WS 117L
SENTRY SYLLABUS

SECRET

LOCKHEED AIRCRAFT CORPORATION
MISSILE SYSTEMS DIVISION
SUNNYVALE, CALIFORNIA
FOREWORD

The chart and photograph reproductions which comprise this report are pertinent to a presentation made to Mr. Roy W. Johnson, Director, Advanced Research Projects Agency, and members of his staff. Essentially, the presentation was given in two parts.

Part I . . . a detailed technical briefing on the Sentry Weapon System 117L as currently programmed or proposed, and

Part II . . . a discussion of advanced component requirements and possible system applications to other programs.

Information pertinent to the system is presented herein. The presentation was given at the Pentagon on 14 and 15 August 1958.
### L/ARPA BRIEFING
14-15 August 1953
Pentagon, Room 3E144

**Thursday 14 August**

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P3017 Flight Test Vehicles Nos. 1 and 2 in Mod & Checkout - LMSD Palo Alto
P3018 Flight Test Vehicles Nos. 1 and 2 in Mod & Checkout - LMSD Palo Alto
P3022  Flight Test Vehicle No. 2 in Mod & Checkout
   - LMSD Palo Alto

P3021  Flight Test Vehicle No. 2 in Mod & Checkout
   - LMSD Palo Alto

P3039  Model XLR Engines - JP4 and UDMH

P3043  UDMH Propellant Tank

P2862  Horizon Scanner

P2864  Horizon Scanner

P3046  Systems Checkout Complex (excluding LACE U ..)

P3047  LACE Unit (Systems Checkout Complex)
ADVANCED RECONNAISSANCE SYSTEM EVOLUTION

BASIC ROCKETRY RESEARCH PHASE

USAF PROJECT RAND SATELLITE FEASIBILITY STUDIES

1.5 MILLION

45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66

SATTELITE FEASIBILITY DETERMINED

RAND ISSUES SATELLITE UTILITY REPORT

GOR PUBLISHED (MAR '55)

RAND RECOMMENDS SATELLITE RECONNAISSANCE DEVELOPMENT PROGRAM

DX PRIORITY

LETTER CONTRACT AWARDED TO LOCKHEED (OCT '56)

DEVELOPMENT DIRECTIVE PUBLISHED (AUG '56)
SENTRY OPERATIONAL OBJECTIVES

VISUAL RECONNAISSANCE
- MAPPING OF USSR AND SATELLITES
- STRATEGIC WARNING INDICATIONS
  - WEAPONS AND BASES IN BEING
  - MILITARY LOGISTICS
  - INDUSTRIAL WAR CAPABILITIES
- NUCLEAR DETONATION DETECTION
- WEATHER OBSERVATION

ELECTRONIC RECONNAISSANCE
- DETECT & OBTAIN INFORMATION ON ELECTRONIC EMITTERS IN AREAS OF USSR & SATELLITES NOT NOW AVAILABLE

INFRARED RECONNAISSANCE
- ICBM ATTACK WARNING

COMMUNICATIONS
- SATELLITE LINKS FOR SECURE & RAPID GLOBAL COMMUNICATIONS

SECRET

P 799 8/8/58
WD-58-05183

SECRET
# WS 117L Program Objectives

## Program Title

### Major Development Objectives

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<td>TEST RECOGNITION PAYLOAD AND GENERAL SYSTEM OPERATIONS</td>
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SENTRY PAYLOAD-DEFINED

RECONNAISSANCE MISSIONS:
- ALL SENSING, PROCESSING & STORAGE EQUIPMENT
- ALL RELATED AUXILIARY POWER SYSTEM EQUIPMENT
- ALL RELATED COMMUNICATIONS EQUIPMENT

BIOASTRONAUTIC RECOVERY MISSIONS:
- RECOVERY CAPSULE & ROCKET
- CAPSULE CARGO
THE SENTRY SUBSYSTEMS

- Subsystem A: Airframe
- Subsystem B: Propulsion
- Subsystem C: Auxiliary Power
- Subsystem D: Guidance & Control
- Subsystem E: Visual Subsystems
- Subsystem F: Ferret
- Subsystem G: Infrared
- Subsystem H: Communications
- DCA: Data Control & Analysis

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WS117L R&D ORGANIZATION

LOCKHEED AIRCRAFT CORP. MISSILE SYSTEMS DIVISION
WEAPON SYSTEM CONTRACTOR

SECRET

PRINCIPAL SUBCONTRACTORS

PROPUSSION
- BOEING AIRCRAFT CORP.
- AEROGST-JEIAL-CORP.

