

[REDACTED]

a/s

ADVANCED RECONNAISSANCE SYSTEM

Short Title ARS: WS-117L
Official Nickname "New Horizon"

1679

The primary 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
Enemy industrial war capabilities.

The WS-117L program development plan embodies the placement of a series of unmanned satellites in prescribed orbits about the earth. The satellites will possess a capability for transmitting acquired information to supporting ground stations in a form which permits subsequent data processing and analyses for operational and scientific uses. The complete system incorporates the launching, tracking, data gathering, data processing, interpretation and dissemination functions of the ground support complex.

Operational vehicles will be launched from within United States territory. The ICBM Atlas will supply the primary propulsion for ascent to an altitude of approximately 300 statute miles, where a substantially circular orbit will be established by means of the satellite vehicle rocket engine.

Key R&D actions leading to initiation of the program were:

March 1955	GOR 80 (SA-2C) issued
October 1955	System Requirement established
March 1956	Evaluation of Design Study completed
April 1956	Development Plan prepared
August 1956	Hq. USAF approval of Development Plan;
October 1956	Development Directive issued Letter Contract AF 04(647)-97 issued to Lockheed Aircraft Corp., Missile Systems Division, as Weapon System Contractor.

[REDACTED]

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KEY CHARACTERISTICS

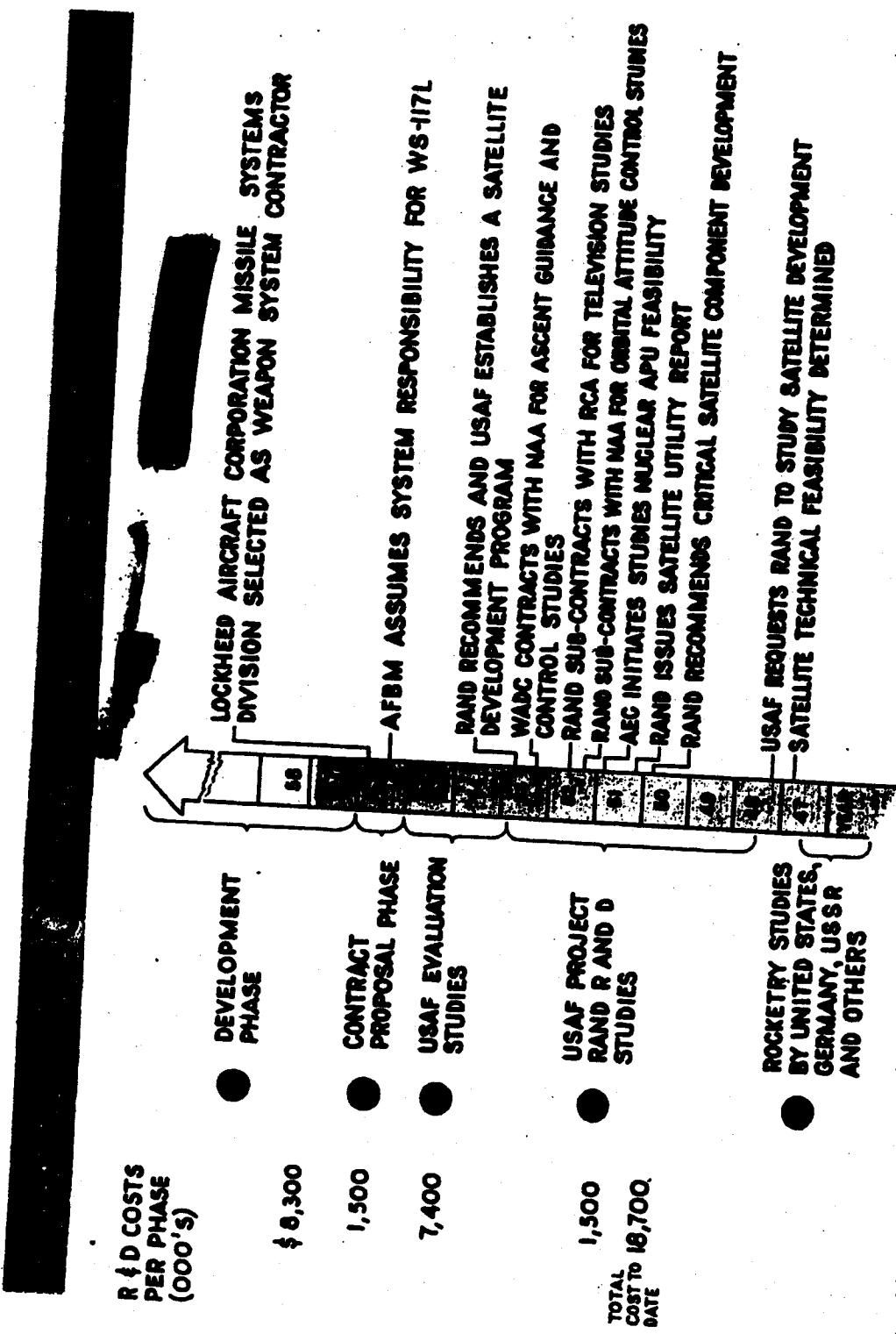
- COMPLETE TARGET AREA COVERAGE
- ACCURATE SPECIFIC TARGET LOCATION
- CONTINUOUS TARGET AREA SURVEILLANCE
- INSTANTANEOUS WARNING OF ICBM ATTACK
- NEARLY INVULNERABLE TO ATTACK OR COUNTER MEASURES
- NO AIRCREWS
- NO OVERSEAS BASES
- INVADES NO AIRSPACE
- HIGH DATA RATE
- ECONOMICAL PER UNIT OF DATA
-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

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LOCKHEED AIRCRAFT CORPORATION
Aerospace Systems Division

KEY CHARACTERISTICS OF IITL

A LISTING OF 12 OUTSTANDING FEATURES OF WEAPON SYSTEM IITL, AS
PREPARED BY THE AIR FORCE BALLISTIC MISSILES DIVISION, HQ., AIR
RESEARCH AND DEVELOPMENT COMMAND.



