MANNED ACQUISITION OF ACTIVE TARGETS

MAIN OPTICS

SEARCH SCOPE

SEARCH SCOPE

SECRET - SPECIAL HANDLING
TARGET EXAMINATION CAPABILITIES

EYE CHARACTERISTICS

- 2:1 CONTRAST
- ~ 3 LINE PAIRS PER TARGET
- 40° EYEPIECE, 5 N. MI. EXIT PUPIL
- MAX 50 POWER, 10 INCH APERTURE

FIELD OF VIEW ~ N. MI.

REQUIRED MAGNIFICATION

OBJECT SIZE ~ FEET

10
9
8
7
6
5
4
3
2
1
0

1.0 1.5 2 3 4 5 6 7 8 9 10 12

SECRET - SPECIAL HANDLING

NRO APPROVED FOR
RELEASE 1 JULY 2015

WHS-022 SECRET - SPECIAL HANDLING
FUNDAMENTAL MANNED FUNCTIONS

- TROUBLE SHOOTING
- MANUAL OVERRIDE
- MAINTENANCE
- BACKUP FAILED SUBSYSTEMS
- SEARCH FOR ACTIVE TARGETS
MULTI-MISSION GROWTH APPROACHES
(APPLICABLE TO INTEGRAL OR RENDEZVOUS)

- ASTRONOMY

- ELINT, DETECTION, AND H.R. PHOTOGRAPHY
## SUMMARY

<table>
<thead>
<tr>
<th></th>
<th>UNMANNED SYSTEM</th>
<th>MANNED BASED LINE</th>
<th>MANNED GROWTH SYSTEMS</th>
</tr>
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<tbody>
<tr>
<td><strong>Launches/Year</strong></td>
<td>7</td>
<td>6</td>
<td>6</td>
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<tr>
<td><strong>Recycle Time</strong></td>
<td>1 MONTH</td>
<td>1 MONTH</td>
<td>8 DAYS</td>
</tr>
<tr>
<td><strong>Number of Targets Per Year</strong></td>
<td>8,800</td>
<td>10,000</td>
<td>20,000</td>
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<tr>
<td><strong>Relative Number of Active Targets</strong></td>
<td>1</td>
<td>~ 3</td>
<td>~ 3</td>
</tr>
<tr>
<td>Category</td>
<td>Cost (Millions of Dollars)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>----------------------------</td>
<td></td>
<td></td>
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<tr>
<td>LABORATORY VEHICLE &amp; MOL SYSTEM INTEGRATION</td>
<td>720.4</td>
<td></td>
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<tr>
<td>MISSION MODULE</td>
<td>422.5</td>
<td></td>
<td></td>
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<tr>
<td>GEMINI B</td>
<td>216.5</td>
<td></td>
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<tr>
<td>TITAN III M</td>
<td>311.9</td>
<td></td>
<td></td>
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<tr>
<td>FLIGHT CREW EQUIPMENT</td>
<td>7.3</td>
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<tr>
<td>FLIGHT CREW TRAINING</td>
<td>1.8</td>
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<td>TEST OPS SUPPORT</td>
<td>2.1</td>
<td></td>
<td></td>
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<tr>
<td>FLT OPS SUPPORT</td>
<td>13.8</td>
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<td></td>
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<tr>
<td>RECOVERY</td>
<td>8.9</td>
<td></td>
<td></td>
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<tr>
<td>GSE TD</td>
<td>46.2</td>
<td></td>
<td></td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1751.4</strong></td>
<td></td>
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</table>
COMPUTED CHARACTERISTICS

- ASSUMED TIME CONSTANTS
  - $6^\circ$/SEC ROLL RATE, $12^\circ$/SEC PITCH RATE
  - 1 SEC ACCELERATION AND DECELERATION TIME
  - 2 SEC MIRROR SETTLING TIME
  - 2 SEC V/H TIME (1 SEC OVERLAP OF SETTLING TIME)

- 80 N. MI. ALTITUDE, 8 DAY REPEATER TYPE ORBITS
  (COMPLETE COVERAGE ABOVE 20°N)

