

FLIGHT DATA FILE

Flight Plan

STS-53

(FRR Cycle Trajectory)

**Mission Operations Directorate
Operations Division**

**Final
September 18, 1992**

<u>EVENT</u>	<u>CST</u>		
Launch	06:15	Thur	Nov 5
DOD-1 Deploy	12:24	Thur	Nov 5
ODERACS Deploy	04:13	Sat	Nov 7
EDW Landing	14:53	Wed	Nov 11



National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas

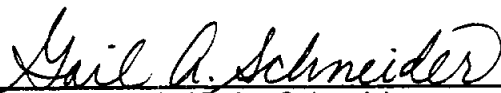


MISSION OPERATIONS DIRECTORATE

STS-53 FLIGHT PLAN


FINAL
September 18, 1992

PREPARED BY:

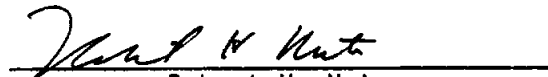


Gail A. Schneider
Book Manager

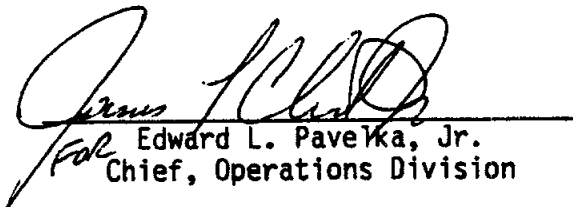
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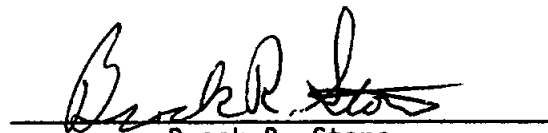
Marvin L. LeBlanc
Head, Flight Planning and
Pointing Section



Robert H. Nute
Chief, Flight Activity Branch



Ed. Edward L. Pavuka, Jr.
Chief, Operations Division



Brock R. Stone
Assistant Director for
Space Shuttle Program

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STS-53 FLIGHT PLAN

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FINAL 09/18/92

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iii.....*	53/FIN	3-34.....	53/FIN
iv.....*	53/FIN	3-35.....	53/FIN
v.....*	53/FIN	3-36.....	53/FIN
vi.....*	53/FIN	3-37.....	53/FIN
vii.....	53/FIN	3-38.....	53/FIN
viii.....	53/FIN	4-1.....	53/FIN
ix.....	53/FIN	4-2.....	53/FIN
x.....	53/FIN	4-3.....	53/FIN
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3-31.....	53/FIN		

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STS-53 FLT PLN CUE CARDS

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(Blank) (Back of DAP A, DAP B TOC).....	6-5	FLT PLN-1b/53/0/A
DAP A.....	6-6	FLT PLN-2a/53/0/A
DAP A1.....	6-6	FLT PLN-2b/53/0/A
A1.....	6-6	FLT PLN-3a/53/0/A
DAP A2.....	6-7	FLT PLN-3b/53/0/A
A2.....	6-7	FLT PLN-4a/53/0/A
DAP A3.....	6-7	FLT PLN-4b/53/0/A
A3.....	6-7	FLT PLN-5a/53/0/A
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A5.....	6-8	FLT PLN-7a/53/0/A
DAP A6.....	6-9	FLT PLN-7b/53/0/A
A6.....	6-9	FLT PLN-8a/53/0/A
DAP A7.....	6-9	FLT PLN-8b/53/0/A
A7.....	6-9	FLT PLN-9a/53/0/A
DAP A8.....	6-10	FLT PLN-9b/53/0/A
A8.....	6-10	FLT PLN-10a/53/0/A
DAP A9.....	6-10	FLT PLN-10b/53/0/A
A9.....	6-10	FLT PLN-11a/53/0/A
DAP A10.....	6-11	FLT PLN-11b/53/0/B
A10.....	6-11	FLT PLN-12a/53/0/B
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DAP B.....	6-11	FLT PLN-13a/53/0/A
DAP B1.....	6-12	FLT PLN-13b/53/0/A
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DAP B2.....	6-12	FLT PLN-14b/53/0/A
B2.....	6-12	FLT PLN-15a/53/0/A
DAP B3.....	6-13	FLT PLN-15b/53/0/A
B3.....	6-13	FLT PLN-16a/53/0/A
DAP B4.....	6-13	FLT PLN-16b/53/0/A
B4.....	6-13	FLT PLN-17a/53/0/A
DAP B5.....	6-14	FLT PLN-17b/53/0/A
B5.....	6-14	FLT PLN-18a/53/0/A
DAP B6.....	6-14	FLT PLN-18b/53/0/B
B6.....	6-14	FLT PLN-19a/53/0/B
DAP B7.....	6-15	FLT PLN-19b/53/0/A
B7.....	6-15	FLT PLN-20a/53/0/A
DAP B8.....	6-15	FLT PLN-20b/53/0/A
B8.....	6-15	FLT PLN-21a/53/0/A
DAP B9.....	6-16	FLT PLN-21b/53/0/B
B9.....	6-16	FLT PLN-22a/53/0/B
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DAP ALT1.....	6-17	FLT PLN-23b/53/0/A
ALT1.....	6-17	FLT PLN-24a/53/0/A
DAP ALT2.....	6-17	FLT PLN-24b/53/0/B
ALT2.....	6-17	FLT PLN-25a/53/0/B
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INTRODUCTION

The STS-53 Flight Plan is the Flight Data File article that contains the on-orbit timeline. It does not contain the detailed timelines that are covered in the Ascent, Post Insertion, Deorbit Prep, and Entry Checklists. The deploy procedures required during the deploy timeframes are in the STS-53 Special Deploy Checklist. For continuity, the entire flight is shown in the summary level timeline.

This on-orbit timeline satisfies the objectives specified in the Flight Definition and Requirements Directive and the requirements of the STS-53 Flight Requirements Document. The Flight Plan, as part of the Flight Data File, meets the specifications of the Flight Cycle version of the STS-53 Flight Initialization Data Pack.

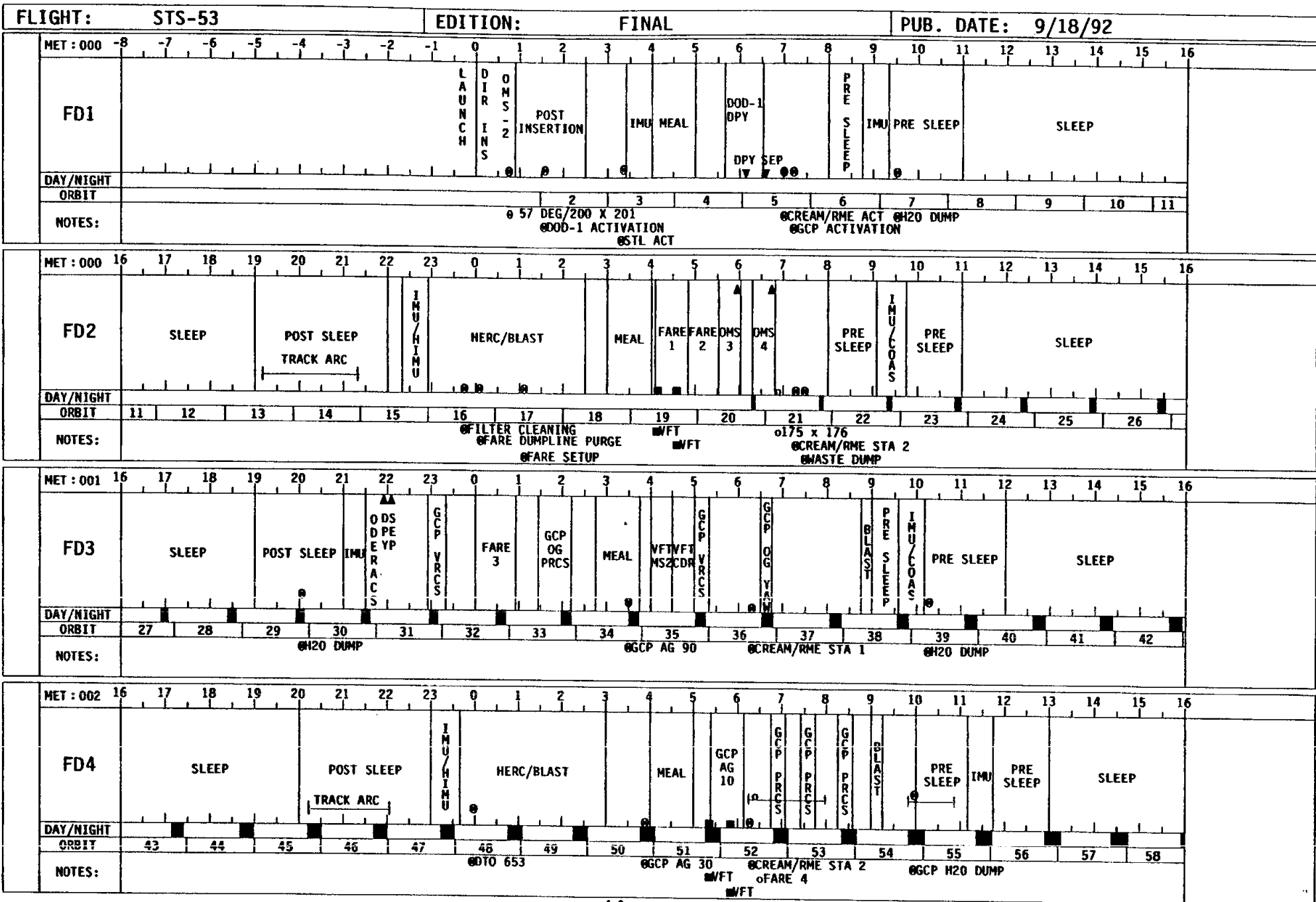
The flight profile used for this Flight Plan is for a launch date of November 5, 1992, at 6:15 CST. Orbiter inertial attitudes are expressed relative to a Mean of 1950 (M50) reference frame.

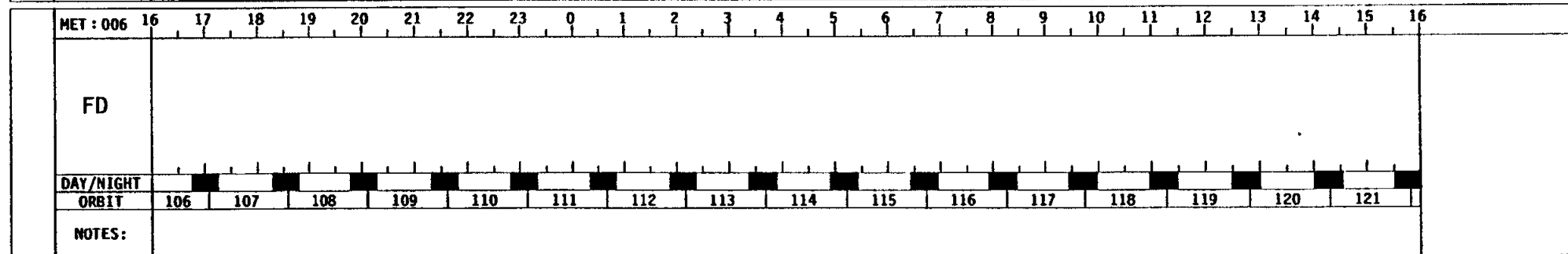
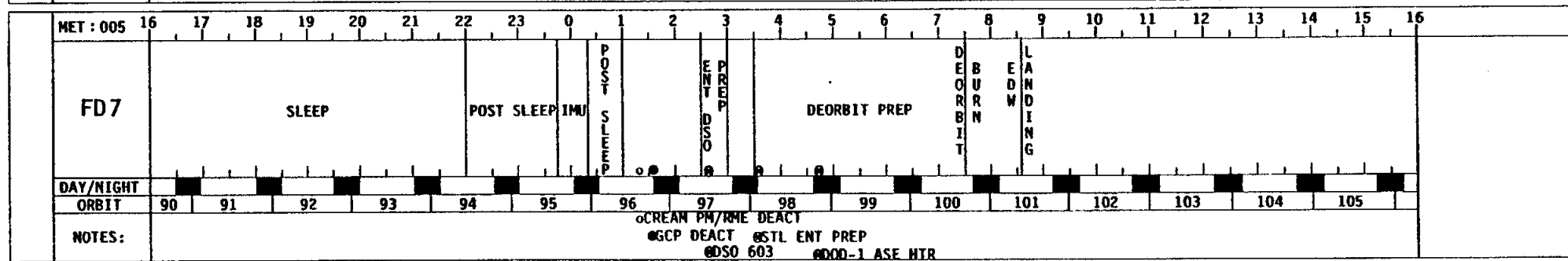
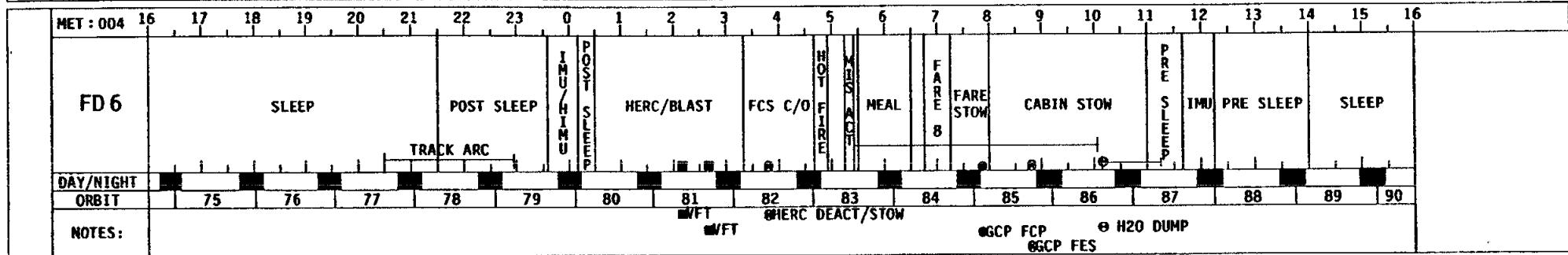
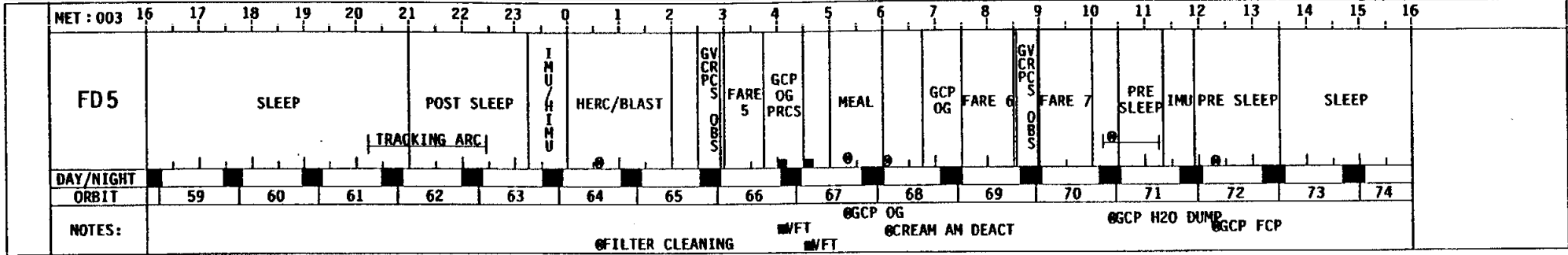
JSC-22359, Crew Scheduling Constraints (Appendix K, CPMP), Basic, Rev B, January 1992, has been used to build the timelines contained in this Flight Plan.

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-53 OVERVIEW

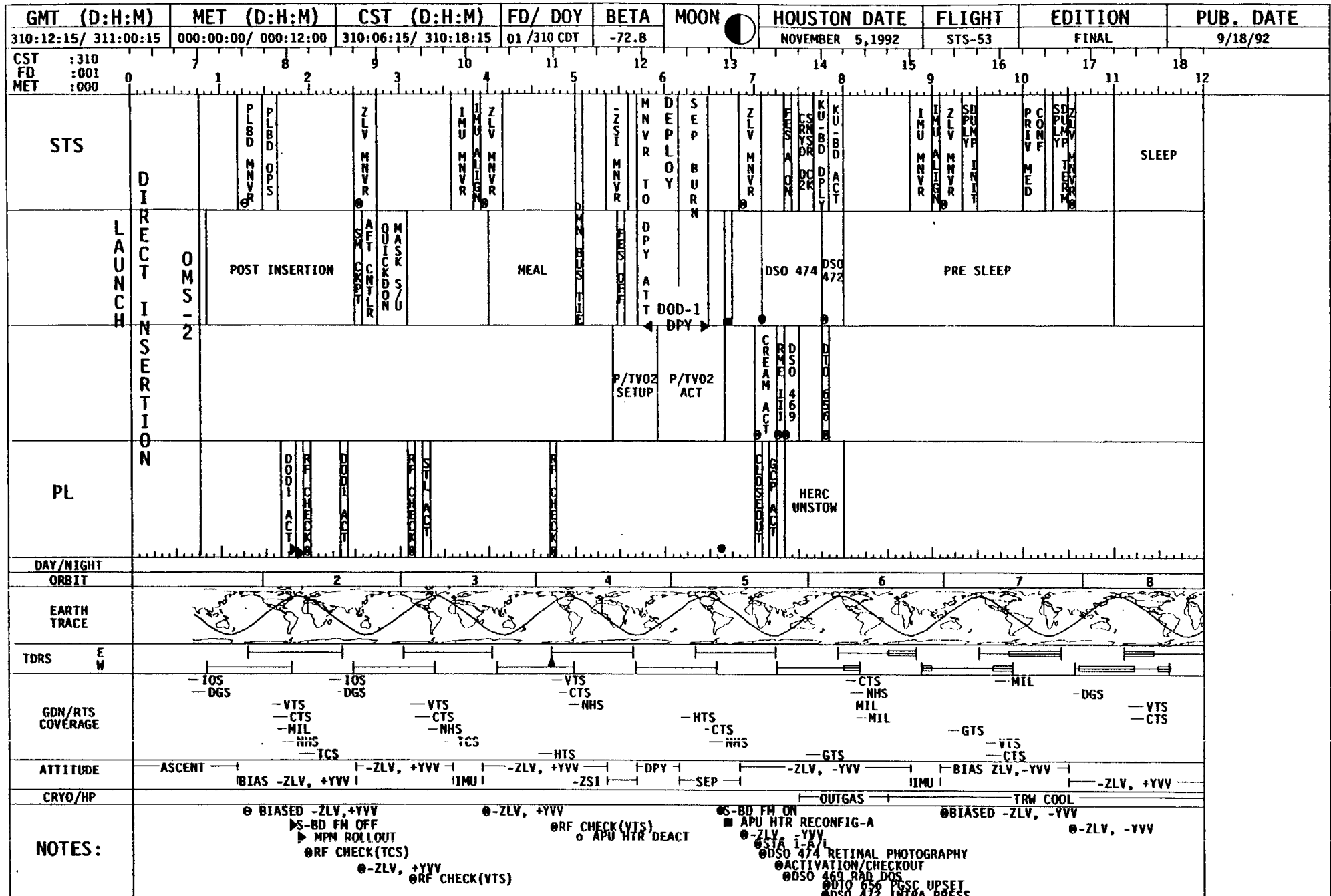




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SUMMARY TIMELINE

SUMMARY TIMELINE

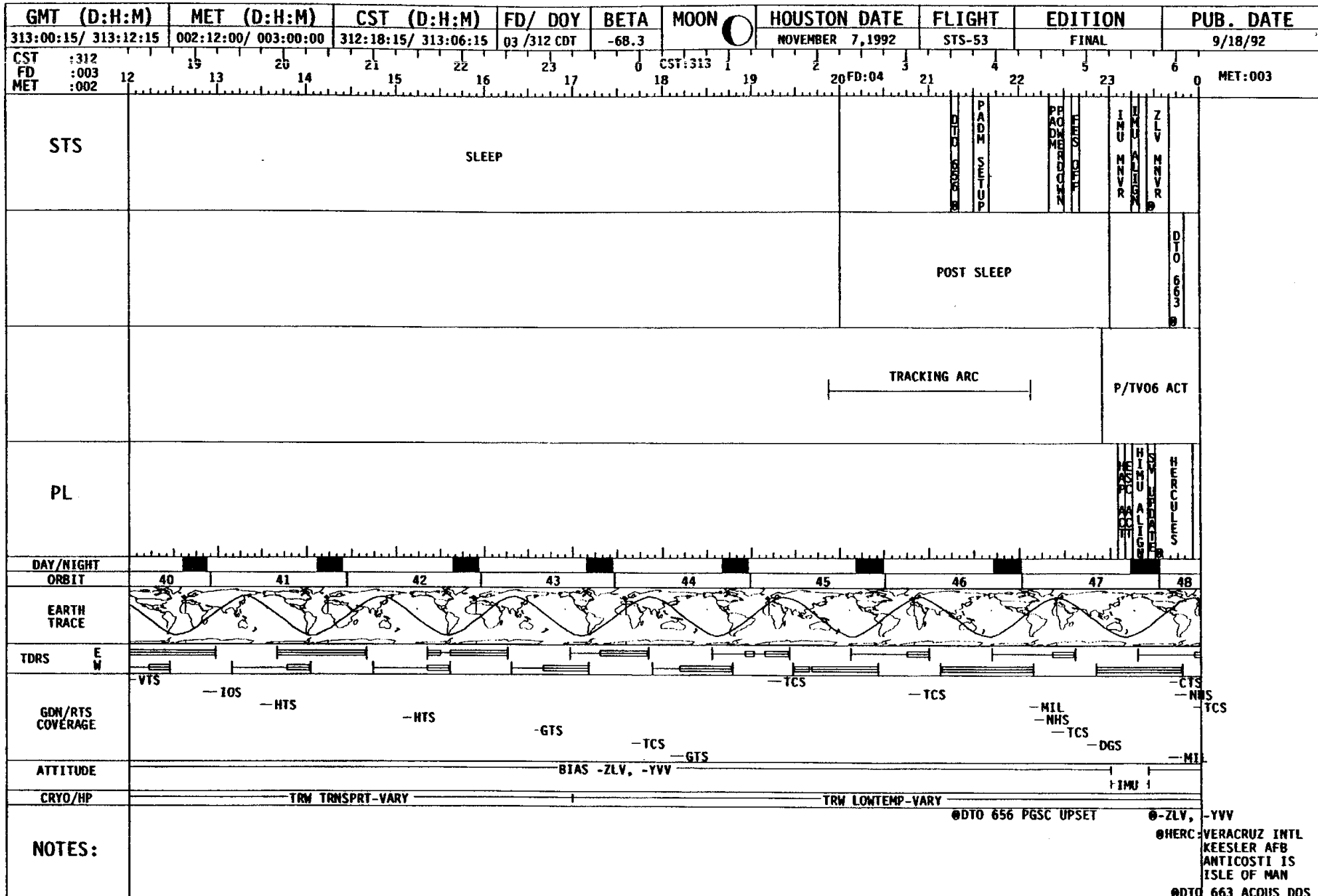


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311:00:15/ 311:12:15	000:12:00/ 001:00:00	310:18:15/ 311:06:15	01 /310 CDT	-72.5		NOVEMBER 5, 1992	STS-53	FINAL	9/18/92					
CST :310 FD :001 MET :000	12	13	14	15	16	17	18	19	20	21	22	23	0	MET:001
STS	SLEEP										FILE FILING			
	POST SLEEP										FILE FILING			
	TRACKING ARC										DSC 604			
PL											FILE FILING			
DAY/NIGHT														
ORBIT														
EARTH TRACE														
TDRS														
GDN/RTS COVERAGE	DGS -IOS -VTS -IOS -HTS -HTS -GTS -ZLV, +YVV -GTS -TCS -TCS -TCS -MIL -NHS -TCS													
ATTITUDE	-ZLV, +YVV													
CRYO/HP	TRW START TRW TRANSPRT-80K HUGHES COOL HUS STARTUP HUS TRANSPRT-115K													
NOTES:	@DTO 656 PGSC UPSET @DTO 663 ACOUS DOS @ZLV: -YVV @HERC: BALTRA IS KINGSTON NAS BERMUDA @HERC: BORNHOLM IS @DSO 604 VIS-VEST													

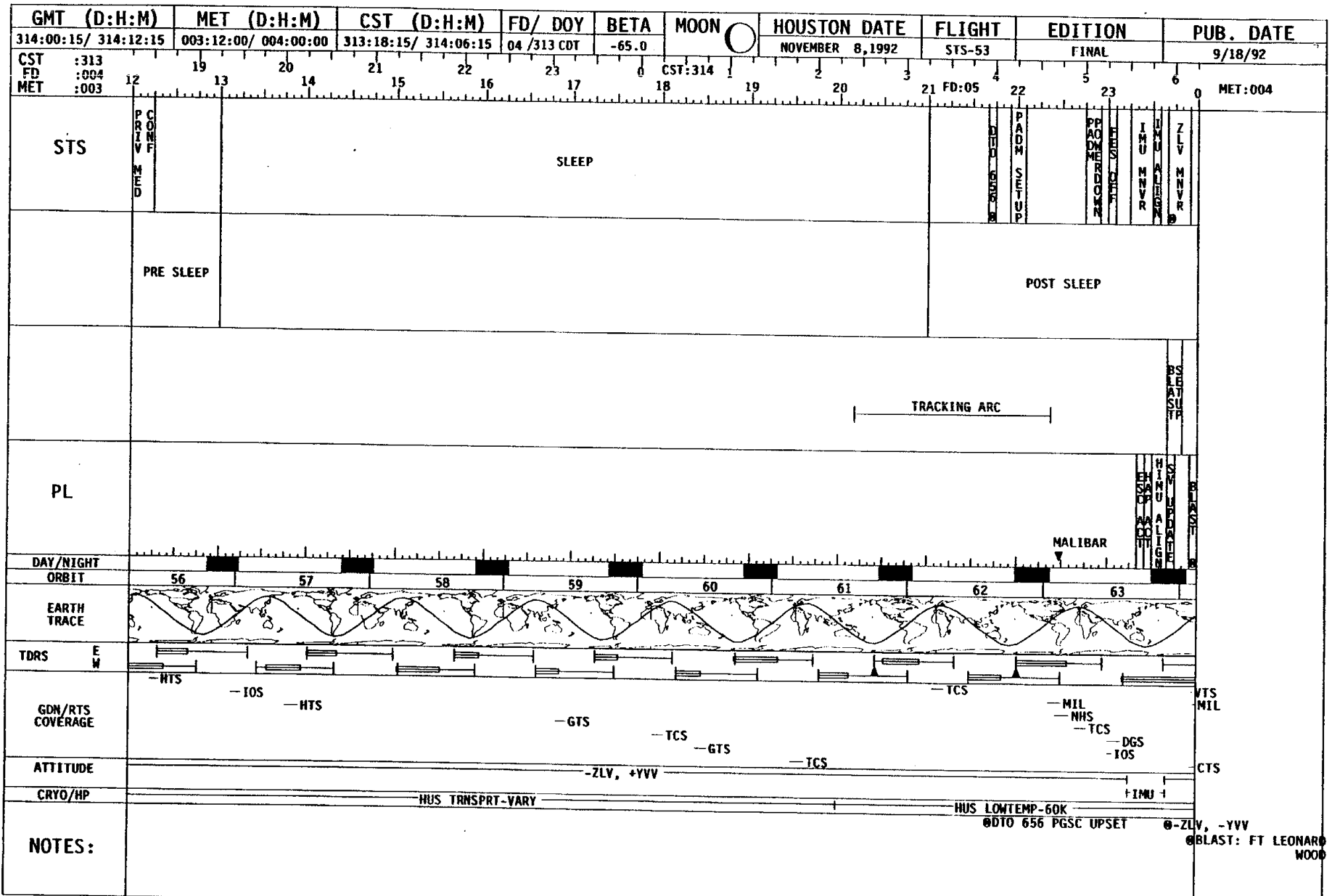
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311:12:15/ 312:00:15	001:00:00/ 001:12:00	311:06:15/ 311:18:15	02/311 CDT	-71.9		NOVEMBER 6, 1992	STS-53	FINAL	9/18/92						
CST :311 FD :002 MET :001															
STS	FILE LANDING					TIG 5:56 OMS 3	TIG 6:43 OMS 4	ZLV MNRV	WASTE INIT	WALSH TERN	IMU/COAS	MNRV	ZLV MNRV	CONV PRIV MED	SLEEP
	P/TVO5	EXERCISE	EXERCISE			MEAL	P/TVO5 ACT	P/TVO5 ACT	EXERCISE	DSO 474	DSO 472	PRE SLEEP			
	DUMPLINE		FARE SETUP			FARE 1	FARE 2		EXERCISE	DTO 656					
PL							VFT CDR	VFT MS2							
DAY/NIGHT															
ORBIT	16	17	18	19	20	21	22	23	24						
EARTH TRACE															
TDRS	E														
GDN/RTS COVERAGE		-CTS -MIL -MIL -NHS -TCS		-VTS -CTS -NHS -TCS		-CTS -NHS -TCS		-HTS -VTS -CTS -NHS		-GTS -CTS -NHS -MIL			-GTS -CTS -MIL		-DGS -VTS
ATTITUDE			-ZLV, -YVV								-ZLV, +YVV				-ZLV, +YVV
CRYO/HP			HUS TRANSP-80K				HUS LOWTEMP-60K				IMU/COAS				TRW COOL
NOTES:	@WASTE WATER @BLAST: FT. HUACHUCA @HERC:TAMPICO INTL FT. CARSON @HERC:ANTICOSTI IS @HERC:ISLE OF MAN IMROZ ADAST @HERC:SHAKESPEARE IS MISTASIN LAKE @-ZLV, +YVV @DSO 474 RET PHOTO @STATION 2-MDDK WALL @DTO 656 PGSC UPSET @DSO 472 INTRA PRES @DTO 663 ACOS DOS @AFT STATION @-ZLV, +YVV														

