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Ltr, DDC/DDC-IR, 1 Jul 64, Clarification of Limited Access Reports

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TO: Hq DDC (DDC-IRA), Cameron Station, Alexandria, Virginia 22314

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3. This intersement contains no classified information.

FOR THE COMMANDER

Kenneth E. Ingram
KENNETH E. INGRAM
Major, USAF
Chief, Systems Security
and Classification Division

7 Atch
m/c

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ADVANCED RECONNAISSANCE SYSTEM

WEAPON SYSTEM 117L

Presenting in summary form the development concepts and present status of the "New Horizon" Weapon System program

In addition to security requirements, which must be met in this contract, the contractor shall export controls, and shall not disclose the information to any government or foreign person or body without the prior approval of AFSSD Code 5552.

(14) LMSD-24 =
LMSD-2903

Lockheed Aircraft Corporation
Missile Systems Division

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DOD DIR 562.10

(11) 1 Nov 58, (12) 6/1/62

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NOV 22 1958
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ADVANCED RECONNAISSANCE SYSTEM

Short Title **ARS. WS-117L**
Official Nickname **"New Horizons"**

The ultimate objective of the WS-117L program is to provide continuous surveillance (visual, electronic and infrared) coverage of the USSR and USSR-dominated countries. In keeping with this objective, the types of intelligence required in order of priority are: strategic warning, enemy military forces in being, enemy military stockpiles of thermonuclear-atomic weapons, enemy logistic capabilities, and enemy industrial war capabilities.

Key R&D action dates relating to this program were:

March 1955	GOR 80 (SA-2C) issued
October 1955	System Requirement established
March 1956	Evaluation of Design Study completed
August 1956	Hq USAF approval of Development Plan; Development Directive issued
October 1956	Letter Contract AF 04(647)-97 issued to Lockheed Aircraft Corp., Missile Systems Division; as Weapon System Contractor
September 1957	Air Staff, with DOD concurrence, decides to support WS-117L in a more substantial manner
January 1958	Contract -97 definitized, a new letter contract executed to provide program acceleration and augmentation

The WS-117L program development plan embodies the placement of a series of unmanned satellites in prescribed orbits about the earth. Two basic types of satellite vehicle reconnaissance systems will be employed. The first type provides for the operation of satellite vehicles utilizing a radio link which relays to ground stations all data gathered by the satellites. The SK-35 Atlas will be used as a booster for these satellite vehicles with the first flight test scheduled to take place in June 1958. The second basic type, introduced into the development program in January 1958, is designed to permit physical recovery of photographic film or other payload components. The IRBM missile will be used as booster for these satellites with the first flight-test date scheduled for October 1958.

The program for the complete system, in each instance, encompasses the following: (1) research, design, development and fabrication of the satellite vehicles, their payloads, communications networks and ground support equipment; (2) site selection of launching and tracking stations, design and construction of support facilities, and the definition of operational manpower requirements; (3) the function of launching and tracking, data reception, processing, interpretation and dissemination.

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WEAPON SYSTEM 117L

LOCKHEED MISSILE SYSTEMS DIVISION KEY PERSONNEL:

L. Eugene Root	Corporate Vice President and LMSD General Manager
Willie M. Hawkins	Assistant General Manager, Weapon Systems
Dr. L. N. Ridener	Chief Scientist
J. H. Carter	Manager, New Horizon Weapon System Branch
R. M. Sauer, Jr.	Assistant Manager, New Horizon Weapon System Branch
Dr. S. R. Baderf	Scientific Advisor, New Horizon Project
Fred W. O'Gross	Director, New Horizon Development Division
R. D. King	Director, New Horizon Test Management and Operations Division
W. C. Holmes	Director, New Horizon Program Administration Division
Subsystem Development Managers:	Subsystem
Ralph O. Youngberg	A- Airframe
Dr. W. C. Neaggarath	B- Propulsion
C. W. Burrell	C- Auxiliary Power
Dr. W. E. Frye	D- Guidance and Control
James W. Plummer	E- Visual Reconnaissance
P. D. Deoran	F- Forward Reconnaissance
J. J. Knepp	G- Infrared Reconnaissance
Dr. J. Jenkins	H- Communications

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WEAPON SYSTEM 117L

PRINCIPAL SUBCONTRACTORS KEY PERSONNEL

Propulsion
Bell Aircraft Corporation
P. O. Box 1
Buffalo 3, N. Y.
Telephone: Niagara Falls-7 831
Mr. J. Magalhães

Forest Reconnaissance

[REDACTED]

Visual Reconnaissance
Eastman Kodak Co.
Naval Ordnance Division
25 Lincoln Avenue
Rochester 11, N. Y.
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Mr. Donald Stevens

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Telephone: Edgewood 4-6211
Dr. Raymond McFee

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Mr. A. Mastala

Ground-Space Communications
Philco Corp.
805 Chestnut Street
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Telephone: EM 9-2321
Dr. W. B. LaBerge

General Electric Co.
Special Projects Department
3198 Chestnut Street
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Telephone: EV 2-7800
Mr. L. L. Stahl

Fairchild Camera & Instrument Corp.
Robbins Lane
Syosset, Long Island, N. Y.
Telephone: Hempstead, N. Y. WE 1-6500
Mr. Richard Hodgson

5

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VEHICLE



AT/11/11 11:11

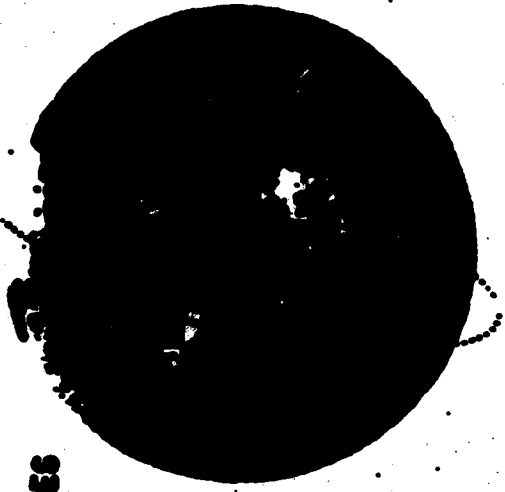
ADVANCED RECONNAISSANCE VEHICLE

An artist's conception of the MS-117L Advanced Reconnaissance System satellite vehicle - Pioneer visual model -- on orbit, as viewed from outer space.

Line of flight is along axis of nose supporting the extended helium spheres. These spheres assist in maintaining stability of the vehicle in a nose-down position.

KEY CHARACTERISTICS

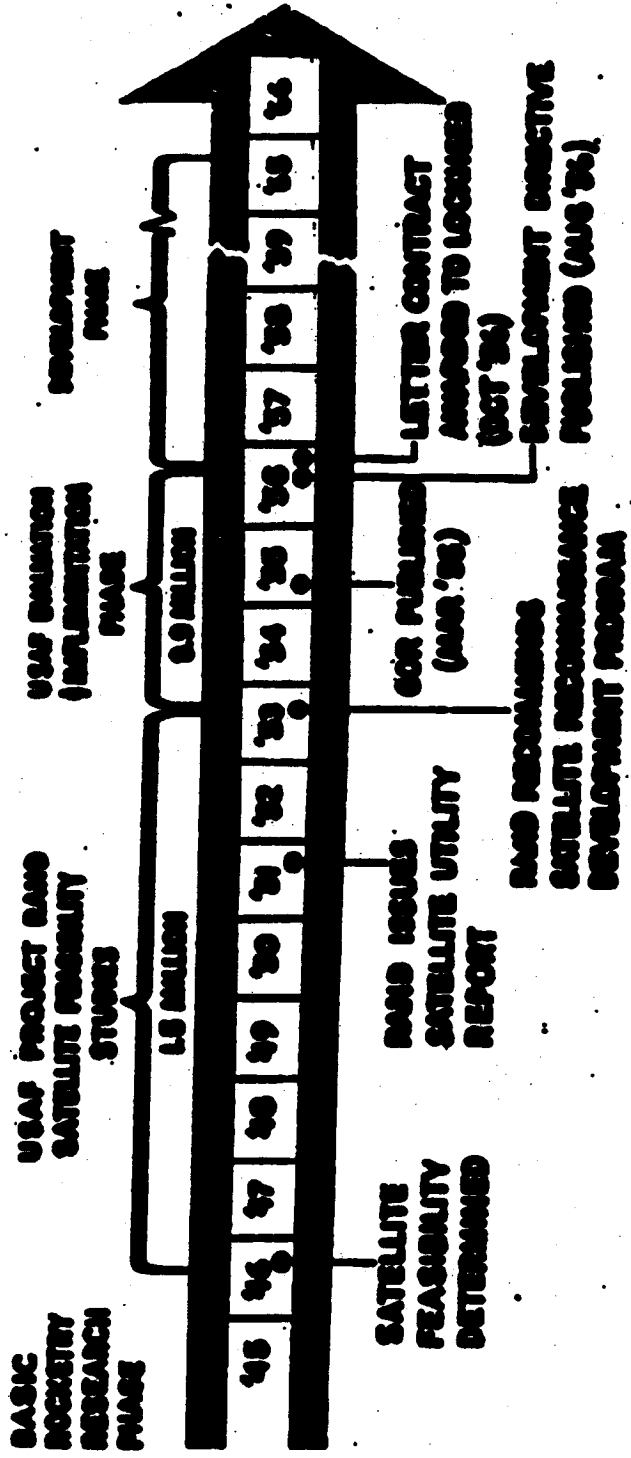
- COMPLETE TARGET AREA COVERAGE
- ACCURATE SPECIFIC TARGET LOCATION
- CONTINUOUS TARGET AREA SURVEILLANCE
- INSTANTANEOUS WARNING OF ICBM ATTACK
- NEARLY INVULNERABLE TO ATTACK OR COUNTER MEASURES
- NO AIRCREWS
- NO OVERSEAS BASES
- INVASES NO AIRSPACE
- HIGH DATA RATE
- ECONOMICAL PER UNIT OF DATA
- FAST RESPONSE
- GROWTH POTENTIAL



P 230 (M) 8 10/74/57

KEY CHARACTERISTICS OF THE ADVANCED RECONNAISSANCE SYSTEM

A listing of some of the unique characteristics of a reconnaissance system based on the use of satellite vehicles as a platform for data-gathering devices.



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 DATE: []



FIG 100 8 10/78

ADVANCED RECONNAISSANCE SYSTEM EVOLUTION

Demonstrates that the NS-117L program represents the culmination of intensive studies and analyses dating from the immediate post-WWII period. Although it was determined as early as 1947 that the launching of satellite vehicles was technically feasible, studies were continued until it could be demonstrated that such satellites would have a significant military utility and be economically competitive with alternative systems. Continued development of KEM/ARSM satellites provided a great reduction in satellite development costs and left little doubt that the military worth of a satellite reconnaissance system would amply justify its costs.

As previously mentioned, the development phase of the ARS program will continue through 1963.

