~~13 April 1967~~

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SCHEDULE REPROGRAMMING AND TECHNICAL STATUS

To DR. FLAX, 14 April 1967

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RECOVERY OPTIONS

IF FY-68 AND FY-69 FUNDING IS LIMITED TO 500 AND 650 RESPECTIVELY:

- SLIP ENTIRE SCHEDULE 12-15 MONTHS
- ATTEMPT TO SHORTEN EK QUALIFICATION AND FV-3 ACCEPTANCE TIME SPANS
- DELAY DEFERRED ITEMS AS LATE AS POSSIBLE

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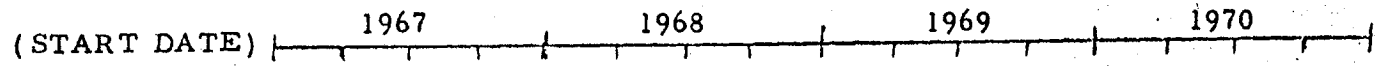
SCHEDULE SLIDES

BASELINE TO 12 MONTH SCHEDULE



GE	THERMAL TEST	6 mos.
	STRUCTURAL TEST	5 mos.
	DEVELOPMENT TEST	6 mos.
	QUALIFICATION TEST	8 mos.
	FV3 ASSEMBLY	10 mos.
DAC	STRUCTURAL TEST	8 mos.
	QUAL VEHICLE ASSEMBLY	9 mos.
	FV3 ASSEMBLY	11 1/2 mos.
EK	STRUCTURAL TEST	6 mos
	THERMAL TEST	4.5 mos.
	ENGINEERING DEV TEST	6 mos.
	QUALIFICATION TEST	8 mos.
	FV3 ASSEMBLY	11 1/2 mos.

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COST ESTIMATE SUMMARY

	FY-67	FY-68	FY-69
BASELINE CONTRACTOR ESTIMATE	334.0	811.0	517.0
FUNDING OBJECTIVES	286.0	500.0	600.0
12 MONTH CONTRACTORS (EXPEN) ESTIMATE	275.0	622.0	647.0
COMMITMENT FUNDING ESTIMATE	+67.0	+26.0	-15.0
15 MONTH DIRECTED LEVELS	286.0	480.0	620.0
NEEDED REDUCTION	+56.0	+168.0	+12.0

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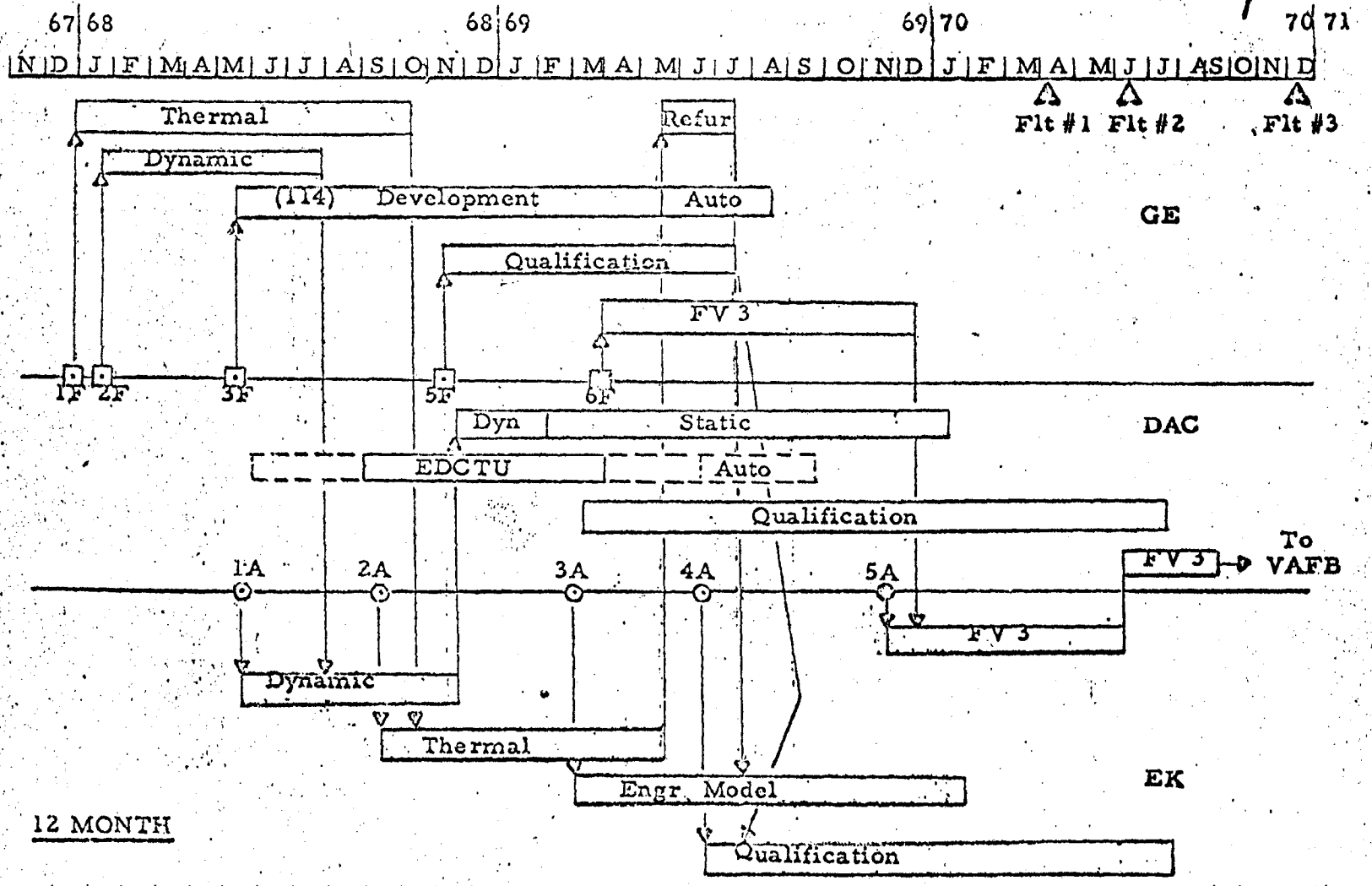
INTEGRATED TEST FLOW PLAN



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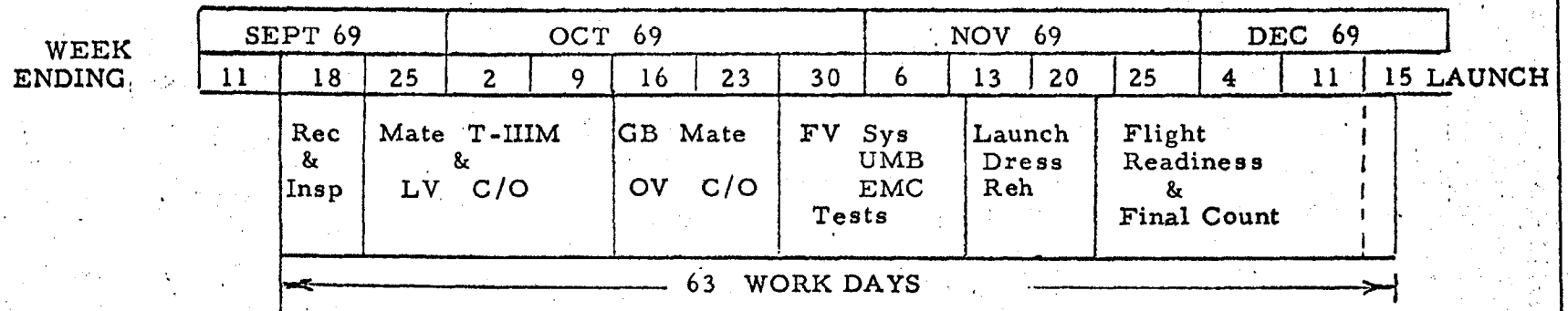
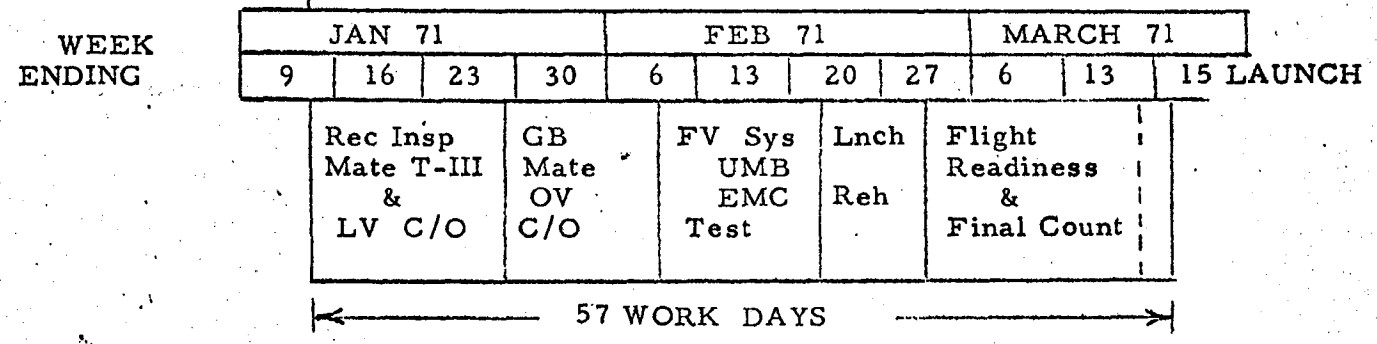
VAFB ACTIVITIES

LV CHECKOUT SCHEDULE - 12 MO



LV CHECKOUT SCHEDULE - 15 MO



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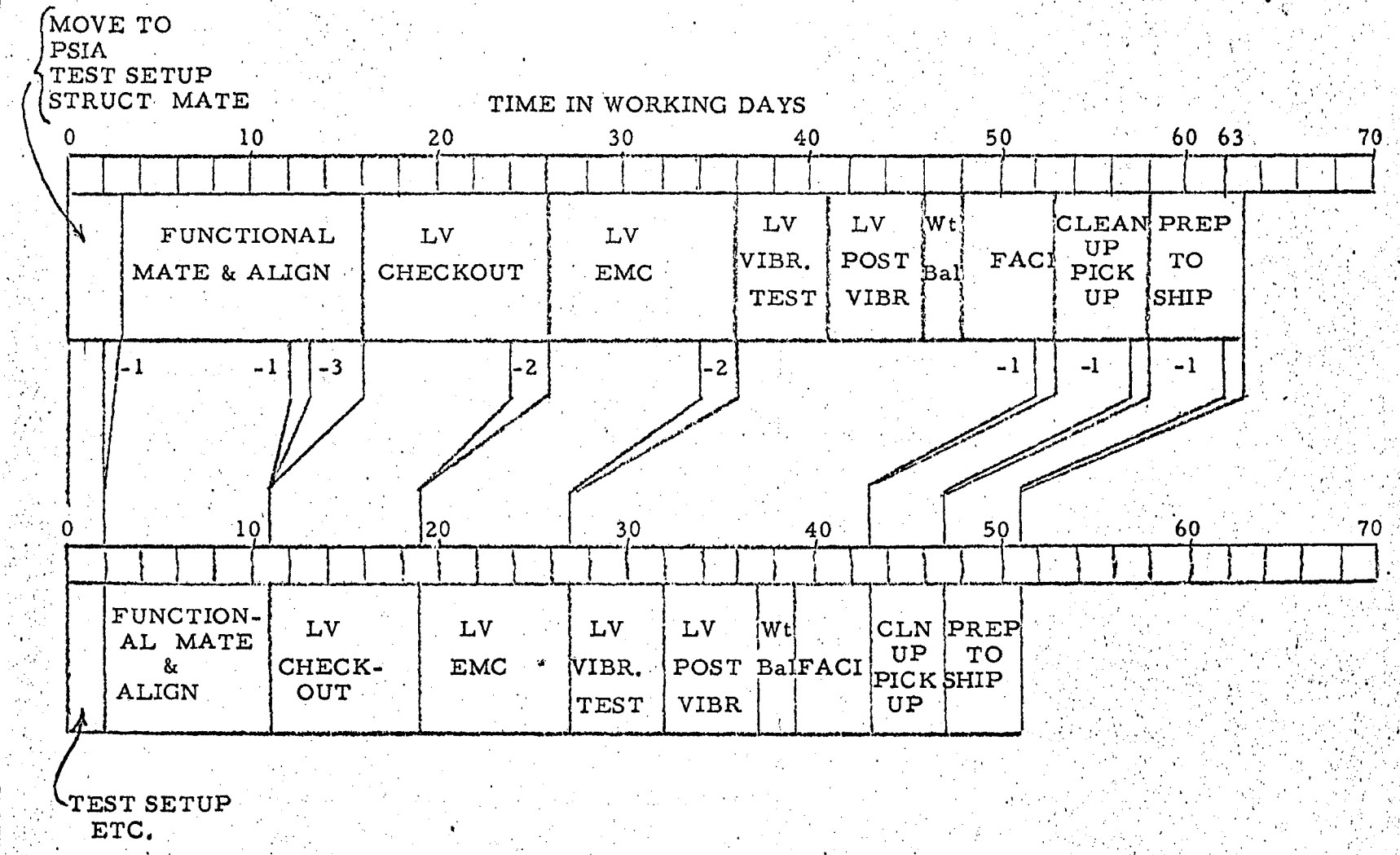
LAB VEHICLE TESTS
(HUNTINGTON BEACH)