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE							
312:00:15/ 312:12:15	001:12:00/ 002:00:00	311:18:15/ 312:06:15	02 /311 CDT	-70.9		NOVEMBER 6, 1992	STS-53	FINAL	9/18/92							
CST :311	19	20	21	22	23	0	CST:312	1	19	FD:03	20	21	22	23	6	MET:002
FD :002	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
MET :001																
STS	SLEEP															
	POST SLEEP															
	P/TV03 ACT															
	P/TV05 SETUP															
	PURGE															
	GCP VRCS															
	GCP VRCS OBS															
PL																
DAY/NIGHT																
ORBIT																
EARTH TRACE																
TDRS																
GDN/RTS COVERAGE	-IOS -DGS -HTS -IOS -HTS -GTS -TCS -MIL -TCS -MIL -NHS -TCS															
ATTITUDE	-ZLV, +YVV -TCS -TCS DEPLOY IMU +ZLV, ROT															
CRYO/HP	TRW TRANSPRT-80K TRW LOWTEMP-60K HUGHES COOL/START HUS TRANSPRT-VARY															
NOTES:	@DT0 656 PGSC UPSET @DT0 663 ACOUS DOS @WASTE WATER @+ZLV, +YVV @CABIN TEMP @CNTL RECONFIG @MEM MOD															

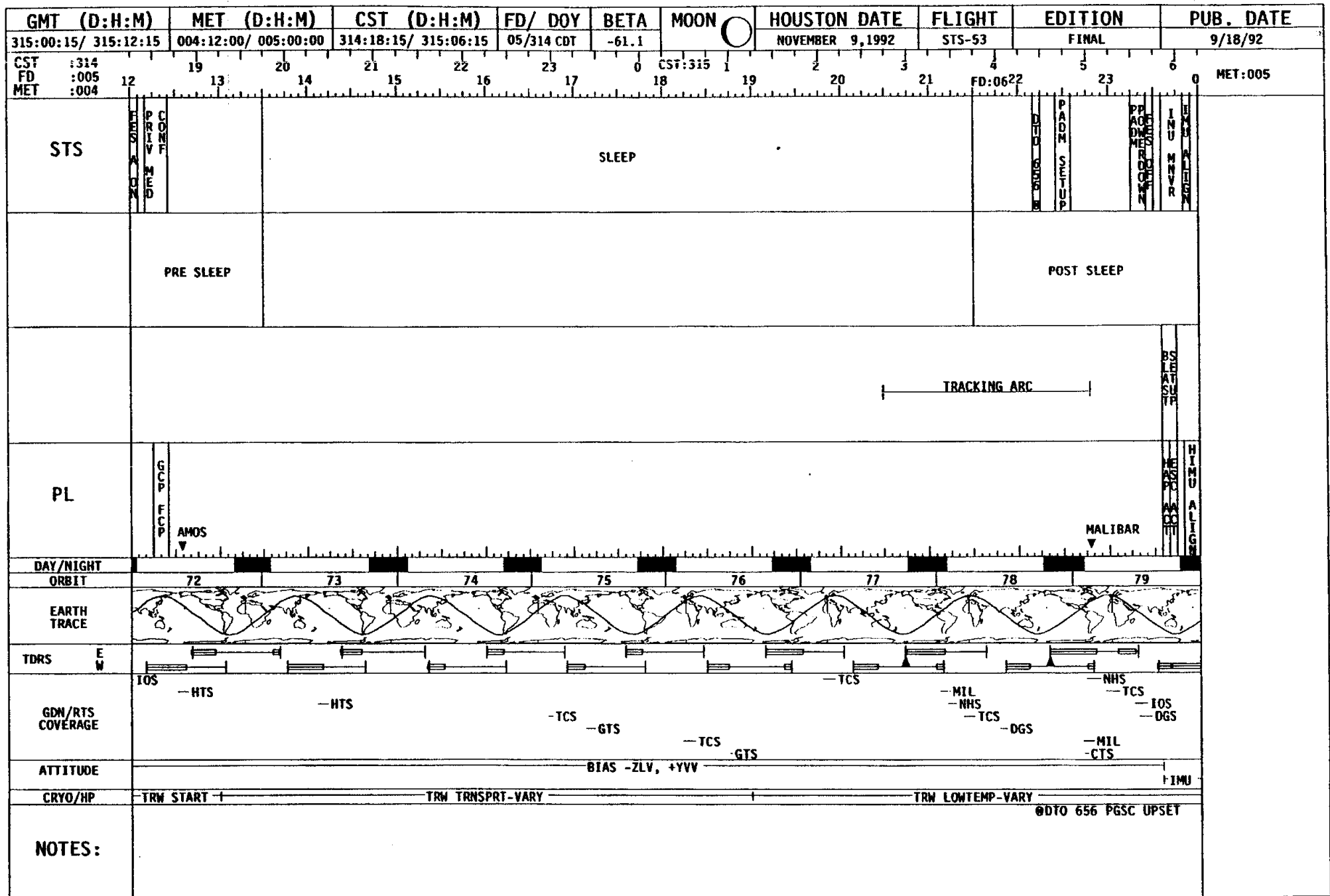
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CST :312 FD :003 MET :002																								
STS	+ZLV MNVVR	GCP OG YAW		+ZLV MNVVR	GCP OG PRCS	A G MNVVR	F L T S E T U P	Z L V MNVVR	F O R W A R D M O N	+ZLV MNVVR	GCP VRCS	+ZLV MNVVR	GCP OG YAW	Z L V MNVVR	H O U S T O N F I G U R E	I M U MNVVR	C O A S MNVVR	Z L V MNVVR	S D P U M P	P R I V M E E D	C O M I M E E D	S D P U M P		
	P/TV05 ACT	EXERCISE	E C L I P S E	E X E R C I S E	P/TV04 SETUP	MEAL	P/TV04 ACT	EXERCISE	P/TV04 ACT	EXERCISE	EXERCISE	EXERCISE	P/TV06 SETUP	EXERCISE	EXERCISE	EXERCISE	PRE SLEEP	PRE SLEEP	PRE SLEEP	PRE SLEEP	PRE SLEEP	PRE SLEEP	PRE SLEEP	PRE SLEEP
	FARE 3		EXERCISE		VFT MS2	VFT CDR																		
PL	GCP OG YAW OBS	GCP OG (PRCS) OBS	B S L A T S U T R	GCP AG 90		GCP VRCS OBS		GCP OG YAW OBS															CHINA LAKE EDWARDS FT. HUACHUCA	
DAY/NIGHT ORBIT	32	33		34		35		36		37		38		39		40								
EARTH TRACE																								
TDRS	E	W																						
GDN/RTS COVERAGE	-IOS -DGS	-VTS -CTS -MIL -NHS -TCS	-IOS	-VTS -CTS -NHS -TCS	-CTS -NHS	-HTS -NHS	-HTS -NHS	-GTS -CTS -NHS	-GTS -CTS -NHS	-MIL	-GTS -CTS -NHS	-GTS -CTS -NHS	-GTS -CTS -NHS	-GTS -CTS -NHS	-GTS -CTS -NHS	-GTS -CTS -NHS	-GTS -CTS -NHS	-GTS -CTS -NHS	-GTS -CTS -NHS	-GTS -CTS -NHS	-GTS -CTS -NHS	-GTS -CTS -NHS	-GTS -CTS -NHS	
ATTITUDE	+ZLV, ROT	+ZLV, +YVV	BIAS +XLV, -YVV	+ZLV, +YVV	BIAS +XLV, -YVV	+ZLV, +YVV	BIAS +XLV, -YVV	+ZLV, +YVV	BIAS +XLV, -YVV	+ZLV, +YVV	BIAS +XLV, -YVV	+ZLV, +YVV	BIAS +XLV, -YVV	+ZLV, +YVV	BIAS +XLV, -YVV	+ZLV, +YVV	BIAS +XLV, -YVV	+ZLV, +YVV	BIAS +XLV, -YVV	+ZLV, +YVV	BIAS +XLV, -YVV	+ZLV, +YVV	BIAS +XLV, -YVV	
CRYO/HP	HUS TRANSPORT-VARY																							
NOTES:	HUS LOWTEMP-65K @+ZLV, +XVV @+ZLV, +YVV @LOAD FUTURE START MNVR @-ZLV, -YVV @BLAST: AMOS @+ZLV, +YVV @STATION 1-A/L CEILING @-ZLV, -YVV @DTO 656 PGSC UPSET @DTO 663 ACQU DGS @DTO 663 ACQU DGS (BATTS) @BLAST: MALIBAR @FWD STATION @BIAS -ZLV, -YVV																							



GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE									
313:12:15/ 314:00:15	003:00:00/ 003:12:00	313:06:15/ 313:18:15	04/313 CDT	-66.7		NOVEMBER 8, 1992	STS-53	FINAL	9/18/92									
CST :313 FD :004 MET :003	0	1	2	3	4	5	6	7	8	9	10	11	12					
STS	DTO 653	EXERCISE	DTO 653	EXERCISE	EXERCISE	AG MNR	AG MNR	+ZLV MNR	GCP PRCS	GCP PRCS	GCP PRCS	ZLV MNR	ZLV MNR	SD PUMP	SD PUMP	I MU	I MU	ZLV MNR
	DTO 653 P/TV		DTO 653 P/TV	DTO 653 P/TV	P/TV05 SETUP	MEAL	VFT MS2	VFT COR	P/TV05 ACT	EXERCISE	EXERCISE		DTO 663					PRE SLEEP
									FARE 4									
PL						GCP AG 30	GCP AG 10	DEFLECTOR	GCP PRCS OBS	GCP PRCS OBS	GCP PRCS OBS	BS SET UP	BS SET UP	BS SET UP	BS SET UP			GCP H2O DUMP
DAY/NIGHT ORBIT	48	49	50	51	52	53	54	55	56									
EARTH TRACE																		
TDRS																		
GDN/RTS COVERAGE	-TCS -IOS -DGS -VTS -CTS -NHS -HTS -VTS -CTS -NHS -TCS -HTS -VTS -CTS -NHS -GTS -CTS -DGS -VTS -CTS -MIL -CTS -IOS -DGS																	
ATTITUDE	-ZLV, -YVV -HTS BIAS +ZLV, +YVV +ZLV, +YVV BIAS -ZLV, -YVV -ZLV, +YVV -VTS																	
CRYO/HP	TRW LOWTEMP-VARY HUGHES COOL/START IIMU I																	
NOTES:	@MKI ROW EVAL @HERC:DULUTH INT CHARLTON IS @BLAST:FT. HUACHUCA @HERC:MEDDOUZA @DTO 663 ACOUS DOS (SURVEY) WHITE SANDS @STATION 2-MDDK WALL @BIASED -ZLV, -YVV FT CARSON & LAZAP @+ZLV, +YVV @BLAST:FT. CARSON @HERC:CAP BON @HERC:MOD REPLACE @HERC:MOD REPLACE @HERC:ZANZIBAR IS @HERC:ZANZIBAR IS @HERC:TAURANGA @HERC:TAURANGA @BIASED -ZLV, +YVV @DTO 663 ACOUS DOS @DTO 656 PGSC UPSET																	

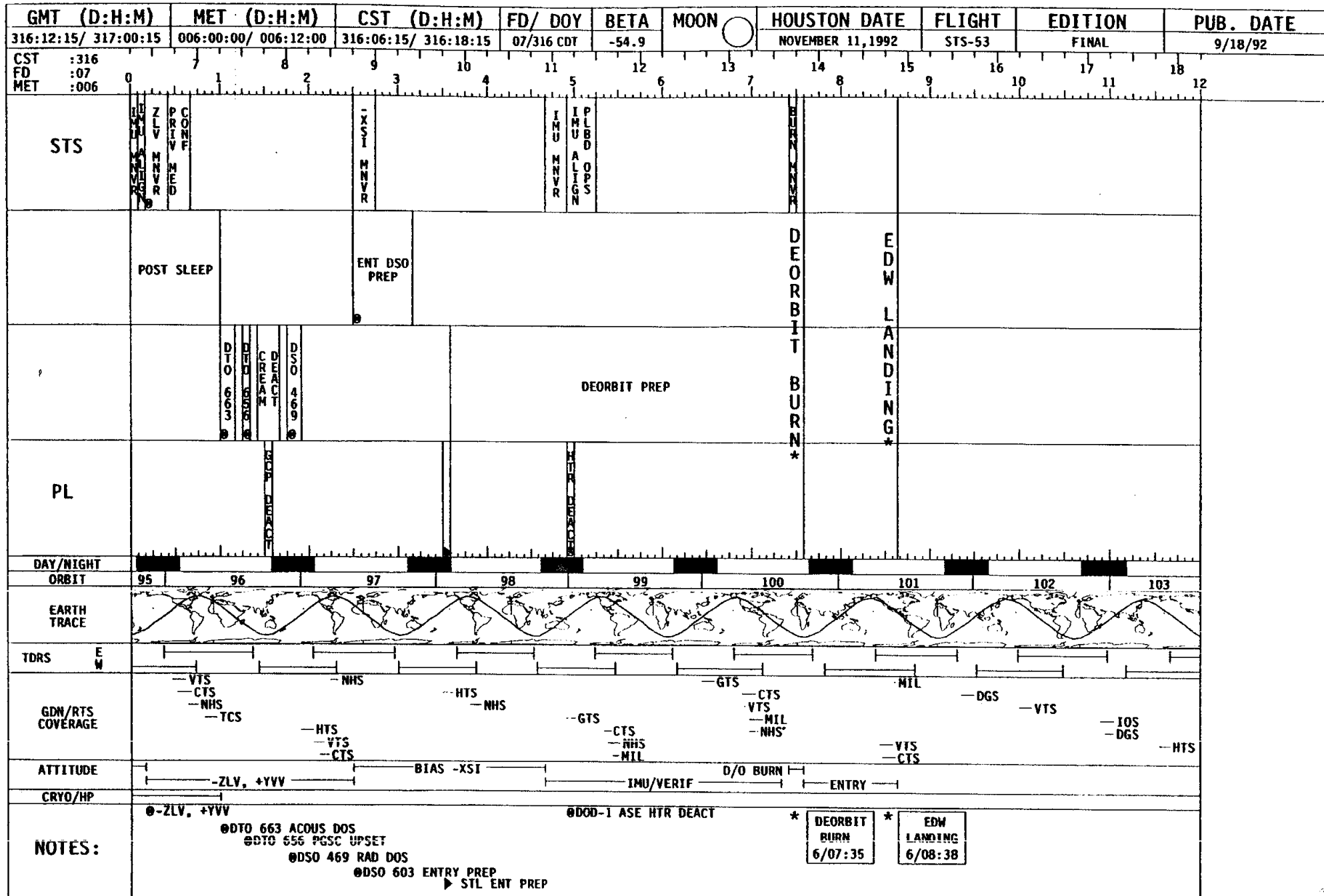


GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE											
314:12:15/ 315:00:15	004:00:00/ 004:12:00	314:06:15/ 314:18:15	05 /314 CDT	-63.1		NOVEMBER 9, 1992	STS-53	FINAL	9/18/92											
CST :314 FD :05 MET :004	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
STS		FILTER CLEANING																		
PL																				
DAY/NIGHT																				
ORBIT																				
EARTH TRACE																				
TDRS																				
GDN/RTS COVERAGE																				
ATTITUDE																				
CRYO/HP																				
NOTES:	@DT0 663 AC0US D0S @BLAST:FT. LEONARD WOOD @HERC:CAPE HURD @HERC:WINNIPEG INTL GOOSE APT ISLE OF WIGHT @HERC:DJIBOUTI @BLAST:EDWARDS: CHINA LAKE @+ZLV, +YVV @+ZLV, +YVV HUS LOWTEMP-60K HUS TRNSPRT-VARY @+ZLV, +YVV @BIASED -ZLV, +YVV @DT0 663 AC0US D0S @DT0 656 PGSC UPSET @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												
315:12:15/ 316:00:15	005:00:00/ 005:12:00	315:06:15/ 315:18:15	06 /315 CDT	-59.1		NOVEMBER 10, 1992	STS-53	FINAL	9/18/92												
CST :315 FD :006 MET :005																					
STS	ZLV MNR		FCS C/O	RCS HOT	MNR & INIT GG	FREE DRIFT	ZLV MNR	FREE DRIFT	ZLV MNR	FC PURGE	RAD OUT	SD PULP	INIT	SD PULP	INIT	SD PULP	INIT	SD PULP	INIT		
	POST SLEEP	DTG 0603	PURGE	PURGE	EXERCISE	EXERCISE	EXERCISE	EXERCISE	EXERCISE	EXERCISE	MEAL	PZTV05 ACT	DSO 474	DSO 472	CABIN STOW				PRE SLEEP		
					VFT CDR	VFT MS2		DSO 604	PZTV04 SETUP	PZTV04 ACT			FARE 8	FARE STOW					DTG 0663		
PL																					
DAY/NIGHT																					
ORBIT		80		81		82		83		84		85		86		87					
EARTH TRACE																					
TDRS	E																				
GDN/RTS COVERAGE	-VTS -CTS -NHS -TCS -IOS		-NHS -TCS			-HTS -VTS -CTS -NHS				-GTS -CTS -NHS -MIL				-CTS -MIL				-DGS	-VTS -CTS		
ATTITUDE			-ZLV, -YVV			-CTS FGG				-ZLV, -YVV										-IOS -DGS	
CRYO/HP																					
NOTES:	TRW LOWTEMP-VARY @ZLV -YVV @HERC: BANKS PENINSULA @BLAST: FT. HUACHUCA @HERC: MAPUTO WHITE SANDS @BLAST: AMOS FT CARSON @HERC: REINDEER IS LAZAP MISTASIN LAKE @HERC: KEWEENAW PT @APU HTR ACT @HERC: ISOLA ASINALA @HERC: MOHAMMEDIA @DSO 604 VIS-VEST INT @APU HTR RECONFIG @MANUAL @ZLV -YVV @BLAST: MALIBAR @DSO 474 RET PHOTO @FC PURGE HTR ON @BIASED -ZLV, +YVV @DSO 472 INTRA PRESS @RAD OUT NORM W/FES @DTG 0656 PGSC UPSET @DTG 0663 ACOUS DOS @DTG 0663 ACOUS DOS (BATTS)																				

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE						
316:00:15 / 316:12:15	005:12:00 / 006:00:00	315:18:15 / 316:06:15	06 / 315 CDT	-57.0	☉	NOVEMBER 10, 1992	STS-53	FINAL	9/18/92						
CST :315	19	20	21	22	23	0	CST:316	1	2	3	4	5	6	0	MET:006
FD :06	12	13	14	15	16	17	18	19	20	21	22	FD:07	23		
MET :005															
STS	MNVR & INIT PTC	PCRS V M E D	SLEEP										TERM PTC	I MU MNVR	
	PRE SLEEP												POST SLEEP		
PL															
DAY/NIGHT	[Day/Night Cycle]														
ORBIT	88 89 90 91 92 93 94 95														
EARTH TRACE	[Earth Trace]														
TDRS	E M														
GDN/RTS COVERAGE	-IOS -HTS -GTS -TCS -GTS -TCS -GTS -TCS -TCS -TCS -MIL -NHS -TCS -DGS -TCS -IOS -DGS -CTS -MIL -NHS														
ATTITUDE	PTC -TCS														
CRYO/HP	HUS TRANSPRT-VARY HUS WARMUP-160K IMU														
NOTES:															

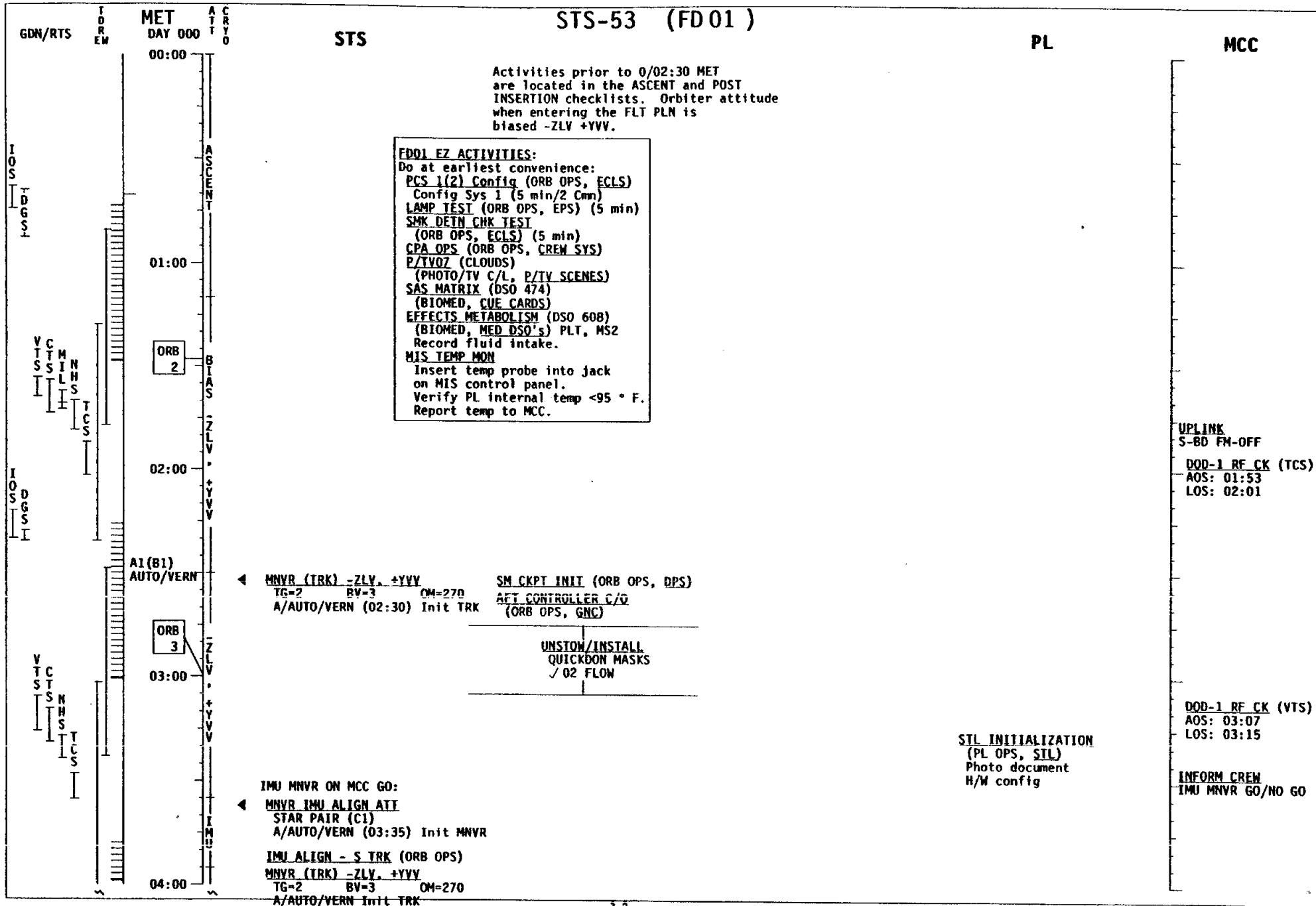


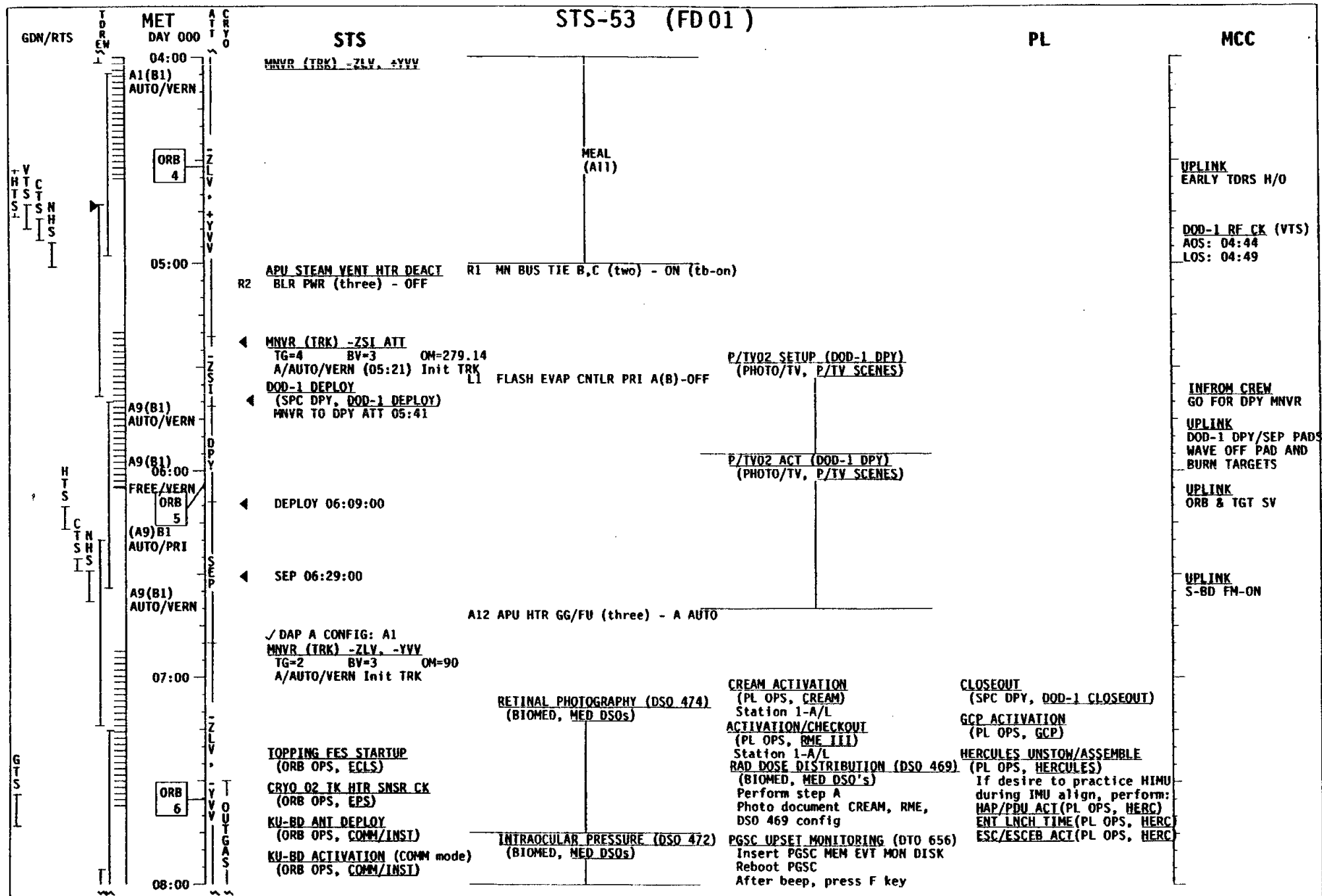
DETAILED TIMELINE

DETAILED
TIMELINE

DETAILED TIMELINE

STS-53 (FD 01)





STS-53 (FD 01)

