NASA GSFC

TRMM Project Schedule Review

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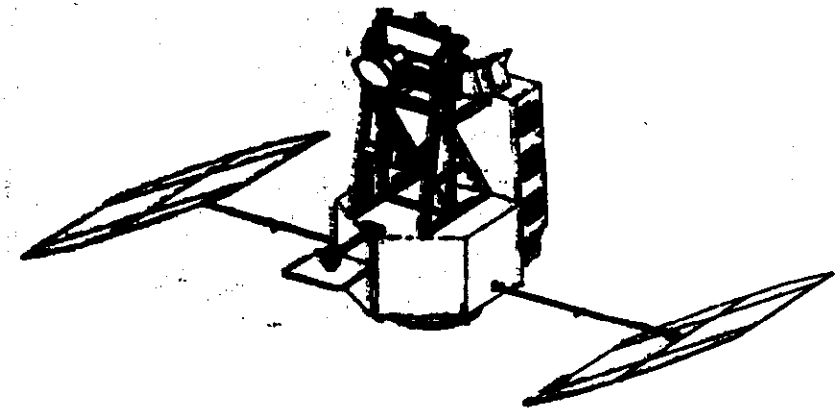


October 23, 1991

Walt Majerowicz
Ext. 5622

FILE: 3R-COVER

Agenda

1.0 Scheduling Overview	9:00
2.0 TRMM Master Schedule & Critical Path Summary	9:30
3.0 Observatory Integration & Test Schedule	9:45
4.0 Observatory Schedules	
4.1 Structure	10:15
4.2 Reaction Control	10:45
4.3 Electrical	11:00
4.4 Power	11:30
L U N C H	12:00
4.5 Command & Data Handling	1:00
4.6 Attitude Control	1:30
4.7 Communications	2:00
4.8 Deployables	2:30

FILE: SR-Agenda.1

Agenda - cont'd.

5.0 Instrument Schedules	3:00
5.1 CERES (EOS)	
5.2 LIS (EOS)	
5.3 Precipitation Radar (NASDA)	
5.4 TMI (GSFC)	
5.5 VIRS (GSFC)	
6.0 Recap & Recommendations	3:45
7.0 Action Item Review	4:00

FILE: SR-Agenda.2

Introduction

Scheduling Overview

TRMM Schedule Review

Purpose

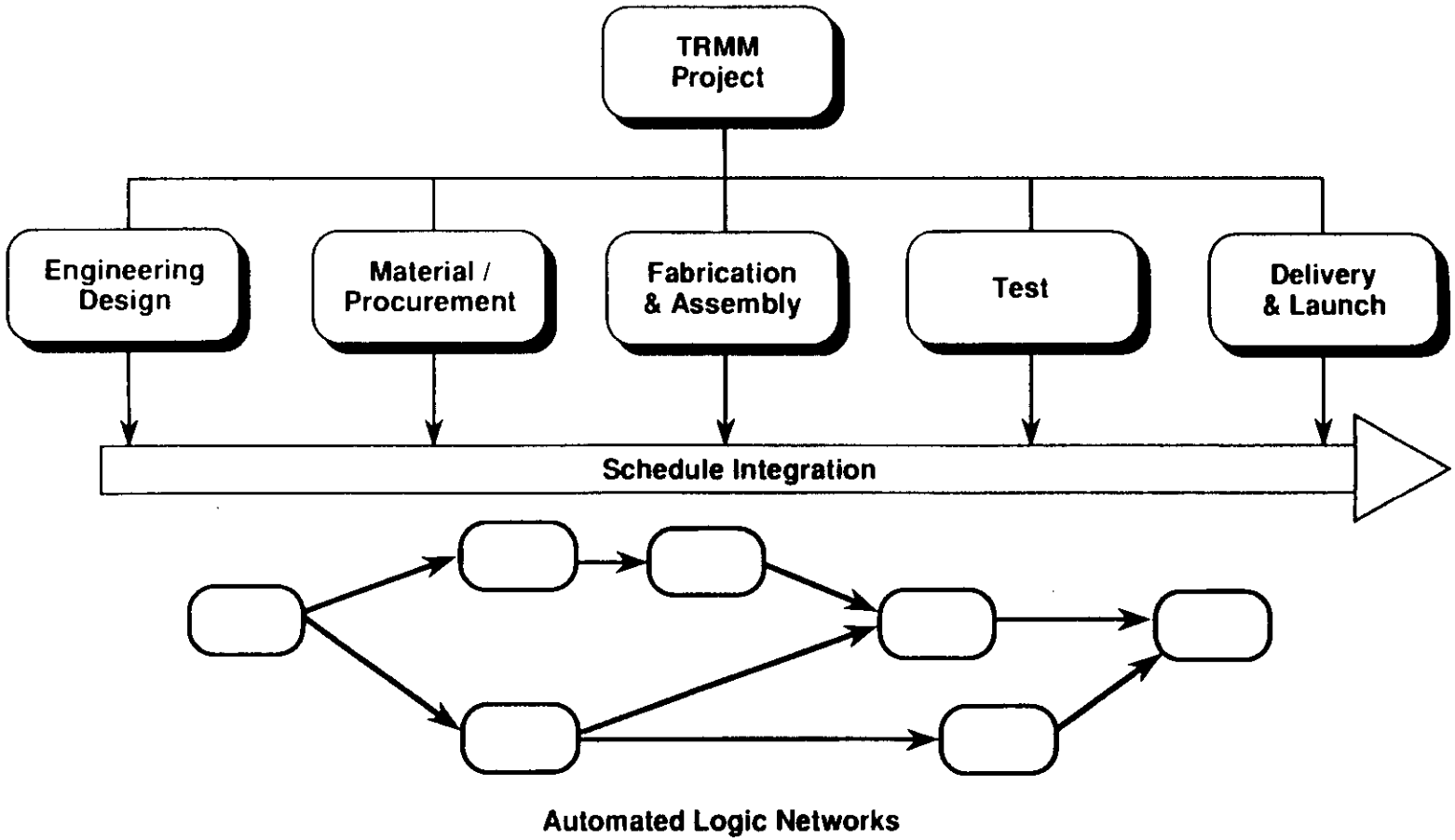
- Review with the TRMM project team the schedule for each major Observatory subsystem and instrument within the context of our integrated logic network (PERT).
- Provide a preliminary assessment of TRMM's overall schedule position relative to an 8/1/97 launch.
- Identify any significant "roadblocks" to meeting an 8/1/97 launch.
- Recommend alternatives which could ensure and / or improve the probability of an 8/1/97 launch.

Scheduling Role

- Develop integrated network schedules for all major activities and events required to design, build, test, launch and support the TRMM Observatory.
- Ensure vertical and horizontal schedule traceability.
- Obtain, record and analyze schedule status in order to assess overall progress against the baseline plan and to identify primary and secondary critical paths.
- Identify potential schedule problems and perform "what if" schedule analysis, "early warning," and "lookout functions".
- Advise Project Management of potential schedule impacts and possible workarounds / corrective actions.
- Revise project networks and schedules in accordance with authorized changes.

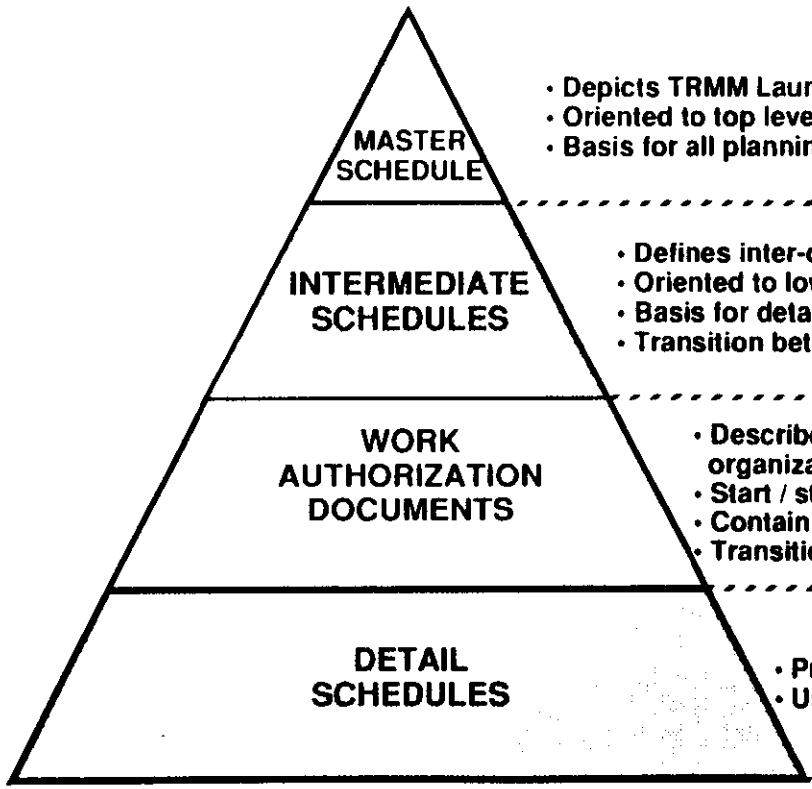
FILE: SR-SCHEDULING ROLE

Schedule Integration



FILE: SR-SCHED INTEG

Schedule Hierarchy



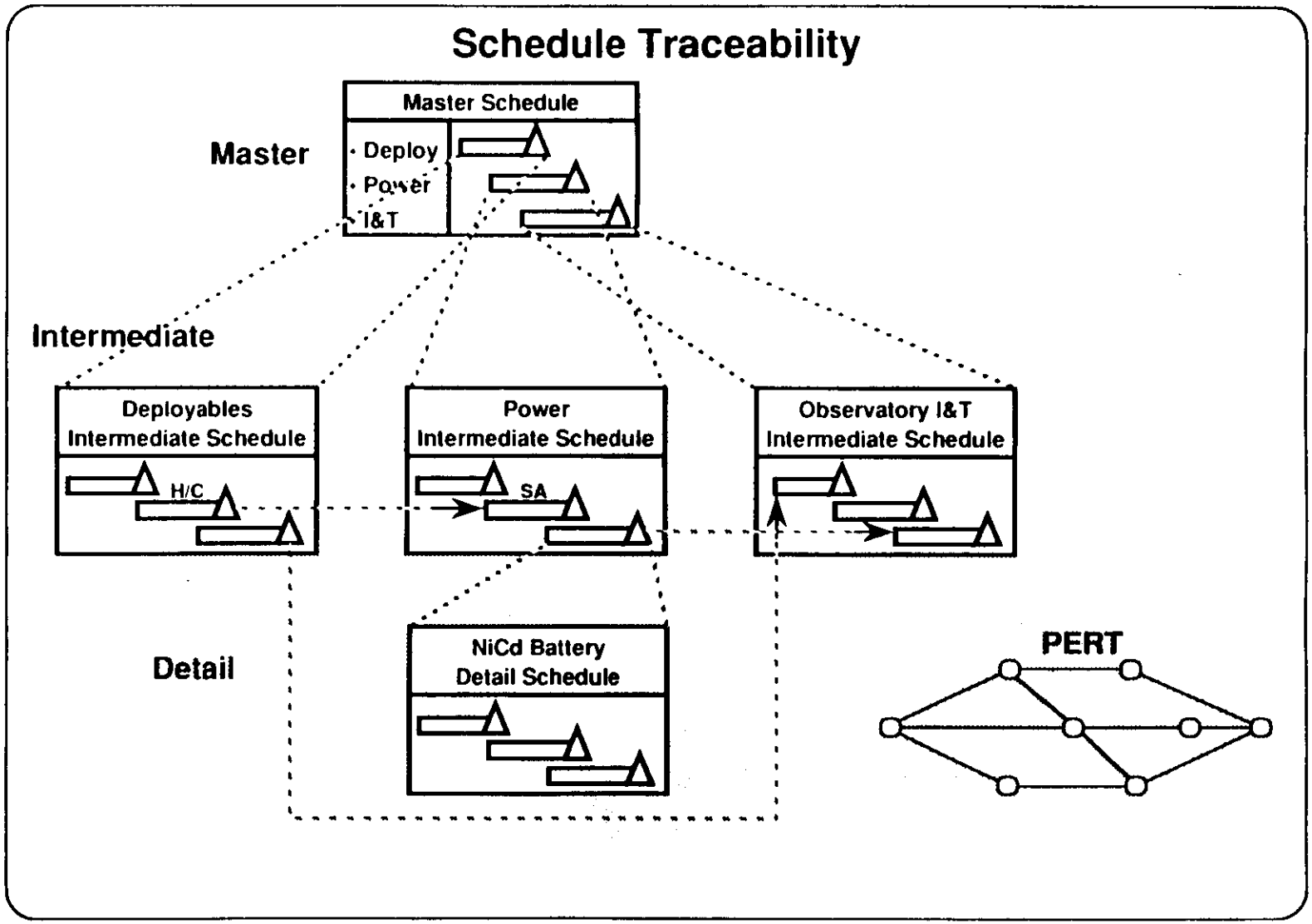
- Depicts TRMM Launch and major program milestones / tasks
- Oriented to top levels of WBS
- Basis for all planning & scheduling

- Defines inter-organizational relationships / interfaces
- Oriented to lower levels of the WBS
- Basis for detailed planning by organizations
- Transition between Master Schedule & "WADs" Schedules

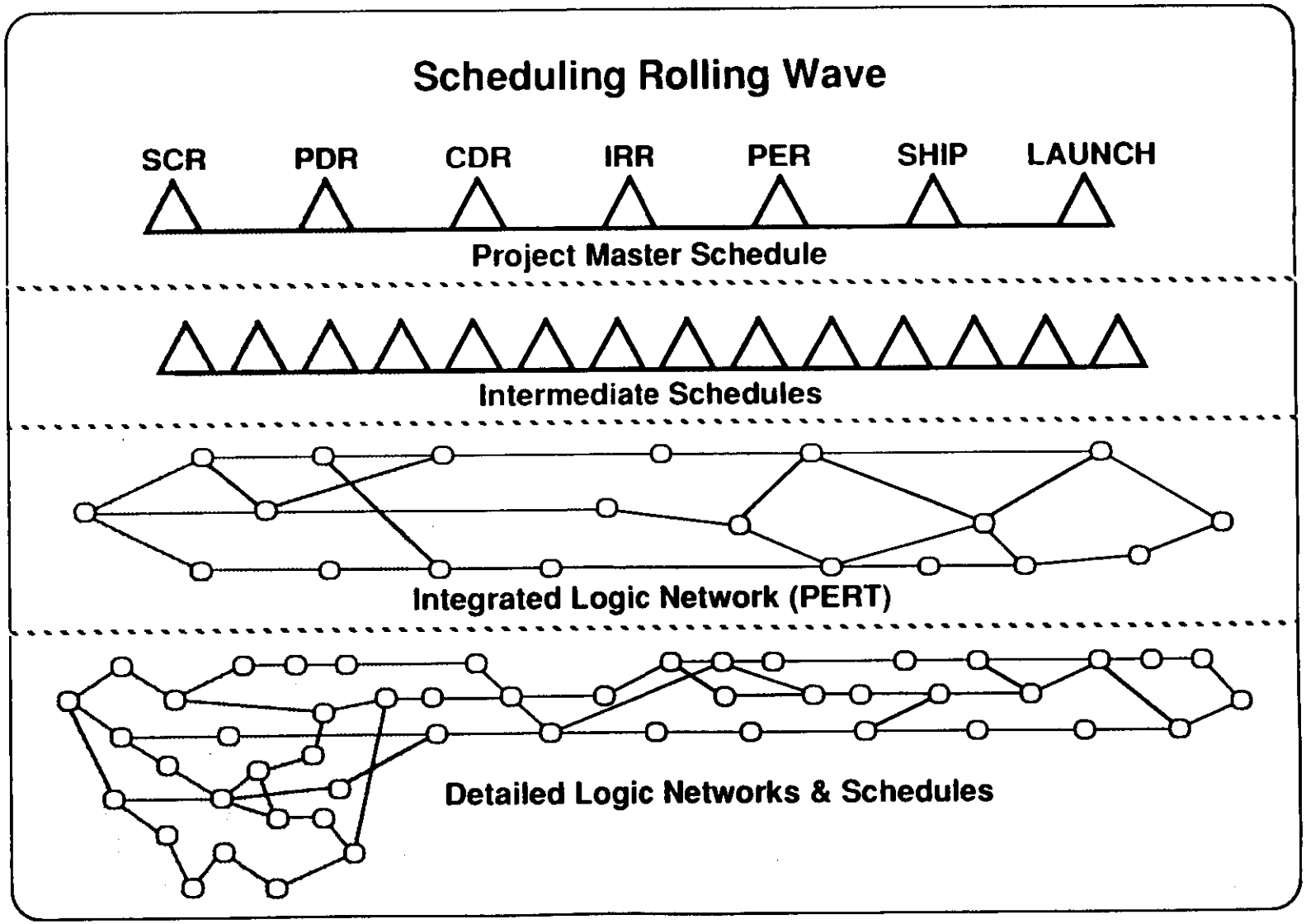
- Describes work scope to be accomplished by a single organization
- Start / stop dates based on Master & Intermediate Schedules
- Contain key interim milestones
- Transition between Intermediate Schedules & Detail Schedules

