

CSJ

ADVANCED RECONNAISSANCE SYSTEM

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

1674

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.

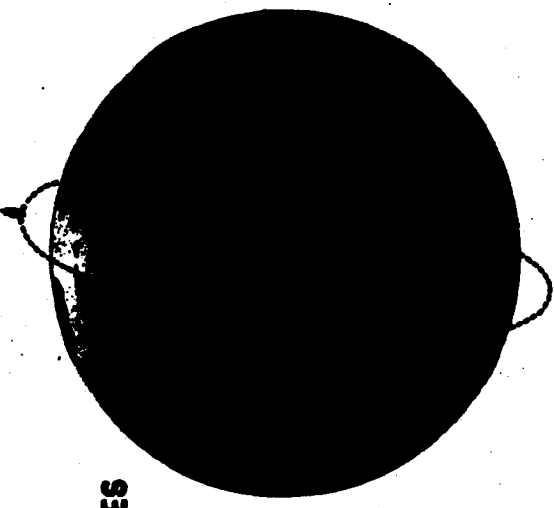
Key R&D actions leading to initiation of the program were:

- | | |
|--------------|---|
| 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; |
| | Development Directive issued |
| October 1956 | Letter Contract AF 04(647)-97 issued to |
| | Lockheed Aircraft Corp., Missile |
| | Systems Division, as Weapon System |
| | Contractor. |



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
—SPACE SYSTEMS DIVISION

KEY CHARACTERISTICS OF 117L

**A LISTING OF 12 OUTSTANDING FEATURES OF WEAPON SYSTEM 117L, AS
PREPARED BY THE AIR FORCE BALLISTIC MISSILES DIVISION, HQ., AIR
RESEARCH AND DEVELOPMENT COMMAND.**

R & D COSTS
PER PHASE
(000's)

- DEVELOPMENT PHASE
- CONTRACT PROPOSAL PHASE
- USAF EVALUATION STUDIES
- USAF PROJECT RAND R AND D STUDIES
- ROCKETRY STUDIES BY UNITED STATES, GERMANY, USSR AND OTHERS

