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PROGRAM MODIFICATIONS

D. R. HOWARD

8 JANUARY 1968

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FIRST-ROUND PROGRAM DECISIONS

CONTENT

12/7/67

- o REPLACE 114E - UPGRADE 113T
- o SM EFFORTS MINIMUM JAN THROUGH JUNE, 1968
- o NO PERFORMANCE TESTING IN 100% O<sub>2</sub>
- o ONE CITE PLUS TV SUPPORT AT HUNTINGTON BEACH - (DELETED IN SUBSEQUENT PROGRAM CHANGES)
- o MODAL SURVEYS ON DTS AND NO. 6 ONLY
- o NO LMQTV ACOUSTIC QUALIFICATION
- o COMBINE EK 30-DAY QUALIFICATION WITH LMQTV
- o TWO-POSITION SLIDING MASK
- o USE ULE; SUSPEND LOUVER DESIGN ; POLISH ONE CERVIT
- o REFURBISH TEST ARTICLES FOR NO. 7 MAIN OPTICS
- o ELIMINATE THRUST TERMINATION TESTS ON 120-INCH MOTORS

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FIRST-ROUND PROGRAM DECISIONS  
CONTENT (CONT'D)

12/7/67

- o INCORPORATE LOW LEVEL VIBRATION TEST ON EACH LM
- o REDUCE COMBINED GE/EK TESTING AT EK
- o ELIMINATE ONE ATS FROM 114
- o NO ARBITRARY REDUCTION OF TELEMETRY POINTS
- o DO NOT INCORPORATE ROLL-RATE BIAS
- o SIMPLIFY HEART RATE RECORDER
- o MAKE EK DYNAMIC TEST A TYPE TEST ONLY
- o ELIMINATE EK LM DYNAMIC DISTURBANCE SIMULATOR
- o DELETE REDUNDANT MMTS OPERATIONS & INSPECTION
- o DELETE EK DYNAMIC TEST CAMERA
- o ELIMINATE GE DEVELOPMENT & QUALIFICATION BASE SHAKE TESTS
- o ELIMINATE SYSTEM ENGINEERING DATA FROM GBQ
- o USE PRESENT CONFIGURATION MANAGEMENT PLAN FOR GEMINI B PROCEDURE  
SIMULATOR

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FIRST-ROUND PROGRAM DECISIONS;SCHEDULES

12/7/67

- o ASSEMBLE LV AT HUNTINGTON BEACH (BASELINE)
- o PUT VAFB OPERATIONS ON 5-DAY WEEK
- o INSTALL MOST AGE AT VAFB BEFORE FLIGHT NO. 1
- o UTILIZE EDCTU FOR LV SOFTWARE VALIDATION
- o REDEFINE FLOW TIMES
  - / MM AT EK
  - / LV AT HUNTINGTON BEACH
- o DELETE REDUNDANT MISSION MODULE GROUND-CONDITIONING TESTS

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SECOND-ROUND PROGRAM DECISIONS  
(DOLLAR CHANGES COMPARED TO 12 + 8)

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12/7/67

ITEM	1968 Δ	1969 Δ	1970 Δ	1971 Δ	TOTAL (THROUGH 1971)
o CHANGE FLIGHT NO. 2 REQUIREMENT	-1.8	-7.5	-8.2	-5.8	-23.3
o REDUCE 10010 BY 1/2	-2.1	-13.0	-11.0	-1.1	-27.2
o SHIFT LMQTV	-5.0	-20.0	+8.5	+ 20.0	+3.5
o ELIMINATE GIGS	-1.8	-4.9	-8.4	-5.8	-20.9
o AF GEMINI TRAINING	0.0	-0.3	-0.5	-0.9	-1.7
o REDUCE ATS RESOLUTION 10%	-1.0	-0.8	--	--	-1.8
o ADJUST SCHEDULE	-23.0	+1.0	--	+22.0	--
o MANAGEABLE ADJUSTMENT	-38.0	+38.0	--	--	--
o TOTAL	-72.7	-7.5	-19.6	+28.4	-71.4

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ITEMS YIELDING POSSIBLE FUTURE SAVINGS

12/7/67

- o ON-PAD BUILDUP OF LABORATORY VEHICLE (RECOMMEND AGAINST)
- o CDRL REDUCTIONS
- o DELETE BLAST SHIELD
- o AGE TO NON-CEI ITEMS
- o MISSION SIMULATOR SIMPLIFICATIONS
- o SYSTEM EFFECTIVENESS SCRUB
- o EMI TESTING REQUIREMENTS REDUCTION
- o VAFB AIR CONDITIONING REQUIREMENTS REDUCTION
- o USE DYNAMIC TEST STRUCTURE FOR LM/MM STATIC TESTS

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REPLACE 114E -- UPGRADE 113T

- O REVISION IN SCHEDULE ALLOWS USE OF 113T FOR EK  
ENGINEERING DEVELOPMENT TESTS
  
- O 114E
  - / WAS TO BE PRIME EXCEPT FOR DELETION OF STAR  
TRACKERS
  
- O 113T
  - / SHELL WILL BE ESSENTIALLY PRIME CONFIGURATION  
(EXCEPT FORWARD MOUNT STIFFENING)
  
  - / SLIDING MASK WILL BE PRIME
  
  - / TRIPOD WILL BE BERYLLIUM INSTEAD OF ALUMINUM  
AS ORIGINALLY PLANNED FOR 113T
  
  - / THERMAL CONTROL SYSTEM TO BE MADE PRIME
  
  - / DETAILED DEFINITION OF ELECTRICAL CONFIGURATION  
(ORIGINAL 113T CONTAINED RESISTIVE HEAD LOAD  
SIMULATION OF ELECTRICAL EQUIPMENT) MUST BE  
ACCOMPLISHED BETWEEN GE AND EK

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SM EFFORTS MINIMUM JAN THRU JUNE 1968

- o **DESIRED OBJECTIVE**
  - / **DEFINING SM SUFFICIENTLY TO AVOID MAKING IT A DEFERRED ITEM.**
  
- o **PREFERRED PLAN**
  - / **PROCEED AS ORIGINALLY PLANNED .**
  
- o **FALL BACK PLAN**
  - / **CARRY PHASE I EFFORT THROUGH DEVELOPMENT OF CEI'S. DEFER PDR'S TO PHASE II.**



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ITEM

NO PERFORMANCE TESTING IN 100% O<sub>2</sub>

AFFECTED CONTRACTOR

EK

WORK STATEMENT REVISION

PROGRAM REQUIREMENTS DEFINITION REQUIRED

DISCUSSION

- PROGRAM REDUCTION INVOLVES USE OF THE LMQTV TESTING FOR 100% O<sub>2</sub> SYSTEMS TESTS.
- EK EFFORT WILL INCLUDE SELECTED COMPONENT TESTS FOR PERFORMANCE AND SAFETY TESTS.
- COMPONENT QUALIFICATION WILL BE FOR 30 DAYS NORMAL ATMOSPHERE (70/30) WITH 5 DAYS ADDITIONAL TESTING AT 100% O<sub>2</sub>.
- THERE WILL BE NO COMPLETE DUAL QUALIFICATION PROGRAM FOR BOTH THE NORMAL AND EMERGENCY MODE ATMOSPHERE.
- 100% O<sub>2</sub> TEST MUST BE RUN ON APPROPRIATE COMPONENTS PRIOR TO THE MANNED LMQTV PROGRAM.

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NO PERFORMANCE TESTING IN 100% O<sub>2</sub> (DAC)

- \*o CREW SAFETY ITEMS TO BE TESTED AT COMPONENT LEVEL.
  - COMPONENT OPERATIONAL EXPOSURE TIME APPROX 8 HOURS.
  
- o PURE O<sub>2</sub> EMERGENCY BACKUP MODE TO BE DEMONSTRATED IN LMQTV TEST.
  - ALL LM COMPONENTS (DAC & ASSOCIATE CONTRACTOR) WILL BE SUBJECTED TO O<sub>2</sub> ENVIRONMENT.
  
  - LMQTV UNMANNED DURING THIS TEST.
  
- \* AEROSPACE DISAGREES - OTHER O<sub>2</sub> SENSITIVE AND POTENTIALLY HAZARDOUS UNSEALED BOXES SHOULD ALSO BE TESTED.