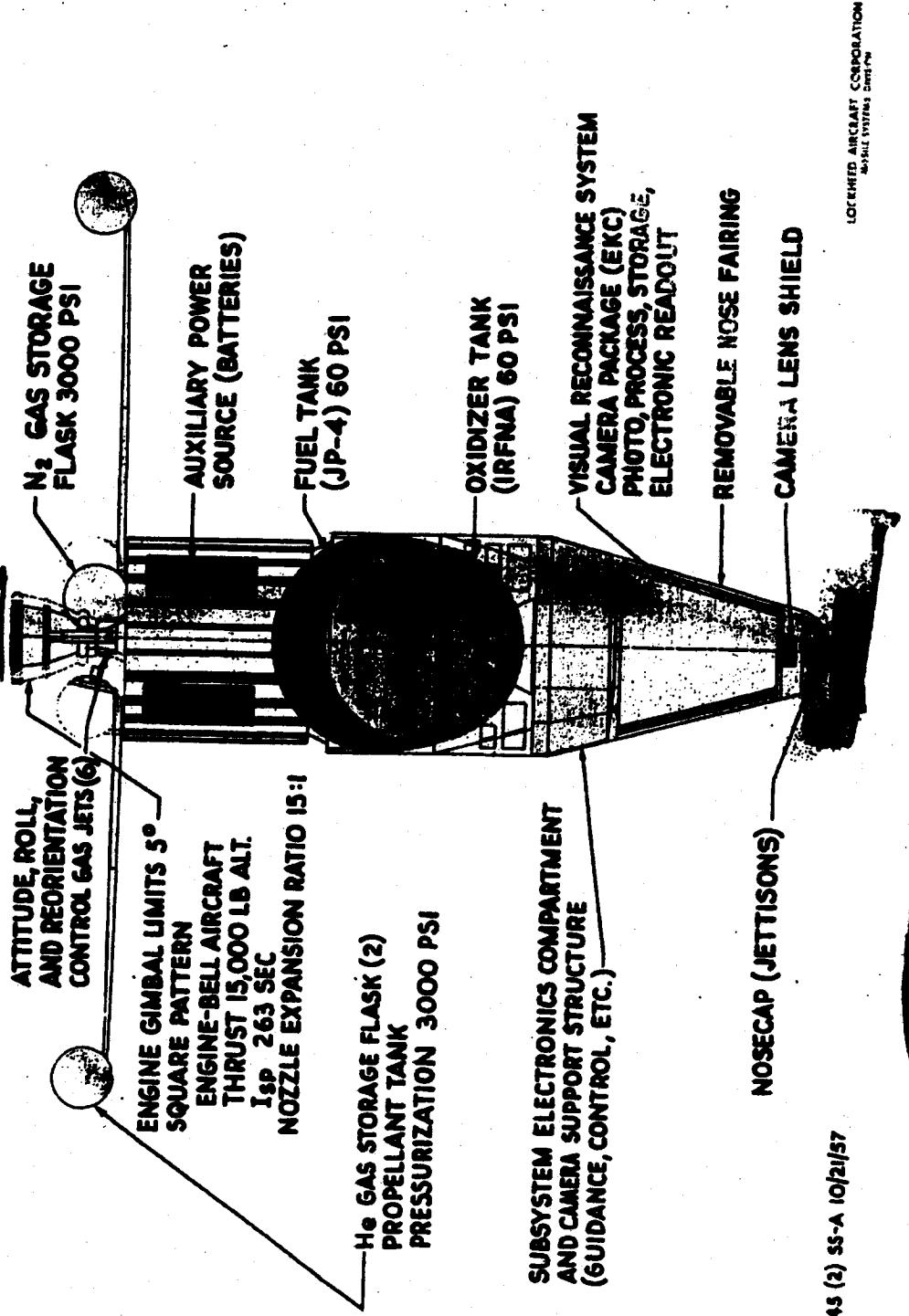
ADVANCED RECONNAISSANCE SYSTEM
- HISTORICAL EVOLUTION -

TRACES EVOLUTION OF THE ADVANCED RECONNAISSANCE SYSTEM FROM
THE FEASIBILITY STUDY PHASE BEGINNING IN 1946, THROUGH SEPT., 1957,
INDICATING TOTAL AIR FORCE EXPENDITURES FOR THIS PURPOSE TO THE
LATTER DATE.

W/S CONTRACTOR'S PROPOSAL, 10/28/57

CR#57	CR 1958	CR 1959	CR 1960	CR 1961	CR 1962	CR 1963	CR 1964	CR 1965
RESEARCH AND ANALYSIS								
SYSTEM DEVELOPMENT								
SUBSYSTEM DEVELOPMENT								
FLIGHT TESTS								
1ST FLT WITH ORBITAL OBJECTIVE								
1ST ACQUISITION OF RECOMM. DATA								
PHASE-IN OF OPERATIONAL APU								
ICBM WARNING NET								
TEST ORBITAL TRACT								
KALAN								
VIA TEL								
RET								

LOCKHEED AIRCRAFT CORPORATION
MOBILE SYSTEMS DIVISION



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LOCKHEED AIRCRAFT CORPORATION
Aviation Systems Division