AUXILIARY POWER
- SOMERSET CORR.
- EAGLE-PICHER CO.
- ENGINEERED MAGNETICS
- HOFFMAN ELECTRONICS CORP.
- BEECHCRAFT R&D INC

GUIDANCE & CONTROL
- DETROIT CONTROLS CORP
- REEVES INSTRUMENT CORP
- MINNEAPOLIS-HONEYWELL REGULATOR CORP
- BENDIX AVIATION CORP

VISUAL RECONN
- EASTMAN KODAK CO.
- COLUMBIA BROADCASTING SYS.
- EPICA INC.
- AMPEX CORP

FERRET
- AIRBORNE INSTRUMENTS LAB. INC.
- HALLER, RAYMOND & BROWN INC

INFRARED RECONN.
- EASTMAN KODAK CO.
- BAIRD ATOMIC CO.
- AEROGST-JEIAL-CORP.
- GENERAL MILLS INC.

GROUND-SPACE COMM.
- PHILCO CORP
- REEVES INSTRUMENT CORP RADIATION INC.
- LOCKHEED AIRCRAFT SERVICES INC.
- HUGHES AIRCRAFT CO.
- TEXAS INSTRUMENT CORP

TEST MGMT & OPERATIONS
- AEROGST-JEIAL-CORP.
- RALPH M. PARSONS CO

GROUND SUPPORT EQUIP
- OTIS ELEVATOR CO.
- CONSOLIDATED AVIONICS CORP
- BEMCO, INC.
- STANDARD MFG. CO. INC.
- HUFFORD CORP

BIO MEDICAL CAPSULE
- GENERAL ELECTRIC CO.
- ALL AMERICAN ENGINEERING CO

ASSOCIATE CONTRACTORS

BOOSTERS
- DOUGLAS A/C CORP (SM-75)
- CONVAIR ASTRONAUTICS (SM-65)

GUIDANCE & CONTROL
- INSTRUMENTATION LAB., MIT
- GENERAL ELECTRIC CO.

AUXILIARY POWER
- THE MARTIN CO.
- ATOMICS INTERNATIONAL

DATA PROCESSING
- RAMO-WOOLBRIDGE CORP

P223 (S)*55 84/58
WD-53-02543

SECRET
LOCKHEED FACILITIES FOR WS 117L

VAN NUYS
AIRFRAME FABRICATION

SUNNYVALE
COMPONENT ASSEMBLY

PALO ALTO
PROJECT MGMT. SYSTEM DESIGN
VEHICLE MOD. & CHECKOUT

SANTA CRUZ
HAZARDOUS TEST FACILITY

NOTE: BURBANK C-1—COMPONENT MFG. & TEST

P 565 SD 6/2/59
WD-58 03455
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ALTITUDE VS. PAYLOAD-SENTRY/THOR

SINGLE BURN

ORBITING ALTITUDE - N. MI.

250

200

150

100

50

USEFUL PAYLOAD - LBS

100

200

300

400

500

600

P 792
WD-58-08183
8/8/58
This document contains information affecting the national defense of the United States and is classified as SECRET. Its transmission or revelation, without the authority of the Secretary of Defense, is prohibited by law.
# Sentry Auxiliary Power Supply

