SPECIAL HANDLING

DISCOVERER-CORONA GENERAL BRIEFING PORTFOLIO

SPECIAL HANDLING
Notice of Page Substitution

Scope

For the purposes of electronic archiving, this page is a substitute for an unscannable page.
## General Schedule

<table>
<thead>
<tr>
<th></th>
<th>1958</th>
<th>1959</th>
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<tbody>
<tr>
<td></td>
<td>AMJ</td>
<td>JAN</td>
</tr>
<tr>
<td><strong>System Analysis</strong></td>
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<tr>
<td><strong>Design</strong></td>
<td>[ ]</td>
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<tr>
<td><strong>Test</strong></td>
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</tr>
<tr>
<td><strong>Flight</strong></td>
<td>[ ]</td>
<td>[ ]</td>
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</tbody>
</table>
DISCOVERER TRAJECTORY TO ORBIT

183° EAST OF NO.-VAFB-FLT.N#5

GROSS WEIGHT 114,650 LBS.
COMBINED BOOSTER & ORBIT STAGE

SEPARATION 103 SEC.
THOR BURNOUT 107 SEC.

THOR BOOSTER PERIOD 23 MIN.

COAST PERIOD 27 MIN.

SENTRY ENGINE CUTOFF 230.8 SEC.
THRUNTH PERIOD 150.8 SEC.
SENTRY ENGINE START 256 SEC.

ORBIT VELOCITY 25,700 FT/SEC.
ORBIT INJECTION ALTITUDE 151 K. AL.
ORBIT STAGE ATTITUDE

LAUNCH
WS117L RECOVERY ORBITS

PROGRAM IIA

17th PASS

18th PASS

RECOVERY INITIATED

RECOVERY COMMAND

CHINAK

Palo Alto

Voice & Data Cable

Recovery Force ORNL & ACQ ADRS

Data Cable  Palo Alto-Kaena Pt.

HF Radio  Kaena Pt-Recon Force

VHF/UHF Radio  SHIP-CAP  ICES Float Plane

UHF Radio  SHIP-CAP  ICES Aircraft

APS Echo Radar  ICES Aircraft

VHF Beacon  Capsule-Recon Force

Impact Area
## Predicted Impact Areas

### Pre-Launch-Area I
- Performance Variations
- Retro Attitude & Velocity
- Reentry Drag

**90% Probability**
- Downrange: -750 N. Miles
- Crossrange: -400°

### Post Tracking-Area II
- Tracking Accuracy
- Retro Attitude & Velocity
- Reentry Drag

**90% Probability**
- Downrange: -37 N. Miles
- Crossrange: -36°

**99.7% Probability**
- Downrange: -176 N. Miles
- Crossrange: -66°
## Re-entry Dispersion Summary

<table>
<thead>
<tr>
<th>Component</th>
<th>Down Range</th>
<th>Side Range</th>
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</thead>
<tbody>
<tr>
<td>Retro Rocket Dynamics</td>
<td>±67 km</td>
<td>±32 km</td>
</tr>
<tr>
<td>2% Variation in Isp</td>
<td>±34°</td>
<td>±0°</td>
</tr>
<tr>
<td>±2 Sec Separation Time Error</td>
<td>±8°</td>
<td>±0°</td>
</tr>
<tr>
<td>Radar Tracking</td>
<td>±44°</td>
<td>±9°</td>
</tr>
<tr>
<td>Re-entry Wind</td>
<td>±2°</td>
<td>±2°</td>
</tr>
<tr>
<td>±15% Variation in Co %m</td>
<td>±10°</td>
<td>±0°</td>
</tr>
<tr>
<td></td>
<td>±88 km</td>
<td>±33 km</td>
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Coverage

For the purposes of electronic archiving, this page is a substitute for an unscannable page.
Pages 9 through 12 of CORONA, ARGON, LANYARD programmatic information are not provided because their full text remains classified.
GROUND TRACKS & TRACKING STATION COVERAGE

POLAR ORBIT, PERIGEE 118 S. Mi. (NOMINAL ORBIT)

ECCENTRICITY = .01, PERIOD 89.56 Min.

ADVANCE PER ORBIT = 22.45°
GROUND TRACKS & TRACKING STATION COVERAGE

POLAR ORBIT, ALTITUDE 138 S. MI.
ECCENTRICITY = 0, PERIOD = 88.95 Min.
ADVANCE PER ORBIT = 22.30°
GROUND TRACKS & TRACKING STATION COVERAGE

POLAR ORBIT, PERIGEE 98 S. MI.
ECCENTRICITY = .0015, PERIOD = 89.57 MIN.
ADVANCE PER ORBIT = 22.45°
GROUND TRACKS & TRACKING STATION COVERAGE
POLAR ORBIT, PERIGEE 98 S. Mi.
ECCENTRICITY = .02, PERIOD=90.25 Min.
ADVANCE PER ORBIT=22.62
40° N. LAT.