- ASSUMED PICTURE SEQUENCE
  - COMPUTER RUN USED G SOFTWARE
  - TARGET SELECTION ASSUMES BALANCED STEREO OF $\pm 7.5^\circ$
    AND 1 N. MI. FRAME
  - EQUIVALENT TO TAKING $15^\circ$ STEREO PAIRS BETWEEN $\pm 20^\circ$
    PITCH ANGLES
POSSIBLE GROWTH PROGRAM PHASING


OPTION 6
- APR
- JUL
- DEC
- APR
- JUL
- OCT
- JAN

POSSIBLE RENDEZVOUS FOLLOW-ON TIII C(U)
- APR
- JUL
- DEC
- APR
- JUL
- OCT
- JAN

POSSIBLE INTEGRAL LAUNCH FOLLOW-ON TIII LDC 1
- APR
- JUL
- DEC
- APR
- JUL
- OCT
- JAN

BASELINE PROGRAM IMPACTS:
- EITHER FOLLOW-ON
  - 60 DAY CRYOGENIC TANKAGE
  - "PROVISION FOR" FILM CHUTE
- ADDITIONAL FOR RENDEZVOUS
  - "PROVISIONS FOR" DOCKING HARDWARE
- UNMANNED TEST
- MANNED
- AUTOMATIC
- DOCKING PROVISIONS
- RENDEZVOUS/RESUPPLY
10 SHOT SLIDING AVERAGE
206-1 EXTRAPOLATION

FLIGHTS (SUCCESSFUL ON-ORBIT)
RESULTS OF TARGET RUNS

- REQUIREMENT PROJECTIONS INDICATE 330 TARGETS/MONTH
- 95% OF MONTHLY REQUIREMENT SATISFIED IN ONE CLOSURE WITHOUT WEATHER
- WEATHER FACTOR ON AVERAGE IS ABOUT 50%
- TOTAL OF 836 TARGETS ARE OBTAINED PER CLOSURE (8 DAYS) WITHOUT WEATHER
- TAKE DOES VARY WITH CONVERGENCE ANGLE

<table>
<thead>
<tr>
<th>CONVERGENCE ANGLE</th>
<th>ESTIMATED DIFFERENCE</th>
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<tr>
<td>20</td>
<td>-8 - 15%</td>
</tr>
<tr>
<td>15</td>
<td>REFERENCE</td>
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<tr>
<td>10</td>
<td>+20 - 30%</td>
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SECRET SPECIAL HANDLING
<table>
<thead>
<tr>
<th>TYPES OF TARGETS</th>
<th>NUMBER OF TARGETS</th>
<th>RATE % MONTH</th>
<th>INTERVAL (MONTHS)</th>
<th>YEARLY TOTAL</th>
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<tbody>
<tr>
<td>MISSILE TEST</td>
<td>50</td>
<td>50</td>
<td>25</td>
<td>300</td>
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<tr>
<td>MISSILE FACTORY</td>
<td>278</td>
<td>25</td>
<td>70</td>
<td>840</td>
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<tr>
<td>NUCL. BW/CW, RADAR, MISS.</td>
<td>252</td>
<td>17</td>
<td>50 153</td>
<td>506</td>
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<tr>
<td>A/C, NUCL., NAVAL, RADAR, MISS.</td>
<td>425</td>
<td>8.3</td>
<td>74 60 10</td>
<td>426</td>
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<tr>
<td>A/C, MISS.</td>
<td>2674</td>
<td>4.2</td>
<td>574</td>
<td>1336</td>
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<tr>
<td>NUCL., NAVY</td>
<td>2011</td>
<td>2.1</td>
<td>503</td>
<td>503</td>
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<tr>
<td>NUCL., BW/CW, NAVAL ARMY</td>
<td>550</td>
<td>0.8</td>
<td>55</td>
<td>3966</td>
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</table>
DORIAN TARGET DECK AND REQUIREMENTS GENESSES

- CURRENT REQUIREMENTS REFLECT PRESENT SYSTEM CAPABILITIES (MINIMUM INTERVAL 2 MONTHS)