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MODAL SURVEYS ON DTS AND NO. 6 ONLY

- PRIMARY OBJECTIVE OF THIS TEST WILL BE TO MEASURE LV FREE-FREE BENDING AND TORSION MODES IN THE ON-ORBIT CONFIGURATION
- THIS INFORMATION COMBINED WITH MODE SURVEY DATA FOR THE MMFS AND MM WILL PROVIDE EMPIRICAL VERIFICATION OF ANALYTICAL MODELING
- THE LV MODE SURVEY IS A ONE-TIME TEST SINCE THE FUNDAMENTAL MODES OF THE LV ARE NOT EXPECTED TO VARY FROM VEHICLE TO VEHICLE IN ABSENCE OF A MAJOR CONFIGURATION CHANGE
- CONCUR WITH LIMITING SURVEY TO DTS AND FV #6

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NO/LM/TV. ACOUSTIC QUALIFICATION

- o DELETES THE ONLY LM STRUCTURAL DYNAMICS QUALIFICATION TEST.
- o DUE TO AGE UNAVAILABILITY, LM SUBSYSTEMS WERE NOT FUNCTIONAL DURING TEST.
- o INCLUDED TRANSPORTATION CYCLE BETWEEN PRE & POST TEST C/ O'S.
- o LM STRUCTURE AND MASS SIMULATED COMPONENTS STILL SUBJECT TO QUAL LEVEL ACOUSTIC DEVELOPMENT TEST.
- o PRODUCTION LM'S SUBJECTED TO LOW-LEVEL VIBRATION ACCEPTANCE TEST.
- o LM COMPONENTS SUBJECTED TO COMPONENT VIBRATION QUALIFICATION TESTS.
- o REPRESENTS SOME TECHNICAL AND SCHEDULE RISK.

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ITEM

COMBINE EK 30-DAY QUALIFICATION TEST PLAN WITH LMQTV

AFFECTED CONTRACTOR

EK, DAC

WORK STATEMENT REVISION

NONE, LOCATION OF LM SYSTEM TESTING NOT DEFINED

DISCUSSION

- o COMBINATION ELIMINATES DUPLICATE TESTING.
- o PROVIDES MORE REALISTIC SIMULATION OF ENVIRONMENT.
- o REQUIRES MORE EK SUPPORT OF DAC LMQTV EFFORT.
- o REQUIRES MORE COMPREHENSIVE EK COMPONENT TEST.
- o DETAIL QUALIFICATION TEST PLAN HAS NOT BEEN WRITTEN BY EK; HENCE, EK MANPOWER, EQUIPMENT, ETC. CANNOT BE ACCURATELY DEFINED TO DAC.

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TWO-POSITION SLIDING MASK

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- O USE OF LOW COEFFICIENT MATERIAL FOR THE TRACKING MIRROR PERMITS USE OF TWO-POSITION SLIDING MASK
  
- O MAXIMUM SIMPLIFICATION OF SLIDING MASK CONTROL HARDWARE ACHIEVED BY [REDACTED] SPECIFICATION VALUE FOR DOOR OPEN/CLOSE TIME
  
- O PRESENT SPECIFICATION VALUE OF 6 SECONDS CAN BE INCREASED TO 10-15 SECONDS WITHOUT SIGNIFICANT EFFECT ON RESOLUTION (< 2 LINES/MM).
  
- O GE SHOULD DETERMINE THE MINIMUM DOOR OPEN/CLOSE TIME CONSISTENT WITH DESIGN OF "SIMPLE" DOOR DRIVE

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ITEM

UTILIZE ULE, ~~SISREND~~ ~~LOW COEFFICIENT MATERIAL~~ ~~ON~~ ~~SLIDING MASK~~ ~~ONE~~ ~~CIRCUIT~~  
~~CER-VIT BLANK~~

AFFECTED CONTRACTOR

EK, GE

WORK STATEMENT REVISION

REVISE BASELINE MATERIAL FOR GLASSWARE

DISCUSSION

- o BASELINE LOW COEFFICIENT MATERIAL, ULE THROUGH EK, CER-VIT THROUGH SAFSP WITH MATERIAL DECISION ABOUT MAY.
- o USE LOW COEFFICIENT MATERIAL FOR ALL TRACKING MIRROR, OPTICAL AND THERMAL OPTICAL TESTS, AND ALL FLIGHT MODELS.
- o INTRODUCE LOW COEFFICIENT MATERIAL IN PRIMARIES AS SOON AS POSSIBLE.
- o ~~COMPLETE LOW COEFFICIENT MATERIAL IN ALL TRACKING MIRRORS.~~
- o ~~DELETE THE LOUVER EFFORT.~~
- o REVISE THE SLIDING MASK TO A TWO-POSITION DEVICE.
- o ORBIT PERFORMANCE PREDICTIONS SHALL BE BASED ON LOW COEFFICIENT MATERIALS AND TWO-POSITION MASK.
- o NO OTHER PROGRAM CHANGES (POWER, WEIGHT SYSTEM TESTING, GROUND CONDITIONING, INTERFACE REQUIREMENTS) ARE INCLUDED WITH THE MATERIAL CHANGE.

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ITEM

REFURBISH TEST ARTICLE FOR NO 7 MAIN OPTICS

AFFECTED CONTRACTOR

EK

WORK STATEMENT REVISION

APPROPRIATE WORD CHANGES THAT DELETE ONE FLIGHT MODEL AND SUBSTITUTE OAT, PLUS REMAINDER OF FLIGHT EQUIPMENT.

DISCUSSION

- o THE OAT (OPTICAL ASSEMBLY AND TEST) MODEL IS A CARRYOVER OF THE ORIGINAL COMPATIBILITY MODEL. WITH PROGRAM REVISIONS THIS MODEL WAS REVISED TO INCLUDE ONLY OPTICS ASSEMBLY (NO CAMERA, VISUAL OPTICS, TRACKING MIRROR, ETC.). ITS AVOWED PURPOSE WAS FOR MANUFACTURING DEVELOPMENT. THE TECHNICAL NEED FOR THIS MODEL HAS NEVER BEEN JUSTIFIED.
- o THE ADDITION OF THE REMAINING FLIGHT EQUIPMENT AND UPGRADING TO FLIGHT 7 EQUIPMENT WILL ALLOW EK TO USE THE HARDWARE FOR DEVELOPMENT AND SUBSEQUENT FLIGHT USE WILL ELIMINATE PART OF ONE FLIGHT MODEL HARDWARE NEEDS.

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ELIMINATE THRUST TERMINATION TEST ON 120 INCH MOTORS

- o PRIMARY OBJECTIVE OF TITAN IIIM FULL SCALE THRUST TERMINATION TEST IS VERIFICATION OF MATH MODEL FOR FLIGHT LOADS
- o THRUST TERMINATION MODEL HAS PREVIOUSLY BEEN VERIFIED BY 2-SEGMENT AND 5-SEGMENT TITAN IIIC TEST FIRINGS
- o A FULL-SCALE TITAN IIIM TEST WOULD ONLY CONTRIBUTE TO CONFIDENCE IN THE MODEL
- o HIGH COST OF THE STATIC TEST IS NOT CONSISTENT WITH DATA TO BE ACQUIRED
- o EXTRAPOLATION OF THE MODEL FOR TITAN IIIM DESIGN IS CONSIDERED TECHNICALLY ACCEPTABLE BY SPO/AEROSPACE AND UTC
- o DELETION OF TITAN IIIM THRUST TERMINATION TEST IS RECOMMENDED AS COST SAVING ITEM

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INCORPORATE LOW LEVEL VIBRATION TEST ON EACH LM

- o LOW LEVEL LONGITUDINAL AXIS VIBRATION
  - o LM SUSPENDED FROM BUNGES
  - o \* LM UNPOWERED DURING VIBRATION
  - o NO MODAL TYPE DATA TO BE ACQUIRED
  - o GE REQUIRES POWER-UP FOR GE-AVE EQUIPMENTS AND INTERFACES
  - o ~~EKC~~ HAS NO POWER-UP REQUIREMENTS
- \* AEROSPACE DISAGREES - UNPOWERED TEST WILL NOT  
EXPOSE INTERMITTENT DISCREPANCIES THAT MAY EXIST.

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REDUCE COMBINED GE/EK TESTING AT EK



- O ORIGINAL REQUIREMENT FOR MMTS BASED ON RUNNING AN MPSS LEVEL MISSION PROFILE AT EK
- O MAJOR ELEMENTS OF MPSS (ALL GE AND EK AVE IN LM) NOT AVAILABLE AT EK AND MUST BE SIMULATED FOR MPSS LEVEL TESTING, REDUCING VALUE OF SUCH TESTING
- O ELIMINATION OF REQUIREMENT FOR MPSS LEVEL TESTING RESULTS IN SIGNIFICANT REDUCTION IN GE ELECTRICAL AGE AT EK
- O DETAILED DEFINITION OF REMAINING TESTING REQUIREMENTS MUST BE ACCOMPLISHED BETWEEN GE AND EK
- O MISSION LEVEL TESTING OF LM MISSION PAYLOAD EQUIPMENT AT VALLEY FORGE MUST BE CONSIDERED
- O NEEDS FURTHER DEFINITION

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ELIMINATE ONE ATS FROM 114

- DEVELOPMENT TESTS SHOULD INCLUDE VERIFICATION OF:
  - / CAPABILITY OF SYSTEM TO ACHIEVE SIMULTANEOUS OPERATION OF BOTH ATTS AND THE PRIMARY TRACKING MIRROR
  - / ELECTRICAL CONFIGURATION FOR BOTH 
  
- EITHER EDCTU TESTS OR 114 TESTS SHOULD INCLUDE ABOVE VERIFICATIONS. COMPLETE HARDWARE   
BOTH ATTS NOT REQUIRED
  
- RECOMMEND GE CONSIDER MINIMUM DEVELOPMENT TEST CONFIGURATION FOR ACCOMPLISHING VERIFICATIONS

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DO NOT INCORPORATE ROLL RATE BIAS

- o ROLL RATE BIAS NO LONGER REQUIRED.
- o RATE DATA TO COMPUTER MUST BE IMPLEMENTED.
  - ROLL AXIS RANGE INCREASE FROM .20 TO .40 DEG/ SEC
  - ROLL AXIS BANDWIDTH INCREASE FROM 1.0 TO 5.0 CPS
- o ATTITUDE REFERENCE IMPROVEMENTS (DYNAMICS & CROSS-COUPLING) ACHIEVED BY ECP 261.
- o RATE DATA MUST BE INCLUDED IN PROGRAM CONTENT.