- Provide additional detailed schedule control
- Usually developed and statused by Subsystem Managers

FILE: SR-Hierarchy

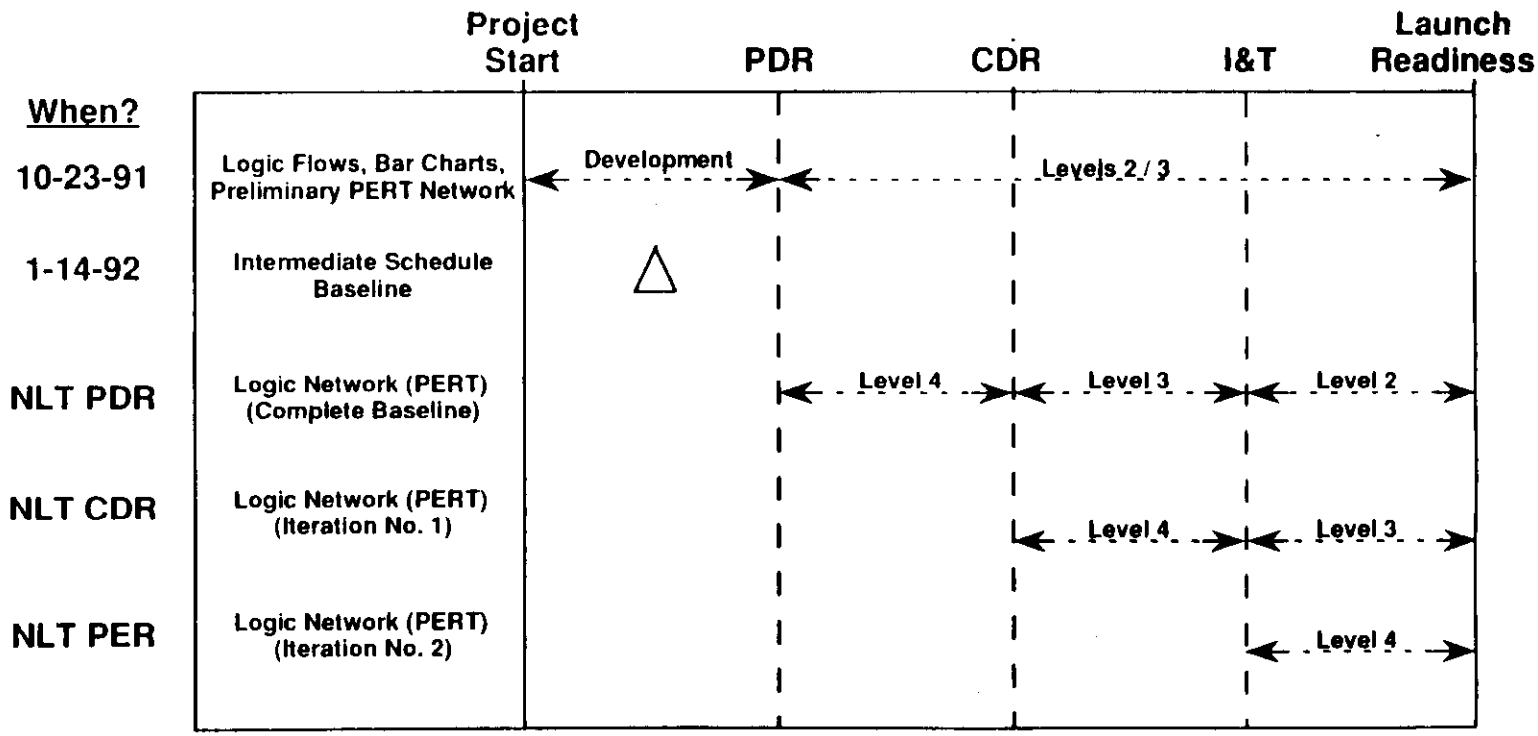


FILE: SR-TRACE



FILE: SR-ROLLING WAVE

TRMM Schedule Baseline Development



FILE: SR-BASELINE

Schedule Development

Identify major work tasks, precedence relationships and task durations within each subsystem.

- *Conducting planning meetings with Subsystem Managers.*
- *Developing initial logic networks.*

Identify precedence relationships among tasks for all subsystems.

- *Subsystem managers identify key inputs needed to accomplish effort.*

Integrate schedule information utilizing an automated scheduling system.

- *Currently utilizing PRESTIGE.*
- *Evaluating alternatives.*

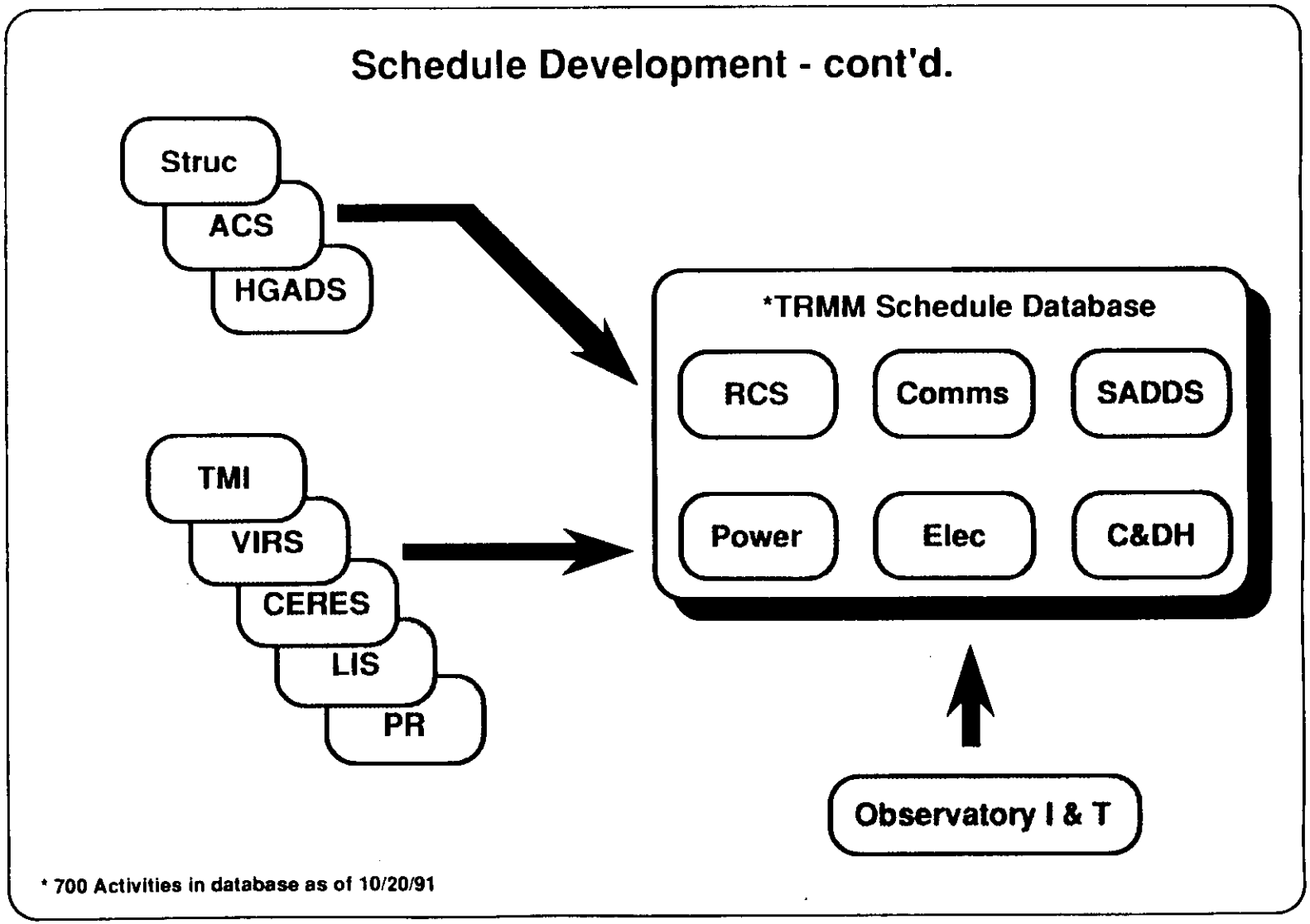
Isolate primary and secondary critical paths within network schedule.

- *Will emerge as network matures.*

Status, maintenance, reports, "what ifs," etc.

- *Ongoing*

FILE: SR-SCHED DEV.1



FILE: SR-SCHED DEV.2

Schedule Status & Control

- Observatory, Instrument and Ground System logic networks (PERTS) developed and maintained in separate databases using automated scheduling system (currently using PRESTIGE, considering other candidates).
- PERTS to be statused and updated on a monthly basis.
- Slack Reports, time analyses, GANTT charts, etc. to be distributed to Project Management and the Subsystem Managers no less than monthly.
- Critical paths are analyzed and schedule issues identified for possible workarounds.
- Subsystem PERT charts plotted monthly for distribution to Subsystem Managers; total Observatory, Instrument and Ground System PERTS plotted monthly and posted in Project area.
- Schedule Management Plan to be developed describing the schedule status and control process for TRMM.

FILE: SR-STATUS & CONTROL

Major Schedule Assumptions

1. TRMM launch scheduled for August 1, 1997.

2. Schedule contingency of 56 work days (approx. 3 mos.) included in the PERT.

   - 28 days for Observatory I & T
   - 28 days for launch site preparations

3. Observatory Preliminary Design Review (PDR) scheduled for July 15, 1992.

4. Observatory Critical Design Review (CDR) scheduled for October 1, 1993.

5. The procurement process schedule span is 9 months from start of procurement request (PR) package preparation through award of contract (unless otherwise noted).

6. Current Observatory Integration & Test schedule is utilized.

7. PERT schedules based on a 5 day work week; average 20 work day month.

FILE: SR-MAJOR ASSUMPTIONS

Summary Procurement Sequence*

- In-House Estimate
- SOW
- Schedule
- Specification
- WBS

Purchase Request (PR) preparation and approval.	Prepare RFP and release to industry.	Contractor proposal preparation & submittal.	Proposal evaluation & contractor selection.	Negotiate & award contract.
1 month	2 months	2 months	2 months	2 months

9 months

* Modified:
- Power
- RCS

FILE SR-PROCURE

Major Findings

- Need dates for subsystem flight hardware based upon current Observatory I&T schedule differ from earlier projections .
- Structure Subsystem needed for start of Observatory integration & test no later than September 27,1994 <u>based upon current Observatory I&T Schedule</u> (including 3 month schedule contingency).
- TMI delivery of August 1, 1995 is "just in time," with minimal slack.
- LIS delivery of June 1, 1995 is "just in time," with minimal slack.
- No uniform schedule span for the procurement process.
- No integrated scheduling started for the Ground Segment.
- Schedules and budgets not fully integrated.
- Flight hardware procurement and fabrication beginning prior to CDR.
- Current Observatory PDR and CDR dates may need to be rescheduled.

FILE: SR-MAJOR FINDINGS

Master Schedule
& Critical Path Summary

GODDARD SPACE FLIGHT CENTER

APPROVAL RESP *V. WEYERS

ACCOMP RESP **T. LaVIGNA

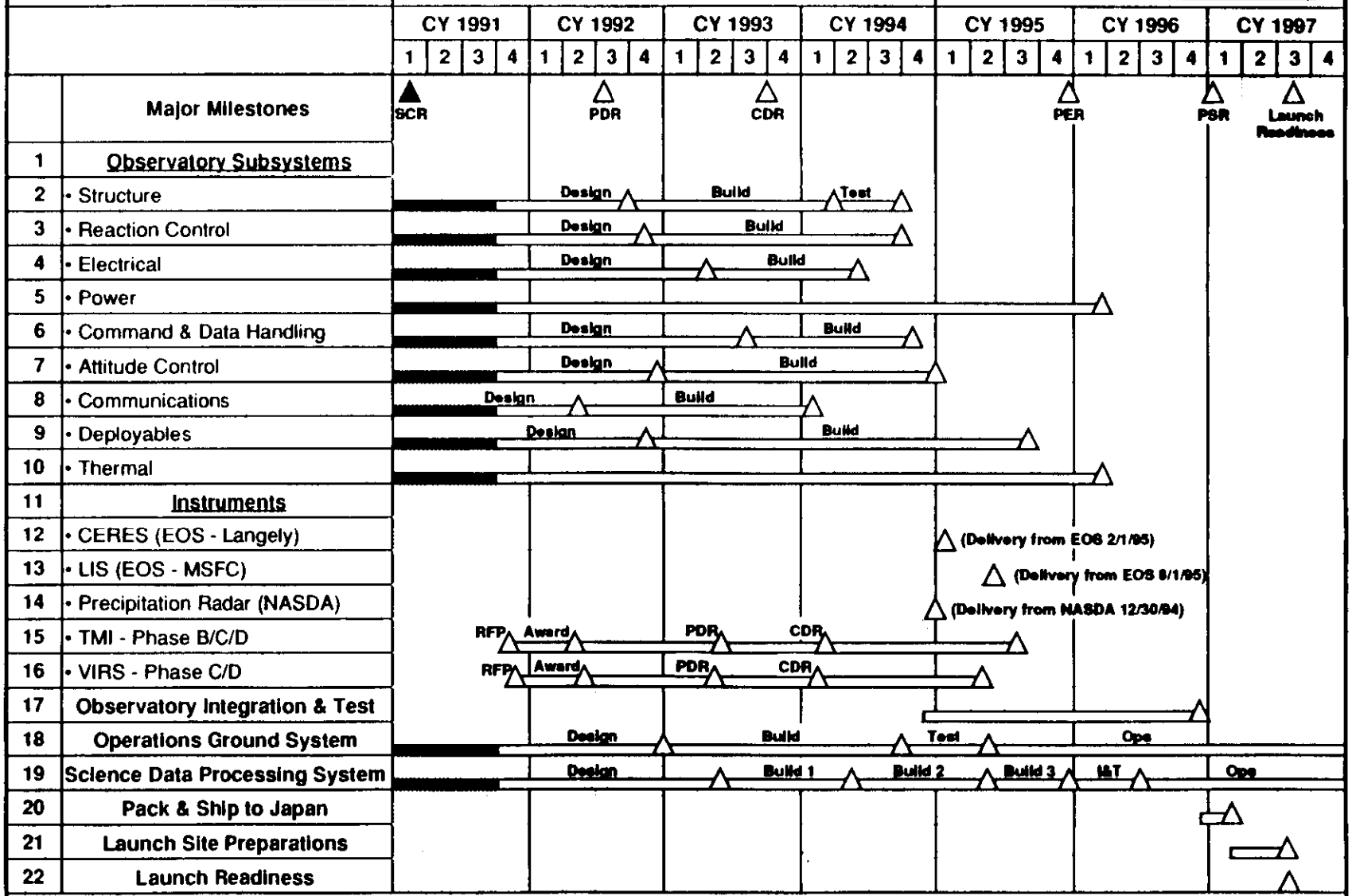
TRMM PROJECT MASTER SCHEDULE

PAGE 1 OF 1

ORIG SCHED APPVL 05/22/90

LAST SCHED CHG ***10/23/91

STATUS AS OF 10/1/91



NOTE: * Schedule revision not yet approved.
** Acting
*** Schedule revision based on preliminary PERT analysis.