## Development Program

- **Conventional Primary Batteries**
  - Silver Peroxide

- **High Energy Battery**
  - Hydrogen-Oxygen

- **Solar Voltaic Converter**
  - Silicon Boron Diffused p-n Junction

- **Nuclear Thermomechanical**
  - Radioisotope Heat Source

### Energy Yield

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<th>Advantages</th>
<th>Disadvantages</th>
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<td>750 Watt Hrs/Lb.</td>
<td>Commercially Available</td>
<td>Low Energy Yield</td>
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<td>600 Watt Hrs. Per Lb.</td>
<td>High Energy Yield</td>
<td>Not Developed</td>
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<td>200 Watt Cont.</td>
<td>Operates Indefinitely</td>
<td>Req's Development</td>
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<td>600 Lb.</td>
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<td>Temp Control</td>
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<td>500 Watt</td>
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<td>Meteorite Damage</td>
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<td>800 Lb. + Shield</td>
<td>Long Life</td>
<td>Heavy Shield Required</td>
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<td>50 Days</td>
<td>Long Life</td>
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<tr>
<td>9 Kw</td>
<td></td>
<td></td>
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<tr>
<td>500 Lb. + Shield</td>
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<td>Life: 1 Year</td>
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P315 (2) 65°F 3/13/58

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ADVANCED AUXILIARY POWER SYSTEMS

SECRET

SOLAR

CHARACTERISTICS

(a) 16% CONVERSION EFFICIENCY
   (10-12 WATTS/FT²)

(b) NICKEL CADMIUM SECONDARY BATTERY
    OF 95 WATTS-HRS/LB
    ~ 2500 CYCLE LIFE

(c) POWER SYSTEM LIFE
    LIMITED BY BATTERY
    AND/OR METALLIC EMISSION

(d) TWILIGHT ORBIT ADVANTAGE:
    CONCURRENT DESTRUCTION AT
    NORMAL INCIDENCE, NO VACUUM
    TUBE, EXPERIMENTAL BATTERY, HIGHER EFFICIENCY

NUCLEAR REACTOR

CHARACTERISTICS

(a) SKIN CONTINUOUSLY
(b) LONG DISSOLUTION (~ 1 YEAR)
(c) SHIELDING REQUIRED
   (8 IN. SEPARATION)
(d) PAYLOAD COMPATIBILITY
    PROBLEMS

ISOTOPE

CHARACTERISTICS

(a) 500 WATTS AT 60 DAYS

(b) 250 WATTS AT 340 DAYS

(c) TUBE FILAMENTS PROVIDE
    PARASITIC RESISTIVE
    LOAD FOR EXCESS POWER
    IN EARLY VEHICLE LIFE
    DURING COAST PERIODS

(d) SHIELDING REQUIRED

(e) TOTAL WEIGHT WITH
    SHIELD 700-800 POUNDS

CHEMICAL

POWER SOURCE

CHARACTERISTICS

(a) LIFE LIMITED BY
    MONOFUEL SUPPLY

(b) EXHAUST PRODUCTS
    USEFUL FOR ORBIT
    ECCENTRICITY
    CONTROL

(c) POWER LEVEL
    EASILY
    CONTROLLABLE
### WS-117L SYSTEM APU LIFE LIMITATIONS

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<tr>
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<tr>
<td></td>
<td>50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>VISUAL</td>
<td>25 kW-HR/DAY</td>
<td></td>
</tr>
<tr>
<td>FERRET</td>
<td>2.2 kW-HR/DAY</td>
<td></td>
</tr>
<tr>
<td>LR</td>
<td>1.9 kW-HR/DAY</td>
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</tbody>
</table>

**SYSTEM LIMITATIONS:**
- PRIMARY BATTERY FLT PIONEER
- HIGH ENERGY FUEL CELL BATTERY FLT 10-15
- SOLAR PHOTOVOLTAIC APU FLT 16
- NUCLEAR APU LIFE FOR ALL SYSTEMS
  - RADIO ISOTOPE 60-180 DAYS
  - NUCLEAR REACTOR 60-360 DAYS

**LESS TELEMETERING**
GUIDANCE & CONTROL SYSTEM

TYPICAL SENTRY ASCENT (ATLAS-PROG I)
SECRET

SENTRY ASCENT BOOST PHASE

GUIDANCE & CONTROL FUNCTIONING COMPONENTS

BODY AXIS SYSTEM

ROLL

117L VEHICLE

PITCH

YAW

ATLAS BOOSTER

ATLAS-GE RADIO INERTIAL

THOR-PROGRAMMED AUTOPilot

VEHICLE REF. AXIS

BOOSTER THRUST

\[ \frac{c_y}{c_x} \times A_p = \text{ANGLE BETWEEN ATLAS THRUST AXIS} \& \text{VEHICLE REF. AXIS} \]

\[ A_p = \text{GYRO GIMBAL ANGLE} \]
Sentry Coast Phase
Guidance & Control Functioning Components