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SIMPLIFY HEART RATE RECORDER

- o HEART RATE RECORDER DELETED. PCM DIGITAL RECORDER STORES HEART BEAT INTERVAL DATA.
  
- o INSTRUMENTATION (BASELINE)
  - CONTINUOUS FOR EACH OF CREW THROUGHOUT MISSION.
  - HEART BEAT SIGNAL CONDITIONER/ DIGITIZER IN LAB.
    - HARDLINE HEART BEAT SIGNAL FROM GEMINI TO LAB CONDITIONER.
    - RF TRANSMITTER OR HARDLINE IN LAB.
  - DATA RATE <100 BITS PER SEC TOTAL
  
- o TELEMETRY
  - CORE BUFFER (NEW) - INTERIM STORAGE (10 MIN) OF DIGITAL HEART BEAT DATA.
  - PCM MULTIPLEXER (BASELINE)
    - READOUT OF BUFFER AT 10 MINUTE INTERVALS AS PART OF LAB PERIODIC DATA OR DURING PAYLOAD OPERATIONS.
    - = MULTIPLEXED WITH LAB STATUS TELEMETRY
  - PCM DIGITAL RECORDER (BASELINE) - RECORDS PERIODIC AND MISSION DATA.
  - DATA COLLECTION AT ALL SCF TRACKING SITES.

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ITEM

MAKE EKC DYNAMICS TEST A TYPE TEST ONLY

AFFECTED CONTRACTOR

EKC

WORK STATEMENT REVISIONS

CHANGE TO MPSS TEST

DISCUSSION

WITH THE MODIFICATION OF THE ORBIT DYNAMICS TEST TO A STRUCTURAL TRANSMISSIBILITY TEST, THE PURPOSE OF TESTING EACH FLIGHT MODEL FOR DYNAMIC DIFFICULTIES IS SHIFTED TO APPROPRIATE COMPONENT TESTS OF THE DYNAMIC DISTURBANCE GENERATORS. THUS, A ONE TIME TEST TO PROVE THE ANALYTICAL TECHNIQUE IS SUFFICIENT. THUS, THE STRUCTURAL TRANSMISSIBILITY TEST WILL BE RUN ONCE ON THE EK ENGINEERING MODEL.

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ITEM

ELIMINATE ~~LMDDS~~ DYNAMIC DISTURBANCE SIMULATOR

AFFECTED CONTRACTORS

EK, GE, DAC

WORK STATEMENT REVISION

NONE

DISCUSSION

- o STUDIES SHOW ORIGINAL REQUIREMENT FOR THE LMDDS TO BE TECHNICALLY UNFEASIBLE.
- o HAVE TO DEPEND ON ANALYSIS FOR DATA LMDDS WAS TO PROVIDE.
- o TEST PROGRAM MUST BE MODIFIED.
- o USE THERMAL SIMULATOR STRUCTURE FOR SUPPORT STRUCTURE.
- o INCLUDE SELECTED COMPONENT VIBRATION INPUT TESTING AT EK, GE AND DAC.
- o PROVIDE GE ANALYSIS OF EK TEST SETUP.

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RIGHT HAND CORNER  
NOTICE IN UPPER  
ORIGIN

ITEM

TYPE 127 POSITIVE

AFFECTED CONTRACTOR

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DELETE EK DYNAMIC TEST CAMERA

EK

WORK STATEMENT REVISION

NONE

DISCUSSION

THE MODIFICATION TO THE ORBIT DYNAMICS TEST  
ELIMINATES THE NEED FOR THIS ARTICLE. APPROPRIATE  
TESTS OF EACH CAMERA MUST BE MADE TO VERIFY THE  
DYNAMIC DISTURBANCE CREATED BY THE CAMERA SYSTEM.

TYPE 127 POSITIVE

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PLACE 3M BRAND PROJECTOR  
TRANSPARENTLY ON ORIGINAL  
WITH NOTCH IN UPPER  
RIGHT HAND CORNER.

TYPE 127 POSITIVE

RIGHT HAND CORNER  
NOTICE IN UPPER  
ORIGIN

PLACE 3  
TRAN  
WI  
R

PLAC  
TR

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ELIMINATE GE DEVELOPMENT AND  
QUALIFICATION BASE SHAKE TESTS

- O   ORIGINALLY GE PLANNED TO QUALIFY LOAD CARRYING  
STRUCTURE TO DYNAMIC ENVIRONMENT BY USE OF A  
BASE SHAKE TEST
  
- O   LENGTH OF VEHICLE PRECLUDES ATTAINMENT OF  
REALISTIC ENVIRONMENT FOR ALL VEHICLE HARDWARE  
BY USE OF A BASE SHAKE TEST
  
- O   LOAD CARRYING STRUCTURE SHOULD BE QUALIFIED BY  
APPLICATION OF A STATIC LOAD EQUIVALENT TO THE SUM  
OF STEADY STATE AND PEAK DYNAMIC LOADS
  
- O   CONCUR WITH ELIMINATION

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ELIMINATE SYSTEM ENGINEERING DATA FROM GBQ

## BASELINE PROGRAM

- \* METHOD OF PREPARATION
  - o GENERATE SED FOR MANNED VERSION
  - o DERIVE GBQ SED BY MODIFICATIONS
  - o NOT NOW ON CONTRACT
- \* SCHEDULE
  - o GBQ SED TOO LATE TO BE USEFUL IN DESIGN OF CEI'S
  - o USEFUL FOR AFTER THE FACT VERIFICATION ONLY

## RECOMMENDATION

- \* DELETE PREPARATION OF GBQ SED
- \* VERIFY GBQ BY COMPARISON WITH
  - o MANNED GEMINI B
  - o HST
  - o NASA GEMINI NO. 3



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USE PRESENT CONFIGURATION MANAGEMENT PLAN

FOR GEMINI B PROCEDURE SIMULATOR

PRESENT CONFIGURATION MANAGEMENT PLAN

- \* BASELINE DEFINED BY SAFSL EXHIBIT 12008 AND MAC E-734
- \* E-734 UPDATED TWICE, FINAL EDITION INCORPORATES 12008

PLAN B

- \* BASELINE DEFINED BY SAFSL EXHIBIT 12008 AND MAC E-734
- \* MORE FORMAL DOCUMENTATION OF CHANGES
- \* COST \$75,000

PLAN C

- \* A PART I AND II SPECIFICATION WOULD BE WRITTEN WITH MANY EXCEPTIONS TO AFSCM 375-1
- \* COST \$280,000

RECOMMENDATIONS

- \* RETAIN PRESENT CONFIGURATION MANAGEMENT PLAN
- \* PLAN C COST IS EXCESSIVE

PUT VAFB OPERATIONS ON 5-DAY WEEK

- o DAC EFFORT NORMALLY 5 DAY/ 2 SHIFT WORK WEEK.
- o AGE UPDATE AND CHECKOUT BETWEEN FLIGHTS 2 & 3  
WILL BE 6 DAY/ 2 SHIFT WORK WEEK.

INSTALL MOST AGE AT VAFB BEFORE FLIGHT I

DAC

- o DOUGLAS INSTALLATION OF ALL AGE PRIOR TO FLIGHT 1.
- o ASTEG TO BE CHECKED OUT BETWEEN FLIGHTS 1 & 2 FOR FLIGHT 2 REQUIREMENTS.
- o DAC AGE TO BE UPDATED AND CHECKED OUT BETWEEN FLIGHTS 2 AND 3.