COVERAGE vs ALTITUDE

COVERAGE - PERCENT

ALTITUDE - STATUTE Mi.

1 DAY

2 DAYS

3 DAYS

4 DAYS
55° N. LAT.

4 DAYS

3 DAYS

2 DAYS

1 DAY

COVEREDAGE - PERCENT

ALTITUDE - STATUTE MI.

COVERAGE VS ALTITUDE
Highest latitude at which design resolution can be achieved as a function of time of year (S.A. 1108 film).

Note: Design resolution for S.A. 1108 is kept on ground.
HIGHEST LATITUDE AT WHICH DESIGN RESOLUTION CAN BE ACHIEVED AS A FUNCTION OF TIME OF YEAR (F.O. 1221 FILM)

NOTE: DESIGN RESOLUTION FOR F.O. 1221 IS 18 FT. ON GROUND

[Graph showing the relationship between latitude and time of year with curves for launch at noon and launch at noon + 3 hours]
TYPICAL COVERAGE—ONE DAY OPERATION
POLAR ORBIT, ALTITUDE 138 S.Mi., PERIOD = 88.95 Min.
ECCENTRICITY = 0 (CIRCULAR)
ADVANCE PER ORBIT = 22 30°.
TYPICAL COVERAGE - TWO DAY OPERATION

POLAR ORBIT, ALTITUDE 138 S. Mi., PERIOD = 88.95 Min.
ECCENTRICITY = 0 (CIRCULAR)
ADVANCE PER ORBIT = 33.36°
Covered Operation on First & Third Days

Polar Orbit, Altitude 138 S. Mi., Period = 88.95 Min.
Eccentricity = 0 (Circular)
Advance Per Orbit = 22.2°
TYPICAL COVERAGE - ONE DAY OPERATION

ORBIT INCLINED -85° TO EQUATOR, ALTITUDE 138 S. Mi.
ECCENTRICITY = 0, PERIOD = 88.95 Min.
TYPICAL COVERAGE—TWO DAY OPERATION

ORBIT INCLINED = 85° TO EQUATOR, ALTITUDE 138 S.MI.

ECCENTRICITY = 0, PERIOD = 88.95 Min.
TYPICAL COVERAGE-ONE DAY OPERATION

ORBIT INCLINED -75° TO EQUATOR, ALTITUDE 138 S.MI.
ECCENTRICITY = 0, PERIOD = 88.95 Min.
ADVANCE PER ORBIT = 22.30°
TYPICAL COVERAGE - TWO DAY OPERATION

ORBIT INCLINED - 75° TO EQUATOR, ALTITUDE 138 S. MI.
ECCENTRICITY = 0, PERIOD = 88.95 MIN.
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Detail Schedules

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DELIVERY & PRODUCTION SCHEDULE

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Vehicle

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CONFIDENTIAL

SENTRY ORBITAL TEST VEHICLE

BOOSTER SEPARATION
THERMAL DESIGN (HEAT)
## WEIGHT SUMMARY - RECONNAISSANCE SYSTEM

<table>
<thead>
<tr>
<th>Item</th>
<th>Qty.</th>
<th>Description</th>
<th>Qty.</th>
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<tr>
<td>Control &amp; Rudder</td>
<td>2</td>
<td></td>
<td>1.9</td>
</tr>
<tr>
<td>Turret &amp; Ring</td>
<td>1</td>
<td></td>
<td>1.7</td>
</tr>
<tr>
<td>Motor, Generator, Gear, Etc.</td>
<td>1</td>
<td></td>
<td>1.0</td>
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<tr>
<td>Miscellaneous</td>
<td>3</td>
<td></td>
<td>3.2</td>
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<tr>
<td>Total</td>
<td>8</td>
<td></td>
<td>8.8</td>
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</tbody>
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### Notes
- A. Inclined shell armor.
- B. Projected armor.
- C. Miscellaneous equipment.

