

Flight Plan

STS-61

(FRR Cycle Trajectory)

Mission Operations Directorate
Operations Division

Final
October 25, 1993

<u>EVENT</u>	<u>CST</u>		
Launch	04:28	Tues	Nov 30
HST Grapple	04:25	Thur	Dec 2
HST Release	02:	Wed	Dec 8
KSC Landing	07	Sat	Dec 11

BRANCH CHIEF
R. NUTE
004
BOND

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas




MISSION OPERATIONS DIRECTORATE


STS-61 FLIGHT PLAN

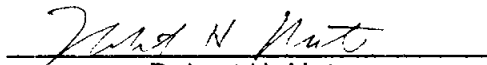
FINAL
October 25, 1993


PREPARED BY:

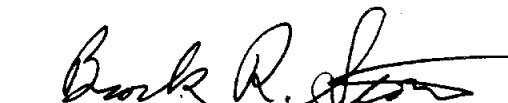

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	FLTPLN-1556	FLTPLN-1570	MULTI-915	
	FLTPLN-1557	FLTPLN-1571	MULTI-917B	
	FLTPLN-1558	FLTPLN-1572A	MULTI-920	
	FLTPLN-1559	FLTPLN-1573	MULTI-933	
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Attitude & Pointing	DO4/J. McKune	244-7860

FLIGHT PLAN
STS-61

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1-2	61/FIN	3-27	61/FIN
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3-13	61/FIN	3-66	61/FIN
3-14	61/FIN	4-1	61/FIN
3-15	61/FIN	4-2	61/FIN

(*) – Omit from flight book

4A-1	61/FIN
4A-2	61/FIN
4B-1	61/FIN
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4C-1	61/FIN
4C-2	61/FIN
4C-3	61/FIN
4C-4	61/FIN
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7-2	* 61/FIN
7-3	* 61/FIN
7-4	* 61/FIN
7-5	* 61/FIN
7-6	* 61/FIN
7-7	* 61/FIN
7-8	* 61/FIN

(*) - Omit from flight book

STS-61 FLIGHT PLAN FABRICATED ITEMS

<u>Title</u>	<u>Ref. Page</u>	<u>Code No.</u>
DAP A, DAP B TOC	6-5	FLT PLN-1a/61/O/C
(Blank)	6-5	FLT PLN-1b/61/O/A
DAP A	6-6	FLT PLN-2a/61/O/A
DAP A1	6-6	FLT PLN-2b/61/O/A
A1	6-6	FLT PLN-3a/61/O/B
DAP A2	6-7	FLT PLN-3b/61/O/A
A2	6-7	FLT PLN-4a/61/O/A
DAP A3	6-7	FLT PLN-4b/61/O/A
A3	6-7	FLT PLN-5a/61/O/A
DAP A4	6-8	FLT PLN-5b/61/O/A
A4	6-8	FLT PLN-6a/61/O/A
DAP A5	6-8	FLT PLN-6b/61/O/B
A5	6-8	FLT PLN-7a/61/O/B
DAP A6	6-9	FLT PLN-7b/61/O/A
A6	6-9	FLT PLN-8a/61/O/A
DAP A7	6-9	FLT PLN-8b/61/O/A
A7	6-9	FLT PLN-9a/61/O/A
DAP A8	6-10	FLT PLN-9b/61/O/A
A8	6-10	FLT PLN-10a/61/O/A
DAP A9	6-10	FLT PLN-10b/61/O/A
A9	6-10	FLT PLN-11a/61/O/C
DAP A10	6-11	FLT PLN-11b/61/O/B
A10	6-11	FLT PLN-27a/61/O/A
(Blank)	6-11	FLT PLN-27b/61/O/A
DAP B	6-11	FLT PLN-12a/61/O/A
DAP B1	6-12	FLT PLN-12b/61/O/A
B1	6-12	FLT PLN-13a/61/O/B
DAP B2	6-12	FLT PLN-13b/61/O/A
B2	6-12	FLT PLN-14a/61/O/B
DAP B3	6-13	FLT PLN-14b/61/O/A
B3	6-13	FLT PLN-15a/61/O/B
DAP B4	6-13	FLT PLN-15b/61/O/A
B4	6-13	FLT PLN-16a/61/O/B
DAP B5	6-14	FLT PLN-16b/61/O/A
B5	6-14	FLT PLN-17a/61/O/B
DAP B6	6-14	FLT PLN-17b/61/O/A
B6	6-14	FLT PLN-18a/61/O/A
DAP B7	6-15	FLT PLN-18b/61/O/A
B7	6-15	FLT PLN-19a/61/O/A
DAP B8	6-15	FLT PLN-19b/61/O/A
B8	6-15	FLT PLN-20a/61/O/A
DAP B9	6-16	FLT PLN-20b/61/O/A
B9	6-16	FLT PLN-21a/61/O/C
DAP B10	6-16	FLT PLN-21b/61/O/B
B10	6-16	FLT PLN-28a/61/O/A
(Blank)	6-17	FLT PLN-28b/61/O/A
ALT DAP TOC	6-17	FLT PLN-22a/61/O/B
DAP ALT1	6-17	FLT PLN-22b/61/O/A
ALT1	6-17	FLT PLN-23a/61/O/A
DAP ALT2	6-18	FLT PLN-23b/61/O/A
ALT2	6-18	FLT PLN-24a/61/O/A
DAP ALT9	6-18	FLT PLN-24b/61/O/B
ALT9	6-18	FLT PLN-25a/61/O/B
**DELAY	6-19	FLT PLN-25b/61/O/C
(Blank)	6-19	FLT PLN-29a/61/O/A

STS-61 FLIGHT PLAN FABRICATED ITEMS (Cont)

<u>Title</u>	<u>Ref. Page</u>	<u>Code No.</u>
DAP ALT10	6-19	FLT PLN-29b/61/O/A
ALT10	6-19	FLT PLN-30a/61/O/B
(Blank)	6-20	FLT PLN-30b/61/O/A
UNIV PTG	6-21	FLT PLN-26a/61/O/A
(Blank)	6-21	FLT PLN-26b/61/O/A

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INTRODUCTION

The STS-61 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, Rendezvous, EVA, Deorbit Prep, and Entry Checklists. The detailed rendezvous timelines and procedures are in the Rendezvous Checklist. The detailed EVA task timelines and procedures are in the EVA Checklist. The deploy procedures required during the deploy timeframe are in the STS-61 HST Deploy Checklist. For continuity, the summary level timeline includes the entire flight.

This on-orbit timeline satisfies the objectives specified in the Flight Definition and Requirements Directive and the requirements of the STS-61 Flight Requirements Document. The Flight Plan, as part of the Flight Data File, meets the specifications of the STS-61 Flight Initialization Data Pack.

The flight profile used for this Flight Plan is for a launch date of November 30, 1993 at 10:28 GMT. Orbiter inertial attitudes are expressed relative to a Mean of 1950 (M50) reference frame.

The STS-61 FRR Cycle was used for the timeline trajectory.

JSC-22359, Crew Scheduling Constraints (Appendix K, CPMP), Basic, Rev B, January 1992, has been used to build the timelines contained in this Flight Plan. Crew awake time prior to launch has been increased (launch - 7.5 hours) to accommodate crewmembers' circadian rhythm and on-orbit sleep cycles. Appendix K waiver #57 allows crew off-duty time to be delayed to Flight Day 10 (EOM-2) in order to complete all HST servicing and release activities prior to scheduling the crew for off-duty time.

The timeline formats used in this Flight Plan are based on JSC-19933, Timeline Format Definitions and Standard Notes, Rev C, May 1990.

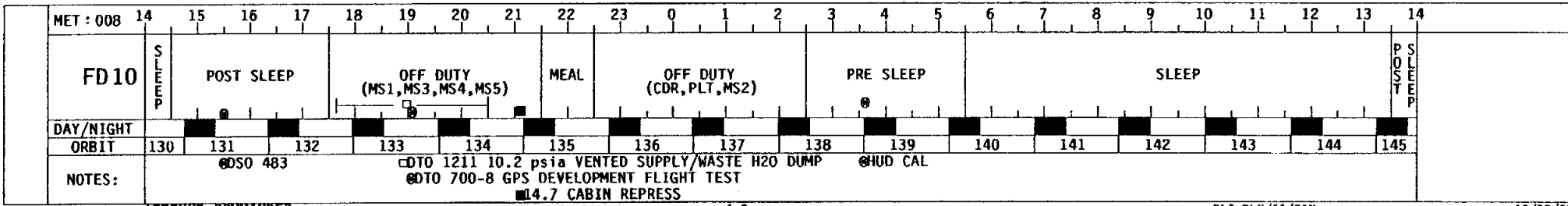
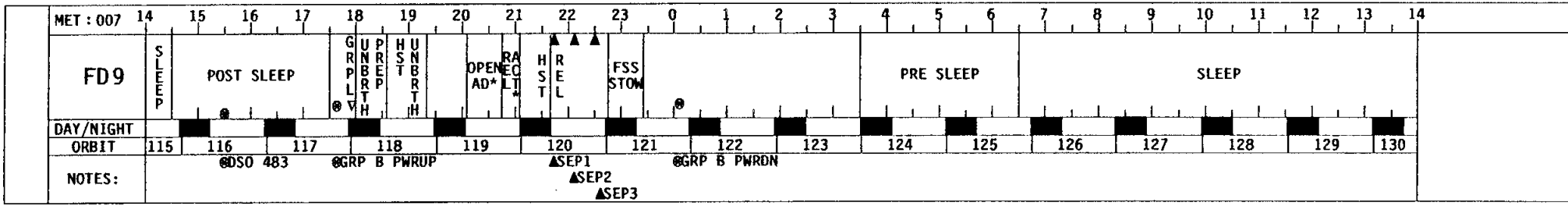
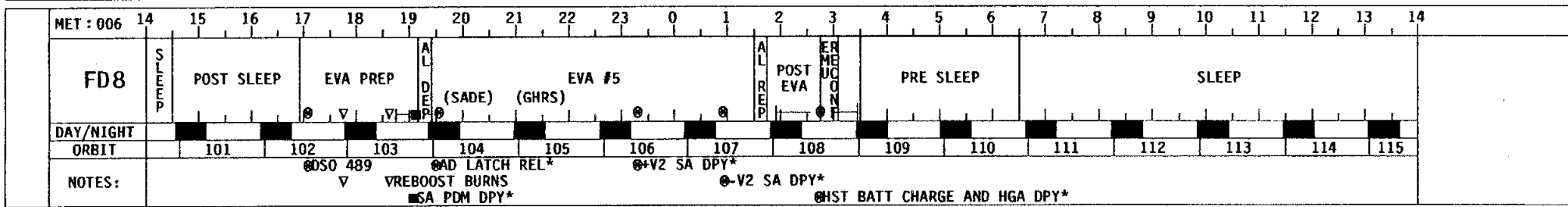
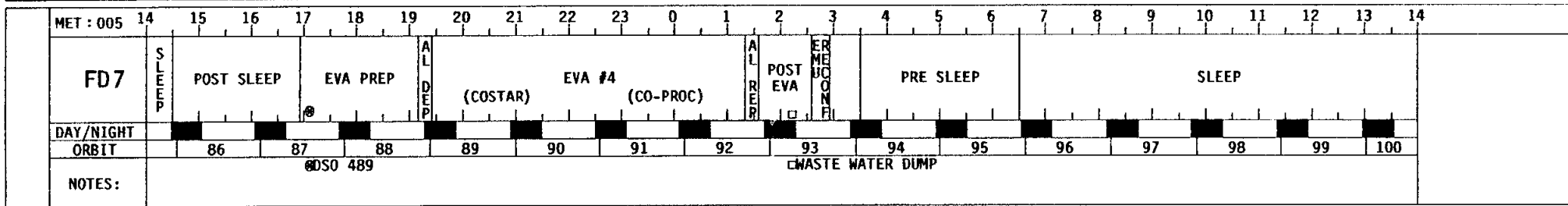
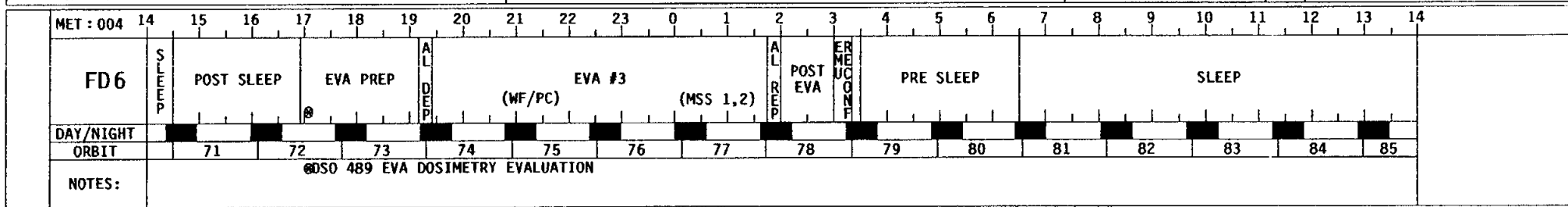
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STS-61 OVERVIEW

FLIGHT: STS-61		EDITION: FINAL		PUB. DATE: 10/25/93																						
MET : 000	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
FD1																										
DAY/NIGHT																										
ORBIT																										
NOTES:																										
MET : 000	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
FD2																										
DAY/NIGHT																										
ORBIT	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25										
NOTES:																										
MET : 001	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
FD3																										
DAY/NIGHT																										
ORBIT	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40											
NOTES:																										
MET : 002	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
FD4																										
DAY/NIGHT																										
ORBIT	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55											
NOTES:																										
MET : 003	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
FD5																										
DAY/NIGHT																										
ORBIT	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70											
NOTES:																										

*GROUND COMMANDED

FLIGHT: STS-61 EDITION: FINAL PUB. DATE: 10/25/93



*GROUND COMMANDED

MET: 009	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14			
FD11	POST SLEEP		FCS C/O	DTO 667 PILOT		CC REN W	MEAL	CABIN STOW			PRE SLEEP			SLEEP						POST SLEEP								
DAY/NIGHT	[Day/Night Cycle]																											
ORBIT	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160												
NOTES:	@DSO 483 @GRP B PWRUP @RCS HOT FIRE @BERGOMETER STOW @ KU-BD STOW																											

MET: 010	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14			
FD12	POST SLEEP		X M S N I V R	DEORBIT PREP			D B U R N	K L S D C G																				
DAY/NIGHT	[Day/Night Cycle]																											
ORBIT	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174													
NOTES:	@DSO 483 @IMU ALIGN PLBD OPS @10/20:46 @SSE PWRDN @10/22:00																											

MET: 011	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14			
FD																												
DAY/NIGHT	[Day/Night Cycle]																											
ORBIT	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189													
NOTES:																												

MET: 012	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14			
FD																												
DAY/NIGHT	[Day/Night Cycle]																											
ORBIT	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204													
NOTES:																												

MET: 013	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14			
FD																												
DAY/NIGHT	[Day/Night Cycle]																											
ORBIT	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219													
NOTES:																												

SUMMARY TIMELINE

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GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE																
334:10:28/ 334:22:28	000:00:00/ 000:12:00	334:04:28/ 334:16:28	1 /334 CST	-22.2	☉	NOVEMBER 30, 1993	STS-61	FINAL	10/25/93																
CST :334	FD :001	MET :000																							
0	5	1	6	2	7	3	8	4	9	5	10	6	11	7	12	8	13	9	14	10	15	11	16	12	
STS	DIRECT LAUNCH	OMS-2	POST INSERTION	SNACK	P/TVO1 SETUP	P/TVO1 OPS	PRE SLEEP	SLEEP																	
PL																									
DAY/NIGHT																									
ORBIT																									
COMM COVERAGE																									
TDRS																									
ATTITUDE	ASCENT																								
FSS																									
SA																									
NOTES:																									

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE									
334:22:28/ 335:10:28	000:12:00/ 001:00:00	334:16:28/ 335:04:28	2 /334 CST	-20.5	☉	NOVEMBER 30, 1993	STS-61	FINAL	10/25/93									
CST :334	17	18	19	20	21	22	23	0	CST:335	1	2	3	4	0	MET:001			
FD :001	12	13	14	15	FD02 16	17	18	19	20	21	22	23	0					
MET :000																		
STS	SLEEP				DSO 483	RMS HTR	10.2 PREP	10.2 DEPRESSZ	IC ON F I G	IMU/COAS	COAS CALL	-ZLV MNR	OAC C SETUP	FILTER CLEANING	RMS PWRDN	NPC	RCS BURN	MEAL
	POST SLEEP						RMS PWRUP	RMS C/O	SSE SURVEY				FSS SURVUE MY B		P/TV11 SETUP	P/TV11 OPS		
					AFT STATION			P/TV02,03 SETUP	P/TV02 OPS	P/TV03 OPS						AIRLOCK PREP		
PL								DSO 469 UP/ACT	SSE C/O					FSS PREP FOR BRTHG		HST TOOL PREP		HST TO RNDZ ATT*
DAY/NIGHT ORBIT	[Day/Night Cycle: 9-16]																	
COMM COVERAGE	[Coverage: GTS, DKR, MIL, DGS, IOS]																	
TDRS E W	[TDRS Coverage: E, W]																	
ATTITUDE	[Attitude: -ZLV -YVV, IMU/COAS, -ZLV +XVV, -NPC -I, -ZLV +XVV]																	
FSS SA	[FSS SA: STOWED, SUN POINT, 180 ROT (BERTH)]																	
NOTES:	@DSO 483 BACK PAIN @RMS HTR ACT/MCIU FILTER CK @DSO 469 RADIATION DOSE DISTRIBUTION @AFT STATION @-ZLV, +XVV *GROUND COMMANDED																	

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
335:10:28/ 335:22:28	001:00:00/ 001:12:00	335:04:28/ 335:16:28	2 /335 CST	-18.7	☉	DECEMBER 1, 1993	STS-61	FINAL	10/25/93

CST :335
FD :002
MET :001

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
		SETUP ERGOMETER		PCONF MED	NSR*	NC2	ZLV MNV	102 MAINT																	

STS																									

PL																									

DAY/NIGHT																									
ORBIT	16	17	18	19	20	21	22	23	24																

COMM COVERAGE	DGS	-HTS -VTS -GD -MIL	-DGS	-HTS -VTS -GD -MIL	-DGS	-HTS -VTS -GD -MIL	-DGS	-HTS -VTS -GD -MIL	-DGS	-HTS -VTS -GD -MIL	-DGS	-HTS -VTS -GD -MIL	-DGS	-HTS -VTS -GD -MIL	-DGS	-HTS -VTS -GD -MIL	-DGS	-HTS -VTS -GD -MIL	-DGS	-HTS -VTS -GD -MIL	-DGS	-HTS -VTS -GD -MIL	-DGS	-HTS -VTS -GD -MIL	-DGS
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TDRS	E																								
	W																								

ATTITUDE																									

FSS																									
SA																									

NOTES:


*Only if req'd for PLAN A
@BIASED -ZLV, -YVV

*GROUND COMMANDED

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
335:22:28/ 336:10:28	001:12:00/ 002:00:00	335:16:28/ 336:04:28	3 /335 CST	-16.8	☉	DECEMBER 1, 1993	STS-61	FINAL	10/25/93
CST :335	12 17 18 19	FD03 20	21	22	23	0 CST:336	1 2	3	4
FD :002	12 13 14	15	16	17	18	19	20	21	22
MET :001								23	0
STS	SLEEP		DSO 483 TO 2 MAINT OMS BURN	NSR NH NC3			NCC Ti HST RNDZ	VBARA GRAPPLE	
		POST SLEEP					RMS HTR RMS PWRUP FOR CAPT RMS POIST		REP TRAIT NIGON
								P/TV04 SETUP	P/TV04 OPS
PL		LTD RDS* LGA DIRECT	SERIAL RTRCT HGAs*	CLR NAT FTR GSC* -S A		FHSTS OFF* FGSS OFF*	TRYPASS* PPSP	CAT PTT/D SBL	HDM SRO TID FE IT*
DAY/NIGHT ORBIT	24	25	26	27	28	29	30	31	
COMM COVERAGE		-GTS	-DKR	-GTS	-DKR	-DKR	-DKR	-DKR	-DKR
TDRS									
ATTITUDE		BIAS -ZLV -YVV		INSR	NH	NC3	TGT TRK		INERTIAL
FSS SA					180 ROT (BERTH)				CAPTURE
NOTES:		DSO 483 BACK PAIN					RMS HTR ACT/MCIU FILTER CK	NON-ESS LOAD RED*	PSEA KA MON DIS*

*GROUND COMMANDED

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE																		
336:10:28 / 336:22:28	002:00:00 / 002:12:00	336:04:28 / 336:16:28	3 / 336 CST	-15.1		DECEMBER 2, 1993	STS-61	FINAL	10/25/93																		
CST :336 FD :003 MET :002	0 5 1 6 2 7 3 8 4 9 5 10 6 11 7 12 8 13 9 14 10 15 11 16 12																										
STS	BERTHA	TRK MNV R	PGWRP DOWN	ZLV MNV R	WASTE MNV R	DUMP INIT	10:2 MAINT	PRIV MED	PADM SLEEP	IMU CHECK	WDU SWTPE	ZLV MNV R	SLEEP														
	BERTHING OPERATION	BERTHED HST SURVEY		MEP FXA RTR EK NDED	PRE SLEEP																						
	P/TV04 OPS	P/TV05 OPS	P/TV05 OPS		VET R UP 04	VPO TL4 RA Y B A C K	NEXT DAY'S EVA RVW																				
PL	LP GI A S O P T S *	HP SW TR *	EXT	S S M / O N F G *	BATT CHARGE		F G E S O N *																				
DAY/NIGHT	ORBIT			32			33			34			35			36			37			38			39		
COMM COVERAGE	HTS VTS GDX MIL			GTS HTS VTS GDX MIL			GTS HTS VTS GDX MIL			GTS HTS VTS GDX MIL			GTS HTS VTS GDX MIL			IOS DGS GTS HTS			IOS DGS GTS HTS			IOS DGS GTS					
TDRS	E W			DKR IOS DGS			DKR IOS DGS			DKR IOS DGS			DKR IOS DGS			DKR IOS DGS			DKR IOS DGS			DKR IOS DGS					
ATTITUDE	INERTIAL			BATT CHARGE			BIAS -ZLV +YVV			BIAS -ZLV +YVV			BIAS -ZLV +YVV			BIAS -ZLV +YVV			BIAS -ZLV +YVV			BIAS -ZLV +YVV					
FSS	SA			180 ROT (BERTH)			DEPLOYED AT 90 DEG			180 ROT (BERTH)			DEPLOYED AT 90 DEG			180 ROT (BERTH)			DEPLOYED AT 90 DEG			180 ROT (BERTH)					
NOTES:	HST TO DRIFT MODE*			BIASED -ZLV, +YVV			BIASED -ZLV, +YVV			GHR'S WARMUP*			Ku-BD ON-ORB C/O*			HSP RET WARMUP*			SIC&DH WARMUP*								
	*GROUND COMMANDED																										

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON 	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE			
336:22:28 / 337:10:28	002:12:00 / 003:00:00	336:16:28 / 337:04:28	4 / 336 CST	-13.5		DECEMBER 2, 1993	STS-61	FINAL	10/25/93			
CST :336 FD :003 MET :002	12	17	13	18	19	20	21	22	23	4	0	MET:003
STS	SLEEP		TRK MNV	10 2 M A I N T	- Z S I M N V R	M O O N F I L T E R	P C R O N E F F I C I A C Y E	Z L V M N V R	Z L V M N V R	Z L V M N V R	- Z S I M N V R	
	POST SLEEP			P/TVO6 S E T U P	P/TVO6 O P S	P/TVO7 S E T U P		P/TVO7 O P S				
				EVA PREP M I P I N B	S U I T O U T	A L E G R I E S S	I N I T I A L E V A S E T U P	R S U E V A (EVA 1)		S A C /2 E C U s /F Z P L G s		
PL				BATT C H A R G E	S A S L E W *	P R E P F O R S A R E T *						
DAY/NIGHT ORBIT	39	40	41	42	43	44	45	46				
COMM COVERAGE	-DKR	-GTS	-DKR	-GTS	-DKR	-DKR	-DKR	-DKR	-DKR	-DKR	-DKR	-DKR
TDRS E W												
ATTITUDE	BIAS -ZLV +XVV		BATT CHARGE		-ZSI BIAS -ZLV +XVV		BIAS -ZLV +XVV		BIAS -ZSI			
FSS SA	DEPLOYED AT 90 DEG				180 ROT (BERTH)				DEPLOYED AT 0 DEG			
NOTES:	<p>*GROUND COMMANDED</p> <p>▶ BATT CHG CMLPT* ⊗ SA OBSERVATION ⊗ 0° POSN ⊗ BIAS -ZLV, +XVV ▶ CONFIG RSU C/O* ⊗ BIAS -ZLV, -XVV ⊗ BIAS -ZLV, +XVV ⊗ BIAS -ZSI ⊗ PARALLEL EVA TASKS</p>											

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE				
337:10:28/ 337:22:28	003:00:00/ 003:12:00	337:04:28/ 337:16:28	4 /337 CST	-11.9		DECEMBER 3, 1993	STS-61	FINAL	10/25/93				
CST :337 FD :004 MET :003	0 5 1 6 2 7 3 8 4 9 5 10 6 11 7 12 8 13 9 14 10 15 11 16 12												
STS	ZLV MNV R	MONITOR SAFETY MNV R	102 MAINT	ROTATE HST	PC DNST EVA	ZLV MNV R	PC ONF MED	IMM A M G	SLEEP				
	P/TV07 OPS		P/TV06 OPS		PRE SLEEP								
	SAC/2 ECUs/FZ PLGs (EVA 1)	DC LOSE OUT	AI NGL S S	POST EVA	RE CONF G	IB NA IT EL M H	ME FX R E N D E D	NEXT DAY'S EVA RVW					
PL	PC WR C NS L	RA SL UV IT S T	RM EF CP OC N F I	+V 2 SD M	RE TR SA CT	RM ES OC N F I	RE CONF G	RE CONF G	RO TA TE H S T	PI VO T H S T	RGA FUN C C/O*	CF RY O S *	PI 6 F P T E S T
DAY/NIGHT	[Day/Night Cycle Bar]												
ORBIT	47 48 49 50 51 52 53 54												
COMM COVERAGE	HTS, VTS, GDX, MIL, DKR, IOS, DGS, GTS												
TDRS E W	[TDRS Coverage Bar]												
ATTITUDE	BIAS -ZLV -XVV, BIAS -ZSI, BIAS -ZLV -YVV												
FSS	175 PVT, 90 ROT 180 ROT (BERTH)												
SA	DEPLOYED AT 0 DEG RETRACTION SDMs STOWED												
NOTES:	@BIASED -ZLV, -XVV @PARALLEL EVA TASKS ▶ WARM SA SDMs ▶ CONFIG P15/P16 C/O @BIASED -ZSI ▶ RECONFIG GHRS* ▶ RECONFIG HSP* *GROUND COMMANDED ▶ PWR ON FP CIRC S2* @BIASED -ZLV, -YVV												

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
337:22:28/ 338:10:28	003:12:00/ 004:00:00	337:16:28/ 338:04:28	5 /337 CST	-10.4		DECEMBER 3, 1993	STS-61	FINAL	10/25/93
CST :003 FD :004 MET :003	12 17 18 19	19 20 21 22	21 22 23	0	1	2	3	4	MET:004
STS	SLEEP		10 2 MAINT 11 1 M A I N T 12 1 M A I N T 13 1 M A I N T 14 1 M A I N T 15 1 M A I N T 16 1 M A I N T 17 1 M A I N T 18 1 M A I N T 19 1 M A I N T 20 1 M A I N T 21 1 M A I N T 22 1 M A I N T 23 1 M A I N T						
		POST SLEEP	P/TV06 SETUP	P/TV06 OPS		P/TV07 SETUP		P/TV07 OPS	
			EVA PREP	S U I T 4 O I T M I P / N I B			A D D E R S E T U P D A I L Y	SOLAR ARRAYS EVA (EVA 2)	
PL	LGT DYB RL OS /P S E A		SA PDM SERIAL RET*	C O N S T R U C T I O N S	R O O T R A T E E V A H S E				
DAY/NIGHT ORBIT	54	55	56	57	58	59	60	61	
COMM COVERAGE	-DKR	-GTS	-DKR	-GTS	-DKR	-DGS	-MIL	-DKR	-VTS
TDRS E W									
ATTITUDE		BIAS -ZLV -YVV					BIAS -ZLV -XVV		
FSS SA		180 ROT (BERTH)				90 ROT (-V2)		270 ROT (+V2)	
NOTES:		SDMs STOWED				PDMs & SDMs STOWED			
					⊖-V2 POSN ⊖BIASED -ZLV, -XVV		▶ CLOSE -V2 SA LAT*		▶ OPEN +V2 SA LAT*
									▶ OPEN -V2 SA LAT*
									▶ CLOSE +V2 SA LAT*

*GROUND COMMANDED

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
338:10:28/ 338:22:28	004:00:00/ 004:12:00	338:04:28/ 338:16:28	5 /338 CST	-8.9		DECEMBER 4, 1993	STS-61	FINAL	10/25/93
CST :338 FD :005 MET :004	0 5 1 6 2 7 3 8 4 9 5 10 6 11 7 12 8 13 9 14 10 15 11 16 12								
STS	ZLV MNR	10 2 MAINT	ZLV MNR WASTE INIT	DUMP INIT	PCDS EVA	CONF MED	WD SM EVA	IMU ALIGN	SLEEP
	P/TV07 OPS	MEP FXA RTR EK NDE D	TB EAR TMT EL M U H				PRE SLEEP		
	SOLAR ARRAYS EVA (EVA 2)	DC CLOSE OUT	ATA NGL LOR LOS	R E F E R E N C E	POST EVA	EM U C O N T I G	TB EAR TMT EL M U H	NEXT DAY'S EVA RVW	
PL	SAT ALE IS IVT IE*								
DAY/NIGHT	ORBIT	62	63	64	65	66	67	68	69
COMM COVERAGE	HTS VTS GDX MIL DKR	GTS HTS VTS GDX MIL	HTS VTS GDX MIL	HTS VTS GDX	HTS VTS GDX	IOS DGS GTS HTS	IOS DGS GTS HTS	IOS GTS HTS	DKR GTS
TDRS	E W	BIAS -ZLV -XVV							
ATTITUDE						BIAS -ZLV +YVV			
FSS SA						180 ROT (BERTH)			
						PDMs & SC's STOWED			
NOTES:	CLOSE +V2 SA LAT*	⊙BIASED -ZLV, +YVV	⊙BIASED -ZLV, -XVV	▶ SAFE MCU*					
	*GROUND COMMANDED								

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE						
338:22:28/ 339:10:28	004:12:00/ 005:00:00	338:16:28/ 339:04:28	6 /338 CST	-7.4		DECEMBER 4, 1993	STS-61	FINAL	10/25/93						
CST :338	17	18	19	20	21	22	23	0	CST:339	1	2	3	4	0	MET:005
FD :005	12	13	14	15	16	17	18	19	20	21	22	23			
MET :004															
STS	SLEEP														
PL															
DAY/NIGHT ORBIT	69	70	71	72	73	74	75	76							
COMM COVERAGE	GTS	DKR	GTS	DKR	GTS	DKR	GTS	DKR	GTS	DKR	GTS	DKR	GTS	DKR	GTS
TDRS															
ATTITUDE															
FSS SA															
NOTES:															

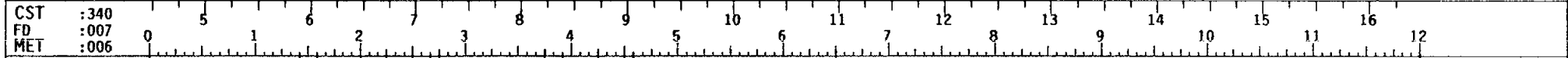
*GROUND COMMANDED

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE	
339:10:28/ 339:22:28	005:00:00/ 005:12:00	339:04:28/ 339:16:28	6 /339 CST	-6.0		DECEMBER 5, 1993	STS-61	FINAL	10/25/93	
CST :339	FD :006	MET :005								
STS	Z L V M N V R	1 0 2 M A I N T	3 P O S T E V A	4 P R I V M E D	5 M U L T I T A S K	S L E E P				
	P/TV07 OPS	W I N S P E C T	M E P F X A R T R E K N D E D	T B E A R T M T E L M I U O H	P R E S L E E P					
	M S S 1,2 E V A (E V A 3)	C L O S E O U T	A I N S I G N A L S A M P L E S	R E P R I S M S	P O S T E V A	E M U C O N T R O L	T B E A R T M T E L M I U O H	N E X T D A Y ' S E V A R V W		
PL	M A T S L E S / S 2 F T U N C	W F / P C I I F U N C T S T *	W F / P C I I	S I D U M P *						
DAY/NIGHT	[Day/Night Cycle: 77 (Night), 78 (Day), 79 (Night), 80 (Day), 81 (Night), 82 (Day), 83 (Night), 84 (Day)]									
ORBIT	77 78 79 80 81 82 83 84									
COMM COVERAGE	-GTS -HTS -VTS -GDX -MIL -DKR -DGS									
TDRS	E W [TDRS Coverage Bars]									
ATTITUDE	BIAS -ZLV -YVV									
FSS	180 ROT (BERTH)									
SA	PDMs & SDMs STOWED									
NOTES:	@BIASED -ZLV, -YVV ▶ MSS1 AL/FUNC TEST* ▶ CNFG MSS2 INSTALL* *GROUND COMMANDED									

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
339:22:28/ 340:10:28	005:12:00/ 006:00:00	339:16:28/ 340:04:28	7 /339 CST	-4.7		DECEMBER 5, 1993	STS-61	FINAL	10/25/93
CST :339									
FD :006									
MET :005									MET:006
STS	SLEEP								
		POST SLEEP							
PL									
DAY/NIGHT ORBIT									
COMM COVERAGE									
TDRS									
ATTITUDE									
FSS SA									
NOTES:									

*GROUND COMMANDED

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
340:10:28/ 340:22:28	006:00:00/ 006:12:00	340:04:28/ 340:16:28	7 /340 CST	-3.4		DECEMBER 6, 1993	STS-61	FINAL	10/25/93

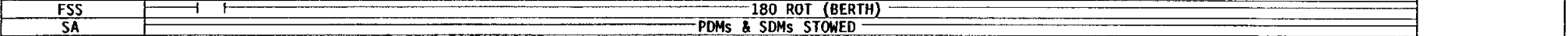
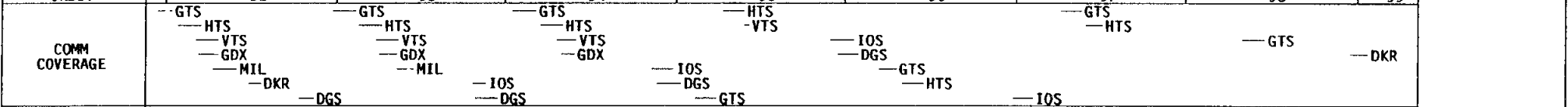
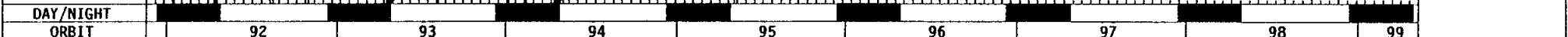