- SITES UNDER CONSTRUCTION AND MODIFICATIONS WARRANT MONTHLY INTERVALS

- A CONCURRENT SURVEILLANCE SYSTEM (G<sup>3</sup>) WAS ASSUMED TO INDICATE CONSTRUCTION/MODIFICATION ACTIVITY

- A COMPOSITE DECK WAS CONSTRUCTED OF:
  - G FLIGHT 977 DECK WITH 4370 TARGETS (SAM'S AND WORLD CITIES NOT INCLUDED)
  - DIA DORIAN STUDY DECK WHICH ADDED 1870 TARGETS, 645 OF WHICH ARE NEW "GROWTH" TARGETS
UNMANNED VEHICLE PERFORMANCE TRADEOFFS

**Orbital Vehicle Weight ~ 1000 Pounds**

**Design Life ~ Days**

**Contingencies**
- 70/170: 30% Cont.
- 70/170: 10% Expendables
- 30% Dry Weight
- 80/180: 30% Contingency
- TIII D/5 Segments (70/170)

**TIII C (U)**

\[ \begin{align*}
  i & = 80^\circ \\
  & = 90^\circ \\
  & = 97^\circ 
\end{align*} \]
30 DAY DORIAN SYSTEM

TITAN III D-5 SEGMENT BOOSTER - 97° INCLINATION, 70 - 170 H.M. ORBIT

SECRET - SPECIAL HANDLING

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WHS-022
MARS PHOTOGRAPHY
- NO MODS
- PTS FOR INITIAL ACQUISITION - MANNED POINTING THROUGH MAIN OPTICS
- EXPOSURE TIME - .004 SEC. SO346 (4404 x) -
- RESOLUTION -
  - MOL 50 N. MI.
  - GROUND 300 N. MI.
  - PROBE .1 N. MI.

DISTANT STARS
- MUST HAVE MODIFICATIONS
- EITHER MOVABLE PLATE HOLDER AND EYEPIECE OR
  LOCKED OPTICS WITH CONTROL MOMENT GYROS
- POINTING TO .01 SEC. POTENTIAL CONTROL
- RESOLUTION LIKE .1 SEC. (GROUND LIKE 1 SEC.)
- 22 MAG WITH SO346-20 MIN. EXPOSURE
- LIMIT MAG 26 - (20 MIN. EXPOSURE)

ULTRA-VIOLET (FREQUENCIES CUT OUT BY $O_3$ LAYER)
- ROSS CORRECTOR INTERCHANGE TO QUARTZ
  (2300-3000A, 1800-2300A)
- MUST HAVE CONTROL MOMENT GYROS
- USE SWR FILMS TO PHOTOGRAPH STARS
- USE IMAGE CONVERTER ON OPTICS FOR MANNED POINTING
DETECTION RADAR SYSTEM INSTALLATION
BASIC MOL VEHICLE

RADAR CAPABILITY
- DUTY CYCLE - 15% ORBITING DURATION
- DEPLOYMENT CYCLE - 30% DEPLOYED, 70% FEATHERED
- 100 M² TARGET
- 104 NM SWATH WIDTH
- < 3/4 MILE CROSS TRACK ACCURACY
- < 100 FT RANGE ACCURACY

INSTALLATION CHARACTERISTICS
- TOTAL HARDWARE WEIGHT - 387#
- POWER PENALTY - 800 WATTS OPERATING, 120 WATTS AVERAGE
- PROPULSION PENALTY - < 1 FPS/DAY

STOWED
DEPLOYED
FEATHERED
SECRET SPECIAL HANDLING

RENDEZVOUS/RESUPPLY VEHICLE

EXTENDED MISSION SERVICE MODULE
- AUTOMATIC MODE VEHICLE SERVICE MODULE
- ADD CRYOGENIC TANKS, FUEL CELLS, AND PROPULSION SYSTEM
- ADD CREW TRANSFER TUNNEL