WS 117L PROGRAM OBJECTIVES

PROGRAM TITLE: WAR DEVELOPMENT OBJECTIVES

- I. **INCREASING PROTOTYPE DEVELOPMENT & TEST**
- II. **POWER VISUAL RECOGNANCE**
- III. **PAYLOAD RECOVERY**
- IV. **ADVANCED VISUAL RECOGNANCE**
- V. **VISUAL SURVEILLANCE**
- VI. **DEFENSE SURVEILLANCE**

REPLACEMENT OF TARGETS ON SERIALS WITH AN IMPROVED
SYSTEM WILL SCALE THE PROBABILE SUCCESS OF WAR
IN THE CASE OF THE FOLLOWING: THE PROBABILE OF THESE IMAGES
BEING TAKEN FROM THE AIR FORCE ADVANCE
ON THE GROUND (LOCAL AREA)
ON THE GROUND (LOCAL AREA) OF THE AIR FORCE
ON THE GROUND (LOCAL AREA) OF THE AIR FORCE

PROVIDE HIGH RESOLUTION PHOTOGRAPHY OF SPECIFIC GROUND TARGETS
IN THE CASE OF THE FOLLOWING: THE PROBABILE OF THESE IMAGES
BEING TAKEN FROM THE AIR FORCE ADVANCE
ON THE GROUND (LOCAL AREA)

DESIGN TO PROTECT THE PROBABILE SUCCESS OF WAR
IN THE CASE OF THE FOLLOWING: THE PROBABILE OF THESE IMAGES
BEING TAKEN FROM THE AIR FORCE ADVANCE
ON THE GROUND (LOCAL AREA)

PROBABILE SUCCESS OF WAR IN THE CASE OF THE FOLLOWING: THE
PROBABILE OF THESE IMAGES BEING TAKEN FROM THE AIR FORCE
ADVANCE ON THE GROUND (LOCAL AREA)

PROBABILE SUCCESS OF WAR IN THE CASE OF THE FOLLOWING: THE
PROBABILE OF THESE IMAGES BEING TAKEN FROM THE AIR FORCE
ADVANCE ON THE GROUND (LOCAL AREA)

FORM 100 8 2/73
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GROUP 1000000
CLASS SECRET

NS-117L PROGRAMS AND OBJECTIVES

Presents the eight development programs and their principal objectives. These programs have been chosen and phased to meet two major development objectives:

1. Optimize the development of the operational Advanced Reconnaissance System in terms of the best balance between early availability, effectiveness, and overall economy in terms of manpower and funds
2. Provide a strategic series of reconnaissance systems capable of collecting significant intelligence of high priority at the earliest dates.

SECRET

1950 - 1960 INCL.

NO. OF FLIGHTS	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	TOTAL
PRE ACCELERATED PROGRAM ENGINEERING PROTOTYPE TESTS	9											9
ACCELERATED PROGRAM INFLIGHT RECOVERY	10											10
ENGINEERING PROTOTYPE TESTS	9											9
PIONEER VISUAL RECORD	5											5
TOTAL NO. OF FLIGHTS, ACCELERATED PROGRAM	29											29

KEY

- ▲ ATLAS BOOSTED
- △ THOR BOOSTED

PLAS 3/2/60
WD-28 00776

11

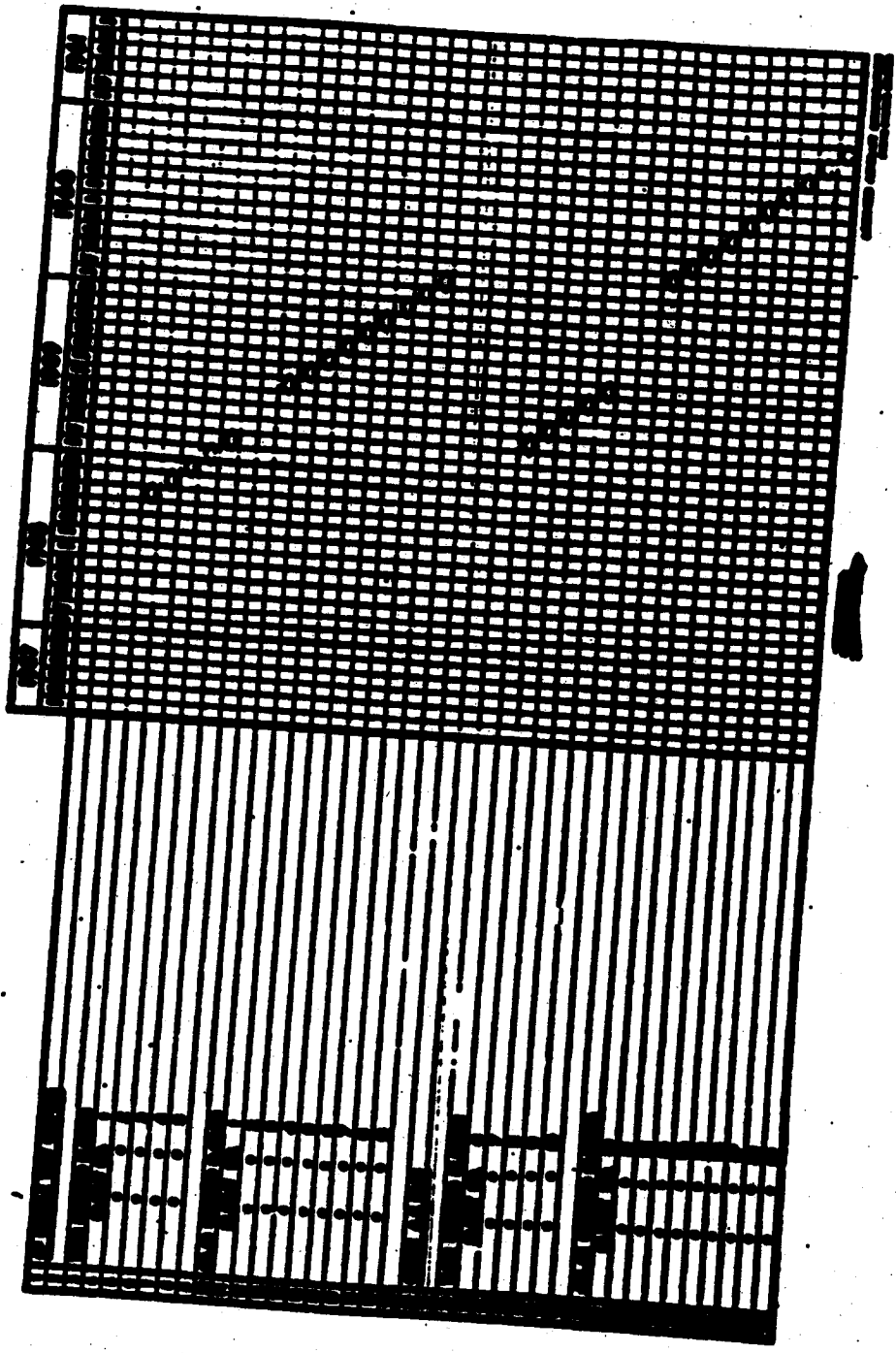
SCHEDULE DATA

Presents flight dates for both the pre-accrued
NS-117L program and the current program as deter-
mined in January 1958.

WS 117L
OCT 1960

WS 117L FLIGHT TEST BY LAUNCH SITE LOCATION

OCT 1960 - DEC 1960



FLIGHT TESTS BY LAUNCH SITE LOCATION

Presents the MS-117L accelerated schedule flight test dates according to launch site location. Early availability of a suitable launch complex at Cocoa AFB is imperative in order that the flight test program may be carried out on schedule.

WS117L PROGRAM SUMMARY THRU DEC 1960

COMPARATIVE SCHEDULE REQUIREMENTS

1ST ORBIT FLIGHT TEST
 1ST VISUAL RECON CAPABILITY
 PROGRAM FROM TO 1-24-60
 JUNE '60
 MARCH '61
 ACCELERATED PROGRAM
 OCT '60
 MARCH '60

VEHICLE PRODUCTION REQUIREMENTS

- VEHICLE MOCKUP
- STRUCTURAL TEST VEHICLE
- PROPULSION TEST VEHICLE ASSEMBLIES
- CAPTIVE TEST VEHICLES
- SYSTEM TEST VEHICLES
- FLIGHT TEST VEHICLES

- NO. OF THOR BOOSTED SATELLITE LAUNCHINGS
- NO. OF ATLAS BOOSTED SATELLITE LAUNCHINGS
- TOTAL NO. OF SATELLITE LAUNCHINGS

1	1	1	1
1	1	1	1
2	3	3	3
1	1	1	1
0	1	1	1
9	30	30	30
0	10	10	10
9	19	19	19
9	29	29	29

1-24-60
 1-24-60

SECRET

1-24-60
 1-24-60

8

NS-117L PROGRAM SUMMARY THROUGH DECEMBER 1960

A summary of the significant schedule changes brought about by the decision (as of 22 January 1958) both to accelerate the program schedule and to augment it with a Thor-based satellite payload recovery program.

VISUAL RECONNAISSANCE MODEL

ENGINE ORBIT LIMITS 6°
SQUARE PATTERN
ENGINE-BELL AIRCRAFT
THRUST 18,000 LB AIT
1.89 263 SEC.

NOZZLE EXPANSION RATIO 18:1

H₂ GAS STORAGE FLASK
3000 PSI

VISUAL RECONNAISSANCE SYSTEM
CAMERA PACKAGE (ENCC)
PHOTO PROCESS, STORAGE,
ELECTRONIC REAROUT

CAMERA LENS SHIELD

NOSE (JETTING)

ATTITUDE ROLL AND
RECONSTRUCTION CONTROL
GAS JETS (6)

AUXILIARY POWER
SOURCE (BATTERIES)

FUEL TANK
(JP-4) 60 PSI

OXIDIZER
TANK (N₂O₄)
60 PSI

H₂ GAS STORAGE FLASK (2)
PROPPELLANT TANK
PRESSURIZATION 3000 PSI

SUBSYSTEM ELECTRONICS COMPARTMENT
AND CAMERA SUPPORT STRUCTURE
(GUIDANCE, CONTROL, ETC.)

REMOVABLE NOSE FAIRING

P238 (2) 95A 30470
WB-50-00776

ARS SATELLITE VEHICLE

Inboard profile and general configuration of the ARS satellite vehicle, engineering prototype and planner model.