1. Horizon Scanner Roll Error Signal
2. Yaw Angle Reset
3. Horizon Scanner Pitch Error Signal
4. Program Pitch Rate

Programmer Commands
- Gyro Package Ref. Attitude
- Gas Jets via Autopilot
- Align Vehicle Attitude to Gyro Ref. Attitude.
"PASSIVE" GRAVITATIONAL RESTORING TORQUE (T) PROPORTIONAL TO THE DIFFERENTIAL GRAVITY FIELD AS
\[ T = R_1 (\bar{g}_1 - \bar{g}_2) = R_1 \sin 2\theta = R_1 \theta \]

\[ K_3 (PITCH) = \frac{0.056 \text{ oz-in.}}{\text{deg}} \]

\[ K_4 (ROLL) = \frac{4000 \text{ dyne-cm-deg}}{\text{deg}} \]

"ACTIVE" DAMPING OF "B" OSCILLATIONS BY RATE GYROS, TRANSFER FUNCTION ELECTRONICS & TORQUE REACTION WHEELS

PAYLOAD

ENGINE

VEHICLE VELOCITY

K_3

ROLL (X') AXIS

\[ \frac{\bar{g}_1}{s + T_x} \]

YAW (Z') AXIS

\[ \frac{\bar{g}_1}{s + T_y} \]

VERTICAL (Z) AXIS

PITCH (Y) AXIS

INPUT AXIS

INPUT AXIS

ROLL RATE GYRO

INPUT AXIS

PITCH RATE GYRO

ELECTRONICS

PITCH WHEEL

YAW WHEEL
**WSI17L SENTRY VEHICLE WEIGHT**

<table>
<thead>
<tr>
<th>Component</th>
<th>PROGRAM IIA (lbs)</th>
<th>PROGRAM I (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VEHICLE PAYLOAD (includes primary payload § A.R.S. telemetry, § communications)</td>
<td>573</td>
<td>3197</td>
</tr>
<tr>
<td>STRUCTURE GROUP (includes airframe § equipment supt. structure)</td>
<td>402</td>
<td>554</td>
</tr>
<tr>
<td>PROPULSION GROUP (includes engine, propellant tanks, press system § ullage rockets)</td>
<td>593</td>
<td>593</td>
</tr>
<tr>
<td>CONTROLS GROUP (includes ascent § orbital controls)</td>
<td>160</td>
<td>123</td>
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<tr>
<td>GUIDANCE GROUP (includes ascent § orbital guidance)</td>
<td>100</td>
<td>140</td>
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<td>VEHICLE WEIGHT EMPTY</td>
<td>1828</td>
<td>4607</td>
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<td>PROPELLANTS</td>
<td>6624</td>
<td>4693</td>
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<tr>
<td>BOOSTER PAYLOAD</td>
<td>8452</td>
<td>9300</td>
</tr>
<tr>
<td>VEHICLE WEIGHT ON ORBIT</td>
<td>1776</td>
<td>4466</td>
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</table>

1. UDMH-1RFNA ENGINE § LAUNCHED FROM CAMP COOKE - THOR BOOSTED NOM. CIRCULAR ORBIT
   ALTITUDE = 180 STATUTE MILES

2. UDMH-1RFNA ENGINE § LAUNCHED FROM AFMTC - ATLAS BOOSTED NOM. CIRCULAR ORBIT
   ALTITUDE = 360 STATUTE MILES
**WS-117L VISUAL RECONNAISSANCE SYSTEM**