STS	10:2 MAINT	WASTE INIT	PCD SNF LEGVA	ESC DNK	WASTE INIT	COMF	SLEEP
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	P/TV07 OPS	MEP FXA RTR ENDED	MC DR KG BT ATR M	P/TV08 SETUP	PRE SLEEP
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	CO-PROC EVA (EVA 4)	DCLOS OUT	AI NGL	POST EVA	REC NFG	IBNA ITT	NEXT DAY'S EVA RVW
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PL	DCHECKOUT*	COPROC ATFT C/O*	REC NFG DF224 NOM*	FOLD TO	FNC SON WMF IG NAL	LD BFB 224	COSTAR FUNC TEST*
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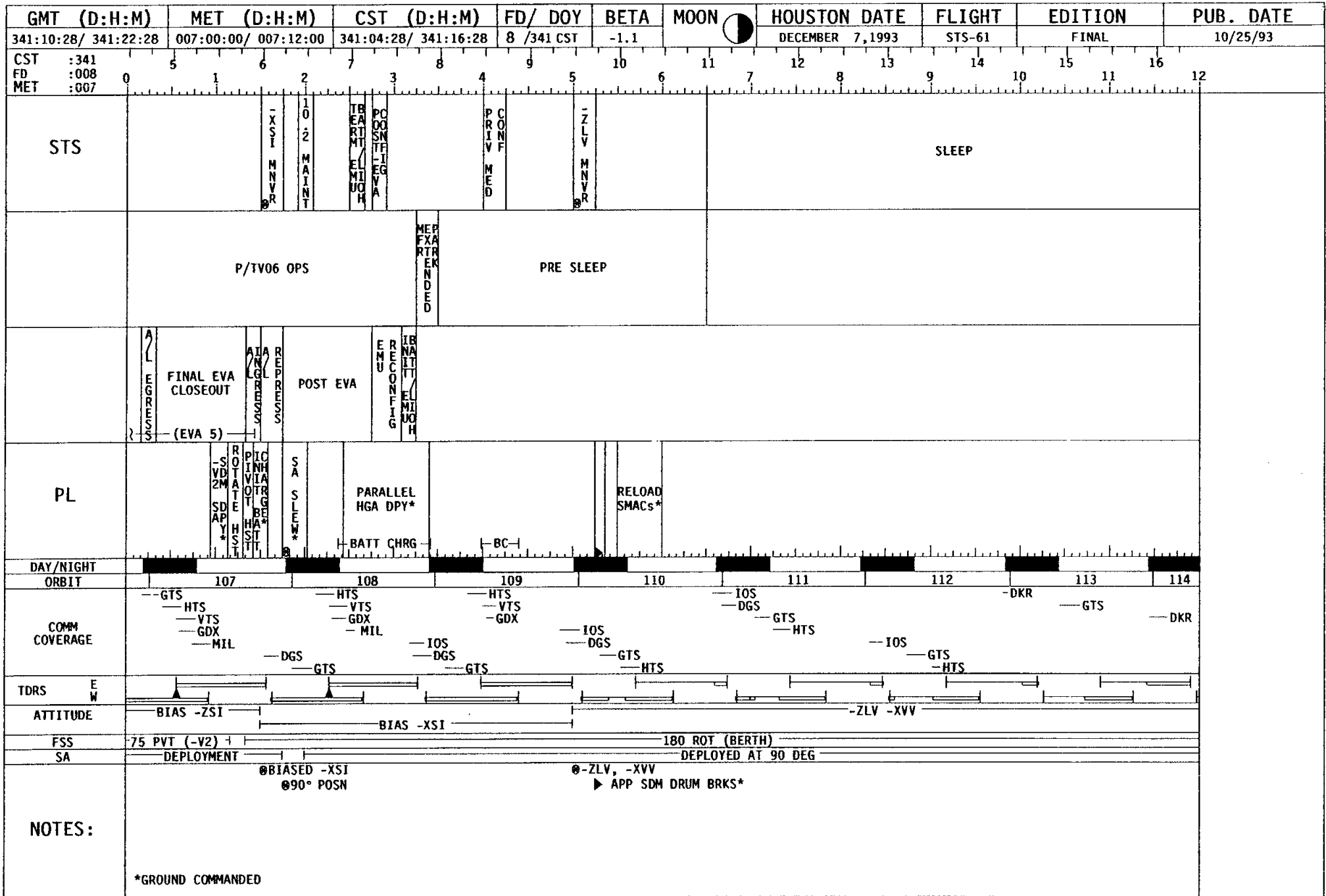
NOTES:

▶ RCVR SI/GHRS/WF* ▶ COSTAR TO HOLD*

*GROUND COMMANDED

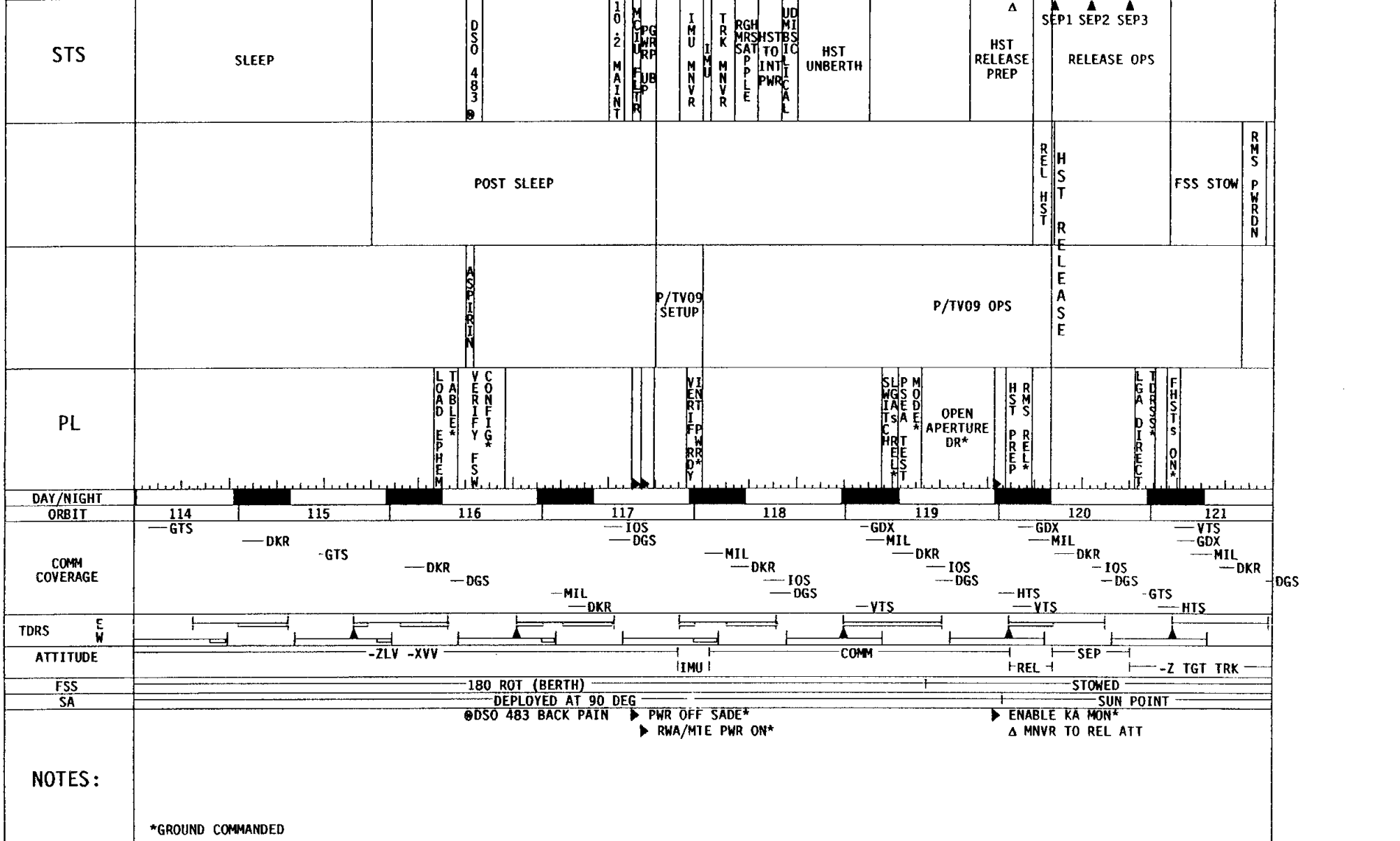
GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
340:22:28/ 341:10:28	006:12:00/ 007:00:00	340:16:28/ 341:04:28	8 /340 CST	-2.2		DECEMBER 6, 1993	STS-61	FINAL	10/25/93
CST :340									
FD :007	12	17	18	19	20	21	22	23	4
MET :006				FD08					MET:007
STS	SLEEP								
PL									
DAY/NIGHT									
ORBIT	99	100	101	102	103	104	105	106	
COMM COVERAGE	GTS	DKR	GTS	DKR	DGS	MIL	DKR	DGS	MIL
TDRS									
ATTITUDE									
FSS SA									
NOTES:									

*GROUND COMMANDED



*GROUND COMMANDED

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
341:22:28/ 342:10:28	007:12:00/ 008:00:00	341:16:28/ 342:04:28	9 /341 CST	-0.1		DECEMBER 7, 1993	STS-61	FINAL	10/25/93
CST :341	17	18	19	20	21	22	23	0	CST:342 1 2 3 4 0
FD :008	12	13	14	FD09 15	16	17	18	19	0 20 21 22 23 0
MET :007	MET:008								



*GROUND COMMANDED

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE	
342:10:28/ 342:22:28	008:00:00/ 008:12:00	342:04:28/ 342:16:28	9 /342 CST	0.9		DECEMBER 8, 1993	STS-61	FINAL	10/25/93	
CST :342 FD :009 MET :008										
STS	ZLV MNV R	DR SN AD BA L NA V	PG WR RP	DB O W N	PC ON F M A I N T	102 M A I N T	SLEEP			
		V T R	S E T U P	09	V P O T L 9 R A Y B A C K	PRE SLEEP				
PL	FHST FOV CHECK*									
DAY/NIGHT										
ORBIT	122 123 124 125 126 127 128 129									
COMM COVERAGE	DGS GTS HTS VTS GDX MIL DGS GTS HTS VTS GDX MIL DGS GTS HTS VTS IOS DGS GTS HTS IOS DGS GTS HTS DKR GTS DKR									
TDRS	E W 									
ATTITUDE	BIAS -ZLV -YVV									
FSS	STOWED									
SA	SUN POINT									
NOTES:	BIASED -ZLV, -YVV ▶ ACTIVATE SADE* *GROUND COMMANDED									

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE	
342:22:28/ 343:10:28	008:12:00/ 009:00:00	342:16:28/ 343:04:28	10/342 CST	1.8		DECEMBER 8, 1993	STS-61	FINAL	10/25/93	
CST :342 FD :009 MET :008	17 18 19	20 21 22	23 0	1 2 3 4	0	CST:343	1 2 3 4	0	MET:009	
STS	SLEEP	DSO 483 RMS HTR 10.2 MAINT RMS HTR -XLV MNR	FILTER CLEANING	DTO 700-8	-ZLV MNR	REPRESS 147	MEAL			
		POST SLEEP	SUPPLY/WASTE DUMPS							
			RMS POS H2O DUMP PWR UP		RMS PWR DN					
PL				OFF DUTY DAY (MS1, MS3, MS4, MS5)			OFF DUTY DAY (CDR, PLT, MS2)			
DAY/NIGHT ORBIT	129	130	131	132	133	134	135	136		
COMM COVERAGE	-GTS	-DKR	-DKR -IOS -DGS	-IOS -DGS	-MIL -DKR -IOS -DGS	-VTS -GDX -MIL -DKR -IOS -DGS	-VTS -GDX -MIL -DKR -IOS -DGS	-HTS -VTS -GDX -MIL -DKR		
TDRS										
ATTITUDE	BIAS -ZLV -YVV		-XLV +YVV			-ZLV +YVV				
FSS SA	STOWED SUN POINT									
NOTES:	@DSO 483 BACK PAIN @RMS HTR ACT/MCIU FILTER CK @-XLV +YVV			@DTO 700-8 GPS DEVELOPMENT FLIGHT TEST @-ZLV, +YVV						
	@DTO 1211 10.2 psia VENTED SUPPLY/WASTE H2O DUMP									

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
343:10:28/ 343:22:28	009:00:00/ 009:12:00	343:04:28/ 343:16:28	10/343 CST	2.6		DECEMBER 9, 1993	STS-61	FINAL	10/25/93
CST :343 FD :010 MET :009	0 5 1 6 2 7 3 8 4 9 5 10 6 11 7 12 8 13 9 14 10 15 11 16 12								
STS	PRONF MED		I MU MNV R	HUD CAL	Z LV MNV R	SLEEP			
	PRE SLEEP								
PL	OFF DUTY DAY (CDR, PLT, MS2)								
DAY/NIGHT ORBIT	136	137	138	139	140	141	142	143	
COMM COVERAGE	DGS GTS HTS VTS GDX MIL	DGS GTS HTS VTS GDX	IOS DGS GTS HTS	IOS DGS GTS HTS	IOS DGS GTS HTS	GTS DKR	GTS	DKR	GTS
TDRS	E W								
ATTITUDE	-ZLV +YVV			FIMU/HUD †		BIAS -ZLV -YVV			
FSS SA	STOWED SUN POINT								
NOTES:	@CDR HUD @BIASED -ZLV, -YVV								

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE			
343:22:28/ 344:10:28	009:12:00/ 010:00:00	343:16:28/ 344:04:28	11 /343 CST	3.3		DECEMBER 9, 1993	STS-61	FINAL	10/25/93			
CST :343 FD :010 MET :009	12 17 18 19 20 21 22 23	13 FD11 14 15 16 17 18 19 20 21 22 23	0	CST:344	1 2 3 4	0	MET:010					
STS	SLEEP	DSO 483 BACK PAIN	PGWR RP UB P	FCS C/O	RCS HOT	DTO 667	DTO 667	AUTO MNV	CREW CONF	ZLV MNV	MEAL	CABIN STOW
		POST SLEEP			ERGOW METER		P/TV13 SETUP	P/TV13 OPS			DSO 469 RADIATION DOSE	
						POST EVA ENT PREP						
PL											DSO 469 RADIATION DOSE	
DAY/NIGHT												
ORBIT	144	145	146	147	148	149	150	151				
COMM COVERAGE	-GTS	-DKR -DGS	-MIL -DKR -DGS	-MIL -DKR -DGS	-MIL -DKR -DGS	-VTS -MIL -DKR	-HTS -VTS -GDX -MIL -DKR	-HTS -VTS -GDX -MIL -DKR	-HTS -VTS -GDX -MIL -DKR	-GTS -HTS -VTS -GDX -MIL		
TDRS												
ATTITUDE	BIAS -ZLV -YVV											
FSS												
SA	STOWED SUN POINT											
NOTES:	◎DSO 483 BACK PAIN ○APU HTR ACT ◎DTO 667 PILOT (CDR) ◎DTO 667 PILOT (PLT) ◎BIASED -ZLV, -YVV ◎DSO 469 RADIATION DOSE DISTRIBUTION											

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
344:10:28/ 344:22:28	010:00:00/ 010:12:00	344:04:28/ 344:16:28	11 /344 CST	3.9		DECEMBER 10, 1993	STS-61	FINAL	10/25/93
CST :344									
FD :011									
MET :010									
STS	CABIN STOW	O JACO S SHS W OBLK OBLK DEB V DEB T TNOG T						SLEEP	
								PRE SLEEP	
PL									
DAY/NIGHT									
ORBIT	151	152	153	154	155	156	157	158	
COMM COVERAGE	— DGS IOS	— IOS — DGS — GTS — HTS — VTS — GDX — MIL	— GTS — HTS — VTS — GDX	— DGS — GTS — HTS	— IOS — DGS — GTS — HTS	— IOS — GTS — HTS	— DKR — GTS	— DKR — GTS	— DKR
TDRS									
ATTITUDE						BIAS -ZLV -YVW			
FSS						STOWED			
SA						SUN POINT			
NOTES:									

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE					
344:22:28/ 345:10:28	010:12:00/ 011:00:00	344:16:28/ 345:04:28	12 /344 CST	4.4		DECEMBER 10, 1993	STS-61	FINAL	10/25/93					
CST :344	17	18	19	20	21	22	23	0	CST:345 1	2	3	4	0	MET:011
FD :011	12	13	FD12 14	15	16	17	18	19	20	21	22	23	0	
MET :010														
STS	SLEEP		POST SLEEP				DEORBIT PREP							
								DEORBIT BURN*						
PL														
DAY/NIGHT ORBIT	159	160	161	162	163	164	165	166						
COMM COVERAGE	GTS	DKR DGS	MIL DKR	MIL DKR IOS DGS	DKR IOS DGS	DKR IOS DGS	MIL DKR DGS	MIL DKR DGS						
TDRS														
ATTITUDE		BIAS -ZLV -YVV		BIAS -XSI	IMU		BIAS -XSI (COMM)	D/O BURN		ENTRY				
FSS SA														
NOTES:			@DSO 483 BACK PAIN											
										* DEORBIT BURN 10/20:46				* KSC LANDING 10/22:00

DETAILED TIMELINE

FD1	3-2
FD2	3-5
FD3	3-11
FD4	3-17
FD5	3-23
FD6	3-29
FD7	3-35
FD8	3-41
FD9	3-47
FD10	3-53
FD11	3-59
FD12	3-65

DETAILED
TIMELINE

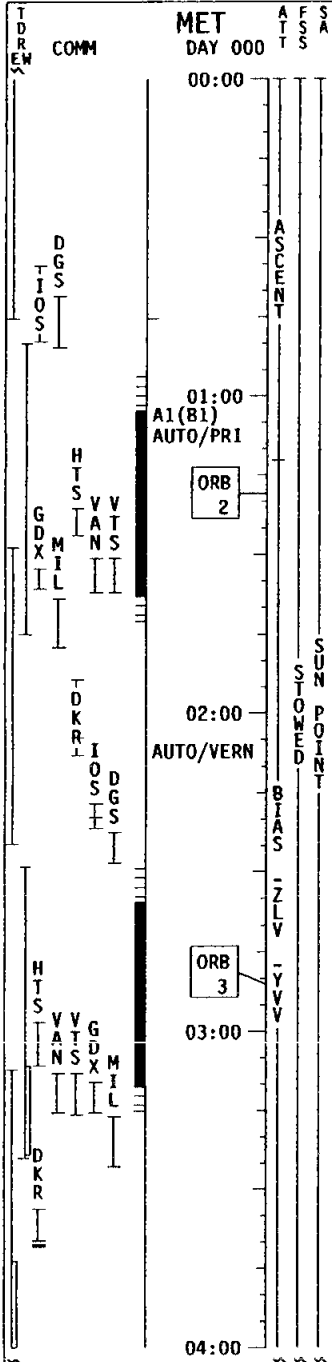
DETAILED TIMELINE

STS-61 (FD 01)

STS

PL

MCC



Activities prior to 0/02:30 MET are in the ASCENT & POST INSERTION checklists. Orbiter attitude when entering the FLT PLN is biased -ZLV -YVV.

FD01 EZ ACTIVITIES:

Do at earliest convenience:
LAMP TEST (ORB OPS, EPS) (5 MIN)
SMK DETN CKT TEST (ORB OPS, ECLS) (5 Min)
 M010W H2O TK N2 REG INLET SYS 2 VLV - CL report CABIN PRESSURE from S66 ENVIRONMENT and PNL 01 METER to MCC
CPA OPS (ORB OPS, CREW SYS) (15 MIN)
WINDOW IMPACT OBSERVATION OPS (ORB OPS, DSO 326) - CDR or PLT

Expect stars of opportunity
IMU ALIGN - S TRK (ORB OPS)

SM CKPT INIT (ORB OPS, OPS)
KU-BD ANT DEPLOY (ORB OPS, COMM/INST)
KU-BD ACTIVATION (COMM mode) (ORB OPS, COMM/INST)

P/TV01 SETUP (PHOTO/TV, PLB VIEWS)

SSE ACTIVATION (PL OPS, SSE ACT/FSS PREP)

SNACK

AFT CONTROLLER C/O (ORB OPS, GNC)
APU STEAM VENT HTR DEACT BLR PWR (three) - OFF
CRYO 02 TK HTR SNSR CK (ORB OPS, EPS)

P/TV01 OPERATIONS (PHOTO/TV, PLB VIEWS)

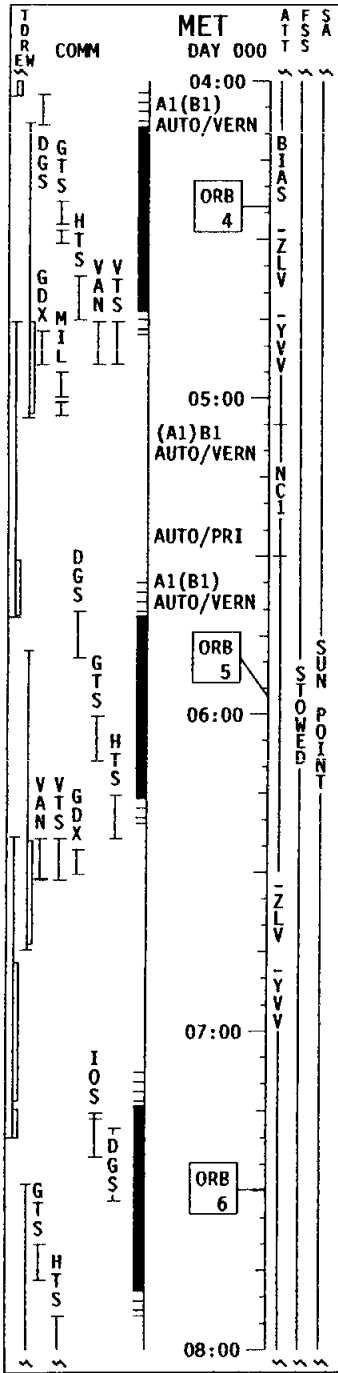
GAPC UNSTOW/SETUP (CUE CARD, ICBC)
MAIN PWR ON (CUE CARD, ICBC)

TV (TDRE) (CREW CNTL-PLB)

QUICKDON MASKS
 Unstow, Install, Verify operation

R2

STS-61 (FD 01)



STS

ELEVON PARK
(ORB OPS, ELEVON PARK)

06 UHF MODE - OFF
PRIVATE MEDICAL CONFERENCE

06 UHF MODE - SPLX (or as reqd)

05:00
DN-ORBIT OMS BURN
(ORB OPS, OMS)
(2 Cmn)

◀ NCI TIG (05:24)

MNVR (TRK) -ZLV, -YVV
TG=2 BV=3 OM=90
A/AUTO/VERN Init TRK

06:00
A12 APU HTR GG/FU (three) - A AUTO

QUICKDON MASKS
Unstow, Install, Verify operation

PADM SETUP
(ORB OPS, PGSC)

PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

NUM SEPS FOR WATER ACCUMULATION

Do not perform
SUPPLY WATER Dump

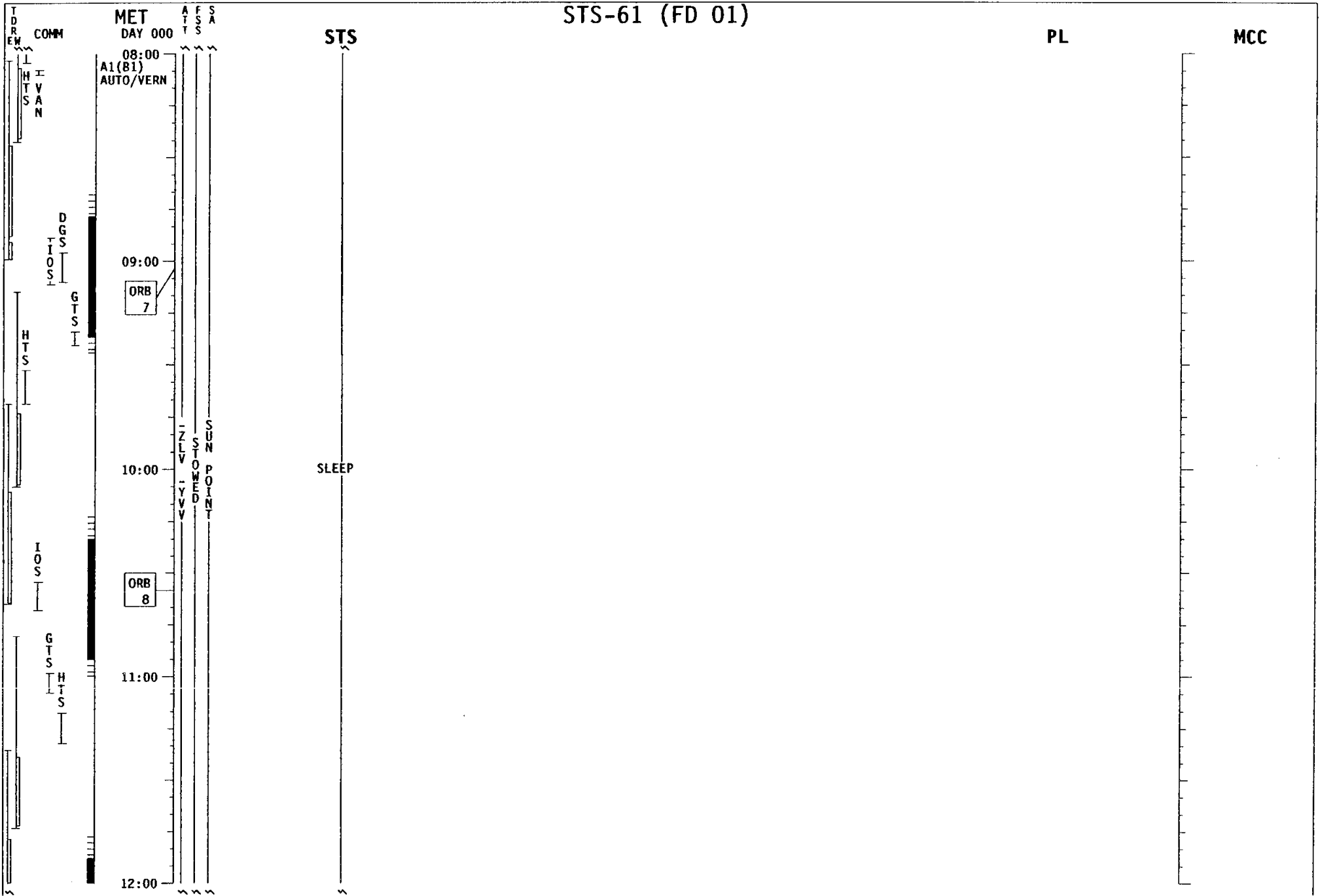
SLEEP

PL

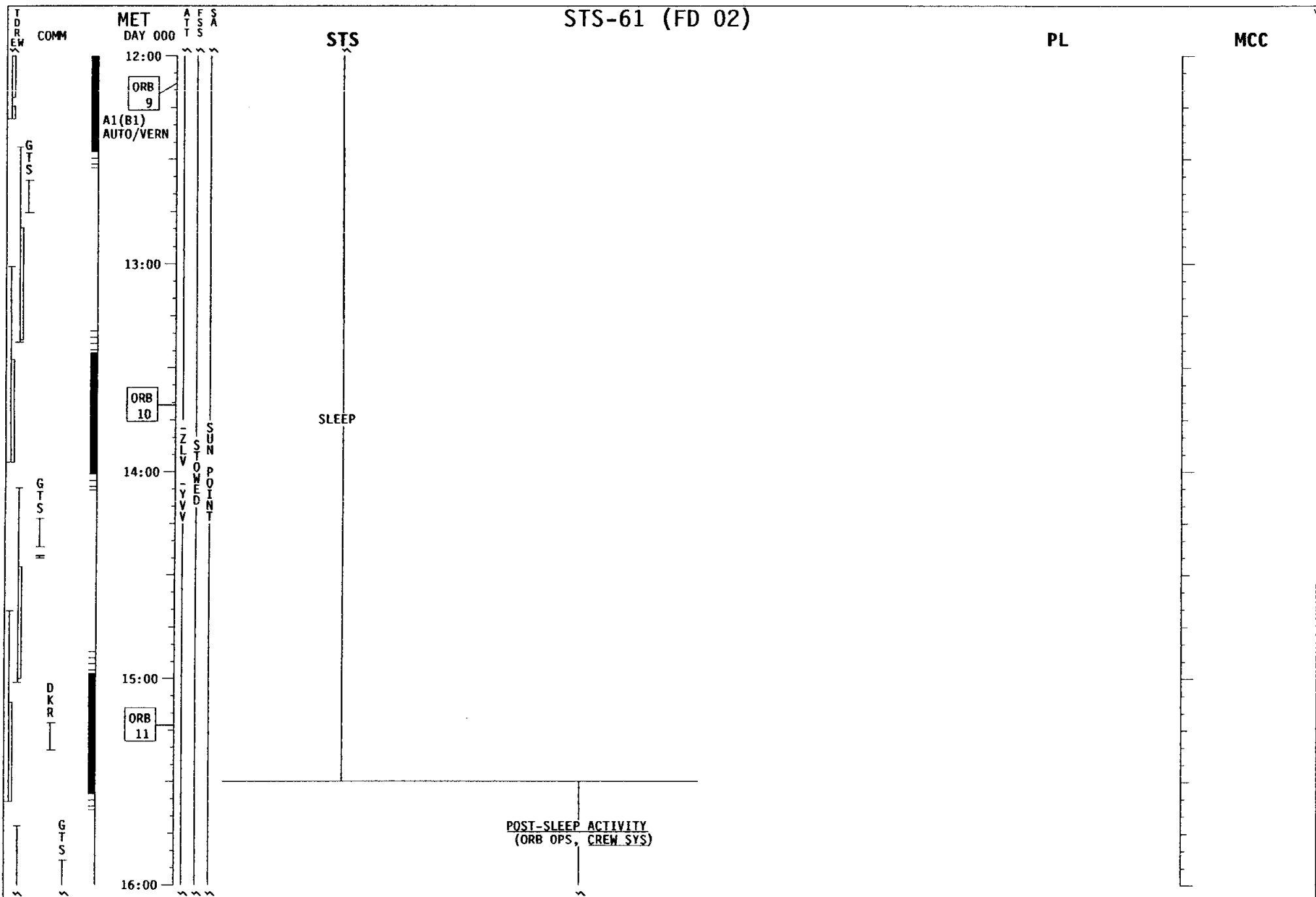
MCC

UPDATE
ORBITAL MNVR PAD

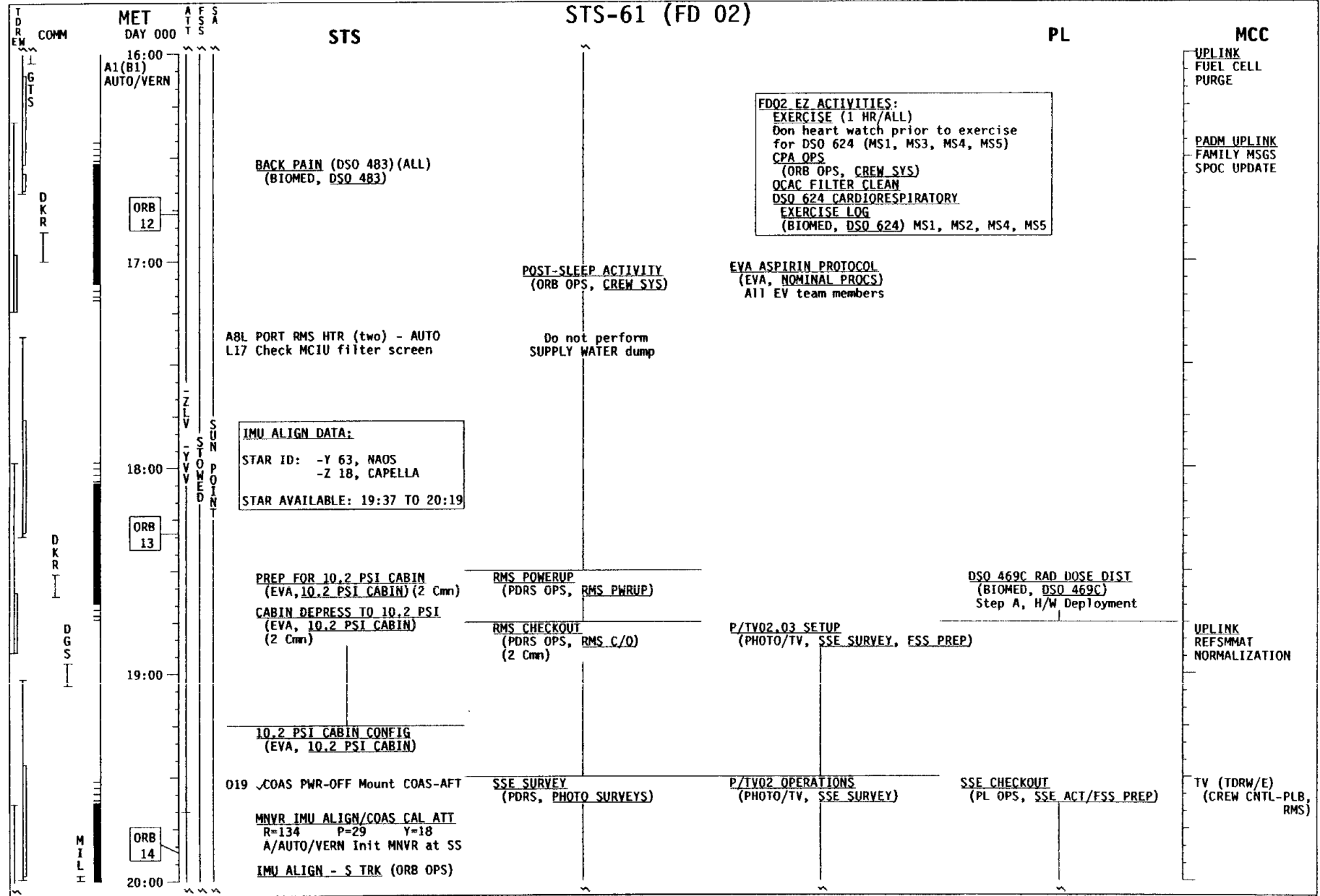
STS-61 (FD 01)



STS-61 (FD 02)



STS-61 (FD 02)



MET DAY 000

STS

PL

MCC

16:00
A1(B1)
AUTO/VERN

BACK PAIN (DSO 483) (ALL)
(BIOMED, DSO 483)

FD02 EZ ACTIVITIES:
EXERCISE (1 HR/ALL)
 Don heart watch prior to exercise
 for DSO 624 (MS1, MS3, MS4, MS5)
CPA OPS
 (ORB OPS, CREW SYS)
QCAC FILTER CLEAN
DSO 624 CARDIORESPIRATORY
EXERCISE LOG
 (BIOMED, DSO 624) MS1, MS2, MS4, MS5

UPLINK
FUEL CELL
PURGE

PADM UPLINK
FAMILY MSGS
SPOC UPDATE

ORB 12

POST-SLEEP ACTIVITY
 (ORB OPS, CREW SYS)

EVA ASPIRIN PROTOCOL
 (EVA, NOMINAL PROCS)
 All EV team members

17:00

A8L PORT RMS HTR (two) - AUTO
 L17 Check MCIU filter screen

Do not perform
 SUPPLY WATER dump

IMU ALIGN DATA:
 STAR ID: -Y 63, NAOS
 -Z 18, CAPELLA
 STAR AVAILABLE: 19:37 TO 20:19

18:00

ORB 13

PREP FOR 10.2 PSI CABIN
 (EVA, 10.2 PSI CABIN) (2 Cmn)

RMS POWERUP
 (PDRS OPS, RMS PWRUP)

DSO 469C RAD DOSE DIST
 (BIOMED, DSO 469C)
 Step A, H/W Deployment

CABIN DEPRESS TO 10.2 PSI
 (EVA, 10.2 PSI CABIN)
 (2 Cmn)