Overall length	19'0"
Width	5'3"
Weight:	
Payload	2,000 lbs
Structure, propulsion units, guidance and control equipment	1,500 lbs
Weight empty	4,200 lbs
Propellants	5,000 lbs
Total weight at launch	9,300 lbs

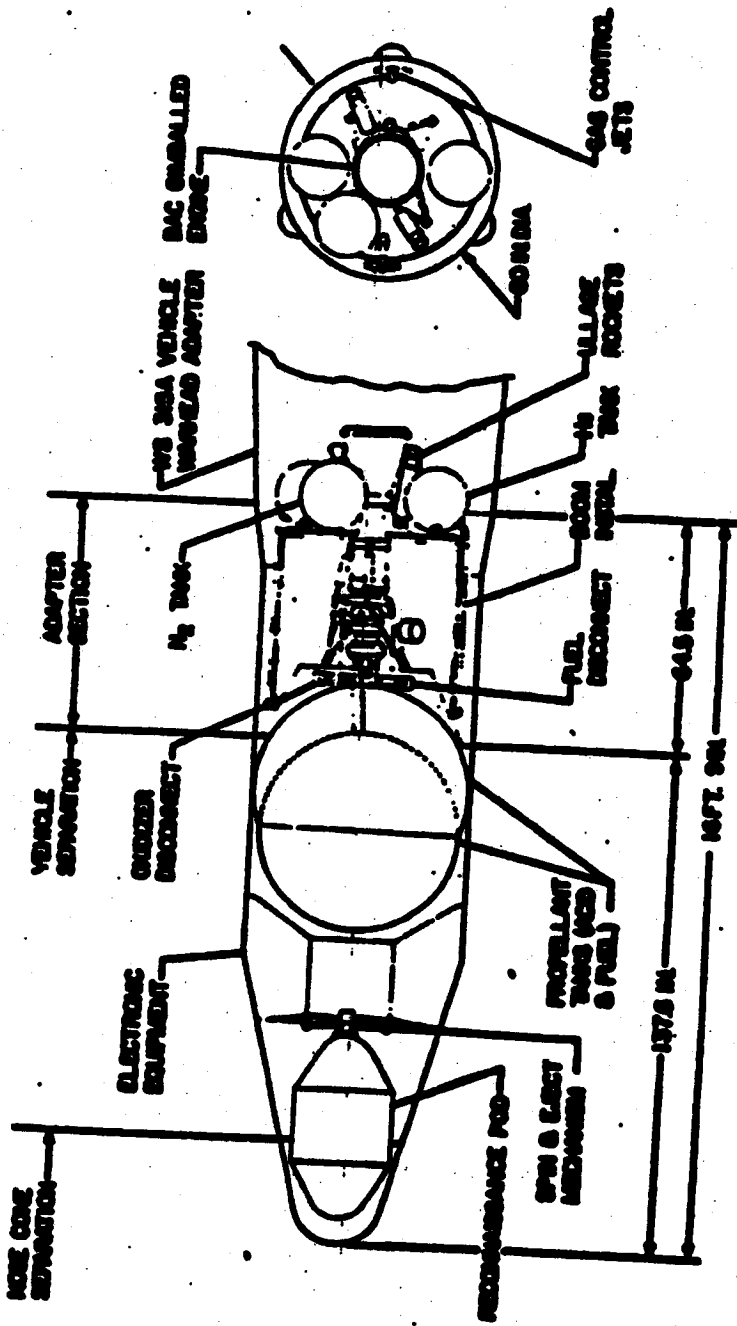
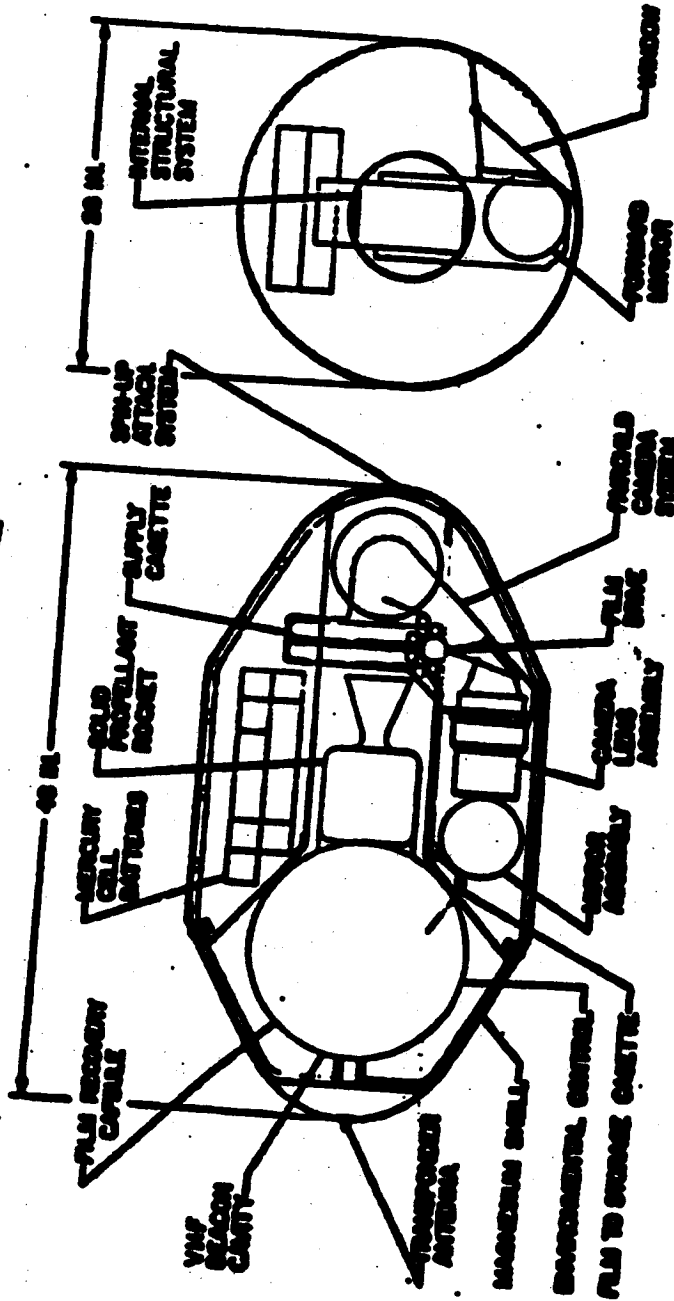


FIG. 1
 W8-2-5778

RE-117L PAYLOAD RECOVERY SATELLITE VEHICLE

Shows the major components associated with the satellite vehicle designed to carry a reconnaissance pod into orbit. The components required to effect separation, attitude control, orbital boost propulsion, attitude control, and reconnaissance pod spin-up and eject are shown. After separation from the vehicle the spin of the reconnaissance pod serves to stabilize it in inertial space and also provides the means for permanent viewing of the earth's surface by the enclosed camera.

MINIATURE RECONNAISSANCE POD

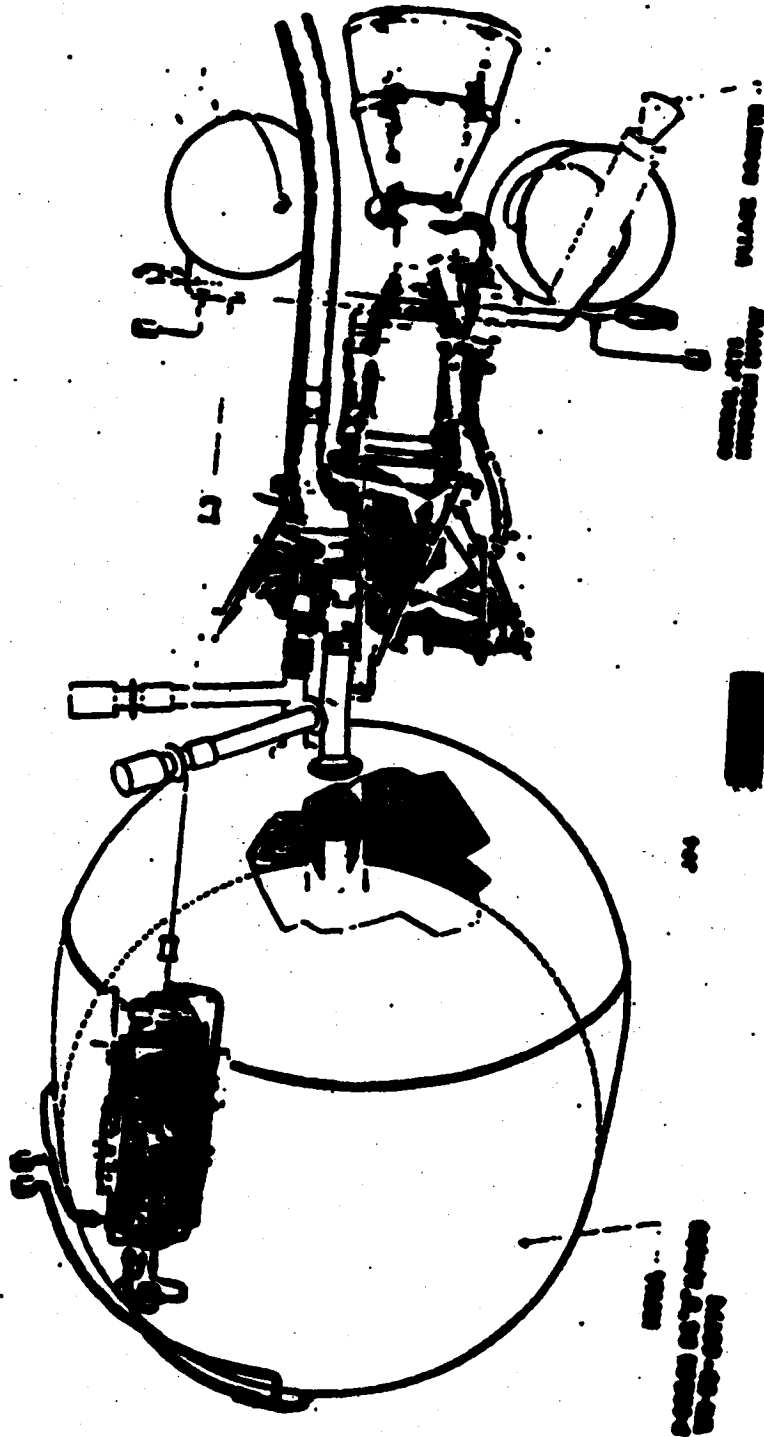


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NS-117L RECONNAISSANCE POD

Shows the major components of the reconnaissance pod designed to obtain panoramic reconnaissance photographs from a satellite orbit and store the exposed film in a recoverable capsule. At the completion of the reconnaissance mission the solid propellant rocket propels the film recovery capsule into a recovery trajectory for return to the earth's surface.