FILE: TRMM.M3.MD

TRMM PROCUREMENT SCHEDULE

ISSUED:
REVISION:
STATUS AS OF:

FY 1992 | FY 1993 | FY 1994

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 N D J F M A M J J A S

	PROCUREMENT TYPE	LEVEL OF REVIEW	RESP.
INSTRUMENTS:			
TMI	C		490
VIRS	C		490
OBSERVATORY:			
THERMAL SUBSYSTEM:			
Louvers			732
RCS SUBSYSTEM:			
Propellant Tanks	S		713
Pressurant Tanks			713
ISO Valves			713
Filters			713
Heaters			713
Repackage COBE Thrusters			713
Transducers			713
COMMUNICATION SUBSYSTEM:			
Gimbal			490
Transponders			490
High Gain Antenna			490
Power Amplifiers			727
Low Gain Antennae			727
RF Test Equipment			727
RF Components			727
GORE Cable			727
ELECTRICAL SUBSYSTEM:			
Power/Pyro (PDSU)			733
Wire Harness			733
S/C GSE			733
I & T Computer			733
Break-out-Boxes			733
Simulator H/W			733

PRELIMINARY

LEGEND:

TYPE
C= COMPETITIVE
S=SOLE SOURCE

1=SPEC
2=SOW
3=IN HOUSE
4=PR TO PROC

MILESTONES
5=RFP ISSUED
6=PROPOSAL RECPT.
7=TECH EVAL RECPT.
8=AUDIT
9=PRICING
10=PRE-NEG COMP.
11=PRE-NEG APPROVED
12=NEG COMPLETE
13=AWARD

LEVEL OF REVIEW
200 = PROCUREMENT OFFICER
280 = DIVISION CHIEF
284 = TRMM PROCUREMENT OFFICE

TRMM PROCUREMENT SCHEDULE

ISSUED:
REVISION:
STATUS AS OF:

FY 1992: O N D J F M A M J J A S
FY 1993: O N D J F M A M J J A S
FY 1994: O N D J F M A M J J A S

	PROCUREMENT TYPE	LEVEL OF REVIEW	RESP.
ACS SUBSYSTEM:			
Earth Sensor			712
Sun Sensor - course			712
SunSensor - digital			712
Gyros			712
Reaction Wheels			712
Torquer Bars			712
Magnetometers			712
C&DH SUBSYSTEM:			
CTTs			490
RPPs			490
SIRT			490
RIU/1773			735
Fib Opt Bus			735
Simulators			735
Frequency Standards			490
POWER SUBSYTEM:			
Solar Array			490
Battery Cells			490
Electronics			
EGSE			711
			490
DEPLOYABLES:			
Honeycomb Panels			490
			490
Potentiometers			490
GROUND:			
Prototyping			731
Ground Truth DPS			731
TSDIS Development			731

PRELIMINARY

LEGEND:

TYPE
C= COMPETITIVE
S=SOLE SOURCE

MILESTONES
1=SPEC
2=SOW
3=IN-HOUSE
4=PR TO PROC
5=RFP ISSUED
6=PROPOSAL RECPT.
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8=AUDIT
9=PRICING
10=PRE-NEG COMP.
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LEVEL OF REVIEW
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TRMM Slack Summary - With 3 Months Schedule Contingency

Subsystem / Instrument	Need Date	PERT	Driver	Slack
1. Structure	9-27-94	1-2-95	S/C Design	-69 Days
2. Reaction Control[1]	8-29-94	4-27-94	Thrstrs & P-Tanks	+88 Days
3. Electrical[2]	1-19-94	10-12-93	SA Boom Harness	+71 Days
4. Power[3]	3-14-96	3-25-96	Flight NiCd Btry.	-7 Days
5. C & DH	2-1-95	11-1-94	ACS Software	+66 Days
6. Attitude Control	3-29-95	12-30-94	EVD	+63 Days
7. Communications	4-26-95	11-8-94	TDRSS Xnpdrs.	+121 Days
8. Deployables[4]	3-15-95	12-19-94	Damper	+62 Days
9. CERES	5-10-95	2-1-95	Promised delivery	+71 Days
10. LIS	6-7-95	6-1-95	" "	+5 Days
11. Precipitation Radar	7-5-95	12-30-94	" "	+133 Days
12. TMI	8-2-95	8-1-95	39 month lead time	+1 Days
13. VIRS	8-30-95	6-1-95	36 month lead time	+64 Days

NOTES:

1 = need date is for Thrusters & Pressuant Tank based on RCS module build.

2 = need date is for Solar Array Boom Assembly Harness.

3 = need date is for NiCd flight batteries.

4 = need date is for Panel Hinge Assembly Dampers.

FILE: SR-SLACK SUMMARY

Observatory I & T Schedule

Observatory I&T Schedule

Assumptions

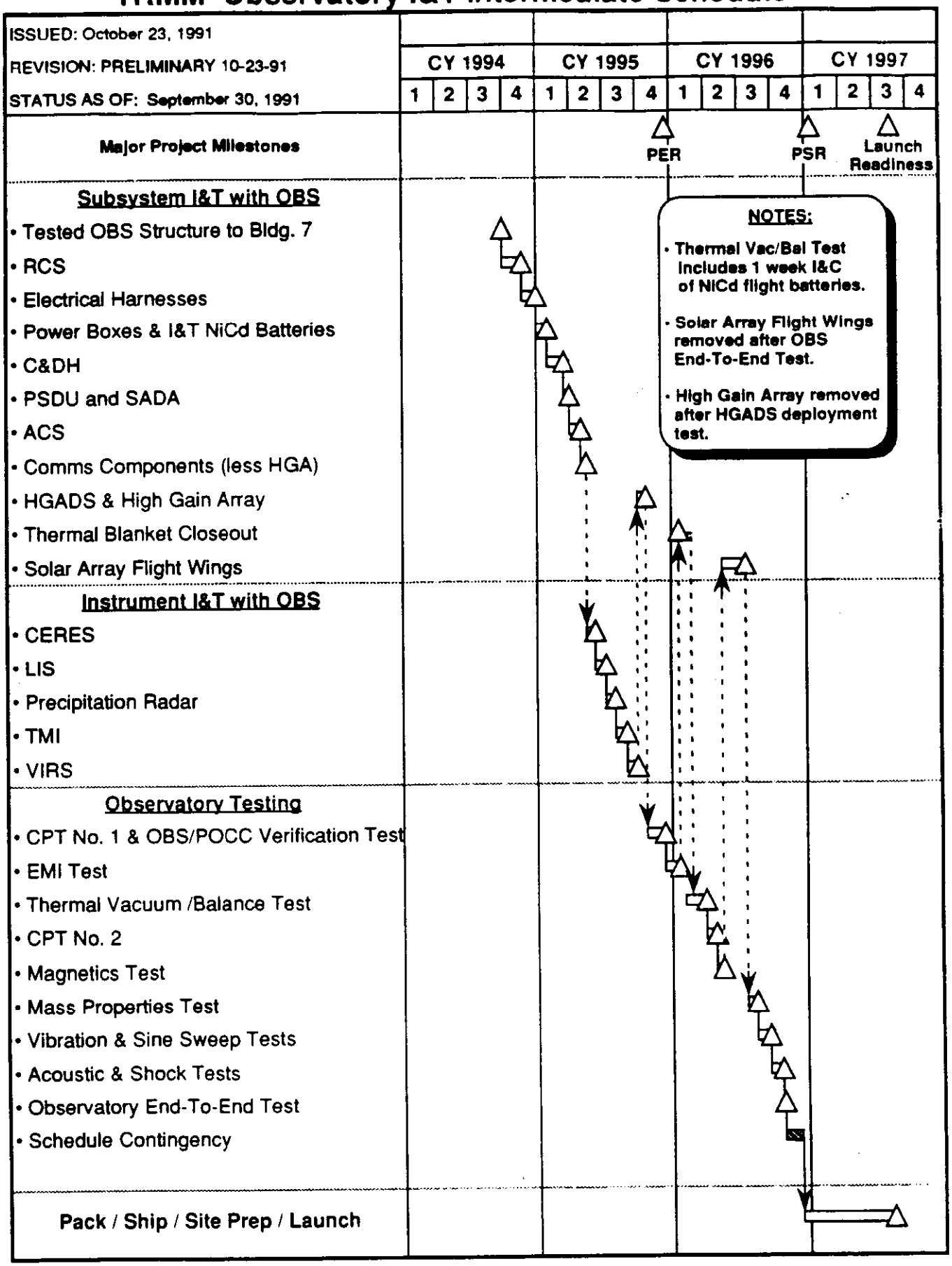
- I&T schedule based on key sequential tasks.
- Building 7 will be used for subsystem I&Ts with Observatory.
- Propulsion pressure testing will be performed at GSFC.
- NiCd Qual / I&T batteries will be used for Power Subsystem I&T with Observatory, but flight batteries will be installed, checked-out and removed after Observatory thermal vacuum / balance test.
- PSDU and SADA will be integrated with Observatory after the C&DH subsystem I&T.
- One month planned for each Instrument integration & alignment.
- HGADS and High Gain Array will be integrated with Observatory after last instrument I&T is complete.
- Magnetics testing will be done at the Observatory level.

TRMM Observatory I&T Intermediate Schedule

ISSUED: October 23, 1991

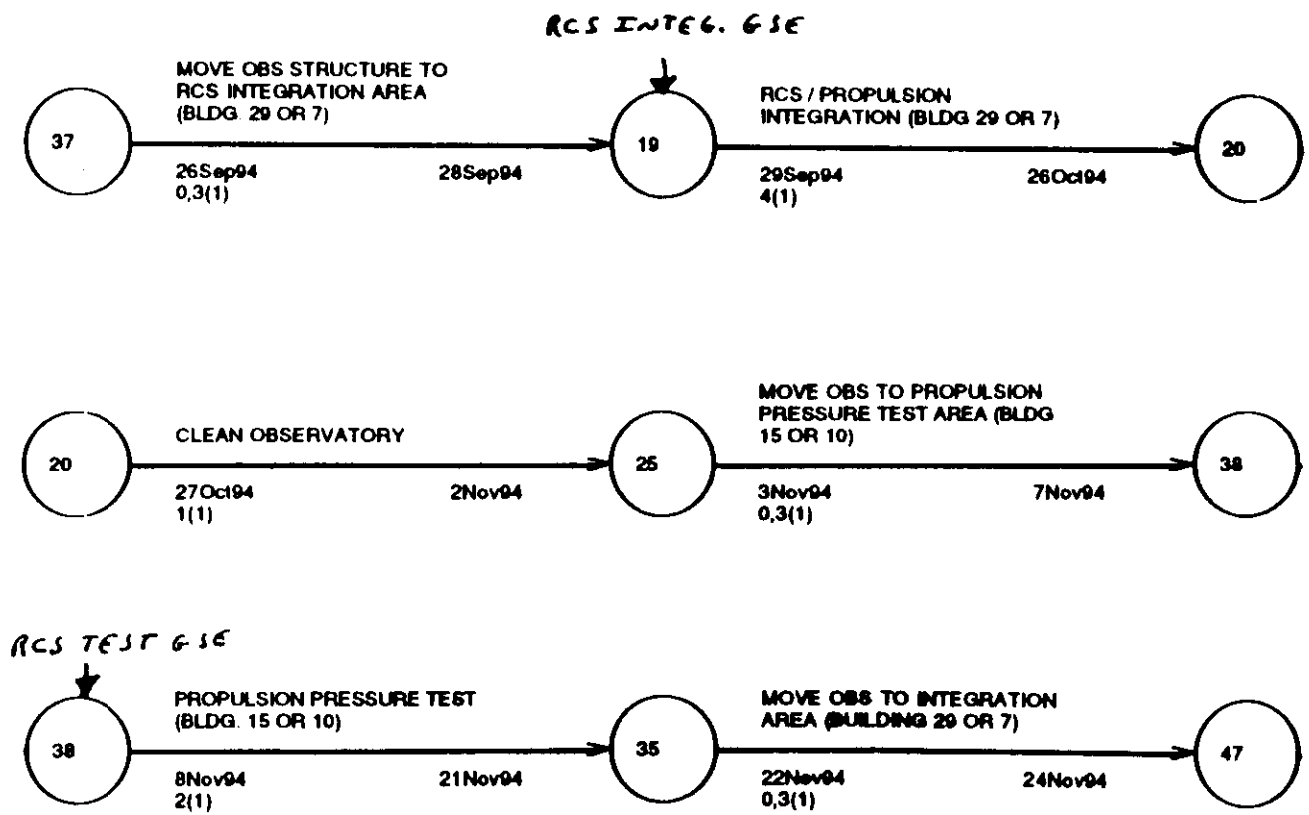
REVISION: PRELIMINARY 10-23-91

STATUS AS OF: September 30, 1991



FILE: OBSI&T.INTERM.MD

Observatory I & T Sequence



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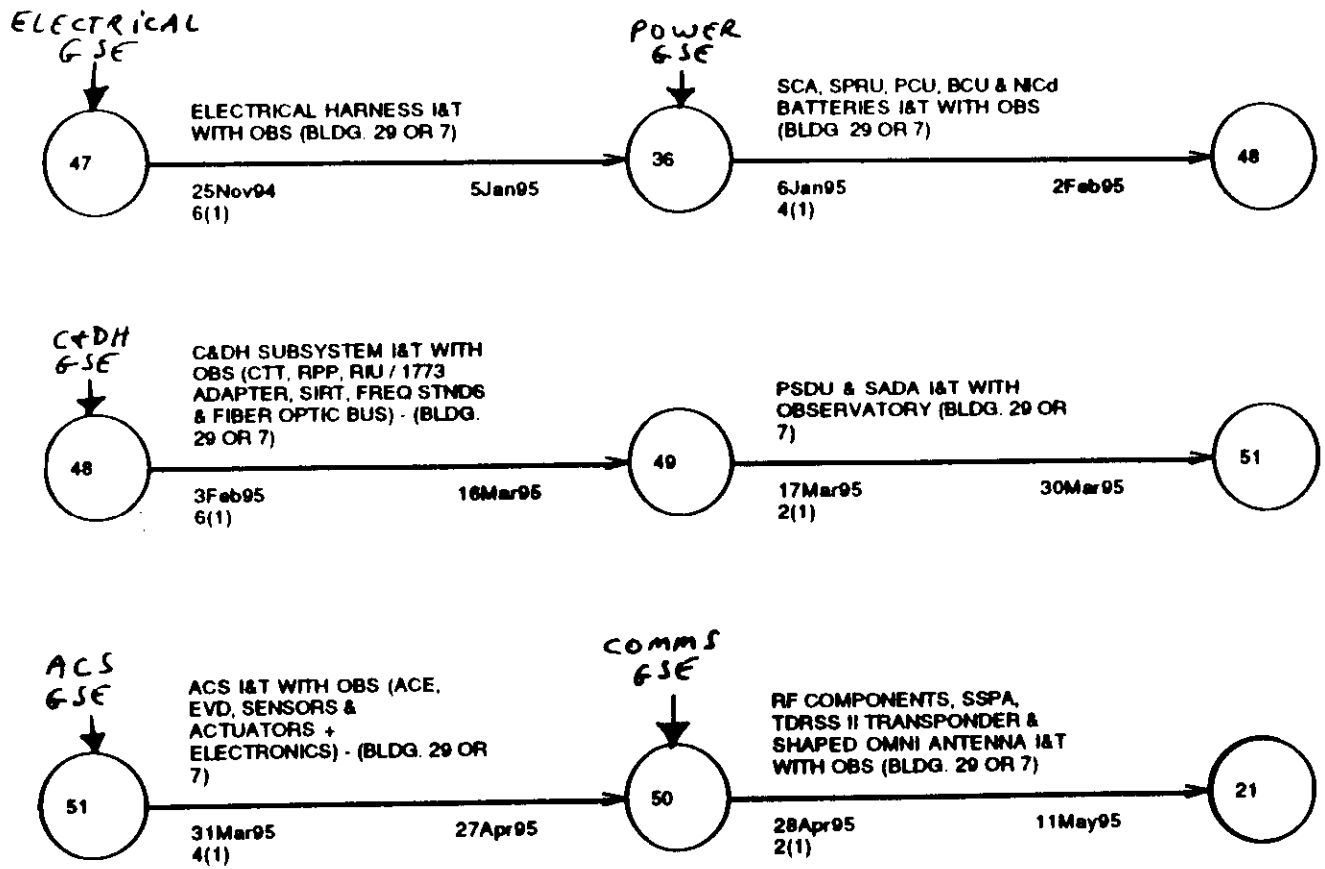
Observatory I & T Sequence - cont'd.