**Total Weight:** 8.8
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Camera

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## COMPARISON TABLE - PANORAMIC CAMERA TYPES

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>PANORAMIC CAMERA TYPE</th>
<th>MIRROR FOCAL PLANE CAMERA</th>
<th>MODIFIED MIRROR ABLE CAMERA</th>
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<tr>
<td>PRIMARY CRITERIA</td>
<td>MOST SIMPLE</td>
<td>GOOD RELIABILITY</td>
<td>GOOD RELIABILITY</td>
</tr>
<tr>
<td>1. RELIABILITY AND</td>
<td>MOST RELIABILITY</td>
<td>GOOD RELIABILITY</td>
<td>GOOD RELIABILITY</td>
</tr>
<tr>
<td>2. MINIMUM WEIGHT AND</td>
<td>EXCELLENT</td>
<td>GOOD</td>
<td>FAIR</td>
</tr>
<tr>
<td>3. MINIMUM WEIGHT AND</td>
<td>MODERATE</td>
<td>MODERATE</td>
<td>LOW</td>
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<tr>
<td>POWER</td>
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<td></td>
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<tr>
<td>SECONDARY CRITERIA</td>
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</tr>
<tr>
<td>1. CONSTRUCTION</td>
<td>GOOD</td>
<td>GOOD</td>
<td>GOOD</td>
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<tr>
<td>ADAPTABLEITY</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2. GROWTH PATTERN</td>
<td>POOR</td>
<td>GOOD</td>
<td>GOOD</td>
</tr>
</tbody>
</table>

**TECHNICAL SKETCH**

Image 1: MIRROR FOCAL PLANE

Image 2: MODIFIED MIRROR ABLE CAMERA

Image 3: PANORAMIC CAMERA
## Comparison Table Panoramic Camera Types

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Oscillating Mirror Camera</th>
<th>Modified EE Camera</th>
<th>Nodding Lens Camera</th>
<th>Modified Pure Rotary Camera</th>
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</thead>
<tbody>
<tr>
<td>Primary Criteria</td>
<td>FAIR</td>
<td>GOOD RELIABILITY</td>
<td>POOR</td>
<td>FAIR RELIABILITY</td>
</tr>
<tr>
<td>Inherent Performance Capabilities</td>
<td>FAIR</td>
<td>GOOD</td>
<td>POOR</td>
<td>FAIR</td>
</tr>
<tr>
<td>Minimum Weight and Power</td>
<td>HIGH</td>
<td>HIGH</td>
<td>HIGH</td>
<td>HIGH</td>
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<tr>
<td>Configuration Adaptability</td>
<td>FAIR</td>
<td>FAIR</td>
<td>EXCELLENT</td>
<td>POOR</td>
</tr>
<tr>
<td>Growth Potential</td>
<td>POOR</td>
<td>GOOD</td>
<td>GOOD</td>
<td>POOR</td>
</tr>
</tbody>
</table>

### Technique Sketches

4. Mirror Motion

5. Focal Plane Motion

6. Focal Plane with Rotation

7. Film Scan Rotation Plus Oscillation
SWATH WIDTH - STATUTE MI.

SWATH WIDTH VS SCAN ANGLE
GROUND RESOLUTION VS SCAN ANGLE
CONTROL SYSTEM CHARACTERISTICS

DESIGN GOAL: 21° DEAD ZONE, TOTAL % IAC ERROR = 5.4%
EXPECTED: 21° DEAD ZONE, TOTAL % IAC ERROR = 6.9%

[Diagram showing yaw angle in degrees and roll rate in milliradians per sec versus % error in IAC at various conditions.

Legend:
- Yaw angle: degrees
- Roll rate: milliradians/sec

Ground resolution in feet at different conditions.

SA 1221 @ 1/1000 sec.
SA 1100 @ 1/1000 sec.
SA 1221 @ 1/1000 sec.]
RESOLUTION vs. PERCENT IMAGE MOTION COMPENSATION ERROR FOR EK SO 1188 AND EK SO 1221
Resolved Ground Spacing vs. Camera Resolution

Medium Contrast Test Target
Density Differences of 0.50 ± 0.10
(Ref. MIL STD 180)

Design Point

\[ f = 24^\circ \]

\[ d_g = \frac{f}{h} \]
HYAC II CAMERA PARAMETERS

ELEVATION LIMITS - 135° N. LIMIT
HORIZON - 2° OF THE HORIZON
ENDED - FOCAL LENGTH 1650 MM, 2X
FIELD ANGLE, FOCAL LENGTH, MINIMUM
200 TIMES FOR BB, LENS X-4 EQUIPMENT
FIELD - 70 MM, \[ \frac{-}{1.5/6} \] (3 2/3 Meters)

FOCAL LENGTH 400, 600, 800
EXPOSURE - 1/120, 1/300, 1/600 SEC.
CAPABILITY - 7000 BFT OF FUEL (10 HRS.)

TOOL TRACK LENGTH 1000
OVERLAP - 245 AT ELEVATION ALTEK
365 - 90° OVER-ALL.

THE RACE - VARIABLE BECAUSE IN 2S RACE TO 2 MINS PER
THEORETICAL, AND IN 2S RACE UP TO 2 MINS.
OPERATIONAL EQUIPMENT - TRELEASE 2X-FOCAL
LENGTH 40° TO 2 MINS.

