

**D-SECRET** SPECIAL HANDLING

WHS-416  
Copy 1  
Page 1

MOL PLANNING SUMMARY

Date: 8-7-67

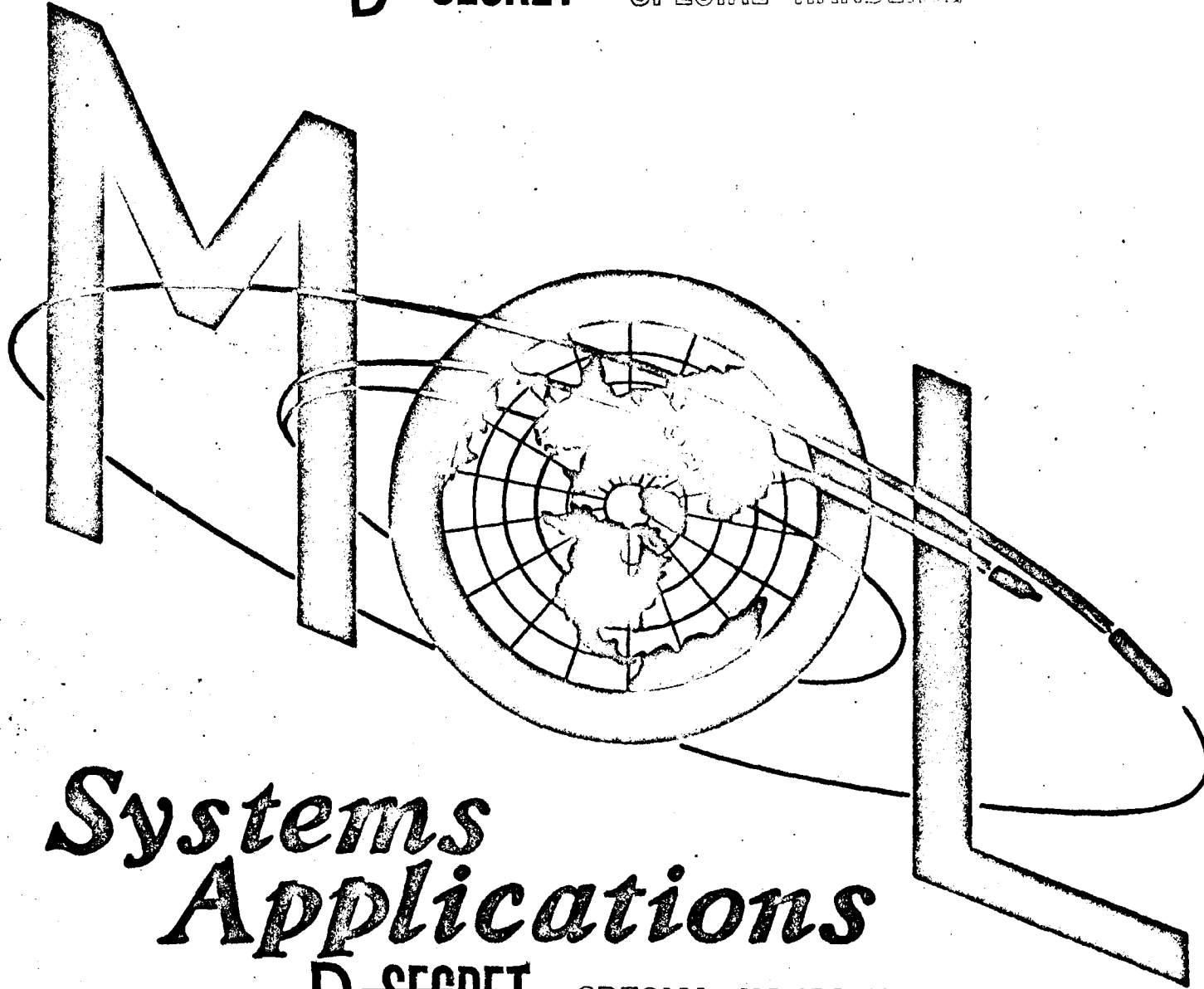
Audience: Gen. Bleymaier, Dr. Leonard, Col. Norman,  
L/C L. Skantze

Briefer: C. L. Olson

**D-SECRET** SPECIAL HANDLING

~~D-SECRET~~ SPECIAL HANDLING

WHS-416  
Page 2



*Systems  
Applications*

~~D-SECRET~~ SPECIAL HANDLING

**D** ~~SECRET~~ SPECIAL HANDLING

*PF*

WHS-416  
Page 3

APPROACH TO MOL FOLLOW-ON PLANNING

**D** ~~SECRET~~ SPECIAL HANDLING

STP

**D** ~~SECRET~~ SPECIAL HANDLING

WHS-416  
Page 4

MOL SYSTEM PLANNING OBJECTIVES

- ▶ VIABLE INITIAL PROGRAM
- ▶ FOLLOW-ON GROWTH THROUGH IMPROVED:
  - SYSTEM ECONOMICS
  - OPERATIONS FLEXIBILITY
  - MISSION PERFORMANCE
  - ADDITIONAL APPLICATIONS (NATIONAL SPACE GOALS)

**D** ~~SECRET~~ SPECIAL HANDLING

517

~~D-SECRET~~ SPECIAL HANDLING

WHS-416  
Page 5

MOL PLANNING ELEMENTS

○ MAJOR MOL SYSTEM SEGMENTS

- |                      |                       |
|----------------------|-----------------------|
| ✓ LAUNCH VEHICLE     | ✓ FACILITIES          |
| ✓ LABORATORY VEHICLE | ✓ FLIGHT CREW         |
| ✓ PAYLOAD            | ✓ TRAINING SIMULATORS |
| ✓ RE-ENTRY VEHICLE   | ✓ SUPPORT FORCES      |
| ✓ SUPPORT MODULE     |                       |

