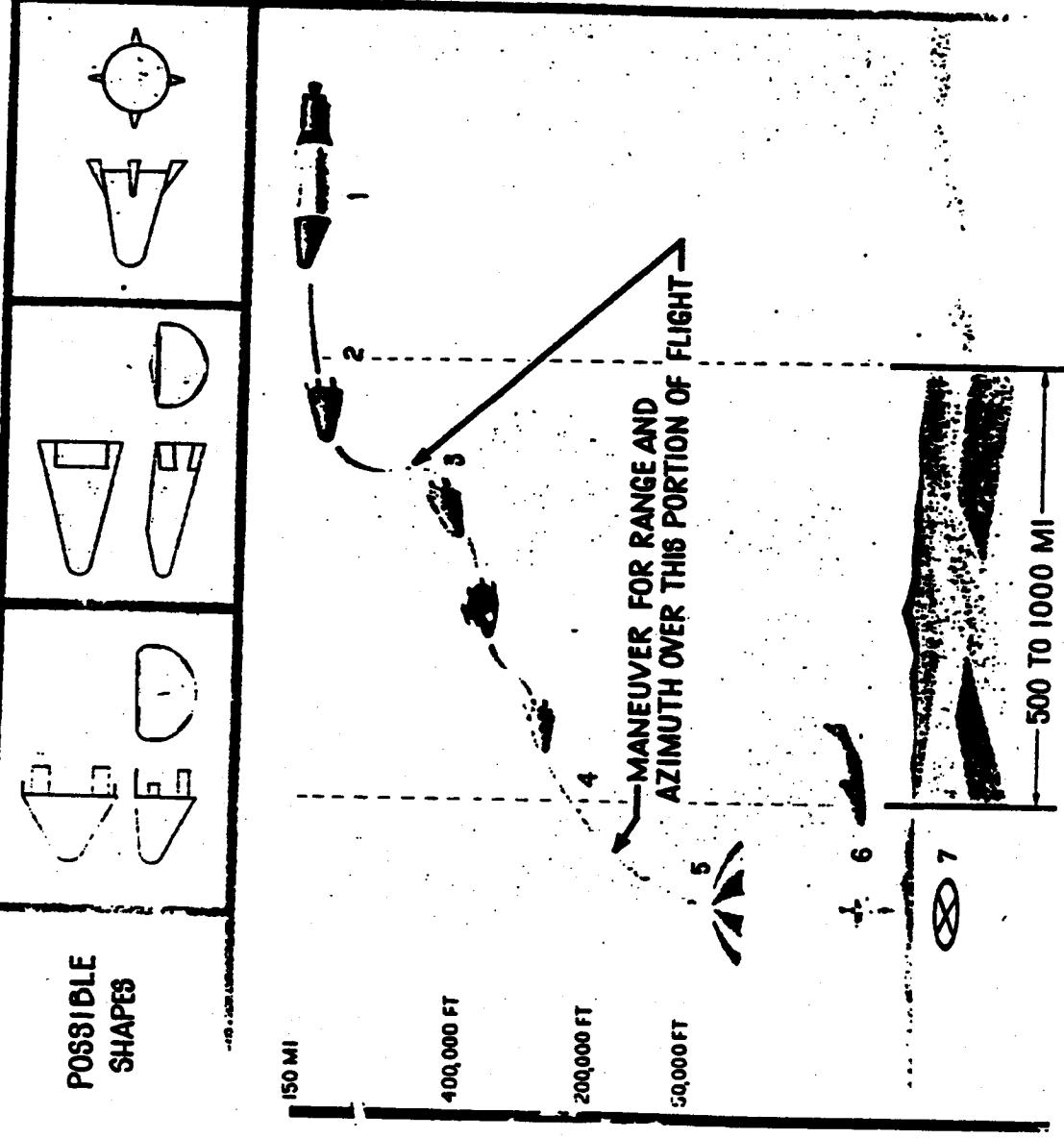
3 RE-ENTRY AND RADIO BLACK-OUT-START RANGE AND AZIMUTH CORRECTIONS

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.