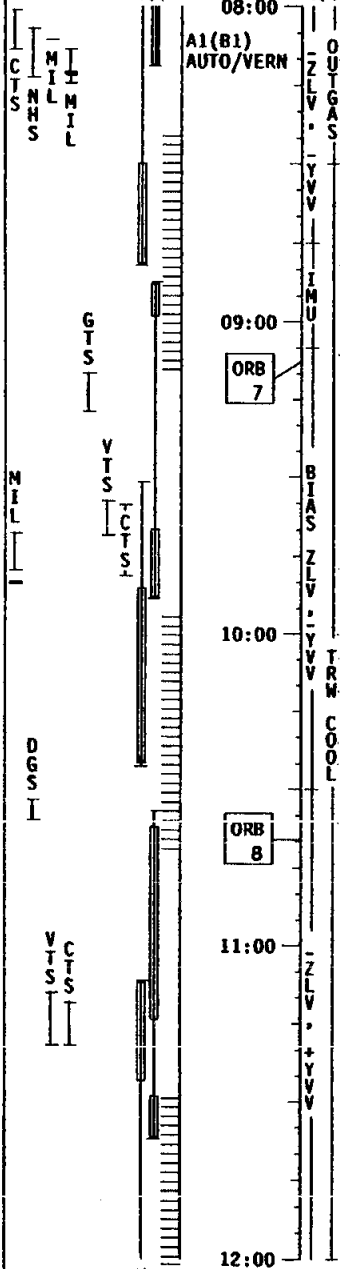
GDN/RTS

MET DAY 000

STS

PL

MCC



08:00

A1(B1)
AUTO/VERN

09:00

ORB
7

10:00

ORB
8

11:00

12:00

◀ MNVR IMU ALIGN ATI
STAR PAIR (E1)
A/AUTO/VERN (08:45) Init MNVR

IMU ALIGN - S TRK (ORB OPS)
◀ MNVR (TRK) BIASED -ZLV, -YVV
TG=2 BV=3 OM=110
A/AUTO/VERN (09:05) Init TRK

SUPPLY WATER DUMP, steps 1&2
(ORB OPS, ECLS)

06 UHF MODE - OFF
PRIVATE MEDICAL CONFERENCE

06 UHF MODE - SPLX (or as reqd)

SUPPLY WATER DUMP, step 3
(ORB OPS, ECLS)

MNVR (TRK) -ZLV, +YVV
TG=2 BV=3 OM=270
A/AUTO/VERN Init TRK

SLEEP

HUM SEP FOR WATER
ACCUMUL ATION

HIMU ALIGN

WIN	STAR
W1	12: CANOPUS
W8	31: CASTOR

PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

STS-53 (FD 01)

GDN/RTS

MET DAY 000

STS

PL

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12:00

13:00

14:00

15:00

16:00

ORB
9

A1 (B1)
AUTO/VERN

ORB
10

ORB
11

A
T
T
R
Y
O

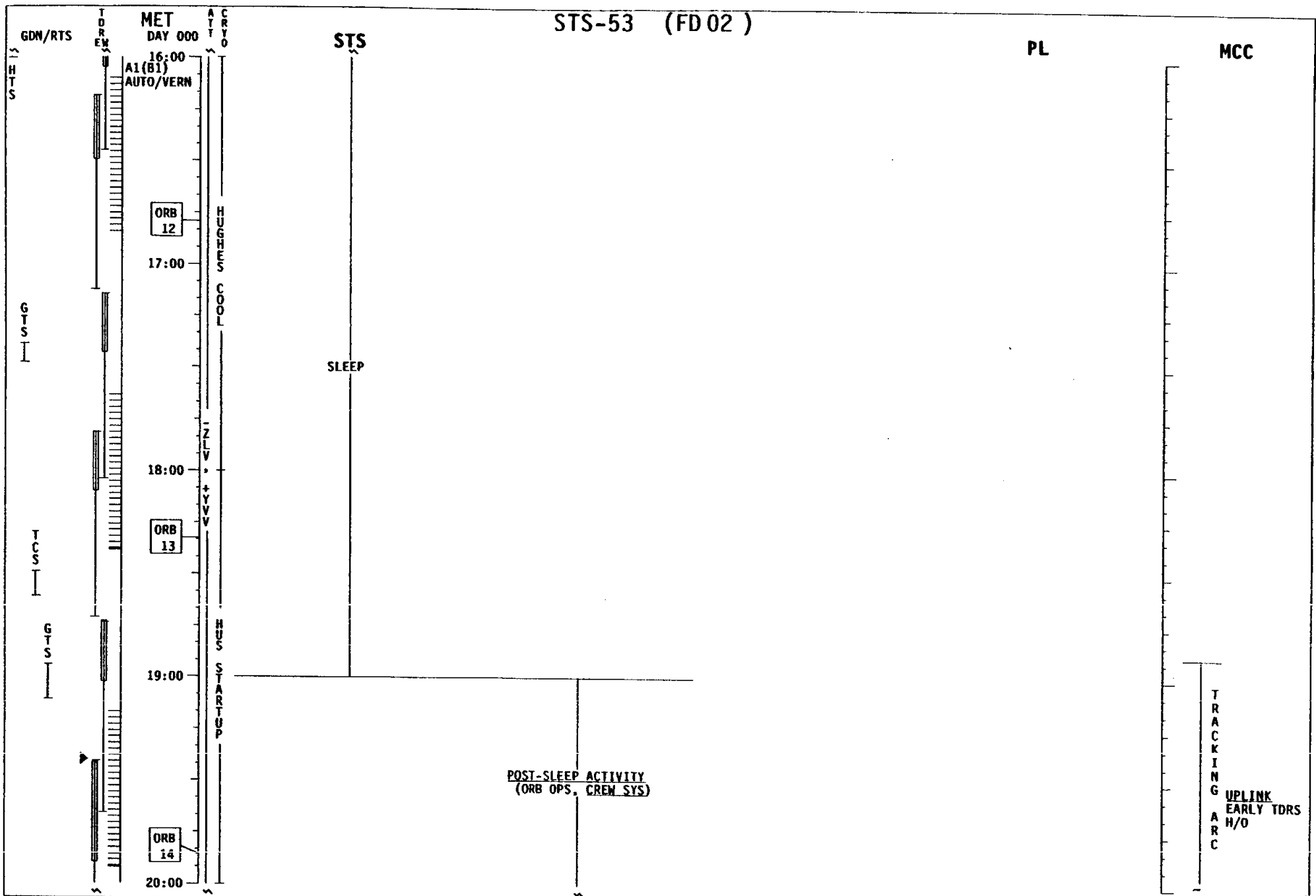
T
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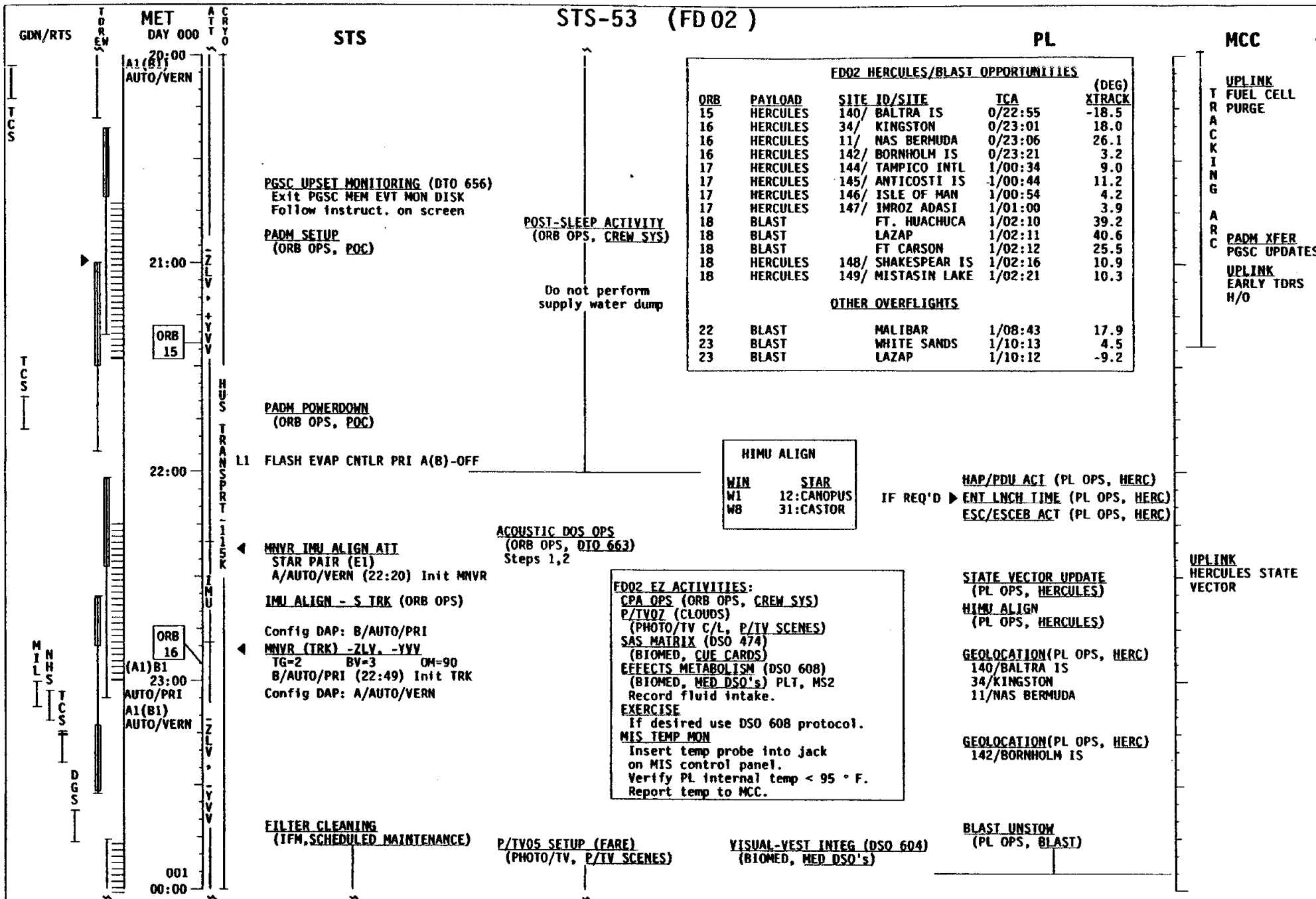
T
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SLEEP

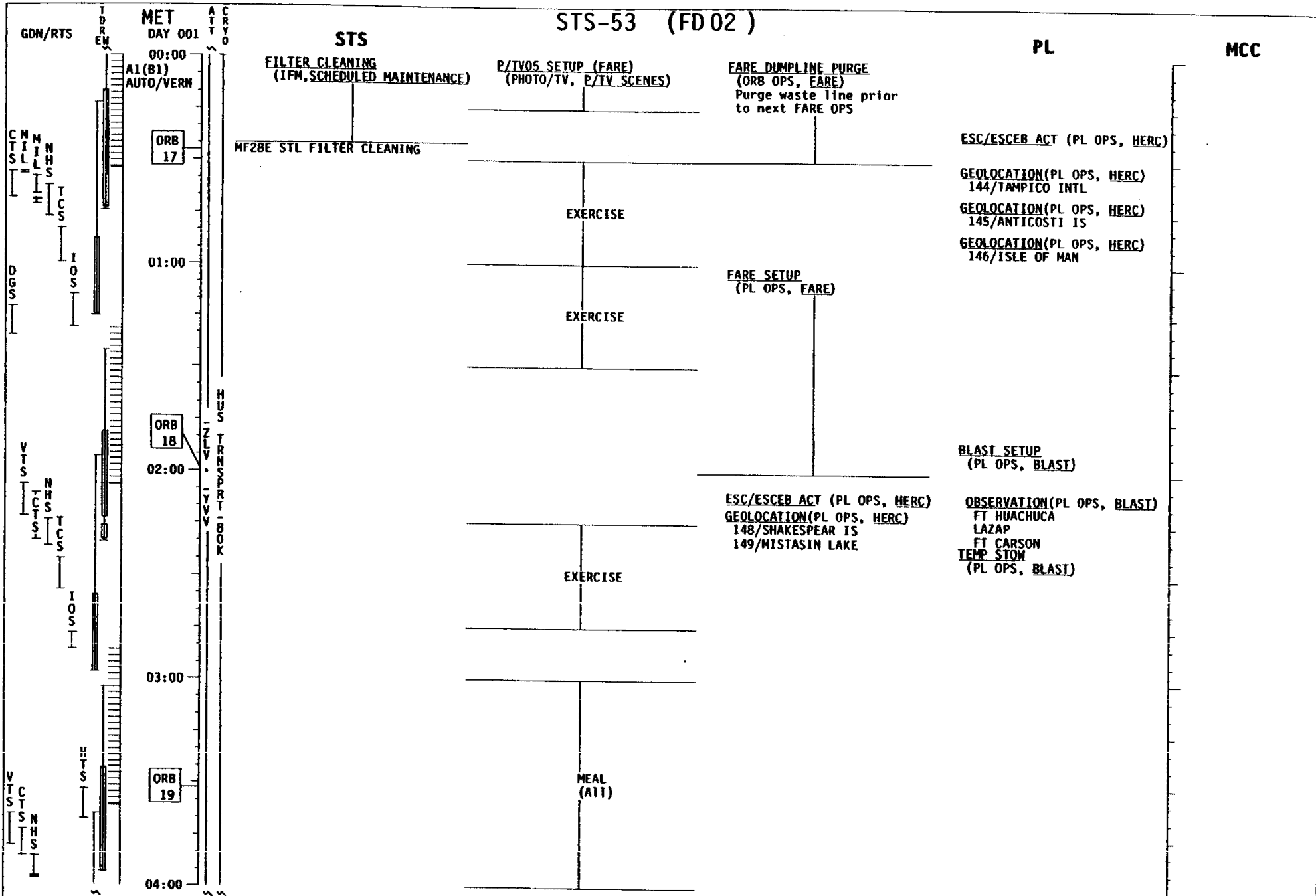
STS-53 (FD 02)



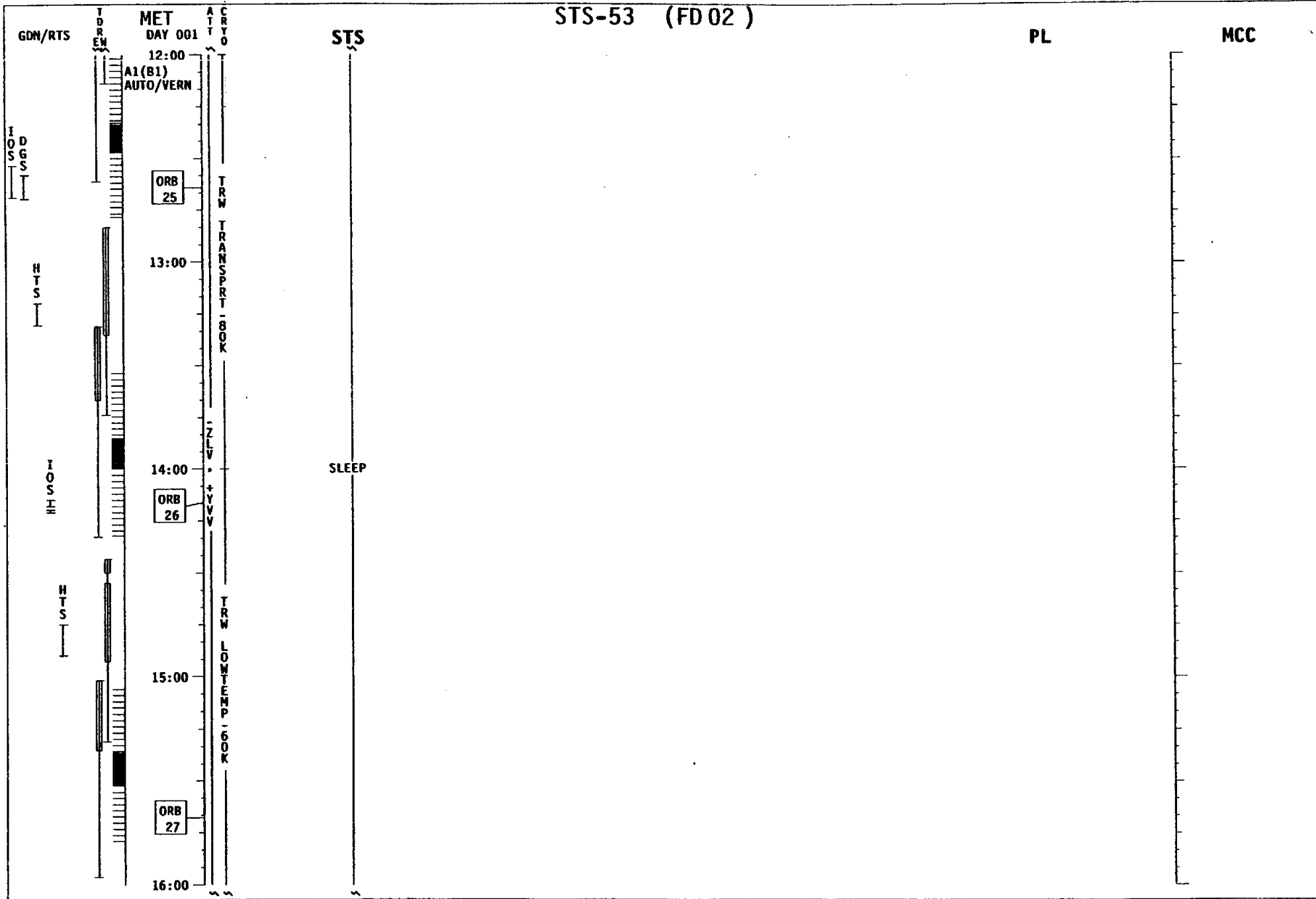
STS-53 (FD02)



STS-53 (FD 02)



STS-53 (FD 02)



STS-53 (FD 03)

GDN/RTS

MET DAY 001

STS

PL

MCC

16:00
A1(B1)
AUTO/VERN

17:00

18:00

19:00

20:00

ORB 28

ORB 29

SLEEP

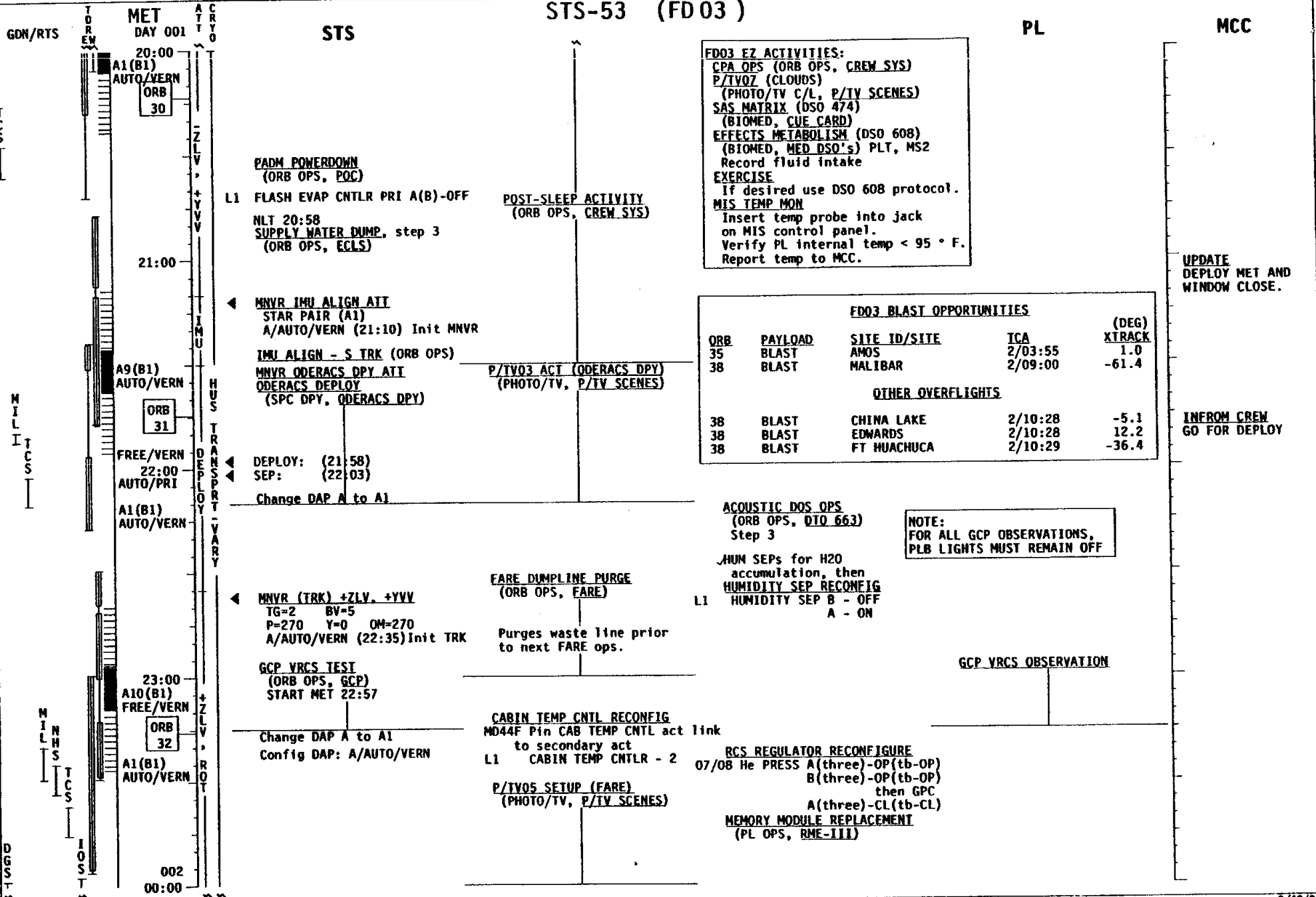
PGSC UPSET MONITORING (DTO 656)
Exit PGSC MEM EVT MON DISK
Follow instruct. on screen
PADM SETUP
(ORB OPS, PQC)
SUPPLY WATER DUMP, steps 1&2
(ORB OPS, ECLS)

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

UPLINK
EARLY TDRS H/O

UPLINK
EARLY TDRS H/O
PADM XFER
PGSC UPDATES
UPDATE
H2O SPLY DUMP
QTY TK A & B

STS-53 (FD03)



FD03 EZ ACTIVITIES:
 CPA OPS (ORB OPS, CREW SYS)
 P/TVQZ (CLOUDS)
 (PHOTO/TV C/L, P/TV SCENES)
 SAS MATRIX (DSO 474)
 (BIOMED, CUE CARD)
 EFFECTS METABOLISM (DSO 608)
 (BIOMED, MED DSO's) PLT, MS2
 Record fluid intake
EXERCISE
 If desired use DSO 608 protocol.
MIS TEMP MON
 Insert temp probe into jack
 on MIS control panel.
 Verify PL internal temp < 95 ° F.
 Report temp to MCC.

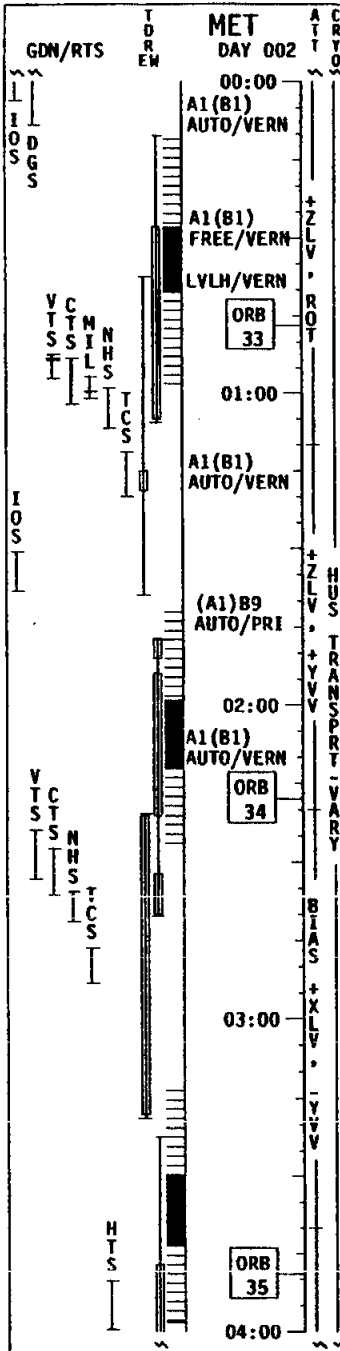
FD03 BLAST OPPORTUNITIES				
ORB	PAYLOAD	SITE ID/SITE	ICA	(DEG) XTRACK
35	BLAST	AMOS	2/03:55	1.0
38	BLAST	MALIBAR	2/09:00	-61.4
OTHER OVERFLIGHTS				
38	BLAST	CHINA LAKE	2/10:28	-5.1
38	BLAST	EDWARDS	2/10:28	12.2
38	BLAST	FT HUACHUCA	2/10:29	-36.4

NOTE:
 FOR ALL GCP OBSERVATIONS,
 PLB LIGHTS MUST REMAIN OFF

UPDATE
 DEPLOY MET AND
 WINDOW CLOSE.