○ TYPICAL PLANNING STUDY CONSIDERATIONS

- |                             |                             |
|-----------------------------|-----------------------------|
| ✓ PRELIMINARY SYSTEM DESIGN | ✓ RELIABILITY ESTIMATES     |
| ✓ CONFIGURATION ANALYSIS    | ✓ COST ESTIMATES            |
| ✓ PERFORMANCE ANALYSIS      | ✓ SCHEDULE CONSTRAINTS      |
| ✓ OPERATIONS SCENARIO       | ✓ EFFECTIVENESS COMPARISONS |
| ✓ CREW FUNCTIONS            |                             |

~~D-SECRET~~ SPECIAL HANDLING

**D-SECRET** SPECIAL HANDLING

WHS-416  
Page 6

REVIEW OF MOL PLANNING ACTIVITIES  
ORGANIZATION AND SCOPE OF BRIEFING

- EARLY SYSTEM DEFINITION STUDIES (1963 - 1965)
  
- RECENT SYSTEM IMPROVEMENTS AND GROWTH STUDIES ( 1965 - 1967)
  
- CURRENT MOL PLANNING FRAMEWORK (1967 - 1968)

**D-SECRET** SPECIAL HANDLING

~~D-SECRET~~ SPECIAL HANDLING

WHS-416  
Page 7

FOLLOW-ON PROGRAM GOALS




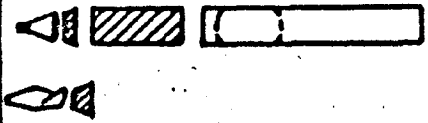



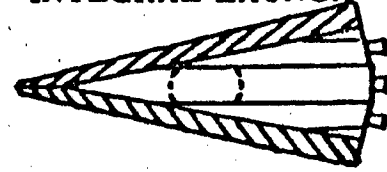
- PROGRAM CONTINUITY
  - HI-RESOLUTION RECONNAISSANCE
  - ADDITIONAL APPLICATIONS OF MOL HARDWARE TO DOD/NASA NATIONAL SPACE GOALS
  
- EVOLUTIONARY GROWTH
  - IMPROVED SYSTEM ECONOMICS
    - ✓ INCREASED MISSION DURATION
    - ✓ EXTENDED UTILIZATION OF SYSTEM SEGMENTS
  - IMPROVED MISSION PERFORMANCE
    - ✓ ADDITIONAL/COMPLIMENTARY PAYLOAD ELEMENTS
    - ✓ DATA RECOVERY TECHNIQUES
  - IMPROVED OPERATIONAL FLEXIBILITY
    - ✓ RECALL/REPEATER CAPABILITY
    - ✓ ORBITAL ASSEMBLY
    - ✓ ORBITAL STORAGE
    - ✓ ADVANCED SENSOR DEVELOPMENT FLIGHTS
  - ALTERNATIVE MOL MISSIONS

~~D-SECRET~~ SPECIAL HANDLING

**D** ~~SECRET~~ SPECIAL HANDLING  
**POTENTIAL VEHICLE SYSTEM CONCEPTS**

WHS-416  
Page 8

3.6

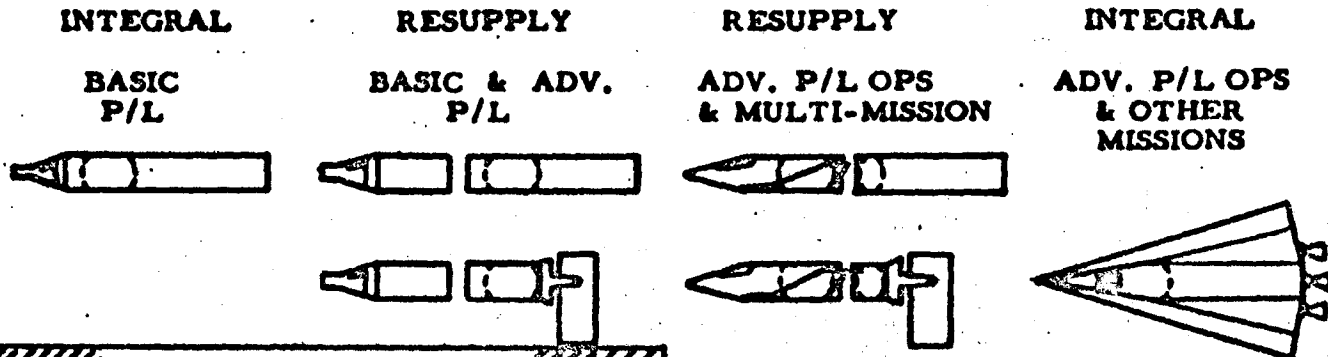
<p>I</p> <p><b>INTEGRAL LAUNCH</b></p>  <p>Dispose all Segments each Mission.</p>	<p>II</p> <p><b>INTEGRAL LAUNCH</b></p>  <p>Retrieve/Reuse R. E. V. each Mission - Dispose all other Segments.</p>	<p>III</p> <p><b>RENDEZVOUS/RESUPPLY</b></p>  <p>Dispose R. E. V. + Supply Module (RRV) each Resupply Mission - Revisit/Reuse Orbiting Vehicle for ~ 1 year cycle.</p>	<p>IV</p> <p><b>RENDEZVOUS/RESUPPLY</b></p>  <p>Dispose Supply Module each Resupply Mission - Retrieve/Reuse R. E. V. - Revisit/Reuse Orbiting Vehicle for ~ 1 year cycle.</p>
<p>V</p> <p><b>RENDEZVOUS/RESUPPLY</b></p>  <p>Retrieve/Reuse R. E. V. + Supply Module (RRV) each Resupply Mission - Revisit/Reuse Orbiting Vehicle for ~ 1 year cycle.</p>	<p>VI</p> <p><b>RENDEZVOUS/RESUPPLY</b></p>  <p>Retrieve/Reuse Integrated R. E. V. + Supply Module + Lab - Revisit/Reuse Mission Module Lab ~ 1 year cycle</p>	<p>VII</p> <p><b>INTEGRAL LAUNCH</b></p>  <p>Retrieve/Reuse fully Integrated R. E. V. + Lab + Supply Module + Mission Module. Dispose conventional booster only.</p>	<p>VIII</p> <p><b>INTEGRAL LAUNCH</b></p>  <p>Retrieve/Reuse fully Integrated R. E. V. + Lab + Supply Module + Mission Module + Propulsion Sys. Dispose propellant tanks and pressurization system only.</p>