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12 MONTH FLOW BUILDUP

ENGINEERING AND THERMAL

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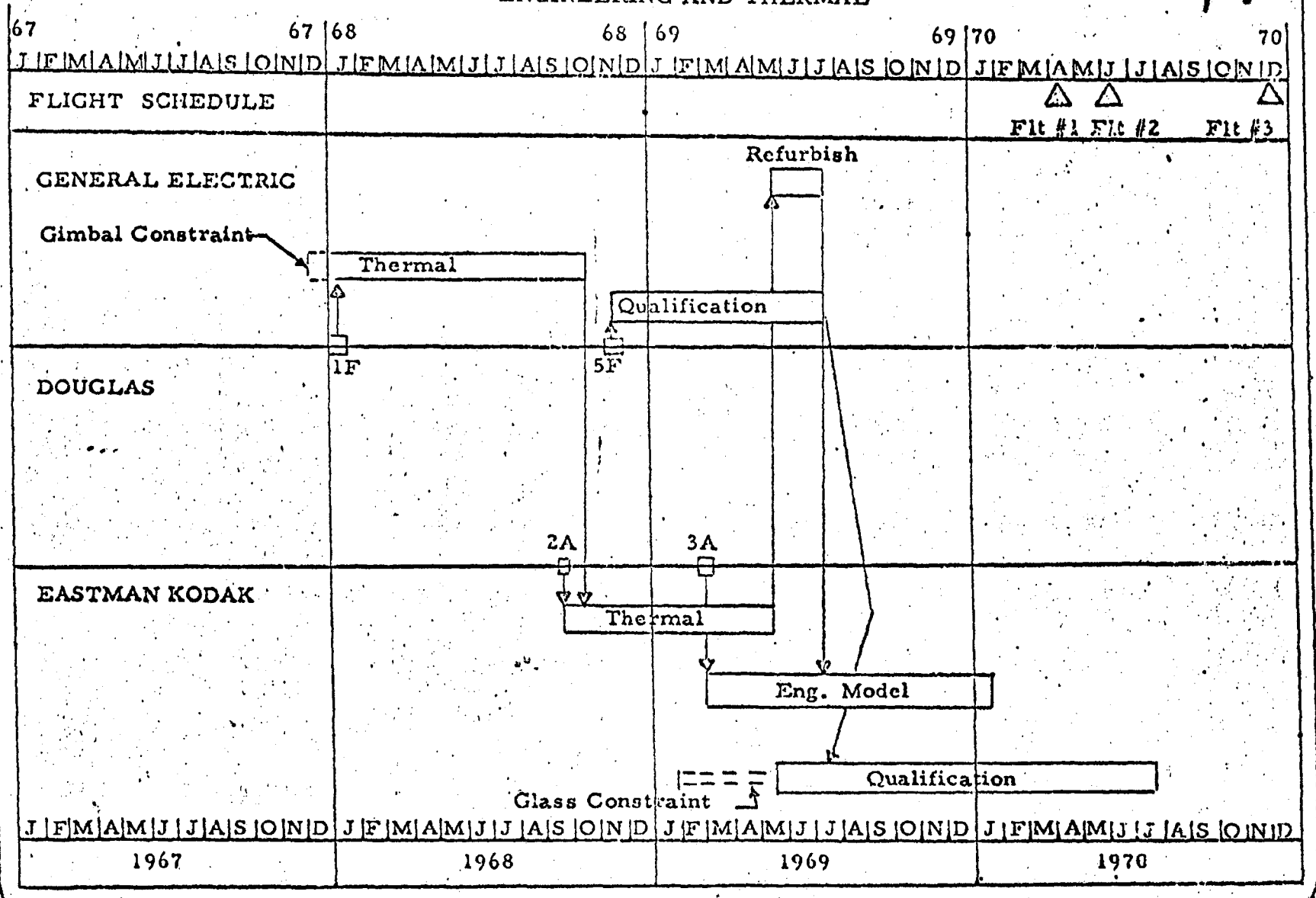

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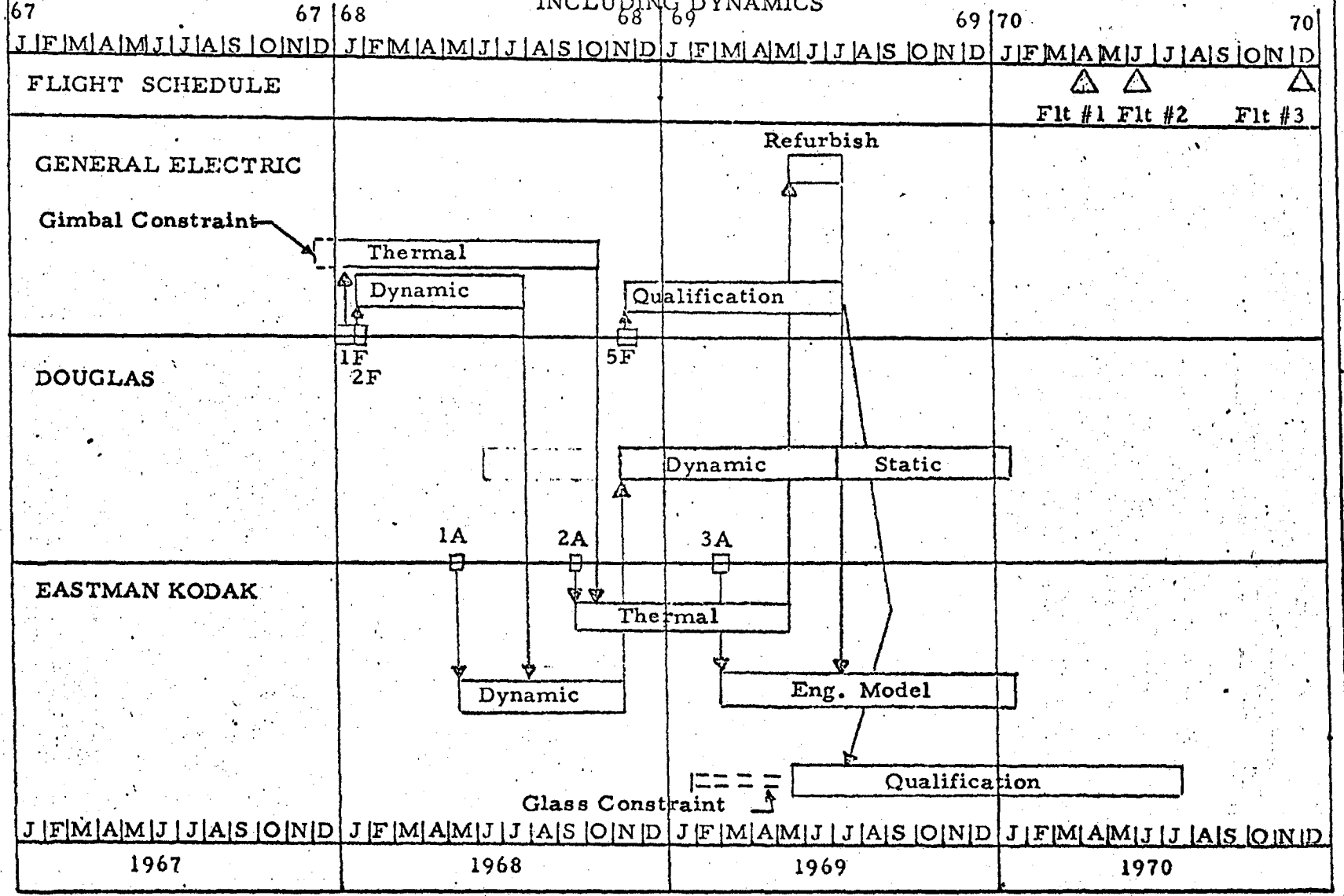
12 MONTH FLOW BUILDUP
ENGINEERING AND THERMAL
INCLUDING DYNAMICS



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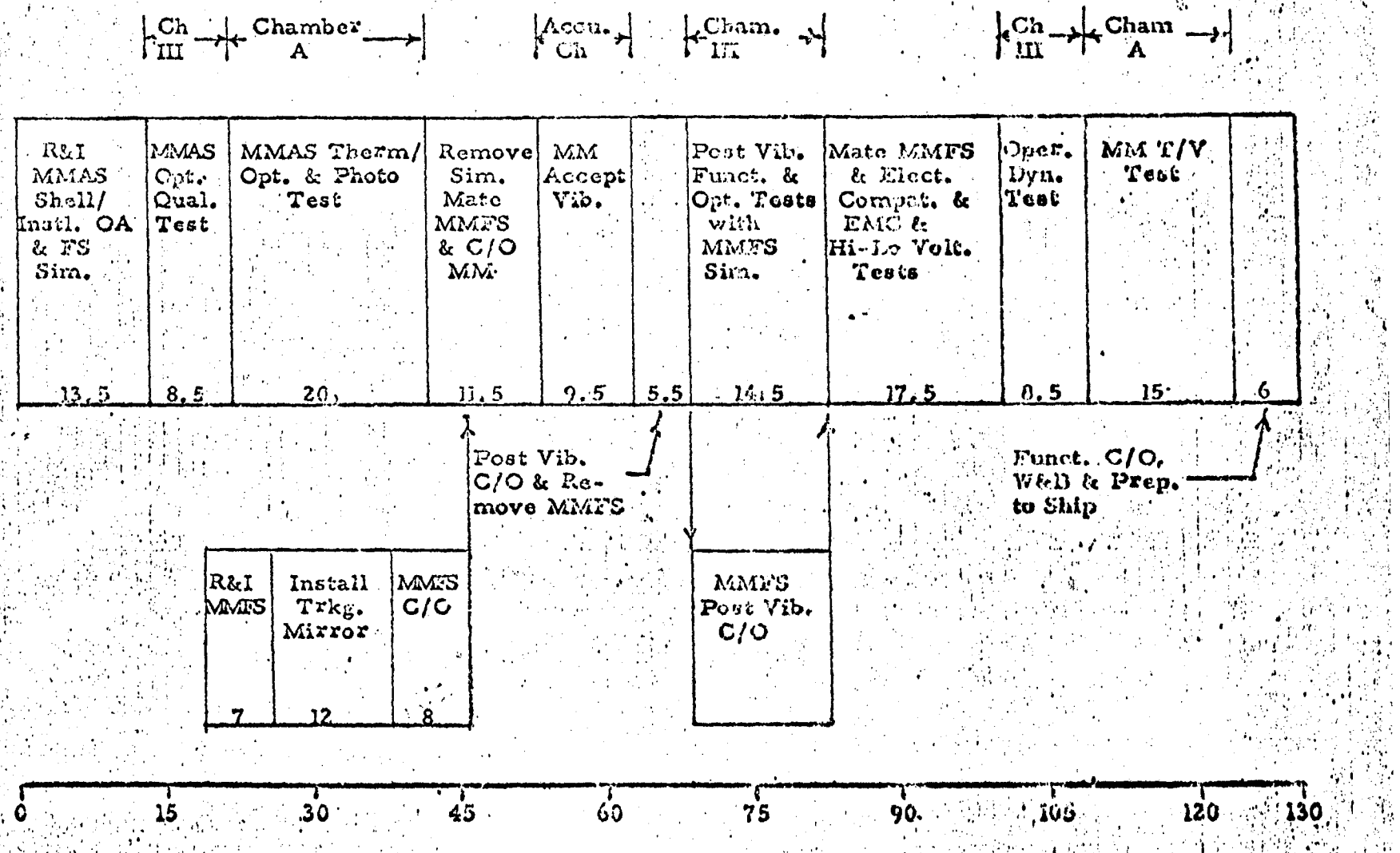
EK ACCEPTANCE TEST FLOW