INFROM CREW
 GO FOR DEPLOY

STS-53 (FD 03)



STS

00:00
A1(B1)
AUTO/VERN
← MNVR (TRK) +ZLV, +YVV
TG-2 BV-5
P=270 Y=0 OM=0
A/AUTO/VERN (00:05) Init TRK
GCP OG YAW TEST
(ORB OPS, GCP)
START MET 00:28

01:00
A1(B1)
AUTO/VERN
← MNVR (TRK) +ZLV, +YVV
TG-2 BV-5
P=270 Y=0 OM=270
A/AUTO/VERN (01:10) Init TRK
GCP OG (PRCS) TEST
Change DAP B to B9
At MET 01:59 DAP: B/AUTO/PRI
After 3 min DAP: A/AUTO/VERN
Change DAP B to B1

02:00
A1(B1)
AUTO/VERN
← MNVR (TRK) GCP AG 90
TG-2 BV-5
P=359.29 Y=15.39 OM=92.09
A/AUTO/VERN (02:20) Init TRK
Load future start MNVR
TG-2 BV=3 OM=90
A/AUTO/VERN (03:40) Init TRK

04:00
← PRELOAD MNVR (TRK) -ZLV, -YVV

P/TVO5 ACT (FARE)
(PHOTO/TV, P/TV SCENES)

FARE TEST 3
FARE OPS-Test 3
RCV TK EXPULSION-Test 3
(PL OPS, FARE)

EXERCISE

NOTE:
FOR ALL GCP OBSERVATIONS,
PLB LIGHTS MUST REMAIN OFF

ECLSS REDUND COMPONENT C/O
(ORB OPS, ECLS)
PCS 1(2) CONFIG(ORB OPS)(2Cmn)

LI FLASH EVAP CNTLR PRI A(B)-OFF
HEATER RECONFIG-Config B
(ORB OPS, EPS)

P/TVO4 SETUP (MIDDECK ACTS)
(PHOTO/TV, P/TV SCENES)
VFT II
CREAM/RME

EXERCISE

MEAL
(A11)

WARNING
DO NOT VIEW SCHEDULED/IDENTIFIED
BLAST/AMOS OVERFLIGHTS WITH OPTICS

PL

GCP OG (YAW) OBSERVATION

GCP OG (PRCS) OBSERVATION

BLAST SETUP
(PL OPS, BLAST)

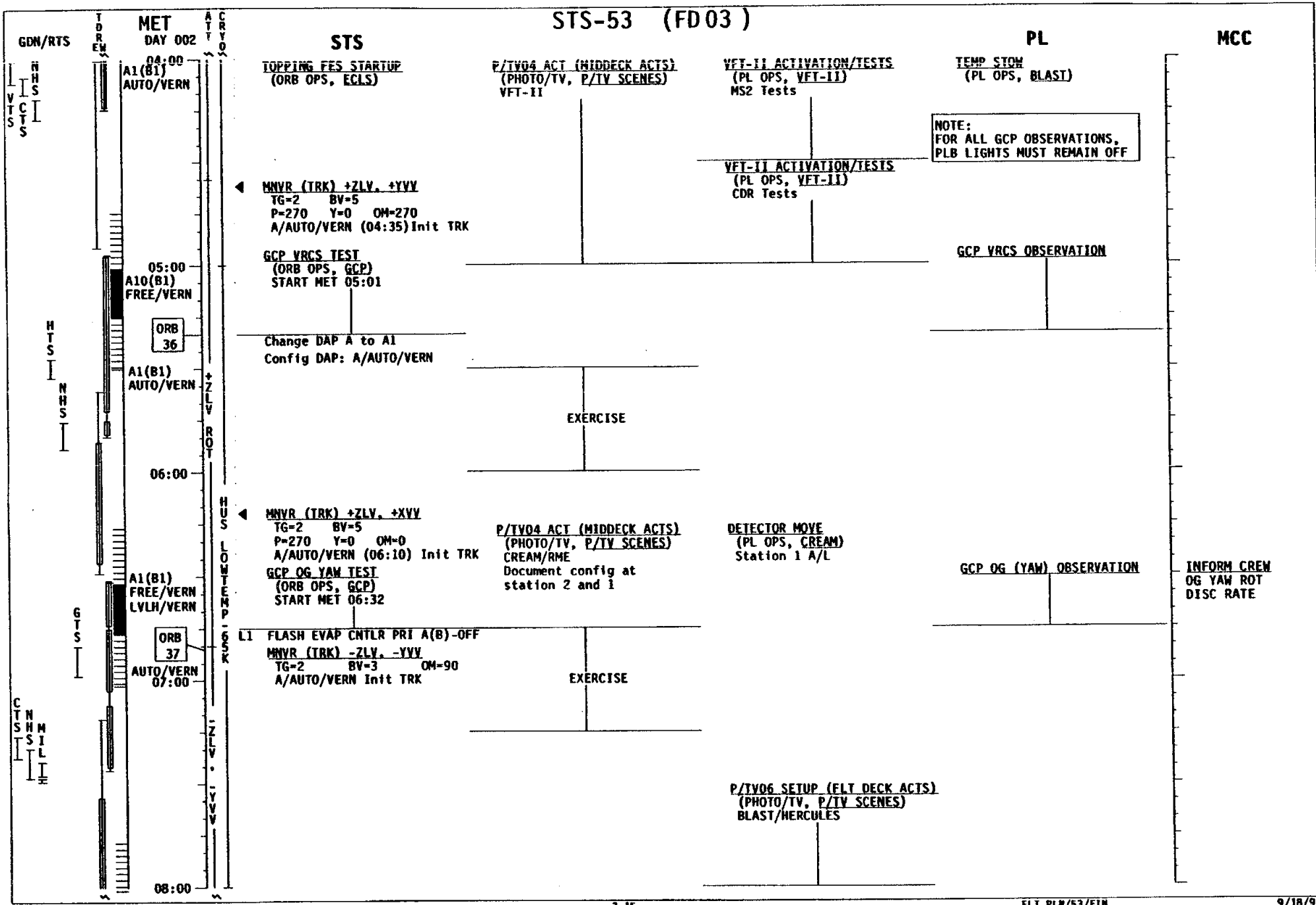
GCP AG 90 OBSERVATION

OBSERVATION(PL OPS, BLAST)
AMOS

MCC

INFORM CREW
OG YAW ROT
DISC RATE

STS-53 (FD03)



NOTE:
FOR ALL GCP OBSERVATIONS,
PLB LIGHTS MUST REMAIN OFF

STS-53 (FD 03)

GDN/RTS

MET DAY 002

STS

PL

MCC

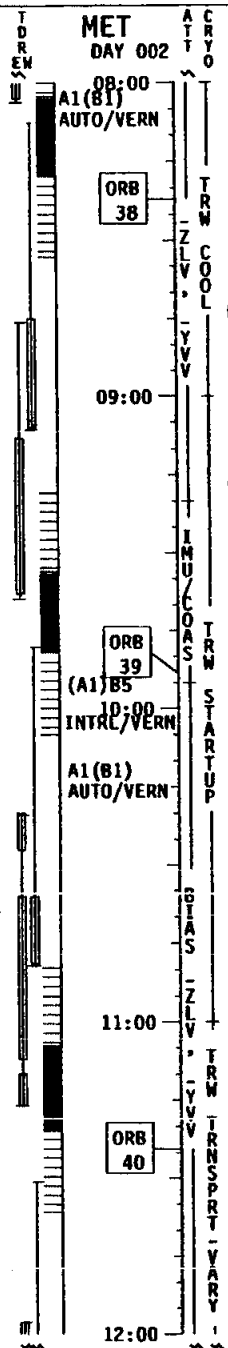
GTS

VCTS MIL

VCTS

DIGSS

VTS



08:00 A1(B1) AUTO/VERN

ORB 38

09:00

ORB 39

(A1)B5 INTRL/VERN

10:00 A1(B1) AUTO/VERN

11:00

ORB 40

12:00

01 HUM SEPS for H2O accumulation, then HUMIDITY SEP RECONFIG HUMIDITY SEP A-OFF B-ON

01 .COAS - OFF Mount COAS - FWD
 MNVR IMU ALIGN ATT
 STAR PAIR (A1)
 A/AUTO/VERN (09:20) Init MNVR

IMU ALIGN - S TRK (ORB OPS)
 MNVR COAS CAL ATT
 TG=12 BV=1 OM=BLANK
 A/AUTO/VERN (09:40) Init TRK
 COAS CALIBRATION (ORB OPS)
 MNVR (TRK) BIASED -ZLY, -YVV
 TG=2 BV=3 OM=110
 A/AUTO/VERN (09:55) Init TRK
 Change OAP: B to B1
 SUPPLY WATER DUMP, steps 1&2 (ORB OPS, ECLS)

TOPPING FES STARTUP (ORB OPS, ECLS)

06 UHF MODE - OFF
 PRIVATE MEDICAL CONFERENCE

06 UHF MODE - SPLX (or as reqd)
 01 .COAS-OFF Stow COAS

SUPPLY WATER DUMP, step 3 (ORB OPS, ECLS)

EXERCISE

PRE-SLEEP ACTIVITY (ORB OPS, CREW SYS)

PGSC UPSET MONITORING (DTO 656)
 Insert PGSC MEM EVT MON DISK
 Reboot PGSC
 After beep, press F key

ACOUSTIC DOS OPS (ORB OPS, DTO 663)
 Step 3
 ACOUSTIC DOS OPS (ORB OPS, DTO 663)
 Step 4 (batts)

BLAST SETUP (PL OPS, BLAST)

OBSERVATION (PL OPS, BLAST)
 MALIBAR

TEMP STOW (PL OPS, BLAST)

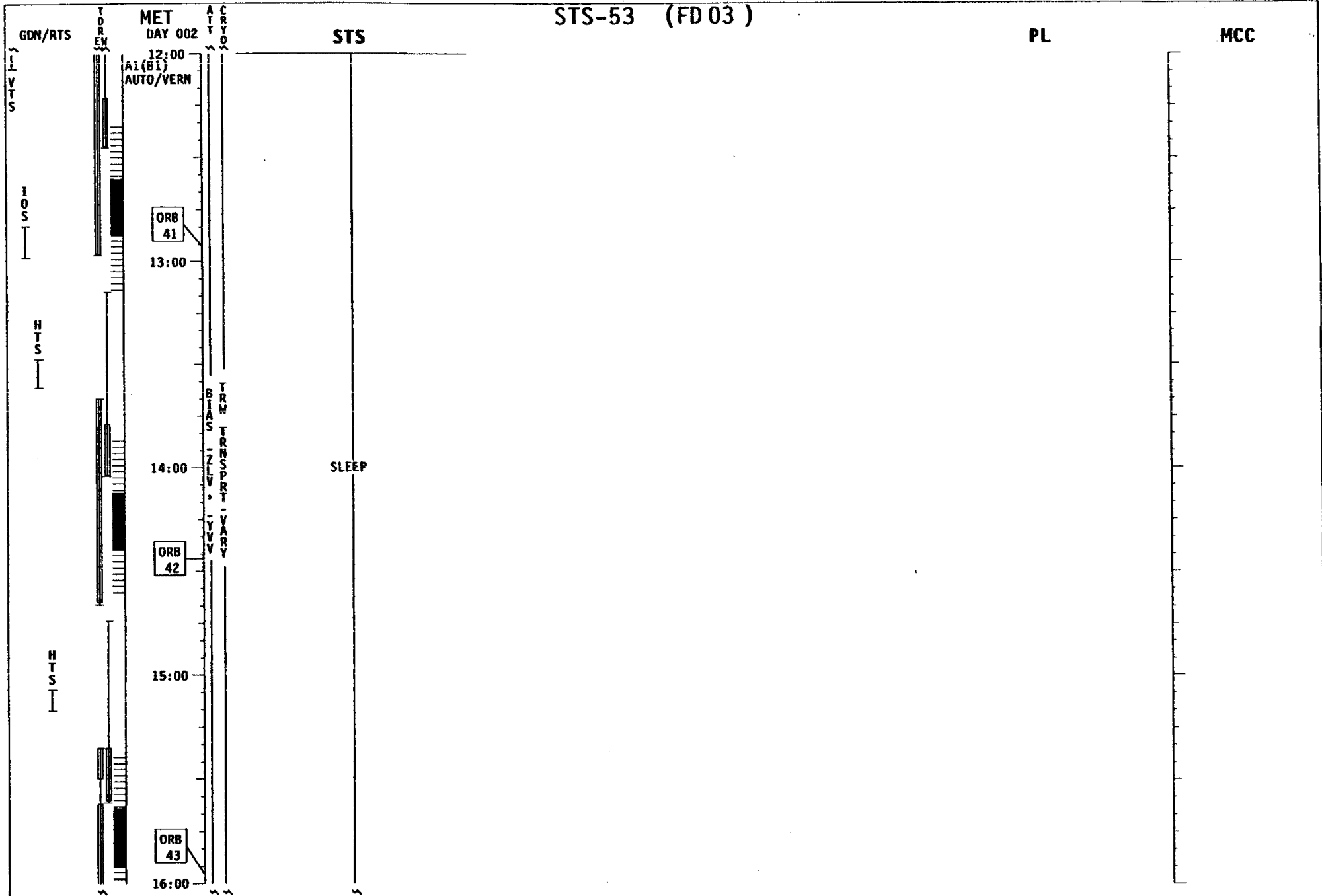
BLAST OVERFLIGHTS

CHINA LAKE EDWARDS FT HUACHUCA

UPDATE H2O SPLY DUMP QTY TK A & B

COAS CALIBRATION LOG	
STAR ID:	+X 12 , CANOPUS
STAR AVAIL:	09:17 TO 10:01
+X Δ BIAS	____ , _____
UPDATE TIME:	___ / ___ : ___ : ___

STS-53 (FD 03)



STS-53 (FD 03)

GDN/RTS

MET
DAY 002

16:00
A1 (B1)
AUTO/VERN

17:00

ORB
44

18:00

ORB
45

19:00

20:00

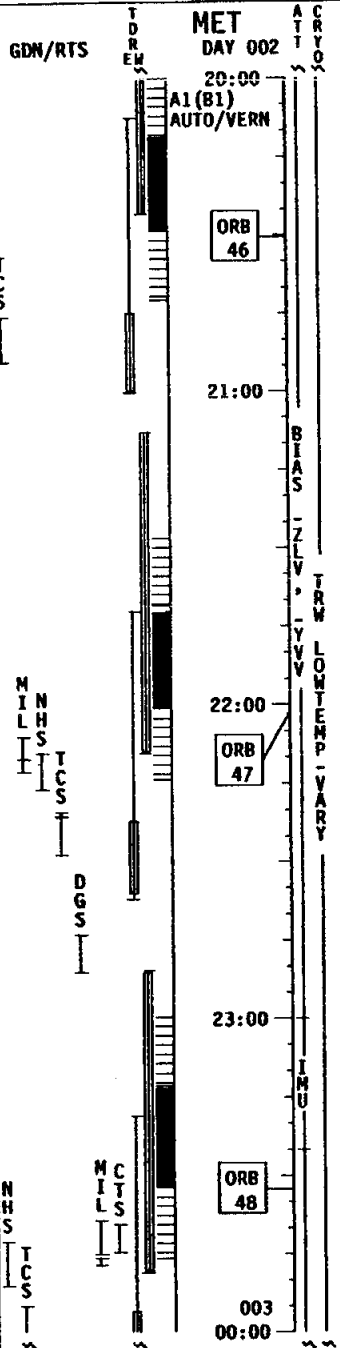
STS

SLEEP

PL

MCC

STS-53 (FD 04)



STS

PL

MCC

FD04 EZ ACTIVITIES:
 CPA OPS (ORB OPS, CREW SYS)
 P/TV07 (CLOUDS)
 (PHOTO/TV C/L, P/TV SCENES)
 SAS MATRIX (DSO 474)
 (BIOMED, CUE CARDS)
 EFFECTS METABOLISM (DSO 608)
 (BIOMED, MED DSO's) PLT, MS2
 Record fluid intake.
 EXERCISE (PLT, MS2)
 If desired use DSO 608 protocol.
MIS TEM MON
 Insert temp probe into jack
 on MIS control panel.
 Verify PL internal temp
 < 95 ° F. Report temp to MCC.

PGSC UPSET MONITORING (DTO 656)
 Exit PGSC MEM EVT MON DISK
 Follow instruct. on screen

PADM SETUP
 (ORB OPS, POC)

PADM POWERDOWN
 (ORB OPS, POC)

L1 FLASH EVAP CNTLR PRI A(B)-OFF

← **MNVR IMU ALIGN ATT**
 STAR PAIR (E1)
 A/AUTO/VERN (23:00) Init MNVR

IMU ALIGN - S TRK (ORB OPS)

MNVR (TRK) -ZLV, -YVY
 TG-2 BV-3 OM-90
 A/AUTO/VERN (23:25) Init TRK

POST-SLEEP ACTIVITY
 (ORB OPS, CREW SYS)

Do not perform
 SUPPLY WATER DUMP

CDR, MS1, MS3 Consume
 8 ounces fluid before
 and after exercise per
 BIOMED C/L DTO 653
 Fluid Loading Protocol

ACOUSTIC DQS OPS
 (ORB OPS, DTO 663)
 Step 3

FD04 HERCULES/BLAST OPPORTUNITIES

ORB	PAYLOAD	SITE ID/SITE	TCA	(DEG) XTRACK
48	HERCULES	160/ VERACRUZ INTL	2/23:38	20.5
48	HERCULES	161/ KEESLER	2/23:41	3.5
48	HERCULES	145/ ANTICOSTI IS	2/23:48	-8.0
48	HERCULES	146/ ISLE OF MAN	2/23:57	15.8
49	BLAST	FT. HUACHUCA	3/01:14	14.2
49	BLAST	LAZAP	3/01:14	17.0
49	BLAST	WHITE SANDS	3/01:15	34.1
49	BLAST	FT. CARSON	3/01:16	-2.9
49	HERCULES	162/ DULUTH INTL	3/01:18	2.9
49	HERCULES	163/ CHARLTON IS	3/01:20	9.2
49	HERCULES	164/ CAP BON	3/01:37	-11.1
49	HERCULES	100/ ZANZIBAR IS	3/01:50	10.6
49	HERCULES	165/ TAURANGA	3/02:22	-19.4
50	HERCULES	166/ MEDDOUZA	3/03:09	8.8
54	BLAST	LAZAP	3/09:12	33.4
54	BLAST	FT. CARSON	3/09:13	-25.6
54	BLAST	WHITE SANDS	3/09:14	39.7

A negative XTRACK is to the north (left) of the ground track

P/TV06 ACT (FLT DECK ACTS)
 (PHOTO/TV, P/TV SCENES)
 BLAST/HERCULES

HIMU ALIGN

WIN	STAR
W1	12: CANOPUS
WB	31: CASTOR

HAP/PDU ACT (PL OPS, HERC)
ESC/ESCEB ACT (PL OPS, HERC)

HIMU ALIGN
 (PL OPS, HERCULES)
STATE VECTOR UPDATE
 (PL OPS, HERCULES)

GEOLOCATION (PL OPS, HERC)
 160/VERACRUZ INTL
 161/KEESLER

145/ANTICOSTI IS

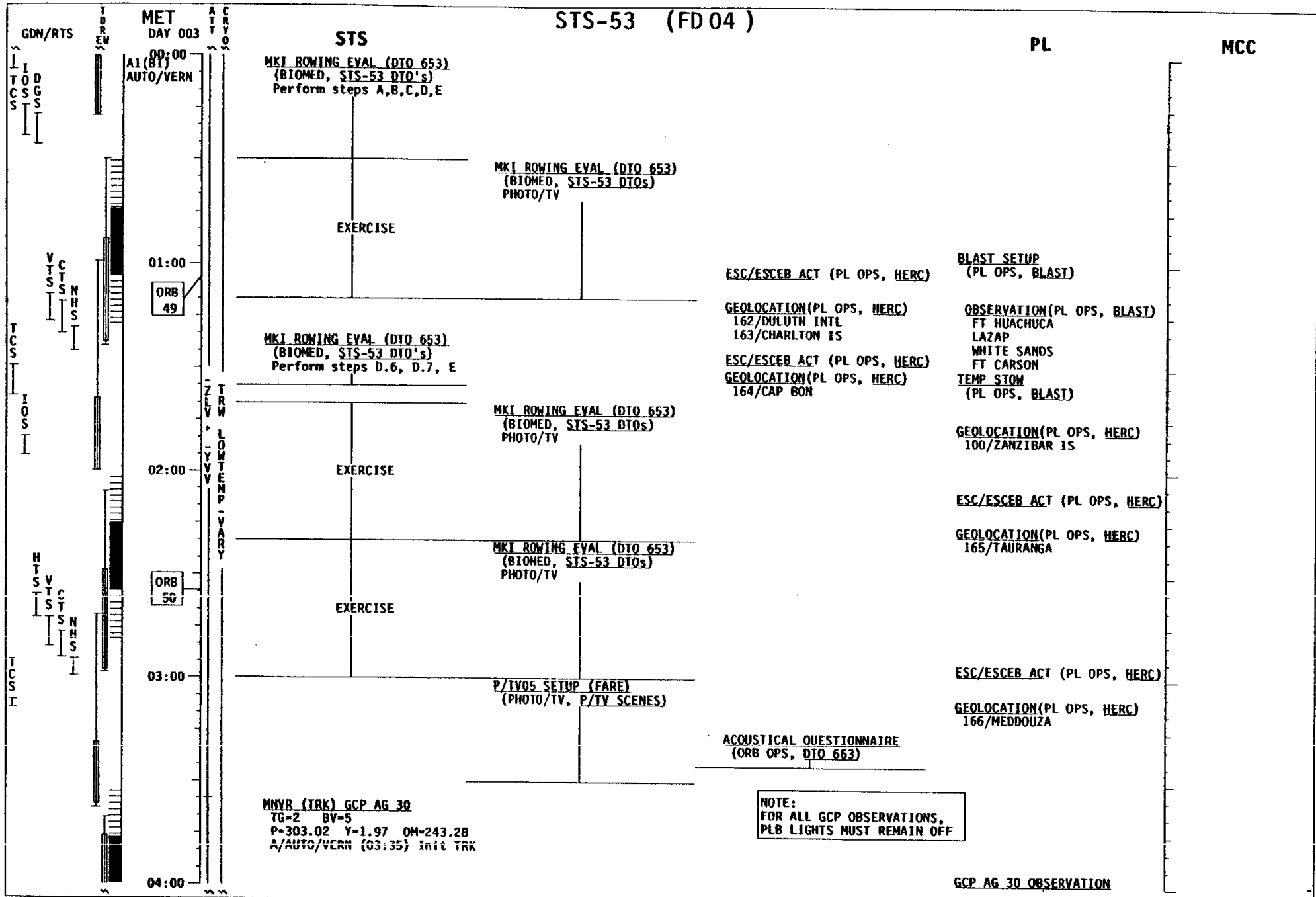
146/ISLE OF MAN

TRACKING ARC

PADM XFER
 PGSC UPDATES

UPLINK
 HERCULES STATE VECTOR

STS-53 (FD 04)

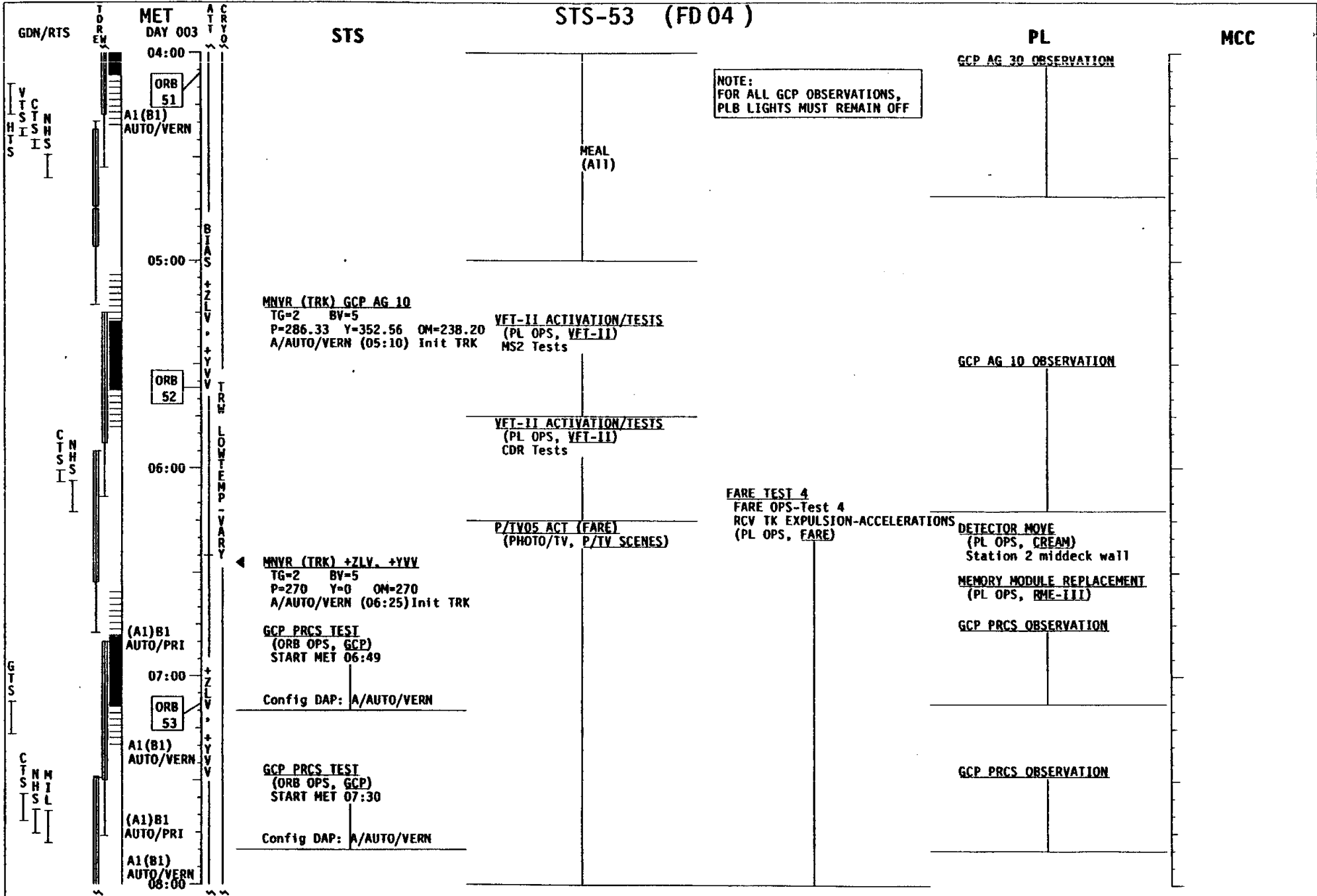


MNVR (TRK) GCP AG 30
 TG=2 BV=5
 P=303.02 Y=1.97 OM=243.28
 A/AUTO/VERN (03:35) Init TRK

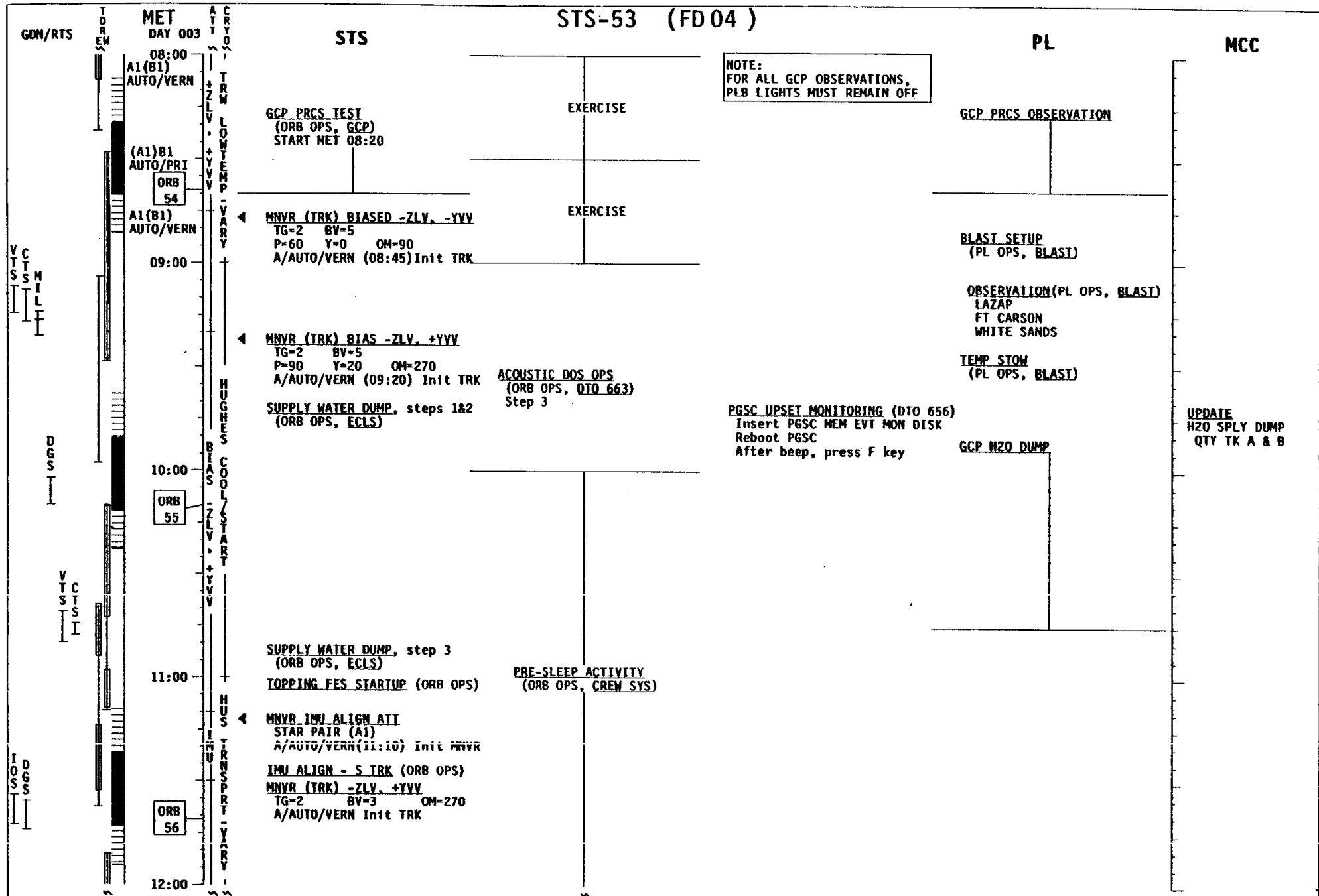
NOTE:
 FOR ALL GCP OBSERVATIONS,
 PLB LIGHTS MUST REMAIN OFF

GCP AG 30 OBSERVATION

STS-53 (FD 04)