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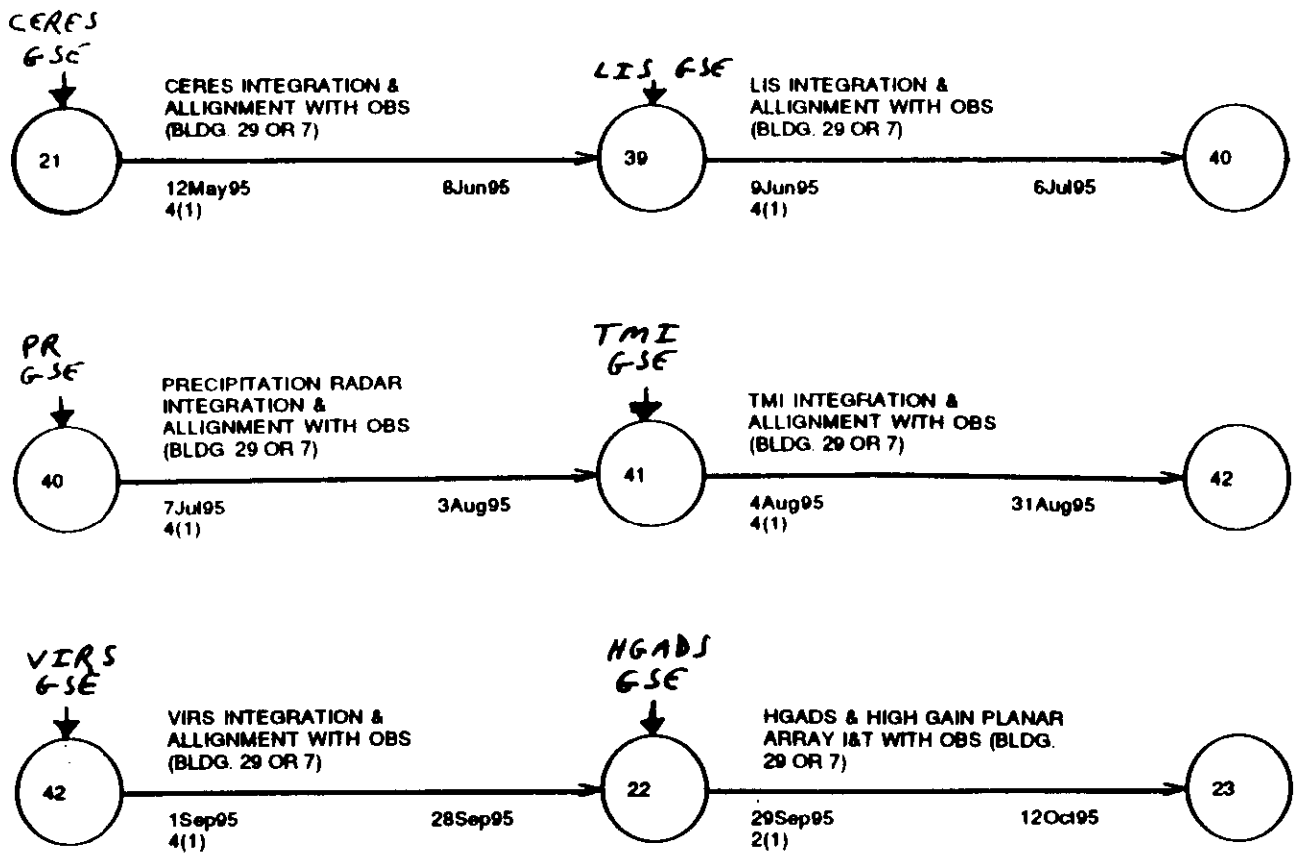
Observatory I & T Sequence - cont'd.



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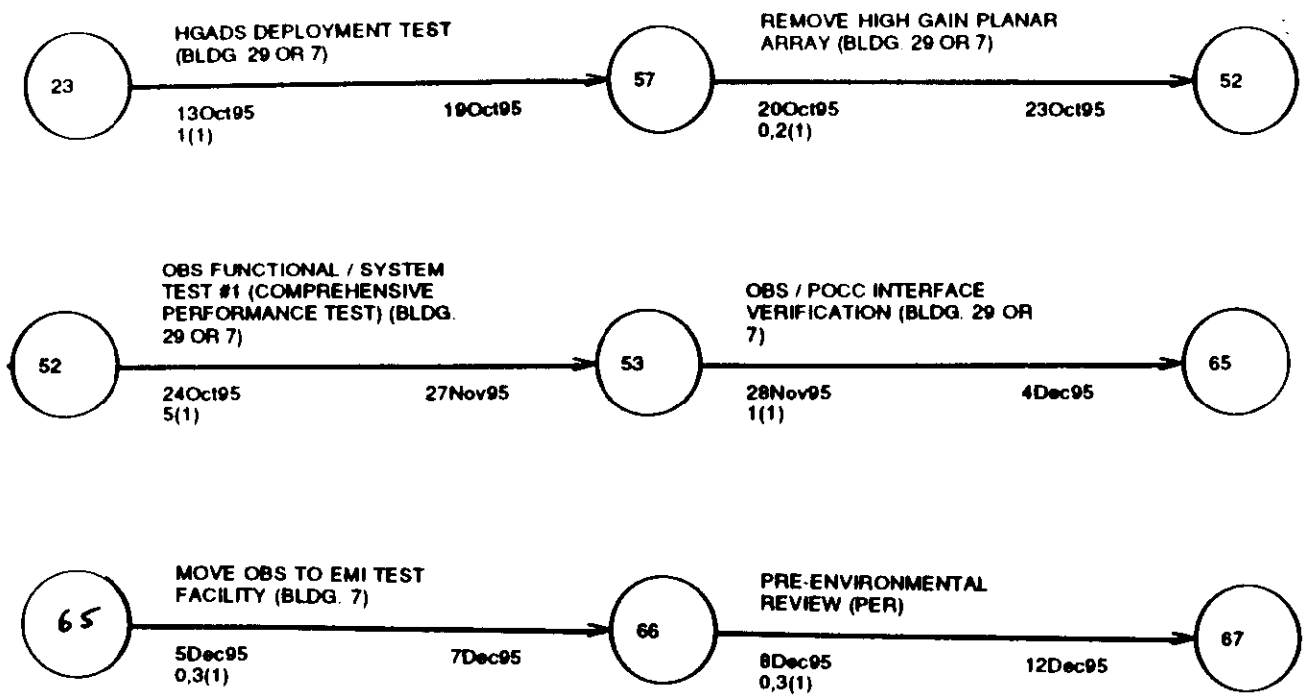
Observatory I & T Sequence - cont'd.



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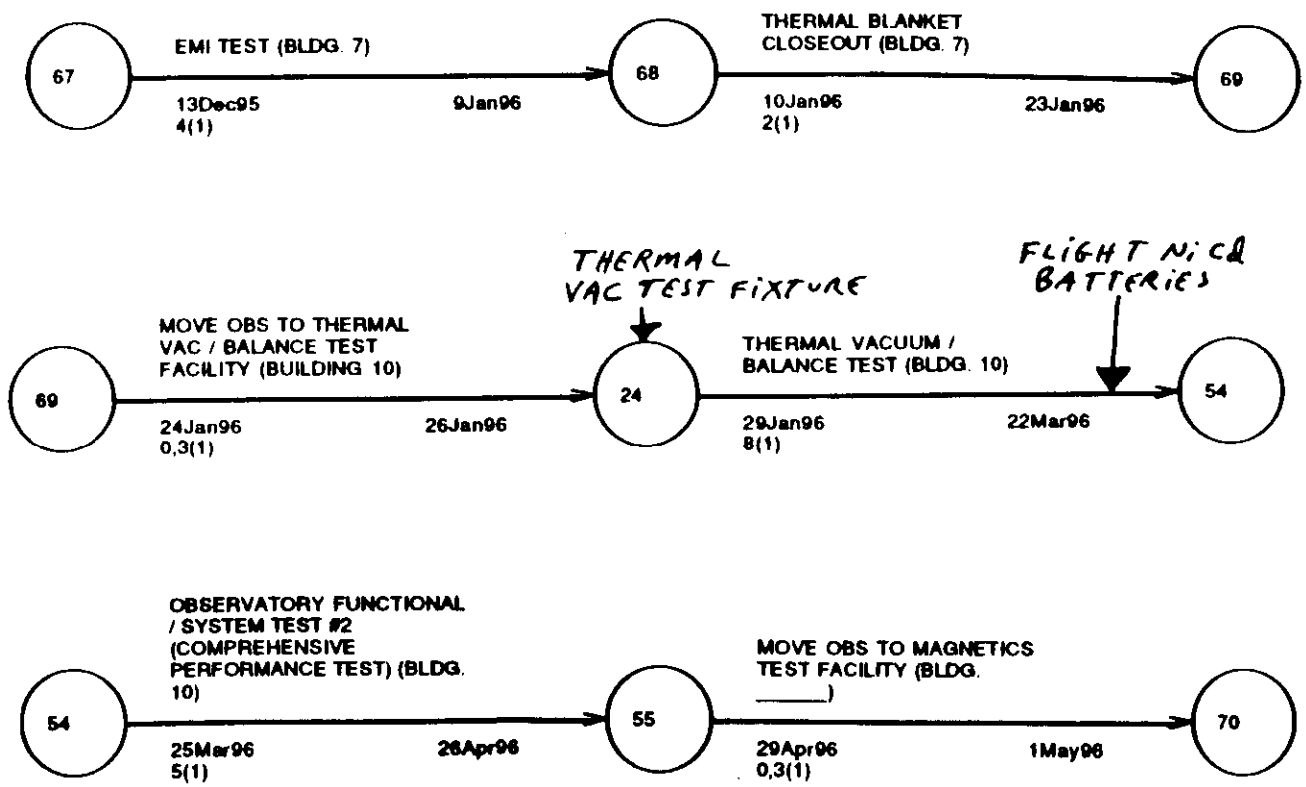
Observatory I & T Sequence - cont'd.



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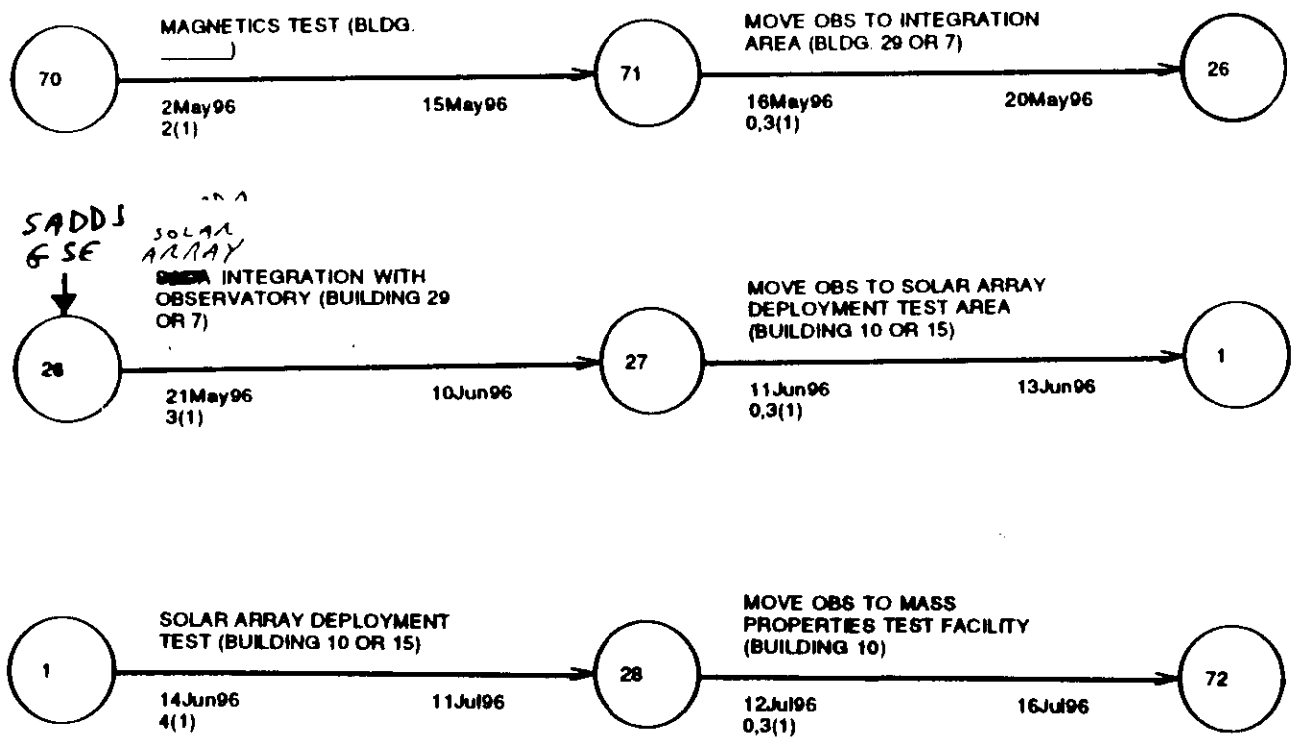
Observatory I & T Sequence - cont'd.



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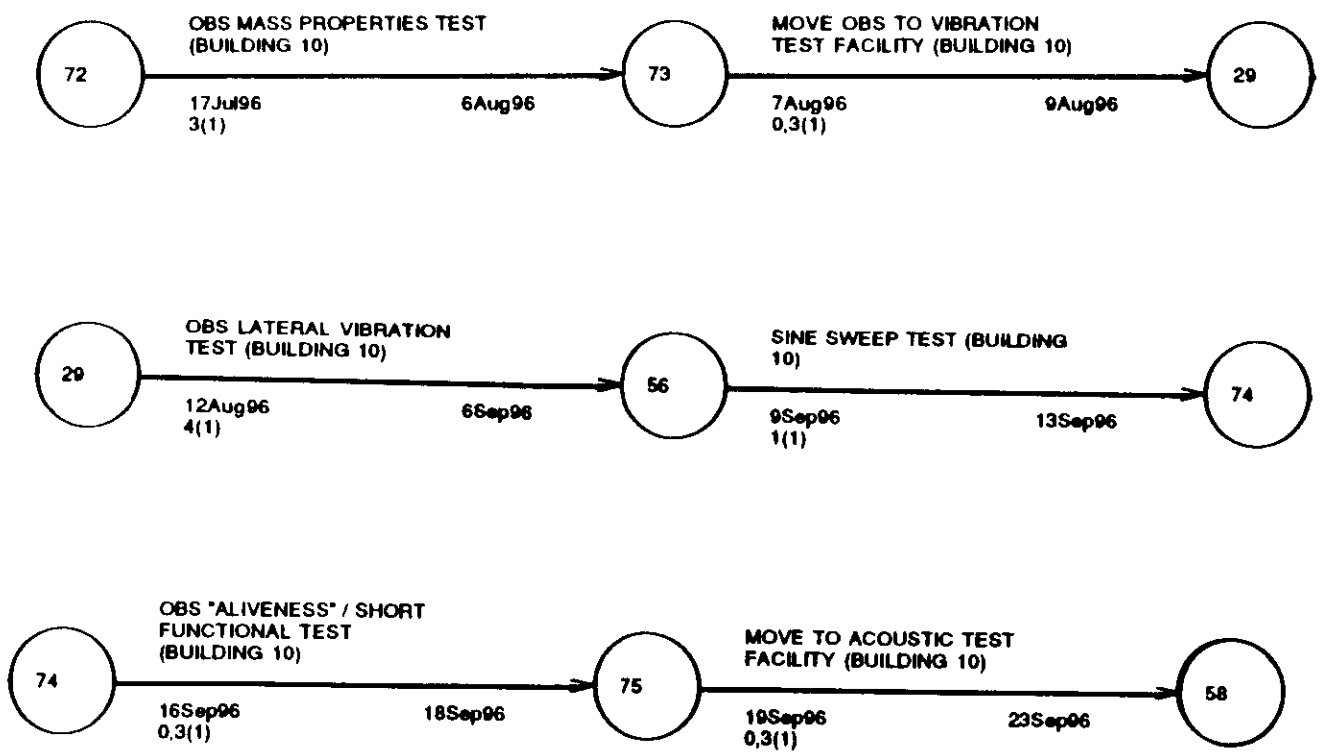
Observatory I & T Sequence - cont'd.



