


 FLIGHT DATA FILE

# Flight Plan

## STS-103

(STS-103 FRR (12/02/99) Trajectory)

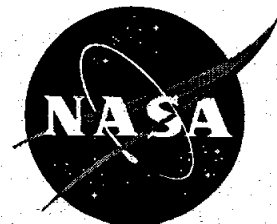
Mission Operations Directorate  
Operations Division

Final  
October 27, 1999

<u>EVENT</u>	<u>MET</u>	<u>CST</u>	
Launch	00/00:00	03:31	12/02/99
OMS2	00/00:45	04:16	12/02/99
NC1	00/05:29	09:00	12/02/99
NPC	00/21:40	01:11	12/03/99
NSR	01/03:46	07:17	12/03/99
NC2	01/04:34	08:05	12/03/99
NC3	01/18:00	21:31	12/03/99
NH	01/18:46	22:17	12/03/99
NC4	01/19:41	23:12	12/03/99
TI	01/22:55	02:26	12/04/99
HST Grapple	02/01:07	04:38	12/04/99
EVA 1 Start	02/18:45	22:16	12/04/99
EVA 2 Start	03/18:55	22:26	12/05/99
EVA 3 Start	04/18:55	22:26	12/06/99
EVA 4 Start	05/18:55	22:26	12/07/99
HST Release	06/21:48	01:19	12/09/99
Sep 01	06/21:49	01:20	12/09/99
Sep 02	06/22:33	02:04	12/09/99
Deorbit	09/20:57	00:28	12/12/99
Landing	09/22:07	01:38	12/12/99

National Aeronautics and  
Space Administration

Lyndon B. Johnson Space Center  
Houston, Texas



Verify this is the correct version for the pending operation (training, simulation or flight).  
Electronic copies of FDF books are available. URL: <http://fltproc.jsc.nasa.gov/fdf>


MISSION OPERATIONS DIRECTORATE

**STS-103 FLIGHT PLAN**

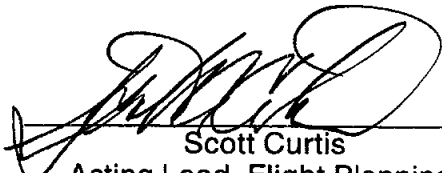
FINAL  
October 27, 1999


PREPARED BY:

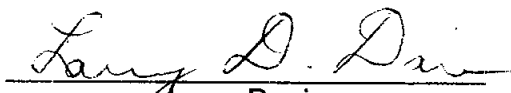
  
\_\_\_\_\_  
Scott Curtis  
Book Manager

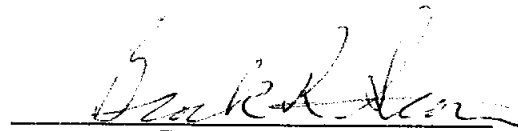
  
\_\_\_\_\_  
Douglas Bristol  
Timeliner

APPROVED BY:

  
\_\_\_\_\_  
Scott Curtis  
Acting Lead, Flight Planning  
and Pointing Group

  
\_\_\_\_\_  
Robert H. Nute  
Chief, Flight Planning Branch

  
\_\_\_\_\_  
Larry Davis  
Chief, Operations Division

  
\_\_\_\_\_  
Brock R. Stone  
Director of Operations

This document is under the configuration control of the Crew Procedures Control Board (CPCB). All proposed changes must be submitted on JSC Form 482 to DO3/FDF Manager.

Additional distribution of this book for official use must be requested in writing to DO3/FDF Manager. The request must include justification and requester's name, organization, position, and phone number. Contractor requests are made through the NASA or DOD organization supported. Deletions, reduction in quantity, or change of address may be submitted to DO3/FDF Management Office, 281-244-1184.

Incorporates the following:

482#: FLT PLN-1936  
FLT PLN-1946

AREAS OF TECHNICAL RESPONSIBILITY

Book Manager/Lead FAO	DO4/S. Curtis	281-244-1085
Lead Timeliner	DO4/D. Bristol	281-244-1148
Lead Pointer	DO4/A. Lalich	281-483-7065

FLIGHT PLAN  
STS-103

**LIST OF EFFECTIVE PAGES**

FINAL 10/27/99

Sign Off .....	* 103/FIN	3-18 .....	103/FIN
ii .....	* 103/FIN	3-19 .....	103/FIN
iii .....	* 103/FIN	3-20 .....	103/FIN
iv .....	* 103/FIN	3-21 .....	103/FIN
v .....	103/FIN	3-22 .....	103/FIN
vi .....	103/FIN	3-23 .....	103/FIN
1-1 .....	103/FIN	3-24 .....	103/FIN
1-2 .....	103/FIN	3-25 .....	103/FIN
2-1 .....	103/FIN	3-26 .....	103/FIN
2-2 .....	103/FIN	3-27 .....	103/FIN
2-3 .....	103/FIN	3-28 .....	103/FIN
2-4 .....	103/FIN	3-29 .....	103/FIN
2-5 .....	103/FIN	3-30 .....	103/FIN
2-6 .....	103/FIN	3-31 .....	103/FIN
2-7 .....	103/FIN	3-32 .....	103/FIN
2-8 .....	103/FIN	3-33 .....	103/FIN
2-9 .....	103/FIN	3-34 .....	103/FIN
2-10 .....	103/FIN	3-35 .....	103/FIN
2-11 .....	103/FIN	3-36 .....	103/FIN
2-12 .....	103/FIN	3-37 .....	103/FIN
2-13 .....	103/FIN	3-38 .....	103/FIN
2-14 .....	103/FIN	3-39 .....	103/FIN
2-15 .....	103/FIN	3-40 .....	103/FIN
2-16 .....	103/FIN	3-41 .....	103/FIN
2-17 .....	103/FIN	3-42 .....	103/FIN
2-18 .....	103/FIN	3-43 .....	103/FIN
2-19 .....	103/FIN	3-44 .....	103/FIN
2-20 .....	103/FIN	3-45 .....	103/FIN
2-21 .....	103/FIN	3-46 .....	103/FIN
2-22 .....	103/FIN	3-47 .....	103/FIN
3-1 .....	103/FIN	3-48 .....	103/FIN
3-2 .....	103/FIN	3-49 .....	103/FIN
3-3 .....	103/FIN	3-50 .....	103/FIN
3-4 .....	103/FIN	3-51 .....	103/FIN
3-5 .....	103/FIN	3-52 .....	103/FIN
3-6 .....	103/FIN	3-53 .....	103/FIN
3-7 .....	103/FIN	3-54 .....	103/FIN
3-8 .....	103/FIN	3-55 .....	103/FIN
3-9 .....	103/FIN	3-56 .....	103/FIN
3-10 .....	103/FIN	3-57 .....	103/FIN
3-11 .....	103/FIN	3-58 .....	103/FIN
3-12 .....	103/FIN	3-59 .....	103/FIN
3-13 .....	103/FIN	3-60 .....	103/FIN
3-14 .....	103/FIN	3-61 .....	103/FIN
3-15 .....	103/FIN	3-62 .....	103/FIN
3-16 .....	103/FIN	3-63 .....	103/FIN
3-17 .....	103/FIN	3-64 .....	103/FIN

\* - Omit from flight book

3-65	103/FIN	3-119	103/FIN
3-66	103/FIN	3-120	103/FIN
3-67	103/FIN	4-1	103/FIN
3-68	103/FIN	4-2	103/FIN
3-69	103/FIN	4-3	103/FIN
3-70	103/FIN	4-4	103/FIN
3-71	103/FIN	5-1	103/FIN
3-72	103/FIN	5-2	103/FIN
3-73	103/FIN	5-3	103/FIN
3-74	103/FIN	5-4	103/FIN
3-75	103/FIN	5-5	103/FIN
3-76	103/FIN	5-6	103/FIN
3-77	103/FIN	6-i	* 103/FIN
3-78	103/FIN	6-ii	* 103/FIN
3-79	103/FIN	6-1	* 103/FIN
3-80	103/FIN	6-2	* 103/FIN
3-81	103/FIN	6-3	* 103/FIN
3-82	103/FIN	6-4	* 103/FIN
3-83	103/FIN	6-5	* 103/FIN
3-84	103/FIN	6-6	* 103/FIN
3-85	103/FIN	6-7	* 103/FIN
3-86	103/FIN	6-8	* 103/FIN
3-87	103/FIN	6-9	* 103/FIN
3-88	103/FIN	6-10	* 103/FIN
3-89	103/FIN	7-1	* 103/FIN
3-90	103/FIN	7-2	* 103/FIN
3-91	103/FIN	7-3	* 103/FIN
3-92	103/FIN	7-4	* 103/FIN
3-93	103/FIN		
3-94	103/FIN		
3-95	103/FIN		
3-96	103/FIN		
3-97	103/FIN		
3-98	103/FIN		
3-99	103/FIN		
3-100	103/FIN		
3-101	103/FIN		
3-102	103/FIN		
3-103	103/FIN		
3-104	103/FIN		
3-105	103/FIN		
3-106	103/FIN		
3-107	103/FIN		
3-108	103/FIN		
3-109	103/FIN		
3-110	103/FIN		
3-111	103/FIN		
3-112	103/FIN		
3-113	103/FIN		
3-114	103/FIN		
3-115	103/FIN		
3-116	103/FIN		
3-117	103/FIN		
3-118	103/FIN		

\* - Omit from flight book

CONTENTS

PAGE

INTRODUCTION ..... vi

OVERVIEW TIMELINE ..... 1-1

SUMMARY TIMELINE ..... 2-1

DETAILED TIMELINE ..... 3-1

MDF TIMELINE ..... 4-1

STS-103 DAP TABLE ..... 5-1

ATTITUDE TIMELINE ..... 6-1

FLIGHT PLAN NOTES ..... 7-1

## INTRODUCTION

The STS-103 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 contained in the Rendezvous Checklist. The detailed EVA task timelines and procedures are in the EVA Checklist. The Detailed Timeline pages of this Flight Plan show high-level, bulleted comments for general insight during the rendezvous and EVAs. The deploy procedures required during the deploy timeframe are in the STS-103 HST Deploy Checklist. For continuity, the summary timeline includes the entire flight.

The Servicing Mission Integrated Timeline (SMIT), Launch Update #1, dated October 26, 1999, was used in the development of these timelines.

This on-orbit timeline satisfies the objectives specified in the Flight Definition and Requirements Directive, and the requirements of the STS-103 Flight Requirements Document. The Flight Plan, as part of the Flight Data File, meets the specifications of the STS-103 Flight Initialization Data Pack.

The STS-103 FRR (12/02/99) Cycle was used for the timeline trajectory. The flight profile used in this Flight Plan is for a launch date of December 02, 1999, at 09:31 GMT. Orbiter inertial attitudes are expressed relative to a mean of 1950 (M50) reference frame.

NSTS-37326, Shuttle Crew Scheduling Constraints (SCSC), Basic, July 1998, has been used to build the timelines contained in this Flight Plan.

The Flight Plan timeline pages, as well as other flight planning information, are available on the Space Shuttle Flight Planning web page at the following address:  
<https://mod.jsc.nasa.gov/do4/flightplan/>

**OVERVIEW TIMELINE**



**STS-103 HST-SM3 Overview Timeline**  
**10+2 Day Mission, 2 EVA Crews, 4 EVAs**

0/	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11
FD 1	Dec 02 Launch @ 09:31 GMT												POST INSERTION			Pre Sleep								
10.2/14.7																								
GRP B																								

0/	12	13	14	15	16	17	18	19	20	21	22	23	1/0	1	2	3	4	5	6	7	8	9	10	11
FD 2	Post Sleep			RMS C/O, SSE C/O, EMU C/O, 10.2 DEPRESS, PRE-RNDZ										Pre Sleep										
10.2/14.7																								
GRP B																								

1/	12	13	14	15	16	17	18	19	20	21	22	23	2/0	1	2	3	4	5	6	7	8	9	10	11
FD 3	Post Sleep			HST Grapple (2/01:07 ↑)										Pre Sleep										
10.2/14.7																								
GRP B																								

2/	12	13	14	15	16	17	18	19	20	21	22	23	3/0	1	2	3	4	5	6	7	8	9	10	11
FD 4	Post Sleep			Pre-EVA		EVA 1 (6:00)						Post-EVA		Pre Sleep										
10.2/14.7																								
GRP B																								

3/	12	13	14	15	16	17	18	19	20	21	22	23	4/0	1	2	3	4	5	6	7	8	9	10	11
FD 5	Post Sleep			Pre-EVA		EVA 2 (6:00)						Post-EVA		Pre Sleep										
10.2/14.7																								
GRP B																								

4/	12	13	14	15	16	17	18	19	20	21	22	23	5/0	1	2	3	4	5	6	7	8	9	10	11
FD 6	Post Sleep			Pre-EVA		EVA 3 (6:00)						Post-EVA		Pre Sleep										
10.2/14.7																								
GRP B																								

5/	12	13	14	15	16	17	18	19	20	21	22	23	6/0	1	2	3	4	5	6	7	8	9	10	11
FD 7	Post Sleep			Pre-EVA		EVA 4 (6:00)						Post-EVA		Pre Sleep										
10.2/14.7																								
GRP B																								

6/	12	13	14	15	16	17	18	19	20	21	22	23	7/0	1	2	3	4	5	6	7	8	9	10	11
FD 8	Post Sleep			HST Release						FSS STOW, 14.7 REPRS			Pre Sleep											
10.2/14.7																								
GRP B																								

7/	12	13	14	15	16	17	18	19	20	21	22	23	8/0	1	2	3	4	5	6	7	8	9	10	11
FD 9	Post Sleep			OFF DUTY				POST EVA ENT PREP			Pre Sleep													
10.2/14.7																								
GRP B																								

8/	12	13	14	15	16	17	18	19	20	21	22	23	9/0	1	2	3	4	5	6	7	8	9	10	11
FD 10	Post Sleep			FCS C/O, RCS HF, GPS TEST						CABIN STOW			Pre Sleep											
10.2/14.7																								
GRP B																								

9/	12	13	14	15	16	17	18	19	20	21	22													
FD 11	Post Sleep			IMU		D/O PREP		ENT		KSC LANDING 9/22:07														
10.2/14.7																								
GRP B																								

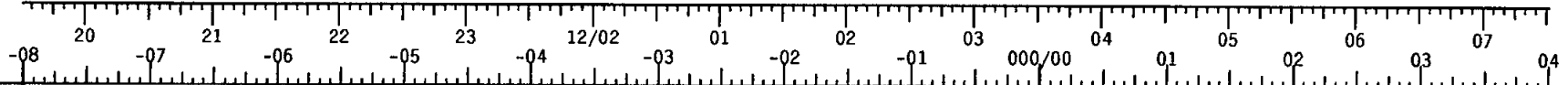
14.7																								
10.2																								

Group B																								
Goup B Dual G2																								

**SUMMARY TIMELINE**

# SUMMARY TIMELINE

BETA -46.50  
CT 12/01/99  
FD01  
MET Day 000



CDR Brown			OMS2Δ ASCENT	POST INSERTION	ACT FLTV LR	GIRA INSTAL	
PLT Kelly			ASCENT	POST INSERTION	TE LOAD DAPS	GIRA INSTAL	AH SEPUR
MS1 (EV1) Smith			ASCENT	POST INSERTION	SA SC ET		ERGOM SETUP
MS2 Clervoy			ASCENT	POST INSERTION	TE PSC	SEE SETUP	
MS3 (EV2) Grunsfeld			ASCENT	POST INSERTION	PUC G/A SC	OSC C/A UC P	ERGOM SETUP
MS4 (EV3) Foale			ASCENT	POST INSERTION	PTV01 SETUP		PS TE VT OU 9P
MS5 (EV4) Nicollier			ASCENT	POST INSERTION	R M S S	SA SC ET	
GND CMD						SPC	
TDRS DAY/NIGHT							
ORBIT SAA							
TDRS E W							
GND SITES							-GDX -DGS-GTS -GDX -MIL -MIL -HTS -HTS -VTS -VTS
ORB ATT							ASCENT
SOLAR ARRAY FSS							-ZLV +YVV
NOTES							

L  
A  
U  
N  
C  
H

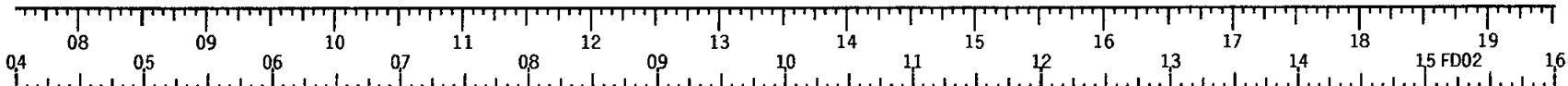
\*#3

STOWED

\*#4

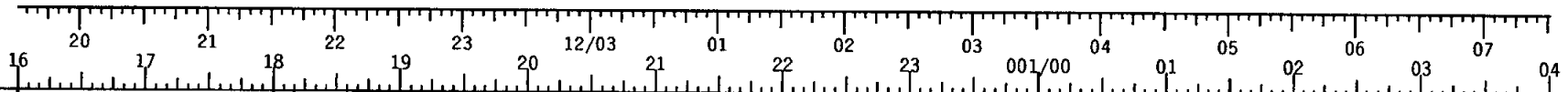
VSM CHECKPOINT INIT

BETA -46.33  
 CT 12/02/99  
 FD01  
 MET Day 000



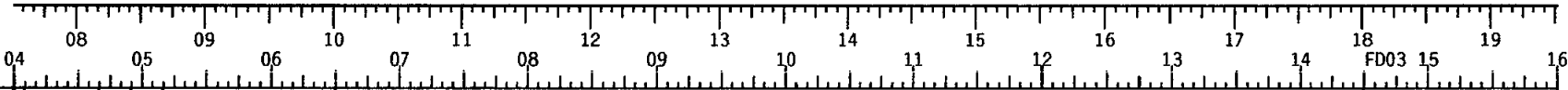
CDR Brown	PRE SLEEP	ELVONS	NC1	GPRWB	OPMO	PRE SLEEP	SLEEP	POST SLEEP
PLT Kelly	PRE SLEEP	ELVONS	OMS BURN	ZXLV	PRE SLEEP	SLEEP	POST SLEEP	
MS1 (EV1) Smith	PRE SLEEP					SLEEP	POST SLEEP	
MS2 Clervoy	PRE SLEEP			GPRWB	PRE SLEEP	SLEEP	POST SLEEP	
MS3 (EV2) Grunsfeld	ODCNALK	PRE SLEEP			ODCNALK	SLEEP	POST SLEEP	
MS4 (EV3) Foale	PRE SLEEP					SLEEP	POST SLEEP	
MS5 (EV4) Nicollier	PRE SLEEP					SLEEP	POST SLEEP	
GND CMD			SPC	HST ATT	CNFG SI AND NSSC1		CNFG GC2	
TDRS DAY/NIGHT	[Timeline of day/night cycles]							
TDRS ORBIT	[Timeline of orbit cycles]							
TDRS SAA	[Timeline of solar array activities]							
TDRS E/W	[Timeline of east/west movements]							
GND SITES	-DGS -GTX -HTS -MIL -VTS	-DGS -GTX -HTS -VTS	-DGS -GTX -HTS -VTS	-DGS -GTX -HTS -VTS	-DGS -GTX -HTS -VTS	-DGS -GTX -HTS -VTS	-DGS -GTX -HTS -VTS	-GTX -HTS -VTS
ORB ATT		NC1				-ZLV -XVV		
SOLAR ARRAY	[Timeline of solar array operations]							
FSS	OPRE SLEEP					STOWED		
NOTES								

BETA -45.49  
 CT 12/02/99  
 FD02  
 MET Day 000



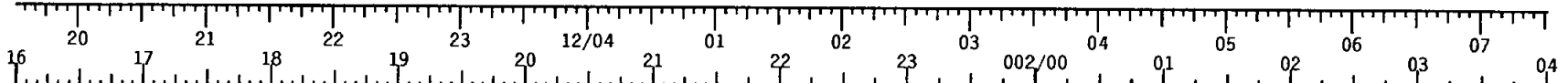
CDR Brown	POST SLEEP	PREP	10.2 DEPRESS	CONF	EXERCISE		NPCA RCS BURN	ZXLVV	MEAL		RNDZ TOOLS C/O	TO NKEN	NO NIKO	FOEN	POAPTY	10.2*	PRE SLEEP	NSRΔ	OMS BURN	PSL
PLT Kelly	POST SLEEP	PREP	10.2 DEPRESS	CONF	EXERCISE	CRYO 02 SNSR	RCS BURN		MEAL		RNDZ TOOLS C/O	FILTER CLEAN	PS T V O U P	FUEL CELL MON OPS	10.2*	PRE SLEEP	OMS BURN	PSL		
MS1 (EV1) Smith	POST SLEEP				EXERCISE	SSE C/O	FSS PREP FOR BRTHG		MEAL		A/L PREP	EVA TOOL UNSTOW/CNFG	PGT C/O		POAPTY					PRE SLEEP
MS2 Clervoy	POST SLEEP	RH MTSR	POST SLEEP	RP MWSRUP	RMS C/O	SSE SURVEY	RMS PLB SURV	RP MWRDN	MEAL		HHL C/O				POAPTY		EXERCISE			PSL
MS3 (EV2) Grunsfeld	POST SLEEP		MAGR SIGI UNSTOW	*SIG DL	SSE C/O	FSS PREP FOR BRTHG	EXERCISE	OD CN ALK	MEAL	A/L PREP	HHL C/O	EMU C/O #3,4 W/GLVS	EMU SWAP	EMU C/O #1,2 W/GLVS					OD CN ALK	PSL
MS4 (EV3) Foale	POST SLEEP		EXERCISE	HST PGSCA INST CNFG	PTV09 OPS	PTV10 OPS			MEAL	A/L PREP	EVA TOOL UNSTOW/CNFG	PGT C/O			POAPTY		VTR P/B			H L M T ⊕
MS5 (EV4) Nicollier	POST SLEEP	PREP	10.2 DEPR	RP MWSRUP	RMS C/O	SSE SURVEY	RMS PLB SURV	EXERCISE	MEAL	A/L PREP	EMU C/O #3,4 W/GLVS	EMU SWAP	EMU C/O #1,2 W/GLVS							PSL
GND CMD												PSLSBRK								
TDRS DAY/NIGHT ORBIT SAA																				
TDRS EW																				
GND SITES																				
ORB ATT																				
SOLAR ARRAY																				
FSS																				
NOTES	<p>*MAGR S/U        *SIGI S/U        *MANUAL PURGE</p> <p>*CNTLR SWAP</p> <p>BERTH CONFIG (-V3)</p> <p>PRE SL        *LT RCHG TERM</p>																			

BETA -44.55  
 CT 12/03/99  
 FD02  
 MET Day 001



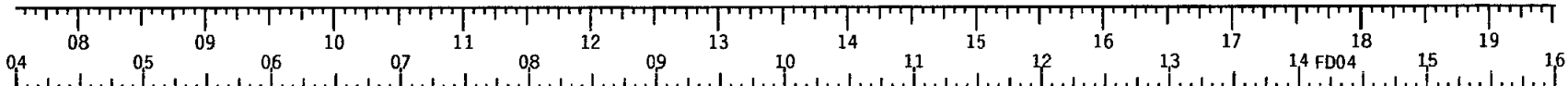
CDR Brown	NC2 RCS BURN	Z L V	PMO OCA	PRE SLEEP	SLEEP				POST SLEEP
PLT Kelly	RCS BURN	HUM SEP		PRE SLEEP	SLEEP				POST SLEEP
MS1 (EV1) Smith	PRE SLEEP			SLEEP				POST SLEEP	
MS2 Clervoy	PRE SLEEP	F O S E P	PRE SLEEP	SLEEP				POST SLEEP	
MS3 (EV2) Grunsfeld	PRE SLEEP		O D C N A L K	SLEEP				POST SLEEP	
MS4 (EV3) Foale	PRE SLEEP			SLEEP				POST SLEEP	
MS5 (EV4) Nicollier	PRE SLEEP			SLEEP				POST SLEEP	
GND CMD	CLOSE DOOR		PS LS BR K	HST LGA	LOAD SPC ZEROS	F M H A S P T	RETRACTION OF HGAS		
TDRS DAY/NIGHT	[Timeline with alternating black and white bars representing day and night cycles]								
ORB ATT	[Timeline with alternating black and white bars representing orbit and attitude cycles]								
SAA	[Timeline with alternating black and white bars representing solar array attitude cycles]								
TDRS E W	[Timeline with alternating black and white bars representing TDRS east and west cycles]								
GND SITES	DGS GTS HTS VTS	GDX MIL MIL HTS VTS	DGS GTS HTS VTS	GDX GTS	DGS GTS	HTS GTS	DGS GTS	GTS HTS	
ORB ATT	NC2	-ZLV -XVV-						-ZLV +YVV-	
SOLAR ARRAY FSS	BERTH CONFIG (-V3)								
NOTES									

BETA -43.53  
 CT 12/03/99  
 FD03  
 MET Day 001



CDR Brown	POST SLEEP	GRP B PWUP	NC3A RCS BURN	10-2*	HST RNDZ										ΔNH	ΔNC4	ΔTI	HST BERTH	BCAHTG	VTR P/B	GRW P/B	10-2*	PMO	SSALEW
PLT Kelly	POST SLEEP	GRP B PWUP	RCS BURN	10-2*	HST RNDZ										RMS	HST BERTH	PTV12 OPS	GRW P/B	10-2*	PTV12	PTV12			
MS1 (EV1) Smith	POST SLEEP	PI CNFG		EXERCISE		GRAPPL										HST BERTH	LATCH	EVA 1 TOOL CNFG		MPDRDEK				
MS2 Clervoy	POST SLEEP	EXERCISE		MCIU*		HST RNDZ										HST BERTH	BERTHED HST SURVEY		RPMA SRK					
MS3 (EV2) Grunsfeld	POST SLEEP	EXERCISE		PTV11 SETUP		PTV11 OPS		HST BERTH										LATCH	EPXWTRG	SDILL	MDDK PREP	SSALEW		
MS4 (EV3) Foale	POST SLEEP	EXERCISE		PTV12 OPS		EVA 1 TOOL CNFG		MPDRDEK										PTV12	PTV12	PTV12				
MS5 (EV4) Nicollier	POST SLEEP	PI CNFG		EXERCISE		HST RNDZ										HST BERTH	BERTHED HST SURVEY		MPDRDEK					
GND CMD	SSALEW		GVOGRLES		LROADCT		TPBRSY		GARTPL		LSWGTCH		GRPL*ATT		LSPD		HDMLS		HST EXT POWER		OTA HTR CONFIG		ESNA	
TDRS	DAY/NIGHT																							
ORBIT	SAA																							
TDRS	E W																							
GND SITES	-GTS -DGS -MIL -DGS -MIL -DGS -VTS -DGS -GDX -MIL -DGS -GDX -MIL -DGS -GTS -MIL -GTS -MIL -VTS -VTS																							
ORB ATT	-ZLV +YVV -NC3 -TGT TRK -RNDZ -FREE -BATT CHG																							
SOLAR ARRAY	FSS																							
NOTES	BERTH CONFIG (-V3) *FILTER CK *180 MIN TIMER START *ON -V3 *RCNFG *PRI BATT HEATERS																							

BETA -42.38  
 CT 12/04/99  
 FD03  
 MET Day 002



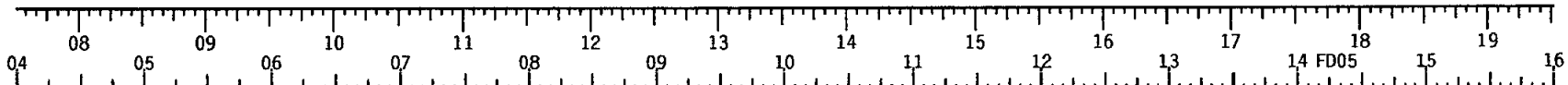
CDR Brown	EVA RVW	PRE SLEEP	SLEEP HST SURVEY (-V3 FWD) & SA STATIC TWIST ANALYSIS #1				POST SLEEP		
PLT Kelly	Z X L V V	PRE SLEEP	SLEEP				POST SLEEP		
MS1 (EV1) Smith	EVA RVW	PRE SLEEP	SLEEP				POST SLEEP PMC A/G		
MS2 Clervoy	O D C N A L K	EVA RVW	PRE SLEEP	SLEEP				POST SLEEP	
MS3 (EV2) Grunsfeld	EVA RVW	P G S C *	EVA RVW	PRE SLEEP	O D C N A L K	SLEEP	POST SLEEP PMC A/G		
MS4 (EV3) Foale	EVA RVW	P S T E V T O U I P	PRE SLEEP	SLEEP				POST SLEEP	
MS5 (EV4) Nicollier	EVA RVW	P G S C *	EVA RVW	PRE SLEEP	SLEEP				POST SLEEP
GND CMD	R P C N E A G	HST PGSCA CHECKOUT	KU BAND C/O	HST PGSCA CHECKOUT	D FMT TEST	HST PGSCA CHECKOUT			
TDRS	Z								
DAY/NIGHT	[Bar chart showing day/night cycle]								
ORBIT	[Bar chart showing orbit parameters]								
SAA	[Bar chart showing solar array activity]								
TDRS	E W	[Bar chart showing TDRS activity]							
GND SITES	-DGS -GDX -GTS -MIL -HTS -VTS -DGS -GDX -GTS -HTS -VTS -DGS -HTS -GTS -DGS -HTS -GTS -GTS -HTS -GTS								
ORB ATT	-ZLV -XVV								
SOLAR ARRAY	0								
FSS	-V3								
NOTES	*HST 4K CNFG *ON								



BETA -41.15  
 CT 12/04/99  
 FD04  
 MET Day 002

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
CDR Brown	EXERCISE																								
PLT Kelly	EXERCISE																								
MS1 (EV1) Smith	EVA PREP																								
MS2 Clervoy	EVA PREP																								
MS3 (EV2) Grunsfeld	EVA PREP																								
MS4 (EV3) Foale	EVA PREP																								
MS5 (EV4) Nicollier	EVA PREP																								
GND CMD	HST PGSCA CHECKOUT																								
TDRS																									
DAY/NIGHT																									
ORBIT																									
SAA																									
TDRS																									
GND SITES																									
ORB ATT																									
SOLAR ARRAY FSS																									
NOTES	*REGULATOR RECONFIG																								
	*FILTER CK																								

BETA -39.83  
 CT 12/05/99  
 FD04  
 MET Day 003

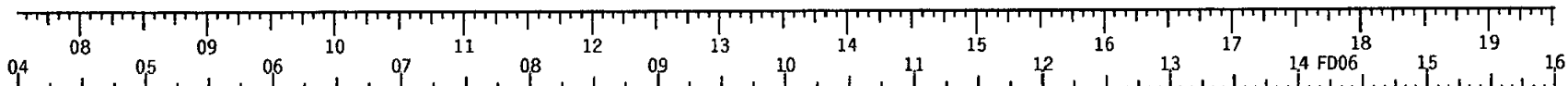


CDR Brown	EVA RVW	PRE SLEEP	SSALEW	PRE SLEEP	SLEEP HST SURVEY (-V3 FWD) & SA STATIC TWIST ANALYSIS #2										POST SLEEP							
PLT Kelly	PRE SLEEP		POTPVS13	RGA MNVR	ZXLVV*	SLEEP										POST SLEEP						
MS1 (EV1) Smith	EVA RVW	PRE SLEEP	SSALEW	PRE SLEEP	SLEEP										POST SLEEP							
MS2 Clervoy	EVA RVW	PRE SLEEP			SLEEP										POST SLEEP							
MS3 (EV2) Grunsfeld	EVA RVW	PRE SLEEP	SSALEW	PSLEEP	ODCNALK	SLEEP										POST SLEEP						
MS4 (EV3) Foale	EVA RVW	PRE SLEEP	PSVTIPI	PRE SLEEP	VHUKCT	SLEEP										POST SLEEP	PMQSA/G	PSOLESTEP				
MS5 (EV4) Nicollier	EVA RVW	PRE SLEEP			VHUKCT	SLEEP										POST SLEEP	PMQSA/G	PSOLESTEP				
GND CMD	VIK FUNCT TEST		SATO DEG		RFTRG	LG	FG	GUENST	AYR	DOY	AR	DO										
TDRS	[Timeline with shaded blocks]																					
DAY/NIGHT	[Timeline with shaded blocks]																					
ORBIT	[Timeline with shaded blocks]																					
SAA	[Timeline with shaded blocks]																					
TDRS EW	[Timeline with shaded blocks]																					
GND SITES	DGS GDX HTS GTS -MIL GTS -VTS HTS -VTS																					
ORB ATT	BATT CHG -BIAS -ZLV -XVV -ZLV -XVV																					
SOLAR ARRAY	100 0 -V3																					
FSS																						
NOTES	*FUTURE LOAD *ON (03/07:00) *HST PWR ON																					

BETA -38.44  
 CT 12/05/99  
 FD05  
 MET Day 003

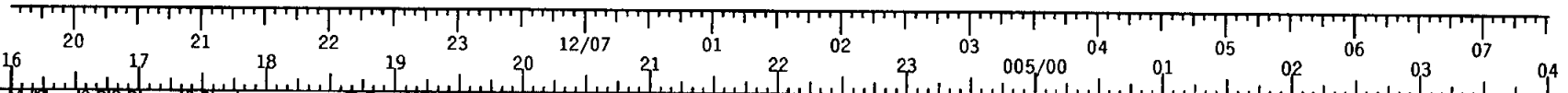
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	01	02	03	04	05	06	07	08						
CDR Brown	PS 10 TE 11 VU 12 3P	EXERCISE	TO NKEN C	SS ALEW	PS 18 TE 19 VU 20 4P	GP RR 21 UP 22 BP	TO NKEN C	RH OST	FO ENS	PTV12 OPS	F- GZ LV	RH OST	FGS +XSI	PO TV 22 V 23	F- GZ LV	PTV12 OPS	F+ GX SI	PO TV 28 V 29	F- GZ LV	PTV12 OPS	F+ GX SI	PO TV 34 V 35	F- ZLV V*	GP RR 36 P R D N	SS ALEW	-ZLV +YVV	SIG DL	P M C	I O 2*	
PLT Kelly	EXERCISE	PTV13 OPS	PS 18 TE 19 VU 20 4P	GP RR 21 UP 22 BP	PTV13 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS
MS1 (EV1) Smith	EVA PREP	EMU PG & P/B	A/L DEP	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST
MS2 Clervoy	MCI U*	RMS MFR A/L	RH OST	SS ALEW	EMU PG & P/B	A/L DEP	RH OST	DAILY SETUP	COMPUTER	M F R	FGS-2 CHNGOUT	DAILY CLSOUT	POST EVA W/H2O RECHG	SS ALEW	R P M A R K	EXERCISE	OD CN AL K													
MS3 (EV2) Grunsfeld	EVA PREP	EMU PG & P/B	A/L DEP	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST	EVA SUPPORT	RH OST
MS4 (EV3) Foale	EVA PREP	EMU PG & P/B	A/L DEP	RH OST	DAILY SETUP	COMPUTER	M F R	FGS-2 CHNGOUT	DAILY CLSOUT	POST EVA W/H2O RECHG	EVA 3 TOOL CNFG																			
MS5 (EV4) Nicollier	EVA PREP	EMU PG & P/B	A/L DEP	RH OST	DAILY SETUP	COMPUTER	M F R	FGS-2 CHNGOUT	DAILY CLSOUT	POST EVA W/H2O RECHG	EMU SWAP	BATT/LIOH	ES QW UA IP																	
GND CMD	+S SL A WP	SC P L O R E P	CC O H M A N P N G	COMP ALIVE	FC N G - 2	D H T A R 1	ADV C O M P F U N C T T E S T	D H T A R 2	ADV C O M P F U N C T T E S T	D H T A R 3	ADV C O M P F U N C T T E S T	SS ALEW																		
TDRS DAY/NIGHT ORBIT SAA	56	57	58	59	60	61	62	63																						
TDRS E W	MIL	DGS	MIL	DGS	MIL	DGS	MIL	DGS	MIL	DGS	MIL	DGS	MIL	DGS	MIL	DGS	MIL	DGS	MIL	DGS	MIL	DGS	MIL	DGS	MIL	DGS	MIL	DGS	MIL	DGS
GND SITES	-ZLV -XVV	FREE	-ZLV -XVV	SUN PROTECT	-ZLV -XVV	-ZLV +YVV																								
ORB ATT	-V3	+V3	-V2	-20	+V3	0																								
SOLAR ARRAY FSS	*FILTER CK	*75 DEG	*HST 4K CNFG	*HST 32K CNFG	*HST 4K CNFG	*HST 32K CNFG	*HST 4K CNFG	*HST 32K CNFG	*HST 4K CNFG	*HST 32K CNFG	*HST 4K CNFG	*HST 32K CNFG	*HST 4K CNFG	*HST 32K CNFG	*HST 4K CNFG	*HST 32K CNFG	*HST 4K CNFG	*HST 32K CNFG	*HST 4K CNFG	*HST 32K CNFG	*HST 4K CNFG	*HST 32K CNFG	*HST 4K CNFG	*HST 32K CNFG	*HST 4K CNFG	*HST 32K CNFG	*HST 4K CNFG	*HST 32K CNFG	*HST 4K CNFG	*HST 32K CNFG
NOTES																														

BETA -36.98  
 CT 12/06/99  
 FD05  
 MET Day 004



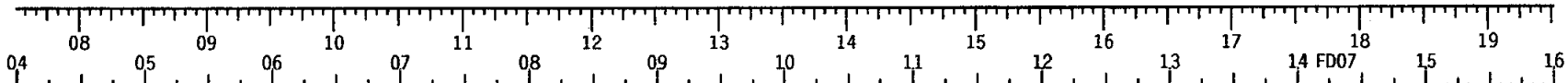
CDR Brown	EVA RVW	PRE SLEEP	SLEEP HST SURVEY (+V3 FWD) & SA STATIC TWIST ANALYSIS #3				POST SLEEP	
PLT Kelly	W I A N A N S I T T E	PRE SLEEP	W T A E S R L T M E	- Z X L V V	P S R L R E E E P	SLEEP	POST SLEEP	
MS1 (EV1) Smith	EVA RVW	PRE SLEEP	SLEEP				POST SLEEP	PMC A/G
MS2 Clervoy	EVA RVW	PRE SLEEP	SLEEP				POST SLEEP	
MS3 (EV2) Grunsfeld	EVA RVW	PRE SLEEP	O D C N A L K	SLEEP			POST SLEEP	PMC A/G
MS4 (EV3) Foale	EVA RVW	P S T E V T T O U I P	PRE SLEEP	SLEEP			POST SLEEP	
MS5 (EV4) Nicollier	EVA RVW	PRE SLEEP	SLEEP				POST SLEEP	
GND CMD	Δ	RCVR SI	RE LOAD GYRO	T L C M A D				
TDRS	DAY/NIGHT ORBIT SAA							
TDRS	E	63 64 65 66 67 68 69 70						W
GND SITES	DGS -GDX -GTS -HTS -VTS DGS -GTS -HTS -VTS DGS -GTS -HTS -VTS GTS -HTS GTS GTS							
ORB ATT	-ZLV +YVV			-ZLV -XVV				
SOLAR ARRAY	0							
FSS	+V3							
NOTES	ΔFGS-2R FUNCT TEST							

BETA -35.47  
 CT 12/06/99  
 FD06  
 MET Day 004



CDR Brown	10-2*	OP SWVRN	OP SWVRN	GP RWPRUB	PTV13 OPS	OB-ZLVA	FCEN	-ZLV	-XVV	FOEF	CSA ACT	10-2*	GP RWPRDN	EXERCISE	10-2*				
PLT Kelly	HTTR*	EXERCISE	GP RWPRUB	PTV13 OPS	PTV14 OPS						CSA ACT	PTV12 OPS	FILTER CLEAN INSPECT		10-2*				
MS1 (EV1) Smith		EVA PREP	EMU PG & P/B	A/L DEP	DEGRS	DSAEITLUP	DOCE EK	SSA XMTR	SSR ESTR3 CNGOUT	MFR	MLI REPAIR BAY 5-10	DAILY CLSOUT	IPNRGPA/LREP	POST EVA W/H2O RECHG	EVA 4 TOOL CNFG				
MS2 Clervoy	MCIU*		RMS MFR A/L		DEGRS	DSAEITLUP	DOCE EK	SSA XMTR	SSR ESTR3 CNGOUT	MFR	MLI REPAIR BAY 5-10	DAILY CLSOUT	EVA 3	RPMASTRK	VTR P/B	EXERCISE	ODCNALK		
MS3 (EV2) Grunsfeld		EVA PREP	EMU PG & P/B	A/L DEP	DEGRS	DSAEITLUP	DOCE EK	SSA XMTR	SSR ESTR3 CNGOUT	MFR	MLI REPAIR BAY 5-10	DAILY CLSOUT	IPNRGPA/LREP	POST EVA W/H2O RECHG	EMU SWAP	BATT/LIOH	ESQWUAIP		
MS4 (EV3) Foale		EVA PREP	EMU PG & P/B	A/L DEP							EVA SUPPORT		A/L REP	POST EVA W/H2O RECHG	EVA 4 TOOL CNFG				
MS5 (EV4) Nicollier	HLSPMT*	EVA PREP	EMU PG & P/B	A/L DEP							EVA SUPPORT		A/L REP	POST EVA W/H2O RECHG	EMU SWAP	BATT/LIOH	ESQWUAIP		
GND CMD											SSAT ALIVE	FGS AMS FUNCT TEST							
TDRS																			
DAY/NIGHT																			
ORBIT SAA		71	72	73	74	75	76	77	78										
TDRS EW																			
GND SITES		-DGS	-MIL	-DGS	-MIL	-DGS	-GDX	-MIL	-VTS	-DGS	-GDX	-MIL	-DGS	-GTS	-GDX	-MIL	-DGS	-GDX	-MIL
ORB ATT		-ZLV	-XVV																
SOLAR ARRAY FSS											SUN PROTECT								
NOTES		*TEMP CNTL RECONFIG					*DR PREP		*CHANGEOUT					*ALIVENESS TEST		*MAINT		*WCS FILTER CK	
		*RECONFIG					*VERIF OFF											*LT RCHG INIT	
		*FILTER CK																	
		*LT RCHG TERM																	

BETA -33.91  
 CT 12/07/99  
 FD06  
 MET Day 005

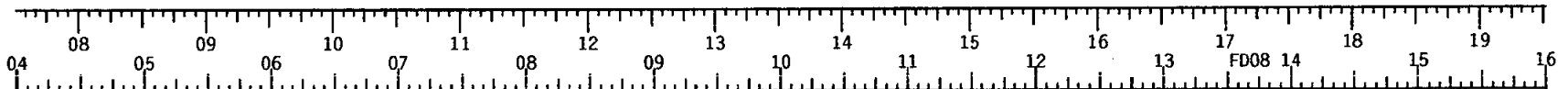


CDR Brown	EVA RVW	PRE SLEEP	SLEEP HST SURVEY (+V3 FWD) & SA STATIC TWIST ANALYSIS #4				POST SLEEP	
PLT Kelly	EVA RVW	PRE SLEEP	SLEEP				POST SLEEP	
MS1 (EV1) Smith	EVA RVW	PRE SLEEP	SLEEP				POST SLEEP	
MS2 Clervoy	EVA RVW	PRE SLEEP	SLEEP				POST SLEEP	
MS3 (EV2) Grunsfeld	EVA RVW	PRE SLEEP	OD CN AL K	SLEEP			POST SLEEP	
MS4 (EV3) Foale	EVA RVW	PRE SLEEP	PS TE V OU IP	SLEEP			POST SLEEP	PMC A/G
MS5 (EV4) Nicollier	EVA RVW	PRE SLEEP	SLEEP				POST SLEEP	PMC A/G
GND CMD								
TDRS								
DAY/NIGHT								
ORBIT								
SAA								
TDRS								
GND SITES								
ORB ATT								
SOLAR ARRAY								
FSS								
NOTES								

BETA -32.30  
 CT 12/07/99  
 FD07  
 MET Day 005

	16	17	18	19	20	21	22	23	20	21	22	23	03	006/00	04	01	05	02	06	03	07	04	
CDR Brown	EXERCISE	EXERCISE	EXERCISE	PTV13 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV12 OPS
PLT Kelly	EXERCISE	EXERCISE	EXERCISE	PTV13 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV14 OPS	PTV12 OPS
MS1 (EV1) Smith	EVA PREP	EMU PG & P/B	A/L DEP	EVA SUPPORT	HGA DPY	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA X TOOL CNFG
MS2 Clervoy	EXERCISE	EXERCISE	EXERCISE	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST
MS3 (EV2) Grunsfeld	EVA PREP	EMU PG & P/B	A/L DEP	EVA SUPPORT	HGA DPY	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA SUPPORT	EVA X TOOL CNFG
MS4 (EV3) Foale	EVA PREP	EMU PG & P/B	A/L DEP	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST
MS5 (EV4) Nicollier	EVA PREP	EMU PG & P/B	A/L DEP	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST	SSRF INST
GND CMD																							
TDRS																							
DAY/NIGHT ORBIT SAA	86	87	88	89	90	91	92	93															
TDRS																							
GND SITES																							
ORB ATT																							
SOLAR ARRAY FSS																							
NOTES	*LT RCHG TERM																						
	*FILTER CK																						
	*PART 1																						
	*OFF																						
	*75 DEG *EXT PWR OFF																						
	*90 DEG *PART 2																						
	*LT RCHG INIT *ON																						
	*HST PWR ON																						