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INSTALL MOST AGE AT VAFB BEFORE FLIGHT NO. 1 - GE

- o CITE HARDWARE INSTALLATION BETWEEN FLIGHTS 1 AND 2
- o CITE CABLING CONCURRENTLY WITH ASTEG AND CAGE PRIOR TO FLIGHT 1
- o CITE HARDWARE AVAILABLE AT WTR PRIOR TO FLIGHT 1, SINCE USE AT VALLEY FORGE COMPLETED IN TIME - EARLIER INSTALLATION WOULD HAVE ADVANTAGES OF EARLIER CHECKOUT OF CITE AND ITS INTERFACE WITH ASTEG
- o RECOMMEND GE CONSIDER INSTALLATION OF CITE PRIOR TO FLIGHT 1

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INSTALL MOST AGE AT VAFB BEFORE FLIGHT NO. 1

GEMINI B

- o BASELINE PROGRAM
  - / BASELINE FLIGHT NO. 1 WAS GBQ SO AGE WAS REQUIRED PRIOR TO FLIGHT NO. 1
  - / MAC FIELD MANPOWER UTILIZATION INEFFICIENT BETWEEN GBQ AND FIRST MANNED FLIGHT
  - / PART OF SAVINGS FROM LVD/GBQ SWITCH WAS DUE TO ELIMINATION OF THIS INEFFICIENCY
  
- o RECOMMENDATION
  - / INSTALL SOME GEMINI B AGE BEFORE FLIGHT NO. 1
  - / COMPLETE INSTALLATION CHECKOUT AS LATE AS POSSIBLE
    - o AVAILABLE FOR GBQ
    - o NO INTERFERENCE WITH LVD OPERATIONS



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UTILIZE EDCTU FOR LV SOFTWARE VALIDATION

DAC

- o SCHEDULE AND APPROACH NOW ARE COMPATIBLE WITH THIS UTILIZATION
- o ACTUAL GE AND EK HARDWARE REQUIRED FOR EDCTU (MINOR EXCEPTION FOR ALIGNMENT SERVOS IN MMAS)
- o PERMITS INTEGRATED LM & LV TEST SOFTWARE DEVELOPMENT
- o PERMITS INTEGRATED LM & LV HARDWARE COMPATIBILITY VALIDATION
- o PERMITS PARTIAL VALIDATION OF ON-BOARD SOFTWARE UTILIZING ACTUAL HARDWARE
- o STATUS
  - / EK HAS NOT AGREED TO SUPPLY ACTUAL HARDWARE OR DYNAMIC SUBSTITUTE
  - / GE INDICATES REFURBISHED DSS-1 AND STE TO BE SUPPLIED

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ITEM

UTILIZE EDCTU FOR LM SOFTWARE QUALIFICATION - EK

AFFECTED CONTRACTOR

EK, GE

WORK STATEMENT REVISION

NONE (3 SETS OF EQUIPMENT ON CONTRACT LMQTV,  
RELIABILITY COMPONENTS, AND EK SYSTEM QUAL)

DISCUSSION

- o WITH THE EK LM SYSTEM QUALIFICATION BEING ACCOMPLISHED IN THE DAC LMQTV TEST, A SET OF EK LM EQUIPMENT IS AVAILABLE FOR OTHER USE. IF THIS EQUIPMENT IS DIVERTED TO SUPPORT THE EDCTU, NO ADDITIONAL EK HARDWARE IS REQUIRED AND THE DESIRED EDCTU PROGRAM CAN BE ACCOMPLISHED AS FAR AS EK HARDWARE IS CONCERNED.
- o THIS APPROACH ELIMINATES THE NEED FOR ONE EG-10 (MM SIMULATOR) INTENDED FOR USE WITH GD-5 FOR AN ELECTRIC SIMULATOR FOR EDCTU USE.
- o COULD REQUIRE ADDITIONAL EK SUPPORT AT DAC.

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UTILIZE EDCTU FOR LV SOFTWARE VALIDATION - GE

- O EDCTU OBJECTIVES SHOULD INCLUDE:
  - / INTEGRATED LM AND LV TEST SOFTWARE DEVELOPMENT
  - / AVE AND AGE SOFTWARE VALIDATION
  - / AVE HARDWARE COMPATIBILITY VALIDATION
  
- O HARDWARE FURNISHED BY GE SHOULD BE NEAR PRIME
  
- O REFURBISHED DSS-1 HARDWARE CONSIDERED SATISFACTORY

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ITEM

REDEFINE FLOW TIMES/MM AT EK

AFFECTED CONTRACTOR

GE, EK

WORK STATEMENT REVISION

NONE

DISCUSSION

- o ONLY PRESENTLY IDENTIFIABLE REDUCTION RESULTS FROM ORBIT DYNAMICS REVISION.
- o MPSS TEST PLAN AT EK IS STILL BEING REVISED AND DEFINED. REDUCTION IS ESSENTIALLY A MORE REALISTIC DEFINITION OF WHAT IS REQUIRED IN COMBINED TESTING AT EK.
- o REDUCE THERMAL TEST TIME.

~~(SECRET SPECIAL HANDLING)~~

BRVA  
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REDEFINE FLOW TIME/ LV AT HUNTINGTON BEACH

- o FV3 PRECEDES LMQTV THROUGH ASSEMBLY & C/O CYCLES.
- o FV3 ASSUMES LONGER "LEARNING CURVE" LM ASSEMBLY & C/O SPANS INSTEAD OF LMQTV.
- o LV LOW LEVEL VIBRATION TEST DELETED ON FV3 THRU 7 (CREDIT 10 DAYS).
- o LM LOW LEVEL VIBRATION TEST ADDED ON FV3 THRU 7 (ADD 5 DAYS).
- o MODAL SURVEYS ON DTS (OV CONFIG) & FV6 (LV CONFIG) ONLY.
- o LM C/O TO EMPLOY TWO STEP CONCEPT--DAC LM AVE C/O AND INTEGRATED LM C/O.

DELETE REDUNDANT ~~MISSION MODULE~~ GROUND CONDITIONING TESTS

- GE HAD PLANNED TO CONDUCT AN IN-HOUSE TEST OF PAD CONDITIONING SYSTEM USING 113T COMBINED WITH A MMAS SIMULATION.
- A COMPLETE TEST OF THE PAD CONDITIONING SYSTEM AT THE MM LEVEL IS INCLUDED IN THE ~~██████████~~ THERMAL TEST PROGRAM
- SINCE THE ~~██████████~~ TESTING WILL PROVIDE SUFFICIENT VERIFICATION OF PERFORMANCE OF THE AIR CONDITIONING SYSTEM, THE GE TESTING IS NOT REQUIRED
- CONCUR WITH DELETION

CHANGE FLIGHT NO. 2 REQUIREMENT (NOW FLIGHT 1)

- o CONTRACTORS PROPOSE AERODYNAMIC FAIRING ON TITAN III
  - / NO DATA FOR ORBITING VEHICLE
  
- o POSSIBLE ALTERNATES INCLUDE MISSION MODULE (WITH NOSE FAIRING)  
OR LABORATORY VEHICLE (WITH NOSE FAIRING)
  - / ENGINEERING ANALYSIS REQUIRED TO STRUCTURALLY SUBSTANTIATE  
CONFIGURATION SELECTED
    - o WEIGHT C.G., AND MOMENT OF INERTIA
    - o LOADS AND STRUCTURAL RESPONSE
  - / MINIMUM INSTRUMENTATION REQUIRED TO CONDUCT FAILURE  
ANALYSIS
    - o STRAIN/TEMPERATURE MEASUREMENTS (ONE CHANNEL T/M)
  
- o RECOMMEND AERODYNAMIC FAIRING ON TITAN III MAKING THIS A  
BOOSTER TEST ONLY

REDUCE 10010 BY 1/2

- o TO BE ACHIEVED BY:
  - / FUNDING LIMITATION FOR FISCAL YEARS
    - o LIMITING LEVEL OF EFFORT FOR CONTROL
    - o ELIMINATE SOME TESTING AND DESIGN CHANGES
  - / INCLUDE SAFSL EXHIBIT 10010 IMPLEMENTATION AND FIRE DETECTION, FIRE SUPPRESSION
  
- o METHOD - TWO-STEP APPROACH
  - / STEP I - CONTRACTORS
    - o IDENTIFY AND CLASSIFY MATERIALS PLANNED FOR USE
    - o DEFINE MINIMUM CONTROL
    - o IDENTIFY SCREENING TESTS AND DESIGN CHANGES REQUIRED
    - o IDENTIFY TEST REQUIREMENTS
    - o SUBMIT FIRM PROPOSAL FOR RECOMMENDED DESIGN CHANGES AND TESTS
  - / STEP II - SPO/AEROSPACE
    - o REVIEW PROPOSED DESIGN CHANGES AND TESTS
    - o AUTHORIZE CONTRACTORS TO IMPLEMENT CHANGES AND TESTING
    - o IMPLEMENT ONLY THOSE DESIGN CHANGES AND CONDUCT THOSE TESTS THAT MAY HAVE MAJOR SAFETY IMPACT