RMS CHECKOUT
 (PDRS OPS, RMS C/O)
 (2 Cmn)

P/TY02.03 SETUP
 (PHOTO/TV, SSE SURVEY, FSS PREP)

19:00

10.2 PSI CABIN CONFIG
 (EVA, 10.2 PSI CABIN)

019 COAS PWR-OFF Mount COAS-AFT

SSE SURVEY
 (PDRS, PHOTO SURVEYS)

P/TY02 OPERATIONS
 (PHOTO/TV, SSE SURVEY)

SSE CHECKOUT
 (PL OPS, SSE ACT/FSS PREP)

ORB 14

MNVN IMU ALIGN/COAS CAL ATT
 R=134 P=29 Y=18
 A/AUTO/VERN Init MNVN at SS

IMU ALIGN - S TRK (ORB OPS)

UPLINK
REFSMAT
NORMALIZATION

TV (TDRW/E)
(CREW CNTL-PLB,
RMS)

*GROUND COMMANDED

3-6

FLT PLN/61/FIN

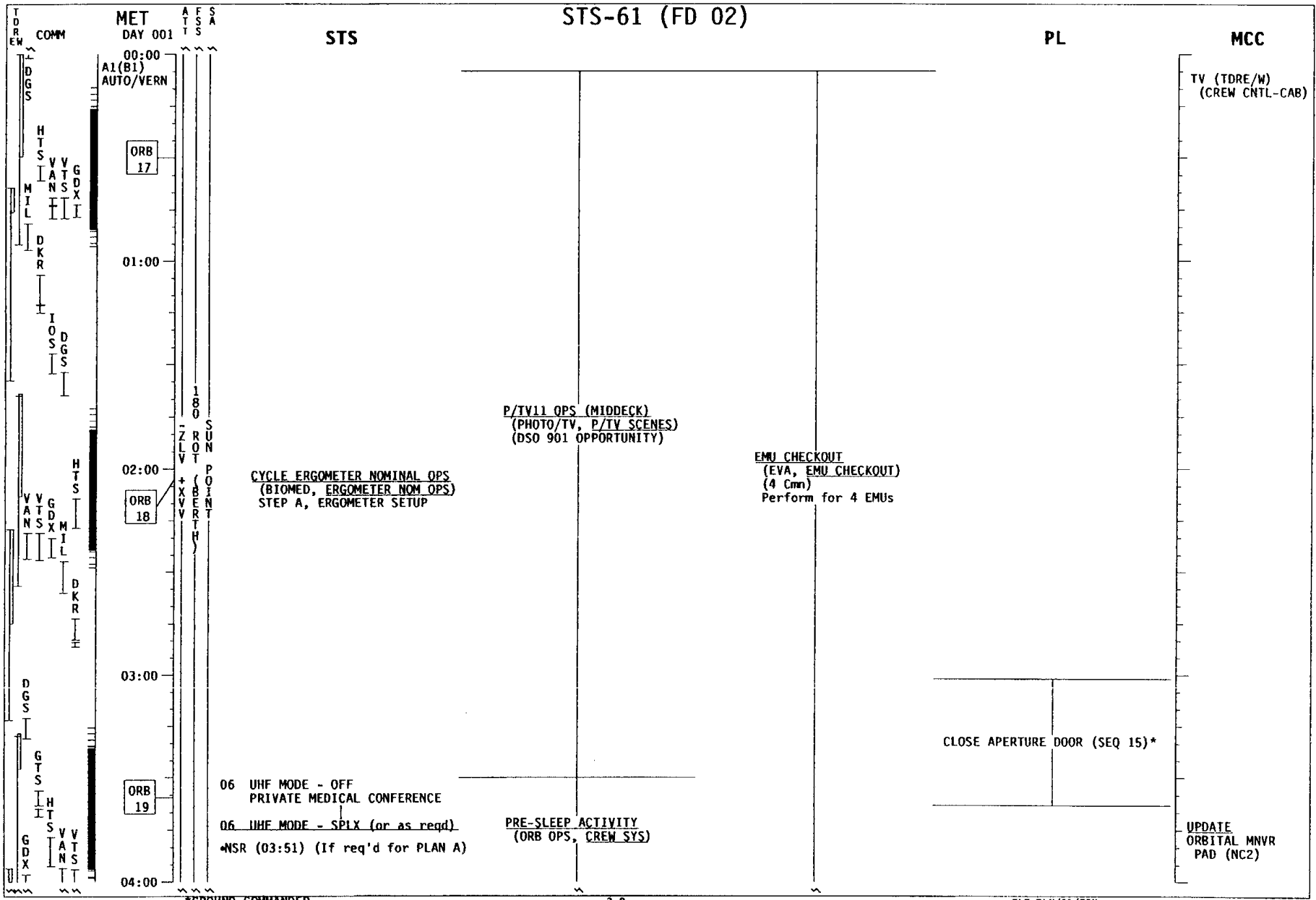
10/25/93

STS-61 (FD 02)

	MET	STS	PL	MCC	
<p>20:00 (A1)B5 INRT/VERN A1(B1) AUTO/VERN</p> <p>21:00</p> <p>22:00 (A1)B1 AUTO/VERN</p> <p>23:00</p> <p>001 00:00</p>	<p>DAY 000</p> <p>20:00 (A1)B5 INRT/VERN A1(B1) AUTO/VERN</p> <p>21:00</p> <p>22:00 (A1)B1 AUTO/VERN</p> <p>23:00</p> <p>001 00:00</p>	<p>COAS CALIBRATION (ORB OPS)</p> <p>MNVR (TRK) -ZLV, +XVY TG=2 BV=3 OM=180 A/AUTO/VERN Init TRK</p> <p>019 COAS PWR - OFF Stow COAS QCAC SETUP (ORB OPS, CREW SYS)</p> <p>FILTER CLEANING (IFM, SCHEDULED MAINTENANCE)</p> <p>RMS POWERDOWN (PDRS OPS, RMS PWRDN) Note: Do not stow MPM's</p> <p>ON-ORBIT +X RCS BURN (ORB OPS, RCS) (2 Cmn)</p> <p>← NPC TIG (22:33) A/AUTO/VERN Init TRK when burn complete.</p> <p>MEAL (A11)</p>	<p>SSE SURVEY (PDRS, PHOTO SURVEYS)</p> <p>P/TVO2 OPERATIONS (PHOTO/TV, SSE SURVEY)</p> <p>P/TVO3 OPERATIONS (PHOTO/TV, ESS PREP FOR BERTH)</p> <p>FSS UMBILICAL SURVEY (PDRS, PHOTO SURVEYS)</p> <p>P/TV11 SETUP (PHOTO/TV, MIDDECK)</p> <p>P/TV11 OPERATIONS (PHOTO/TV, MIDDECK)</p> <p>AIRLOCK PREP (EVA, EQUIP PREP)</p>	<p>SSE CHECKOUT (PL OPS, SSE ACT/ESS PREP)</p> <p>FSS PREP FOR BERTHING (PL OPS, SSE ACT/ESS PREP)</p> <p>HST TOOL PREP (EVA, EQUIP PREP)</p>	<p>TV (TDRW/E) (CREW CNTL-PLB, RMS)</p> <p>TV (TDRW/E) (CREW CNTL-PLB, RMS)</p> <p>UPDATE ORBITAL MNVR PAD</p> <p>TV (TDRW) (CREW CNTL-CAB)</p>
		<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> <p>COAS CALIBRATION LOG</p> <hr/> <p>STAR ID: -Z 18, CAPELLA STAR AVAIL: 0/19:37 to 0/20:22</p> <p>-Z Δ BIAS _____</p> <p>UPDATE TIME: ___ / ___ : ___ : ___</p> </div>		<p>HST TO RNDZ ATT (SEQ 11)*</p>	

*GROUND COMMANDED

STS-61 (FD 02)



*GROUND COMMANDED

STS-61 (FD 02)

PL

MCC

STS

MET
DAY 001

04:00
A1(B1)
AUTO/VERN
(A1)B1
AUTO/VERN

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

◀ NC2 TIG (04:38)

MNVR (TRK) BIASED -ZLY -YVV
TG=2 BV=3 OM=116
A/AUTO/VERN Init TRK

A1(B1)
AUTO/VERN

PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

10.2 PSI MAINTENANCE
(EVA, 10.2 PSI CABIN)

MUM SEPS FOR WATER
ACCUMULATION

Do not perform
SUPPLY WATER Dump

Expect stars of opportunity
IMU ALIGN - S TRK (ORB OPS)

05:00

ORB
20

06:00

ORB
21

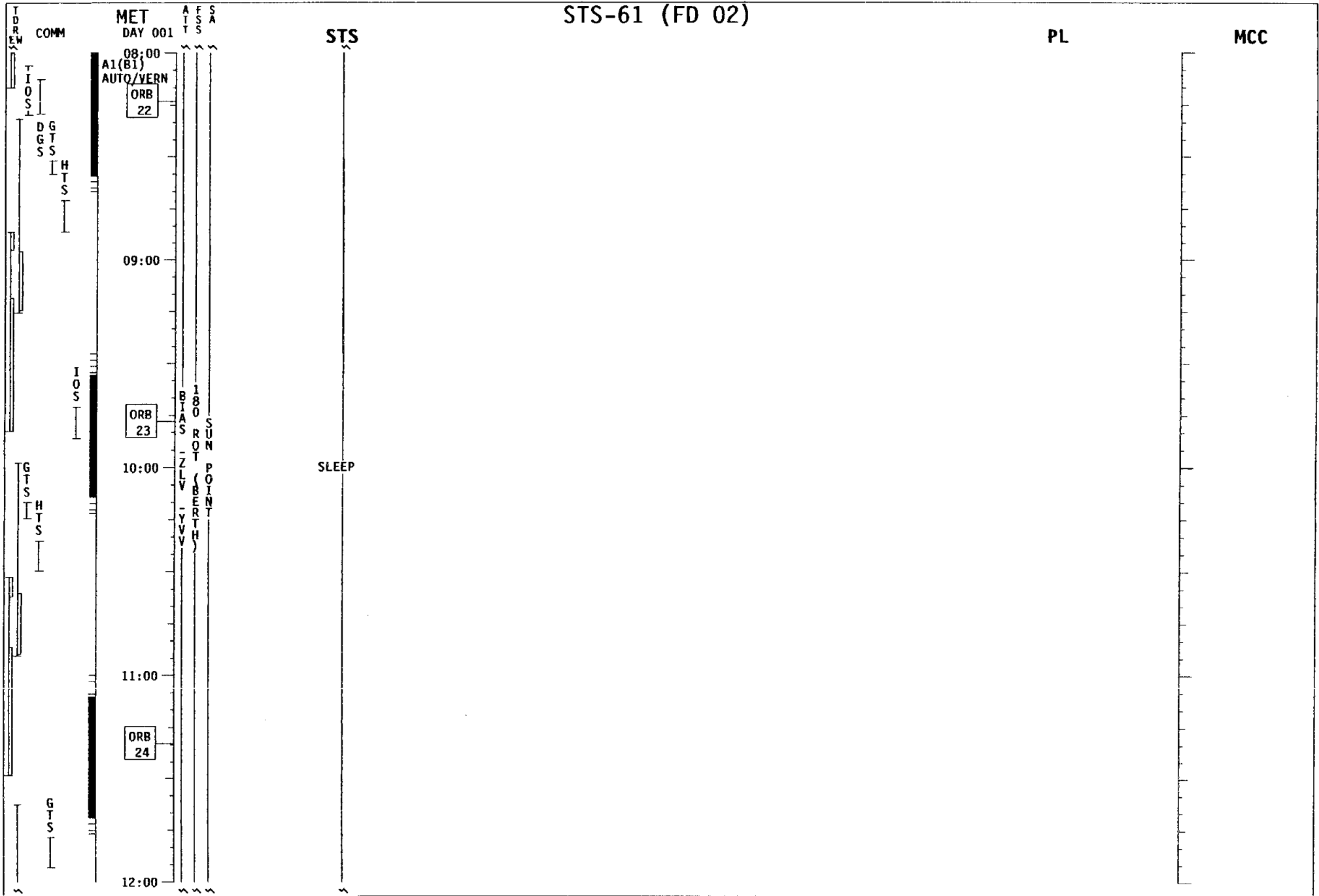
07:00

SLEEP

08:00

*GROUND COMMANDED

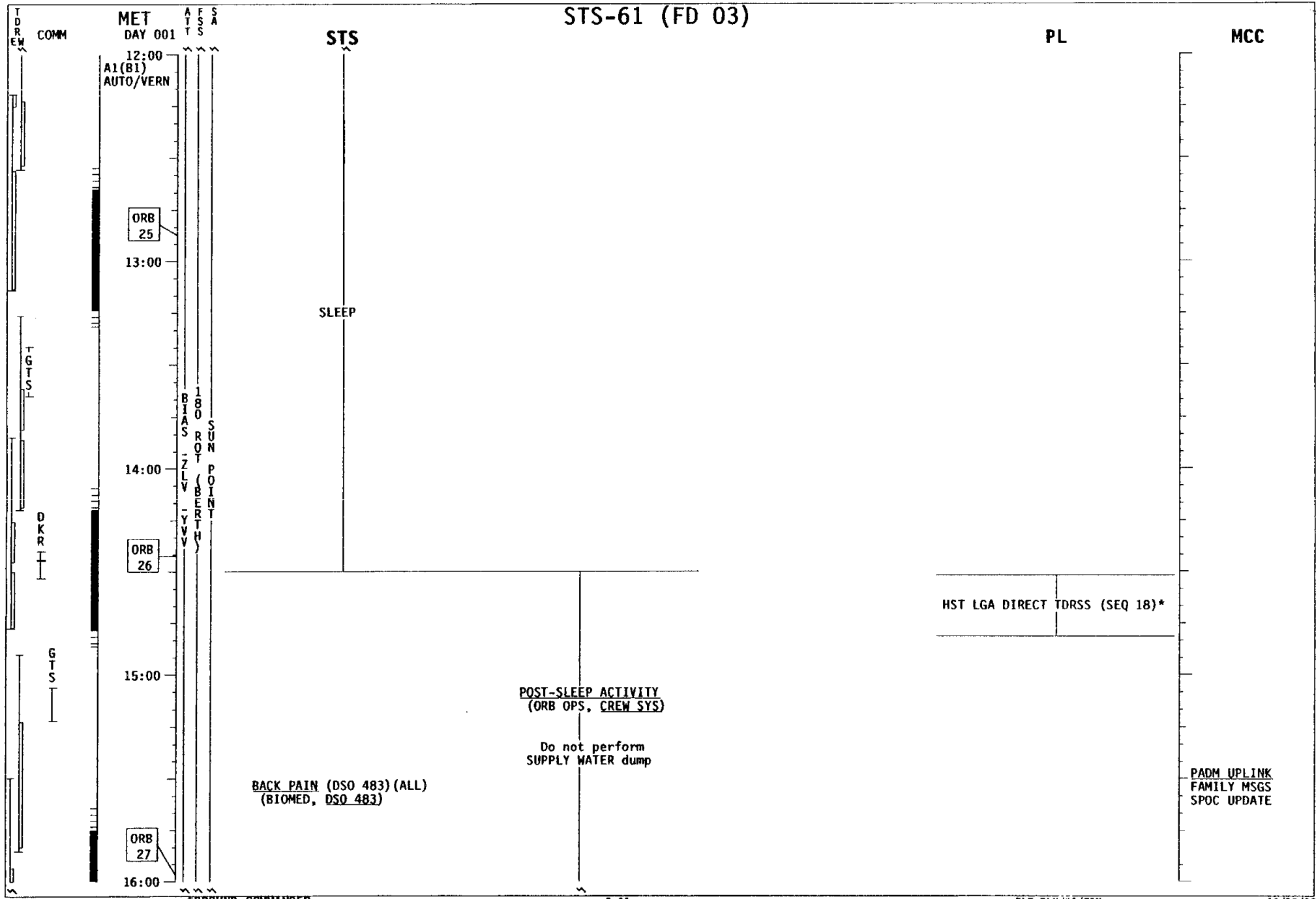
STS-61 (FD 02)



PL

MCC

STS-61 (FD 03)



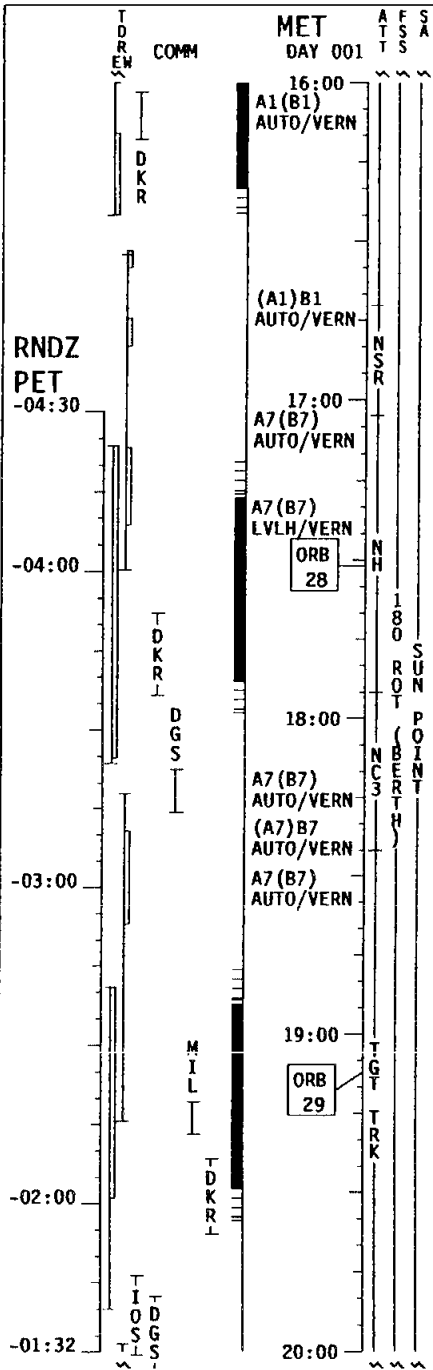
*GROUND COMMANDED

STS-61 (FD 03)

STS

PL

MCC



Expect stars of opportunity
IMU ALIGN - S TRK (ORB OPS)
10.2 PSI MAINTENANCE
(EVA, 10.2 PSI CABIN)

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

◀ NSR TIG (17:02)

HST RENDEZVOUS
(RNDZ, RNDZ TIMELINE)

NH TIG (17:32)
LASER CHECKOUT

NC3 TIG (18:20)

CONFIG Ku FOR RADAR

PI CONFIG

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

Do not perform
SUPPLY WATER Dump

RNDZ PET (Ti)
00:00 = 1/21:33

Transition to RNDZ C/L

FD03 EZ ACTIVITIES:
EXERCISE (1 HR/ALL)
Don heart watch prior to exercise
for DSO 624 (MS1, MS3, MS4, MS5)
CPA OPS
(ORB OPS, CREW SYS)
QCAC FILTER CLEAN
DSO 624 CARDIORESPIRATORY
EXERCISE LOG
(BIOMED, DSO 624) MS1, MS3, MS4, MS5

SERIAL RETRACT HGAs (SEQ 20)*

UPDATE
ORBITAL MNVR
PAD

CONFIG LATCHS-SA RTRCT (SEQ 21)*

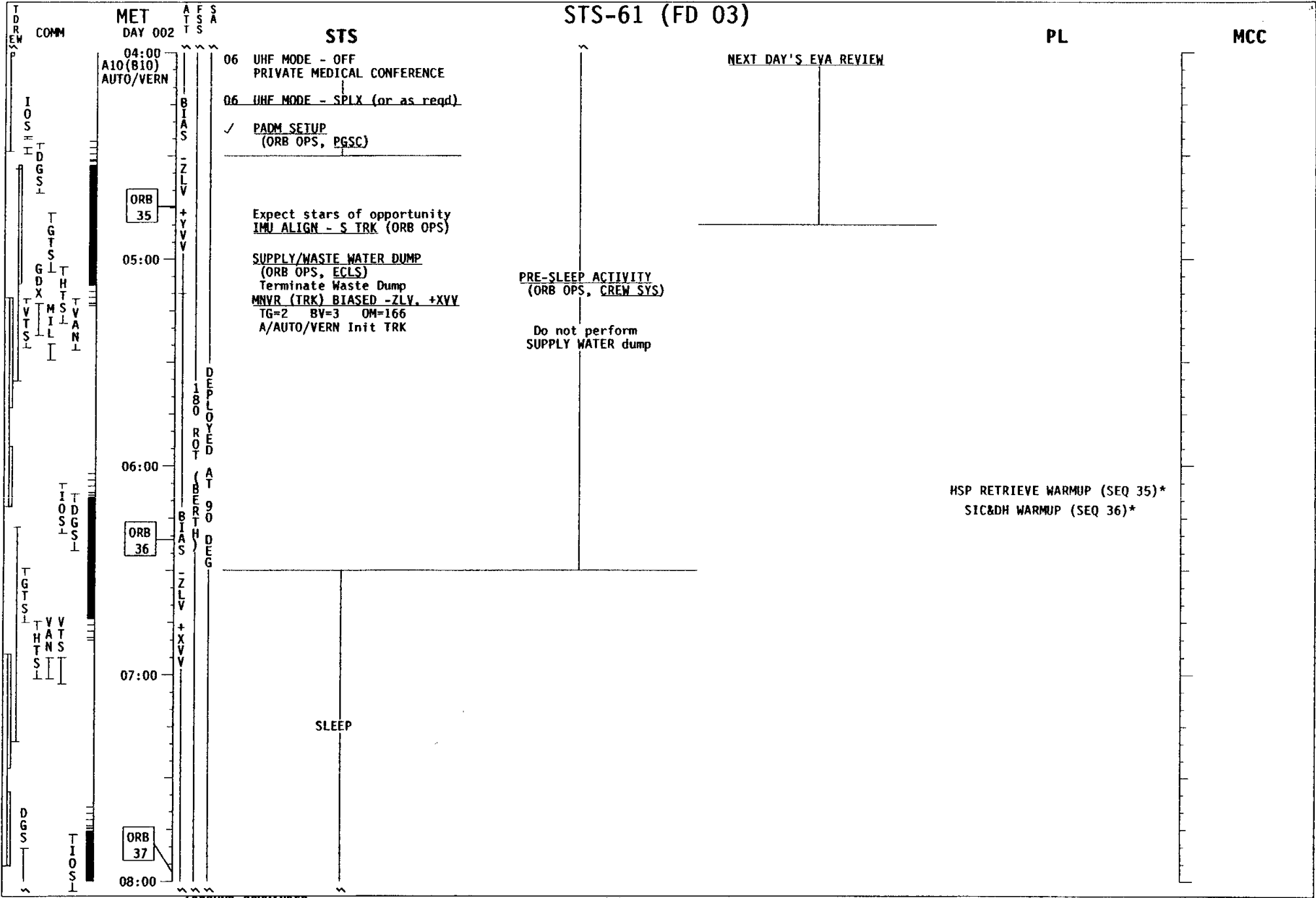
*GROUND COMMANDED

3-12

FLT PLN/61/FIN

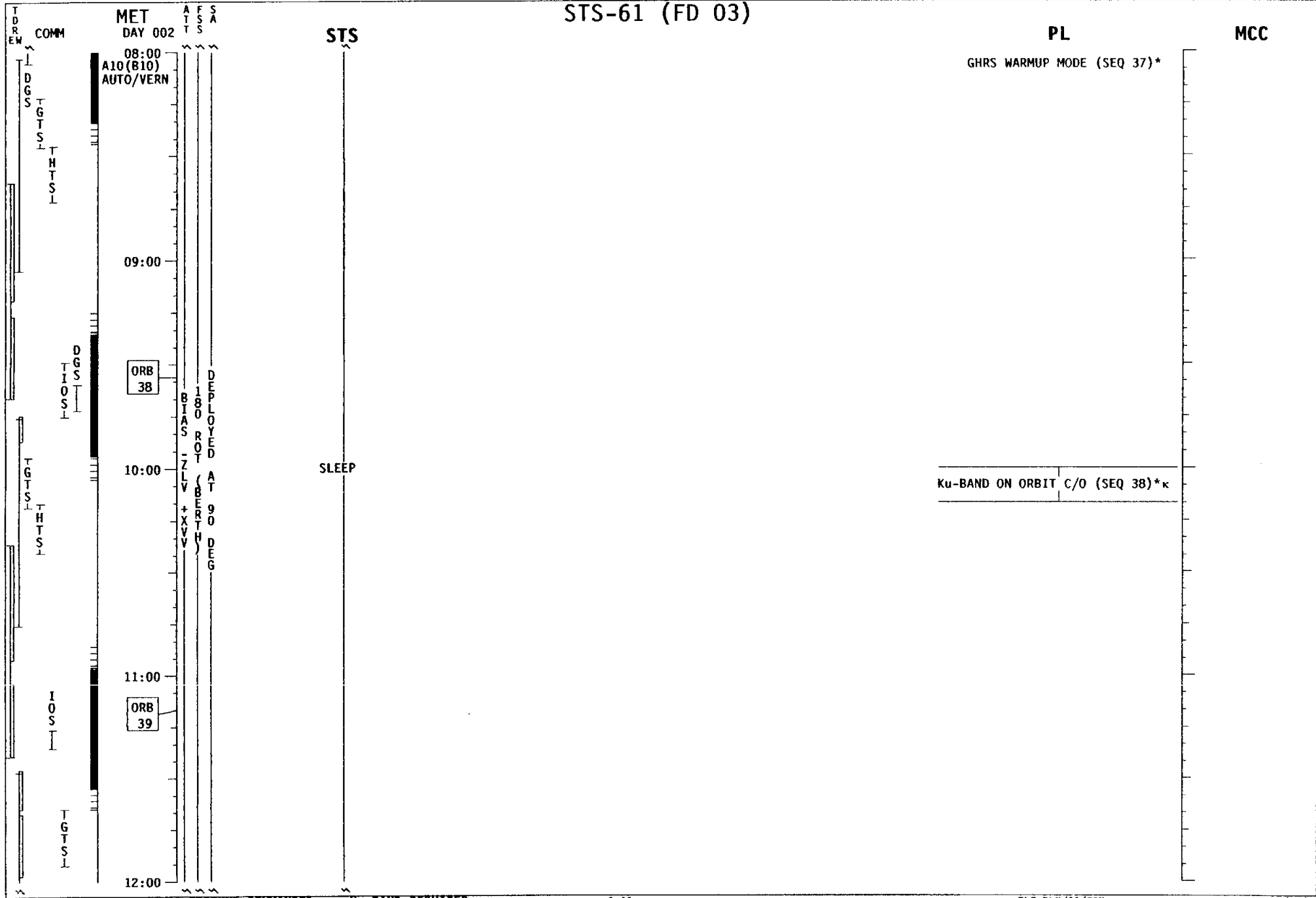
10/25/93

STS-61 (FD 03)



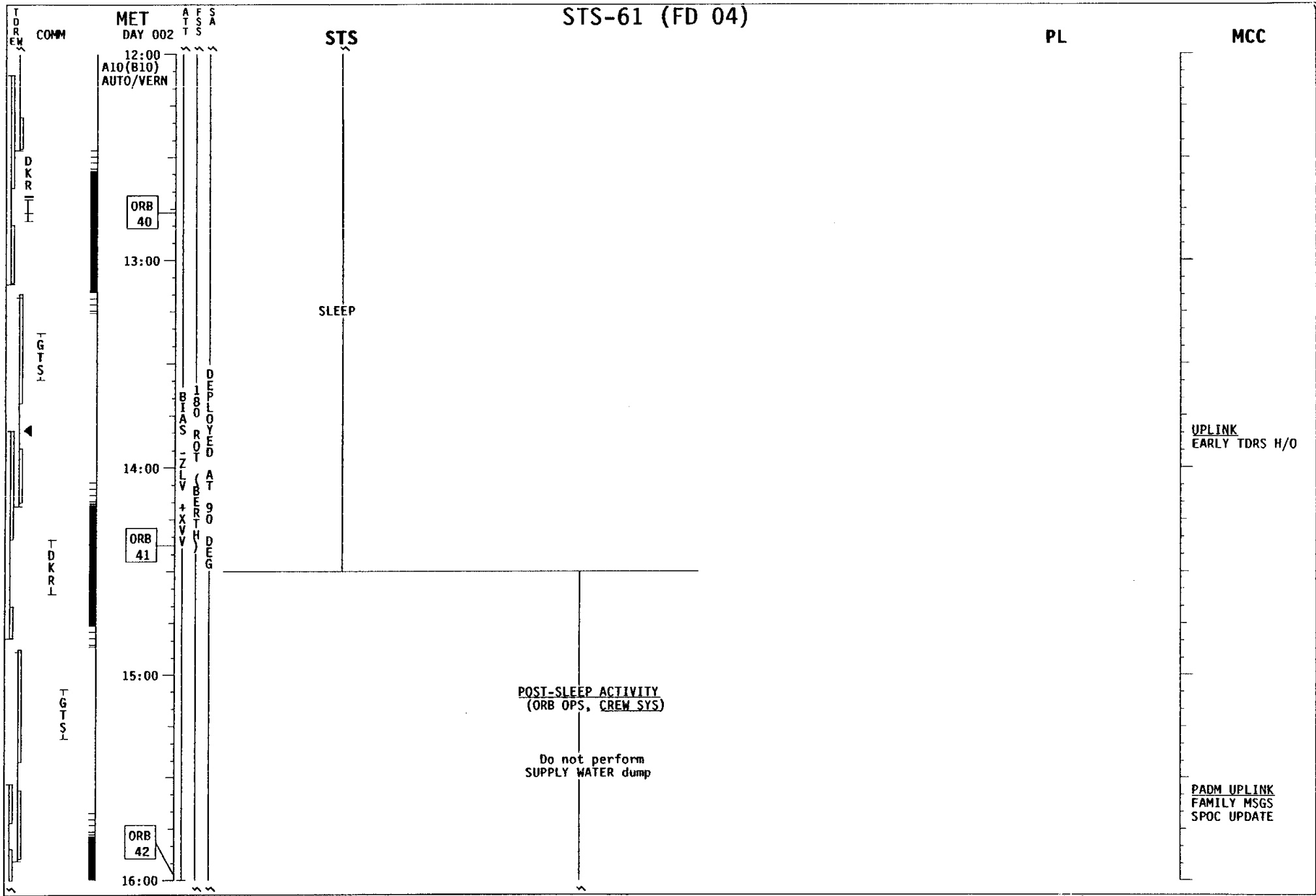
*GROUND COMMANDED

STS-61 (FD 03)

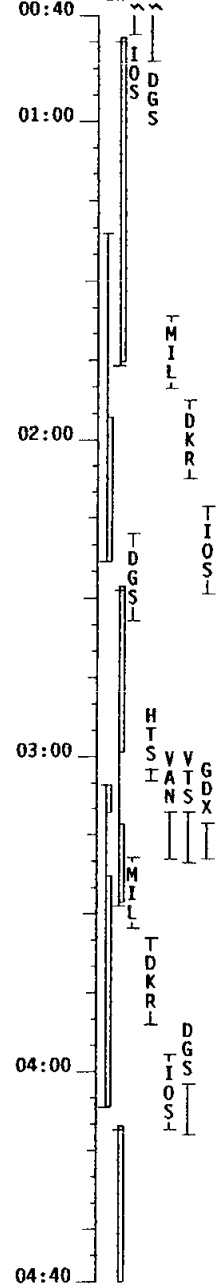


*GROUND COMMANDED; κ=Ku-BAND REQUIRED

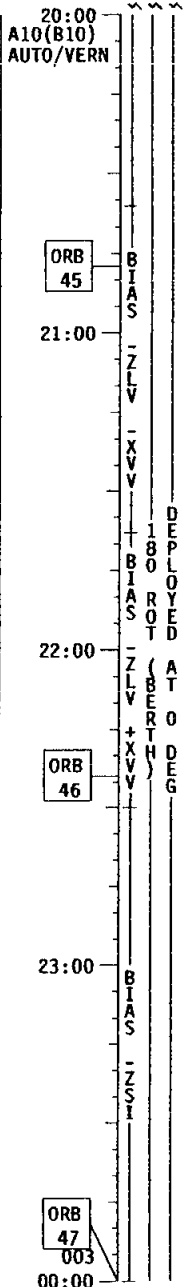
STS-61 (FD 04)



EVA 1
PET



MET
DAY 002



STS

MNVR (TRK) BIASED -ZLV, -XVV
TG=2 BV=3 OM=26
A/AUTO/VERN (20:36) Init TRK
(NET: SS; NLT 20:58)

MNVR (TRK) BIASED -ZLV, +XVV
TG=2 BV=3 OM=178
A/AUTO/VERN (21:38) Init TRK
(NET 21:29; NLT 21:44)

MNVR (TRK) BIASED -ZSI ATT
TG=4 BV=5
P=78 Y=9 OM=0
A/AUTO/VERN Init TRK

STS-61 (FD 04)

P/TV07 OPERATIONS
(PHOTO/TV, HST EYA)

PL

INITIAL SETUP
(EVA, HST SM-1)

RSU
(EVA, HST SM-1)
SOPE PREP

OPEN -V3 DOORS

R RSU REPLACE

L RSU REPLACE

WORKSITE CLEANUP

RSU FINAL CLOSEOUT

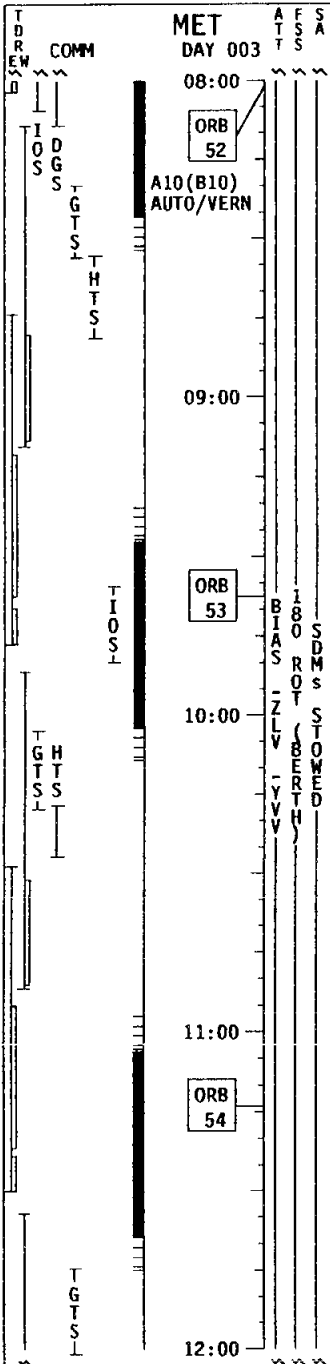
SAC PREP AFTER RSU
ECU
FUSE PLUGS
(EVA, HST SM-1)

MCC

TV (TDRW/E)
(CREW CNTL-PLB, RMS)

CONFIG FOR RSU 2,3 C/O
(SEQ 43)*

STS-61 (FD 04)