ACCURACY OF LOCATION - ONE MILE OVER-ALL
ACCURACY RACE - VARIOUS TO 0.3 MILES, VARIOUS THE
HANDS FOR INDIKATION OF VARIOUS VELOCITY,
HANDS FOR STANDARD REASSURANCE FOR INDIKATION
OF FUEL AND RACE TO 0.3°
THE INDIKATION TO 0.3° AT VARIOUS OF RACE IN
OVER-ALL WHICH
WHICH - ONE, OTHERS UNDER SLIGHT, \[ W/\] COURSE,
AND INDIKATION 30.5 MILES.
THE-UP OVER-ALL - 20.5 MILES.
HYAC II
HIGH ACUITY CAMERA
AND CASSETTE
HIGH ACUITY PANORAMIC CAMERA
HIGH ACUITY
PANORAMIC CAMERA
HIGH ACUITY
PANORAMIC CAMERA
HIGH ACUITY
HYAC II LENS ASSEMBLY
FOCAL LENGTH 24" 4/8
HYAC II
FUNCTIONAL DIAGRAM

A. CONTROL—SEQUENTIAL

B. SEQUENTIAL STEPS

1. FILM SUPPLY LOOP FILLS.
2. FULL LOOP TRIGGERS FILM TRANSPORT.
3. FILM TRANSPORT COMPLETION TRIGGERS SCAN ARM.
4. SCANNING ARM RETURN STROKE PREPARES SYSTEM FOR REPEETITIVE CYCLE.
%h CONTROL

VEHICLE COMMAND RECEIVER

GROUND COMMAND TRANSMITTER

ONE SWITCH CLOSURE IS ONE COMMAND

%h CONTROL SECTOR

STEPPING SWITCH (10 POSITION)

SWITCH (2 DIFFERENT 10 MINIMUM)

VOLTAGE DIVIDER (0-12 VOLTS IN 10 STEPS)

CAMERA DRIVE SERVO (NOMINAL 240)

VEHICLE TELEMETRY TRANSMITTER

%h CONTROL SECTOR

POSITION MONITOR

GROUND TELEMETRY RECEIVER DECOMMUTATOR
VEHICLE CLOCK

CRYSTAL OSCILLATOR
FREQUENCY: 81520 CYCLES/SEC.
STABILITY: ONE PART/MILLION

180 PULSES/SEC. - PRODUCE VERNIER TIME MARKS ON FILM

DIGITOTE ELECTRO-MECANICAL COUNTER
TOTAL COUNT 99999

CRISSCROSS TO FRAME

VOLTAGES PROPORTIONAL TO NUMBERS INDICATED

VEHICLE TELEMETERING EQUIPMENT

RECEIVING EQUIPMENT FOR WWV TIME SIGNALS

TRACKING STATION TELEMETERING & DATA RECORDING EQUIPMENT

PRINTED RECORD DISPLAYING VEHICLE TIME & REAL TIME
FLOW DIAGRAM
INSTRUMENTATION SIGNALS
## POWER CONSUMPTION
### RECONNAISSANCE SYSTEM

<table>
<thead>
<tr>
<th>POWER SOURCE</th>
<th>SEPT. 24 WATT-HOURS</th>
<th>JAN. 23 WATT-HOURS</th>
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<tbody>
<tr>
<td>115 VOLTS ± 1% 400 ± 1 CPS, 1 φ</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>115 VOLTS ± 5% 2000 ± 20 CPS, 1 φ</td>
<td>240</td>
<td>0</td>
</tr>
<tr>
<td>+28 VOLTS D.C. REGULATED ± 1.8%</td>
<td>12.32.5</td>
<td>326</td>
</tr>
<tr>
<td>-28 VOLTS D.C. REGULATED ± 1.8%</td>
<td>12.5</td>
<td>20</td>
</tr>
<tr>
<td>+28 VOLTS D.C. UNREGULATED</td>
<td>0</td>
<td>190</td>
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**TOTAL 1500 541**
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Recovery Body

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RECOVERY SYSTEM

● Parachute Descent

● Capsule Tracking & Acquisition Aids
  (A) Chaff
  (B) Silvered Chute
  (C) Pulsed Beacon
  (D) Rescuelite

● Detection Devices
  (A) RC-121 Aircraft with APS20/45 Radar
  (B) C-119J Aircraft with Direction Finder
  (C) Ships with Direction Finder

● Pickup Equipment
  (A) C-119J with A.A.E. Co Model 80C Pickup Equipment
  (B) Ship
RE-ENTRY CAPSULE
EXPLOSIVE PIVOTS.