WS-117L ORBITAL THRUST ENGINE

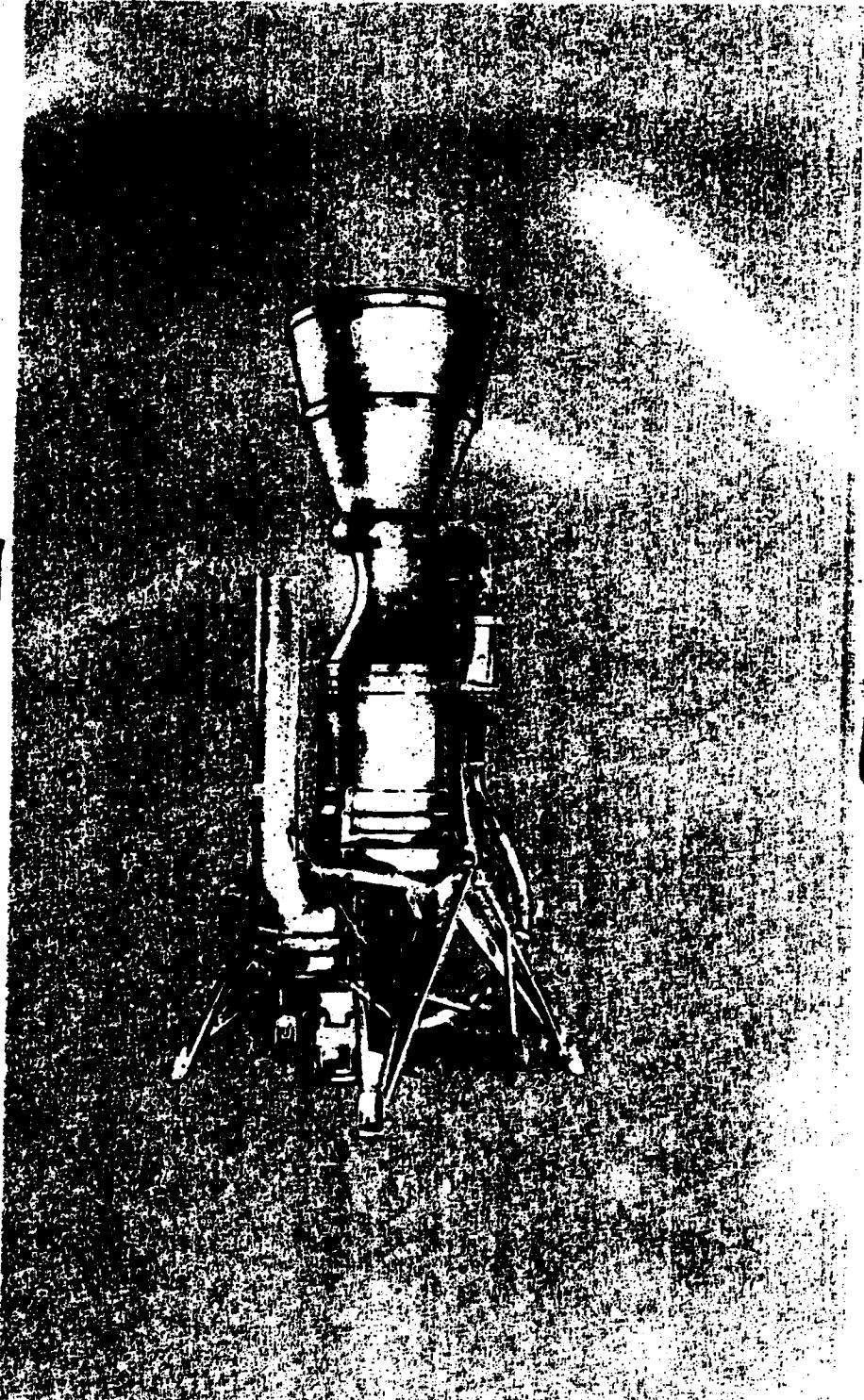
**HOTOGRAPH OF MOCKUP OF BELL AIRCRAFT CORPORATION'S "HUSTLER"
ENGINE WHICH WILL BE USED TO ACCELERATE THE WS-117L SATELLITE
EHICLE TO ORBITAL VELOCITY.**

PERFORMANCE SPECIFICATIONS:

15,150 LBS. THRUST IN A VACUUM

MINIMUM SPECIFIC IMPULSE .. 263 sec

MAXIMUM SPECIFIC IMPULSE .. 269 sec



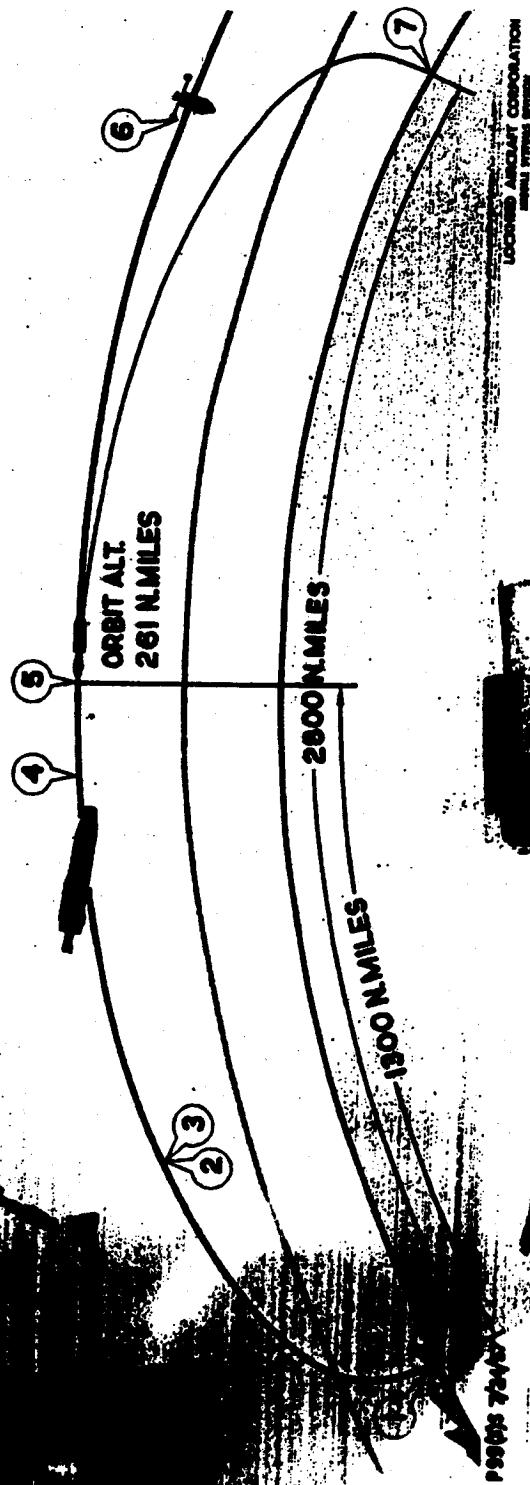
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LOCKHEED AIRCRAFT CORPORATION
PHOTOG SYSTEMS DIVISION