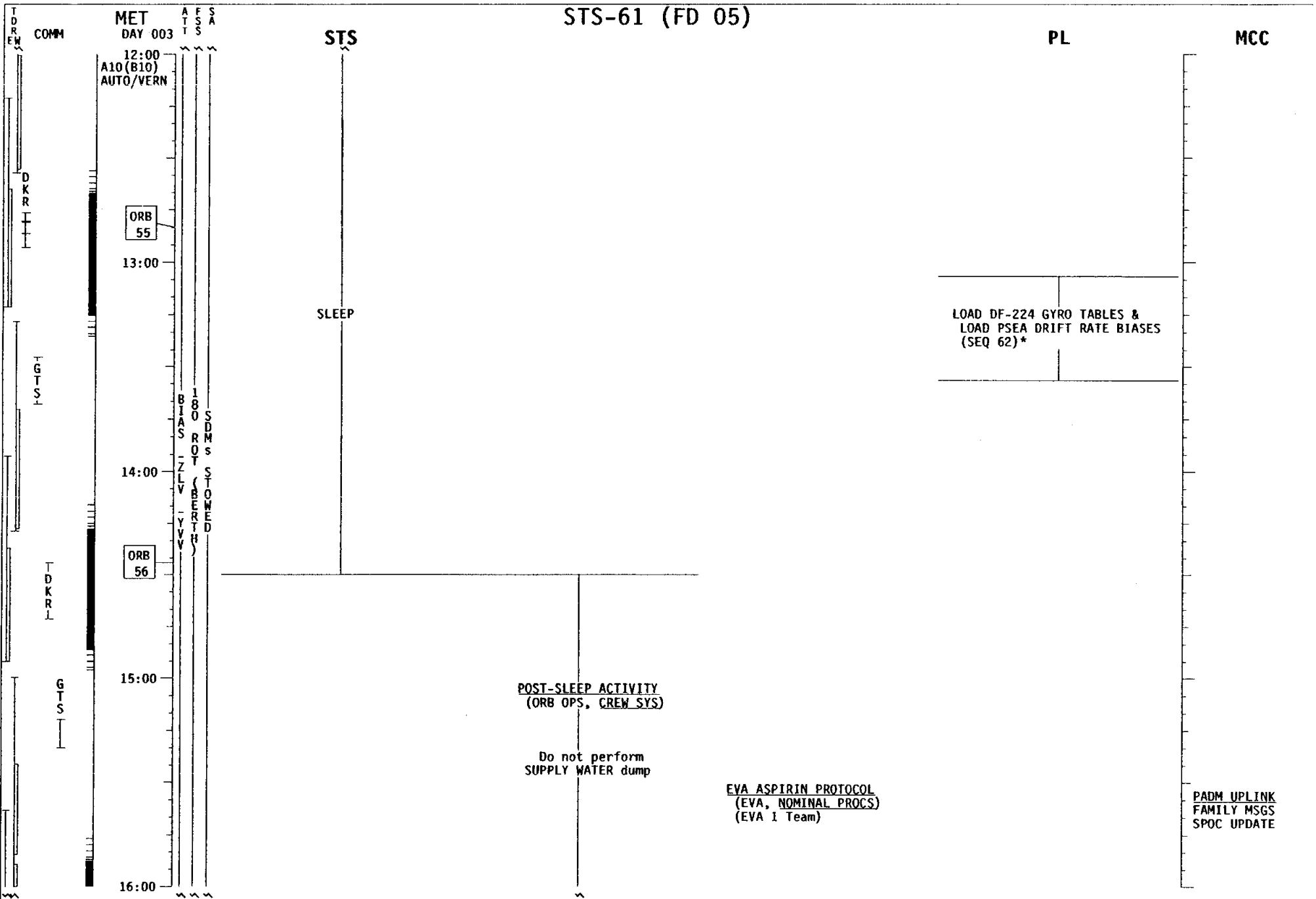
STS

SLEEP

PL
P16 FUSE PLUG FUNCTIONAL TEST
(SEQ 61)*

MCC

STS-61 (FD 05)



*GROUND COMMANDED

STS-61 (FD 05)

PL

MCC

MET
DAY 004

A T T S
F S A

STS

SUPPLY/WASTE WATER DUMP
(ORB OPS, ECLS)
Terminate Waste Dump

NEXT DAY'S EVA REVIEW

Expect stars of opportunity
IMJ ALIGN - S TRK (ORB OPS)

PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

Do not perform
SUPPLY WATER dump

CREW/MCC EVA
DEBRIEF

04:00
A10(B10)
AUTO/VERN

ORB
65

05:00

06:00

ORB
66

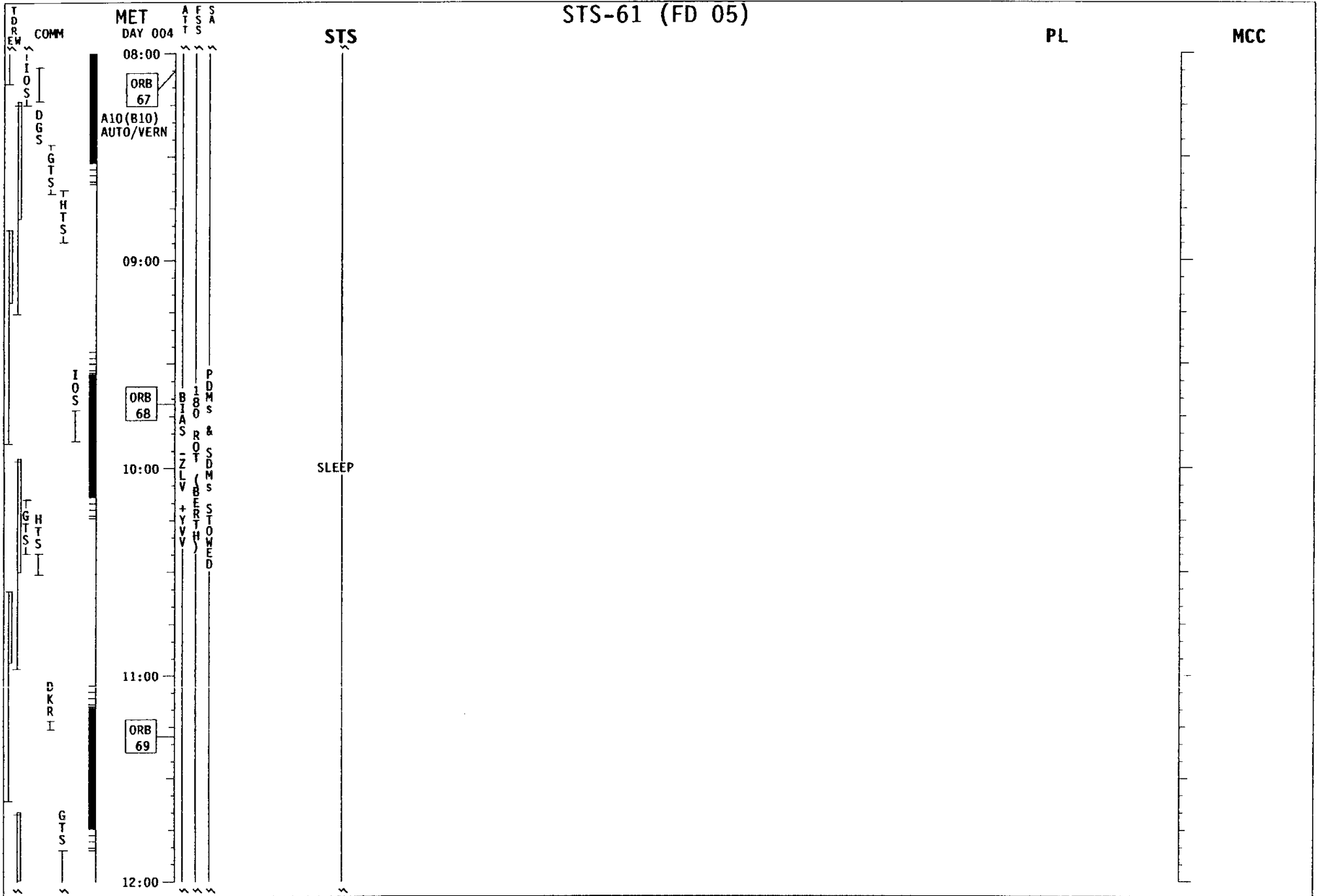
07:00

08:00

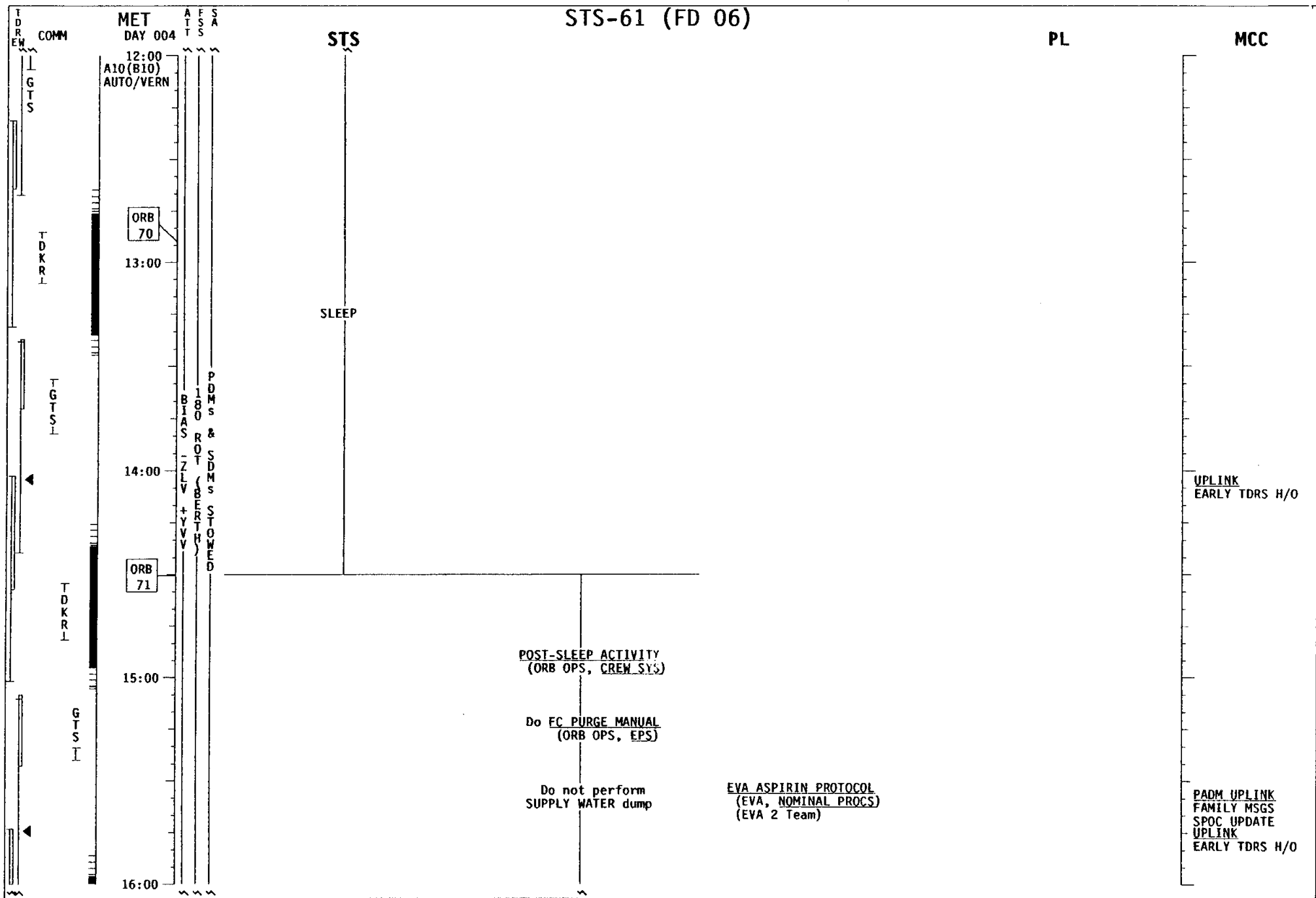
P D M S & S D M S
1800 ROT (DEBRIEF)
BIAS - ZLV + YVV
STOWED

SLEEP

STS-61 (FD 05)



STS-61 (FD 06)



STS-61 (FD 06)

PL

MCC

STS

Expect stars of opportunity
IMU ALIGN - S TRK (ORB OPS)

FD06 EZ ACTIVITIES:
EXERCISE (1 HR/CDR, PLT, MS2)
CPA OPS
(ORB OPS, CREW SYS)
QCAC FILTER CLEAN
DSO 624 CARDIORESPIRATORY
EXERCISE LOG
(BIOMED, DSO 624) MS1, MS3, MS4, MS5

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

Do FC PURGE MANUAL
(ORB OPS, EPS)

Do not perform
SUPPLY WATER dump

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

10.2 PSI MAINTENANCE
(EVA, 10.2 PSI CABIN)

L17 Check MCIU filter screen

014,15, Pri RJD DRIVER, LOGIC
16:F (sixteen) - ON

FILTER CLEANING
(IFM, SCHEDULED MAINTENANCE)
Inspect filters and clean
as necessary

P/TV11 SETUP
(PHOTO/TV, MIDDECK)

40 MIN P/B START

P/TV11 MIDDECK OPS
(PHOTO/TV, P/TV11 MIDDECK)
(DSO 901 OPPORTUNITY)

P/TV07 SETUP
(PHOTO/TV, HST EVA)

DEPRESS/REPRESS (CUE CARD)
(3 Cmn)

MS1 (IV2), MS2, MS5 (IV1)
Transition to EVA C/L.
EVA crew members: MS3, MS4

NOMINAL EVA 3 PET
00:00 = 4/19:20

P/TV07 OPERATIONS
(PHOTO/TV, HST EVA)

A/L EGRESS
(EVA CUFF C/L, 3)

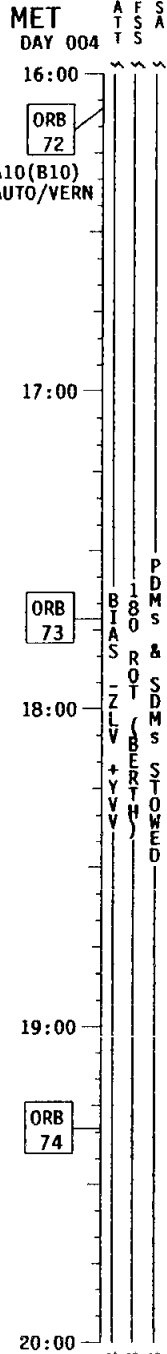
DAILY SETUP
(EVA, HST SM-1)

UPLINK
EARLY TDRS H/O

TV (TDRW)
(CREW CNTL-CAB)

UPLINK
EARLY TDRS H/O

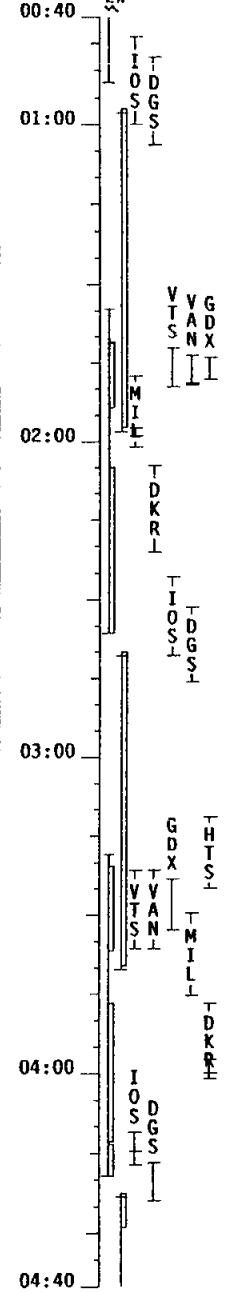
TV (TDRW/E)
(CREW CNTL-PLB
RMS)



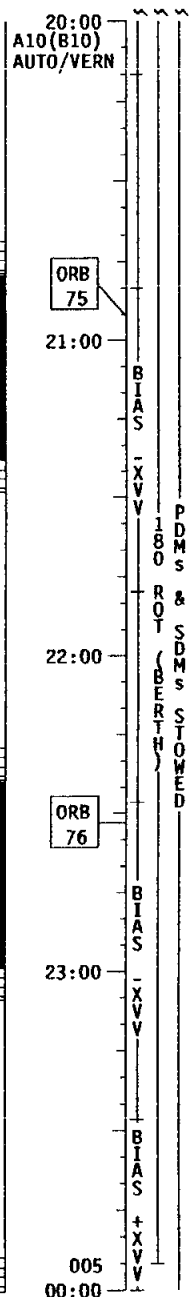
EVA 3
PET
00:00

00:40

EVA 3
PET



MET
DAY 004



STS

MNVR (TRK) BIASED -ZLV. +XVV
TG=2 BV=3 OM=153
A/AUTO/VERN (20:10) Init TRK
(NET 20:02; NLT 20:20)

MNVR (TRK) BIASED -ZLV. -XVV
TG=2 BV=3 OM=1
A/AUTO/VERN (20:50) Init TRK
(NET 21:00; NLT 21:10)

MNVR (TRK) BIASED -ZLV. +XVV
TG=2 BV=3 OM=167
A/AUTO/VERN (21:48) Init TRK
(NET 21:39; NLT 21:52)

MNVR (TRK) BIASED -ZLV. -XVV
TG=2 BV=3 OM=348
A/AUTO/VERN (22:28) Init TRK
(NET 22:20; NLT 22:44)

MNVR (TRK) BIASED -ZLV. +XVV
TG=2 BV=3 OM=153
A/AUTO/VERN (23:28) Init TRK
(NET 23:18; NLT 23:29)

STS-61 (FD 06)

P/TV07 OPERATIONS
(PHOTO/TV, HST EVA)

WFPC
(EVA, HST SM-1)

POSN +V2 SCUFF PLATE
OPEN FGS DOORS
CLOSE FGS DOORS

OPEN FGS DOORS
WF/PC I REMOVAL

EMPTY BAY INSP

TEMP STOW WF/PC I

WF/PC II REMOVAL

WF/PC II INSTALL

FGS BAY CLOSEOUT

STOW WF/PC I

ROTATE HST FOR MSS

PL

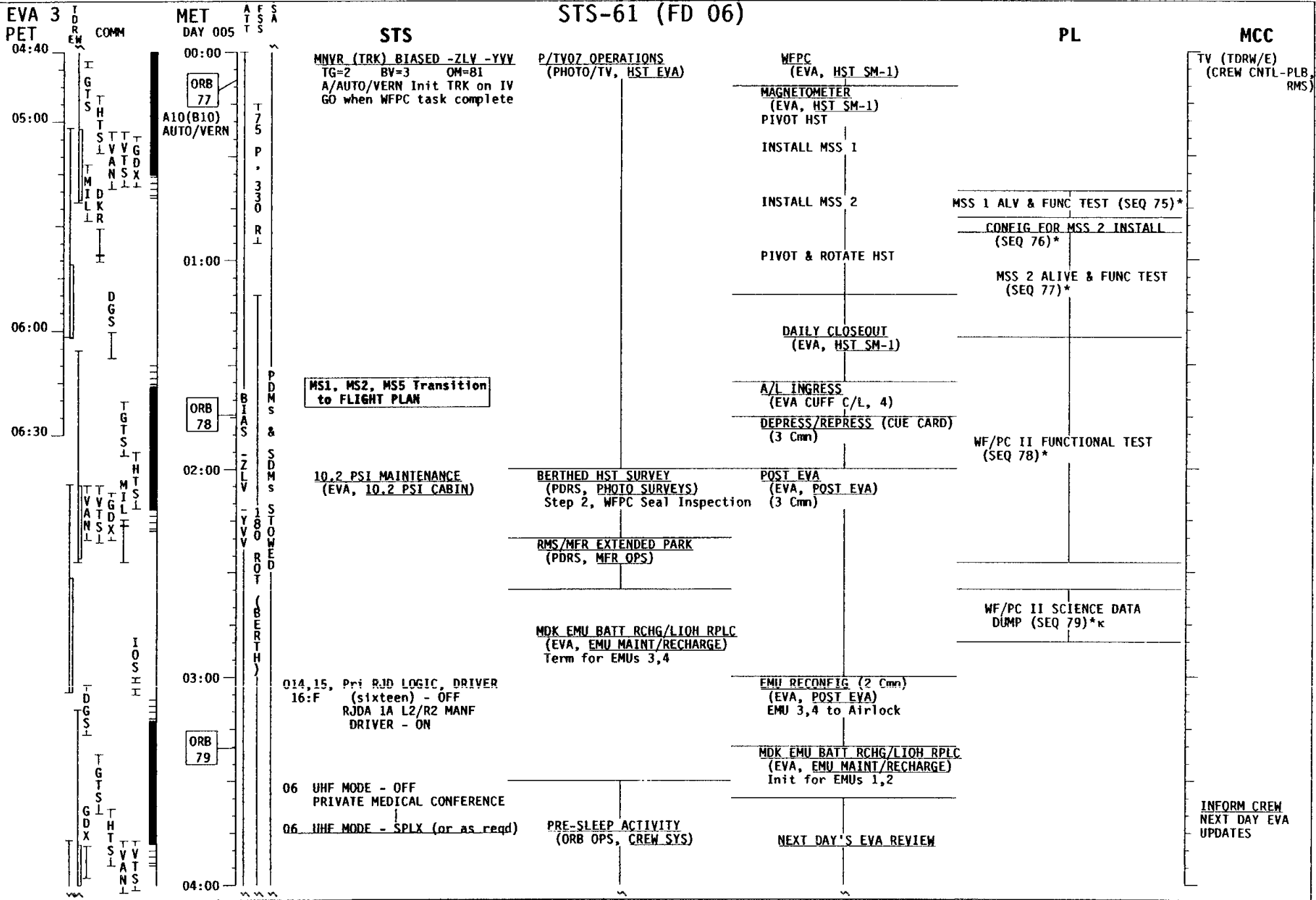
WF/PC CHANGEOUT MODE (SEQ 71)*

WF/PC II ALIVENESS TST (SEQ 72)*

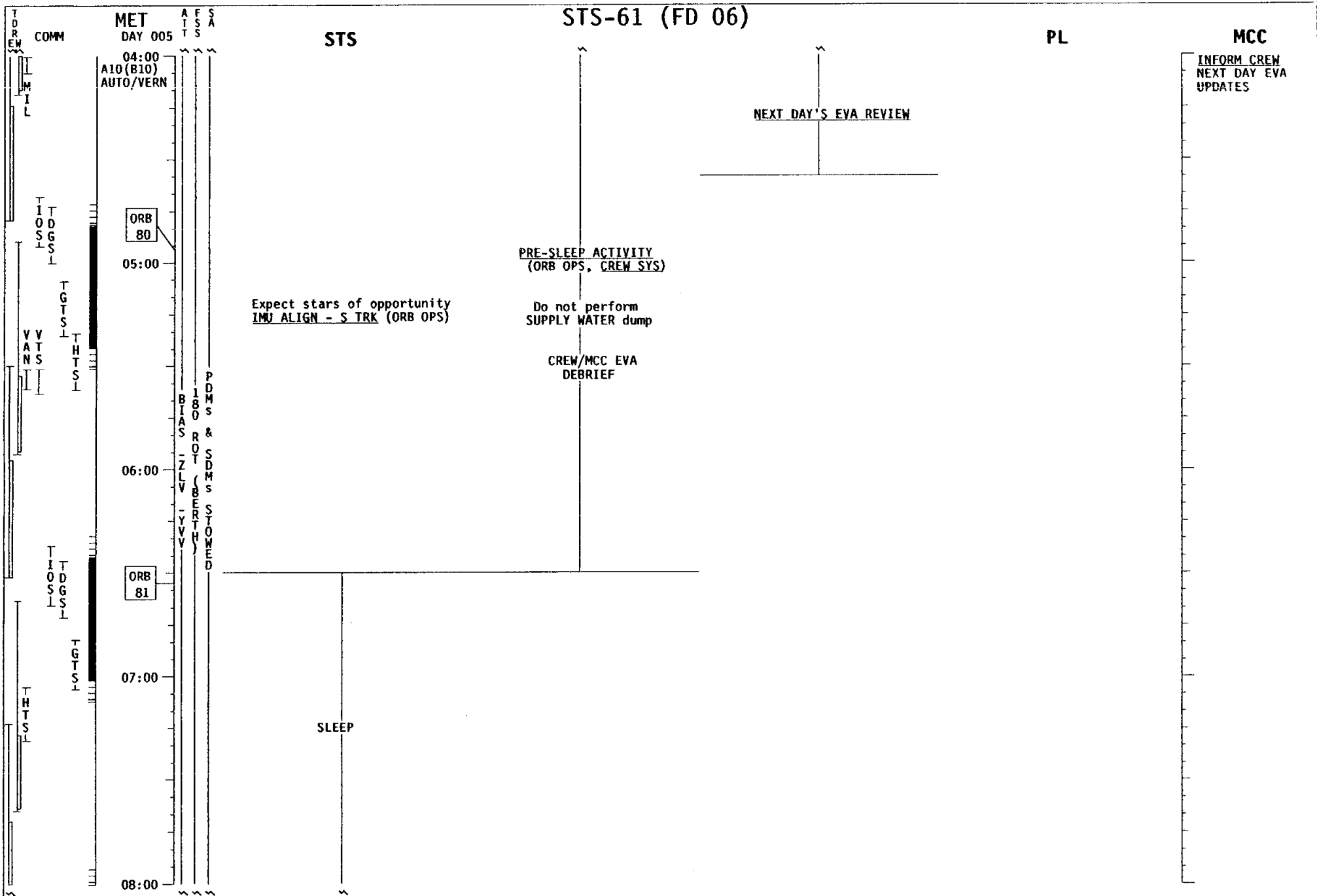
CNFG MSS 1 INSTALL & S/U FUNC CHK (SEQ 73)*

MCC

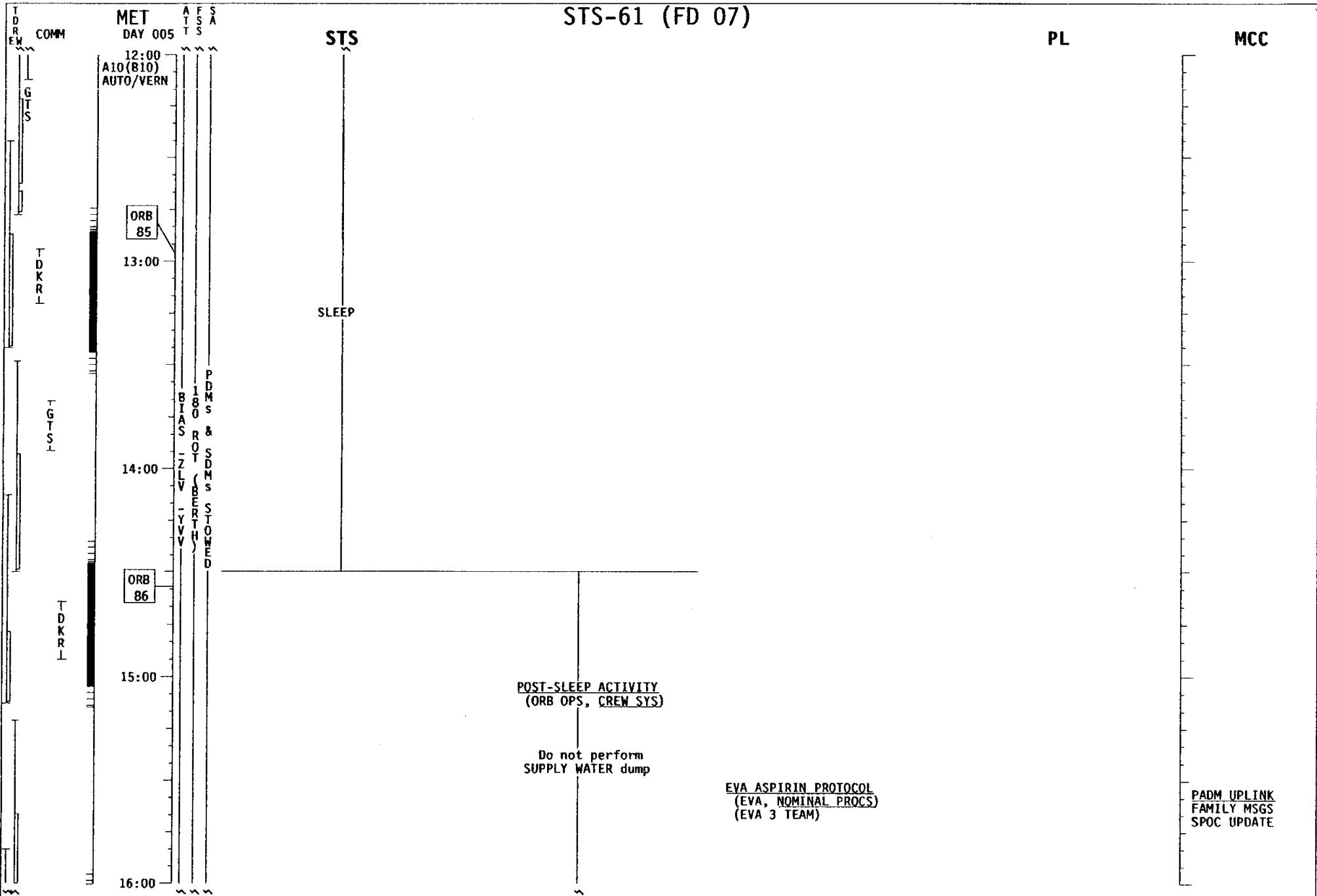
TV (TDRW/E)
(CREW CNTL-PLB, RMS)



*GROUND COMMANDED; κ=Ku-BAND REQUIRED



STS-61 (FD 07)



STS-61 (FD 07)

STS

PL

MCC

MET DAY 005

16:00

ORB 87

A10(B10) AUTO/VERN

Expect stars of opportunity
IMU ALIGN - S TRK (ORB OPS)

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

FD07 EZ ACTIVITIES:
EXERCISE (1 HR/CDR, PLT, MS2)
CPA OPS
(ORB OPS, CREW SYS)
QCAC FILTER CLEAN
DSO 624 CARDIORESPIRATORY
EXERCISE LOG
(BIOMED, DSO 624) MS1, MS3, MS4, MS5

Do not perform
SUPPLY WATER dump

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

17:00

10.2 PSI MAINTENANCE
(EVA, 10.2 PSI CABIN)

RCS REGULATOR RECONFIGURE
(ORB OPS, RCS)

L17 Check MCIU filter screen

P/TV11 SETUP
(PHOTO/TV, MIDDECK)

HEATER RECONFIG-Config B
(ORB OPS, EPS)

CABIN TEMP CNTL RECONFIG

MD44F Pin CAB TEMP CNTL act link
to secondary act
L1 CABIN TEMP CNTLR - 2

P/TV11 MIDDECK OPS
(PHOTO/TV, P/TV11 MIDDECK)
(DSO 901 OPPORTUNITY)

014,15, Pri RJD DRIVER, LOGIC
16:F (sixteen) - ON

40 min P/B START

18:00

P/TV07 SETUP (HST EVA OPS)
(PHOTO/TV, P/TV07 HST EVA)

ROTATE HST (COSTAR POSN)
(PL OPS, INBAY OPS)

19:00

MS2, MS3(IV2), MS4(IV1)
Transition to EVA C/L.
EVA crew members: MS1, MS5

P/TV07 OPERATIONS
(PHOTO/TV, HST EVA)

DEPRESS/REPRESS (CUE CARD)
(3 Cmn)

← MNVR (TRK) BIASED -ZLV, -XVY
TG=2 BV=3 OM=344
A/AUTO/VERN (19:30) Init TRK
NLT 19:43

A/L EGRESS
(EVA CUFF C/L, 3)

EVA 4
PET

00:00

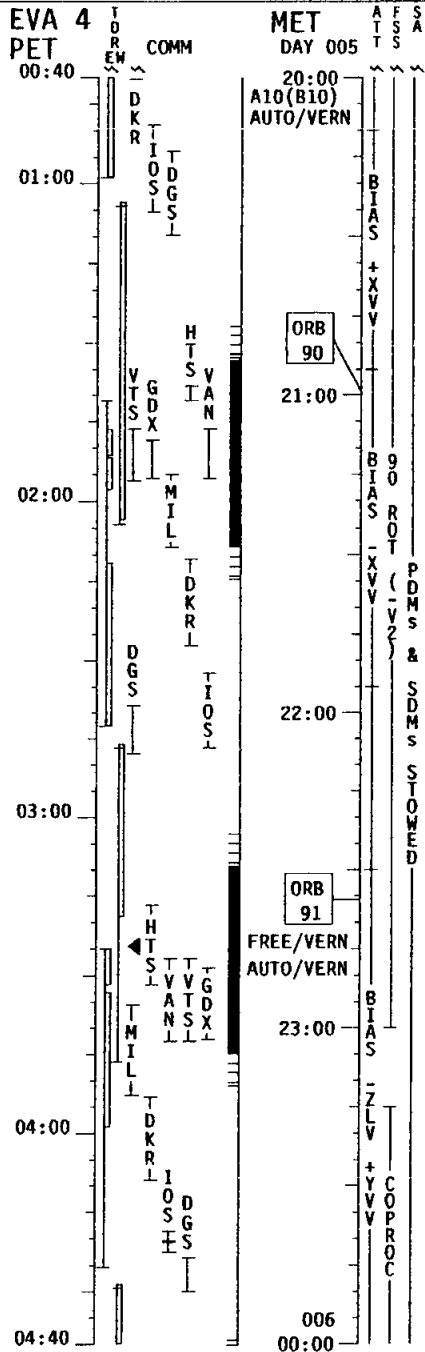
NOMINAL EVA 4 PET
00:00 = 5/19:20

DAILY SETUP
(EVA, HST SM-1)

20:00

TV (TDRW)
(CREW CNTL-CAB)

TV (TDRW/E)
(CREW CNTL-PLB
RMS)



STS

MNVR (TRK) BIASED -ZLV, +XVV
TG=2 BV=3 OM=156
A/AUTO/VERN (20:10) Init TRK
(NET 20:07; NLT 20:20)

MNVR (TRK) BIASED -ZLV, -XVV
TG=2 BV=3 OM=4
A/AUTO/VERN (20:55) Init TRK
(NET SS; NLT 21:16)

MNVR (TRK) BIASED -ZLV, +XVV
TG=2 BV=3 OM=166
A/AUTO/VERN (21:55) Init TRK
(NET 21:45; NLT 21:58)

MNVR (TRK) BIASED -ZLV, +YVV
TG=2 BV=3 OM=269
A/AUTO/VERN Init TRK on IV
GO when COSTAR task complete.