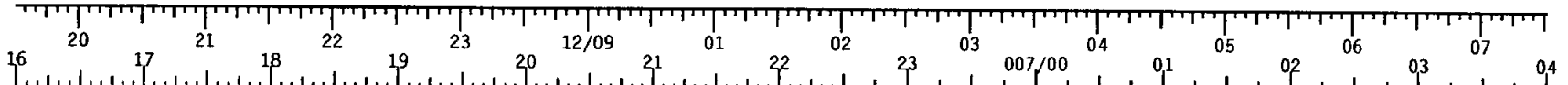
BETA -30.65  
 CT 12/08/99  
 FD07  
 MET Day 006



CDR Brown	PRE SLEEP	PMC OCA	PRE SLEEP	SLEEP HST SURVEY (-V3 FWD) & SA STATIC TWIST ANALYSIS #5						POST SLEEP	
PLT Kelly	PRE SLEEP	WT AS E R L T M V E	Z X L V V	PRE SLEEP	SLEEP						POST SLEEP
MS1 (EV1) Smith	PRE SLEEP			SLEEP						POST SLEEP	
MS2 Clervoy	PRE SLEEP			SLEEP						POST SLEEP	
MS3 (EV2) Grunsfeld	PRE SLEEP			OD C N A L K	SLEEP						POST SLEEP
MS4 (EV3) Foale	PRE SLEEP			SLEEP						POST SLEEP	
MS5 (EV4) Nicollier	PRE SLEEP			SLEEP						POST SLEEP	
GND CMD											
TDRS DAY/NIGHT	[Timeline with shaded blocks]										
ORBIT SAA	[Timeline with horizontal bars]										
TDRS E W	[Timeline with horizontal bars]										
GND SITES	GDX -VTS	DGS -GTS	HTS -VTS	DGS -GTS	HTS -GTS	DGS -GTS	GTS -HTS	GTS	GTS	GTS	DGS
ORB ATT	-ZLV -XVV										
SOLAR ARRAY FSS	0 -V3										
NOTES											

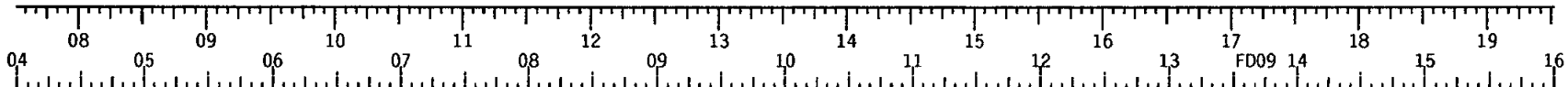


BETA -28.97  
 CT 12/08/99  
 FD08  
 MET Day 006



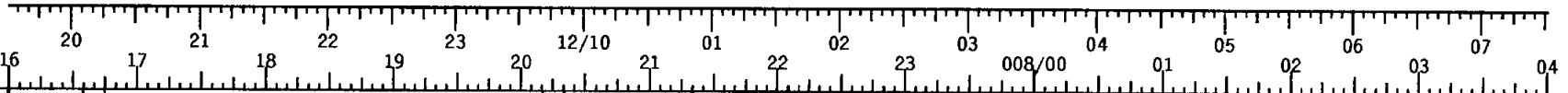
CDR Brown	POST SLEEP	10.2*	SA SLEW	GRPB PWUP	PSTG SETUP		HST UMBTH MNVR	RAETL SE	MEAL	HST RELEASE PREP	REL HST	SEP1A	SEP2A	GRPRD N		TO WKEN	EXERCISE	FENS	14.7 RPRSS	PC MCA	PRE SLEEP	FEFF	PRE SLEEP
PLT Kelly	POST SLEEP		PSTG TV13	PTV15 OPS	GRPB PWUP	PSTG SETUP	HST UMBTH MNVR	RAETL SE	MEAL	HST RELEASE PREP	REL HST		RELEASE OPS	GRPRD N	-ZLVV		EXERCISE		14.7 RPRSS				PRE SLEEP
MS1 (EV1) Smith	POST SLEEP		SA SLEW				UMBTH MNVR		MEAL	HST RELEASE PREP	REL HST	RHS		FSS STOW			POAPOTTY						PRE SLEEP
MS2 Clervoy	POST SLEEP				MCIU*	GRPL	HST UMBTH MNVR		MEAL	HST RELEASE PREP	REL HST			RPMSRD N			POAPOTTY		EXERCISE				PRE SLEEP
MS3 (EV2) Grunsfeld	POST SLEEP						UMBTH MNVR		MEAL	HST RELEASE PREP	REL HST	L		FSS STOW		EMU*	POAPOTTY			ODCNAL K			PRE SLEEP
MS4 (EV3) Foale	POST SLEEP		PSTG TV15	PTV15 OPS			PTV15 OPS		MEAL			SE	PTV15 OPS		PSTG TV15		POAPOTTY		VTRP/B				PRE SLEEP
MS5 (EV4) Nicollier	POST SLEEP					GRPL	HST UMBTH MNVR		MEAL	HST RELEASE PREP	REL HST			RPMSRD N		EMU*	POAPOTTY						PRE SLEEP
GND CMD			PREP BATT CHG			PSEATEST MODE											FHST FOV CHECK						ATT DET & LGBU DATA
TDRS																							
DAY/NIGHT																							
ORBIT																							
SAA																							
TDRS																							
GND SITES																							
ORB ATT																							
SOLAR ARRAY																							
FSS																							
NOTES																							

BETA -27.27  
 CT 12/09/99  
 FD08  
 MET Day 007



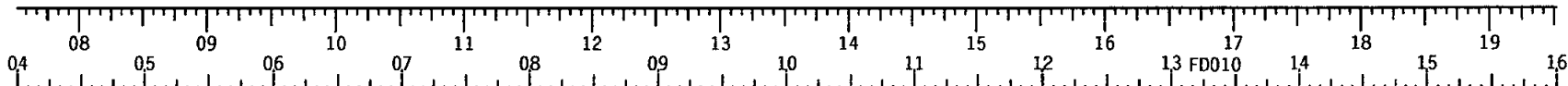
CDR Brown	PRE SLEEP	SLEEP		POST SLEEP		
PLT Kelly	PRE SLEEP	SLEEP		POST SLEEP	FILTER CLEAN	
MS1 (EV1) Smith	PRE SLEEP	SLEEP		POST SLEEP		
MS2 Clervoy	PRE SLEEP	SLEEP		POST SLEEP		
MS3 (EV2) Grunsfeld	PRE SLEEP	OD CN ALK	SLEEP		POST SLEEP	
MS4 (EV3) Foale	PRE SLEEP	SLEEP		POST SLEEP		
MS5 (EV4) Nicollier	PRE SLEEP	SLEEP		POST SLEEP		
GND CMD	ATT DET & LGBU DATA					
TDRS						
GND SITES	-GDX -HTS -VTS	-DGS -HTS -GTS	-DGS -HTS -GTS	-GTS -HTS	-GTS	-DGS
ORB ATT	-ZLV -XVV					
SOLAR ARRAY FSS	90 STOWED					
NOTES						

BETA -25.56  
 CT 12/09/99  
 FD09  
 MET Day 007



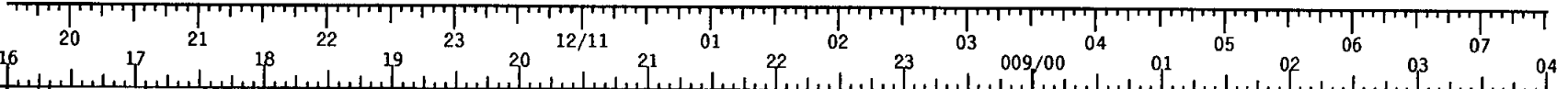
CDR Brown	OFF DUTY	PRIV	OFF DUTY	OPPS2	MEAL	OFF DUTY	OPPS2	EXERCISE	OFF DUTY	POAPPTY	COMCA	PRE SLEEP		
PLT Kelly	OFF DUTY	PRIV	OFF DUTY	OPPS2	MEAL	OFF DUTY	OPPS2	OFF DUTY	EXERCISE	OFF DUTY	POAPPTY	PRE SLEEP		
MS1 (EV1) Smith	OFF DUTY	PRIV	OFF DUTY		MEAL	POST EVA EVENT PREP		OFF DUTY	EXERCISE	OFF DUTY	POAPPTY	PRE SLEEP		
MS2 Clervoy	OFF DUTY	PRIV	OFF DUTY		MEAL	EXERCISE		OFF DUTY	PAO OPPTY	OFF DUTY	POAPPTY	COMM*	PRE SLEEP	
MS3 (EV2) Grunsfeld	OFF DUTY	PRIV	OFF DUTY	ODCNALK	MEAL	POST EVA EVENT PREP		OFF DUTY	EXERCISE		POAPPTY	ODCNALK	PRE SLEEP	ODCNALK
MS4 (EV3) Foale	OFF DUTY	PRIV	OFF DUTY		MEAL	POST EVA EVENT PREP	PS TE V O U P	OFF DUTY			POAPPTY		PRE SLEEP	
MS5 (EV4) Nicollier	OFF DUTY	PRIV	OFF DUTY		MEAL	POST EVA EVENT PREP		OFF DUTY	PAO OPPTY	OFF DUTY	POAPPTY		PRE SLEEP	
GND CMD														
TDRS														
DAY/NIGHT														
ORBIT SAA	115	116	117	118	119	120	121	122	123					
TDRS E W														
GND SITES														
ORB ATT	-ZLV -XVV-													
SOLAR ARRAY FSS	-STOWED													
NOTES	*STRING I C/O INIT													

BETA -23.85  
 CT 12/10/99  
 FD09  
 MET Day 008

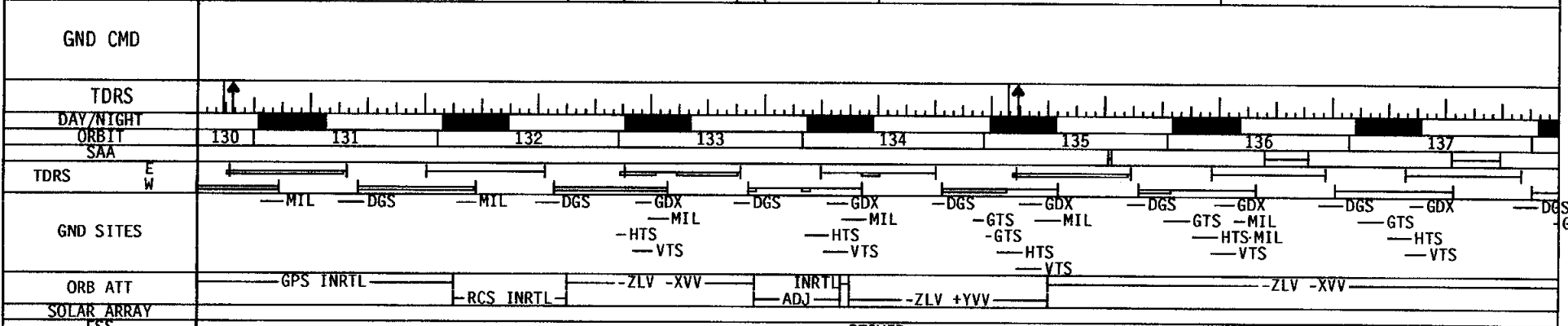


CDR Brown	SLEEP	POST SLEEP	OPS3 GPS TEST
PLT Kelly	SLEEP	POST SLEEP	POST SLEEP * OPS3 GPS TEST
MS1 (EV1) Smith	SLEEP	POST SLEEP	EXERCISE
MS2 Cervoy	SLEEP	POST SLEEP	
MS3 (EV2) Grunsfeld	SLEEP	POST SLEEP	
MS4 (EV3) Foale	SLEEP	POST SLEEP	PS TE VT OU 3P
MS5 (EV4) Nicollier	SLEEP	POST SLEEP	
GND CMD			
TDRS			
DAY/NIGHT			
ORBIT	123	124	125
SAA			
TDRS			
GND SITES	HTS -VTS	DGS -GTS	HTS -GTS
ORB ATT	-ZLV -XVV		
SOLAR ARRAY	GPS INRTL		
FSS	STOWED		
NOTES	*APU HTR ACT		

BETA -22.14  
 CT 12/10/99  
 FD010  
 MET Day 008



CDR Brown	CREW CONF	CREW PHOTO	FCS C/O	RCS HOT FR	D/O PREP BRIEF	MEAL	C D S E A A C T	*RCS BURN	EXERCISE	CABIN STOW	W T A E R T M E	- X Z L V V	CABIN STOW	E N E T M P M C R P A / G	PRE SLEEP	- Z Y L V L V *
PLT Kelly	CREW CONF	CREW PHOTO	FCS C/O	RCS HOT FR	- Z X L V V	B R I E F	MEAL	C D S E A A C T	RCS BURN	- Z L V V	W T A E R T M E	L C I L C N O N D M G M * * * * *	EXERCISE	FILTER CLEAN	PRE SLEEP	
MS1 (EV1) Smith	CREW CONF	CREW PHOTO			D/O PREP BRIEF	MEAL				CABIN STOW			ERGOM STOW	PRE SLEEP		
MS2 Clervoy	CREW CONF	CREW PHOTO	FCS C/O	RCS HOT FR	D/O PREP BRIEF	MEAL			EXERCISE	CABIN STOW			K S U T O W	C O M M * *	PRE SLEEP	
MS3 (EV2) Grunsfeld	CREW CONF	CREW PHOTO	EXERCISE	P S T G T S O C W A	D/O PREP BRIEF	O D C N L K	MEAL	S I G D L		CABIN STOW			M F X S / U	PRE SLEEP		
MS4 (EV3) Foale	P S T G T V T O U P	CREW CONF	CREW PHOTO		D/O PREP BRIEF	MEAL			CABIN STOW		EXERCISE	K S U T O W	ERGOM STOW	PRE SLEEP		
MS5 (EV4) Nicollier	CREW CONF	CREW PHOTO			D/O PREP BRIEF	MEAL		EXERCISE	CABIN STOW				PRE SLEEP			

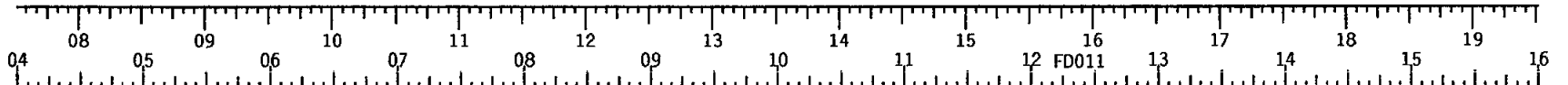


ORB ATT: GPS INRTL, RCS INRTL, -ZLV -XVV, INRTL, ADJ, -ZLV +YVV, -ZLV -XVV

SOLAR ARRAY FSS: STOWED

NOTES: VOPS3 GPS TEST, OOPS3 GPS TEST, \*Perigee Adjust, \*EAST COAST COMM C/O, \*WEST COAST COMM C/O, \*STRING 1 C/O TERM, \*FUT LOAD (9/03:00)

BETA -20.45  
 CT 12/11/99  
 FD010  
 MET Day 009



CDR Brown	SLEEP	POST SLEEP	GRP B PWUP
PLT Kelly	SLEEP	POST SLEEP	GRB B PWUP
MS1 (EV1) Smith	SLEEP	POST SLEEP	P L E A C T
MS2 Clervoy	SLEEP	POST SLEEP	A S I A R M P
MS3 (EV2) Grunsfeld	SLEEP	POST SLEEP	O S T A O C W
MS4 (EV3) Foale	SLEEP	POST SLEEP	
MS5 (EV4) Nicollier	SLEEP	POST SLEEP	P L E A C T
GND CMD			
TDRS	[Timeline with shaded blocks]		
DAY/NIGHT	[Timeline with shaded blocks]		
ORBIT	[Timeline with shaded blocks]		
SAA	[Timeline with shaded blocks]		
TDRS	[Timeline with shaded blocks]		
GND SITES	GTS HTS DGS HTS GTS HTS GTS HTS GTS HTS GTS HTS DGS MIL DGS		
ORB ATT	-ZLV -XVV		
SOLAR ARRAY	-ZLV -YVV		
FSS			
NOTES	#FC PURG		

BETA -18.77  
 CT 12/11/99  
 FD011  
 MET Day 009



CDR Brown	D/O IMU ALIGN	DEORBIT PREP													
PLT Kelly	D/O IMU ALIGN	DEORBIT PREP	D E O R B I T	L A N D I N G											
MS1 (EV1) Smith		DEORBIT PREP													
MS2 Clervoy	TEPC DICE ACT	DEORBIT PREP													
MS3 (EV2) Grunsfeld	MAGR SIGI ENTRY S/U	DEORBIT PREP			B U R N *	K S C *									
MS4 (EV3) Foale	PTV07 SETUP	DEORBIT PREP													
MS5 (EV4) Nicoitier		DEORBIT PREP													
GND CMD															
TDRS															
DAY/NIGHT															
ORBIT	145	146	147	148	149	150	151	152							
SAA															
TDRS															
GND SITES	MIL	DGS	GDX MIL VTS	DGS	GDX MIL HTS VTS	DGS	GDX MIL HTS VTS	DGS	GDX MIL HTS VTS	DGS	GDX MIL HTS VTS	DGS	GDX MIL HTS VTS	DGS	GDX MIL HTS VTS
ORB ATT	IMU	XSI		COMM	D/O	ENTRY									
SOLAR ARRAY															
FSS															
NOTES	*009/20:57 *009/22:07														

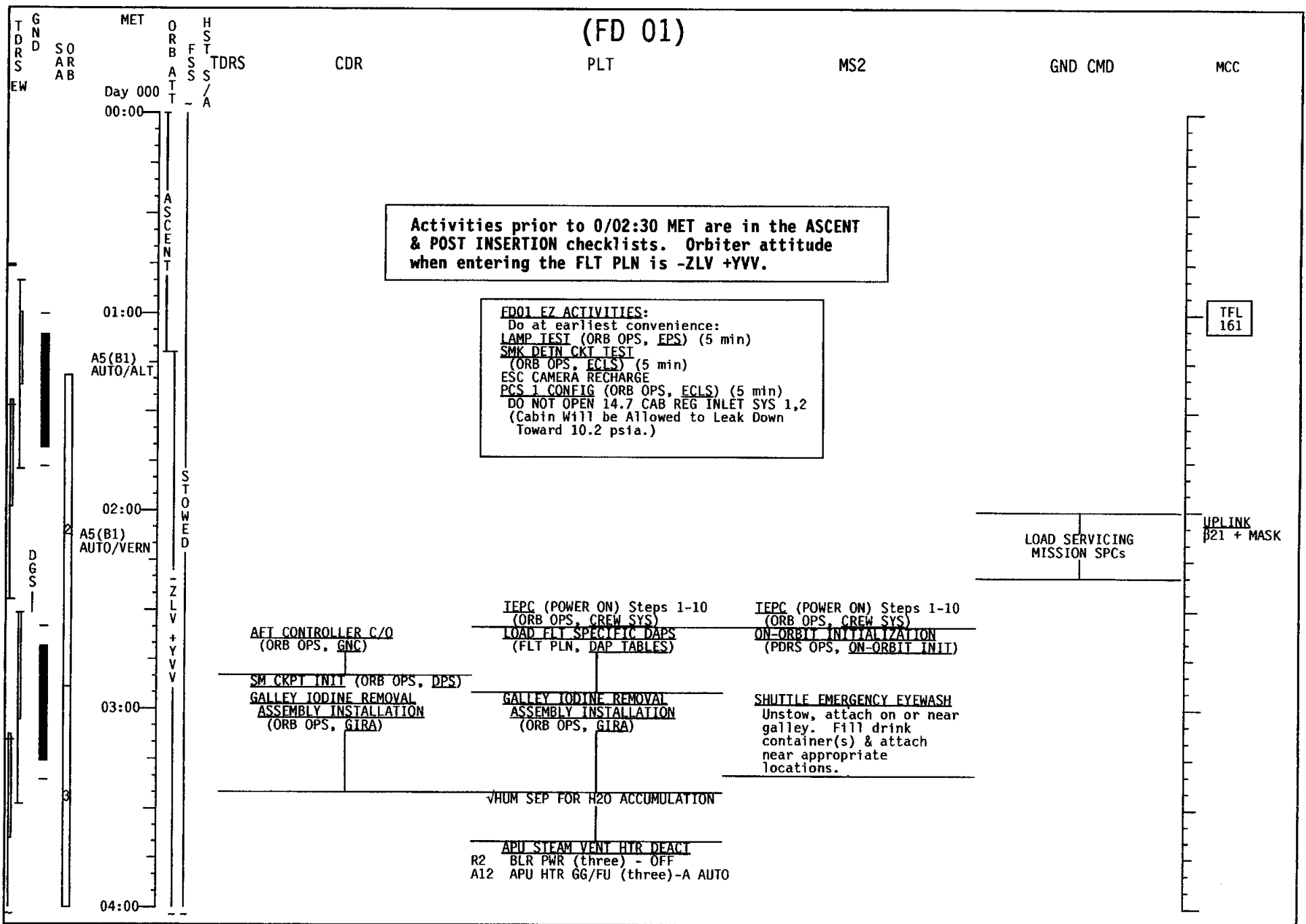
DETAILED TIMELINE

**DETAILED  
TIMELINE**

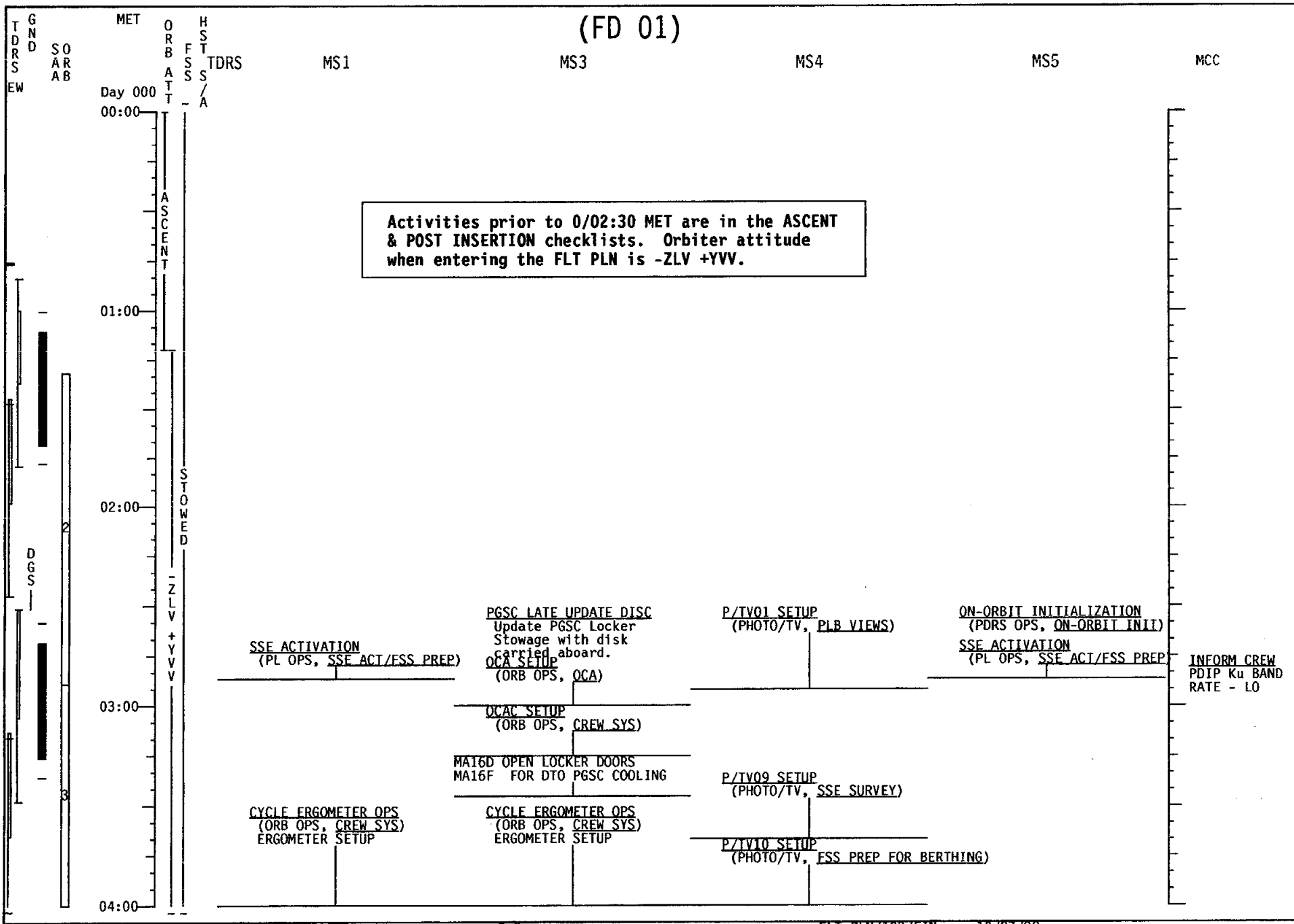


# DETAILED TIMELINE

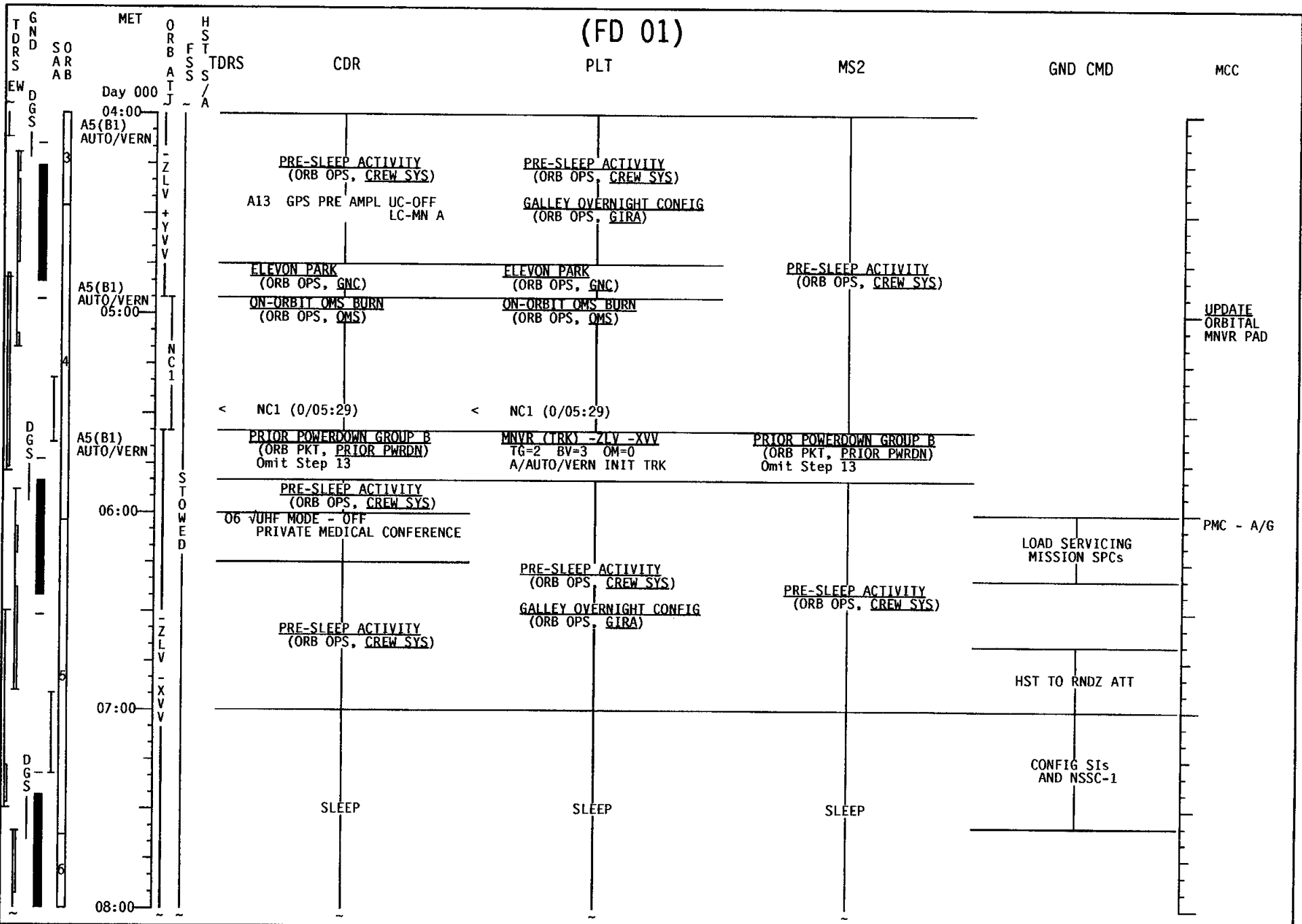
## (FD 01)



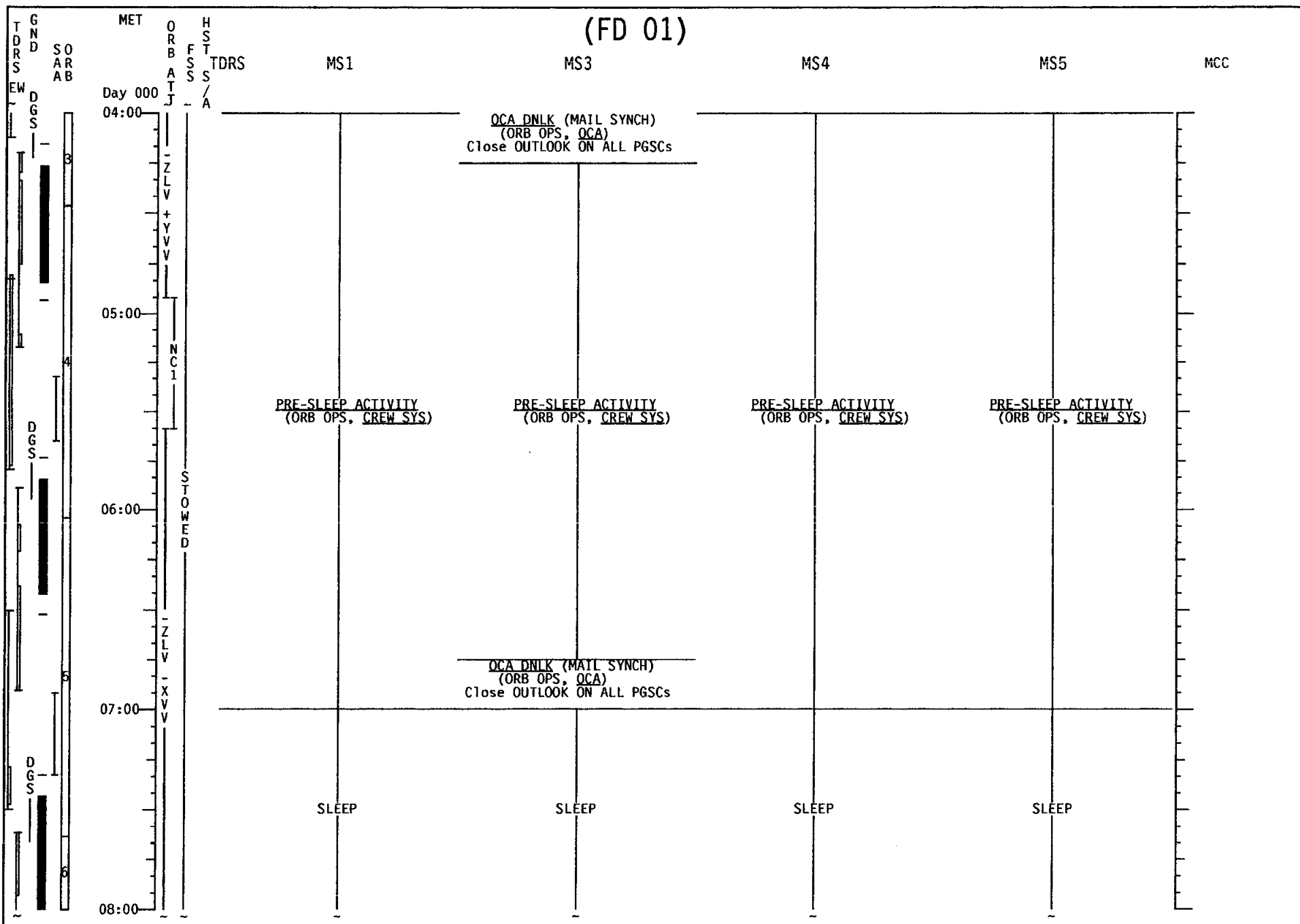
# (FD 01)



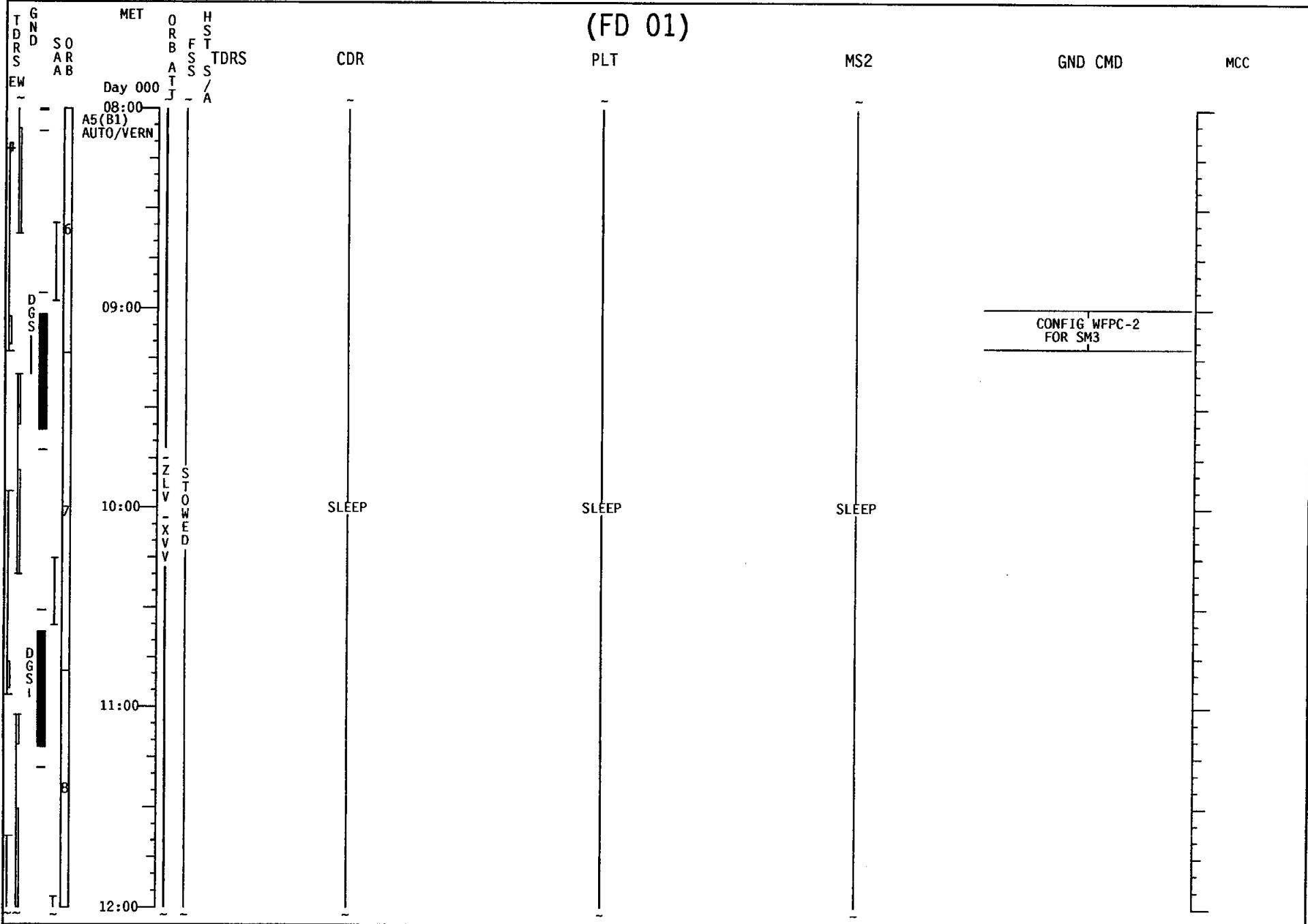
(FD 01)



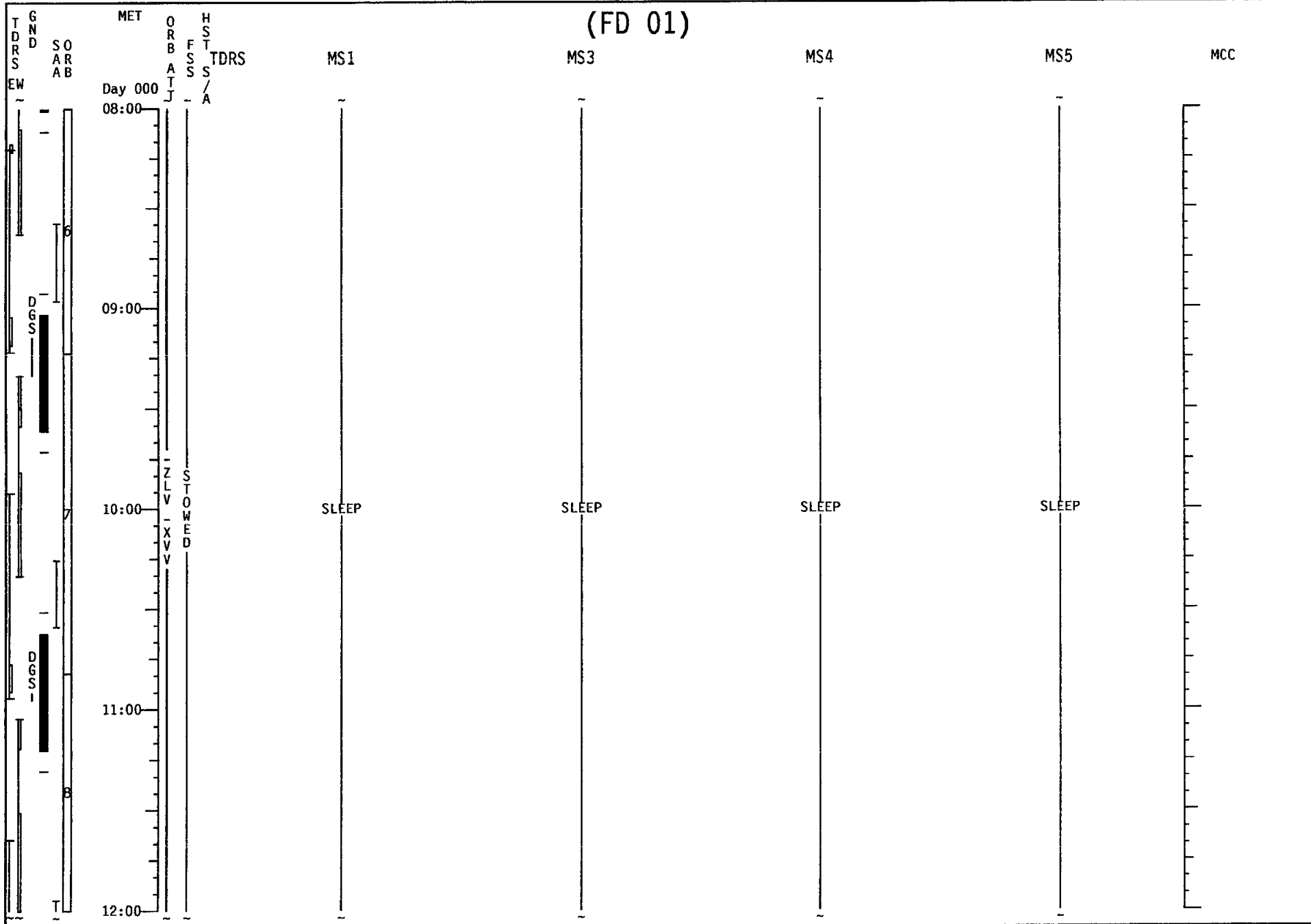
# (FD 01)



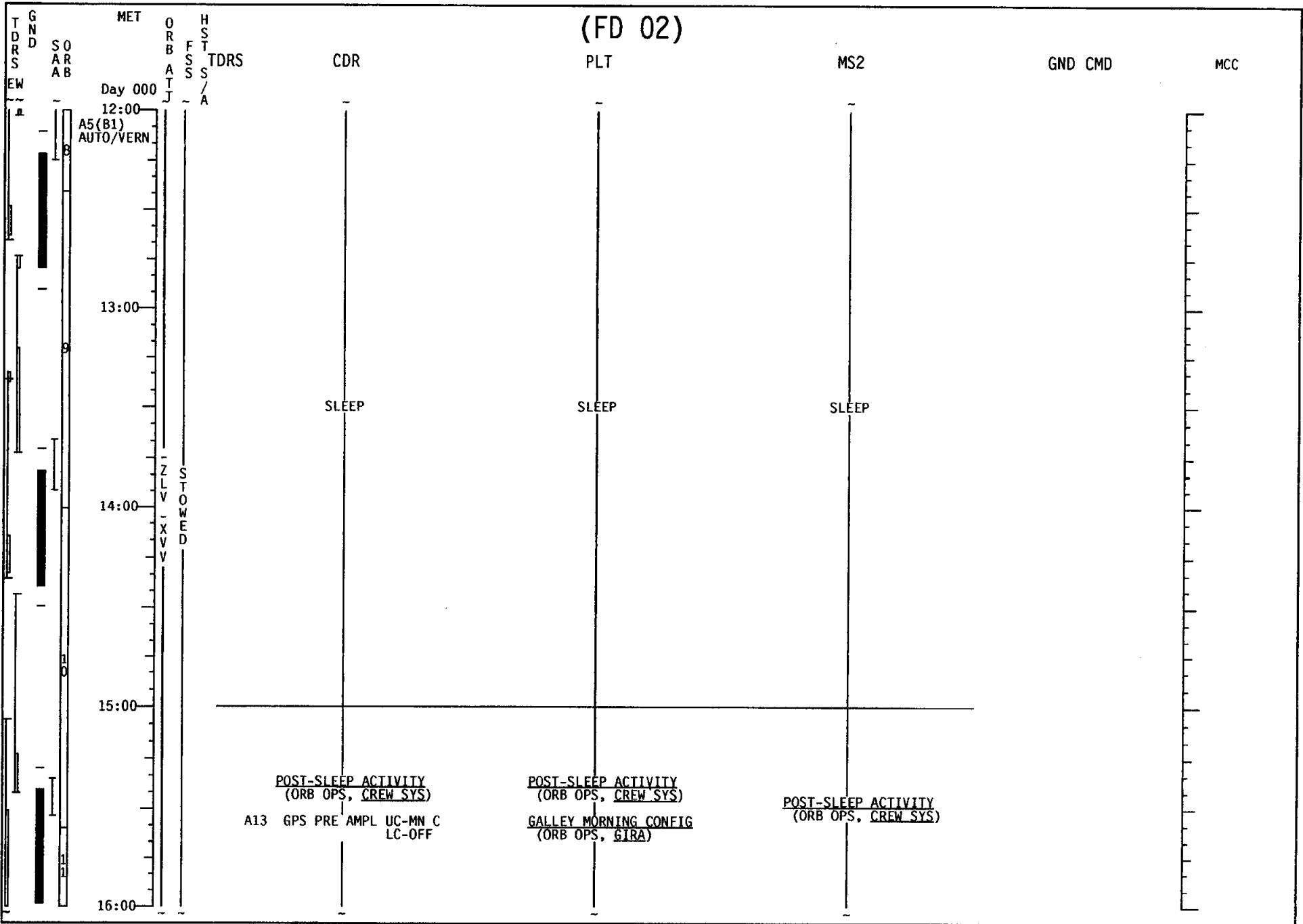
(FD 01)



(FD 01)



(FD 02)



