

# FLIGHT DATA FILE

## Flight Plan

### STS-41

### (Flight Cycle Trajectory)

Mission Operations Directorate  
Operations Division

Final  
August 7, 1990

<u>EVENT</u>	<u>CDT</u>		
Launch	6:35	Fri	Oct 5 <sup>6</sup>
Ulysses Deploy	12:36	Fri	Oct 5 <sup>6</sup>
EDW Landing	8:42	Tue	Oct 9 <sup>10</sup>



National Aeronautics and  
Space Administration

Lyndon B. Johnson Space Center  
Houston, Texas

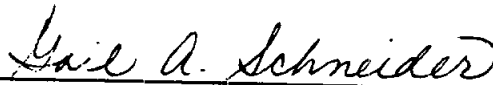


MISSION OPERATIONS DIRECTORATE

STS-41 FLIGHT PLAN


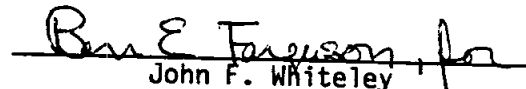

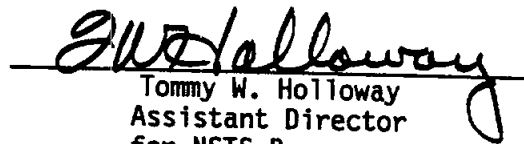
FINAL  
August 7, 1990

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		FLT PLN 828	
	FLT PLN 807A	FLT PLN 829	
	FLT PLN 808A	FLT PLN 830	
	FLT PLN 809A	FLT PLN 831	
	FLT PLN 810	FLT PLN 832	
	FLT PLN 811	FLT PLN 833	
	FLT PLN 815A	FLT PLN 842	
	FLT PLN 816A	FLT PLN 843	
	FLT PLN 817	FLT PLN 844	
	FLT PLN 818	FLT PLN 845	
	FLT PLN 819	FLT PLN 846	
	FLT PLN 820	MULTI 248A	
	FLT PLN 821	MULTI 259	
	FLT PLN 822	MULTI 260	
	FLT PLN 823	MULTI 267B	
	FLT PLN 824	MULTI 269	
	FLT PLN 825		

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Nominal Timelines	DH4/D. L. Kaley	483-4482
Pointing	DH4/C. J. McKenna	483-4362

STS-41 FLIGHT PLAN

**LIST OF EFFECTIVE PAGES**

FINAL 08/07/90

Sign Off...*	41/FIN	4C-1.....	41/FIN
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iv.....*	41/FIN	4C-4.....	41/FIN
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vi.....*	41/FIN	4D-2.....	41/FIN
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viii.....	41/FIN	4D-4.....	41/FIN
ix.....	41/FIN	4D-5.....	41/FIN
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(\*) - Omit from flight book

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STS-41 FLT PLN CUE CARDS

<u>Title</u>	<u>Ref. Page</u>	<u>Card Code</u>
DAP Book Front Cover.....	6-4	FLT PLN-1a/41/O/A
UNIV PTG (Back of DAP Book Front Cover).....	6-4	FLT PLN-1b/41/O/A
DAP A TOC.....	6-5	FLT PLN-2a/41/O/B
DAP A1.....	6-5	FLT PLN-2b/41/O/A
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DAP A6.....	6-8	FLT PLN-7b/41/O/A
A6.....	6-8	FLT PLN-8a/41/O/A
DAP A7.....	6-8	FLT PLN-8b/41/O/A
A7.....	6-8	FLT PLN-9a/41/O/A
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A10.....	6-10	FLT PLN-12a/41/O/A
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DAP B1.....	6-12	FLT PLN-15b/41/O/B
B1.....	6-12	FLT PLN-16a/41/O/B
DAP B2.....	6-12	FLT PLN-16b/41/O/B
B2.....	6-12	FLT PLN-17a/41/O/B
DAP B3.....	6-13	FLT PLN-17b/41/O/B
B3.....	6-13	FLT PLN-18a/41/O/B
DAP B4.....	6-13	FLT PLN-18b/41/O/B
B4.....	6-13	FLT PLN-19a/41/O/B
DAP B5.....	6-14	FLT PLN-19b/41/O/B
B5.....	6-14	FLT PLN-20a/41/O/B
DAP B6.....	6-14	FLT PLN-20b/41/O/B
B6.....	6-14	FLT PLN-21a/41/O/B
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B7.....	6-15	FLT PLN-22a/41/O/B
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DAP Book (Back Cover).....	6-17	FLT PLN-24b/41/O/B

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## INTRODUCTION

The STS-41 Flight Plan is the flight data file article that contains the on-orbit timeline. It does not contain the detailed timelines that are covered in the Ascent, Post Insertion, Deorbit Prep, and Entry Checklists. The detailed deploy procedures required during the deploy timeframe are in the IUS Deploy Checklist. For continuity, the entire flight is shown in the summary level timeline.

This on-orbit timeline satisfies the objectives specified in the Flight Definition and Requirements Directive and the requirements of the STS-41 Flight Requirements Document. The Flight Plan, as part of the Flight Data File, meets the specifications of the Flight cycle (6/27/90) version of the STS-41 Flight Initialization Data Pack.

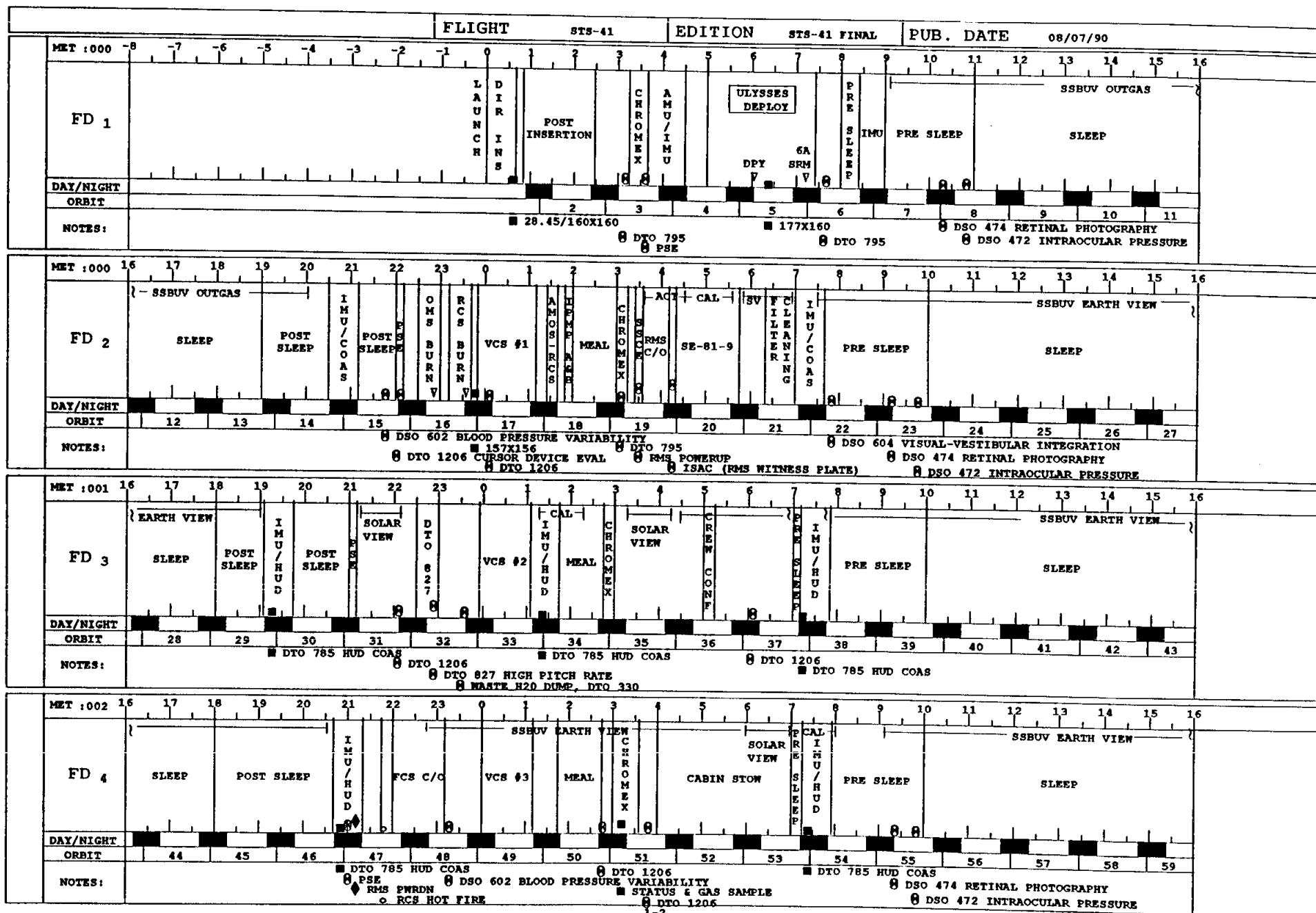
The flight profile used for this Flight Plan is for a launch date of October 5, 1990, at 6:35 CDT. Orbiter inertial attitudes are expressed relative to a Mean of 1950 (M50) reference frame.

JSC-22359, Crew Scheduling Constraints (Appendix K, CPMP), Basic, Rev A, January 1990, has been used to build the timelines contained in this Flight Plan. Exemption 1403 #5 authorizes the Flight Day 2 unscheduled EVA timelines in Section 4.

The timeline formats used in this Flight Plan are based on JSC-19933, Timeline Format Definitions and Standard Notes, Revision B, May 25, 1987.

STS-41 OVERVIEW

# OVERVIEW



MET :003	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16							
FD 5	EARTH VIEW		POST SLEEP		CAL	IMU	S L E E P	P O S T S L E E P	DEORBIT PREP								D E O R B I T	B U R N	E L E M E N T	L A N D I N G												
DAY/NIGHT																																
ORBIT	60		61		62		63		64		65		66		67		68		69		70		71		72		73		74		75	
NOTES:	CHROMEX STATUS 0 PSE STATUS																															

MET :004	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16							
FD 6																																
DAY/NIGHT																																
ORBIT	76		77		78		79		80		81		82		83		84		85		86		87		88		89		90		91	
NOTES:																																

MET :005	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16					
FD 7																														
DAY/NIGHT																														
ORBIT	92		93		94		95		96		97		98		99		100		101		102		103		104					
NOTES:																														

MET :006	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16			
FD 8																												
DAY/NIGHT																												
ORBIT																												
NOTES:																												

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SUMMARY TIMELINE

# SUMMARY TIMELINE

GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
278:11:35/ 278:23:35	000:00:00/ 000:12:00	278:06:35/ 278:18:35	01 / 278 CDT	-8.1		OCTOBER 5, 1990	STS-41	STS-41 FINAL	08/07/90
CDT :278									
FD :001									
MET :000									
STS									
PL									
DAY/NIGHT									
ORBIT									
GSTDN COVERAGE									
RTS COVERAGE									
TDRS									
ATTITUDE									
SSBUV									
NOTES:									

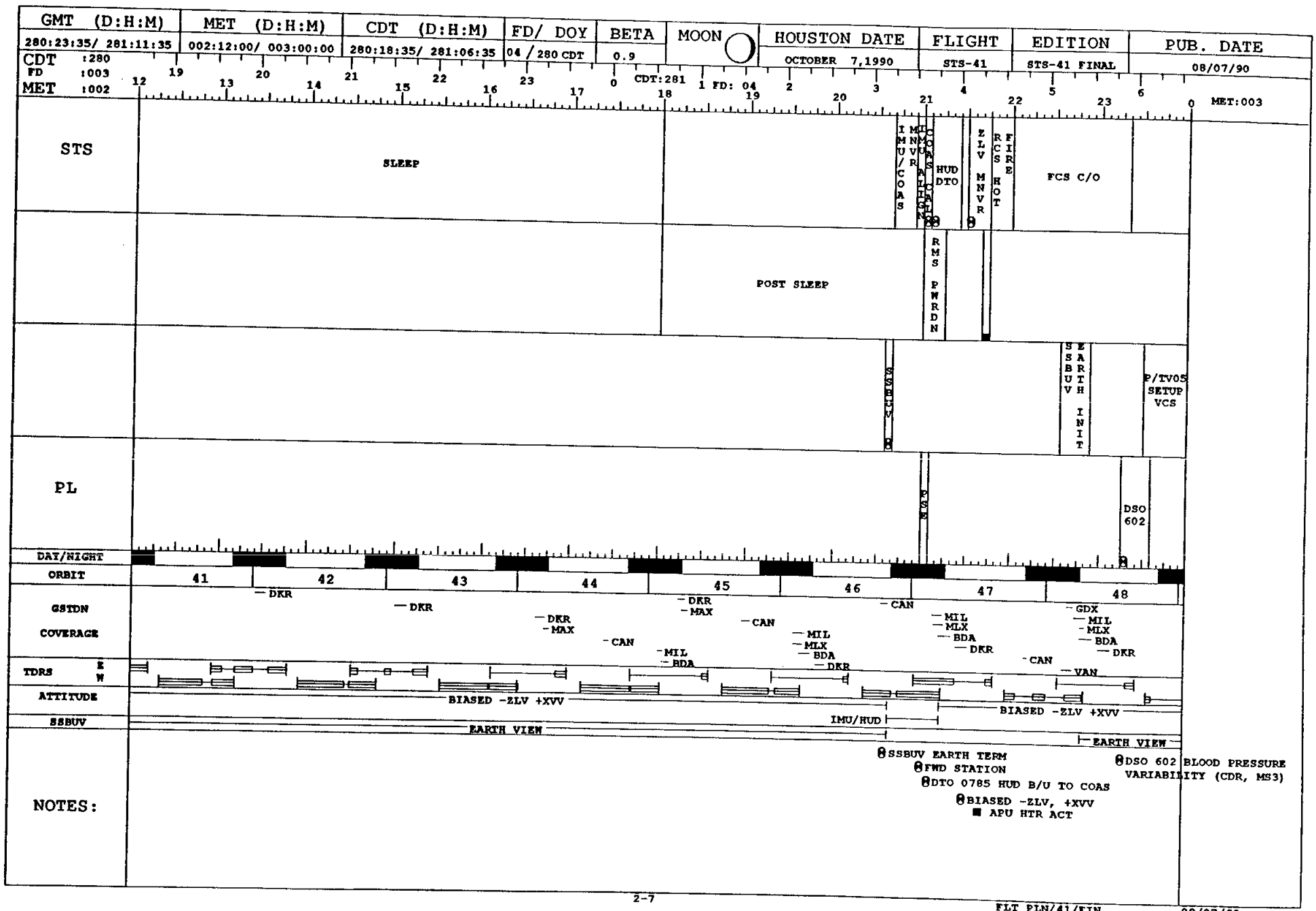








GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE					
280:11:35/ 280:23:35	002:00:00/ 002:12:00	280:06:35/ 280:18:35	03 / 280 CDT	-0.9		OCTOBER 7, 1990	STS-41	STS-41 FINAL	08/07/90					
CDT :280														
FD :003														
MET :002														
STS	0	1	2	3	4	5	6	7	8	9	10	11	12	
	W/AU S/T E T E R M	I M U V /R /C O A S	M I C R O C O M M U N I C A T I O N S H U D D T O	- E S I M N V R	M E A L	D T O 7 9 5	E L V M N V R	C R E W C O N F		D T O 1 2 0 6	I M U V /R /C O A S	M I C R O C O M M U N I C A T I O N S H U D D T O	E L V M N V R	S L E E P
			SSBUV CAL INIT			SSBUV SOLAR INIT							PRE SLEEP	
	P/TV05 ACT VCS		P/TV05 SETUP CONF			P/TV05 CONF								
	VCS CONF I G	VCS D E A C T			C R M X S T A T									
PL	VCS CONF I G	VCS D E A C T			C R M X S T A T									
DAY/NIGHT														
ORBIT	33	34	35	36	37	38	39	40						
GSTDN	-VAN -GDX -MIL -MLX -BDA	-GDX -MIL -MLX -BDA	-MLX		-VAN									
COVERAGE	-VAN -GDX -MIL -MLX -BDA	-VAN -GDX -MIL -MLX -BDA	-VAN -GDX -MIL		-VAN									
TDRS														
ATTITUDE	-ELV +XVV	IMU/HUD		-ESI		BIASED -ELV +XVV	IMU/HUD			BIASED -ELV +XVV				
SSBUV		CAL		SOLAR		EARTH VIEW				EARTH VIEW				
NOTES:			Ⓢ FWD STATION Ⓢ DTO 0785 HUD B/U TO COAS Ⓢ SSBUV CAL TERM			Ⓢ DTO 795 PGSC EL DISPLAY EVAL (EL DIPLAY) Ⓢ SSBUV SOLAR TERM				Ⓢ DTO 1206 SSF CURSOR CNTL DEVICE EVALUATION (MS2) Ⓢ SSBUV MDA LID CLOSING Ⓢ FWD STATION			Ⓢ DTO 0785 HUD B/U TO COAS Ⓢ SSBUV MDA LID OPENING Ⓢ BIASED -ELV, +XVV	





GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE		
281:23:35/ 282:11:35	003:12:00/ 004:00:00	281:18:35/ 282:06:35	05/ 281 CDT	4.3	☉	OCTOBER 8, 1990	STS-41	STS-41 FINAL	08/07/90		
CDT :281											
FD :004											
MET :003											
<div style="display: flex; justify-content: space-between; font-size: small;"> <span>12 19</span> <span>13 20</span> <span>14 21</span> <span>15 22</span> <span>16 23</span> <span>17 0</span> <span>18 CDT:282</span> <span>1 19</span> <span>2 FD:05</span> <span>3</span> <span>4</span> <span>5</span> <span>6</span> <span>0 MET:004</span> </div>											
STS	SLEEP					IMU MNV R	XSI MNV R	CRM X STAT	IMU MNV R	IP LBD ALIGN	COMM MNV R
						POST SLEEP			DEORBIT PREP		
						PACTV 057			RME-III		
PL						SSBUV CAL INIT					
DAY/NIGHT	[Day/Night Cycle Diagram]										
ORBIT	57	58	59	60	61	62	63	64			
GSTDN COVERAGE	DKR	-DKR	-DKR MAX	-CAN	-MIL -MLX -BDA -DKR -MAX	-MLX -MIL -BDA -DKR	-MLX -BDA -DKR	-BDA -DKR	-BDA -DKR		
TDRS E W											
ATTITUDE	BIASED -ZLV +XVV										
SSBUV	EARTH VIEW										
NOTES:	<ul style="list-style-type: none"> <li>⊗ SSBUV EARTH TERM</li> <li>⊗ SSBUV CAL TERM</li> <li>⊗ SSBUV DATA TRANSFER</li> <li>⊗ SSBUV DEACTIVATION</li> <li>⊗ RME-III DEACT/STOW</li> <li>⊗ ASE ENTRY PREP</li> </ul>										

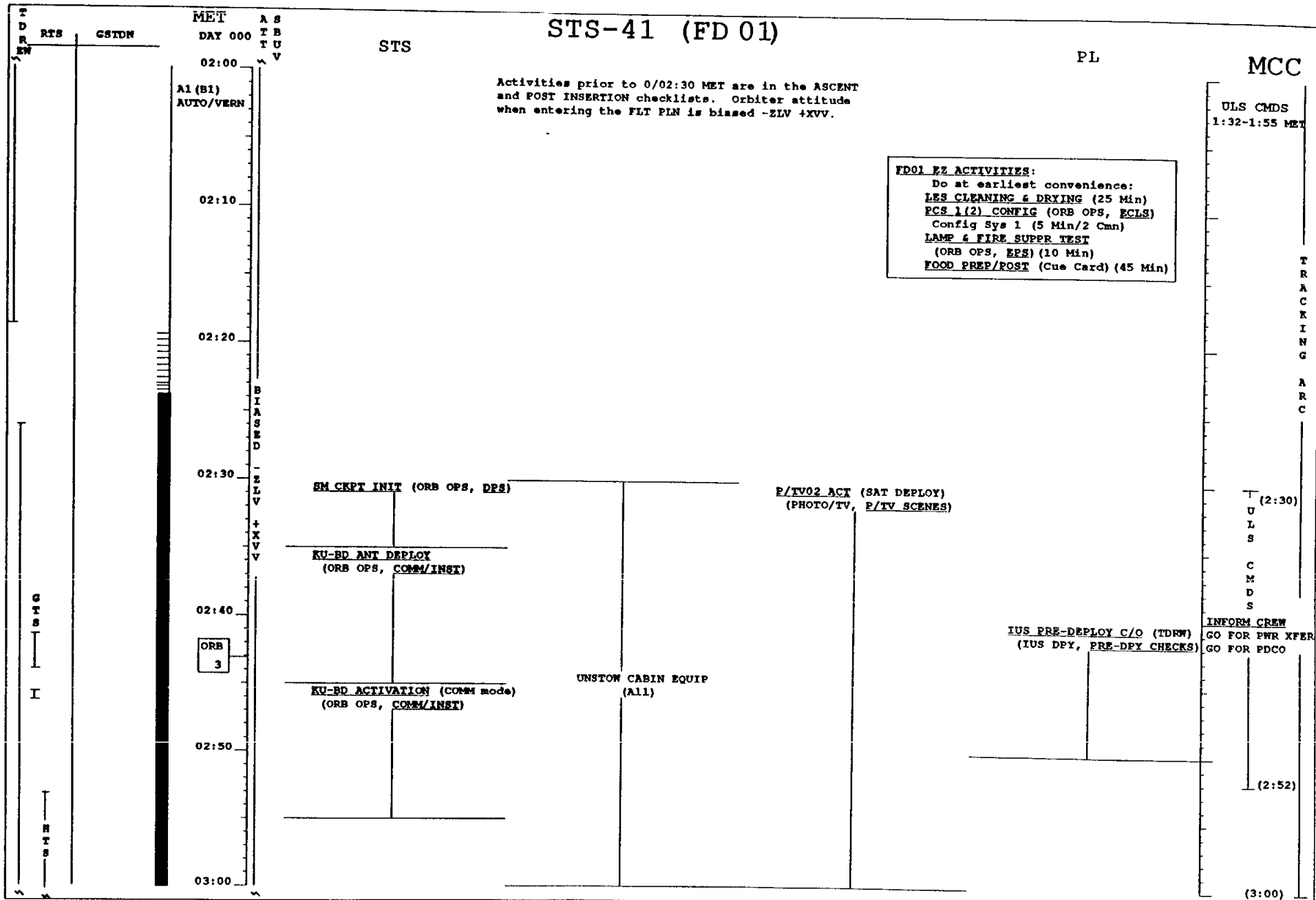
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282:11:35/ 282:23:35	004:00:00/ 004:12:00	282:06:35/ 282:18:35	05/ 282 CDT	6.0	☉	OCTOBER 9, 1990	STS-41	STS-41 FINAL	08/07/90
CDT :282									
FD :005									
MET :004									
STS									
	DEORBIT PREP	D E O R B I T		E D W  L A N D I N G *					
PL									
DAY/NIGHT	[Day/Night bar chart]								
ORBIT	65	66	67	68	69	70	71	72	
GSTDN COVERAGE	- VAN - GDX - MIL - MLX - BDA	- MIL - MLX							
TDRS E W	[TDRS bar chart]								
ATTITUDE	COMM ATT D/O BURN	ENTRY							
SSBUV									
NOTES:	* DEORBIT BURN 4/01:07      * EDW LANDING 4/02:07								



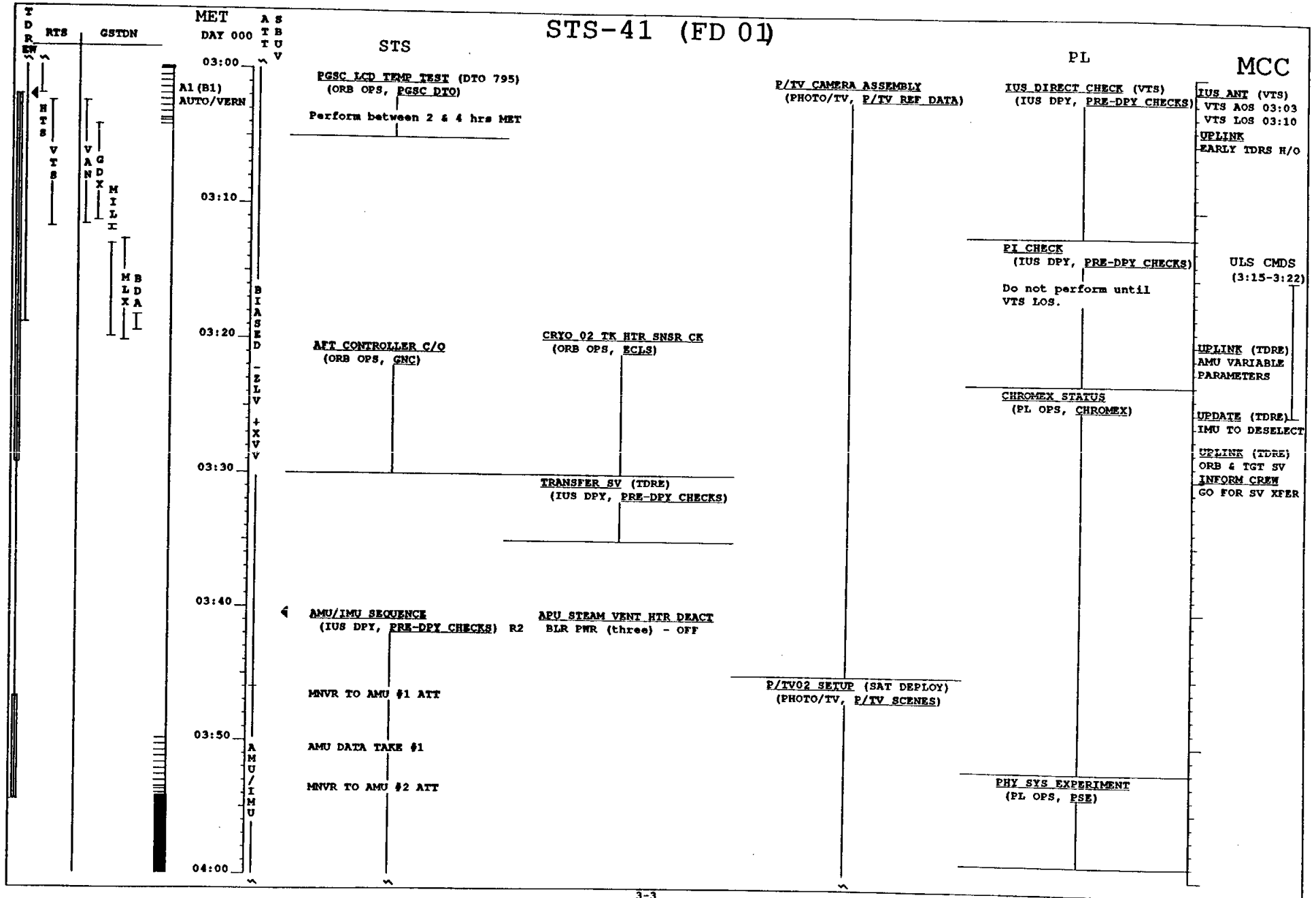
DETAILED TIMELINE

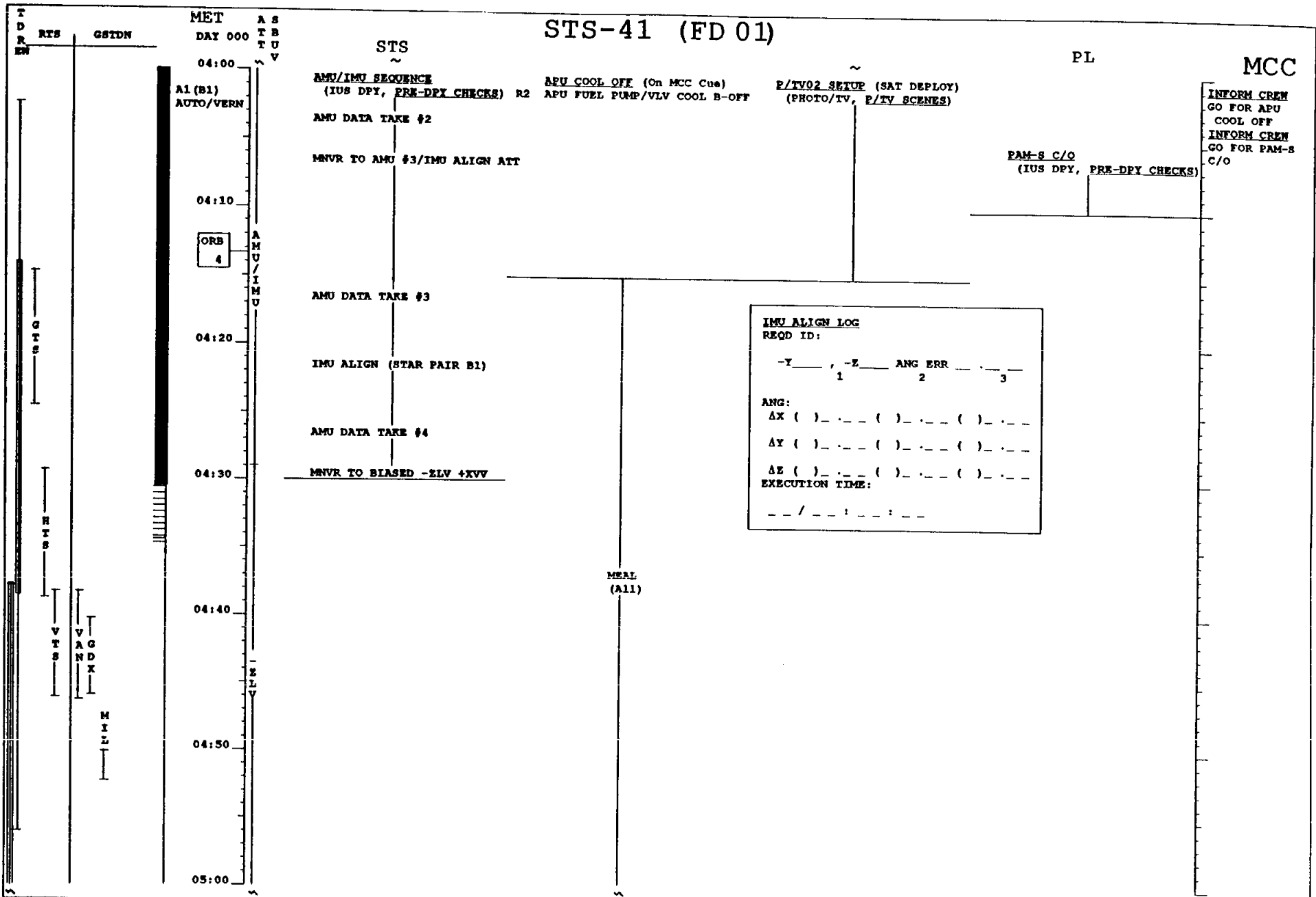
DETAILED  
TIMELINE

# DETAILED TIMELINE



# STS-41 (FD 01)





**IMU ALIGN LOG**

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ANG:

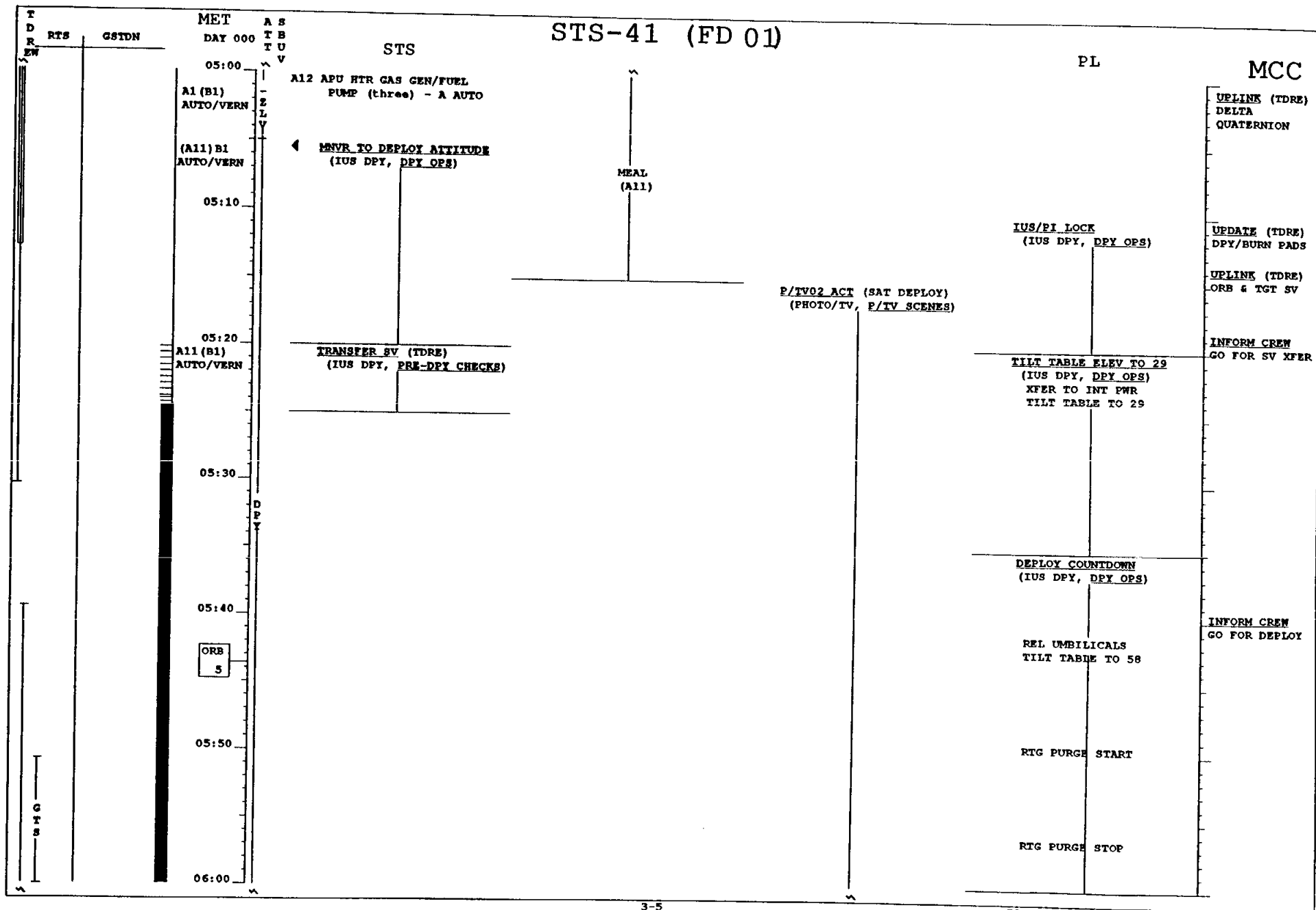
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ΔY ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_

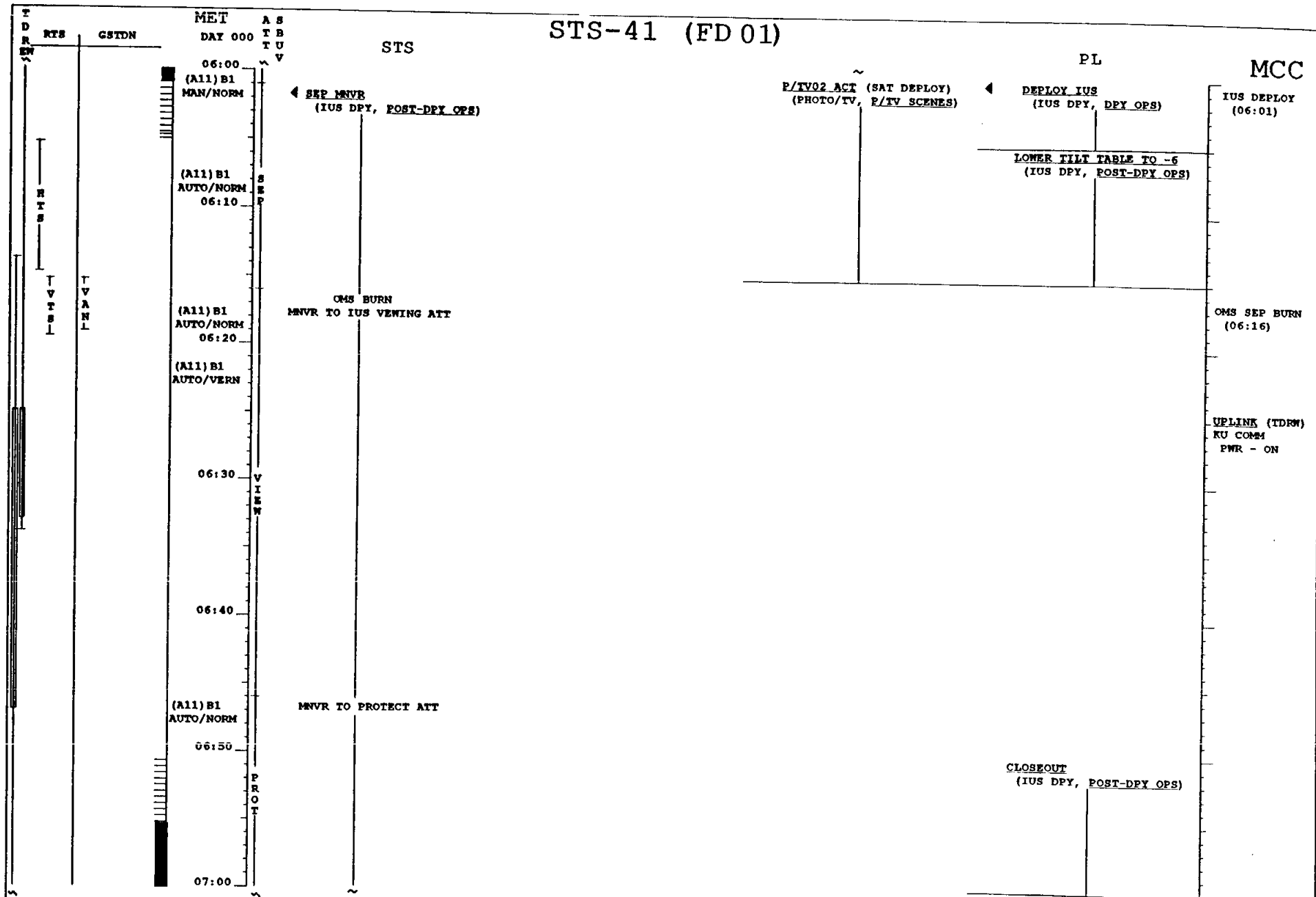
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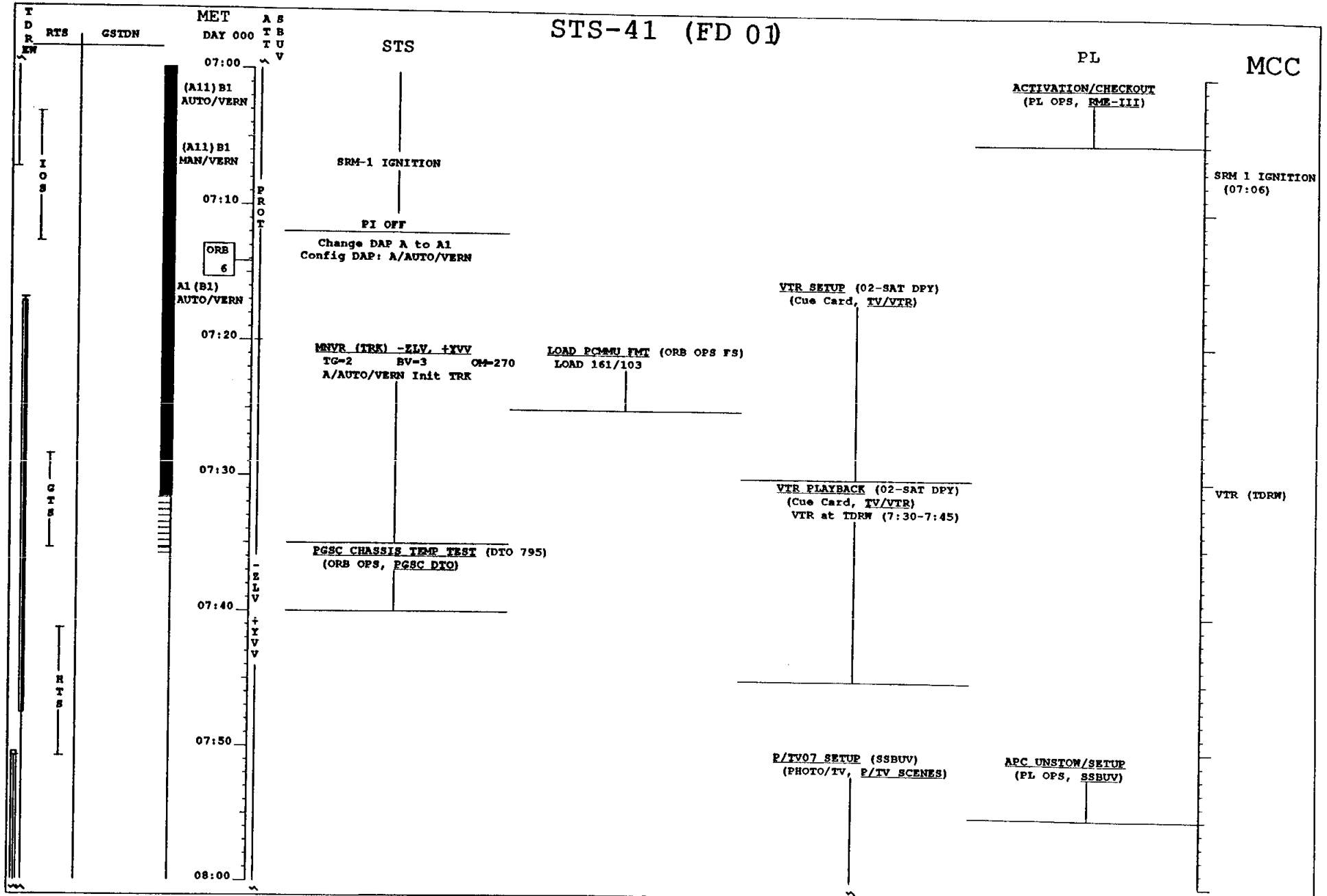
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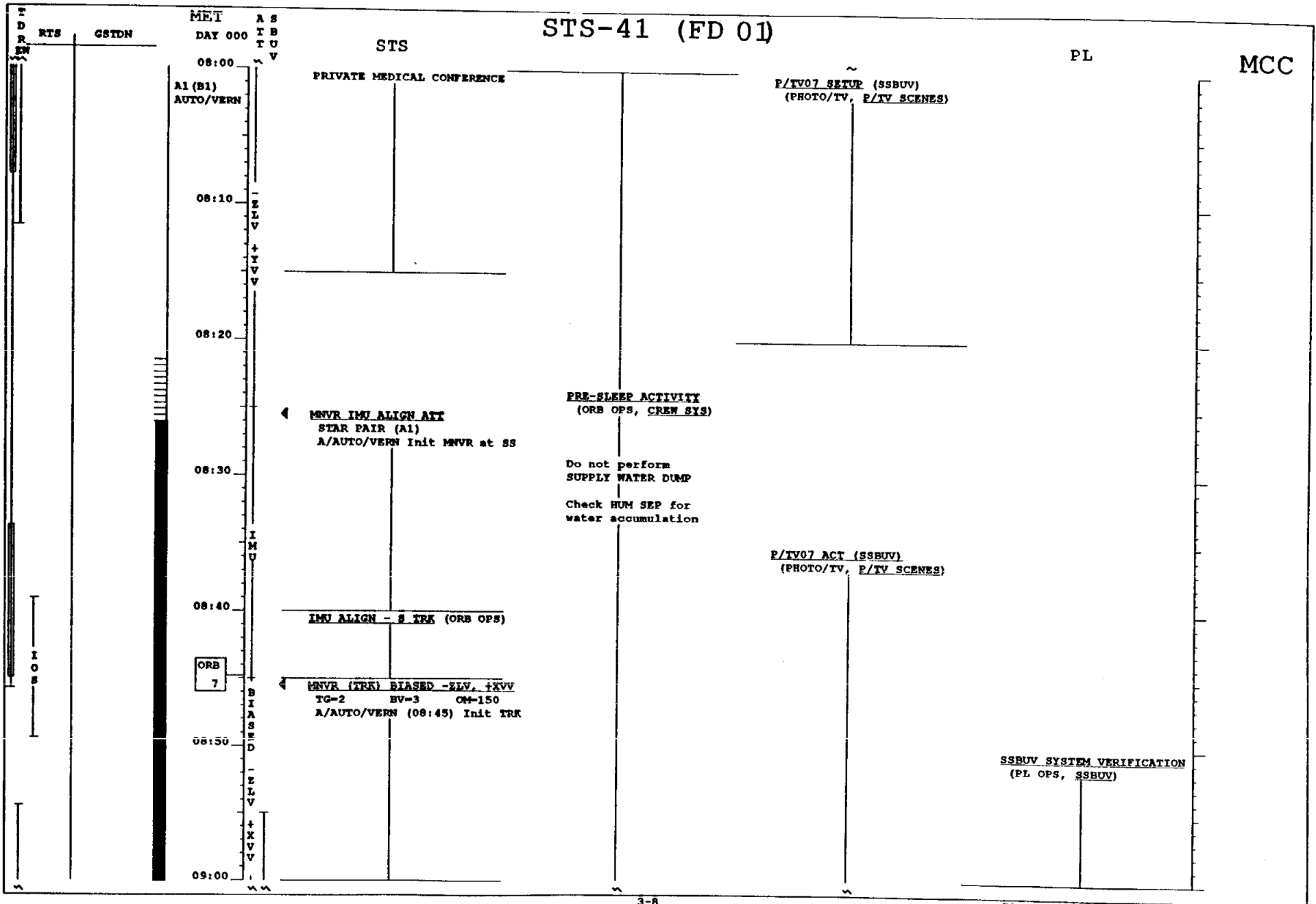


# STS-41 (FD 01)



# STS-41 (FD 01)







# STS-41 (FD 01)

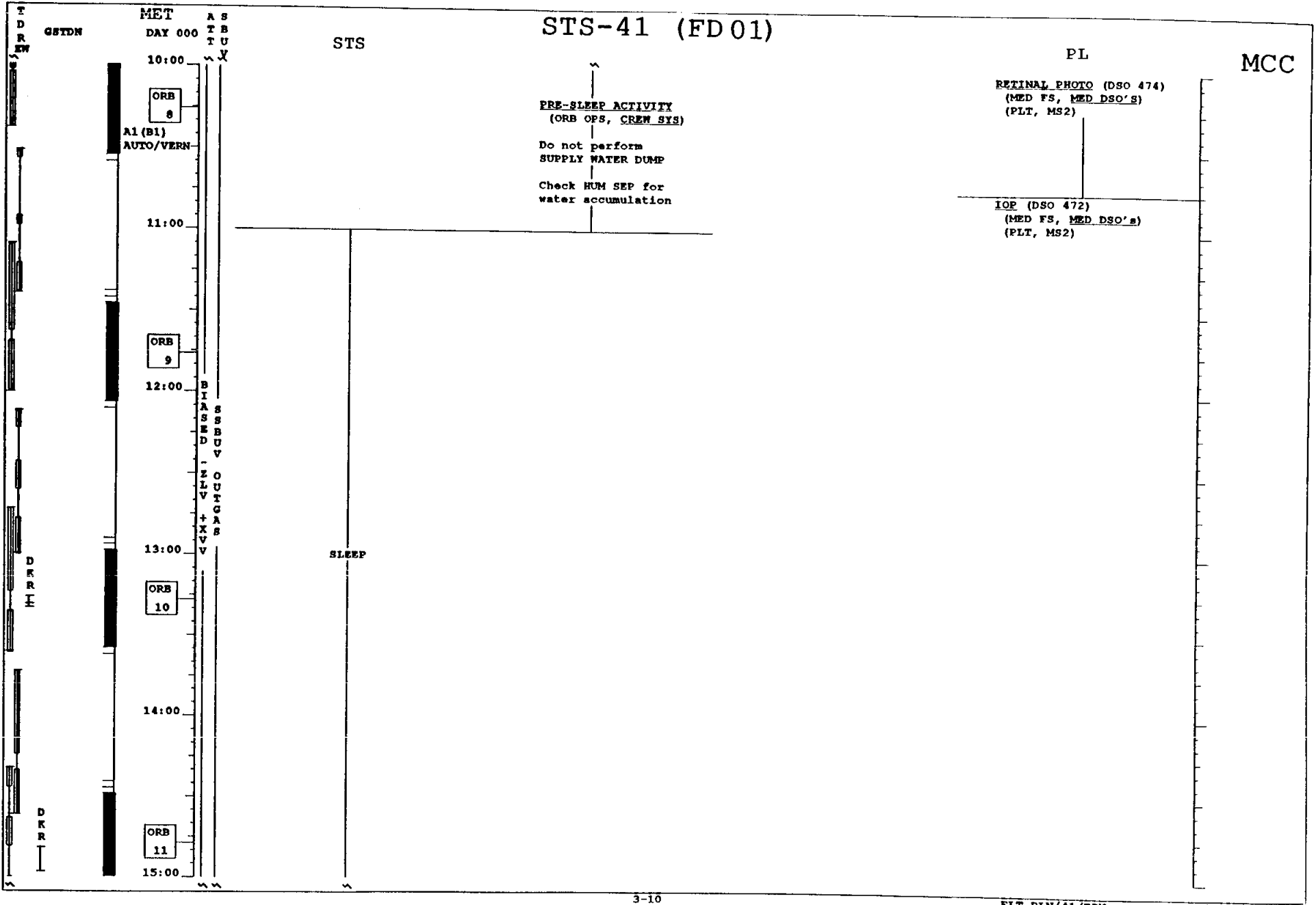
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**EW** **DAY 000** **TU**  
**09:00** **X**  
**A1 (B1)**  
**AUTO/VERN**  
**09:10**  
**09:20**  
**09:30**  
**09:40**  
**09:50**  
**10:00**

**STS**  
**IMU ALIGN LOG**  
**REQD ID:**  
 -Y\_\_\_\_, -Z\_\_\_\_ ANG ERR \_\_\_\_  
           1          2          3  
**ANG:**  
**ΔX ( )** \_\_\_\_ ( ) \_\_\_\_ ( ) \_\_\_\_  
**ΔY ( )** \_\_\_\_ ( ) \_\_\_\_ ( ) \_\_\_\_  
**ΔZ ( )** \_\_\_\_ ( ) \_\_\_\_ ( ) \_\_\_\_  
**EXECUTION TIME:**  
 \_\_\_\_ / \_\_\_\_ : \_\_\_\_ : \_\_\_\_

**PL** **MCC**  
**P/TV07 ACT (SSBUV)**  
 (PHOTO/TV, P/TV SCENES)  
**SSBUV OUTGAS INIT**  
 (PL OPS, SSBUV)

**PRE-SLEEP ACTIVITY**  
 (ORB OPS, CREW SYS)

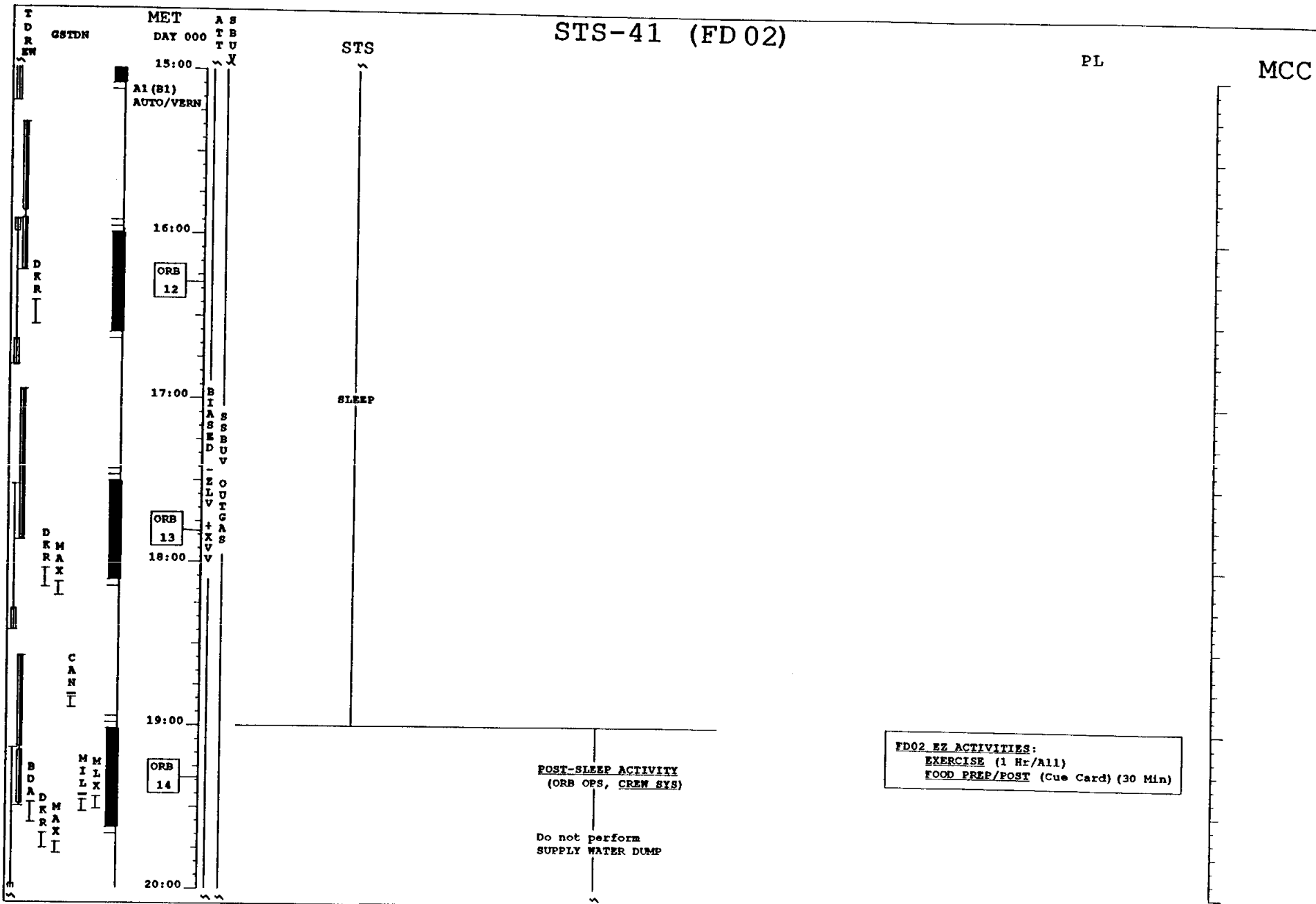
Do not perform  
 SUPPLY WATER DUMP  
 Check HUM SEP for  
 water accumulation



# STS-41 (FD 02)

PL

MCC



# STS-41 (FD 02)

STS

PL

MCC

TD R W	GSTDN	MET DAY 000	A S T B T U X
CAN		20:00	
		A1 (B1) AUTO/VERN	
M I L D A		(A1) B5 ORB 15	
D K R		21:00	
		A1 (B1) AUTO/VERN	
CAN		22:00	
V A N L L D A		(A1) B1 AUTO/VERN	
D K R		23:00	
		(A1) B1 MAN/VERN	
CAN		00:00	
V A N L L D A		(A1) B1 AUTO/VERN	
D K R		01:00	

019 /COAS PWR-OFF Mount COAS-AFT  
 ◀ MNVR IMU ALIGN/COAS CAL ATT  
 STAR PAIR (A1)  
 A/AUTO/VERN (20:32) INIT MNVR  
 IMU ALIGN - S TRK (ORB OPS)  
 COAS CALIBRATION (ORB OPS)  
 MNVR (TRK) -ELV, -YVV  
 TG-2 BV-3 OM-90  
 A/AUTO/VERN (20:52) Init TRK  
 Change DAP B to B1  
 Config DAP: A/AUTO/VERN  
 019 /COAS PWR - OFF Stow COAS

POST-SLEEP ACTIVITY  
 (ORB OPS, CREW SYS)

Do not perform  
 SUPPLY WATER DUMP

COAS CALIBRATION LOG	
STAR ID:	-E 27, Deneb
STAR AVAIL:	20:20 TO 21:08
-E Δ BIAS	___, ___
UPDATE TIME:	___ / ___ : ___ : ___

P/TV04 SETUP (MD DK)  
 (PHOTO/TV, P/TV SCENES)

SSBUV OUTGAS TERM  
 (PL OPS, SSBUV)

UPLINK  
 REFSMMAT  
 NORMALIZAT'N

TV (TDRW)  
 (GND CNTRL-PLB)  
 EARTH VIEWS

P/TV04 ACT (MD DK)  
 (PHOTO/TV, P/TV SCENES)

BP VARIABILITY (DSO 602)  
 (MED FS, MED DSO'S)  
 (CDR, MS3)

CURSOR CNTRL DEVICE (DTO 1206)  
 (ORB OPS, CURSOR CNTRL DTO)  
 (MS2)

PHY SYS EXPERIMENT  
 (PL OPS, PSE)

UPDATE  
 ORBITAL MNVR  
 PAD

ON-ORBIT OMS BURN  
 (ORB OPS, OMS)  
 1 ENG BURN (2 Cmn)

◀ TIG (22:56)

P/TV05 SETUP (VCS)  
 (PHOTO/TV, P/TV SCENES)

VCS UNSTOW  
 (PL OPS, VCS PL OPS)

UPDATE  
 ORBITAL MNVR  
 PAD

ON-ORBIT RCS BURN  
 (ORB OPS, RCS)  
 (2 Cmn)

◀ TIG (23:38)

P/TV05 ACT (VCS)  
 (PHOTO/TV, P/TV SCENES)