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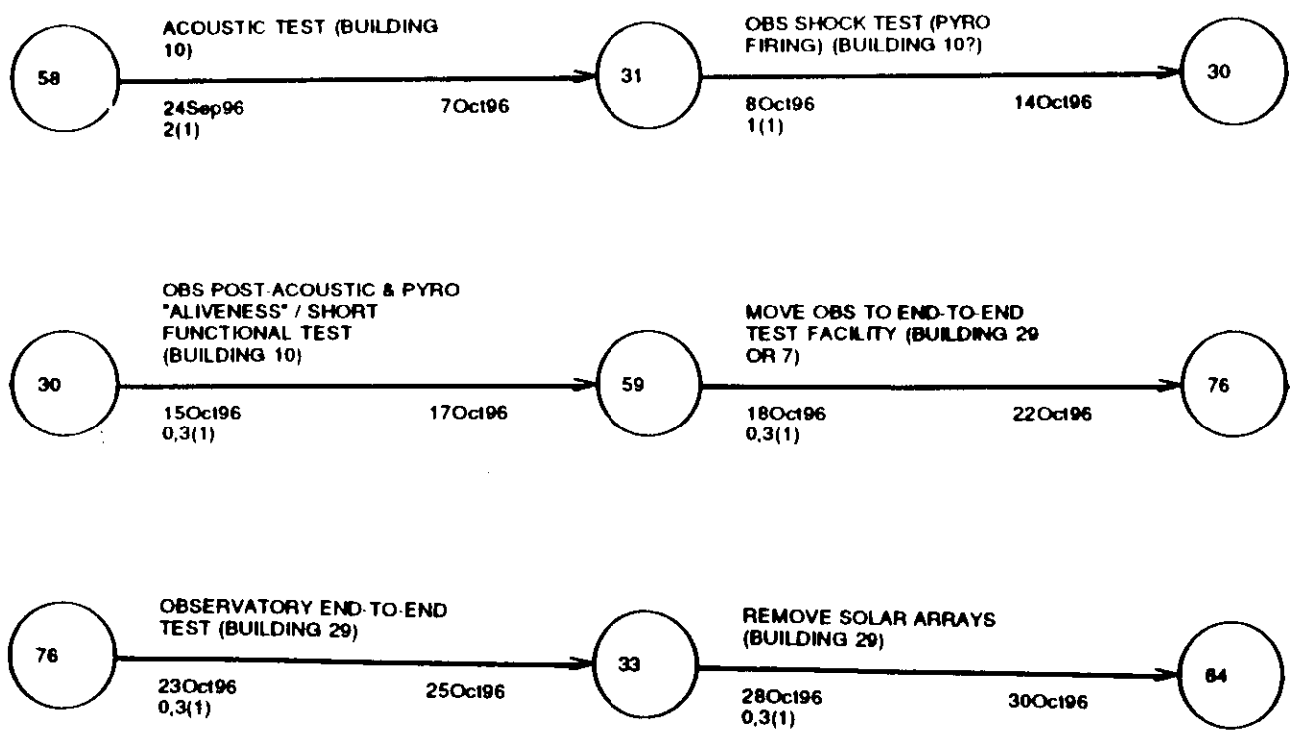
Observatory I & T Sequence - cont'd.



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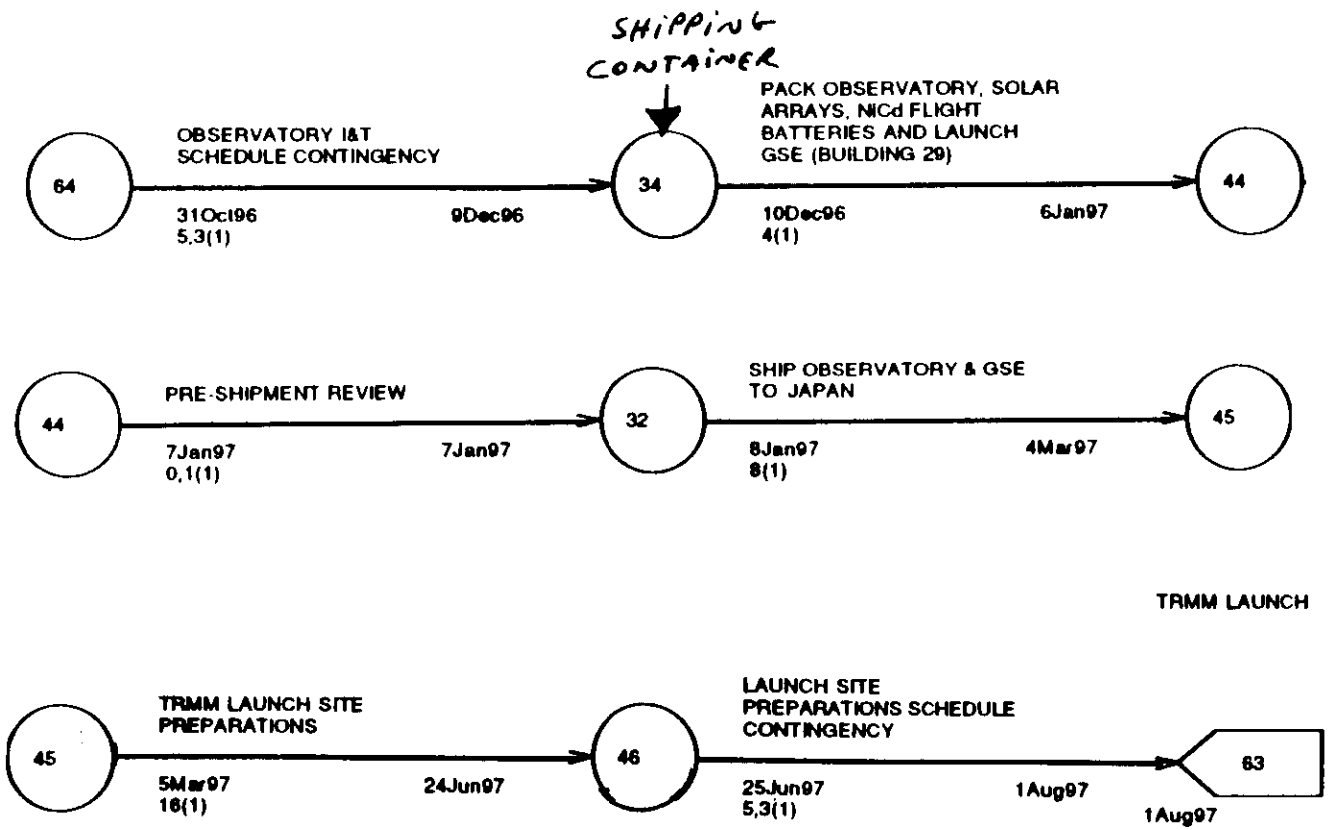
Observatory I & T Sequence - cont'd.



FILE: SR-OBS I&T

Observatory I&T Schedule - cont'd.

Issues

- Indentification of all key steps in the Observatory I&T sequence.
- Adequacy of schedule durations in Observatory I&T sequence.
- Realism in the logical order / sequence of the Observatory I&T tasks (i.e. thermal vacuum test before or after OBS vibration test?).

Recommendations

- Subsystem Managers review / comment on Observatory I&T schedule / flow.

Observatory Subsystem Schedules

Structures Subsystem

Structures Subsystem Schedule

Assumptions

- H-II Flight data, Coupled Loads Analysis, H-II PAF / SC MICD signoff, and instrument MICD signoffs completed per the Intermediate Schedule.
- Begin piece part fabrication before CDR.
- Structural testing period of 6 months.
- No ETU will be fabricated.
- Test PAF available from NASDA no later than May 1, 1994.

Critical Path

- Structure design = -69 days slack.

TRMM Structures Subsystem Intermediate Schedule

ISSUED: October 23, 1991
REVISION: PRELIMINARY 10-23-91
STATUS AS OF: September 30, 1991

CY 1991 | CY 1992 | CY 1993 | CY 1994 | CY 1995 | CY 1996 | CY 1997
1 2 3 4 | 1 2 3 4 | 1 2 3 4 | 1 2 3 4 | 1 2 3 4 | 1 2 3 4 | 1 2 3 4

Major Project Milestones: SCR, PDR, CDR, PER, PSR, Launch Readiness

Key Design Inputs Required
- H-II Flight Data
- Coupled Loads Analysis
- H-II PAF/SC MICD Signoff
- Instrument MICD Signoffs
- S/C Structure Design
- S/C Tooling Design & Fab
- S/C Dolly/Sling/GSE Design & Fab
- S/C Structure Fab & Assy.
- S/C Structural Testing
- Observatory Integration & Test

Key
1 = H-II Flight #1 Data from NASDA
2 = H-II Flight #2 Data from NASDA
3 = CLA #1 from NASDA
4 = CLA #2 from NASA
5 = CLA #3 from NASDA
6 = H-II PAF/Spacecraft MICD
7 = Prec Radar MICD
8 = CERES, LIS, TMI & VIRS MICDs

= Potential -69 day schedule problem.

Test PAF Required From NADA

Structure needed to start Observatory I&T no later than 9-27-94 vs. current plan of 1-2-95.

Budget	FY '91	FY '92	FY '93	FY '94	FY '95	FY '96	FY '97
• Civil Service Manpower (Man years)	5.2	7.7	8.4	8.4	7.0	8.2	7.5
• POP 91-2 ($K)	125	1233	2403	2312	2126	561	316

FILE STRUC INTERM.MD

Structures Subsystem Schedule - cont'd.

Issues

- Design effort could be completed 3 months early - based upon completing the Instrument MICDs, H-II Flight Data, H-II PAF / SC MICD and instrument MICDs 3 months early.
- TMI and VIRS MICD signoffs needed prior to the projected TMI and VIRS PDRs.
- Fabrication of hardware to start before Observatory CDR.
- Budget and schedule integration.

Recommendations

- Determine the feasibility of completing instrument MICDS, obtaining Coupled Loads Analysis, etc. 3 months earlier than currently anticipated.
- Review Observatory I&T schedule / sequence for potential schedule savings.
- Conduct detailed cost / schedule integration review.

FILE: SR-STRUC.ISSUES

Reaction Control Subsystem

Reaction Control Subsystem Schedule

Assumptions

- TDRSS propellant tank can be used for TRMM.
- COBE Thrusters can be repackaged for TRMM.
- No ETU hardware will be fabricated.
- 12 month RCS module integration period.
- RFPs for major procurements issued to industry no later than April 1, 1992; contracts awarded by July 1, 1992.
- RCS will not be integrated and tested at the subsystem level prior to Observatory I&T.

Critical Path

- COBE Thrusters & Pressurant Tanks = +88 days slack.

TRMM Reaction Control Subsystem Intermediate Schedule

ISSUED: October 23, 1991
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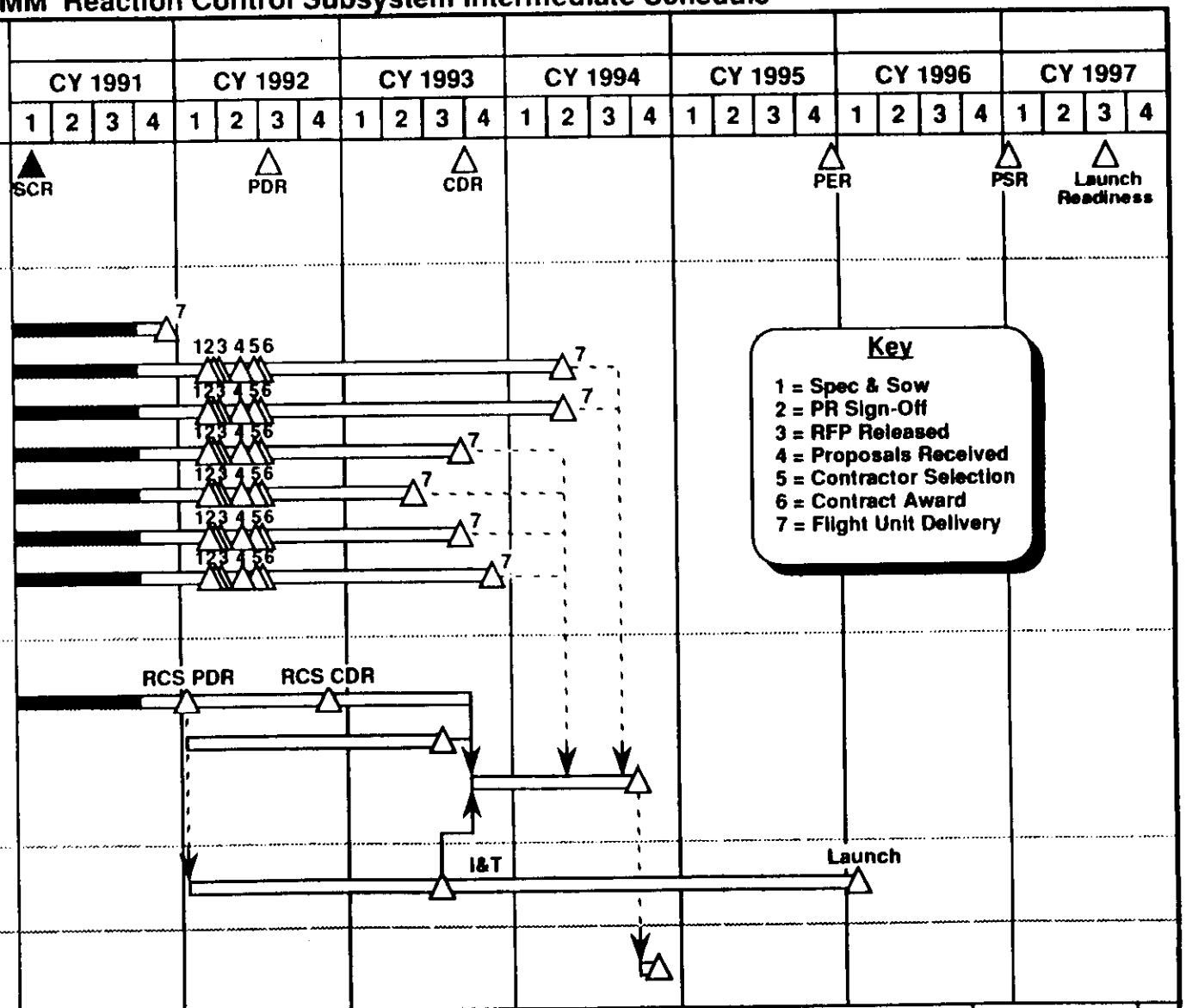

Budget	FY '91	FY '92	FY '93	FY '94	FY '95	FY '96	FY '97
• Civil Service Manpower (Manyears)	1.7	4.7	4.9	6.5	4.0	3.6	3.0
• POP 91-2 ($K)	284	213	1111	854	193	49	107

FILE: RCS.INTERM.MD

PRELIMINARY

Reaction Control Subsystem - cont'd.

Issues

- Major procurements currently scheduled for contract award prior to Observatory CDR.
- Procurement / fab of piece parts to start before Observatory CDR.
- Budget and schedule integration.

Recommendations

- Conduct detailed cost / schedule integration review.

FILE: SR-STRUC.ISSUES

Electrical Subsystem

Electrical Subsystem Schedule

Assumptions

- No ETU hardware will be fabricated.
- Solar Array boom assembly harness will be integrated with boom assembly prior to Observatory I&T.
- Power Electronics flight harness will be integrated with Power Electronics boxes (SPRU, BPA, SCA & PCU) prior to Observatory I&T.

Critical Path

- Array Boom Harness = +71 days slack.

TRMM Electrical Subsystem Intermediate Schedule

ISSUED: October 23, 1991
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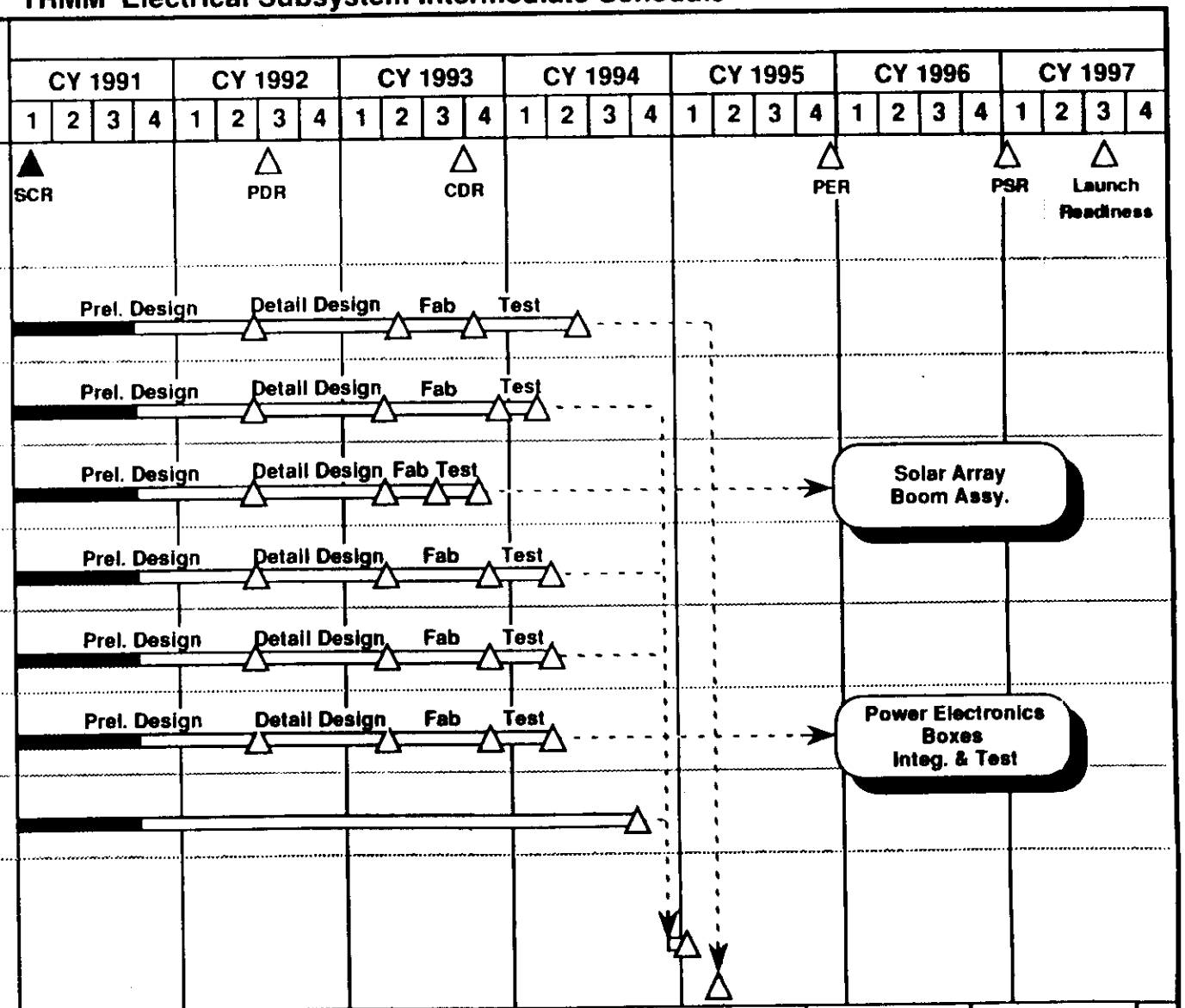


Budget	FY '91	FY '92	FY '93	FY '94	FY '95	FY '96	FY '97
• Civil Service Manpower (Man years)	3.0	8.0	14.0	14.2	14.2	10.7	9.7
• POP 91-2 ($K)	148	1244	3662	2848	3090	1314	1325

FILE: ELEC.INTERM.MD

PRELIMINARY

Electrical Subsystem Schedule - cont'd.