Day 000

12:00

A5(B1)  
AUTO/VERN

13:00

14:00

15:00

16:00

SLEEP

SLEEP

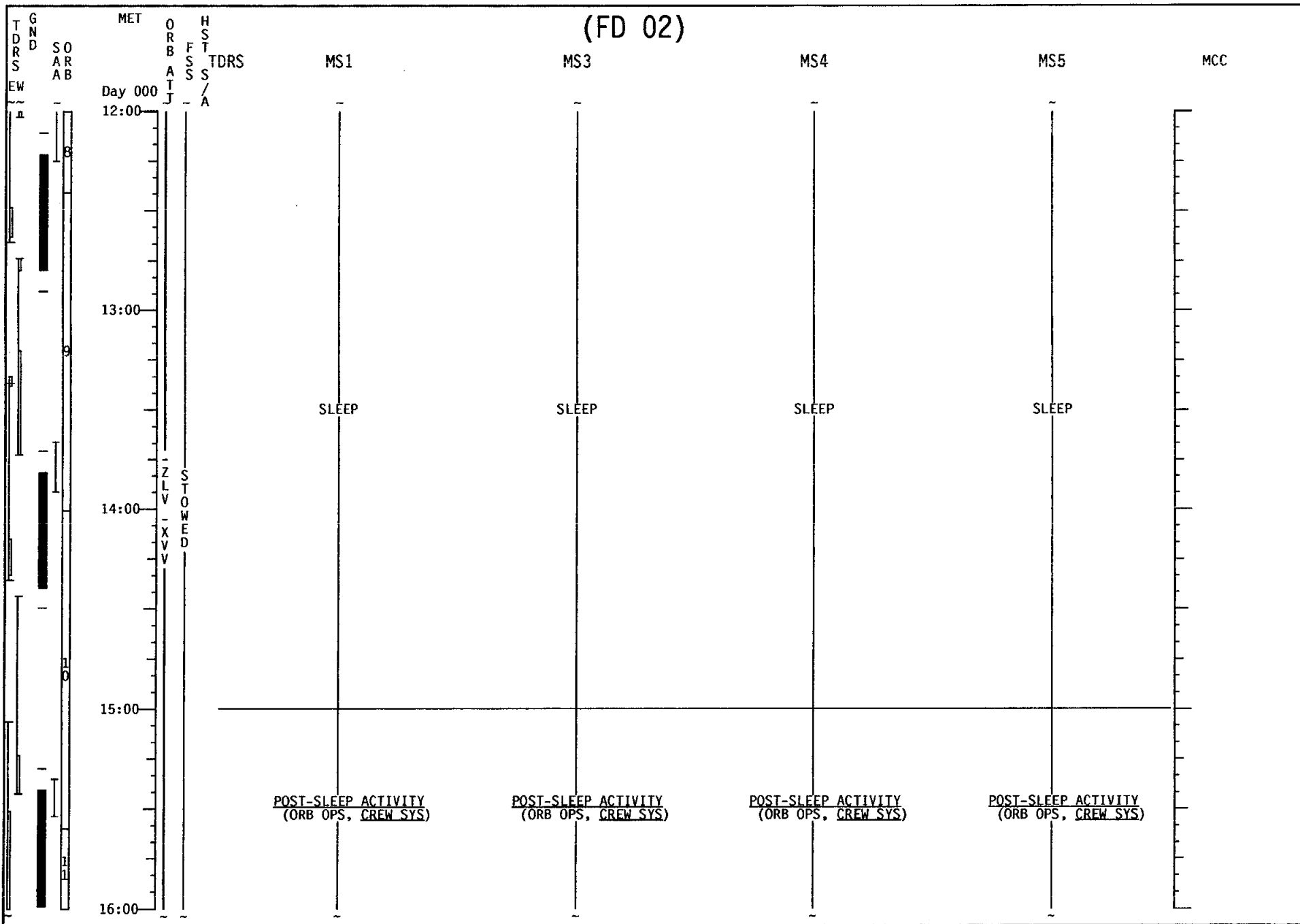
SLEEP

POST-SLEEP ACTIVITY  
(ORB OPS, CREW SYS)  
A13 GPS PRE AMPL UC-MN C  
LC-OFF

POST-SLEEP ACTIVITY  
(ORB OPS, CREW SYS)  
GALLEY MORNING CONFIG  
(ORB OPS, GIRA)

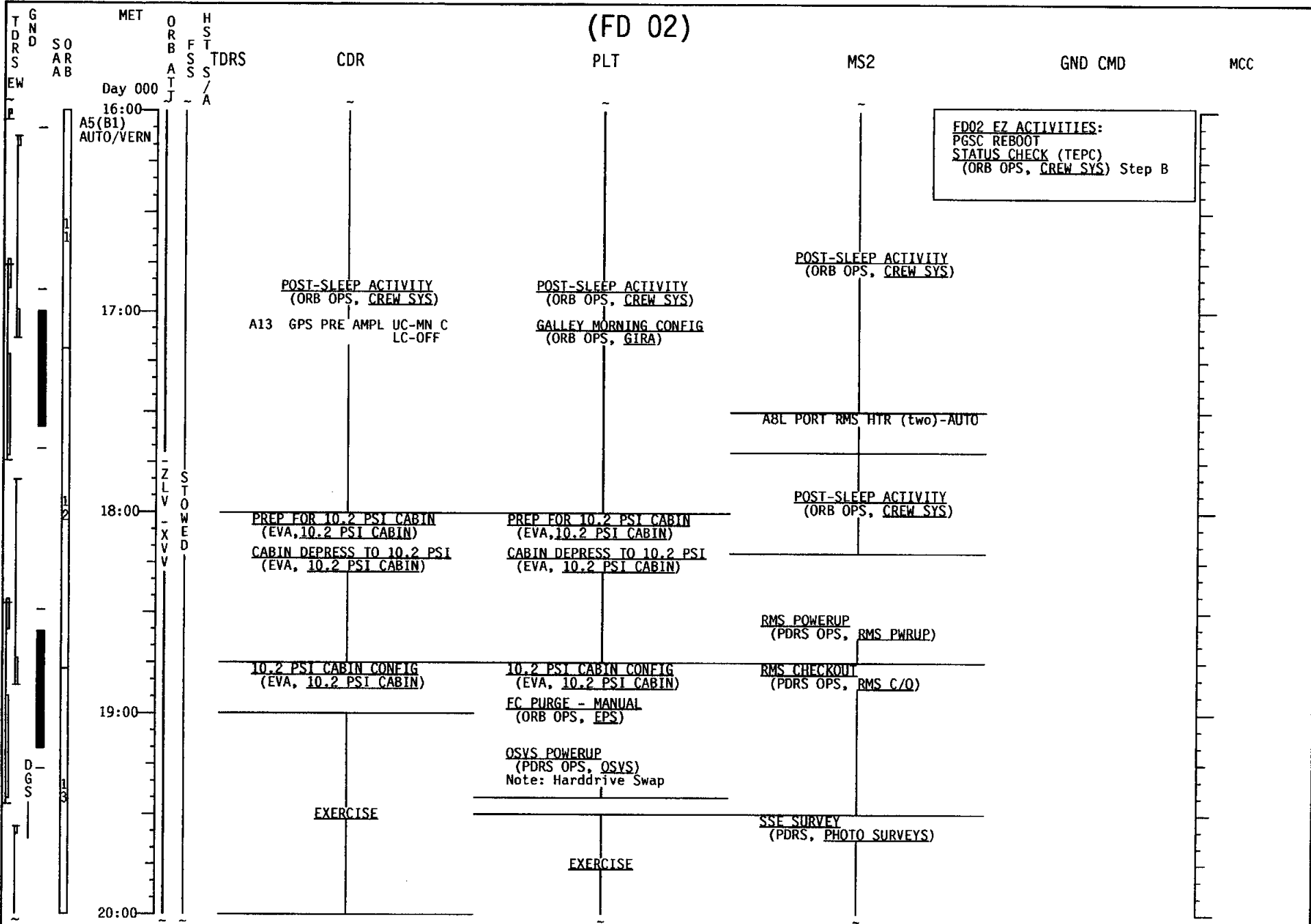
POST-SLEEP ACTIVITY  
(ORB OPS, CREW SYS)

(FD 02)



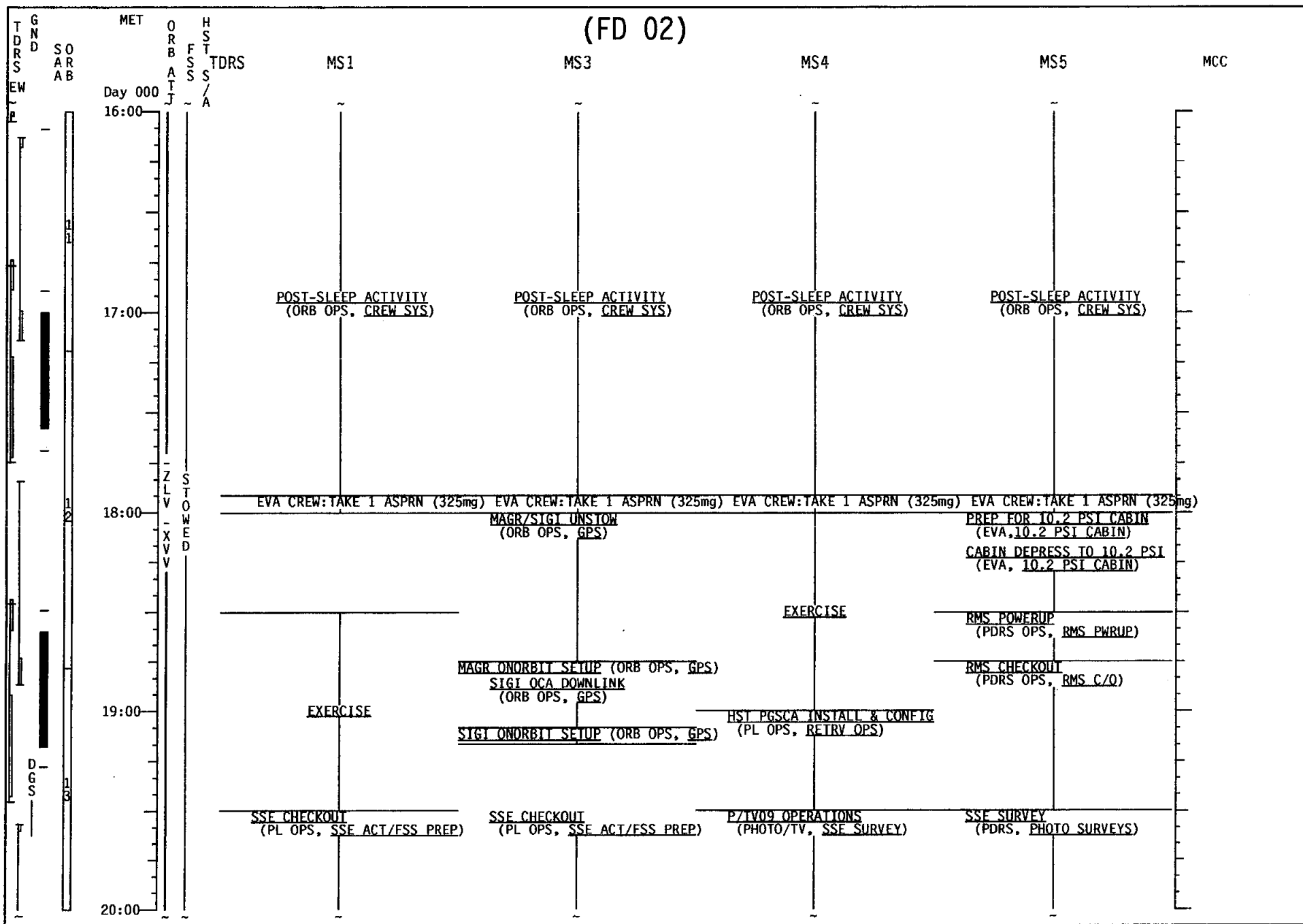


(FD 02)

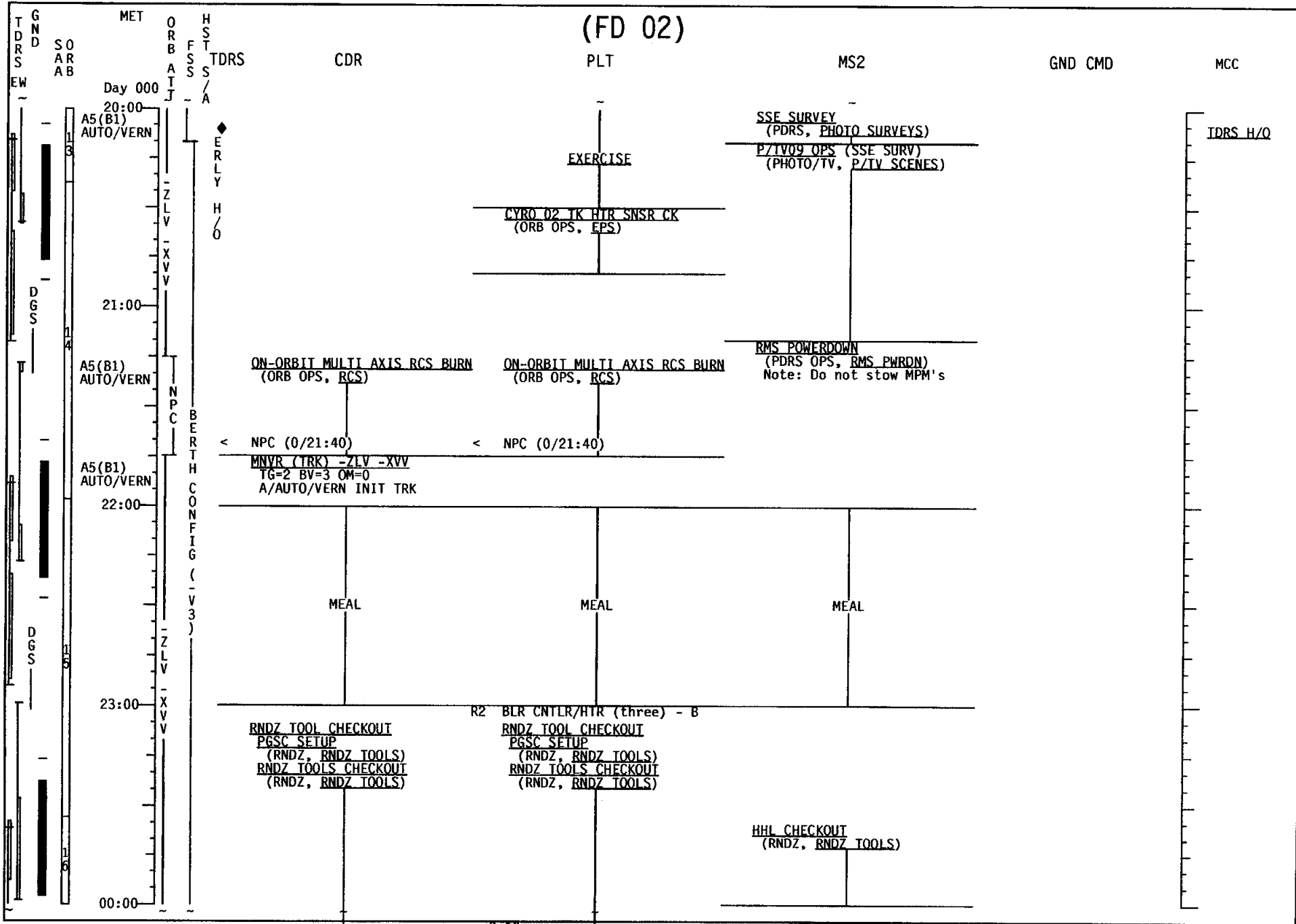


FD02 EZ ACTIVITIES:  
 PGSC REBOOT  
 STATUS CHECK (TEPC)  
 (ORB OPS, CREW SYS) Step B

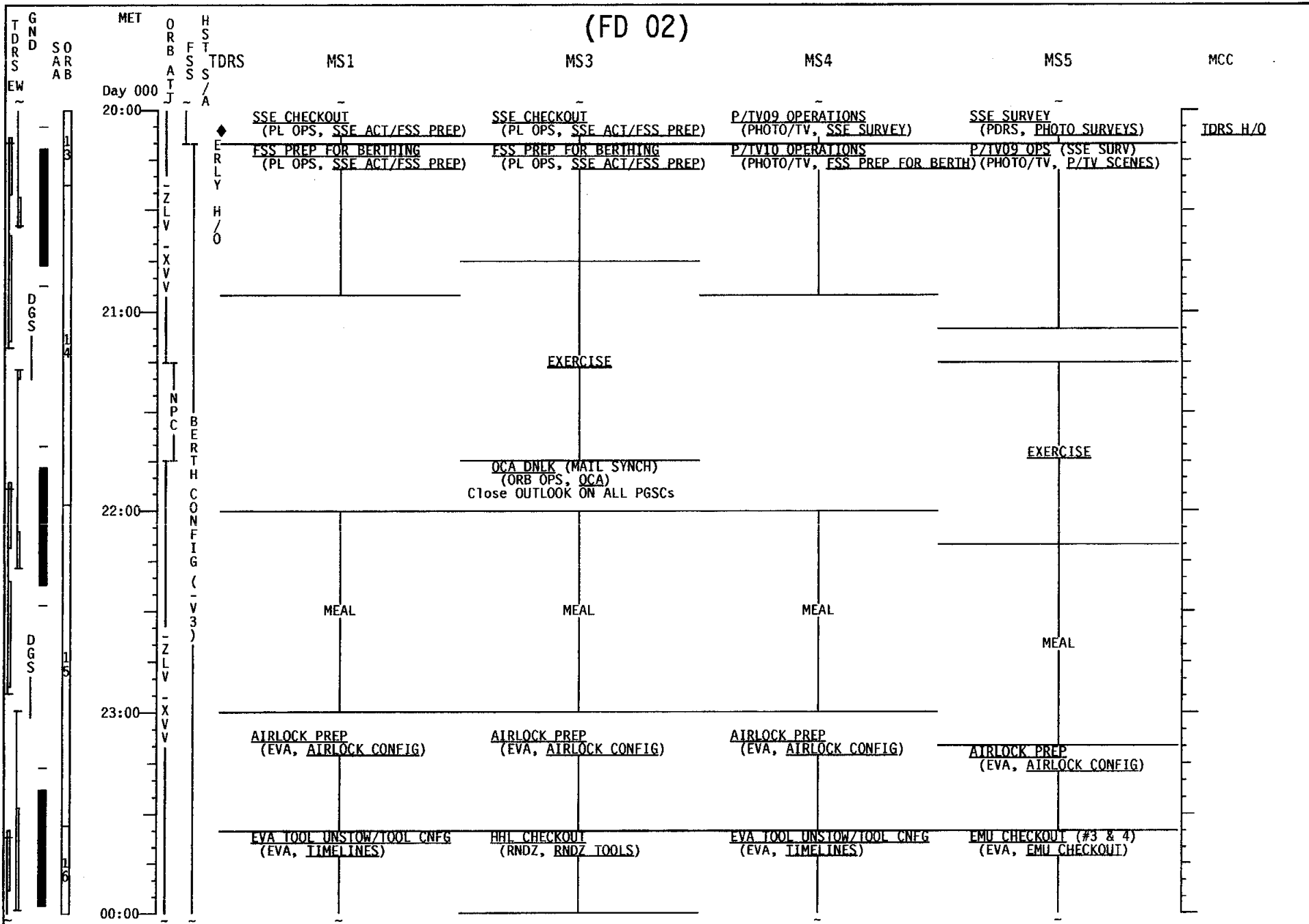
(FD 02)



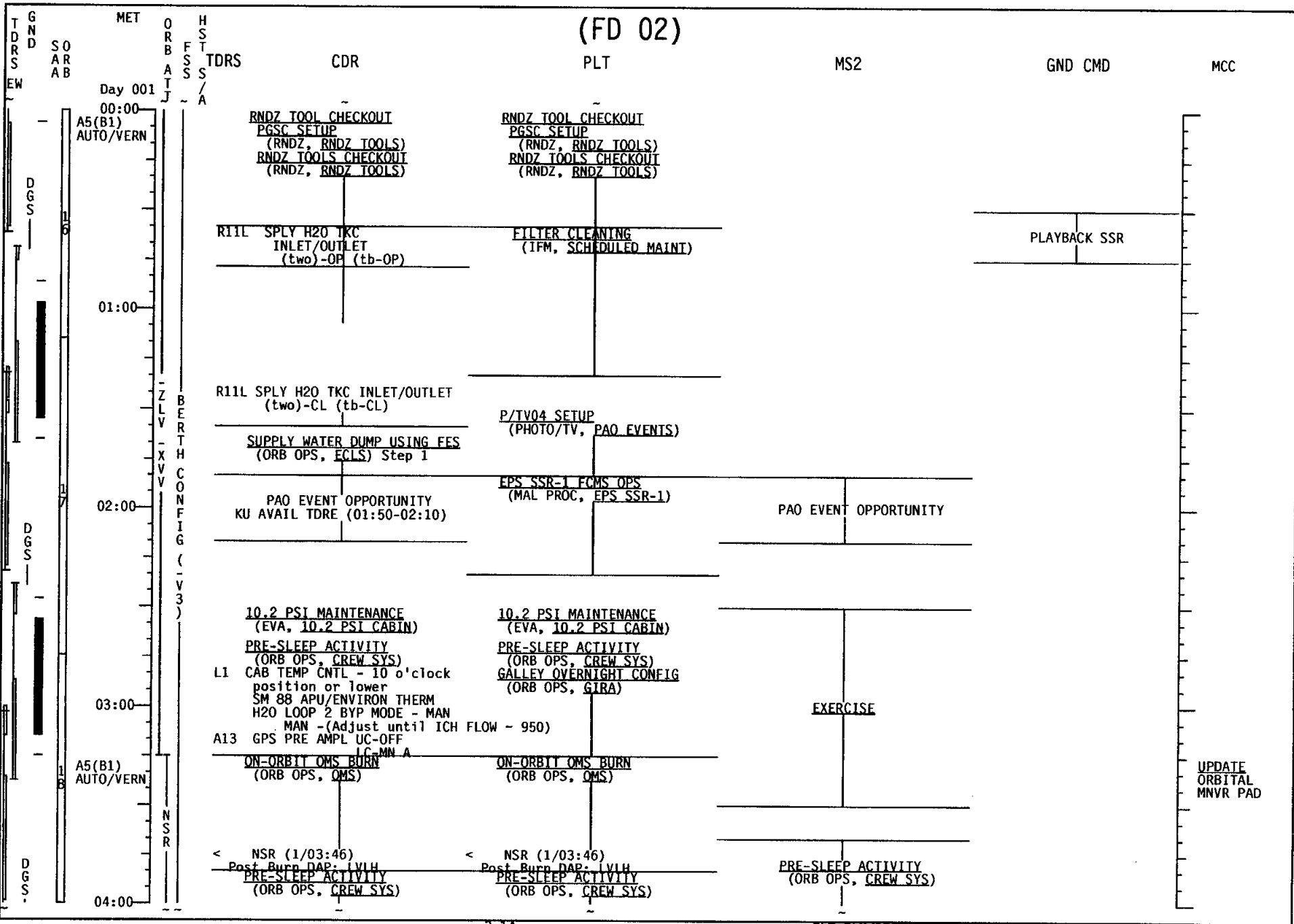
(FD 02)



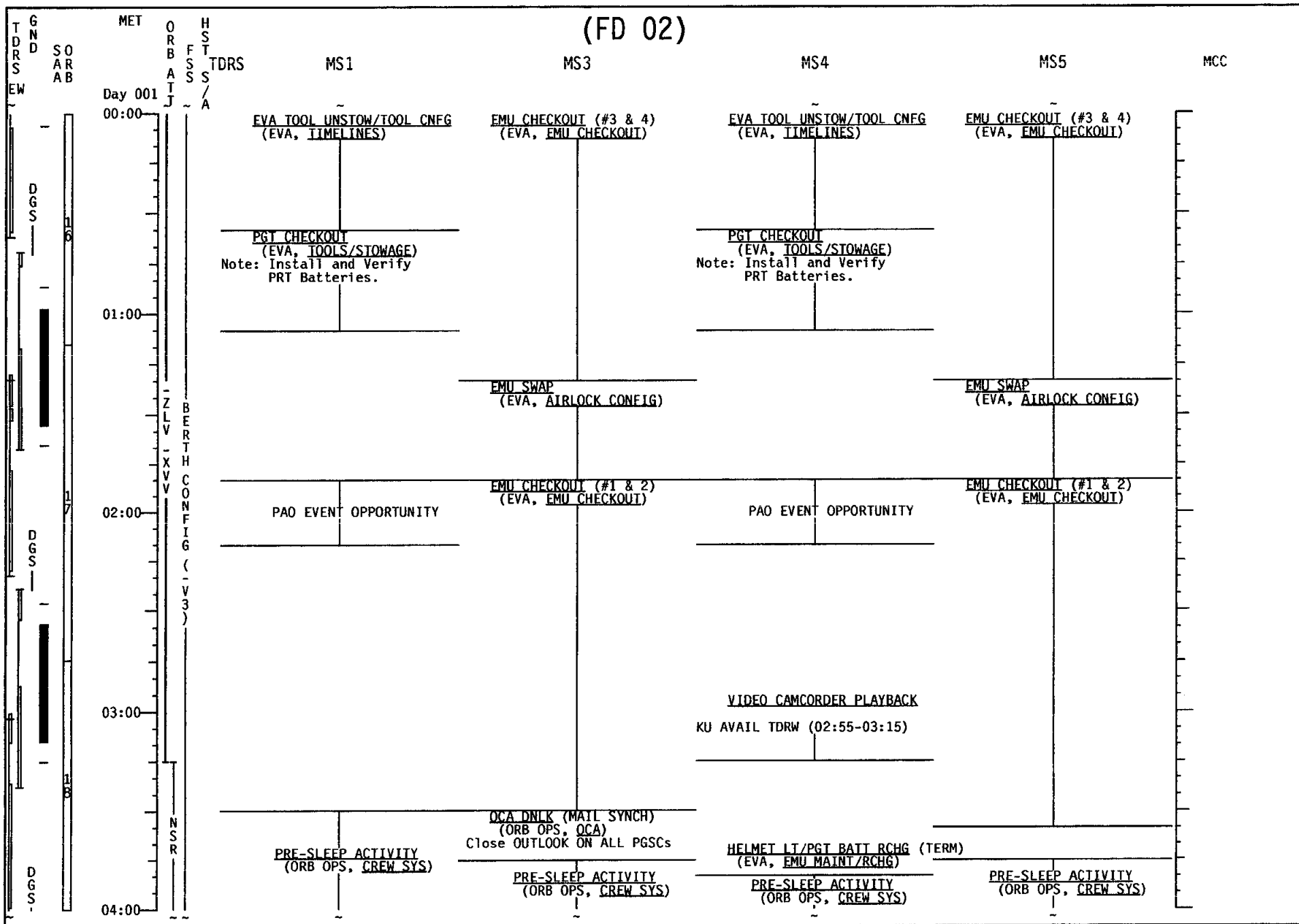
(FD 02)



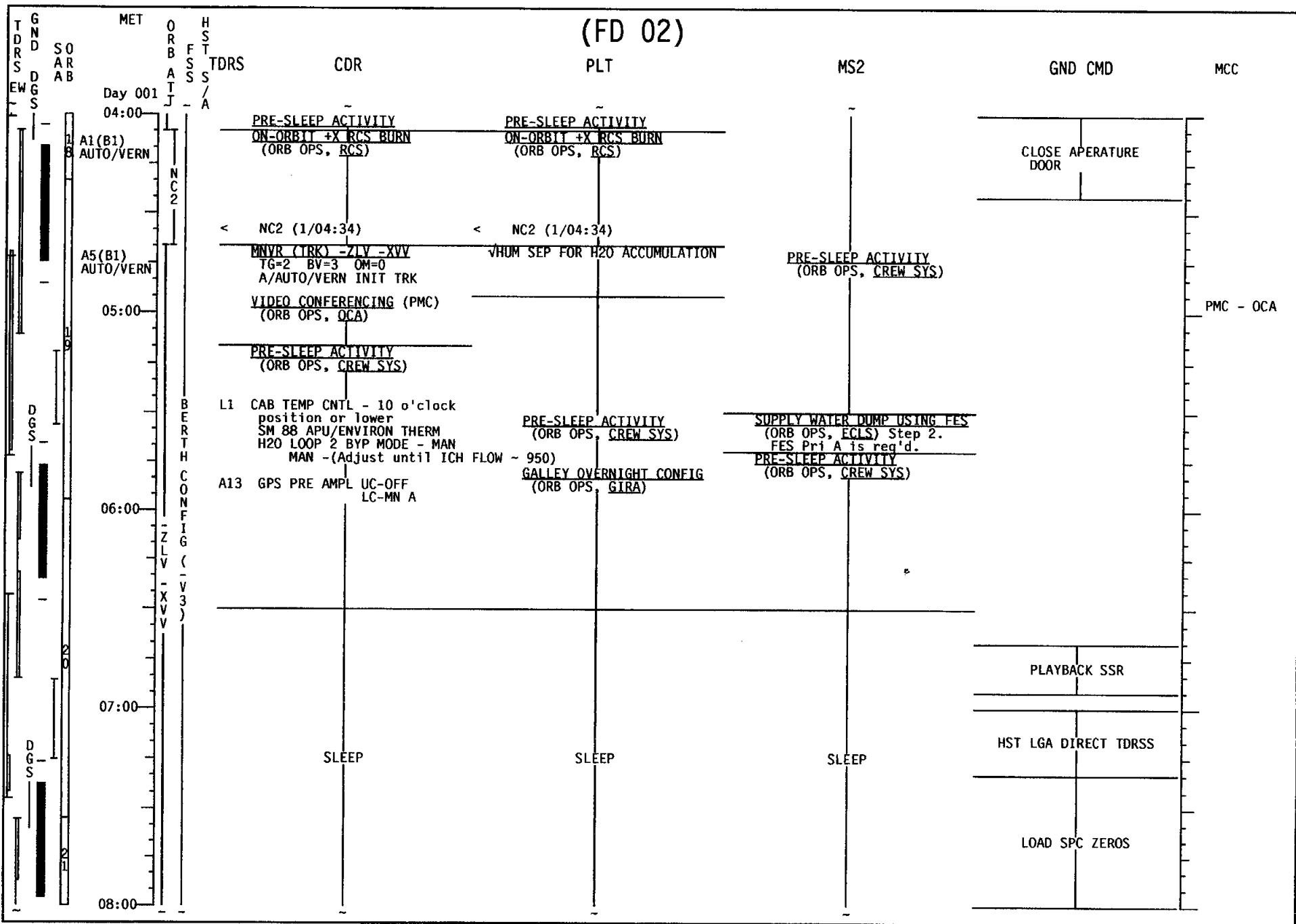
(FD 02)



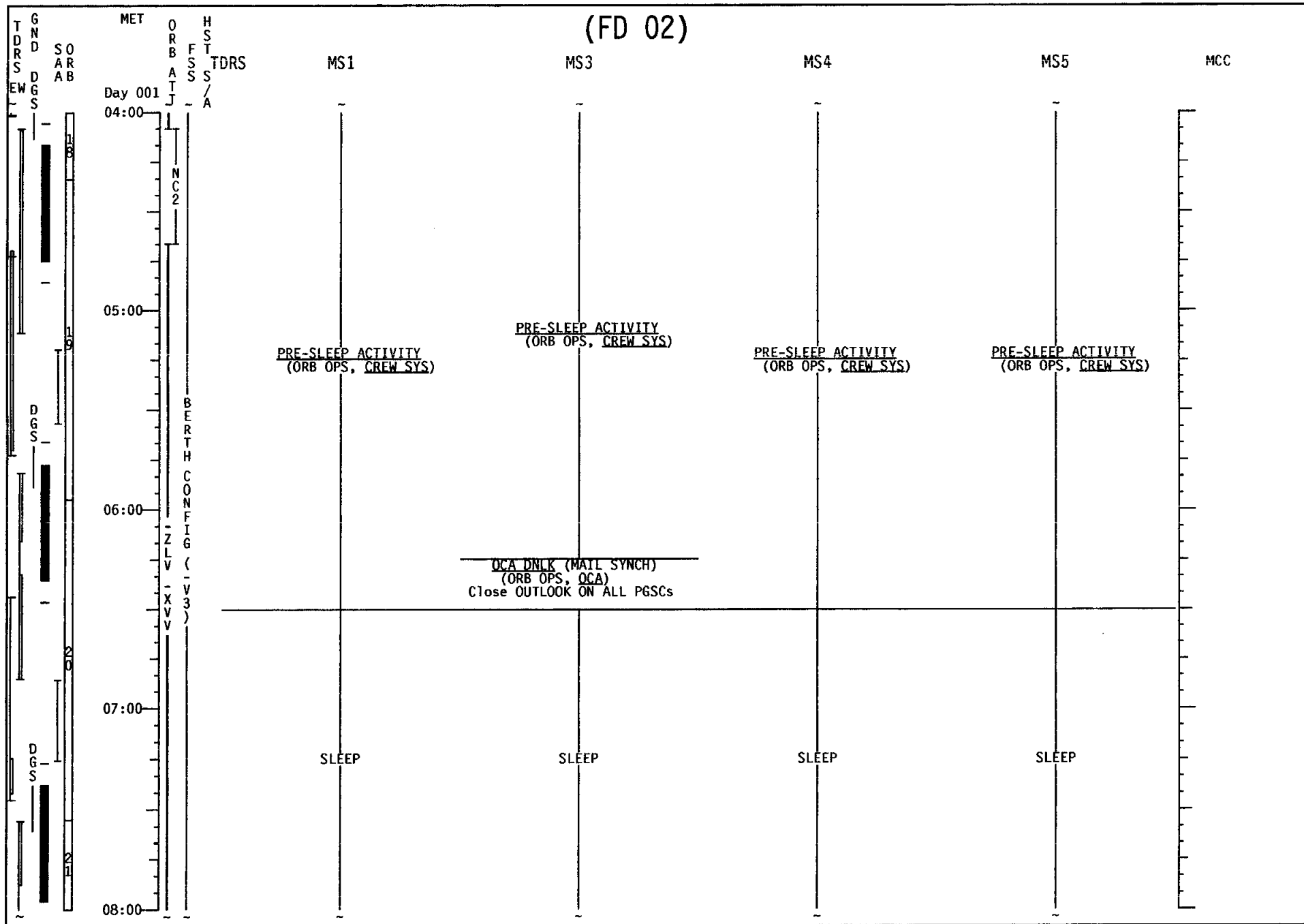
# (FD 02)



(FD 02)

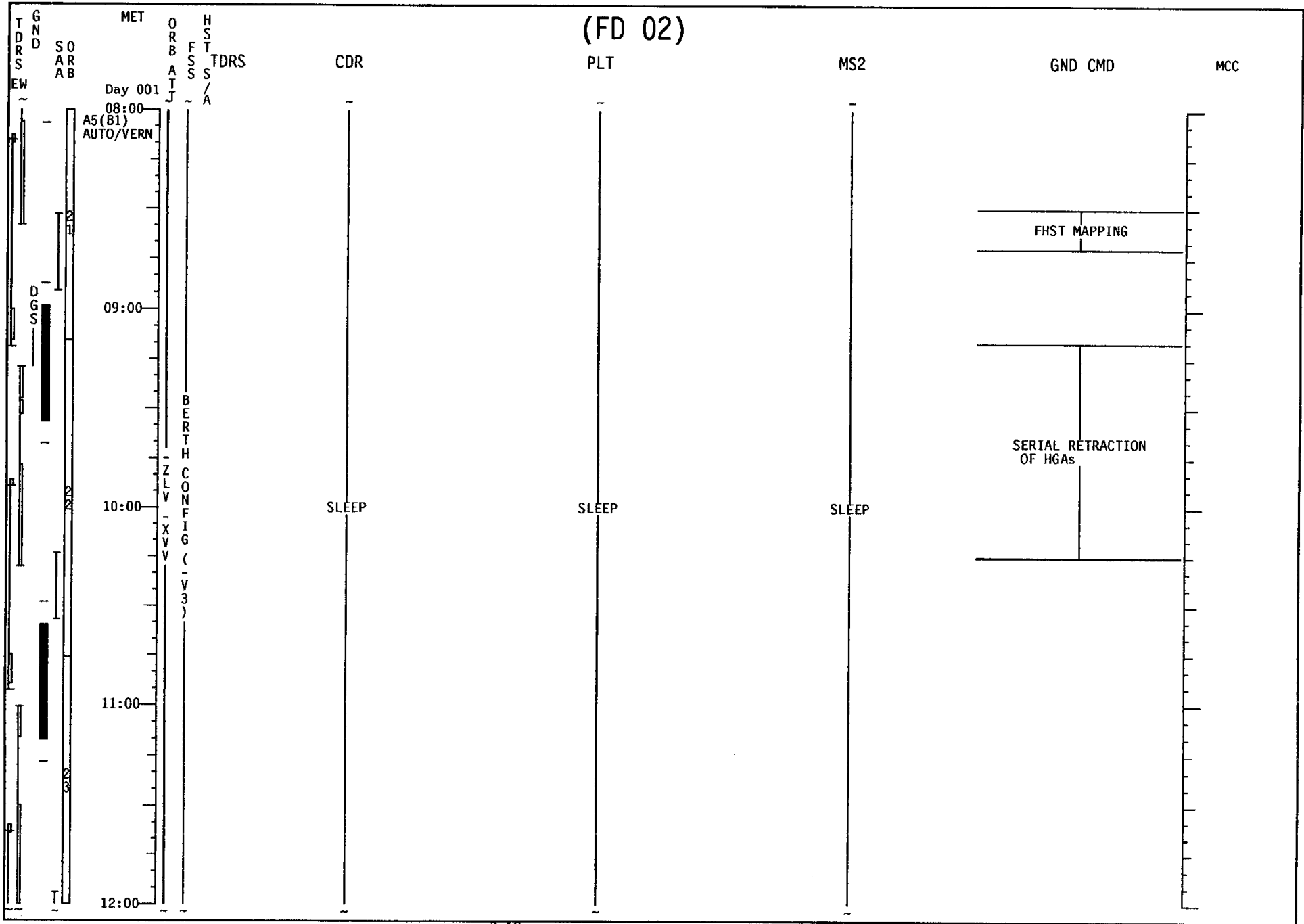


(FD 02)

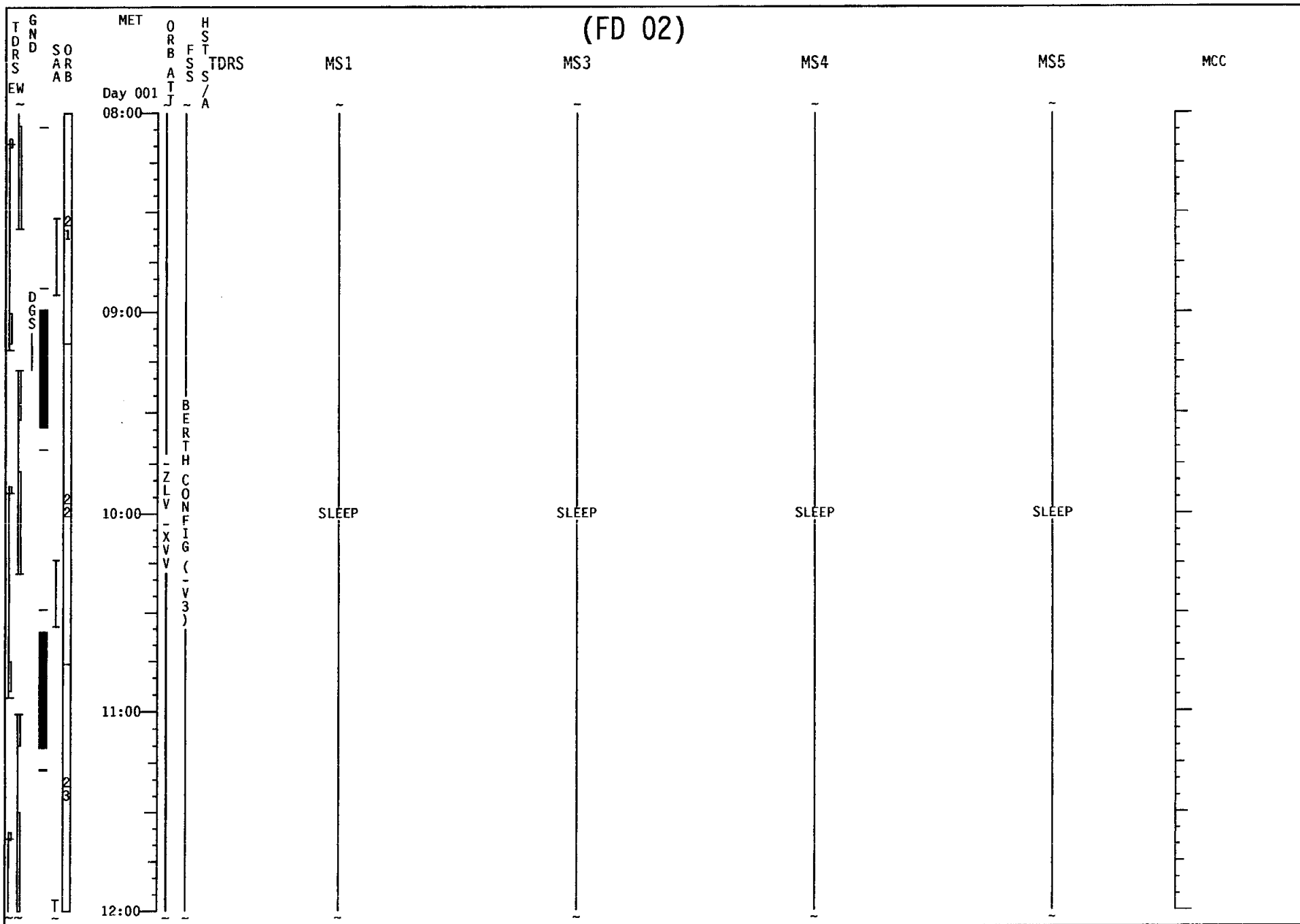




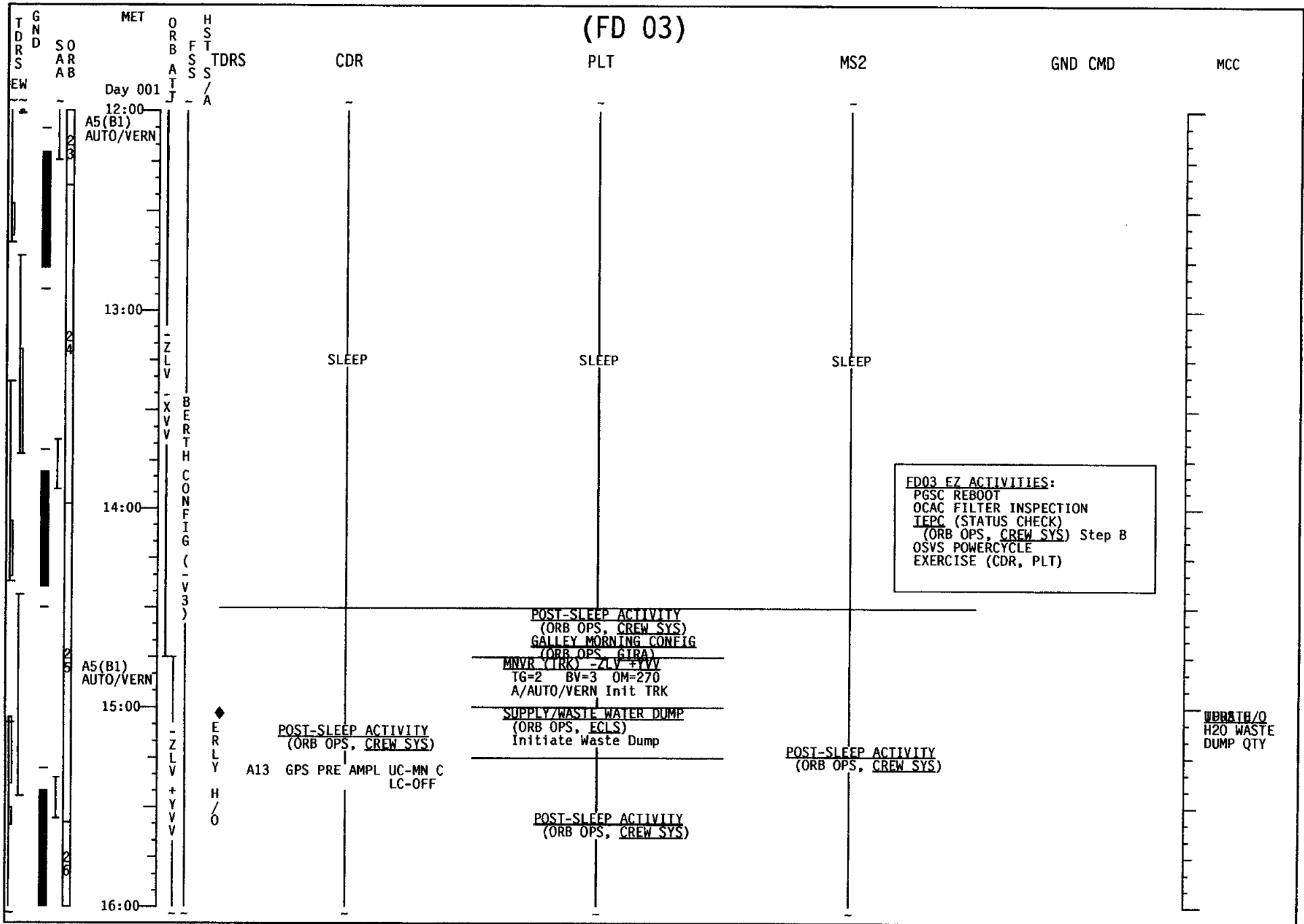
(FD 02)