STS-61 (FD 07)

P/TV07 OPERATIONS
(PHOTO/TV, HST EVA)

COSTAR
(EVA, HST SM-1)
OPEN AFT SHROUD DOORS

AFT SHROUD INSP

HSP REMOVAL

HST TEMP STOW

COSTAR REMOVAL

COSTAR INSTALL

AFT SHROUD CLOSEOUT

HSP STOW

HST ROTATE

CO-PROCESSOR
(EVA, HST SM-1)
RETRIEVE NEW CO-PROCESSOR

OPEN BAY 1 DOOR
DF224 PREP

INSTALL CO-PROCESSOR

PL

HSP POWER DOWN (SEQ 81)*

COSTAR ALIVENESS TEST (SEQ 82)*

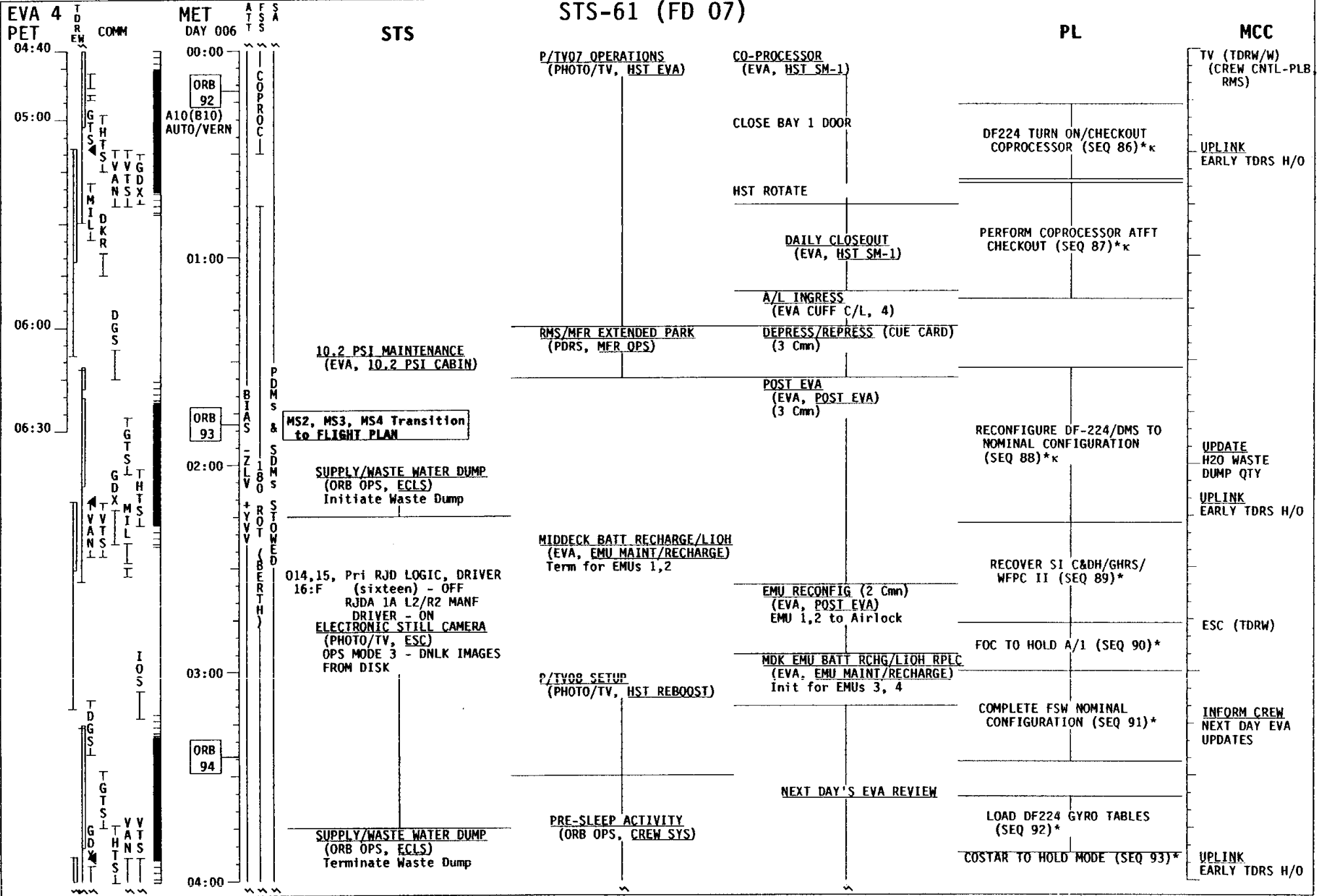
SAFE SI C&DH & SI's (SEQ 83)*

CONFIG DF-224 FOR CHANGEOUT/
COPROCESSOR INSTALL
(SEQ 84)*κ

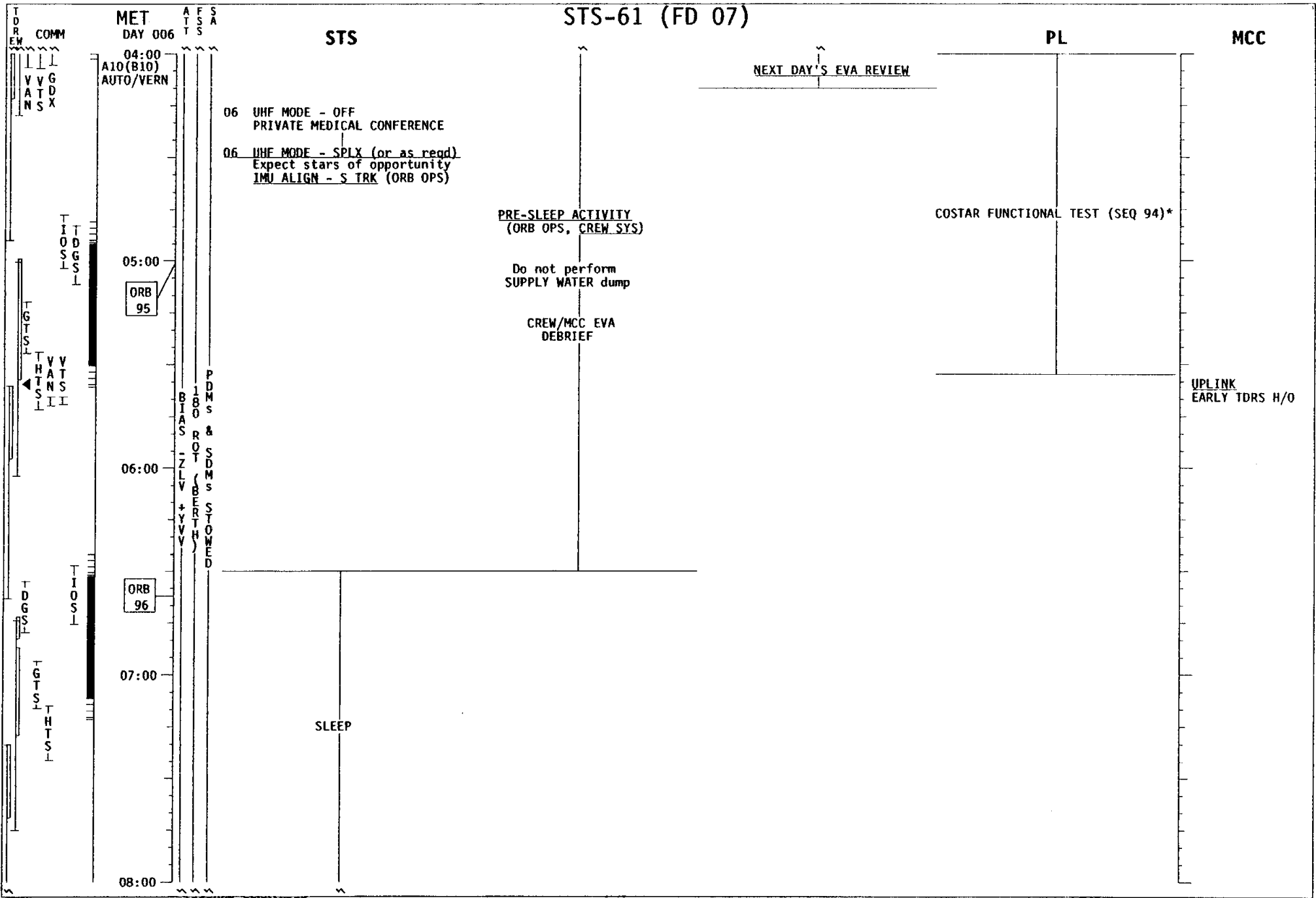
MCC

TV (TDRW/E)
(CREW CNTL-PLB,
RMS)

UPLINK
EARLY TDRS H/O



STS-61 (FD 07)

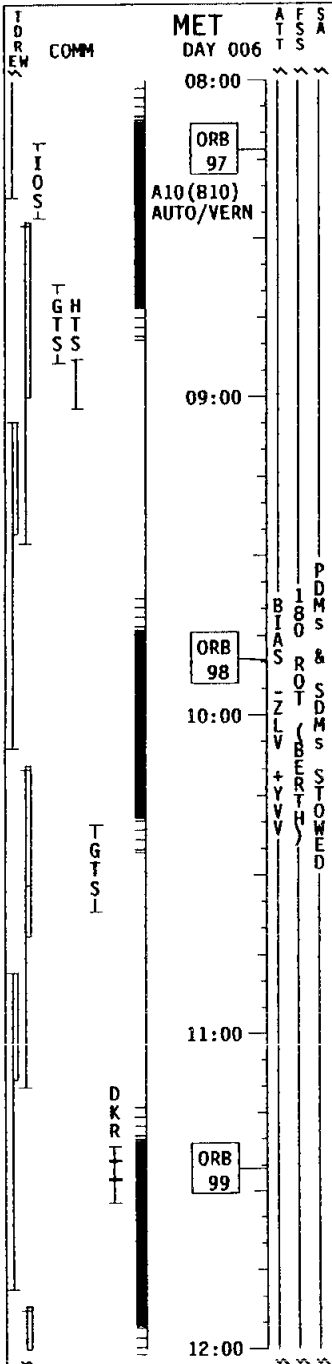


NEXT DAY'S EVA REVIEW

STS-61 (FD 07)

PL

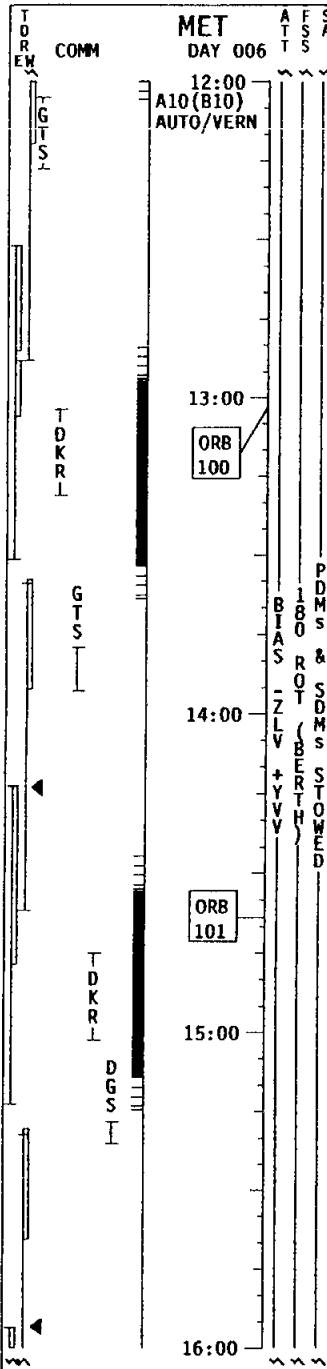
MCC



STS-61 (FD 08)

PL

MCC



STS

SLEEP

12:00
A10 (B10)
AUTO/VERN

13:00
ORB
100

14:00

ORB
101

15:00

16:00

ATT
SSA
PDMMS & SDMS
180 ROT (BEETH)
BIAS - ZLV + YVV
STOWED

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

Do not perform
SUPPLY WATER dump

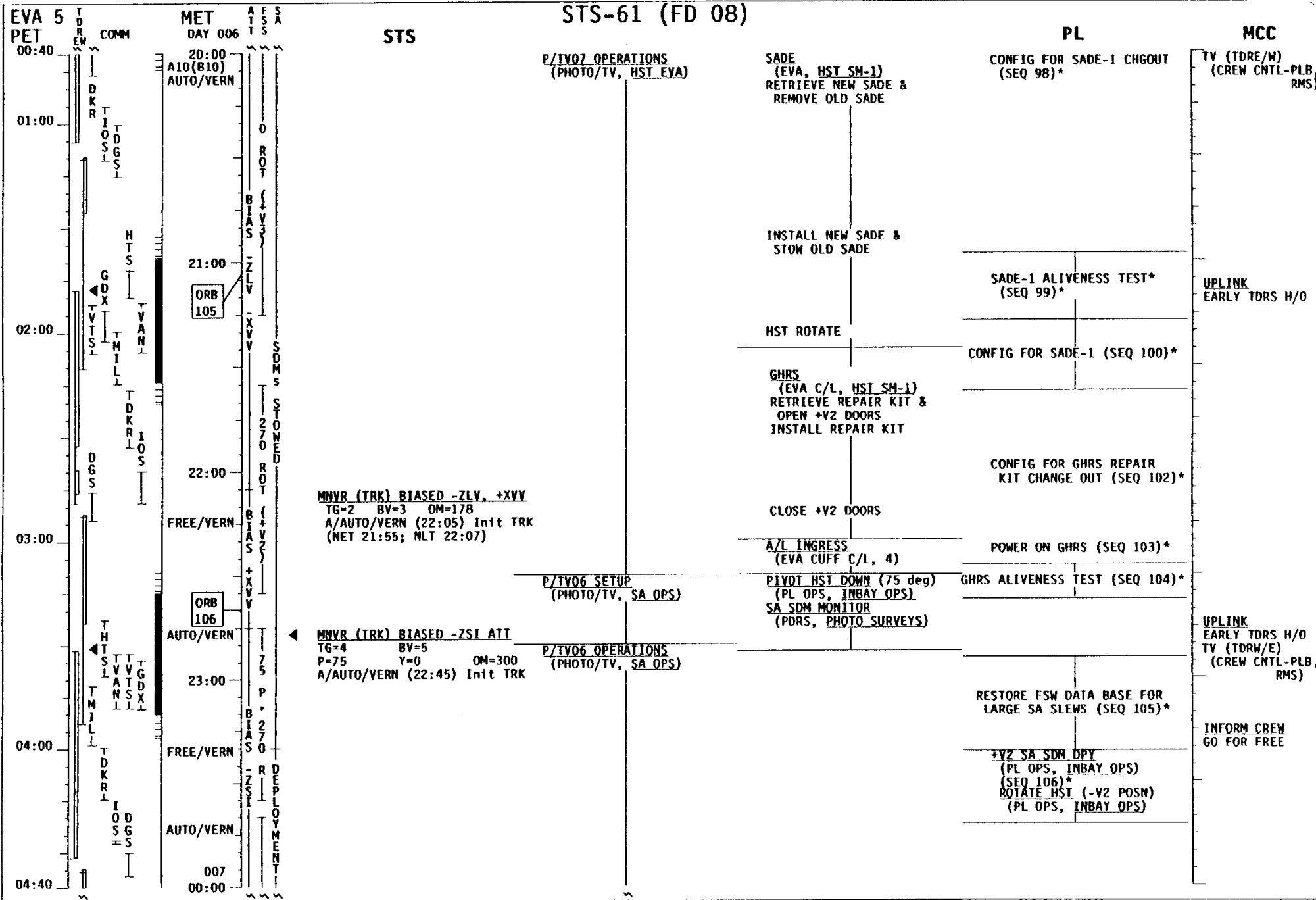
EVA ASPIRIN PROTOCOL
(EVA, NOMINAL PROCS)
(EVA 4 Team)

Expect stars of opportunity
IMU ALIGN - S TRK (ORB OPS)

UPLINK
EARLY TDRS H/O

PADM UPLINK
FAMILY MSGS
SPOC UPDATE

UPLINK
EARLY TDRS H/O



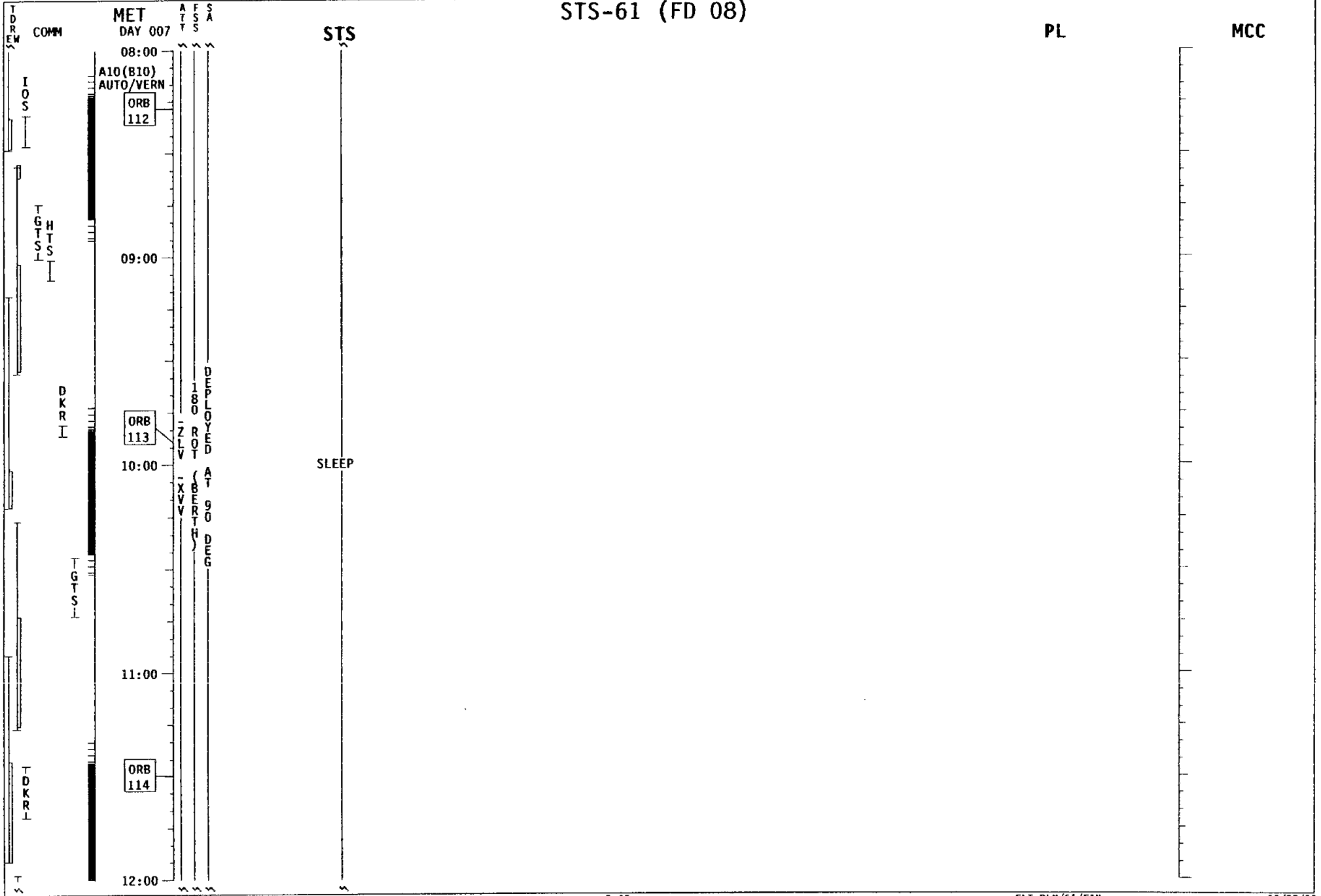
*GROUND COMMANDED

3-43

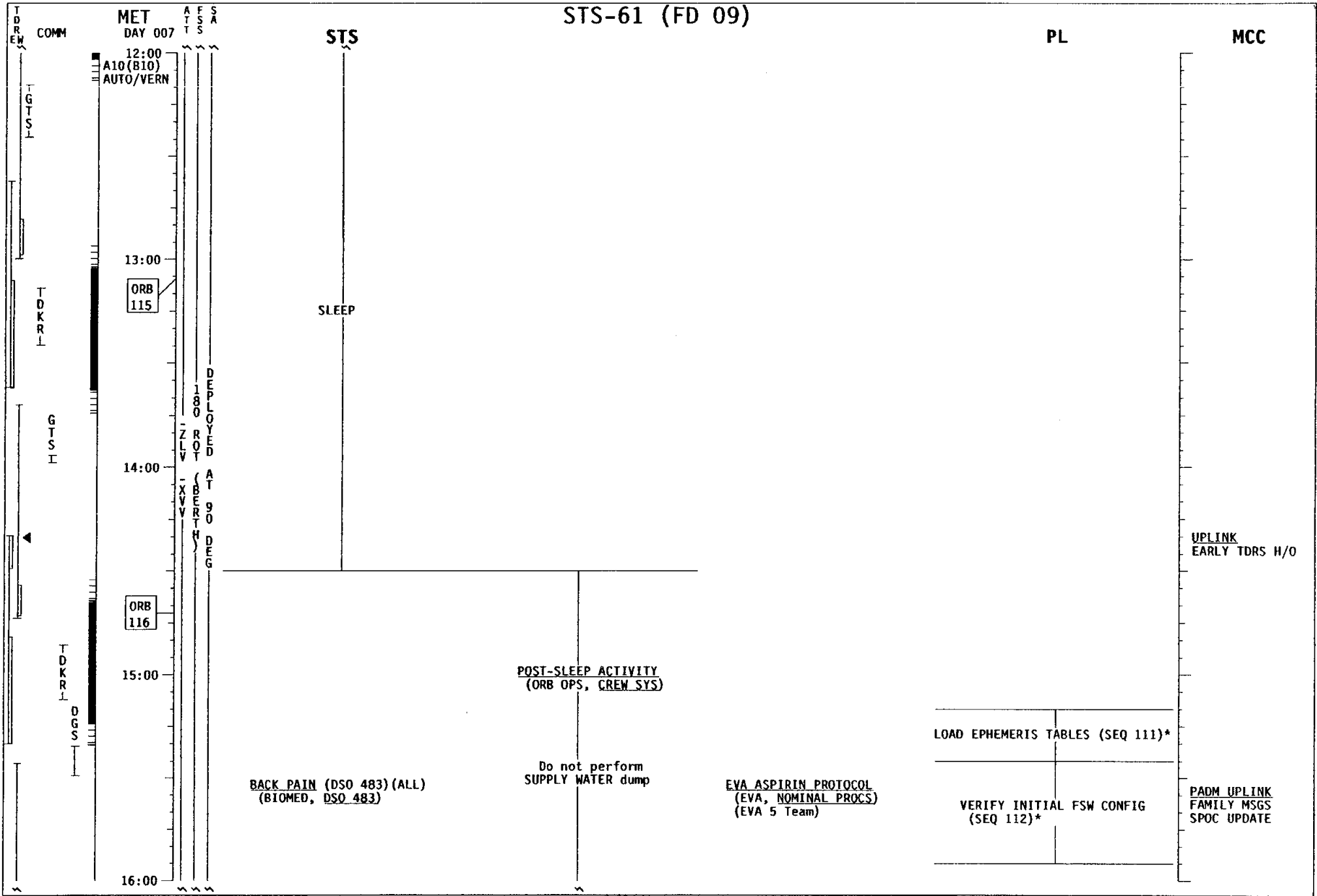
FLT PLN/61/FIN

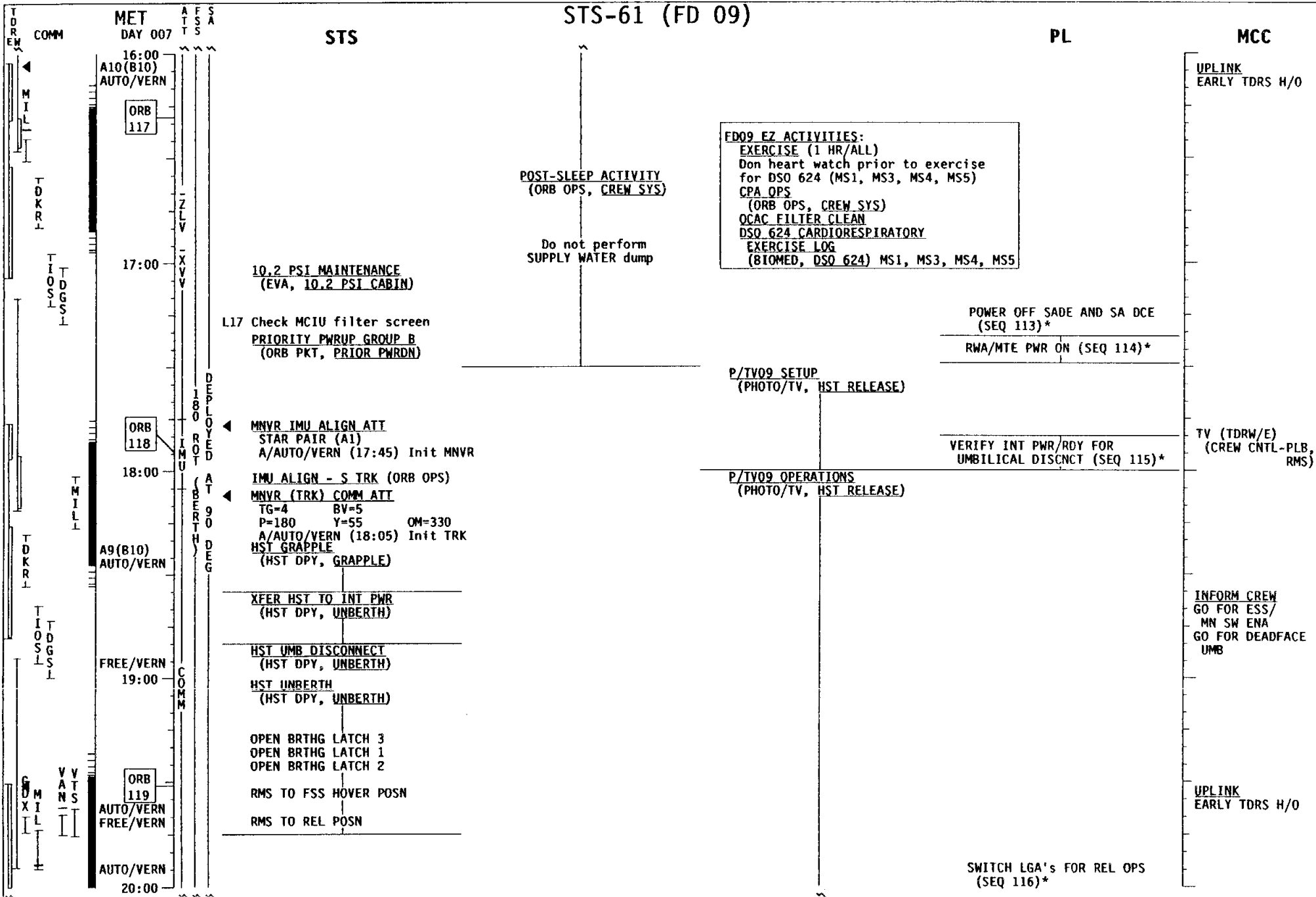
10/25/93

STS-61 (FD 08)



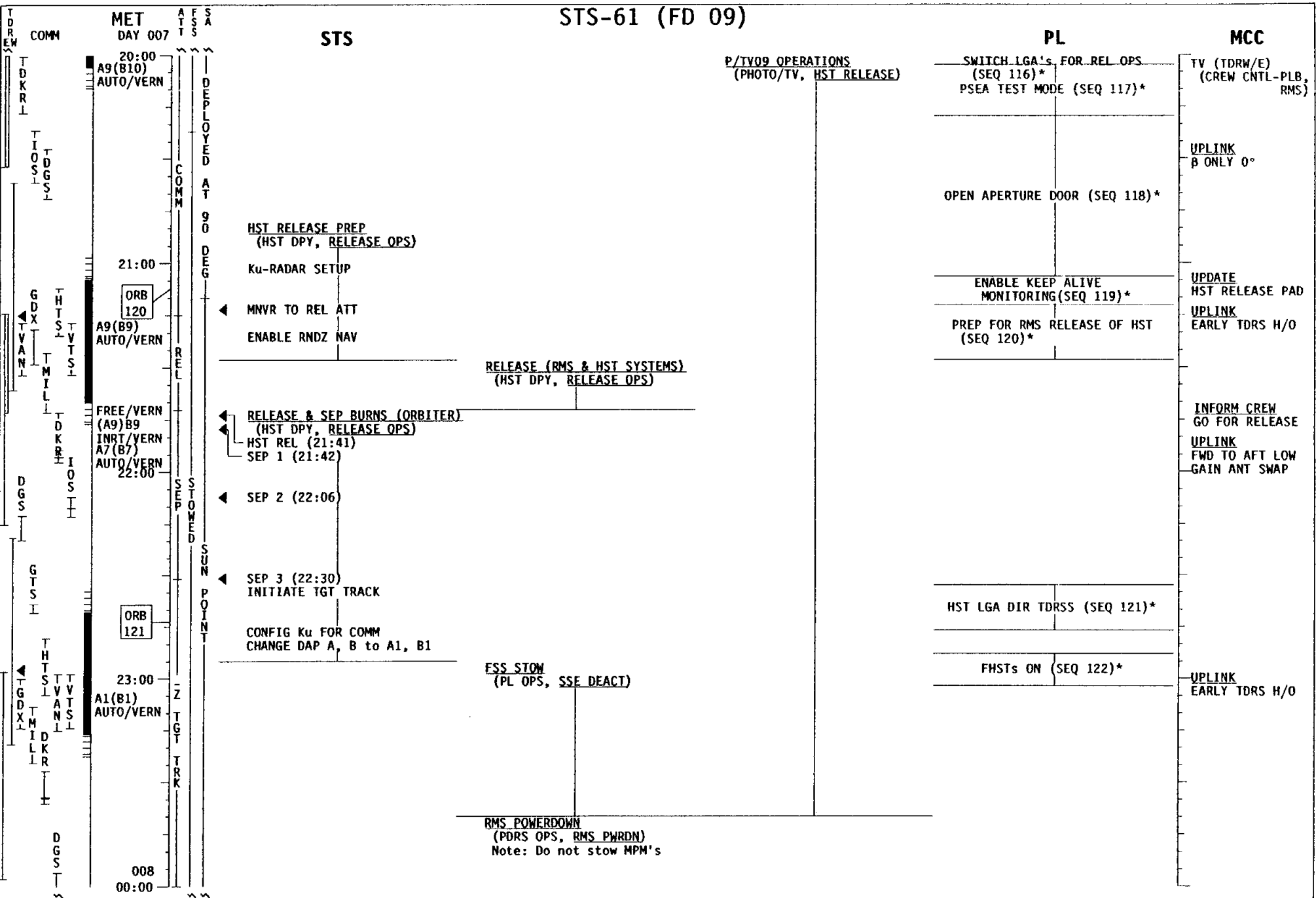
STS-61 (FD 09)





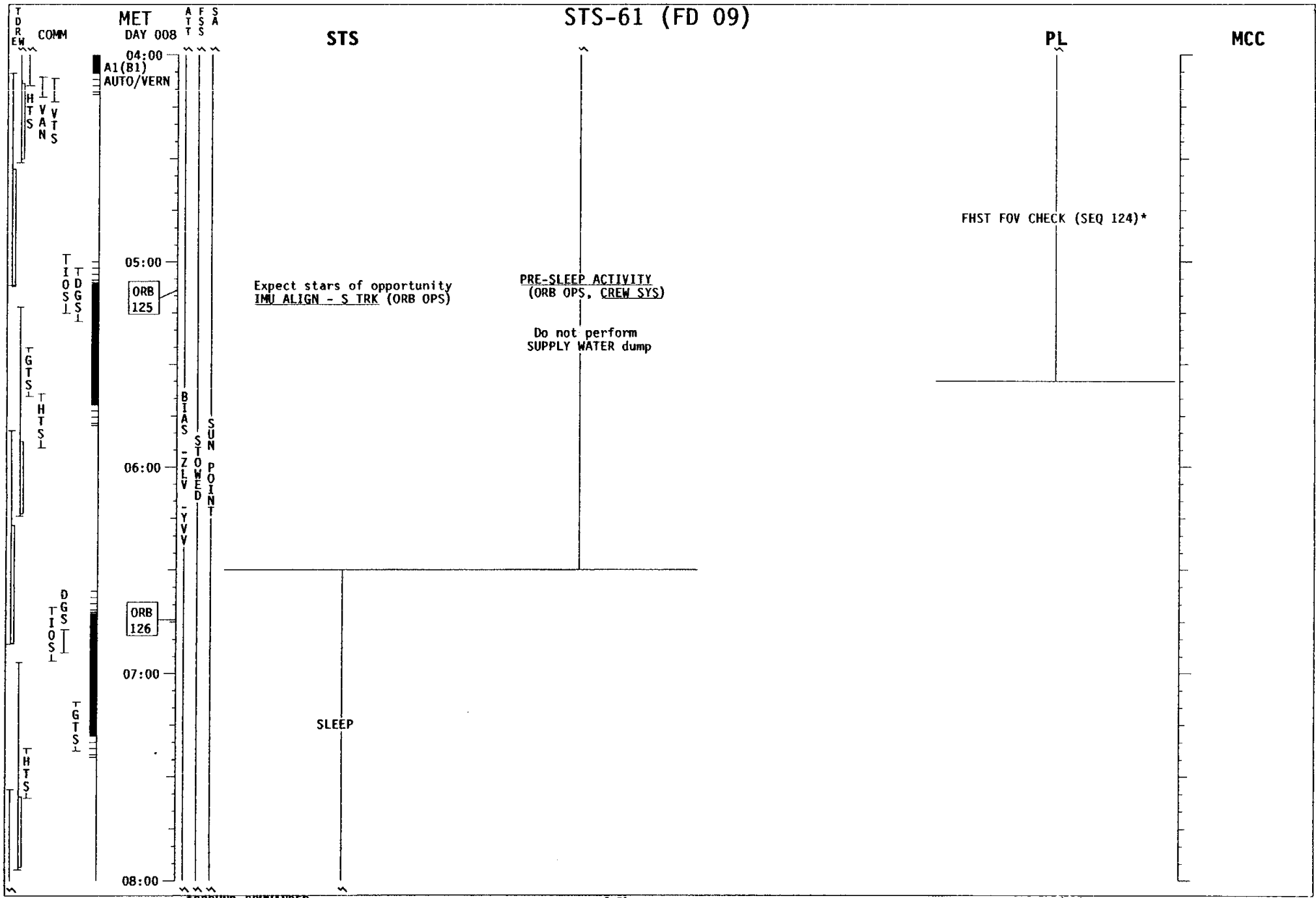
*GROUND COMMANDED

STS-61 (FD 09)



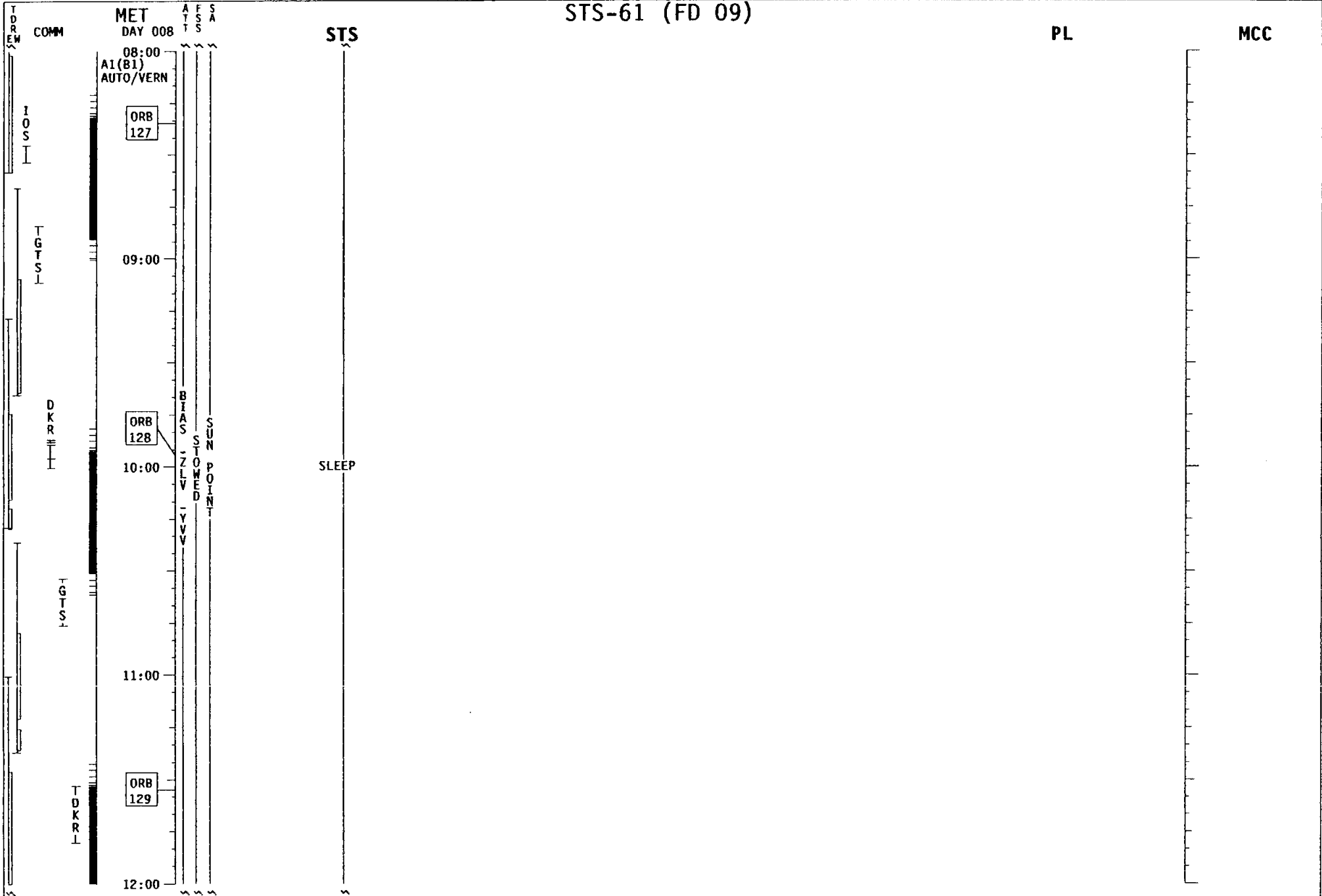
*GROUND COMMANDED

STS-61 (FD 09)