Issues

- Procurement of long lead parts will be based on preliminary designs.
- All fabrication currently scheduled to start prior to Observatory CDR.
- Use of a Power Electronics flight harness for Power Electronics Box I&T.
- Budget and schedule integration.

Recommendations

- Conduct detailed cost / schedule integration review.

FILE: SR-ELEC.ISSUES

Power Subsystem

Power Subsystem Schedule

Assumptions

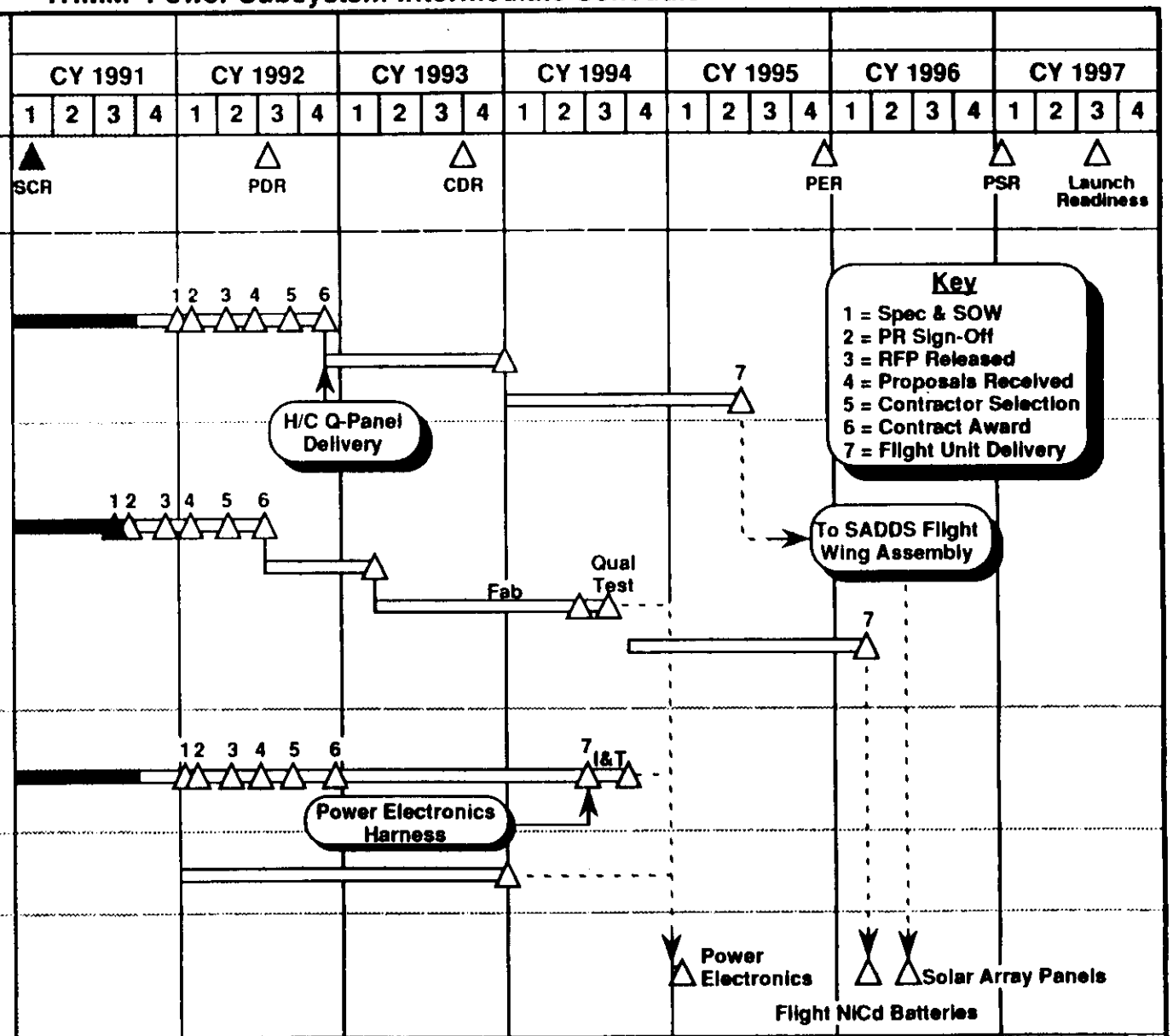
- Power Electronics (SPRU, BPU, SCA & PCU) are a combined procurement.
- Flight NiCd batteries will be installed / removed after the completion of Observatory thermal vacuum / balance testing.
- No ETU hardware will be fabricated.
- Power Electronics Boxes will be integrated and tested with the flight power electronics harness prior to Observatory I&T.
- Fabrication start of the flight Solar Array honeycomb panels is not dependent upon a successful qualification of the Solar Array.
- 12 month procurement process schedule span (start of PR prep to contract award).

Critical Path

- Flight NiCd batteries = -7 days slack.

TRMM Power Subsystem Intermediate Schedule

ISSUED: October 23, 1991
REVISION: PRELIMINARY 10-23-91
STATUS AS OF: September 30, 1991



Budget	FY '91	FY '92	FY '93	FY '94	FY '95	FY '96	FY '97
• Civil Service Manpower (Man Years)	3.0	4.6	4.5	4.6	4.7	4.9	4.9
• POP 91-2 ($K)	162	852	3535	3974	1633	2136	669

FILE: PCWER.INTERM.MD

PRELIMINARY

Power Subsystem Schedule - cont'd.

Issues

- Major procurements currently scheduled for contract award prior to Observatory CDR.
- Use of Power Electronics flight harness for Power Electronics Box I&T.
- Budget and schedule integration.

Recommendations

- Conduct detailed cost / schedule integration review.

Command & Data Handling Subsystem

Command & Data Handling Subsystem Schedule

Assumptions

- 9 month procurement process schedule span for Frequency Standards and Fiber Optic Bus (start of PR prep to contract award).
- RIU 1773 Adapter to be used.
- SIRT hardware and software still a requirement.
- ETU hardware will be fabricated for CTT, RPP, SIRT, RIU 1773 Adapter, Frequency Standards and Fiber Optic Bus.
- Breadboard C&DH will be available to support ACS Closed Loop Simulation.

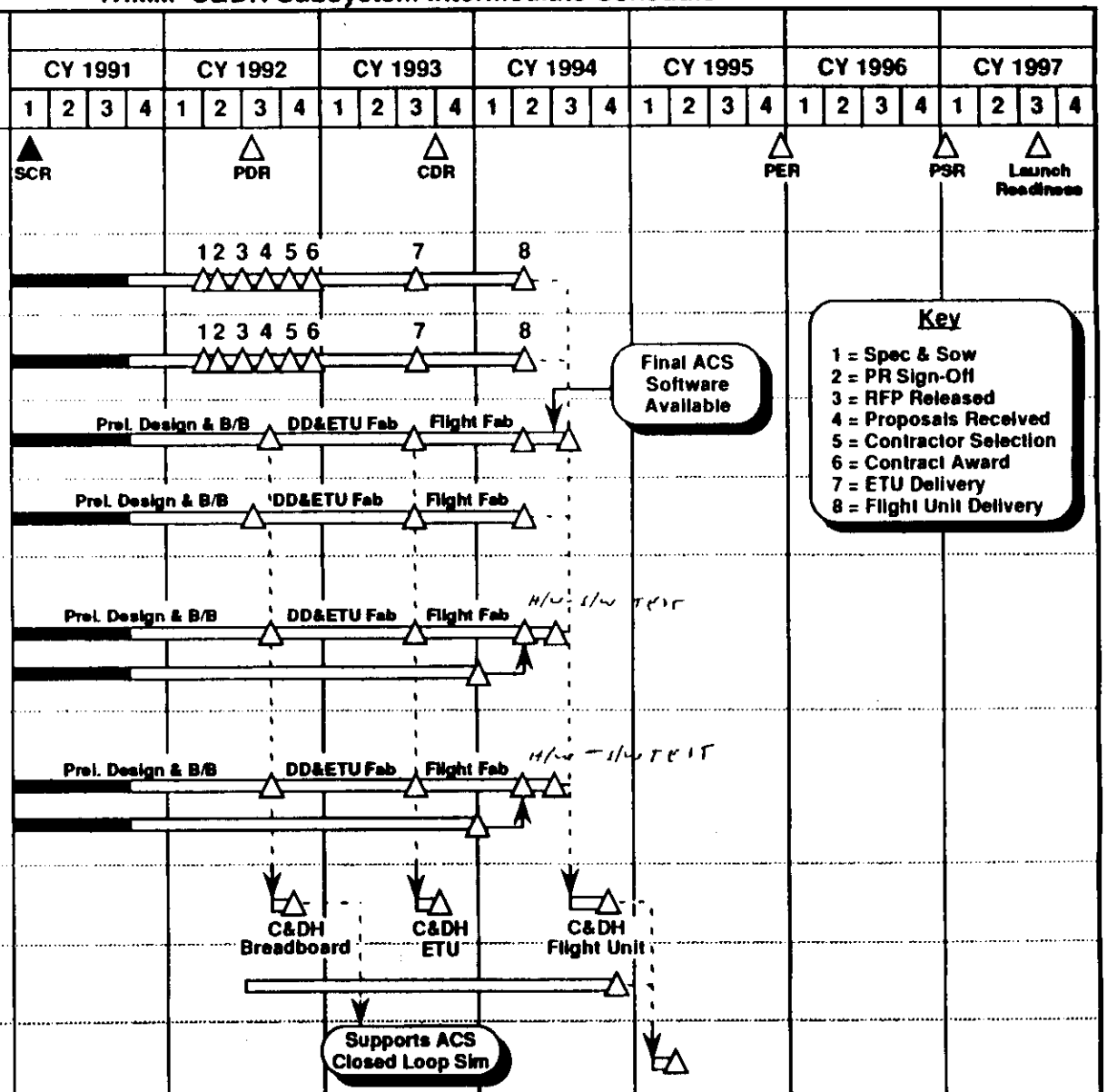
Critical Path

- RPP / C&DH Flight Unit Test = +66 days slack (driven by availability of final ACS Software)

FILE: SR-C&DH.ANALYSIS

TRMM C&DH Subsystem Intermediate Schedule

ISSUED: October 23, 1991
REVISION: PRELIMINARY 10-23-91
STATUS AS OF: September 30, 1991



Budget	FY '91	FY '92	FY '93	FY '94	FY '95	FY '96	FY '97
• Civil Service Manpower (Man years)	3.4	8.9	13.0	12.5	11.0	9.4	7.6
• POP 91-2 ($K)	446	1800	5906	5529	281	39	72

FILE: C&DH.INTERM.MD

Command & Data Handling Subsystem Schedule - cont'd.

Issues

- Go / no-go on SIRT.
- Adequacy of procurement process schedule span (start of PR prep to contract award)
- Budget / schedule integration.

Recommendations

- Conduct detailed cost / schedule integration review.

FILE: SR-C&DH.ISSUES

Attitude Control Subsystem

Attitude Control Subsystem Schedule

Assumptions

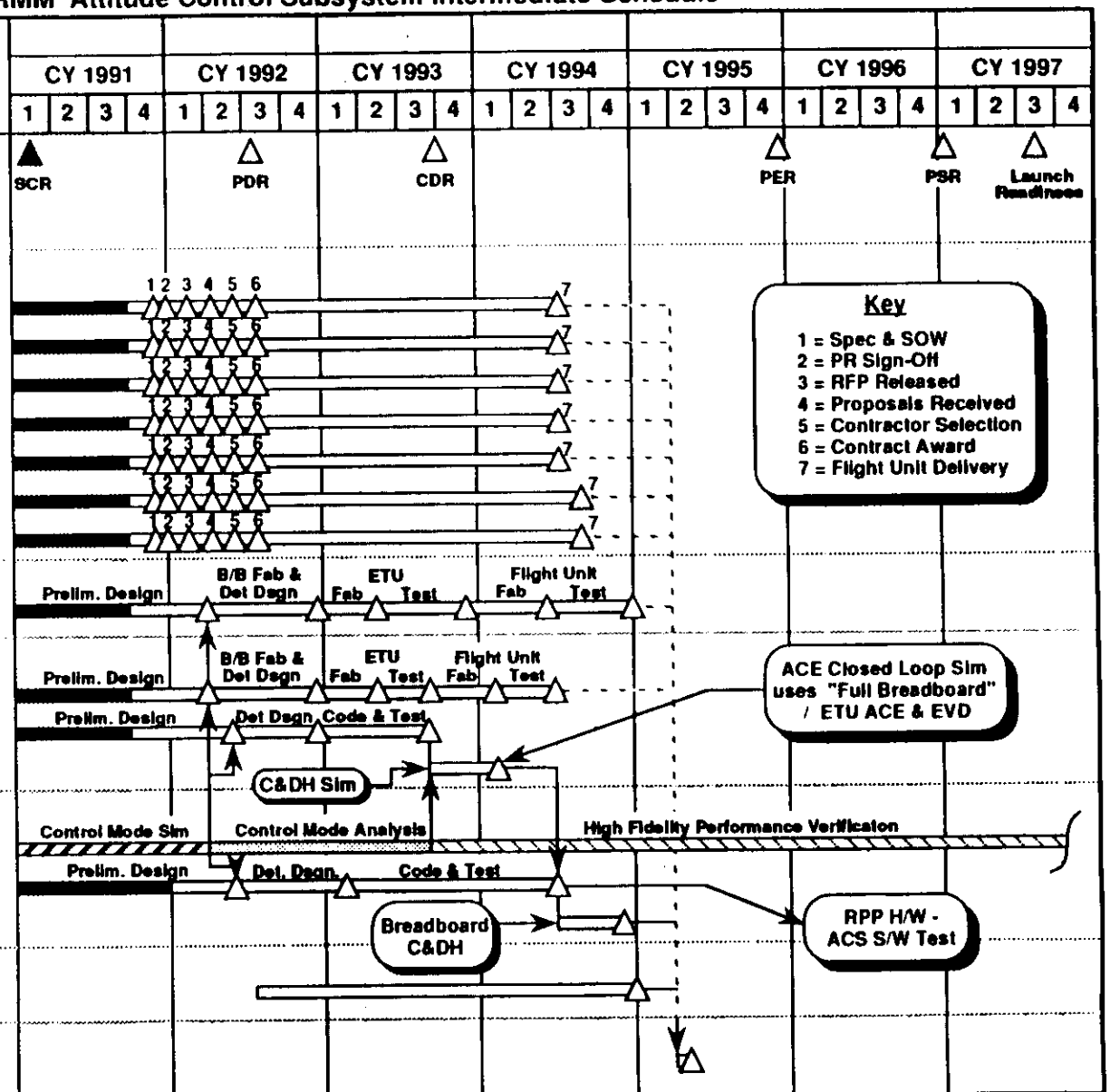
- 9 month procurement process schedule span for Sensors and Actuators (start of PR prep to contract award).
- Sensors and Actuators to be integrated directly with Observatory; not part of subsystem integration & test.
- Breadboard C&DH will be available to support the ACS Closed Loop Simulation.
- "Full Breadboard" / ETU hardware will be fabricated for the Attitude Control Electronics (ACE) and Engine Valve Driver (EVD).
- ACS software development tied to RPP H/W - S/W test and ACS Closed Loop Simulation.