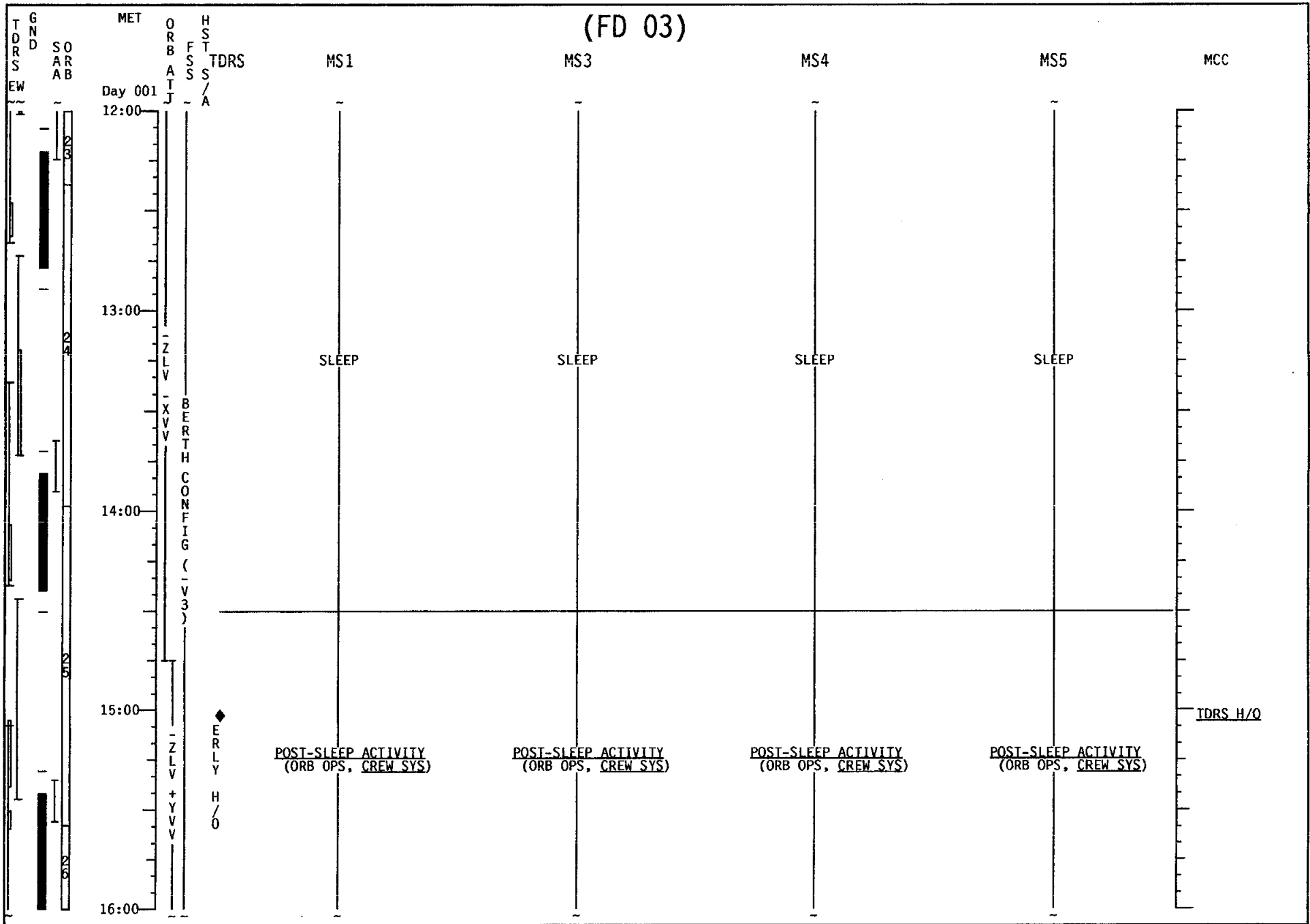
(FD 02)

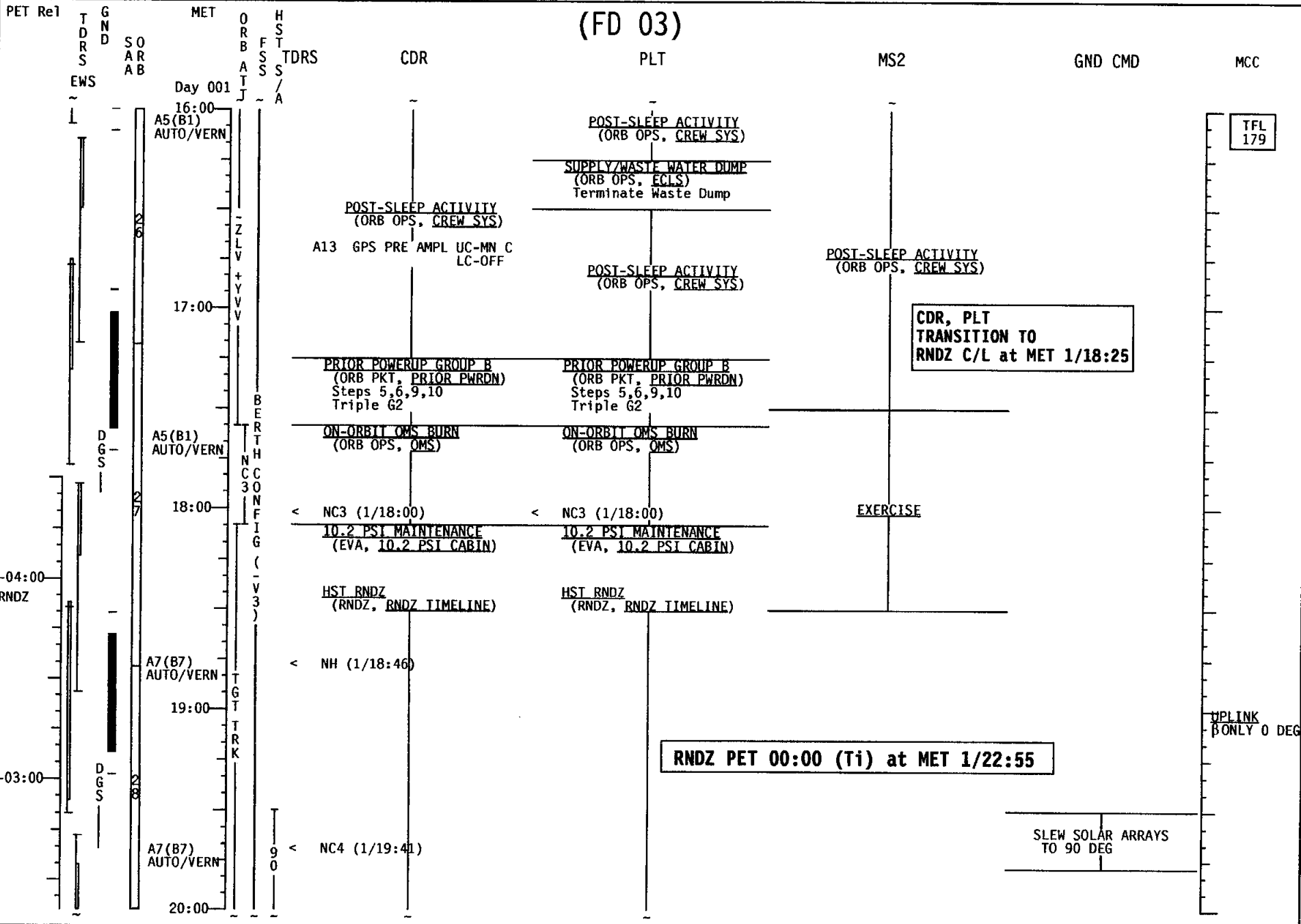


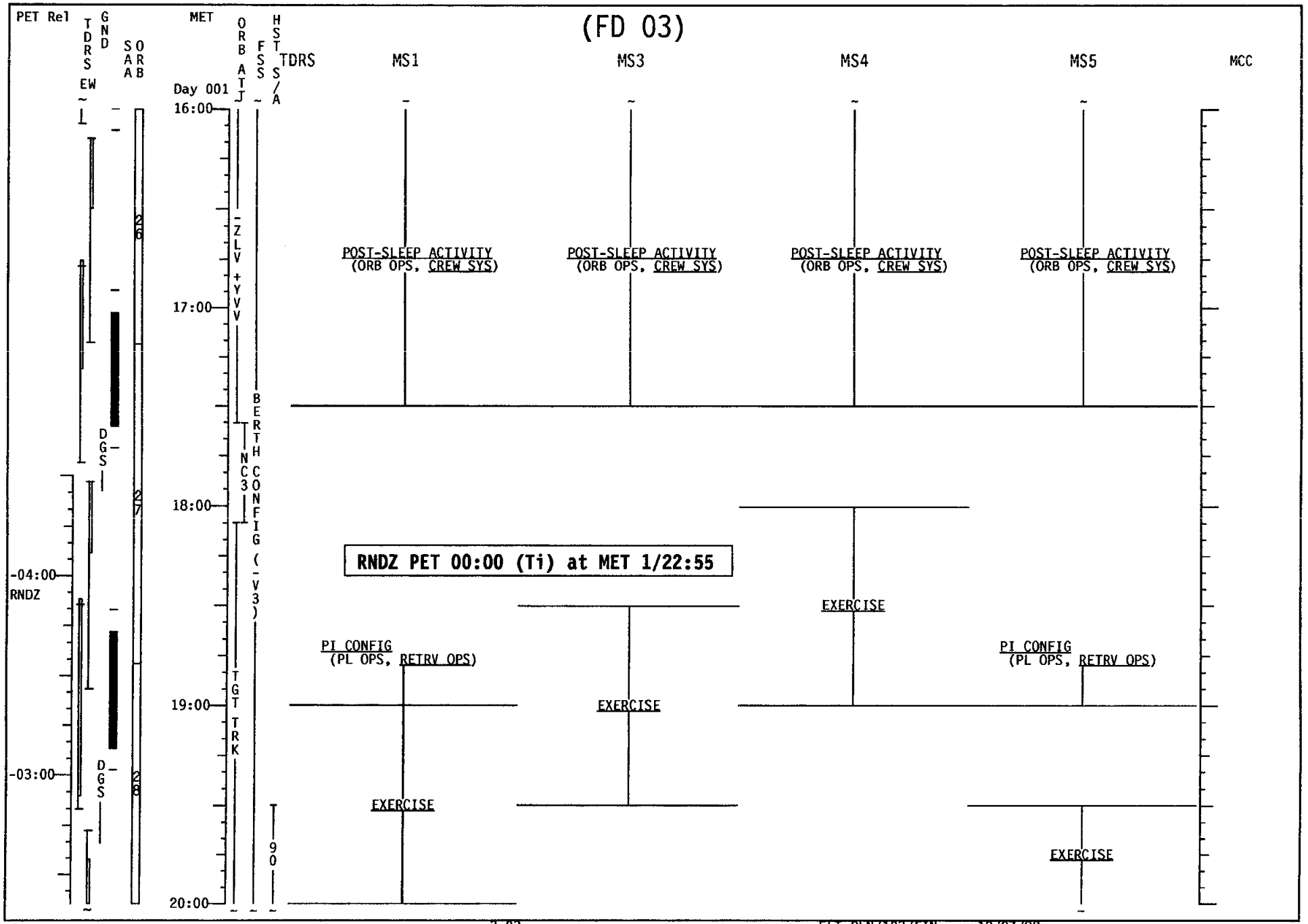
(FD 03)



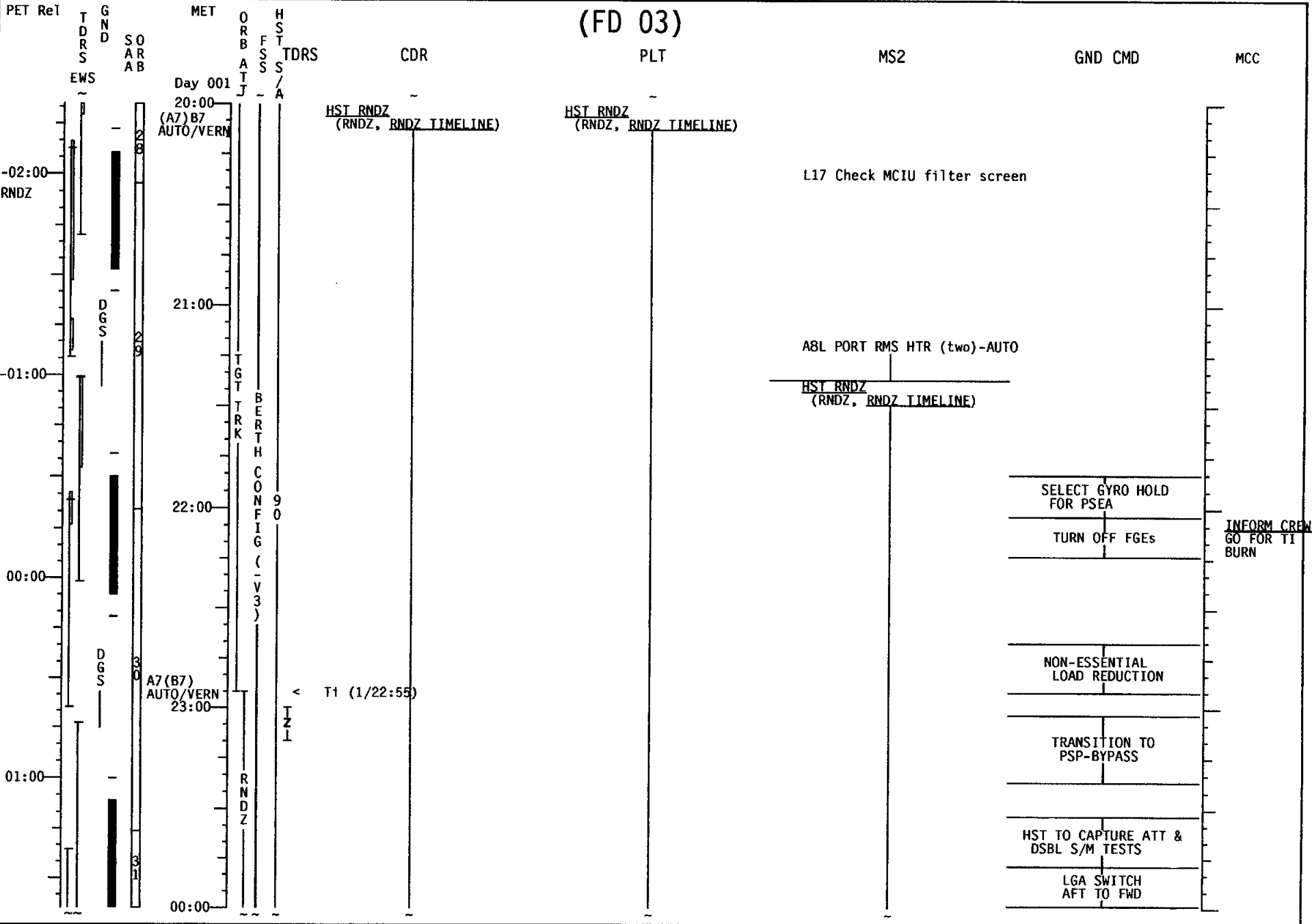
(FD 03)



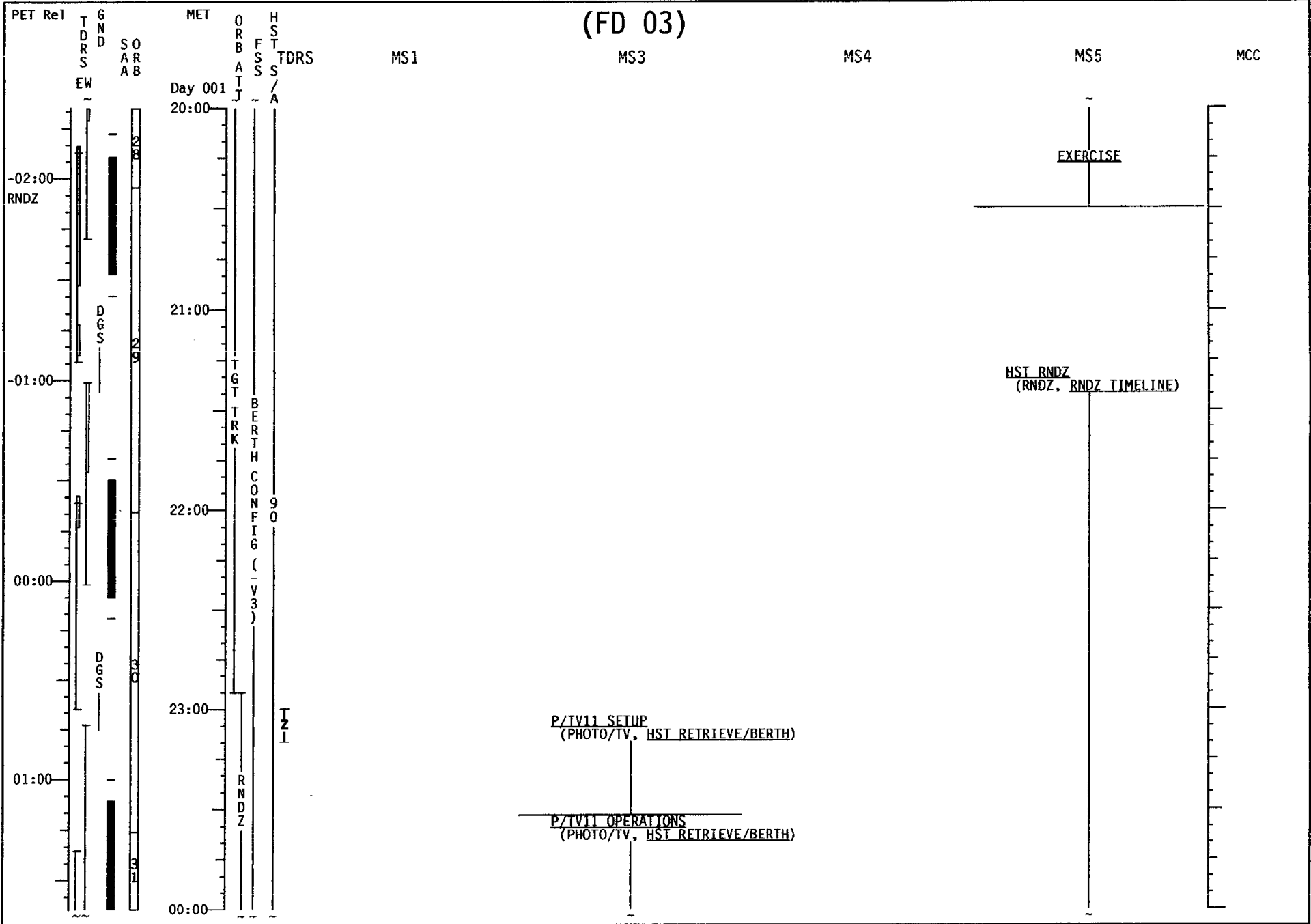




(FD 03)

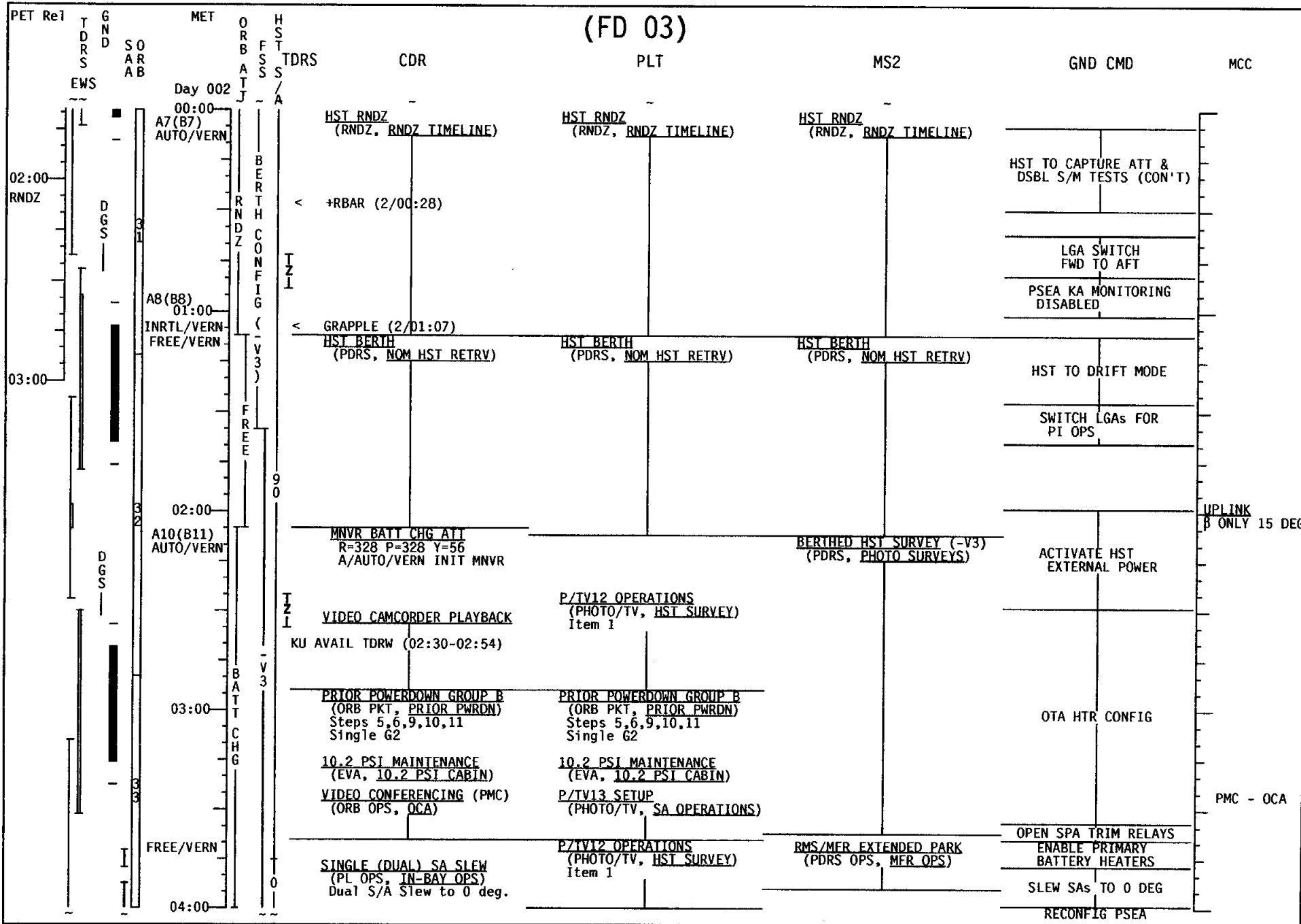


(FD 03)

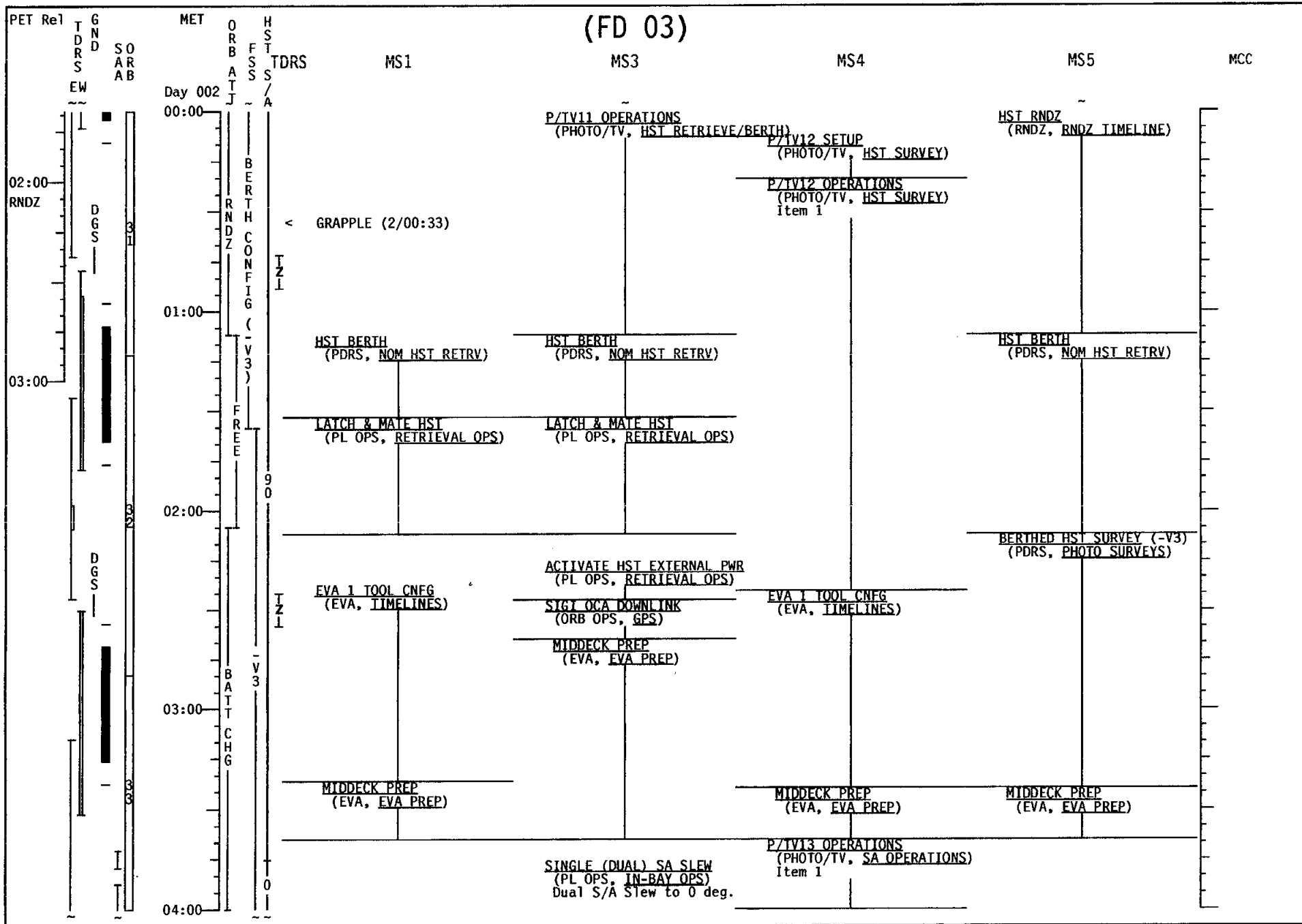




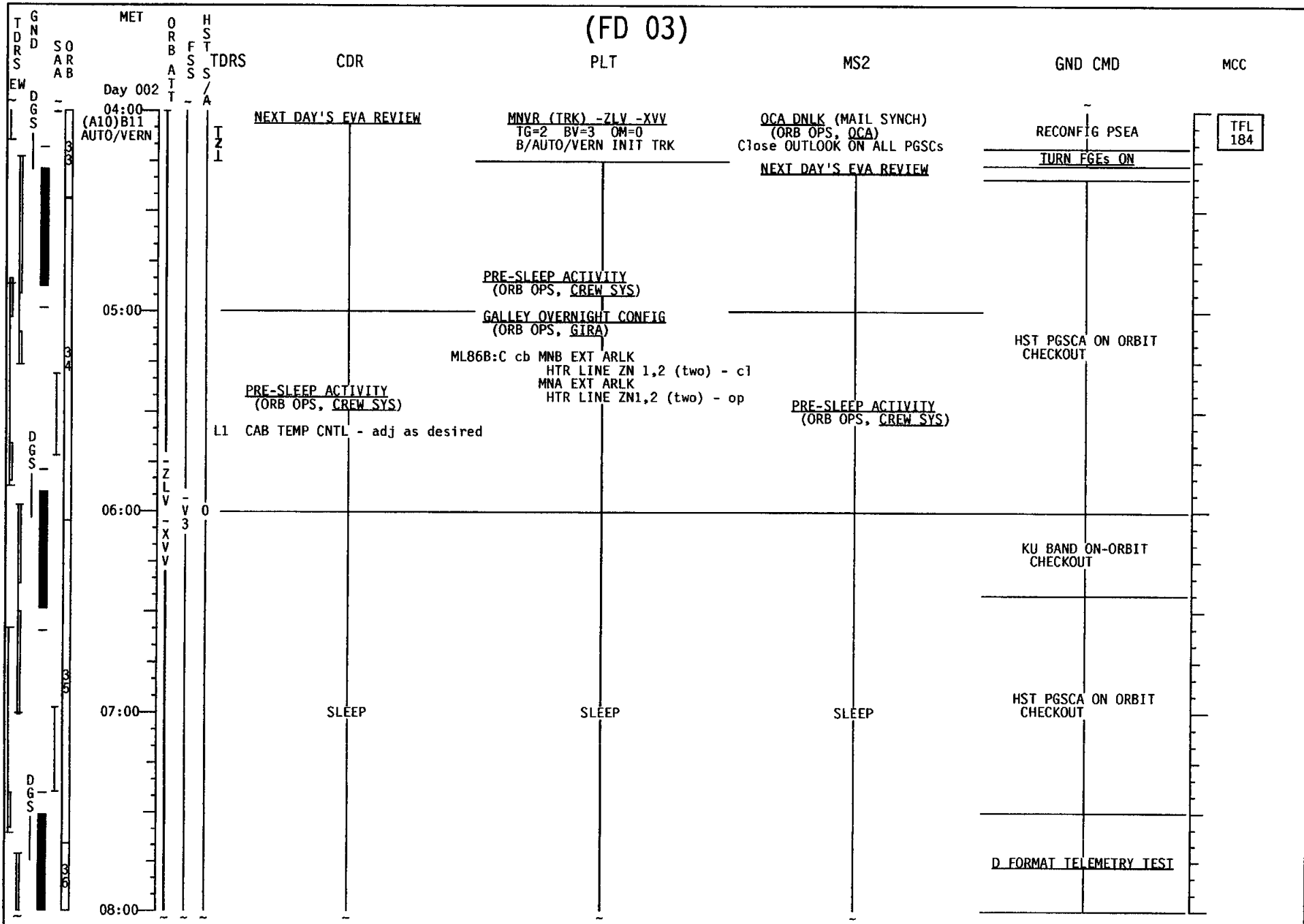
(FD 03)



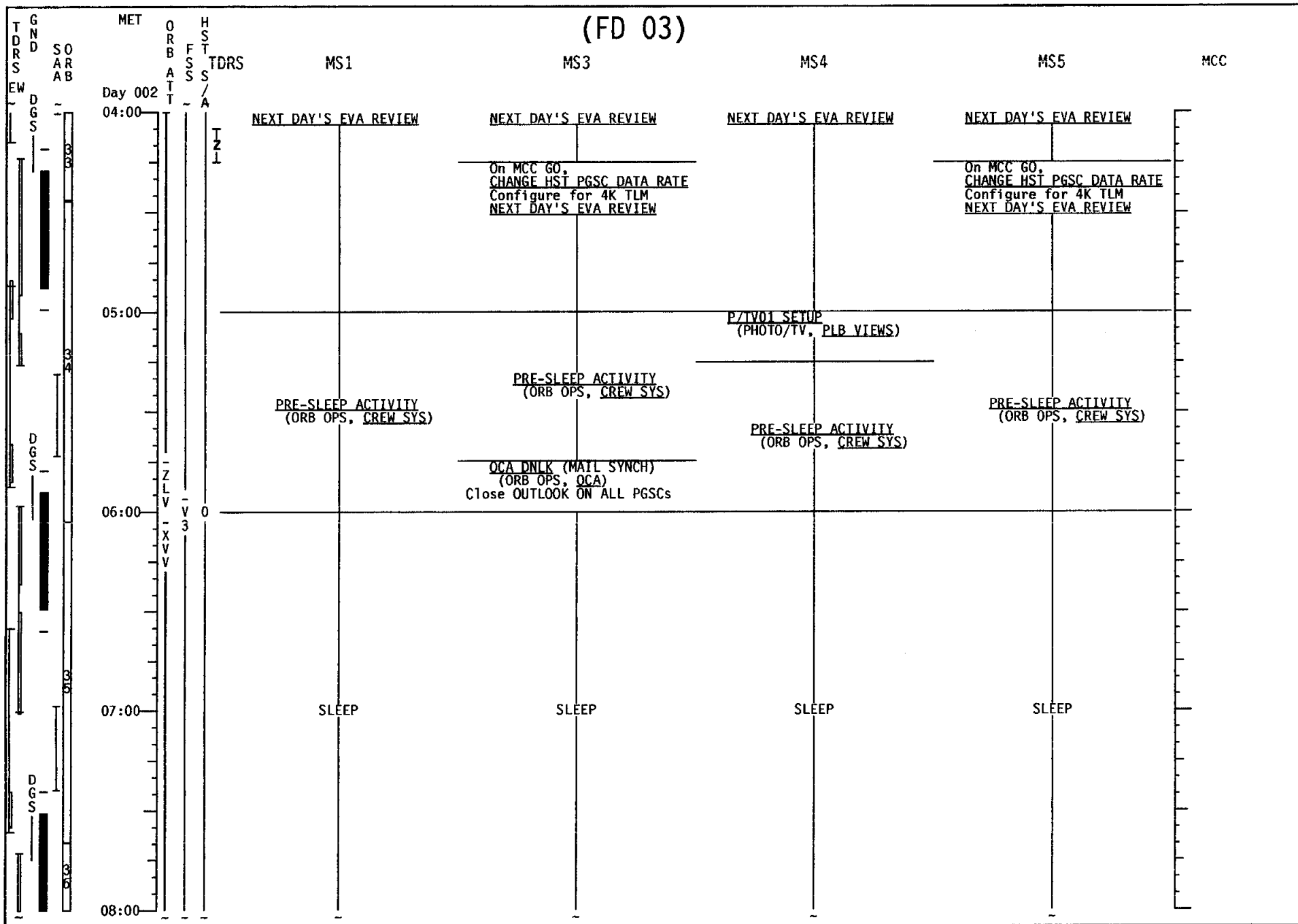
# (FD 03)



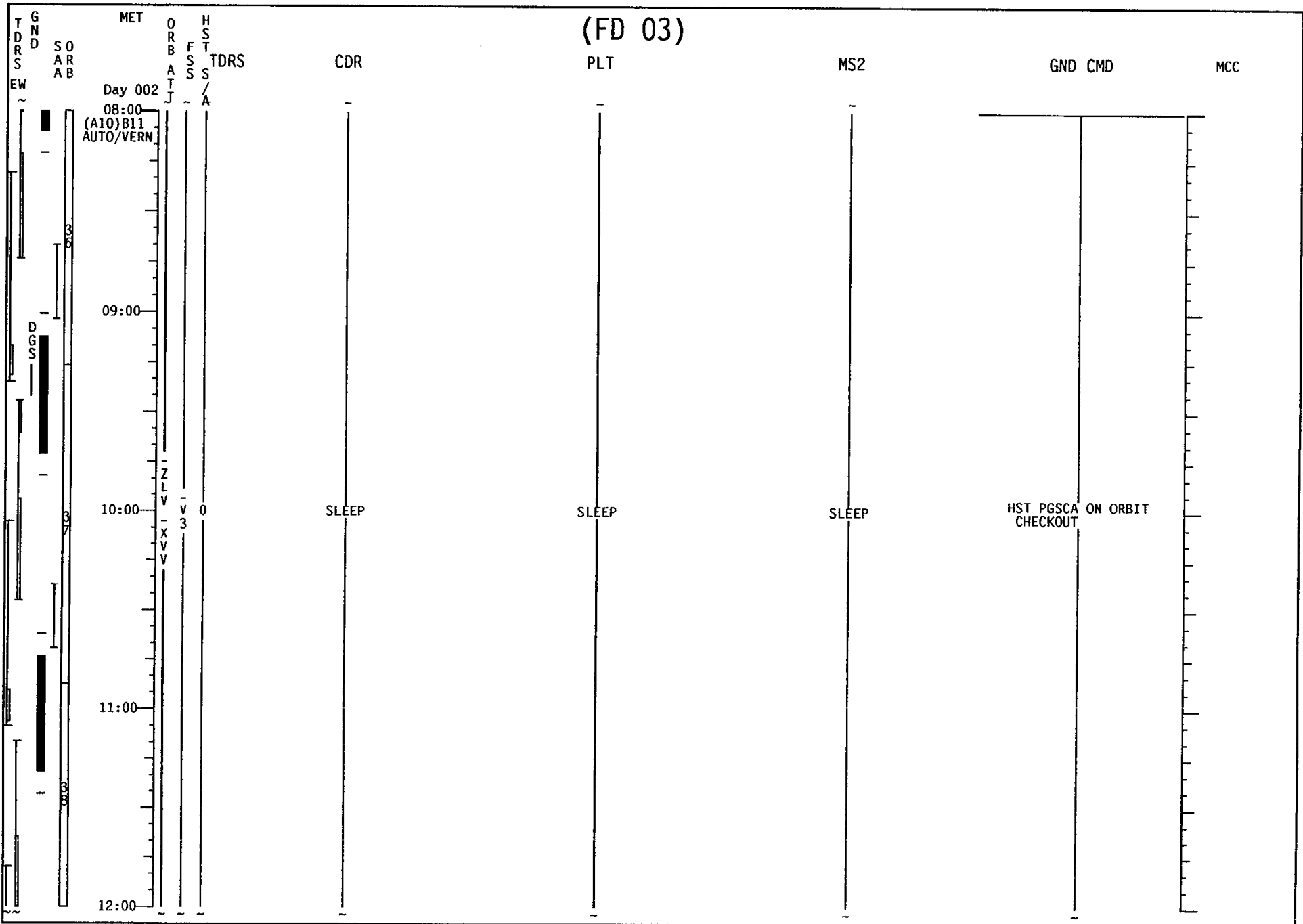
(FD 03)



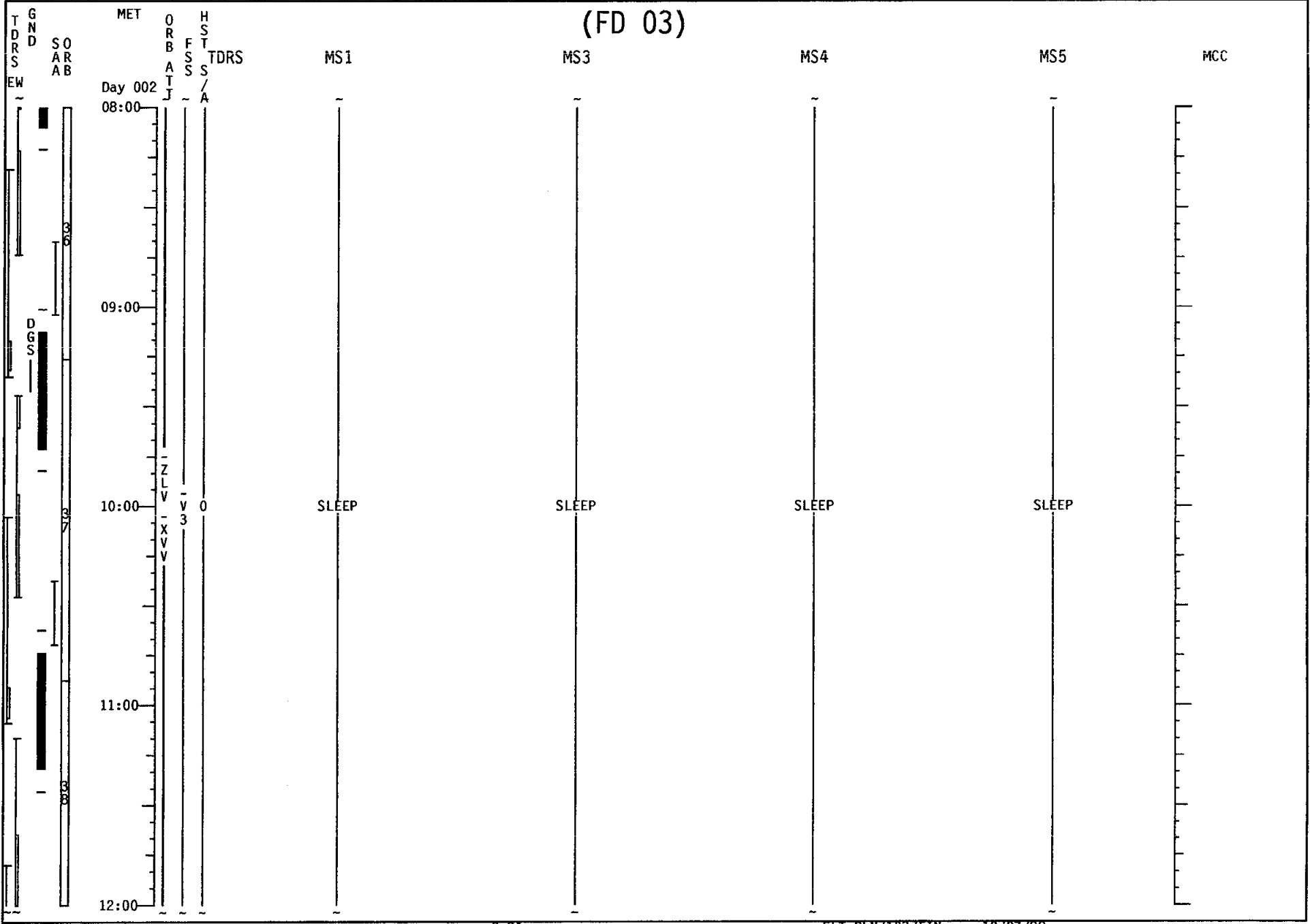
(FD 03)



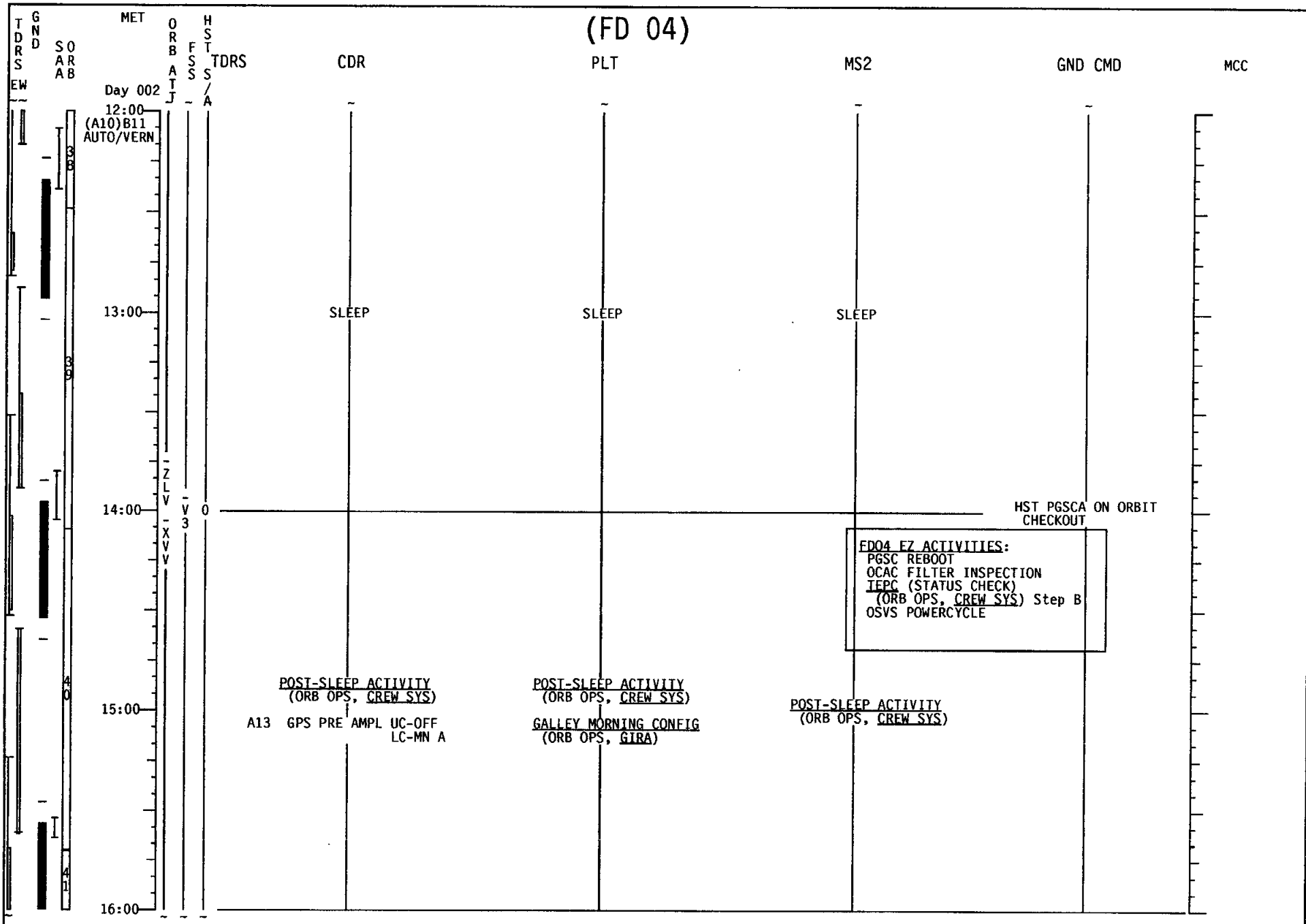
(FD 03)