\$ 8,300

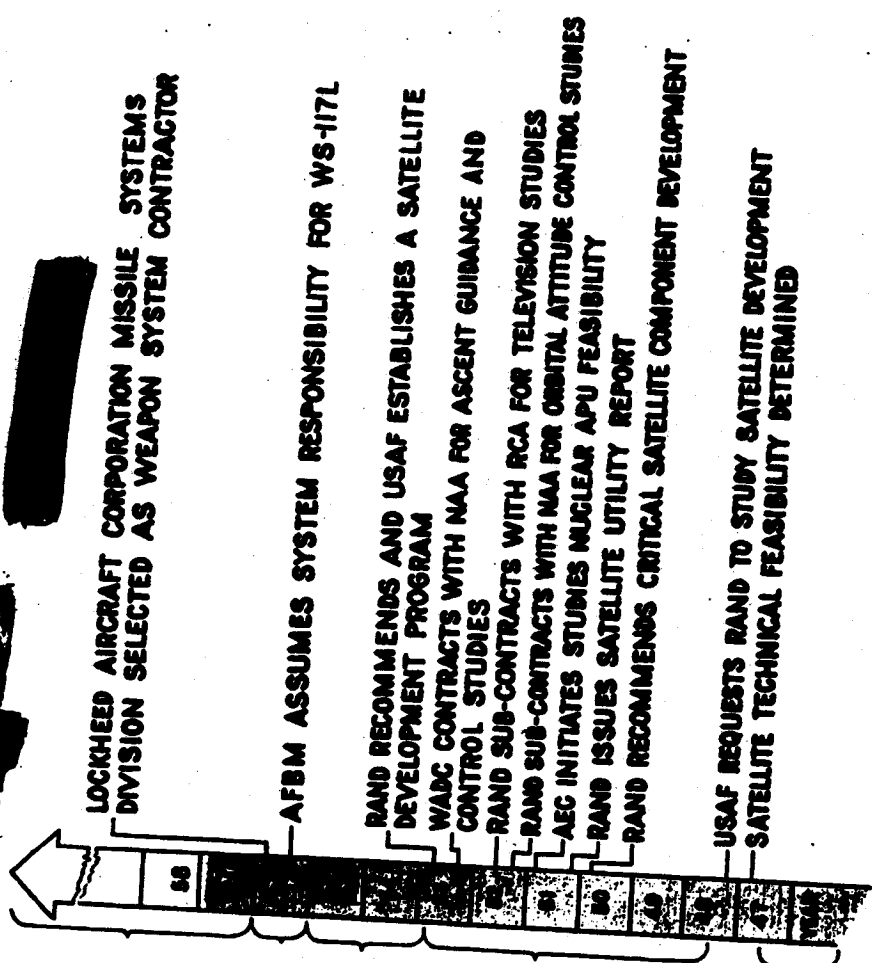
1,500

7,400

1,500

TOTAL
COST TO
DATE

18,700

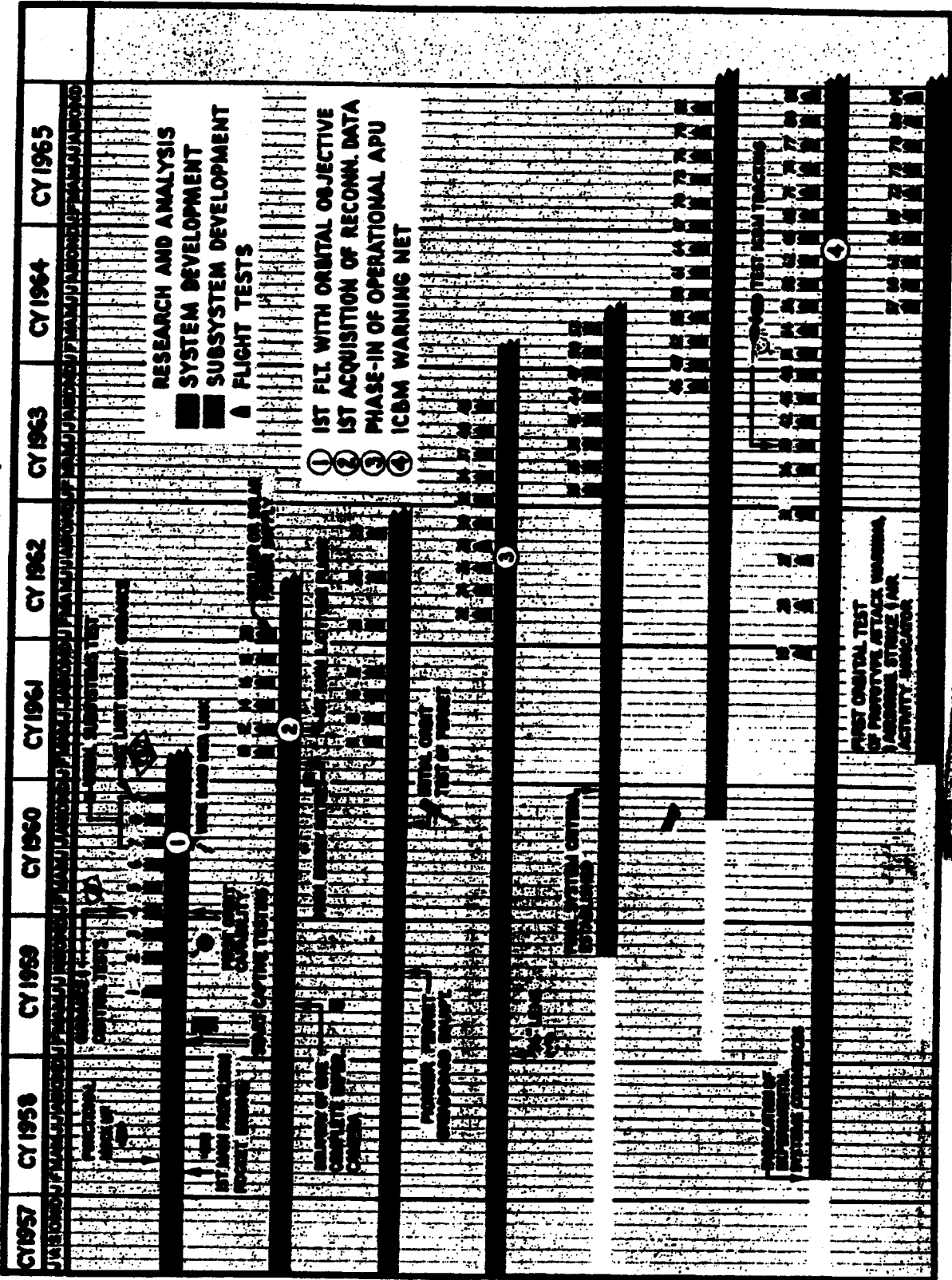


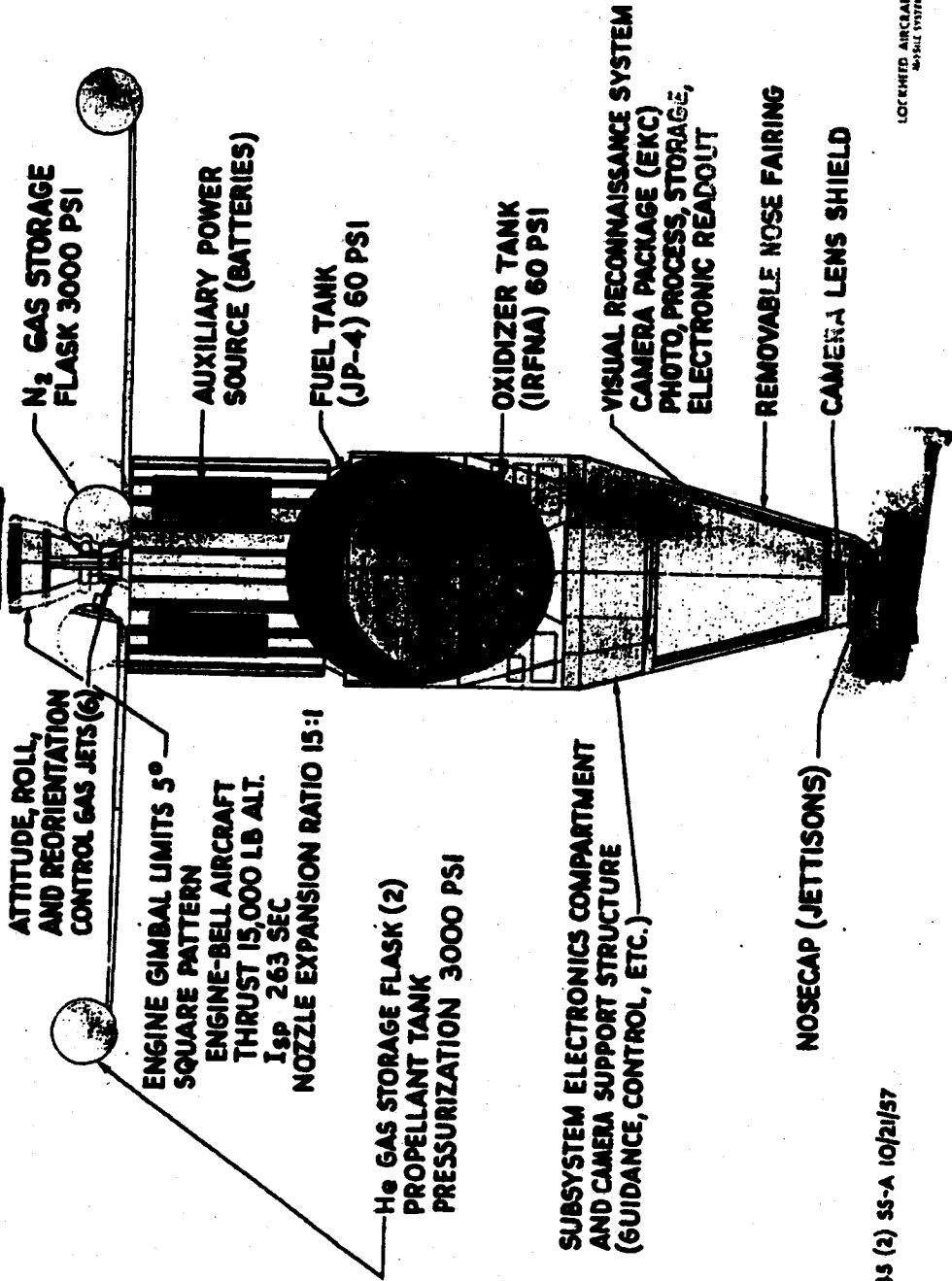
ADVANCED RECONNAISSANCE SYSTEM

- 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





ATTITUDE, ROLL,
AND REORIENTATION
CONTROL GAS JETS (6)

ENGINE GIMBAL LIMITS 5°
SQUARE PATTERN
ENGINE-BELL AIRCRAFT
THRUST 15,000 LB ALT.
Isp 263 SEC
NOZZLE EXPANSION RATIO 15:1

He GAS STORAGE FLASK (2)
PROPELLANT TANK
PRESSURIZATION 3000 PSI

N₂ GAS STORAGE
FLASK 3000 PSI

AUXILIARY POWER
SOURCE (BATTERIES)

FUEL TANK
(JP-4) 60 PSI

OXIDIZER TANK
(IRFNA) 60 PSI

VISUAL RECONNAISSANCE SYSTEM
CAMERA PACKAGE (EKC)
PHOTO, PROCESS, STORAGE,
ELECTRONIC READOUT

REMOVABLE NOSE FAIRING

CAMERA LENS SHIELD

NOSECAP (JETTISONS)