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SHIFT LMQTV

- o TECHNICAL CONTENT OF QUAL CYCLE UNCHANGED EXCEPT  
FOR ELIMINATION OF LM ACOUSTIC QUALIFICATION TEST
- o SHIFT MAKES LM 3 THE FIRST VEHICLE THRU ASSY & C/O
- o LMQTV TESTS FOR ASSOCIATE HARDWARE QUALIFICATION  
ARE RELATIVELY LATE

(43)

ELIMINATE GIGS

- o IN CASE OF OFF-NOMINAL INSERTION, GIGS  
REQUIRED FOR SUCCESSFUL INSERTION
- o PROVIDES BACK-UP TO BIGS
- o DELETION WOULD CAUSE EXTENSIVE SYSTEM  
IMPACT
- o COST SAVINGS DOUBTFUL
- o RECOMMEND RETAINING GIGS



AF GEMINI TRAINING

Δ STATUS

- NOT NOW ON CONTRACT
- DESIRED MAGNITUDE NOT DEFINED

Δ RECOMMENDATION

- ELIMINATE
- DO TRAINING IN-HOUSE
  - \* MOL SPO AND TRAINING COMMAND

(D) ~~SECRET~~ SPECIAL HANDLING

REDUCE ATS RESOLUTION 10%

- o **HARDWARE IMPACT**
  - / REPLACES POSITION LOOP IN PITCH AXIS WITH RATE LOOP
  - / ELIMINATES DIGITAL PROCESSORS IN BOTH AXES
  - / PERMITS UTILIZATION OF LESS PRECISE POSITION ENCODERS
  
- o **SYSTEM IMPACT**
  - / GE CLAIMS SENSITIVITY TO BEARING NOISE INCREASED  
(~~2~~10% LOSS OF RESOLUTION) AEROSPACE DISAGREES THAT  
LOSS OF RESOLUTION WILL OCCUR
  - / SENSITIVITY TO ACTS FIRING AND TM SLEW DISTURBANCES  
DECREASED
  - / ELIMINATES BACKUP MODE IN EVENT OF GYRO FAILURE
  
- o **IF COST REDUCTION IS AS SMALL AS IT APPEARS, RECOMMEND  
AGAINST CHANGE**

(D) ~~SECRET~~ SPECIAL HANDLING

CDRL REDUCTIONS - DAC


- o DAC RECOMMENDS DELETION  
OF 148 ITEMS
  
- o AEROSPACE DISAGREES -  
RECOMMENDS DELETION OF  
ONLY 56 ITEMS

(D) ~~SECRET~~ SPECIAL HANDLING

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CDRL REDUCTIONS

GE

- O SPO/AEROSPACE AND GE EFFORTS IN PROGRESS TO REDUCE THE TOTAL VOLUME OF DOCUMENTATION AND DATA EXCHANGE REQUIRED BETWEEN CONTRACTORS WITH MINIMUM IMPACT TO THE PROGRAM
- O REVISION FREQUENCY OF MANY OF THE CDRL AND GFDL ITEMS IS BEING REDUCED
- O FORM 9's ARE BEING REWRITTEN
  - / TO REDUCE IN SCOPE THE SPECIFIC TASK OF THE CONTRACTOR IN PREPARING MANY OF THE CDRL ITEMS
  - / TO COMBINE RELATED DOCUMENTATION AND THEREBY REDUCE TOTAL NUMBER OF CDRL ITEMS REQUIRED
- O IT IS ANTICIPATED THAT SIGNIFICANT COST SAVINGS WILL BE 

(D) ~~SECRET~~ SPECIAL HANDLING

~~(SECRET SPECIAL HANDLING)~~

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ITEM

CDRL REDUCTIONS ~~CDRL REDUCTIONS~~  
~~REVISIONS~~

AFFECTED CONTRACTOR

EKC

WORK STATEMENT REVISION

CHANGES TO CDRL, F-017522-CH.

DISCUSSION

- o EKC SUPPLIED DATA IN CDRL PRESENTLY MINIMAL.
- o COULD DECREASE FREQUENCY OF MASS PROPERTIES STATUS REPORT TO REFLECT PROGRAM SLIP.
- o COULD COMBINE SPECIFICATIONS WHERE HARDWARE ITEMS ARE COMBINED.
- o PROGRAM STATUS MUST BE ESTABLISHED BEFORE FURTHER CDRL ~~REDUCTION COULD BE~~ CONSIDERED.

~~(SECRET SPECIAL HANDLING)~~



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CDRL REDUCTIONS

GEMINI B

- o A FEW LINE ITEMS MAY BE DELETED
  - SUBSTITUTE INFORMAL CONTRACTOR REPORTS
  
- o SUBMITTAL FREQUENCY REDUCED ON MANY PERIODIC REPORTS
  - FREQUENCY MUST BE COORDINATED WITH THAT OF OTHER ASSOCIATES
  
- o EXACT CHANGES UNDER STUDY BY MAC



DELETE BLAST SHIELD

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- o BLAST SHIELD REQUIREMENT BASED ON:
  - / DIRECT EXHAUST IMPINGEMENT OF SIX SOLID MOTORS ON CRYOGENIC TANKS, PROPELLANT TANKS, GASEOUS ACCUMULATORS, FLUID LINES AND EQUIPMENT
  - / CRYOGENIC TANKS - 300 TO 1000 PSI
  - PROPELLANT TANKS - 300 PSI
  - ACCUMULATORS - 400 TO 1250 PSI
  - / HAZARD OF EXPLOSION DUE TO PENETRATION OF HIGH PRESSURE TANKS AND EXHAUST INTO EXPLOSIVE MIXTURES
    - o DAMAGE TO GEMINI B HEAT SHIELD AND MOTORS, AND TIPOFF
  - / IMPACT ON CREW FATALITIES - REDUCTION FROM 10.66 TO 2.62 CREWS/1000
- o RELATED CASES
  - / NASA GEMINI
    - o BLAST SHIELD USED - CONDITIONS SIMILAR TO MOL -- SOLID MOTOR'S IMPINGEMENT ON CRYOGENICS AND PROPELLANTS
  - / T-III FIRE-IN-THE-HOLE
    - o NO BLAST SHIELD - THERMAL COATING ON LOWER STAGE FORWARD DOME
    - o LIQUID ENGINE IMPINGEMENT
    - o LOWER STAGE - PROPELLANT DEPLETED - NEGLIGIBLE PRESSURE
- o TEST DATA - NASA GEMINI
  - / BURNED THROUGH 0.09 FIBERGLASS IN 0.47 SECONDS
    - o REPRESENTATIVE OF MOL CONDITIONS
- o RECOMMEND RETENTION OF THE BLAST SHIELD

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AGE TO NON-CEI ITEMS - DAC

- o DAC PROPOSES ALL MECHANICAL AGE CEI'S TO BE DELETED.
- o AEROSPACE DISAGREES - REQUIRE 23 TO BE RETAINED (33 OK TO DELETE)
- o RETENTION CRITERIA:
  - = SIGNIFICANT/ CRITICAL VEHICLE INTERFACE AFFECTING VEHICLE PERFORMANCE.
  - IMPORTANT VEHICLE INTERFACE WHERE NO SIGNIFICANT SAVINGS POSSIBLE.
  - IMPORTANT INTERFACE WITH ASSOCIATE CONTRACTOR.

(D)~~SECRET~~ SPECIAL HANDLING

AGE TO NON-CEI ITEMS - GE

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- O POTENTIAL COST REDUCTION BY RELAXATION OF SAFSL  
24004 ~~GE~~ CONFIGURATION MANAGEMENT PLAN BY RECLASSIFICATION  
TO NON-CEI CONTROL FOR SELECTED ITEMS OF AGE
- O MOST BUT NOT ALL OF 20 ~~GE~~ MECHANICAL AGE ITEMS  
ARE CONSIDERED CANDIDATES FOR RECLASSIFICATION  
TO NON-CEI STATUS
- O ONLY ONE OF THE 5 ELECTRICAL AGE ITEMS IS  
CONSIDERED AS A CANDIDATE FOR RECLASSIFICATION
- O SPECIFIC MECHANICAL AGE ITEMS TO BE RECLASSIFIED  
MUST BE DEFINED

(D)~~SECRET~~ SPECIAL HANDLING



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AGE TO NON CEI'S

GEMINI B

Δ STATUS

- PRESENT REQUIREMENTS
  - LARGEST AND MOST COMPLEX AGE ITEMS ARE PRESENTLY SPECIFIED BY CEI
    - PREVIOUS NASA GEMINI EQUIPMENT
    - NEW AGE
- ELIMINATION OF CEI'S ON PREVIOUS NASA **GEMINI** EQUIPMENT ACCEPTABLE
  - OPERABILITY HAS BEEN DEMONSTRATED
  - MINIMUM RISK FOR THESE EQUIPMENTS NOT UNDER CONFIGURATION CONTROL
- ELIMINATION OF ALL CEI CONTROL ON NEW AGE NOT DESIRABLE
  - HARDWARE NEW, OPERATIONAL SUCCESS NOT DEMONSTRATED
  - MAJORITY OF NEW AGE INTERFACES WITH OTHER ASSOCIATE'S EQUIPMENT
  - PROBLEM OF CONTROLLING INTERFACES
    - IFS ARE CONTRACTUALLY A PART OF CEI
    - GOVERNMENT ACCEPTS HARDWARE TO CEI REQUIREMENTS
    - IF CEI'S DELETED, THEN IFS HAS NO CONTRACTUAL STANDING