**SECRET**

**TECHNICAL SUMMARY**

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<thead>
<tr>
<th></th>
<th>PIONEER</th>
<th>ADVANCED</th>
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</thead>
<tbody>
<tr>
<td><strong>FOCAL LENGTH</strong></td>
<td>6&quot;</td>
<td>36&quot;</td>
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<tr>
<td><strong>LENS SPEED</strong></td>
<td>F 2.8</td>
<td>F 2.8</td>
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<tr>
<td><strong>DURATION</strong></td>
<td>9 DAYS</td>
<td>30 DAYS</td>
</tr>
<tr>
<td><strong>STRIP ON GROUND - WIDTH</strong></td>
<td>100 MIl.</td>
<td>17 MIl.</td>
</tr>
<tr>
<td><strong>STRIP ON GROUND - LENGTH</strong></td>
<td>2000 MIl.</td>
<td>360 MIl.</td>
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<tr>
<td><strong>AREA COVERED</strong></td>
<td>1.07 x 10^7 SQ. MI.</td>
<td>8.9 x 10^6 SQ. MI.</td>
</tr>
<tr>
<td><strong>CAMERA Wt.</strong></td>
<td>300 Lb.</td>
<td>400 Lb.(EST.)</td>
</tr>
<tr>
<td><strong>INCIDES FILM &amp; PROCESSOR</strong></td>
<td>3.4 Lb.</td>
<td>11.4 Lb.</td>
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</table>

<table>
<thead>
<tr>
<th><strong>ELECTRICAL POWER REQUIREMENTS</strong></th>
<th>PIONEER</th>
<th>ADVANCED</th>
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<tr>
<td><strong>PEAK</strong></td>
<td>300 WATTS</td>
<td>300 WATTS</td>
</tr>
<tr>
<td><strong>AVERAGE</strong></td>
<td>660 WATT HR/DAY</td>
<td>660 WATT HR/DAY</td>
</tr>
</tbody>
</table>

| **SCALE ON VEHICLE FILM** | 1:3,168,000 | 1:528,000 |
| **RESOLUTION ON GROUND**     | AT LOW (2:1) CONTRAST 100 FT. | 20 FT. |

**FILM USED:** MICROFILE EASTMAN F5740-6  
**FILM RESOLUTION:** 250 L/mm HIGH CONTRAST  
> 100 L/mm LOW CONTRAST  

**GROUND ENLARGEMENT 53:1 FOR USE**

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**Airborne Reception**

**Priority Bands**
1. 2,500-3,200 MC/SEC
2. 9,000-10,000 MC/SEC
3. (a) 59-100 MC/SEC
   (b) 100-200 MC/SEC
   (c) 200-400 MC/SEC
   (d) 400-600 MC/SEC

Monitoring of all bands in the 50-18000 MC/SEC spectrum.
ICBM ATTACK ALARM

SATELLITE POLAR ORBIT ALT.
APPROX. 1000 NAUTICAL MILES

GROUND READ-OUT STATIONS

(THULE)
(FARIBANKS, AL)
(NORTH SCOTLAND)

INSTANTANEOUS DIRECT READ-OUT
TO GROUND STATION

ADC HQ
(COLD SPRING)

GCE AGENCIES

USAP HQ
(WASH., D.C.)

ICBM INSTALL.

INTELLIGENCE AGENCIES
## Proposed ICBM Attack Alarm System

**Satellite Power Requirements vs. Supply**

<table>
<thead>
<tr>
<th>Power Requirements</th>
<th>Solar Power Supply</th>
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<tbody>
<tr>
<td><strong>UNIT</strong></td>
<td><strong>WATT HR/DAY</strong></td>
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<tr>
<td>TRANSMITTER</td>
<td>171</td>
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<tr>
<td>RECEIVER</td>
<td>117</td>
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<tr>
<td>DECODER</td>
<td>176</td>
</tr>
<tr>
<td>TIMER &amp; PROGRAMMER</td>
<td>120</td>
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<tr>
<td>SUBSYSTEM &quot;G&quot;</td>
<td>180</td>
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<tr>
<td>ATTITUDE DAMPING Syst.</td>
<td>240</td>
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<tr>
<td>YAW STAB. GYRO WHEEL</td>
<td>96</td>
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<tr>
<td><strong>TOTAL REQMT</strong></td>
<td><strong>1100</strong></td>
</tr>
</tbody>
</table>

### Comments:

- **80 FT² SOLAR CELLS REQUIRED AT 1000 N. MI. ALTITUDE ON NOON ORBIT**
- **OVERALL PERFORMANCE FACTOR: 33%**
## ICBM Attack Alarm System