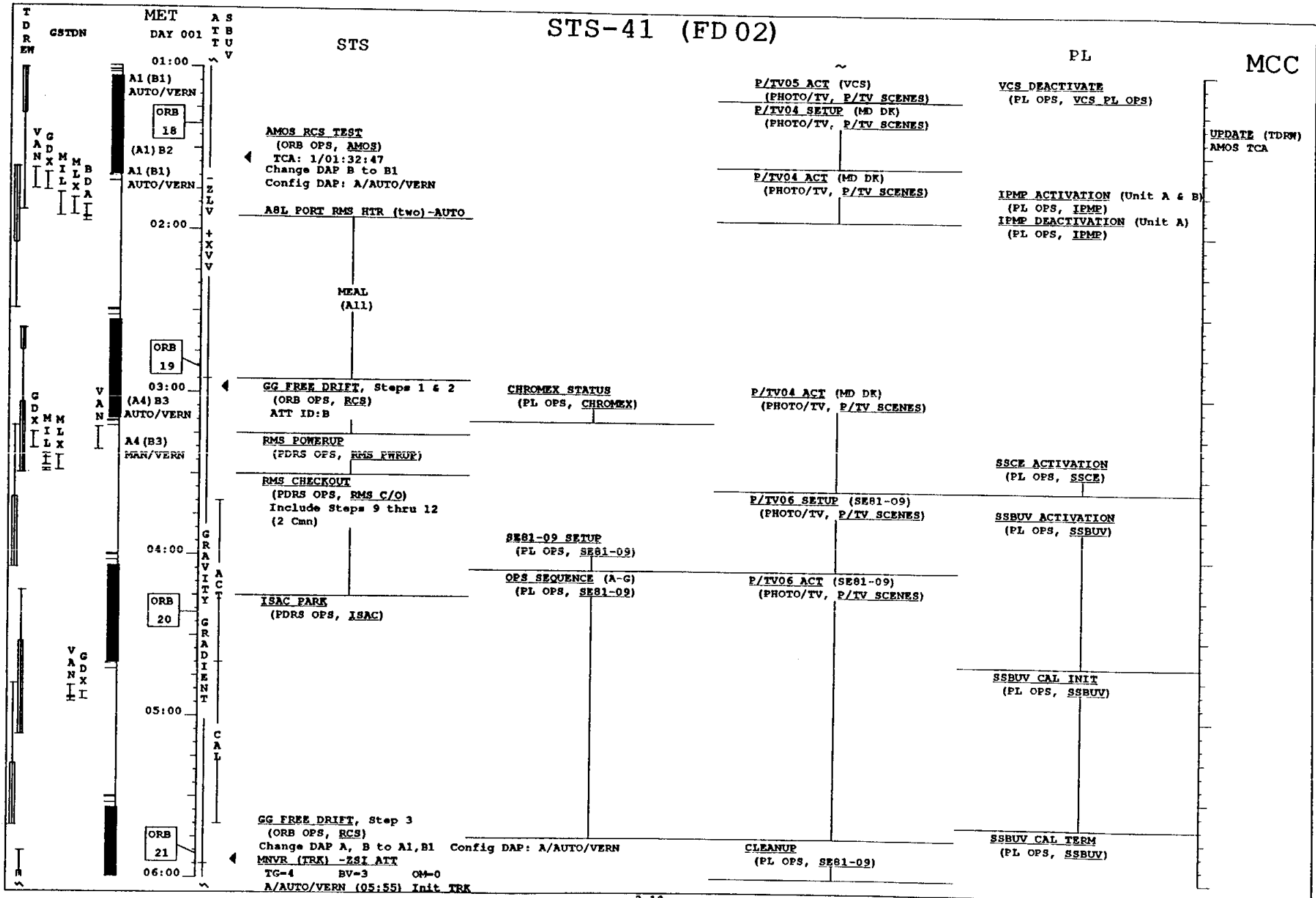
VCS CONFIG  
 (PL OPS, VCS PL OPS)

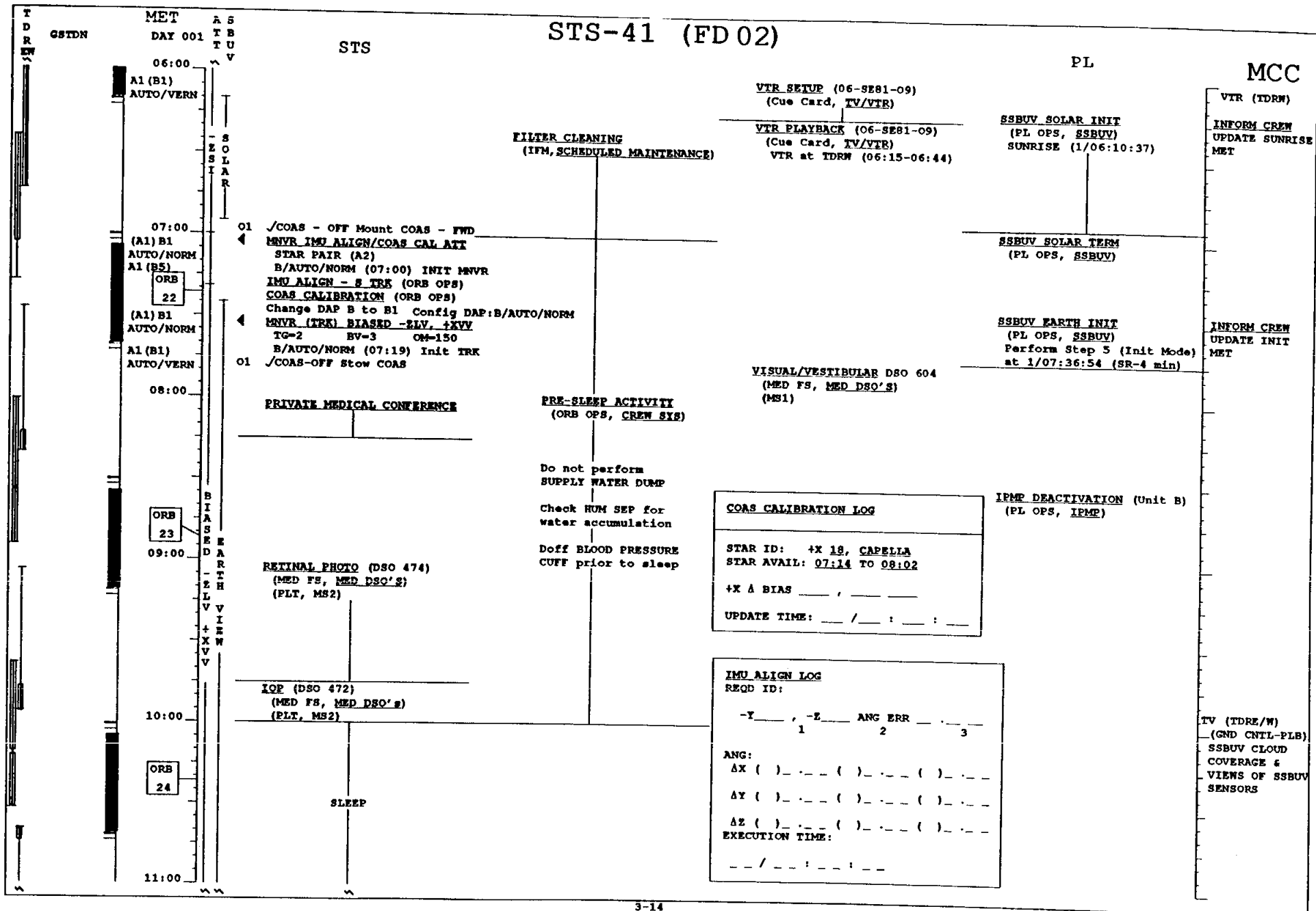
Config DAP: A/AUTO/VERN  
 MNVR (TRK) -ELV, +XVV  
 TG-2 BV-3 OM-180  
 A/AUTO/VERN Init TRK  
 CURSOR CNTRL DEVICE (DTO 1206)  
 (ORB OPS, CURSOR CNTRL DTO)  
 (CDR)

IMU ALIGN LOG	
REQD ID:	
-Y	-E ANG ERR
1	2 3
ANG:	
ΔX ( )	( ) ( )
ΔY ( )	( ) ( )
ΔZ ( )	( ) ( )
EXECUTION TIME:	
___ / ___ : ___ : ___	

VCS EXERCISE (#1)  
 (PL OPS, VCS PL OPS)

# STS-41 (FD 02)





GSTDN

MET  
DAY 001

A S  
T B  
T U  
V

STS

STS-41 (FD 02)

PL

MCC

06:00  
A1 (B1)  
AUTO/VERN

07:00  
(A1) B1  
AUTO/NORM  
A1 (B5)  
ORB 22

(A1) B1  
AUTO/NORM

A1 (B1)  
AUTO/VERN

08:00

ORB 23

09:00

ORB 24

11:00

S  
O  
L  
A  
R

B  
I  
A  
S

E  
A  
R  
T  
H  
V  
I  
E  
W

01 /COAS - OFF Mount COAS - FWD  
 ◀ MNVR IMU ALIGN/COAS CAL ATT  
 STAR PAIR (A2)  
 B/AUTO/NORM (07:00) INIT MNVR  
 IMU ALIGN - S TRK (ORB OPS)  
 COAS CALIBRATION (ORB OPS)  
 Change DAP B to B1 Config DAP:B/AUTO/NORM  
 ◀ MNVR (TRK) BIASED -ELV, +XV  
 TG-2 BV-3 OM-150  
 B/AUTO/NORM (07:19) Init TRK  
 01 /COAS-OFF Stow COAS

PRIVATE MEDICAL CONFERENCE

PRE-SLEEP ACTIVITY  
(ORB OPS, CREW SYS)

Do not perform  
SUPPLY WATER DUMP

Check HUM SEP for  
water accumulation

Doff BLOOD PRESSURE  
CUFF prior to sleep

RETINAL PHOTO (DSO 474)  
(MED FS, MED DSO'S)  
(PLT, MS2)

IQE (DSO 472)  
(MED FS, MED DSO'S)  
(PLT, MS2)

SLEEP

VTR SETUP (06-SE81-09)  
(Cue Card, TV/VTR)

VTR PLAYBACK (06-SE81-09)  
(Cue Card, TV/VTR)  
VTR at TDRW (06:15-06:44)

SSBUV SOLAR INIT  
(PL OPS, SSBUV)  
SUNRISE (1/06:10:37)

SSBUV SOLAR TERM  
(PL OPS, SSBUV)

SSBUV EARTH INIT  
(PL OPS, SSBUV)  
Perform Step 5 (Init Mode)  
at 1/07:36:54 (SR-4 min)

VISUAL/VESTIBULAR DSO 604  
(MED FS, MED DSO'S)  
(MS1)

COAS CALIBRATION LOG

STAR ID: +X 18, CAPELLA  
STAR AVAIL: 07:14 TO 08:02

+X A BIAS \_\_\_\_\_

UPDATE TIME: \_\_\_ / \_\_\_ : \_\_\_ : \_\_\_

IMU ALIGN LOG

REQD ID:

-Y \_\_\_ , -Z \_\_\_ ANG ERR \_\_\_

1 2 3

ANG:

AX ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_

AY ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_

AZ ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_

EXECUTION TIME:

\_\_\_ / \_\_\_ : \_\_\_ : \_\_\_

VTR (TDRW)

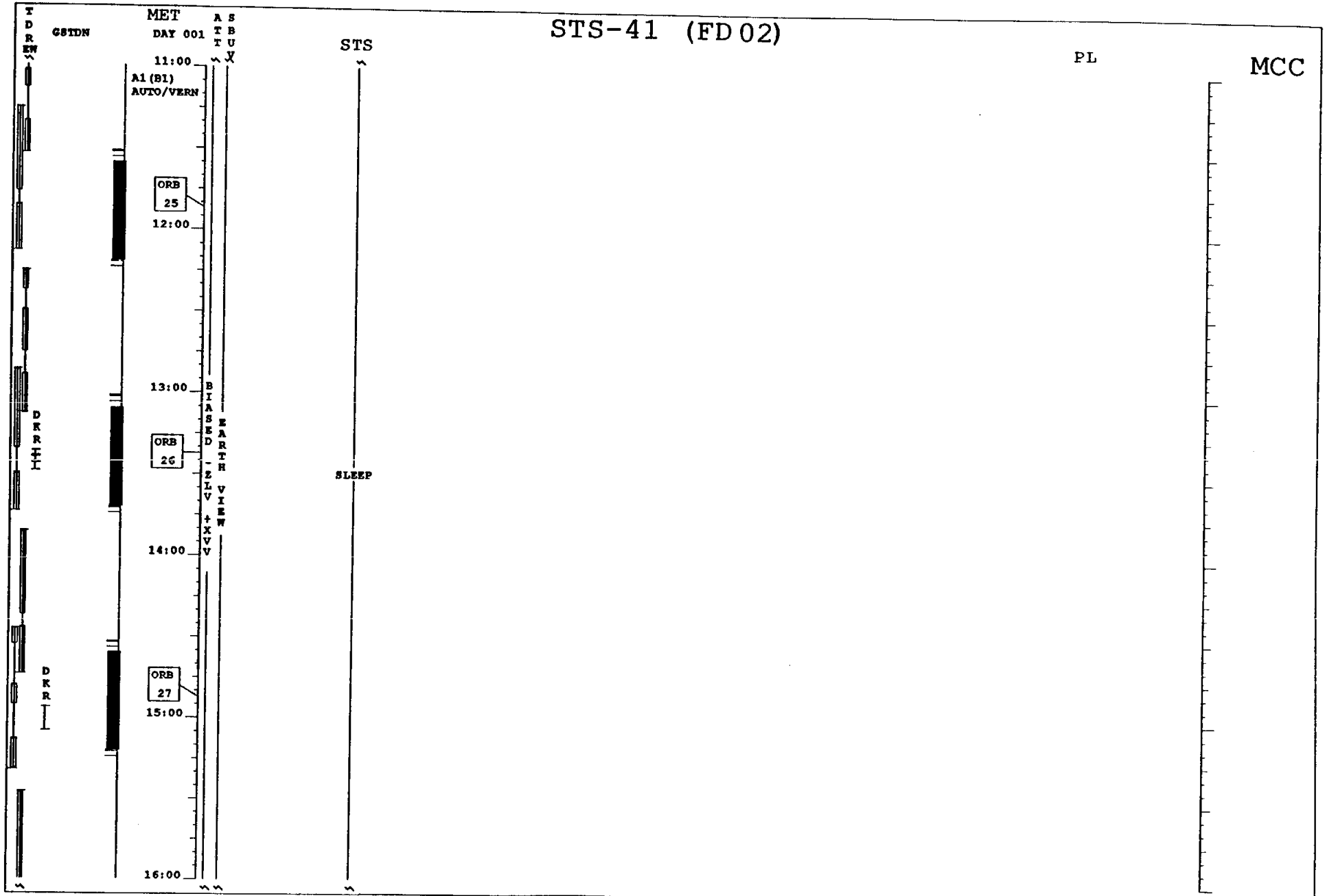
INFORM CREW  
UPDATE SUNRISE  
MET

INFORM CREW  
UPDATE INIT  
MET

IPMP DEACTIVATION (Unit B)  
(PL OPS, IPMP)

TV (TDRE/W)  
(GND CNIL-PLB)  
SSBUV CLOUD  
COVERAGE &  
VIEWS OF SSBUV  
SENSORS

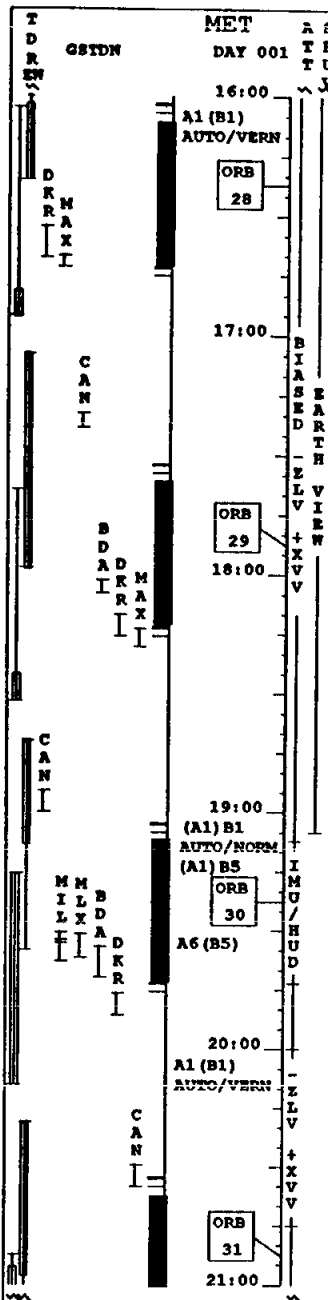
# STS-41 (FD 02)



# STS-41 (FD 03)

PL

MCC



**COAS CALIBRATION LOG**

STAR ID: +X 18, CAPELLA  
 STAR AVAIL: 1 9:1 6 TO 2 0:0 4

+X A BIAS \_\_\_\_\_

UPDATE TIME: \_\_\_\_ / \_\_\_\_ : \_\_\_\_ : \_\_\_\_

**HUD CALIBRATION PAD**

STAR ID: +X 18, CAPELLA  
 STAR AVAIL: 1 9:1 6 to 2 0:0 4

**IMU ALIGN LOG**  
 REQD ID:

-Y\_\_\_\_, -Z\_\_\_\_ ANG ERR \_\_\_\_

1 2 3

ANG:  
 AX ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_  
 AY ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_  
 AZ ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_

EXECUTION TIME:  
 \_\_\_\_ / \_\_\_\_ : \_\_\_\_ : \_\_\_\_

**FD03 EE ACTIVITIES:**  
 EXERCISE (1 Hr/All)  
 FOOD PREP/POST (Cue Card) (30 Min)

01 ✓COAS - OFF Mount COAS - FWD

◀ **MNVR IMU ALIGN/COAS CAL ATT**  
 STAR PAIR (A2)  
 B/AUTO/NORM (19:07) Init MNVR  
 IMU ALIGN - S TRK (ORB OPS)  
 COAS CALIBRATION (ORB OPS)  
 HUD R/U TO COAS (DIO 785)  
 (ORB OPS, HUD DIO)  
 Perform DATA TAKE 1

◀ **MNVR (TRK) +XSI ATT**  
 TG-5 BV-1 OM-BLANK  
 RA=192.14 DEC=-5.21  
 A/AUTO/VERN (19:43) Init TRK  
 HUD R/U TO COAS (DIO 785)  
 (ORB OPS, HUD DIO)  
 Perform DATA TAKE 1

Change DAP A,B to A1,B1 Config: DAP A/AUTO/VERN

◀ **MNVR (TRK) BIASED -ZLV +XVY**  
 TG-2 BV-3 OM-150  
 A/AUTO/VERN (20:00) Init TRK

01 ✓COAS-OFF Stow COAS

◀ **MNVR (TRK) -ZSI ATT**  
 TG-4 BV-3 OM-0  
 A/AUTO/VERN (20:45) Init TRK

**POST-SLEEP ACTIVITY**  
 (ORB OPS, CREW SYS)

Do not perform  
 SUPPLY WATER DUMP

Do FC PURGE-MANUAL  
 (Cue Card)

**SSBUV EARTH TERM**  
 (PL OPS, SSBUV)

**RCS REGULATOR RECONFIGURE**  
 07/08 He PRESS A(three)-OP(tb-OP)  
 B(three)-OP(tb-OP)  
 then GPC  
 A(three)-CL(tb-CL)



# STS-41 (FD 03)

**TDRS**  
**ORBN**  
**ASTDN**  
**DAY 001**  
**21:00**  
**22:00**  
**23:00**  
**00:00**  
**01:00**  
**02:00**

**AS**  
**TU**  
**V**  
**SOLAR**  
**ZSI**  
**DTO**  
**B27**  
**ZLV**  
**+YV**  
**IMU**  
**/HUD**  
**CD**  
**ZSI**

**MM**  
**IL**  
**LD**  
**A**  
**DKR**  
**ML**  
**BD**  
**A**  
**CD**  
**MI**  
**LD**  
**A**  
**BM**  
**LD**  
**XA**  
**DKR**  
**CD**  
**MI**  
**LD**  
**A**  
**BM**  
**LD**  
**XA**  
**DKR**  
**CD**  
**MI**  
**LD**  
**A**  
**BM**  
**LD**  
**XA**  
**DKR**

**ORB 32**  
**(A12) B4**  
**ORB 33**  
**(A1) B5**  
**ORB 34**  
**A6 (B5)**  
**A1 (B1)**

**A1 (B1)**  
**AUTO/VERN**  
**A1 (B1)**  
**AUTO/VERN**  
**A1 (B1)**  
**AUTO/VERN**  
**A1 (B1)**  
**AUTO/VERN**  
**A1 (B1)**  
**AUTO/VERN**

**STS**

**CABIN TEMP CNTL RECONFIG**  
 MD44F Pin CAB TEMP CNTL actuator linkage to secondary actuator

**L1 CABIN TEMP CNTLR - 2**  
**ECLSS REDUND COMPONENT C/O**  
 (ORB OPS, ECLS)  
**HEATER RECONFIG-Config B**  
 (ORB OPS, EPS)

**PCS 1(2) CONFIG (ORB OPS)**  
 (2Cmn)

**MNVR (DTO 827 SETUP)**  
 R=225.3 P=218.4 Y=59.5  
 A/AUTO/VERN (22:30) Init MNVR

**HIGH PITCH RATE (DTO 827)**  
 (ORB OPS, DTO 827)

Change DAP A, B to A1, B1  
 Config DAP:A/AUTO/VERN

**MNVR (TRK) -ZLV, +YV**  
 TG=2 BV=3 OM=270  
 A/AUTO/VERN (23:15) Init TRK  
**WASTE WATER DUMP, Steps 1&2**  
 (ORB OPS, ECLS)

**WASTE WATER DUMP, Step 3**  
 (ORB OPS, ECLS)

**COAS CALIBRATION LOG**

STAR ID: +X 18, CAPELLA  
 STAR AVAIL: 0 1:1 7 to 0 2:0 4  
 +X Δ BIAS \_\_\_\_\_ , \_\_\_\_\_  
 UPDATE TIME: \_\_\_\_ / \_\_\_\_ : \_\_\_\_ : \_\_\_\_

**SSBUV CAL INIT**  
 (PL OPS, SSBUV)

**IMU ALIGN/COAS CAL ATT**  
 STAR PAIR (A2)  
 A/AUTO/VERN (01:00) Init MNVR  
**IMU ALIGN - S TRK (ORB OPS)**  
**COAS CALIBRATION (ORB OPS)**  
**HUD B/U TO COAS (DTO 785)**  
 (ORB OPS, HUD DTO)  
 Perform DATA TAKE 2

Change DAP A, B to A1, B1 Config DAP:A/AUTO/VERN  
**MNVR (TRK) -ZSI ATT**  
 TG=4 BV=3 OM=0  
 A/AUTO/VERN (01:44) Init TRK

**COAS-OFF Stow COAS**

/HUM SEPs for H2O accumulation, then  
**HUMIDITY SEP RECONFIG**  
 L1 HUMIDITY SEP B - OFF  
 A - ON

**CURSOR CNTL DEVICE (DTO 1206)**  
 (ORB OPS, CURSOR CNTL DTO)  
 (CDR)

**IMU ALIGN LOG**  
 REQD ID:  
 -Y\_\_\_\_, -Z\_\_\_\_ ANG ERR \_\_\_\_  
 1 2 3

ANG:  
 ΔX ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_  
 ΔY ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_  
 ΔZ ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_

EXECUTION TIME:  
 \_ \_ / \_ \_ : \_ \_ : \_ \_

**HUD CALIBRATION PAD**

STAR ID: +X 18, CAPELLA  
 STAR AVAIL: 0 1:1 7 to 0 2:0 4

**P/TV05 SETUP (VCS)**  
 (PHOTO/TV, P/TV SCENES)

**P/TV05 ACT (VCS)**  
 (PHOTO/TV, P/TV SCENES)

Check HUM SEP for water accumulation

**PL**

**PHY SYS EXPERIMENT**  
 (PL OPS, PSE)

**SSBUV SOLAR VIEW**  
 (PL OPS, SSBUV)  
 SUNRISE (1/21:13:23)

**SSBUV SOLAR TERM**  
 (PL OPS, SSBUV)

**MEMORY MODULE REPLACEMENT**  
 (PL OPS, RME-III)

**VCS CONFIG**  
 (PL OPS, VCS PL OPS)

**VCS EXERCISE (#2)**  
 (PL OPS, VCS PL OPS)

**VCS DEACTIVATE**  
 (PL OPS, VCS PL OPS)

**MCC**

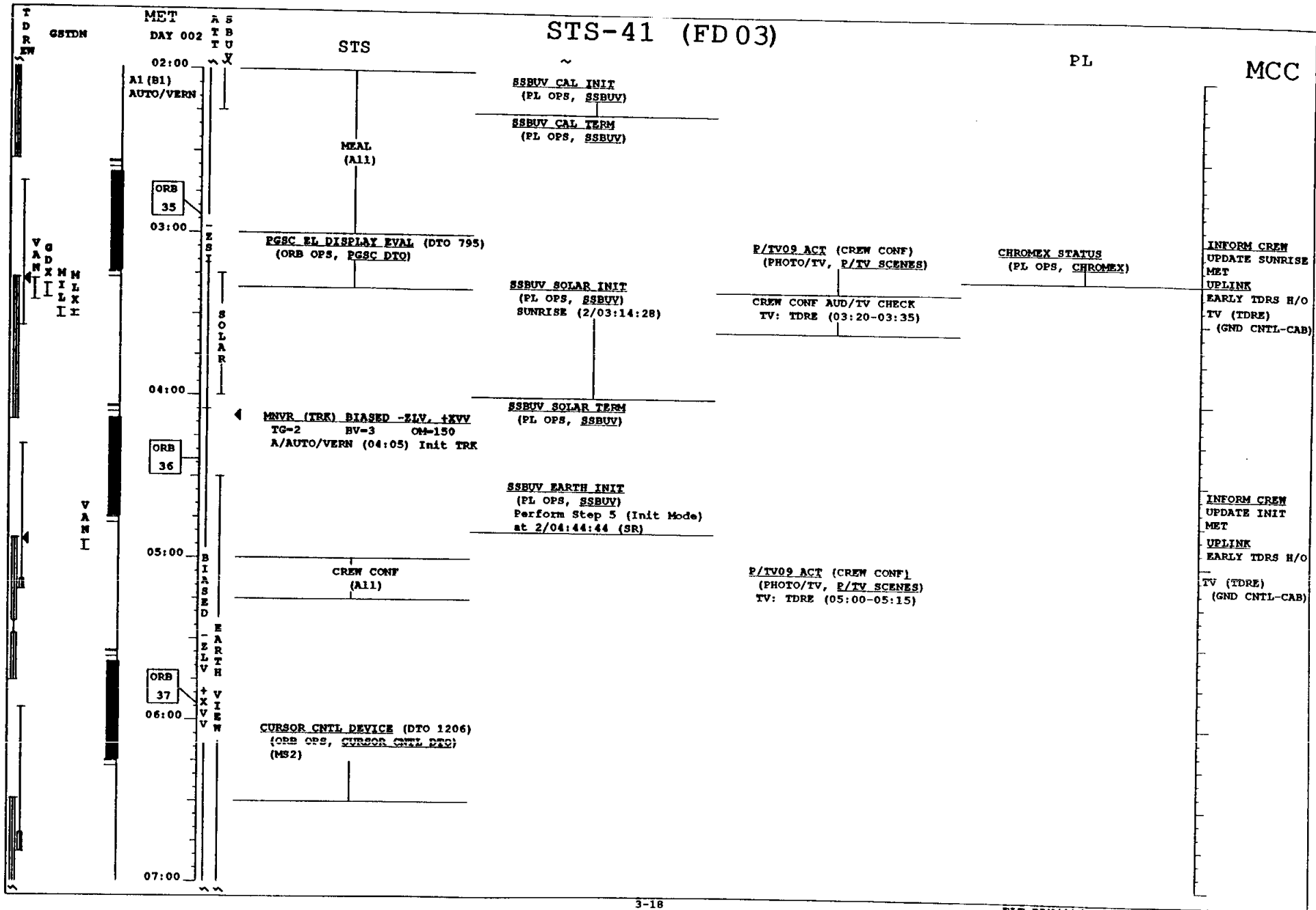
**INFORM CREW**  
 UPDATE SUNRISE  
 MET

**INFORM CREW**  
 DTO 827 ROT  
 INIT MET

**UPDATE**  
 WASTE H2O  
 DUMP QTY  
 FOR DTO 330

**TV (TDRE)**  
 (GND CNTL-CAB)

**UPLINK**  
 EARLY TDRS H/O



# STS-41 (FD 03)

PL

MCC

MET A S  
 DAY 002 T B  
 T U  
 X  
 07:00  
 (A1)B1  
 AUTO/NORM  
 A1 (B5)  
 ORB  
 38  
 A6 (B5)  
 (A1)B1  
 AUTO/NORM  
 08:00  
 A1 (B1)  
 AUTO/VERN  
 ORB  
 39  
 09:00  
 B  
 I  
 A  
 S  
 E  
 A  
 R  
 T  
 H  
 E  
 R  
 L  
 V  
 I  
 E  
 W  
 +  
 X  
 V  
 V  
 10:00  
 ORB  
 40  
 11:00  
 SLEEP  
 ORB  
 41  
 12:00

01 /COAS - OFF Mount COAS - FWD  
 MNVR IMU ALIGN/COAS CAL ATT  
 STAR PAIR (A2)  
 B/AUTO/NORM (07:09) Init MNVR  
 IMU ALIGN - S TRK (ORB OPS)  
 COAS CALIBRATION (ORB OPS)  
 HUD B/U TO COAS (DTO 785)  
 (ORB OPS, HUD DTO)  
 Perform DATA TAKE 3

Change DAP A,B to A1,B1 Config DAP:B/AUTO/NORM  
 MNVR (TRK) BIASED -ZLV, +XVY  
 TG=2 BV=3 CM=150  
 B/AUTO/NORM (07:39) Init TRK  
 When MNVR Complete  
 Config DAP: A/AUTO/VERN  
 01 /COAS-OFF stow COAS