RE-ENTRY BODY

EXPLOSIVE PISTONS

SPENT RETRO & SPIN ROCKETS

TIME: 14 SEC. AFTER EJECTION FROM SENTRY
RECOVERY SYSTEM

CHAFF PARACHUTE
BEACON LIGHT
RECOVERABLE PAYLOAD
ABLATIVE SHELL RELEASED

ALTITUDE 50,000 FT
CAPSULE RECOVERY

PROGRAM IIA

RC-121 RADAR LOCATING & VECTORING AIRCRAFT

C-125 PICKUP AIRCRAFT
WATER RECOVERY

LOCATING AIRCRAFT

PICK UP SHIP

RADIO BEACON

BEACON LIGHT

SEA MARKER
AET RECOVERY SYSTEM

WEIGHTS:
- Recovery Shell: 84.5 lbs
- Propulsion Ejection: 72.5 lbs
- Recovery System: 62.5 lbs
- Cassette: 12.5 lbs (capacity: 40 lbs)

Total: 2940 lbs

Note: Film not included
RECOVERY .IDS CHARACTERISTIC.

TELEPHONE PACKAGE
(1) OPENING FREQUENCY = 250-1000 Hz
(2) ADJUSTMENT FREQUENCY = 1000 Hz
(3) POWER OUTPUT = 50 Watts
(4) AVERAGE POWER OUTPUT = 40 Watts
(5) WEIGHT = 4 lbs.
(6) OPERATING CAPACITY = 10 hours

REELING REEL (5 REELS)
(1) TIME = 1 MINUTE PER REEL
(2) FORCE = 5 x 105 LBS FORCE PER REEL
(3) FORCE ADJUSTMENT = 1 MINUTE
(4) WEAR = 500 REELS PER REEL
(5) OPERATING CAPACITY = 10 hours

SEA PACKAGE (5 REELS)
(1) TIME = 3 MINUTES PER REEL
(2) FORCE = 1000 LBS FORCE PER REEL
(3) FORCE ADJUSTMENT = 3 MINUTES
(4) WEAR = 500 REELS PER REEL
(5) OPERATING CAPACITY = 10 hours

STANDBY INTEGRAL BATTERY
(1) TIME = 3 MINUTES TO ATTEND, 3 min. REEL IN 5-MIN.
(2) FORCE = 1000 LBS FORCE PER REEL
(3) FORCE ADJUSTMENT = 3 MINUTES
(4) WEAR = 500 REELS PER REEL
(5) OPERATING CAPACITY = 10 hours

SEA PACKAGE = LIGHT SHIP DECK, ATEX OR WATER-RESISTANT; LARGE DEPENDENT ON SEA STATE AND TYPE OF DAY OR NIGHT

SEA BATTERY = SHIP SHIP DECK, ATEX OR WATER-RESISTANT; LARGE DEPENDENT ON WAVE AND SEA STATE
PARACHUTE & CHAFF SYST.

PARACHUTE CHARACTERISTICS:

- MAX. DIAMETER: 21.5 FEET
- WEIGHT: 13.5 LBS.
- MAX. RATE: 35 FPS AT 30,000 FT
- CORDAGE:
  - 1.1 CS/ROV. 28 ILIMA WAXED NYLON
  - 125 FEET NYLON CORE

CONSIDERED WITH ALUMINIZED DISKETTES OR METALLIZED AND FIRE CHARGE PACKAGE FOR BOTH RADAR REFRACTIVITY AND VISUAL IDENTIFICATION

- WEIGHT: ALTERNATIVELY 375 & 1500 LB. TEST

CHAFF CHARACTERISTICS:

- RELEASED WITH CHAFF OPENER
- TYPE B, MERRITT MILLER & BROS. CO.
- "REPUBLIC I 40" DISH ALUMINUM
- WEIGHT OF CHAFF: .8 LB
- TIED TO "TP" AND "UP" BANDS

MATERIALS & SIZES:

- PARACHUTE, VISUAL - APPROX. 39.5 FEET
- PARACHUTE, APS-40 MARA - 70 F. FEET
- PARACHUTE, APS-45 MARA - 70 F. FEET
- CHAFF, APS-40 MARA - 140 F. FEET

- DYED FABRIC
- METALLIZED FABRIC
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Programmer

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SIMPLIFIED FUNCTIONAL BLOCK DIAGRAM
SECONDARY PROGRAMMER

Programmer period is adjustable by command to
be equal to the vehicle orbit period to ±5 seconds.
Programmer may be reset by command to synchronize
programmed events with position of vehicle in orbit.
Capacity - 120 orbit programs, all different.
ONE PERIOD = 4 1/2 IN. OF TAPE