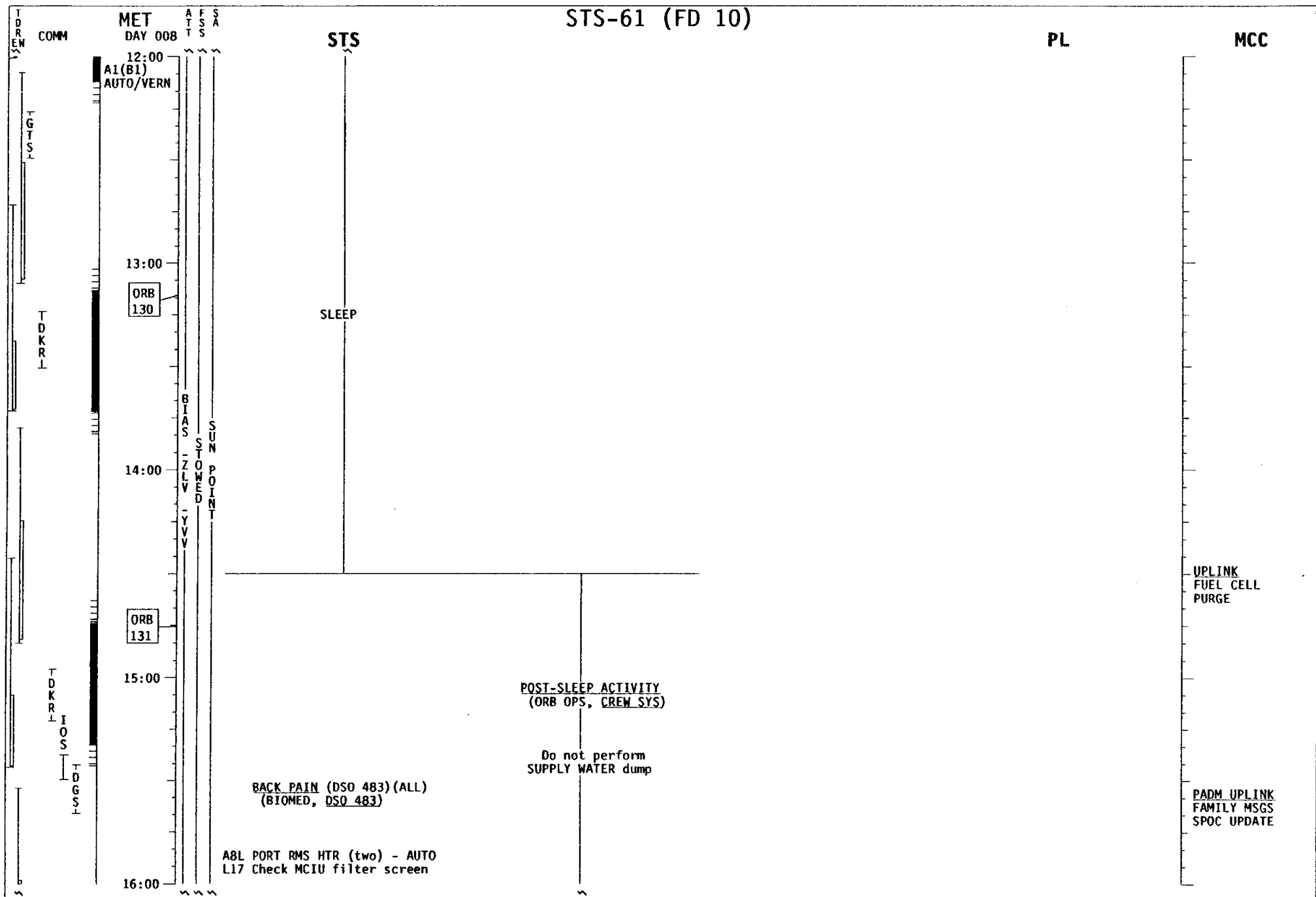


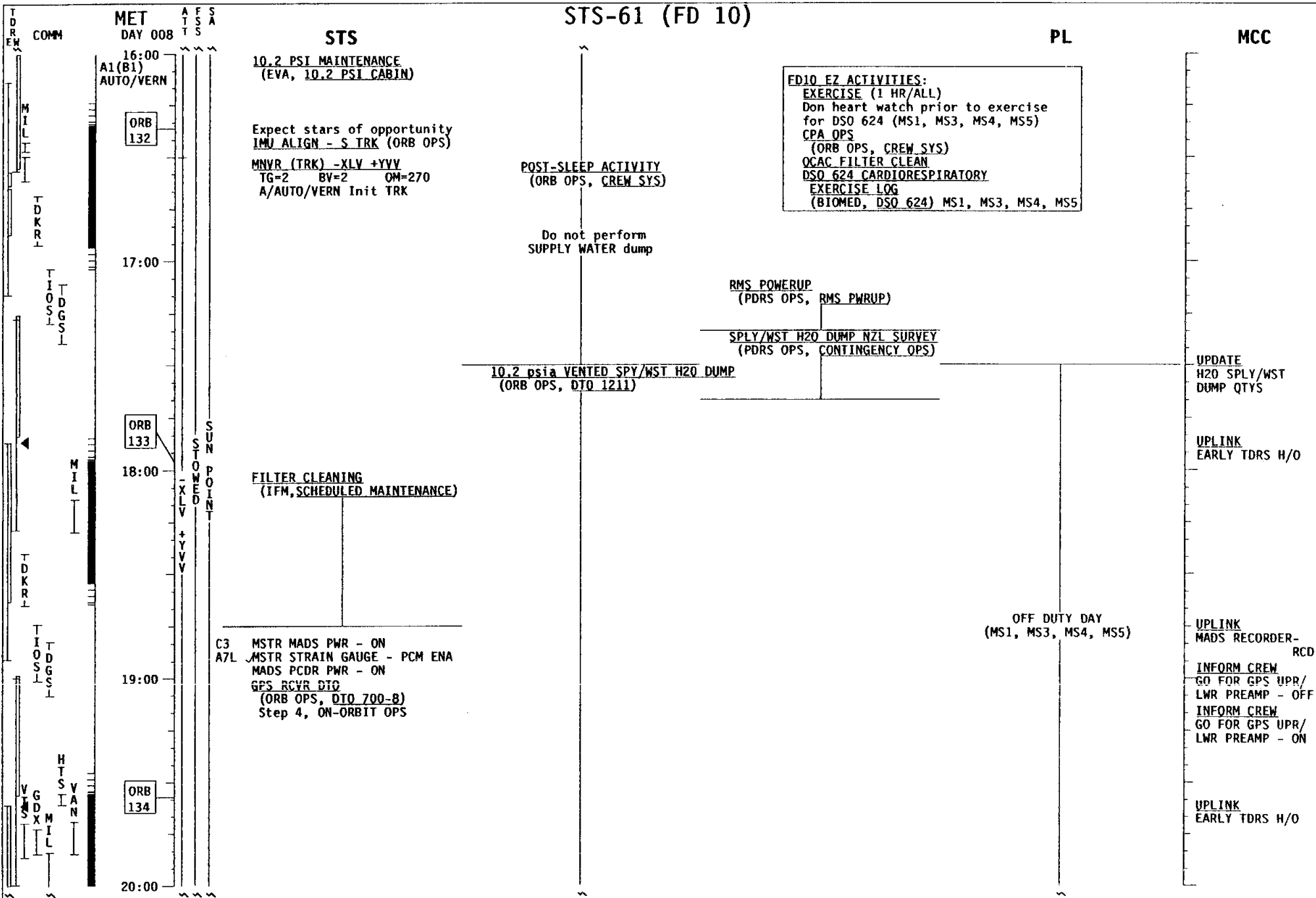
*GROUND COMMANDED

STS-61 (FD 09)

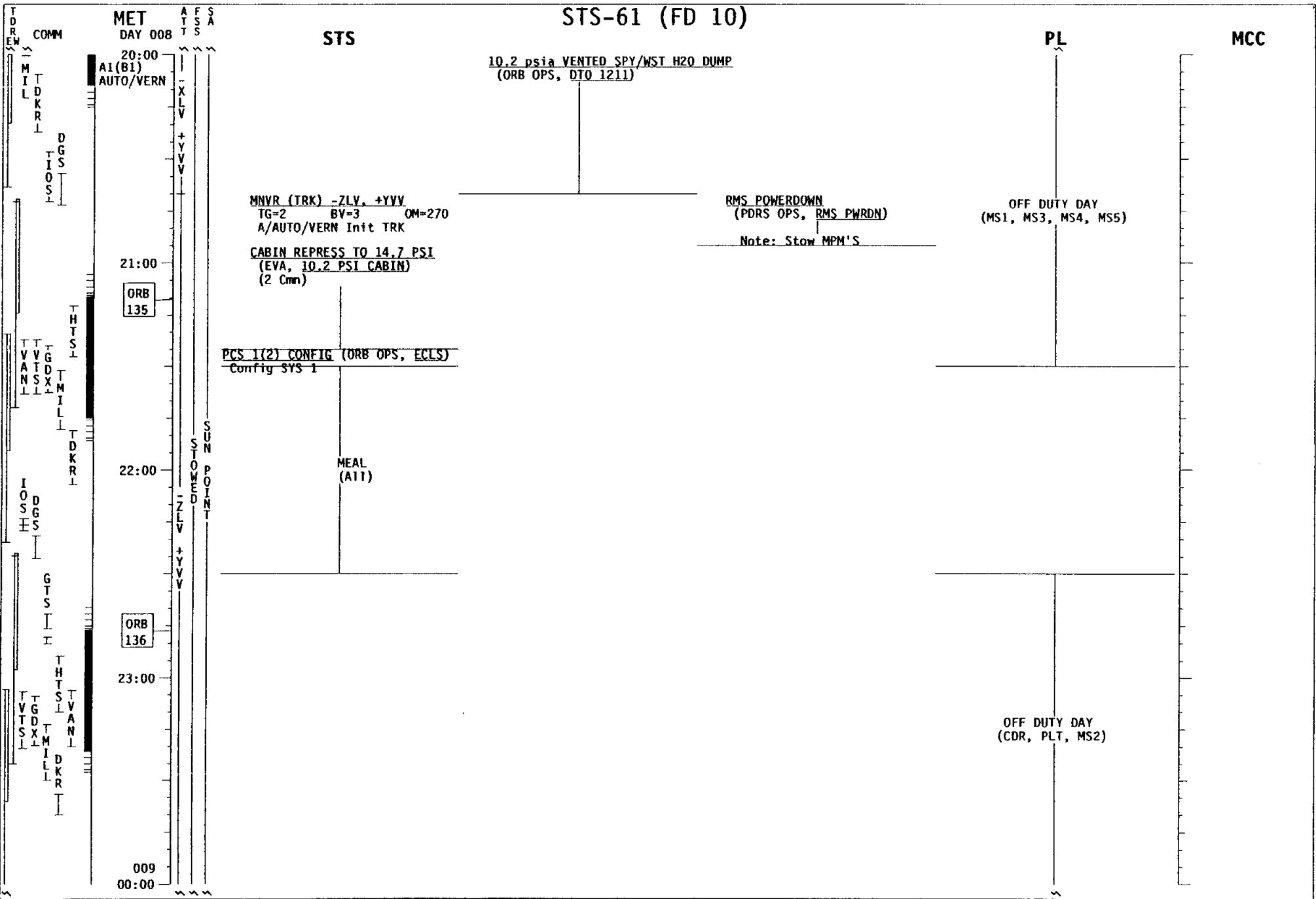


STS-61 (FD 10)





STS-61 (FD 10)



STS-61 (FD 10)

STS

PL

MCC

MET DAY 009

00:00
A1(B1)
AUTO/VERN

ORB
137

01:00

ORB
138

02:00

- 06 UHF MODE - OFF
PRIVATE MEDICAL CONFERENCE
- 06 UHF MODE - SPLX (or as reqd)

03:00

- ◀ MNVR IMU ALIGN ATT
STAR PAIR (C1)
A/AUTO/VERN (03:25) Init MNVR
IMU ALIGN - S TRK (ORB OPS)
- ◀ MNVR HUD CAL ATT
R=49 P=287 Y=45
A/AUTO/VERN MNVR when align cmplt
CDR HUD CALIBRATION (ORB OPS)

ORB
139

04:00

OFF DUTY DAY
(CDR, PLT, MS2)

HUD CALIBRATION LOG

STAR ID: 18, CAPELLA
STAR AVAIL: 03:30 - 04:19

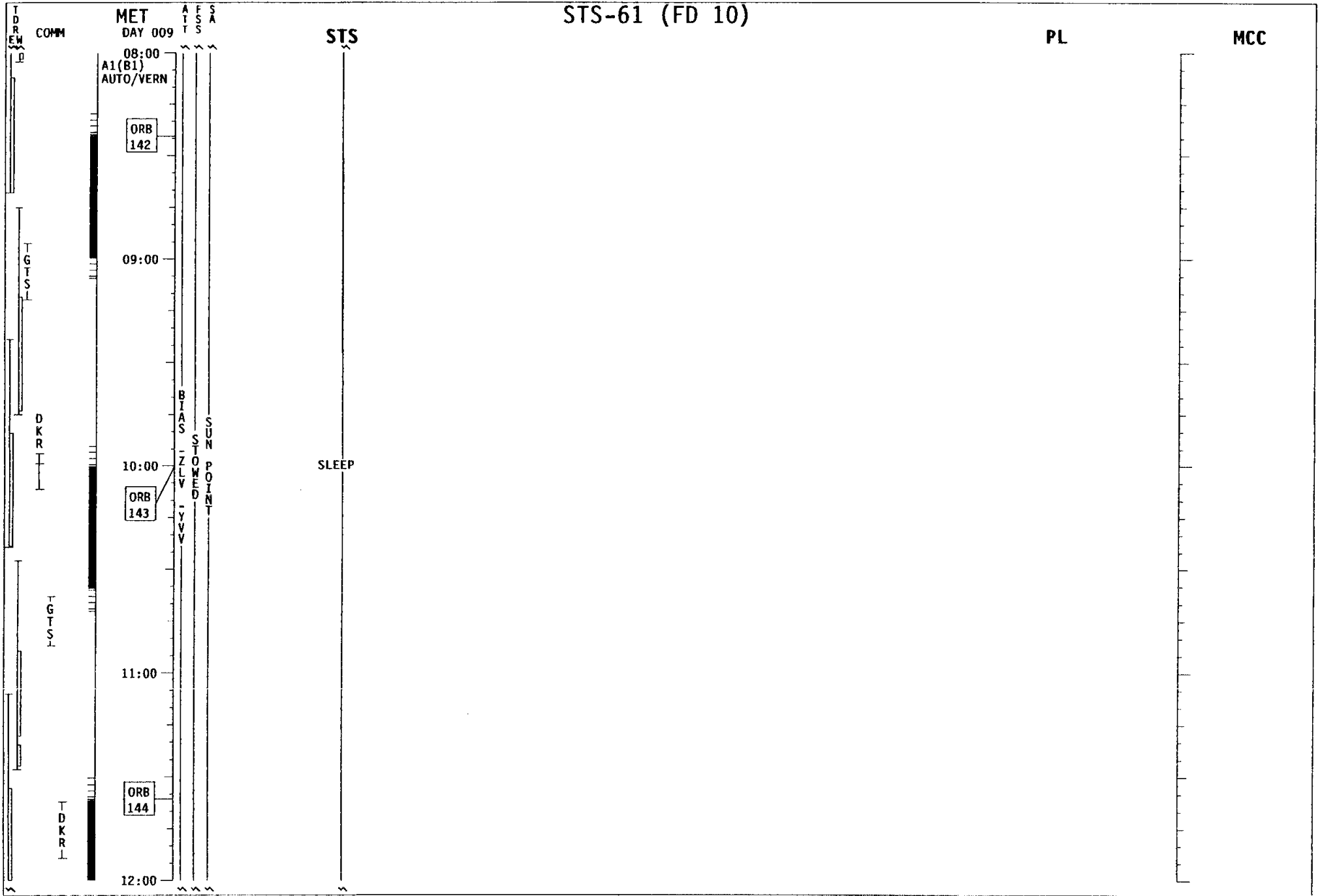
+X Δ BIAS _____, _____

UPDATE TIME: ____/____:____:____

PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

Do not perform
SUPPLY WATER dump

STS-61 (FD 10)



STS-61 (FD 11)

PL

MCC

T O R E W
 COMM
 MET DAY 009
 12:00
 A1(B1)
 AUTO/VERN
 G T S
 D K R R
 D G S S
 M I L L
 D K R R
 I O S
 D G S L
 16:00

STS

SLEEP

13:00

ORB 145

14:00

ORB 146

15:00

16:00

A T T
 F S S
 A
 B I A S
 S T O W E D
 S U N P O I N T
 Z L V
 Y V V

BACK PAIN (DSO 483) (ALL)
(BIOMED, DSO 483)

Expect stars of opportunity
IMU ALIGN - S TRK (ORB OPS)

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

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

Do not perform
SUPPLY WATER dump

FD11 EZ ACTIVITIES:
EXERCISE (1 HR/ALL)
 Don heart watch prior to exercise
 for DSO 624 (MS1, MS3, MS4, MS5)
CPA OPS
 (ORB OPS, CREW SYS)
WINDOW IMPACT OBSERVATION OPS
 (ORB OPS, DSO 326) - CDR or PLT
QCAC FILTER CLEAN
DSO 624 CARDIORESPIRATORY
EXERCISE LOG
 (BIOMED, DSO 624) MS1, MS3, MS4, MS5

PADM UPLINK
 FAMILY MSGS
 SPOC UPDATE

STS-61 (FD 11)

STS

PL

MCC

MET DAY 009

16:00
A1(B1)
AUTO/VERN

ORB 147

INRT/VERN
17:00

AUTO/VERN

INRT/VERN

AUTO/VERN
18:00

ORB 148

19:00

ORB 149

20:00

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

PRIORITY PWRUP GROUP B
(ORB PKT, PRIOR PWRDN)

FCS CHECKOUT
(ORB OPS, GNC)
(2 Cmn)

RCS HOT FIRE TEST
(ORB OPS, RCS) (2 Cmn)

Config DAP: A/AUTO/VERN

APU HTR RECONFIG (ORB OPS)

CYCLE ERGOMETER NOMINAL OPS
(BIOMED, ERGOMETER NOM OPS)
STEP B, RECONFIG/STOW

PILOT (CDR)
(ORB OPS, DTO 667)

POST EVA ENT PREP
(EVA, POST EVA ENT PREP)
(3 Cmn)

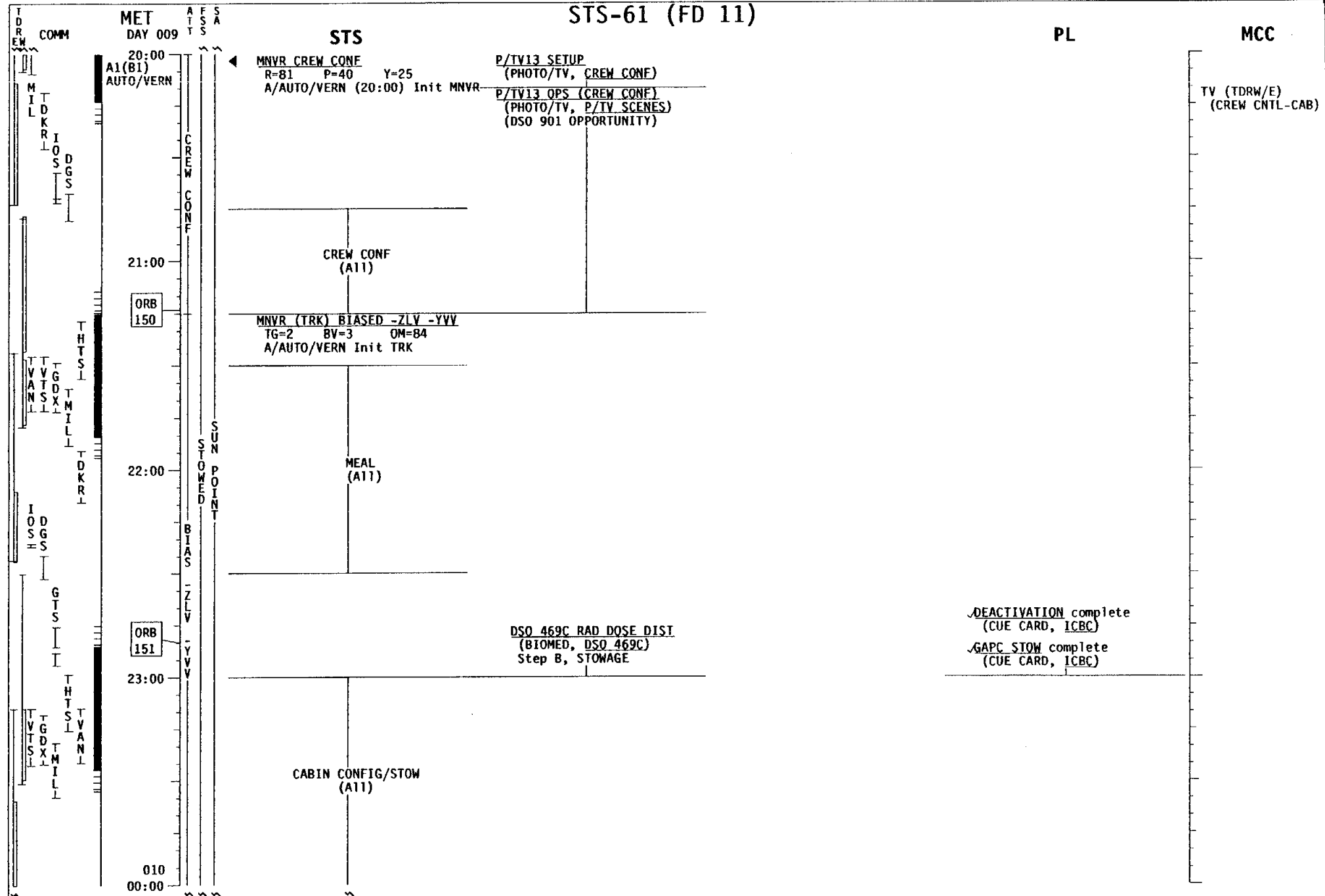
PILOT (PLT)
(ORB OPS, DTO 667)

P/TW13 SETUP
(PHOTO/TV, CREW CONE)

DR EW
COMM
MILL
D K R
T I O S G S
V T S
M I L
H T S
V A N S
G D D X M I L
T V T S
I

A F S A
T S
S U N
B I A S
S T O P
P O I N T
Z L V
Y V V

STS-61 (FD 11)



STS-61 (FD 11)

PL

MCC

MET
 DAY 010
 00:00
 A1(B1)
 AUTO/VERN

ORB 152
 01:00
ORB 153
 02:00
ORB 154
 04:00

COMM
 D I G S S
 T G I S S
 G D X
 V T S I
 I O S
 T G S I
 V T S I
 T G S I
 V T S I
 T G S I
 T I O D S
 S G L S
 L S T S

A F S A
 S T S
 S U N
 P O I N T
 B I A S
 S T O P
 Z O N E
 L V
 Y V V

STS

CABIN CONFIG/STOW
(A11)

OCAC STOW
(ORB OPS, CREW SYS)

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

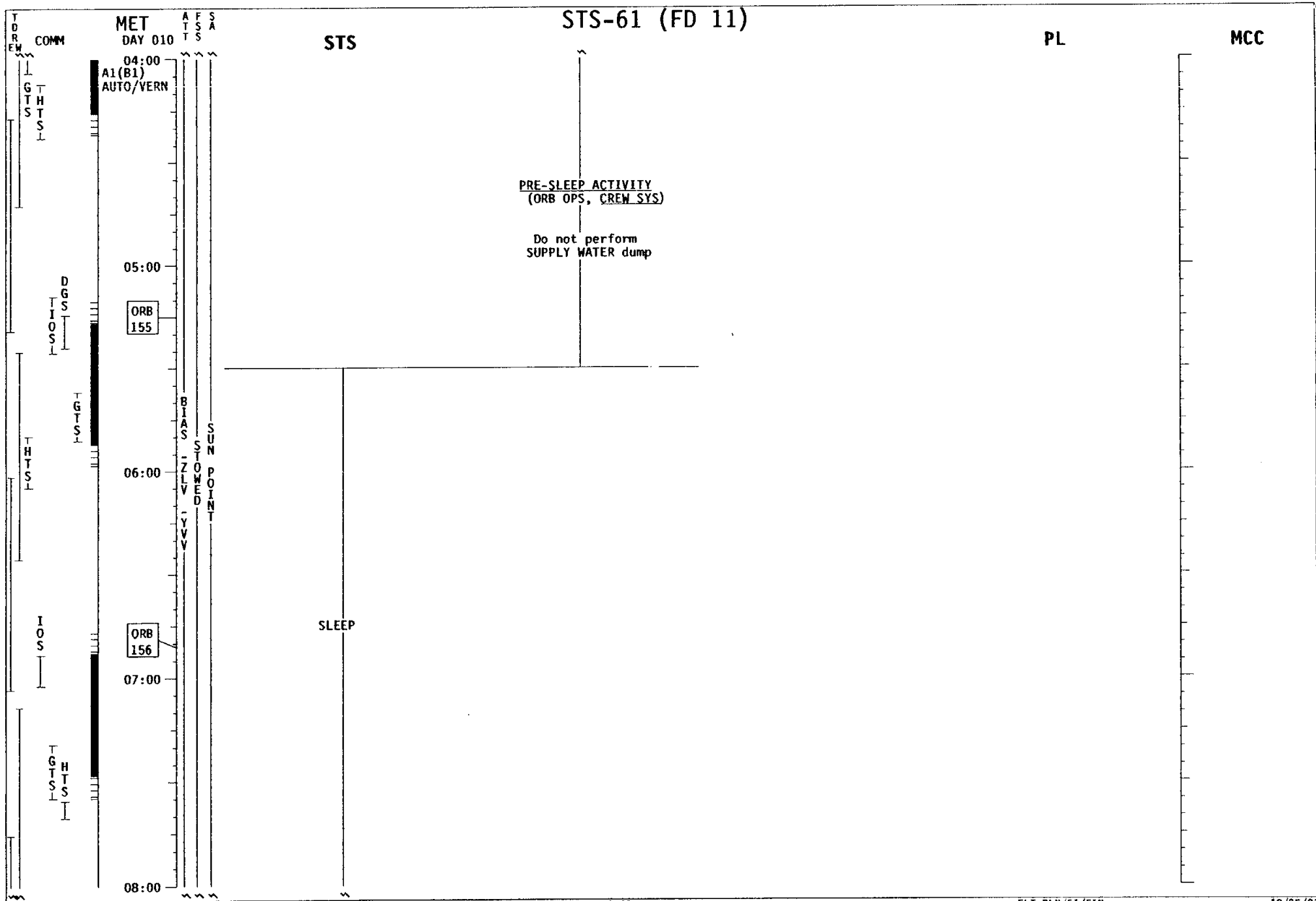
06 UHF MODE - OFF
PRIVATE MEDICAL CONFERENCE

06 UHF MODE - SPLX (or as reqd)

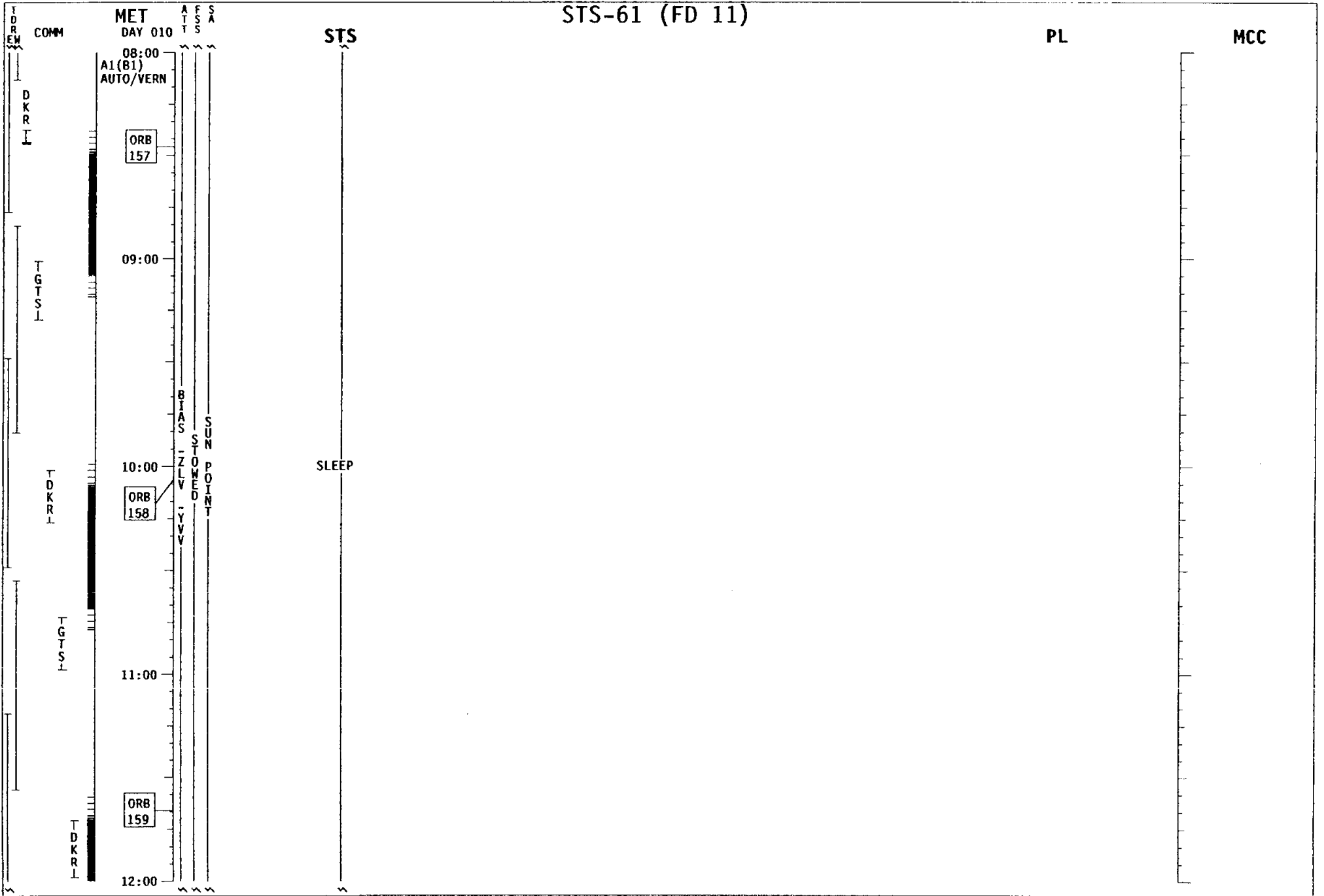
PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

Do not perform
SUPPLY WATER dump

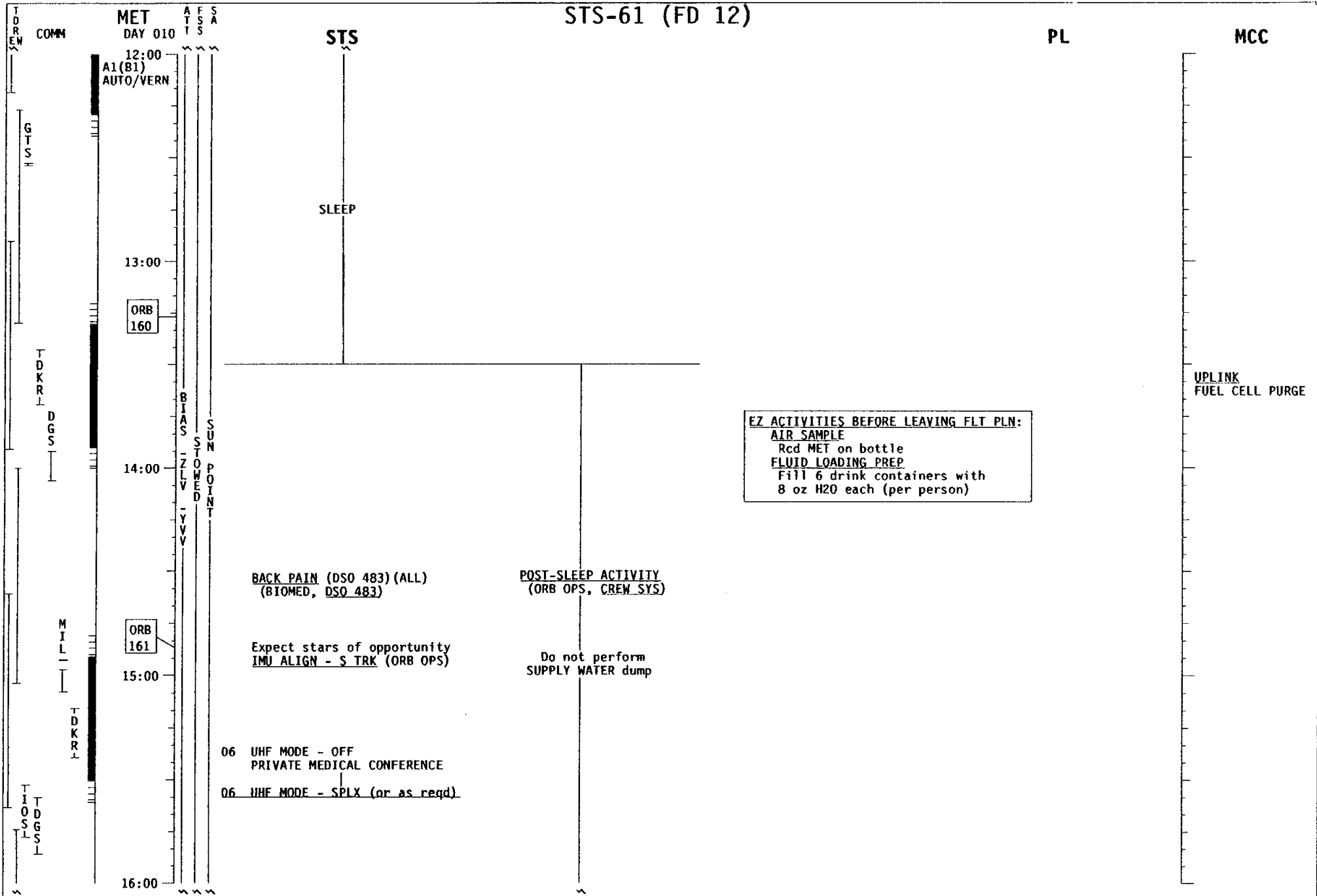
Expect stars of opportunity
IMU ALIGN - S TRK (ORB OPS)



STS-61 (FD 11)



STS-61 (FD 12)



STS-61 (FD 12)

STS

PL

MCC

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

MET
DAY 010

16:00
A1(B1)
AUTO/VERN

ORB
162

17:00

18:00

ORB
163

19:00

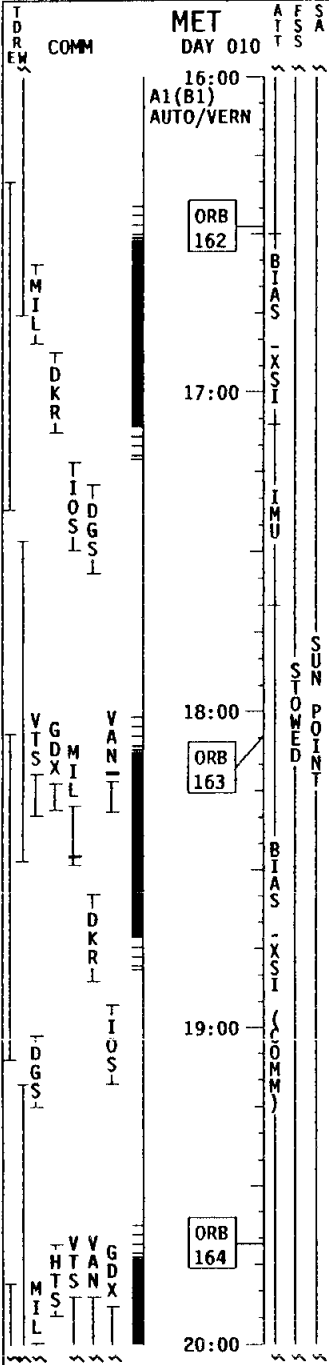
ORB
164

20:00

← MNYR (TRK) BIASED -XSI
TG=4 BV=5
P=184 Y=0 OM=270
A/AUTO/VERN (16:30) Init TRK
Update: CRT TIMER SETUP PAD
in NOMINAL DEORBIT PREP

Go to DEORBIT PREP at 10/16:46 MET

UPDATE
CRT TIMER
SETUP PAD



CONTINGENCY TIMELINES

MINIMUM DURATION FLIGHT W/FD2 RENDEZVOUS 4A-1
FD3 RENDEZVOUS W/ONE EVA 4B-1
SA SECONDARY DEPLOYMENT MECHANISM EVA ON RELEASE DAY 4C-1

CONTINGENCY
TIMELINES

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MINIMUM DURATION FLIGHT W/FD2 RENDEZVOUS

The intent of this timeline is to perform rendezvous, HST grapple, one EVA, HST release, and then deorbit in the shortest mission possible. The MDF timeline assumes that launch occurred in the portion of the launch window that allows a FD2 rendezvous and that a failure occurred during or shortly after ascent which places the orbiter in an MDF posture. As a result, a mission of approximately 72-hours duration has been designed to achieve the highest priority mission objectives. STS-61 Flight Rule A2-10, High Priority Flight Objectives, allows a mission specific exception to All Flights Rule 15-14C, Scheduled and Unscheduled EVA Constraints, which allows the EVA to be scheduled on FD3.