WS117L PROPULSION SYSTEM



CONICAL AIR INLET

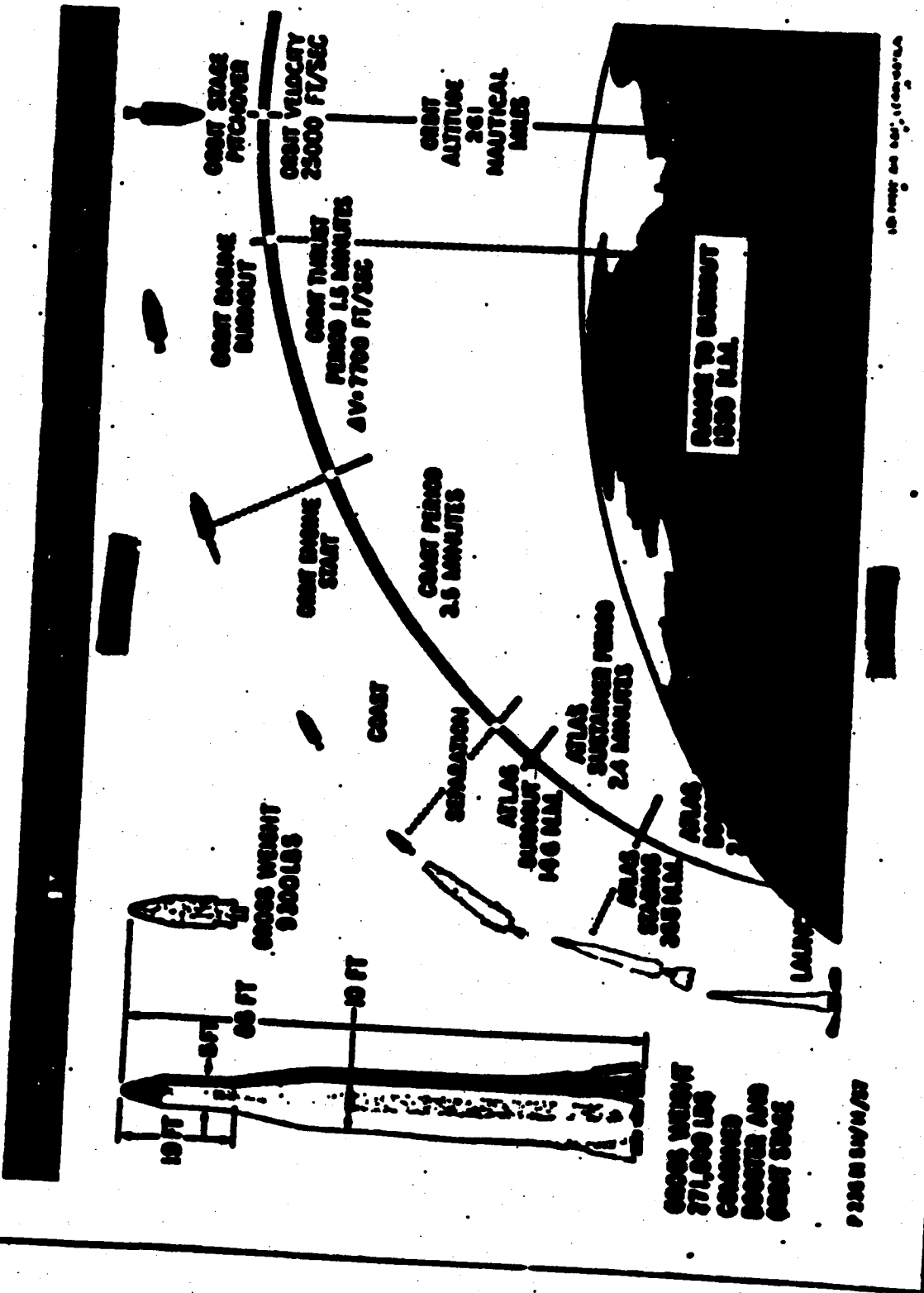
PROPULSION SYSTEM

MS-117L VEHICLE PROPULSION SYSTEM

A photograph of the Ball Aircraft Corporation "Huster" engines in schematic relationship to other major propulsion system components. As indicated, the engine is gimbal-mounted in order that thrust direction may be controlled. Engine performance specifications are:

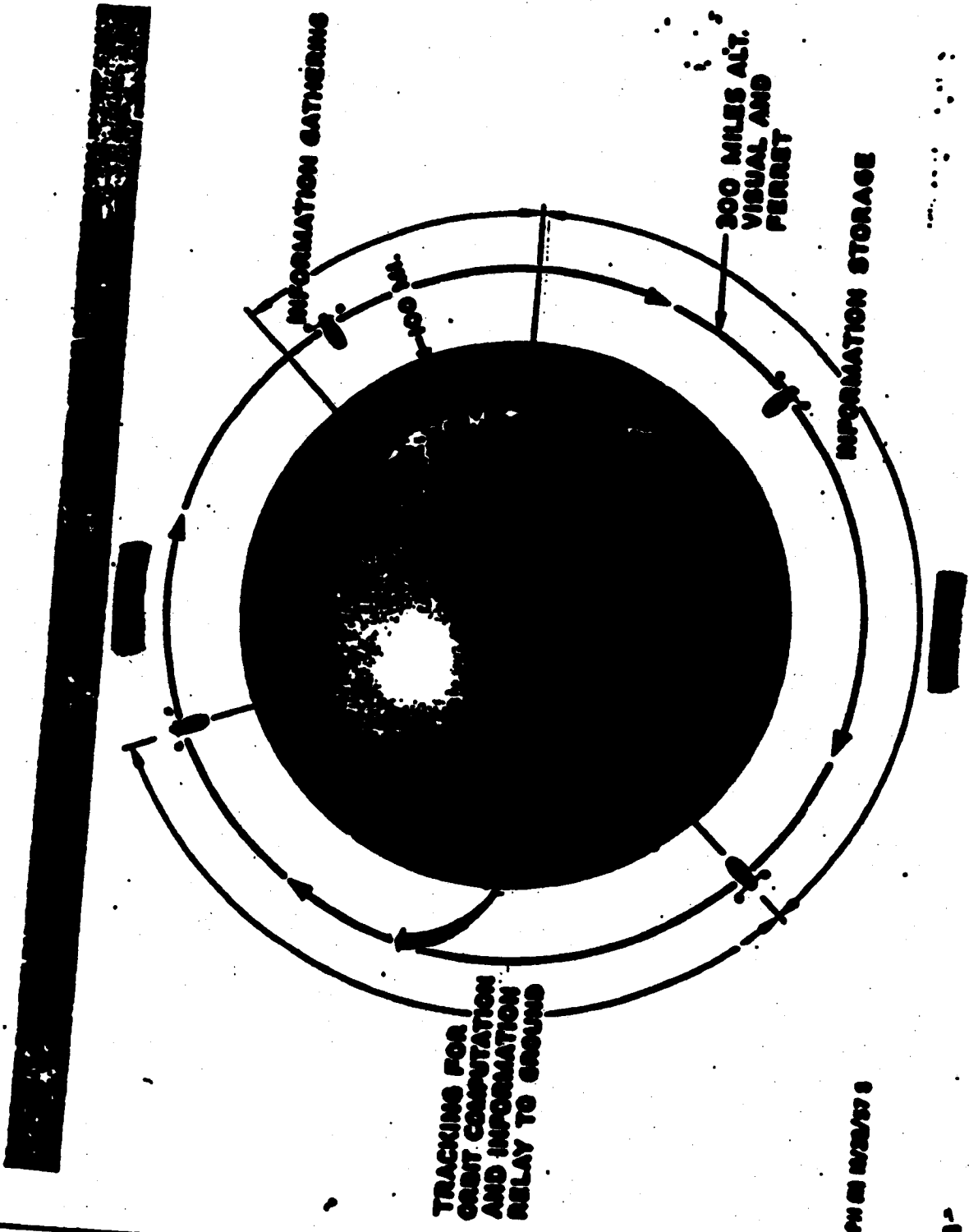
Thrust in a vacuum	15,150 lbs
Minimum specific impulse	263 sec
Maximum specific impulse	269 sec

Nested spherical tanks contain the propellants which are pressure-fed to the combustion chamber; pressure is supplied by helium contained in the two spherical tanks above on either side of the thrust chamber. The engine is started by the simultaneous ignition of a solid propellant charge in the gas generator and the opening of a connection between the two propellant tanks. Prior to engine start, propellants in the tanks are properly oriented and gas bubbles expelled by the firing of two solid slugs control rockets.



ARS VEHICLE TRAJECTORY TO ORBIT

Precondition of flight launch phase of the Atlas-boosted Advanced Reconnaissance System satellite vehicle. Booster-satellite separation is accomplished by the use of retro-firing rockets attached to the Atlas. Satellite pitchover and stabilization in a nose-down position is achieved by nitrogen-fed gas jets as shown in the vehicle configuration drawing.



INFORMATION GATHERING

300 MILES ALT.
VISUAL AND
FERRET

INFORMATION STORAGE

100 mi

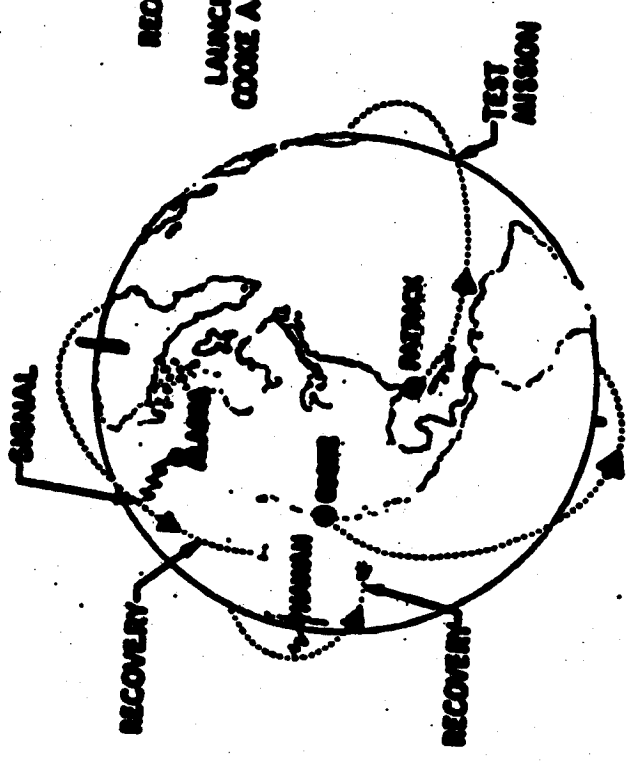
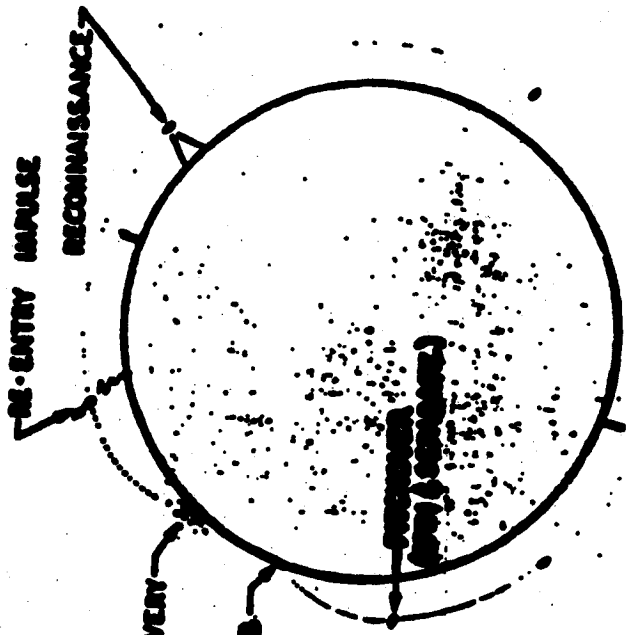
TRACKING FOR
ORBIT COMPUTATION
AND INFORMATION
RELAY TO GROUND

PH 68 8028/17 8

**ADVANCED RECONNAISSANCE
SATELLITE ORBIT SCHEMATIC**

Illustrates how orbiting reconnaissance satellites gather and store intelligence data while passing over territory of interest, then jettisons ("reads out") the data while passing over ZI-located ground stations.