RELAY NO. 1
RELAY NO. 2
RELAY NO. 3
RELAY NO. 4
RELAY NO. 5
RELAY NO. 6
PERIOD INDEX

TAPE MOTION

CANCEL ALL
START FIRST PERIOD
CLOSE RELAY NO. 1
CLOSE RELAY NO. 2
CLOSE RELAY NO. 3
CLOSE RELAY NO. 4
CLOSE RELAY NO. 5
CLOSE RELAY NO. 6
OPEN RELAY NO. 1
OPEN RELAY NO. 2
OPEN RELAY NO. 3
OPEN RELAY NO. 4
OPEN RELAY NO. 5
OPEN RELAY NO. 6
START SECOND PERIOD

TYPICAL TAPE
SECONDARY PROGRAMMER
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GSE

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For the purposes of electronic archiving, this page is a substitute for an unscannable page.
ALTITUDE TEST CHAMBER

TEMP SYSTEM
SIDE SEGMENTS (12) -85°C to +160°C
Top & Bottom Plates
-85°C to +100°C

VACUUM SYSTEM
Ultimate Vacuum
1x10^-6 mm Hg.
Specified Press. Reached & Maintained
in Max. Of 60 Min. U/Day Chamber

INSTRUMENTATION
Vacuum Monitoring - Cont. Record & Visual
Measuring Syst. 800 mm Hg to 10^-7 mm Hg
±5% Actual Readings

Temp. Measure. Inputs To And Elem. - 14 Recorders
Test Specimen - 4 Recorders
(20 Data Ch. Ea.)
ENVIRONMENT TEST CHAMBER INSTAL.
THERMAL TEST OBJECTIVES

A. CALIBRATION TEST
1. Determine Time Change Capability of Chamber w/ Small Load
2. Estimate Response of Vehicle Skin Alone to Envirom Conditions

B. AET TEST
To check certain points in order to establish design envelope.
1. Determine mean temp. of interior under assumed envirom conditions.
2. Determine amplitude of oscillations of the interior temperature.
3. Determine characteristic time of the mean interior temp. change.
4. Determine influence of thermal oscillations on the characteristic time of mean interior temp change.
**THERMAL TEST #1 RESULTS**

1. **Spatial-temporal temperatures distributions were obtained.**

2. Temperature differences on Plate B do not exceed approx. 80°F at any time.

3. Temperature on Plate 2 indicates need for more effective isolation from heat source.

4. Thermal design of electronics section should aim at mean temperature of +75°F.

5. Basic thermal control design verified.
Typical Thermal Data
CRITICAL MAX & MIN DATA POINTS
RECOVERY TESTING PROGRAM

- CHAFF EVALUATION
- AIR TARGET CHARACTERISTICS
- WATER TARGET CHARACTERISTICS
- VECTORING TECHNIQUES & PICKUP
- OPERATIONAL VEHICLE AIR PICKUP
- OPERATIONAL VEHICLE WATER IMPACT
- OPERATIONAL REHEARSAL
RECOVERY TESTING & PROGRAM SUPPORT

<table>
<thead>
<tr>
<th>Testing</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
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<tbody>
<tr>
<td>Chaff Evaluation</td>
<td>24-30 Aug</td>
<td></td>
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<tr>
<td>Air Target Characteristics</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hardware</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dummy Capsules</td>
<td>3, 2, 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CAPSULE DROP BOMB

- Transition Piece
- Test Article
- Retainer Door
- Spring Loaded Chute Door
- Release Mechanism
- 1/4 Wall x 20" Dia. Water Well Casing
### AERIAL RECOVERIES

<table>
<thead>
<tr>
<th>PARACHUTE</th>
<th>DROPS</th>
<th>CONTACTS</th>
<th>RECOVERIES</th>
<th>AVERAGE PASSES PER CONTACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>MK I</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mod. 0</td>
<td>15</td>
<td>16</td>
<td>7(100%)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1(100%)</td>
<td>1.0</td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td>10</td>
<td>6(60%)</td>
<td>3.3</td>
</tr>
<tr>
<td>TOTAL</td>
<td>31</td>
<td>27</td>
<td>14(50%)</td>
<td></td>
</tr>
<tr>
<td>MK II</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mod. 0</td>
<td>17</td>
<td>15</td>
<td>11(73%)</td>
<td>3.7</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0(0%)</td>
<td>5.0</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>7</td>
<td>4(37%)</td>
<td>3.5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>28</td>
<td>23</td>
<td>15(69%)</td>
<td>3.7</td>
</tr>
<tr>
<td>TRAINING</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1h'</td>
<td>53</td>
<td>-</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>2h'</td>
<td>63</td>
<td>-</td>
<td>52</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>139</td>
<td>-</td>
<td>89</td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**

1. Recovery percentages based on contacts, not drops.

2. Average passes per contact based on total passes, including those for chutes not contacted.

3. Mk. I and Mk. II drops include those made in load tests and in Phase II tests (over water) for which data are available.
**CONFIGURATION DEVELOPMENT**

**Mod. 1 - Parachutes**

Same as Mod 0 except for reinforced lines and vented canopy. Improvement of stability was insignificant and rate of descent increased considerably.