TAKE OFF CONDITION

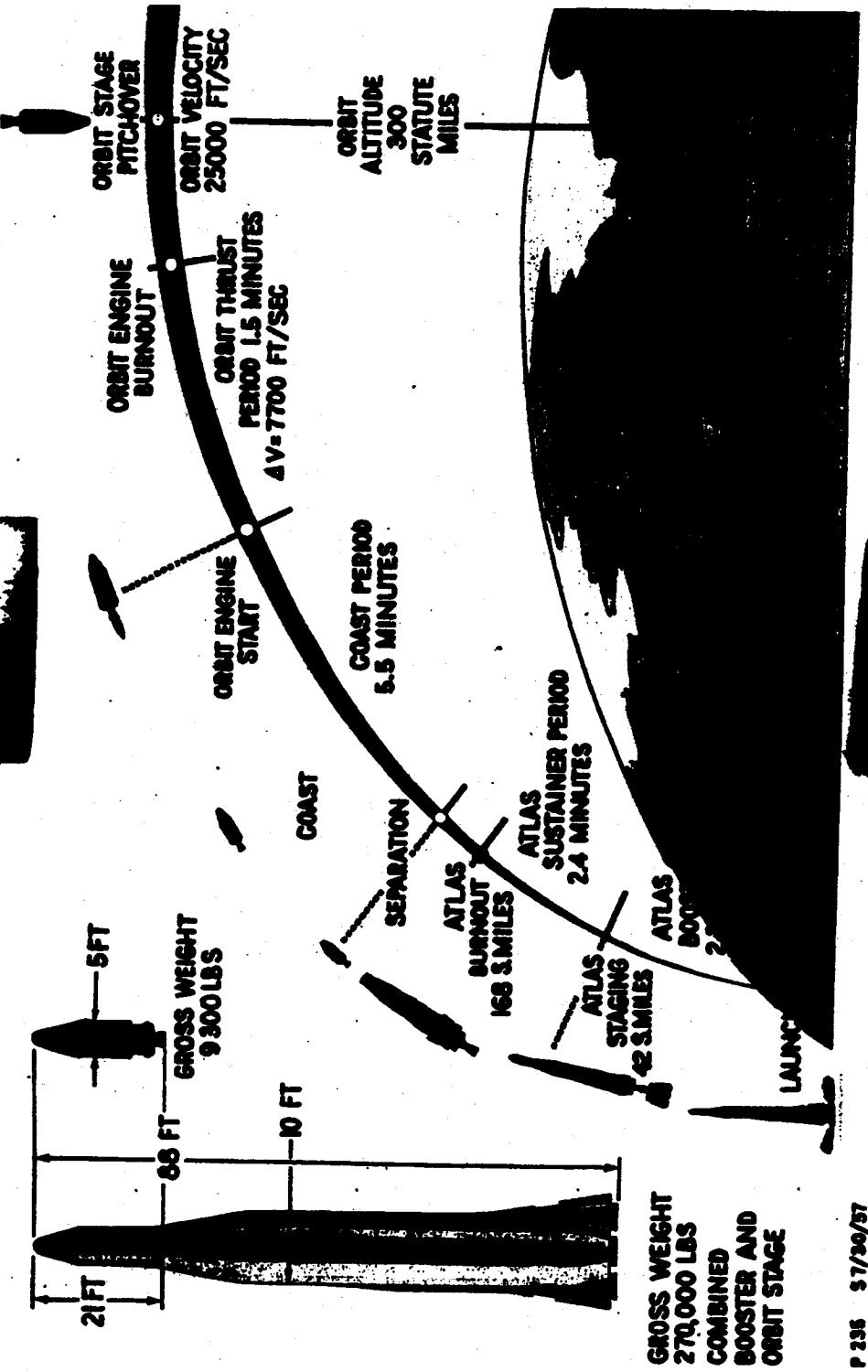
OVERALL LENGTH - 87.4 FT.
NOSE CONE DIAMETER - 10 FT.
SATELLITE DIAMETER - 5 FT.
SATELLITE LENGTH - 21.0 FT.

- ① LAUNCH
- ② END POWERED COAST
- ③ SEPARATION OF SATELLITE
- ④ BEGIN COAST
- ⑤ ORBITING POSITION
- ⑥ FINISH COAST
- ⑦ ATTITUDE



LOCKHEED AIRCRAFT CORPORATION
PHOENIX DIVISION

RECORDED BY
S-117. VEHICLE TRAJECTORY
PRESENTS TAKE-OFF DIMENSIONS OF THE
ATLAS BOOSTER, AND INDICATES KEY POINTS OF
LAUNCH TO ATTAINMENT OF ORBITAL ALTITUDE AND ATTITUDE.