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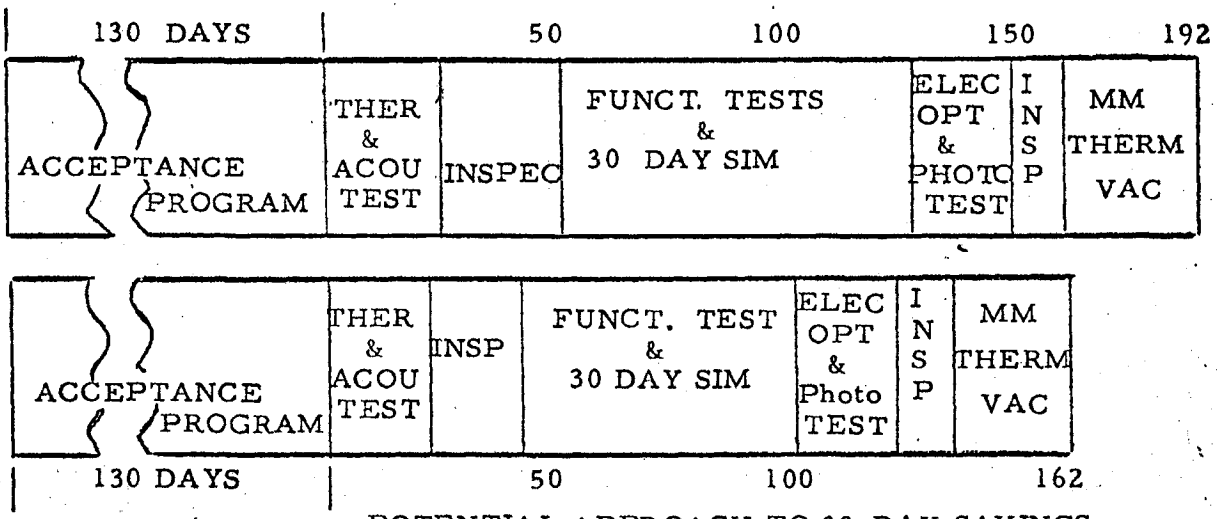
EK QUALIFICATION PROGRAM



POTENTIAL APPROACH TO 30-DAY SAVINGS

- MISSION MOD NON-OPERATING TEMP TEST
  ASCENT VENTING & ELECT. TESTS
  ACOUSTIC NOISE & ELECT. TESTS — **3 DAYS**
- DISASSEMBLY & INSPECTION
  REASSEMBLE INSTALL MMFS SIM. & C/O — **5 DAYS**
- FUNCTIONAL ELECTRICAL, OPTICAL & PHOTOGRAPHIC TESTS
  30-DAY SIMULATED MISSION — **17 DAYS**
- MISSION MODULE THERMO VAC TEST — **5 DAYS**

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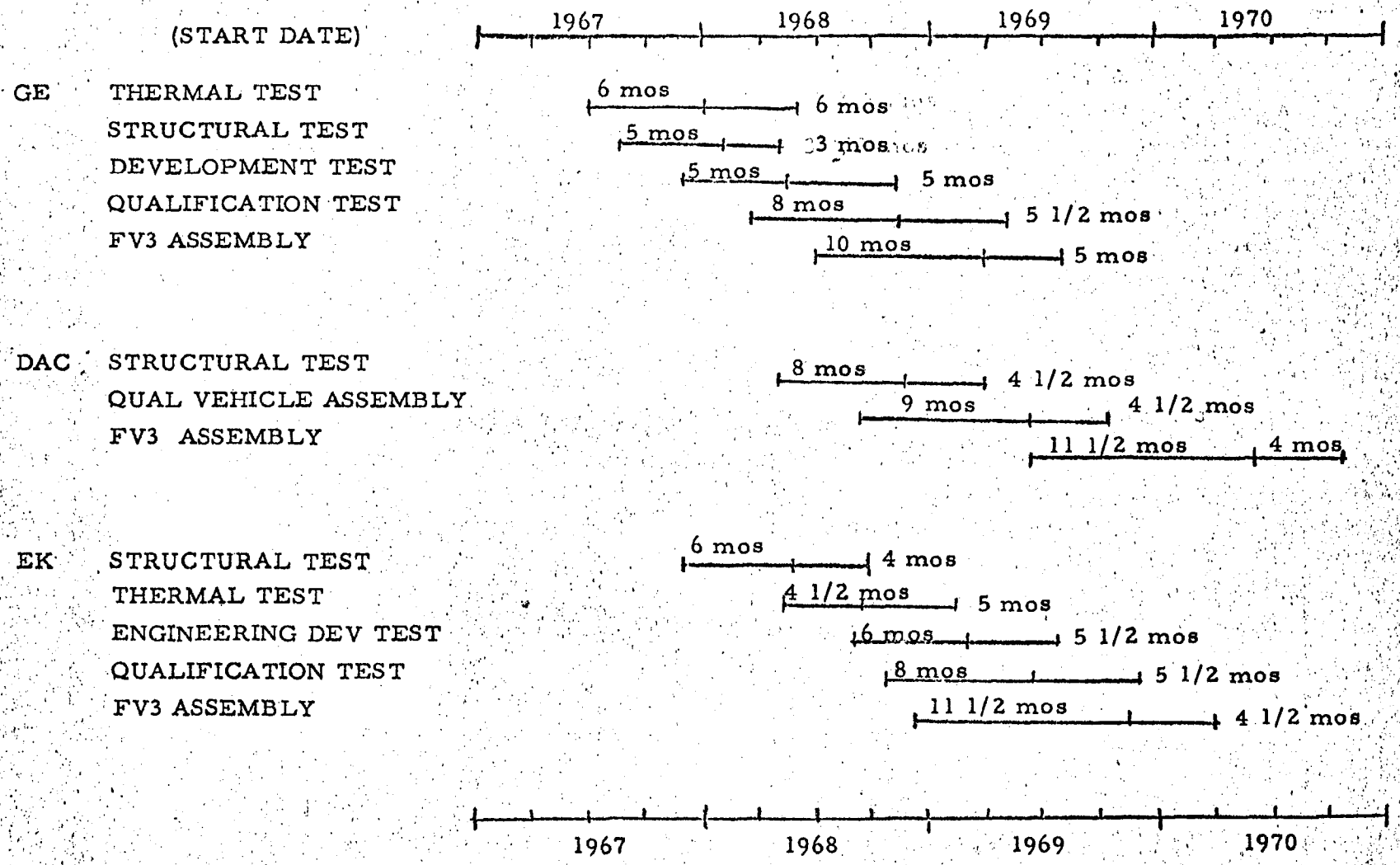
SCHEDULES SLIDES
BASELINE TO 12 MONTH TO 15 MONTH SCHEDULE



OTHER CHANGES IN 15-MONTH SCHEDULE

- INITIATION OF DYNAMICS TESTS NOW PRECEDES THERMAL TESTS AT GE
- THERMAL MODEL USES BERYLLIUM GIMBAL
- REFURBISH TIME FOR THERMAL FORWARD MISSION MODULE SECTION INCREASED TO TWO AND ONE-HALF MONTHS
- IMPROVED MANUFACTURING FLOW & REDUCED STORAGE TIMES (FLT. VEHICLE #1, 2)
- MISSION SIMULATOR PROGRAM COMPLETELY REVISED
- TIME BETWEEN LAUNCHES 2 AND 3 REDUCED 2 WEEKS
- MANNED LAUNCHES ON FOUR-MONTH CENTERS
- DEVELOPMENT FOR FLIGHTS 6 AND 7 NOW PROGRAMMED

CONCLUSIONS RELATIVE TO 15 MONTH SCHEDULE

- BASED ON SUCCESS PLANNING AND HAS MINIMUM CONTINGENCY TO PROTECT FV-3 LAUNCH DATE

- AUTOMATIC-MODE SCHEDULE SUBJECT TO CHANGE PENDING FURTHER DEFINITION

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POTENTIAL MAJOR PROBLEM AREAS

- FLIGHTS 1 AND 2
  - MASS SUBSTITUTE DEFINITION
  - CONTRACTUAL COVERAGE
- GIMBAL BEARING, TRACKING MIRROR AND SCOPES
  - EFFECTS ON IMC SMOOTHNESS
- THERMAL DOOR (SLIDING MASK)
  - INTERIOR VERSUS EXTERIOR
- CONTAMINATION
  - ATTITUDE CONTROL SYSTEM
  - MM DOOR SEPARATION
- ELECTRICAL POWER
  - 1-SEC INTERRUPT
  - SWITCHING VERSUS BATTERIES
- GEMINI FIRE HAZARD
- LABORATORY FIRE HAZARD

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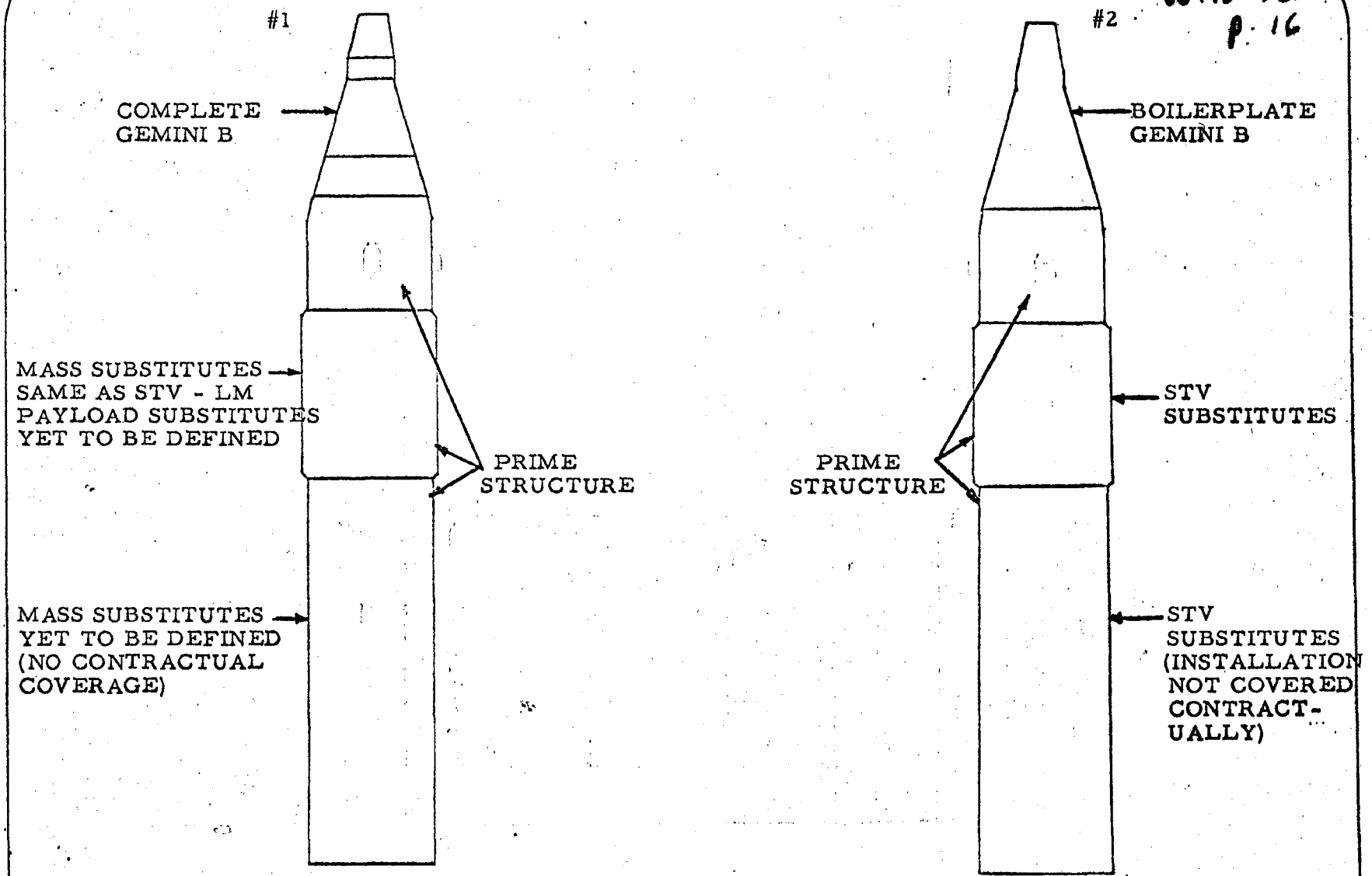
FLIGHT 1 & 2 STATUS AND PROBLEMS



#1 - OBJECTIVES

- o Qualify Gemini B in Ascent Re-entry and Recovery
- o Exercise Recovery Forces

OBJECTIVES (Both Flights)

- o Qualify Vehicle Structure
- o Qualify TIII M Vehicle & Ground Systems

#2 - OBJECTIVES

- o Obtain Environmental Data to validate subsystem Ground Test criteria

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FLIGHT 1 & 2 INSTRUMENTATION PROBLEMS

- DAC/GE/AEROSPACE INSTRUMENTATION LIST

	DAC	GE
ACOUSTICS	12	7
VIBRATION	54	90
SHOCK		9
STRAIN	112	10
PRESSURE	6	15
THERMAL	55	100
ACCELERATION	4	
VOLTAGE	3	

- REQUIRES 7 TRANSMITTERS PLUS SOME ON-BOARD RECORDING FOR DELAYED PLAYBACK
- PRESENT CONTRACTUAL COVERAGE INCLUDES DAC INSTRUMENTATION, DAC DATA REDUCTION, AND 3 TRANSMITTERS
- NO GE COVERAGE FOR INSTRUMENTATION, ADDITIONAL 4 TRANSMITTERS, OR DATA REDUCTION