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

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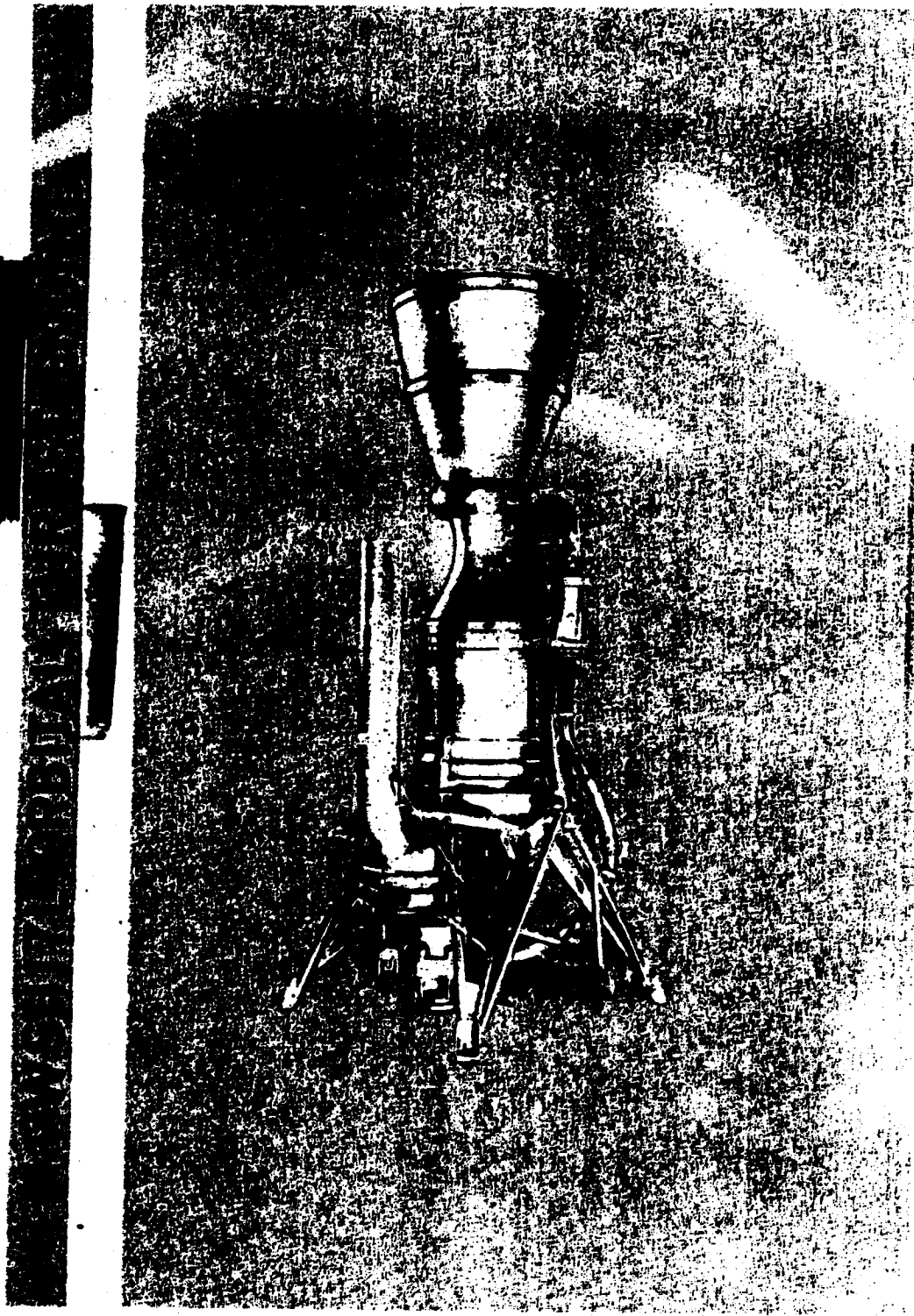
LOCKHEED AIRCRAFT CORPORATION
MOBILE SYSTEMS DIVISION

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 VEHICLE TO ORBITAL VELOCITY.