**D-SECRET SPECIAL HANDLING**

WHS-416  
Page 9

**FOLLOW-ON SYSTEMS PERSPECTIVE**



**INITIAL PLANNING PERIOD**

SYSTEM AVAILABILITY	1970	1973 - 1975	1978	POST 1980
R. E. V. TYPE	GEMINI B	GEMINI B	LIFTING BODY (MED L/D)	LIFTING BODY (HI L/D)
LAUNCH VEH.	T III M	T III M	LDC 1 & 2	STRAP-ON TANK- AGE
LAUNCH WEIGHT	31.0 K (i = 90°)	30.0 K (i = 96.4°)	47.0 K (i = 96.4°)	~ 70.0 K
P/L TYPE	BASILINE	BASIC & ADV	ADV & MULT.	ADV & OTHER
MISSION DURATION	30 DAYS	CONT. OPS - 1 YR. 60 D. RESUPPLY (BASIC)	CONT. OPS - 1 YR. 50 D. RESUPPLY	60 + DAYS
DEV. 'MT STATUS	PHASE II	PHASE II	TECHNOLOGY STUDIES COMPONENTS IN II PRELIMINARY STUDIES PRELIMINARY STUDIES	PROPOSED BY INDUSTRY
R. E. VEHICLE LAB. MOD. MISS. MOD. LAUNCH VEHICLE	" " "	" " "		
DEV'MT CYCLE	5 YR	3 YR (BASIC)	7 YR	10-12 YRS
△ NRC - (ROM)	0	275 M\$	1,200 M\$	2,000 M\$