### Vehicle Payload

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Infrared**    | Bouwers Concentric Optical System  
7-Inch Aperture; 1.3 Aperture Ratio  
Uncooled Lead-Sulphide Detectors  
Modulating Reticle Mounted on Rotating Scanner Frame  
Transistorized Infrared Signal Amplifiers |
| **Communications** | Transmitter & Modulators  
Command Receiver  
Decoder  
Timer/Programmer  
4 Quadrant Receiving Antennas  
Transmitter Antenna |
| **Aux. Power**  | Solar Energy Collector Cells  
400 Cycle Inverter  
2000 Cycle Inverter  
28V DC Regulator  
Nickel-Cadmium Battery |

*SECRET*
PROPOSED ICBM ATTACK ALARM SYSTEM

OPERATIONAL GROUND BASE REQUIREMENTS

1. LAUNCH SITE - COOKE AIR FORCE BASE
   • LAUNCH PADS: THREE
   • GRND. SUPP. EQUIP: THREE SETS
   • ASSEMBLY HANGARS: ONE

2. TRACKING STATIONS - NORTHEAST, NORTHWEST, & SOUTH CENTRAL
   • SAME UHF INSTALLATIONS AS PROGRAMS I, II, & III
     (IF VHF IS UTILIZED, ADDITIONAL EQUIPMENT REQUIRED)

3. READ OUT STATIONS - THULE, GREENLAND; FAIRBANKS, ALS; N. SCOTLAND
   • THREE 60 FT. TRACKING ANTENNAS FOR IR DATA & TELEMETRY RECEPTION.
   • THREE DATA LINK & THREE TELEMETRY RECEIVERS.
   • TWO DIRECTION FINDERS & TWO COMMAND TRANSMITTERS WITH ANTENNAS.
   • THREE SETS OF DISPLAY CONSOLES & CONTROL CONSOLES.
   • MASTER CONTROL CONSOLE, DATA RECEIVERS, ORBIT TRACKING PROGRAMMER.
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WS117L DATA CONTROL

RECONNAISSANCE MISSION ASSIGNMENT

1. IDENTIFICATION
2. PRIORITY
3. TYPE OF RECONNAISSANCE
4. AREA TO BE COVERED
5. TIME SPAN

WS117L TECHNICAL OPERATIONS CONTROL

MISSION STATUS
WS-117L/SM-75 PROGRAM OBJECTIVES

SECRET

PRIMARY

• LAUNCH OF WS-117L/SM-75 COMBINATION
• ACHIEVEMENT OF ORBIT
• DEVELOPMENT WS-117L AIRBORNE & GROUND SYSTEMS
• DEVELOPMENT OF GROUND/SPACE COMMUNICATIONS

SECONDARY

• RECOVERY
• AEROMEDICAL MEASUREMENTS
• G. R. D. MEASUREMENTS
## Flight Missions & Objectives

### Program II A

<table>
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<tr>
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<td>1</td>
<td>225</td>
<td>1275 VERT.</td>
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<td>JP4/IRFNA</td>
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<td>1547 HORIZ. 195°</td>
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<td>Bio-Medical</td>
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<td>145</td>
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<td>Capsule 195°</td>
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<td>(N=125 S.M.E = .02)</td>
<td>(165° LAUNCH AZIMUTH)</td>
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<td>GRD. ALBEDO</td>
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<td>Phase B</td>
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<td>DENSITY COSMIC RAY</td>
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<td>Engineering Tests</td>
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<td>6-8</td>
<td>160</td>
<td>1649</td>
<td>250 LBS.</td>
<td>CAPSULE</td>
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<tr>
<td>10 THRU 160</td>
<td>1649</td>
<td>250 LBS.</td>
<td>CAPSULE</td>
<td></td>
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<td>Experiment</td>
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</table>

Phase A: Engineering Tests
Phase B: Engineering Tests
Bio-Medical Experiment
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Sentry Recovery Operations

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WS-117L BIO MED. VEHICLE

195 LB. - JP4
279 LB. - UDMH

73'10"

60°

19'5"

1429 LB. - EMPTY

7309 LB. - THOR-PAYLOAD

44.45"

27.45"

-33.13"

SECRET
WSI 7L USEFUL PAYLOAD WEIGHT VS ALT.