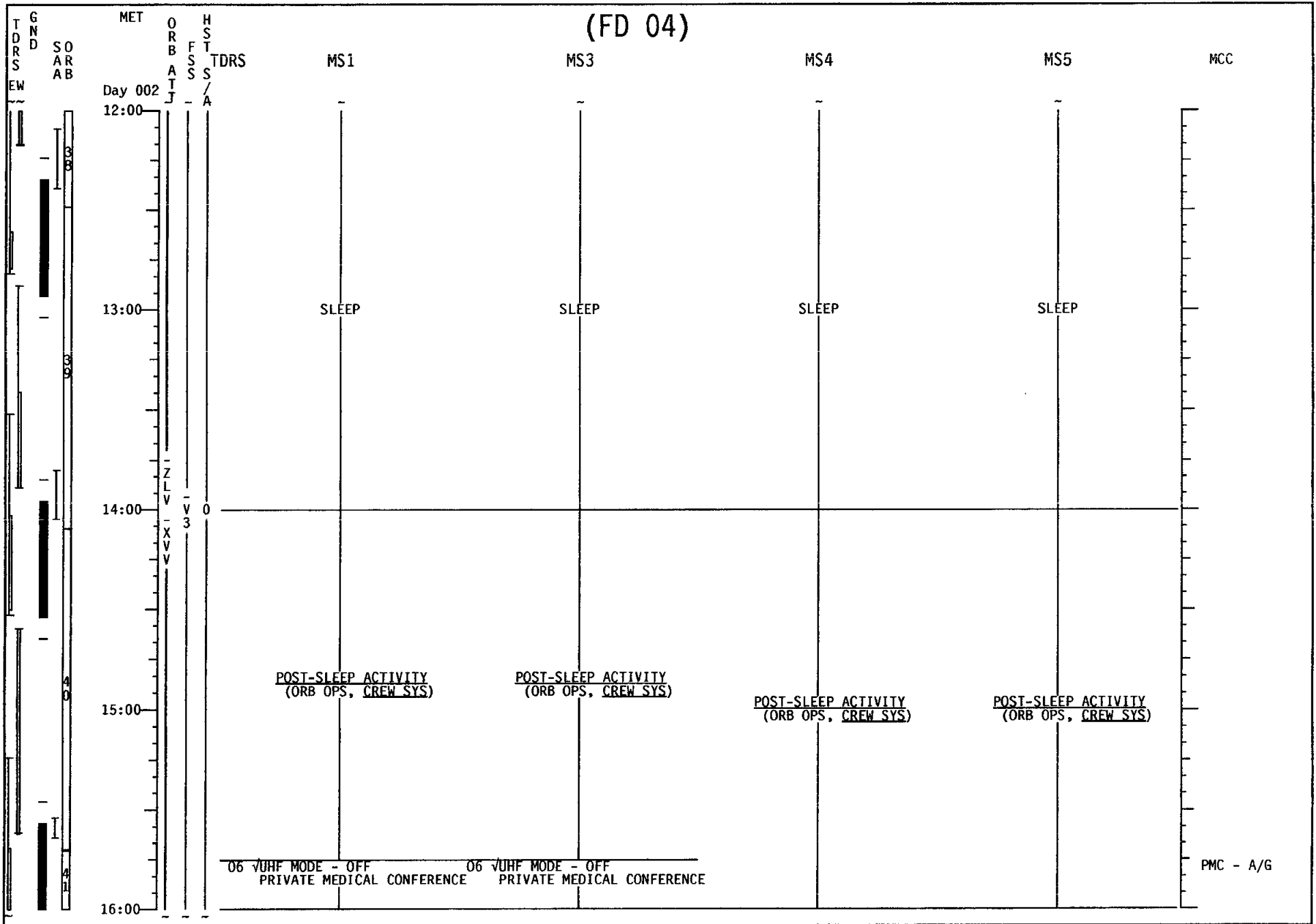
(FD 03)



(FD 04)

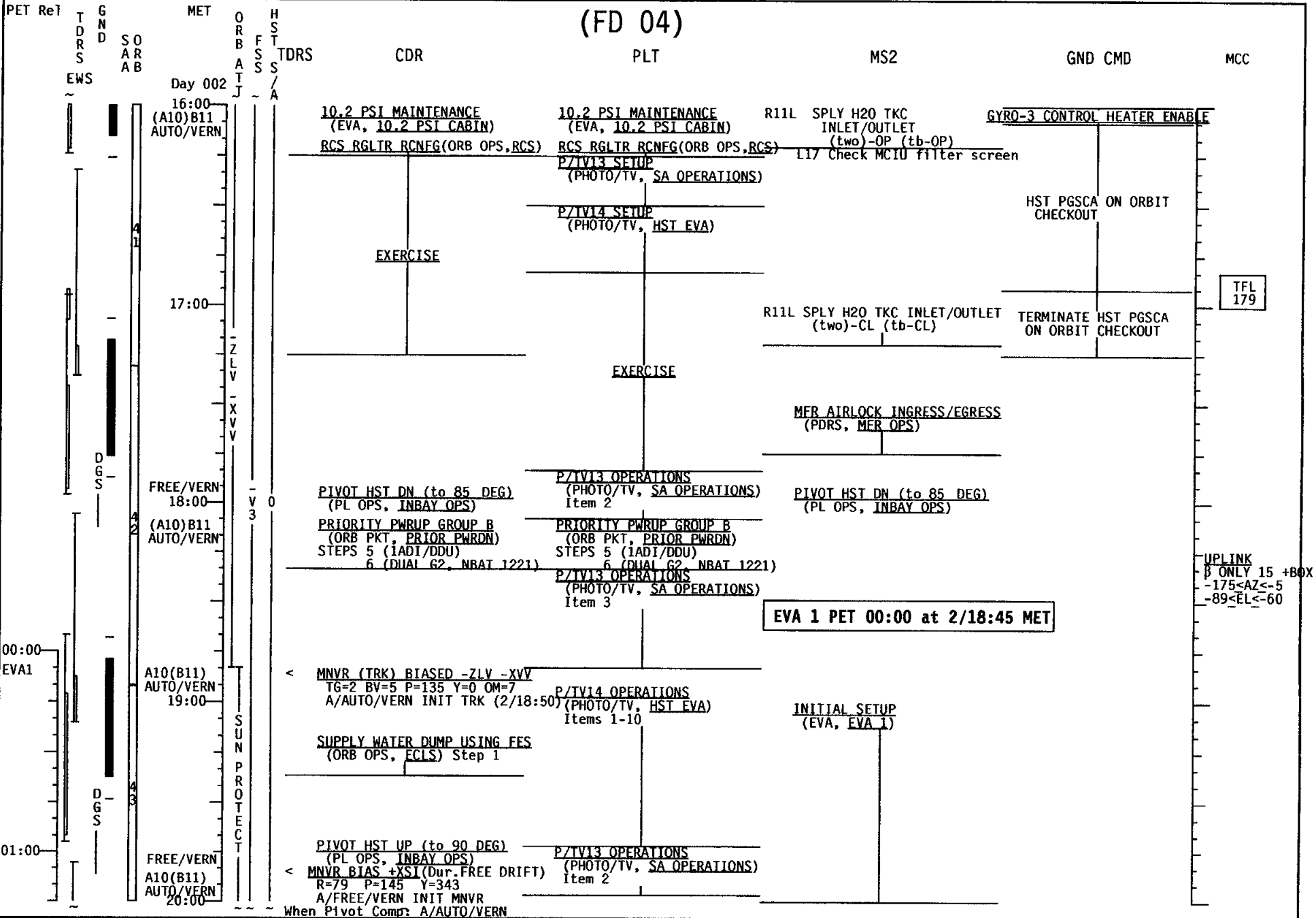


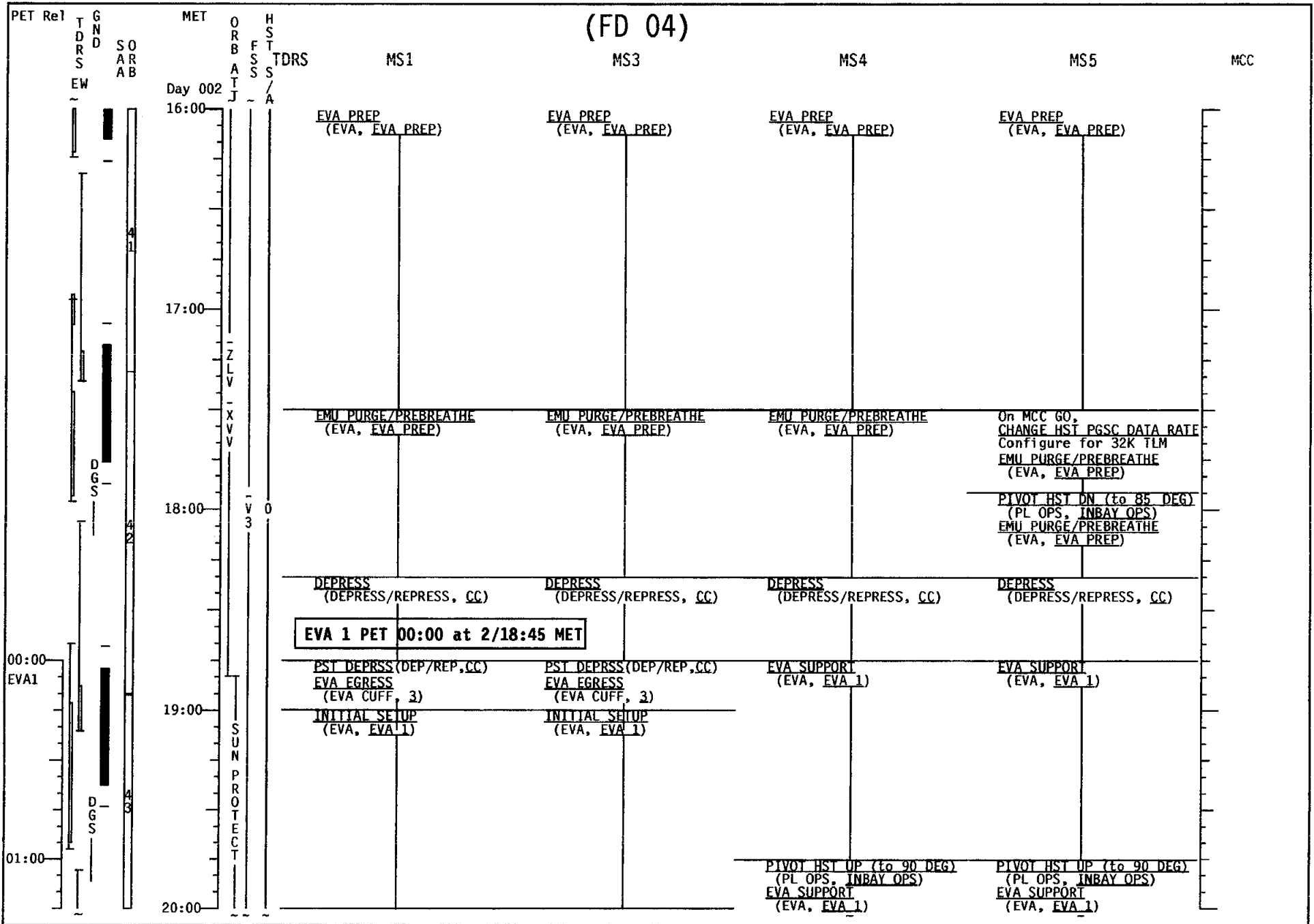
(FD 04)





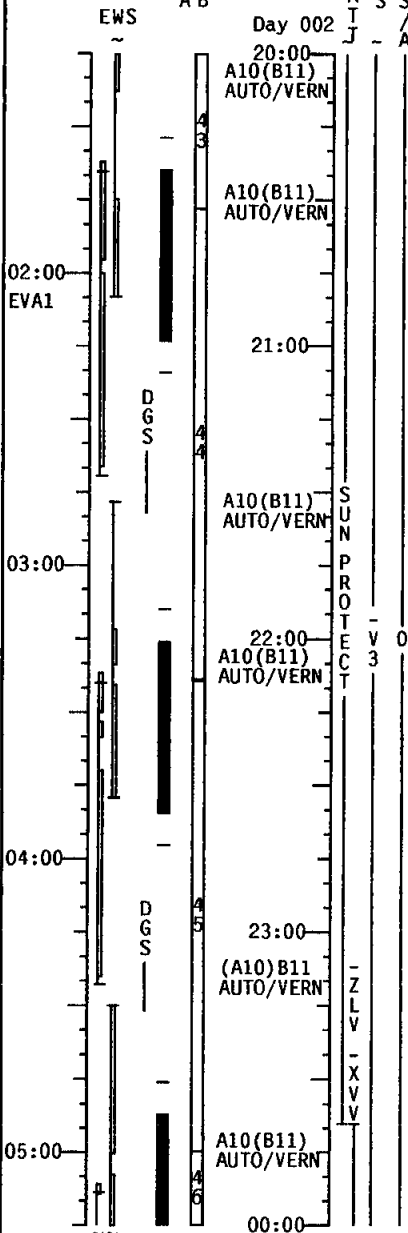
(FD 04)





(FD 04)

PET Re1 TDRS GND SO AR AB MET ORB AT J HST TDRS CDR PLT MS2 GND CMD MCC



MNVR BIAS +XSI

P/TV14 OPERATIONS (PHOTO/TV, HSI EVA) Items 1-10

RSU 1,2,3 CHANGEOUT (EVA, EVA 1)

RSU #1,2,3 CHANGEOUT (INCLUDES PREP & C/O)

< MNVR (TRK) BIASED -ZLV -XVV TG=2 BV=5 P=135 Y=0 OM=7 A/AUTO/VERN INIT TRK (2/20:25)

< MNVR BIAS +XSI R=79 P=145 Y=343 A/AUTO/VERN INIT MNVR (2/21:28)

< MNVR (TRK) BIASED -ZLV -XVV TG=2 BV=5 P=135 Y=0 OM=7 A/AUTO/VERN INIT TRK (2/22:02)

< MNVR BIAS +XSI R=79 P=145 Y=343 A/AUTO/VERN INIT MNVR (2/23:04)

< MNVR (TRK) -ZLV -XVV TG=2 BV=3 OM=0 A/AUTO/VERN INIT TRK (2/23:39)

OPEN NICMOS VALVES (EVA, EVA 1)

AFT SHROUD DOOR CLOSURE (EVA, EVA 1)

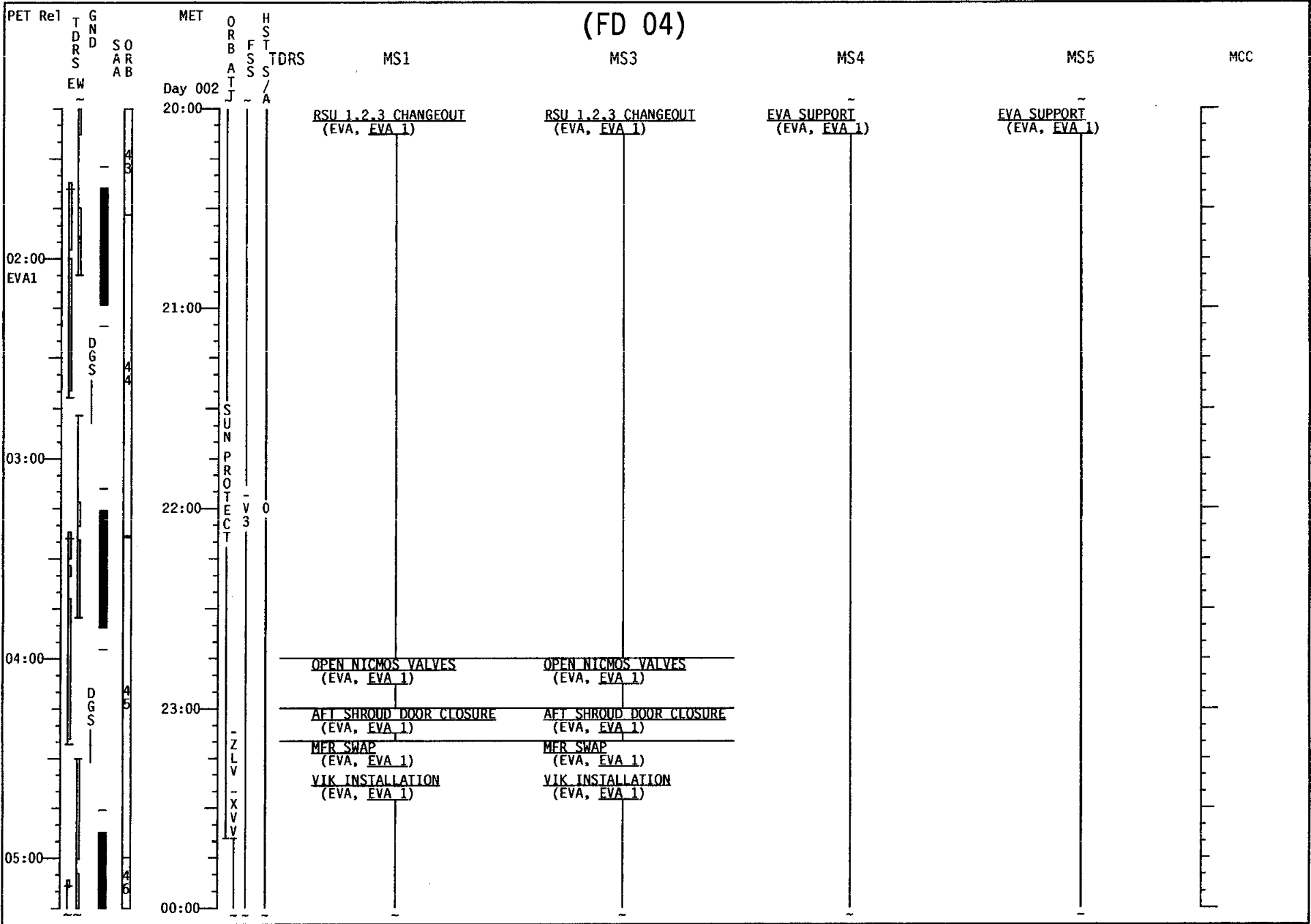
MER SWAP (EVA, EVA 1)

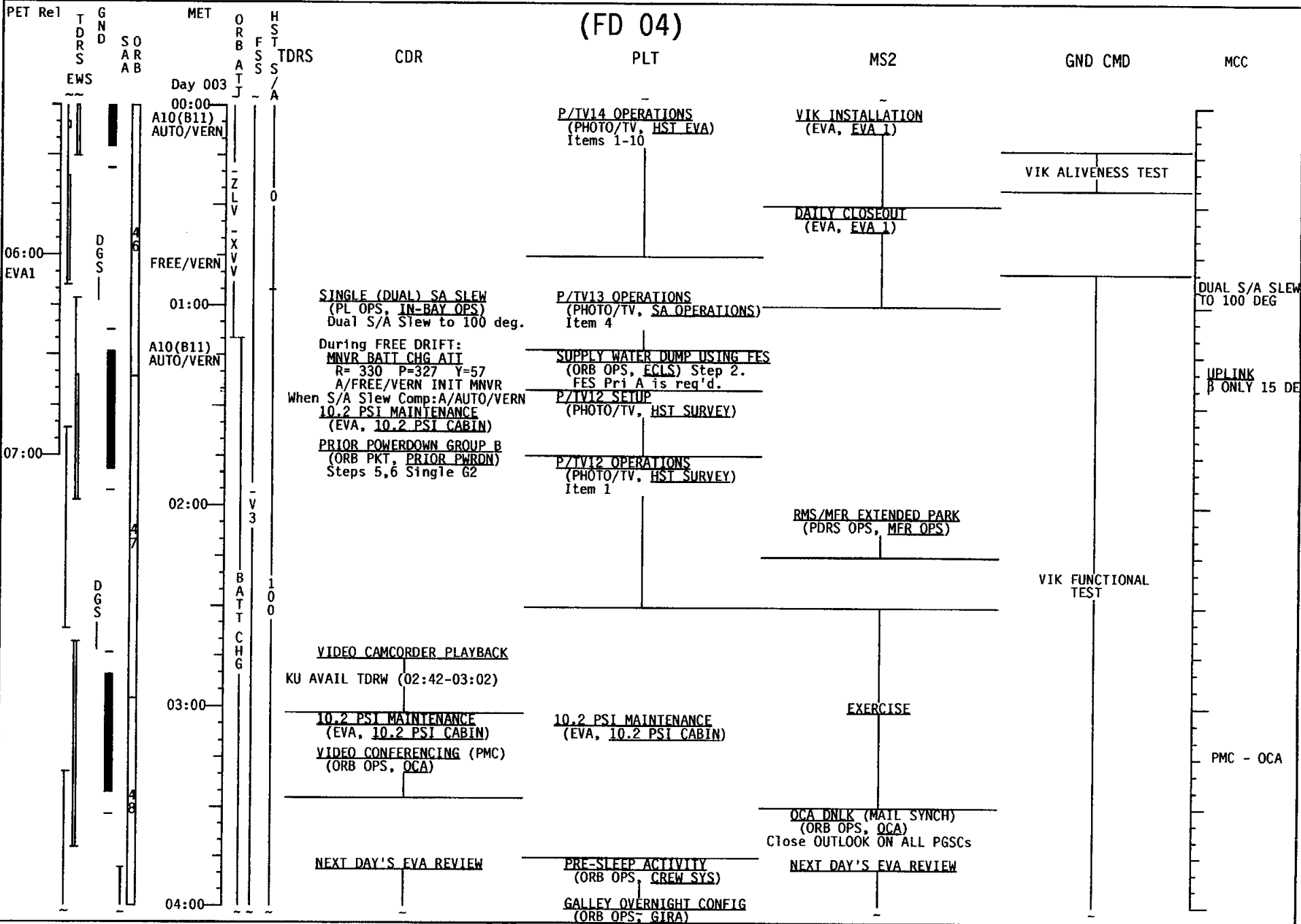
VIK INSTALLATION (EVA, EVA 1)

TURN FGEs OFF

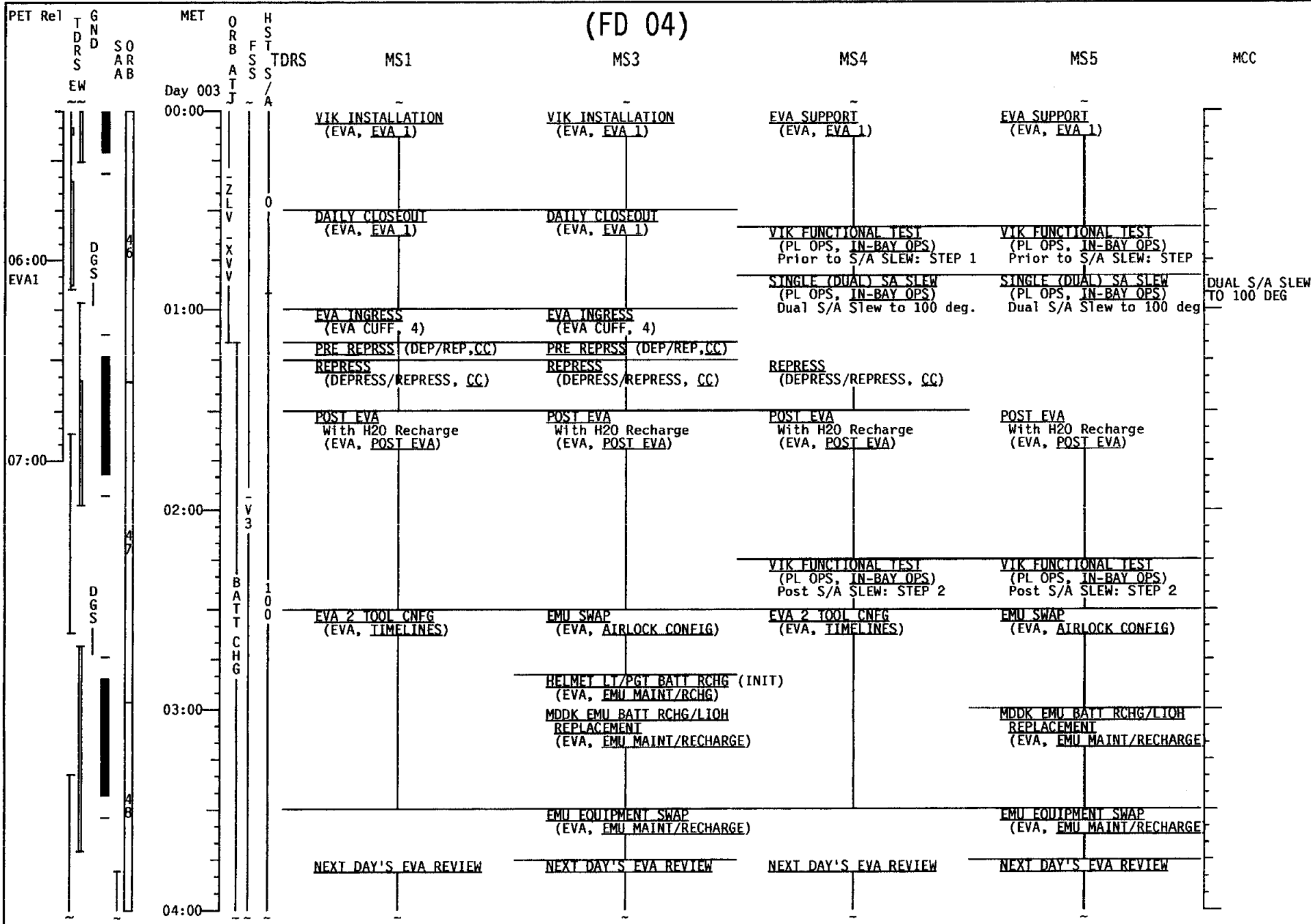
CONFIGURE FOR VIK INSTALLATION

# (FD 04)

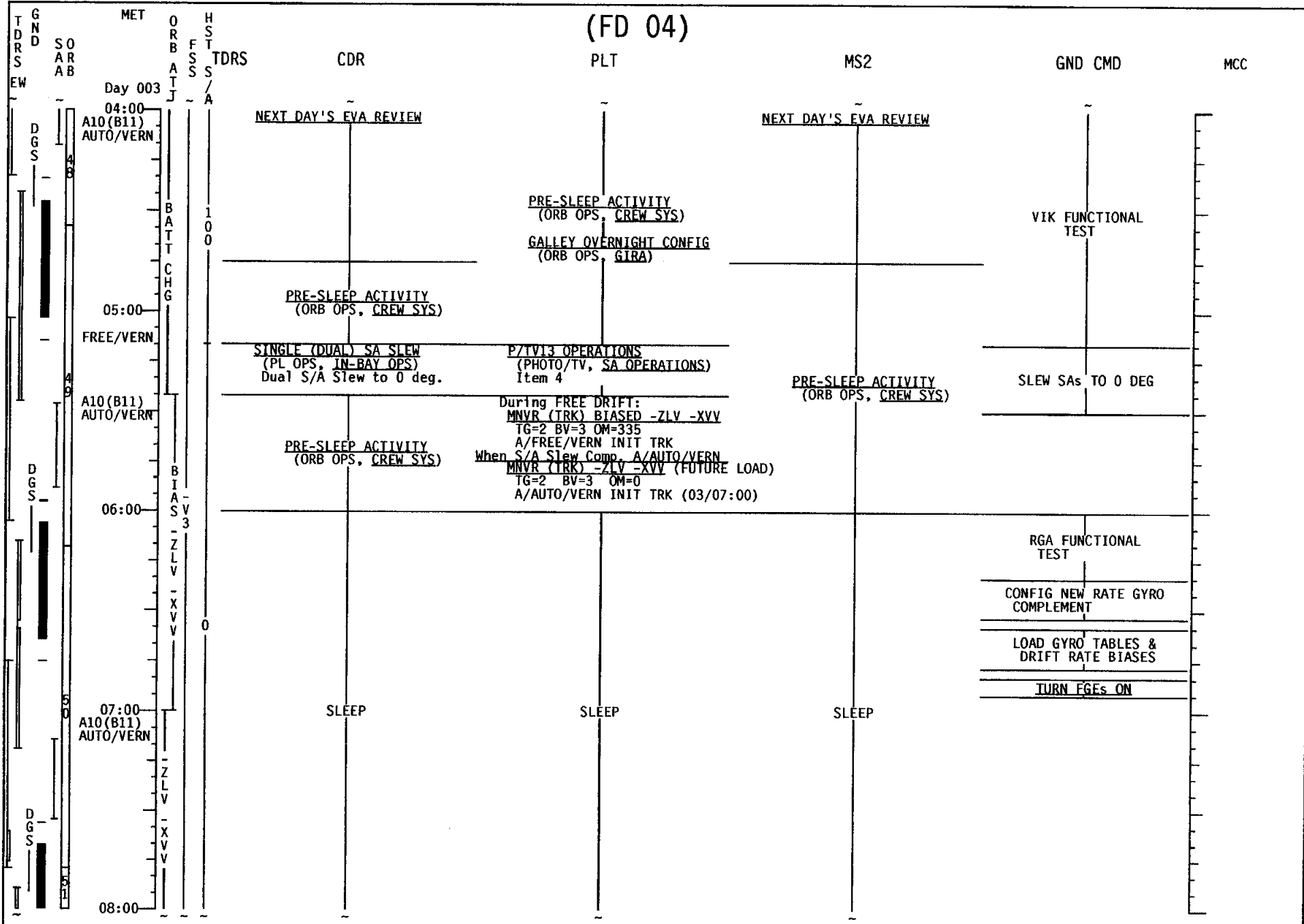




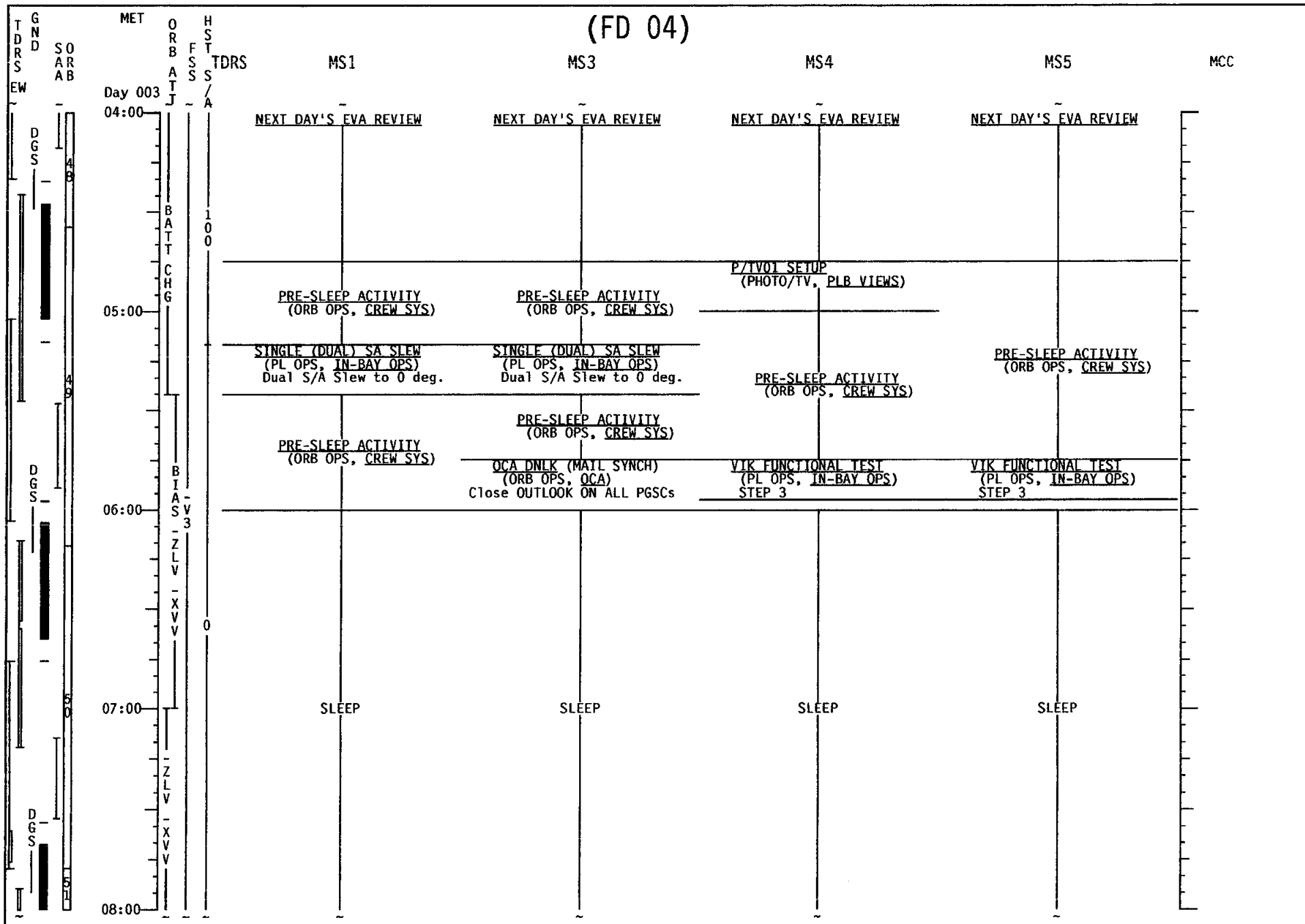
# (FD 04)



(FD 04)

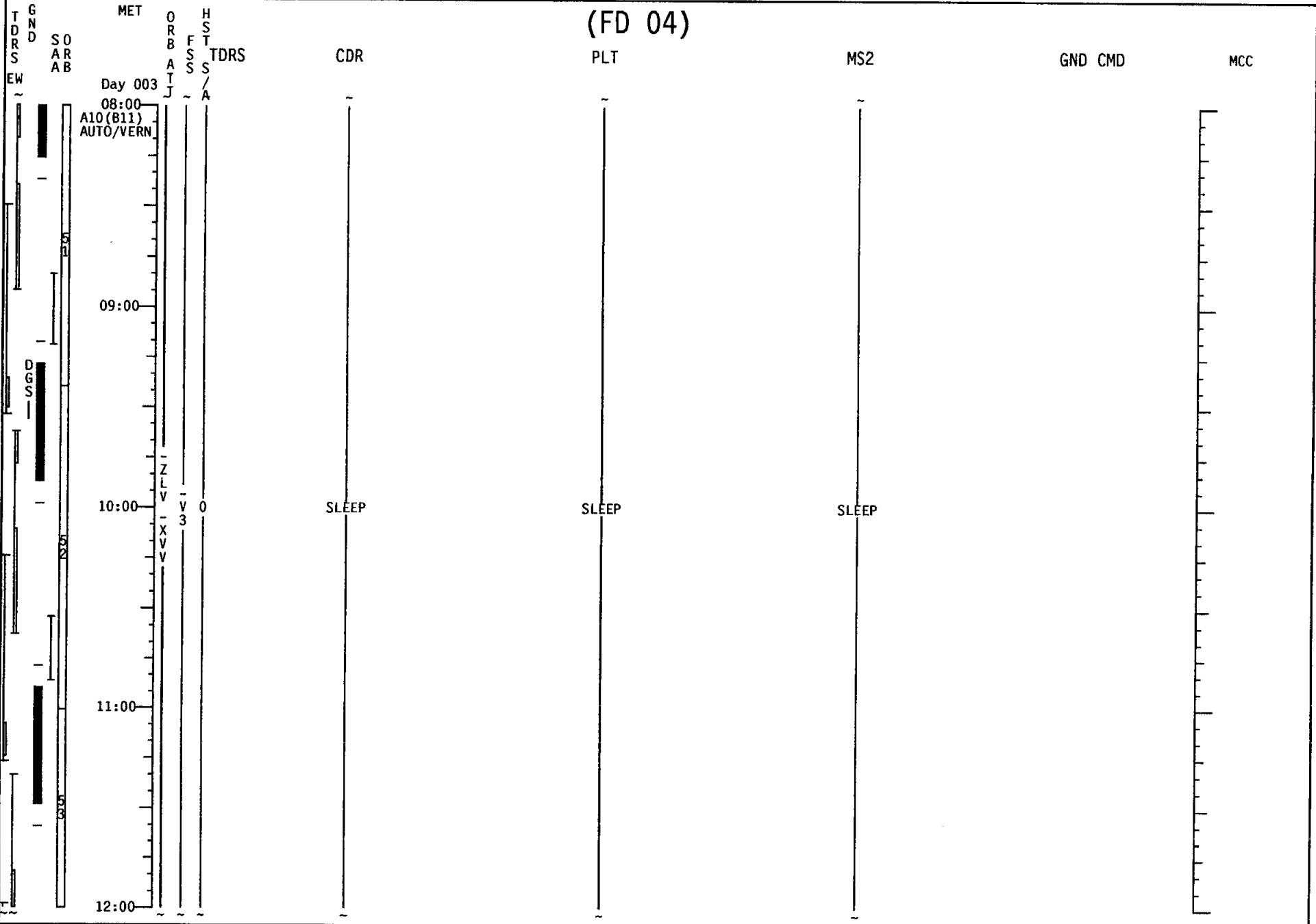


# (FD 04)

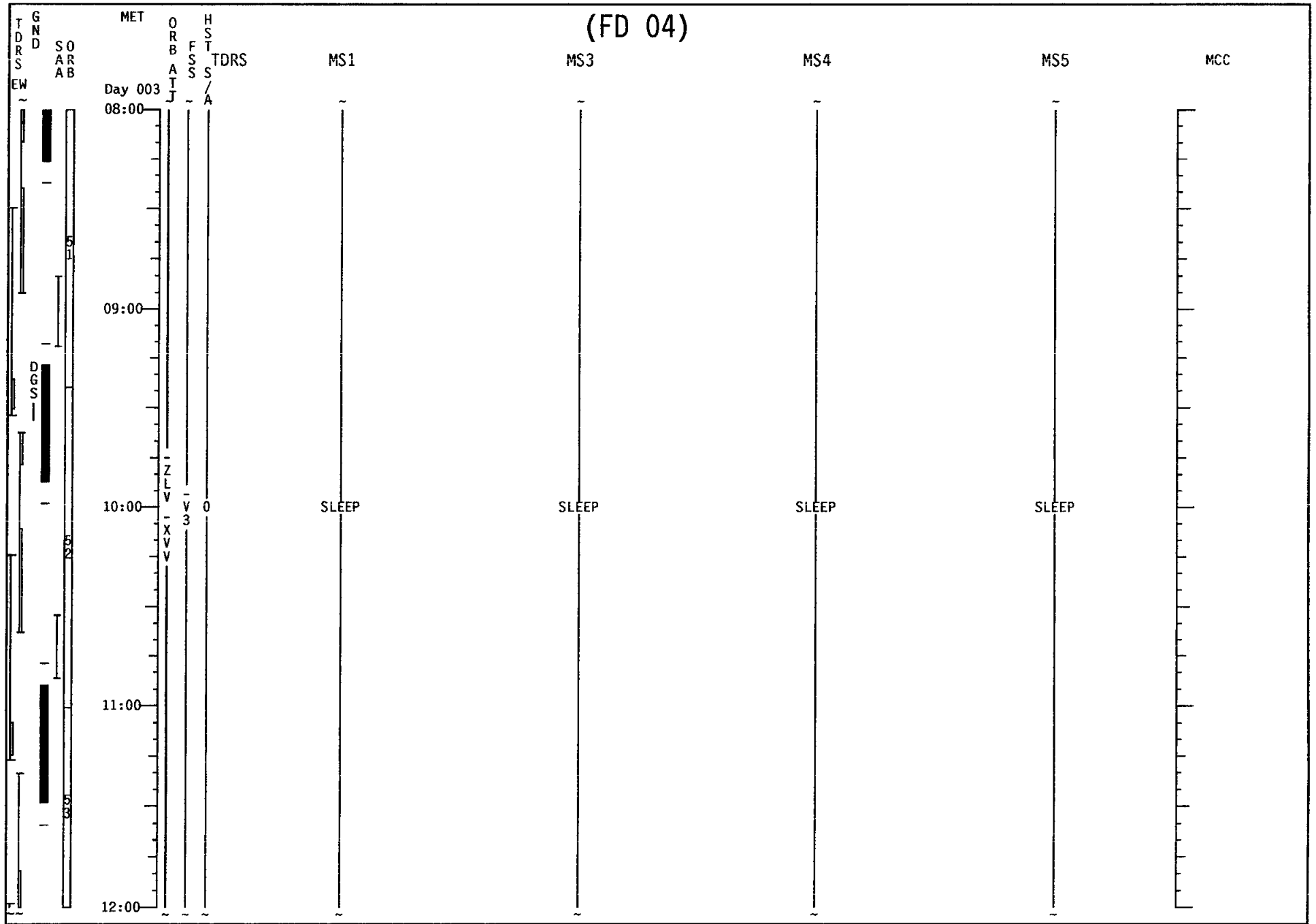




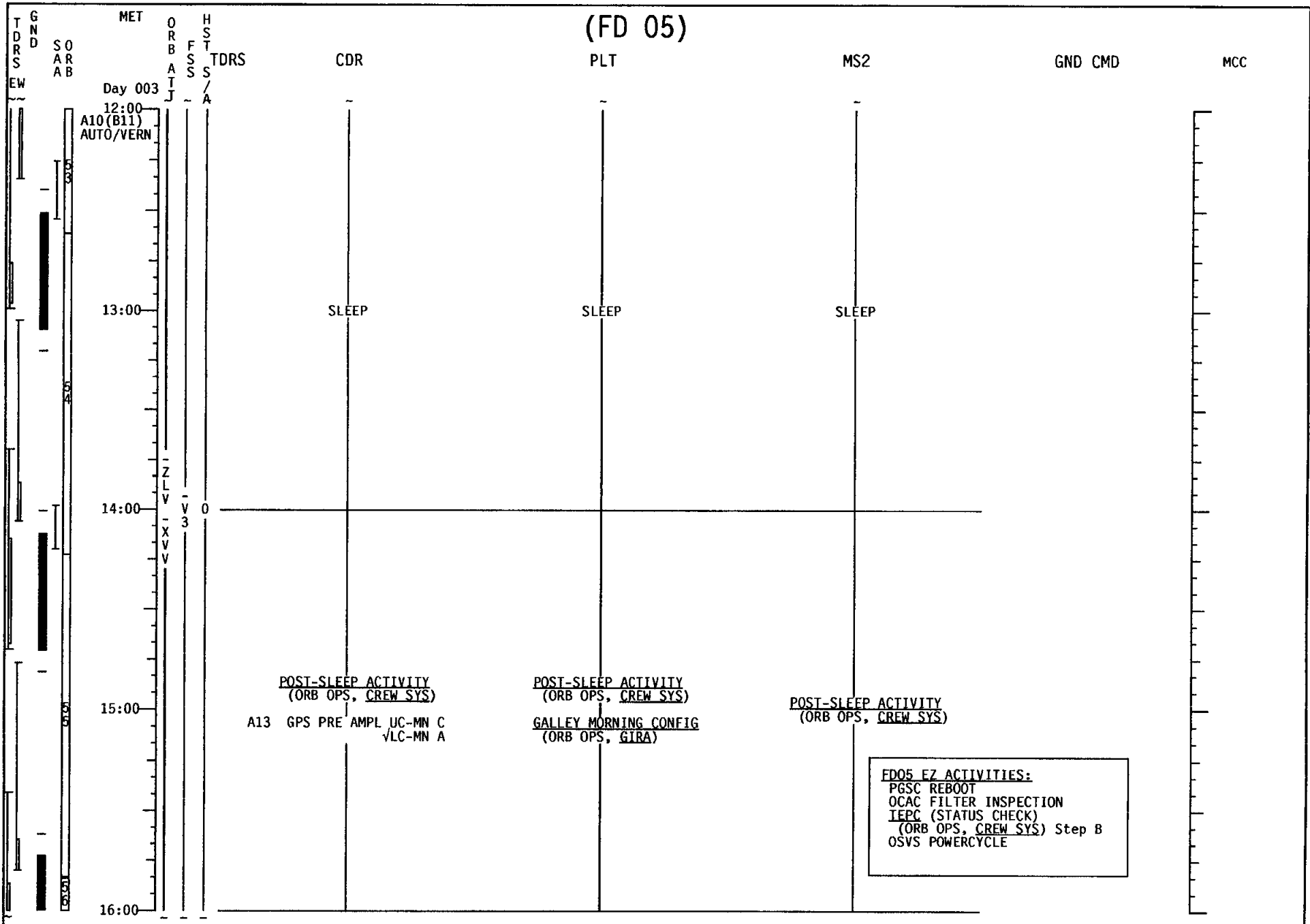
(FD 04)