**D-SECRET SPECIAL HANDLING**

**D** ~~SECRET~~ SPECIAL HANDLING

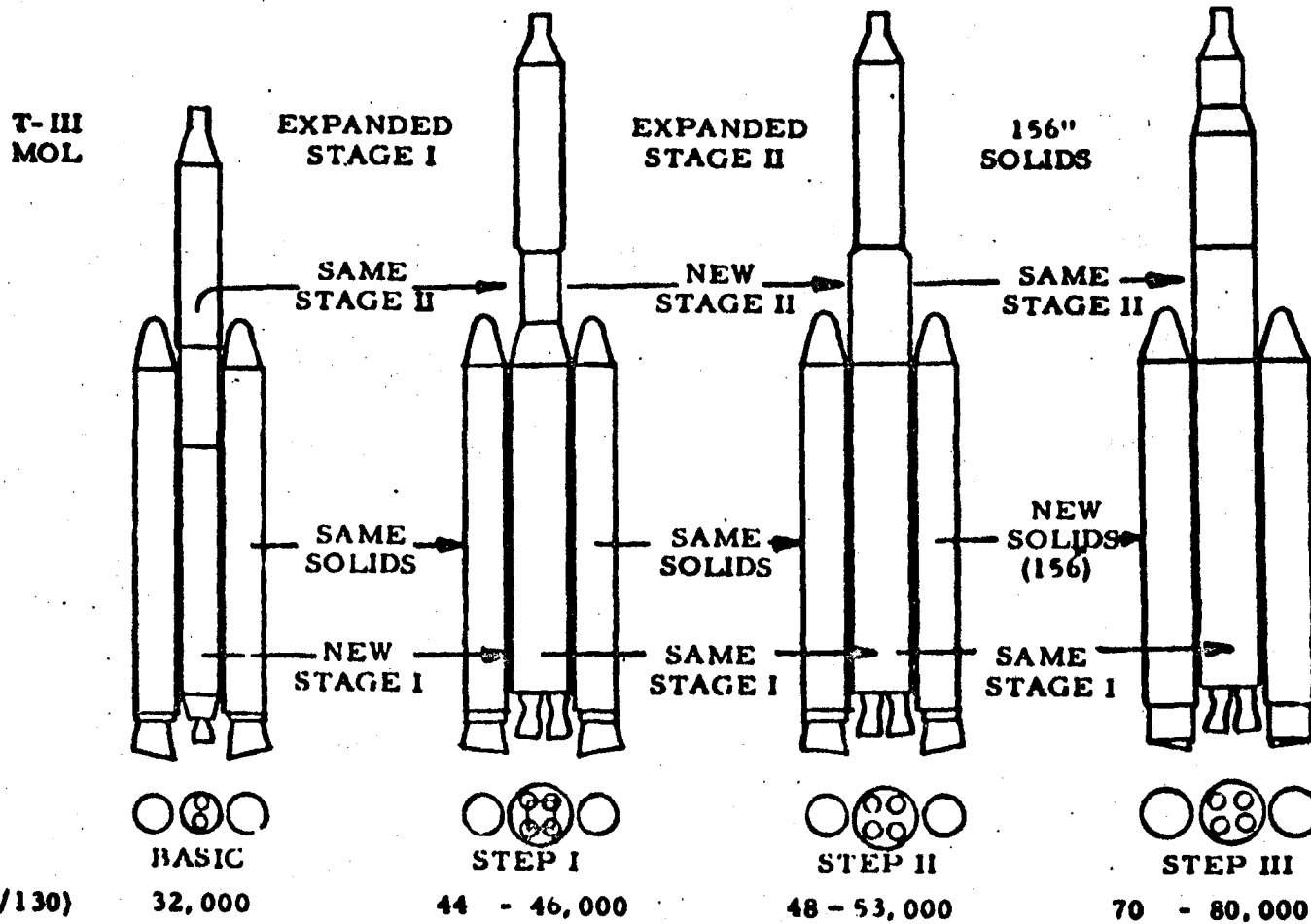
WHS-416  
Page 10

POSSIBLE FOLLOW-ON SYSTEM SEGMENTS

**D** ~~SECRET~~ SPECIAL HANDLING

# ~~D-SECRET~~ SPECIAL HANDLING

## POSSIBLE MOL LAUNCH VEHICLE EVOLUTION

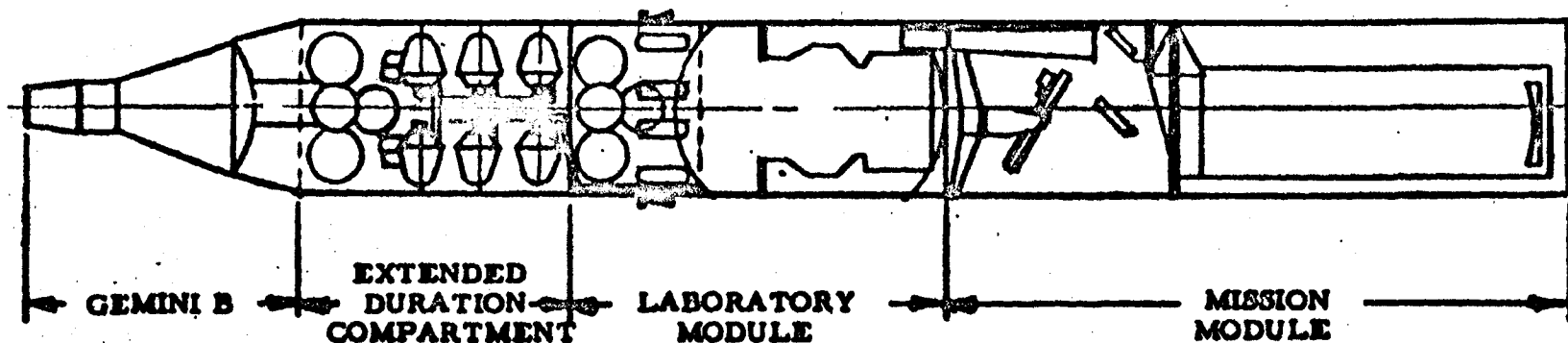


~~D-SECRET~~ SPECIAL HANDLING

WHS-416  
Page 12

EXTENDED DURATION INTEGRAL LAUNCH

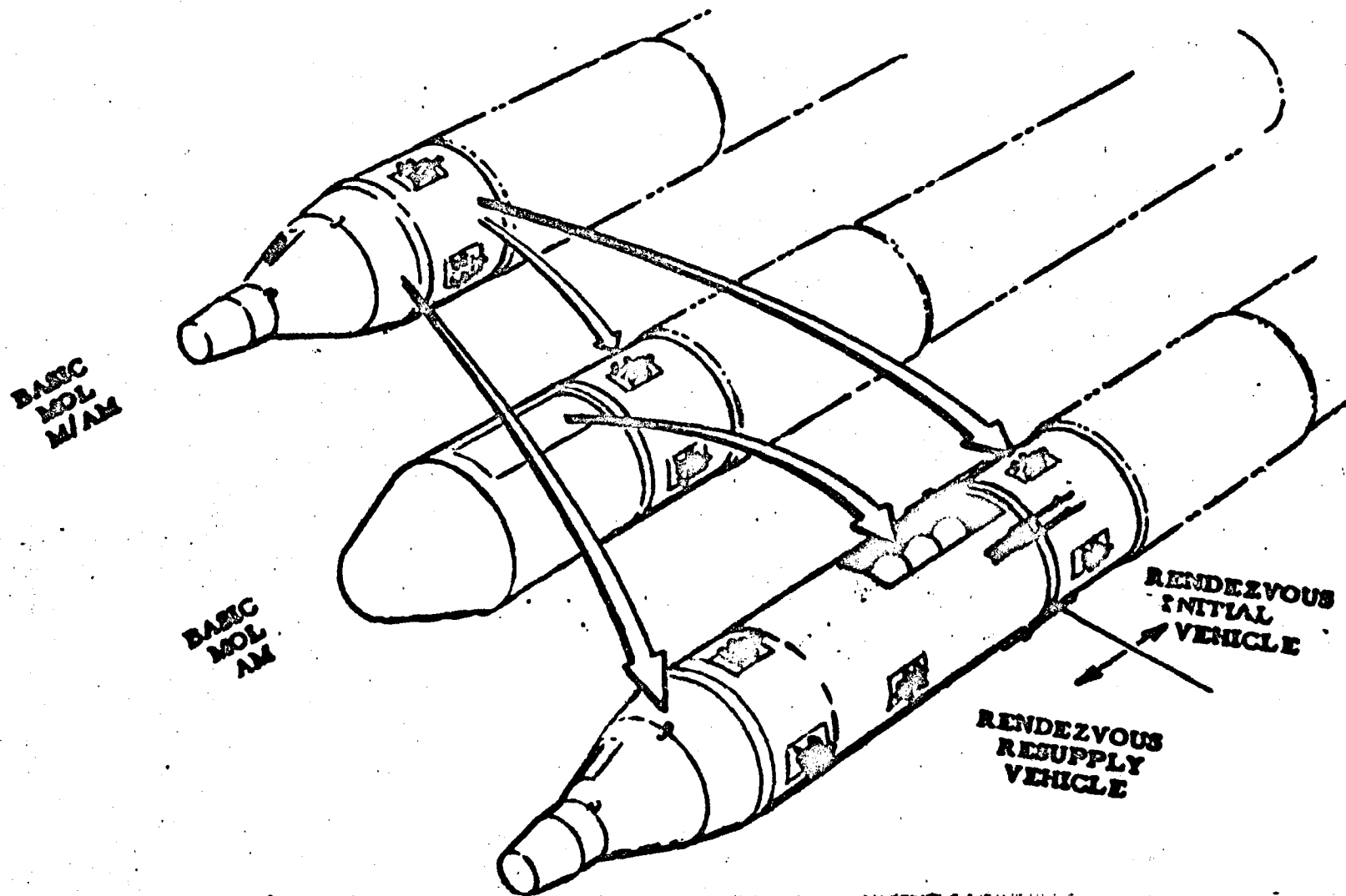
ORBITING VEHICLE  
(50 DAY MISSION DURATION)  
(LDC 1 BOOSTER)