**Mod. 2 - Parachutes**

Same reinforcement as Mod 1, vents deleted, and skirt extended to 150 in lieu of 10. Stability was improved, but sink rate was increased.

**Mod. 3, 3A and 4 - Parachutes**

Same reinforcement as Mod 1, no vents, and diameter increased. Stability of Mods. 3 and 4 was acceptable but Mod 3A was unsatisfactory.

<table>
<thead>
<tr>
<th>PARACHUTE MODEL</th>
<th>PARACHUTE WEIGHT (pounds)</th>
<th>FLAT NO.</th>
<th>SINK RATE (fps) AT 1000' AFE</th>
<th>PARACHUTE STABILITY (PILOT REPORT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M I - 0</td>
<td>3.6</td>
<td>28.0</td>
<td>25.0</td>
<td>POOR</td>
</tr>
<tr>
<td>M II - 0</td>
<td>7.5</td>
<td>20.0</td>
<td>25.0</td>
<td>POOR</td>
</tr>
<tr>
<td>M I - 1</td>
<td>9.9</td>
<td>20.0</td>
<td>20.0</td>
<td>POOR</td>
</tr>
<tr>
<td>M II - 1</td>
<td>9.3</td>
<td>20.0</td>
<td>20.0</td>
<td>POOR</td>
</tr>
<tr>
<td>M II - 2</td>
<td>5.1</td>
<td>14.3</td>
<td>22.0</td>
<td>ACCEPTANCE</td>
</tr>
<tr>
<td>M II - 3</td>
<td>5.5</td>
<td>16.5</td>
<td>17.0, 28.1</td>
<td>ACCEPTANCE</td>
</tr>
<tr>
<td>M II - 3A</td>
<td>11.3</td>
<td>4.0</td>
<td>12.0, 20.0, 28.0</td>
<td>ACCEPTANCE</td>
</tr>
<tr>
<td>M II - 4</td>
<td>13.3</td>
<td>20.0</td>
<td>26.0, 30.5</td>
<td>GOOD</td>
</tr>
</tbody>
</table>
Alignment - Compatibility

Interface Tests

Facility - Itek Waltham Plant - Boston
Personnel - Fairchild, Itek, Lockheed, G.E.
Date - Jan. 12-16, 1959
Test Specimen - Camera - Engng. Model
Reentry Caps. - Prod. Unit No. 101
Nose Cone Fairing - Fli Unit

Scope -
2. Check Compatibility of Camera, Fairing & Reentry Capsule.
## TEST #2

**THERMAL GRADIENT**

<table>
<thead>
<tr>
<th>THERMOCOUPL.</th>
<th>BASE LINE</th>
<th>( T_1 )</th>
<th>( T_2 )</th>
<th>( T_3 )</th>
<th>( T_4 )</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 7</td>
<td>80°</td>
<td>186°</td>
<td>169°</td>
<td>235°</td>
<td>246°</td>
<td>TOP FEED ACCESS DOOR</td>
</tr>
<tr>
<td>2 - 8</td>
<td>81°</td>
<td>130°</td>
<td>121°</td>
<td>155°</td>
<td>155°</td>
<td>RET. HORIZON</td>
</tr>
<tr>
<td>3 - 9</td>
<td>85°</td>
<td>175°</td>
<td>161°</td>
<td>235°</td>
<td>249°</td>
<td>TOP-UNDER MTE. FINGERS</td>
</tr>
<tr>
<td>4 - 10</td>
<td>80°</td>
<td>104°</td>
<td>107°</td>
<td>122°</td>
<td>127°</td>
<td>LEFT HORIZON DOOR</td>
</tr>
<tr>
<td>5 - 11</td>
<td>80°</td>
<td>85°</td>
<td>95°</td>
<td>106°</td>
<td>110°</td>
<td>CAMERA MTE. PLATE</td>
</tr>
<tr>
<td>6 - 12</td>
<td>46°</td>
<td>35°</td>
<td>39°</td>
<td>40°</td>
<td></td>
<td>CENTER BOTTOM</td>
</tr>
</tbody>
</table>

**ARM CURRENT**

| NOMINAL %    | 5.0%      | 5.5%      | 5.0%      | 5.6%      | 5.6%      |
| HIGH %       | 5.5%      | 10.5%     | 10.5%     | 10.5%     | 10.0%     |
### Alignment Test - Reconnaissance System