BASELINE SERVICE MODULE
- BASELINE VEHICLE UNPRESSURIZED SECTION
- ADD DOCKING HARDWARE

GEMINI-B

- LAUNCH WEIGHT 30,800 LBS

SECRET SPECIAL HANDLING
SECRET SPECIAL HANDLING

TYPICAL ELINT INSTALLATION

INSTALLATION CHARACTERISTICS

- HARDWARE WEIGHT
  - INCLUDING STRUCTURE: 480#
  - SCANNING STRUCTURE

- POWER PENALTY
  - 250 WATTS OPERATING, 25 WATTS AVERAGE

- DUTY CYCLE
  - 10% ORBITAL DURATION

- DEPLOYMENT CYCLE
  - 100%

- PROPULSION PENALTY
  - 1 FPS/DAY
## MOL Vehicle Specified Weights

### Target/Wgt vs. Contingency (LBS)

<table>
<thead>
<tr>
<th>Segment</th>
<th>Target/Wgt</th>
<th>Contingency</th>
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</thead>
<tbody>
<tr>
<td>Lab Veh. Seg.</td>
<td>13,555</td>
<td>+ 1,940</td>
</tr>
<tr>
<td>G/B Seg.</td>
<td>5,660</td>
<td>+ 270</td>
</tr>
<tr>
<td>Mission Payload</td>
<td>8,433</td>
<td>+ 1,700</td>
</tr>
<tr>
<td>Flgt. Crew Segment</td>
<td>360</td>
<td>+ 0</td>
</tr>
<tr>
<td>Crew Equip. Seg.</td>
<td>553</td>
<td>+ 100</td>
</tr>
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**Total** 28,561 + 4,010 = **32,571**
MOL LAUNCH SCHEDULE

<table>
<thead>
<tr>
<th>Year</th>
<th>Option 5</th>
<th>Option 6</th>
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<tr>
<td>1969</td>
<td>APR</td>
<td>APR</td>
</tr>
<tr>
<td></td>
<td>AUG</td>
<td>JUL</td>
</tr>
<tr>
<td>1970</td>
<td>APR</td>
<td>APR</td>
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<tr>
<td></td>
<td>JUL</td>
<td>JUL</td>
</tr>
<tr>
<td></td>
<td>OCT</td>
<td>OCT</td>
</tr>
<tr>
<td>1971</td>
<td>JAN</td>
<td>JAN</td>
</tr>
</tbody>
</table>

- △ UNMANNED
- ▲ MANNED
- ◇ AUTOMATIC
MOL AUTOMATIC MODE/RENDEZVOUS AUTOMATIC MODE VEHICLE

EXTENDED MISSION SERVICE MODULE (EMSM)

DOCKING PLANE

5'

14'

74.5'

NOSE FAIRING

AUTOMATIC MODE SERVICE MODULE (AMSM)

BASELINE SERVICE MODULE (BSM)

LABORATORY PRESSURIZED SECTION

MISSION MODULE

SECRET SPECIAL HANDLING
RENDEZVOUS VEHICLE FAMILY

- RENDEZVOUS/RESUPPLY VEHICLE (RRV)

- RENDEZVOUS/AUTOMATIC MODE VEHICLE (RAMV)

SECRET SPECIAL HANDLING
RENDEZVOUS VEHICLE CONFIGURATION

- ONE YEAR ORBITING VEHICLE OPERATION
- 60 DAY RESUPPLY CYCLE

DOCKING AND SEPARATION PLANE

93.5'

RESUPPLY VEHICLE  ORBITING VEHICLE

RRV FUNCTIONS

- ATTITUDE CONTROL (ACTS PROPULSION)
- PRIME POWER SYSTEM
- LIFE SUPPORT EXPENDABLES
- DATA SYSTEM

RAMV FUNCTIONS

- LIFE SUPPORT SYSTEM
- ATTITUDE CONTROL ELECTRONICS
- COMMUNICATIONS AND DATA HANDLING
- ENVIRONMENTAL CONTROL

SECRET SPECIAL HANDLING
T-III LDC 1 GROWTH
INTEGRAL LAUNCH

EMSM  BSM

38'  87'

- TYPICAL 60 DAY VEHICLE WGT. = 41,000 LBS

T-III LDC 1 LAUNCH CAPABILITY (~42,300 LBS)

i = 90°, 80/180 N. ML.

ORBITING VEHICLE WEIGHT
(1000 LBS)

DESIGN WEIGHT

EXPENDABLES "OFF-LOADING"

MISSION DURATION DAYS

0  20  40  60  80

50  40  30  20  10  0
MOL BASELINE VEHICLE

GEMINI-B

BASELINE SERVICE MODULE

LABORATORY PRESSURIZED SECTION

MISSION MODULE

72'