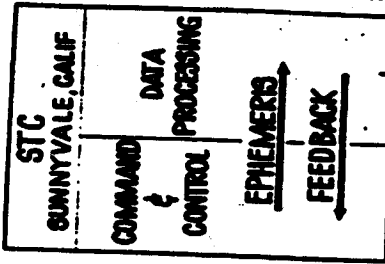
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# INTERIM READOUT R & D DATA FLOW



SECURITY CONTROLLED  
WITHIN R & D FACILITIES



35 MM PRIMARY RECORD  
AND FERRET MAGNETIC TAPE  
VIA ARMED FORCES OR SPECIAL CARRIER

TRACKING DATA VIA 100 W/M TT

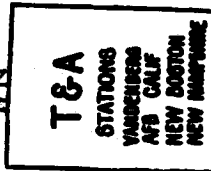


PHOTO-RECONSTRUCTED & TITLED TRANSPARENCIES & PRIMARY  
RECORDS (SINGLE MASTERS FOR SUBSEQUENT DUPLICATION)

FILM PROCESSING  
ORGANIZATION  
"DUPLICATING"

REPRODUCTIONS  
AS REQUESTED  
&  
DISTRIBUTION  
TO USERS

FERRET TABULAR FRONTEND OF INTERSECTS

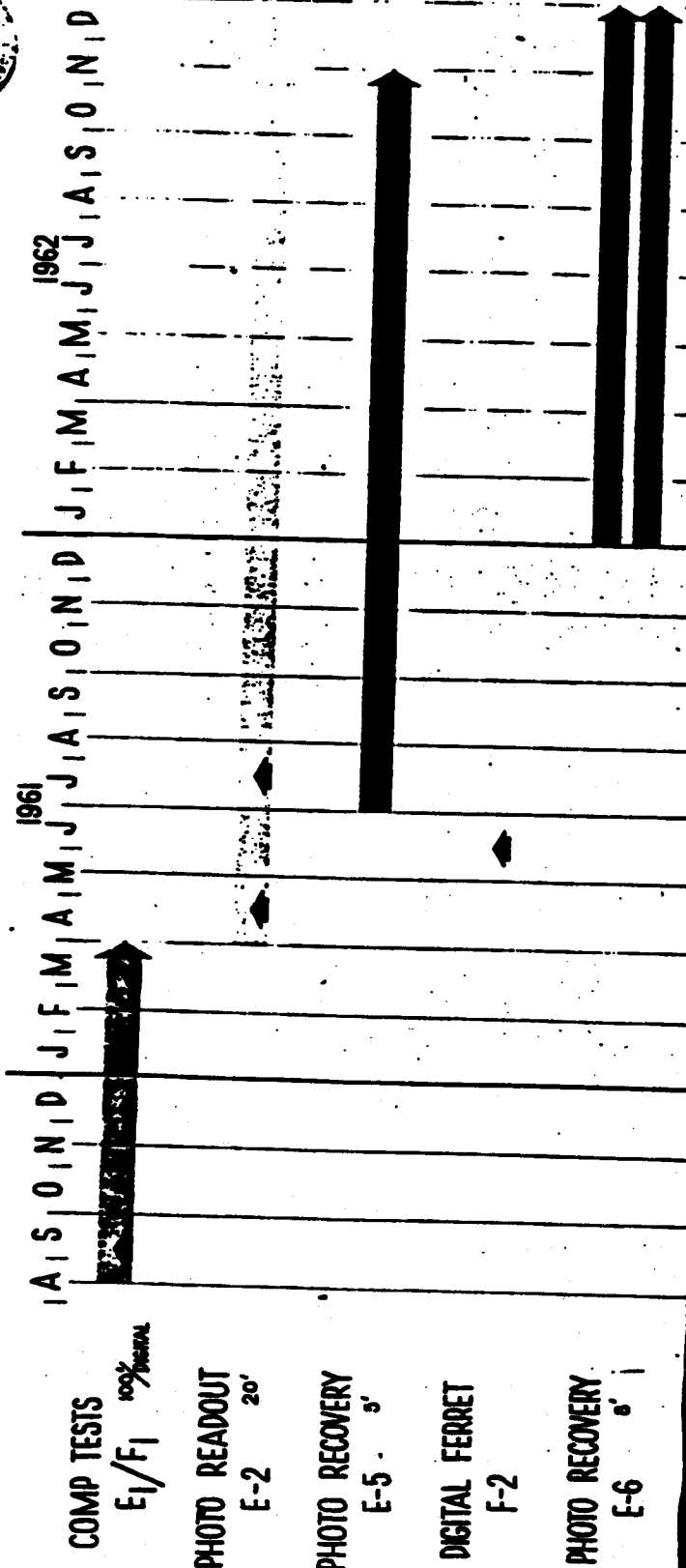
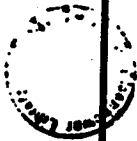
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# SAMOS LAUNCH SCHEDULE