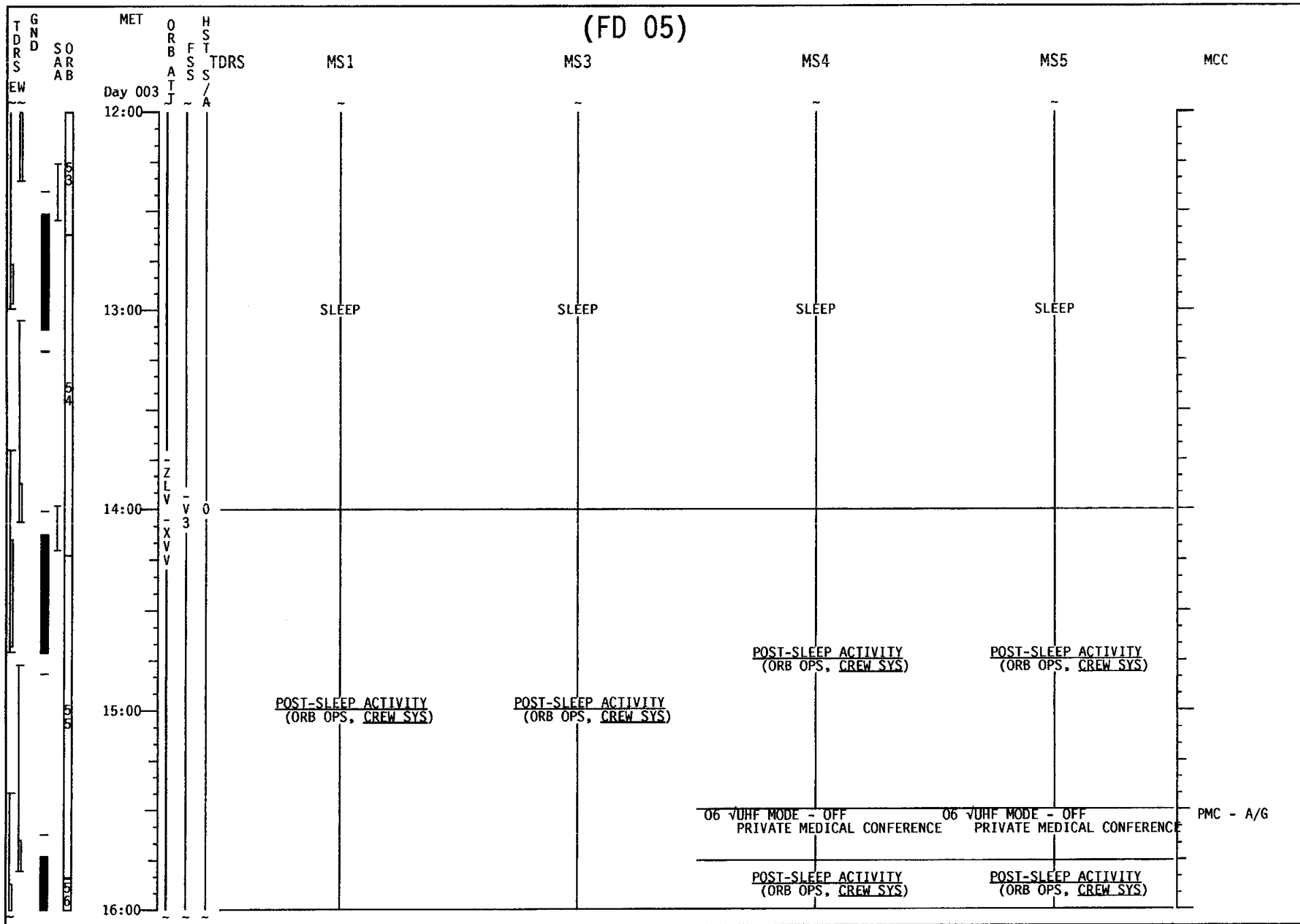
(FD 04)



(FD 05)

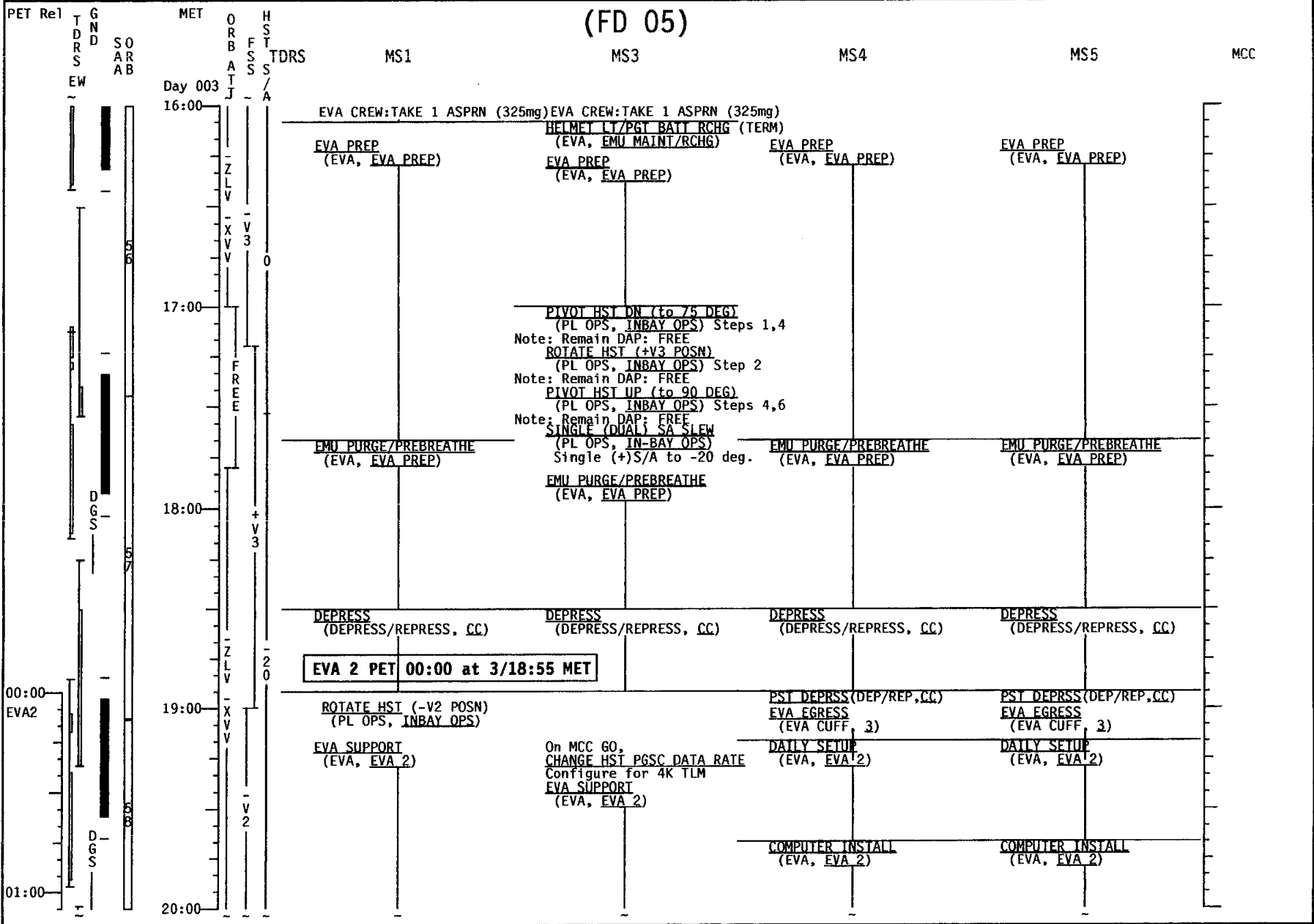


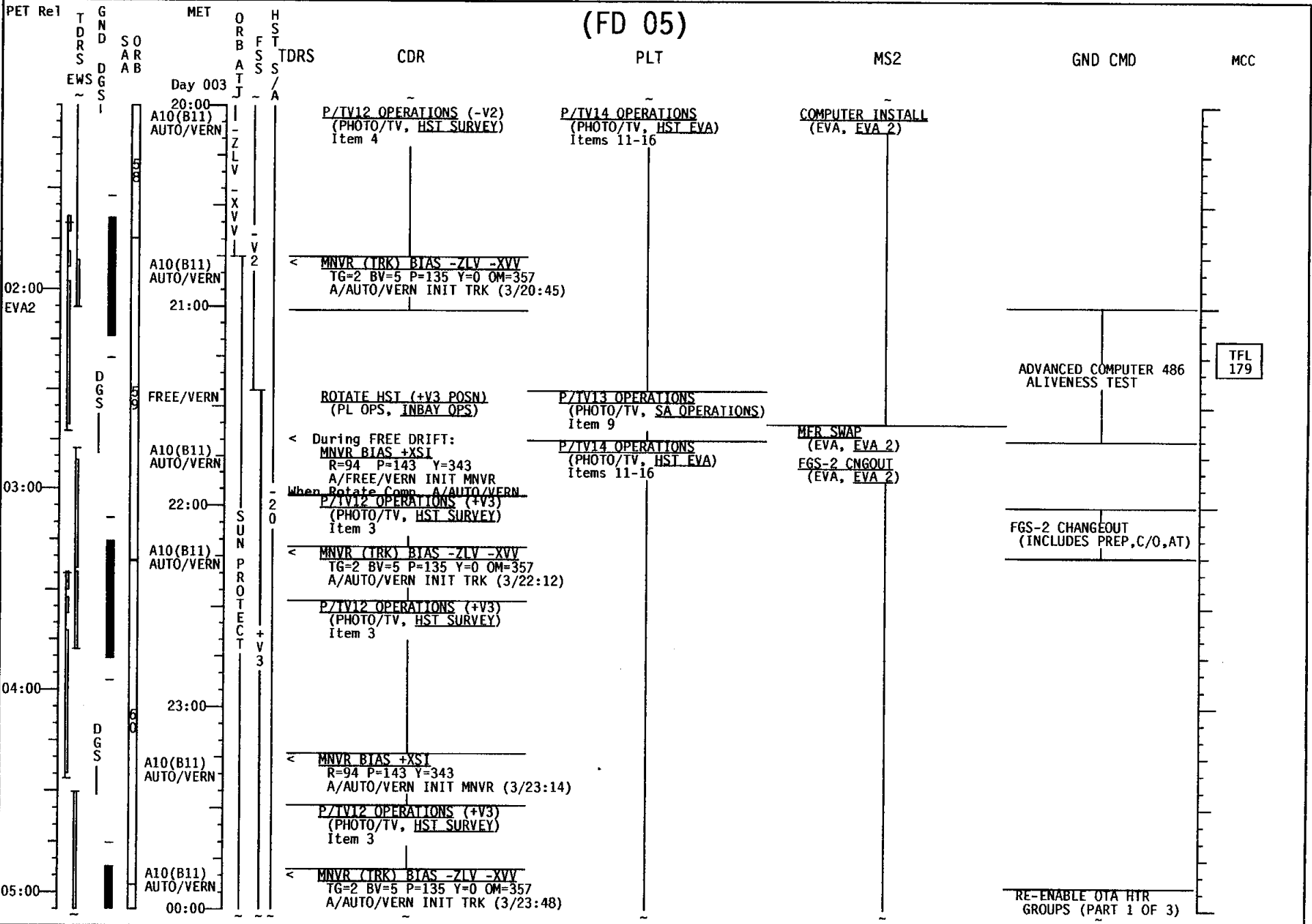
(FD 05)



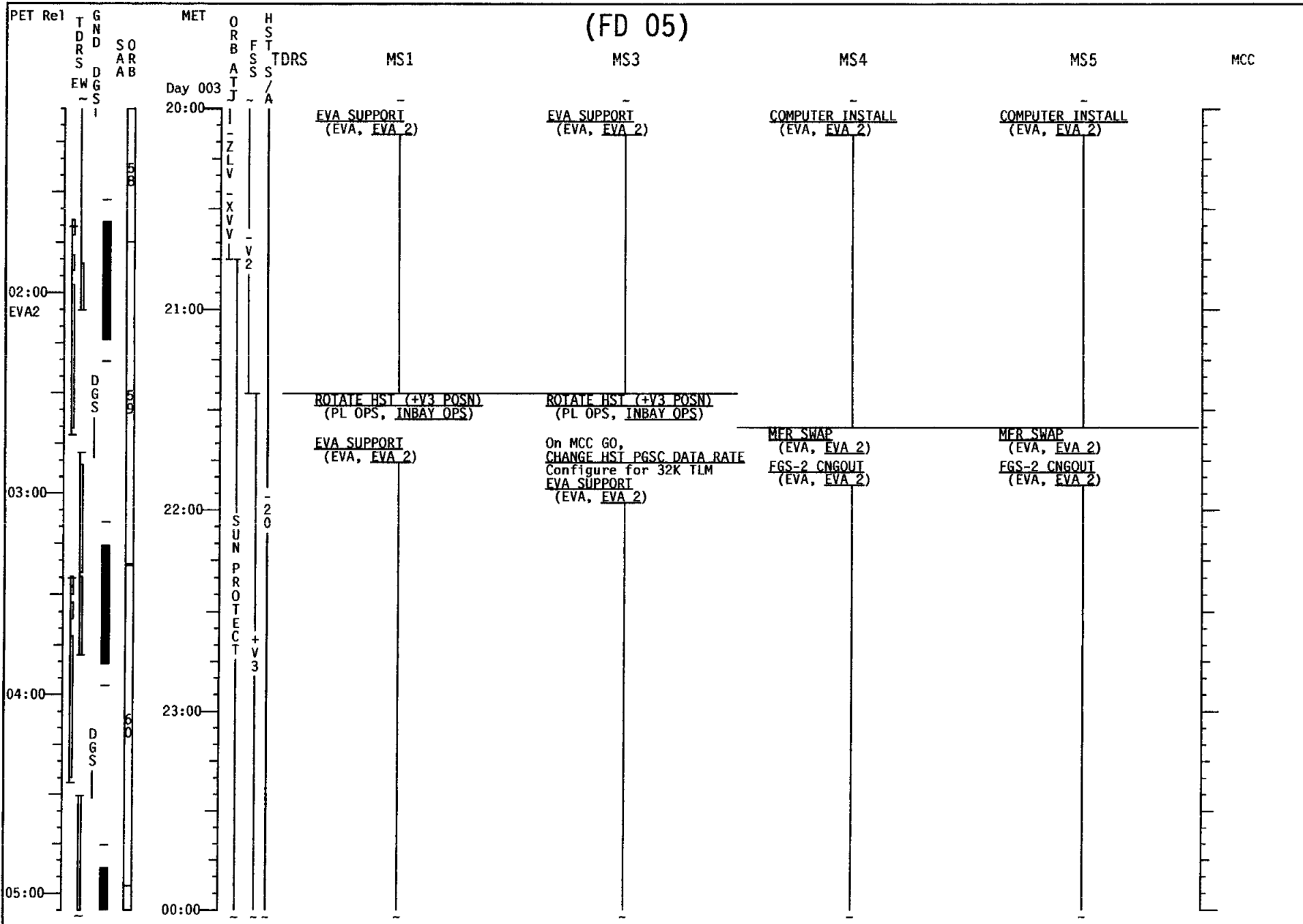
TDRS    GND    MET    ORB    HST    TDRS    CDR    PLT    MS2    GND CMD    MCC  
 SO    AR    AB    AT    SS    /    A  
 EWS    Day 003    Z    V    V    0    EXERCISE    EXERCISE    EXERCISE    EXERCISE    EXERCISE    EXERCISE  
 A10(B11)    16:00    10.2 PSI MAINTENANCE    P/TV13 SETUP    L17 Check MCIU filter screen  
 AUTO/VERN    AUTO/VERN    (EVA, 10.2 PSI CABIN)    (PHOTO/TV, SA OPERATIONS)    (PDRS, MFR OPS)  
 FREE/VERN    17:00    EXERCISE    P/TV13 OPERATIONS    PIVOT HST DN (to 75 DEG)  
 FREE/VERN    FREE/VERN    (two)-OP (tb-OP)    (PHOTO/TV, SA OPERATIONS)    (PL OPS, INBAY OPS) Steps 1,4  
 Note: Remain DAP: FREE  
 ROTATE HST (+V3 POSN)  
 (PL OPS, INBAY OPS) Step 2  
 Note: Remain DAP: FREE  
 PIVOT HST UP (to 90 DEG)  
 (PL OPS, INBAY OPS) Steps 4,6  
 Note: Remain DAP: FREE  
 SINGLE (DUAL) SA SLEW    SINGLE (DUAL) SA SLEW  
 (PL OPS, IN-BAY OPS)    (PL OPS, IN-BAY OPS)  
 Single (+)S/A to -20 deg.    Single (+)S/A to -20 deg.  
 SLEW +SA TO -20 DEG  
 PREP FOR ADV COMPUTER  
 486/DF-224 CHANGEOUT  
 A10(B11)    18:00    P/TV12 SETUP    P/TV14 SETUP    UPLINK  
 AUTO/VERN    AUTO/VERN    (PHOTO/TV, HST SURVEY)    (PHOTO/TV, HST EVA)    B ONLY 15 +BOX  
 -175<AZ<-5  
 -89<EL<-60  
 PRIORITY PWRUP GROUP B    PRIORITY PWRUP GROUP B  
 (ORB PKT, PRIOR PWRDN)    (ORB PKT, PRIOR PWRDN)  
 STEPS 5 (IADI/DDU)    STEPS 5 (IADI/DDU)  
 6 (DUAL G2, NBAT 1221)    6 (DUAL G2, NBAT 1221)  
 P/TV13 OPERATIONS    P/TV13 OPERATIONS  
 (PHOTO/TV, SA OPERATIONS)    (PHOTO/TV, SA OPERATIONS)  
 Items 7, 8  
 EVA 2 PET 00:00 at 3/18:55 MET  
 ROTATE HST (-V2 POSN)    ROTATE HST (-V2 POSN)  
 (PL OPS, INBAY OPS)    (PL OPS, INBAY OPS)  
 SUPPLY WATER DUMP USING FES    DAILY SETUP  
 (ORB OPS, ECLS) Step 1    (EVA, EVA 2)  
 ADV COMPUTER 486/DF-224  
 CHANGEOUT  
 P/TV12 OPERATIONS (-V2)    COMPUTER INSTALL  
 (PHOTO/TV, HST SURVEY)    (EVA, EVA 2)  
 Item 4  
 TFL  
 184  
 00:00    19:00    20:00  
 EVA2    FREE/VERN    AUTO/VERN  
 DGS    DGS

(FD 05)

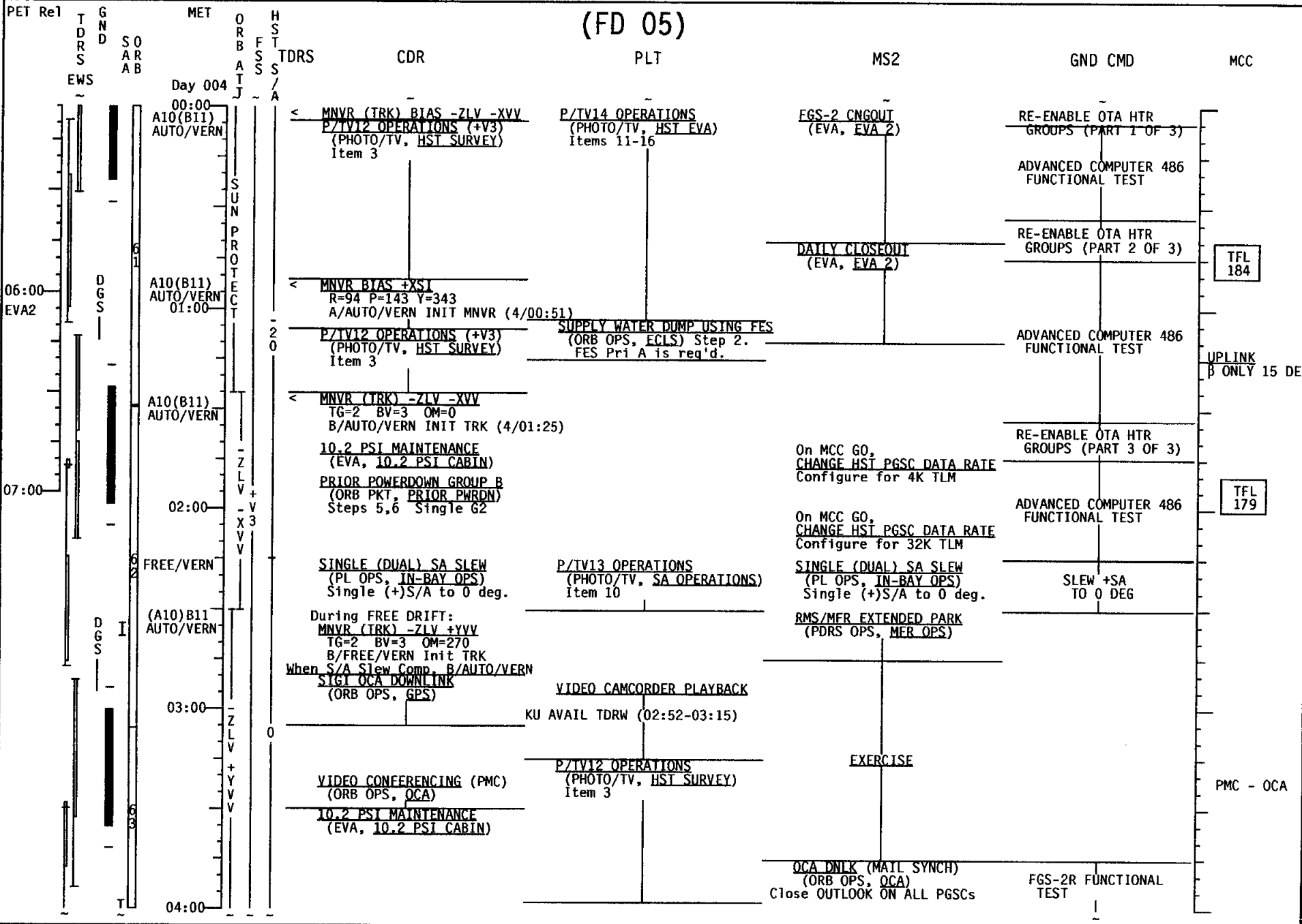


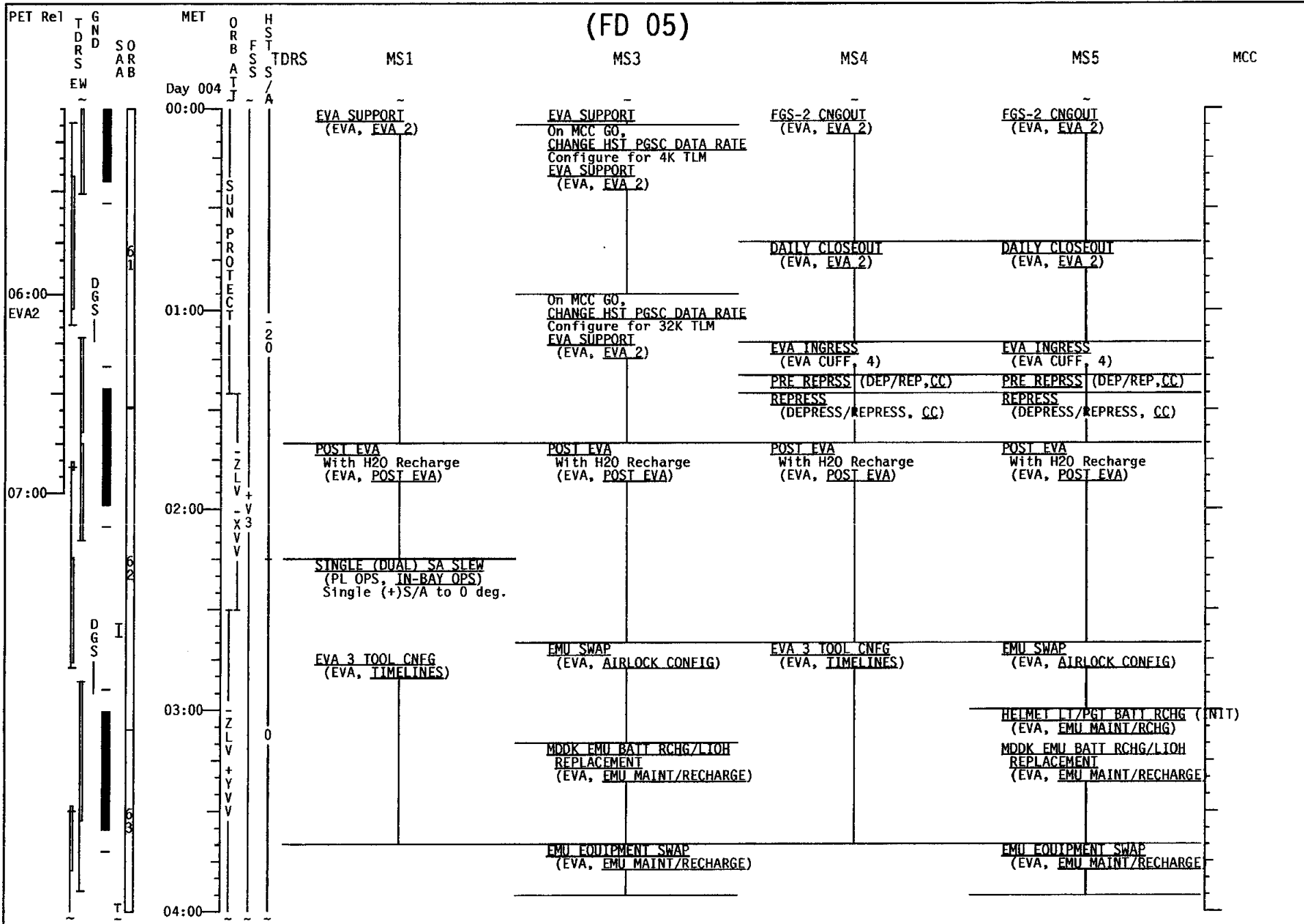


# (FD 05)

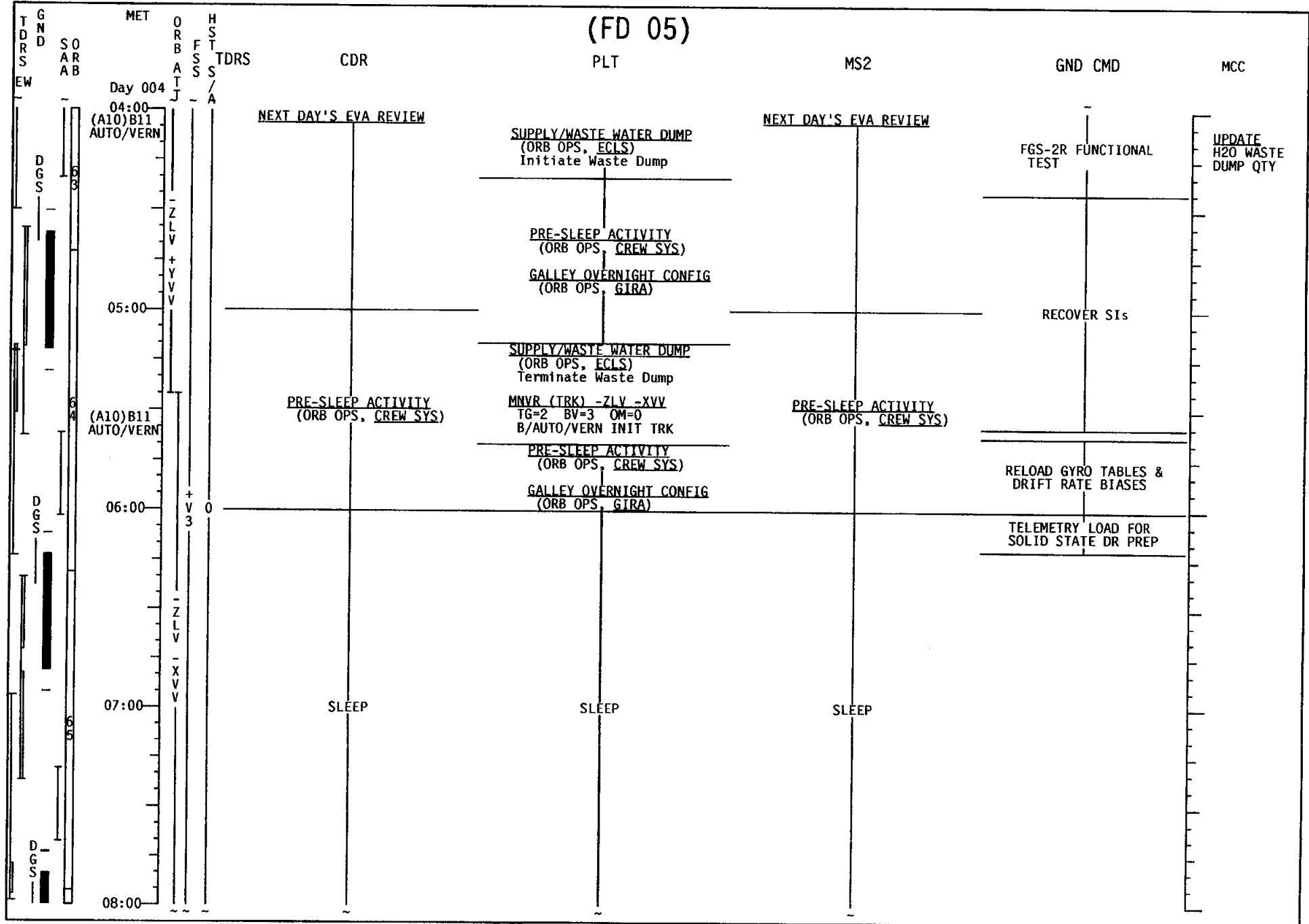




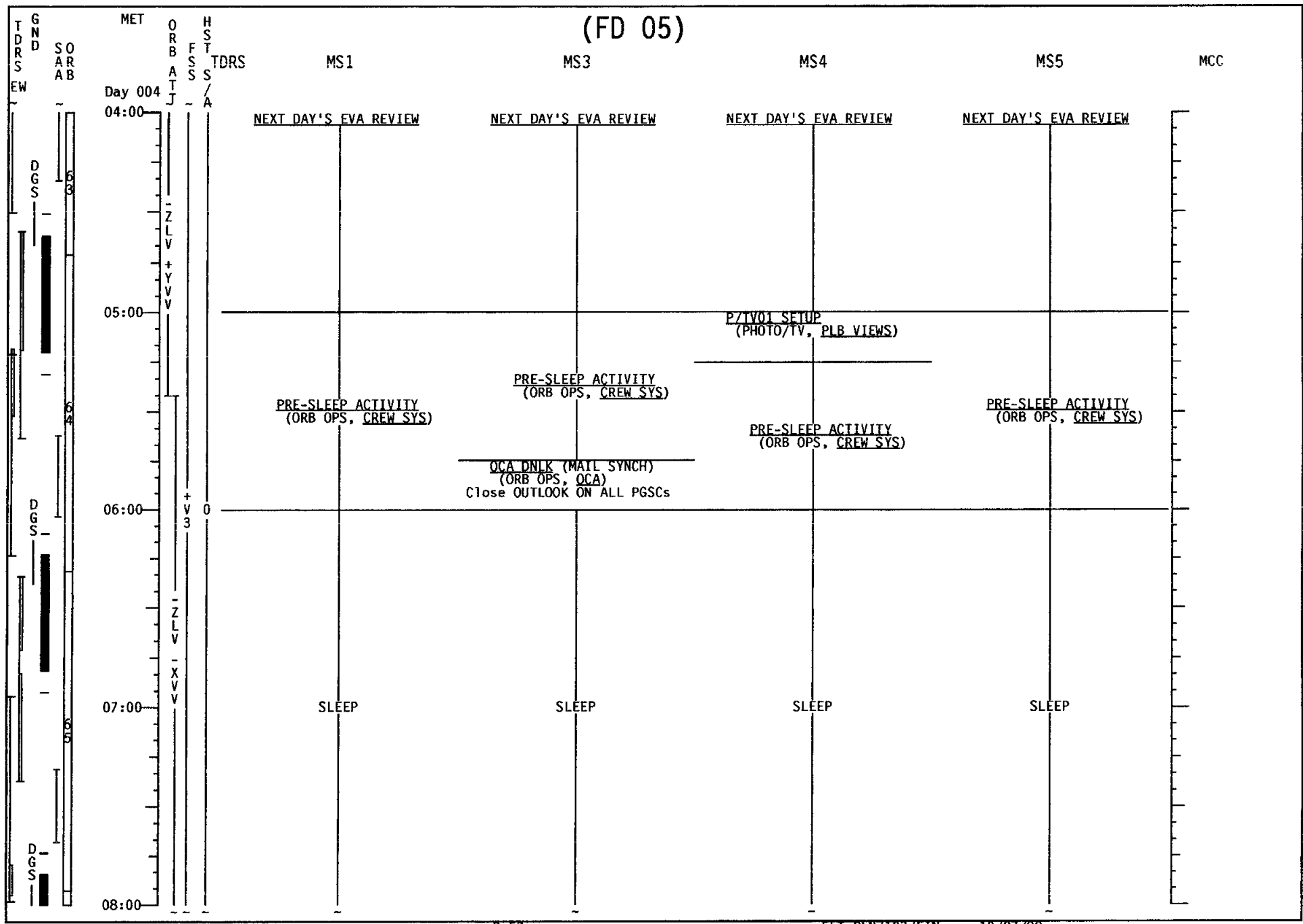




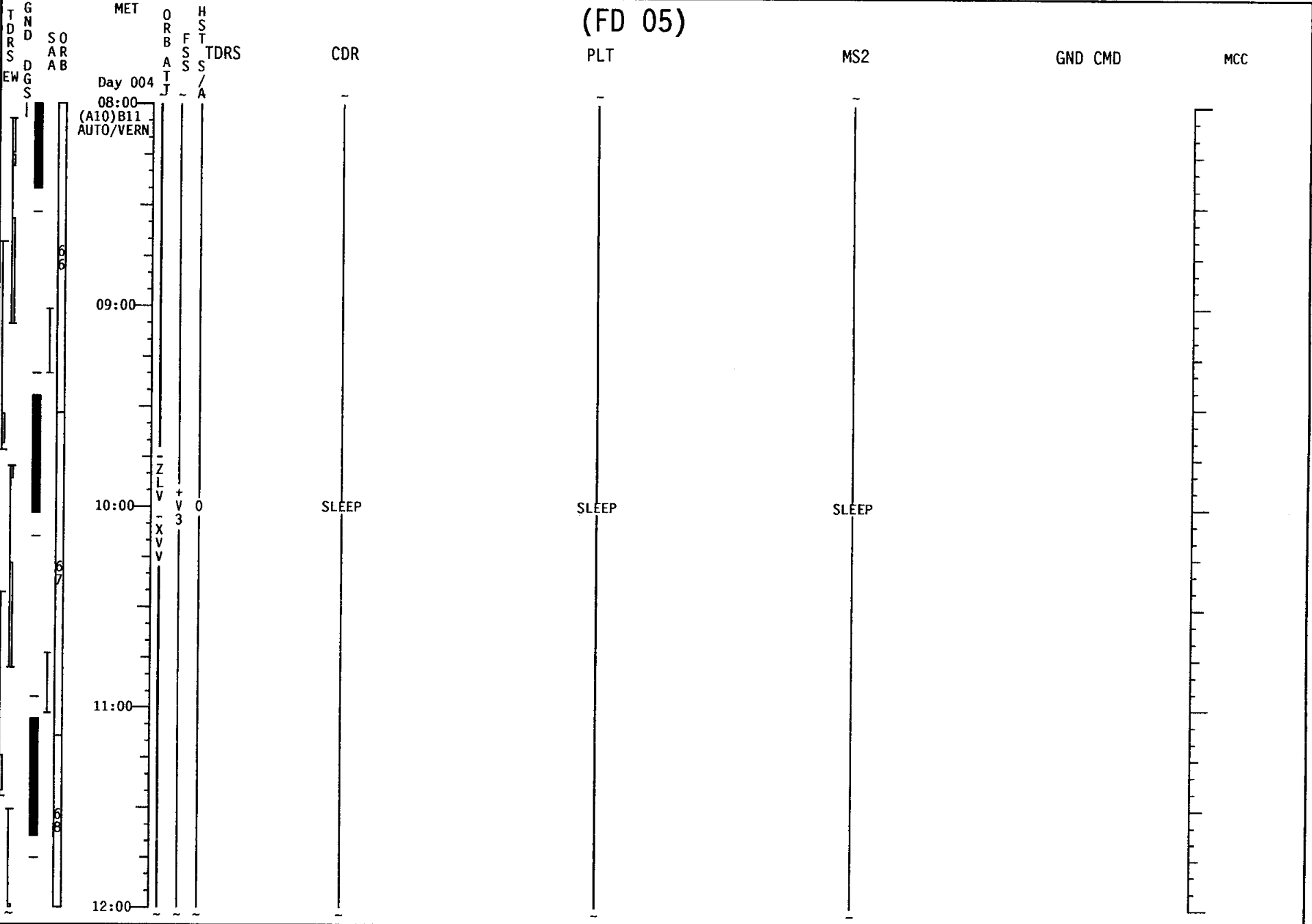
(FD 05)



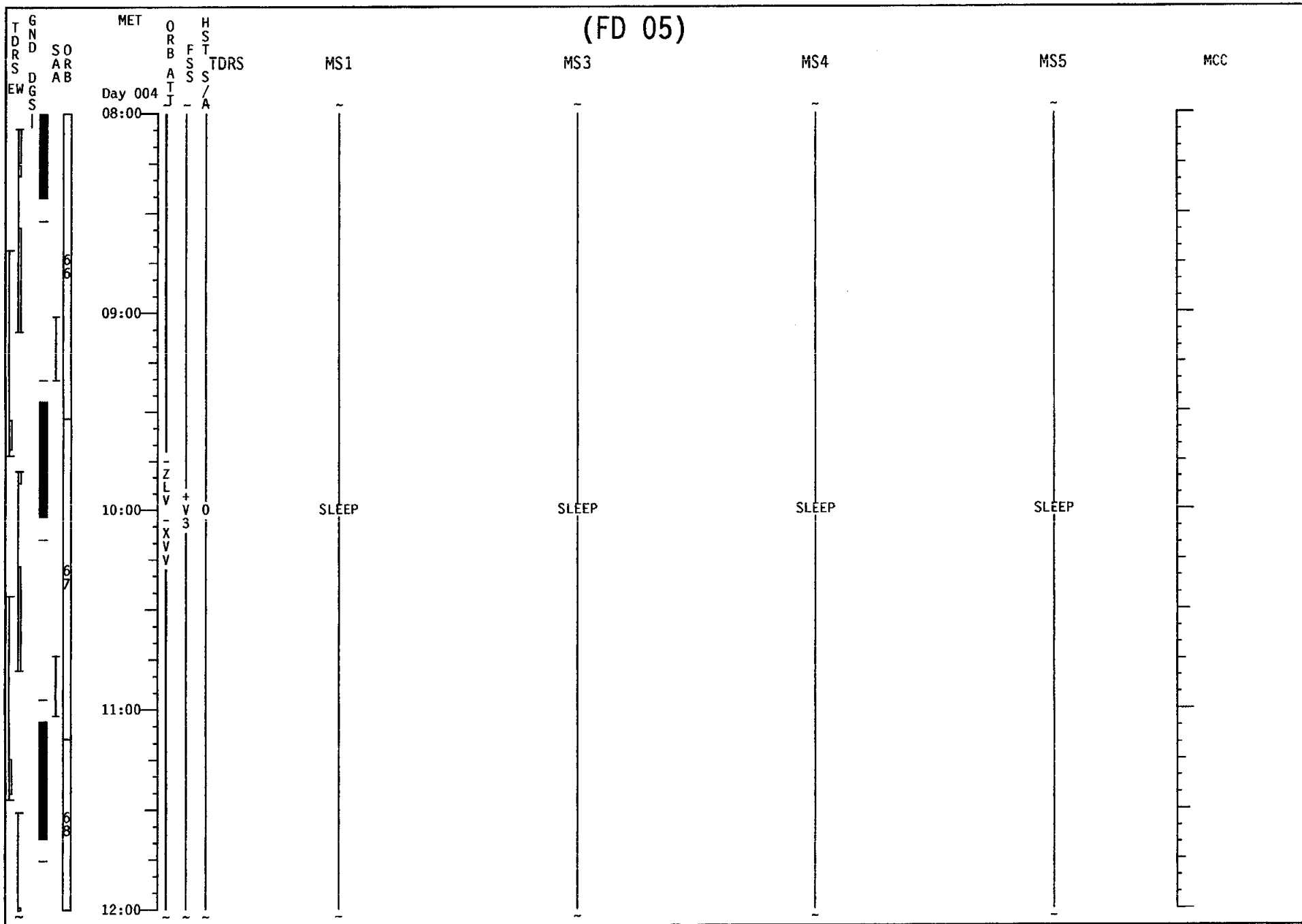
# (FD 05)



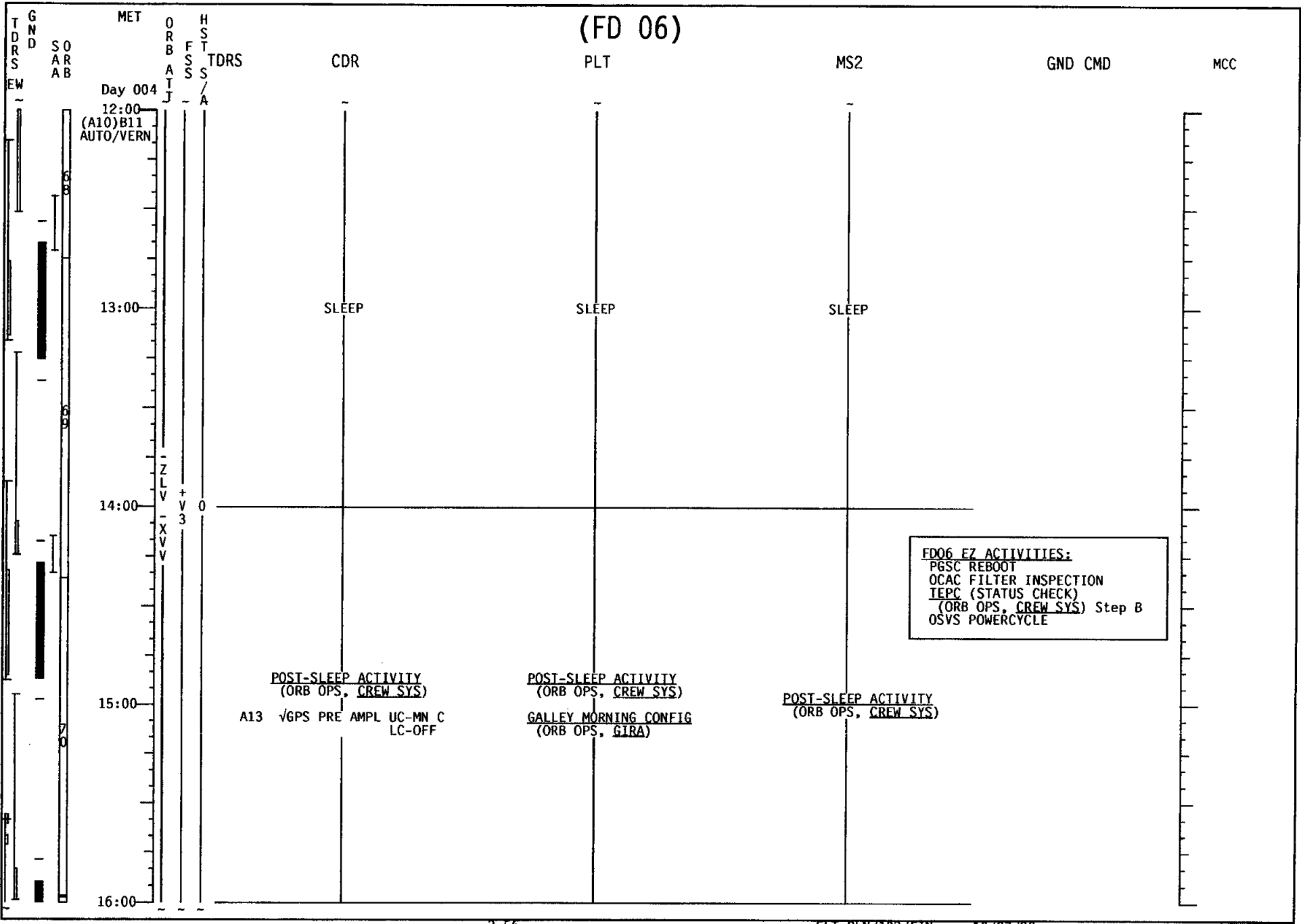
(FD 05)