The following are assumptions:

- The MDF is declared prior to OMS 2.
- Liftoff occurs at a time in the launch window that permits a FD2 rendezvous.
- RMS C/O is scheduled earlier at 00/03:35 MET.
- One EVA is scheduled to perform the HST highest priority EVA tasks possible, fuses, RSU 2 and COSTAR on FD3.
- SAs remain deployed.
- The EVA and HST release occur on the same flight day.
- Reboost of the HST is not accomplished.
- AD is not opened prior to HST release due to the limited time available.

MDF W/
FD2 RNDZ

MDF W/
FD2 RNDZ

FLIGHT: STS-61		EDITION: FINAL		PUB. DATE: 10/25/93																						
MET : 000	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
FD1																										
DAY/NIGHT																										
ORBIT																										
NOTES:	ASSUMPTION: MDF IS DECLARED NLT MET 0/00:45 MINIMUM DURATION FLIGHT w/ FD2 RNDZ C W R A K E L / O D M S I R 2 POST INSERT S N A C K R M S C / O S S E I N S P & C / O N S R P R E S L E E P S L E E P S S E A C T K U A N T D P Y C A B I N D E P R E S S																									
MET : 000	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
FD2																										
DAY/NIGHT																										
ORBIT	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25										
NOTES:	S L E E P N H N C 2 P O S T S L E E P N P C F C O N F I G N C C R M S M N V R R E H E A R S A L T i B R T H G O P S P R E B A T T C H G + B A T T C H G F C S C / O P R E S L E E P S L E E P (7 . 0) E M U C / O (4 E M U s) R C S H O T F I R E W A S T E W A T E R D U M P																									
MET : 001	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
FD3																										
DAY/NIGHT																										
ORBIT	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40											
NOTES:	S L E E P P O S T S L E E P E V A P R E P A L D E P E V A # 1 (6 : 2 0) P O S T E V A H G A D P Y U P N R B E R T H H U R S T N S E C A B I N S T O W P R E S L E E P S L E E P C O A S C A L B A T T C H G S E P 1 S E P 2 S E P 3 F S S S T O W 1 4 . 7 R E P R E S S																									
MET : 002	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
FD4																										
DAY/NIGHT																										
ORBIT	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55											
NOTES:	S L E E P P O S T S L E E P C A B I N S T O W X M S N I V R D E O R B I T P R E P D B U R N K L S C G B I L I D U G K U B A N D S T O W S S E D E A C T 3 / 0 2 : 2 0 3 / 0 4 : 0 2																									
MET : 003	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
FD5																										
DAY/NIGHT																										
ORBIT	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70											
NOTES:																										

FD3 RENDEZVOUS W/ONE EVA

The intent of this timeline is to perform rendezvous, HST grapple, one EVA, HST release, and then deorbit in the shortest mission possible. There are two cases for which this timeline would be applicable. The first case is a launch in the portion of the launch window which only allows for a FD3 rendezvous and a decision is made to shorten the mission duration before approximately 51 hours MET. The other case is for a launch in the portion of the launch window that allows a FD2 rendezvous, but the failure does not occur until after 00/03:35 MET but prior to 02/02:45 MET. The result of either case is an approximately 96-hour timeline. STS-61 Flight Rule A2-10, High Priority Flight Objectives, allows a mission specific exception to All Flights Rule 2-30, Minimum Duration Flight.

The following assumptions apply:

- The decision to shorten the mission to four days is made prior to 02/02:45 MET.
- One EVA is scheduled to perform the HST highest priority EVA tasks possible, fuses, RSU 2, and COSTAR on FD4.
- SAs remain deployed.
- The EVA and HST release occur on the same flight day.
- Reboost of the HST is not accomplished.
- AD is not opened prior to HST release due to the limited time available.

FLIGHT: STS-61		EDITION: FINAL		PUB. DATE: 10/25/93																						
MET: 000	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
FD1																										
DAY/NIGHT																										
ORBIT																										
NOTES:	ASSUMPTION: MDF IS DECLARED NLT 2/02:45												@SSE ACT @KU ANT DPY													
MET: 000	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
FD2																										
DAY/NIGHT																										
ORBIT	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25										
NOTES:	@DSO 483 @DSO 469 ACT @CABIN DEPRESS @IMJ ALIGN/AFT COAS												@HST TOOL PREP *IF REQD (FOR PLAN A)													
MET: 001	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
FD3																										
DAY/NIGHT																										
ORBIT	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40											
NOTES:	@DSO 483 BACK PAIN IN MICRO-G @HST BATT CHARGE @RCS HOT FIRE												@GRP B PWRDN @WASTE WATER DUMP													
MET: 002	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
FD4																										
DAY/NIGHT																										
ORBIT	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55											
NOTES:	@BATT CHG @SEP1 @FSS STOW @SEP2 @14.7 REPRESS @SEP3																									
MET: 003	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
FD5																										
DAY/NIGHT																										
ORBIT	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70											
NOTES:	@KU BAND STOW @SSE DEACT												@4/00:46 @4/02:26													

SA SECONDARY DEPLOYMENT MECHANISM EVA ON RELEASE DAY


The purpose of the Solar Array Deploy EVA timeline is to show the deltas to the nominal timeline in the event a failure requires an EVA on release day. This timeline assumes an SDM failure occurs during the final EVA and there is not adequate time available in the EVA to perform a manual SDM deploy. Therefore, an EVA on release day is shown. After the EVA tasks are completed, the EV crewpersons will ingress the airlock and remain there until the deploy preparations are completed and release is effected. Airlock repress and post-EVA activities will be performed immediately after release. The following guidelines apply:

- An SDM failure mode was assumed which would affect both SDMs.
- The 24 minute duration of the SDM EVA task shown on the timeline is for simultaneous manual deploy of the SDMs. The duration of the total EVA time shown on release day (1 hour, 25 minutes) is the maximum EVA time allowable to accomplish a deploy on Rev 123.
- The HST remains on the FSS for the duration of the EVA tasks.
- 60 minutes of battery charging is allotted on release day.

SA SDM EVA
ON REL DAY

SA SDM EVA
ON REL DAY

FLIGHT: STS-61		EDITION: FINAL		PUB. DATE: 10/25/93												
MET: 006	14 15 16 17 18 19 20 21 22 23 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14	SA SDM EVA ON RELEASE DAY		EVA #5		A/L INGR	ALREP	POST EVA	EMERGENCY MAINT	PRE SLEEP	SLEEP					
DAY/NIGHT	[Day/Night Cycle]															
ORBIT	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	
NOTES:	@ SA SDM DPY* @ HGA DPY* SDM FAILURE *GROUND COMMANDED															
MET: 007	14 15 16 17 18 19 20 21 22 23 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14	SLEEP	POST SLEEP	EVA PREP	EVA	SSAL	BATT CHG	HUNBRTH	OPEN	AD*	HREST	FSS STOW	PRE SLEEP	SLEEP		
DAY/NIGHT	[Day/Night Cycle]															
ORBIT	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
NOTES:	@ GRP B PWRUP @ A/L DEPR @ MAN SDM DPY SEPS A1 A2 A3 @ A/L REPRESS @ GRP B PWRDN															
MET: 008	14 15 16 17 18 19 20 21 22 23 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14	SLEEP	POST SLEEP	OFF DUTY (MS1, MS3, MS4, MS5)		MEAL	OFF DUTY (CDR, PLT, MS2)		PRE SLEEP	SLEEP						
DAY/NIGHT	[Day/Night Cycle]															
ORBIT	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145
NOTES:	@DTO 1211 SPY/WST H2O DMP @DTO 700-8 GPS DEV FLT TEST @14.7 CAB REPRESS @ HUD CAL															
MET: 009	14 15 16 17 18 19 20 21 22 23 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14	POST SLEEP	FCS C/O	CROWN	MEAL	CABIN STOW		PRE SLEEP	SLEEP		SLEEP					
DAY/NIGHT	[Day/Night Cycle]															
ORBIT	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
NOTES:	@GRP B PWRUP @ RCS HOT FIRE @ KU-BD STOW															
MET: 010	14 15 16 17 18 19 20 21 22 23 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14	POST SLEEP	POST SLEEP	DEORBIT PREP		DBURN	KSC	LDC	SLEEP							
DAY/NIGHT	[Day/Night Cycle]															
ORBIT	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	
NOTES:	@SSE PWRDN @IMU ALIGN PLBD OPS @10/20:31 @10/20:00															

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON 	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE							
341:22:28/ 342:10:28	007:12:00/ 008:00:00	341:16:28/ 342:04:28	9 /341 CST	-0.1		DECEMBER 7, 1993	STS-61	FINAL	10/25/93							
CST :341 FD :008 MET :007	12	13	14	15	16	17	18	19	20	21	22	23	0	MET:008		
STS	SLEEP					10:2 MAINT	MCHEUC FLTR	PGWRP UP		ZSI MNVR	MNVRT CHG		RGH MRS SAT PLE	TRK MNVR		
				POST SLEEP			P/TV09 SETUP				P/TV09 OPS					
							EVA PREP		DEPRESS	EVA MAN SDM DPY		INGRESS				
PL													BATTERY CHARGING	ICNH ITRG BEAT		
DAY/NIGHT	[Night]		[Night]		[Night]		[Night]		[Night]		[Night]		[Night]			
ORBIT	114	115	116	117	118	119	120	121								
COMM COVERAGE	-GTS	-DKR	-GTS	-DKR	-DGS	-MIL	-DKR	-GDX	-MIL	-DKR	-GDX	-MIL	-DKR	-GTS		
TDRS E W																
ATTITUDE			-ZLV -YVV							-ZSI		BATT CHARGE		ICOMM		
NOTES:	*GROUND COMMANDED										@EVA PREP (EVA, EVA PREP) @DEPRESS/REPRESS (Cue Card) @90° POSN ▼SA P/TV				► PWR OFF SADE* ► RWA/MTE PWR ON*	
SA SDM EVA ON RELEASE DAY																

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE	
342:10:28/ 342:22:28	008:00:00/ 008:12:00	342:04:28/ 342:16:28	9 /342 CST	0.9		DECEMBER 8, 1993	STS-61	FINAL	10/25/93	
CST :342	FD :009	MET :008								
STS	HST UNBERTH	HST RELEASE PREP	SEP1 SEP2 SEP3	RC RELS	RMS PWRDN	PG WRRP	CON F	IO Z	MAINT	SLEEP
	P/TV09 OPS	HST RELEASE	POST EVA	REC ONFIG	MD DR KG	BT AE TR M				PRE SLEEP
			FSS STOW							
PL	SLPM WGSO IAED TS AE C HRT EE LS *T	OPEN APERTURE DR*	HST PERL	HST PERL	LGD DR *S	FHST S ON*				FHST FOV CHECK*
DAY/NIGHT ORBIT	122	123	124	125	126	127	128	129		
COMM COVERAGE	DGS GTS HTS VTS GDX MIL	DGS GTS HTS VTS GDX MIL	DGS GTS HTS VTS	HTS	IOS DGS	GTS HTS	IOS DGS	GTS	DKR	GTS DKR
TDRS	EW	IOS	IOS	GTS	IOS DGS	GTS	IOS	GTS		
ATTITUDE	COMM	REL	SEP	-Z TGT TRK			-ZLV -YVV			
NOTES:	▶ ENABLE KA MON* ◎DEPRESS/REPRESS (Cue Card) ▶ S/W SUNPOINT* ◎POST EVA (EVA, POST EVA) ▶ ACTIVATE SADE* *GROUND COMMANDED SA SDM EVA ON RELEASE DAY									

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

ATTITUDE TIMELINE

ATTITUDE
TIMELINE

Attitude Timeline

MET/GMT	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
1 000/01:12:00 MET 21:20 334/11:40:00 GMT 49:20	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=100.00	A1 AUTO PRI	DSC 0.200 DB AT 5.00 DB RT 0.20	EARTH R 0 P 90	LVLH R=180.00 P= 0.00 Y=280.00	BIAS -ZLV -YVV PLBD OPENING SOPA
2 000/05:04:00 MET 13:34 334/15:32:00 GMT 41:34	INRTL R=105.00 MNVR P= 15.00 Y= 54.00	B1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 223 P 148		NC-1 (OMS) TIG: 0/05:24
3 000/05:30:00 MET 37:30 334/15:58:00 GMT 16:05:30	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 90.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y=270.00	-ZLV -YVV
4 000/19:40:00 MET 49:08 335/06:08:00 GMT 17:08	INRTL R=134.00 MNVR P= 29.00 Y= 18.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 169 P 113	SPECIAL PAIR -Y ST: 63 -Z ST: 18	IMU ALIGN COAS CAL -Z: 18, CAPELLA
5 000/20:10:00 MET 21:59 335/06:38:00 GMT 49:59	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=180.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 90	LVLH R=180.00 P= 0.00 Y= 0.00	-ZLV +XVV
6 000/22:13:00 MET 20:03 335/08:41:00 GMT 48:03	INRTL R=129.00 MNVR P=349.00 Y= 73.00	B1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 260 P 160		NPC (+X RCS) TIG: 0/22:33
7 000/22:40:00 MET 41:20 335/09:08:00 GMT 09:20	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=180.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 90	LVLH R=180.00 P= 0.00 Y= 0.00	-ZLV +XVV
8 001/04:18:00 MET 25:06 335/14:46:00 GMT 53:06	INRTL R=109.00 MNVR P= 12.00 Y= 51.00	B1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 215 P 147		NC-2 (+X RCS) TIG: 1/04:38
9 001/04:45:00 MET 50:30 335/15:13:00 GMT 18:30	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=116.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 90	LVLH R=180.00 P= 0.00 Y=296.00	BIAS -ZLV -YVV SOPA
10 001/16:42:00 MET 50:54 336/03:10:00 GMT 18:54	INRTL R=116.00 MNVR P= 3.00 Y= 58.00	B1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 220 P 155		NSR (OMS) TIG: 1/17:02
11 001/17:03:00 MET 336/03:31:00 GMT		A1 LVLH VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 78	LVLH HOLD R=179.92 P=347.84 Y=359.82	LVLH HOLD
12 001/17:17:00 MET 32:00 336/03:45:00 GMT 04:00:00	INRTL R= 73.00 MNVR P=216.00 Y= 37.00	A7 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 162 P 118		NH (OMS) TIG: 1/17:32

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

MET/GMT	MNVR OPTION	DAF	E/S	REF ATT/REMARKS	EVENT	
1 001/17:33:00 MET 336/04:01:00 GMT		A7 LVLH VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 180 P 109	LVLH R=359.88 HOLD P= 19.25 Y=359.97	LVLH HOLD
2 001/18:15:00 MET 16:48 336/04:43:00 GMT 44:48	INRTL R=287.00 MNVR P= 36.00 Y=322.00	A7 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 18 P 62		NC-3 (OMS) TIG: 1/18:20
3 001/18:21:00 MET 24:41 336/04:49:00 GMT 52:41	TGT=1 BV=3 P= 90.00 Y= 0.00 OM= 0.00	B7 AUTO PRI	DSC 0.500 DB AT 2.00 DB RT 0.20			-Z TGT TRK POST NC-3
4 001/21:33:00 MET 336/08:01:00 GMT	TGT=1 BV=3 P= 90.00 Y= 0.00 OM= 0.00	A7 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02			-Z TGT TRK POST TI
5 001/22:48:00 MET 336/09:16:00 GMT		A7 INRT PRI	DSC 0.200 DB AT 2.00 DB RT 0.20	SUN R 167 P 66	INRTL R= 71.52 HOLD P=201.42 Y=344.88	EST INRT RATES GRAPPLE ATT
6 002/00:45:00 MET 56:02 336/11:13:00 GMT 24:02	TGT=4 BV=5 P=185.00 Y= 0.00 OM=250.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 180 P 175	INRTL R= 91.91 P=313.27 Y= 54.36	BIAS -XSI BATTERY CHARGE
7 002/03:00:00 MET 09:14 336/13:28:00 GMT 37:14	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=268.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 360 P 90	LVLH R=180.00 P= 0.00 Y= 88.00	BIAS -ZLV +YVV WASTE DUMP SOPA
8 002/05:10:00 MET 18:30 336/15:38:00 GMT 46:30	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=166.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 360 P 90	LVLH R=180.00 P= 0.00 Y=346.00	BIAS -ZLV +XVV INCIDENTAL BATTERY CHARGE
9 002/16:00:00 MET 08:47 337/02:28:00 GMT 36:47	TGT=4 BV=5 P=185.00 Y= 0.00 OM= 80.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 180 P 175	INRTL R=261.13 P=313.48 Y= 64.70	BIAS -XSI BATTERY CHARGE
10 002/17:30:00 MET 42:46 337/03:58:00 GMT 04:10:46	TGT=4 BV=3 P= 90.00 Y= 0.00 OM=300.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 360 P 90	INRTL R=293.23 P= 80.22 Y= 19.87	-ZSI SA STOW POSN TEST OBS
11 002/19:45:00 MET 57:50 337/06:13:00 GMT 25:50 -SR +10:00	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=178.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 360 P 90	LVLH R=180.00 P= 0.00 Y=358.00	BIAS -ZLV +XVV RSU's SS PROTECT
12 002/20:36:00 MET 48:40 337/07:04:00 GMT 16:40	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 26.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 90	LVLH R= 0.00 P=180.00 Y=334.00	BIAS -ZLV -XVV RSU's SR PROTECT

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

MET/GMT	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
1 002/21:38:00 MET 50:40 337/08:06:00 GMT 18:40	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=178.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 90	LVLH R=180.00 P= 0.00 Y=358.00	BIAS -ZLV +XVV RSU's SS PROTECT
2 002/22:30:00 MET 44:52 337/08:58:00 GMT 09:12:52	TGT=4 RA= 248.998 BV=5 DEC= -22.042S P= 78.00 Y= 9.00 OM= 0.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 9 P 78	INRTL R=291.00 P= 30.64 Y=340.12	BIAS -ZSI ECU's/SI C&DH
3 003/00:00:00 MET 01:34 337/10:28:00 GMT 29:34	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=345.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y= 15.00	BIAS -ZLV -XVV SAC PREP FUSE PLUGS
4 003/01:45:00 MET 53:42 337/12:13:00 GMT 21:42	TGT=4 RA= 249.145 BV=5 DEC= -22.061S P= 75.00 Y= 0.00 OM=240.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 360 P 75	INRTL R=263.53 P=143.87 Y= 14.31	BIAS -ZSI SDM RETRACT
5 003/04:15:00 MET 29:39 337/14:43:00 GMT 57:39	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 93.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 360 P 90	LVLH R=180.00 P= 0.00 Y=273.00	BIAS -ZLV -YVV SOPA
6 003/19:00:00 MET 11:05 338/05:28:00 GMT 39:05	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=320.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 90	LVLH R= 0.00 P=180.00 Y= 40.00	BIAS -ZLV -XVV SOLAR ARRAYS
7 004/00:45:00 MET 46:40 338/11:13:00 GMT 14:40	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=340.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 90	LVLH R= 0.00 P=180.00 Y= 20.00	BIAS -ZLV -XVV OM TWEAK FOR KU
8 004/02:00:00 MET 05:45 338/12:28:00 GMT 33:45	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=271.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 90	LVLH R= 0.00 P=180.00 Y= 89.00	BIAS -ZLV +YVV WASTE DUMP SOPA
9 004/20:10:00 MET 19:50 339/06:38:00 GMT 47:50	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=153.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 90	LVLH R=180.00 P= 0.00 Y=333.00	BIAS -ZLV +XVV WF/PC SS PROTECT
10 004/20:50:00 MET 21:02:40 339/07:18:00 GMT 30:40	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 1.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 90	LVLH R= 0.00 P=180.00 Y=359.00	BIAS -ZLV -XVV WF/PC SR PROTECT
11 004/21:48:00 MET 22:01:50 339/08:16:00 GMT 29:50	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=167.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 360 P 90	LVLH R=180.00 P= 0.00 Y=347.00	BIAS -ZLV +XVV WF/PC SS PROTECT
12 004/22:28:00 MET 42:55 339/08:56:00 GMT 09:10:55	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=348.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y= 12.00	BIAS -ZLV -XVV WF/PC SR PROTECT

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

MET/GMT	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
1 004/23:28:00 MET 41:45 339/09:56:00 GMT 10:09:45	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=153.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 90	LVLH R=180.00 P= 0.00 Y=333.00	BIAS -ZLV +XVV WF/PC SS PROTECT
2 005/00:00:00 MET 06:00 339/10:28:00 GMT 34:00	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 81.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 90	LVLH R= 0.00 P=180.00 Y=279.00	BIAS -ZLV -YVV MAGNETOMETERS SOPA
3 005/19:30:00 MET 38:05 340/05:58:00 GMT 06:06:05	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=344.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y= 16.00	BIAS -ZLV -XVV HSP/COSTAR SR PROTECT
4 005/20:10:00 MET 24:20 340/06:38:00 GMT 52:20	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=156.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 90	LVLH R=180.00 P= 0.00 Y=336.00	BIAS -ZLV +XVV HSP/COSTAR SS PROTECT
5 005/20:55:00 MET 21:07:40 340/07:23:00 GMT 35:40	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 4.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 90	LVLH R= 0.00 P=180.00 Y=356.00	BIAS -ZLV -XVV HSP/COSTAR SR PROTECT
6 005/21:55:00 MET 22:08:30 340/08:23:00 GMT 36:30	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=166.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 360 P 90	LVLH R=180.00 P= 0.00 Y=346.00	BIAS -ZLV +XVV HSP/COSTAR SS PROTECT
7 005/22:30:00 MET 38:35 340/08:58:00 GMT 09:06:35	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=269.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 360 P 90	LVLH R=180.00 P= 0.00 Y= 89.00	BIAS -ZLV +YVV COPROCESSOR WASTE DUMP SOPA
8 006/17:05:00 MET 12:37 341/03:33:00 GMT 40:37	TGT=2 BV=5 P=100.00 Y= 0.00 OM= 0.00	B1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 360 P 100	LVLH R= 0.00 P=170.00 Y= 0.00	REBOOST 1 (-X) TIG: 6/17:25
9 006/17:24:30 MET 341/03:52:30 GMT TIG -00:30		B1 INRT PRI	DSC 0.500 DB AT 3.00 DB RT 0.20	SUN R 178 P 46	INRTL R= 60.90 HOLD P=178.96 Y=329.21	INRTL HOLD
10 006/17:26:00 MET 341/03:54:00 GMT		A1 LVLH VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 94	LVLH R=360.00 HOLD P=175.59 Y=359.99	LVLH HOLD
11 006/17:53:00 MET 28 341/04:21:00 GMT 28	TGT=2 BV=5 P=100.00 Y= 0.00 OM= 0.00	B1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 100	LVLH R= 0.00 P=170.00 Y= 0.00	REBOOST 2 (-X) TIG: 6/18:13
12 006/18:12:30 MET 341/04:40:30 GMT TIG -00:30		B1 INRT PRI	DSC 0.500 DB AT 3.00 DB RT 0.20	SUN R 2 P 133	INRTL R=298.95 HOLD P=359.23 Y= 30.16	INRTL HOLD

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

MET/GMT	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
1 006/18:20:00 MET 24:01 341/04:48:00 GMT 52:01	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=315.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 90	LVLH R=: 0.00 P=:180.00 Y=: 45.00	BIAS -ZLV -XV PDM DEPLOY SADE GHR SR PROTECT
2 006/22:05:00 MET 16:25 341/08:33:00 GMT 44:25	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=178.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 360 P 90	LVLH R=:180.00 P=: 0.00 Y=:358.00	BIAS -ZLV +XV GHR SS PROTECT
3 006/22:45:00 MET 55:32 341/09:13:00 GMT 23:32	TGT=4 BV=5 P= 75.00 Y= 0.00 OM=300.00 RA= 253.361 DEC= -22.564S	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 360 P 75	INRTL R=:290.43 P=: 78.22 Y=: 4.02	BIAS -ZSI SDM DEPLOY
4 007/01:30:00 MET 40:30 341/11:58:00 GMT 12:08:30	TGT=4 BV=5 P=165.00 Y= 0.00 OM=200.00 RA= 253.486 DEC= -22.577S	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 360 P 165	INRTL R=:172.14 P=:270.90 Y=: 68.43	BIAS -XSI BATTERY CHARGE
5 007/05:00:00 MET 14:32 341/15:28:00 GMT 42:32	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 90	LVLH R=: 0.00 P=:180.00 Y=: 0.00	-ZLV -XV INCIDENTAL BATTERY CHARGE
6 007/17:45:00 MET 59:33 342/04:13:00 GMT 27:33	INRTL R=:134.00 MNVR P= 24.00 Y= 24.00	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 166 P 115	STAR PAIR A1 -Y ST: 63 -Z ST: 66	IMU ALIGN
7 007/18:05:00 MET 17:14 342/04:33:00 GMT 45:14	TGT=4 BV=5 P=180.00 Y= 55.00 OM=330.00 RA= 254.242 DEC= -22.655S	A10 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 90 P 125	INRTL R=:169.38 P=:142.23 Y=: 61.51	COMM ATT UNBERTH OPEN AD
8 007/21:15:00 MET 17:30 342/07:43:00 GMT 45:30	TGT=4 BV=5 P=180.00 Y= 55.00 OM= 0.00 RA= 254.386 DEC= -22.669S	A9 AUTO VERN	DSC 0.200 DB AT 2.00 DB RT 0.05	SUN R 90 P 125	INRTL R=:197.36 P=: 90.58 Y=: 59.85	RELEASE ATT REL: 7/21:41
9 007/21:41:30 MET 342/08:09:30 GMT		A9 INRT VERN	DSC 0.200 DB AT 2.00 DB RT 0.05	SUN R 90 P 125	INRTL R=:197.39 HOLD P=: 90.48 Y=: 59.83	INRTL HOLD SEP 1 TIG: (REL +00:30)
10 007/21:51:30 MET 58:04 342/08:19:30 GMT 26:04 SEP 1 +10:00	TGT=1 BV=5 P= 80.00 Y= 0.00 OM=270.00	A7 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02			-Z TGT TRK SEP 2 TIG: (SEP 1 +24:00)
11 007/22:12:30 MET 27:27 342/08:40:30 GMT 55:27 SEP 1 +31:00	TGT=2 BV=5 P= 0.00 Y= 90.00 OM=190.00	A7 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 90 P 90	LVLH R=:270.00 P=:180.00 Y=:350.00	BIAS +YLV -XV SEP 3 TIG: (SEP 1 +48:00)
12 007/22:31:00 MET 37:58 342/08:59:00 GMT 09:05:58	TGT=1 BV=3 P= 90.00 Y= 0.00 OM= 90.00	A7 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02			-Z TGT TRK

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

MET/GMT	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
1 008/00:00:00 MET 07:36 342/10:28:00 GMT 35:36	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 83.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y=277.00	BIAS -ZLV -YVV SOPA
2 008/16:30:00 MET 44:35 343/02:58:00 GMT 03:12:35	TGT=2 BV=2 P=180.00 Y= 0.00 OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 2 P 180	LVLH R= 90.00 P= 90.00 Y= 0.00	-XLV +YVV H2O/WASTE DUMP DTO 1211
3 008/20:40:00 MET 47:30 343/07:08:00 GMT 15:30	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y= 90.00	-ZLV +YVV
4 009/03:25:00 MET 37:53 343/13:53:00 GMT 14:05:53	INRTL R= 50.00 MNVR P=283.00 Y= 76.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 74 P 166	STAR PAIR C1 -Y ST: 37 -Z ST: 16	IMU ALIGN
5 009/03:45:00 MET 47:36 343/14:13:00 GMT 15:36	INRTL R= 49.00 MNVR P=287.00 Y= 45.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 203 P 160		HUD CAL +X: 18, CAPELLA
6 009/04:10:00 MET 18:39 343/14:38:00 GMT 46:39	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 83.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y=277.00	BIAS -ZLV -YVV SOPA
7 009/17:00:00 MET 344/03:28:00 GMT		A1 INRT VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 299 P 93	INRTL R=322.99 HOLD P=280.11 Y=337.47	FCS C/O PT 2
8 009/17:20:00 MET 26:14 344/03:48:00 GMT 54:14	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 83.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y=277.00	RETURN TO AUTO
9 009/17:40:00 MET 344/04:08:00 GMT		A1 INRT VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 150 P 83	INRTL R=106.66 HOLD P=267.66 Y=329.73	RCS HOT FIRE
10 009/17:55:00 MET 59:40 344/04:23:00 GMT 27:40	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 83.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 90	LVLH R= 0.00 P=180.00 Y=277.00	RETURN TO AUTO
11 009/20:00:00 MET 14:12 344/06:28:00 GMT 42:12	INRTL R= 81.00 MNVR P= 40.00 Y= 25.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 216 P 108		CREW CONF
12 009/21:15:00 MET 28:23 344/07:43:00 GMT 56:23	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 84.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 90	LVLH R= 0.00 P=180.00 Y=276.00	BIAS -ZLV -YVV SOPA

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

MET/GMT	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
1 010/16:30:00 MET 41:20 345/02:58:00 GMT 03:09:20	TGT=4 RA= 257.461 BV=5 DEC= -22.945S P=184.00 Y= 0.00 OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 R 180 DB RT 0.02 P 176	SUN R 180 P 176	INRTL R= 70.64 P=294.12 Y= 60.27	BIAS -XSI RAD COLDSOAK
2 010/17:06:00 MET 14:43 345/03:34:00 GMT 42:43 TIG -3:40	INRTL R=180.00 MNVR P=288.00 Y= 76.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 R 289 DB RT 0.02 P 168	SUN R 289 P 168	-Y ST: 50 -Z ST: 41	DEORBIT ALIGN
3 010/17:20:00 MET 34:27 345/03:48:00 GMT 04:02:27	INRTL R=344.00 MNVR P=321.00 Y=352.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 R 297 DB RT 0.02 P 106	SUN R 297 P 106	-Y ST: 43 -Z ST: 28	ALIGN VERIF
4 010/17:40:00 MET 46:33 345/04:08:00 GMT 14:33	INRTL R= 24.00 MNVR P=276.00 Y= 61.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 R 183 DB RT 0.02 P 170	SUN R 183 P 170		BIAS -XSI COMM ATT
5 010/20:31:00 MET 34:00 345/06:59:00 GMT 07:02:00 -TIG -15:00	INRTL R= 61.00 MNVR P=184.00 Y= 5.00	TRANS AUTO PRI	DSC 0.500 DB AT 3.50 R 185 DB RT 0.50 P 85	SUN R 185 P 85		DEORBIT BURN TIG 10/20:46

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

STS-61 DAP BOOK

DAP A CONFIGURATIONS

	ITEM #	A1*	A2	A3	A4	A5	A6	A7	A8	A9	A10
<u>TRANSLATION</u>											
PULSE ft/sec	1	0.10	0.10	0.10	0.10		0.10	0.10	0.05	0.05	0.05
<u>ROTATION</u>											
DSC RT NORM °/sec	2	0.200	0.400	0.200	0.500		0.200	0.200	0.200	0.100	0.100
VERN °/sec	3	0.200	0.400	0.008	0.200		0.200	0.200	0.200	0.100	0.200
PULSE NORM °/sec	4	0.10	0.10	0.10	0.10		0.10	0.10	0.10	0.04	0.10
VERN °/sec	5	0.010	0.010	0.010	0.010		0.010	0.010	0.010	0.040	0.010
COMP NORM °/sec	6	.00	.00	.00	.00		.00	.00	.00	.00	.00
VERN °/sec	7	.000	.000	.000	.000		.000	.000	.000	.000	.000
<u>DEADBAND</u>											
ATT NORM (deg)	8	5.00	1.00	1.00	3.00		5.00	2.00	2.00	5.00	5.00
VERN (deg)	9	1.000	1.000	0.070	1.000		1.000	1.000	1.000	2.000	1.000
RATE NORM °/sec	10	0.20	0.20	0.20	0.20		0.20	0.20	0.20	0.20	0.20
VERN °/sec	11	.020	.020	.010	.020		.020	.020	.020	.060	.020
<u>JET OPT</u>											
P	12	1	1	1	1		3	1 or 3	1	1 or 3	1 or 3
Y	13	1	1	3	1		3	1 or 3	1	1 or 3	1 or 3
CNTL ACCEL	14	0	0	0	0		0	0	0	1 - 4	4, 5