Δ RECOMMENDATION

- USE IDENTIFICATION CEI'S ON SUBSTITUTES AND MAJOR NEW TEST AGE
  - INCORPORATE IF SPECIFICATIONS
  - ACCEPT TO IF SPEC REQUIREMENTS
- NO CEI'S FOR EXISTING NASA AGE - ~~EXCEPT TO IF SPEC REQUIREMENTS~~

(D) ~~SECRET~~ SPECIAL HANDLING  
MISSION SIMULATOR SIMPLIFICATIONS

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	SPO/AEROSPACE ESTIMATE	
	<u>FY 68</u>	<u>TOTAL</u>
o RECOMMENDED ITEMS		
/ DELETE MOMIES, SMG OPERATIONS	.32	.91
/ LEASE INSTEAD OF BUY LVPS COMPUTER	2.66	(-.18)
/ DELETE PORTIONS OF COMM. ECP	.08	.20
/ DELETE GBPS/LMSE INTERFACE	.10	.25
/ DELETE AURAL EFFECTS	.03	.10
/ GE REWORK EK EXCHANGE HARDWARE FOR MDS	.03	.1
/ GFE HYBRID COMPUTERS FOR MDS	<u>.09</u>	<u>.31</u>
	TOTAL	3.31
		1.69

o SPO/AEROSPACE/ASSOCIATES AGREE ON ABOVE ITEMS FOR SIMPLIFICATION

o A FEW OTHER MINDR ITEMS ARE STILL UNDER CONSIDERATION

(D) ~~SECRET~~ SPECIAL HANDLING

SYSTEM EFFECTIVENESS SCRUB

DAC

RECOMMENDS:

/ DELETION OF SAFETY COMPUTATION OF MATH MODEL

NOTE AEROSPACE CONCURS - FAULT TREE ANALYSIS TAKES ITS PLACE

/ DELETION OF ASSESSMENT PROGRAM

NOTE AEROSPACE DISAGREES

(AEROSPACE PROPOSES ALTERNATES - SCRUB OF CONTINGENCY EFFORT AND  
CURRENT PARTS ANALYSIS EFFORT)

GE

RECOMMENDS:

/ NO CHANGE IN TASKS OR ANALYSIS AT THIS TIME

/ MAKE MONTHLY EFFECT. REPORTS QUARTERLY

MAC

RECOMMENDS:

/ NO CHANGE IN TASKS OR ANALYSIS AT THIS TIME

MARTIN

RECOMMENDS:

/ NO CHANGE IN TASKS OR ANALYSIS AT THIS TIME

EMI TESTING REQUIREMENTS REDUCTION

- o MAC PROPOSES DELETIONS OF EMI TEST REQUIREMENTS FOR  
/ 7 NASA/GEMINI AGE ITEMS  
/ GEMINI SUBSTITUTES FOR LAB AND T-III
- o EQUIPMENTS INTERFACE WITH AVE AND ASSOCIATE CONTRACTORS AGE
- o PRESENT TEST REQUIREMENTS - TESTED AGAINST 64-4 FOR CONDUCTED  
INTERFERENCE
- o OTHER CONTRACTOR'S EMI TEST REQUIREMENTS FOR AGE INTERFACES AND  
EXCHANGE HARDWARE IS TO MEASURE EMISM'S
- o DELETION OF ALL TEST REQUIREMENTS WOULD IMPAIR ASSURANCE OF INTERFACE  
COMPATIBILITY
- o RECOMMEND REDUCTION TO MEASUREMENT OF EMISM'S

~~(SECRET SPECIAL HANDLING)~~

ITEM

~~VAD3 AIR CONDITIONING REQUIREMENT REDUCTION~~

AFFECTED CONTRACTOR

MMC, GE, EKC

WORK STATEMENT REVISION

NONE

DISCUSSION

- o ITEM BASED ON INSUFFICIENT KNOWLEDGE OF CURRENT PROGRAM ACTIVITY. ORIGINAL MARTIN ESTIMATE HIGH BECAUSE OF GE ICD.
- o AEROSPACE/SAFSL 14 EFFORT IN NOVEMBER 1967 HAS RESULTED IN HALVING OF CCN COST. NOT YET TRANSMITTED TO MARTIN.
- o FURTHER REDUCTION OF AIR CONDITIONING FACILITY NOT REASONABLE WITH PRESENT OV REQUIREMENTS.

~~(SECRET SPECIAL HANDLING)~~



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USE DYNAMIC TEST STRUCTURE FOR LM/ MM STATIC TESTS

- o ENABLES DELETION OF STATIC TEST STRUCTURE.(OR USE AS BACKUP FOR FV2).
- o MAKES RESULTS OF STRUCTURAL QUAL TESTS LATE FOR PROGRAM USAGE.
  - APPROX 1 MONTH BEFORE FV-2 FLIGHT, 6 MONTHS BEFORE FV-3 FLIGHT.
  - INTRODUCES TIGHT COUPLING WITH STATIC TESTING AND ARRIVAL OF STUFFED MM AT HUNTINGTON BEACH.
- o NOT RECOMMENDED.

CONTINGENCY PLAN FOR FAILURE OF FLIGHT 1

- o RESCHEDULE NO. 2 BOOSTER
- o PROCURE NEW FAIRING
- o REPEAT FLIGHT 1
- o ORDER A NEW BOOSTER

CONTINGENCY PLAN FOR FAILURE OF FLIGHT 2

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o PROBLEM

/ LVD NOW FLIGHT 1 AND GBQ FLIGHT 2

- LVD NOT AVAILABLE FOR GBQ BACKUP
- NO TIME TO CONVERT GB S/C2 FROM GBQ TO MANNED CONFIGURATION BETWEEN FLIGHTS 2 AND 3

o PROPOSED ACTION

/ GEMINI

- BUILD S/C #2 IN MANNED CONFIGURATION PLUS WIRING, TRANSDUCERS, ETC. REQUIRED TO CONVERT TO GBQ
- PROCURE AND ASSEMBLE CONTROLLERS, TM, ETC., ON PALLETS
- CONVERT S/C2 TO GBQ CONFIGURATION IF NEEDED
- SLIP FLIGHT 3 BY 1 OR 2 MONTHS
- PROCURE EXTRA GEMINI FOR THIRD MANNED FLIGHT IN FOLLOW-ON IF NECESSARY

/ BOOSTER

- USE #3 BOOSTER FOR GBQ IF NEEDED
- PROCURE ADDITIONAL BOOSTER IN FOLLOW-ON IF NECESSARY

/ LABORATORY

- USE EXISTING OR ADDITIONAL STRUCTURE

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ALTERNATIVES FOR FLIGHT NO. 2 BACKUP

- o 1 TO 2 MONTH SLIP OF FLIGHT 3 - GEMINI B CONTROLS

LABORATORY VEHICLE ALTERNATIVES

A. DYNAMIC TEST STRUCTURE

CONTRACTOR PROPOSAL

FLIES ACOUSTIC/ SHOCK-TESTED  
STRUCTURE

NO LM BURST TEST IF FV-2 FAILS

B. LIMIT LOAD STS  
(DTS ULT LOAD TESTED)

ULTIMATE STATIC TEST OF FATIGUED  
STRUCTURE

USE FOR FV-7 IF FV-2 SUCCESSFUL

C. ADDITIONAL STRUCTURE  
(FROM SOFT TOOLING)

EARLY FUNDING IMPACT

STRETCHES DOWNSTREAM FLIGHTS  
USE FOR FV-7 IF FV-2 SUCCESSFUL

- o 7 1/2 MONTH SLIP OF FLIGHT 3

USE LAB PRODUCTION LINE STRUCTURES

ORDER ADDITIONAL STRUCTURE IF FV-2  
FAILS

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FLIGHT TWO BACKUP ALTERNATIVES