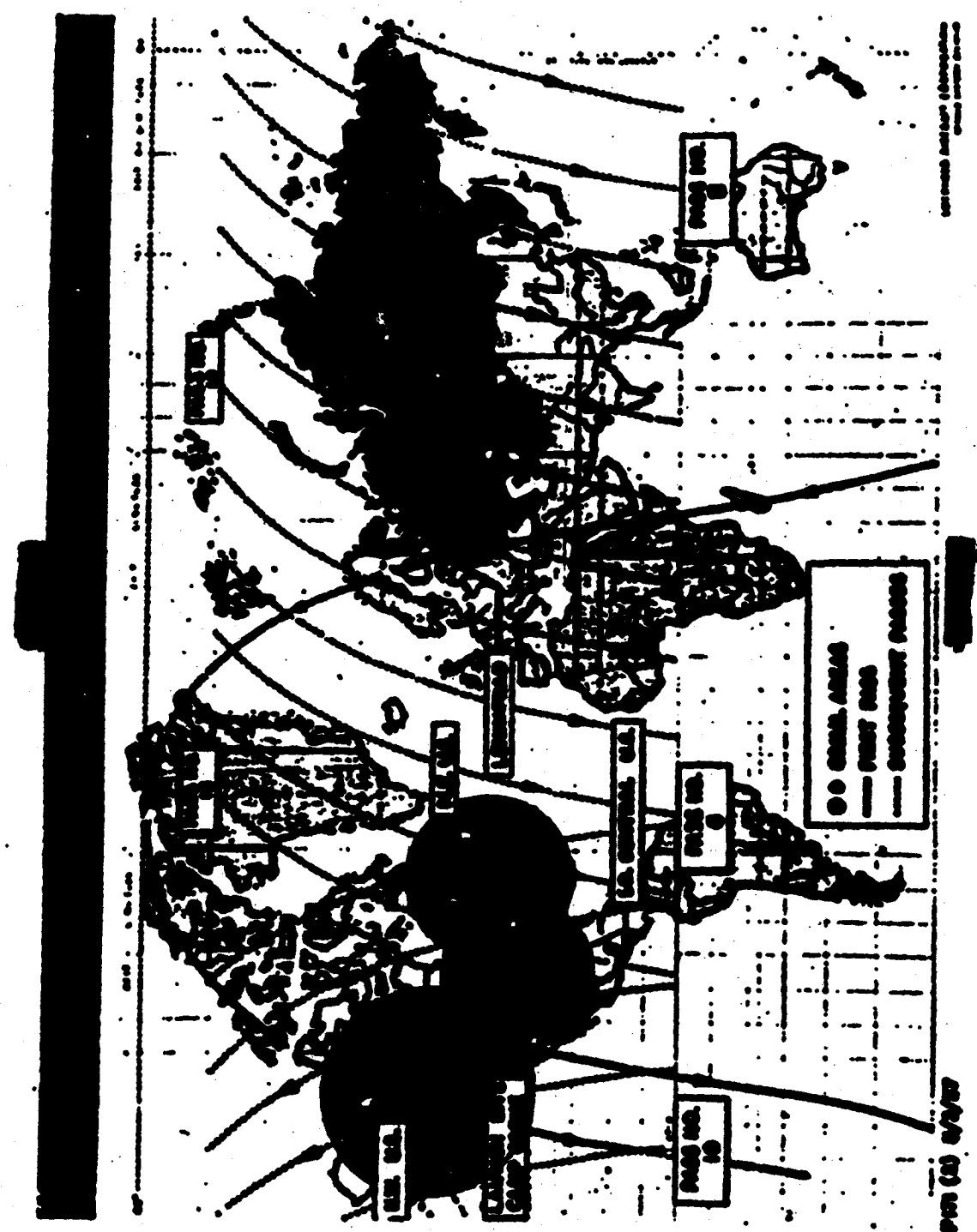
As indicated, the pioneer visual system, utilizing a 6-inch focal length lens, photographs a swath 1500 miles long by 300 miles wide.



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65-16-00776

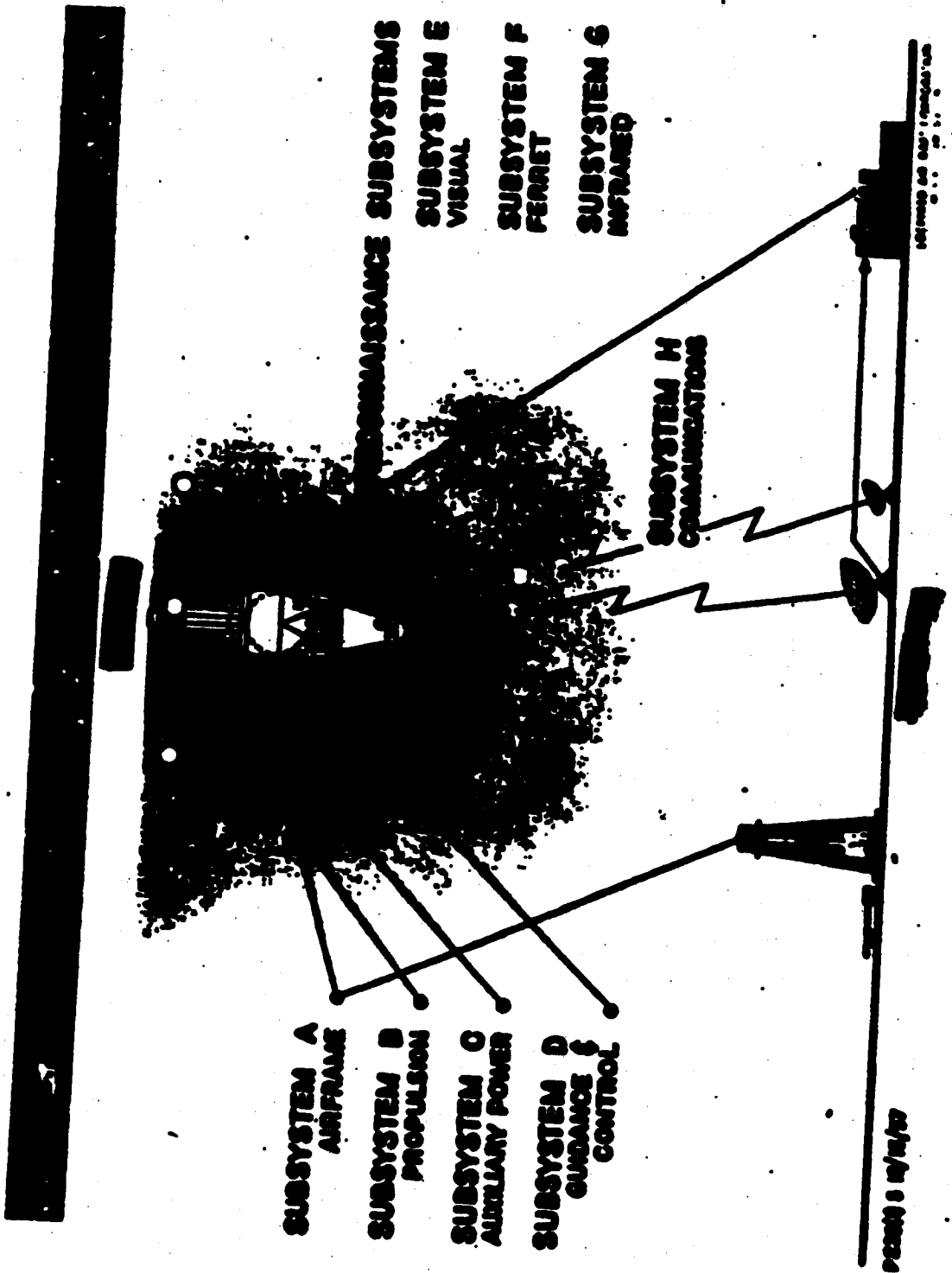
RECOVERY MISSION PROFILE

Process sequence of events for launch of a Thor-based payload recovery satellite from Cocks AFB. As indicated, at launch of the second (satellite vehicle) stage engine, the satellite is pitched over. The recovery pod containing the reconnaissance camera is spun in spin and then is separated from the vehicle to continue on an independent orbit. The pod is controlled in lateral space by its spin. The initial orientation is such that it is 85 degrees south latitude, its longitudinal axis will be parallel to the surface of the earth. At this orientation the pod is also parallel to the surface of the earth as it passes over Soviet territory.



RS-117L GROUND TRACES OF 60-DEGREE ORBITS

Indicates ground traces of a satellite vehicle on an orbit inclined 60 degrees to the plane of the equator. This orbit has been selected for use in operational reconnaissance missions. Shaded areas on the North American continent indicate the range of ground control stations located in the central U.S. east, and northwest and northwest locations.



**SUBSYSTEM A
AIRFRAME**

**SUBSYSTEM B
PROPULSION**

**SUBSYSTEM C
AUXILIARY POWER**

**SUBSYSTEM D
GUIDANCE &
CONTROL**

RECONNAISSANCE SUBSYSTEMS

**SUBSYSTEM E
VISUAL**

**SUBSYSTEM F
FERRET**

**SUBSYSTEM G
INFRARED**

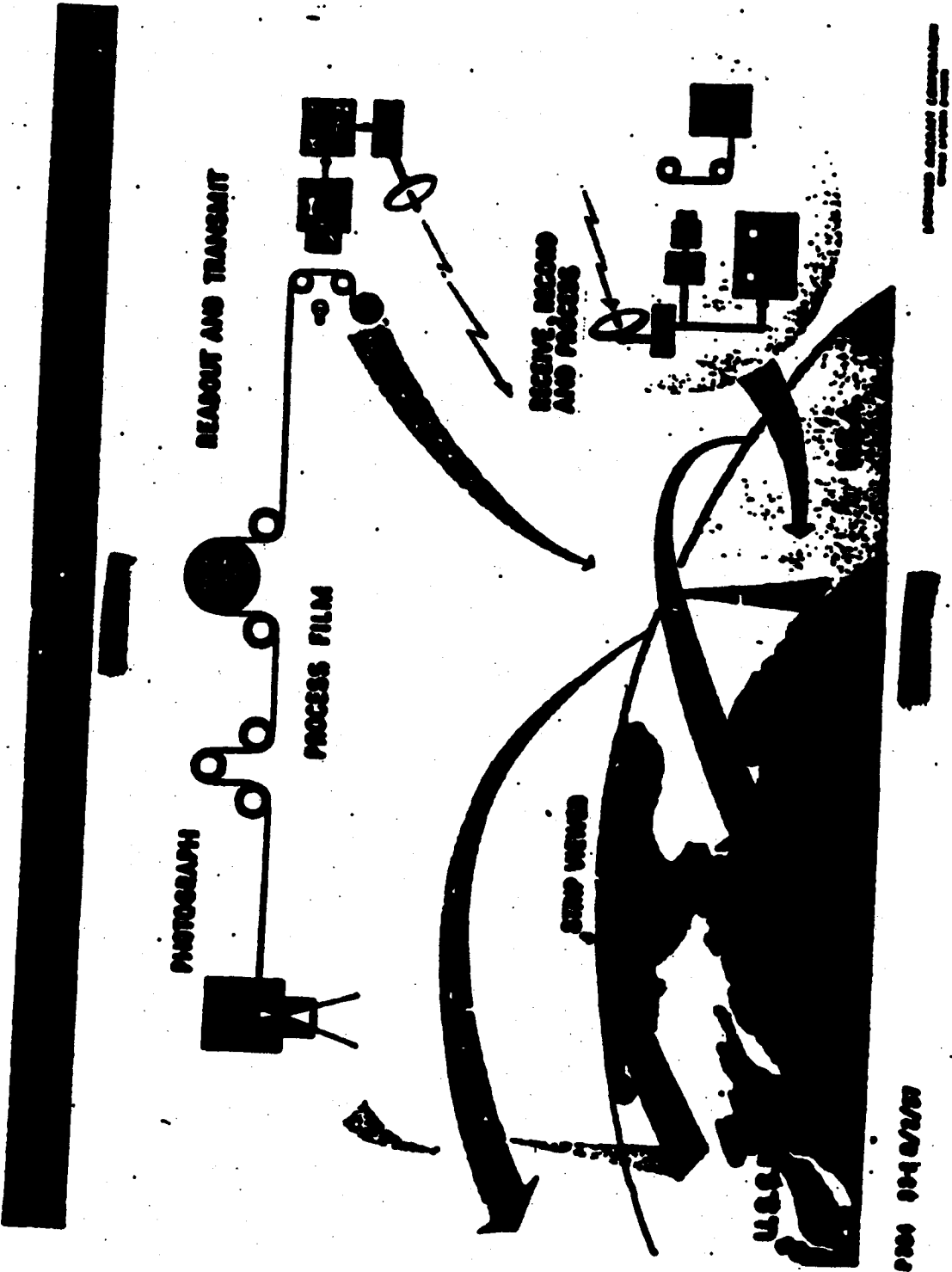
**SUBSYSTEM H
COMMUNICATIONS**

PC-1000 8 10/10/70

RECONNAISSANCE SUBSYSTEMS

THE NS-117L SUBSYSTEMS

Indicates how the Inopen System Controller, for management control purposes, has featured its broad area of responsibility into more readily manageable subsystems.