PERFORMANCE SPECIFICATIONS:

15,150 LBS. THRUST IN A VACUUM
MINIMUM SPECIFIC IMPULSE -- 263 sec
MAXIMUM SPECIFIC IMPULSE -- 269 sec



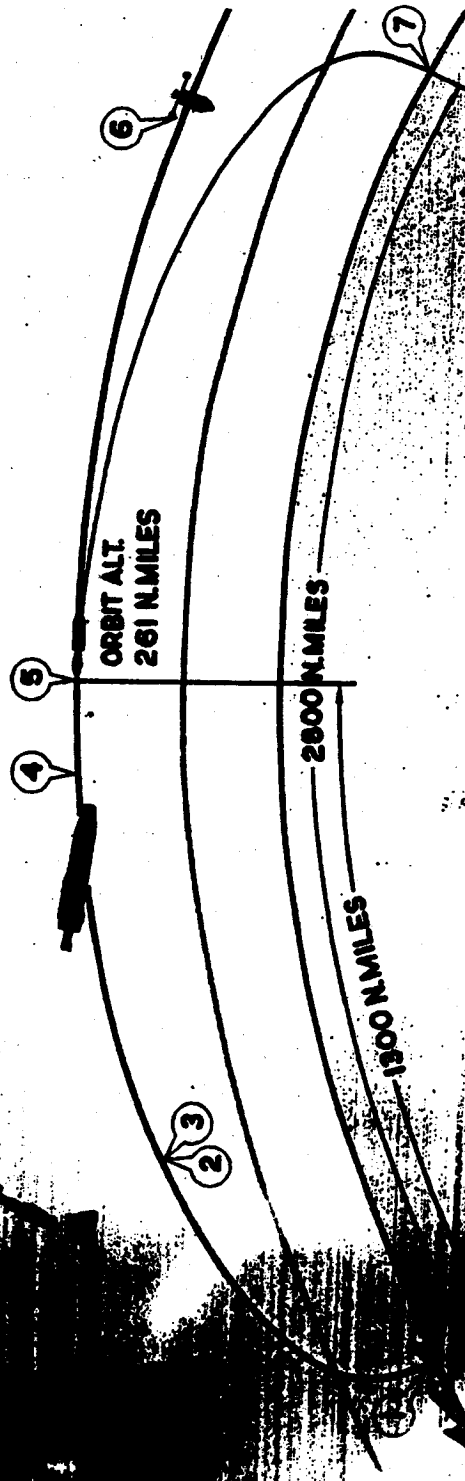
LOCKHEED AIRCRAFT CORPORATION
MILWAUKEE, WISCONSIN

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TAKE OFF CONDITION

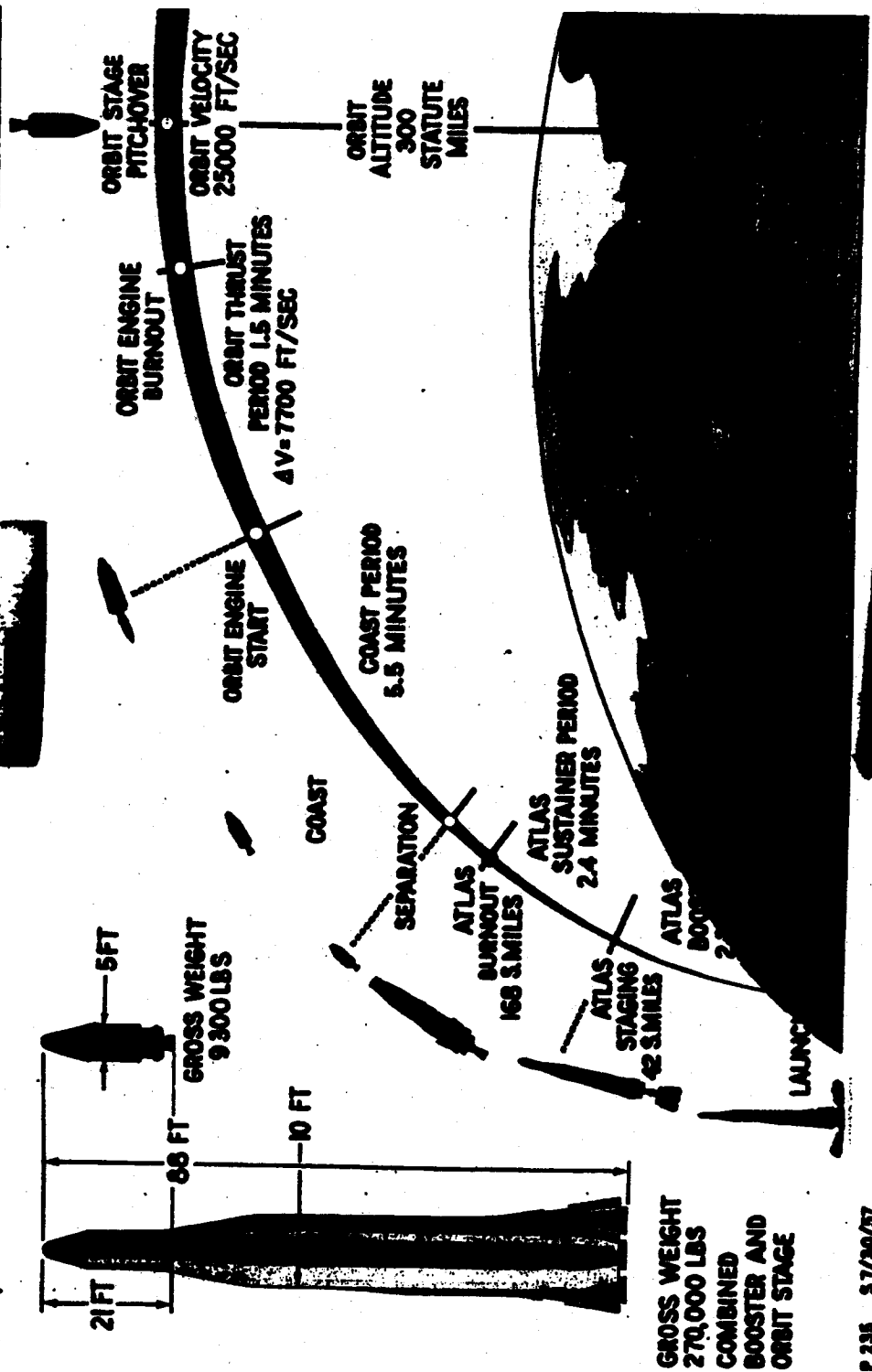
OVERALL LENGTH 87.4 FT.
BOOSTER DIAMETER 10 FT.
SHELLITE DIAMETER 5 FT.
SHELLITE LENGTH 21.0 FT.