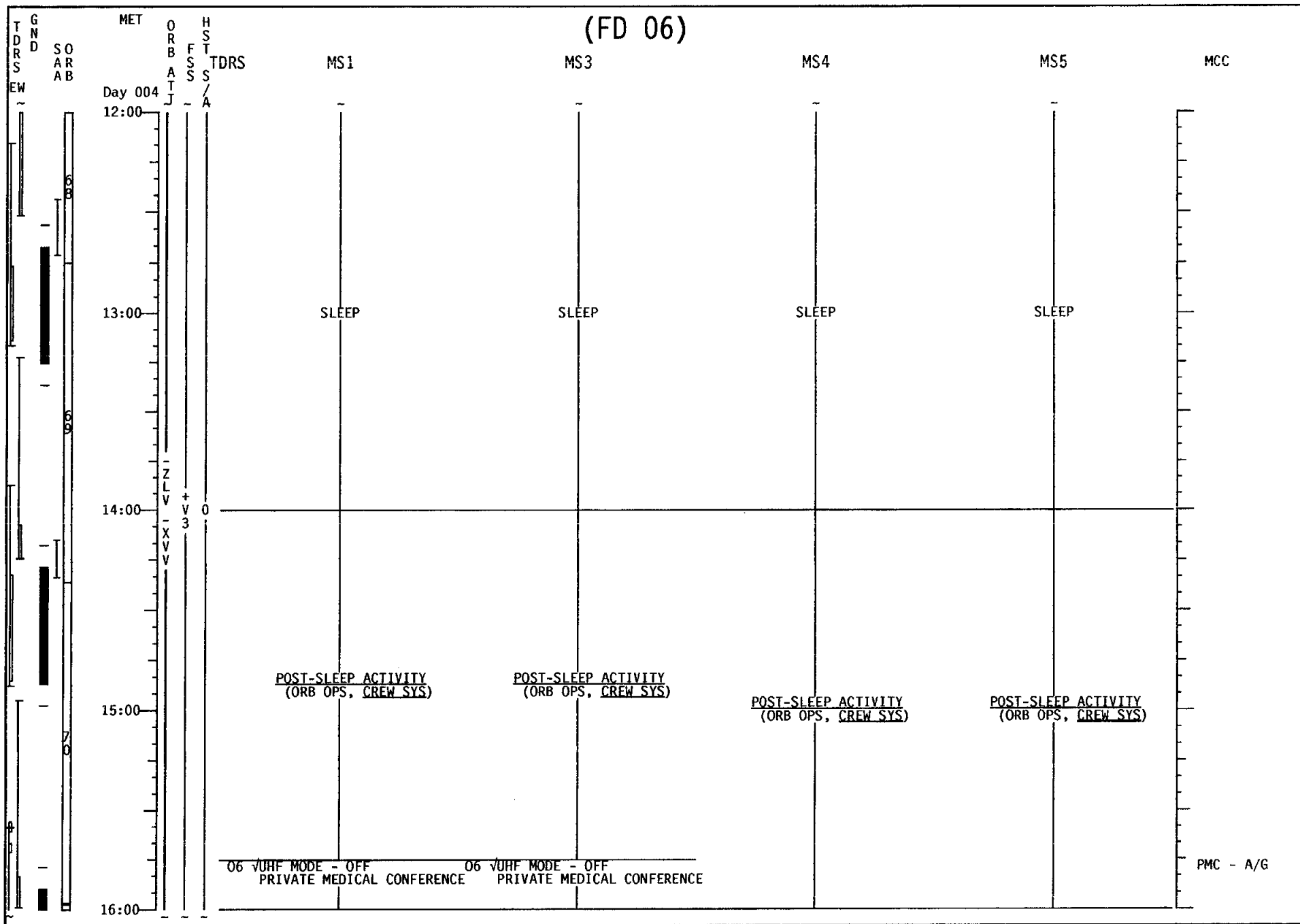
(FD 05)



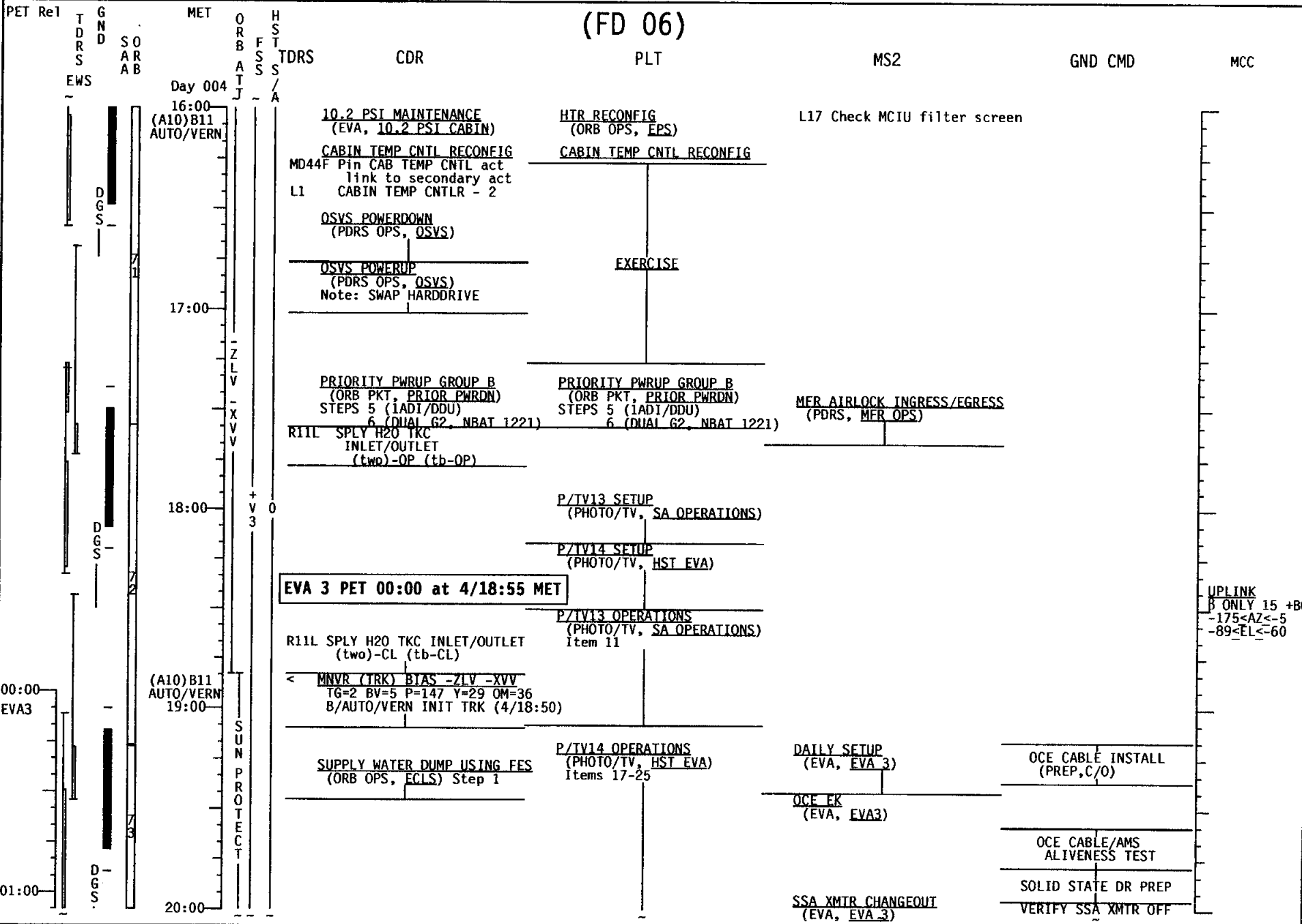
# (FD 06)



(FD 06)

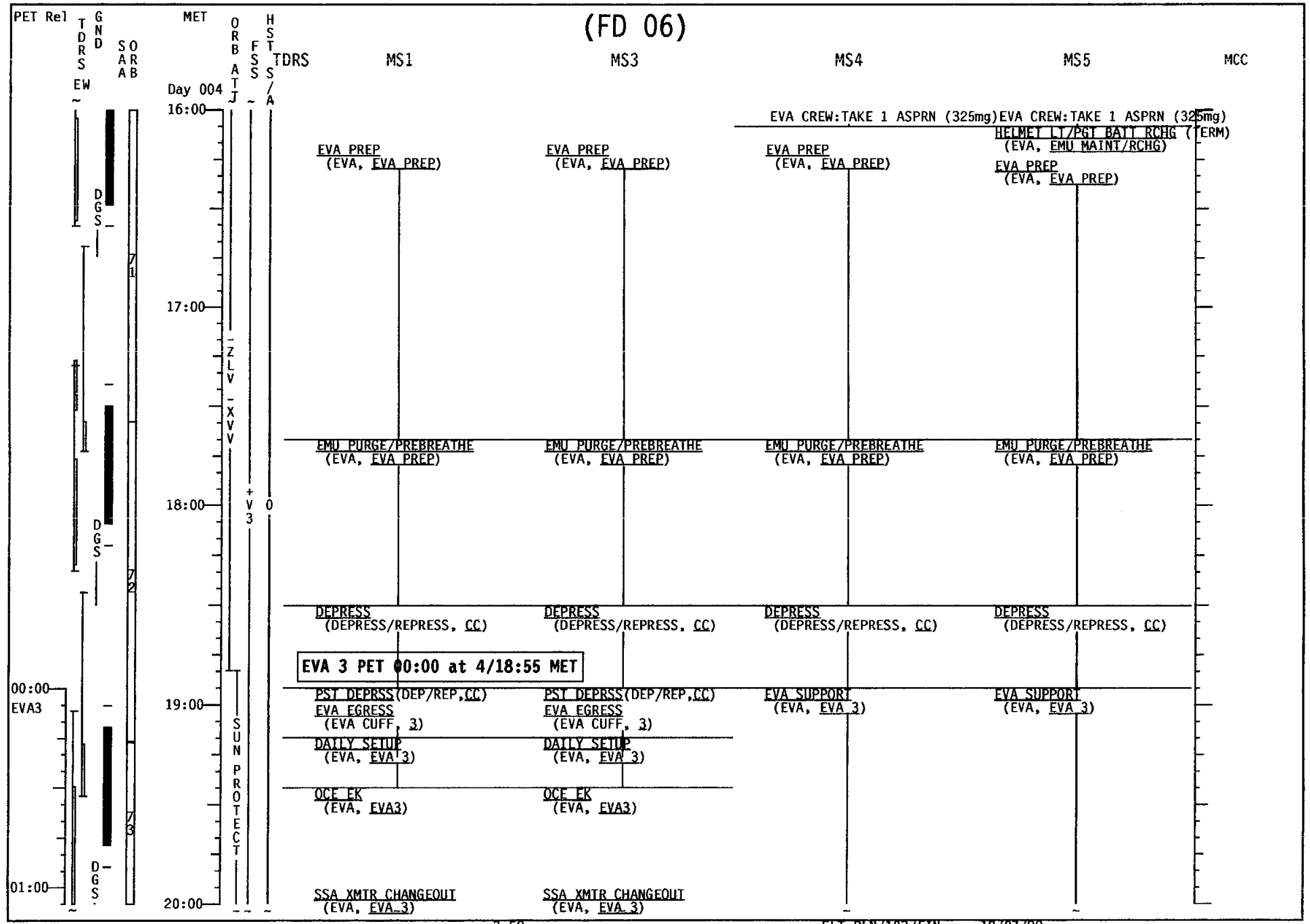


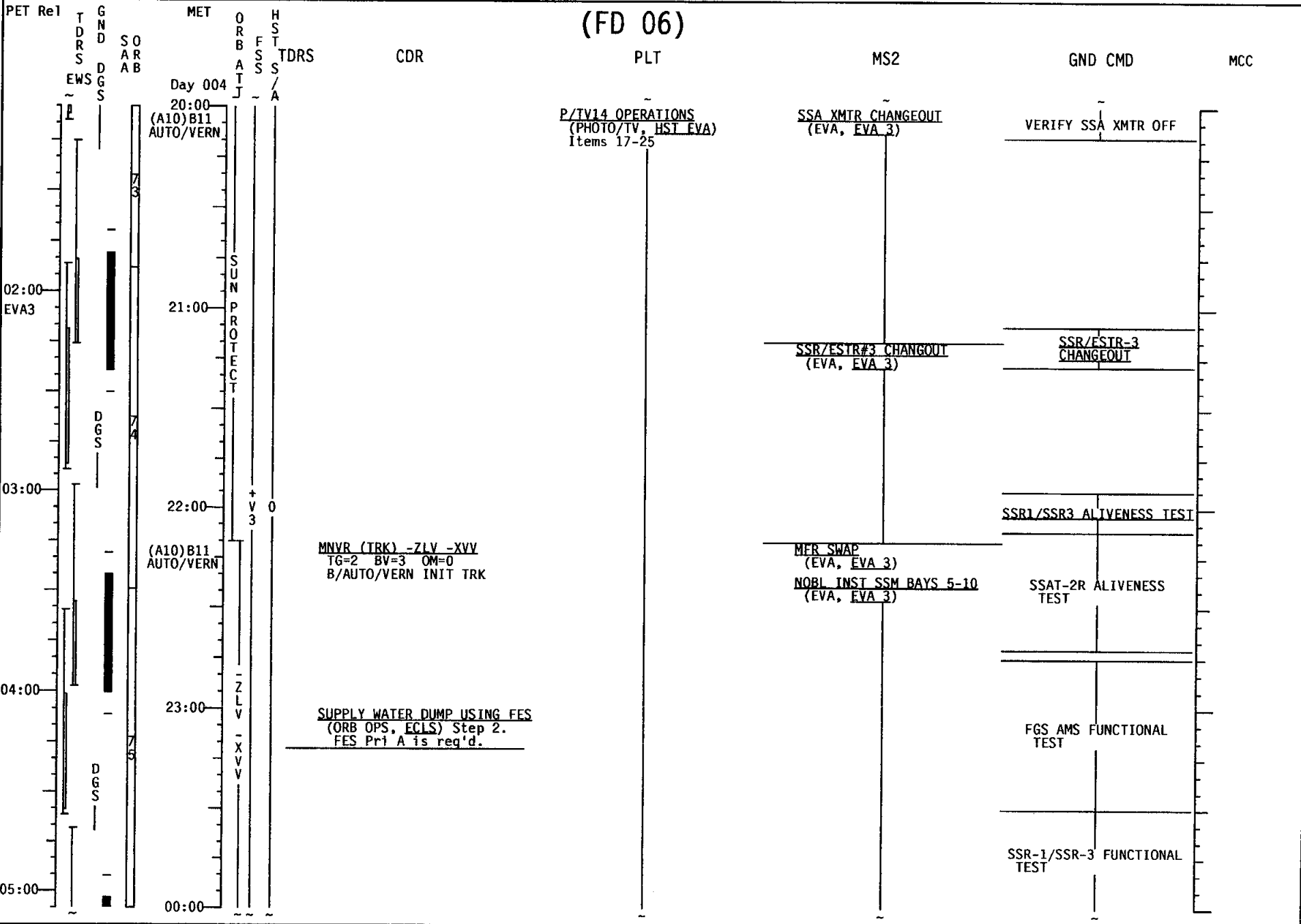




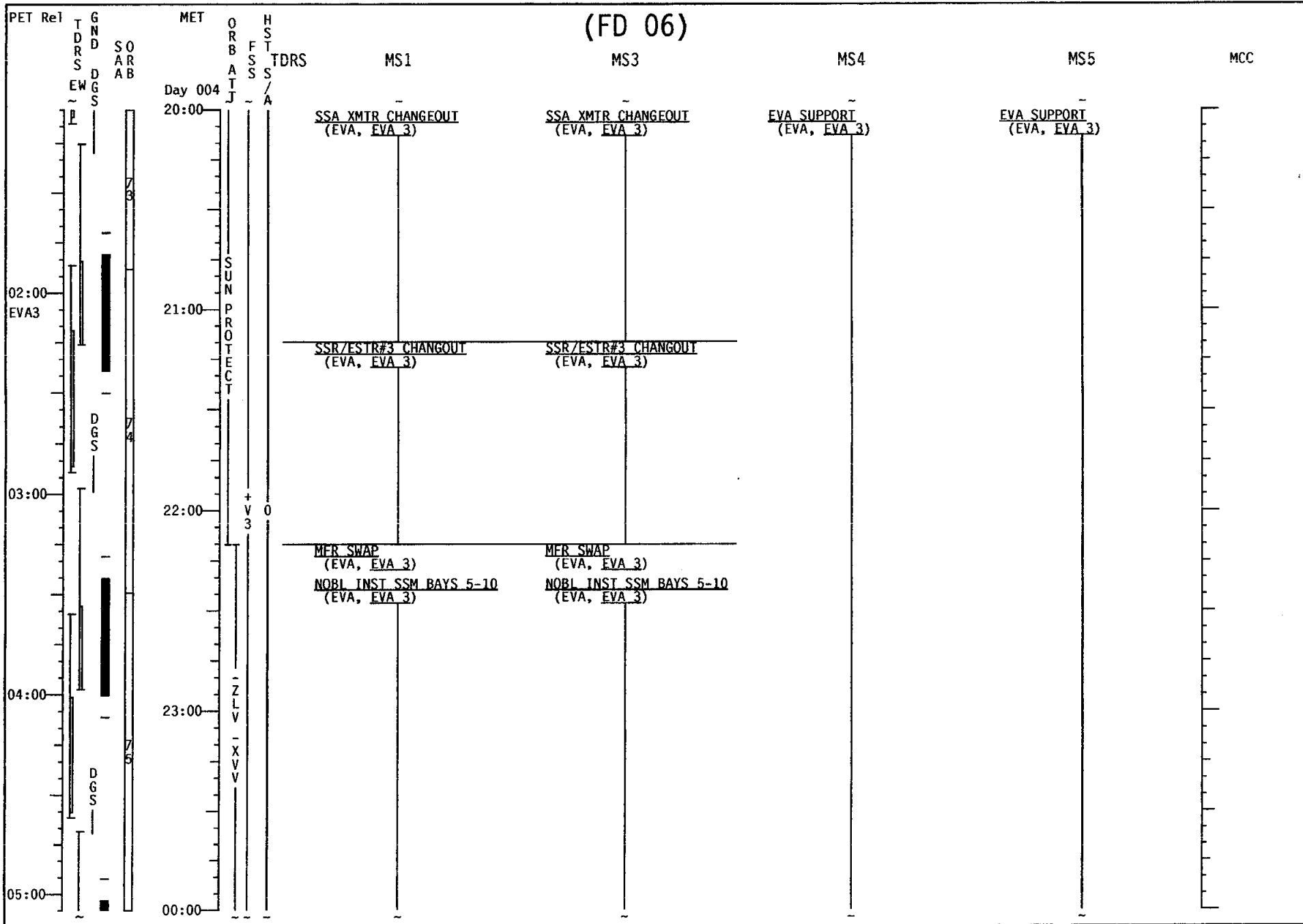
UPLINK  
 B ONLY 15 +BOX  
 -175<AZ<-5  
 -89<EL<-60

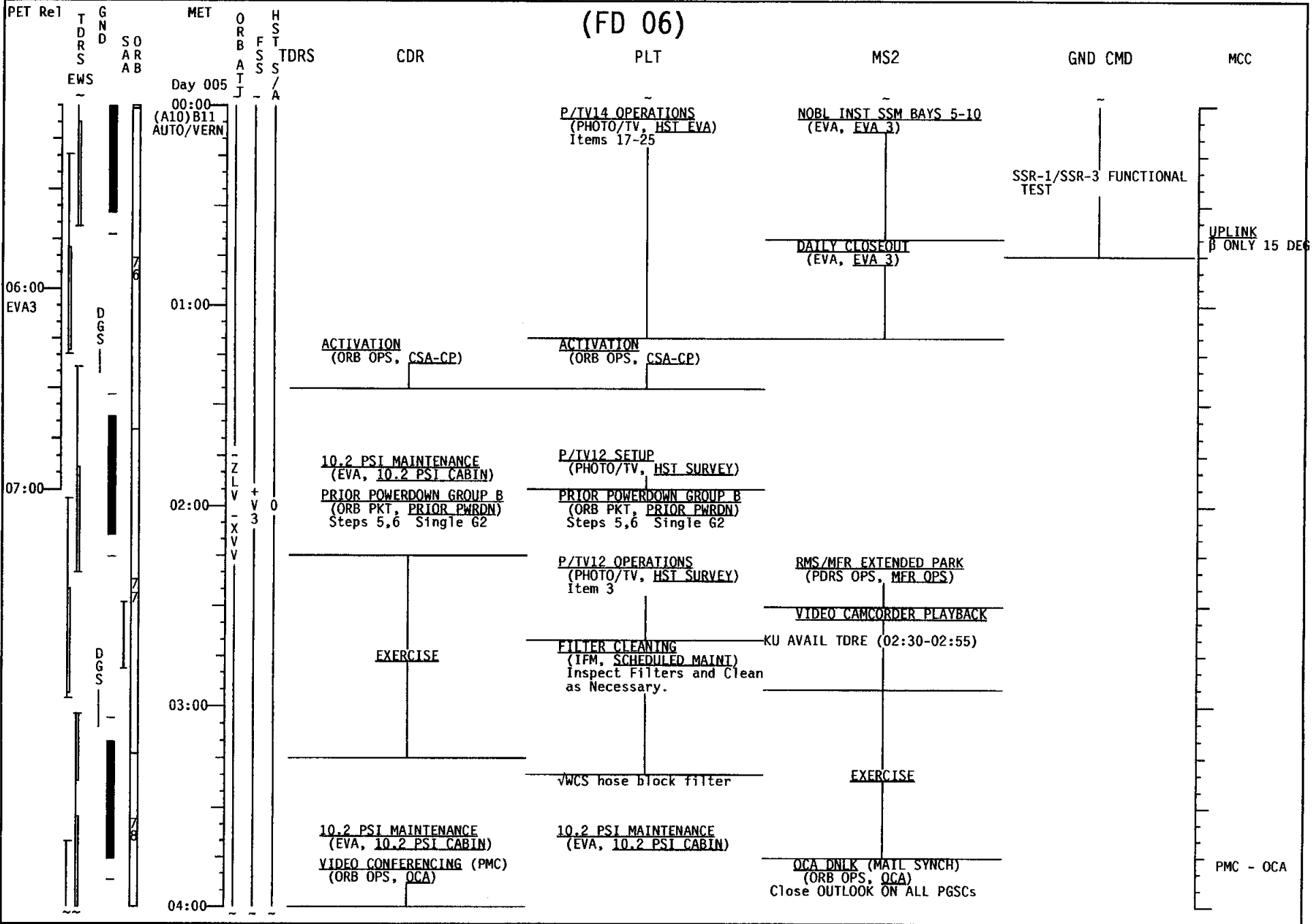
# (FD 06)



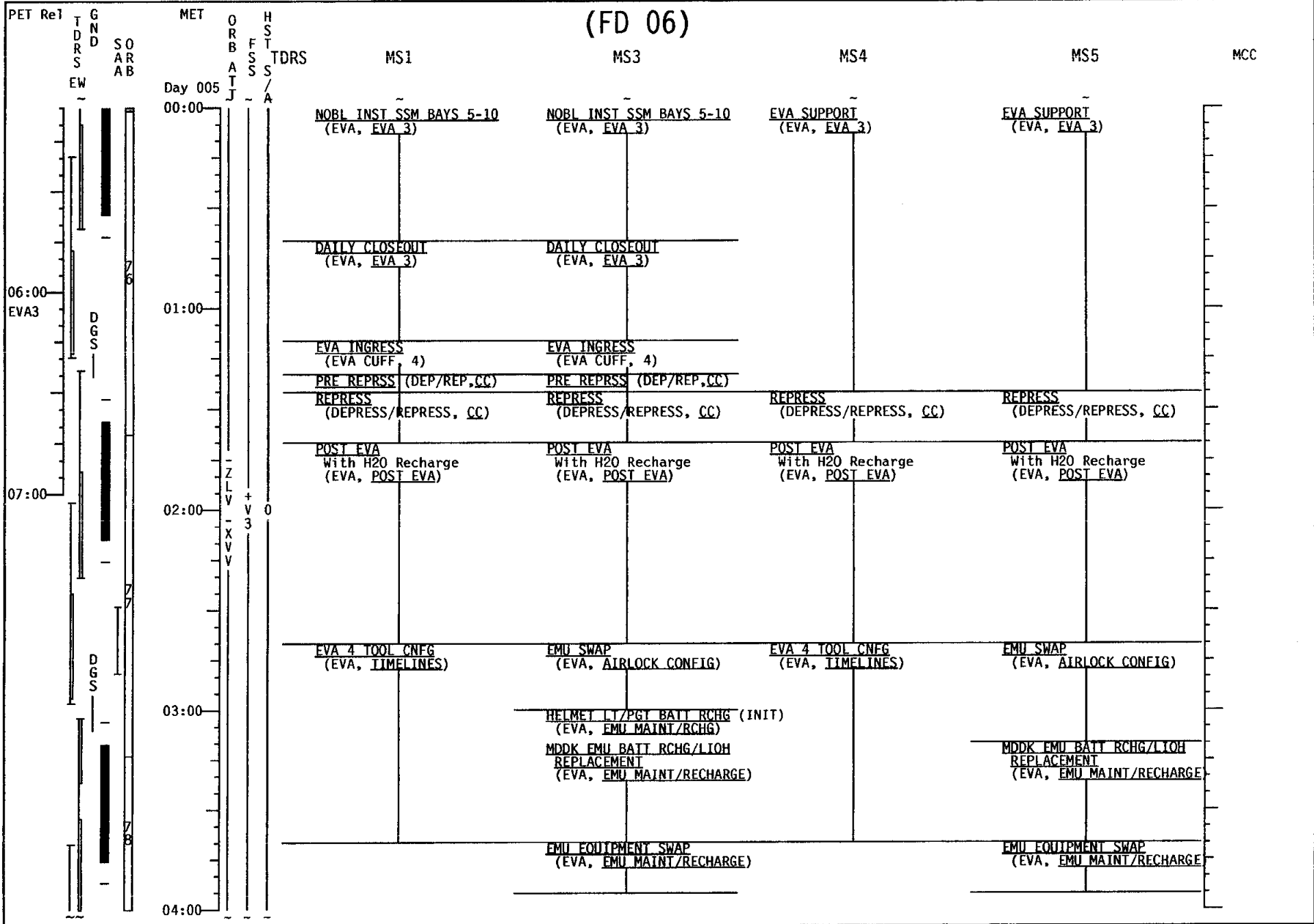


# (FD 06)

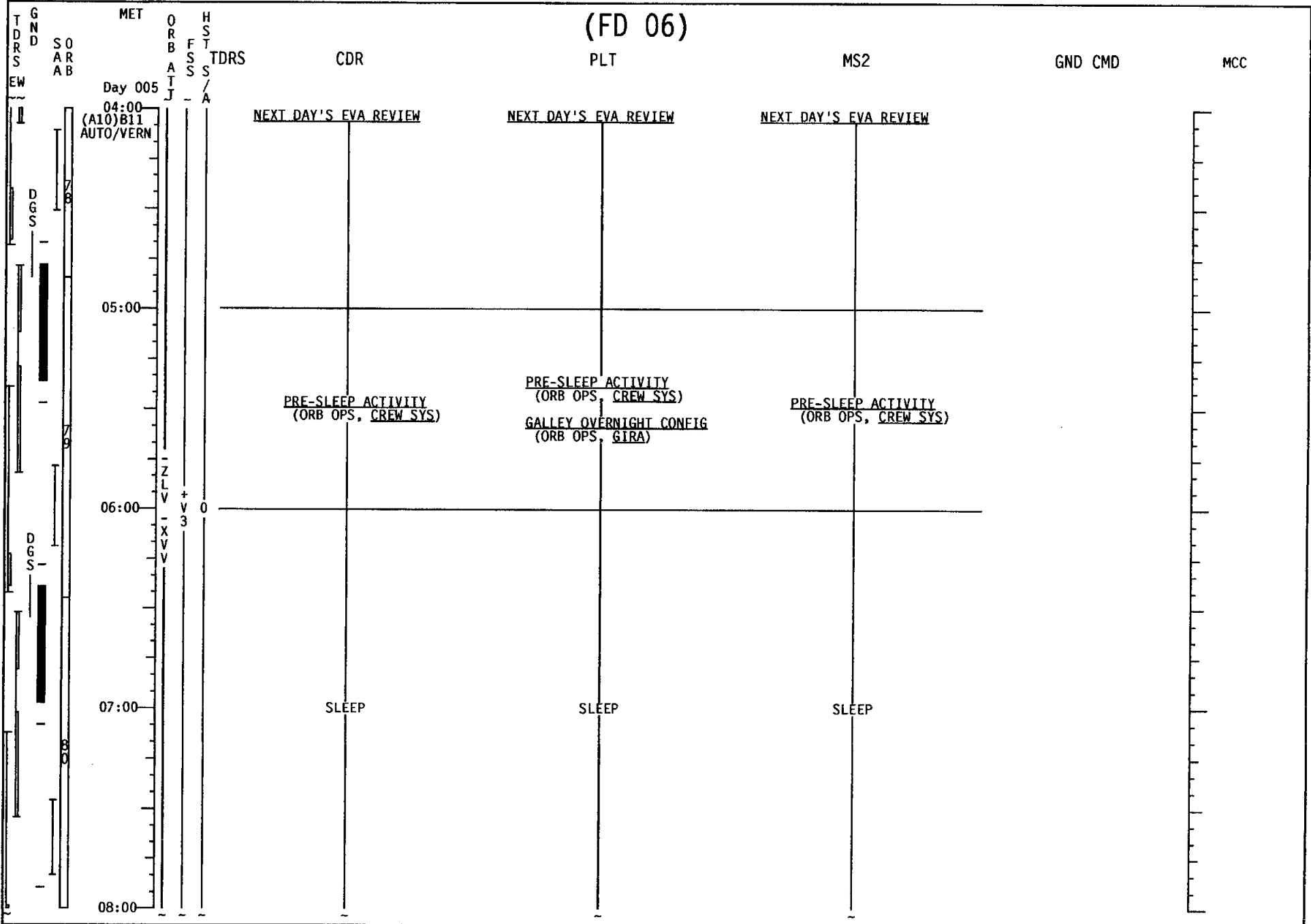




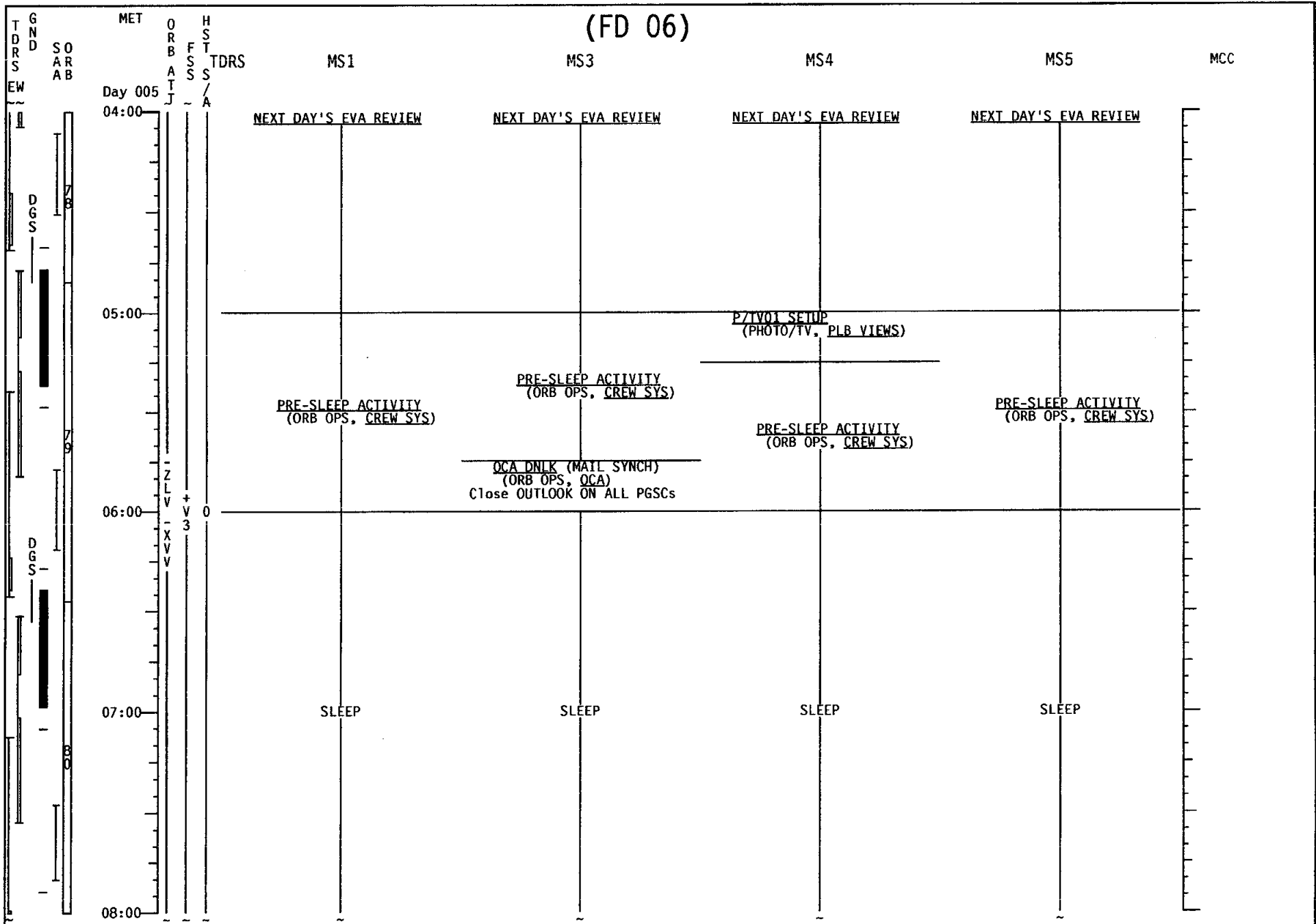
(FD 06)



(FD 06)

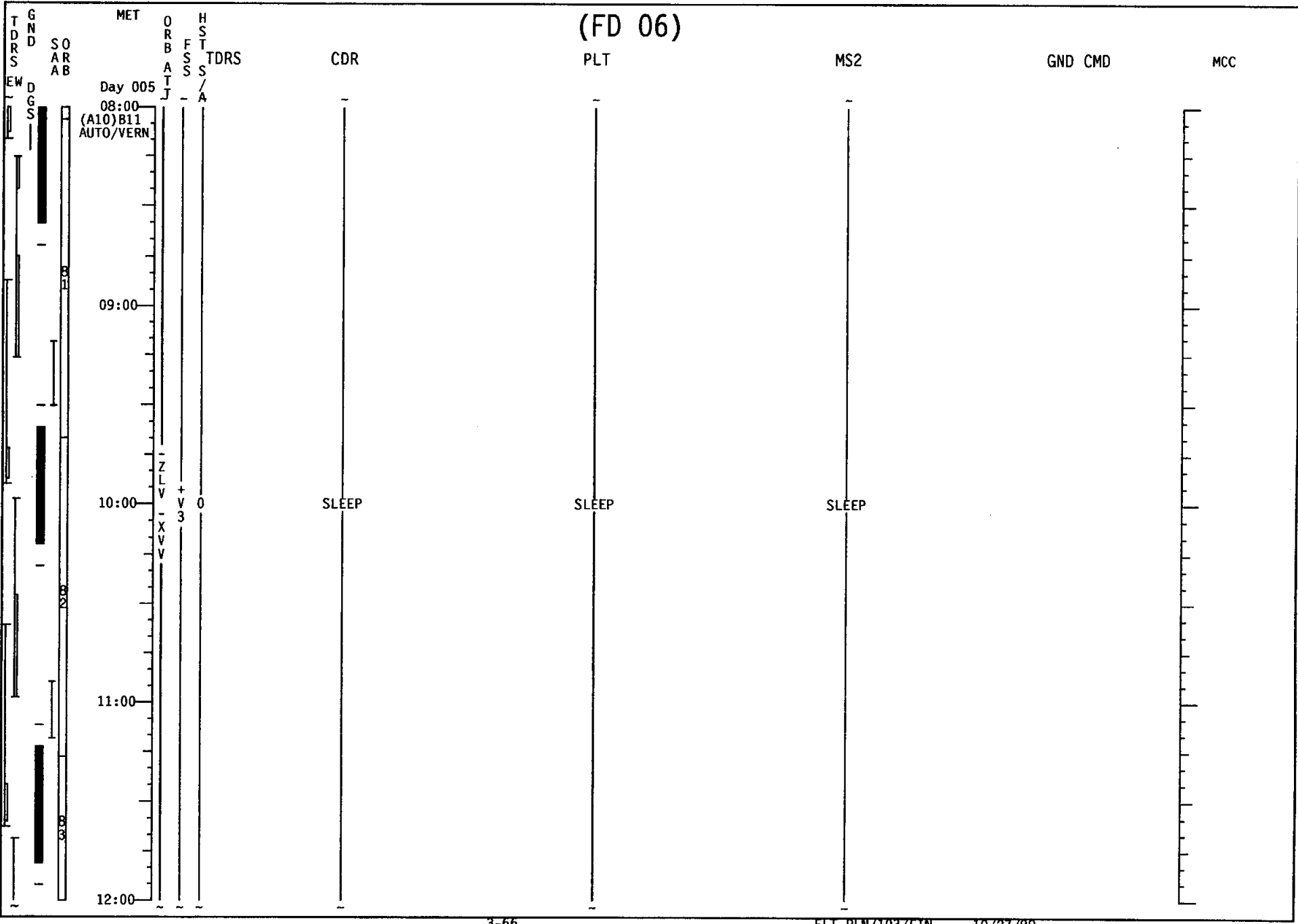


(FD 06)

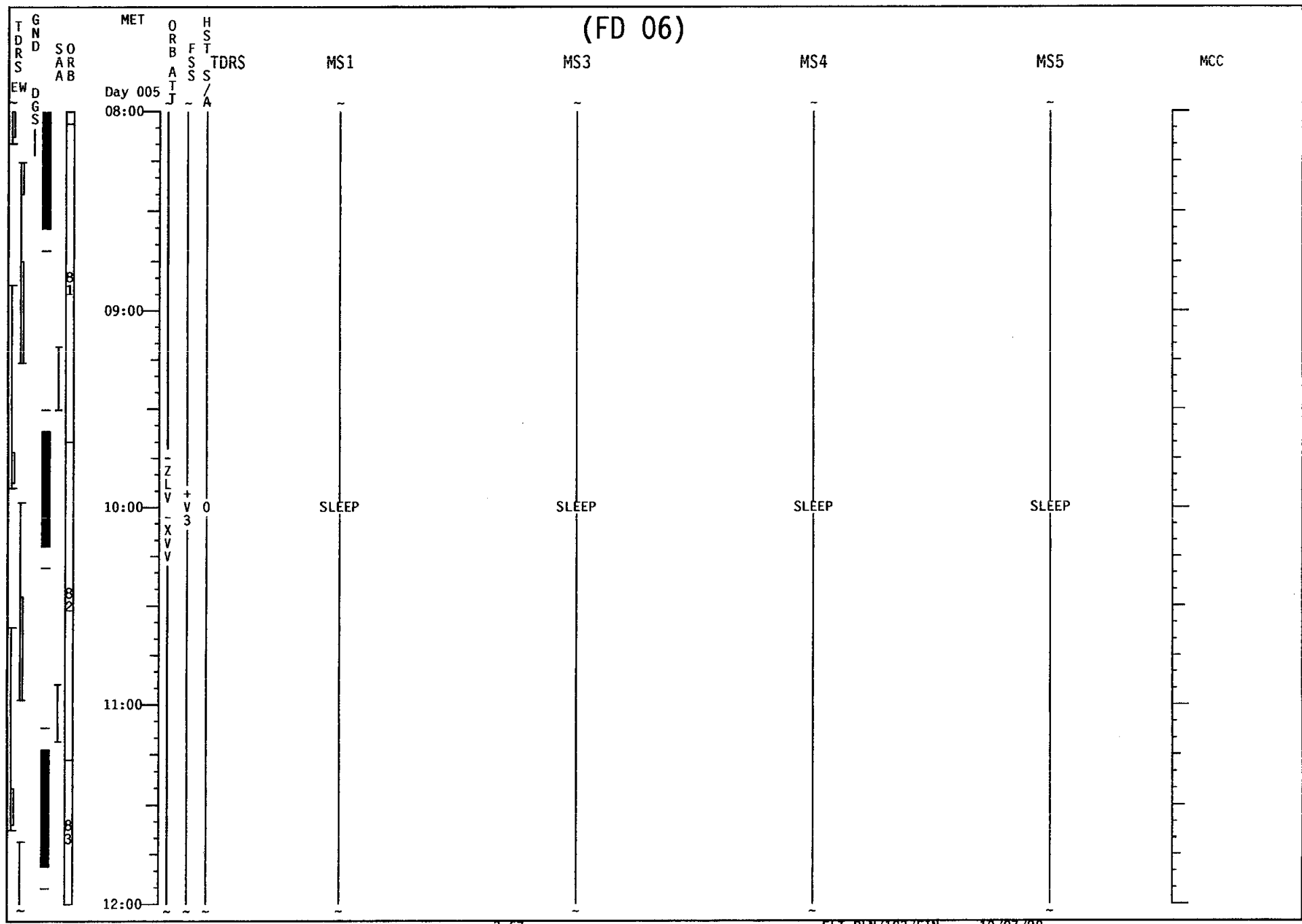




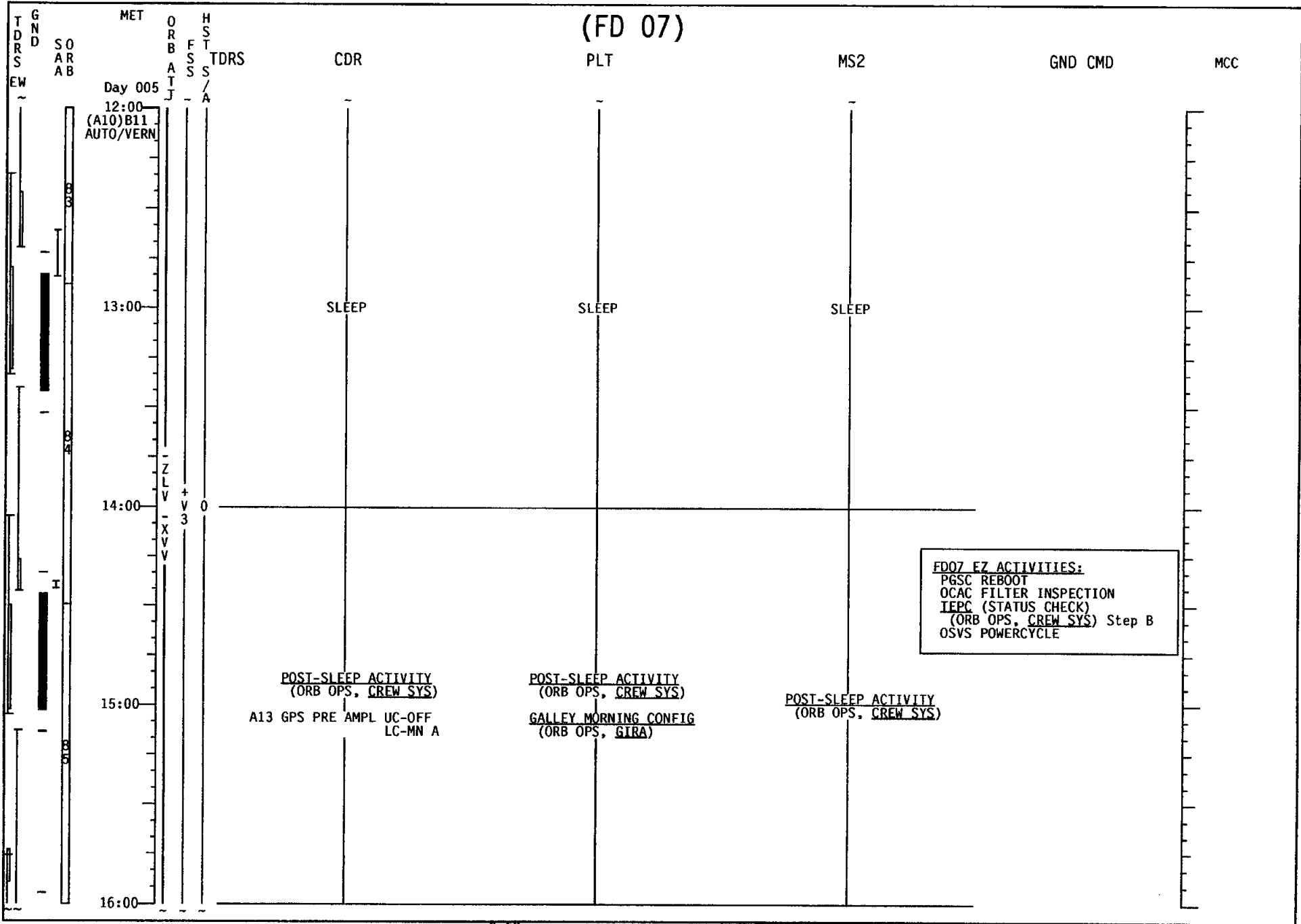
(FD 06)