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GIMBAL BEARING PROBLEMS

TRACKING MIRROR AND SCOPES

- NEAR-ZERO ROLL RATE STICTION

  RESULTS FROM ROLL AND YAW ANGLES THAT PRODUCE ROLL RATE ≤ .01 DEG/SEC

  PROVIDE VEHICLE RATE BIASES

- BEARING RIPPLE/STIFFNESS

  VARIATION IN FRICTION RELATED TO PRE-LOAD, MANUFACTURING QUALITY, AND LUBRICATION

  STIFFNESS REQUIRED FOR SUITABLE CENTRAL SYSTEM PERFORMANCE

- BEARING BRINELLING

  SEVERE GROUND ENVIRONMENT FROM HANDLING, VIBRATION, AND ACOUSTIC TEST

  LAUNCH ENVIRONMENT

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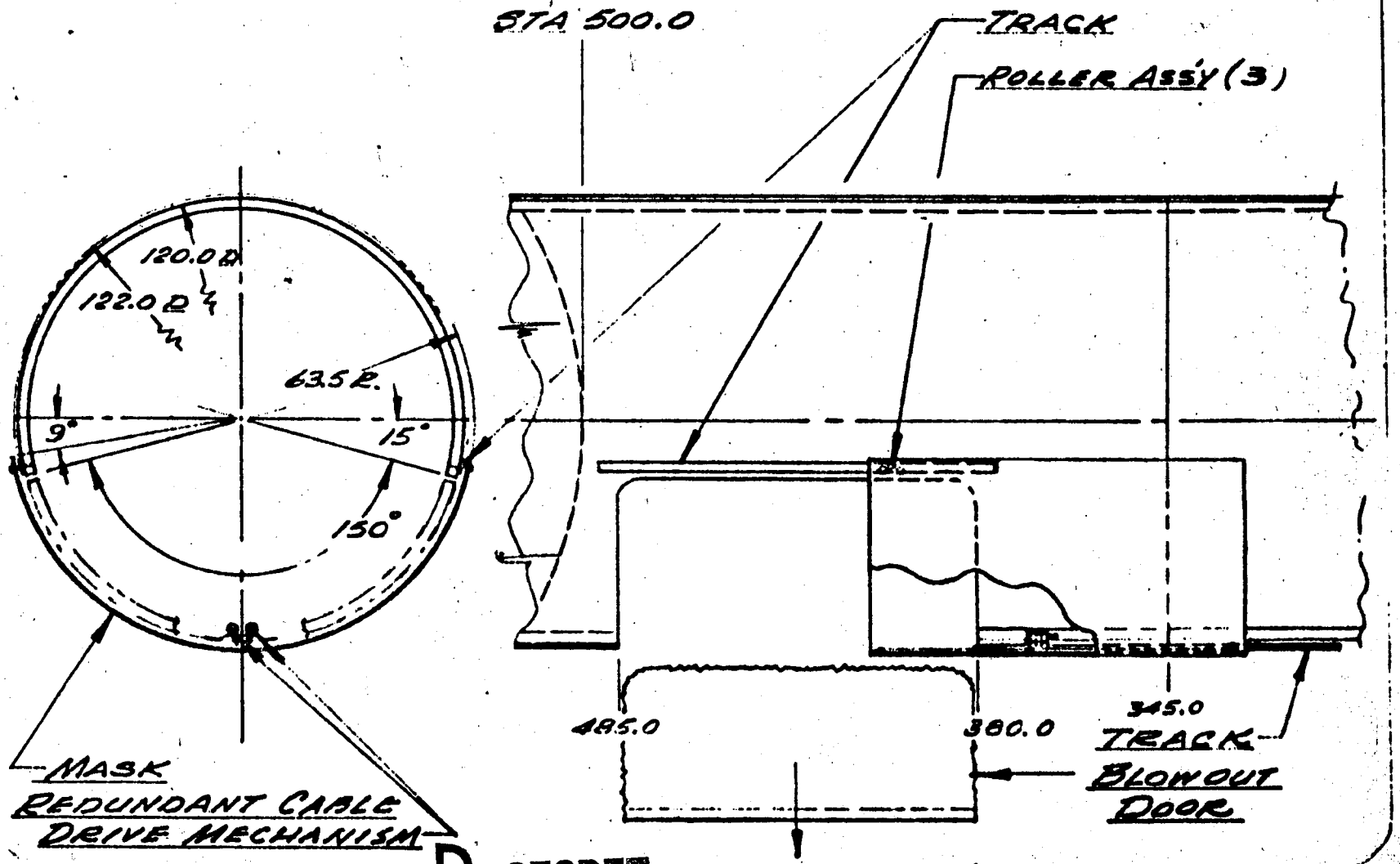
EXTERNAL PITCH MASK



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THERMAL DOOR PROBLEMS

EXTERIOR DESIGN PROBLEMS

- FLUTTER, PRESSURE, AND THERMAL CONDITIONS MAY BE CONTROLLING DESIGN FACTORS - INCREASE IN INITIAL WEIGHT ESTIMATE
- ADDITIONAL TESTS
  - / WIND TUNNEL - FORCE AND PRESSURE
  - / WIND TUNNEL - FLUTTER, TRANSONIC AND SUPERSONIC
  - / THERMAL/STRUCTURE - LOAD/TEMPERATURE TESTS
  - / ACOUSTIC/VIBRATION

INTERIOR DESIGN PROBLEM

- SPACE ALLOCATION - POSSIBLE REDESIGN FOR INTERFERENCE

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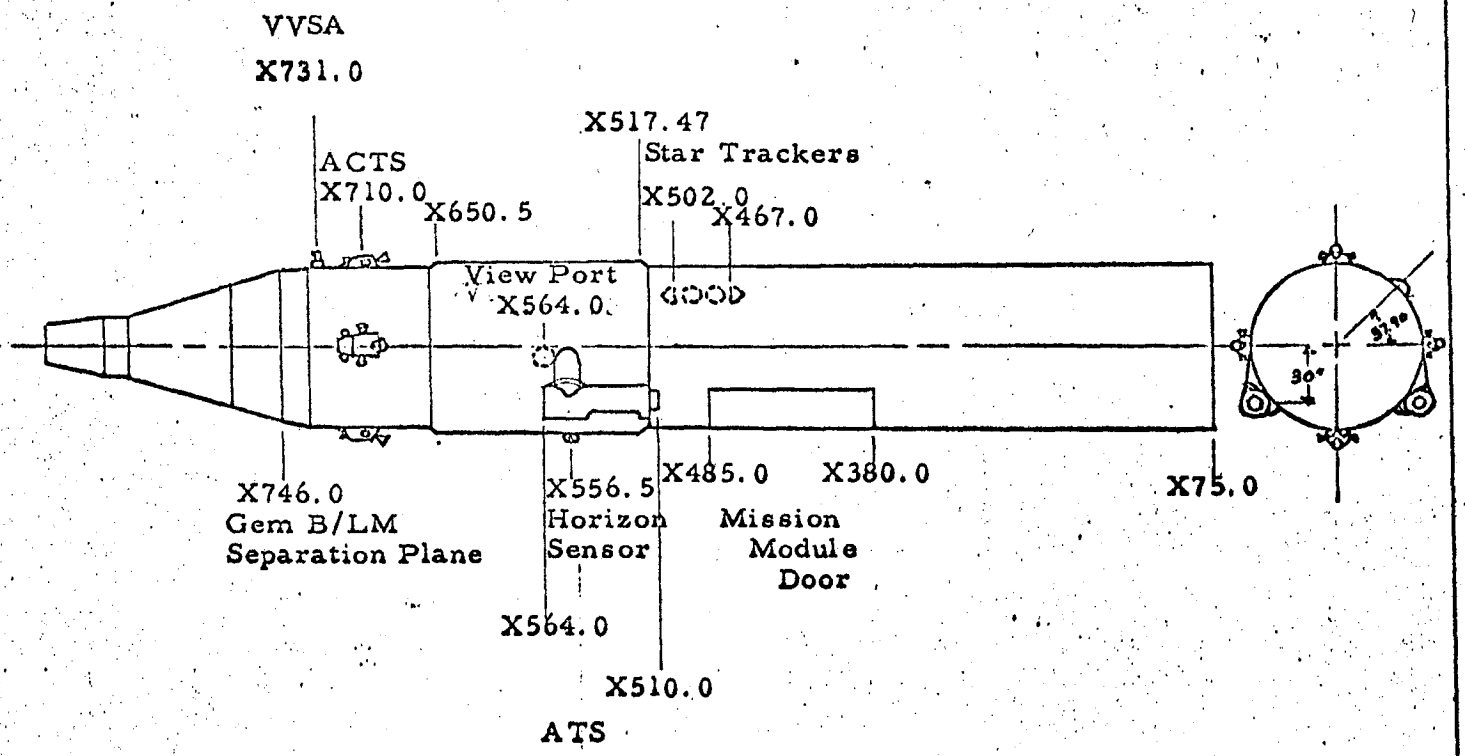
CONTAMINATION PROBLEM
CRITICAL OV SUBSYSTEMS



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EXPECTED EFFECTS OF PLUME IMPINGEMENT ON PRESENT BASELINE

- HORIZON SENSORS
  - / POSSIBLE DEGRADATION WITH TIME DUE TO CONTAMINATION BUILDUP - FAIRING PROVIDES PROTECTION
- VIEWPORT
  - / TRANSMITTANCE DEGRADATION AND INCREASED LIGHT SCATTERING DUE TO DEPOSITION OF CONTAMINANTS
- RADIATORS
  - / DECREASE IN THERMAL EFFICIENCY DUE TO INCREASE IN SOLAR ABSORPTIVITY ON THE SURFACE
- MISSION PAYLOAD EQUIPMENT
  - / DEGRADATION IN PERFORMANCE CAUSED BY DEPOSITION OF CONTAMINATION
    - / STAR TRACKER

      NO EXPECTED DEGRADATION DUE TO "TUCK AWAY" FEATURE OF HEAD
    - / ATS

      "EYE LIDS", NOT DESIGNED AS YET, ARE EXPECTED TO BE CAPABLE OF SEALING OUT CONTAMINATION
    - / MISSION MODULE PAYLOAD

      ONE-HALF TO ONE INCH GAP BETWEEN STRUCTURE AND MASK WILL ALLOW CONTAMINATION INTO THE PAYLOAD AREA

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CONTAMINATION TEST DATA SUMMARY

- EXISTING CONTAMINATION DATA

  GEMINI WINDOW CONTAMINATION

  NAA APOLLO PLUME IMPINGEMENT - AEDC - 1963

  ASTROSYSTEMS INTERNATIONAL - AFRPL FUNDED - 1963-1964

  ASTROSYSTEMS INTERNATIONAL - GRUMMAN FUNDED - 1966

  NAA TESTS AT MARQUARDT - AFRPL FUNDED - 1966

  SUMMARY OF EXISTING DATA

  - NO SUCCESSFUL IN-SITU DATA OBTAINED
  - BEFORE/AFTER MEASUREMENTS AFFECTED BY TIME AND MEASUREMENT ENVIRONMENT
  - SURFACE DEGRADATION INDICATED QUALITATIVELY ONLY

- PLANNED TESTS

  MINUTEMAN "PIGGYBACK" TESTS - AEDC - 1967

  DOUGLAS MOL TESTS - AEDC - 1968

  APOLLO FLIGHT EXPERIMENT - 1968

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IMPACT OF ACTS TRANSLATION THRUSTOR REVERSAL

- FUNCTIONAL
  - / OV/TIII M SEPARATION
    - RETRO ROCKETS USED FOR SEPARATION - BASELINE MARGINAL
  - / ORBIT CORRECTION
    - OV ROTATIONS REQUIRED FOR ΔV
  - / MODE "D" ABORT
    - OV TURNAROUND TIME DOES NOT SIGNIFICANTLY AFFECT MODE C/D DEADMAN ZONE
- HARDWARE
  - / INSULATION PADS REQUIRED FOR GEMINI SEPARATION PYROTECHNICS
  - / ION SENSOR MUST BE RELOCATED
  - / RETRO ROCKETS REQUIRED ON TIII
  - / WEIGHT INCREASE $\approx$ 87 LBS
- PROPELLANT CAPABILITY INCREASED 28 LBS
  - / DECREASE CANT ANGLE FROM 20° TO 10° (69 LB SAVINGS).
  - / OV TURNAROUND PROPELLANT FOR ORBIT CORRECTIONS (43 LB LOSS)
  - / DEORBIT TURNAROUND (2 LB SAVINGS)