- ① LAUNCH
- ② END POWERED BOOST
- ③ SEPARATE BOOSTER FROM COAST
- ④ BEGIN ORBITAL TRAJECTORY
- ⑤ ORBITAL ALTITUDE
- ⑥ FINAL ORBITAL ALTITUDE
- ⑦ BOOSTER IMPACT POINT



NS-117L VEHICLE TRAJECTORY

PRESENTS TAKE-OFF DIMENSIONS OF VEHICLE, POINTS TO
ATLAS BOOSTER, AND INDICATES KEY POINTS OF FLIGHT
LAUNCH TO ATTAINMENT OF ORBITAL ALTITUDE AND ATTITUDE.



GROSS WEIGHT
270,000 LBS
COMBINED
BOOSTER AND
ORBIT STAGE

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LOCKHEED AIRCRAFT CORPORATION
MEMPHIS, TENNESSEE

WS-117L TRAJECTORY TO ORBIT

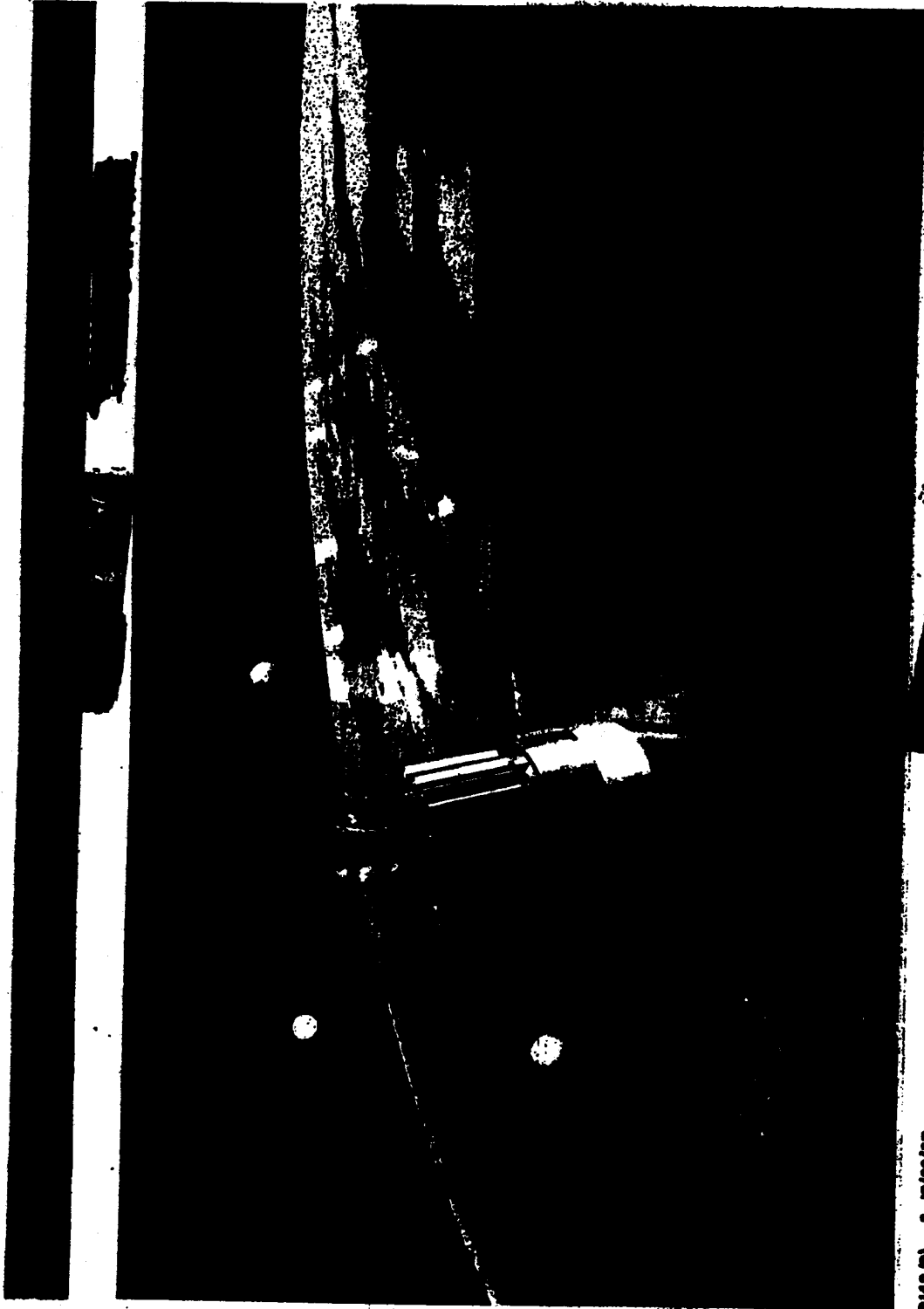
A MORE DETAILED PRESENTATION OF FLIGHT LAUNCH PHASE, INDICATING GUIDANCE AND CONTROL PROBLEMS WHICH MUST BE RESOLVED IN ORDER TO ACHIEVE ORBITAL CAPABILITY.

[REDACTED]

[REDACTED]

[REDACTED]