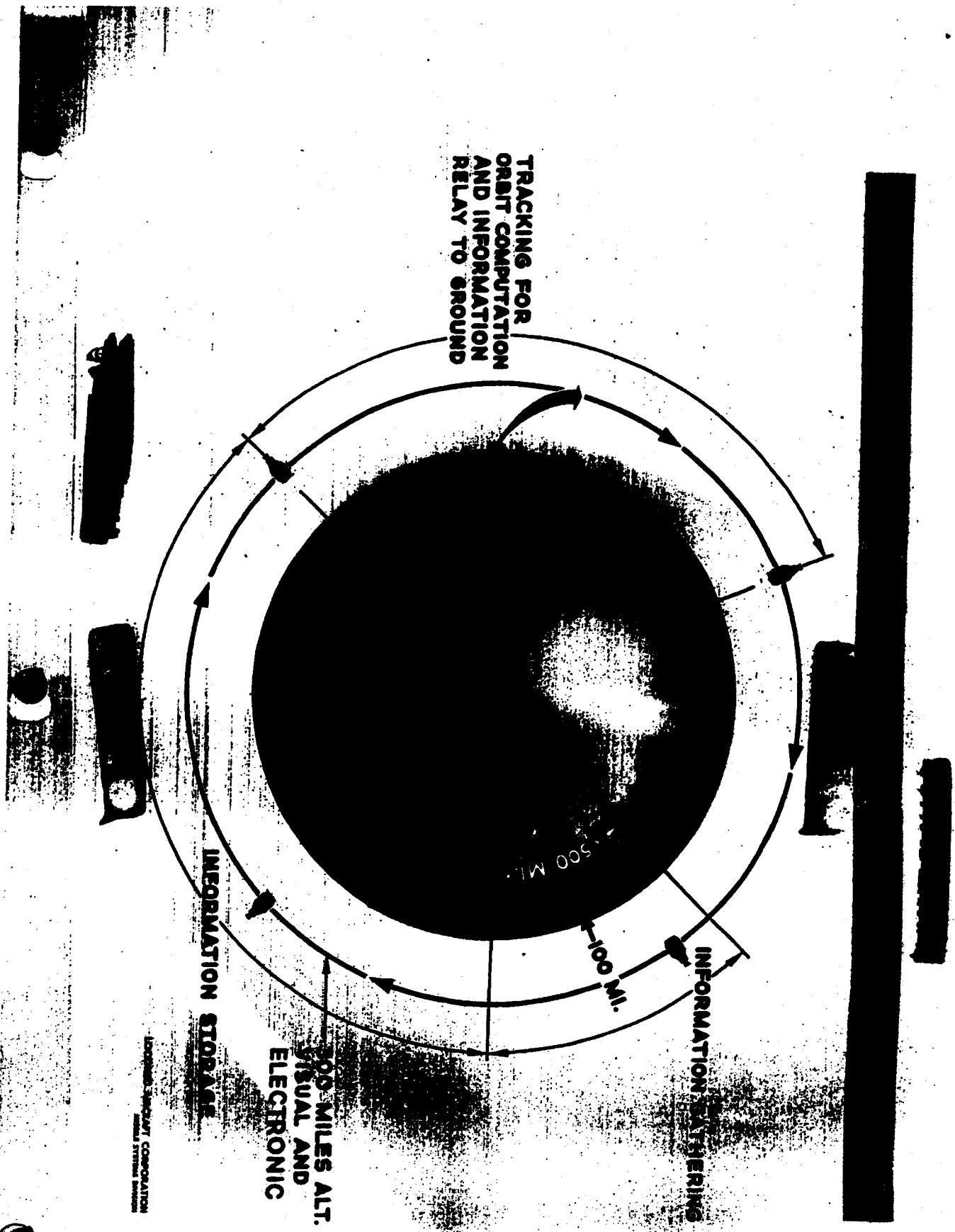


WS-117L TRAJECTORY TO ORBIT

**A MORE DETAILED PRESENTATION OF FLIGHT LAUNCH PHASE, INDICATING
GUIDANCE AND CONTROL PROBLEMS WHICH MUST BE RESOLVED IN
ORDER TO ACHIEVE ORBITAL CAPABILITY.**

LOCKHEED AIRCRAFT CORPORATION
MAIL SYSTEM DIVISION

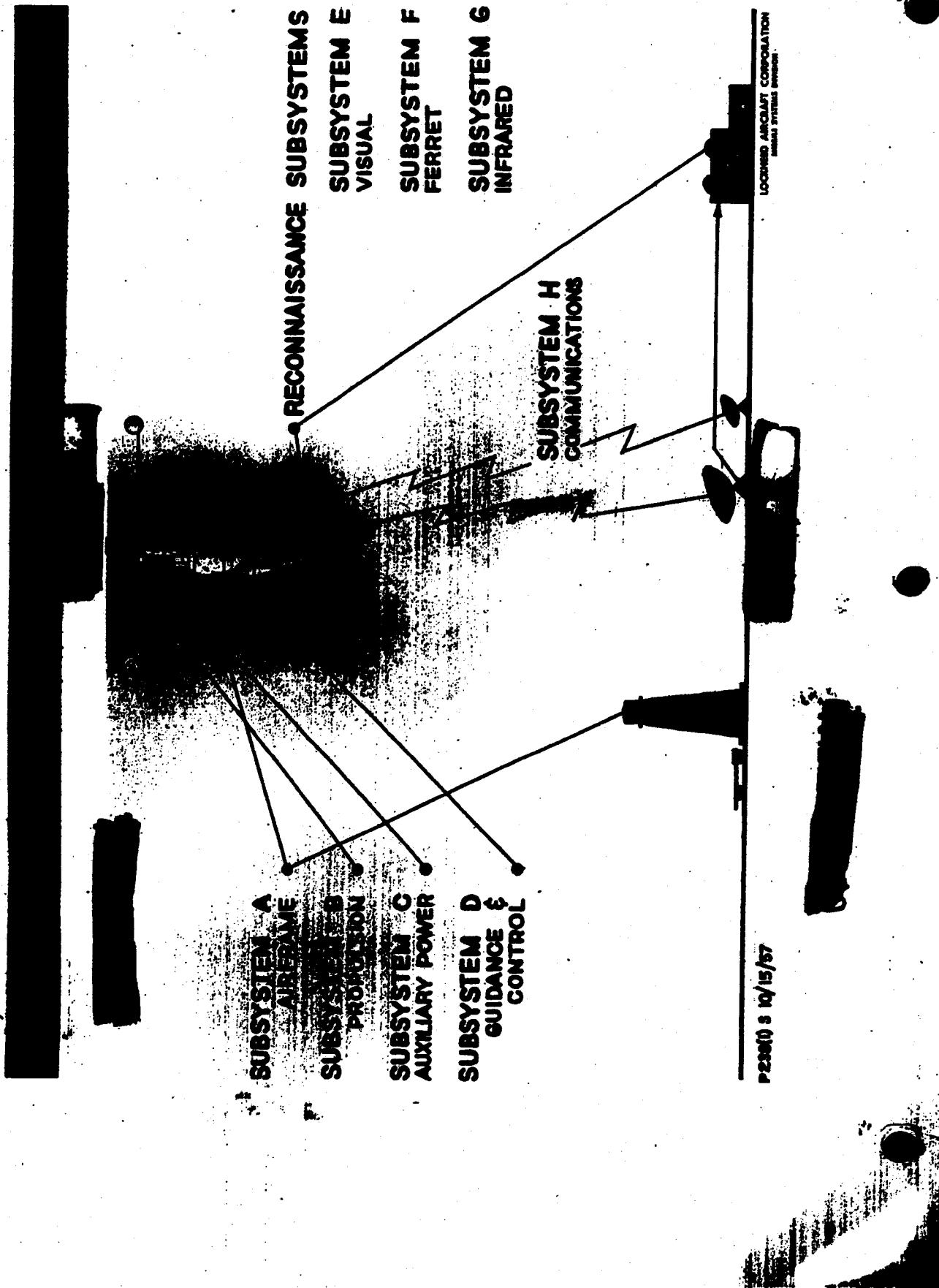
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BY, THEN RELAY
LOCATED CONTROL STATION

EE ORBIT

Demonstrate the ability to provide
MASSANCE COVERAGE TO THE CONUS
ENABLING SECURE "READ-OUT" OF INTELLIGENCE
STATIONS LOCATED WITHIN THE CONTINENTAL UNITED STATES
TERRITORIES.



VEHICLE-BORNE PROCESSOR

PROCESSING

PHOTOGRAPHING

STORING

READING OUT

LOGIC

GROUND

VS-117L VISUAL RECONNAISSANCE SYSTEM
VEHICLE-BORNE PROCESSES

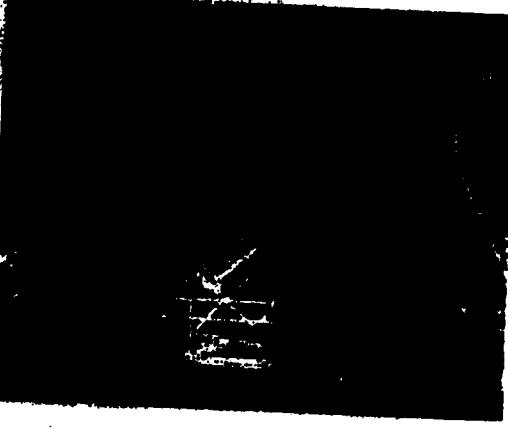
A SCHEMATIC DIAGRAM OF THE SATELLITE VEHICLE-BORNE OPERATING
PROCESSES REQUIRED FOR VISUAL (PHOTOGRAPHIC) RECONNAISSANCE.