**HUD CALIBRATION PAD**

STAR ID +X 18, CAPELLA  
 STAR AVAIL: 0 7:1 8 to 0 8:0 5

**PRE-SLEEP ACTIVITY**  
 (ORB OPS, CREW SYS)

Do not perform  
 SUPPLY WATER DUMP

/HUM SEPS for H2O  
 accumulation, then  
**HUMIDITY SEP RECONFIG**  
 L1 HUMIDITY SEP A-OFF  
 B-ON

At 55 close MDA lid:  
**SSBUV OUTGAS TERM**  
 (PL OPS, SSBUV)

At 2/07:44 (SR-1 min)  
 open MDA lid:  
**SSBUV OUTGAS INIT**  
 (PL OPS, SSBUV)  
 Perform Steps 2 thru 5

**IMU ALIGN LOG**  
 REQD ID:  
 -Y\_\_\_\_, -Z\_\_\_\_ ANG ERR \_\_\_\_  
 1 2 3

ANG:  
 ΔX ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_  
 ΔY ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_  
 ΔZ ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_  
 EXECUTION TIME:  
 \_ \_ / \_ \_ : \_ \_ : \_ \_

**COAS CALIBRATION LOG**

STAR ID: +X 18, CAPELLA  
 STAR AVAIL: 0 7:1 8 TO 0 8:0 5

+X Δ BIAS \_\_\_\_ , \_\_\_\_

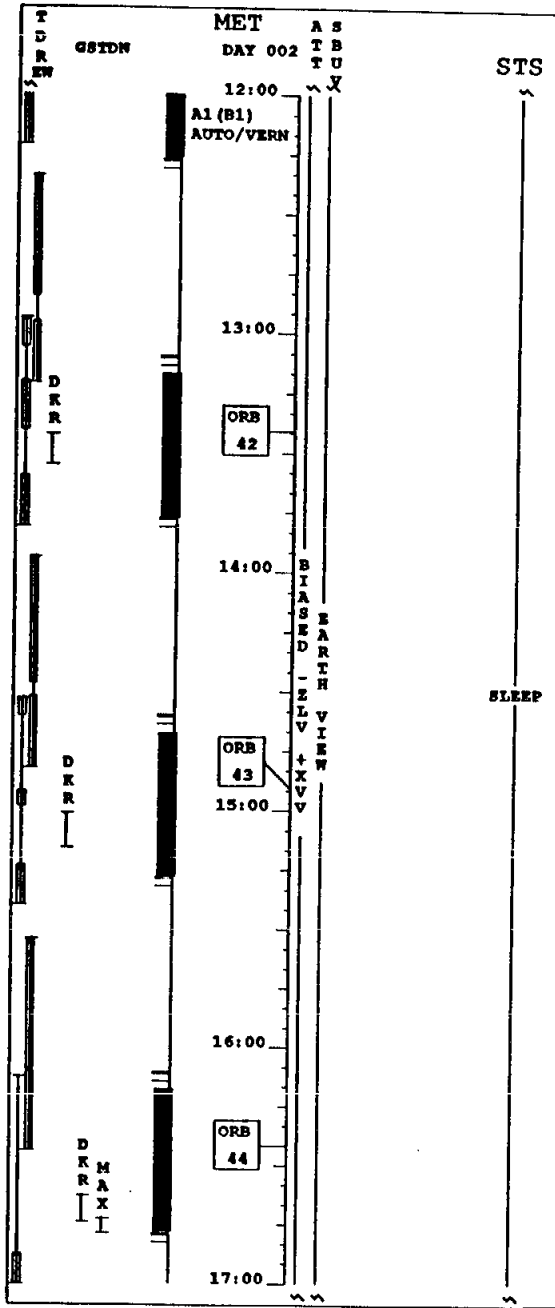
UPDATE TIME: \_ \_ / \_ \_ : \_ \_ : \_ \_

TV (TDRE/W)  
 (GND CNTL-PLB)  
 SSBUV CLOUD  
 COVERAGE &  
 VIEWS OF SSBUV  
 SENSORS

# STS-41 (FD 03)

PL

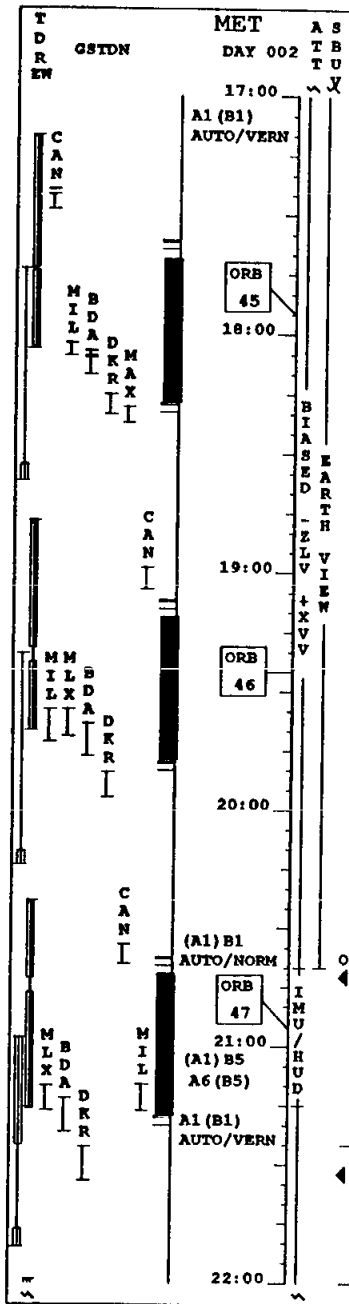
MCC



# STS-41 (FD 04)

PL

MCC



STS  
SLEEP

**FD04 EE ACTIVITIES:**  
 EXERCISE (1 Hr/All)  
 FOOD PREP/POST (Cue Card) (30 Min)

**HUD CALIBRATION PAD**

STAR ID: +x 18, CAPELLA  
 STAR AVAIL: 2 0:5 0 to 2 1:3 7

**POST-SLEEP ACTIVITY**  
 (ORB OPS, CREW SYS)

Do not perform  
 SUPPLY WATER DUMP

**IMU ALIGN LOG**  
 REQD ID:  
 -Y \_\_\_\_\_, -Z \_\_\_\_\_ ANG ERR \_\_\_\_\_  
 1 2 3

ANG:  
 AX ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_  
 AY ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_  
 AZ ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_

EXECUTION TIME:  
 \_ \_ / \_ \_ : \_ \_ : \_ \_

**COAS CALIBRATION LOG**

STAR ID: +X 18, CAPELLA  
 STAR AVAIL: 2 0:5 0 TO 2 1:3 7

+X A BIAS \_\_\_\_\_, \_\_\_\_\_

UPDATE TIME: \_ \_ / \_ \_ : \_ \_ : \_ \_

01 /COAS - OFF Mount COAS - FWD  
 MNVR IMU ALIGN/COAS CAL ATT  
 STAR PAIR (A2)  
 B/AUTO/NORM (20:42) Init MNVR  
 IMU ALIGN - S TRK (ORB OPS)  
 COAS CALIBRATION (ORB OPS)  
 HUD B/U TO COAS (DIO 785)  
 (ORB OPS, HUD DIO)  
 Perform DATA TAKE 4

Change DAP A,B to A1,B1 Config DAP: A/AUTO/VERN  
 MNVR (TRK) BIASED -ZLV, +XVV  
 TG-2 BV-3 OM-150  
 A/AUTO/VERN (21:17) Init TRK  
 RCS HOT FIRE TEST (ORB OPS, RCS) (2 Cmn)

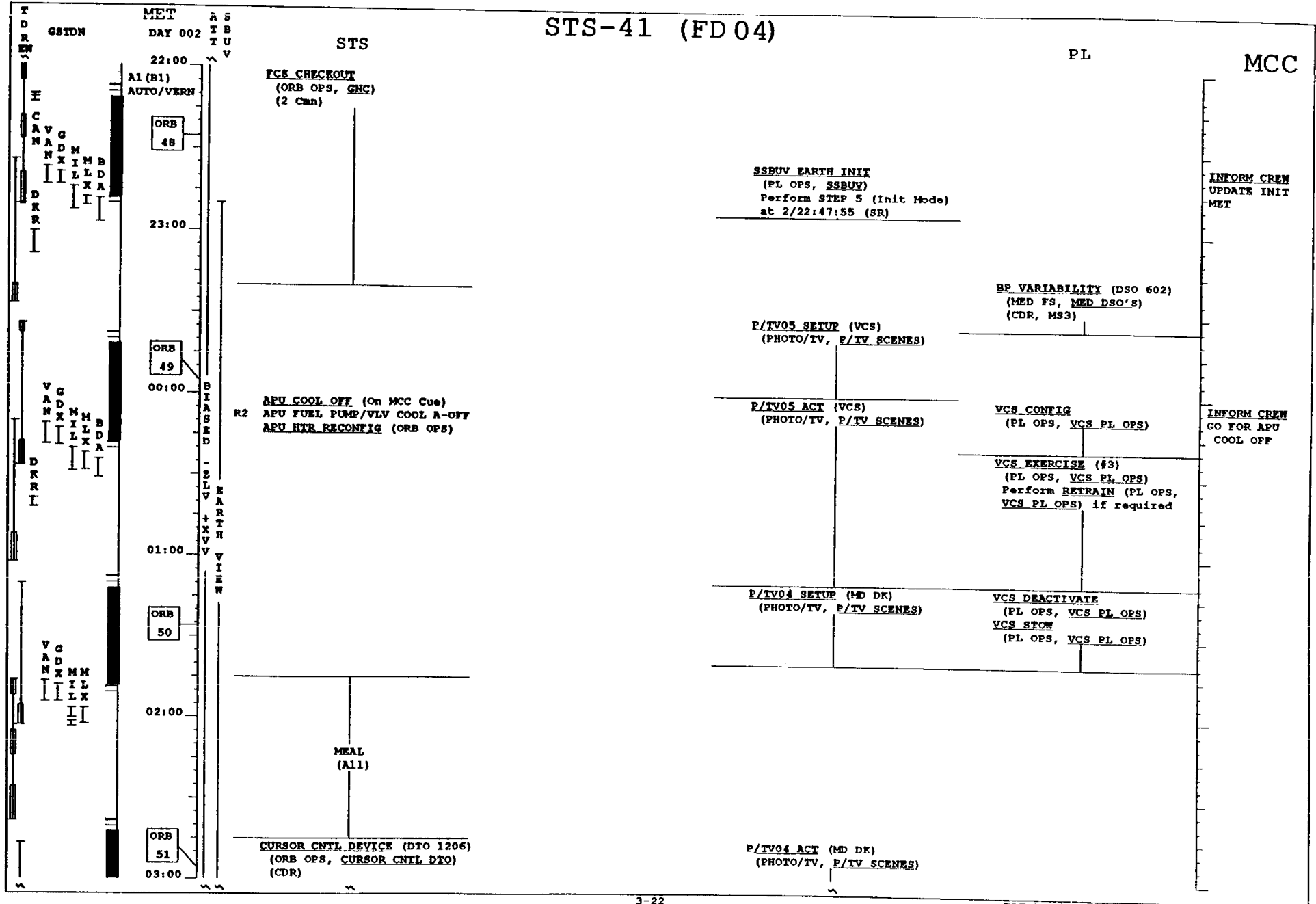
APU STEAM VENT HTR ACT  
 R2 BLR CNTLR/HTR(three) -B  
 PWR (three) -ON

Config DAP: A/AUTO/VERN 01 /COAS-OFF Stow COAS

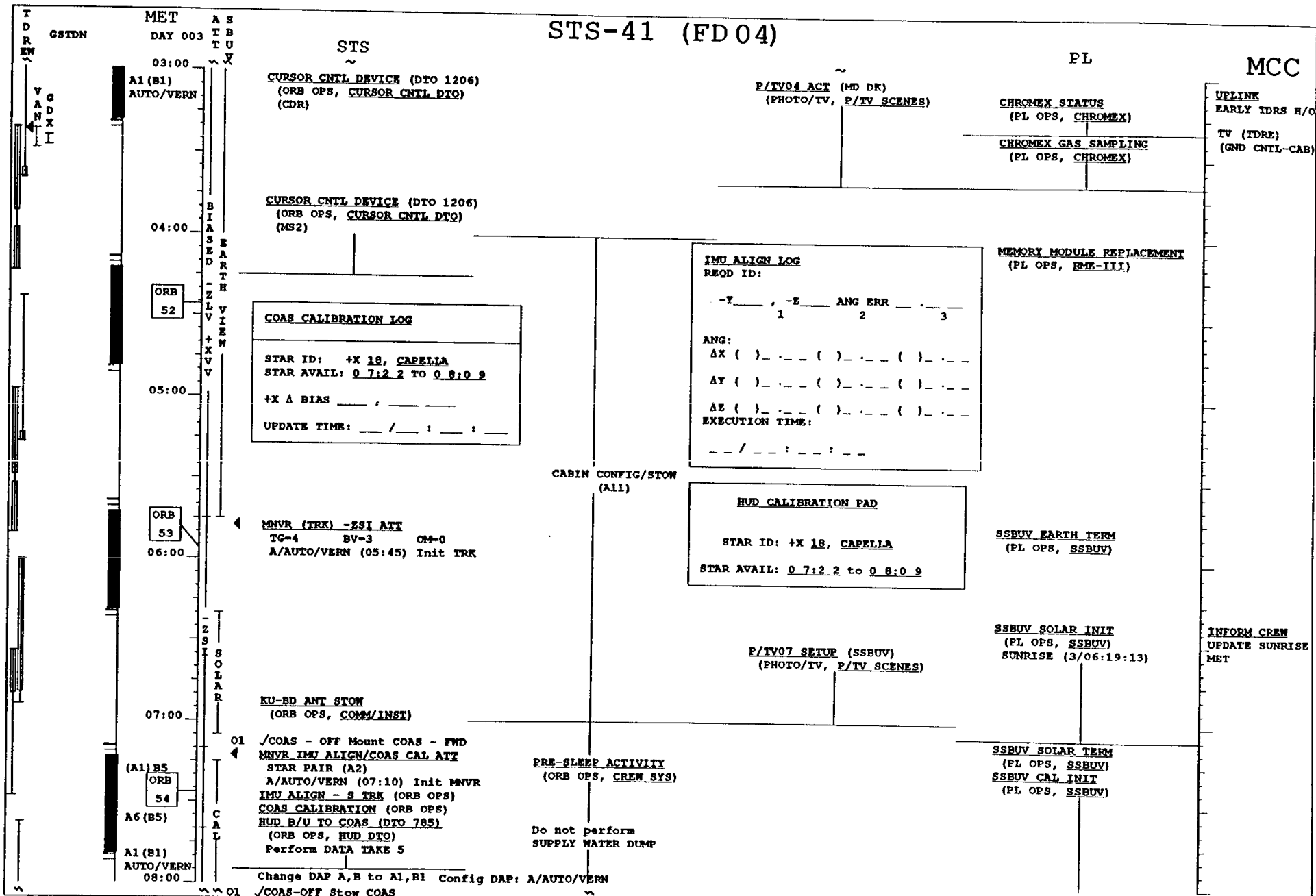
SSBUV EARTH TERM  
 (PL OPS, SSBUV)

PHY SYS EXPERIMENT  
 (PL OPS, PSE)

# STS-41 (FD 04)



# STS-41 (FD 04)



GSTDN

MET DAY 003

STS

PL

MCC

03:00  
A1 (B1)  
AUTO/VERN

CURSOR CNTL DEVICE (DTO 1206)  
(ORB OPS, CURSOR CNTL DTO)  
(CDR)

P/TV04 ACT (MD DK)  
(PHOTO/TV, P/TV SCENES)

CHROMEX STATUS  
(PL OPS, CHROMEX)

UPLINK  
EARLY IDRS H/O  
TV (TDRE)  
(GND CNTL-CAB)

CHROMEX GAS SAMPLING  
(PL OPS, CHROMEX)

04:00

CURSOR CNTL DEVICE (DTO 1206)  
(ORB OPS, CURSOR CNTL DTO)  
(MS2)

MEMORY MODULE REPLACEMENT  
(PL OPS, RME-III)

**COAS CALIBRATION LOG**

STAR ID: +X 18, CAPELLA  
STAR AVAIL: 0 7:2 2 TO 0 8:0 9

+X A BIAS \_\_\_\_\_

UPDATE TIME: \_\_\_\_ / \_\_\_\_ : \_\_\_\_ : \_\_\_\_

**IMU ALIGN LOG**  
REQD ID: \_\_\_\_\_

-Y \_\_\_\_\_ -Z \_\_\_\_\_ ANG ERR \_\_\_\_\_  
1 2 3

ANG:  
ΔX ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_  
ΔY ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_  
ΔZ ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_

EXECUTION TIME:  
\_ \_ / \_ \_ : \_ \_ : \_ \_

05:00

CABIN CONFIG/STOW  
(All)

**HUD CALIBRATION PAD**

STAR ID: +X 18, CAPELLA  
STAR AVAIL: 0 7:2 2 to 0 8:0 9

SSBUV EARTH TERM  
(PL OPS, SSBUV)

06:00

MNVR (TRK) -ZSI ATT  
TG-4 BV-3 OM-0  
A/AUTO/VERN (05:45) Init TRK

P/TV07 SETUP (SSBUV)  
(PHOTO/TV, P/TV SCENES)

SSBUV SOLAR INIT  
(PL OPS, SSBUV)  
SUNRISE (3/06:19:13)

INFORM CREW  
UPDATE SUNRISE  
MET

07:00

KU-BD ANT STOW  
(ORB OPS, COMM/INST)

PRE-SLEEP ACTIVITY  
(ORB OPS, CREW SYS)

SSBUV SOLAR TERM  
(PL OPS, SSBUV)  
SSBUV CAL INIT  
(PL OPS, SSBUV)

(A1) B5  
ORB 54

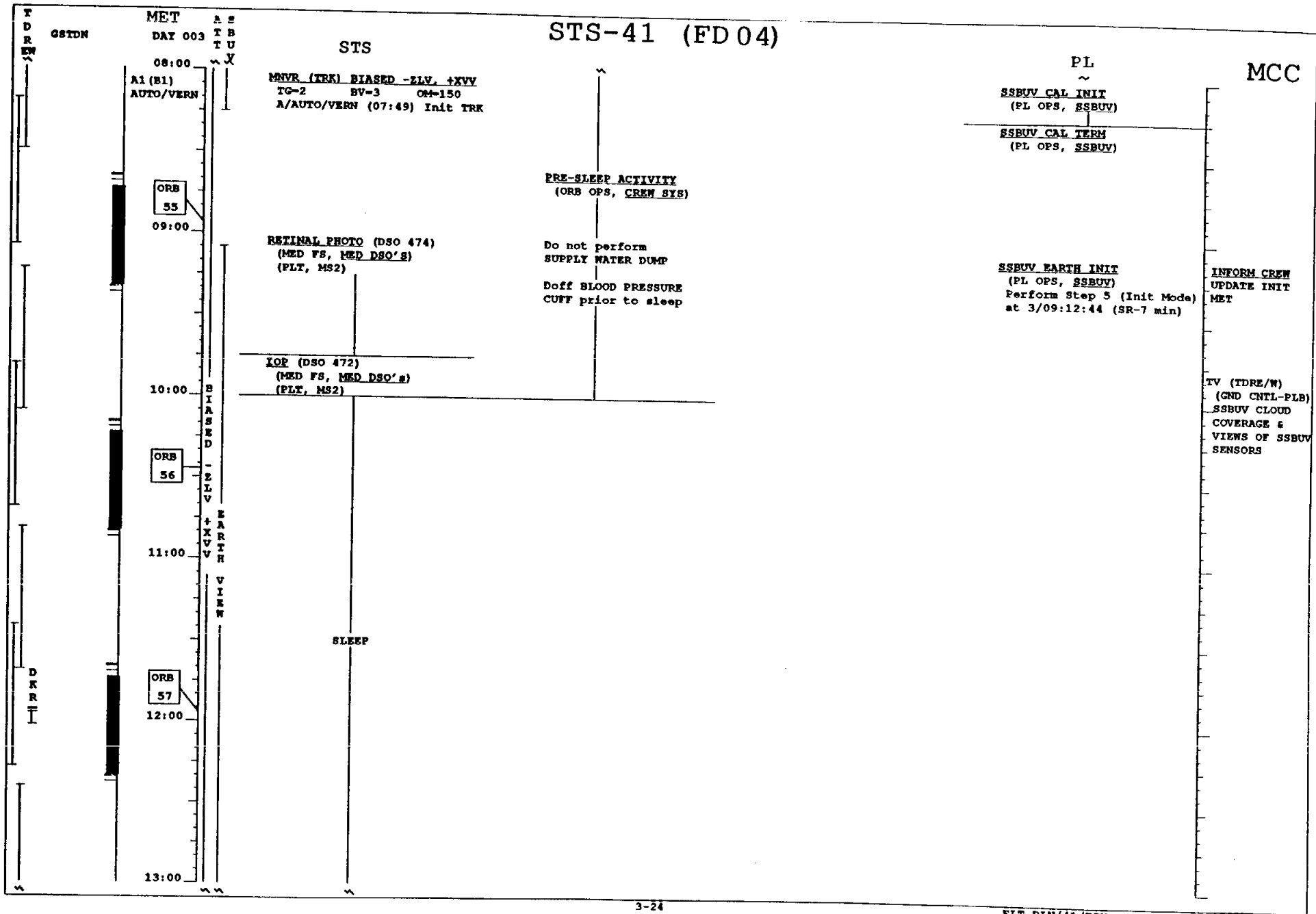
01 /COAS - OFF Mount COAS - FWD  
MNVR IMU ALIGN/COAS CAL ATT  
STAR PAIR (A2)  
A/AUTO/VERN (07:10) Init MNVR  
IMU ALIGN - B TRK (ORB OPS)  
COAS CALIBRATION (ORB OPS)  
HUD B/U TO COAS (DTO 785)  
(ORB OPS, HUD DTO)  
Perform DATA TAKE 5

Do not perform  
SUPPLY WATER DUMP

A6 (B5)  
A1 (B1)  
AUTO/VERN  
08:00

Change DAP A,B to A1,B1 Config DAP: A/AUTO/VERN

01 /COAS-OFF Stow COAS

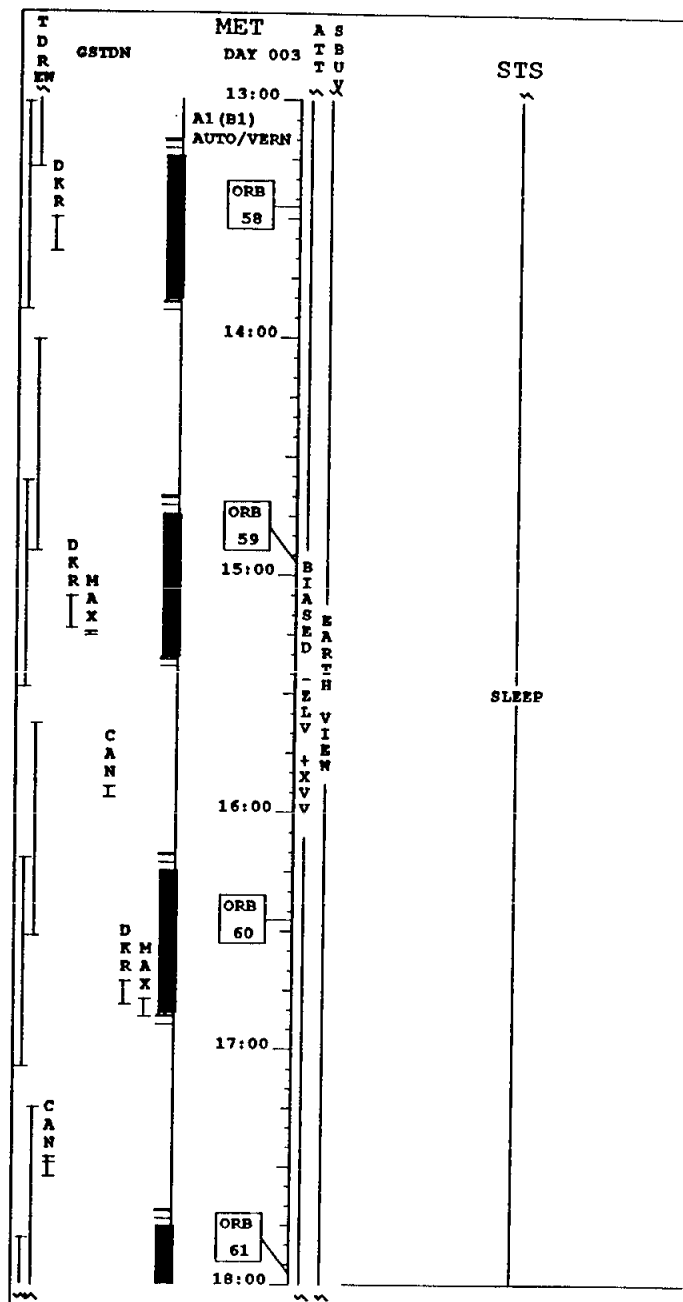




# STS-41 (FD 04)

PL

MCC

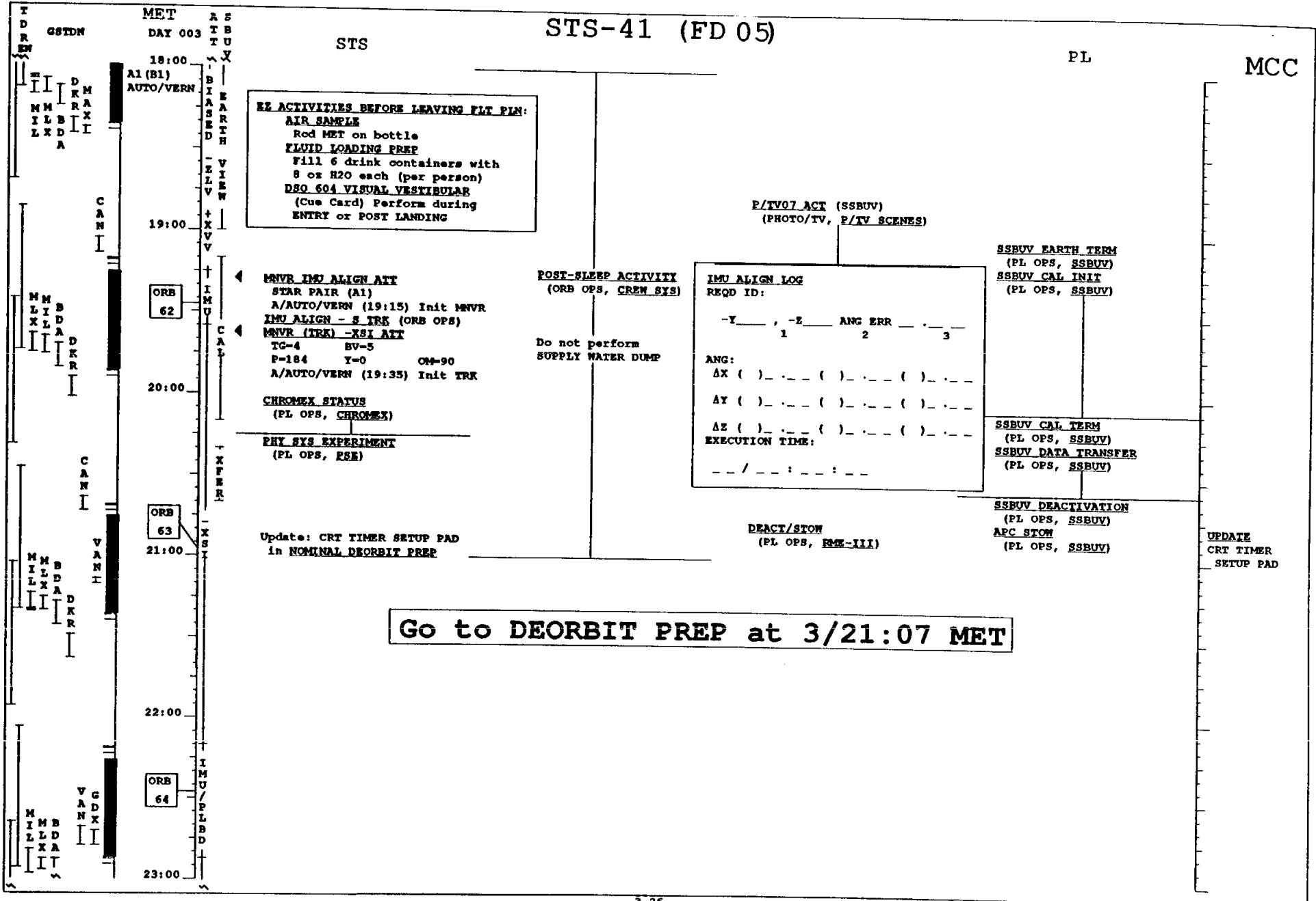


# STS-41 (FD 05)

STS

PL

MCC



CONTINGENCY TIMELINES

CONTINGENCY  
TIMELINES

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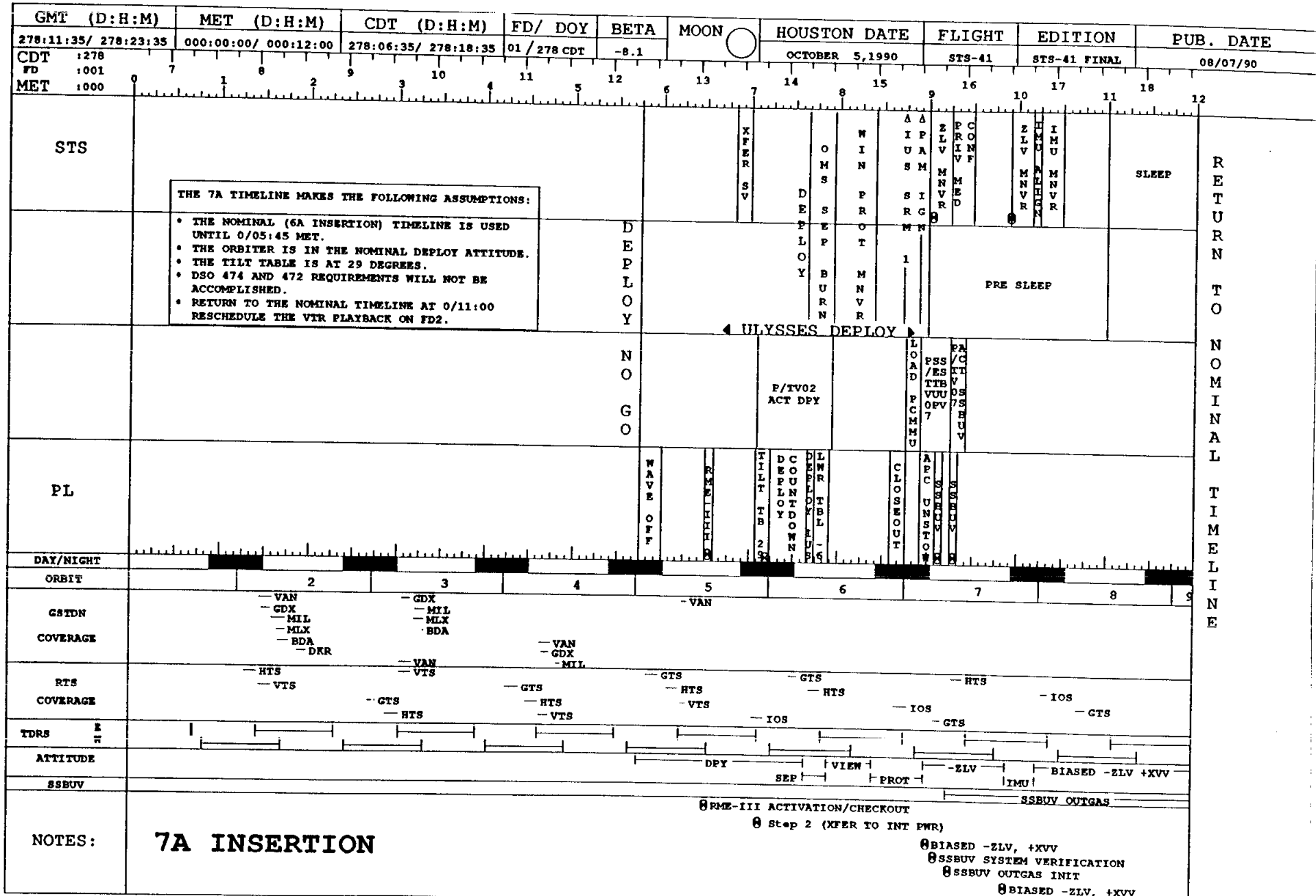
CONTINGENCY  
TIMELINES

## 7A ULYSSES INSERTION

The 7A Ulysses Insertion timeline is designed to accommodate delaying deployment of Ulysses to the 7A Insertion opportunity. The nominal timeline is used until the GO/NO-GO point in the deploy countdown for the nominal (6A Insertion) timeline. The timeline is based on the nominal Flight Cycle OMS-2 Insertion.