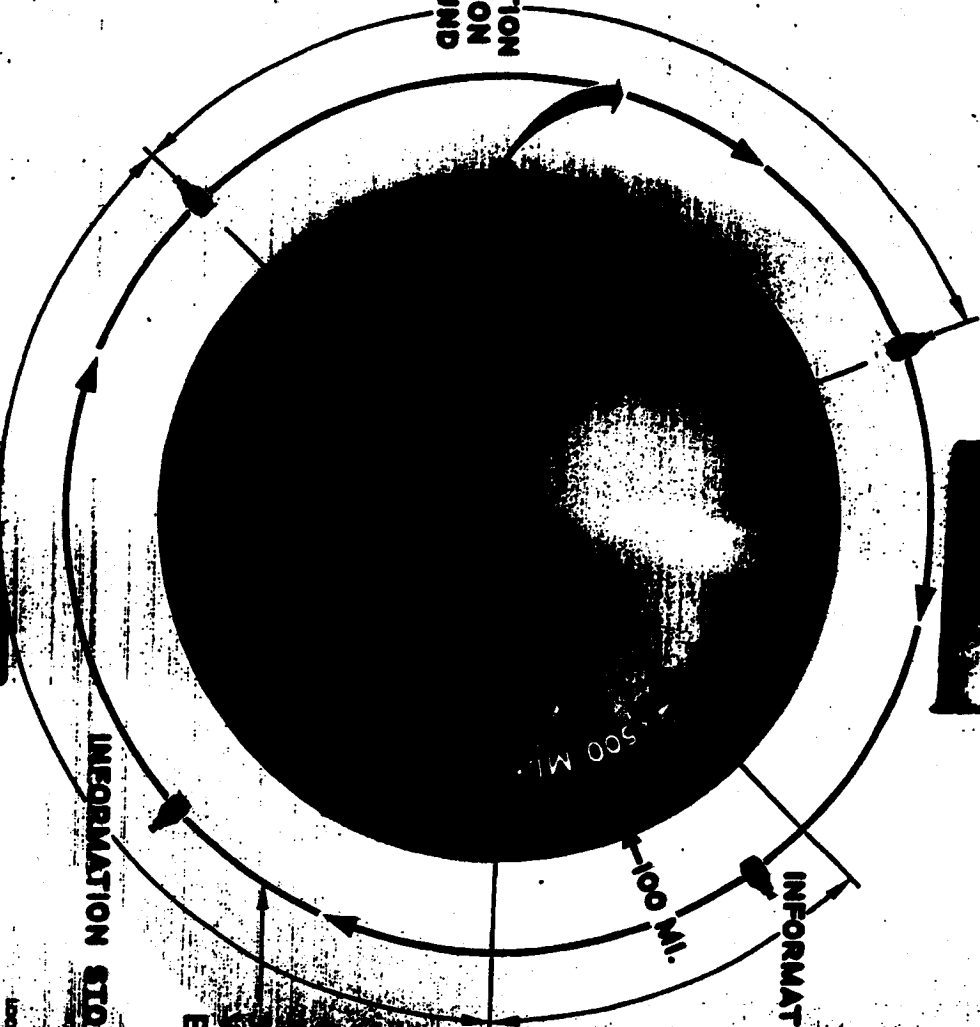
UNCLASSIFIED



LOCKHEED AIRCRAFT CORPORATION
MISSILE SYSTEMS DIVISION

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TRACKING FOR
ORBIT COMPUTATION
AND INFORMATION
RELAY TO GROUND



300 MILES ALT.
VISUAL AND
ELECTRONIC

INFORMATION STORAGE

INFORMATION GATHERING

LOCKHEED-SPACELAB CORPORATION
MILWAUKEE, WISCONSIN

FORWARDED BY
137. THEN RELAY TO
LOCATED CONTROL STATION

FREE ORBIT

5-17-54

DEMONSTRATED THE
MAISSANCE COVERAGE OF
ENABLING SECURE "HEAD-OUT"
STATIONS LOCATED WITHIN THE CONTINENTAL UNITED STATES
TERRITORIES.

SUBSYSTEM A

AIRFRAME

SUBSYSTEM B

PROPULSION

SUBSYSTEM C

AUXILIARY POWER

SUBSYSTEM D

GUIDANCE &
CONTROL

RECONNAISSANCE SUBSYSTEMS

SUBSYSTEM E

VISUAL

SUBSYSTEM F

FERRET

SUBSYSTEM G

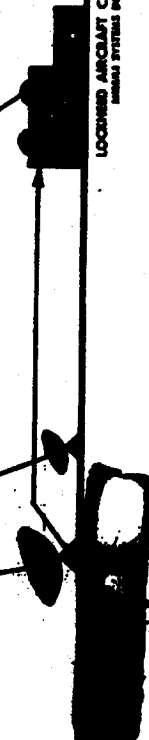
INFRARED

SUBSYSTEM H

COMMUNICATIONS

P23610 s 10/15/57

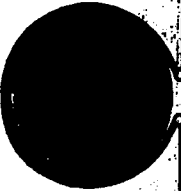
LOCKHEED AIRCRAFT CORPORATION
COMMUNICATIONS SYSTEMS DIVISION



VEHICLE-BORNE PROCESSOR

PROCESSING

PHOTOGRAPHING



STORING



READING OUT



READING

GROUND



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**WS-117A VISUAL RECONNAISSANCE SYSTEM
VEHICLE-BORNE PROCESSES**

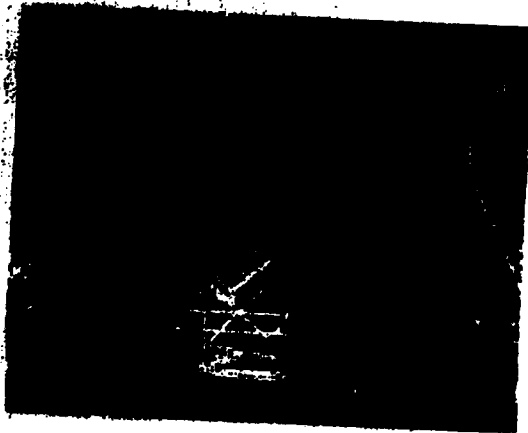
A SCHEMATIC DIAGRAM OF THE SATELLITE VEHICLE-BORNE OPERATING PROCESSES REQUIRED FOR VISUAL (PHOTOGRAPHIC) RECONNAISSANCE.

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

IMAGE READOUT

6 INCH LENS

100-FOOT RESOLUTION



ORIGINAL SCENE



**FILM IMAGE
IN SATELLITE**



**IMAGE RECORDED
ON GROUND**

PIONEER VISUAL RECONNAISSANCE SYSTEM
SIMULATED PHOTOGRAPHS - 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**