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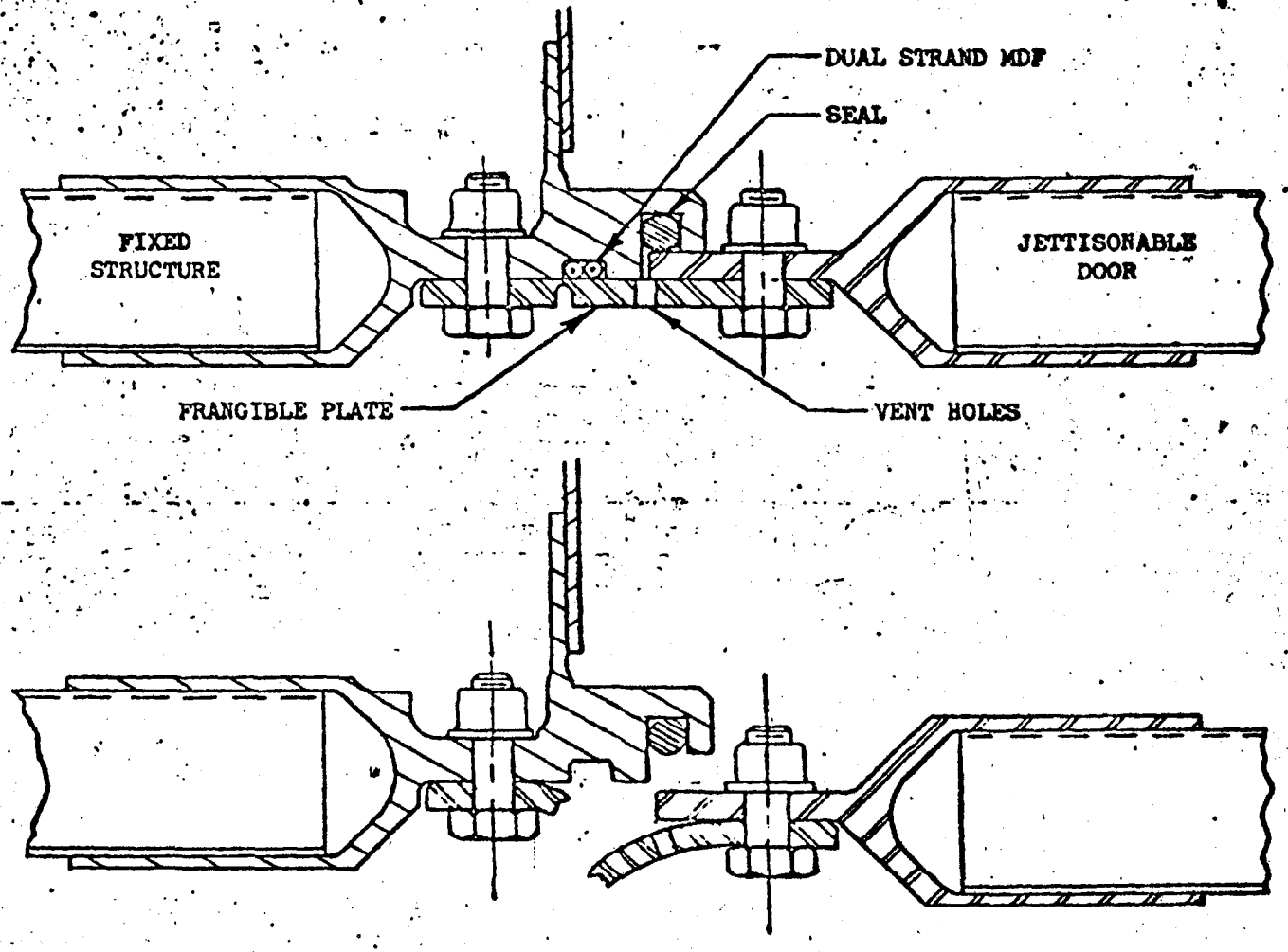
MISSION MODULE DOOR EXPLOSIVE JOINT



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ONE-SECOND POWER INTERRUPT

DEFINITION

- 1-SEC DROP OF VOLTAGE BELOW 20 VOLTS

PROBLEM

- NO DAMAGE TO COMPONENTS
- IMMEDIATELY RETURN TO SPECIFIED PERFORMANCE
- NOT ON CONTRACT WITH GE AND EK

POTENTIAL SOLUTIONS

- PROVIDE BATTERY FOR CONTINUOUS POWER
- LIMIT MAXIMUM FEEDER FAULT CURRENT
- RELAX SPECIFICATION AND ALLOW GROUND UPDATE

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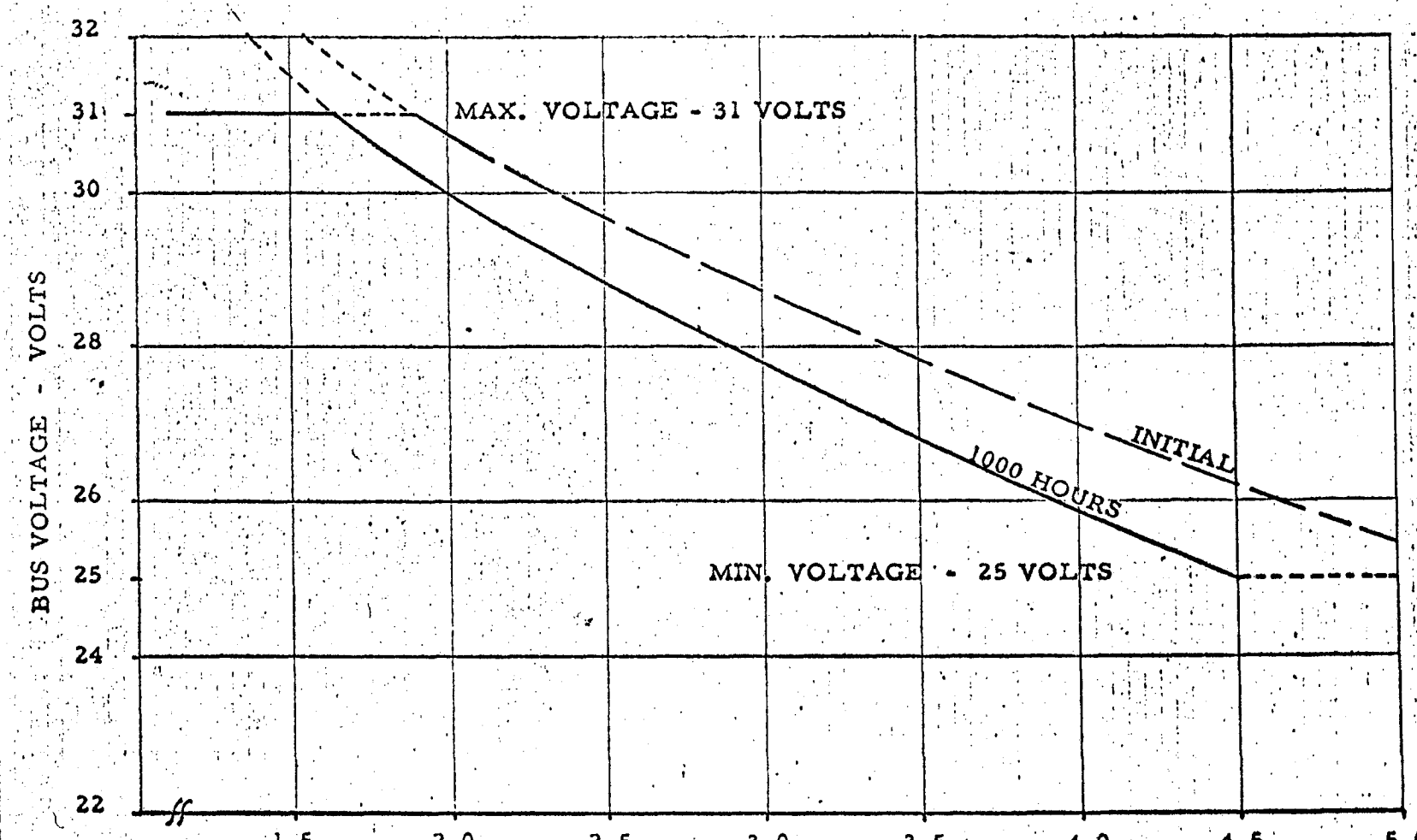
MOL FUEL CELL ELECTRICAL PERFORMANCE

(INCLUDING TRANSIENTS)



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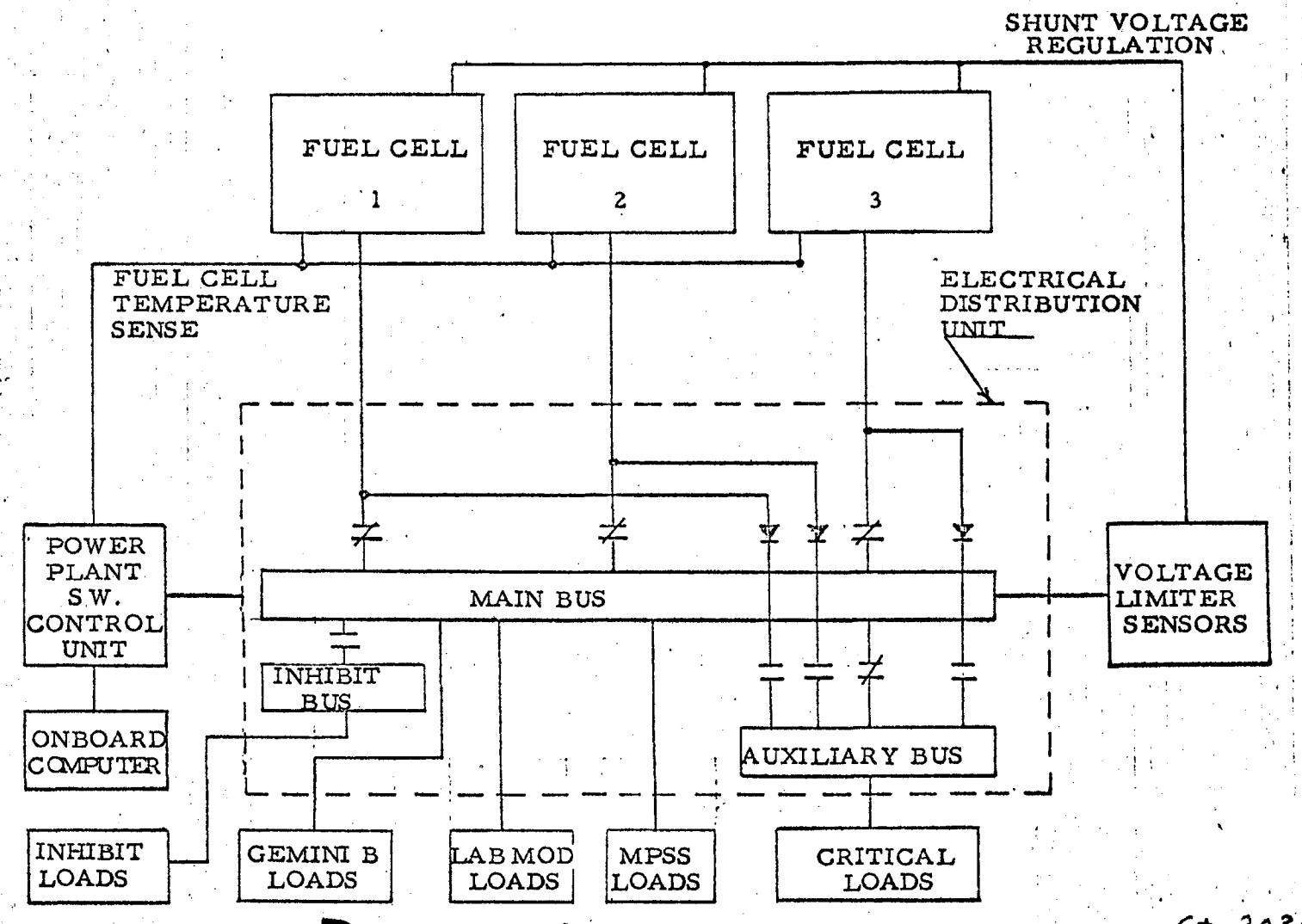
ELECTRICAL POWER SYSTEM SCHEMATIC



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ELECTRICAL POWER STATUS

		P. O. PEAK	AVG
GEMINI B	ALLOCATED	145	100
	REPORTED	132	90
LABORATORY	ALLOCATED	1362	1006
	REPORTED	1237	867
MPSS	ALLOCATED	2758	633
	REPORTED	2683	616
ORBITING VEHICLE	ALLOCATED	4265	1752
	REPORTED	4052	1573

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GEMINI B OXYGEN FIRE HAZARD

- ENVIRONMENT
  - / PAD CHECKOUT - 15-20 PSI PURE OXYGEN
  - / ASCENT - 15-5 PSI PURE OXYGEN
  - / ON ORBIT - 5 PSI PURE OXYGEN
- ASSESSMENT OF PROBLEM
  - / SIMILAR TO APOLLO
  - / SHOULD BE LESS SEVERE
    - MAJORITY OF EQUIPMENT OUTSIDE PRESSURE COMPARTMENT
    - FASTER EGRESS POSSIBLE (HATCHES OPEN IN < 10 SECONDS)
- CURRENT ACTIVITIES
  - / REVIEWING MATERIALS AND EQUIPMENT TESTING
  - / REVIEWING CHECKOUT/TEST PROCEDURES
  - / STUDYING SIMPLIFIED TWO GAS SYSTEM
  - / REVIEWING ON ORBIT EMERGENCY PROCEDURES