7A  
INSERTION

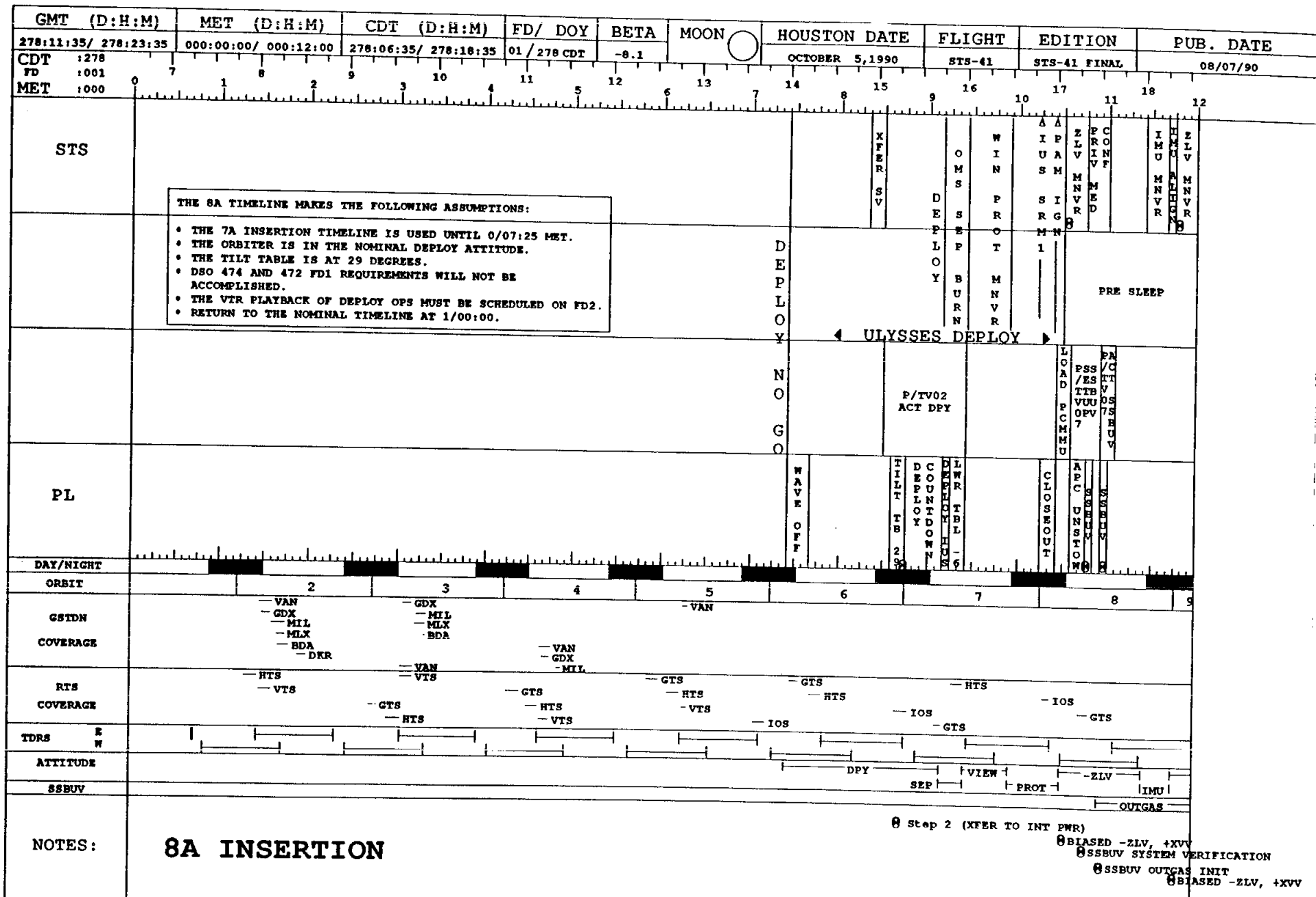
7A  
INSERTION



## 8A ULYSSES INSERTION

The 8A Ulysses Insertion timeline is designed to accommodate delaying deployment of Ulysses for the 8A Insertion opportunity. The 7A Insertion timeline is used up to the GO/NO-GO decision point in the deploy countdown. An 8A Insertion will be considered if a high probability of deploying exists or if a 16A Insertion cannot be accommodated due to orbiter or IUS/Ulysses problems. Additional assumptions are shown on the timeline. The trajectory utilized is the nominal Flight cycle OMS-2 Insertion.

8A  
INSERTION







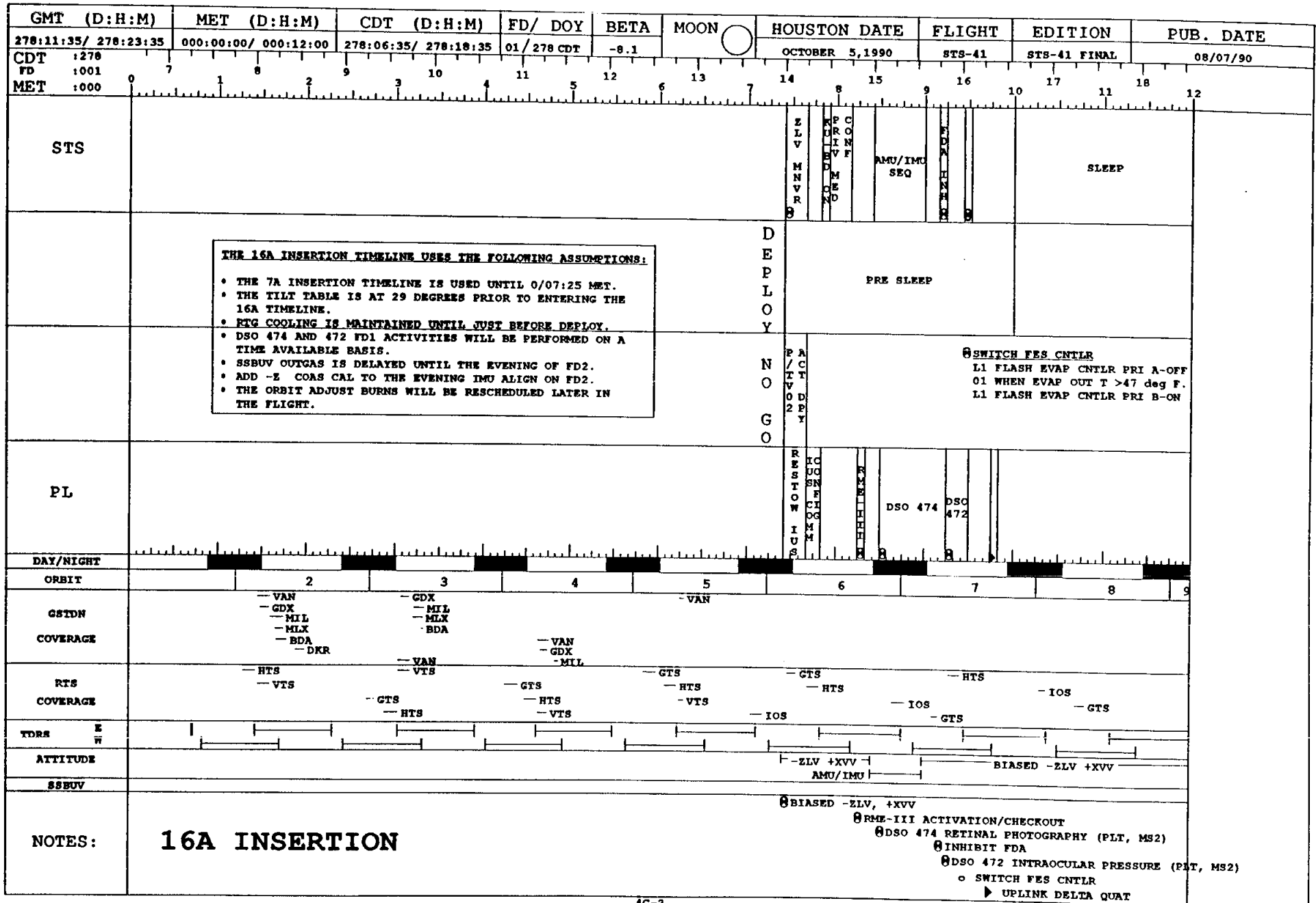
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## 16A ULYSSES INSERTION

The 16A Ulysses Insertion timeline is designed to accommodate delaying deployment of Ulysses until the 16A Insertion opportunity. The timeline assumes an attempt at 7A Insertion failed at the GO/NO-GO decision point in the deploy countdown procedure. The timeline assumes the tilt table is at 29 degrees at the wave-off decision. Additional assumptions are shown on the timeline. The trajectory utilized is the nominal Flight Cycle OMS-2 Insertion.

16A  
INSERTION

# 16A INSERTION



GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
278:23:35/ 279:11:35	000:12:00/ 001:00:00	278:18:35/ 279:06:35	02/ 278 CDT	-6.4		OCTOBER 5, 1990	STS-41	STS-41 FINAL	08/07/90
CDT :278									
FD :01					CDT:279				
MET :000					18 FD:02				MET:001
STS	SLEEP					AMU/IMU SEQ	DEPLOY	ULYSSES DEPLOY	RETURN TO NOMINAL TIMELINE
	POST SLEEP								
						PACTV02 DPY	P/TV02 ACT DPY	VTR SETUP	
PL						XFER SV	IUS/PI	CLOSEOUT	
DAY/NIGHT									
ORBIT	9	10	11	12	13	14	15	16	
GSTDN COVERAGE	-DKR	-DKR	-DKR	-DKR	-DKR	-MLX -BDA -DKR -MAX	-BDA -DKR	-CAN	-DKR
RTS COVERAGE	-GTS	-GTS	-GTS	-GTS	-GTS	-CAN	-MIL -MLX	-VTS	-IOS
TDRS									
ATTITUDE	BIASED -ZLV +XVW								
SSBUV	BIASED -ZLV +XVW								
NOTES:	<b>16A INSERTION</b>					① SWITCH_FES CNTLR L1 FLASH EVAP CNTLR PRI B-OFF 01 WHEN EVAP OUT T > 47 deg F. L1 FLASH EVAP CNTLR PRI A-ON  ② ENABLE FDA ③ PRE-DPY CK (TDRS) ④ UPLINK DELTA QUAT			
						⑤ BIASED -ZLV, +XVW ⑥ DSO 602 BLOOD PRESSURE VARIABILITY (CDR, MS3)			

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## 19A ULYSSES (10.2 PSIA EVA) INSERTION

The 19A Ulysses Insertion timeline is designed to accommodate delaying deployment of Ulysses until the 19A Insertion opportunity following an EVA to manually raise the tilt table. The 10.2 psi Cabin EVA protocol is used. There will be no Flight Day 1 EVA. The Contingency EVA Operations STS-41 Flight Supplement, Contingency EVA for Payload Failures section, is the source document for the 19A Insertion timeline. Additional assumptions are shown on the timeline. The trajectory utilized is the nominal Flight Cycle OMS-2 Insertion.

19A  
INSERTION

# 19A INSERTION

GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
278:11:35/ 278:23:35	000:00:00/ 000:12:00	278:06:35/ 278:18:35	01 / 278 CDT	-8.1	☉	OCTOBER 5, 1990	STS-41	STS-41 FINAL	08/07/90
CDT :278	FD :001	MET :000							
STS	<p>THE 19A INSERTION EVA TIMELINE USES THE FOLLOWING ASSUMPTIONS:</p> <ul style="list-style-type: none"> <li>"GO FOR EVA" FOLLOWS TILT TABLE FAILURE DURING ELEVATION TO 29 DEGREES.</li> <li>10.2 PSI CABIN PROTOCOL WILL BE USED.</li> <li>ATTEMPTS WILL BE MADE ON FD2 TO RAISE IUS/ULYSSES PRIOR TO AIRLOCK DEPRESS. IF SUCCESSFUL, EVA WILL NOT OCCUR AS SCHEDULED.</li> <li>REM HTR SUBJECT TO REAL-TIME CALL.</li> <li>DTO 474 AND 472 FD1 ACTIVITIES WILL BE COMPLETED ON A TIME AVAILABLE BASIS.</li> <li>SSBUV WILL NOT BEGIN OUT GAS OPS UNTIL EVENING OF FD2.</li> <li>MOST FD2 SECONDARY, DTO AND DSO ACTIVITIES WILL BE DELETED OR RESCHEDULED IN REAL-TIME.</li> <li>THE ORBIT ADJUST BURNS WILL BE SCHEDULED LATER IN THE FLIGHT.</li> <li>POST EVA ENTRY PREP WILL BE SCHEDULED PRIOR TO DEORBIT.</li> </ul>					SLEEP			
PL									
DAY/NIGHT									
ORBIT									
GSTDN COVERAGE									
RTS COVERAGE									
TDRS E W									
ATTITUDE									
SSBUV									
NOTES:	<p><b>19A (10.2 EVA) INSERTION</b></p>								



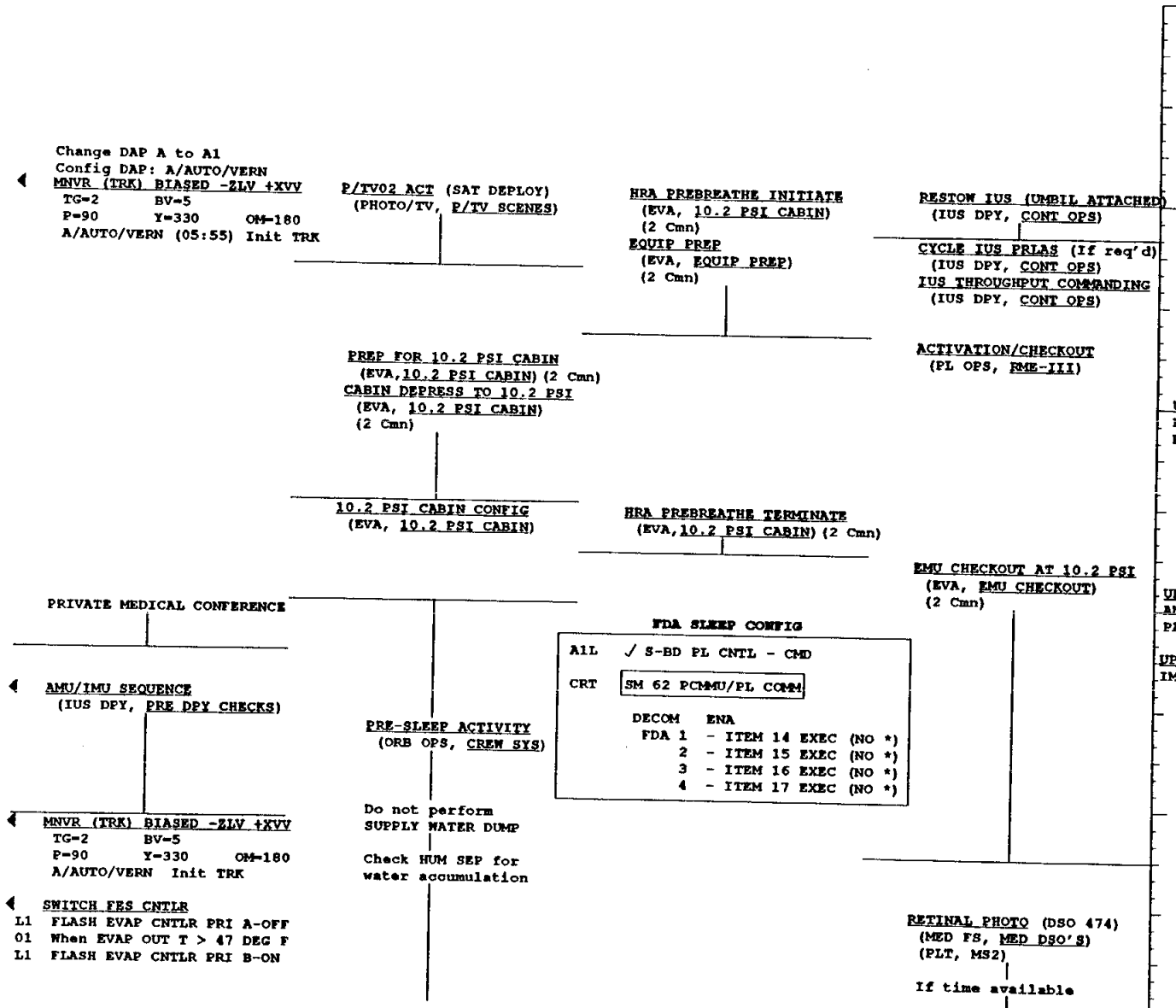


GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE										
279:11:35/ 279:23:35	001:00:00/ 001:12:00	279:06:35/ 279:18:35	02/ 279 CDT	-4.6	☉	OCTOBER 6, 1990	STS-41	STS-41 FINAL	08/07/90										
CDT :279	MET :001																		
STS	<div style="display: flex; justify-content: space-between;"> <span>W I N A A Z I I M P C E P P</span> <span>0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19</span> </div>																		RETURN TO NOMINAL TIMELINE
PL	<div style="display: flex; justify-content: space-between;"> <span>P/TV02 ACT DPY</span> <span>ULYSSES DEPLOY</span> <span>DEPLOY BURNT</span> <span>W I N A A Z I I M P C E P P</span> <span>0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19</span> </div>																		
DAY/NIGHT	<div style="display: flex; justify-content: space-between;"> <span>INGRS</span> <span>DCOUNTDOWN</span> <span>ULYSSES DEPLOY</span> <span>W I N A A Z I I M P C E P P</span> <span>0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19</span> </div>																		
ORBIT	<div style="display: flex; justify-content: space-between;"> <span>EVA</span> <span>INGRS</span> <span>DCOUNTDOWN</span> <span>ULYSSES DEPLOY</span> <span>W I N A A Z I I M P C E P P</span> <span>0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19</span> </div>																		
GSTDN COVERAGE	<div style="display: flex; justify-content: space-between;"> <span>EVA</span> <span>INGRS</span> <span>DCOUNTDOWN</span> <span>ULYSSES DEPLOY</span> <span>W I N A A Z I I M P C E P P</span> <span>0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19</span> </div>																		
RTS COVERAGE	<div style="display: flex; justify-content: space-between;"> <span>EVA</span> <span>INGRS</span> <span>DCOUNTDOWN</span> <span>ULYSSES DEPLOY</span> <span>W I N A A Z I I M P C E P P</span> <span>0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19</span> </div>																		
TDRS	<div style="display: flex; justify-content: space-between;"> <span>EVA</span> <span>INGRS</span> <span>DCOUNTDOWN</span> <span>ULYSSES DEPLOY</span> <span>W I N A A Z I I M P C E P P</span> <span>0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19</span> </div>																		
ATTITUDE	<div style="display: flex; justify-content: space-between;"> <span>EVA</span> <span>INGRS</span> <span>DCOUNTDOWN</span> <span>ULYSSES DEPLOY</span> <span>W I N A A Z I I M P C E P P</span> <span>0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19</span> </div>																		
SSBUV	<div style="display: flex; justify-content: space-between;"> <span>EVA</span> <span>INGRS</span> <span>DCOUNTDOWN</span> <span>ULYSSES DEPLOY</span> <span>W I N A A Z I I M P C E P P</span> <span>0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19</span> </div>																		
NOTES:	<p>19A (10.2 EVA) INSERTION</p> <p>⊗ -ZLV, +YVV</p> <p>⊗ SSBUV SYSTEM VERIFICATION</p> <p>⊗ AFT STATION</p> <p>⊗ BIASED -ZLV, +XVV</p> <p>⊗ SSBUV OUTGAS INIT</p> <p>⊗ DSO 474 RETINAL PHOTOGRAPHY (PLT, MS2)</p> <p>⊗ DSO 472 INTRAOCULAR PRESSURE (PLT, MS2)</p>																		

# STS-41 (FD01) 19A (10.2 EVA) INSERTION

PL MCC

T D R E W	RTS	GSTDN	MET DAY 000	A S T B T U V					
			05:00						
			06:00						
			07:00						
			08:00						
			09:00						
			10:00						



UPLINK (TDRE)  
KU COMM  
PWR-ON

UPLINK  
AMU VARIABLE  
PARAMETERS

UPDATE  
IMU TO DESELECT

# STS-41 (FD 01) 19A (10.2 EVA) INSERTION

PL

MCC

RETINAL PHOTO (DSO 474)  
 (MED FS, MED DSO'S)  
 (PLT, MS2)  
 IOP (DSO 472)  
 (MED FS, MED DSO'S)  
 (PLT, MS2) Time permitting

UPLINK (TDRE)  
 DELTA  
 QUATERNION

PRE-SLEEP ACTIVITY  
 (ORB OPS, CREW SYS)

Do not perform  
 SUPPLY WATER DUMP

**IMU ALIGN LOG**

READ ID:

-Y\_\_\_\_, -Z\_\_\_\_ ANG ERR \_\_\_\_  
 1          2          3

ANG:

AX ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_

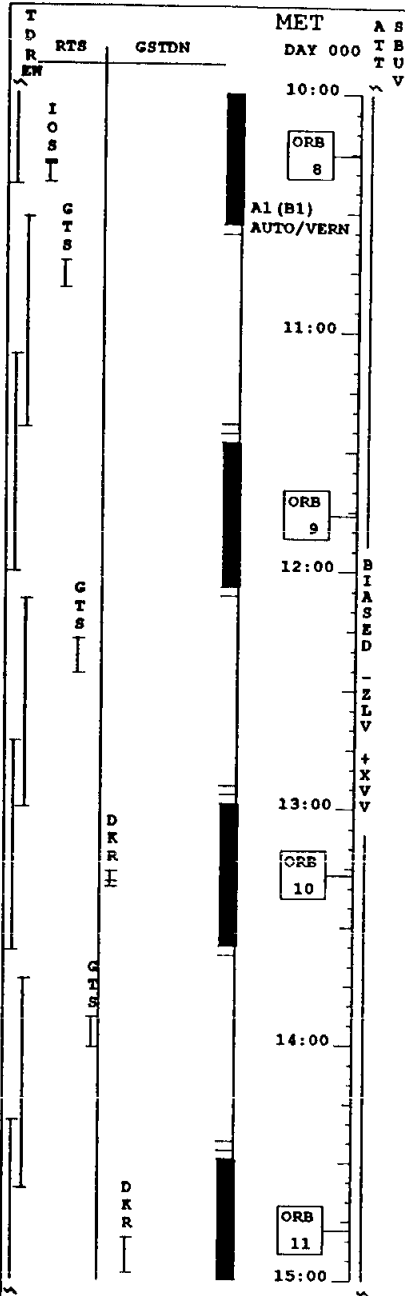
AY ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_

AZ ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_

EXECUTION TIME:

\_ \_ / \_ \_ : \_ \_ : \_ \_

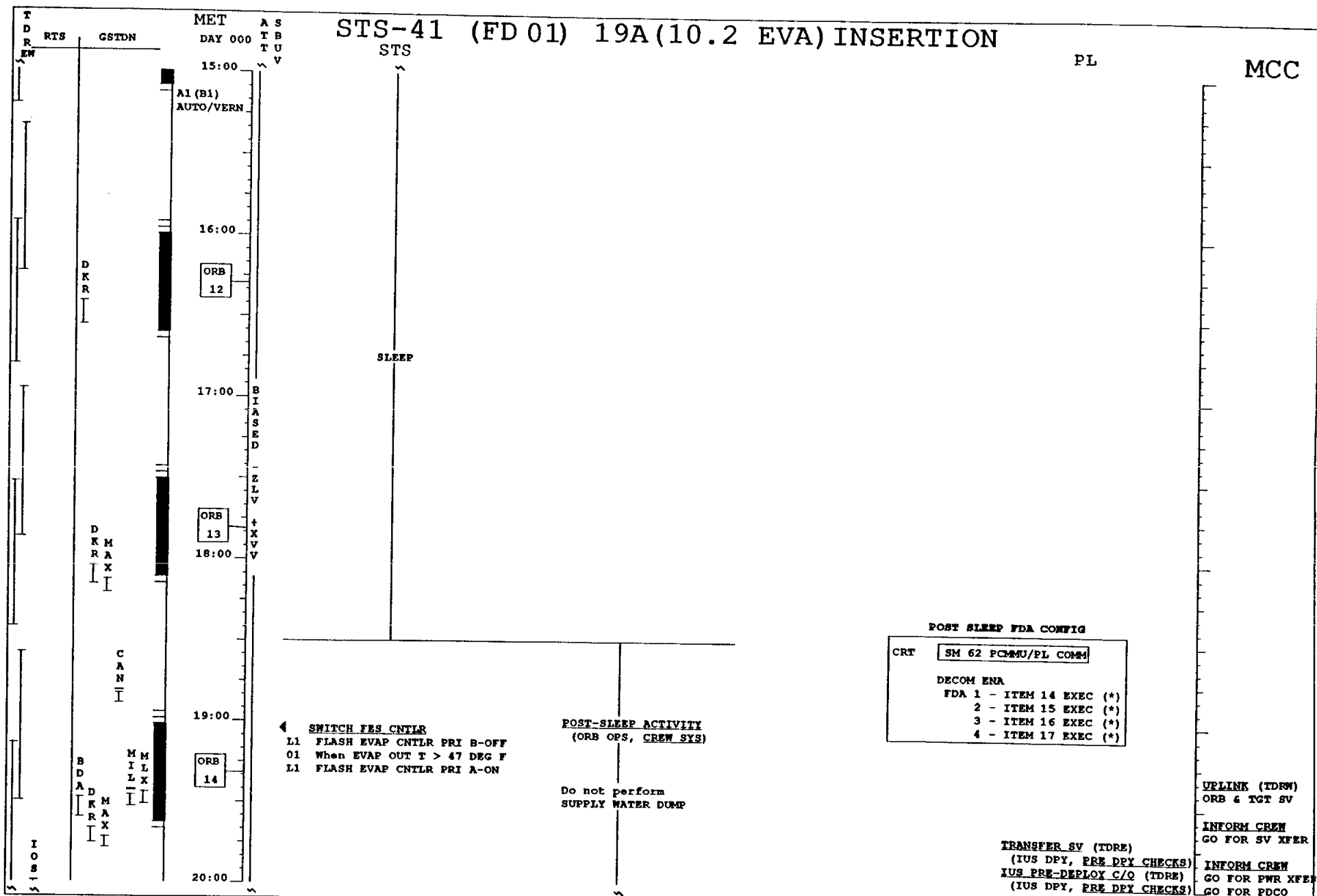
SLEEP



# STS-41 (FD 01) 19A (10.2 EVA) INSERTION

PL

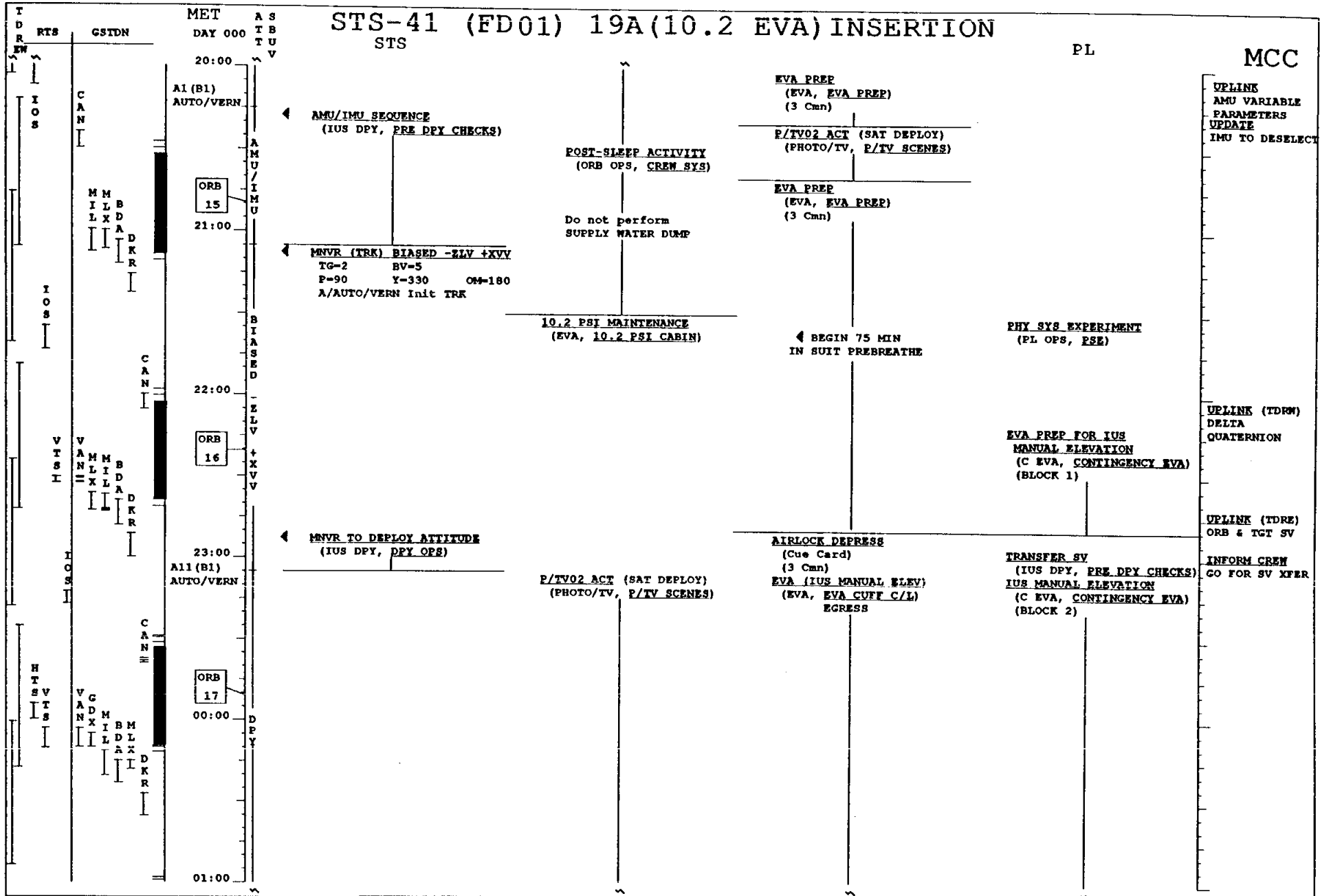
MCC



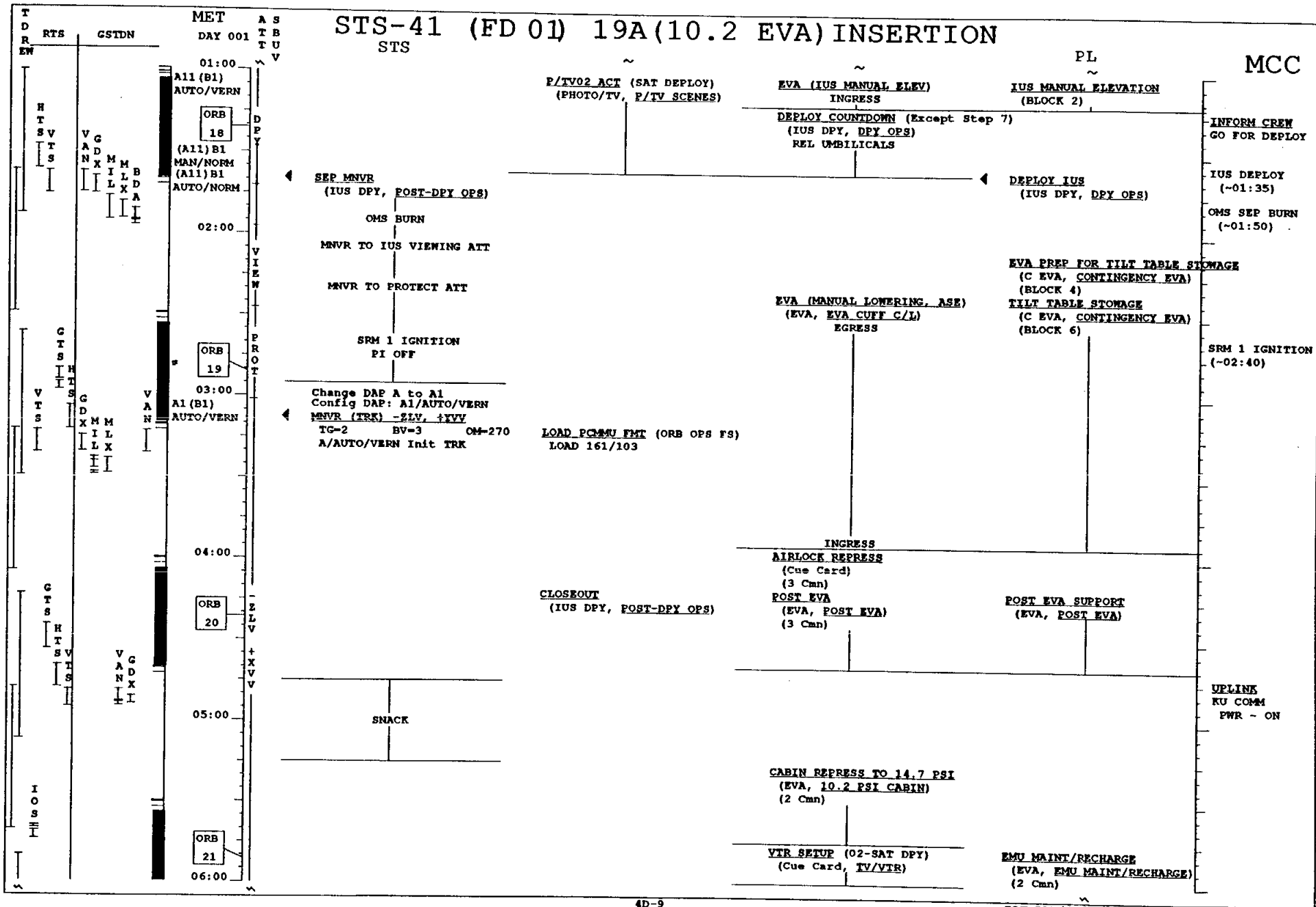
# STS-41 (FD01) 19A (10.2 EVA) INSERTION

PL

MCC



# STS-41 (FD 01) 19A(10.2 EVA) INSERTION





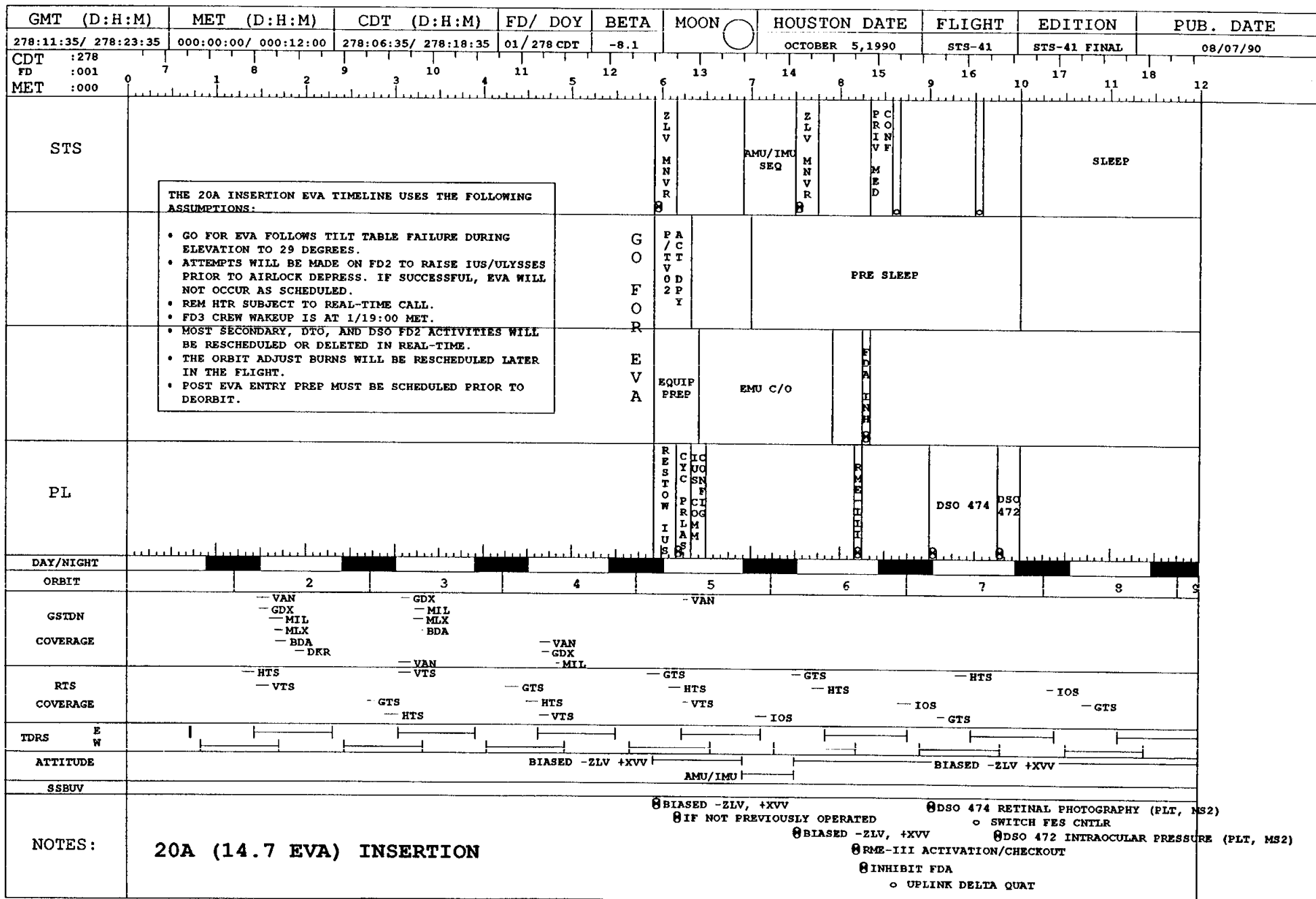


## 20A ULYSSES (14.7 PSIA EVA) INSERTION

The 20A Ulysses Insertion timeline is designed to accommodate delaying deployment of Ulysses until the 20A Insertion opportunity following an EVA to manually raise the tilt table. The 14.7 psia EVA timeline will be utilized in the event 10.2 psia protocol is not an option. There will be no Flight Day 1 EVA. The Contingency EVA Operations STS-41 Flight Supplement, Contingency EVA for Payload Failures section, is the source document for the 20A Insertion timeline. Additional assumptions are shown on the timeline. The trajectory utilized is the nominal Flight Cycle OMS-2 Insertion.

20A  
INSERTION

# 20A INSERTION



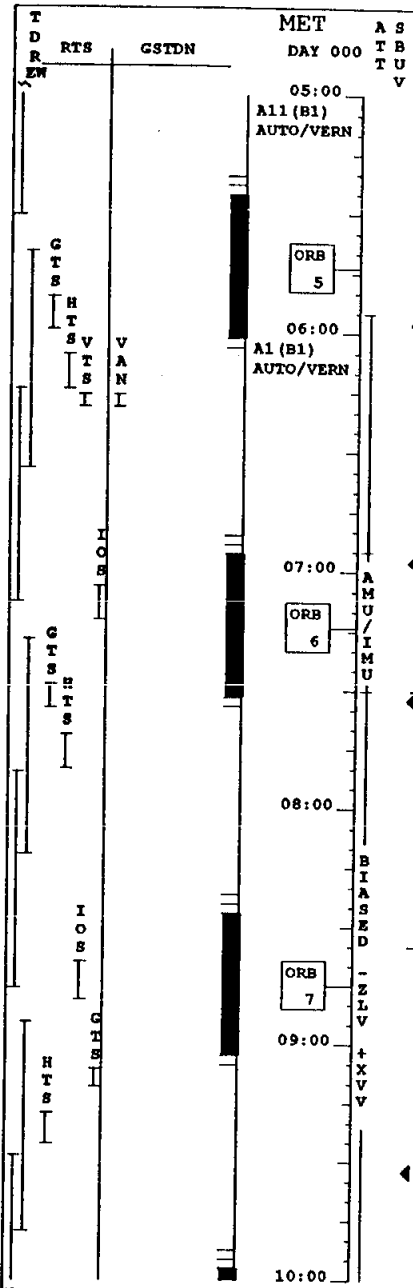
GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE					
278:23:35/ 279:11:35	000:12:00/ 001:00:00	278:18:35/ 279:06:35	02/ 278 CDT	-6.4	☉	OCTOBER 5, 1990	STS-41	STS-41 FINAL	08/07/90					
CDT :278														
FD :01														
MET :000														
	12 19	13 20	14 21	15 22	16 23	17 0	18 CDT:279	1 19	2 20	3 21	4 22	5 23	6 0	MET:001
STS	SLEEP											AMU/IMU SEQ	Z L V M N V R	
												POST SLEEP	P/TV02 ACT DPY	
												EVA PREP	BEGIN 4.0 HOUR PREBREATHE	
PL												TRANSFER SV	PREP MAN ELEV	
DAY/NIGHT	[Day/Night Cycle]													
ORBIT	9	10	11	12	13	14	15	16						
GSTDN COVERAGE	-DKR	-DKR	-DKR	-DKR	-DKR	-MLX -BDA -DKR -MAX	-BDA -DKR	-DKR	-CAN	-VAN -MLX -MIL -BDA	-DKR	-CAN	-CAN	
RTS COVERAGE	-GTS	-GTS				-CAN	-MIL	-CAN	-MIL -MLX	-VTS			-IOS	-IOS
TDRS	[TDRS Coverage]													
ATTITUDE	BIASED -ZLV +XVW													
SSBUV	[SSBUV Coverage]													
NOTES:	20A (14.7 EVA) INSERTION ○ SWITCH FES CNTRL ⊕ ENABLE FDA ⊕ BIASED -ZLV, +XVW ○ UPLINK DELTA QUAT ⊕ PRE-DPY CK													



# STS-41 (FD01) 20A(14.7 EVA) INSERTION

PL

MCC



Change DAP A to A1  
Config DAP A/AUTO/VERN  
MNRV (TRK) BIASED -ELV +XVV  
TG-2 BV-5  
P-90 Y-330 OM-180  
A/AUTO/VERN (05:55) Init TRK

P/TVO2 ACT (SAT DEPLOY)  
(PHOTO/TV, P/TV SCENES)

EQUIP PREP  
(EVA, EQUIP PREP)  
(2 Cmn)

RESTOR IUS (UMBIL ATTACHED)  
(IUS DPY, CONT OPS)

CYCLE IUS PRELAS (If req'd)  
(IUS DPY, CONT OPS)  
IUS THROUGHPUT COMMANDING  
(IUS DPY, CONT OPS)

EMU CHECKOUT AT 14.7 PSI  
(EVA, EMU CHECKOUT)  
(2 Cmn)

UPLINK  
AMU VARIABLE  
PARAMETER

AMU/IMU SEQUENCE  
(IUS DPY, PRE DRY CHECKS)

UPDATE  
IMU TO Deselect

MNRV (TRK) BIASED -ELV +XVV  
TG-2 BV-5  
P-90 Y-330 OM-180  
A/AUTO/VERN Init TRK

UPLINK (TDRE)  
KU COMM  
PWR - ON

PRE-SLEEP ACTIVITY  
(ORB OPS, CREW SYS)

ACTIVATION/CHECKOUT  
(PL OPS, FME-III)

PRIVATE MEDICAL CONFERENCE

Do not perform  
SUPPLY WATER DUMP

Check HUM SEP for  
water accumulation

UPLINK  
DELTA  
QUATERNION

**FDA SLEEP CONFIG**

A1L	✓ S-BD PL CNTL - CMD
CRT	SM 62 PCMMU/PL COMM
DECOM	ENA
FDA 1	- ITEM 14 EXEC (NO *)
2	- ITEM 15 EXEC (NO *)
3	- ITEM 16 EXEC (NO *)
4	- ITEM 17 EXEC (NO *)

RETINAL PHOTO (DSO 474)  
(MED FS, MED DSO'g)  
(PLT, MS2)

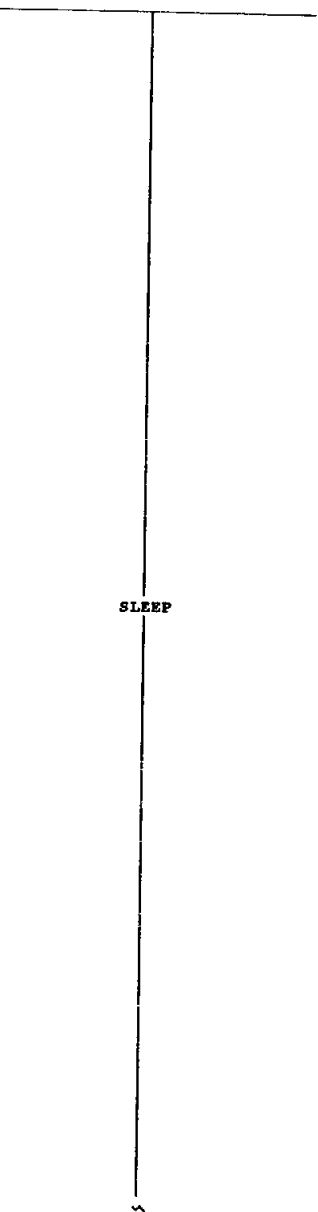
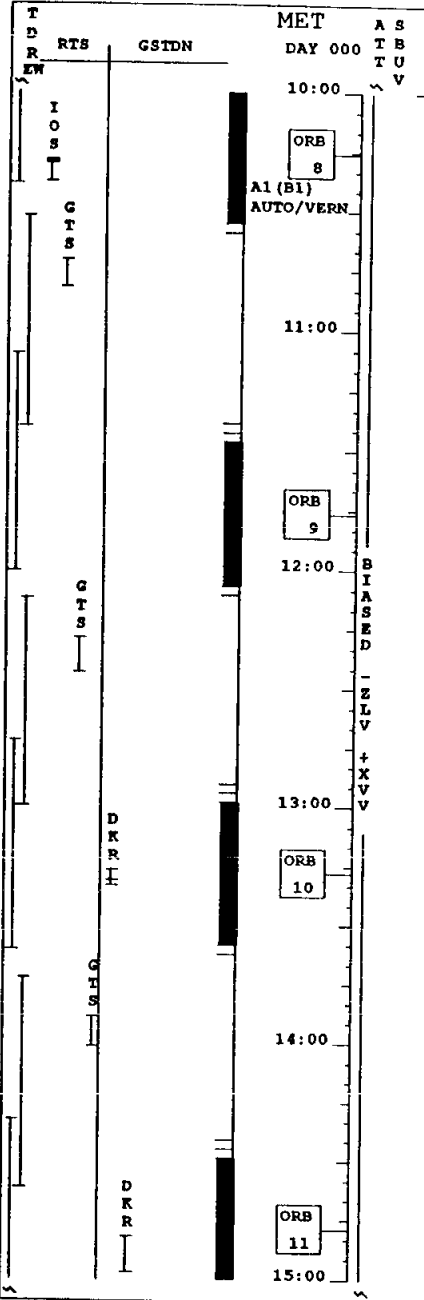
SWITCH FES CNTLR  
L1 FLASH EVAP CNTLR PRI A-OFF  
O1 WHEN EVAP OUT T > 47 deg F.  
L1 FLASH EVAP CNTLR PRI B-ON

IOE (DSO 472)  
(MED FS, MED DSO'g)  
(PLT, MS2)

# STS-41 (FD 01) 20A (14.7 EVA) INSERTION

PL

MCC



# STS-41 (FD01) 20A(14.7 EVA) INSERTION

PL

MCC

**TDR**  
RTS  
GSTDN  
MET DAY 000  
A1 (B1)  
AUTO/VERN  
15:00  
16:00  
17:00  
18:00  
19:00  
20:00

**AS**  
T  
B  
U  
V

**B**  
**I**  
**A**  
**S**  
**E**  
**D**

**Z**  
**L**  
**V**

**+**  
**X**  
**V**  
**V**

**A**  
**M**  
**U**  
**/**  
**I**  
**M**  
**U**

**D**  
**K**  
**R**  
**R**

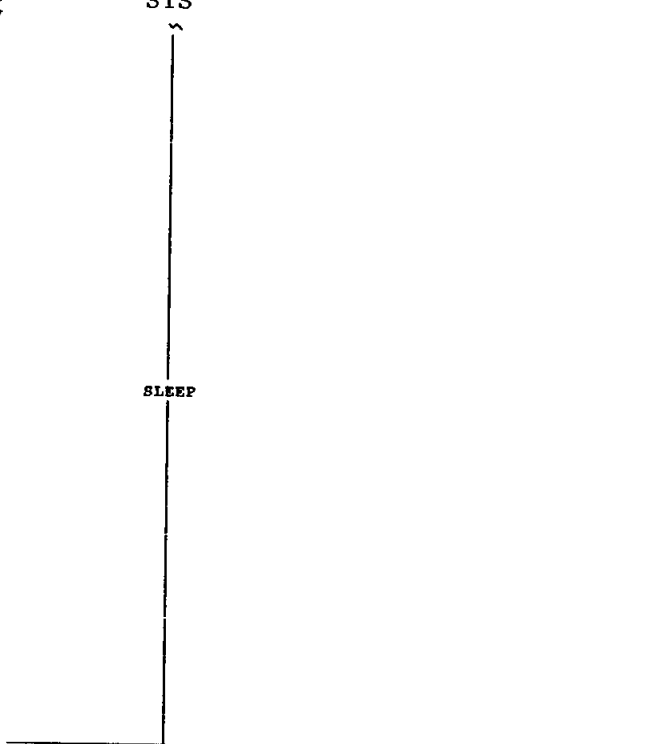
**D**  
**K**  
**M**  
**R**  
**A**  
**X**  
**X**

**C**  
**A**  
**N**

**M**  
**M**  
**L**  
**X**  
**X**

**B**  
**D**  
**A**  
**D**  
**K**  
**R**  
**R**

**I**  
**O**  
**S**



◀ **SWITCH FES CNTLR**  
L1 FLASH EVAP CNTLR PRI B-OFF  
01 WHEN EVAP OUT T > 47 deg F.  
L1 FLASH EVAP CNTLR PRI A-ON

◀ **AMU/IMU SEQUENCE**  
(IUS DPY, PRE DPY CHECKS)

◀ **MNVR (TRK) BIASED -ZLV +XVV**  
TG-2 SV-5  
P-90 Y-330 CM-180  
A/AUTO/VERN Init TRK

**POST-SLEEP ACTIVITY**  
(ORB OPS, CREW SYS)

Do not perform  
SUPPLY WATER DUMP

**FDA POST SLEEP CONFIG**

CRT **SM 62 PCMMU/PL COMM**

DECOM	ENA
FDA 1	- ITEM 14 EXEC (*)
2	- ITEM 15 EXEC (*)
3	- ITEM 16 EXEC (*)
4	- ITEM 17 EXEC (*)

**TRANSFER SV (TDRW)**  
(IUS DPY, PRE DPY CHECKS)

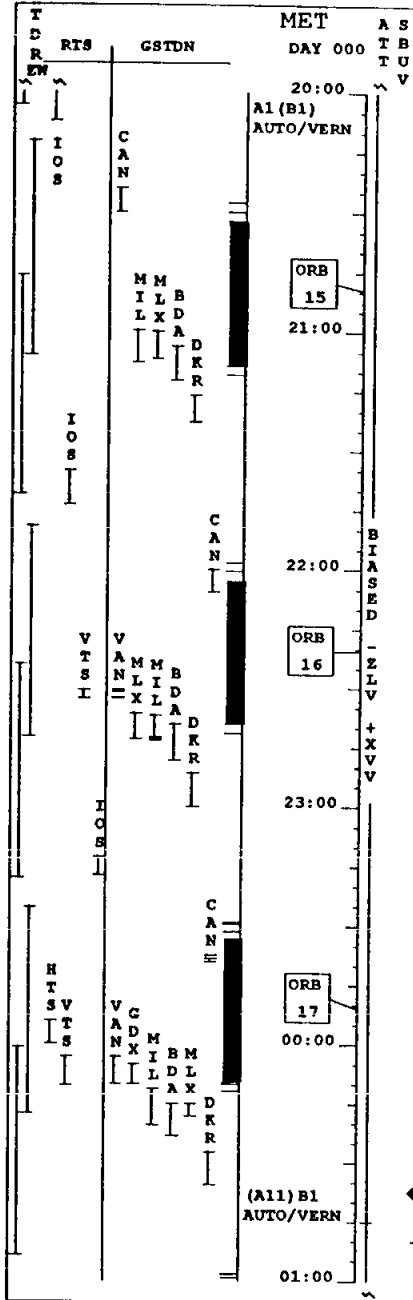
**EVA PREP**  
(EVA, EVA PREP)  
(3 Cmn)

**UPLINK**  
AMU VARIABLE  
PARAMETER  
**UPLINK (TDRW)**  
ORB & TGT SV  
INFORM CREW  
GO FOR SV XFER  
**UPDATE**  
IMU TO DESELECT

# STS-41 (FD 01) 20A(14.7 EVA) INSERTION

PL

MCC



**POST-SLEEP ACTIVITY**  
 (ORB OPS, CREW SYS)

Do not perform  
 SUPPLY WATER DUMP

**EVA PREP**  
 (EVA, EVA PREP)  
 (3 Cmn)

◀ BEGIN 4 HOUR PREBREATHE

**P/TV02 ACT (SAT DEPLOY)**  
 (PHOTO/TV, P/TV SCENES)

**PHY SYS EXPERIMENT**  
 (PL OPS, PSE)

**IUS PRE-DEPLOY C/O (TDRE)**  
 (IUS DPY, PRE DPY CHECKS)

**EVA PREP FOR IUS**  
**MANUAL ELEVATION**  
 (C EVA, CONTINGENCY EVA)  
 (BLOCK 1)

**TRANSFER SV (TDRE)**  
 (IUS DPY, LATE CHECKS)

**AIRLOCK DEPRESS**  
 (Cue Card)  
 (3 Cmn)  
**EVA (IUS MANUAL ELEV)**  
 (EVA, EVA CUFF C/L)  
 EGRESS

**IUS MANUAL ELEVATION**  
 (C EVA, CONTINGENCY EVA)  
 (BLOCK 2)

◀ **MNVR TO DEPLOY ATTITUDE**  
 (IUS DPY, DPY OPS)