ALTERNATIVE

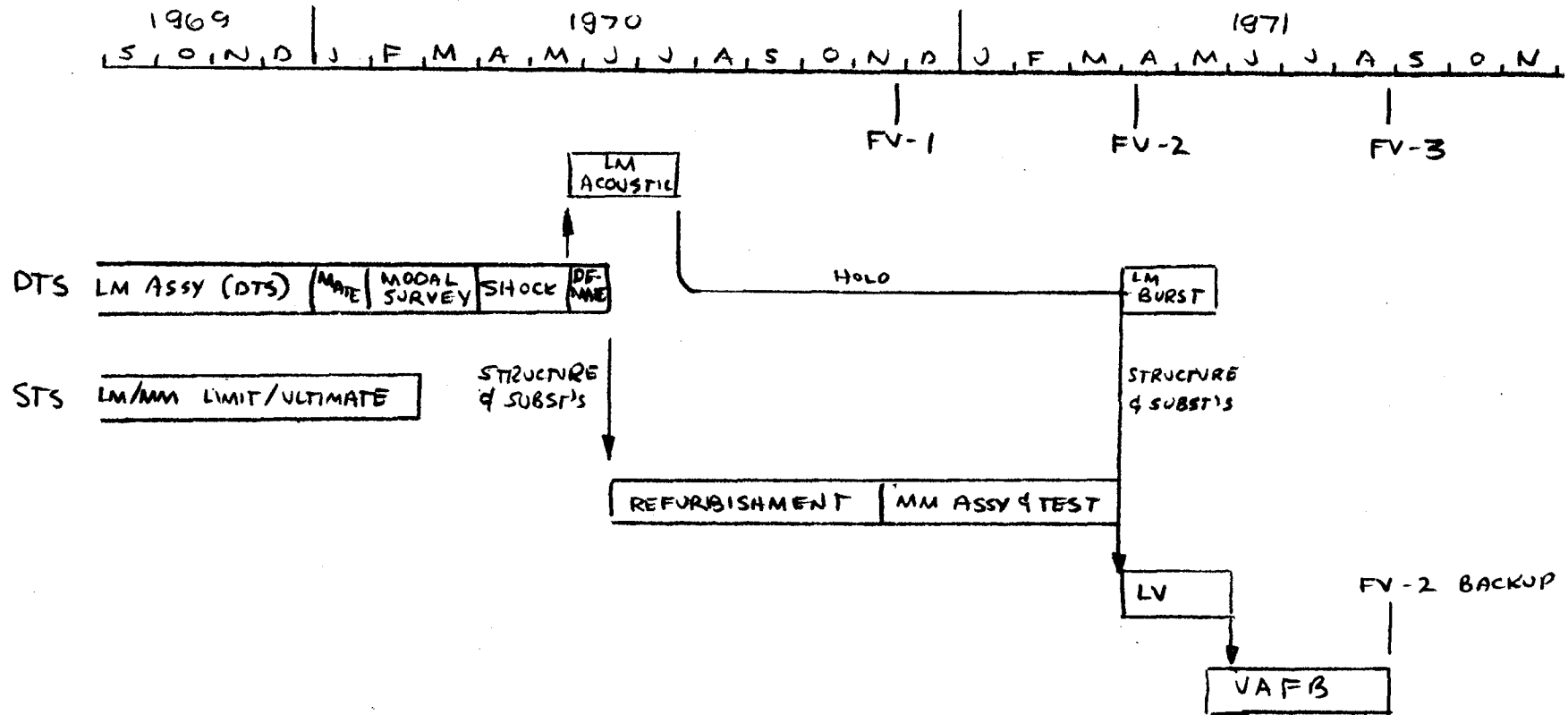
COMMENTS

A. USE SEPARATE STATIC AND DYNAMIC TEST  
STRUCTURES; USE DTS AS FV2 BACKUP.

- o PRESERVES 5-MONTH INTERVAL TO  
BACKUP FLIGHT.
- o PRESERVES CORRECT PHASING OF  
STRUCTURAL QUALIFICATION TEST  
COMPLETION.
- o NECESSITATES BACKUP FLIGHT USE  
OF ACOUSTIC AND SHOCK TESTED  
STRUCTURE (DTS).

FLIGHT 2 (BACKUP)

ALTERNATIVE A



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FLIGHT TWO BACKUP ALTERNATIVES

ALTERNATIVE

COMMENTS

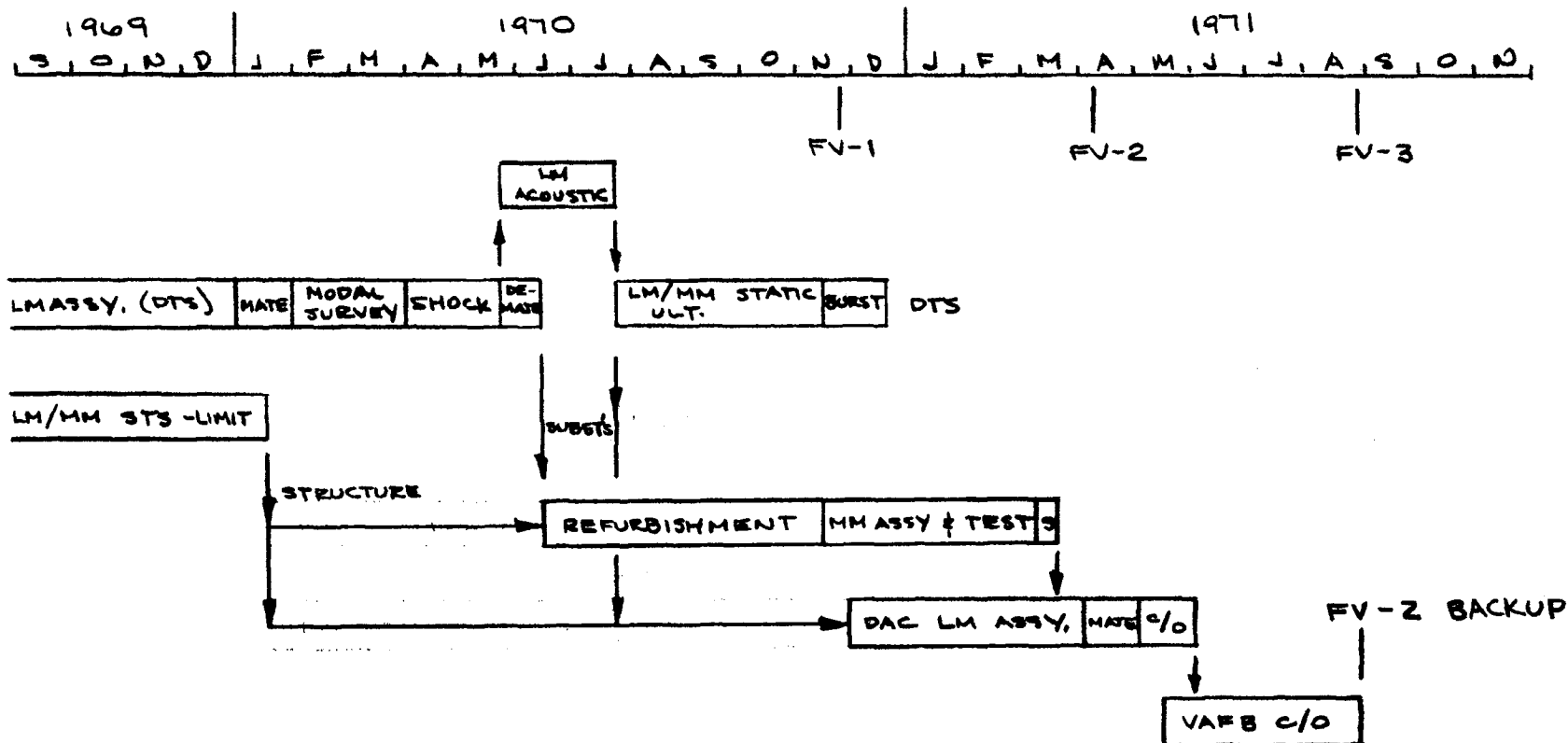
B. CONDUCT ALL ACOUSTIC, SHOCK AND DESTRUCTIVE (ULTIMATE AND BURST) TESTS ON DTS; STOP AT LIMIT LOADS ON STS AND PREPARE FOR FV2 BACKUP; IF FV2 SUCCEEDS, REMOVE SUBSTITUTES AND FLY STS STRUCTURE FOR FV7.

- o PRESERVES 5-MONTH INTERVAL TO BACKUP FLIGHT.
- o PRESERVES CORRECT PHASING OF LIMIT-LOAD TESTS, BUT DELAYS ULTIMATE-LOAD TESTING 8 1/2 MONTHS (WITH RESPECT TO FV2 AND FV3).
- o AVOIDS BACKUP FLIGHT USE OF ACOUSTIC/ SHOCK-TESTED STRUCTURE.
- o REQUIRES ULTIMATE LOADS TEST OF STRUCTURE PREVIOUSLY EXPOSED TO ACOUSTIC/ SHOCK TESTS.
- o ELIMINATES ONE STRUCTURE IF FV2 SUCCEEDS.
- o NECESSITATES TWO SET-UPS FOR STATIC TESTING.