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(7B)

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MOL FIRE HAZARD IMPACTS

MATERIALS	LIMIT USE & LOCATION OF NON-METALLICS INCORPORATION OF NEW NASA MAT'L SPEC & TESTING TECHNIQUE Q. C. TESTING FOR FLAMMABILITY OF MATERIALS APPLICATION OF MATERIALS SPECS TO CARRY-ON AGE
ATMOSPHERE	HIGHER LM PRESSURE OF 7-10 psi (CONSTANT 3-1/2 psi O_2) PURGE WITH He AND ADD O_2 (LAUNCH PAD) He IN TUNNEL
FIRE CONTROL	INCORPORATE FENWAL SYSTEM (SENSOR + DILUENT) DEVELOP CARRY-ON FIRE DETECTION AND CONTROL AGE
COMBUSTION THEORY	ZERO GRAVITY TESTING BURN RATE DATA AS FUNCTION OF O_2/ DILUENT RATIO
GROUND OPERATIONS	AMBIENT AIR OR He ATMOSPHERE ONLY DURING TESTING STRICT REVIEW OF SPACE CHAMBER USAGE
DESIGN	VERIFY DESIGN CRITERIA FOR ELECTRICAL/ELECTRONIC GEAR METHODS OF TIE-DOWN & WIRE PLACEMENT POWER ISOLATION CAPABILITY RESTRICTIONS ON INSULATION

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ORBITING VEHICLE SYSTEM SEGMENT

WEIGHT SUMMARY - 1 APRIL 1967

	Contractor	SP/DR Weight	Projected Changes to SP/DR	Adjusted SP/DR Weight	Current Predicted Weight
GEMINI B		6,120	+328	6,448	6,422
GEMINI B SYSTEM SEGMENT	MAC	5,680	+328	6,008	5,982
FLIGHT CREW SYSTEM SEGMENT	SPO	360	--	360	360
PRESSURE SUIT ASSMEBLY SEGMENT	SPO	80	--	80	80
LABORATORY VEHICLE SYSTEM SEGMENT (AVE)	DAC	14,449	0	14,449	14,549
MISSION PAYLOAD SYSTEM SEGMENT		8,622	+307	8,929	8,943
G. E.	GE	2,435	-117	2,318	2,359
E. K.	EK	5,583	0	5,583	5,556
GFE	SPO	441	- 20	421	421
WIDEBAND READOUT SYSTEM	-	163	+268	431	431
BIG EYE △	-	--	+176	176	176
TOTAL		29,191	+635	29,826	29,914

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PROJECTED CHANGES TO SP/DR

	ESTIMATED CONTRACTUAL WEIGHT CHANGES	
o GEMINI B		
PAD ABORT CONTROL SYSTEM	+ 46	
STRENGTHEN ADAPTER INTERMODULE TIES	+ 14	
BLAST PROTECTION FOR ABORT	+268	
		+328
o THERMAL DOORS		
DELETE CURRENT THERMAL DOOR SYSTEM	-388	
ADD PITCH MASK - STRUCTURE, MASK, MECHANICAL DRIVES AND ELECTRONICS	+174	
ADD MISSION LOUVERS AND MOUNTS	+ 97	
		-117
o GOVERNMENT FURNISHED EQUIPMENT		- 20
o WIDEBAND READOUT SYSTEM		
ADD ANTENNA SYSTEM & ELECTRONICS	+173	
ADD OPTICAL SYSTEM - CBS	+127	
ADD STRUCTURAL PROV. & COLD PLATES - DAC	+131	
DELETE PREVIOUS SYSTEM	-163	
		+268
o ACQUISITION SYSTEM		
ADD 10" SYSTEM (2)	+496	
DELETE 5" SYSTEM	-320	
		+176
o TOTAL PROJECTED CHANGES		+635

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OV WEIGHT MARGIN

	ORBIT 80° INCL. 80/180 55° N	ORBIT 90° INCL. 80/180 55° N
BOOSTER CAPABILITY	32,292	31,130
*PREDICTED MAX OV CONTRACTUAL WEIGHT	31,086	31,086
P/L MARGIN	1,206	44
*ADJUSTED SP/DR	29,826	
CONTRACT INCENTIVE GROWTH MAX.	1,260	DAC 750 MAC 120 GE 390
	31,086	

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PERTINENT ORBIT PARAMETER COMPARISON

- q = 16-2/15
- 3-DAY SUSTENANCE CYCLE
- 1964 JACCHIA ATMOSPHERE

	PARAMETER	INCLINATION	
		80°	90°
INITIAL	PERIGEE ALTITUDE (N. MI.)	80	80
	APOGEE ALTITUDE (N. MI.)	168.9	187.5
	PERIGEE LATITUDE (°N)	55	55
	MINIMUM ALTITUDE (N. MI.)	78.6	78.7
	NODAL PERIOD (MIN)	88.9	89.2
DECAYED	PERIGEE ALTITUDE (N. MI.)	77.9	78.6
	APOGEE ALTITUDE (N. MI.)	149.4	169.0
	PERIGEE LATITUDE (°N)	65.9	67.9
	MINIMUM ALTITUDE (N. MI.)	76.6	77.6
	NODAL PERIOD (MIN)	88.4	88.8

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PERTINENT ORBIT PARAMETER COMPARISON

- TOTAL SUSTENANCE REQUIREMENTS IDENTICAL WITHIN 2%

- 80° CASE - BOTH SUSTENANCE IMPULSES FORWARD

  90° CASE - ONE FORWARD AND ONE AFT

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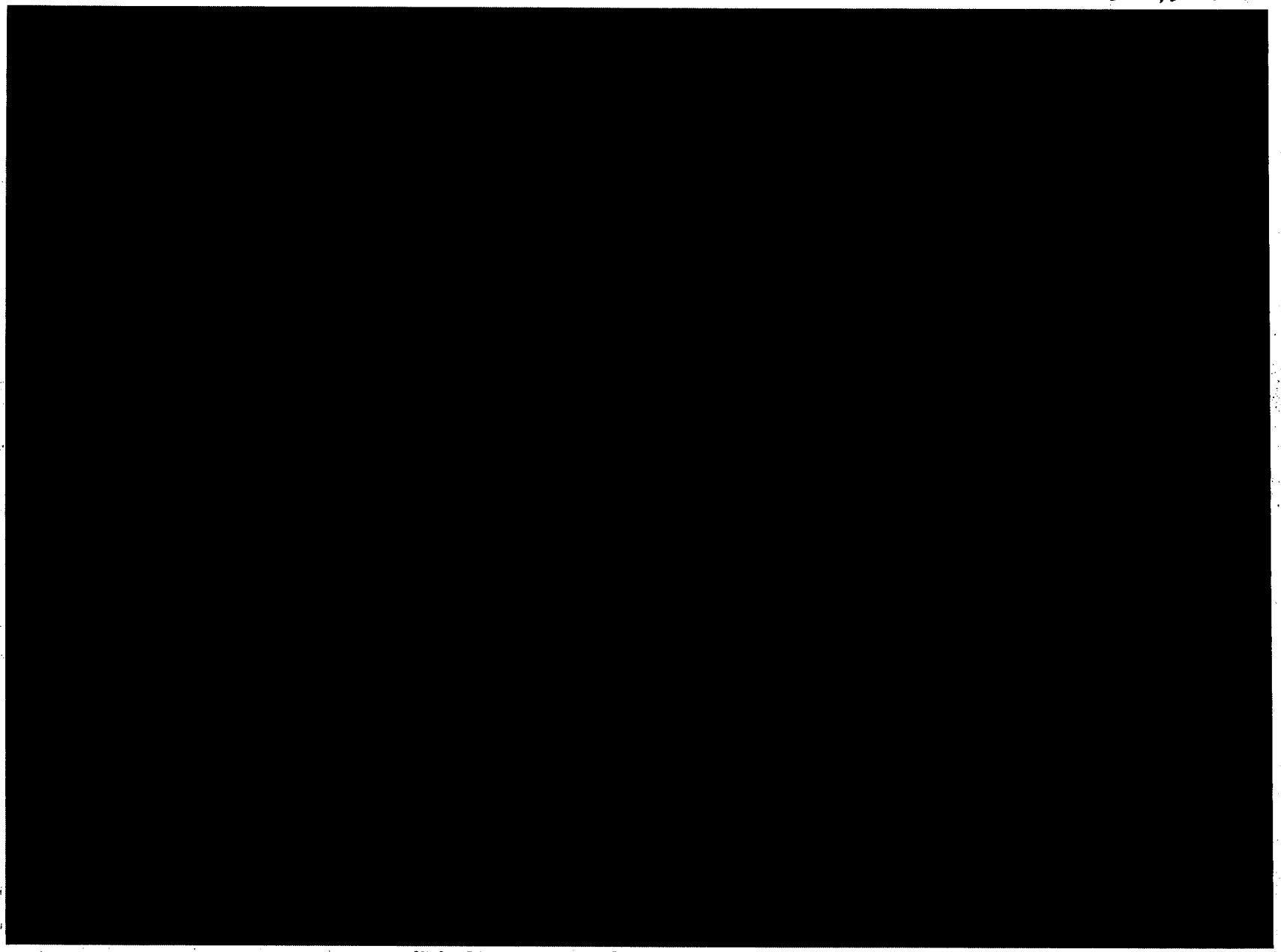

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DRV AND READOUT COMPARISON

	WEIGHT (LB)	COST	DELETION CREDIT	CAPABILITY
DRV ONLY	475		$8.8M	o DETAIL ANALYSIS OF 1st WEEK TAKE o 60-LB PAYLOAD CAPABILITY GEMINI 230-LB LIMIT
READOUT ONLY	431	$19.5 to $25 M	$18 M	o WEEKLY PRIMARY RECORD SAMPLE o DAILY 1 FRAME/TARGET
READOUT & DRV	906		$26.8 M	
SPACE PROVISIONS DRV READOUT	40		$2 M	

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RECOMMENDED POSITION ON DRV AND READOUT

- DEFER CAPABILITY FOR DRV AND READOUT TO FOLLOW-ON VEHICLES
- RESERVE SPACE IN UNPRESSURIZED SECTION FOR ELECTRONICS, BAY 2 FOR SCANNER; CARRY POWER REQUIREMENTS IN POWER BUDGET
- RETAIN PRESENT PROCESSOR - MAY OFF-LOAD BIMAT
- RESERVE SPACE FOR DRV BUT LEAVE OUT ATTACHMENTS AND DRV LOCK
- CHANGE BASELINE INCLINATION SPECIFICATION TO 90° FOR BETTER WEIGHTS MANAGEMENT AND MISSION PERFORMANCE - PROVIDES 910-LB MARGIN

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ACOUSTIC ACCEPTANCE TESTING

7.37

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ACCEPTANCE TESTING CONSIDERATIONS

- TWO SCHOOLS OF THOUGHT
  - PRE- AND POST-CHECK WITH ARTICLE SUBJECTED TO FLIGHT LEVEL ENVIRONMENT (LIKE 1 MIN)
  - LOWER THAN FLIGHT LEVEL VIBRATION TESTS WITH CHECK FOR INTERMITTENT FAILURES DURING EXCITATION (UP TO MANY HOURS)
- MAJOR PROBLEM IS CHECKOUT TIME (SUMMARY CHECK OF MOST CIRCUITS)
  - LABORATORY MODULE 15 MIN > t < 60 MIN
  - TMB 2 MIN > t < 10 MIN
  - COAB 1 MIN

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SEGMENT LEVEL ACOUSTIC AND VIBRATION TEST PLAN

	SYSTEM LV = LM + MM	LM	MM	
			MMFS	MMAS
DEVELOPMENT		ACOUSTIC OFF SITE	ACOUSTIC AT EK	
QUALIFICATION		ACOUSTIC OFF SITE TO FLIGHT LEVEL	VIBRATION LOW LEVEL	ACOUSTIC AT EK ACCEP. & QUAL. LEVEL
ACCEPTANCE	LOW LEVEL VIBR. AT LM/MM INTERFACE (WORKMANSHIP)	LOW LEVEL VIBRATION	LOW LEVEL VIBR.	ACOUSTIC AT EK TO NEAR FLIGHT LEVEL

