SAMOS
SIGNAL SATELLITE RECONNAISSANCE SYSTEM
PHOTOGRAPHIC ELECTRONIC

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

DEVELOPMENT AGENCY
UNITED STATES AIR FORCE

604818
SAMOS SYSTEM ELEMENTS

PAYLOAD
VISUAL 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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ClaraHarvey Library for replacement of a deteriorating manuscript
SECRET

SAMOS CONCEPT

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

INFO STORAGE
INFO GATHERING

INFO RECOVERY

TRACKING FOR ORBIT COMputation & INFO RELAY TO GROUND

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TYPICAL SIZE AND WEIGHT

THOR
AGENA B

AGENA B
EMPTY WEIGHT
1,400
LAUNCH WEIGHT
16,150

THOR
EMPTY WEIGHT
8,830
LAUNCH WEIGHT
107,170

TOTAL BOOSTER AND AGENA
WEIGHT AT LAUNCH
123,320 LBS

AGENA B
EMPTY WEIGHT
1,400
LAUNCH WEIGHT
19,800

ATLAS
AGENA B

ATLAS
EMPTY WEIGHT
14,150
LAUNCH WEIGHT
258,130

TOTAL BOOSTER AND AGENA
WEIGHT AT LAUNCH
277,930 LBS
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

SECRET
INTELLIGENCE REQUIREMENTS FOR SAMOS

PRIORITY I

PHOTOGRAPIHC-LOCATION OF OPERATIONAL ICBM SITES

PRIORITY II

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

PRIORITY III

A. PHOTOGRAPIHC 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

"DESCRIPTIVE" INFORMATION - 5' "RECOGNIZABILITY"

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

"GENERAL SEARCH" - 20' "RECOGNIZABILITY"

- 1st PRIORITY - TO LOCATE SUSPECTED ICBM LAUNCH SITES BETWEEN NOW & END OF 1962
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"DESCRIPTIVE" INFORMATION - 5' "RECOGNIZABILITY"

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

[Redacted text]
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
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.
<table>
<thead>
<tr>
<th>VEHICLE</th>
<th>WEIGHT ON ORBIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>THOR &amp; AGENA B</td>
<td>AT 150 N.MILES ALTITUDE:</td>
</tr>
<tr>
<td>ATLAS &amp; AGENA B</td>
<td>2800 LBS</td>
</tr>
<tr>
<td></td>
<td>6500 LBS</td>
</tr>
<tr>
<td></td>
<td>AT 261 N.MILES ALTITUDE:</td>
</tr>
<tr>
<td></td>
<td>2600 LBS</td>
</tr>
<tr>
<td></td>
<td>6200 LBS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>WEIGHT ON ORBIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-5</td>
<td>AT 150 N.MILES ALTITUDE:</td>
</tr>
<tr>
<td>E-1 / F-1</td>
<td>5700 LBS</td>
</tr>
<tr>
<td>F-2</td>
<td></td>
</tr>
<tr>
<td>F-3</td>
<td></td>
</tr>
<tr>
<td>E-2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AT 261 N.MILES ALTITUDE:</td>
</tr>
<tr>
<td></td>
<td>4300 LBS</td>
</tr>
<tr>
<td></td>
<td>4100 LBS</td>
</tr>
<tr>
<td></td>
<td>4400 LBS</td>
</tr>
<tr>
<td></td>
<td>4900 LBS</td>
</tr>
</tbody>
</table>

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**E-5 WEIGHT DISTRIBUTION**

<table>
<thead>
<tr>
<th>AGENA EMPTY WEIGHT (1400 LBS)</th>
<th>ON ORBIT POWER SUPPLY SYSTEM</th>
<th>ATTITUDE CONTROL AND SYSTEM COMMAND SYSTEM</th>
<th>PAYLOAD AND RECOVERY SYSTEM (CAMERA &amp; FILM-APPROX. 1000 LBS)</th>
<th>RESTART AND RESIDUAL PROPPELLANTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3 (IN THOUSANDS OF LBS)</td>
<td>4</td>
</tr>
</tbody>
</table>

Electrostatic reproduction made for preservation purposes by the Eisenhower Library for replacement of a deteriorating manuscript item.
### CHARACTERISTICS
PHOTO PAYLOAD SYSTEMS

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>DATA RETRIEVAL METHOD</th>
<th>RESOLUTION</th>
<th>SWATH WIDTH</th>
<th>OPERATING LIFE</th>
<th>MAX DAILY COVERAGE</th>
<th>TOTAL COVERAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-1</td>
<td>READOUT</td>
<td>100'</td>
<td>87 NMI</td>
<td>10 DAYS</td>
<td>.57 (1 STA)</td>
<td>5.7</td>
</tr>
<tr>
<td>E-2</td>
<td>READOUT</td>
<td>20'</td>
<td>14.5 NMI</td>
<td>4 MOS</td>
<td>.033 (2 STA)</td>
<td>4.0</td>
</tr>
<tr>
<td>E-5</td>
<td>RECOVERY</td>
<td>5'</td>
<td>53 NMI</td>
<td>15-30 DA</td>
<td>0.6</td>
<td>4.9</td>
</tr>
<tr>
<td>E-6</td>
<td>RECOVERY</td>
<td>8'</td>
<td>200 NMI</td>
<td>5 DA</td>
<td>3.0</td>
<td>14.0</td>
</tr>
</tbody>
</table>