Critical Path

- Engine Valve Driver (EVD) = +63 days slack.

TRMM Attitude Control Subsystem Intermediate Schedule

ISSUED: October 23, 1991
REVISION: PRELIMINARY 10-23-91
STATUS AS OF: September 30, 1991



Budget	FY '91	FY '92	FY '93	FY '94	FY '95	FY '96	FY '97
• Civil Service Manpower (Man years)	9.0	12.6	12.6	12.6	12.6	9.0	9.0
• POP 91-2 ($K)	185	1230	5923	3959	2223	147	580

FILE: ACS.INTERM.MD

PRELIMINARY

Attitude Control Subsystem Schedule - cont'd.

Issues

- Major procurements currently scheduled for contract award prior to Observatory CDR.
- Adequacy of 9 month procurement process schedule span (start of PR prep to contract award).
- Budget and schedule integration.

Recommendations

- Conduct detailed cost / schedule integration review.

FILE: SR-ACS.ISSUES

Communications Subsystem

Communications Subsystem Schedule

Assumptions

- Communication RF components (diplexers, switches, etc.) will be individually procured. (NOTE: hybrids, directional couplers and circulators may be combined into a single procurement.)
- Communications components will not be integrated and tested at the subsystem level prior to Observatory I&T.
- No ETU hardware will be fabricated (including Antenna Gimbal).
- 9 month procurement process schedule span (start of PR prep to contract award).
- NOTE: TRMM Transponders to be included as option in the XTE procurement (contract award 5/1/92; TRMM option exercise NLT 11/1/92.)

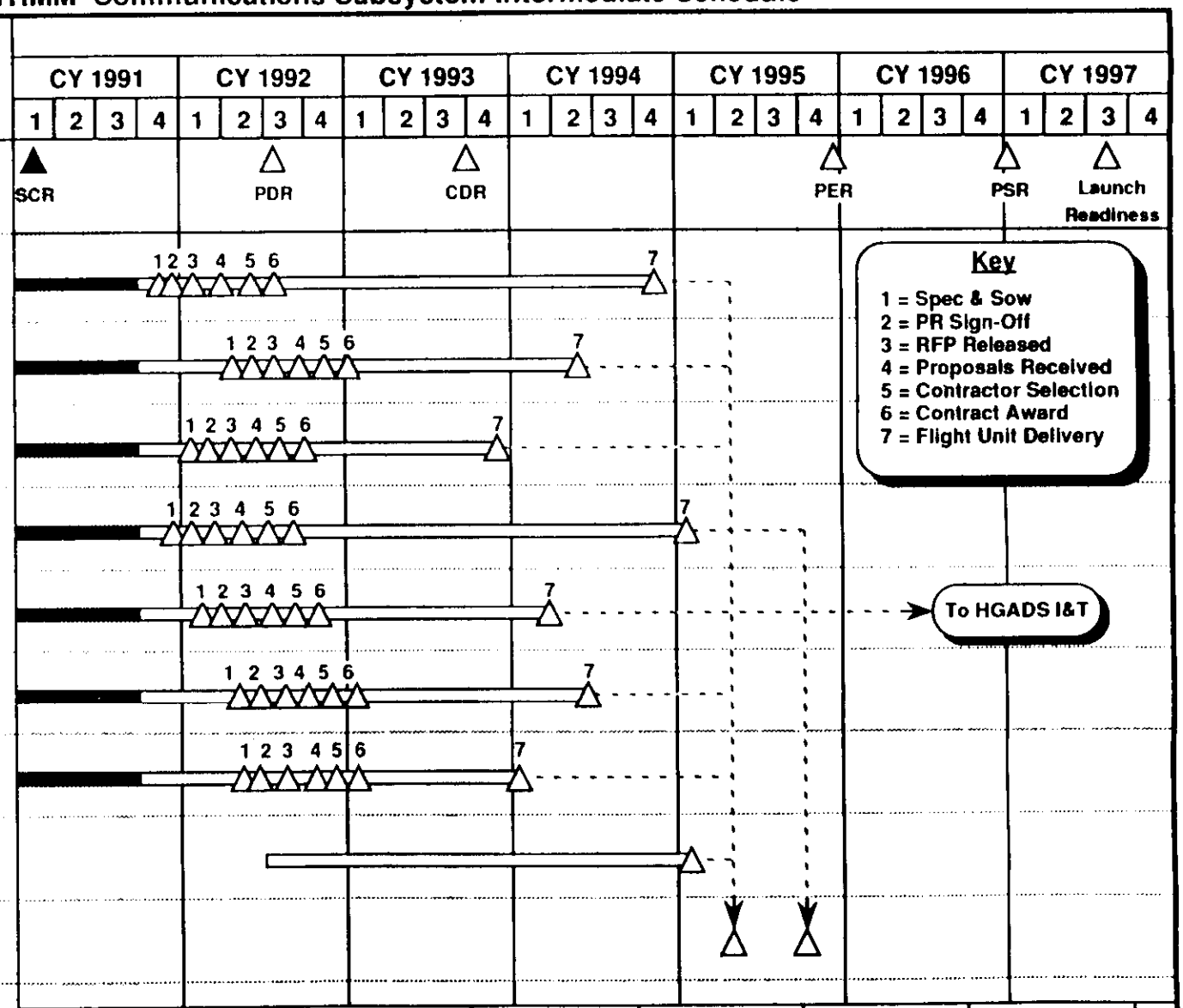
Critical Path

- TDRSS II Transponders = +121 days slack.

FILE: SR-COMMS.ANALYSIS

TRMM Communications Subsystem Intermediate Schedule

ISSUED: October 23, 1991
REVISION: PRELIMINARY 10-23-91
STATUS AS OF: September 30, 1991



Budget	FY '91	FY '92	FY '93	FY '94	FY '95	FY '96	FY '97
• Civil Service Manpower (Man years)	1.3	1.5	1.5	2.0	1.5	1.0	1.0
• POP 91-2 ($K)	65	277	2529	5775	1373	129	135

FILE COMMS.INTERM.MD

PRELIMINARY

Communications Subsystem Schedule - cont'd.

Issues

- Major procurements currently scheduled for contract award prior to Observatory CDR.
- Adequacy of 9 month procurement process schedule span (start of PR prep to contract award).
- Budget and schedule integration.

Recommendations

- Conduct detailed cost / schedule integration review.
- Review adequacy of procurement process schedule spans.

FILE: SR-COMMS.ISSUES

Deployables Subsystem

Deployables Subsystem Schedule

Assumptions

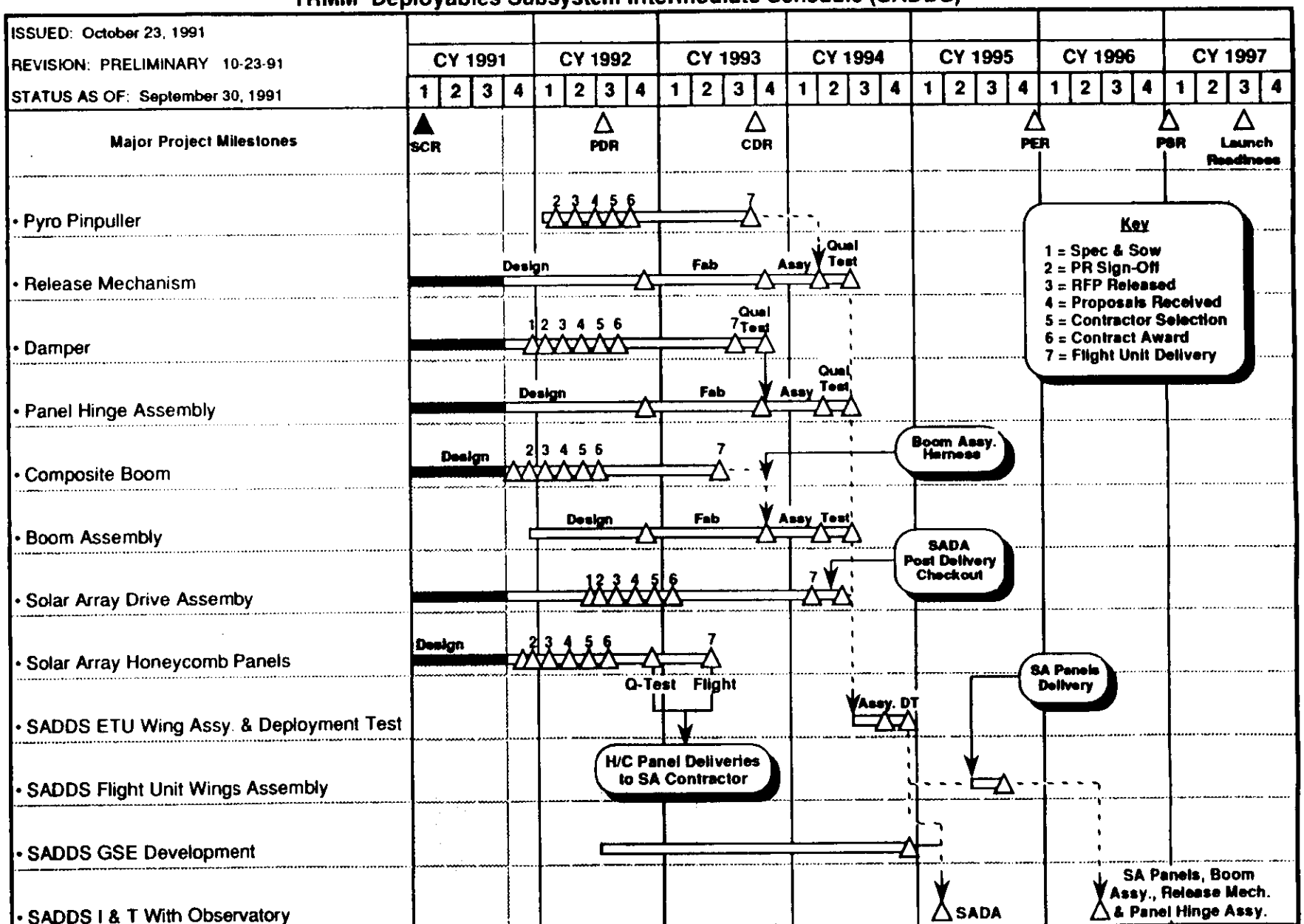
- Fabrication start of Solar Array honeycomb flight panel structure is not dependent upon a successful qualification of the Solar Array.
- 9 month procurement process schedule span (start of PR prep to contract award).
- ETU and flight hardware fabricated in parallel.
- Solar Array honeycomb panel structure with mass simulators for the solar cells will be used for ETU wing.
- Solar Array Boom Assembly harness will be installed at the assembly level.
- Assembly start of SADDS flight wings dependent upon successful ETU deployment test.

Critical Path

- Panel Hinge Assembly = +62 days slack.

TRMM Deployables Subsystem Intermediate Schedule (SADDS)

ISSUED: October 23, 1991
REVISION: PRELIMINARY 10-23-91
STATUS AS OF: September 30, 1991



Budget (SADDS & HGADS)	FY '91	FY '92	FY '93	FY '94	FY '95	FY '96	FY '97
• Civil Service Manpower (Man years)	.8	2.5	3.5	3.4	4.1	3.6	2.9
• POP 91-2 ($K)	274	536	1061	3491	2415	488	52

FILE SADDS.INTERM.MD

PRELIMINARY

Deployables Subsystem Schedule - cont'd.

Issues

- Major procurements currently scheduled for contract award prior to Observatory CDR.
- Adequacy of 9 month procurement process schedule span (start of PR prep to contract award).
- Budget and schedule integration.
- No HGADS network developed and integrated with overall PERT.

Recommendations

- Conduct detailed cost / schedule integration review.
- Develop network schedule for HGADS and integrate with overall project PERT.

FILE: SR-DEPLOY.ISSUES

Instrument Schedules

LEY RESEARCH CENTER

APPROVAL: D.A. Wood

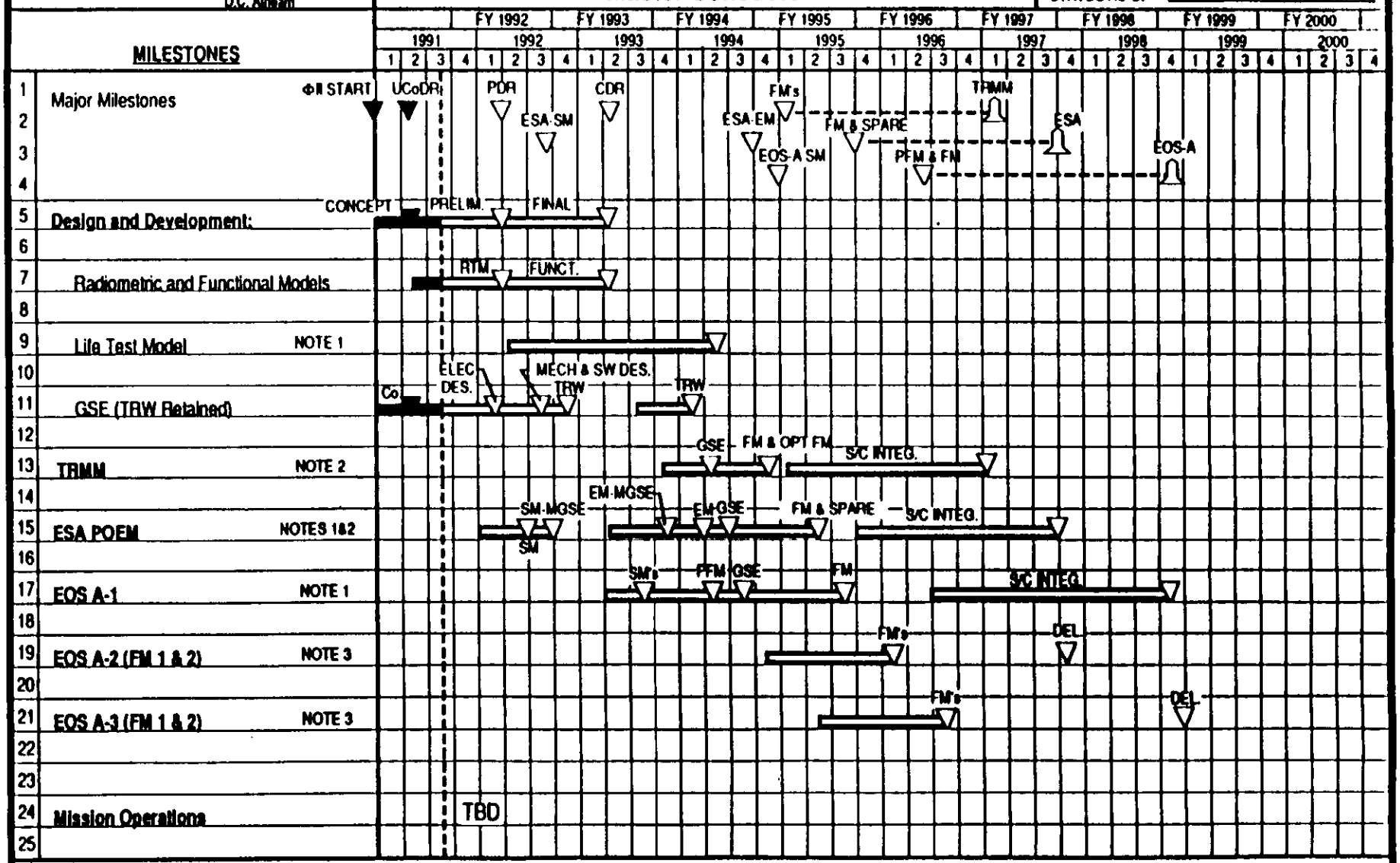
ACCOMPLISHMENT D.C. Ahlgren

CERES
Clouds and the Earth's Radiant Energy System
Master Schedule

ORIGINAL SCHEDULE APPROVAL Prelim.

LAST SCHEDULE CHANGE

STATUS AS OF 8/8/91



NOTES: Schedule under study pending resolution of funding

1 - ESA Structural Model, ESA Engineering Model, Life Test Model, and EOS A-1 Structural Model(s) to be added to the development contract.