~~SECRET~~ SPECIAL HANDLING

External Sound Pressure Levels

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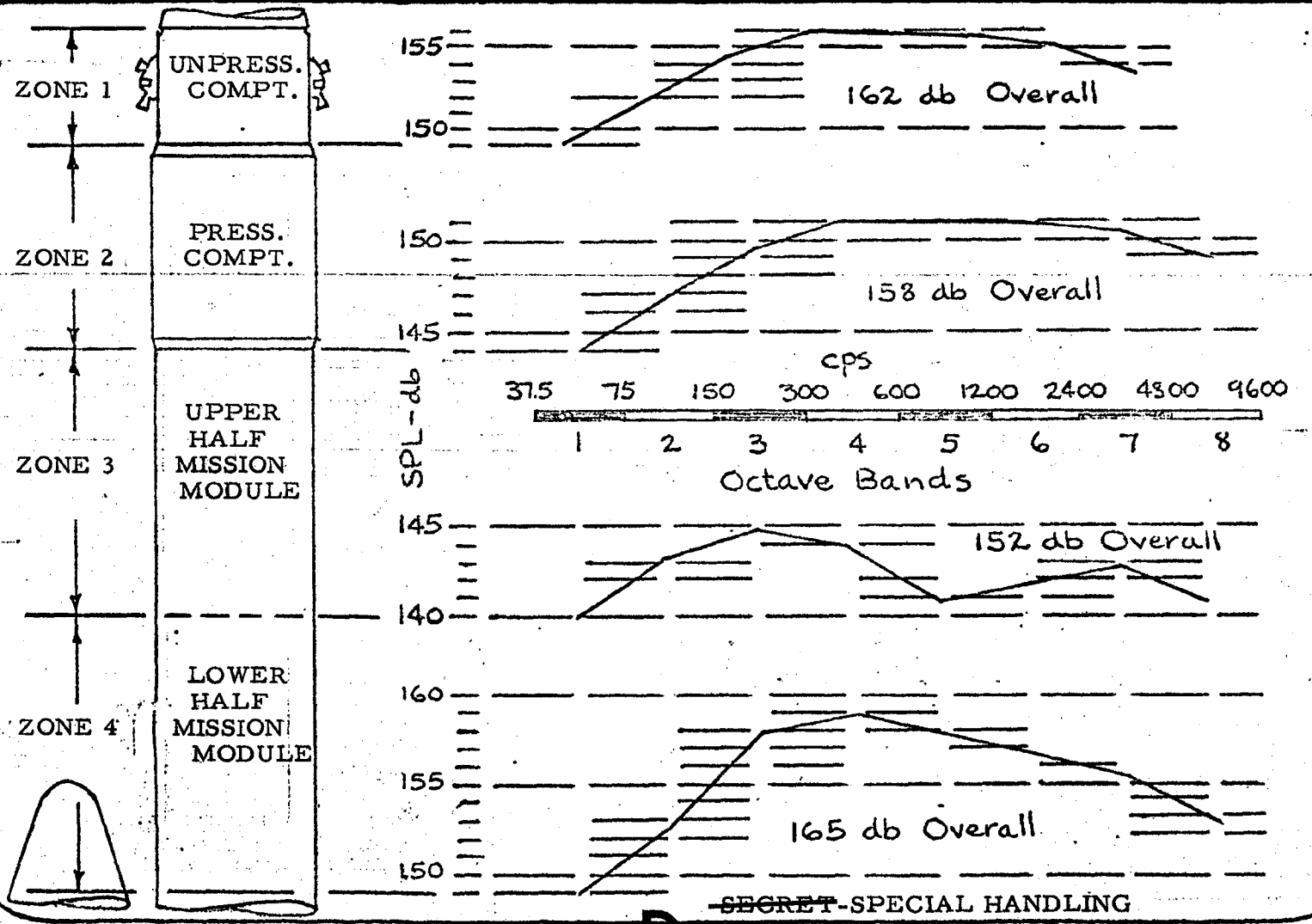

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D

ST-1069

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ORIGIN OF ACOUSTIC TEST LEVELS

- REDUCED T-IIIC DATA USED TO ESTABLISH BUFFET NOISE
- SHOCK NOISE THEORETICALLY DERIVED
- DATA OBTAINED AT MACH 1 q = 725 LB/SEC USING TWO MICROPHONES AT 100 ^{o} SEPARATION
- HIGH FREQUENCY RANGE HAS BEEN BOOSTED, BASED ON DOUGLAS EXPERIENCE
- "C" FLIGHTS NEVER REACHED "A" 160 DB LEVEL
- THREE 2-SEC INTERVALS REDUCED
- "A" FLIGHT HAD VERY HIGH AMBIENT INSTRUMENT NOISE
- ACCELEROMETER DATA SHOW DURATIONS LIKE 40 SEC
- WIND TUNNEL TESTS WILL PROVIDE BETTER RESOLUTION AND CONFIDENCE OF ACOUSTIC DATA

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CONCLUSIONS

- 15-MONTH SLIDE REPRESENTS ABOUT THE MOST THAT CAN BE DONE THROUGH SCHEDULING TO REDUCE FY 68 AND 69 FUNDING REQUIREMENTS AND STILL RETAIN REASONABLE CONFIDENCE
- SOLUTION TO OUTSTANDING PROBLEMS WILL IMPACT ON FUNDING REQUIREMENTS, FOR WHICH A RESERVE IS NEEDED
- WEIGHT AND POWER STATUS IS SATISFACTORY
- MISSION EFFECTIVENESS WOULD BE IMPROVED BY USE OF 90° INCLINATION BASELINE ORBITS
- DEFERMENT OF DRV AND READOUT WILL EASE FISCAL PROBLEMS AND PROVIDE SUBSTANTIAL PART OF WEIGHT MARGIN FOR SHIFT FROM 80 TO 90° INCLINATIONS
- ACOUSTIC ACCEPTANCE OF MISSION MODULE TESTING IS AN INTEGRAL PART OF 15-MONTH PROGRAM

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MISSION PAYLOAD SYSTEM SEGMENT

GFE WEIGHT SUMMARY

	BASIS FOR SP/DR WGT.	PROPOSED SP/DR WGT.
IMAGE VELOCITY SENSOR (I/V)	22	24
HARD COPY PRINTER (2)	20	0 *
CUE FILM AND CONTAINERS	20	2
COMPUTER	68	85
TERRAIN CAMERA AND FILM	11	0
DATA RECOVERY VEHICLE (DRV)	300	310
TOTAL	441	421

* CARRIED IN DAC WEIGHT

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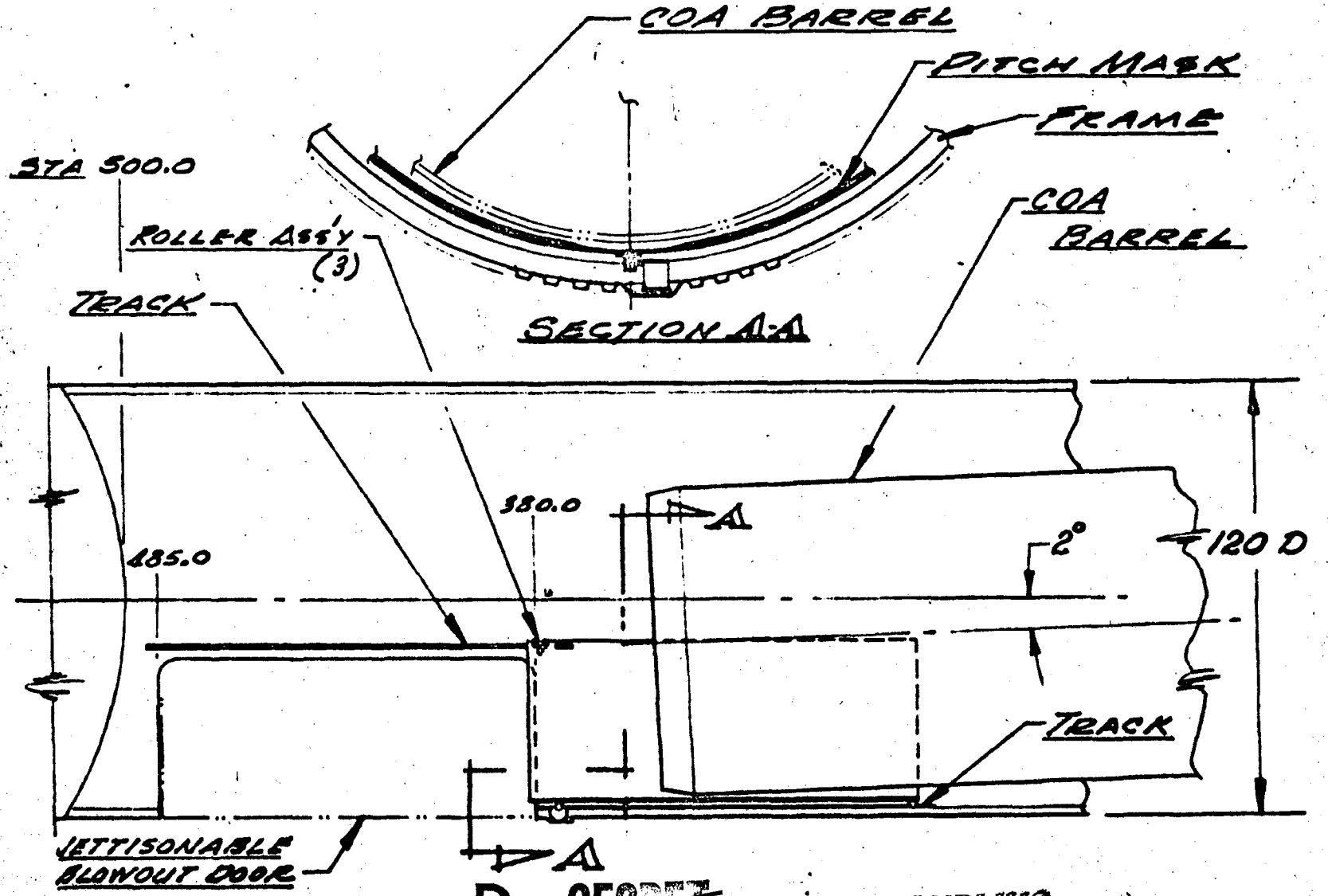
INTERNAL PITCH MASK



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~~SECRET~~ SECRET

MOL LAUNCH WINDOWS

90° ORBITAL INCLINATION

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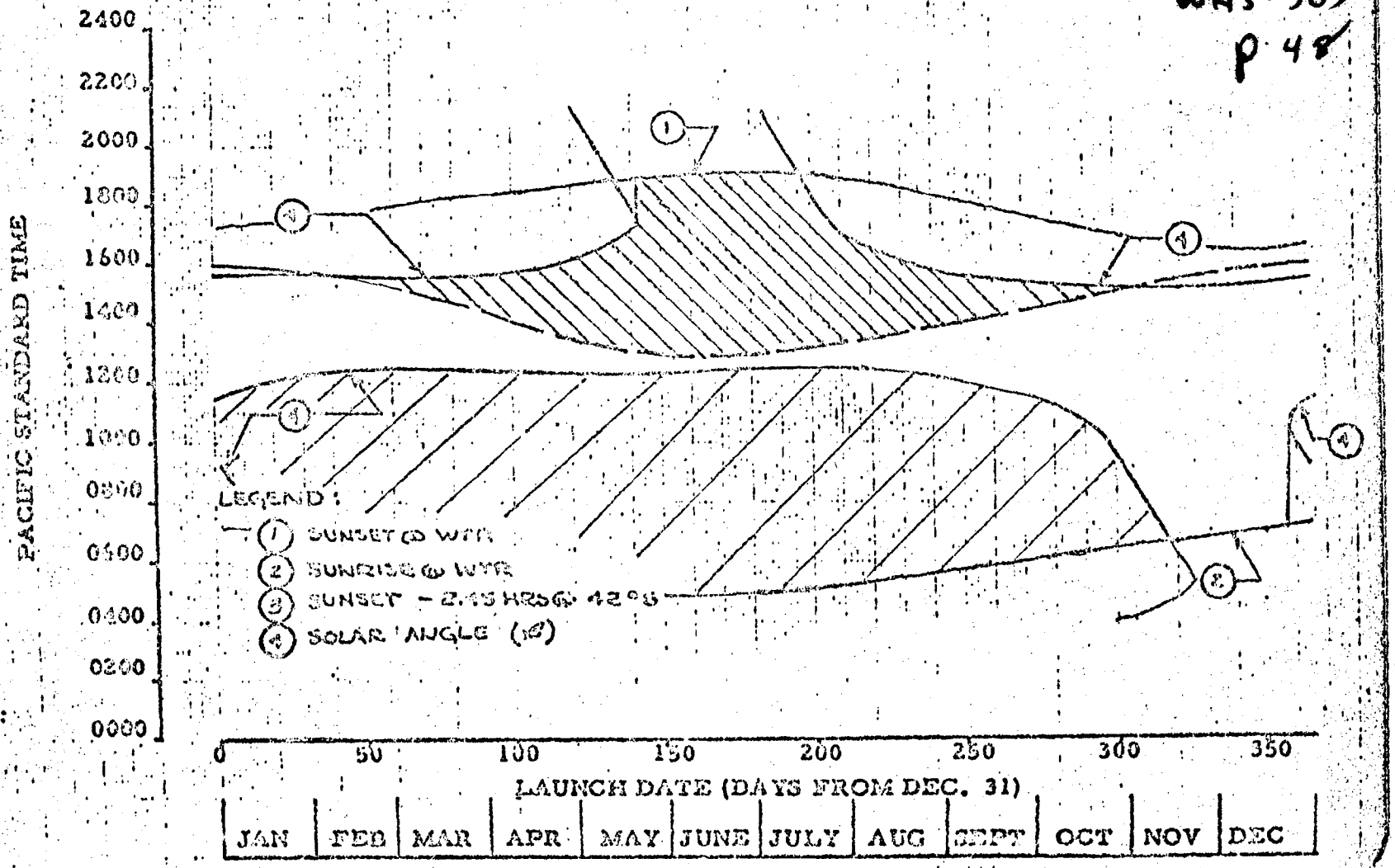