NOTE:
FOR ALL GCP OBSERVATIONS,
PLB LIGHTS MUST REMAIN OFF

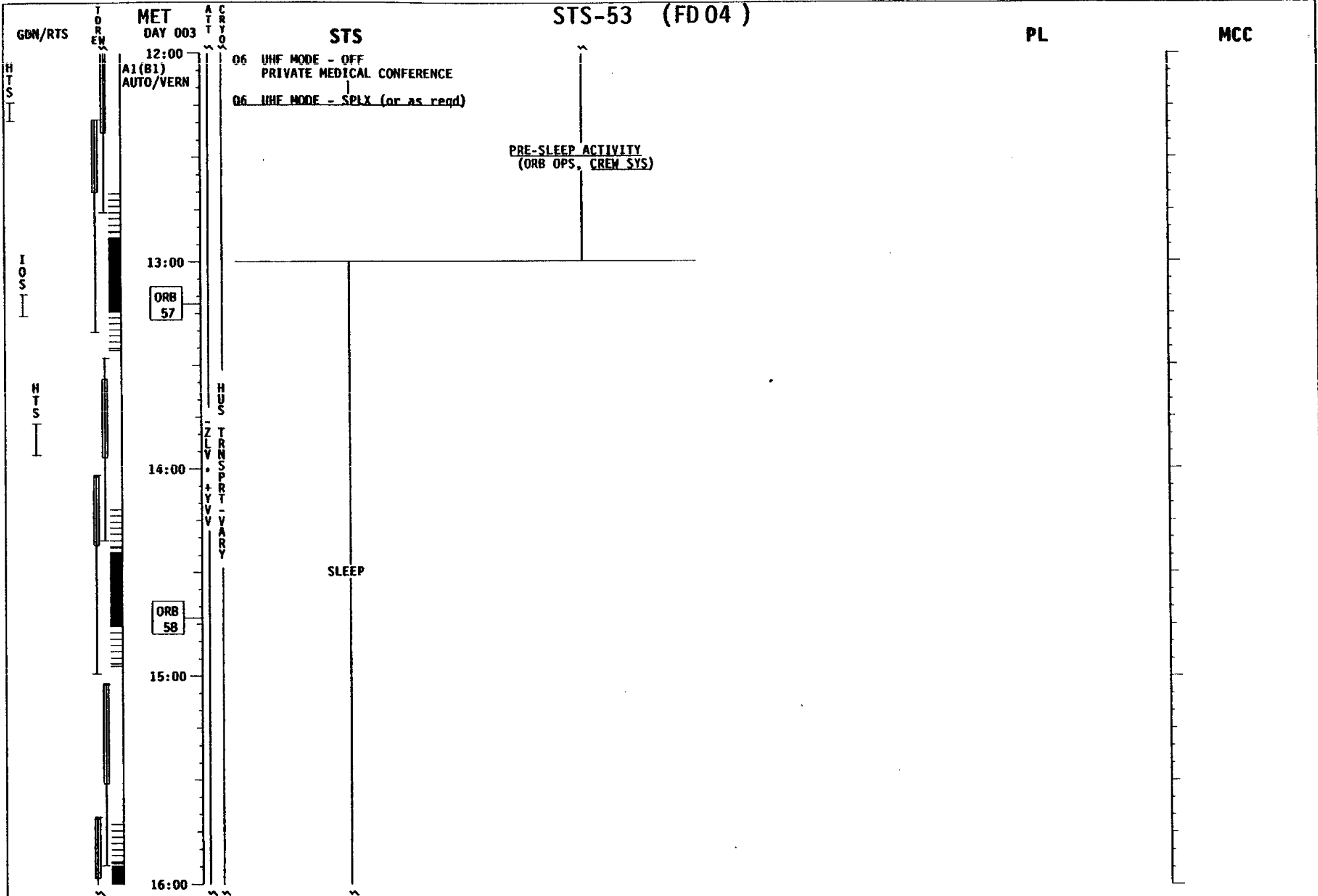


NOTE:
FOR ALL GCP OBSERVATIONS,
PLB LIGHTS MUST REMAIN OFF

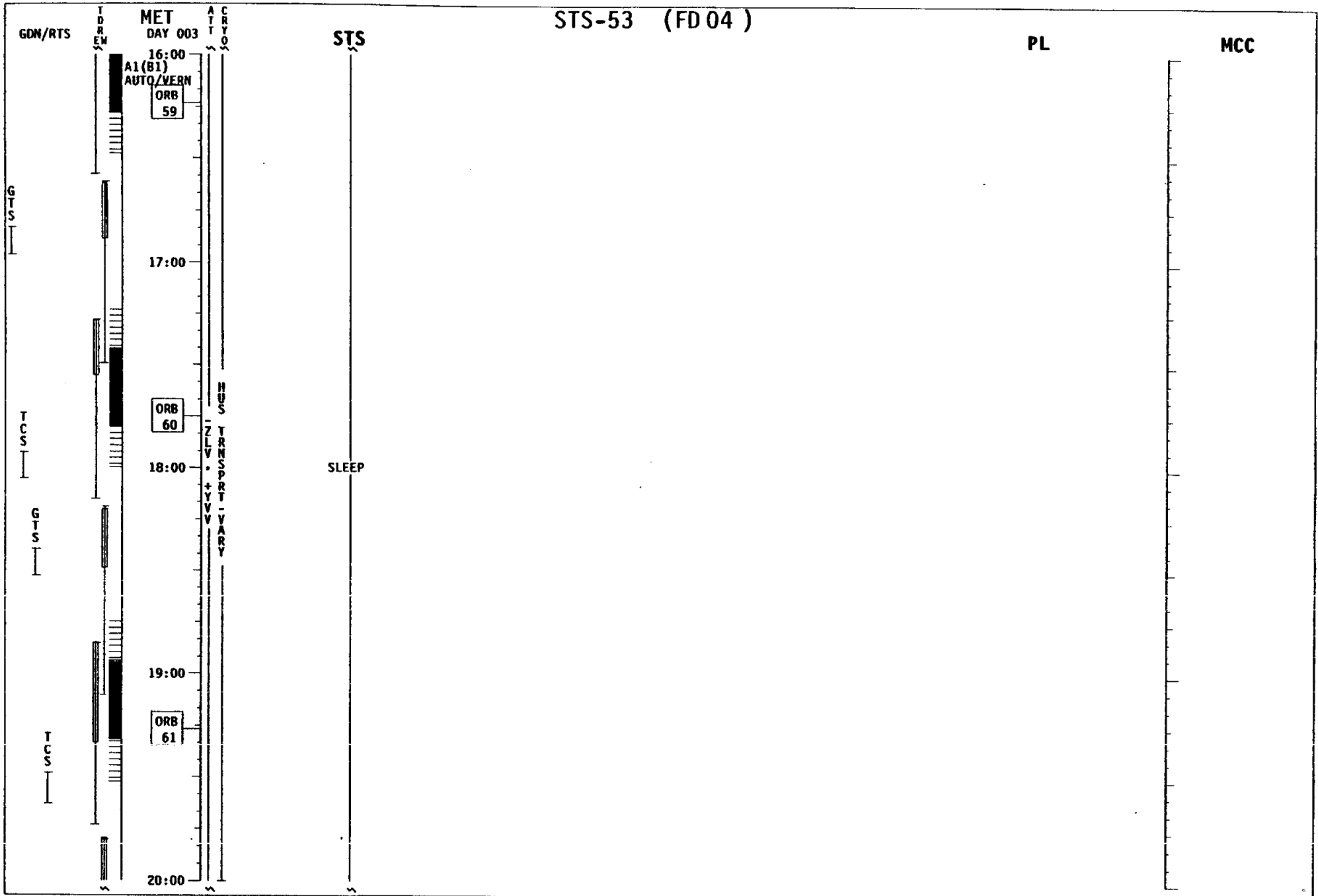
STS-53 (FD04)

PL

MCC



STS-53 (FD 04)



STS-53 (FD 05)

FD05 EZ ACTIVITIES:
 CPA OPS (ORB OPS, CREW SYS)
 P/TV07 (CLOUDS)
 (PHOTO/TV C/L, P/TV SCENES)
 SAS MATRIX (DSO 474)
 (BIOMED, CUE CARDS)
 EFFECTS METABOLISM (DSO 608)
 (BIOMED, MED DSO's) PLT ,MS2
 Record fluid intake.
EXERCISE
 If desired use DSO 608 protocol.
MIS TEMP MON
 Insert temp probe into jack
 on MIS control panel. Verify
 PL internal temp < 95 ° F.
 Report temp to MCC.

PL

MCC

UPLINK
EARLY TDRS H/O

T
R
A
C
K
I
N
G
A
R
C

UPLINK
EARLY TDRS H/O

UPLINK
HERCULES STATE
VECTOR

FD05 HERCULES/BLAST OPPORTUNITIES

ORB	PAYLOAD	SITE ID/SITE	TCA	(DEG) XTRACK
64	BLAST	FT. LEONARD WOOD	4/00:01	-0.5
64	HERCULES	167/ CAPE HURD	4/00:02	0.0
64	HERCULES	168/ GOOSE APT	4/00:06	13.0
64	HERCULES	169/ ISLE OF WIGHT	4/00:15	21.8
64	HERCULES	92/ DJIBOUTI	4/00:29	0.1
65	BLAST	EDWARDS	4/01:31	4.2
65	BLAST	CHINA LAKE	4/01:32	-9.5
65	HERCULES	171/ WINNIPEG INTL	4/01:35	-9.4
65	HERCULES	149/ MISTASIN LAKE	4/01:40	19.8

OTHER OVERFLIGHTS

63	BLAST	MALIBAR	3/22:27	-16.2
72	BLAST	AMOS	4/12:36	62.3

BLAST OVERFLIGHTS

MALIBAR ▶

HIMU ALIGN

WIN	STAR
WI	12: CANOPUS
WB	31: CASTOR

BLAST SETUP
(PL OPS, BLAST)

ESC/ESCEB ACT (PL OPS, HERC)
 HAP/PDU ACT (PL OPS, HERC)
 HIMU ALIGN
 (PL OPS, HERCULES)
 STATE VECTOR UPDATE
 (PL OPS, HERCULES)

OBSERVATION (PL OPS, BLAST)
 FT LEONARD WOOD

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

Do not perform
supply water dump

PGSC UPSET MONITORING (OTO 656)
 Exit PGSC MEM EVT NON DISK
 Follow instruct. on screen

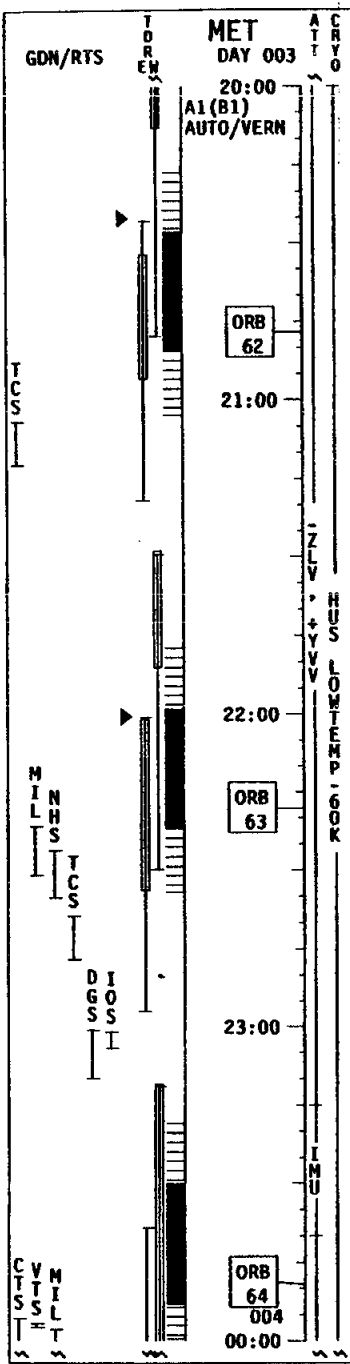
PADM SETUP
(ORB OPS, POC)

PADM POWERDOWN
(ORB OPS, POC)

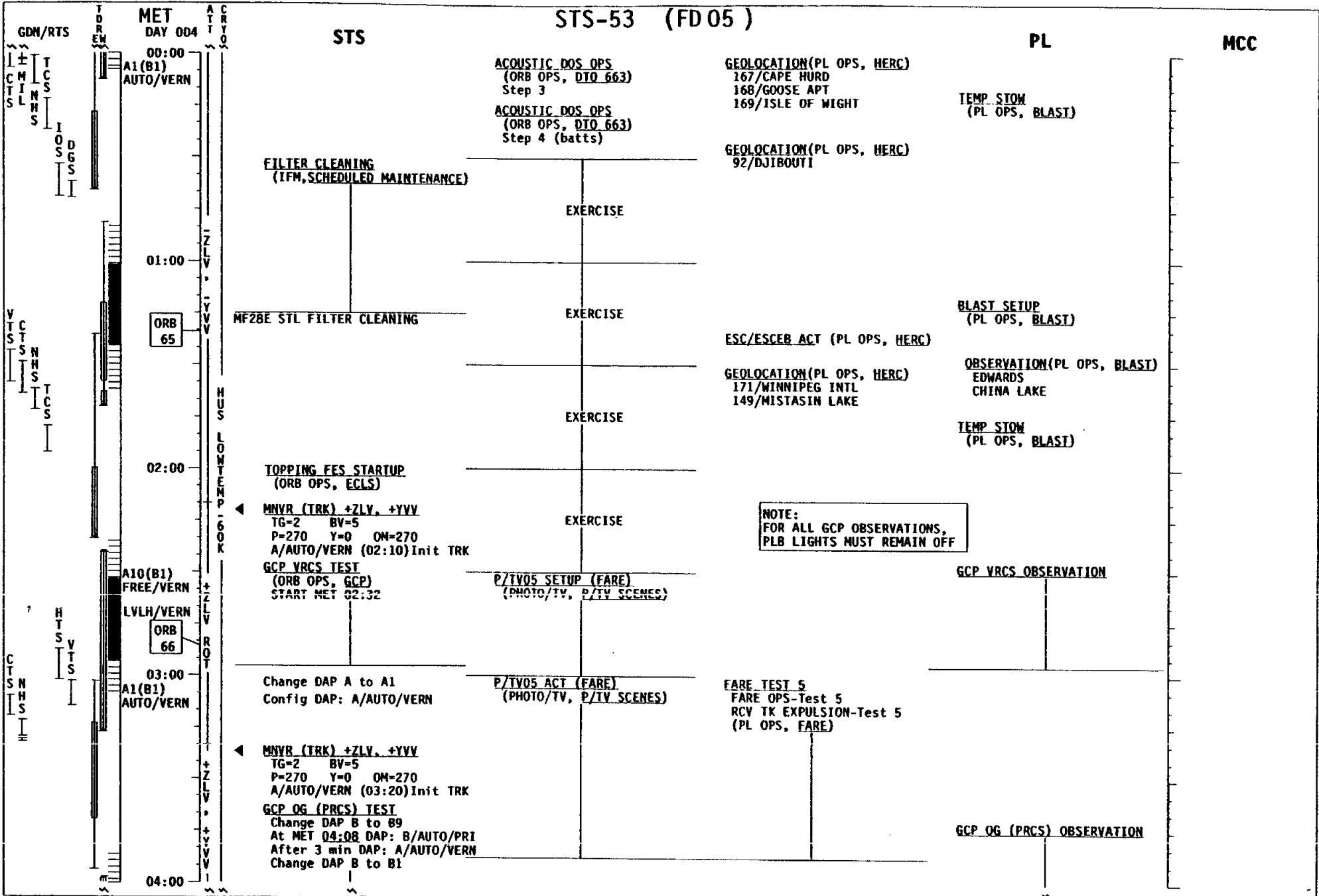
L1 FLASH EVAP CNTLR PRI A(B)-OFF

◀ **MNVR IMU ALIGN ATT**
 STAR PAIR (E1)
 A/AUTO/VERN (23:15) Init MNVR
IMU ALIGN - S TRK (ORB OPS)

MNVR (TRK) -ZLV, -YVV
 TG=2 BV=3 OM=90
 A/AUTO/VERN (23:40) Init TRK



STS-53 (FD 05)



GDN/RTS
 LCM TCS
 TIL NH S
 I O DGS
 S I I
 V T S
 T S NH S
 TCS
 H T S
 T S NH S
 I I

MET DAY 004
 00:00
 A1(B1)
 AUTO/VERN
 01:00
 ORB 65
 02:00
 A10(B1)
 FREE/VERN
 LVLH/VERN
 ORB 66
 03:00
 A1(B1)
 AUTO/VERN
 04:00

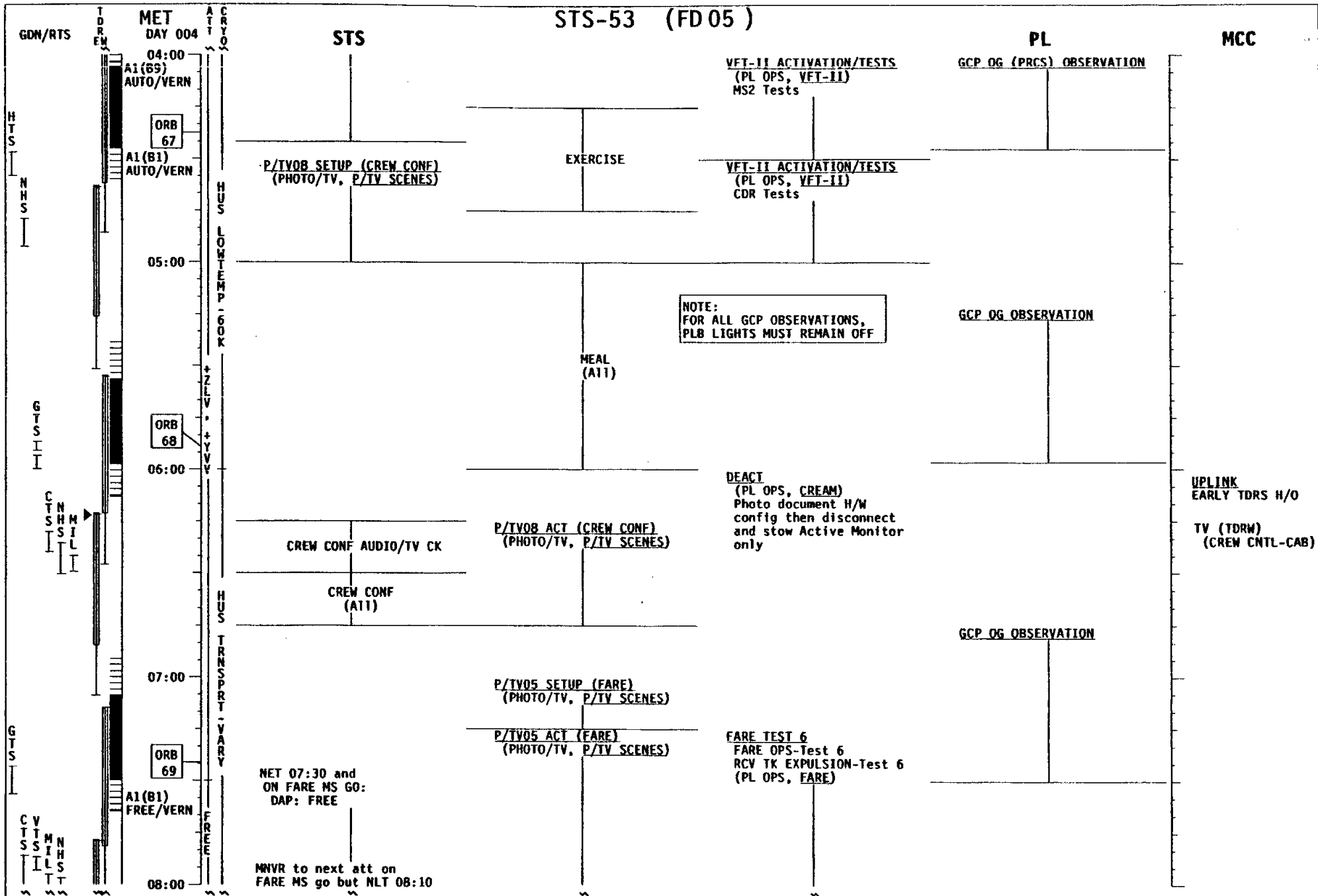
STS
 ACQUSTIC DOS OPS
 (ORB OPS, DTO 663)
 Step 3
 ACQUSTIC DOS OPS
 (ORB OPS, DTO 663)
 Step 4 (batts)
 FILTER CLEANING
 (IFM, SCHEDULED MAINTENANCE)
 EXERCISE
 MF28E STL FILTER CLEANING
 EXERCISE
 TOPPING FES STARTUP
 (ORB OPS, ECLS)
 MNVR (TRK) +ZLV, +YVV
 TG-2 BV-5
 P-270 Y=0 OM-270
 A/AUTO/VERN (02:10) Init TRK
 GCP VRCS TEST
 (ORB OPS, GCP)
 START MET 02:32
 Change DAP A to A1
 Config DAP: A/AUTO/VERN
 MNVR (TRK) +ZLV, +YVV
 TG-2 BV-5
 P-270 Y=0 OM-270
 A/AUTO/VERN (03:20) Init TRK
 GCP OG (PRCS) TEST
 Change DAP B to B9
 At MET 04:08 DAP: B/AUTO/PRI
 After 3 min DAP: A/AUTO/VERN
 Change DAP B to B1

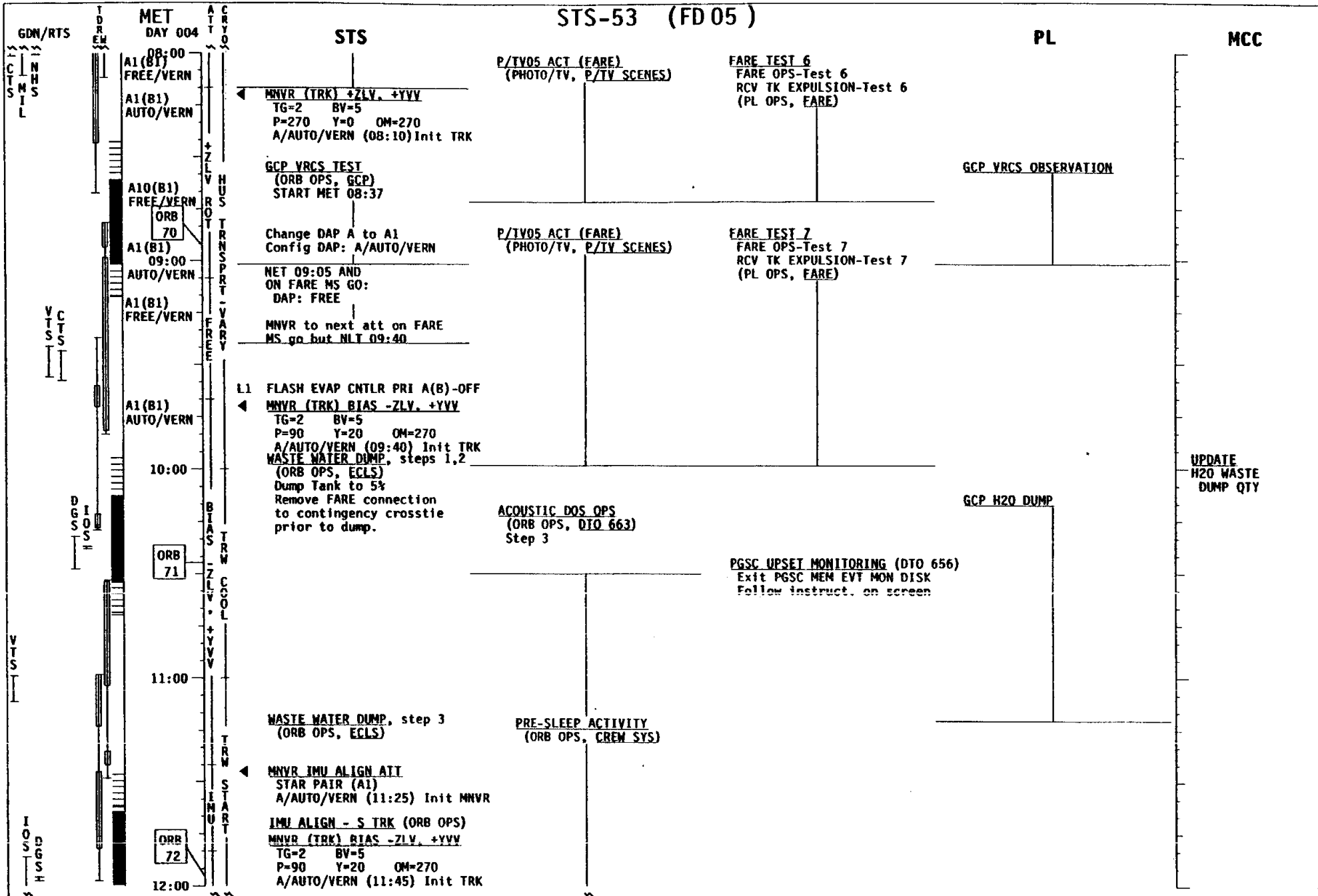
EXERCISE
 EXERCISE
 EXERCISE
 EXERCISE
 P/TV05 SETUP (FARE)
 (PHOTO/TV, P/TV SCENES)
 P/TV05 ACT (FARE)
 (PHOTO/TV, P/TV SCENES)

GEOLOCATION(PL OPS, HERC)
 167/CAPE HURD
 168/GOOSE APT
 169/ISLE OF WIGHT
 GEOLOCATION(PL OPS, HERC)
 92/DJIBOUTI
 ESC/ESCEB ACT (PL OPS, HERC)
 GEOLOCATION(PL OPS, HERC)
 171/WINNIPEG INTL
 149/MISTASIN LAKE
 NOTE:
 FOR ALL GCP OBSERVATIONS,
 PLB LIGHTS MUST REMAIN OFF
 FARE TEST 5
 FARE OPS-Test 5
 RCV TK EXPULSION-Test 5
 (PL OPS, FARE)

PL
 TEMP STOM
 (PL OPS, BLAST)
 BLAST SETUP
 (PL OPS, BLAST)
 OBSERVATION(PL OPS, BLAST)
 EDWARDS
 CHINA LAKE
 TEMP STOM
 (PL OPS, BLAST)
 GCP VRCS OBSERVATION
 GCP OG (PRCS) OBSERVATION

MCC





STS-53 (FD 05)

GDN/RTS

T
D
R
E
W

MET
DAY 004

12:00
A1(B1)
AUTO/VERN

A
C
T
I
V
E

STS

TOPPING FES STARTUP
(ORB OPS, ECLS)

06 UHF MODE - OFF
PRIVATE MEDICAL CONFERENCE

06 UHF MODE - SPLX (or as reqd)

PL

MCC

UPLINK
FUEL CELL
PURGE START AT
MET 4/12:15

GCP FUEL CELL PURGE OBS

WARNING
DO NOT VIEW SCHEDULED/IDENTIFIED
BLAST/AMOS OVERFLIGHTS WITH OPTICS

AMOS

PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

13:00

ORB
73

14:00

ORB
74

15:00

16:00

T
R
W
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A
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A
R
Y

SLEEP

STS-53 (FD 05)

GDN/RTS

MET
DAY 004

ACTRYO

STS

PL

MCC

16:00
A1 (81)
AUTO/VERN

ORB
75

17:00

18:00

ORB
76

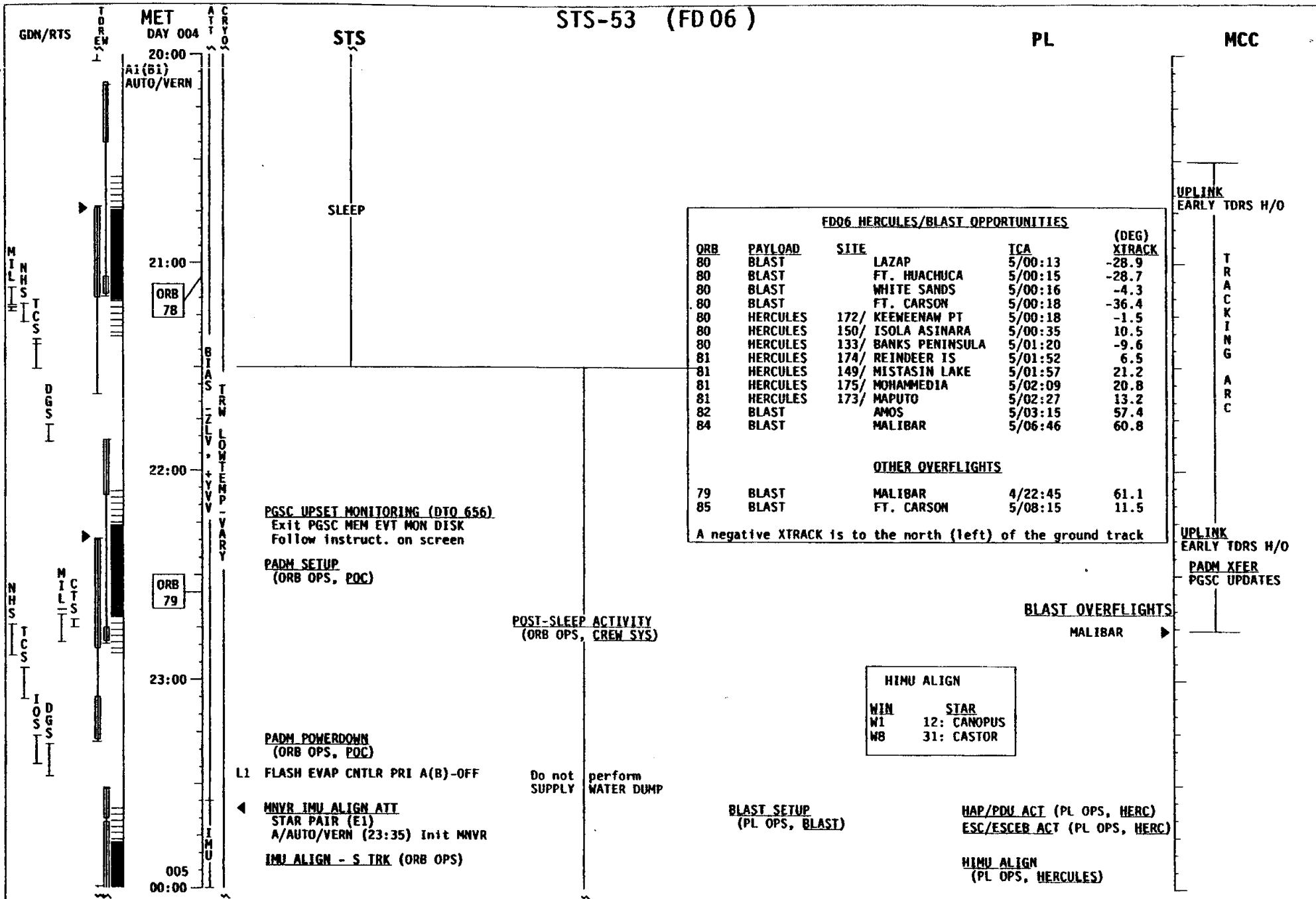
19:00

ORB
77

20:00

SLEEP

STS-53 (FD06)