AEROMECHANICAL

FLIGHT 2 (BACKUP)

ALTERNATIVE B





FLIGHT TWO BACKUP ALTERNATIVES

ALTERNATIVE

COMMENTS

C-1 USE SEPARATE STATIC AND DYNAMIC TEST STRUCTURES; ORDER ADDITIONAL STRUCTURE FOR FV2 BACKUP AND PRE-INSTALL SUBSTITUTES; IF FV2 SUCCEEDS, REMOVE SUBSTITUTES AND USE AS FV7.

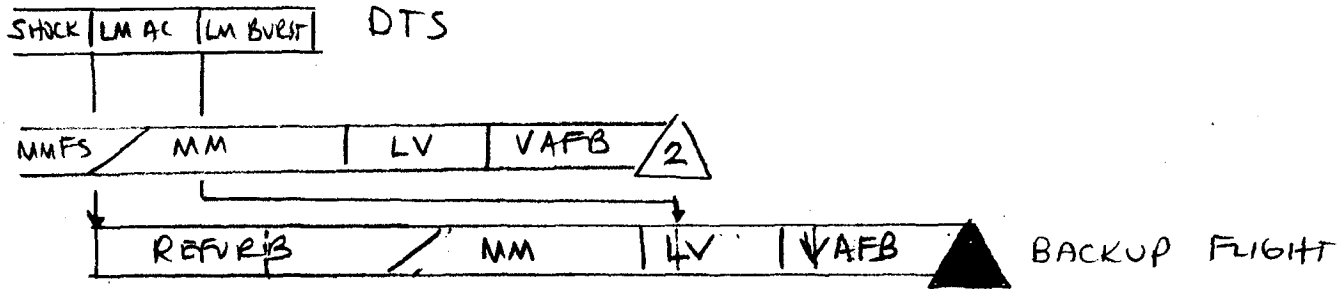
- o PRESERVES 5-MONTH LAUNCH INTERVAL ON BACKUP FLIGHT.
- o PRESERVES CORRECT PHASING OF STRUCTURAL QUALIFICATION TEST COMPLETION.
- o AVOIDS BACKUP USE OF ACOUSTIC/SHOCK TESTED STRUCTURE.
- o REQUIRES ONE EXTRA STRUCTURE IF FV2 FAILS.
- o ADDITIONAL STRUCTURE HAS EARLY FY IMPACT (REQUIRES EARLIER START OF MANUFACTURE).
- o IMPOSES EXTRA DELAY (BEYOND ONE NORMAL LAUNCH INTERVAL) ON FV7 DUE TO MMFS FABRICATION LEAD TIME.

# FLIGHT TWO BACKUP ALTERNATIVE C-1

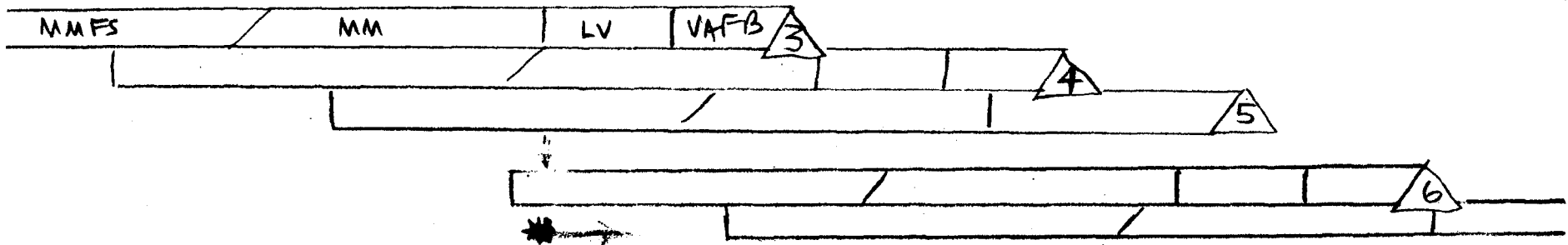
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STS = STATIC TESTS COMPLETE: MAR 1970



## FLIGHT VEHICLE SCHEDULE (BASING)



\* ORDER NEW FV7 STRUCTURES IF BACKUP STRUCTURE IS USED; OTHERWISE  
DIVERT BACKUP STRUCTURE TO FV7.

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FLIGHT TWO BACKUP ALTERNATIVES

ALTERNATIVE

COMMENTS

C-2 USE SEPARATE STATIC AND DYNAMIC TEST STRUCTURES; IF FV2 SUCCEEDS, PROCEED NORMALLY; IF FV2 FAILS, INSTALL SUBSTITUTES IN FIRST AVAILABLE FV STRUCTURES (FV 4 LM, FV6 MMFS, FV4 MMAS) FOR BACKUP FLIGHT AND ORDER NEW STRUCTURES FOR FV7.

- o REQUIRES 12-MONTH INTERVAL ON BACKUP FLIGHT.
- o PRESERVES CORRECT PHASING OF STRUCTURAL QUALIFICATION TESTING.
- o AVOIDS BACKUP FLIGHT USE OF ACOUSTIC / SHOCK-TESTED STRUCTURE.
- o REQUIRES ONE EXTRA STRUCTURE IF FV2 FAILS.
- o LAUNCH INTERVAL O. K. AFTER BACKUP FLIGHT.

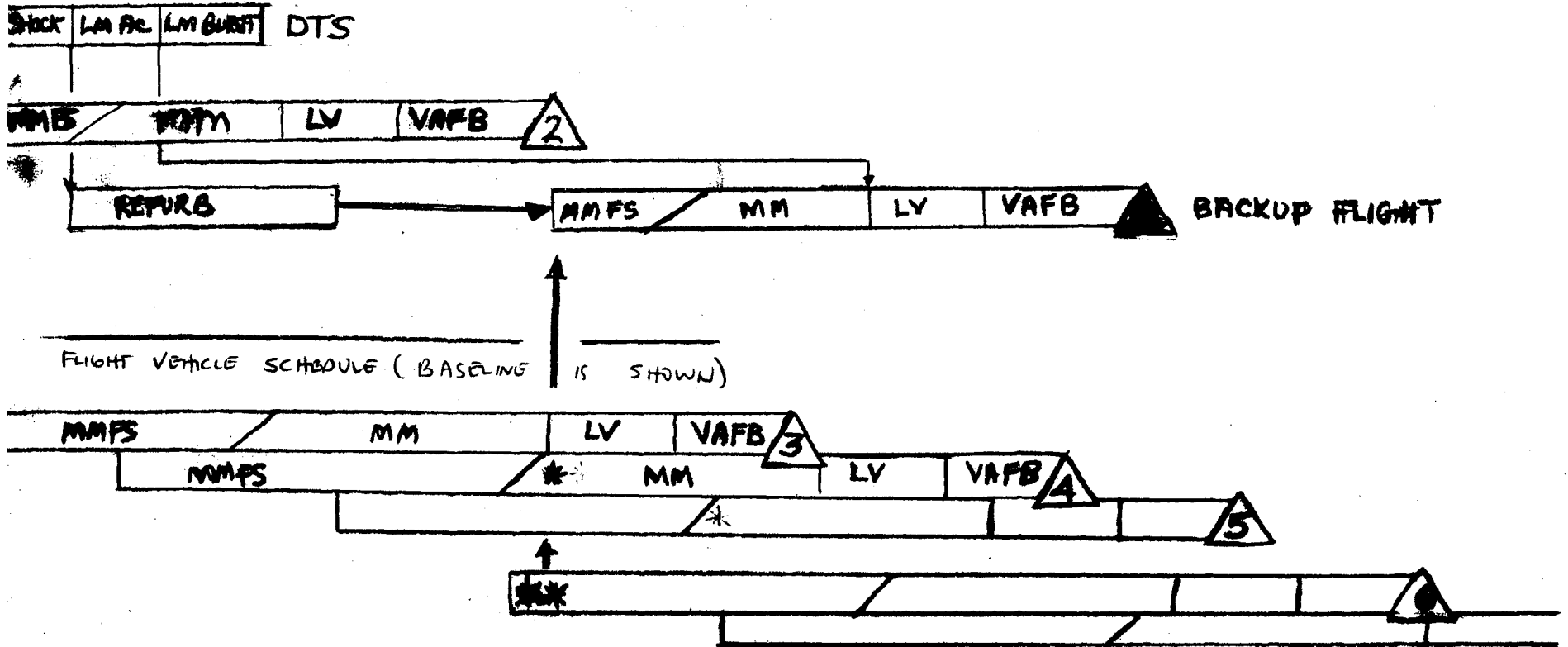
## FLIGHT TWO BACKUP - ALTERNATIVE C-2

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1970                      1971                      1972

M|J|J|A|S|O|N|D|J|F|M|A|M|J|J|A|S|O|N|D|J|F|M|A|M|J|J|A|S|O

STS: STATIC TESTS COMPLETE MAR: 1970



\* DIVERT FU#4 MMFS, LM TO BACKUP

\*\* DIVERT FU#6 MMFS TO BACKUP