## 11 AUG 60 DEV PLAN



COMP TESTS  
E1/F1 100% Normal

PHOTO READOUT  
E-2 20'

PHOTO RECOVERY  
E-5 5'

DIGITAL FERRET  
F-2

PHOTO RECOVERY  
E-6 5'

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\* DIAGNOSTIC FLIGHTS  
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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

● 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

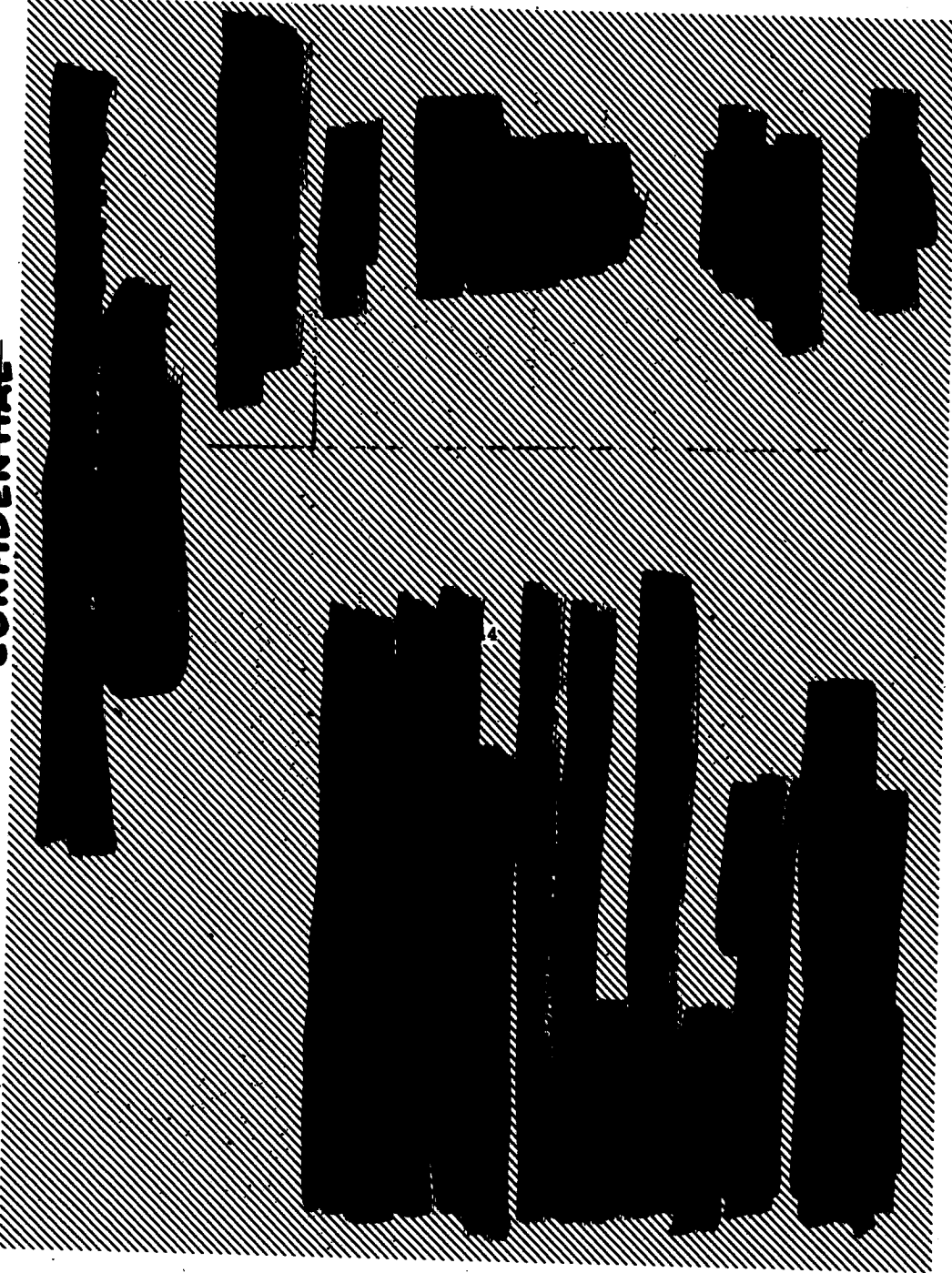
INTERIM PROCESSING OF R&D TAKE - SUNNYVALE

● RECOVERY CENTER - HAWAII



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