PROPOSED MAN IN SPACE PROG.

GROSS PAYLOAD WT.
ALLOWABLE CAPSULE WT.

GROSS PAYLOAD INCLUDES:
- DESTRUCT: 25
- CONTROLS: 175
- APU: 45
- GUIDANCE: 140
- TELEMETER & APU: 60
- RETRO ROCKET: 181

SUB-TOTAL: 728

CAPSULE VARIABLE AS SHOWN
ABOVE, APPROX. 2300 TO 3300
GROSS WT. VARIABLE AS SHOWN

NOTE:
1. AFMTC LAUNCH
2. 28° ORBIT

ALTITUDE S. MILES

LBS.

5000
4000
3000
2000
1000
0

100 150 200 250 300 350 400
SATELLITE WEATHER MISSIONS

SCIENTIFIC RESEARCH
DETERMINE MEANS FOR UTILIZING SATELLITE DATA
CORRELATE DATA OVER LARGE AREAS OF EARTH
PERFORM STUDIES ON WEATHER CONTROL

STORM PATROL
DETECT PRESENCE OF MAJOR STORM CENTERS
PERFORM TIMELY TRACKING AND WARNING

DOMESTIC WEATHER FORECASTING
AUGMENT PRESENT SYSTEM OF STATIONS
PROVIDE ADDITIONAL COVERAGE

MILITARY MISSIONS
WEATHER DATA FOR OPERATIONAL MISSIONS
INTELLIGENCE INFORMATION
WS-117L TECHNICAL SCHEDULING
SENTRY WEATHER SURVEILLANCE

SECTIONS
- PHOTOGRAPHY
- RADIOMETER
- RADAR

STATUS MOSAIC AT WEATHER CENTER

AFFORDS SYNOPTIC RECORD
- CLOUD TYPE
- CLOUD COVER
- CLOUD VELOCITY
- CLOUD ALBEDO
- TERRESTRIAL RADIATION SPECTRUM
- TERRESTRIAL HEAT BALANCE

1000 MILES

LOCKHEED AIRCRAFT CORPORATION
MISSILE SYSTEMS DIVISION

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TYPES OF WEATHER DATA

CONFIDENTIAL

MILITARY AND DOMESTIC

PRESENT METHODS

TEMPERATURE
PRESSURE
HUMIDITY
WIND VELOCITY
RECENT WEATHER HISTORY

SATELLITE DATA

VISUAL
CLOUDS-SEMI QUANTITATIVE
  1. EXISTENCE
  2. WIND VELOCITY
  3. WIND SHEARS
  4. VERTICAL STRUCT
  5. WATER Vapor
  6. AIR STABILITY
  7. LEE CLOUDS OVER MOUNTAINS
  8. FRONTAL CLOUDS

RADIO METRIC
ALBEDO
OZONE CONCENTRATIONS
SOLAR RADIATIONS

RADAR
PRECIPITATION
ALBEDO
# POSSIBLE SCIENTIFIC EXPERIMENTS

## UTILIZING WS-117L VEHICLE

<table>
<thead>
<tr>
<th>DRAG</th>
<th>LARGE PAYLOAD</th>
<th>DATA STORAGE &amp; WIDE-BAND TRANSMISSION</th>
<th>LARGE POWER (LONG LIFE)</th>
<th>POLAR ORBIT</th>
<th>CONTROLLED ATTITUDE</th>
<th>INTER-SATELLITE COMM.</th>
<th>COINCIDENCE-TYPE EXPERIMENTS</th>
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<tbody>
<tr>
<td>SOLAR UV, X-RAYS, &amp; TOTAL RADIATION</td>
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<tr>
<td>PRIMARY AND ALBEDO COSMIC RAYS</td>
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<tr>
<td>ELECTRON DENSITY IN IONOSPHERE</td>
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<td>△</td>
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<tr>
<td>DENSITY AND TEMPERATURE IN ORBIT</td>
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<td>△</td>
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</tr>
</tbody>
</table>

- △ NOT NECESSARY FOR THE MEASUREMENT
- △ USEFUL FOR THE MEASUREMENT
- △ ADDS GREATLY TO VALUE OF MEASUREMENT
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