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$\zeta = 80°$

6 4

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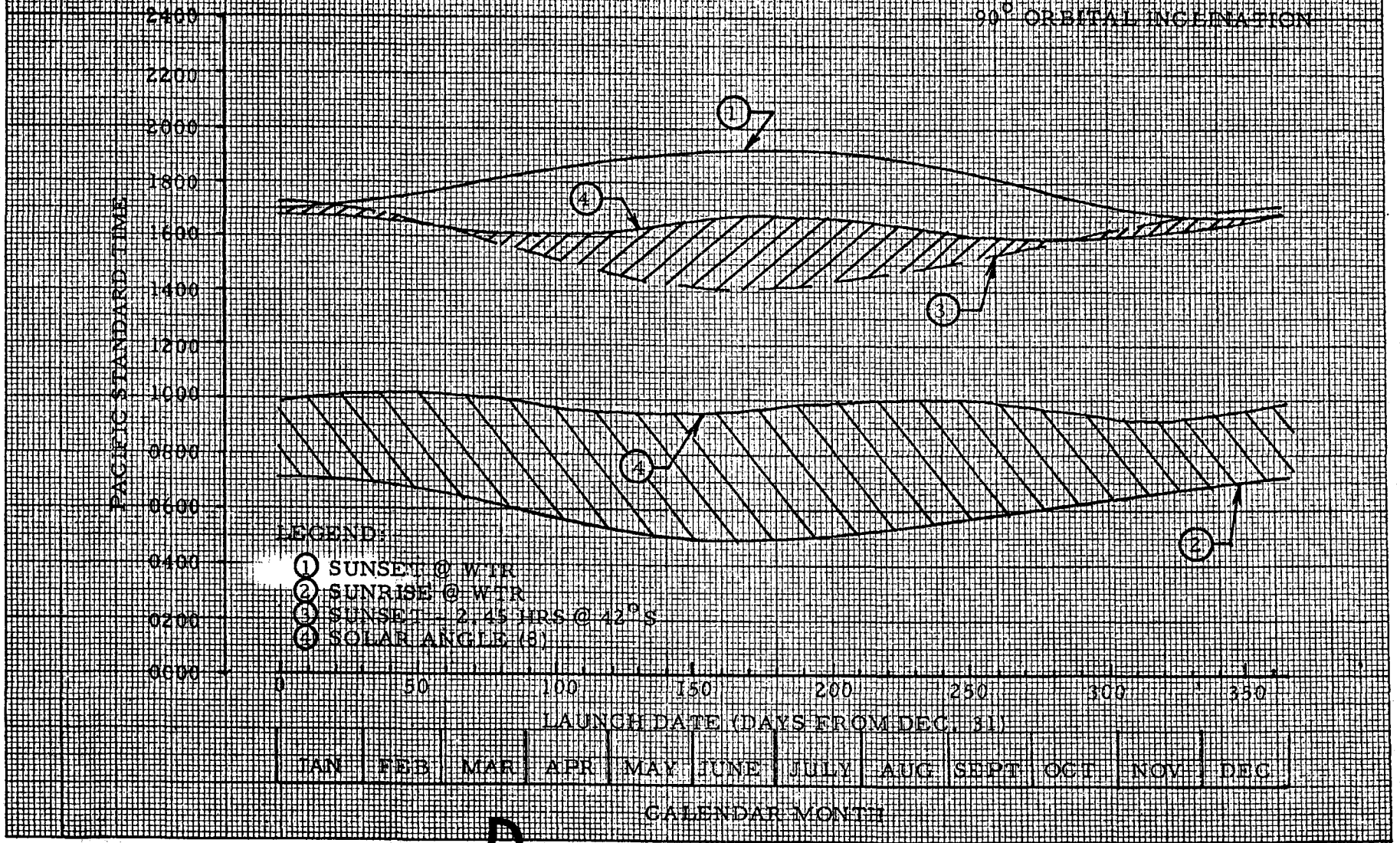
(D) ~~SECRET~~ - SPECIAL HANDLING

MOL LAUNCH WINDOWS

90° ORBITAL INCLINATION



D ~~SECRET~~ SPECIAL HANDLING

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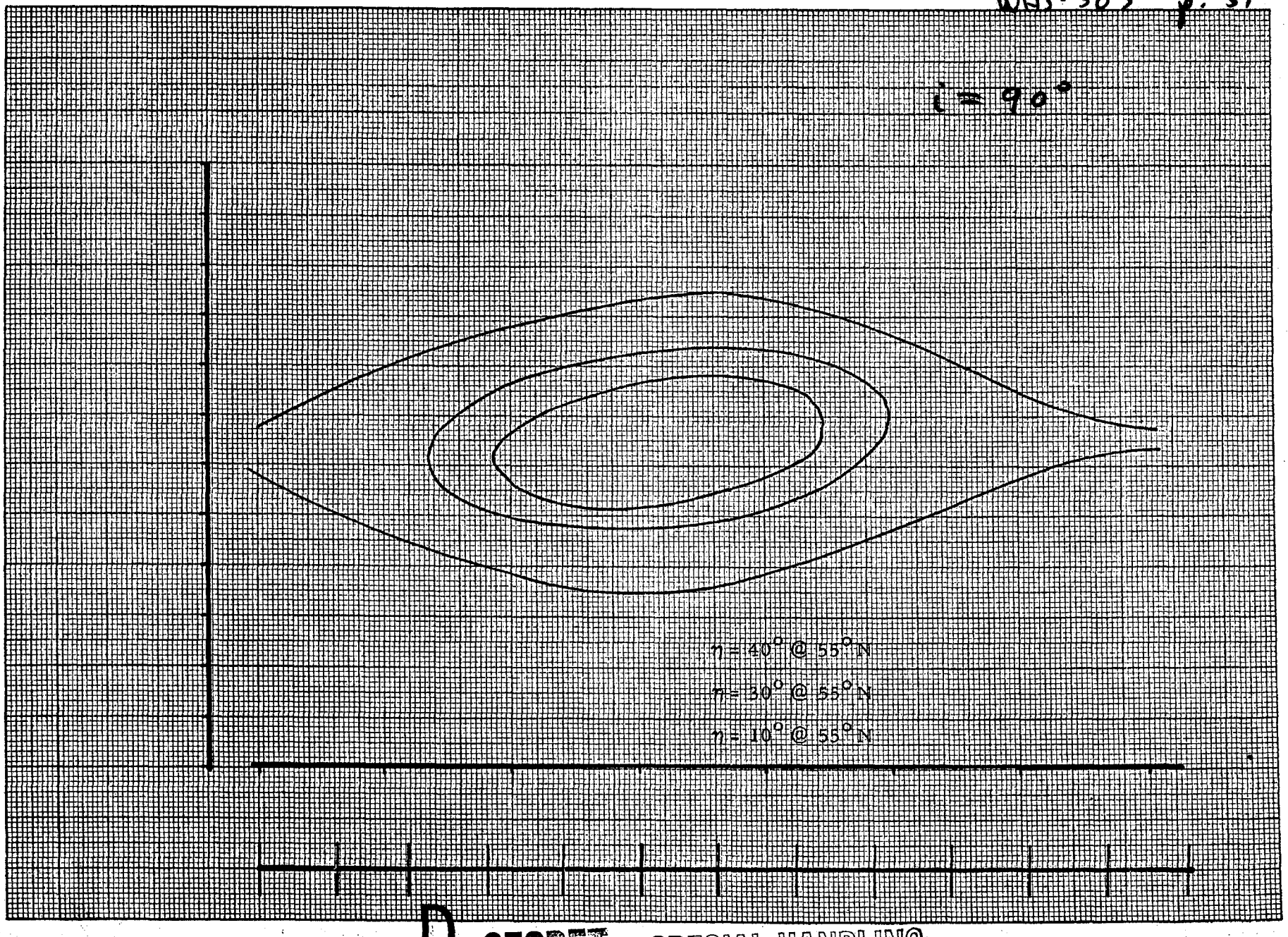

D ~~SECRET~~ SPECIAL HANDLING

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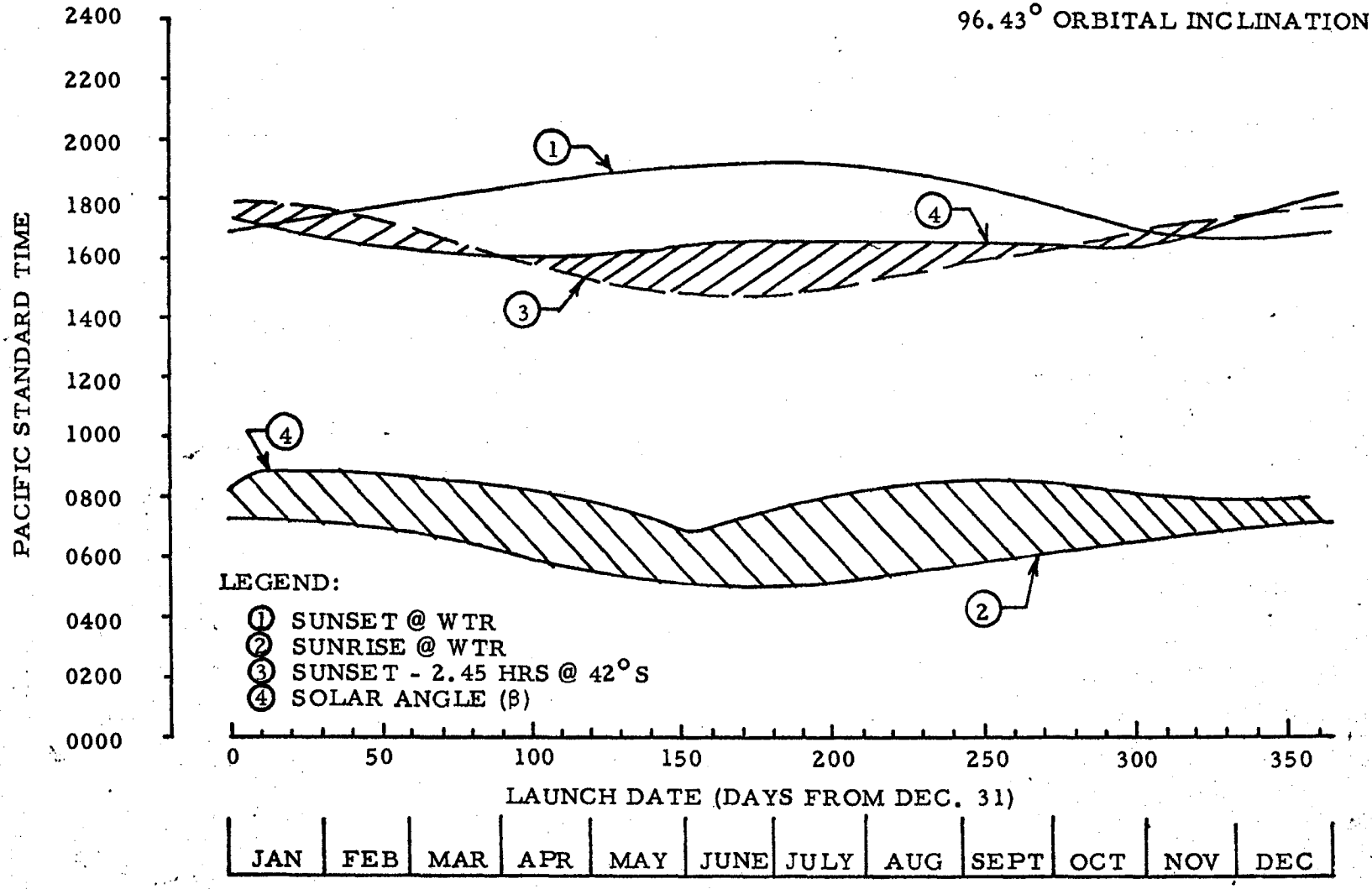
(D) ~~SECRET~~ SPECIAL HANDLING

MOL LAUNCH WINDOWS

96.43° ORBITAL INCLINATION



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$\dot{c} = SS$