~~D-SECRET~~ SPECIAL HANDLING

~~D-SECRET~~ SPECIAL HANDLING  
RESUPPLY SYSTEM CONCEPT

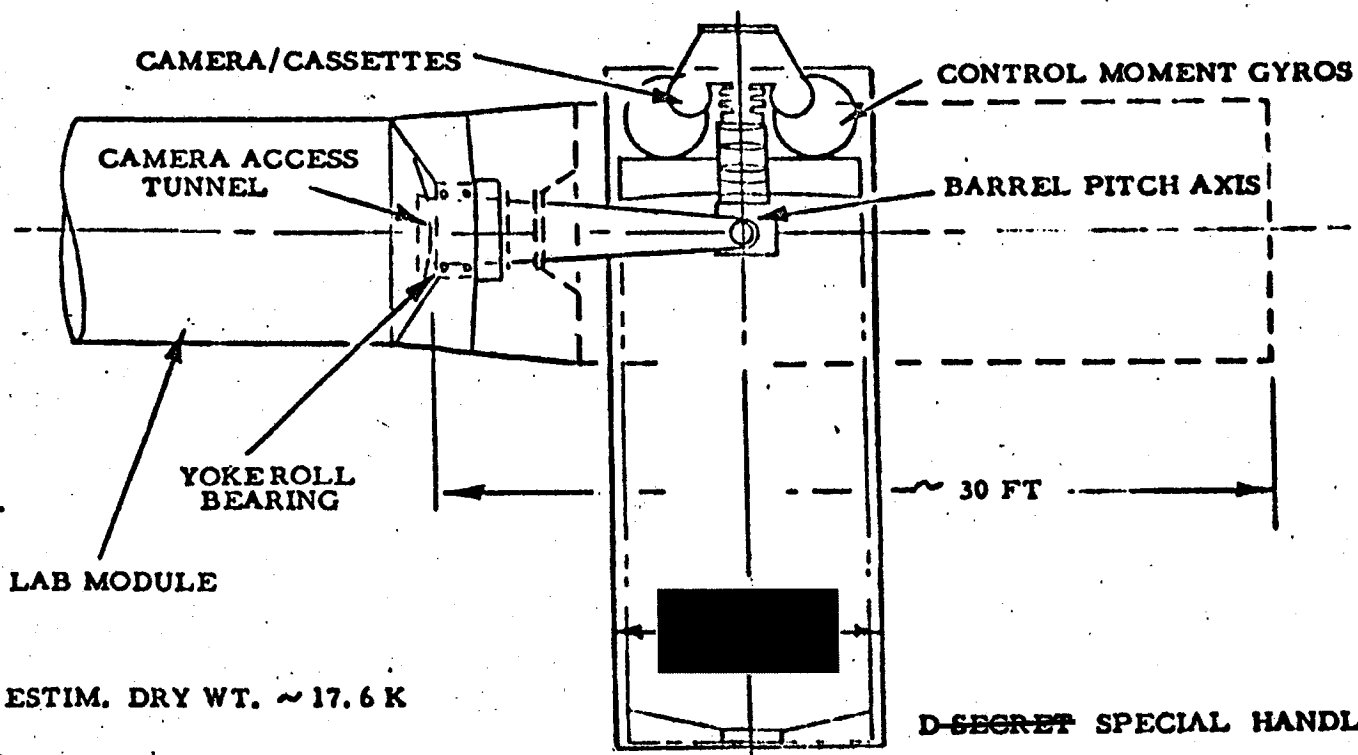
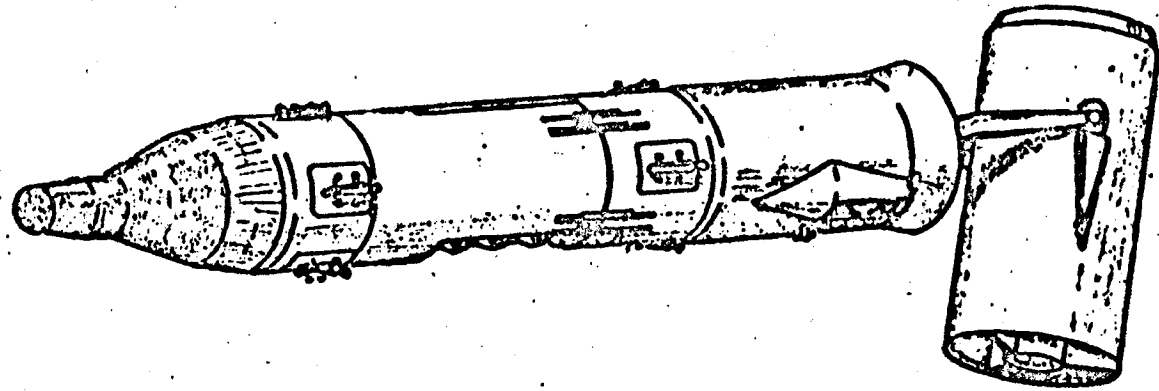
WHS-416  
Page 13