SERVING AS A SUBCONTRACTOR TO LOCKHEED MISSILE SYSTEMS DIVISION,
THE EASTMAN KODAK COMPANY ASSISTED BY THE COLUMBIA BROAD-
CASTING SYSTEM LABORATORIES IS DIRECTING THE RESEARCH, DEVEL-
OPMENT, FABRICATION AND ASSEMBLY OF VISUAL PAYLOAD COMPONENTS.

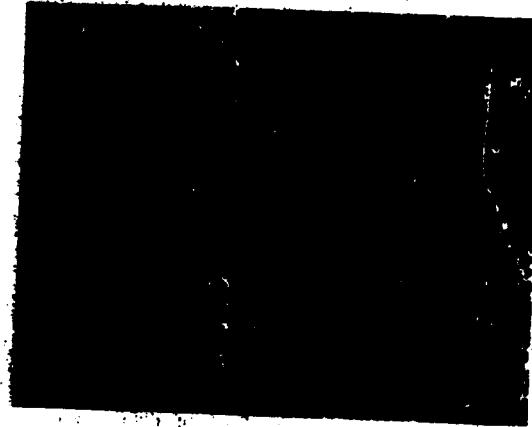
SCENE READING

6 INCH LENS

100-FOOT RESOLUTION



ORIGINAL SCENE



FILM IMAGE
IN SATELLITE

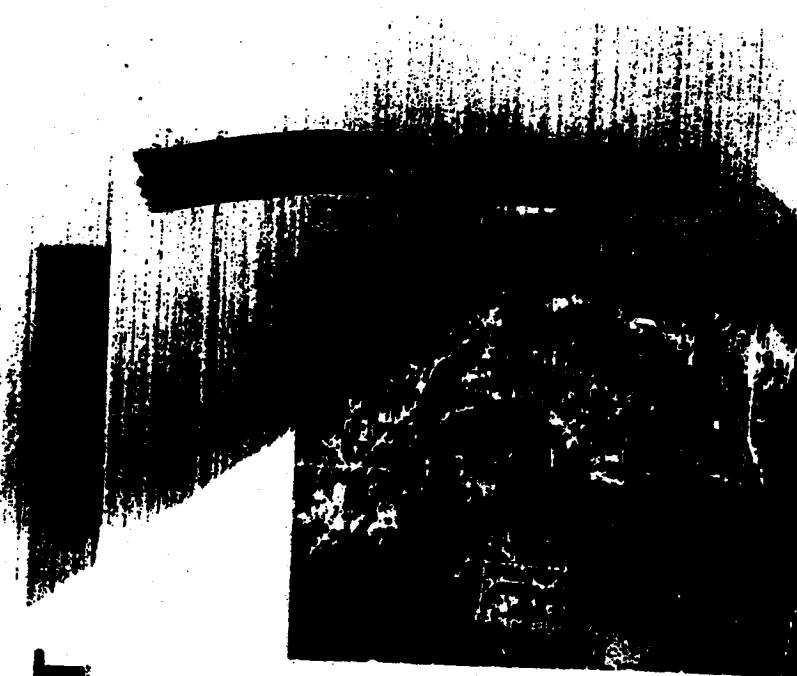


IMAGE RECORDED
ON GROUND

PIONEER VISUAL RECONNAISSANCE SYSTEM
SIMULATED PHOTOGRAPHIC - 6-INCH LENS

RECENT 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 SEP-
TEMBER 1957 CONFIRM THESE LABORATORY SIMULATIONS.

**36 INCH LENS
17-FOOT RESOLUTION**



ORIGINAL SCENE



**FILM IMAGE
IN SATELLITE**



**IMAGE RECORDED
ON GROUND**

**ADVANCED VISUAL RECOGNITION SYSTEM
WITH PHOTOCAMERA**

THE 36-INCH LENS IS IN AN ADVANCED STATE OF DEVELOPMENT.
PHOTOGRAPHS ARE BEING TESTED FROM THE
DIGITAL RECOGNITION SYSTEM (VS-11/L-1)
36-INCH FOCAL LENGTH LENS CAMERA, 17-FOOT, 360°.

THE 36-INCH LENS IS IN AN ADVANCED STATE OF DEVELOPMENT.
PHOTOGRAPHS ARE BEING TESTED FROM THE
DIGITAL RECOGNITION SYSTEM (VS-11/L-1)
36-INCH FOCAL LENGTH LENS CAMERA, 17-FOOT, 360°.

OBJECTIVE

THE OBJECTIVE OF ELECTRONIC RECONNAISSANCE IS TO DETECT AND OBTAIN INFORMATION ON ELECTRONIC EMITTERS IN AREAS WHERE SUCH INFORMATION DOES NOT NOW EXIST.

ADVANTAGES OF SATELLITE FERRET SYSTEM OVER CONVENTIONAL

FERRET TECHNIQUES:

- COMPLETE WORLD COVERAGE
- CONTINUOUS UNATTENDED SURVEILLANCE
- ALL WEATHER OPERATION
- RELATIVE FREEDOM FROM CAMOUFLAGE
- ABILITY TO IDENTIFY HIGH PRIORITY INSTALLATIONS BY ELECTRONIC SIGNATURES
- RAPID RECOVERY AND DISSEMINATION OF ELINT INFORMATION