RS-117L ARS VISUAL RECONNAISSANCE SYSTEM

Illustrates the operation of the satellite vehicle visual reconnaissance system. The Pioneer system, utilizing a 6-inch focal length lens, will photograph a 100-mile-wide strip on each pass over the territory of interest. It is designed to provide 100-foot ground resolution and locate objects (targets) to an accuracy of one mile. Nine days of operation, with an average information gathering period of five minutes per revolution of the satellite, would provide photographic coverage of five minutes per revolution 54 million square miles.

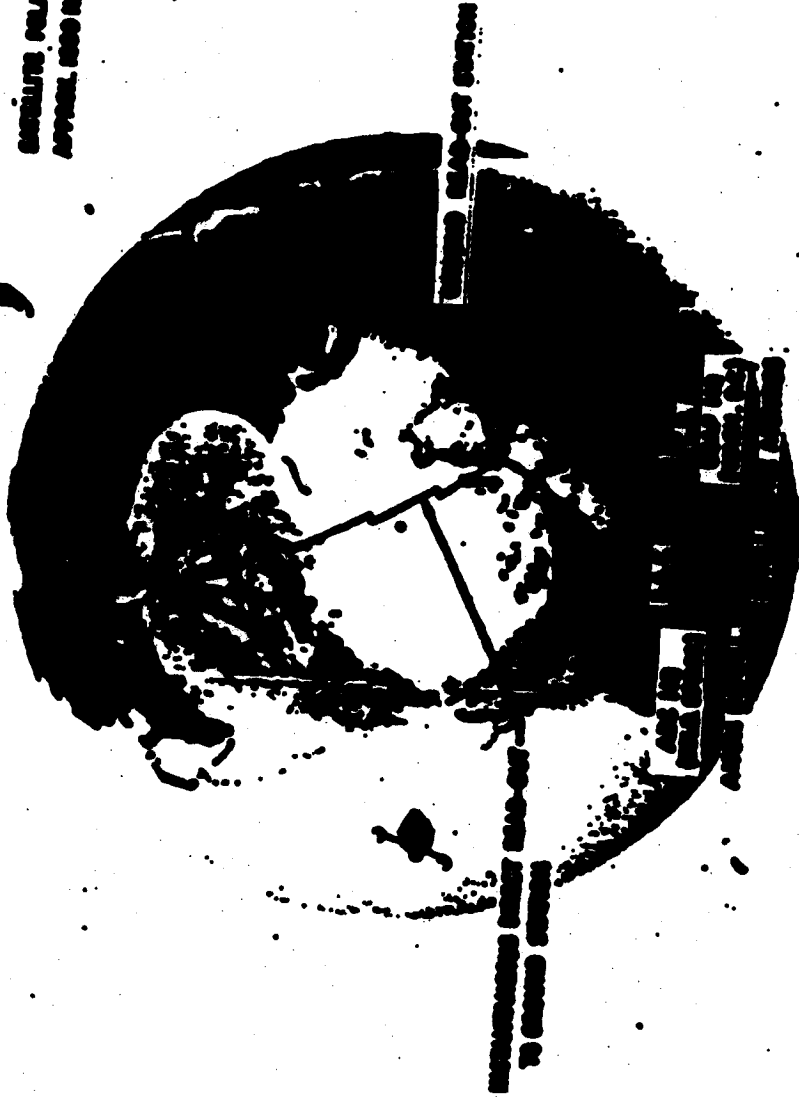
The Advanced visual system, utilizing a 24-inch focal length lens, would cover a 20-mile-wide swath with 20-foot ground resolution and a location accuracy of one-half mile. Programmed coverage of selected targets would be feasible.

The ultimate, or surveillance system, utilizing multiple satellites, would provide daily surveillance of all targets at 17-foot resolutions or better. Each satellite vehicle would have an operational (data-gathering) life of at least one year.

Serving as a subcontractor to Lockheed Missile Systems Division, the Eastman Kodak Company selected by the Columbia Broadcasting System Laboratories is directing the research, development, fabrication and assembly of visual payload components.

REQUIRE POLAR ORBIT ALT.
APPROX. 8000 NUTICAL MILES

REQUIRE POLAR ORBIT ALT.
APPROX. 8000 NUTICAL MILES



REQUIRE POLAR ORBIT ALT.
APPROX. 8000 NUTICAL MILES

**W-117L INFRARED RECONNAISSANCE SYSTEM
ICBM ATTACK WARNING**

Illustration how satellite vehicles equipped with infrared sensing devices could detect, and instantaneously report to a USAF-controlled ground station, the launching of ballistic missiles having an intercontinental range capability.

At a nominal altitude of 1000 nautical miles, infrared sensors would have a mean alert range of 2000 nautical miles; each IR-equipped satellite would scan an area of 12 million square miles every thirty seconds. The launching of an IRBM/ICBM missile within this area would be detected by the IR sensors, and be instantaneously reported to a ground-based monitoring station.

WSH17L INFRARED SURVEILLANCE-RECONNAISSANCE

OPERATIONAL OBJECTIVES

- ICBM ATTACK WARNING
- AIR ACTIVITY INDICATION
- AIRBORNE "STRIKE" DETECTION & TRACKING
- ICBM TRACKING AND PREDICTION

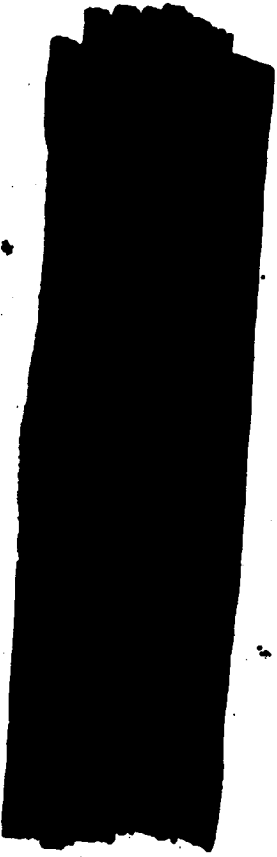
P 803MWS1/67

RS-117L INFRARED RECONNAISSANCE SYSTEM

**A statement of principal operational objectives of the Infrared
Satellite Reconnaissance System, Modified as Subsystem 'G';
Program VIII of the RS-117L Development Plan.**

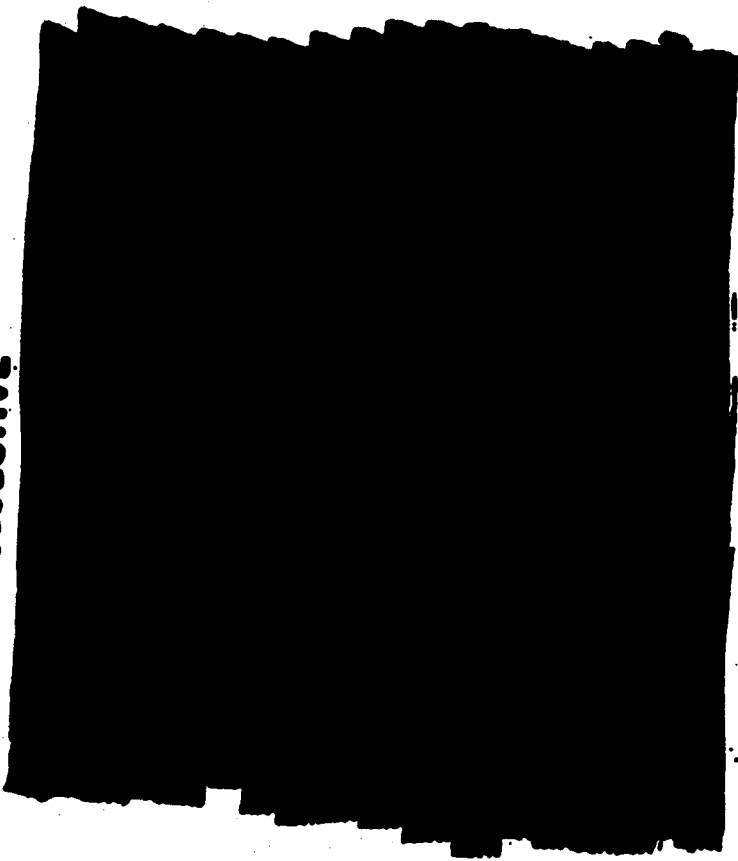
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RS-117L ELECTRONIC RECONNAISSANCE SYSTEM





OBJECTIVE



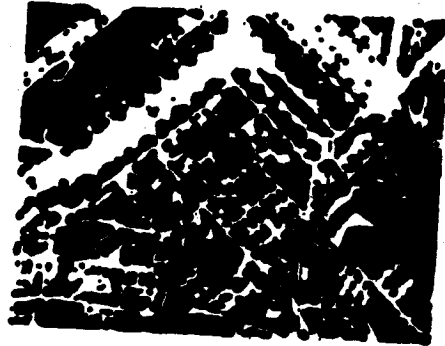
FORM 8-66-57

FOR OFFICIAL USE ONLY (GPO)

FILM IMAGE READOUT

36 INCH LENS

17 FOOT RESOLUTION



ORIGINAL SCENE



**FILM IMAGE
IN SATELLITE**



**IMAGE RECORDED
ON GROUND**

IN SCENE

NO. 488 S. 5th ST. LINCOLN, NE

**ADVANCED VISUAL RECONNAISSANCE SYSTEM
SIMULATED PHOTOGRAPHS-- 36-INCH LENS**

Laboratory-simulated photographs demonstrating the quality of data to be expected from the operation of an Advanced Visual Reconnaissance System (AVRS-117L Program IV) utilizing a 36-inch focal-length camera lens, 17-foot resolution.