~~D-SECRET~~ SPECIAL HANDLING

~~D-SECRET~~ SPECIAL HANDLING  
POSSIBLE ADVANCED PAYLOAD CONFIGURATION

WHS-416  
Page 14



ESTIM. DRY WT. ~ 17.6 K

~~D-SECRET~~ SPECIAL HANDLING

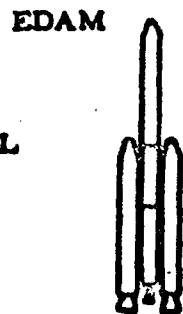
SELECTED EARLY FOLLOW-ON ALTERNATIVES

● INTEGRAL LAUNCH OPERATIONS

BASIC  
MOL  
PROGRAM

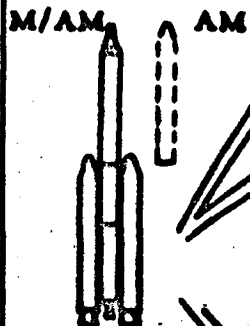


- TIII M
- [REDACTED] P/L
- 30 DAY

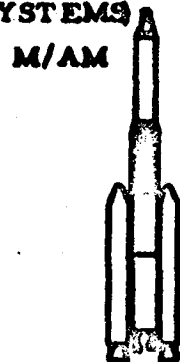


- TIII M
- [REDACTED] P/L
- 45 DAY

(BASELINE SYSTEMS)  
.....  
(EXTENDED DURATION SYSTEMS)



- TIII LDC 1
- [REDACTED] P/L
- 50 DAY



- TIII LDC 1 & 2
- [REDACTED] ADV. P/L
- 60 DAY

● RENDEZVOUS/RESUPPLY OPERATIONS

- TIII M
- [REDACTED] P/L
- 30 DAY



- TIII M
- [REDACTED] P/L
- CONT. OPS
- 60 DAY RESUPPLY



- TIIIM
- [REDACTED] ADV. P/L
- CONT. OPS.
- 50 DAY RESUPPLY

~~D-SECRET~~ SPECIAL HANDLING

WHS-416  
Page 16

COMPARISON OF ALTERNATIVE SYSTEM CAPABILITY TO MEET  
OVERALL MOL EARLY FOLLOW-ON OBJECTIVES

<u>FOLLOW-ON OBJECTIVE</u>	<u>BASELINE (M/AM+EDAM) SYSTEM</u>	<u>EXTENDED DURATION INTEGRAL LAUNCH SYSTEM</u>	<u>RENDEZVOUS/ RESUPPLY SYSTEM</u>
● IMPROVED SYSTEM ECONOMICS			
/ REDUCTION IN HRO P/L LAUNCHES	1 MON. LIFE	2 MON. LIFE	12 MON. LIFE
/ UTILIZATION OF BASELINE DEVELOPED HARDWARE	100%	95%	90%
/ IMPACT OF SENSOR AVAILABILITY	MAXIMUM	MODERATE	MINIMUM
/ SYSTEM FIRST COST INCREMENT	28 M\$	212 M\$	275 M\$
/ AVERAGE COST PER OPERATING DAY	2.0 M\$	1.7 M\$	1.0 M\$
● IMPROVED MISSION PERFORMANCE			
/ ADDITIONAL/COMPLIMENTARY PAYLOAD ELEMENTS	---	160 #/DAY	6,000 # RIV
/ DATA RECOVERY TECHNIQUES	---		180 #/DAY RRV
● IMPROVED OPERATIONAL FLEXIBILITY			
/ RECALL/REPEATER CAPABILITY	SHORTENED MISSION	SHORTENED MISSION	CONTINUOUS MISSION
/ ORBITAL ASSEMBLY	---	---	INHERENT
/ ORBITAL STORAGE	---	---	INHERENT
/ ADVANCED SENSOR DEVELOPMENT FLIGHTS	---	LIMITED DURATION	LONG DURATION