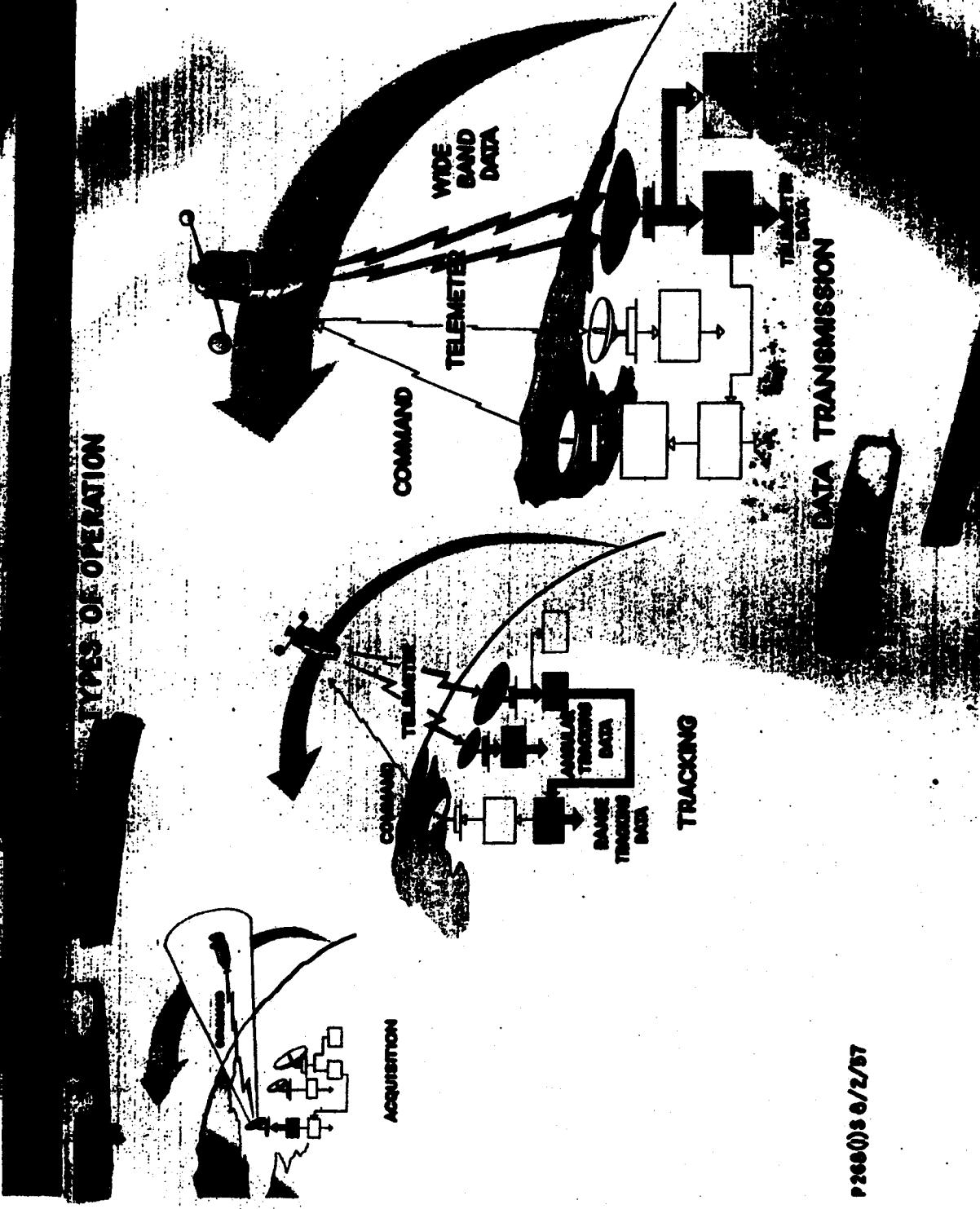
INFORMATION
PIKE DRIVING

LOCATED AIRPORT CORPORATION

airline systems division

P 2039WZI/57

STATEMENT OF PRINCIPAL OPERATIONAL OBJECTIVES FOR THE INTELLIGENCE
RED SATELLITE RECONNAISSANCE SYSTEM, IDENTIFIED AS SUBSYSTEM
"G", PROGRAM VIII OF THE VS-117L DEVELOPMENT PLAN.



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WS-117L COMMUNICATION SYSTEM

ILLUSTRATES THE PRINCIPAL AREAS ENCOMPASSED BY THE WS-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 WS-117L.