**UPLINK (TDRM)**  
 DELTA  
 QUATERNION

**INFORM CREW**  
 GO FOR PWR XFER  
 GO FOR PDCO

**UPLINK (TDRE)**  
 ORB & TGT SV

**INFORM CREW**  
 GO FOR SV XFER







STS-41  
ATTITUDE TIMELINE

ATTITUDE  
TIMELINE

Attitude Timeline

MET	MNVR OPTION		DAP	E/S	REMARKS	EVENT
1 0/01:12:00 21:14	TRK TGT=2 BV=5( 90.00,330.00) OM=180.00	A1 AUTO NORM	DSC 0.200 DB AT 5.00 DB RT 0.20	EARTH T 90 P 330	LVLH R+210 P+ 0 Y+ 0	PLBD OPENING
2 0/03:46:00 49:45	MNVR R+177.00 P+ 20.00 Y+326.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 129 P 125		AMU #1
3 0/03:53:00 04:03:00	MNVR R+211.00 P+137.00 Y+ 14.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 45 P 117		AMU #2
4 0/04:06:00 16:02	MNVR R+ 88.00 P+155.00 Y+ 8.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 28 P 229	STAR PR B1 -Y: 46 -Z: 23	AMU #3 / IMU ALIGN / AMU #4
5 0/04:29:00 43:13	TRK TGT=2 BV=5( 90.00,330.00) OM=180.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 330	LVLH R+210 P+ 0 Y+ 0	ROLL BIASED -ZLV +XVV
6 0/05:05:00 13:44	TRK TGT=4 BV=5(277.70, 0.00) OM=270.00 DEPLOY 0/06:01:29	B1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 83 P 180	INRTL R+ 9 P+263 Y+330	DEPLOY ATT
7 0/06:02:29	ROT BV=5( 0.00,270.00)	B1 MAN NORM	DSC 0.420 DB AT 3.00 DB RT 0.20		ROT R+ 9 START P+263 ATT Y+330	-2.2 FPS SEP BEGIN -70 DEG PITCH
8 0/06:02:37	ROT BV=5( 0.00,270.00)	B1 MAN NORM	DSC 0.840 DB AT 3.00 DB RT 0.20		ROT R+ 7 START P+259 ATT Y+330	SEP CUTOFF / CONTINUE -70 DEG PITCH
9 0/06:03:56	CANCEL	B1 MAN NORM	DSC 0.500 DB AT 3.00 DB RT 0.20	SUN T 13 P 179	INRTL R+334 P+187 Y+343	END OF -70 DEG PITCH
10 0/06:08:29 10:27	MNVR R+319.00 P+153.00 Y+288.00	B1 AUTO NORM	DSC 0.500 DB AT 3.00 DB RT 0.20	SUN T 62 P 106		OMS SEP
11 0/06:16:56 18:26	TRK TGT=1 BV=3( 90.00, 0.00) OM= 0.00	B1 AUTO NORM	DSC 0.500 DB AT 3.00 DB RT 0.20	SUN T 82 P 121		IUS VIEW ATT
12 0/06:46:29 51:18	TRK TGT=1 BV=5(327.00, 0.00) OM= 0.00	B1 AUTO NORM	DSC 0.500 DB AT 3.00 DB RT 0.20	SUN T 130 P 173		WINDOW PROTECT ATT

\*\*\*ALL ATTITUDES IN MEAN OF 1950\*\*\*

ATTITUDE  
TIMELINE

Attitude Timeline

MET	MNVR OPTION		DAP	E/S	REMARKS	EVENT
1 0/07:06:29	CANCEL	B1 MAN VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 130 P 173	INRTL R+321 P+322 Y+ 54	INRTL HOLD
2 0/07:20:00 31:22	TRK TGT=2 BV=3( 90.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+ 0 P+180 Y+ 90	-ZLV +YVV
3 0/08:25:00 39:46	MNVR R+238.00 P+ 78.00 Y+309.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 86 P 109	STAR PR A1 -Y: 54 -Z: 27	IMU ALIGN
4 0/08:45:00 59:19	TRK TGT=2 BV=3( 90.00, 0.00) OM=150.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+330	YAW BIASED -ZLV +XVV
5 0/20:32:00 41:56	MNVR R+238.00 P+ 78.00 Y+309.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 85 P 109	STAR PR A1 -Z: 27	IMU ALIGN -Z COAS CAL
6 0/20:52:00 21:03:40	TRK TGT=2 BV=3( 90.00, 0.00) OM= 90.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+ 0 P+180 Y+270	-ZLV -YVV
7 0/22:30:00 40:14	MNVR R+295.00 P+353.00 Y+ 47.00	B1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 145 P 158		OMS BURN
8 0/23:10:00 24:23	MNVR R+ 56.00 P+165.00 Y+325.00	B1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 25 P 11		RCS BURN
9 0/23:40:00 54:59	TRK TGT=2 BV=3( 90.00, 0.00) OM=180.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+ 0	-ZLV +XVV AMOS RCS TEST
10 1/02:55:00 03:04:16	TRK TGT=2 BV=5(357.51, 359.23) OM=110.91	B3 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 3 P 204	LVLH R+111 P+268 Y+ 2	GG +XLV PLB SOUTH ATT ID B
11 1/05:55:00 06:05:30	TRK TGT=4 BV=3( 90.00, 0.00) OM= 0.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 90 P 359	INRTL R+337 P+ 64 Y+302	-ZSI / SSBV
12 1/07:00:00 05:23	MNVR R+ 15.00 P+283.00 Y+ 44.00	B1 AUTO NORM	DSC 0.500 DB AT 3.00 DB RT 0.20	SUN T 112 P 161	STAR PR A2 -Y: 27 -Z: 54 +X: 18	IMU ALIGN +X COAS CAL

\*\*\*ALL ATTITUDES IN MEAN OF 1950\*\*\*

Attitude Timeline

MET	MNVR OPTION		DAP	E/S	REMARKS	EVENT
1/07:19:00 24:21	TRK TGT=2 BV=3( 90.00, 0.00) OM=150.00	B1 AUTO NORM	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+330	YAW BIASED -ZLV +XVV
1/19:07:00 11:38	MNVR R+ 15.00 P+283.00 Y+ 44.00	B1 AUTO NORM	DSC 0.500 DB AT 3.00 DB RT 0.20	SUN T 112 P 161	STAR PR A2 +X: 18	IMU ALIGN / +X COAS CAL / HUD DTO
1/19:43:00 52:16	TRK TGT=5 BV=1( 0.00, 0.00) OM=BLANK	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 1 P 166	INRTL R+ 62 P+175 Y+348	+XSI/HUD DTO RA 192.14 DEC -5.21
1/20:00:00 14:05	TRK TGT=2 BV=3( 90.00, 0.00) OM=150.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+330	YAW BIASED -ZLV +XVV
1/20:45:00 57:42	TRK TGT=4 BV=3( 90.00, 0.00) OM= 0.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 90 P 0	INRTL R+335 P+ 63 Y+302	-ZSI / SSBV
1/22:30:00 44:18	MNVR R+225.30 P+218.40 Y+ 59.50	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 80 P 1		DTO 827
1/22:50:00	ROT BV=5( 0.00, 90.00)	A12 AUTO NORM	DSC 0.620 DB AT 0.20 DB RT 0.20		ROT R+225 START P+218 ATT Y+ 60	BEGIN +PITCH
1/22:50:30	ROT BV=5( 0.00, 90.00)	A12 AUTO VERN	DSC 0.620 DB AT 0.30 DB RT 0.01		ROT R+240 START P+200 ATT Y+ 45	CONTINUE +PITCH
1/22:52:00	ROT BV=5( 0.00, 90.00)	A12 MAN VERN	DSC 0.620 DB AT 0.30 DB RT 0.01		ROT R+249 START P+175 ATT Y+353	FREE DRIFT / CONTINUE +PITCH
0 1/23:00:00	CANCEL	B2 MAN NORM	DSC 0.200 DB AT 3.00 DB RT 0.20	SUN T 68 P 1	INRTL R+236 P+205 Y+ 50	END OF +PITCH
1 1/23:15:00 29:46	TRK TGT=2 BV=3( 90.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+ 0 P+180 Y+ 90	-ZLV +XVV / H2O DUMP
2 2/01:00:00 12:17	MNVR R+ 15.00 P+283.00 Y+ 44.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 112 P 161	STAR PR A2 +X: 18	IMU ALIGN / +X COAS CAL / HUD DTO

\*\*ALL ATTITUDES IN MEAN OF 1950\*\*\*

Attitude Timeline

MET	MNVR OPTION		DAP	E/S	REMARKS	EVENT
1 2/01:44:00 57:26	TRK TGT=4 BV=3( 90.00, 0.00) OM= 0.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 90 P 0	INRTL R+335 P+ 63 Y+302	-ZSI / SSBUV
2 2/04:05:00 18:12	TRK TGT=2 BV=3( 90.00, 0.00) OM=150.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+330	YAW BIASED -ZLV +XVV
3 2/07:09:00 13:35	MNVR R+ 15.00 P+283.00 Y+ 44.00	B1 AUTO NORM	DSC 0.500 DB AT 3.00 DB RT 0.20	SUN T 112 P 162	STAR PR A2 +X: 18	IMU ALIGN / +X COAS CAL / HUD DTO
4 2/07:39:00 44:50	TRK TGT=2 BV=3( 90.00, 0.00) OM=150.00	B1 AUTO NORM	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+330	YAW BIASED -ZLV +XVV
5 2/20:42:00 46:34	MNVR R+ 15.00 P+283.00 Y+ 44.00	B1 AUTO NORM	DSC 0.500 DB AT 3.00 DB RT 0.20	SUN T 113 P 162	STAR PR A2 +X: 18	IMU ALIGN / +X COAS CAL / HUD DTO
6 2/21:17:00 30:53	TRK TGT=2 BV=3( 90.00, 0.00) OM=150.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+330	YAW BIASED -ZLV +XVV
7 3/05:45:00 57:41	TRK TGT=4 BV=3( 90.00, 0.00) OM= 0.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 90 P 1	INRTL R+332 P+ 60 Y+301	-ZSI / SSBUV
8 3/07:10:00 23:23	MNVR R+ 15.00 P+283.00 Y+ 44.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 113 P 162	STAR PR A2 +X: 18	IMU ALIGN / +X COAS CAL / HUD DTO
9 3/07:49:00 08:02:55	TRK TGT=2 BV=3( 90.00, 0.00) OM=150.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+330	YAW BIASED -ZLV +XVV
10 3/19:15:00 25:00	MNVR R+238.00 P+ 78.00 Y+309.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 82 P 109	STAR PR A1	IMU ALIGN
11 3/19:35:00 43:05	TRK TGT=4 BV=5(184.00, 0.00) OM= 90.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 176 P 178	INRTL R+207 P+357 Y+ 16	-XSI
12 3/22:07:00 15:05	MNVR R+238.00 P+ 78.00 Y+309.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 82 P 109	-Y: 54 -Z: 27	DEORBIT IMU ALIGN

Attitude Timeline						
MET	MNVR OPTION		DAP	E/S	REMARKS	EVENT
1 3/22:27:00 29:50	MNVR R+184.00 P+358.00 Y+ 1.00	B1 AUTO NORM	DSC 0.500 DB AT 3.00 DB RT 0.20	SUN T 166 P 104	-Y: 24 -Z: 45	DEORBIT IMU VERIF
2 3/22:52:00 56:50	MNVR R+ 54.00 P+ 90.00 Y+ 0.00	B1 AUTO NORM	DSC 0.500 DB AT 3.00 DB RT 0.20	SUN T 84 P 291		D/O COMM ATT
3 4/00:52:00 54:38	MNVR R+ 62.00 P+169.00 Y+350.00 TIG 4/01:07:04	B1 AUTO NORM	DSC 0.500 DB AT 3.00 DB RT 0.20	SUN T 6 P 251		D/O BURN ATT

\*\*\*ALL ATTITUDES IN MEAN OF 1950\*\*\*

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FLT PLN/41/FIN



The sections following this divider page  
will not be included in flight copies.

STS-41 DAP BOOK

DAP A CONFIGURATIONS

	A1*	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
<u>TRANSLATION</u>												
PULSE ft/sec	0.10	0.10	0.10	0.10	0.10	0.10		0.10	0.10	0.05	0.25	0.10
<u>ROTATION</u>												
DSC RT NORM °/sec	0.200	0.400	0.200	0.200	0.200	0.200		0.500	0.200	0.200	0.200	0.620
VERN °/sec	0.200	0.400	0.200	0.008	0.200	0.200		0.200	0.200	0.200	0.200	0.620
PULSE NORM °/sec	0.10	0.10	0.30	0.10	0.10	0.10		0.10	0.10	0.10	0.05	0.10
VERN °/sec	0.010	0.010	0.010	0.010	0.050	0.010		0.010	0.010	0.010	0.010	0.010
COMP NORM °/sec	.00	.00	.00	.00	.00	.00		.00	.00	.00	.00	.00
VERN °/sec	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.00
<u>DEADBAND</u>												
ATT NORM (deg)	5.00	1.00	5.00	1.00	5.00	5.00		3.00	2.00	2.00	1.00	0.20
VERN (deg)	1.000	1.000	1.000	0.070	1.000	1.000		1.000	1.000	1.000	1.000	0.30
RATE NORM °/sec	0.20	0.20	0.20	0.20	0.20	0.20		0.20	0.20	0.20	0.20	0.20
VERN °/sec	.020	.020	.020	.010	.020	.020		.020	.020	.020	.010	.010
<u>JET OPT</u>												
P	1	1	3	1	1	3		1	1	1	3	3
Y	1	1	3	3	1	3		1	1	1	3	3
CNTL ACCEL	0	0	0	0	0	0		0	0	0	0	0

\*I-LOADED OPS-2 DAP Configuration

6-2

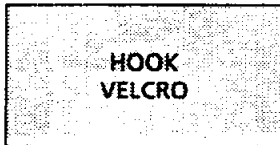
FLT PLN/41/FIN

DAP B CONFIGURATIONS

	B1*	B2	B3	B4	B5	B6	B7	B8
<u>TRANSLATION</u>								
PULSE ft/sec	0.02	0.02	0.02	0.02	0.02	0.05	0.01	
<u>ROTATION</u>								
DSC RT NORM °/sec	0.500	0.200	0.200	0.200	0.200	0.500	0.200	
VERN °/sec	0.200	0.200	0.200	0.008	0.016	0.200	0.200	
PULSE NORM °/sec	0.04	0.04	0.04	0.04	0.04	0.04	0.04	
VERN °/sec	0.002	0.002	0.002	0.002	0.002	0.002	0.002	
COMP NORM °/sec	.00	.00	.00	.00	.00	.00	.00	
VERN °/sec	.000	.000	.000	.000	.000	.000	.000	
<u>DEADBAND</u>								
ATT NORM (deg)	3.00	3.00	3.00	0.30	3.00	2.00	2.00	
VERN (deg)	1.000	1.000	1.000	0.100	0.033	1.000	1.000	
RATE NORM °/sec	0.20	0.20	0.20	0.20	0.20	0.20	0.20	
VERN °/sec	.020	.020	.020	.010	.020	.020	.020	
<u>JET OPT</u>								
P	1	3	1	3	3	1	1	
Y	1	3	1	3	3	1	1	
CNTL ACCEL	0	0	0	0	0	0	0	

\*I-LOADED OPS-2 DAP Configuration

# DAP BOOK



FLT PLN-1a/41/0/A

UNIV PTG	
TGT ID = 1	Orbiting Vehicle .
= 2	Earth ctr
= 3	Earth tgt
	Input LAT ( $\pm 90$ )
	LON ( $\pm 180$ , + = East)
	ALT (-3444.0 to 20000.0 nm)
= 4	Sun ctr
= 5	Celestial tgt
	Input RA (0-359.99)
	DEC ( $\pm 90$ )
= 11-110	Nav Stars
BODY VECT = 1	+X*
= 2	-X*
= 3	-Z*
= 4	PTC ( $-2^\circ$ below +X)*
= 5	Optional
	Input P (0-359.99)
	Y (270-359.99, 0-90)
* input OM $\rightarrow$	OM (0-359.99)
MON AXIS = 1	+X
2	-X

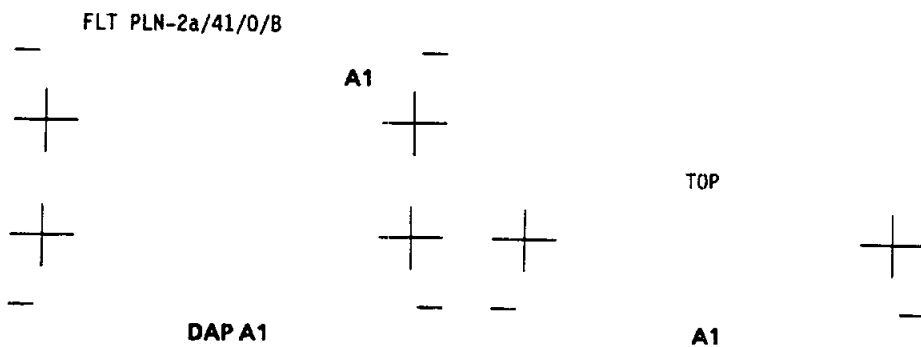
FLT PLN-1b/41/0/A

G20 DAP CONFIG	
CNTL ACCEL = 0	Orbiter alone
= 1 thru 5	not used
JET OPT = 1	Normal
= 2	Nose only
= 3	Tail only



DAP                      PURPOSE

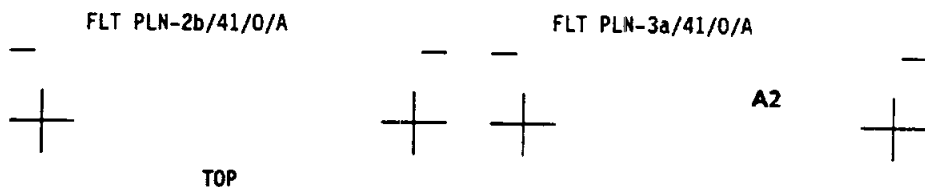
- A1 - NOMINAL  
IMU ALIGN  
LOSS OF VERN  
(NOSE & TAIL)
- A2 - PTC
- A3 - RCS HOT FIRE
- A4 - GG
- A5 - IMU ROTATION
- A6 - LOSS OF VERN  
(TAIL ONLY)
- A7 - (Blank)
- A8 - PRE/POST DEPLOY
- A9 - RENDEZVOUS
- A10 - PROX OPS
- A11 - IUS
- A12 - DTO 827



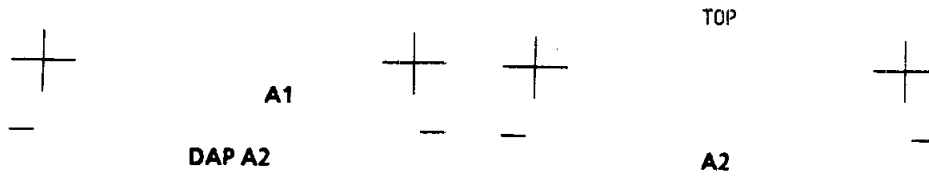
PURPOSE:

- NOMINAL
- IMU ALIGN
- LOSS OF VERN  
(NOSE & TAIL)

0.1 0	1	TRANSLATION PULSE
ROTATION		
0.2 0 0	2	DSC RT NORM
0.2 0 0	3	VERN
0.1 0 0	4	PULSE NORM
0.0 1 0	5	VERN
.0 0 0	6	COMP NORM
.0 0 0	7	VERN
DEADBAND		
5.0 0	8	ATT NORM
1.0 0 0	9	VERN
0.2 0	10	RATE NORM
.0 2 0	11	VERN
1	12	JET OPT P
1	13	Y
0	14	CNTL ACCEL



(reduced copy)

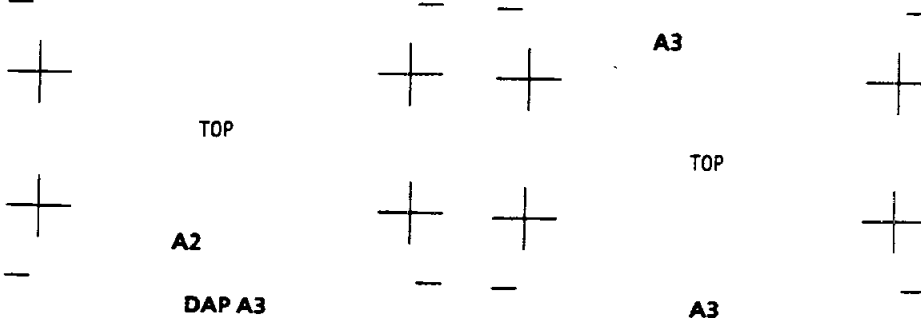


PURPOSE:  
PTC

0.1 0	1	TRANSLATION	
		PULSE	
ROTATION			
0.4 0 0	2	DSC RT	NORM
0.4 0 0	3		VERN
0.1 0 0	4	PULSE	NORM
0.0 1 0	5		VERN
.0 0 0	6	COMP	NORM
.0 0 0	7		VERN
DEADBAND			
1.0 0	8	ATT	NORM
1.0 0 0	9		VERN
0.2 0	10	RATE	NORM
.0 2 0	11		VERN
1	12	JET OPT	P
1	13		Y
0	14	CNTL ACCEL	

FLT PLN-3b/41/0/A

FLT PLN-4a/41/0/A

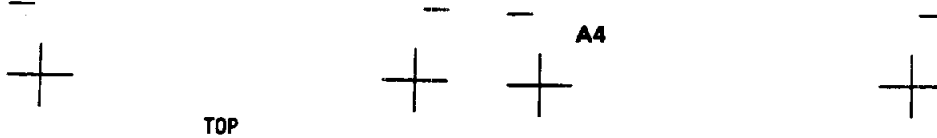


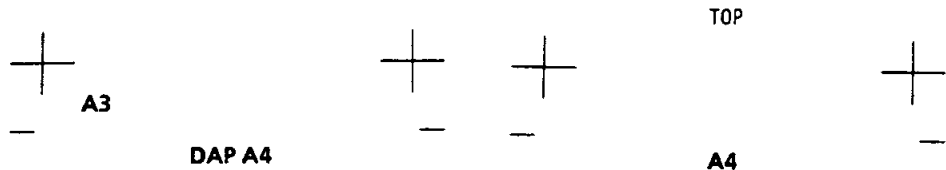
PURPOSE:  
RCS HOT FIRE

0.1 0	1	TRANSLATION	
		PULSE	
ROTATION			
0.2 0 0	2	DSC RT	NORM
0.2 0 0	3		VERN
0.3 0 0	4	PULSE	NORM
0.0 1 0	5		VERN
.0 0 0	6	COMP	NORM
.0 0 0	7		VERN
DEADBAND			
5.0 0	8	ATT	NORM
1.0 0 0	9		VERN
0.2 0	10	RATE	NORM
.0 2 0	11		VERN
3	12	JET OPT	P
3	13		Y
0	14	CNTL ACCEL	

FLT PLN-4b/41/0/A

FLT PLN-5a/41/0/A



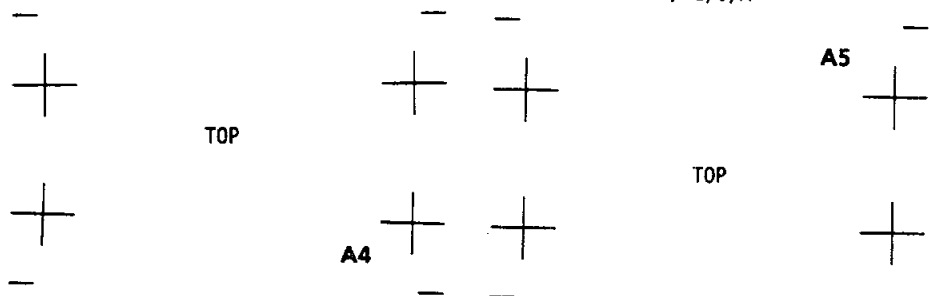


PURPOSE:  
GG

0.1 0	1	TRANSLATION	
		PULSE	
ROTATION			
0.2 0 0	2	DSC RT	NORM
0.0 0 8	3		VERN
0.1 0	4	PULSE	NORM
0.0 1 0	5		VERN
.0 0 0	6	COMP	NORM
.0 0 0	7		VERN
DEADBAND			
1.0 0	8	ATT	NORM
0.0 7 0	9		VERN
0.2 0	10	RATE	NORM
.0 1 0	11		VERN
1	12	JET OPT	P
1	13		Y

FLT PLN-5b/41/0/A

FLT PLN-6a/41/0/A

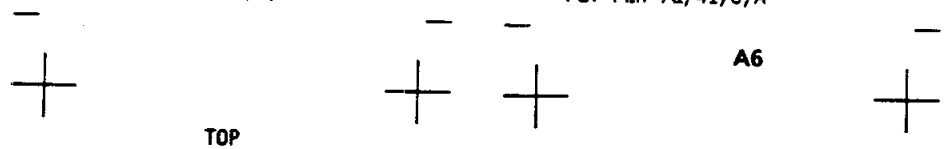


PURPOSE:  
IMU ROTATION

0.1 0	1	TRANSLATION	
		PULSE	
ROTATION			
0.2 0 0	2	DSC RT	NORM
0.2 0 0	3		VERN
0.1 0	4	PULSE	NORM
0.0 5 0	5		VERN
.0 0 0	6	COMP	NORM
.0 0 0	7		VERN
DEADBAND			
5.0 0	8	ATT	NORM
1.0 0 0	9		VERN
0.2 0	10	RATE	NORM
.0 2 0	11		VERN
1	12	JET OPT	P
1	13		Y
0	14	CNTL ACCEL	

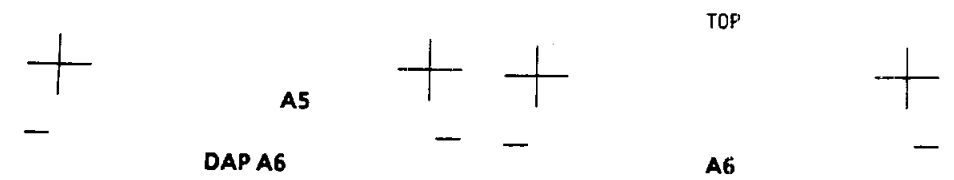
FLT PLN-6b/41/0/A

FLT PLN-7a/41/0/A



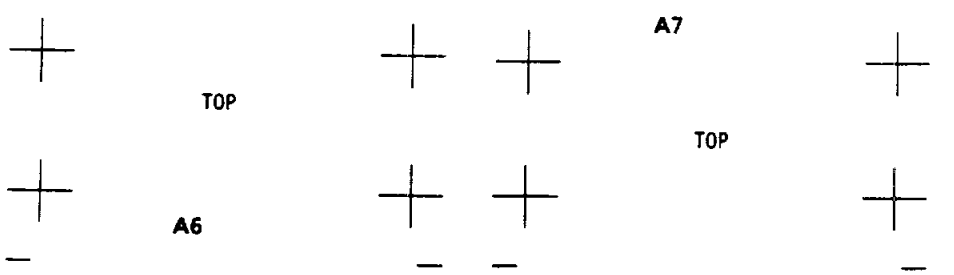
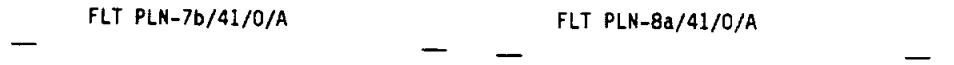
(reduced copy)





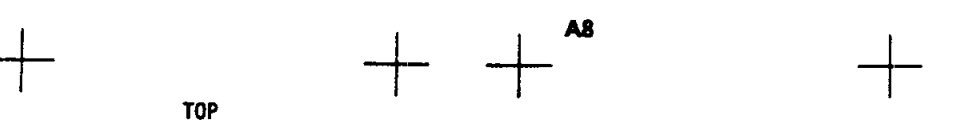
PURPOSE:  
LOSS OF VERN  
(TAIL ONLY)

0.1 0	1	TRANSLATION	
		PULSE	
ROTATION			
0.2 0 0	2	DSC RT	NORM
0.2 0 0	3		VERN
0.1 0 0	4	PULSE	NORM
0.0 1 0 0	5		VERN
.0 0 0	6	COMP	NORM
.0 0 0	7		VERN
DEADBAND			
5.0 0	8	ATT	NORM
1.0 0 0	9		VERN
0.2 0	10	RATE	NORM
.0 2 0	11		VERN
3	12	JET OPT	P
3	13		Y
0	14	CNTL ACCEL	



PURPOSE: (Blank)

---	1	TRANSLATION	
		PULSE	
ROTATION			
---	2	DSC RT	NORM
---	3		VERN
---	4	PULSE	NORM
---	5		VERN
---	6	COMP	NORM
---	7		VERN
DEADBAND			
---	8	ATT	NORM
---	9		VERN
---	10	RATE	NORM
---	11		VERN
---	12	JET OPT	P
---	13		Y
---	14	CNTL ACCEL	



A7

+

TOP

+

DAP A8

A8

PURPOSE:  
PRE/POST DEPLOY

0.1 0	1	TRANSLATION	
		PULSE	
ROTATION			
0.5 0 0	2	DSC RT	NORM
0.2 0 0	3		VERN
0.1 0 0	4	PULSE	NORM
0.0 1 0	5		VERN
.0 0 0	6	COMP	NORM
.0 0 0	7		VERN
DEADBAND			
3.0 0	8	ATT	NORM
1.0 0 0	9		VERN
RATE			
0.2 0	10		NORM
.0 2 0	11		VERN
1	12	JET OPT	P
1	13		Y
0	14	CNTL ACCEL	

FLT PLN-9b/41/0/A

FLT PLN-10a/41/0/A

+

+

A9

+

TOP

TOP

+

+

+

A8

DAP A9

A9

PURPOSE:  
RENDEZVOUS

0.1 0	1	TRANSLATION	
		PULSE	
ROTATION			
0.2 0 0	2	DSC RT	NORM
0.2 0 0	3		VERN
0.1 0 0	4	PULSE	NORM
0.0 1 0	5		VERN
.0 0 0	6	COMP	NORM
.0 0 0	7		VERN
DEADBAND			
2.0 0	8	ATT	NORM
1.0 0 0	9		VERN
RATE			
0.2 0	10		NORM
.0 2 0	11		VERN
1	12	JET OPT	P
1	13		Y
0	14	CNTL ACCEL	