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**VISUAL SENSORS CAPABILITIES**

<table>
<thead>
<tr>
<th>E-1 COMPONENT TEST PAYLOAD</th>
<th>E-2</th>
<th>E-5</th>
<th>E-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>TERRAIN FEATURES &amp; COMMUNICATION CENTERS</td>
<td>IDENTIFY FEATURES &amp; COMPLEXES</td>
<td>LEVEL OF MILITARY ACTIVITY</td>
<td>IDENTIFY FEATURES &amp; COMPLEXES</td>
</tr>
<tr>
<td>AIRFIELDS</td>
<td>LARGE AIRCRAFT</td>
<td>IDENTIFY AIRCRAFT</td>
<td>LARGE AIRCRAFT</td>
</tr>
<tr>
<td>HARBOR FACILITIES &amp; SHIPPING</td>
<td>SUBS-PIERS - SUPPORTING FACILITIES</td>
<td>IDENTIFY TYPES &amp; USES i.e., SHIPBOARD MISSILE FACILITIES</td>
<td>SUBS-PIERS SUPPORTING FACILITIES</td>
</tr>
<tr>
<td>LOCATE INDUSTRIAL COMPLEXES</td>
<td>IDENTIFY INSTALLATIONS</td>
<td>IDENTIFY MATERIAL PRODUCTION</td>
<td>IDENTIFY INSTALLATIONS</td>
</tr>
<tr>
<td>SUSPECT CONSTRUCTION OF MISSILE SITES</td>
<td>LOCATE MISSILE SITES</td>
<td>IDENTIFY TYPE OF MISSILE SITE</td>
<td>LOCATE MISSILE SITES</td>
</tr>
<tr>
<td>FIRST FLIGHT - SEP 60 3 FLIGHTS STRIP CAMERA 6° FOCAL LENGTH</td>
<td>FIRST FLIGHT - APR. 61 3 FLIGHTS STRIP CAMERA 36° FOCAL LENGTH</td>
<td>FIRST FLIGHT - SEPT. 61 7 FLIGHTS PANORAMIC CAMERA 66° FOCAL LENGTH SPEC:</td>
<td>FIRST FLIGHT - JAN 62 7 FLIGHTS PROBABLY A PANORAMIC CAMERA 24 TO 36° FOCAL LENGTH</td>
</tr>
</tbody>
</table>
FERRET SENSORS CAPABILITY

F-1
RECOGNITION OF CONVENTIONAL GROUND, NAVAL & AIRBORNE RADAR SIGNALS
LOCATION WITHIN 150 N.M. CIRCLE
ONETIME COVERAGE OF 60% - 70% OF SOVIET BLOC

F-2
RECOGNITION OF KNOWN AND SUSPECTED SIGNALS
IMPROVED LOCATION ACCURACY
COVERAGE OF ENTIRE SOVIET BLOC EVERY FIVE DAYS

F-3
"FINE" LOOKS AT SIGNALS DISCOVERED BY GENERAL COVERAGE SYSTEM
"LOOKS" AT GIVEN SIGNALS FROM HORIZON-TO-HORIZON
FREQUENCY COVERAGE SAME AS GENERAL COVERAGE SYSTEM
SECRET

SAMOS OUTPUTS

READOUT

READOUT TIME

\{\begin{align*}
\text{VAFB STA ONLY} & \quad - 25 \text{ MIN PER DAY} \\
\text{VAFB & NEW BOSTON STA} & \quad - 53 \text{ MIN PER DAY}
\end{align*}\}

PHOTO E-2 (20')

PER MINUTE OF READOUT

- 800 8Q MILES
- 90 FT

OF 35 M PRIMARY RECORD

= 12 - 9\frac{1}{2}'' \times 18'' \text{ PHOTOS}

RECOVERY

PHOTO E-6 (5')

PER MISSION

- 4.9 MILLION 8Q N MI

E-6 (8')

PER MISSION

- 9.0 MILLION 8Q N MI

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Restoration Library for replacement of a deteriorating manuscript item.
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.
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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SECURITY CONTROLLED WITHIN R&D FACILITIES

T&A STATIONS
VANDERBILT AF B. CALIF.
NEW BOSTON NEW HAMPSHIRE

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

TRACKING DATA VIA 100 W/M TT

STC SUNNYVALE CALIF
COMMAND & CONTROL
DATA PROCESSING
EPHEMERIS
FEEDBACK

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

SECRET
SECRET

SUMMARY

ELEMENTS OF SAMOS RESEARCH AND DEVELOPMENT PROGRAM

- RECOVERY
  - E-5 PHOTO 5' RESOLUTION ------ 7
  - E-6 PHOTO 5' 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
  ATLAS/AGENA (THRU 1962)

- SPECIAL COMPONENT TESTS
- LAUNCHINGS FROM PT. ARGUELO
- 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