*I-LOADED OPS-2 DAP Configuration

DAP B CONFIGURATIONS

	ITEM #	B1*	B2	B3	B4	B5	B6	B7	B8	B9	B10
TRANSLATION											
PULSE ft/sec	15	0.10	0.10	0.10	0.10	0.10		0.05	0.01	0.01	0.01
ROTATION											
DSC RT NORM °/sec	16	0.500	0.200	0.200	0.200	0.200		0.500	0.200	0.050	0.100
VERN °/sec	17	0.200	0.200	0.200	0.008	0.016		0.200	0.200	0.024	0.200
PULSE NORM °/sec	18	0.04	0.04	0.04	0.04	0.04		0.04	0.04	0.04	0.04
VERN °/sec	19	0.002	0.002	0.002	0.002	0.002		0.002	0.002	0.005	0.002
COMP NORM °/sec	20	.00	.00	.00	.00	.00		.00	.00	.00	.00
VERN °/sec	21	.000	.000	.000	.000	.000		.000	.000	.000	.000
DEADBAND											
ATT NORM (deg)	22	3.00	3.00	3.00	0.30	3.00		2.00	2.00	2.00	3.00
VERN (deg)	23	1.000	1.000	1.000	0.100	0.033		1.000	1.000	0.500	1.000
RATE NORM °/sec	24	0.20	0.20	0.20	0.20	0.20		0.20	0.20	0.20	0.20
VERN °/sec	25	.020	.020	.020	.010	.020		.020	.020	.030	.010
JET OPT											
P	26	1	3	1	3	3		1 or 3	1	3	1
Y	27	1	3	1	3	3		1 or 3	1	3	1
CNTL ACCEL	28	0	0	0	0	0		0	0	1	4

*I-LOADED OPS-2 DAP Configuration except TRANSLATION PULSE (I-LOAD is 0.02 ft/sec)

ALT DAP CONFIGURATIONS

	ITEM #	ALT1*	ALT2	ALT9	ALT10
RATE DEADBAND	32	0.200	0.070	0.100	0.100
JET OPTION	33	1	1 or 3	3	1 or 3
NUMBER OF JETS	34	2	1	2	2
ON TIME	35	0.08	0.08	0.08	0.08
DELAY	36	0.00	0.00	**	17.4

*I-LOADED OPS-2 DAP Configuration

**DELAY: HST

17.4 Attached to FSS

11.8 RMS OPS w/SA I

13.1 RMS OPS w/SA II



<u>DAP</u>	<u>PURPOSE</u>	<u>DAP</u>	<u>PURPOSE</u>
A1	- NOMINAL IMU ALIGN LOSS OF VERN (NOSE & TAIL)	B1	- NOMINAL PRCS IMU ALIGN OMS & RCS BURNS
A2	- PTC	B2	- LOSS OF VERN (TAIL ONLY)
A3	- GG	B3	- LOSS OF VERN (NOSE & TAIL) GG MNVR
A4	- PRE/POST DEPLOY	B4	- SSUS DEPLOY
A5	- (Blank)	B5	- COAS CAL
A6	- LOSS OF VERN (TAIL ONLY)	B6	- (Blank)
A7	- RENDEZVOUS	B7	- RENDEZVOUS
A8	- PROX OPS	B8	- PROX OPS
A9	- HST RMS OPS	B9	- HST RELEASE
A10	- HST BERTHED MFR OPS	B10	- SA OPS

FLT PLN-1a/61/O/C



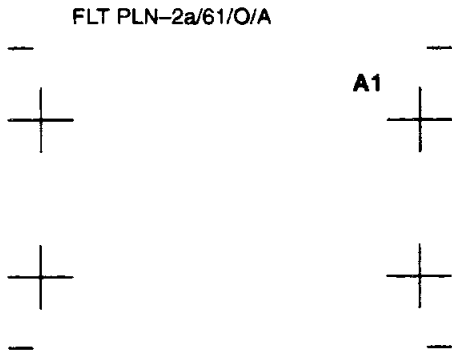
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FLT PLN-1b/61/O/A





DAP A



FLT PLN-2a/61/O/A

A1

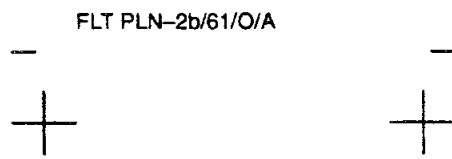
DAP A1

PURPOSE:
 NOMINAL
 IMU ALIGN
 LOSS OF VERN
 (NOSE & TAIL)

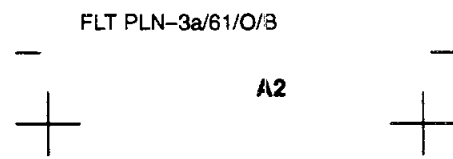


A1

0.10	1	TRANSLATION PULSE
ROTATION		
0.200	2	DISC RT NORM
0.200	3	VERN
0.10	4	PULSE NORM
0.010	5	VERN
.00	6	COMP NORM
.000	7	VERN
DEADBAND		
-5.00	8	ATT NORM
-1.000	9	VERN
0.20	10	RATE NORM
.020	11	VERN
1	12	JET OPT P
1	13	Y
0	14	CNTL ACCEL



FLT PLN-2b/61/O/A



FLT PLN-3a/61/O/B

A2



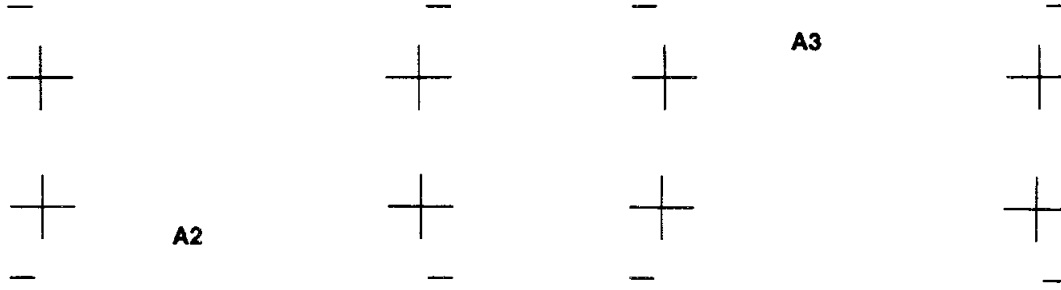
A1
DAP A2
 PURPOSE:
 PTC

A2

0.1 0	1	TRANSLATION	
		PULSE	
ROTATION			
0.4 0 0	2	DSC RT	NORM
0.4 0 0	3		VERN
0.1 0	4	PULSE	NORM
0.0 1 0	5		VERN
.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/61/O/A

FLT PLN-4a/61/O/A



A2
DAP A3
 PURPOSE:
 GG

A3

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	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
3	13		Y
0	14	CNTL ACCEL	

FLT PLN-4b/61/O/A

FLT PLN-5a/61/O/A





DAP A4

PURPOSE:
PRE/POST DEPLOY

FLT PLN-5b/61/O/A



A4

DAP A5

PURPOSE:
(Blank)

FLT PLN-6b/61/O/B



A4

		TRANSLATION	
0.10	1	PULSE	
		ROTATION	
0.500	2	DSC RT	NORM
0.200	3		VERN
0.10	4	PULSE	NORM
0.010	5		VERN
.00	6	COMP	NORM
.000	7		VERN
		DEADBAND	
.300	8	ATT	NORM
.1000	9		VERN
0.20	10	RATE	NORM
.020	11		VERN
1	12	JET OPT	P
1	13		Y
Q	14	CNTL ACCEL	

FLT PLN-6a/61/O/A



A5

A5

		TRANSLATION	
---	1	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	

FLT PLN-7a/61/O/B



A6



A5

DAP A6

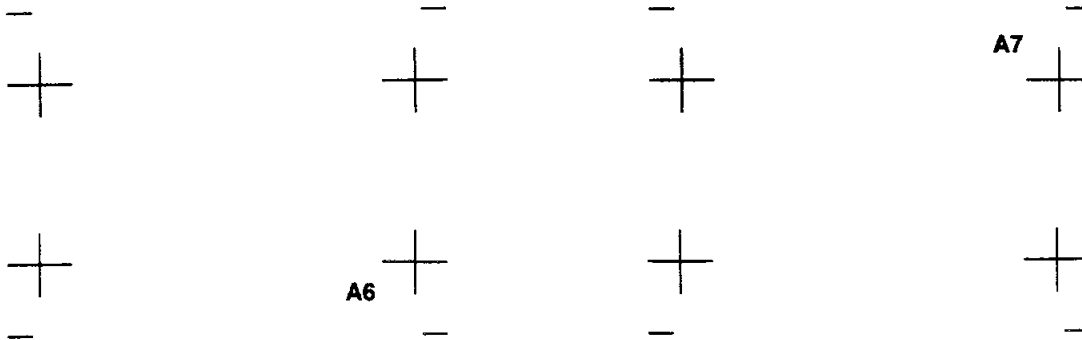
PURPOSE:
LOSS OF VERN
(TAIL ONLY)

A6

- 0.1 0 1 TRANSLATION PULSE
- 0.2 0 0 2 ROTATION DSC RT NORM
- 0.2 0 0 3 VERN
- 0.1 0 4 PULSE NORM
- 0.0 1 0 5 VERN
- .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-7b/61/O/A

FLT PLN-8a/61/O/A



A6

A7

DAP A7

PURPOSE:
RENDEZVOUS

A7

- 0.1 0 1 TRANSLATION PULSE
- 0.2 0 0 2 ROTATION DSC RT NORM
- 0.2 0 0 3 VERN
- 0.1 0 4 PULSE NORM
- 0.0 1 0 5 VERN
- .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 or 3 12 JET OPT P
- 1 or 3 13 Y
- 0 14 CNTL ACCEL

FLT PLN-8b/61/O/A

FLT PLN-9a/61/O/A



A8



A7

DAP A8

PURPOSE:
PROX OPS

FLT PLN-9b/61/O/A



A8

0.05	1	TRANSLATION	
		PULSE	
ROTATION			
0.200	2	DSC RT	NORM
0.200	3		VERN
0.10	4	PULSE	NORM
0.010	5		VERN
.00	6	COMP	NORM
.000	7		VERN
DEADBAND			
-2.00	8	ATT	NORM
-1.000	9		VERN
0.20	10	RATE	NORM
.020	11		VERN
1	12	JET OPT	P
1	13		Y
0	14	CNTL ACCEL	

FLT PLN-10a/61/O/A



A8

DAP A9

PURPOSE:
HST RMS OPS

FLT PLN-10b/61/O/A



A9

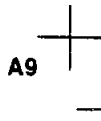
0.05	1	TRANSLATION	
		PULSE	
ROTATION			
0.100	2	DSC RT	NORM
0.100	3		VERN
0.04	4	PULSE	NORM
0.040	5		VERN
.00	6	COMP	NORM
.000	7		VERN
DEADBAND			
-5.00	8	ATT	NORM
-2.000	9		VERN
0.20	10	RATE	NORM
.060	11		VERN
1 or 3	12	JET OPT	P
1 or 3	13		Y
1-4	14	CNTL ACCEL	

FLT PLN-11a/61/O/C



A10





DAP A10

PURPOSE:

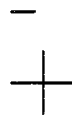
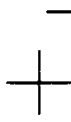
HST BERTHED
MFR OPS

A10

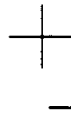
0.05	1	TRANSLATION	
		PULSE	
		ROTATION	
0.100	2	DSC RT	NORM
0.200	3		VERN
0.10	4	PULSE	NORM
0.010	5		VERN
.00	6	COMP	NORM
.000	7		VERN
		DEADBAND	
5.00	8	ATT	NORM
1.000	9		VERN
0.20	10	RATE	NORM
.020	11		VERN
1 or 3	12	JET OPT	P
1 or 3	13		Y
4, 5	14	CNTL ACCEL	

FLT PLN-11b/61/O/B

FLT PLN-27a/61/O/A



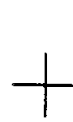
A10



DAP B

FLT PLN-27b/61/O/A

FLT PLN-12a/61/O/A



B1





DAP B1

PURPOSE:

NOMINAL
PRCS IMU ALIGN
OMS & RCS
BURNS

15	0.10*
16	0.500
17	0.200
18	0.04
19	0.002
20	.00
21	.000

22	3.00
23	1.000

24	0.20
25	.020

26	1
27	1

28	0
----	---

FLT PLN-12b/61/O/A



DAP B2

PURPOSE:

LOSS OF VERN
(TAIL ONLY)

15	0.10
16	0.200
17	0.200
18	0.04
19	0.002
20	.00
21	.000

22	3.00
23	1.000

24	0.20
25	.020

26	3
27	3

28	0
----	---

FLT PLN-13b/61/O/A



B1

* Not I-LOAD

FLT PLN-13a/61/O/B

B2

B2

FLT PLN-14a/61/O/B

B3





B2

DAP B3

PURPOSE:

LOSS OF VERN
(NOSE & TAIL)
GG MNVR

FLT PLN-14b/61/O/A



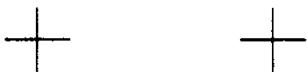
B3

DAP B4

PURPOSE:

SSUS DEPLOY

FLT PLN-15b/61/O/A



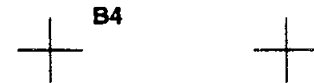
(reduced copy)



B3

15	0.1 0
16	0.2 0 0
17	0.2 0 0
18	0.0 4
19	0.0 0 2
20	.0 0
21	.0 0 0
22	-.3 0 0
23	-.1 0 0 0
24	0.2 0
25	.0 2 0
26	1
27	1
28	0

FLT PLN-15a/61/O/B



B4



B4

15	0.1 0
16	0.2 0 0
17	0.0 0 8
18	0.0 4
19	0.0 0 2
20	.0 0
21	.0 0 0
22	-.0 3 0
23	-.0 1 0 0
24	0.2 0
25	.0 1 0
26	3
27	3
28	0

FLT PLN-16a/61/O/B



B5

FLT PLN/61/FIN



B4

DAP B5

PURPOSE:
COAS CAL



B5

15	0.10
16	0.200
17	0.016
18	0.04
19	0.002
20	.00
21	.000
22	3.00
23	0.033
24	0.20
25	.020
26	3
27	3
28	0

FLT PLN-16b/61/O/A

FLT PLN-17a/61/O/B



B6



B5

DAP B6

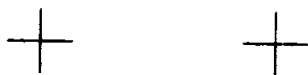
PURPOSE:
(Blank)

B6

15	---
16	---
17	---
18	---
19	---
20	---
21	---
22	---
23	---
24	---
25	---
26	-
27	-
28	-

FLT PLN-17b/61/O/A

FLT PLN-18a/61/O/A



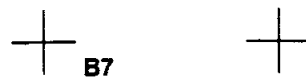
B7



DAP B7

PURPOSE:
RENDEZVOUS

FLT PLN-18b/61/O/A



DAP B8

PURPOSE:
PROX OPS

FLT PLN-19b/61/O/A



B7

15	0.05
16	0.500
17	0.200
18	0.04
19	0.002
20	.00
21	.000
22	-2.00
23	-1.000
24	0.20
25	.020
26	1 or 3
27	1 or 3
28	0

FLT PLN-19a/61/O/A



B8

15	0.01
16	0.200
17	0.200
18	0.04
19	0.002
20	.00
21	.000
22	-2.00
23	-1.000
24	0.20
25	.020
26	1
27	1
28	0

FLT PLN-20a/61/O/A





B8

DAP B9

PURPOSE:
HST RELEASE



B9

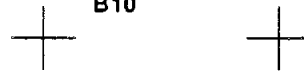
15	0.01
16	0.050
17	0.024
18	0.04
19	0.005
20	.00
21	.000
22	-2.00
23	--5.00
24	0.20
25	.030
26	3
27	3
28	1

FLT PLN-20b/61/O/A

FLT PLN-21a/61/O/C



B10



B9



DAP B10

PURPOSE:
SA OPS

B10

15	0.01
16	0.100
17	0.200
18	0.04
19	0.002
20	.00
21	.000
22	-3.00
23	-1.000
24	0.20
25	.010
26	1
27	1
28	4

FLT PLN-21b/61/O/B

FLT PLN-28a/61/O/A



+ B10 +

+ DAP PURPOSE +

ALT1 - NOMINAL
I-LOAD
ALT2 - LOSS OF
VERNS
ALT9 - HST RMS
OPS
ALT10- HST
BERTHED

FLT PLN-22a/61/O/B

+ ALT1 +

FLT PLN-28b/61/O/A

+ +

+ DAP ALT1 + + ALT1 +

PURPOSE:
NOMINAL I-LOAD

RATE DB
32 0.2 0 0
JET OPT
33 1
JETS
34 2
ON TIME
35 - 0.0 8
DELAY
36 - 0.0 0

FLT PLN-22b/61/O/A

FLT PLN-23a/61/O/A

+ + + ALT2 +

+ +
DAP ALT2

PURPOSE:

LOSS OF VERNIS

FLT PLN-23b/61/O/A

+ +
ALT2

RATE DB
32 0.070
JET OPT
33 1 or 3
JETS
34 1
ON TIME
35 -0.08
DELAY
36 -0.00

FLT PLN-24a/61/O/A

+ +
ALT1

+ +
ALT9

+ +
DAP ALT9

PURPOSE:

HST RMS OPS

FLT PLN-24b/61/O/B

+ +
ALT9

RATE DB
32 0.100
JET OPT
33 3
JETS
34 2
ON TIME
35 -0.08
DELAY
36 ** (see back)

FLT PLN-25a/61/O/B

+ +
ALT2

+ +



****DELAY: HST**

17.4 Attached to
FSS

11.8 RMS OPS
w/SA I

13.1 RMS OPS
w/SA II

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FLT PLN-25b/61/O/C

FLT PLN-29a/61/O/A



ALT9



ALT10



DAP ALT10



PURPOSE:

HST BERTHED

FLT PLN-29b/61/O/A



ALT10



RATE DB
32 0.1 0 0

JET OPT
33 1 or 3

JETS
34 2

ON TIME
35 0.0 8

DELAY
36 1 7.4 0

FLT PLN-30a/61/O/B







FLT PLN-30b/61/O/A



ALT10



UNIV PTG			
TGT ID = 1	Orbiting Vehicle		
= 2	Earth ctr		
= 3	Earth tgt		
	Input LAT (± 90)		
	LON (± 180 , + = East)		
	ALT (-3444.0 to 20000.0 nm)		
= 4	Sun ctr		
= 5	Celestial tgt		
	Input RA (0-359.99)		
	DEC (± 90)		
= 11-110	Nav Stars		
BODY VECT = 1	+X*		
= 2	-X*		
= 3	-Z*		
= 4	-Y Star Tracker*		
= 5	Optional		
	Input P (0-359.99)		
	Y (270-359.99, 0-90)		
* input OM →	OM (0-359.99)		
MON AXIS = 1	+X		
2	-X		
CNTL ACCEL = 0	Orbiter Alone		
= 1	HST Capture/Release		
= 2	HST Extended Park		
= 3	HST FSS Hover		
= 4	HST Berthed		
= 5	HST Reboost		
PRI JET OPT = 1	Normal	ALT JET OPT = 1	Normal
= 2	Nose only	= 2	Illegal entry
= 3	Tail only	= 3	Tail only

FLT PLN-26a/61/O/A

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FLT PLN-26b/61/O/A

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STS-61
FLIGHT PLAN NOTES

FLT PLN
NOTES

FLIGHT PLAN NOTES
(CONSTRAINTS AND GUIDELINES)

A. FLIGHT DESCRIPTION

Orbiter: Endeavour (OV105)
 Inclination: 28.45°
 Insertion Altitude: 310 x 136 nm
 HST Grapple Altitude: 320 x 313 nm
 Duration: 11 + 2 days

Major Events

<u>Activity</u>	<u>DV (fps)</u>	<u>MET</u>	<u>GMT (CST)</u>	<u>HA/HP (nm)</u>
Launch	--	00/00:00	334/10:28 (334/04:28)	--
OMS-2	187.2	00/00:45	334/11:13	310/136
NC-1	8.0	00/05:24	334/15:52	310/141
NPC	4.4	00/22:33	335/09:01	310/141
NC-2	4.0	01/04:38	335/15:06	310/143
NSR	275.3	01/17:02	336/03:30	310/304
NH	15.8	01/17:32	336/04:00	319/305
NC-3	9.6	01/18:20	336/04:48	319/311
NCC	0.0	01/20:33	336/07:01	319/311
Ti	3.1	01/21:33	336/08:01	320/312
HST Grapple	--	01/23:43	336/10:11 (336/04:11)	320/314
HST Reboost 1*	0.0	06/17:25	341/03:53	320/313
HST Reboost 2*	0.0	06/18:13	341/04:41	320/313
HST Release	--	07/21:41	342/08:09 (342/02:08)	320/313
SEP-1	0.7	07/21:42	342/08:10	320/313
SEP-2	2.0	07/22:06	342/08:34	320/313
SEP-3	3.0	07/22:30	242/08:58	320/311
DEORBIT	507.5	10/20:46	345/07:14 (345/01:14)	--
LANDING	--	10/22:00	345/08:28 (345/02:28)	--

*HST Reboost desired if prop is available

FLT PLN
NOTES

Landing opportunities are:

		<u>Landing Orbit</u>	<u>Site</u>	<u>Local Time</u>
		<u>No.</u>		
Nominal	Primary	165	KSC	03:28 EST
	1 Rev late	166	KSC	05:10 EST
	Weather Alt	166	EDW	02:01 PST
1 Day Late	Primary	180	KSC	03:31 EST
	Weather Alt	180	EDW	00:24 PST
2 Days Late	Primary	195	KSC	03:39 EST
	Weather Alt	195	EDW	00:30 PST

B. CREW

CDR – Richard Covey
 PLT – Kenneth Bowersox
 MS1/EV3 – Kathryn Thornton
 MS2 – Claude Nicollier
 MS3/EV1 – Jeffrey Hoffman
 MS4/EV2 – Story Musgrave
 MS5/EV4 – Thomas Akers

C. COMMUNICATIONS

TDRS Support: TDRS–E (40° W), TDRS–W (174° W)
 Backup TV Support: GDS(GDX), MIL(MLX), DFRC (90–minute lead time required)
 Contingency GSTDN: MIL(MLX), BDA(BDX), GDS(GDX), DKR, and DFR (2–hour lead time required)
 Emergency GSTDN: MAD(MAX) and CAN (2–hour lead time required)
 Contingency RTS: HST, GTS, VTS, IOS, CTS, NHS, TCS, and DGS (4–hour lead time required)
 Planned RTS Support: IOS and DGS will be scheduled preflight to support critical mission phases (i.e. EVA, RNDZ, HST REL)

D. TELEVISION/PHOTOGRAPHY

1. The CCTV systems provide one color, wide–angle camera and one camcorder 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. There will also be an RMS elbow, RMS end effector, flight support system (FSS), and a keel camera flown.
2. There are two video tape recorders available and 124 2–hour cassettes.
3. Five still cameras are available for in–cabin use: two 35mm (F4), one 16mm, and two 70mm.
4. Two still cameras are available for EVA use: one 35mm and one 70mm.

E. PAYLOADS

1. Hubble Space Telescope Servicing Mission (HST SM)

The HST SM objective is to retrieve, repair, and release the HST. Primary objectives are to replace the Solar Arrays (SA), Wide Field Planetary Camera (WFPC), P16 Fuse Plugs, Rate Sensing Units (RSU) 2 and 3, Electronic Control Unit (ECU) 3, Magnetic Sensing System (MSS) 1, and the Solar Array Drive Electronics (SADE). Also, the High Speed Photometer (HSP) will be switched out with the Corrective Optics Space Telescope Axial Replacement (COSTAR). Secondary objectives include the installation of the DF-224 Coprocessor, replacement of P15 Fuse Plugs, ECU 1, and MSS 2, and the repair of the Goddard High Resolution Spectrometer (GHRS).

The payload complement for this mission includes the FSS, the Orbital Replaceable Unit Carrier (ORUC), and the Solar Array Carrier (SAC). The FSS provides a maneuverable servicing platform for the HST and electrical power interfaces to the orbiter. ORUC will carry both the WFPC and the COSTAR in Scientific Instrument Protective Enclosures (SIPES). The MSSs are stowed on the aft end of the ORUC. The ORUC will also provide a Large Orbital Replaceable Unit (ORU) Protective Enclosure (LOPE) to transport an HST DF-224 Coprocessor and new DF-224 computer, and a Small ORU Protective Enclosure (SOPE) to transport three Rate Sensor Units (RSUs), two Electronic Control Units (ECUs) and the GHRS Repair Kit. The Contingency ORU Protective Enclosure (COPE) is carried on the SAC and will contain the SADE and spare fuse plugs.

F. SECONDARY PAYLOADS

1. IMAX Camera

The IMAX camera is a 65mm motion picture camera system which is located in the cabin of the orbiter. The system consists of the IMAX camera, lenses, rolls of film, two magazines with film, a cassette recorder, blank cassette tapes, window mounting bracket, photoflood light, power cables, and a black changing bag. Operation of the camera will be controlled by the crew. IMAX scenes include HST retrieval, HST maintenance, HST release, and Earth views.

2. IMAX Cargo Bay Camera (ICBC)

The ICBC is a 65mm color motion picture camera system consisting of a camera, a 30mm lens, and a film magazine containing approximately 3520 feet of film for 10.5 minutes of filming. The camera is housed in an insulated, pressurized enclosure with a movable lens window cover. This container is mounted in Bay 13 on the port side of the aft payload bay on a SPA Gas Beam. The payload is controlled from the aft flight deck with the Autonomous Payload Controller (APC). Scene opportunities shall be provided to the crew both in preflight and real-time, and shall include HST retrieval, HST maintenance, HST release, and Earth viewing.

3. Air Force Maui Optical Site (AMOS)

AMOS uses the orbiter during cooperative overflights of Maui and Arecibo to obtain imagery and/or signature data to support the calibration of the ground-based sensors and to observe plume phenomenology. No unique onboard hardware is associated with the AMOS test. AMOS is manifested on STS-61 as a target of opportunity. Cooperative overflights requiring crew and orbiter participation may be scheduled real time if resources become available. Any necessary crew procedures will be uplinked real time.

G. ON-ORBIT DTOs

1. Electronic Still Photography Test (with downlink) (DTO 648)

Electronic still photography is a new technology which provides the means for a handheld camera to electronically capture and digitize an image with resolution approaching film quality. The digital image is stored on disks and can be converted to a format suitable for downlink transmission or enhanced using image processing software. The ability to enhance and/or downlink high-resolution images in realtime will greatly improve capabilities in Earth observations. The objective of this DTO is to determine camera response to the photographic conditions encountered on orbit using a variety of lenses and camera settings. The Electronic Still Camera (ESC) was specifically manifested on STS-61 to support HST photography documentation requirements.

2. PGSC Single Event Upset Monitoring (DTO 656)

The objective of this DTO is to determine PGSC RAM susceptibility to single event upset (SEU) caused by cosmic radiation. This data could lead to procedure changes and software or hardware changes that would reduce the affects of cosmic radiation on PGSC operations. This DTO will run continuously once initiated on the PGSC, and will be interrupted only if the crew needs to use the PGSC or for PADM operations.

3. Portable Inflight Landing Operations Trainer (PILOT) (DTO 667)

This DTO consists of a laptop PC with landing software and a spare rotational hand controller (RHC) (essentially a landing simulator). The DTO will attempt to verify that the simulator will assist the CDR and PLT in maintaining a high level of proficiency for approach and landing on EDO missions. The CDR and PLT will participate in this DTO on the day before entry only.

4. Laser Range and Range Rate Device (DTO 700-2)

The purpose of this DTO is to demonstrate the capability to provide the orbiter flight crew with range and range rate data for rendezvous and proximity operations using a handheld device. This DTO will assess the usefulness of the data to assist the pilot in achieving the desired trajectory conditions. The equipment will be checked out on FD3 when the crew transitions to the RNDZ C/L.

5. GPS Development Flight Test (DTO 700-8)

This DTO will demonstrate the performance and operation of the Global Positioning System (GPS) during orbiter ascent, on-orbit, entry, and landing phases. The GPS will estimate the position, velocity, measurement discreets and attitude data during ascent and entry phases.

6. Waste and Supply Water Dumps at 10.2 PSIA (DTO 1211)

The purpose of this test is to determine if the orbiter waste and supply water dumps can be successfully accomplished at 10.2 psia. This DTO will help validate the Space Station Freedom (SSF) overboard water dump nozzle, similar in design to the orbiter water dump nozzle. The SSF dump nozzle is designed to operate at an ambient SSF pressure of 10.2 psia. The DTO requires use of the RMS to view the serial waste and supply water dumps. DTO 1211 is a low priority flight objective that will not be performed until HST release is accomplished.

H. ON-ORBIT DSOs

1. Window Impact Observation (DSO 326)

The objective of this DSO is to link window damages found during turnaround processing to a mission time, attitude, and altitude. This data will aid significantly in the analysis of shuttle window impacts in the effort to identify the sources of these damages. DSO 326 is a target of opportunity. It is called out as an EZ activity on FD1 and FD11. The crew will make other observations if time is available.

2. Inflight Radiation Dose-Distribution (TEPC) (DSO 469)

The purpose of this DSO is to establish, evaluate, and verify analytical and measurement methods for assessing and managing health risks from exposure to space radiation. This DSO will measure the radiation environment inside the shuttle at a thinly shielded region: dosimetry #2 location (DLOC #2) on the right middeck wall (MR85B).

3. Back Pain Pattern in Microgravity (DSO 483)

This study will collect information about the back pain pattern and height changes experienced by astronauts during flight. All crewmembers are participating in this DSO which requires each crewmember to record height measurements and log back pain symptoms daily. This DSO will not be performed on EVA days.

4. Inter-MARS Tissue Equivalent Proportional Counter (ITEPC) (DSO 485)

This experiment is located in the payload bay and consists of a spectrometer, radiation detector, data storage board, computer clock, multi-channel analyzer, discriminators, amplifiers, and power supply. The purposes of the experiment are to demonstrate the ability of the hardware to withstand the radiation environment and to gather data on the radiation environment for future EVAs and single event upset data. There are no on-orbit crew activities associated with this DSO.

5. Immunological Assessment of Crewmembers (DSO 487)

As Shuttle missions durations increase, the potential development of infectious illness in crewmembers during flight also increases. This study will improve the understanding of the potential impacts of space flight induced immunological alterations on crewmember health and performance. There are no on-orbit crew activities associated with this DSO.

6. EVA Dosimetry Evaluation (DSO 489)

The current location of the Crew Passive Dosimeter (CPD) in the EMU may be shielded by the upper torso portion of the Liquid Cooled Garment and not give accurate exposure measurements. For this investigation, dosimeters will be placed in other areas of the body to determine the reliability of the CPD measurements. The placement of these dosimeters will be referenced from the EVA prep procedure in the EVA checklist.

7. Visual-Vestibular Integration as a Function of Adaptation (OI-3) (DSO 604)

The objective of this DSO is to investigate visual-vestibular and perceptual adaptive responses as a function of longer missions and to determine the operational impact on performance of entry, landing, and egress procedures.

The crew will perform investigation OI-3. There are no on-orbit crew activities associated with this DSO.

8. CV Responses to Submaximal Exercise (DSO 624)

For this DSO the crew will wear a heart watch during exercise to help evaluate the changes in aerobic capacity pre-, in-, and postflight. Crewmembers participating in this DSO will maintain an exercise log.

9. CV Responses to Standing Postflight (DSO 626)

The objective of this DSO is to characterize the integrated responses of arterial pressure control systems to standing before and after space flight. There are no on-orbit crew activities associated with this DSO.

10. Documentary Television (DSO 901)

The purpose of DSO 901 is to provide live television or VTR dumps of crew activities, orbiter operations, payload deployment/retrieval and operations, Earth views, rendezvous and proximity operations. Telecasts are planned for communication periods with 7 or more minutes of uninterrupted viewing time. The broadcast is accomplished using operational air-to-ground and/or operational intercom audio. VTR recording may be used when live television is not possible.

11. Documentary Motion Picture Photography (DSO 902)

The purpose of DSO 902 is to provide documentary and public affair motion picture photography of the orbiter's basic capabilities and key objectives. Documentation shall include launch, crew activities, payload development, landing, and unscheduled activities of special interest.

12. Documentary Still Photography (DSO 903)

The purpose of DSO 903 is to provide still photography of crew activities, orbiter operations, payload deployment/retrieval and operations, Earth views, and unscheduled items of interest.

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FLIGHT DATA FILE
Distribution
61 FLT PLN FSP FIN

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MD/BRINKLEY, R. (4)
MER-30/LIBRARY (10)
NS2/CHIEF
NS4/LIBRARY (2)
SD/WATSON, T.L. (5)
SD2/WEDGEWORTH, B.L.
SD26/PANDER, L. (2)

SD26/WARD, D.F.
SD5/CHARLES, J.B.
SN15/ERSAF
SN15/PITTS, D.
SN3/HARDY, A.C.
SP33/JOHNSON, M.L.
SP4/RAUCH, J.
SP4/YEATES, H.D.
SP44/KLOERIS, V.
TA/MANAGER
TB/CUSTOMER SUPT SPEC (4)
TC3/CONWELL, J.J.
TC3/KAMEN, S.A.
TC3/LEWIS, M.P.
TJ2/BLACKMER, S.H.
TJ4/HOLLMAN, M.P.
TM2/MANAGER (3)
TM3/HOOVER, R.
VF32/GERLACH, D.A.
VG/MANAGER
VP/FLT SUPPORT EQUIP (3)
VP12/FITTS, D.J. (3)
VP5/GOODMAN, J.R. (2)
WE4/LIBRARY
ZR1/HOLS, T.
ZR1/USAF TECHNICAL LIBRARY
ZS8/ASSGND LEAD FORECASTER

** JSC OFFSITE **

ALLIED SIGNAL-HOUSTON
B33B-555/OSD DOCUMENT CNTL (5)

CAE LINK-HOUSTON
TSC/LIBRARY

LOCKHEED-HOUSTON
C42/HUGHES, C.L.
C70/KEENER, J.F.
C87/WEISSINGER, W.D.
CO3/WRIGHT, M.G.

MARTIN MARIETTA-HOUSTON
GEGS BLDG/MIC LIBRARY (5)

MCDONNELL DOUGLAS-HST TWR 1
16055 SPACE CENTER BLVD
HOUSTON, TX 77062
B1/BROUSSARD, A.
TA2CK/CARMODY, R.

MCDONNELL DOUGLAS-HST TWR 2
13100 SPACE CENTER BLVD
HOUSTON, TX 77059
MDA-2-2261/MOLGAARD, D. (21)

RSOC-HOUSTON
R12A/SMITH, W.E.
R12B-16/SAIL/GN&C
R16C/BERTRAND, B. (2)
R16C/ORB DSGN LIBRARY
R16C/SAWIN, D.L.
R16E/COOPER, D.
R16E/KOCEN, M.H.
R16E/NAVIGATION LIBRARY
R16E/TRAJ OPS SUPPORT (3)
R16H/FRENCH, J.
R20B/SYSTEMS LIBRARY
R21M/WARD, P.A.
ZC20/MEREDITH, M.

UNISYS GOV'T SYSTEMS GROUP-HST
B32F/BLD9/GARDNER, J.A.
U03D/HOPE, A.J.
U03D/IV&T MANAGER

IBM-HOUSTON
6402A/SILVA, E. (3)

BOEING AEROSPACE-HOUSTON
P O BOX 58747
HOUSTON, TX 77058
HF-10/TRAVLOS, J.A.
HF-10/WIBLE, L.

CALSPAN/JOHNSON OPERATIONS
P O BOX 580668
HOUSTON, TX 77258-0668
F6E6S/MARTINEZ, M.A.