MET DAY 004

20:00

A1(B1) AUTO/VERN

STS

SLEEP

PL

MCC

21:00

ORB 78

FD06 HERCULES/BLAST OPPORTUNITIES

ORB	PAYLOAD	SITE	ICA	(DEG) XTRACK
80	BLAST	LAZAP	5/00:13	-28.9
80	BLAST	FT. HUACHUCA	5/00:15	-28.7
80	BLAST	WHITE SANDS	5/00:16	-4.3
80	BLAST	FT. CARSON	5/00:18	-36.4
80	HERCULES	172/ KEWEENAW PT	5/00:18	-1.5
80	HERCULES	150/ ISOLA ASINARA	5/00:35	10.5
80	HERCULES	133/ BANKS PENINSULA	5/01:20	-9.6
81	HERCULES	174/ REINDEER IS	5/01:52	6.5
81	HERCULES	149/ MISTASIN LAKE	5/01:57	21.2
81	HERCULES	175/ MOHAMMEDIA	5/02:09	20.8
81	HERCULES	173/ MAPUTO	5/02:27	13.2
82	BLAST	AMOS	5/03:15	57.4
84	BLAST	MALIBAR	5/06:46	60.8

OTHER OVERFLIGHTS

79	BLAST	MALIBAR	4/22:45	61.1
85	BLAST	FT. CARSON	5/08:15	11.5

A negative XTRACK is to the north (left) of the ground track

22:00

PGSC UPSET MONITORING (DIO 656)
Exit PGSC MEM EVT MON DISK
Follow instruct. on screen

PADM SETUP
(ORB OPS, PQC)

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

BLAST OVERFLIGHTS

MALIBAR

23:00

PADM POWERDOWN
(ORB OPS, PQC)

L1 FLASH EVAP CNTLR PRI A(B)-OFF

Do not perform SUPPLY WATER DUMP

HIMU ALIGN
WIN STAR
W1 12: CANOPUS
WB 31: CASTOR

MNVR IMU ALIGN ATT
STAR PAIR (E1)
A/AUTO/VERN (23:35) Init MNVR

BLAST SETUP
(PL OPS, BLAST)

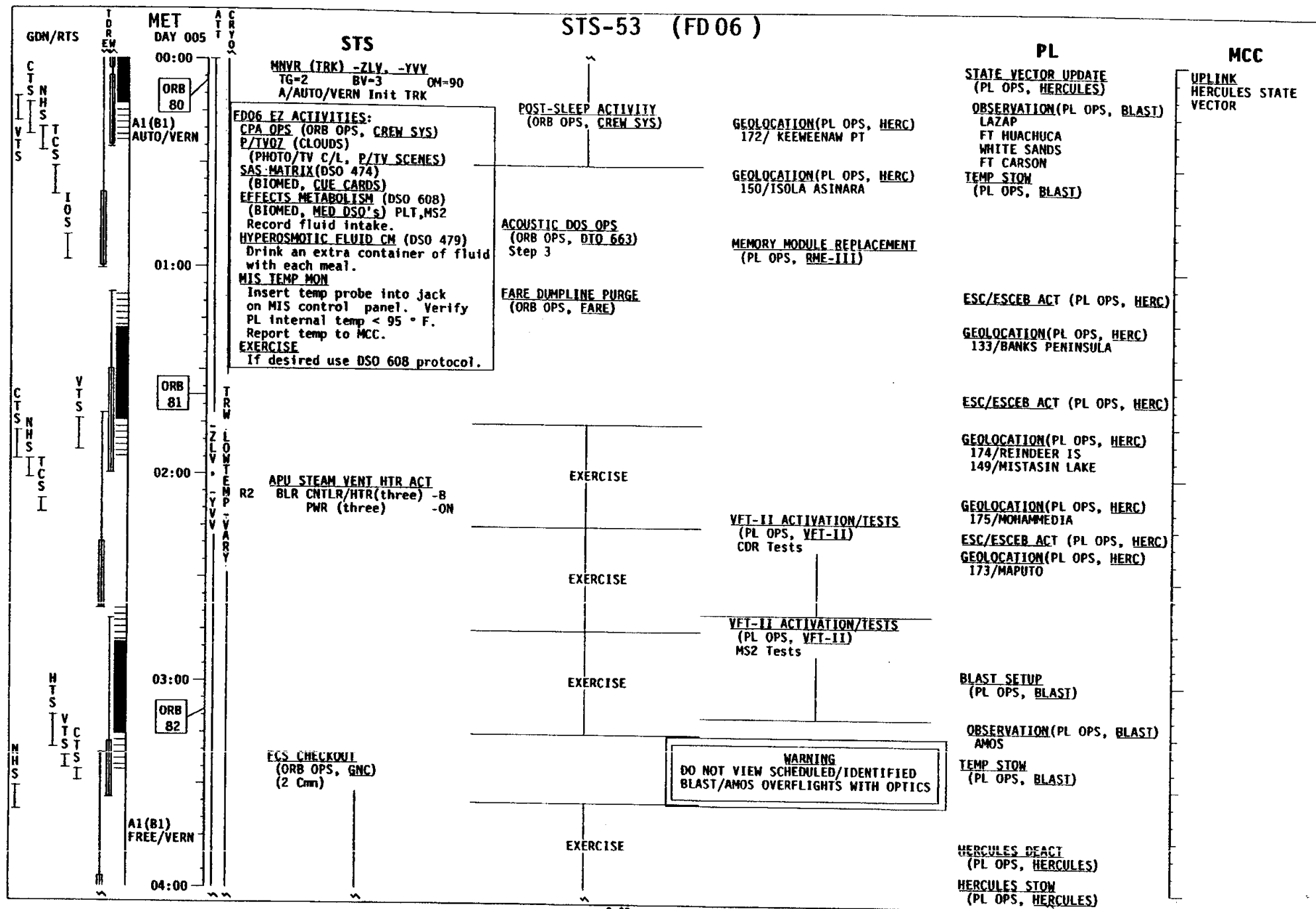
HAP/PDV ACT (PL OPS, HERC)
ESC/ESCB ACT (PL OPS, HERC)

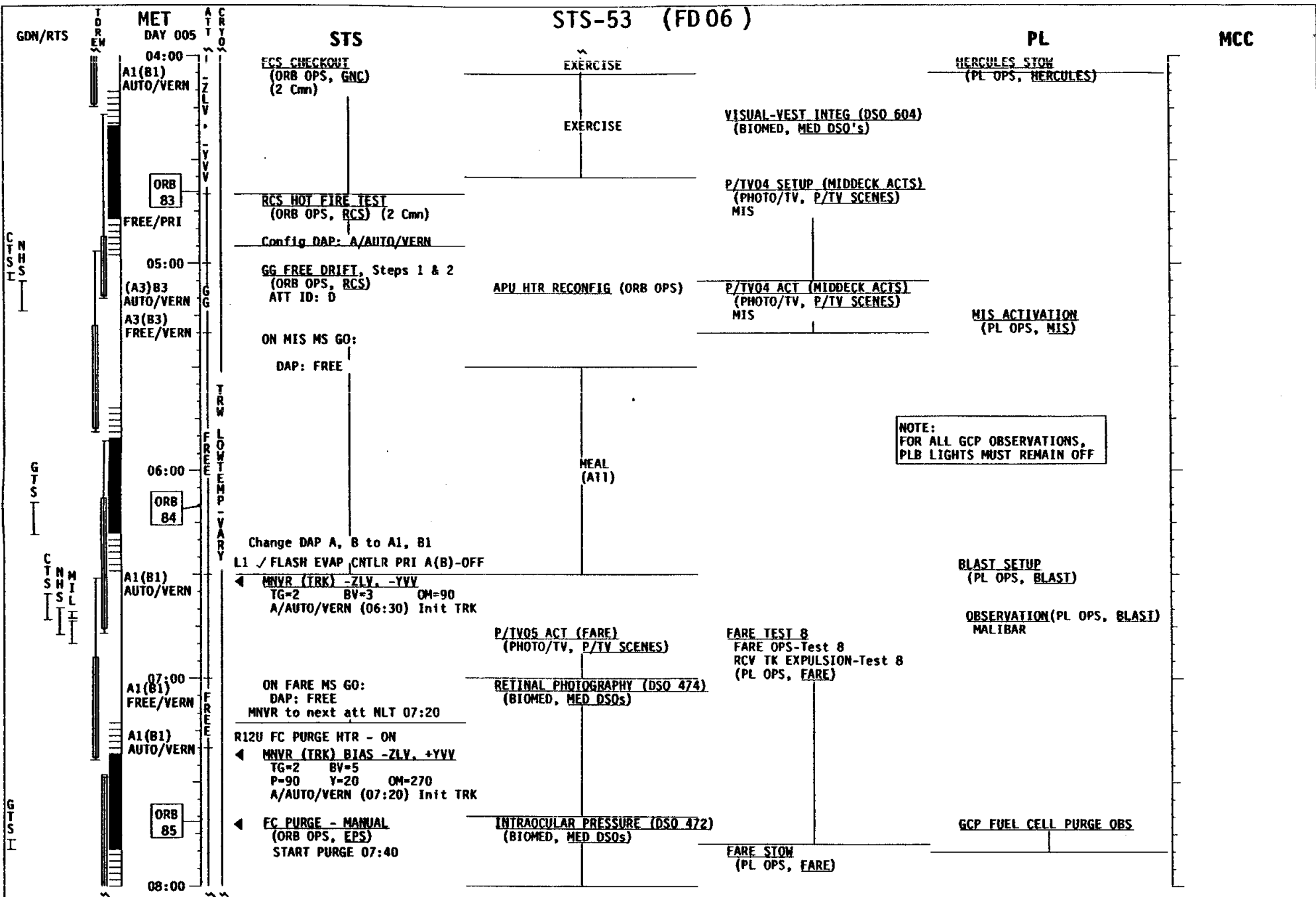
IMU ALIGN - S TRK (ORB OPS)

HIMU ALIGN
(PL OPS, HERCULES)

005
00:00

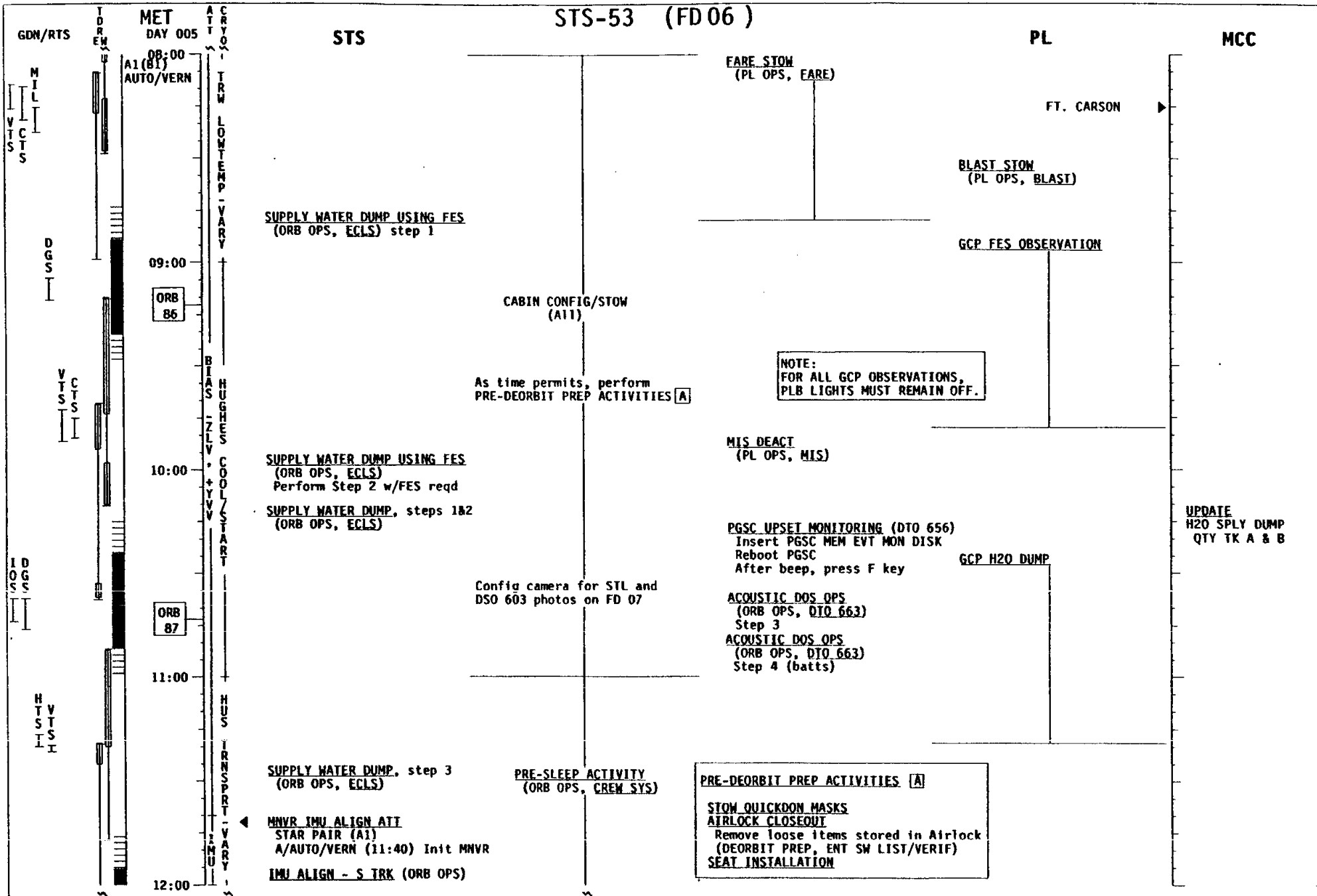
STS-53 (FD 06)

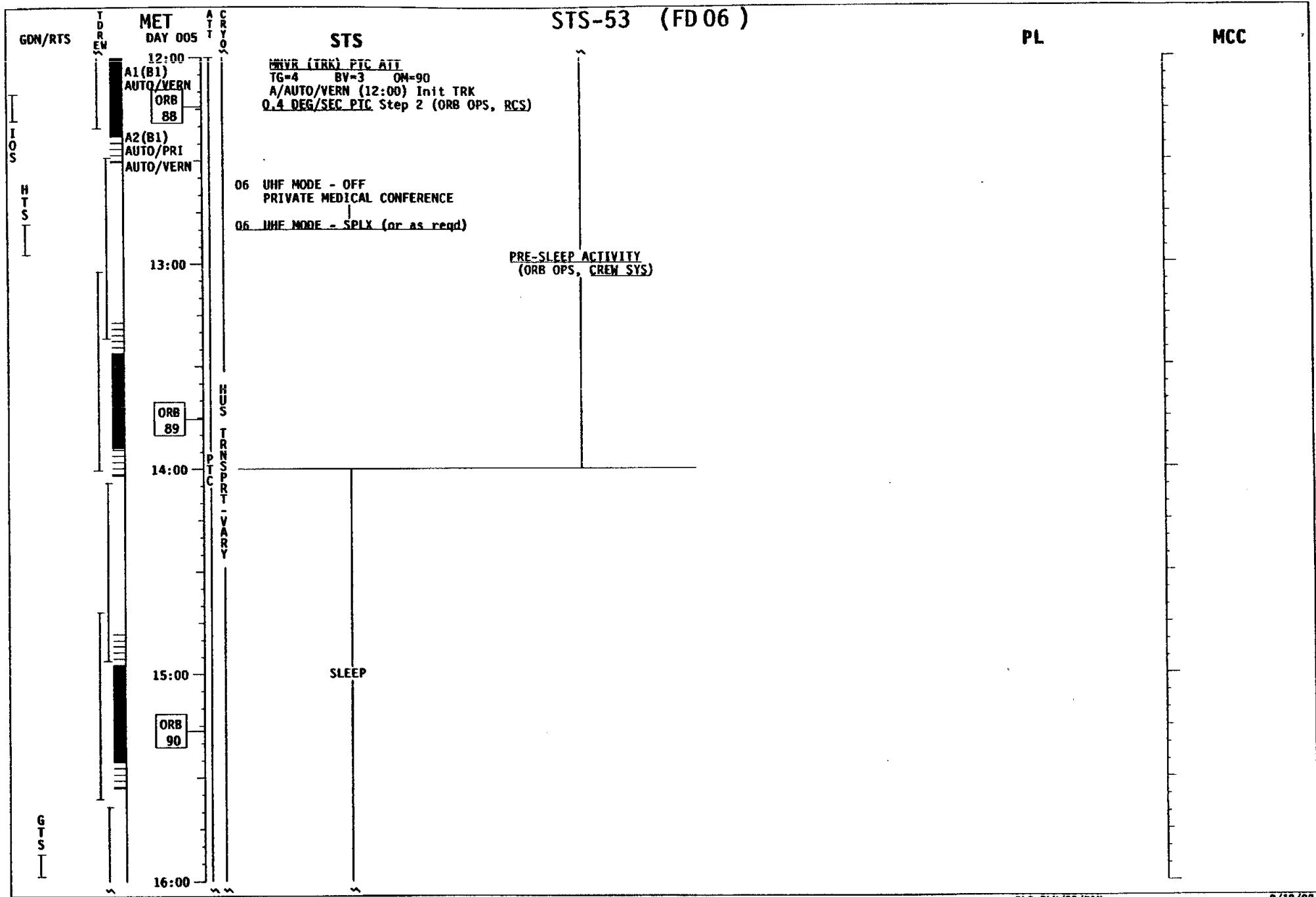




NOTE:
FOR ALL GCP OBSERVATIONS,
PLB LIGHTS MUST REMAIN OFF

STS-53 (FD 06)





STS-53 (FD 06)

GDN/RTS

MET DAY 005

16:00
A2(B1)
AUTO/VERN

ORB
91

17:00

18:00

ORB
92

19:00

ORB
93

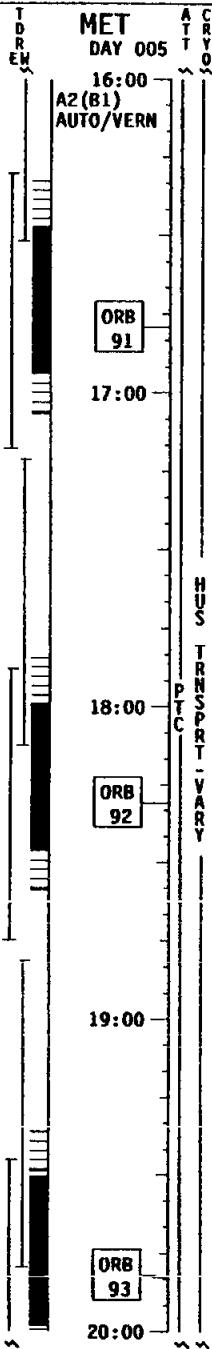
20:00

STS

SLEEP

PL

MCC



TCS

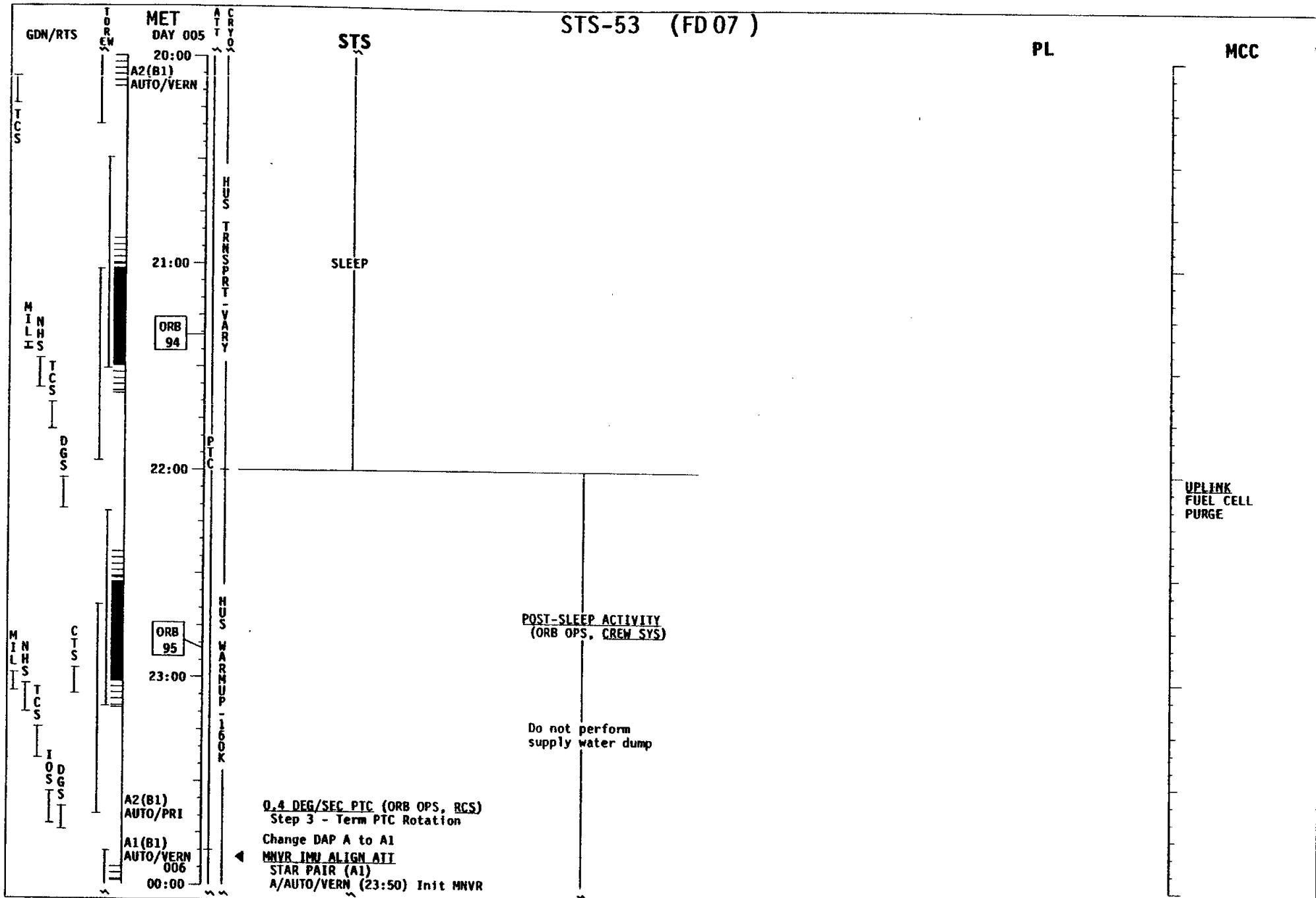
STS

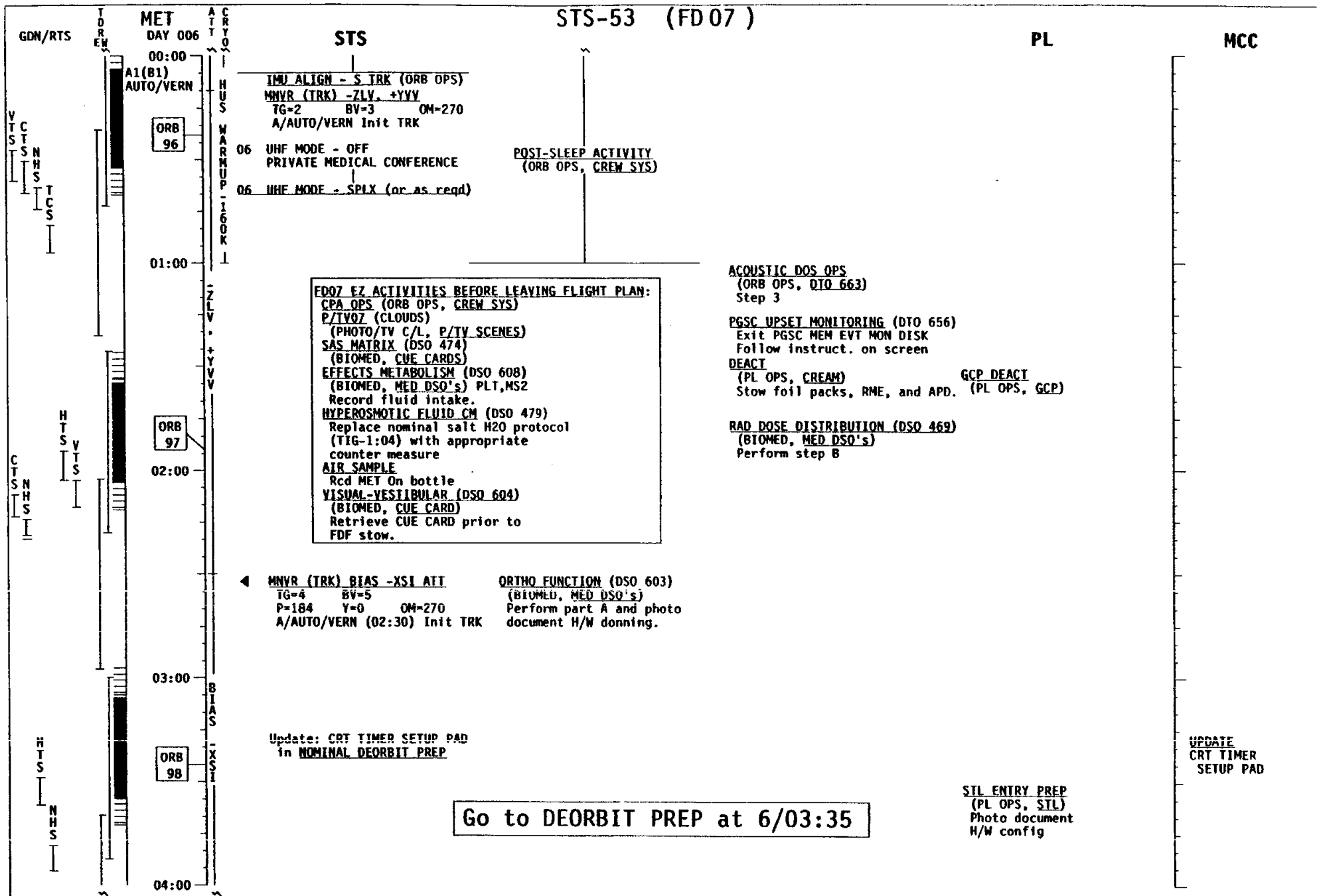
TCS

STS-53 (FD07)

PL

MCC





CONTINGENCY TIMELINES

DOD-1 ONE REV LATE DEPLOY..... 4-3
DOD-1 ORBIT 16 DEPLOY..... 4-7

CONTINGENCY
TIMELINES

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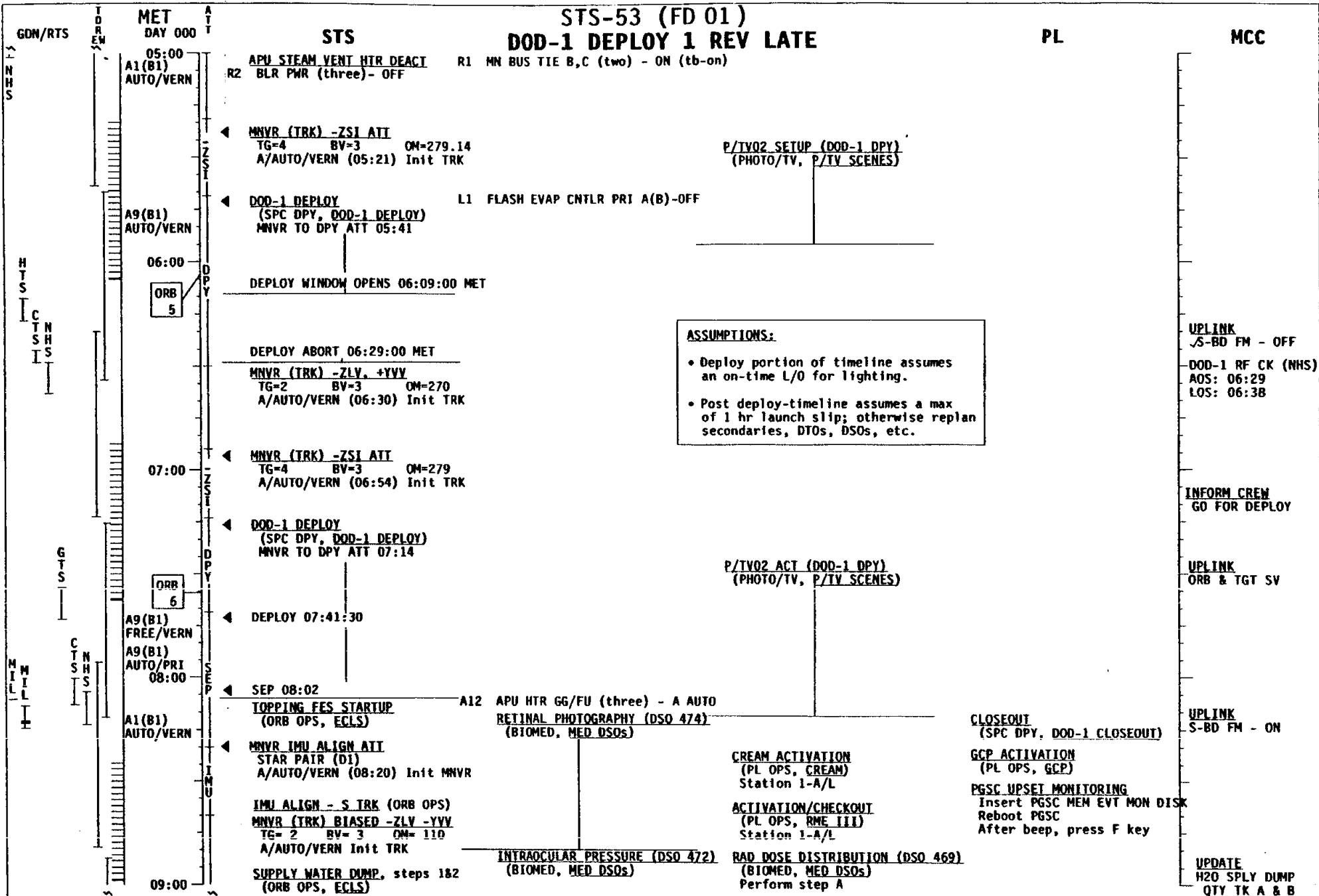
DOD-1 ONE REV LATE DEPLOY

The one rev late deploy shows the activities required to back out of the orbit 4 prime deploy opportunity and to prepare for an orbit 5 deploy.