2 - Currently carried in contract options to be executed

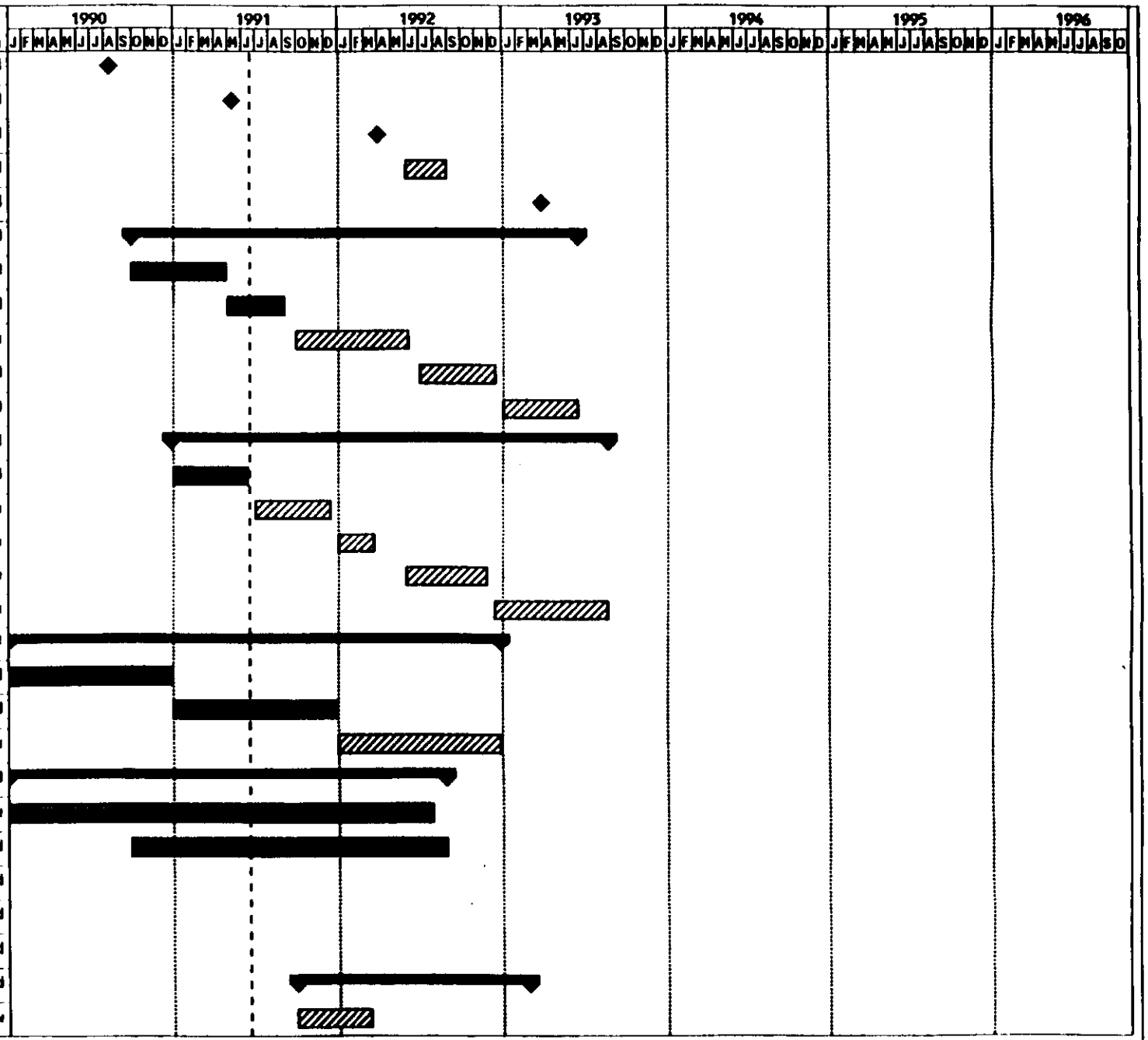
3 - Options for A2 & A3 instruments to be added to development contract

CERES SCH (8/8/91)

CERES Schedule

- Delivery from LRC scheduled for February 1, 1995 = +71 days slack.
- Needed for integration & alignment with Observatory no later than May 11, 1995 based on current I&T schedule.

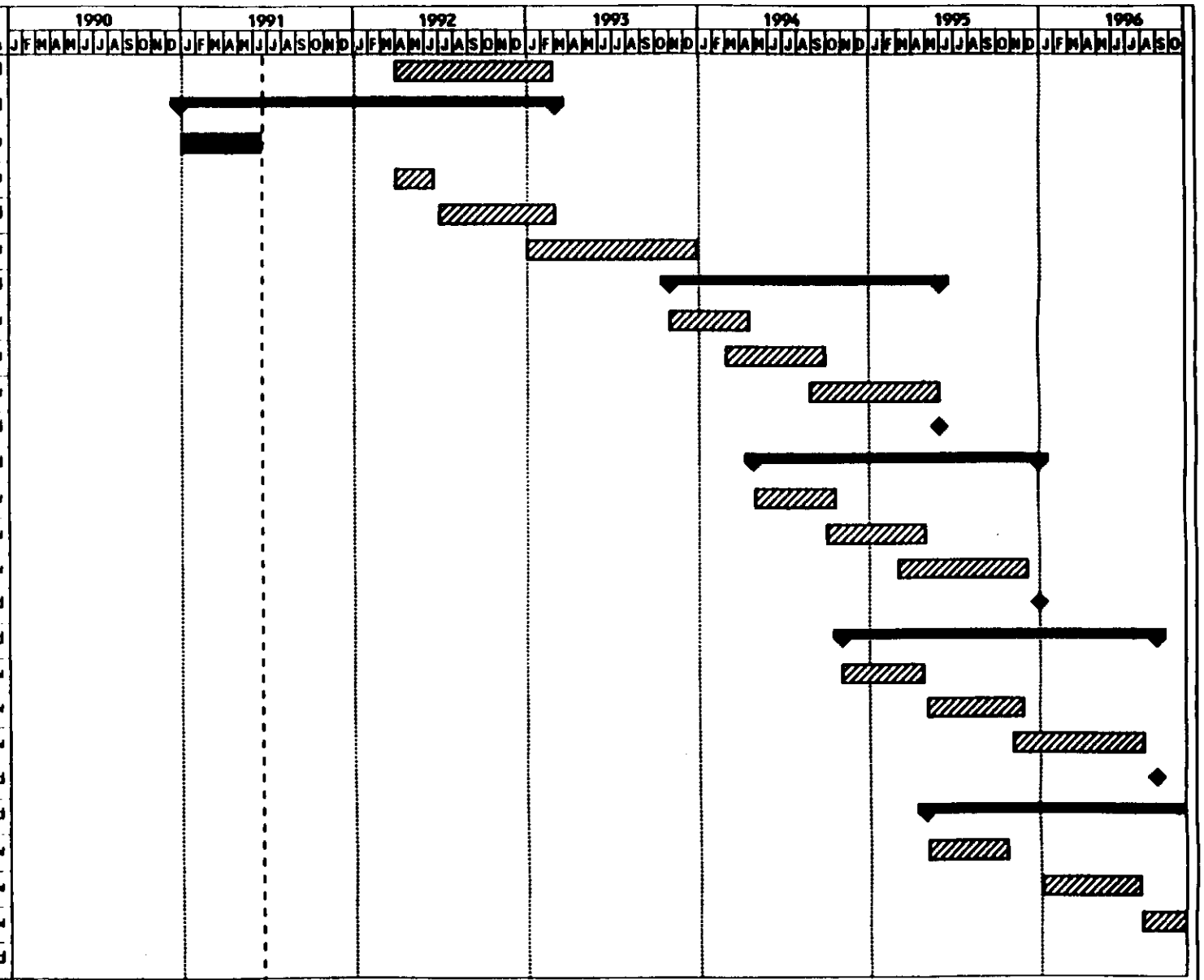
ID	Name	Duration
1	CDCR	0d
2	REQUIREMENTS REVIEW	0d
3	PDR	0ed
4	ER-2 FLIGHTS	92.38ed
5	CDR	0d
6	FPA	990.38ed
7	FPA CHARACTERIZATION	1d
8	FPA SPEC DEVELOPMENT	90d
9	FPA PROCUREMENT	36w
10	FPA PROTOTYPE DEV	120d
11	FPA DEVELOPMENT	120d
12	OPTICAL SUBSYSTEM	965.38ed
13	OPTICAL SPEC DEVELOPM	120d
14	OPTICAL PROCUREMENT	24w
15	OPTICAL DESIGN	12w
16	OPTICAL PROTOTYPE DEV	26w
17	FLT OPTICAL SYSTEM DE	36w
18	PROCESSOR	########
19	PROCESSOR I/O PREL DE	260d
20	PROCESSOR I/O TEST	260d
21	PROCESSOR FINAL DES/T	52w
22	GSE	972.38ed
23	DESIGN GSE EQUIPMENT	135w
24	TEST/CAL GSE DEVELOPM	501d
25	POWER SUPPLY	1.38ed
26	POWER SUPPLY PREL DES	1d
27	POWER SUPPLY FINAL DE	1d
28	MECHANICAL DESIGN	516.38ed
29	PRELIM MECHANICAL DES	24w



Project: LISMASTER
Date: 6/19/91

Critical — Progress — Summary — Marked
Noncritical — Milestone

ID	Name	Duration
30	FINAL MECHANICAL DESI	333.38ed
31	THERMAL DESIGN	790.38ed
32	THERMAL CONCEPT DESIG	24w
33	PRELIM THERMAL DESIGN	12w
34	FINAL THERMAL DESIGN	243.38ed
35	PARTS PROCUREMENT	52w
36	TRMM UNIT	577.38ed
37	TRMM UNIT FAB	25w
38	TRMM UNIT ASSEMBLY	30w
39	TRMM UNIT TEST/CAL	40w
40	TRMM DELIVERY	0d
41	EOS-A UNIT	610.38ed
42	EOS-A FAB	25w
43	EOS-A ASSEMBLY	30w
44	EOS-A TEST/CAL	40w
45	EOS-A DELIVERY	0d
46	SPARE/EOS-C UNIT	670ed
47	SPARE FAB	25w
48	SPARE ASSEMBLY	30w
49	SPARE TEST/CAL	40w
50	SPARE DELIVERY	0d
51	EOS-E UNIT	762.38ed
52	EOS-E FAB	25w
53	EOS-E ASSEMBLY	30w
54	EOS-E TEST/CAL	40w
55	EOS-C DELIVERY	0d



Project: LISMASTER
Date: 6/19/91

Critical | Progress | Summary | Marked
Noncritical | Milestone

LIS Schedule

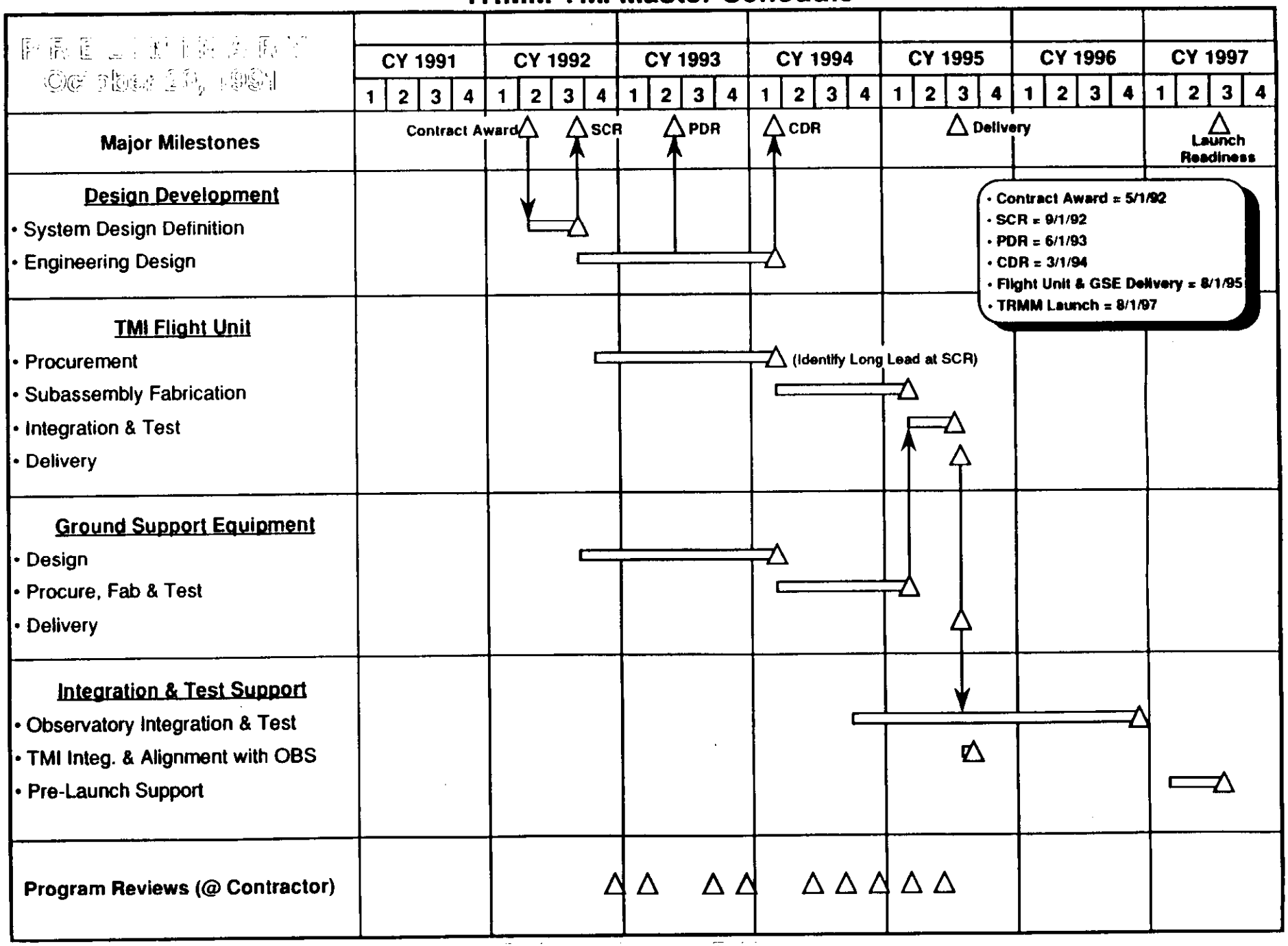
- Delivery from MSFC scheduled for June 1, 1995 = +5 days slack.
- Needed for integration & alignment with Observatory no later than June 8, 1995 based on current I&T schedule.

Precipitation Radar Schedule

- Current delivery from NASDA to GSFC is anticipated December 30, 1994 = +133 days slack.
- Needed for integration & alignment with Observatory no later than July 7, 1995 based on current I&T schedule.
- No schedule available from NASDA to track development progress.

FILE: SR-PRECRADAR

TRMM TMI Master Schedule



FILE: TMI MS MD

TMI Schedule

- Delivery from contractor projected for August 1, 1995 = +1 day slack.
- Needed for integration & alignment with Observatory no later than August 2, 1995 based on current I&T schedule.
- NOTE: The TMI Master Schedule has been revised from the September 16 version to include the 3 month schedule contingency.

VIRS Schedule

- Delivery from contractor projected for June 1, 1995 = +64 days slack.
- Needed for integration & alignment with Observatory no later than August 30, 1995 based on current I&T schedule.

Recap of Major Findings

- Need dates for subsystem flight hardware based upon current Observatory I&T schedule differ from earlier projections .
- Structure Subsystem needed for start of Observatory integration & test no later than September 27,1994 <u>based upon current Observatory I&T Schedule</u> (including 3 month schedule contingency).
- TMI delivery of August 1, 1995 is "just in time," with minimal slack.
- LIS delivery of June 1, 1995 is "just in time," with minimal slack.
- No uniform schedule span for the procurement process.
- No integrated scheduling started for the Ground Segment.
- Schedules and budgets not fully integrated.
- Flight hardware procurement and fabrication beginning prior to CDR.
- Current Observatory PDR and CDR dates may need to be rescheduled.

Overall Recommendations

1. Conduct detailed cost / schedule planning meetings for each subsystem in order to integrate schedules and budgets.

2. Definitize the Observatory Integration & Test schedule / sequence in order to finalize need dates for subsystem flight hardware.

3. Baseline Observatory Intermediate Schedules no later than January 14, 1992.

4. Include subsystem Intermediate Schedules in the monthly Subsystem Technical Review.

5. Develop a preliminary intermediate logic network for the Ground Segment by the last week of January 1992.

6. Reassess the instrument schedule position in light of pending developments with VIRS, CERES and LIS, as well as the definitized Observatory Integration & Test Schedule / Sequence.

FILE: SR-RECOM