~~D-SECRET~~ SPECIAL HANDLING



STP

2364

13

~~SECRET~~ SPECIAL HANDLING

WHS-416  
Page 17

RESUPPLY SYSTEM DERIVATION FROM MOL HARDWARE

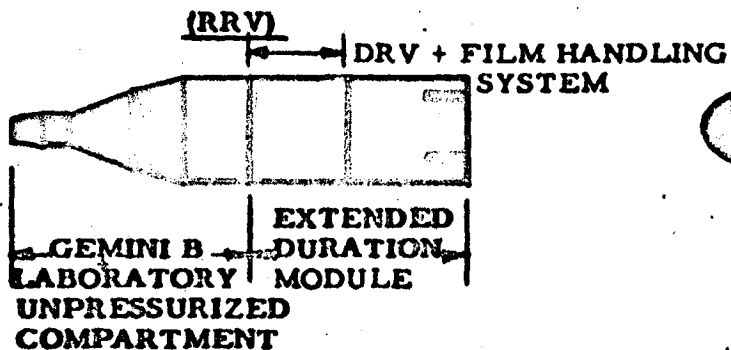
BASELINE AM VEHICLE



BASELINE M/AM VEHICLE

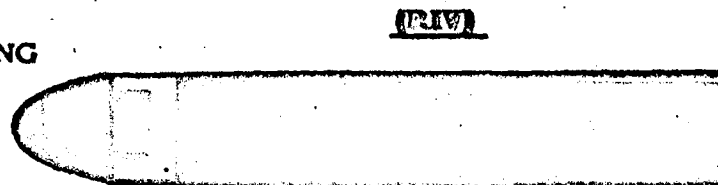


RENDEZVOUS RESUPPLY VEHICLE



- ADD BASELINE SUBSYSTEM COMPONENTS
- ADD DOCKING SYSTEM AND INTERFACE

RENDEZVOUS INITIAL VEHICLE



- DELETE GEMINI B
- ADD EXTENDED DURATION PROVISIONS
- ADD DOCKING SYSTEM AND INTERFACE
- ADD ASCENT FAIRING


~~SECRET~~ SPECIAL HANDLING

# ~~D-SECRET~~ SPECIAL HANDLING

## FOLLOW-ON ALTERNATIVES

### (INITIAL PERIOD)

1973/1980

- 
- BASELINE MAM/AM MIX
  - BASELINE MAM/EXTENDED DURATION AM MIX
  - EXTENDED DURATION INTEGRAL LAUNCH
    - ✓ BASELINE PAYLOAD
    - ✓ ADVANCED PAYLOAD
  - RENDEZVOUS/RESUPPLY OPERATIONS, BASELINE HARDWARE
    - ✓ BASELINE PAYLOAD
    - ✓ ADVANCED PAYLOAD

### (LONG RANGE PERIOD)

POST 1980

- RENDEZVOUS/RESUPPLY SYSTEM, RE-USABLE MANEUVERING LABORATORY
- INTEGRAL LAUNCH, SELF PROPELLED, FULLY RE-USABLE MANEUVERING SYSTEM

~~D-SECRET~~ SPECIAL HANDLING

**D-SECRET** SPECIAL HANDLING

WHS-416  
Page 19

QUESTIONS PERTINENT TO FOLLOW-ON MOL PLANNING

- WHAT ARE RELATIVE COST PROFILES FOR REASONABLE "CARBON-COPY" FOLLOW-ON PROGRAMS?
- WHAT ARE THE COST PROFILES AND BENEFITS CONNECTED WITH GROWTH OF MOL DEVELOPMENT SYSTEM?
- HOW DOES A POSSIBLE ADVANCED PAYLOAD DEVELOPMENT PROGRAM AFFECT THE MOL FOLLOW-ON DECISIONS?
- WHAT IS THE RESULT OF VARIOUS REASONABLE FISCAL LEVEL CONSTRAINTS ON THE ABOVE CASES?
- WHAT ARE THE OVERALL PROS AND CONS WHICH MUST GUIDE FOLLOW-ON PLANNING AND TIMING?