STS-53 (FD 01) DOD-1 DEPLOY 1 REV LATE

PL

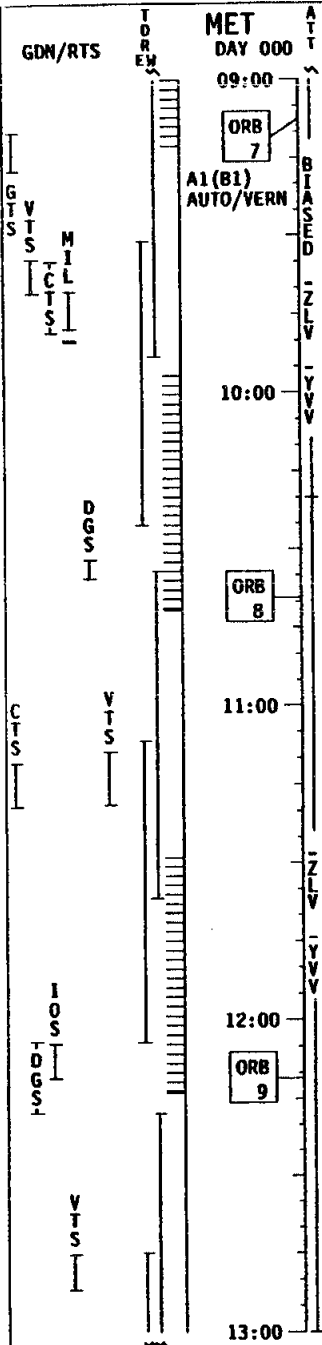
MCC



STS-53 (FD 01)

PL

MCC



STS

CRYO 02 TK HTR SNSR CK
(ORB OPS, EPS)

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

KU-BD ACTIVATION (COMM mode)
(ORB OPS, COMM/INST)

06 UHF MODE - OFF
PRIVATE MEDICAL CONFERENCE

06 UHF MODE - SPLX (or as reqd)

SUPPLY WATER DUMP, step 3
(ORB OPS, ECLS)

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

JHM SEP FOR WATER ACCUMULATION

Photo document CREAM, RME,
and DSO 469 H/W config

PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

SLEEP

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DOD-1 ORBIT 16 DEPLOY

The orbit 16 deploy timeline shows the activities required to back out of the orbit 5 one rev late opportunity and to prepare for a flight day 2 deploy of the DOD-1.

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
10:12:15/ 311:00:15	000:00:00/ 000:12:00	310:06:15/ 310:18:15	01 /310 CST	-72.8		NOVEMBER 5, 1992	STS 53	FINAL	9/18/92

CST :310
 FD :001
 MET :000

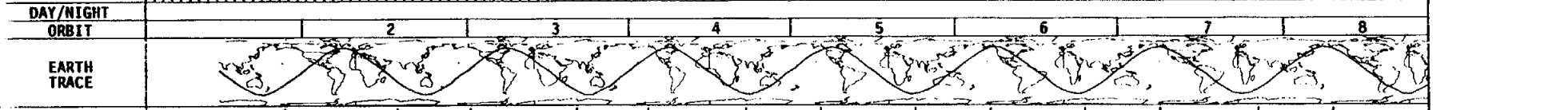
STS **FLIGHT DAY 2 DEPLOY**

ASSUMPTIONS: TWO DEPLOY ATTEMPTS ON FD1
 STAR OF OPPORTUNITY ALIGN FD2 AM
 DELETE FD2 MORNING HERCULES AND BLAST OPS

PRE SLEEP

PL

DAY/NIGHT ORBIT



TDRS E W

GDN/RTS COVERAGE

-IOS -DGS -VTS -DGS -VTS -CTS -NHS -HTS -CTS -NHS -GTS -MIL -DGS -VTS -CTS
 -VTS -CTS -MIL -NHS -TCS -CTS -NHS -HTS -CTS -NHS -GTS -VTS -CTS
 -TCS -HTS -GTS

ATTITUDE

CRYO/HP

NOTES:

- MN BUS CONFIG
- -ZLV, +YVV
- ⊙ STA 1-A/L
- ⊙ RCV ONLY
- ⊙ ACTIVATION/CHECKOUT
- ⊙ DTD 656 PGSC UPSET MONITORING
- ⊙ -ZLV, -YVV

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE											
311:00:15/ 311:12:15	000:12:00/ 001:00:00	310:18:15/ 311:06:15	01 /310 CST	-72.5		NOVEMBER 5, 1992	STS 53	FINAL	9/18/92											
CST :310 FD :001 MET :000	12	19	20	21	22	23	0	CST:311	1	19	FD:02	20	21	22	23	0	MET:001			
STS		SLEEP																		
	PRE SLEEP												POST SLEEP							
PL																				
DAY/NIGHT																				
ORBIT																				
EARTH TRACE																				
TDRS																				
GDN/RTS COVERAGE	-DGS -IOS -VTS -IOS -HTS -HTS -GTS -TCS -GTS -TCS -TCS -MIL -NHS -TCS																			
ATTITUDE	-ZLV, -YVV																			
CRYO/HP																				
NOTES:	DS-BD FM OFF @DTO 656 PGSC UPSET MONITORING @RF CHECK(NHS) @DTO 663 ACOUSTIC DOS																			

ATTITUDE TIMELINE

ATTITUDE
TIMELINE

Attitude Timeline

GHT/MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
1 000/01:12:00 MET 26:03 310/13:27:00 GMT 41:03	TGT=2 BV=5 P= 55.00 Y= 0.00 OM=270.00	A1 AUTO PRI	DSC 0.200 DB AT 5.00 DB RT 0.20	EARTH R 0 P 55	LVLH R=270.00 P=270.00 Y= 55.00	PLBD OPEN S/C ACTIVATION SUN PROTECTED
2 000/02:30:00 MET 32:55 310/14:45:00 GMT 47:55	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 0 P 90	LVLH R= 0.00 P=180.00 Y= 90.00	-ZLV NS ALL RTS SITES SOUTH OF ORBIT WITHIN P/L FOV
3 000/03:35:00 MET 47:51 310/15:50:00 GMT 16:02:51	INRTL R=285.00 MNVR P=186.00 Y=331.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 286 P 24	-Y: 51 -Z: 22	IMU ALIGN PR C1
4 000/03:55:00 MET 04:06:01 310/16:10:00 GMT 21:01	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 0 P 90	LVLH R= 0.00 P=180.00 Y= 90.00	-ZLV NS
5 000/05:21:00 MET 29:40 310/17:36:00 GMT 44:40	TGT=4 BV=3 P= 90.00 Y= 0.00 OM=279.14 RA= 220.515 DEC= -15.7355	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 360 P 90	INRTL R=320.56 P= 77.91 Y= 10.15	-ZSI
6 000/05:41:00 MET 56:00 310/17:56:00 GMT 18:11:00 DPY-27:30	INRTL R=139.45 MNVR P= 90.00 Y= 0.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.01	SUN R 180 P 74		DOD - 1 DEPLOY D = 0/6:09:00
7 000/06:21:00 MET 24:35 310/18:36:00 GMT 39:35 DPY+12:00	TGT=2 BV=5 P= 80.00 Y= 0.00 OM=180.00	B1 AUTO PRI	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 0 P 80	LVLH R=180.00 P=350.00 Y= 0.00	SEP BURN TIG = 0/6:29:00
8 000/06:50:00 MET 57:32 310/19:05:00 GMT 12:32	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 0 P 90	LVLH R= 0.00 P=180.00 Y=270.00	-ZLV NN
9 000/08:45:00 MET 50:45 310/21:00:00 GMT 05:45	INRTL R=125.00 MNVR P=359.00 Y= 25.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 190 P 159	-Y: 12 -Z: 31	IMU/HIMU ALIGN ST PR: E1
10 000/09:05:00 MET 17:05 310/21:20:00 GMT 32:05	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=110.00	A1 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=290.00	BIAS -ZLV NN SUPPLY H2O DUMP 20 DEG OOP
11 000/10:30:00 MET 43:20 310/22:45:00 GMT 58:20	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 NS
12 000/22:05:00 MET 17:30 311/10:20:00 GMT 32:30	INRTL R=125.00 MNVR P=359.00 Y= 25.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 190 P 158	-Y/W1: 12 -Z/W7: 31	IMU/HIMU ALIGN ST PR: E1

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

Attitude Timeline

GMT/MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
1 000/22:49:00 MET 53:12 311/11:04:00 GMT 08:12	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 90.00	B1 AUTO PRI	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y=270.00	-ZLV NN
2 001/05:31:00 MET 40:37 311/17:46:00 GMT 55:37	INRTL R=121.00 MNVR P=247.00 Y=334.00	B1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 95 P 72		OMS 3 LOWERING TIG = 01/05:56
3 001/06:00:00 MET 311/18:15:00 GMT		A1 LVLH VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 359 P 58	LVLH R= 0.59 HOLD P=212.08 Y=359.97	LVLH HOLD
4 001/06:18:00 MET 27:30 311/18:33:00 GMT 42:30	INRTL R=239.00 MNVR P= 69.00 Y= 30.00	B1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 85 P 109		OMS 4 CIRC TIG = 01/06:43
5 001/06:50:00 MET 58:12 311/19:05:00 GMT 13:12	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 0 P 90	LVLH R= 0.00 P=180.00 Y= 90.00	-ZLV NS
6 001/09:05:00 MET 12:50 311/21:20:00 GMT 27:50	INRTL R= 76.00 MNVR P= 89.00 Y= 37.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 241 P 100	-Y: 47 -Z: 31	IMU/-Z CAL ST PR: A1
7 001/09:30:00 MET 43:11 311/21:45:00 GMT 58:11	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 NS
8 001/21:10:00 MET 17:19 312/09:25:00 GMT 32:19	INRTL R= 76.00 MNVR P= 89.00 Y= 37.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 241 P 100	-Y: 47 -Z: 31	IMU ALIGN ST PR: A1
9 001/21:30:00 MET 44:44 312/09:45:00 GMT 59:44	TGT=2 BV=1 P= 0.00 Y= 0.00 OM=180.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 107 P 0	LVLH R=180.00 P=270.00 Y= 0.00	ODERACS DPY DPY = 1/21:58 SEP = 1/22:03
10 001/22:35:00 MET 45:00 312/10:50:00 GMT 11:00:00	TGT=2 BV=5 P=270.00 Y= 0.00 OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y=270.00	+ZLV NN GCP VRCS 0 DEG SS = 1/22:57:00
11 001/22:57:30 MET 59:10 312/11:12:30 GMT 14:10	TGT=2 BV=5 P=270.00 Y= 0.00 OM=300.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y=300.00	VRCS 30 DEG
12 001/23:00:00 MET 01:40 312/11:15:00 GMT 16:40	TGT=2 BV=5 P=270.00 Y= 0.00 OM=330.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y=330.00	VRCS 60 DEG

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

Attitude Timeline

GMT/MET	MNVR OPTION	DAP	E/Z	REF ATT/REMARKS	EVENT	
1 001/23:03:30 MET 05:10 312/11:18:30 GMT 20:10	TGT=2 BV=5 P=270.00 Y= 0.00 OM= 0.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y= 0.00	VRCS 90 DEG
2 001/23:07:00 MET 08:40 312/11:22:00 GMT 23:40	TGT=2 BV=5 P=270.00 Y= 0.00 OM= 30.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y= 30.00	VRCS 120 DEG
3 001/23:10:30 MET 12:10 312/11:25:30 GMT 27:10	TGT=2 BV=5 P=270.00 Y= 0.00 OM= 60.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y= 60.00	VRCS 150 DEG
4 001/23:14:00 MET 15:40 312/11:29:00 GMT 30:40	TGT=2 BV=5 P=270.00 Y= 0.00 OM= 90.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y= 90.00	VRCS 180 DEG
5 002/00:05:00 MET 12:30 312/12:20:00 GMT 27:30	TGT=2 BV=5 P=270.00 Y= 0.00 OM= 0.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y= 0.00	GCP OG W/ YAW +ZLV NOSE FWD
6 002/00:28:00 MET 312/12:43:00 GMT	LVLH FREE ROTATION ROTR ABOUT -Z AXIS RATE=0.200	A1 LVLH VERN	DSC 0.200 DB AT 1.00 DB RT 0.02		LVLH R= 0.00 P= 0.00 Y= 0.00	INIT ROT AT SS LVLH -YAW ROTR 180 DEG SS = 2/00:28
7 002/00:43:00 MET 312/12:58:00 GMT		A1 LVLH VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 180 P 90	LVLH R=180.00 HOLD P=180.00 Y= 0.00	STOP ROTATION (ADI YAW = 180)
8 002/01:10:00 MET 17:30 312/13:25:00 GMT 32:30	TGT=2 BV=5 P=270.00 Y= 0.00 OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y=270.00	GCP OG W/ PRCS +ZLV NN
9 002/02:20:00 MET 34:13 312/14:35:00 GMT 49:13	TGT=2 BV=5 P=359.29 Y= 15.39 OM= 92.09	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 93 P 15	LVLH R= 92.02 P=285.36 Y= 1.26	GCP AG 90 NOON TO MIDNITE
10 002/02:40:00 MET 312/14:55:00 GMT	LOAD NEXT ATT AS FUT MNVR					
11 002/03:40:00 MET 47:40 312/15:55:00 GMT 16:02:40	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 0 P 90	LVLH R= 0.00 P=180.00 Y=270.00	-ZLV NN
12 002/04:35:00 MET 50:00 312/16:50:00 GMT 17:05:00	TGT=2 BV=5 P=270.00 Y= 0.00 OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y=270.00	+ZLV NN GCP VRCS 0 DEG SS = 2/05:01

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

Attitude Timeline

GMT/MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
1 002/05:01:30 MET 03:10 312/17:16:30 GMT 18:10	TGT=2 BV=5 P=270.00 Y= 0.00 OM=300.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y=300.00	VRCS 30 DEG
2 002/05:05:00 MET 06:40 312/17:20:00 GMT 21:40	TGT=2 BV=5 P=270.00 Y= 0.00 OM=330.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y=330.00	VRCS 60 DEG
3 002/05:08:30 MET 10:10 312/17:23:30 GMT 25:10	TGT=2 BV=5 P=270.00 Y= 0.00 OM= 0.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y= 0.00	VRCS 90 DEG
4 002/05:12:00 MET 13:40 312/17:27:00 GMT 28:40	TGT=2 BV=5 P=270.00 Y= 0.00 OM= 30.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y= 30.00	VRCS 120 DEG
5 002/05:15:30 MET 17:10 312/17:30:30 GMT 32:10	TGT=2 BV=5 P=270.00 Y= 0.00 OM= 60.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y= 60.00	VRCS 150 DEG
6 002/05:19:00 MET 20:40 312/17:34:00 GMT 35:40	TGT=2 BV=5 P=270.00 Y= 0.00 OM= 90.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y= 90.00	VRCS 180 DEG
7 002/06:10:00 MET 17:30 312/18:25:00 GMT 32:30	TGT=2 BV=5 P=270.00 Y= 0.00 OM= 0.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y= 0.00	+ZLV NOSE FWD GCP OG W/ YAW
8 002/06:32:00 MET 312/18:47:00 GMT	LVLH FREE ROTATION ROTR ABOUT -Z AXIS RATE=0.200	A1 LVLH VERN	DSC 0.200 DB AT 1.00 DB RT 0.02		LVLH R= 0.00 P= 0.00 Y= 0.00	INIT ROT AT SS LVLH -YAW ROTR 180 DEG SS = 2/06:32
9 002/06:47:00 MET 312/19:02:00 GMT		A1 LVLH VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 180 P 90	LVLH R=180.00 HOLD P=180.00 Y= 0.00	STOP ROTATION (ADI YAW = 180)
10 002/06:50:00 MET 07:05:00 312/19:05:00 GMT 20:00	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 NN
11 002/09:20:00 MET 28:25 312/21:35:00 GMT 43:25	INRTL R= 76.00 MNVR P= 89.00 Y= 37.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 240 P 100	-Y: 47 -Z: 31	IMU ALIGN ST PR: A1
12 002/09:40:00 MET 21 312/21:55:00 GMT 21	TGT=12 RA= 95.711 BV=1 DEC= -52.668S P= 0.00 Y= 0.00 OM=(bLank)	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 241 P 97	INRTL R= 72.78 P= 94.34 Y= 37.12	COAS CAL +X +X: 12

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

Attitude Timeline

GHT/MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
1 002/09:55:00 MET 10:07:20 312/22:10:00 GMT 22:20	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=110.00	A1 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=290.00	BIAS -ZLV NN SUPPLY H2O DUMP
2 002/23:00:00 MET 02:18 313/11:15:00 GMT 17:18	INRTL R=125.00 MNVR P=359.00 Y= 25.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 187 P 156	-Y: 12 -Z: 31	IMU/HIMU ALIGN ST PR: E1
3 002/23:25:00 MET 34:54 313/11:40:00 GMT 49:54	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 NN
4 003/03:35:00 MET 49:32 313/15:50:00 GMT 16:04:32	TGT=2 BV=5 P=303.02 Y= 1.97 OM=243.28	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 178 P 57	LVLH R=228.04 P=234.13 Y=312.22	GCP AG 30 MIDNITE TO NOON
5 003/05:10:00 MET 11:40 313/17:25:00 GMT 26:40	TGT=2 BV=5 P=286.33 Y=352.56 OM=238.20	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 188 P 74	LVLH R=198.37 P=210.42 Y=303.41	GCP AG 10 MIDNITE TO NOON
6 003/06:25:00 MET 27:57 313/18:40:00 GMT 42:57	TGT=2 BV=5 P=270.00 Y= 0.00 OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y=270.00	+ZLV NN GCP PRCS SS = 3/06:49
7 003/08:45:00 MET 09:00:00 313/21:00:00 GMT 15:00	TGT=2 BV=5 P= 60.00 Y= 0.00 OM= 90.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 60	LVLH R= 90.00 P=270.00 Y=300.00	BIAS -ZLV NN BLAST
8 003/09:20:00 MET 34:34 313/21:35:00 GMT 49:34	TGT=2 BV=5 P= 90.00 Y= 20.00 OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 20 P 90	LVLH R= 0.00 P=160.00 Y= 90.00	BIAS -ZLV NS GCP H2O DUMP
9 003/11:10:00 MET 18:10 313/23:25:00 GMT 33:10	INRTL R= 76.00 MNVR P= 89.00 Y= 37.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 239 P 100	-Y: 47 -Z: 31	IMU ALIGN ST PR: A1
10 003/11:30:00 MET 41:28 313/23:45:00 GMT 56:28	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 0 P 90	LVLH R= 0.00 P=180.00 Y= 90.00	-ZLV NS
11 003/23:15:00 MET 27:44 314/11:30:00 GMT 42:44	INRTL R=125.00 MNVR P=359.00 Y= 25.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 187 P 155	-Y: 12 -Z: 31	IMU/HIMU ALIGN ST PR: E1
12 003/23:40:00 MET 49:16 314/11:55:00 GMT 12:04:16	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 NN

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

Attitude Timeline

GMT/MET		MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
1	004/02:10:00 MET 25:00 314/14:25:00 GMT 40:00	TGT=2 BV=5 P=270.00 Y= 0.00 OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y=270.00	+ZLV NN GCP VRCS 0 DEG SS = 4/02:32:00
2	004/02:32:30 MET 34:10 314/14:47:30 GMT 49:10	TGT=2 BV=5 P=270.00 Y= 0.00 OM=300.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y=300.00	VRCS 30 DEG
3	004/02:36:00 MET 37:40 314/14:51:00 GMT 52:40	TGT=2 BV=5 P=270.00 Y= 0.00 OM=330.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y=330.00	VRCS 60 DEG
4	004/02:39:30 MET 41:10 314/14:54:30 GMT 56:10	TGT=2 BV=5 P=270.00 Y= 0.00 OM= 0.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y= 0.00	VRCS 90 DEG
5	004/02:43:00 MET 44:40 314/14:58:00 GMT 59:40	TGT=2 BV=5 P=270.00 Y= 0.00 OM= 30.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y= 30.00	VRCS 120 DEG
6	004/02:46:30 MET 48:10 314/15:01:30 GMT 03:10	TGT=2 BV=5 P=270.00 Y= 0.00 OM= 60.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y= 60.00	VRCS 150 DEG
7	004/02:50:00 MET 51:40 314/15:05:00 GMT 06:40	TGT=2 BV=5 P=270.00 Y= 0.00 OM= 90.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y= 90.00	VRCS 180 DEG
8	004/03:20:00 MET 35:00 314/15:35:00 GMT 50:00	TGT=2 BV=5 P=270.00 Y= 0.00 OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y=270.00	+ZLV NN GCP OG W/ PRCS
9	004/07:30:00 MET 314/19:45:00 GMT		A1 FREE VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y=270.00 HOLD	FARE 6 FREE DRIFT
10	004/08:10:00 MET 314/20:25:00 GMT	TGT=2 BV=5 P=270.00 Y= 0.00 OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y=270.00	+ZLV NN GCP VRCS 0 DEG SS = 4/08:37
11	004/08:37:30 MET 39:10 314/20:52:30 GMT 54:10	TGT=2 BV=5 P=270.00 Y= 0.00 OM=300.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y=300.00	VRCS 30 DEG
12	004/08:41:00 MET 42:40 314/20:56:00 GMT 57:40	TGT=2 BV=5 P=270.00 Y= 0.00 OM=330.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y=330.00	VRCS 60 DEG

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

Attitude Timeline

GMT/MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
1 004/08:44:30 MET 46:10 314/20:59:30 GMT 21:01:10	TGT=2 BV=5 P=270.00 Y= 0.00 OM= 0.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y= 0.00	VRCS 90 DEG
2 004/08:48:00 MET 49:40 314/21:03:00 GMT 04:40	TGT=2 BV=5 P=270.00 Y= 0.00 OM= 30.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y= 30.00	VRCS 120 DEG
3 004/08:51:30 MET 53:10 314/21:06:30 GMT 08:10	TGT=2 BV=5 P=270.00 Y= 0.00 OM= 60.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y= 60.00	VRCS 150 DEG
4 004/08:55:00 MET 56:40 314/21:10:00 GMT 11:40	TGT=2 BV=5 P=270.00 Y= 0.00 OM= 90.00	A10 AUTO PRI	DSC 0.300 DB AT 2.00 DB RT 0.20	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y= 90.00	VRCS 180 DEG
5 004/09:05:00 MET 314/21:20:00 GMT		A1 FREE VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 180 P 90	LVLH R= 0.00 HOLD P= 0.00 Y= 90.00	FARE 7 FREE DRIFT
6 004/09:40:00 MET 53:20 314/21:55:00 GMT 22:08:20	TGT=2 BV=5 P= 90.00 Y= 20.00 OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 20 P 90	LVLH R= 0.00 P=160.00 Y= 90.00	BIAS -ZLV NS GCP H2O DUMP
7 004/11:25:00 MET 32:31 314/23:40:00 GMT 47:31	INRTL R= 76.00 MNVR P= 89.00 Y= 37.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 238 P 100	-Y: 47 -Z: 31	IMU ALIGN ST PR: A1
8 004/11:45:00 MET 56:58 315/00:00:00 GMT 11:58	TGT=2 BV=5 P= 90.00 Y= 20.00 OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 20 P 90	LVLH R= 0.00 P=160.00 Y= 90.00	BIAS -ZLV NS
9 004/23:35:00 MET 47:56 315/11:50:00 GMT 12:02:56	INRTL R=125.00 MNVR P=359.00 Y= 25.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 186 P 154	-Y: 47 -Z: 31	IMU/HIMU ALIGN ST PR: E1
10 005/00:00:00 MET 10:15 315/12:15:00 GMT 25:15	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 NN
11 005/05:00:00 MET 07:28 315/17:15:00 GMT 22:28	TGT=2 BV=5 P=177.51 Y= 0.77 OM= 69.09	B3 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 17 P 177	LVLH R=290.92 P= 91.61 Y=357.95	GG FREE DRIFT MIS ATTITUDE ID: D
12 005/05:15:00 MET 315/17:30:00 GMT		A3 LVLH VERN	DSC 0.008 DB AT 0.07 DB RT 0.01	EARTH R 17 P 177	LVLH R=290.92 HOLD P= 91.61 Y=357.95	MIS FREE DRIFT

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

5-8

FLT PLN/53/FIN

Attitude Timeline

GMT/MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
1 005/06:30:00 MET 37:28 315/18:45:00 GMT 52:28	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 0 P 90	LVLH R= 0.00 P=180.00 Y=270.00	-ZLV NN BLAST
2 005/07:00:00 MET 315/19:15:00 GMT		A1 LVLH VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 0 P 90	LVLH R= 0.00 HOLD P=180.00 Y=270.00	FARE 8 FREE DRIFT
3 005/07:20:00 MET 35:00 315/19:35:00 GMT 50:00	TGT=2 BV=5 P= 90.00 Y= 20.00 OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 20 P 90	LVLH R= 0.00 P=160.00 Y= 90.00	BIAS -ZLV NS GCP H2O DUMP
4 005/11:40:00 MET 46:56 315/23:55:00 GMT 316/00:01:56	INRTL R= 76.00 MNVR P= 89.00 Y= 37.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 237 P 101	-Y: 47 -Z: 31	IMU ALIGN ST PR: A1
5 005/12:00:00 MET 14:32 316/00:15:00 GMT 29:32	TGT=4 BV=3 P= 90.00 Y= 0.00 OM= 90.00 RA= 225.803 DEC= -17.2735	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 0 P 90	INRTL R=252.52 P=311.63 Y=315.87	PTC START ATT
6 005/12:15:00 MET 316/00:30:00 GMT	INRTL BV=1 ROTR P= 0.00 Y= 0.00	A2 AUTO PRI	DSC 0.400 DB AT 1.00 DB RT 0.20		INRTL R=252.60 P=311.72 Y=315.86	PTC ROTATION
7 005/23:40:00 MET 316/11:55:00 GMT		A2 INRT PRI	DSC 0.400 DB AT 1.00 DB RT 0.20	SUN R 120 P 90	INRTL R=132.60 HOLD P=311.72 Y=315.86	PTC CANCEL
8 005/23:50:00 MET 006/00:02:55 316/12:05:00 GMT 17:55	INRTL R= 76.00 MNVR P= 89.00 Y= 37.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 237 P 101	-Y: 47 -Z: 31	IMU ALIGN ST PR: A1
9 006/00:10:00 MET 20:15 316/12:25:00 GMT 35:15	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 NS
10 006/02:30:00 MET 44:37 316/14:45:00 GMT 59:37	TGT=4 BV=5 P=184.00 Y= 0.00 OM=270.00 RA= 226.415 DEC= -17.4405	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 180 P 176	INRTL R= 76.00 P=334.16 Y= 39.84	TAIL SUN
11 006/04:40:00 MET 48:09 316/16:55:00 GMT 17:03:09	INRTL R=179.00 MNVR P=283.00 Y= 3.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 50 P 118	-Y: 23 -Z: 41	DEORBIT PREP IMU ALIGN
12 006/05:00:00 MET 04:38 316/17:15:00 GMT 19:38	INRTL R=143.00 MNVR P=255.00 Y=321.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 78 P 70	-Y: 40 -Z: 25	DEORBIT PREP IMU VERIF