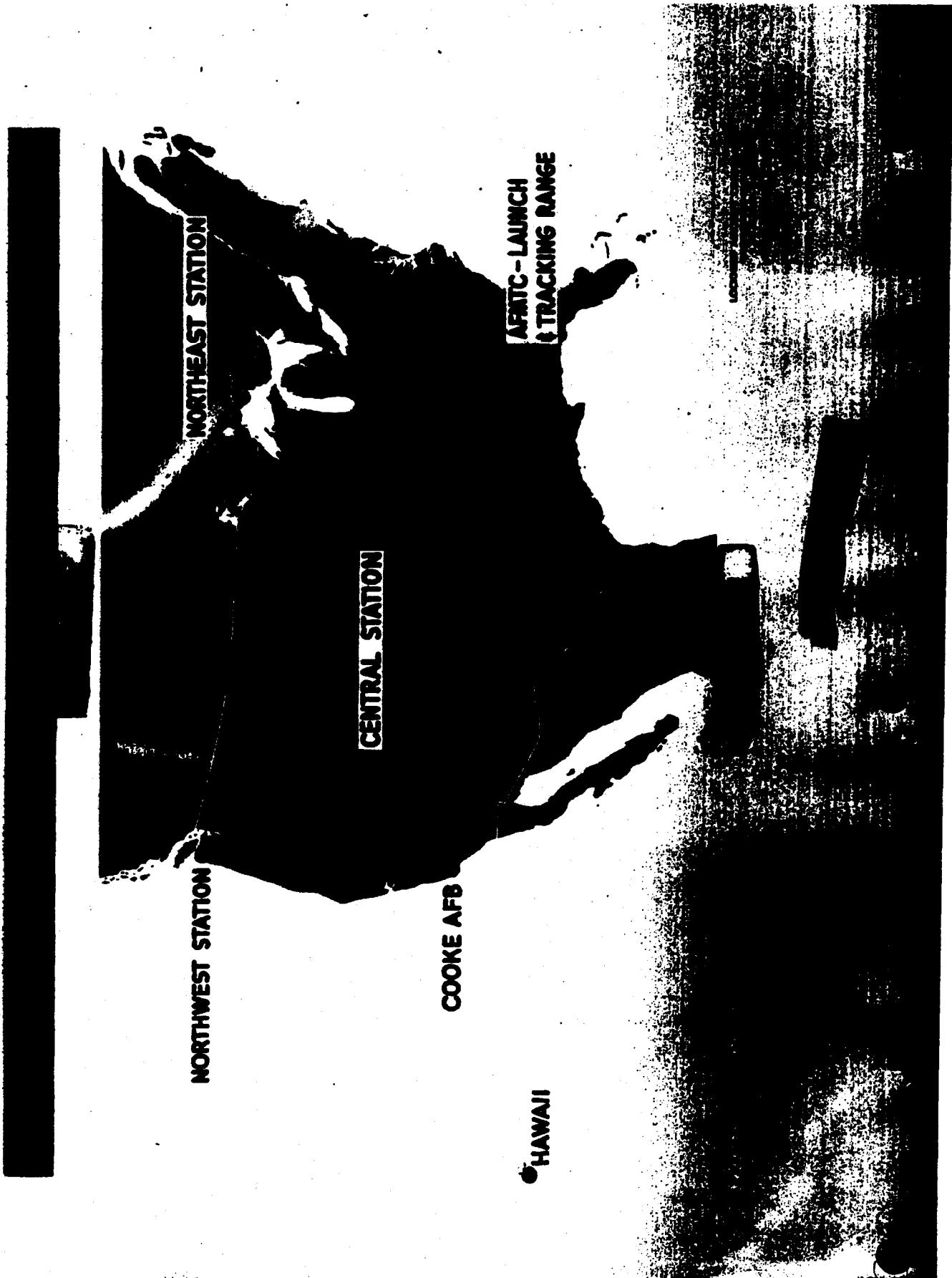
~~[REDACTED]~~ PROVIDED BY WS-117L VEHICLE CAPABILITY

- PAYLOAD WEIGHT CARRYING CAPACITY OF 700 POUNDS (MORE FOR ADVANCED VERSION)
- PAYLOAD VOLUME CAPACITY OF 10 CUBIC FEET
- ATTITUDE ORIENTATION AND STABILIZATION TO ± 1 DEGREE
- NUMBER OF VEHICLES AVAILABLE, ESPECIALLY FOR SMALLER PAYLOADS (DUE TO WS-117L REQUIREMENTS AND USE OF OPERATIONAL MISSILE FOR BOOSTER)
- GUIDANCE ACCURACY TO PLACE VEHICLE INTO ORBITS OF AS LITTLE AS 20-MILE ECCENTRICITY
- POSSIBILITY OF SETTING UP LINKS BETWEEN TWO SATELLITES
- LONG ORBITING 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
- CAPACITY TO CARRY TWO OR MORE PAYLOADS FOR COINCIDENCE-TYPE EXPERIMENTS
- WIDE-BAND DATA LINK FOR TRANSMISSION OF INFORMATION
- TRACKING SYSTEM MEASUREMENTS ANGULAR TO ± 1 MIL AND ALTITUDE TO .1 MILE

LOCATED AT AIR FORCE BASE

P 236 6 732917

ENTICING OF SATELLITES
WHICH MAKE IT ATTRACTIVE AS
PHYSICAL RESEARCH PURPOSES.



WS-117L FACILITY REQUIREMENTS

A PLOT OF THE PRINCIPAL FACILITIES REQUIRED FOR THE FLIGHT TESTING AND OPERATION OF THE ADVANCED RECONNAISSANCE SYSTEM.

NEW AIR FORCE FACILITIES REQUIRED SOLELY FOR THE ARS SYSTEM ARE:

PACIFIC (HAWAIIAN) TRACKING STATION

NORTHEAST AND NORTHWEST U. S. TRACKING STATIONS

CENTRAL U. S. TRACKING AND CONTROL STATION

INTELLIGENCE DATA-PROCESSING CENTER.

AN ICBM ATTACK ALARM SYSTEM WOULD REQUIRE CONSTRUCTION OF A
MODIFIED, WILL BE UTILIZED.



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LOCKHEED AIRCRAFT CORPORATION

MISSILE SYSTEMS DIVISION

SAN FRANCISCO BAY AREA FACILITIES

AN INTEGRATED FACILITY FOR ALL TYPES OF HAZARDOUS TESTS.
AN AREA SHOWING THE LOCATION OF RECENTLY
COMPLETED FACILITIES FOR THE EXCLUSIVE USE OF THE MISSILE
PROGRAM, WHICH IS COMPRISING APPROXIMATELY 560,000 SQ. FT.
OF BLOW AND DRY FACILITY, AND A CAPITAL INVESTMENT IN EXCESS OF 28 MILLION
DOLLARS.

PALO ALTO

RESEARCH AND DEVELOPMENT LABORATORIES
WS-117L PROJECT OFFICES

SUNNYVALE

DIVISION HEADQUARTERS
LABORATORIES, IN-PLANT TEST FACILITIES; PROTOTYPE FABRICATION
SANTA CRUZ MOUNTAINS

AN INTEGRATED FACILITY FOR ALL TYPES OF HAZARDOUS TESTS.

ADDITIONAL FACILITIES ARE UNDER CONSTRUCTION, OR IN THE ADVANCED PLANNING STAGE.
A COMPLETE MANUFACTURING FACILITY IS ALSO OPERATED AT VAN NUYS, CALIFORNIA.

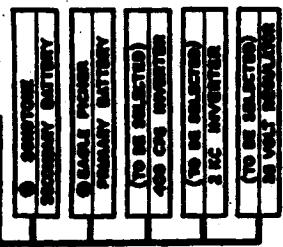
AIRFRAME

A



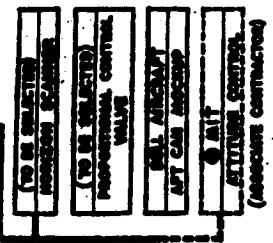
AUXILIARY POWER

C



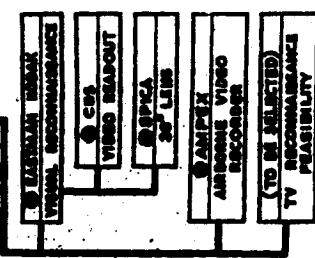
GUIDANCE CONTROL

D



VISUAL RECONNAISSANCE

E



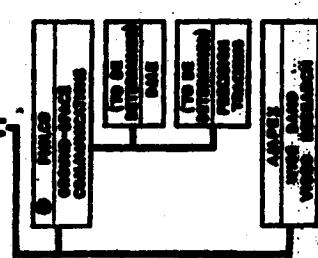
FERRET RECONNAISSANCE

F



GROUND-SPACE COMMUNICATION

H



INFRARED SYSTEM

G



• CONTRACT NUMBER APPROVED BY AFMD



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