FLT PLN-10b/41/0/A

FLT PLN-11a/41/0/A

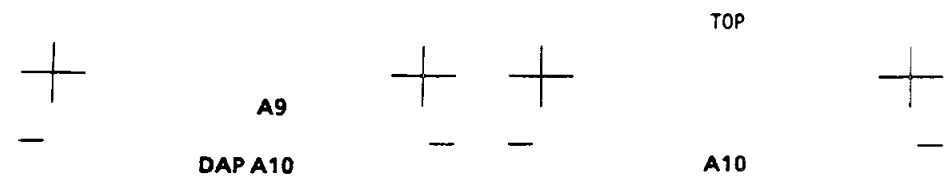
+

+

A10

+

TOP



PURPOSE:  
PROX OPS

0.0 5 1 TRANSLATION PULSE

ROTATION

0.2 0 0	2	DSC RT	NORM
0.2 0 0	3		VERN
0.1 0 0	4	PULSE	NORM
0.0 1 0	5		VERN
.0 0 0	6	COMP	NORM
.0 0 0	7		VERN

DEADBAND

2.0 0	8	ATT	NORM
1.0 0 0	9		VERN
0.2 0	10	RATE	NORM
.0 2 0	11		VERN
1	12	JET OPT	P
1	13		Y
0	14	CNTL ACCEL	



FLT PLN-11b/41/0/A

FLT PLN-12a/41/0/A

PURPOSE:  
IUS

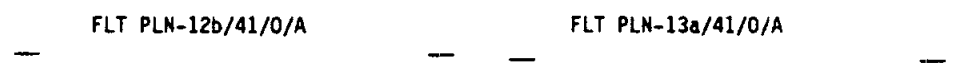
0.2 5 1 TRANSLATION PULSE

ROTATION

0.2 0 0	2	DSC RT	NORM
0.2 0 0	3		VERN
0.0 5 0	4	PULSE	NORM
0.0 1 0	5		VERN
.0 0 0	6	COMP	NORM
.0 0 0	7		VERN

DEADBAND

1.0 0	8	ATT	NORM
1.0 0 0	9		VERN
0.2 0	10	RATE	NORM
.0 1 0	11		VERN
3	12	JET OPT	P
3	13		Y
0	14	CNTL ACCEL	

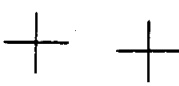


FLT PLN-12b/41/0/A

FLT PLN-13a/41/0/A



A11



TOP



DAP A12

PURPOSE:

DTO 827

A12  
TRANSLATION  
PULSE

0.1 0 1

ROTATION  
DSC RT NORM  
VERN  
PULSE NORM  
VERN  
COMP NORM  
VERN

0.6 2 0 2

0.6 2 0 3

0.1 0 4

0.0 1 0 5

.0 0 6

.0 0 0 7

DEADBAND  
ATT NORM  
VERN

0 0.2 0 8

0.3 0 0 9

0.2 0 10

.0 1 0 11

RATE NORM  
VERN

3 12

3 13

JET OPT P  
Y

0 14

CNTL ACCEL

FLT PLN-13b/41/0/B

FLT PLN-14a/41/0/B



TOP



TOP



A12



DAP                    PURPOSE

- B1 - NOMINAL  
      PRCS IMU ALIGN  
      OMS & RCS BURNS
- B2 - LOSS OF VERN  
      (TAIL ONLY)
- B3 - LOSS OF VERN  
      (NOSE & TAIL)  
      GG MNVR
- B4 - SSUS DEPLOY
- B5 - COAS CAL
- B6 - RENDEZVOUS
- B7 - PROX OPS
- B8 - (BTank)

FLT PLN-14b/41/0/B

FLT PLN-15a/41/0/B



TOP



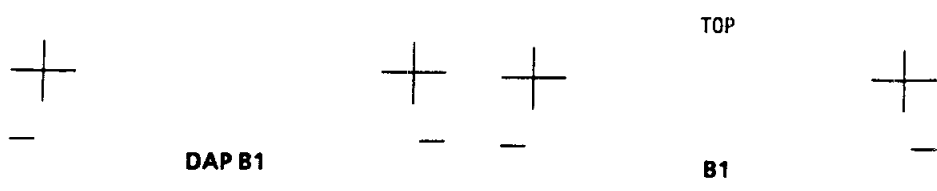
B1



(reduced copy)

6-11

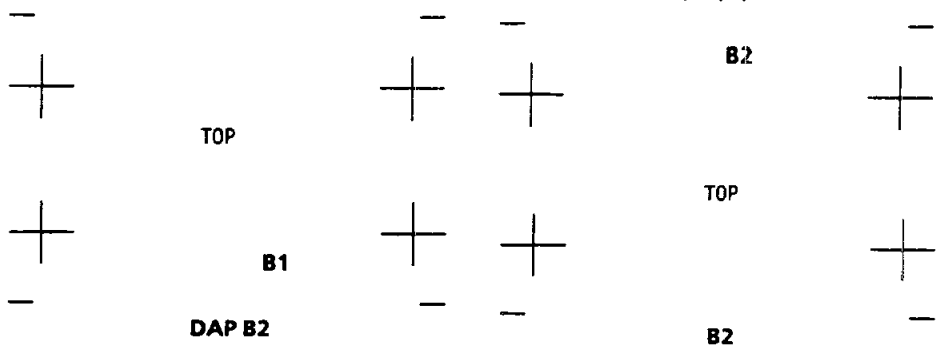
FLT PLN/41/FIN



PURPOSE:  
 NOMINAL  
 PRCS IMU ALIGN  
 OMS & RCS BURNS

TRANSLATION				
PULSE	15	0.0	2	
ROTATION				
DSC RT	NORM 16	0.5	0	0
	VERN 17	0.2	0	0
PULSE	NORM 18	0.0	0	4
	VERN 19	0.0	0	2
COMP	NORM 20	.0	0	0
	VERN 21	.0	0	0
DEADBAND				
ATT	NORM 22	3.0	0	0
	VERN 23	1.0	0	0
RATE				
	NORM 24	0.2	0	
	VERN 25	.0	2	0
JET OPT				
	P 26		1	
	Y 27		1	
CNTL ACCEL 28 0				

FLT PLN-15b/41/0/B

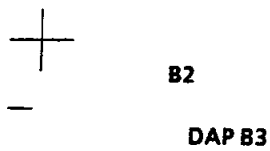


PURPOSE:  
 LOSS OF VERN  
 (TAIL ONLY)

TRANSLATION				
PULSE	15	0.0	2	
ROTATION				
DSC RT	NORM 16	0.2	0	0
	VERN 17	0.2	0	0
PULSE	NORM 18	0.0	0	4
	VERN 19	0.0	0	2
COMP	NORM 20	.0	0	0
	VERN 21	.0	0	0
DEADBAND				
ATT	NORM 22	3.0	0	0
	VERN 23	1.0	0	0
RATE				
	NORM 24	0.2	0	
	VERN 25	.0	2	0
JET OPT				
	P 26		3	
	Y 27		3	
CNTL ACCEL 28 0				

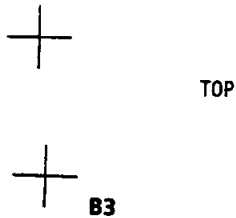
FLT PLN-16b/41/0/B





PURPOSE:  
LOSS OF VERN  
(NOSE & TAIL)  
GG MNVR

FLT PLN-17b/41/0/B



PURPOSE:  
SSUS DEPLOY

FLT PLN-18b/41/0/B



(reduced copy)



TRANSLATION  
PULSE 15 0.0 2

ROTATION  
DSC RT NORM 16 0.2 0 0  
VERN 17 0.2 0 0  
PULSE NORM 18 0.0 0 4  
VERN 19 0.0 0 2  
COMP NORM 20 0.0 0 0  
VERN 21 0.0 0 0

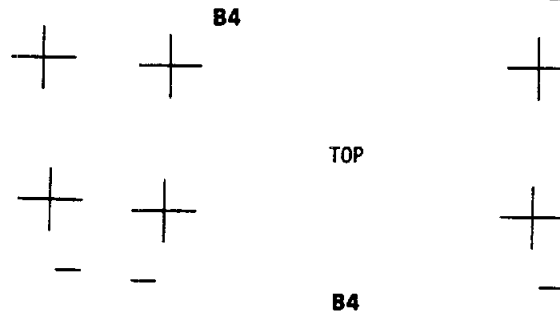
DEADBAND  
ATT NORM 22 3.0 0  
VERN 23 1.0 0 0

RATE NORM 24 0.2 0  
VERN 25 0.2 0

JET OPT P 26 1  
Y 27 1

CNTL ACCEL 28 0

FLT PLN-18a/41/0/B



TRANSLATION  
PULSE 15 0.0 2

ROTATION  
DSC RT NORM 16 0.2 0 0  
VERN 17 0.0 0 8  
PULSE NORM 18 0.0 0 4  
VERN 19 0.0 0 2  
COMP NORM 20 0.0 0 0  
VERN 21 0.0 0 0

DEADBAND  
ATT NORM 22 0.3 0  
VERN 23 0.1 0 0

RATE NORM 24 0.2 0  
VERN 25 0.1 0

JET OPT P 26 3  
Y 27 3

CNTL ACCEL 28 0

FLT PLN-19a/41/0/B



FLT PLN/41/FIN



B4



TOP



DAP B5

B5

PURPOSE:  
COAS CAL

TRANSLATION  
PULSE 15 0.0 2

ROTATION  
DSC RT NORM 16 0.2 0 0  
VERN 17 0.0 1 6  
PULSE NORM 18 0.0 0 4  
VERN 19 0.0 0 2  
COMP NORM 20 0.0 0 0  
VERN 21 0.0 0 0

DEADBAND  
ATT NORM 22 3.0 0  
VERN 23 0.0 3 3

RATE NORM 24 0.2 0  
VERN 25 0.0 2 0

JET OPT P 26 3  
Y 27 3

CNTL ACCEL 28 0

FLT PLN-19b/41/0/B

FLT PLN-20a/41/0/B



TOP



B6



B5



TOP



DAP B6

B6

PURPOSE:  
RENDEZVOUS

TRANSLATION  
PULSE 15 0.0 5

ROTATION  
DSC RT NORM 16 0.5 0 0  
VERN 17 0.2 0 0  
PULSE NORM 18 0.0 0 4  
VERN 19 0.0 0 2  
COMP NORM 20 0.0 0 0  
VERN 21 0.0 0 0

DEADBAND  
ATT NORM 22 2.0 0  
VERN 23 1.0 0 0

RATE NORM 24 0.2 0  
VERN 25 0.0 2 0

JET OPT P 26 1  
Y 27 1

CNTL ACCEL 28 0

FLT PLN-20b/41/0/B

FLT PLN-21a/41/0/B





TOP




B7




  
**B6**  
  
**DAP B7**

PURPOSE:  
 PROX OPS

FLT PLN-21b/41/0/B

  
 TOP





  
**B7**

**DAP B8**

PURPOSE: (Blank)



FLT PLN-22b/41/0/B

  
 TOP



  
  
  
  
**B7**

TRANSLATION  
 PULSE 15 0.0 1  
  
 ROTATION  
 DSC RT NORM 16 0.2 0 0  
 VERN 17 0.2 0 0  
 PULSE NORM 18 0.0 0 4  
 VERN 19 0.0 0 2  
 COMP NORM 20 0.0 0 0  
 VERN 21 0.0 0 0  
  
 DEADBAND  
 ATT NORM 22 2.0 0  
 VERN 23 1.0 0 0  
  
 RATE NORM 24 0.2 0  
 VERN 25 0.0 2 0  
  
 JET OPT P 26 1  
 Y 27 1  
  
 CNTL ACCEL 28 0

FLT PLN-22a/41/0/B

  
  
**B8**



TOP

**B8**

TRANSLATION  
 PULSE 15 .-.-  
  
 ROTATION  
 DSC RT NORM 16 .-.-  
 VERN 17 .-.-  
 PULSE NORM 18 .-.-  
 VERN 19 .-.-  
 COMP NORM 20 .-.-  
 VERN 21 .-.-  
  
 DEADBAND  
 ATT NORM 22 .-.-  
 VERN 23 .-.-  
  
 RATE NORM 24 .-.-  
 VERN 25 .-.-  
  
 JET OPT P 26 -  
 Y 27 -  
  
 CNTL ACCEL 28 -

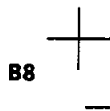
FLT PLN-23a/41/0/B

**B9**

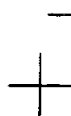






B8

FLT PLN-23b/41/0/B



TOP

TOP

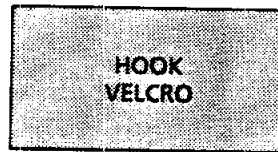


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FLT PLN-24a/41/0/B



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BACK COVER 'DAP BOOK'



FLT PLN-24b/41/0/B



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STS-41  
FLIGHT PLAN NOTES

FLIGHT PLAN NOTES  
(CONSTRAINTS AND GUIDELINES)

A. FLIGHT DESCRIPTION

The STS-41 (OV-103) launch from KSC on October 5, 1990 (Flight Cycle) will be into a 160 nm orbit at an inclination of 28.45 degrees. The mission duration will be 4 days. Nominal landing occurs at EDW on October 9, 1990.

Landing opportunities are:

		<u>Landing Orbit No.</u>	<u>Site</u>	<u>Landing Site Time</u>
Nominal	Primary	66	EDW	06:44 PDT
	Weather Alt.	66	NOR	07:44 MDT
1 Day Late	Primary	82	EDW	06:46 PDT
	Weather Alt.	82	NOR	07:48 MDT
2 Days Late	Primary	98	EDW	06:49 PDT
	Weather Alt.	97	KSC	08:23 EDT

MAJOR EVENTS

LAUNCH (KSC)  
MET (DD/HH:MM)                      October 5, 1990  
 0/00:00  
 Day of year                              278  
CDT/GMT                                06:35/11:35

OMS-2  
MET (DD/HH:MM)                      0/00:42  
 DV (fps)                                  221.0  
 ORBIT ha/hp (nm)                      160/160

ULYSSES/IUS DEPLOY  
MET (DD/HH:MM)                      0/06:01

OMS SEPARATION BURN  
MET (DD/HH:MM)                      0/06:16  
 DV (fps)                                  31.0  
 DT (MM:SS)                              00:16  
 ORBIT ha/hp (nm)                      177/160

OMS-4  
MET (DD/HH:MM)                      0/22:56  
 DV    35.1  
 ORBIT ha/hp (nm)                      160/156

RCS-2  
MET (DD/HH:MM)                      0/23:38  
 DV    6.6  
 ORBIT ha/hp (nm)                      157/156

DEORBIT BURN  
MET (DD/HH:MM)                      04/01:07  
 DV (fps)                                  278.0

LANDING (EDW)  
MET (DD/HH:MM)                      04/02:07  
 Day of year                              282  
CDT/GMT                                8:42/13:42

FLT PLN NOTES

## B. CREW

### 1. The 5 crewmembers flying this mission are:

CDR - Richard N. Richards  
PLT - Robert D. Cabana  
MS1 - Bruce E. Melnick  
MS2 - William M. Shepherd  
MS3 - Thomas D. Akers

### 2. The crewmembers responsible for performing an EVA, should one become necessary, are: MS1 will be EV1, MS3 will be EV2, and MS2 will be IV1.

## C. ORBITER SYSTEMS

### 1. Communications and Instrumentation

- a. The Operational Instrumentation (OI) system will nominally be managed from the ground through uplink real-time commands (RTCs) coordinated with the crew.
- b. TDRS coverage is supported by TDRS-E (41 degrees W) and TDRS-W (171 degrees W) and is the prime mode of communication coverage.
- c. TDRS Ku-Band is the prime mode of real-time TV. There are also three GSTDN sites available as backup for TV (90 minute lead time required): GDS(GDX), MIL(MLX), VAN.
- d. TDRS-E is available to support Ku-Band uplink (e.g., TAGS). The status of TDRS-W is TBD.
- e. HDR uplink (e.g., Teleprinter) is available through TDRS-E and TDRS-W.
- f. GSTDN sites available during the first 25 minutes of the mission are MIL(MLX), PDL, BDA, DKR, and IOS. IOS can be used for UHF voice during ascent.
- g. There are five GSTDN sites available on-orbit through Ulysses deploy, or for deorbit: VAN, GDS(GDX), MIL(MLX), BDA(BDX), and DFR. (Note: DFR is not shown in the Flight Plan). CAN and MAD can be called up for emergencies.
- h. After Ulysses deploy, there are five GSTDN sites which are available or can be called up to support as bailout sites: VAN, GDS (GDX), MIL (MLX), BDA (BDX), and DFR. One GSTDN site will be available per orbit. (Note: DFR is not shown in the Flight Plan).
- i. RTS sites are available predeploy to support IUS activities. They are also available for contingency support or when scheduled in advance (2 hours of lead time required). HTS, GTS, VTS, and IOS are certified for orbiter support; CTS is available only for direct communication to the IUS.

2. Guidance and Navigation

- a. The orbiter state vector must be uplinked whenever downtrack error in the on-board vector becomes greater than 20 nm, but is usually uplinked when errors are greater than 5 nm. These are real-time calls. In addition, state vectors must be uplinked for specified targets when utilizing an orbiting vehicle as a TGT ID with Universal Pointing.
- b. IMU alignments occur approximately every 12 hours in the pre-sleep and postsleep activities and prior to major events requiring low navigation uncertainty.

3. Environmental Control and Life Support Subsystem (ECLSS)

- a. Two CO2 absorbers are installed prior to launch. On-orbit, the canisters are alternately replaced as required per the cue card.
- b. There are four supply water tanks and one waste water tank which are loaded for launch with volumes sufficient to meet a launch day deorbit opportunity with payload bay doors (PLBDs) failed closed. Supply water will be managed via the FES to provide RTG cooling on FD1 and minimize SSBUV contamination throughout the flight. A waste water dump is scheduled on FD3.

4. Utility Power Usage

The following tables are the DC and AC Utility Power Outlet Schedules. These tables show the times of outlet reconfiguration during the mission.

STS-41 DC UTILITY POWER OUTLET SCHEDULE

OUTLET \ MET		PRELAUNCH	POST INSERTION	ON-ORBIT		DEORBIT PREP
			0/2:02	0/2:30	0/TIG-4:00	
MNA	019 M052J	PLT* MS3*	-- --	-- Chromex	-- Chromex	PLT* MS3*
MNB	F1 M013Q	-- Chromex/PSE	PGSC Chromex/PSE	PGSC PSE	PGSC PSE	PGSC Chromex/PSE
MNC	A11 A15 M030F	MS1*,MS2* CDR* --	-- TPR --	-- TPR --	-- TPR --	MS1*,MS2* CDR* --
MNA or MNB	L15	--	--	--	--	--

NOTE: \* Crewmember suit fan

STS-41 AC UTILITY POWER OUTLET SCHEDULE

OUTLET \ MET		PRELAUNCH	POST INSERTION	ON-ORBIT		DEORBIT PREP
			0/1:00	1/2:30	TIG-4:00	
AC1	M052J F1	-- --	-- SPOC	-- SPOC	-- SPOC	-- SPOC THRU D/O BURN
AC3	M013Q A15	-- --	-- --	-- --	-- --	-- --

NOTE: Intermittent AC outlets are needed for the vacuum cleaner and the photo floodlight.

D. TEXT UPLINK SYSTEM

1. The Text and Graphics System (TAGS) is a high-resolution facsimile system that scans text or graphics material and converts the analog SCAN data into serial digital data. This data is transmitted via a telemetry link to the cathode-ray tube hardcopier. Transmission time for an 8-1/2 by 11-inch page can vary from just over 1 minute to just over 16 minutes depending on the hardcopy resolution desired. The TAGS can only uplink images using Ku-Band. This Flight Plan assumes Ku-Band forward link is available for both TDRS-E and TDRS-W, (TBD), and TAGS is the primary mode of text uplink. Instrumentation has the capability to uplink onboard hardcopier control commands via S-Band or Ku-Band for power on, advance, ready, standby, and off.
2. The teleprinter (TPR) will provide a backup on-orbit capability to receive and reproduce text-only data from MCC. The TPR uses S-Band and is not dependent on TDRS Ku-Band. TPR requires 1 to 2.5 minutes per page, depending on the number of lines (up to 66).

E. TELEVISION/PHOTOGRAPHY

1. The CCTV systems provide two-color, wide-angle cameras for in-cabin coverage. There will also be four PLB TV cameras. There are three different lens assemblies for the PLB cameras (color lens assembly, monochrome lens assembly, and wide-angle lens assembly). The type of lens assembly for each PLB camera is documented in the Flight Requirements Document.
2. There is a video tape recorder available with 30-minute cassettes.
3. Three camera systems are available: 35mm, 16mm, and 70mm.



## F. PAYLOADS

### 1. Ulysses

Ulysses is an interplanetary spacecraft designed to study the sun's heliosphere and North and South Poles. The Spacecraft will also investigate interplanetary neutral gas and dust, and the Jovian magnetosphere during Jupiter swingby. Ulysses utilizes a 3 stage upper stage: the IUS and a Payload Assist Module S type (PAM-S). The nominal IUS/Ulysses deployment opportunity occurs approximately 65 minutes prior to node 6A (ascending). Backup opportunities are available for injections on 7A, 8A, and 16A-22A.

### 2. IUS (Inertial Upper Stage)

The IUS is a two-stage solid rocket, inertially stabilized upper stage. The IUS ignites its first stage (SRM-1) 65 minutes after IUS/Ulysses deployment. The two IUS stages burn in quick succession followed by the PAM-S ignition to insert Ulysses into its designed trajectory.

### 3. SSBUV (Shuttle Solar Backscatter Ultraviolet)

The SSBUV program is designed to provide calibration of backscatter ultraviolet (UV) instruments being flown currently on free-flying satellites. The payload configuration consists of two canisters interconnected by cables mounted on a Get-Away-Special (GAS) adapter beam. The canister containing the SSBUV spectrometer is equipped with a Motorized Door Assembly (MDA). The adjacent support canister contains data, command, and power systems. Crew interface is through a GAS Autonomous Payload Controller (GAPC) on the aft flight deck. After an outgassing period, the instrument will operate in three modes: Earth view, Solar view, and calibration.

### 4. SSCE (Solid Surface Combustion Experiment)

The SSCE consists of an ashless filter paper sample internally mounted in a pressurized chamber. While the sample is burned, documentary photography of the front and side of the sample is taken. In addition measurements are made of chamber temperature, chamber pressure, and middeck air temperature. The experiment must be run during a period of low orbiter accelerations.

### 5. IPMP (Investigations into Polymer Membrane Processing)

The research objective of the IPMP payload is to flash evaporate mixed solvent systems in the absence of convection to control the porosity of the polymer membrane. With at least 24 hours remaining before entry the crew will activate the experiment and log the MET.

6. Chromex (Chromosome and Plant Cell Division in Space)

This experiment is designed to determine whether the normal rate, frequency, and patterning of cell division in root tips can be sustained upon exposure to microgravity. In addition, the fidelity of the partitioning of the chromosomes is investigated after cell exposure to microgravity. Day Lily and Haplopappis Gracilis roots will be used. Crew activity includes activation, status checks, video recordings, and gas sampling.

7. PSE (Physiological Systems Experiment)

The PSE is designed to determine the effects of a proprietary protein molecule on animal physiological systems in microgravity. Sixteen rodents are contained in 2 Animal Enclosure Modules (AEMs). The crew is required to perform daily observations and housekeeping tasks. Photographic documentation is also required.

8. VCS (Voice Command System)

The VCS is a voice recognition device designed to allow voice controlling of the orbiter Closed Circuit Television (CCTV) system. When powered off, the VCS does not affect the normal operation of CCTV system.

Preflight the assigned crewmembers are required to create a personalized voice print template. In flight the VCS test will be performed three times at approximately the same time of day each time.

9. ISAC (Intelsat Solar Array Coupon)

The ISAC consists of solar array material samples bonded to two witness plates and mounted on the orbiter RMS. The purpose is to obtain data on the interaction of atomic oxygen with the materials of the Intelsat spacecraft, now stranded in low Earth orbit. The witness plates will be exposed in the velocity vector direction for a minimum of 23 hours.

10. SE-81-9 (Convection in Zero Gravity)

The objective of this experiment is to study surface tension induced flows in microgravity. The effects of boundary conditions such as fluid depth, heating rate, aspect ratio, "g" jitter, and container configuration will be investigated. Fluid surface deformations will also be studied. Aluminum pans with an embedded heater will hold Krytox oil in which aluminum powder is suspended for visualization. Video recordings, temperature, time, and orbiter acceleration data are obtained to evaluate the tests.

11. RME-III (Radiation Monitoring Equipment)

The RME III configuration consists of a handheld instrument with replaceable memory modules. The equipment contains a Liquid Crystal Display (LCD) for real-time data display and a keyboard for controlling its functions. The experiment is self-contained with two zinc air and 5 AA batteries contained in each memory module and a zinc air battery in the main module. The equipment takes measurements of the radiation environment at a specified sample rate.

## 12. AMOS (Air Force Maui Optical Site)

The primary objective of the AMOS activity is to use the orbiter during cooperative overflights of Maui to obtain imagery and/or signature data to support the calibration of the AMOS ground-based sensors and to observe plume phenomenology. No unique onboard hardware is associated with the AMOS test; crew and orbiter participation may be required to establish the controlled conditions for the Maui cooperative overflight.

### G. ON-ORBIT DTOs

#### 1. Water Dump Cloud Formation (DTO 330)

This DTO is designed to provide a definition of water-dump plume formation and angular extent with respect to orbiter coordinate system and trajectory. It is desired to dump the water in a retrograde direction. Ground observation sites are determined on a flight by flight basis. Preferred sites are Houston, TX, Orlando, FL, or Hilo, HI. The ground site must be in darkness at the time of the observation.

#### 2. HUD Backup to COAS (DTO 785)

This DTO will verify the suitability of the HUD as a star sighting device for IMU alignments.

#### 3. PGSC EL Display Evaluation (DTO 795)

The purpose of this DTO is to evaluate a new PGSC configuration which includes an electroluminescent display that is brighter and has a wider viewing angle than those previously flown.

#### 4. Tracking Using High Pitch Rates (DTO 827)

The objective of this DTO is to test the ability of the orbiter to maneuver efficiently at high pitch rates with tight attitude and rate deadbands. The data from this test will support planning for the starlab mission.

#### 5. Space Station Cursor Control Device Evaluation (DTO 1206)

The purpose of this DTO is to evaluate human performance under spaceflight conditions of cursor control devices similar to those being considered for Space Station.

### H. ON-ORBIT DSOs

#### 1. Intraocular Pressure (DSO 472)

Pressure measurements 20-25% above normal/preflight levels were observed in bedrest studies, during 0-G on the KC-135, and on the D-1 shuttle mission. The possible deleterious effects of sustained deviations in intraocular pressure are difficult to predict since no statistically valid in-flight data exists. Even though a few days or weeks of elevated intraocular pressure would be harmless, months or years of sustained pressure, due to microgravity, could cause ocular disturbances. Significant baseline data is needed to define normal intraocular pressure

ranges in microgravity and to determine the magnitude of pressure rises to be expected in crewmembers. A tonopen is used to measure IOP among the crewmembers.

2. Retinal Photography (DSO 474)

The purpose of this DSO is to collect retinal photographs in flight to determine if microgravity induced cephalic fluid shifts elevate intracranial pressure. Evidence of increased ICP and the development of SAS will be correlated. Two crewmembers shall collect retinal photographs during the scheduled presleep periods.

3. Variability of Blood Pressure and Heart Rate During Space Flight (DSO 602)

The objective of this DSO is to determine whether arterial blood pressure and heart rate exhibit less variability in a microgravity environment than on Earth. The data will be used to investigate whether reduced blood pressure variability in flight, if any, is correlated with the extent of baroreflex attenuation that has been measured postflight. Integrity of the baroreceptor function is required for the appropriate blood pressure responses to the orthostatic stresses imposed by entry, landing, and egress. The crewmember will wear blood pressure and electrocardiograph equipment for 2 Flight days on orbit.

4. Orthostatic Function During Entry, Landing, and Egress (DSO 603)

The objective of this DSO is to measure the changes in orthostatic function of crewmembers during the actual stresses of entry, landing, and egress from the orbiter. Crewmembers will don equipment prior to donning the LES during deorbit preparation. Equipment consists of a blood pressure monitor, accelerometers, an Impedance Cardiograph, and Transcranial Doppler hardware. The crewmember wears the equipment and records verbal comments through entry.

5. Visual Vestibular Integration as a Function of Adaptation (DSO 604)

The objective of this DSO is to investigate visual vestibular and perceptual adaptive responses as a function of mission duration. The operational impact of these responses on the crewmembers ability to conduct entry, landing, and egress procedures will also be investigated. For STS-41, four sessions will be scheduled where the crewmember performs head movements at a slow frequency while verbally recording self and surrounding motion sensations. The sessions are scheduled early on-orbit, late in the flight, during entry, and immediately post landing.

I. TIMELINE FORMATS

1. The timeline formats used in this Flight Plan are based on JSC document 19933: Timeline Format Definitions and Standard Notes, Revision B, May 25, 1987.

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