<table>
<thead>
<tr>
<th>% Com. Posi</th>
<th>Armature Current-Church Test</th>
<th>Armature Current-Camera MTD in Fairing</th>
<th>Armature Current-Complete Assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low High</td>
<td>Low High</td>
<td>Low High</td>
</tr>
<tr>
<td>1</td>
<td>1.8 6.5</td>
<td>2.5 7.6</td>
<td>3.0 9.0</td>
</tr>
<tr>
<td>2</td>
<td>2.1 7.2</td>
<td>2.7 8.2</td>
<td>3.0 10.2</td>
</tr>
<tr>
<td>3</td>
<td>2.3 7.4</td>
<td>2.7 8.8</td>
<td>3.0 10.6</td>
</tr>
<tr>
<td>4</td>
<td>2.3 7.6</td>
<td>2.7 9.0</td>
<td>3.0 10.6</td>
</tr>
<tr>
<td>5</td>
<td>2.3 7.6</td>
<td>2.7 9.0</td>
<td>3.0 10.6</td>
</tr>
<tr>
<td>6</td>
<td>2.3 7.8</td>
<td>2.8 9.1</td>
<td>3.0 10.6</td>
</tr>
<tr>
<td>7</td>
<td>2.3 7.8</td>
<td>2.9 9.2</td>
<td>3.0 10.6</td>
</tr>
<tr>
<td>8</td>
<td>2.3 7.8</td>
<td>2.9 9.4</td>
<td>3.0 10.6</td>
</tr>
<tr>
<td>9</td>
<td>2.4 8.2</td>
<td>3.0 9.5</td>
<td>3.0 10.6</td>
</tr>
<tr>
<td>10</td>
<td>2.4 8.6</td>
<td>3.0 9.8</td>
<td>3.0 10.6</td>
</tr>
<tr>
<td>11</td>
<td>2.4 8.8</td>
<td>3.0 9.8</td>
<td>3.0 10.5</td>
</tr>
</tbody>
</table>

**NOTE:** Film broke after each scan sequence through 11 positions. Camera was run for 18 min. at nominal speed.
ALIGNMENT TEST - FAIRING

TEST DESCRIPTION:
A Production Fairing was instrumented and subjected to simulated exit heating and loading conditions.
B Deflections and 16 temps were recorded during heat / load cycle.
C Unit was allowed to cool to room temp and alignment of plates @ was checked mechanically.

DEFLECTION MEASUREMENTS - MAX.

COND I:
1. Relative in plane translation of plates
   X: Avg. .005" (1.3MM)
   Y: Avg. .000" (1.3MM)
   Out of parallel measurement of plates
   X: Avg. .001" @ 68.8"
   Y: Avg. 104° INCREASE
   Z: Avg. .250" INCREASE
   Avg. local sign deflection 104°

COND II:
2. Alignment of plates
   In plane translation 0.00"
   Axial Separation 0.000"
   Out of parallel 0.007" @ 68.8"

COND III: Limit load, press temp @.

COND IV: After test, no load, room temp.

CONCLUSION:
Exit heating and axial loading will not cause mis-alignment sufficient to impair operation of chimney / chutes.
Notice of Page Substitution

Operations

For the purposes of electronic archiving, this page is a substitute for an unscannable page.
WSI17L RECOVERY SYSTEM CONTROL

PROGRAM IIA

TECHNICAL OPNS CENTER
TEST DIRECTOR-AFMA
TEST CONDUCTOR-LAGD
(PALO ALTO)

HAWAII
AFMA STATION Cor.
LAGD STATION ASR.

C-129 PROVISIONAL ORE.
TAC-IMMAM AB

RC-121 SUPPORT
333RD AEW WING

SURFACE FORCE
US NAVY
## PROGRAM IIIA

<table>
<thead>
<tr>
<th>TIME PERIOD</th>
<th>COMMAND RECOV ORDER</th>
<th>RECOV FORCE ALERTED</th>
<th>RECOV COMMANDED</th>
<th>Refined Impact Area Data</th>
<th>Recovery Ops. Report</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td></td>
<td></td>
<td>(3)</td>
</tr>
</tbody>
</table>

### Table Legend

- **(1)**: Command Recov Order
- **(2)**: Reov Force Alerted
- **(3)**: Refined Impact Area Data
- **(4)**: Recovery Ops. Report

### Table Data

- **TIME PERIOD**: 90 HRS
- **COMMAND RECOV ORDER**: 90 HRS
- **RECOV FORCE ALERTED (1)**: 90-1525 HRS
- **RECOV COMMANDED**: 1525-1592 MIN.
- **Refined Impact Area Data (1)**: 1525 MIN.-27 HRS.
- **RECOVERY OPS. REPORT (3)**: 27 HRS

---

**Note**: The table contains time periods and operational stages related to recovery and data transmission processes.
SECRET

AERO MEDICAL VAN COMPLEX