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

Attitude Timeline

GMT/MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
006/07:25:00 MET 31:10	INRTL R=212.00 MNVR P= 3.00 Y=312.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 78 P 85		D/O BURN ATT TIG 6/07:35:00
316/19:40:00 GMT 46:10						

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

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

STS-53 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	0.10	0.05	1.00	0.10
<u>ROTATION</u>											
DSC RT NORM °/sec	2	0.200	0.400	0.200	0.500	0.200	0.200	0.200	0.200	0.200	0.300
VERN °/sec	3	0.200	0.400	0.008	0.200	0.200	0.200	0.200	0.200	0.200	0.200
PULSE NORM °/sec	4	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
VERN °/sec	5	0.010	0.010	0.010	0.010	0.050	0.010	0.010	0.010	0.010	0.070
COMP NORM °/sec	6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
VERN °/sec	7	.000	.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	5.00	2.00	2.00	1.00	2.00
VERN (deg)	9	1.000	1.000	0.070	1.000	1.000	1.000	1.000	1.000	1.000	1.000
RATE NORM °/sec	10	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
VERN °/sec	11	.020	.020	.010	.020	.020	.020	.020	.020	.010	.020
<u>JET OPT</u>											
P	12	1	1	1	1	1	3	1 or 3	1	1	1
Y	13	1	1	3	1	1	3	1 or 3	1	1	1
<u>CNTL ACCEL</u>											
	14	0	0	0	0	0	0	0	0	0	0

*I-LOADED OPS-2 DAP Configuration

DAP B CONFIGURATIONS

	ITEM #	B1*	B2	B3	B4	B5	B6	B7	B8	B9
<u>TRANSLATION</u>										
PULSE ft/sec	15	0.02	0.02	0.02	0.02	0.02	0.02	0.05	0.01	0.02
<u>ROTATION</u>										
DSC RT NORM °/sec	16	0.500	0.200	0.200	0.200	0.200	0.500	0.500	0.200	0.200
VERN °/sec	17	0.200	0.200	0.200	0.008	0.016	0.310	0.200	0.200	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	0.002	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
<u>DEADBAND</u>										
ATT NORM (deg)	22	3.00	3.00	3.00	0.30	3.00	3.00	2.00	2.00	0.50
VERN (deg)	23	1.000	1.000	1.000	0.100	0.033	2.000	1.000	1.000	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	.020	.020
<u>JET OPT</u>										
P	26	1	3	1	3	3	1	1 or 3	1	3
Y	27	1	3	1	3	3	1	1 or 3	1	3
<u>CNTL ACCEL</u>	28	0	0	0	0	0	0	0	0	0

*I-LOADED OPS-2 DAP Configuration

ALT DAP CONFIGURATIONS

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

*I-LOADED OPS-2 DAP Configuration



<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	- IMU ROTATION	B5	- COAS CAL
A6	- LOSS OF VERN (TAIL ONLY)	B6	- BLAST PLMT
A7	- RENDEZVOUS	B7	- RENDEZVOUS
A8	- PROX OPS	B8	- PROX OPS
A9	- SPECIAL DEPLOY	B9	- OG PRCS
A10	- GCP OPS		

FLT PLN-1a/53/0/B



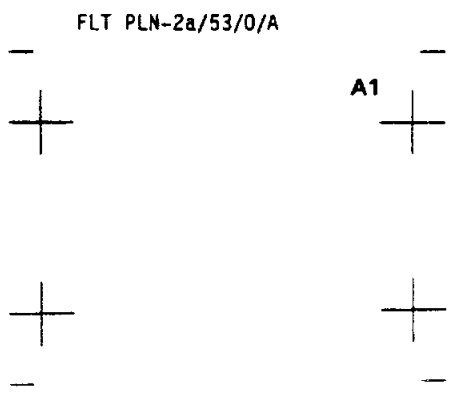
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FLT PLN-1b/53/0/A





DAP A

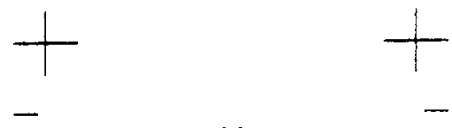


FLT PLN-2a/53/0/A

A1

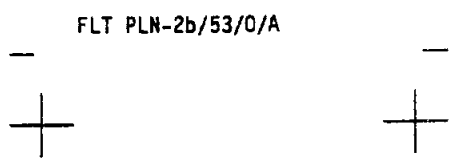
DAP A1

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

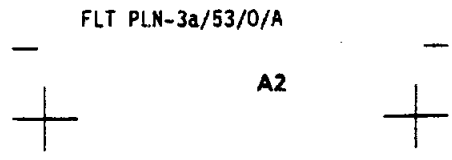


A1

0.1 0	1	TRANSLATION	
		PULSE	
		ROTATION	
0.2 0 0	2	DSC RT	NORM
0.2 0 0	3	VERN	
0.1 0 0	4	PULSE	NORM
0.0 1 0	5	VERN	
0.0 0 0	6	COMP	NORM
0.0 0 0	7	VERN	
		DEADBAND	
5.0 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-2b/53/0/A



FLT PLN-3a/53/0/A

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

FLT PLN-3b/53/0/A

FLT PLN-4a/53/0/A



A3



A2

DAP A3

PURPOSE:

GG

A3

0.1 0	1	TRANSLATION	
		PULSE	
ROTATION			
0.2 0 0	2	DSC RT	NORM
0.0 0 0	3		VERN
0.1 0 0	4	PULSE	NORM
0.0 1 0	5		VERN
.0 0 0	6	COMP	NORM
.0 0 0	7		VERN
DEADBAND			
1.0 0	8	ATT	NORM
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/53/0/A

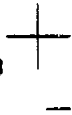
FLT PLN-5a/53/0/A



A4



A3



DAP A4

PURPOSE:
PRE/POST DEPLOY

A4

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

FLT PLN-5b/53/0/A

FLT PLN-6a/53/0/A



A5



A4

DAP A5

PURPOSE:
IMU ROTATION

A5

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

FLT PLN-6b/53/0/A

FLT PLN-7a/53/0/A



A6



A5

DAP A6

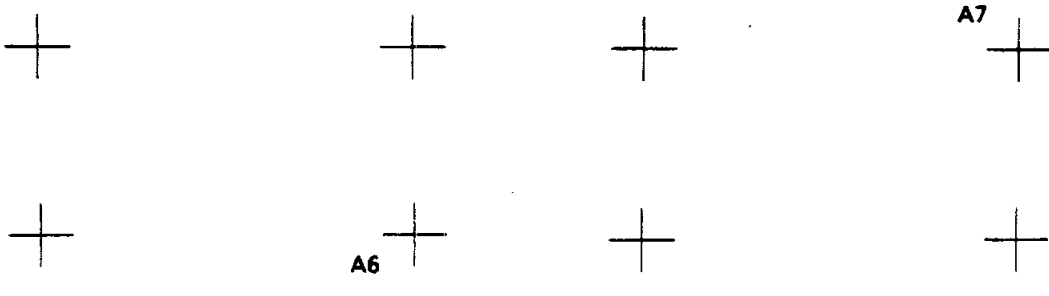
PURPOSE:
LOSS OF VERN
(TAIL ONLY)

A6

0.1 0	1	TRANSLATION PULSE	
ROTATION			
0.2 0 0	2	DSC RT	NORM
0.2 0 0	3		VERN
0.1 0 0	4	PULSE	NORM
0.0 1 0 0	5		VERN
.0 0 0 0	6	COMP	NORM
.0 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/53/0/A

FLT PLN-8a/53/0/A



A7

A6

DAP A7

PURPOSE:
RENDEZVOUS

A7

0.1 0	1	TRANSLATION PULSE	
ROTATION			
0.2 0 0	2	DSC RT	NORM
0.2 0 0	3		VERN
0.1 0 0	4	PULSE	NORM
0.0 1 0 0	5		VERN
.0 0 0 0	6	COMP	NORM
.0 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/53/0/A

FLT PLN-9a/53/0/A



A8



A7



DAP A8

PURPOSE:

PROX OPS

A8

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

FLT PLN-9b/53/0/A

FLT PLN-10a/53/0/A



A9



A8



DAP A9

PURPOSE:

SPECIAL DEPLOY

A9

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

FLT PLN-10b/53/0/A

FLT PLN-11a/53/0/A



A10





A9



DAP A10

PURPOSE:
GCP OPS

A10

0.1 0	1	TRANSLATION	
		PULSE	
		ROTATION	
0.3 0 0	2	DSC RT	NORM
0.2 0 0	3		VERN
0.1 0 0	4	PULSE	NORM
0.0 7 0	5		VERN
.0 0 0	6	COMP	NORM
	7		VERN
		DEADBAND	
2.0 0	8	ATT	NORM
1.0 0 0	9		VERN
0.2 0	10	RATE	NORM
.0 2 0	11		VERN
1	12	JET OPT	P
1	13		Y
0	14	CNTL ACCEL	

FLT PLN-11b/53/0/B



FLT PLN-12a/53/0/B



A10



DAP B

FLT PLN-12b/53/0/A



FLT PLN-13a/53/0/A



B1





DAP B1

PURPOSE:

NOMINAL
PRCS IMU ALIGN
OMS & RCS BURNS

B1

15	0.0 2
16	0.5 0 0
17	0.2 0 0
18	0.0 4
19	0.0 0 2
20	.0 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-13b/53/0/A

FLT PLN-14a/53/0/A



B2



B1



B2



DAP B2

PURPOSE:

LOSS OF VERN
(TAIL ONLY)

15	0.0 2
16	0.2 0 0
17	0.2 0 0
18	0.0 4
19	0.0 0 2
20	.0 0 0
21	.0 0 0
22	3.0 0
23	- 1.0 0 0
24	0.2 0
25	.0 2 0
26	3
27	3
28	0

FLT PLN-14b/53/0/A

FLT PLN-15a/53/0/A



B3



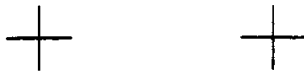


B2

DAP B3

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

FLT PLN-15b/53/0/A



B3

OAP B4

PURPOSE:
SSUS DEPLOY

FLT PLN-16b/53/0/A



B3

15	0.0 2
16	0.2 0 0
17	0.2 0 0
18	0.0 0 4
19	0.0 0 2
20	.0 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-16a/53/0/A



B4



B4

15	0.0 2
16	0.2 0 0
17	0.0 0 8
18	0.0 0 4
19	0.0 0 2
20	.0 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-17a/53/0/A



B5

+ +
 B4

DAP B5

PURPOSE:
 COAS CAL

FLT PLN-17b/53/0/A

+ +

+ +
 B5

DAP B6

PURPOSE:
 BLAST PLMT

FLT PLN-18b/53/0/B

+ +

+ +

B5

15	0.0	2
16	0.2	0 0
17	0.0	1 6
18	0.0	0 4
19	0.0	0 2
20	.0	0 0
21	.0	0 0
22	3.0	0
23	0.0	3 3
24	0.2	0
25	.0	2 0
26		3
27		1
28		0

FLT PLN-18a/53/0/A

+ +
 B6

+ +

B6

15	0.0	2
16	0.5	0 0
17	0.3	1 0
18	0.0	0 4
19	0.0	0 2
20	.0	0 0
21	.0	0 0
22	3.0	0
23	2.0	0 0
24	0.2	0
25	.0	2 0
26		1
27		1
28		0

FLT PLN-19a/53/0/B

+ +
 B7

+ +



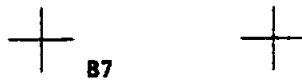
B6

DAP B7

PURPOSE:

RENDEZVOUS

FLT PLN-19b/53/0/A



B7

DAP B8

PURPOSE:

PROX OPS

FLT PLN-20b/53/0/A



B7

15 0.0 5

16 0.5 0 0

17 0.2 0 0

18 0.0 4

19 0.0 0 2

20 0 0

21 .0 0 0

22 2.0 0

23 -1.0 0 0

24 0.2 0

25 .0 2 0

26 1 or 3

27 1 or 3

28 0

FLT PLN-20a/53/0/A



B8



B8

15 0.0 1

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 2.0 0

23 -1.0 0 0

24 0.2 0

25 .0 2 0

26 1

27 1

28 0

FLT PLN-21a/53/0/A



B9



B8

DAP B9

PURPOSE:
OG PRCS



B9

15	0.0	2
16	0.2	0 0
17	0.2	0 0
18	0.0	0 4
19	0.0	0 2
20	0.0	0 0
21	.0	0 0
22	0.5	0
23	1.0	0 0
24	0.2	0
25	0.2	0
26		3
27		3
28		0

FLT PLN-21b/53/0/B

FLT PLN-22a/53/0/B



B9



DAP PURPOSE
 ALT1 - NOMINAL
 I-LOAD
 ALT2 - LOSS OF
 VERNS

FLT PLN-23a/53/0/B



ALT1

FLT PLN-22b/53/0/A



+	+	+	+
DAP ALT1			ALT1
PURPOSE:			RATE DB
NOMINAL I-LOAD			32 <u>0.2 0 0</u>
			JET OPT
			33 <u>1</u>
			# JETS
			34 <u>2</u>
			ON TIME
			35 - <u>0.0 8</u>
			DELAY
			36 - <u>0.0 0</u>
FLT PLN-23b/53/0/A			FLT PLN-24a/53/0/A

+	+	+	+
			ALT2

+	+	+	+
DAP ALT2			ALT2
PURPOSE:			RATE DB
LOSS OF VERNIS			32 <u>0.0 7 0</u>
			JET OPT
			33 <u>1 or 3</u>
			# JETS
			34 <u>1</u>
			ON TIME
			35 - <u>0.0 8</u>
			DELAY
			36 - <u>0.0 0</u>
FLT PLN-24b/53/0/B			FLT PLN-25a/53/0/B

+	+	+	+
	ALT1		



FLT PLN-25b/53/0/B



ALT2



UNIV PTG	
TGTID	= 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 \rightarrow OM (0-359.99)
MON AXIS	= 1 +X = 2 -X
CNTL ACCEL	= 0 Orbiter Alone = 1 thru 5 not used
PRI JET OPT	= 1 Normal = 2 Nose only = 3 Tail only
ALT JET OPT	= 1 Normal = 2 Illegal entry = 3 Tail only

FLT PLN-26a/53/0/8



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FLT PLN-26b/53/0/B



STS-53
FLIGHT PLAN NOTES

FLIGHT PLAN NOTES
(CONSTRAINTS AND GUIDELINES)

A. FLIGHT DESCRIPTION

The STS-53 (OV103) launch from KSC is scheduled for November 5, 1992, into a 200 x 201 nm orbit at an inclination of 57 degrees. An altitude stepdown to 175 nm circ will be performed on FD2. The mission duration is 6 days. Nominal landing occurs at EDW on November 11, 1992.

Landing opportunities are:

		<u>Landing Orbit No.</u>	<u>Site</u>	<u>Local Time</u>
Nominal	Primary	101	EDW	PST
	1 Rev Late	102	EDW	PST
	Weather Alt.	100	KSC	EST
1 Day Late	Primary	116	EDW	PST
	1 Rev Late	117	EDW	PST
	Weather Alt.	116	KSC	EST
2 Days Late	Primary	132	EDW	PST
	1 Rev Late	133	EDW	PST
	Weather Alt.	131	KSC	EST

Major Events

<u>LAUNCH (KSC)</u>	November 5, 1992
MET (DD/HH:MM)	00/00:00
Day of year	310
CST/GMT	06:15/12:15

<u>OMS-2</u>	
MET (DD/HH:MM)	00/00:41
DV (fps)	338.5
ORBIT hp/ha (nm)	200/201

<u>DOD-1 DEPLOY</u>	
MET (DD/HH:MM:SS)	00/06:08:49

<u>RCS SEP</u>	
MET (DD/HH:MM)	00/06:29
DV (fps)	5.0
ORBIT hp/ha (nm)	200/203

<u>HEIGHT ADJUST</u>	
MET (DD/HH:MM)	01/05:56
DV (fps)	47.3
ORBIT hp/ha (nm)	175/200

<u>CIRC</u>	
MET (DD/HH:MM)	01/06:43
DV (fps)	43.0
ORBIT hp/ha (nm)	175/176

<u>ODERACS DEPLOY</u>	
MET (DD/HH:MM)	01/21:58

FLT PLN NOTES

<u>RCS SEP</u>	
MET (DD/HH:MM)	01/22:03
DV (fps)	6.0
ORBIT hp/ha (nm)	175/179

<u>DEORBIT BURN</u>	
MET (DD/HH:MM)	06/07:35
DV (fps)	305.0

<u>LANDING (EDW)</u>	
MET (DD/HH:MM)	06/08:38
Day of year	316
CST/GMT	14:53/20:53

B. CREW

1. The five crewmembers flying this mission are:

CDR - David M. Walker
PLT - Robert D. Cabana
MS1 - Guion S. Bluford
MS2 - James S. Voss
MS3 - Michael R. Clifford

C. ORBITER SYSTEMS

1. Communications and Instrumentation

- a. The Operational Instrumentation (OI) system will nominally be managed from the ground through uplink real-time command (RTCs) coordinated with the crew.
- b. TDRS coverage is assumed to be supported by TDRS-E (41 degrees W) and TDRS-W (174 degrees W) and is the prime mode of communication coverage.
- c. RTS sites are available for FD1 support or when scheduled in advance (4-hour lead time required): HTS, GTS, VTS, IOS, CTS, NHS, TCS, and DGS.
- d. There are four GN sites available for on-orbit contingency support: VAN, MIL(MLX), BDA(BDX), and DKR. MAD(MAX) and CAN are emergency sites (2-hour lead time required).
- e. TDRS Ku-band is the prime mode of real-time TV. Downlink is permitted only from inside the orbiter crew cabin. There are also three GN sites available as backups: GDS(GDX), MIL(MLX), and VAN (90-minute lead time required).
- f. TDRS-E and TDRS-W are available for ascent and entry support. IOS (RTS site) is available for UHF voice in an emergency (4-hour lead time required).
- g. TDRS-E and TDRS-W are available to support Ku-band uplink (e.g., TAGS).
- h. S-band HDR uplink (e.g., Teleprinter) is available through TDRS-E and TDRS-W.

D. TELEVISION/PHOTOGRAPHY

1. Two camcorders are provided for in-cabin coverage (one L1 and one A1 camcorder). In addition, one Canon A1 camcorder is provided by the FARE payload. There will also be four PLB TV cameras. There are three different lens assemblies for the PLB cameras (color lens assembly, monochrome lens assembly, and wide-angle lens assembly). The type of lens assembly for each PLB camera is documented in the Flight Requirements Document.
2. There is one video tape recorder available with 30-minute cassettes.
3. Three camera systems will be available: 35mm, 16mm, and 70mm.

E. PAYLOADS

1. DOD-1

The DOD-1 cargo element consists of a deployable spacecraft and associated Airborne Support Equipment (ASE). The ASE contains the spacecraft deployment system and attaches to the orbiter at four longeron positions and one keel position.

2. Glow/Cryogenic Heat Pipe Experiment (GCP)

The GLO experiment contains an Extreme Ultraviolet (EUV) imager and spectrograph for making glow measurements in the 115 to 1150 nanometer spectral range. The sensors will observe orbiter surfaces, contaminating events, and air glow. The CRYOHP will measure the zero-gravity performance of liquid oxygen heat pipes. The payload is a hitchhiker carrier mounted on the starboard side of the payload bay.

3. Handheld, Earth-Oriented, Real-Time, Cooperative, User-Friendly, Location Targeting, and Environmental System (HERCULES)

This payload will provide the space shuttle and crewmembers with real-time, on-orbit capability to geolocate a ground target to 1 nm. The H/W configuration consists of a Playback/Downlink Unit (PDU), the Electronic Still Camera (ESC) and electronic box, the HERCULES Attitude Processor (HAP), and the HERCULES Inertial Measurement Unit (HIMU).

4. Space Tissue Loss (STL)

The objective of the payload is to validate models of muscle, bone, and endothelial cell biochemical and functional loss induced by microgravity stress; to evaluate cytoskeleton, metabolism, membrane integrity, and protease activity in target cells; and to test tissue loss pharmaceuticals for efficiency.

5. Battlefield Laser Acquisition and Sensor Test (BLAST)

The objective of the BLAST payload is to evaluate the concept of utilizing a spaceborne laser receiver to detect laser energy and also provide a laser communication uplink for transmitting

information from the ground. The BLAST receiver mounts in the overhead, starboard window. The hardware configuration consists of the System Optical Head Assembly (SOHA), the System Electronics Assembly (SEA), the orbiter CCTV Video Interface Unit (VIU/C), and a PGSC.

6. RME-III

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

7. Visual Function Tester - 2 (VFT-2)

VFT is a handheld, battery-powered testing device that the crew looks into to measure changes in their vision parameters that may be affected by microgravity.

8. Microcapsules in Space - 1 (MIS-1)

The objective of MIS is to demonstrate the feasibility of producing pharmaceutical microcapsules in a microgravity environment. Ampicillin anhydrate will be the drug microencapsulated in space. The system consists of hardening chambers, a delivery system for the polymer/drug solution, ultrasonic spray nozzles with power supply, electric field generators, a video recorder, and a control module.

9. CLOUDS 1A

The CLOUDS 1A consists of a 35mm camera assembled with a motor drive, data recording system, 105mm lens, and red filter. The objective of CLOUDS 1A is to photograph sequences of cloud fields over various ground sites.

10. Cosmic Radiation Effects and Activation Monitor (CREAM)

A detector will be used to collect data on the cosmic ray energy spectra, neutron fluxes, and induced radioactivity as a function of geomagnetic coordinates, and detector location within the orbiter.

11. Fluid Acquisition and Resupply Experiment (FARE)

This experiment investigates fill, refill, and expulsion of simulated propellant tanks and liquid motion in a low-gravity environment. The tanks are made of clear acrylic plastic to enable video recording of the fluid's behavior. The test fluid is treated water.

12. Orbital Debris Radar Calibration Spheres (ODERACS)

This experiment will eject from the payload bay six spheres ranging in size from two to six inches in diameter. The spheres will be observed, tracked, and recorded by ground-based radars and optical telescopes, enabling calibration of these imaging facilities and data analysis systems. In addition, the radar signatures of the spheres with known physical properties will be compared to signatures detected from current orbital debris.

F. ON-ORBIT DTOs

1. Evaluation of the MK I Rowing Machine (DTO 653)

This DTO will evaluate the MK I rowing machine as an alternative to the shuttle treadmill. Noise and vibration associated with the MK I are anticipated to be significantly less than in the case of the treadmill. In-flight simulated rowing is anticipated to provide total body exercise including aerobic and anaerobic conditioning. Heart rate will be recorded to determine the effectiveness of changes in the resistive settings of the device.

2. PGSC Single Event Upset Monitoring (DTO 656)

The objective of this DTO is to determine Payload and General Support Computer (PGSC) random access memory susceptibility to single event upset caused by cosmic radiation. The information could lead to improved procedures, hardware, or software to reduce radiation effects.

3. Acoustical Noise Dosimeter Data (DTO 663)

Noise levels within the orbiter crew compartment are a concern from a crew operations, performance, and health standpoint. Data obtained from this DTO will establish an average sound level reading for crew awake and crew sleep timeframes. The crewmembers will also complete a questionnaire about their perception of the ambient noise levels.

G. ON-ORBIT DSOs

1. In-Flight Radiation Dose Distribution (DSO 469)

A passive, proton spectrometer will be used to measure the radiation environment. The data will be used to verify analytical and measurement methods for assessing risks from exposure to space radiation.

2. Intraocular Pressure (DSO 472)

The purpose of this DSO is to establish a data base of changes in intraocular pressures that can be used to evaluate crew health. The handheld tonometer will be validated as a tool for diagnostic and scientific data collection on-orbit.

3. Retinal Photography (DSO 474)

The purpose of this DSO is to analyze retinal photography taken on-orbit and determine if microgravity-induced cephalad fluid shifts elevate intracranial pressure. It will also certify equipment to provide retinal images for diagnostic and investigative purposes.

4. Hyperosmotic Fluid Countermeasure (DSO 479)

The hypothesis of this test is that if a hyperosmotic saline countermeasure is ingested before return to 1-g, the crewmember will experience decreased loss of plasma volume and longer lasting protection against orthostatic intolerance than if an isosmotic countermeasure were ingested. Further, crewmembers who ingest a salt water solution will have better resistance to orthostatic stress than crewmembers who consume salt tablets and water of the same osmolality. The objective of this test is to compare different combinations of salt and water.

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

The objective of this DSO is to document the relationship between mission duration and the changes in orthostatic function of crewmembers during the actual stresses of entry, landing, and egress from the orbiter. Crewmembers will don equipment prior to donning the LES during deorbit preparation. Equipment consists of a blood pressure monitor, accelerometers, a TEAC Cassette Data Recorder with microphone, and an electrode harness and kit. The crewmember wears the equipment and records verbal comments throughout entry.

6. Visual-Vestibular Integration as a Function of Adaption (DSO 604 OI-1)

The objective of this DSO is to investigate visual vestibular and perceptual adaptive responses as a function of mission duration. The operational impact of these responses on the crewmembers' ability to conduct entry, landing, and egress procedures will also be investigated.

7. Effects of Space Flight on Aerobic and Anaerobic Metabolism at Rest and During Exercise (DSO 608)

Changes in energy metabolism, shifts in fuel utilization, and decreases in muscle mass after extended duration space flight may limit a crewmember's ability to do physical work, both in-flight and postflight. The crewmembers will keep a daily log of their fluid intake and may be given prescribed exercise protocols.

8. The Effect of Prolonged Space Flight on Head and Gaze Stability During Locomotion (DSO 614)

The objective of this DSO is to characterize head and body movement along with gaze stability during exercise. Changes in these parameters due to the microgravity environment could impair a crewmember's ability to perform an emergency egress from the vehicle. For STS-53, this DSO will consist of pre- and post-flight activity only.

9. Documentary Television (DSO 901)

This DSO requires live television transmission or VTR dumps of crew activities, payload activities, and spacecraft functions.

10. Documentary Motion Picture Photography (DSO 902)

This DSO requires documentary and public affairs motion picture photography of significant activities which best depicts the basic capabilities of the space shuttle and key objectives.

11. Documentary Still Photography (DSO 903)

This DSO requires still photography of crew activities in the orbiter, and mission-related scenes of general public and historical interest.

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53 FLT PLN FIN

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DK2/QUICK, T.K. (3)
DM11/CHIEF
DM22/HEAD
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DM41/RANDELS, K.D.
DM42/HEAD (7)
DM43/HEAD (6)
TRUMP, M.
DM46/HEAD (2)
LSO
DP/CHIEF

EC/CTSD

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EE/MR1/TCO/LIBRARY
EE2/RCA SUPPORT
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EG/LIBRARY
EG1/THIBODEAU, J.R.
EG2/FRANK, K.
EK/LIBRARY
EK6/LEMKE, M. (2)
EP2/JENKINS, L.W.
ER61/MCFADIN, L. (2)
ES32/CHANG, Y. PHD.
MARAIA, R.J.
GA/HOLLOWAY, T.W.
JL/BILLINGSLEY, D.G. (2)
JL3/SLATER, R.
JL5/SUPPORT (2)
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MJ/LIEBERGOT, S.A.
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WARD, D.
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