The 36-inch lens is in an advanced state of development, with delivery of the first unit scheduled for January 1959.

FILM IMAGE READOUT

6 INCH LENS



ORIGINAL SCENE



**FILM IMAGE
IN SATELLITE**



**IMAGE RECORDED
ON GROUND**

FOR COVER

FOR COVER

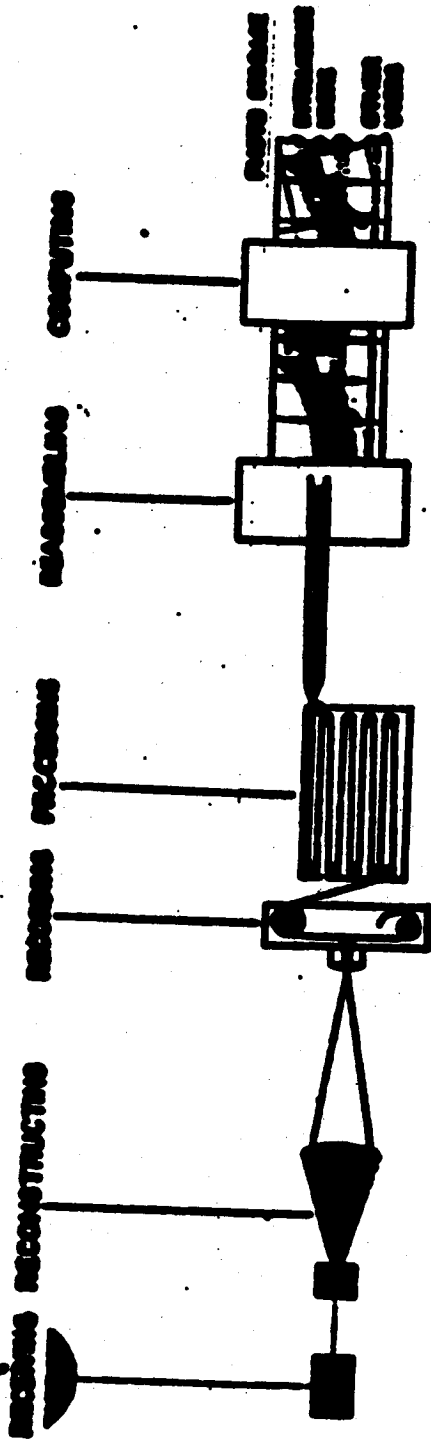
**PIONEER VISUAL RECONNAISSANCE SYSTEM
SIMULATED PHOTOGRAPHS -- 6-INCH LENS**

Presents laboratory-simulated photographs demonstrating the quality of data to be expected from the operation of a Pioneer Visual Reconnaissance System utilizing a 6-inch focal-length camera lens, 100-foot resolution.

Balloon-borne high-altitude flight tests conducted in September 1957 confirm these laboratory simulations.

SECRET.

GROUND RECONSTRUCTION PROCESSES



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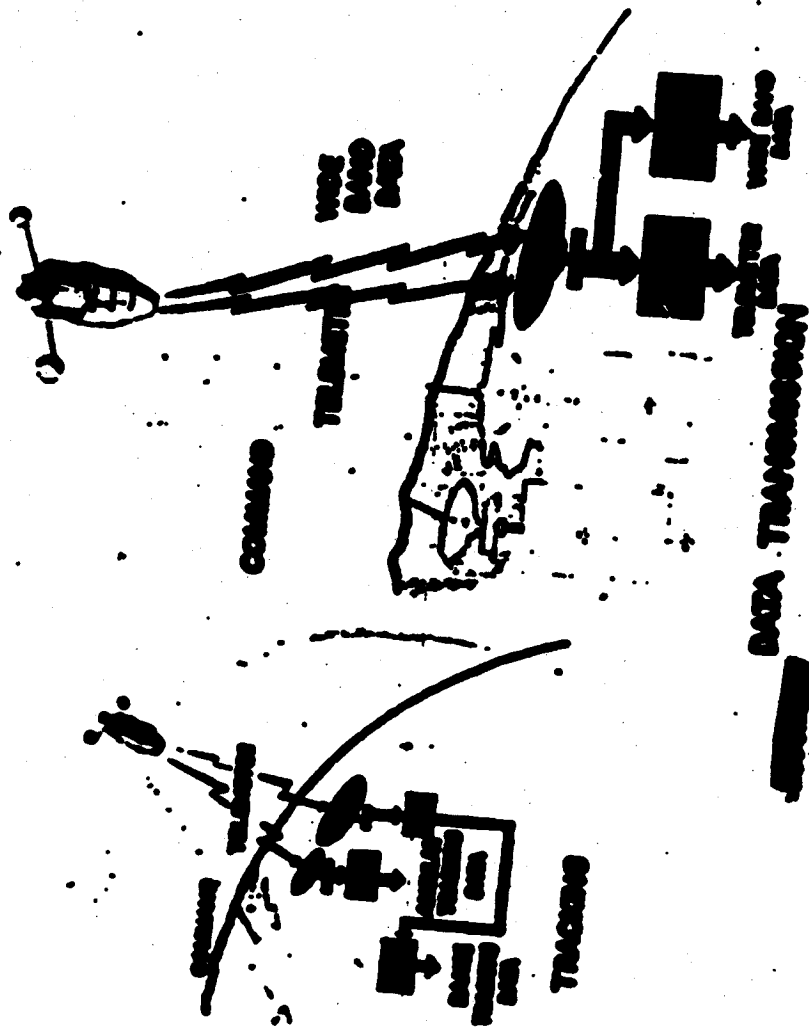
[Redacted]

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**RS-117L VISUAL RECONNAISSANCE SYSTEM
GROUND RECONSTRUCTION PROCESSES**

A schematic diagram of the ground processes required for the Pioneer Visual Reconnaissance System, including data received, reconstruction, and geographic classification.

TYPES OF OPERATION



SECRET
NOFORN

FORM 8-72/77

NS-117L COMMUNICATION SYSTEM

Illustrates the principal areas encompassed by the NS-117L ground-space communication system:

Satellite acquisition (locating the vehicle in space)

Satellite tracking; orbit computation and prediction

Data transmission -- communications from satellite to ground,

ground to satellite, and ground to ground.

The Philco Corporation is serving as the principal subcontractor for this subsystem of NS-117L.

FEATURES FOR SCIENTIFIC APPLICATION

- CAPACITY TO CARRY TWO OR MORE PAYLOADS FOR COINCIDENCE-TYPE EXPERIMENTS
- GUIDANCE ACCURACY TO PLACE VEHICLE INTO ORBITS OF AS LITTLE AS 20-MILE ECCENTRICITY
- POSSIBILITY OF SETTING UP LINKS BETWEEN TWO SATELLITES
- HIGHER ALTITUDES INCLUDING POSSIBILITY OF 70-POUND PAYLOADS AT 2700 MILES
- TRACKING SYSTEM MEASUREMENTS ANGULAR TO 21 MIL AND ALTITUDE TO 1 MIL
- CAPACITY TO CARRY TWO OR MORE PAYLOADS FOR COINCIDENCE-TYPE EXPERIMENTS
- GUIDANCE ACCURACY TO PLACE VEHICLE INTO ORBITS OF AS LITTLE AS 20-MILE ECCENTRICITY
- POSSIBILITY OF SETTING UP LINKS BETWEEN TWO SATELLITES
- HIGHER ALTITUDES INCLUDING POSSIBILITY OF 70-POUND PAYLOADS AT 2700 MILES
- TRACKING SYSTEM MEASUREMENTS ANGULAR TO 21 MIL AND ALTITUDE TO 1 MIL
- PAYLOAD WEIGHT CAPACITY UP TO A TON (MORE FOR ADVANCED VERSIONS)
- SOLAR ORBITS AVAILABLE THROUGH PERFORMANCE MARGIN AND IOC LAUNCHING SITE
- WIDE-BAND DATA LINK FOR TRANSMISSION OF INFORMATION
- ATTITUDE ORIENTATION STABILIZATION TO 21 DEGREE
- NUMBER OF VEHICLES AVAILABLE, ESPECIALLY FOR SMALLER PAYLOADS (DUE TO WS-17L REQUIREMENTS AND USE OF OPERATIONAL MODULE FOR BOOSTER)
- LONG CLIMBING DURATION AFFORDED BY 300-MILE ALTITUDES OR HIGHER
- LONG PAYLOAD OPERATION WITH MODEST POWER THROUGH SOLAR OR CHEMICAL BATTERIES; OR WITH NUCLEAR AUXILIARY POWER PLANTS FOR HIGH POWER
- WIDE-BAND DATA LINK FOR TRANSMISSION OF INFORMATION
- CAPACITY TO CARRY TWO OR MORE PAYLOADS FOR COINCIDENCE-TYPE EXPERIMENTS
- GUIDANCE ACCURACY TO PLACE VEHICLE INTO ORBITS OF AS LITTLE AS 20-MILE ECCENTRICITY
- POSSIBILITY OF SETTING UP LINKS BETWEEN TWO SATELLITES
- HIGHER ALTITUDES INCLUDING POSSIBILITY OF 70-POUND PAYLOADS AT 2700 MILES
- TRACKING SYSTEM MEASUREMENTS ANGULAR TO 21 MIL AND ALTITUDE TO 1 MIL

**RS-117L SATELLITE VEHICLE
SCIENTIFIC RESEARCH APPLICATIONS**

Although Respon System 117L is being developed for military reconnaissance purposes, its excellent large payload-carrying capacity makes it attractive as a medium for geophysical research purposes. The Air Force Cambridge Research Center maintains close liaison with the Respon System Committee on geophysical matters.