**D-SECRET** SPECIAL HANDLING

~~D SECRET~~ SPECIAL HANDLING

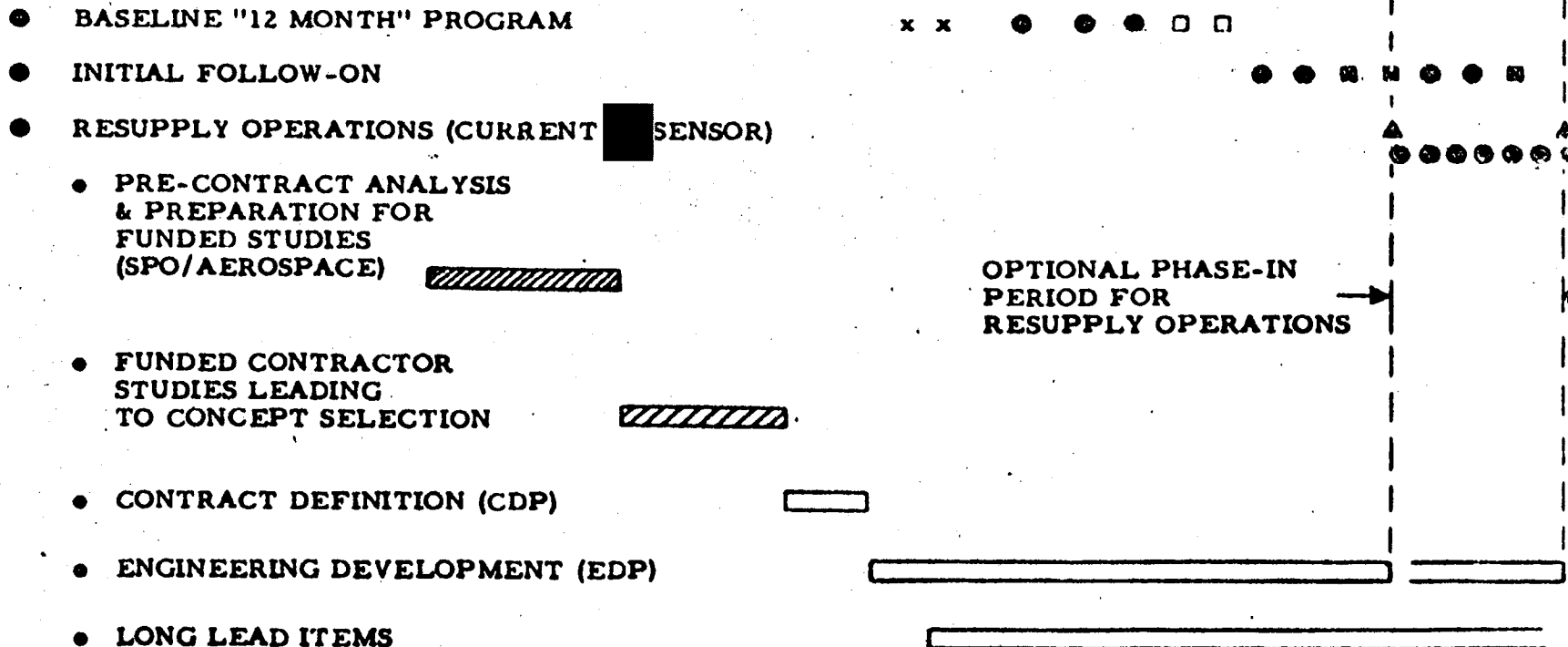
WHS-416  
Page 20

SYMBOLS

LVD	x
M/AM	●
AM (30)	□
AM (ED)	■
RIV	▲
RRV	⊙

MILESTONES TO IMPLEMENT PLANNING FRAMEWORK  
FOLLOW-ON RESUPPLY SYSTEM WITH CURRENT PAYLOAD

CY	67	68	69	70	71	72	73	
FY		68	69	70	71	72	73	74



~~D SECRET~~ SPECIAL HANDLING



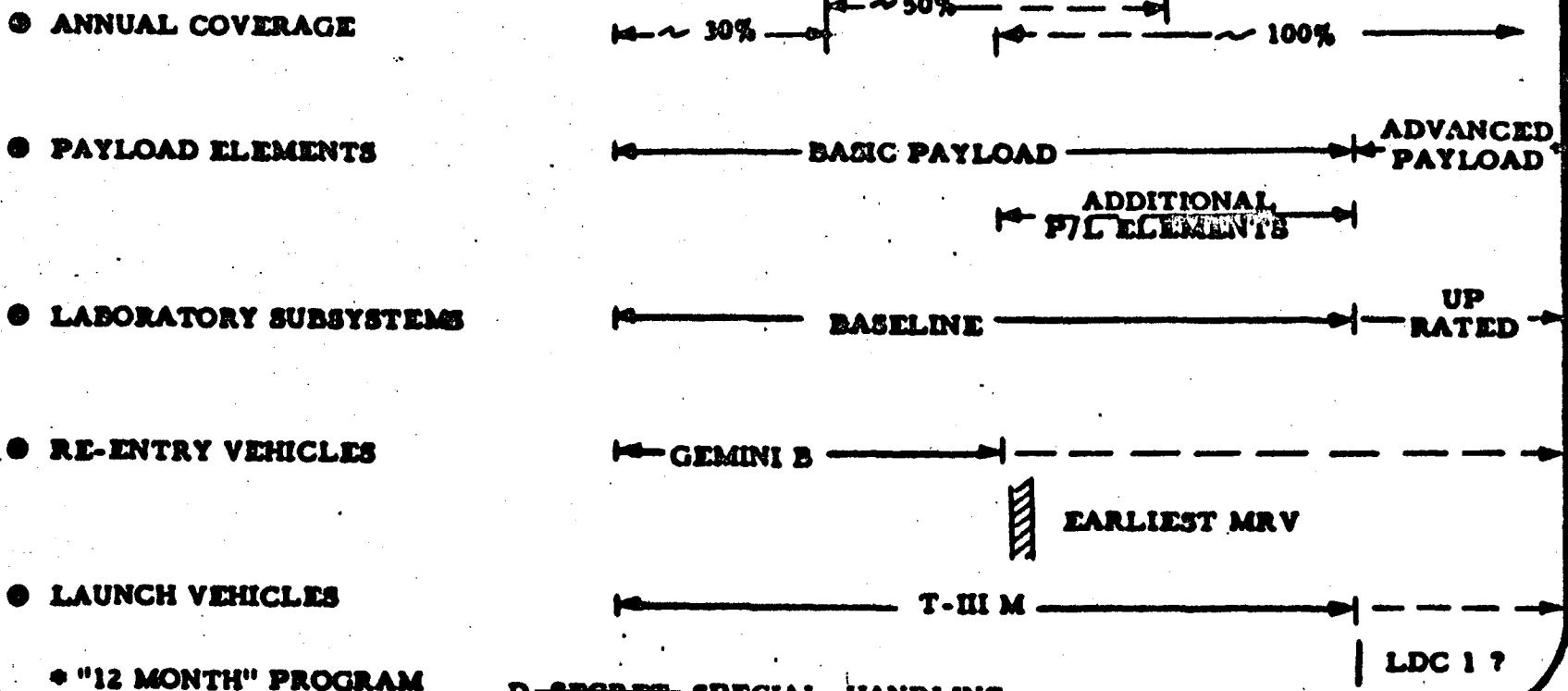
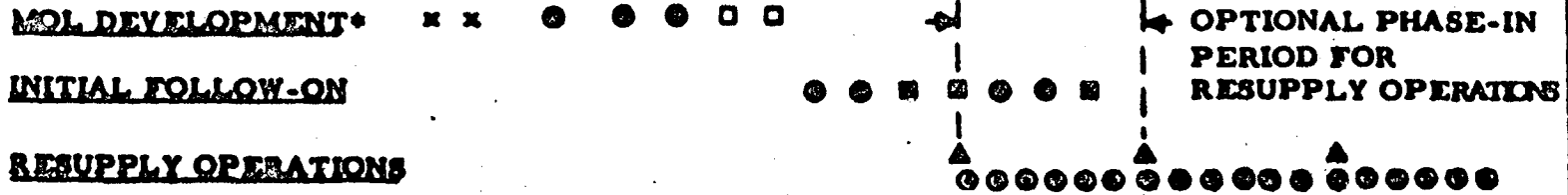
~~D-SECRET~~ SPECIAL HANDLING

WHS-416  
Page 22

SYMBOLS	
LVD	x
M/AM	⊙
AM (30)	□
AM (ED)	■
RIV	▲
RRV	⊙

POSSIBLE MOL PLANNING FRAMEWORK

CY	70	71	72	73	74	75	
----	----	----	----	----	----	----	--



• "12 MONTH" PROGRAM

~~D-SECRET~~ SPECIAL HANDLING

LDC 1 ?