NORTHWEST STATION

NORTHEAST STATION

CENTRAL STATION

COOKE AFB

HAWAII

ARFC-LAUNCH
TRACKING RANGE

FIGURE 10 10/7/57

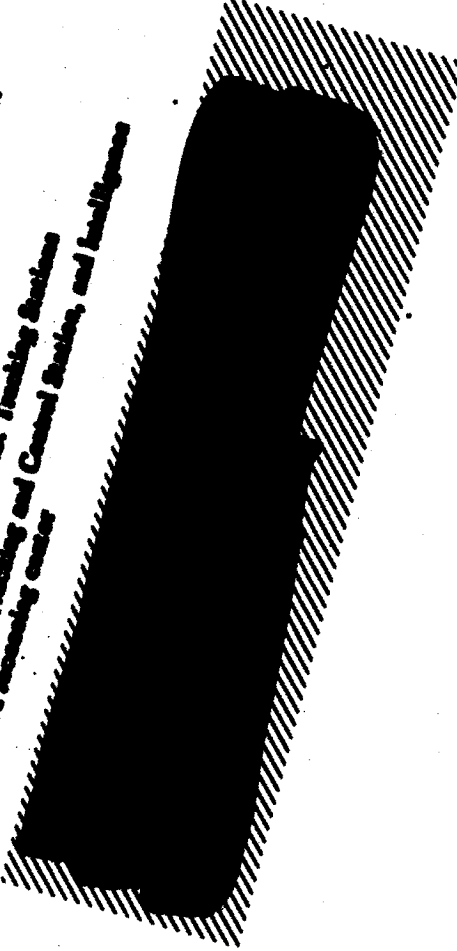
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RE-117L FACILITY REQUIREMENTS

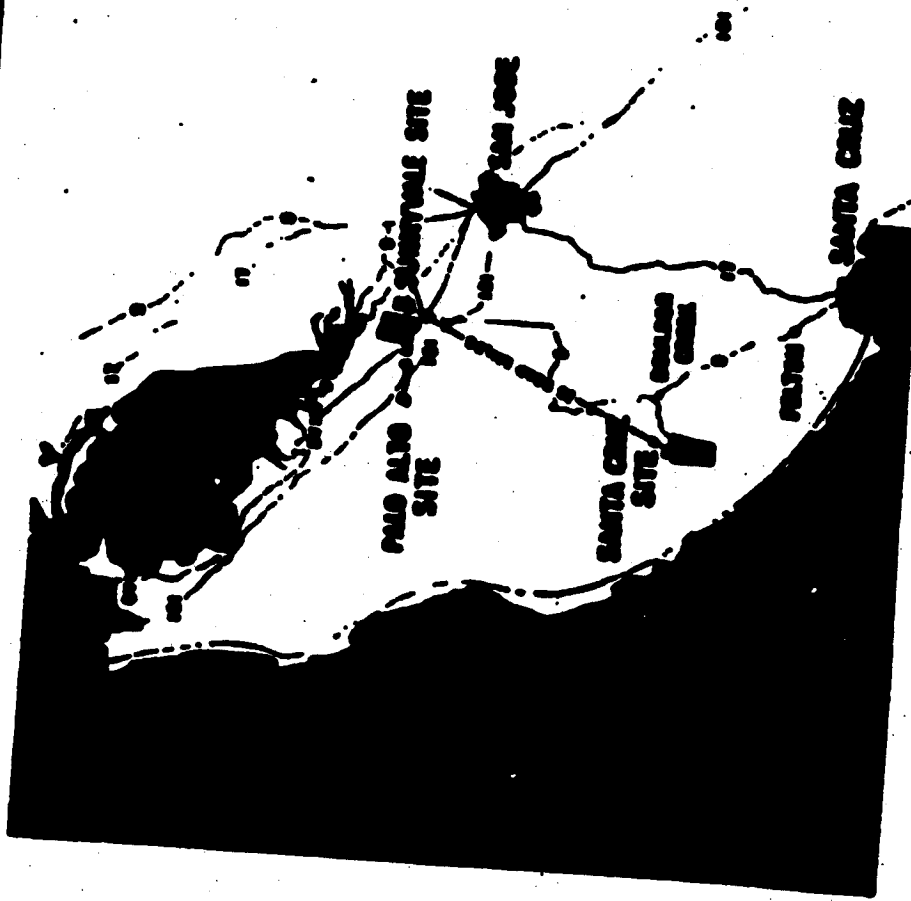
A list of the principal facilities required for the flight testing and operation of the advanced reconnaissance system.

New Air Force facilities required for the flight testing and

- Pacific (Operational) Training Station
- Mountain and Northwest U.S. Training Station
- Central U.S. Training and Control Station, and Intelligence Data-Processing center



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LOCKHEED AIRCRAFT CORPORATION

MISSILE SYSTEMS DIVISION

SAN FRANCISCO BAY AREA FACILITIES

A map of the San Francisco Bay Area showing the location of recently constructed Lockheed facilities for the exclusive use of the Missile Systems Division. These facilities, comprising approximately 600,000 square feet of shop and office space and a capital investment in excess of 20 million dollars are:

Palo Alto -

**Research and Development Laboratories
MS-117L Project Office**

Sunnyvale -

**Division Headquarters
Laboratory, In-flight Test Facilities; Prototypes Fabrication
Santa Cruz Mountains -**

An integrated facility for all types of business tests.

Additional facilities are under construction, or in the advanced planning stage to provide total floor space in excess of one million square feet. A complete manufacturing facility is also operated at Van Nuys, California.

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MS-171 SYSTEM DEVELOPMENT MANAGEMENT

WFO AF SMO
AF SMO
AF SMO

LOCKHEED AIRCRAFT CORP
MISSILE SYSTEMS DIV
WFO DIVISION

PRINCIPAL SUBCONTRACTORS

PROPULSION

- HALL AIRCRAFT CORP
- AIRCRAFT-CORPORATION CORP

AUXILIARY POWER

- GEORGE CORP
- HALL AIRCRAFT CORP
- HALL AIRCRAFT CORP

GUIDANCE & CONTROL

- GEORGE CORP
- HALL AIRCRAFT CORP
- HALL AIRCRAFT CORP

USUAL RECONNAISSANCE

- HALL AIRCRAFT CORP
- HALL AIRCRAFT CORP
- HALL AIRCRAFT CORP

ARMED CORP

- GEORGE CORP
- HALL AIRCRAFT CORP
- HALL AIRCRAFT CORP

WFO AF SMO

ASSOCIATE CONTRACTORS

- GEORGE CORP
- HALL AIRCRAFT CORP
- HALL AIRCRAFT CORP
- HALL AIRCRAFT CORP
- HALL AIRCRAFT CORP
- HALL AIRCRAFT CORP

FIRST RECONNAISSANCE



- GEORGE CORP
- HALL AIRCRAFT CORP
- HALL AIRCRAFT CORP
- HALL AIRCRAFT CORP
- HALL AIRCRAFT CORP

GROUND-SPACE COMMUNICATIONS

- GEORGE CORP
- HALL AIRCRAFT CORP
- HALL AIRCRAFT CORP

OPERATIONS

- GEORGE CORP
- HALL AIRCRAFT CORP
- HALL AIRCRAFT CORP

WFO AF SMO

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MS-117L SYSTEM DEVELOPMENT MANAGEMENT

Indicates the relationships between the Weapon System Project Office, the Weapon System Contractor, and satellite contractors. Also shown are the principal subcontractors working under the technical direction of Lockheed Missile Systems Division, the Weapon System Contractor. Chief among these are

- | | |
|--|---|
| Bell Aircraft Corporation | Satellite Rocket Engine Development |
| Eastman Kodak Company,
Columbia Broadcasting System | Visual Reconnaissance System Research and Development |
| Phillips Corporation | Ground-Space Communications System Research and Development |
| [REDACTED] | [REDACTED] |
| General Electric Company | Payload Recovery Capsule |
| Avco-General Corporation,
Eastman Kodak Company | Infrared Subsystem Development |
| Felchold Camera & Instrument Corporation | Aerial Camera for Photo-physical Recovery Program |

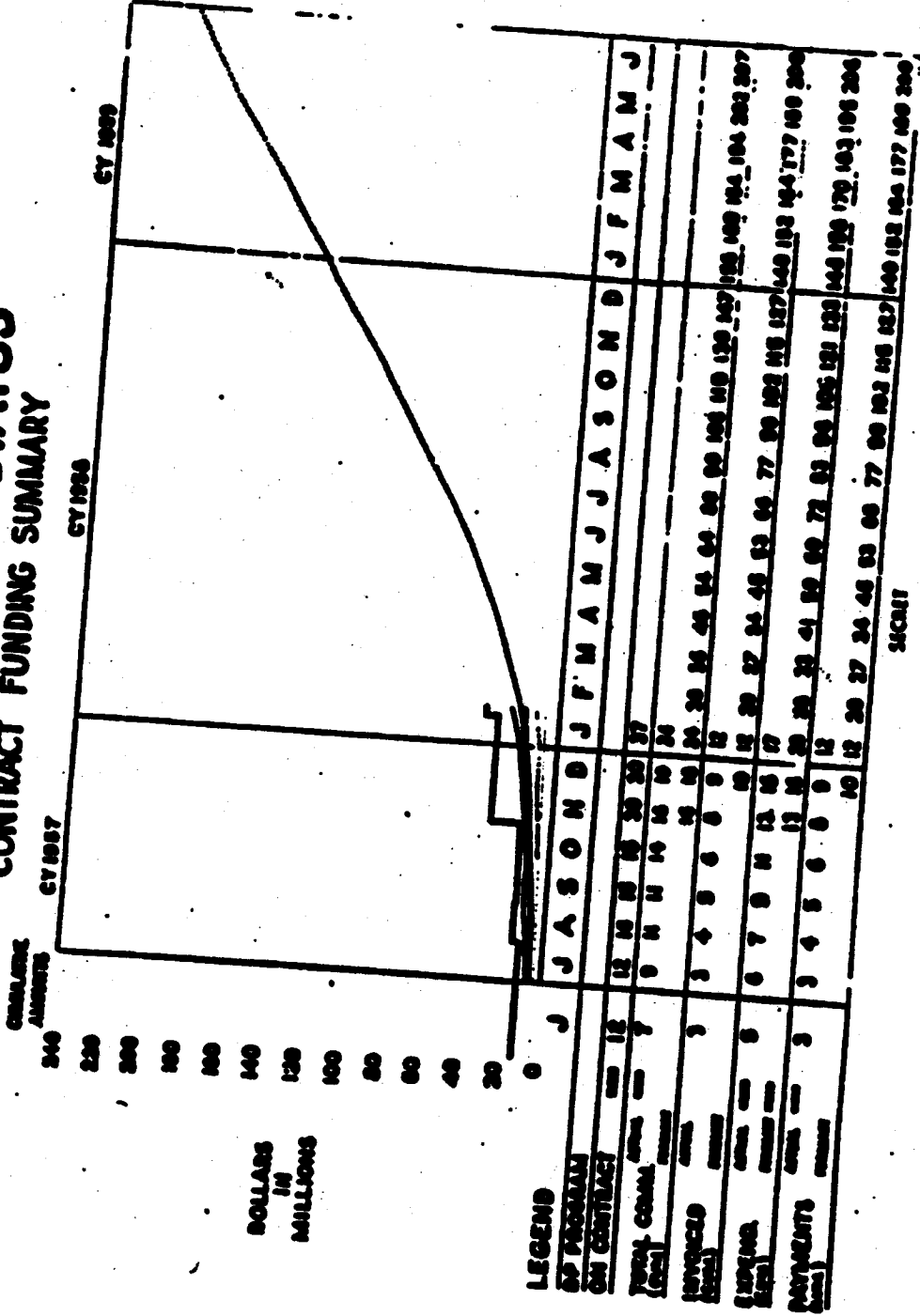
The following industrial concerns are working directly for the U.S. Atomic Energy Commission in the development of long-duration (radioisotope and small nuclear reactor) auxiliary power systems for use in the ARS satellite vehicles: North American Aviation; The Martin Co.; Thompson Products.

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REV. 2/4/76
SECRET

FINANCIAL MGMT. STATUS CONTRACT FUNDING SUMMARY



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RS-117L WEAPON SYSTEM CONTRACTOR'S FUNDING PROGRAM

Summarizes the principal financial aspects of Contract AF 04(647)-97, covering the period 1 October 1956 through 30 June 1959. As indicated, funds totaling \$31 million had been placed on contract through December 1957. An additional \$7 million were provided in January 1958 by Letter Contract AF 04(647)-101. Cumulative expenditures plus outstanding commitments as of 31 December 1957 totaled \$17.6 million. Projected expenditures are only indicative, as details of the accelerated program remain subject to negotiation.

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