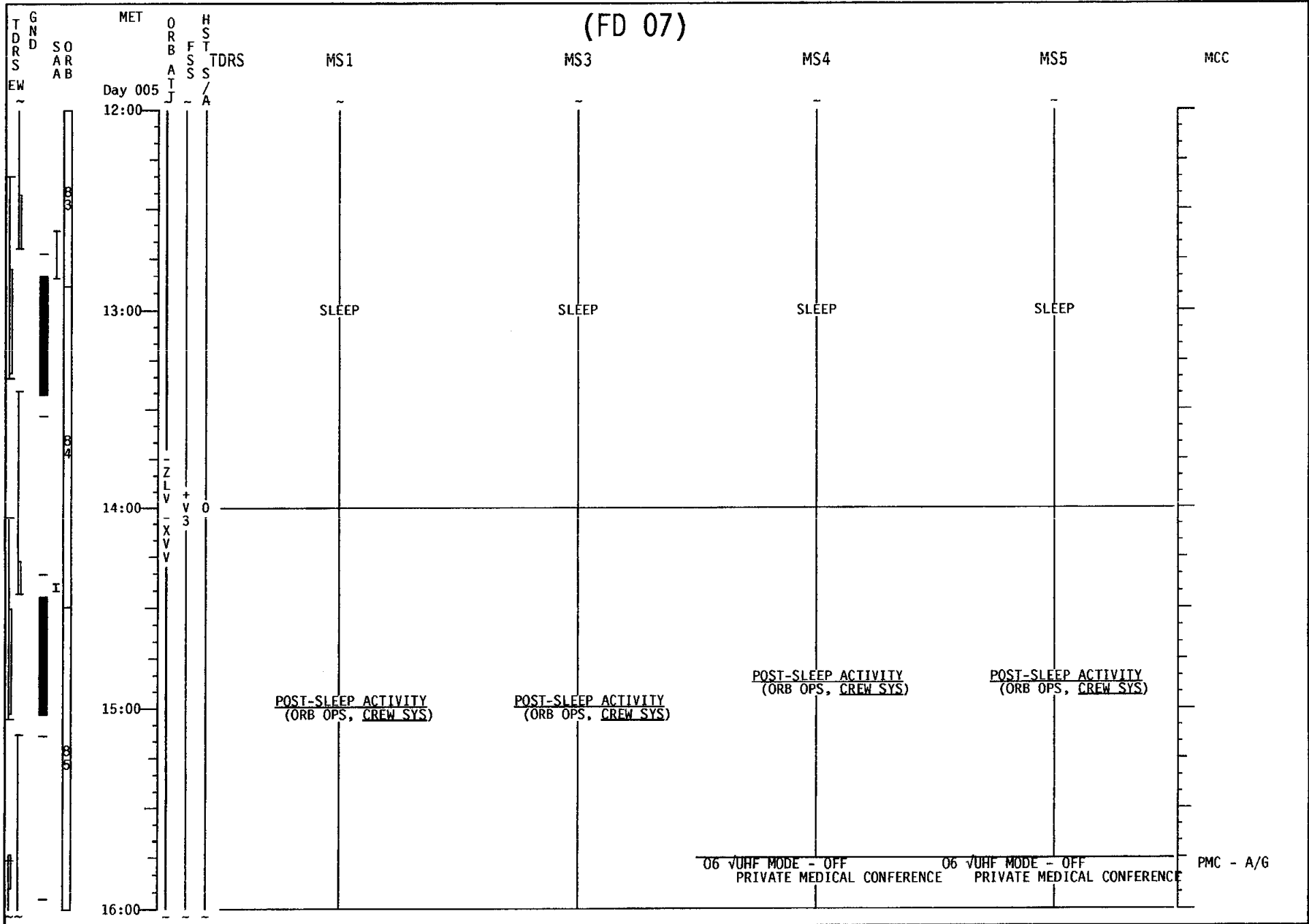
(FD 06)



# (FD 07)

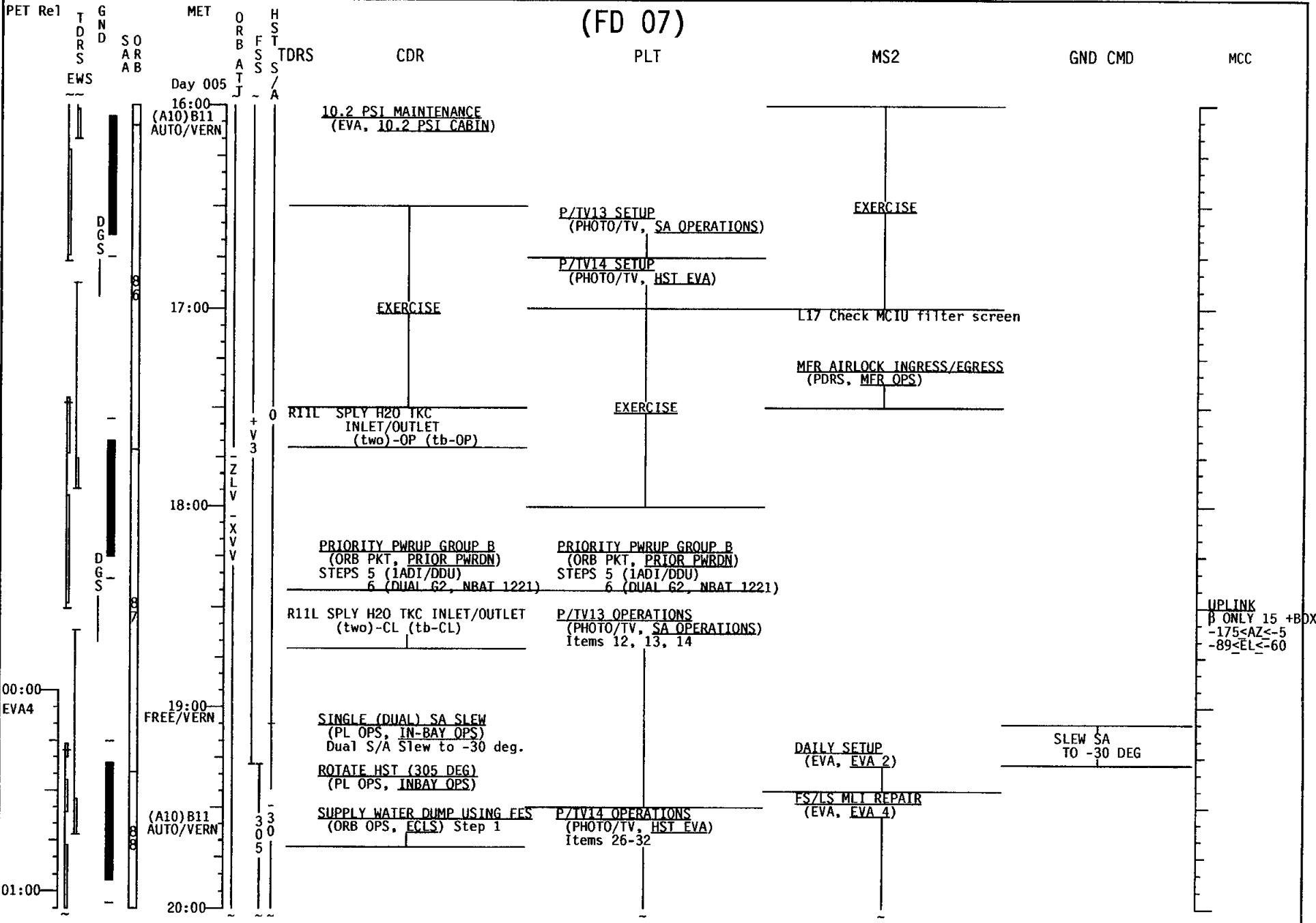


(FD 07)

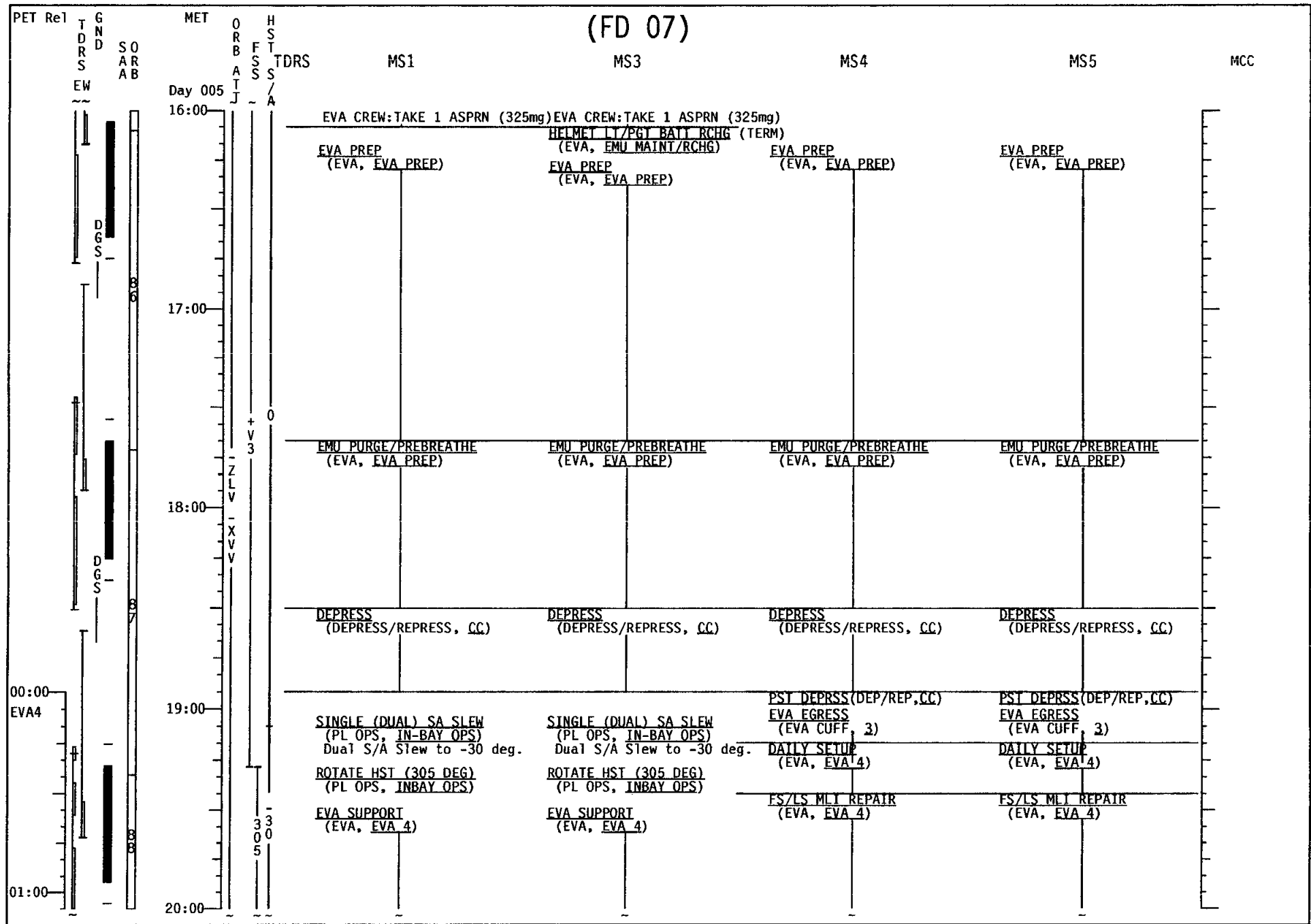


PET Re1

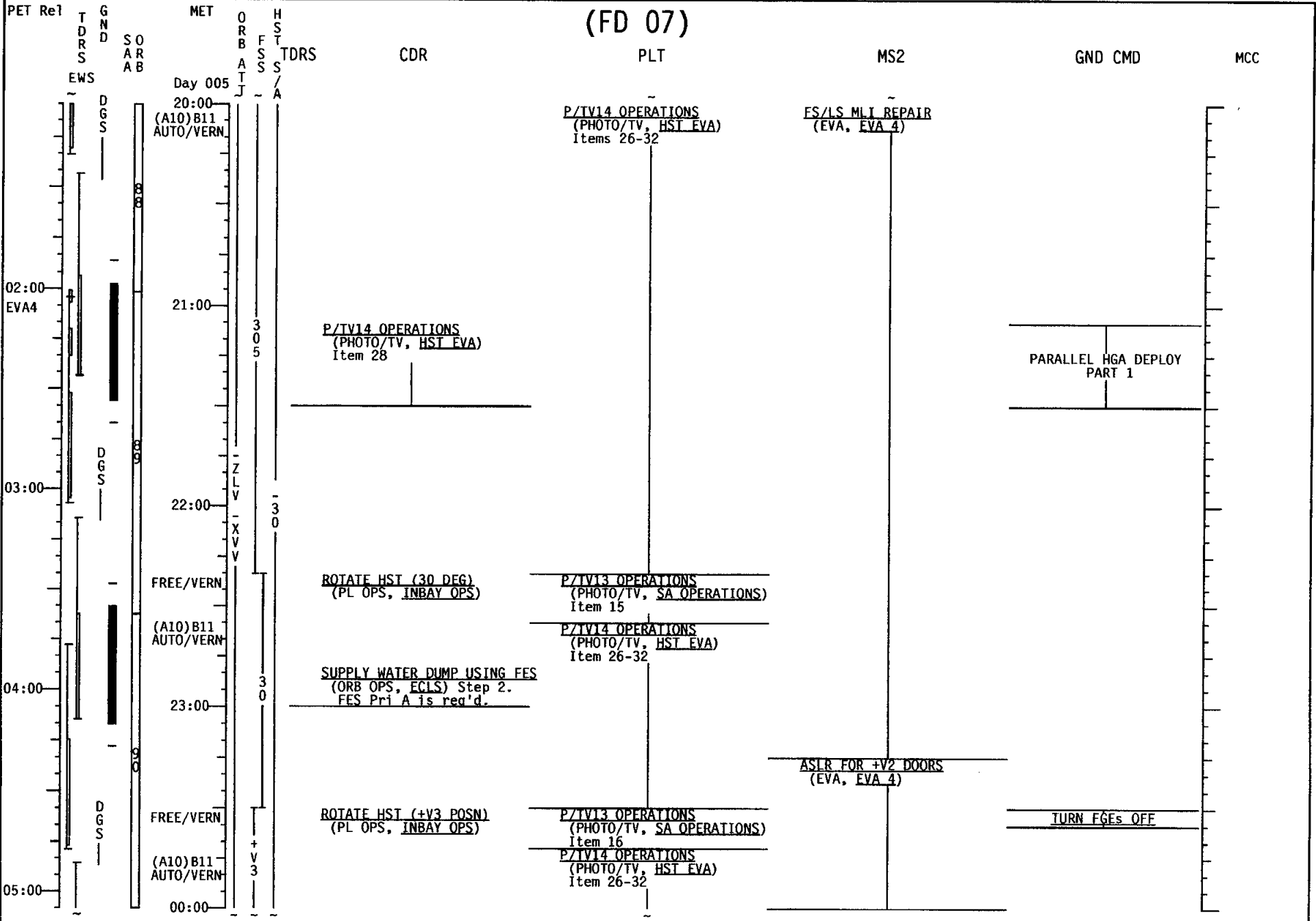
# (FD 07)



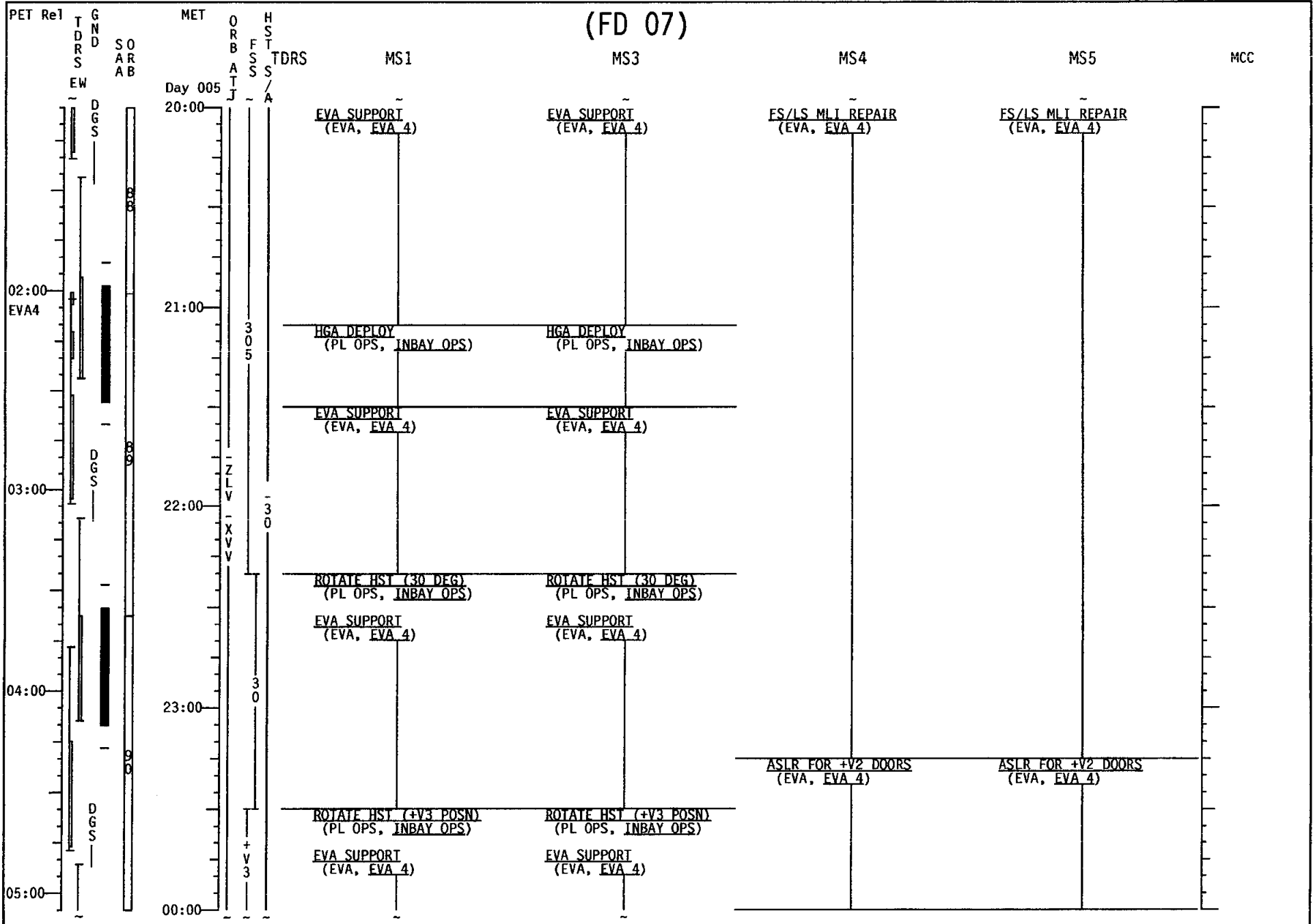
# (FD 07)



(FD 07)

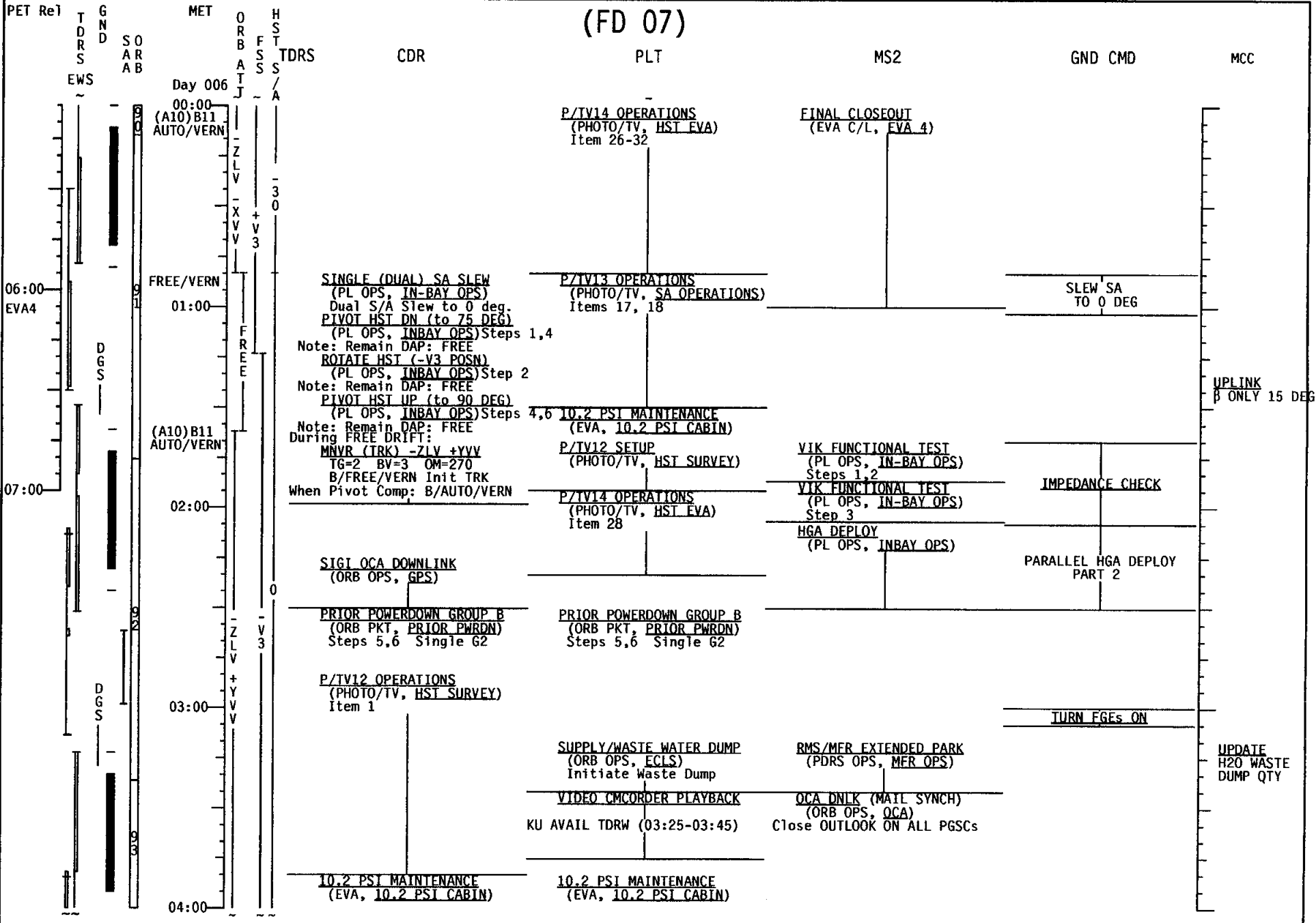


# (FD 07)

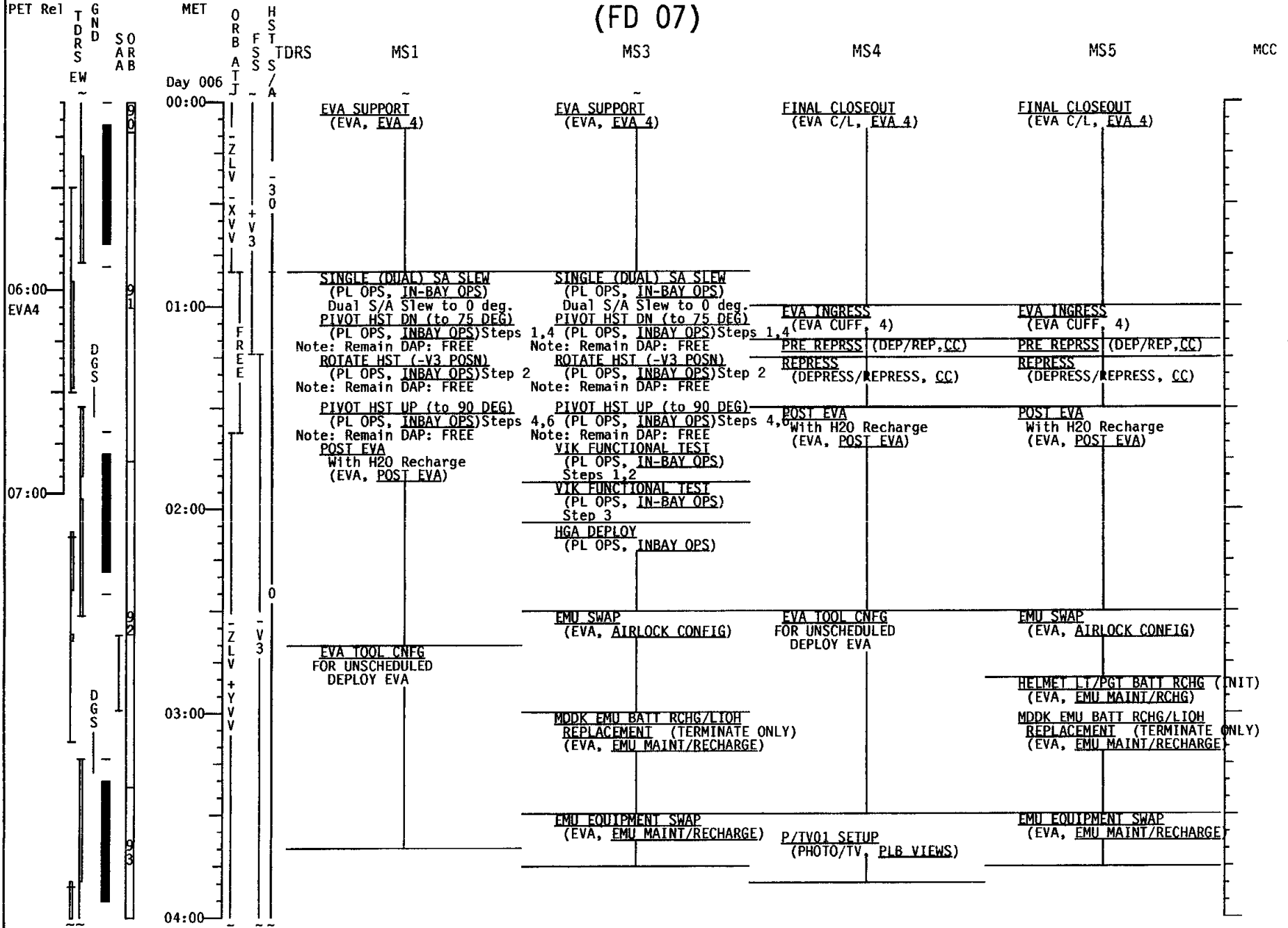




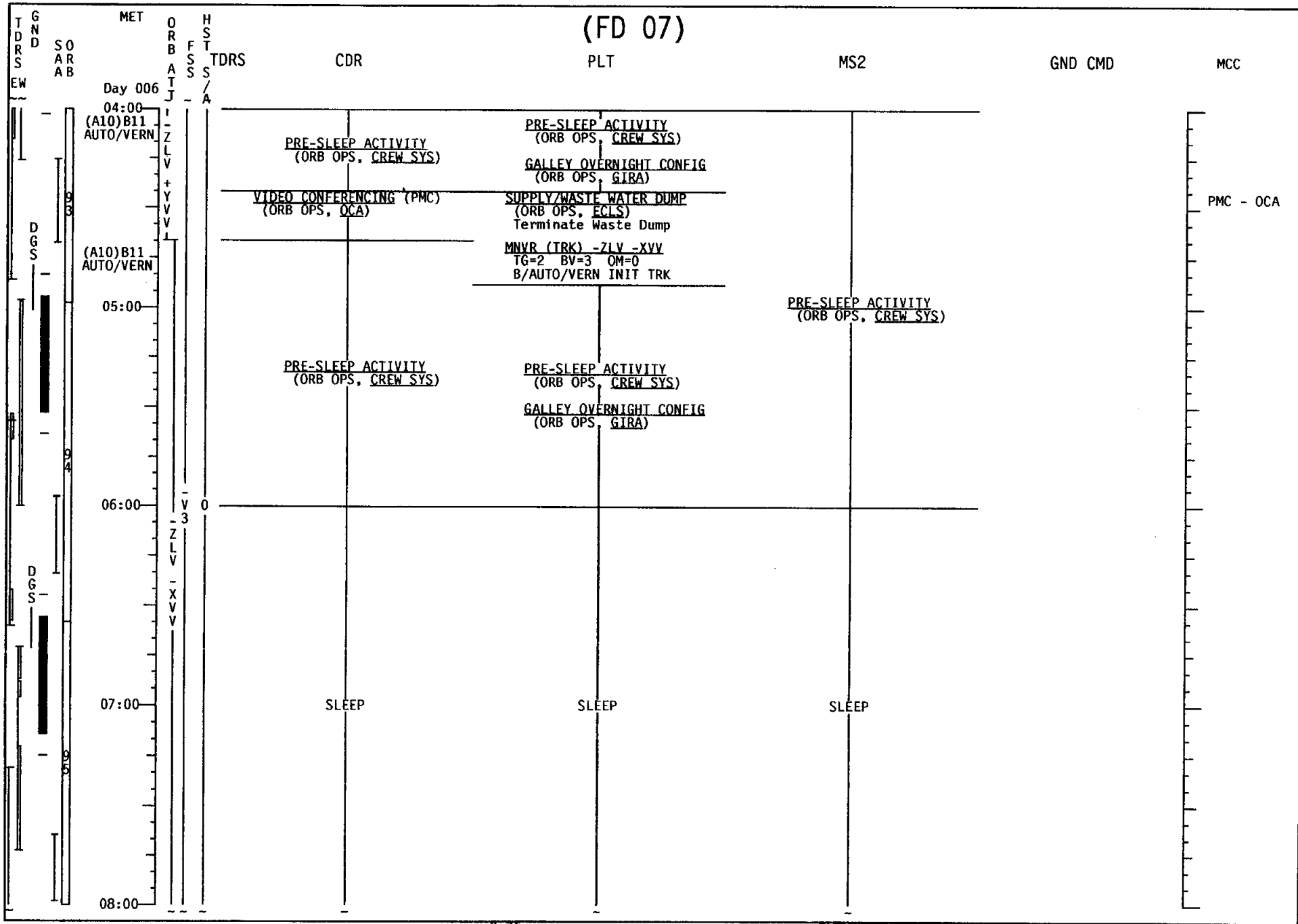
(FD 07)



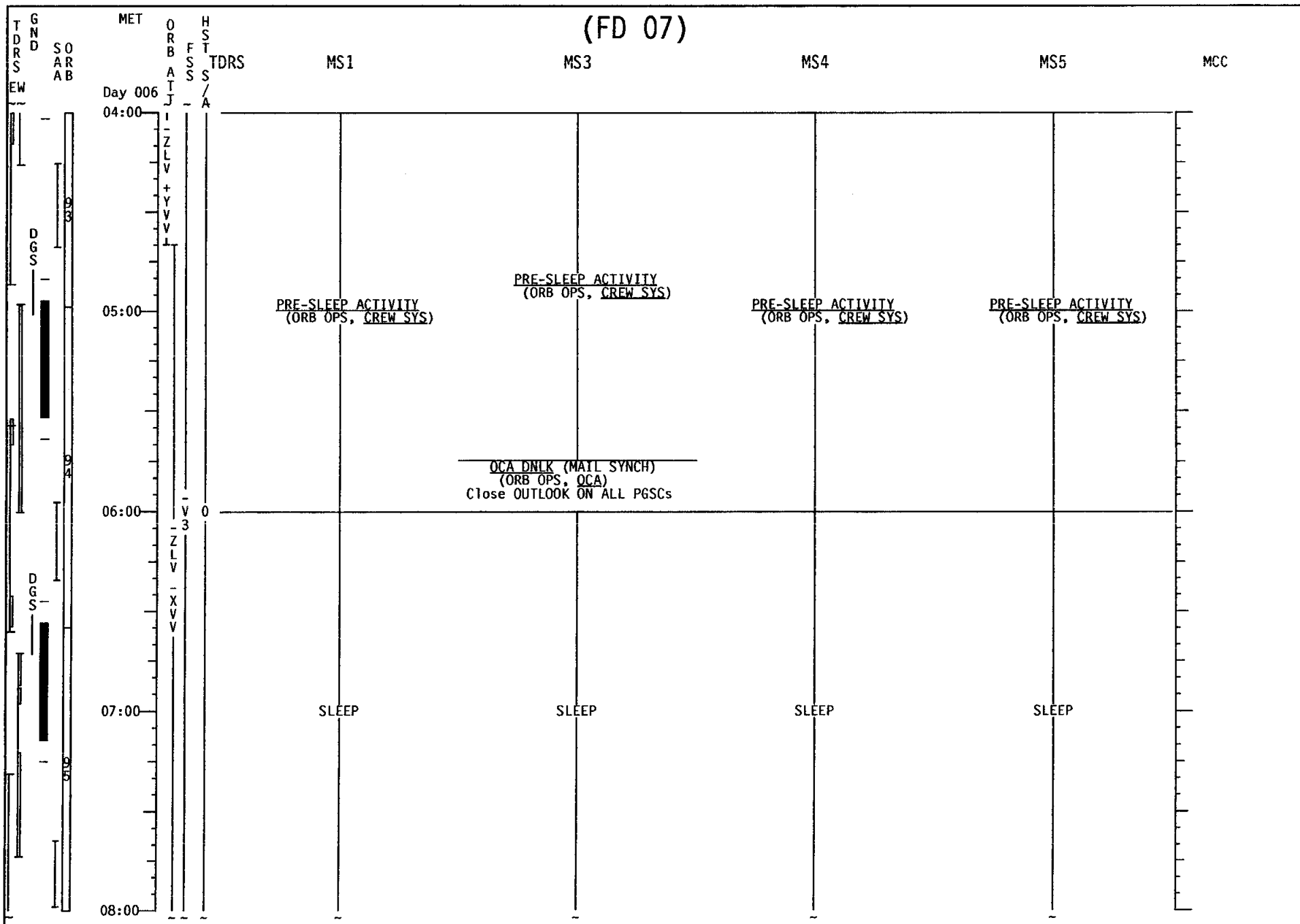
(FD 07)



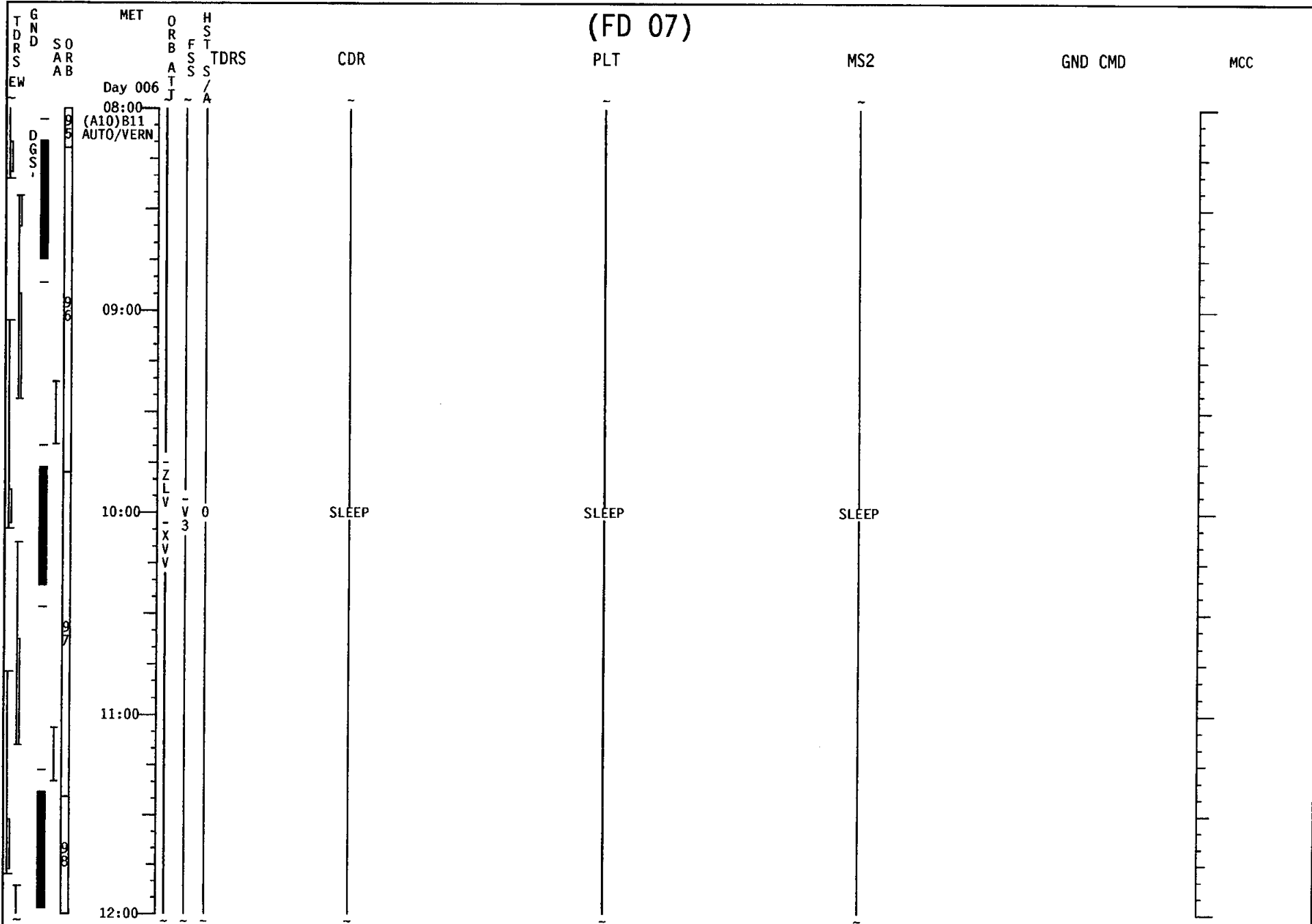
(FD 07)



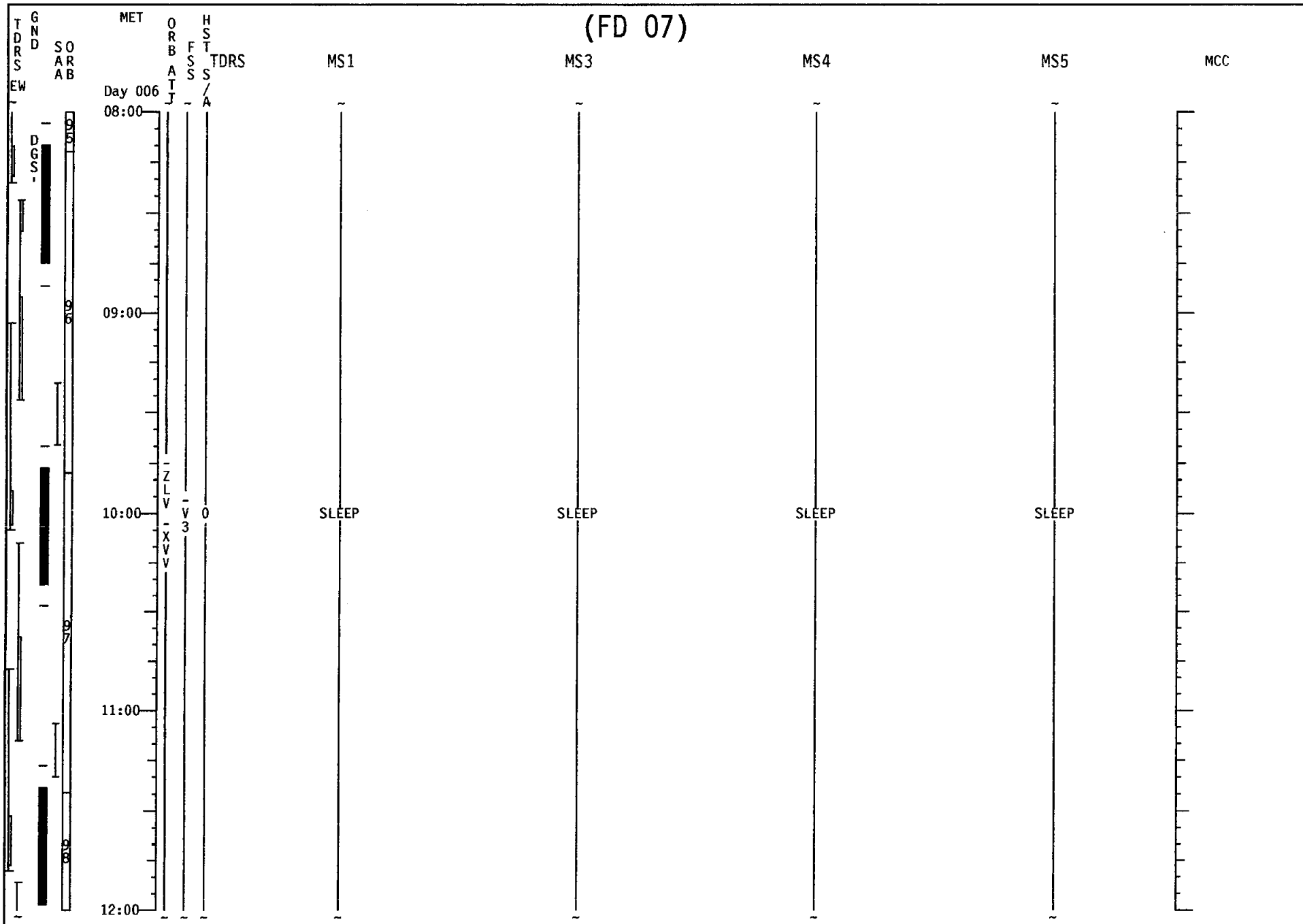
(FD 07)



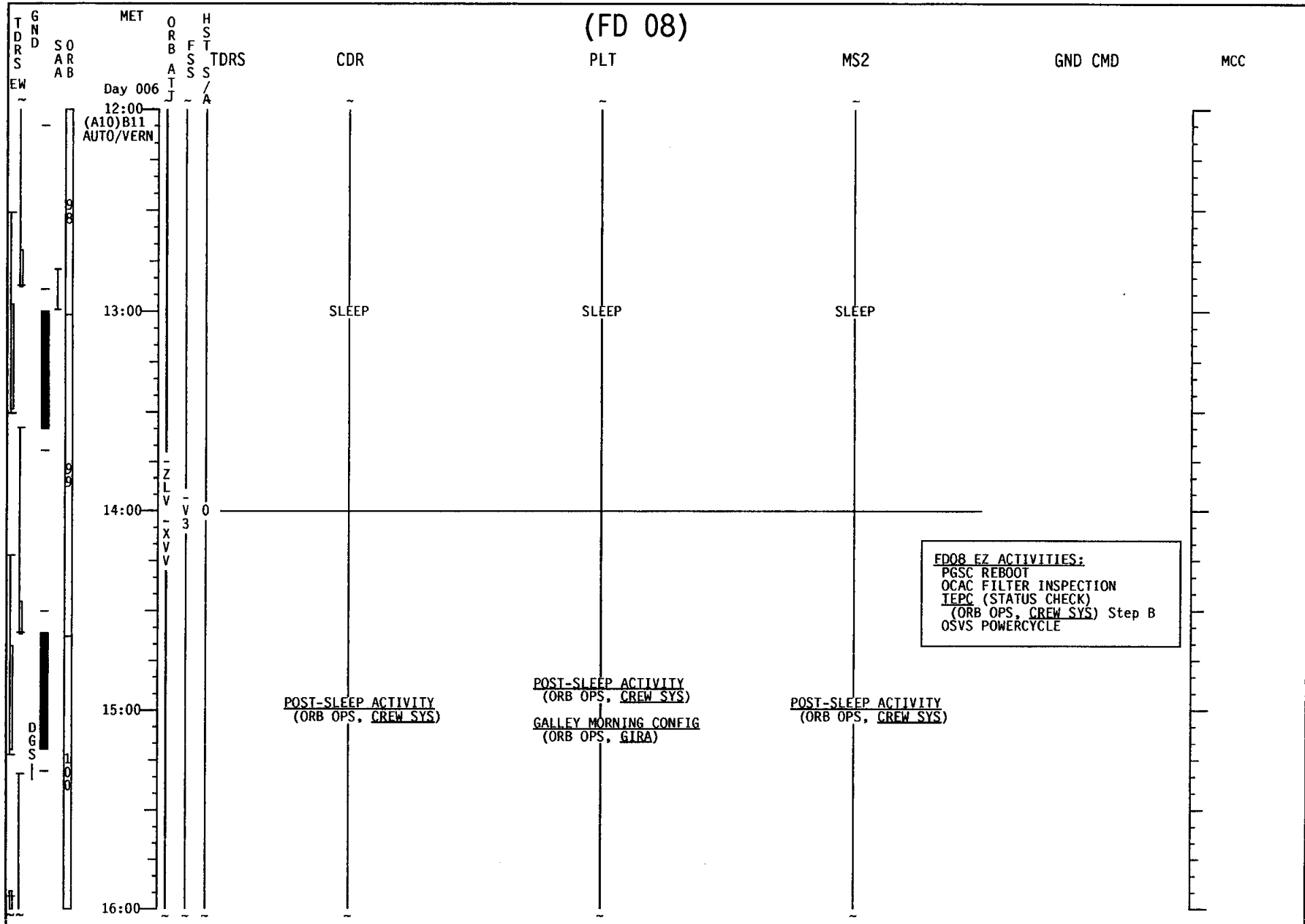
(FD 07)



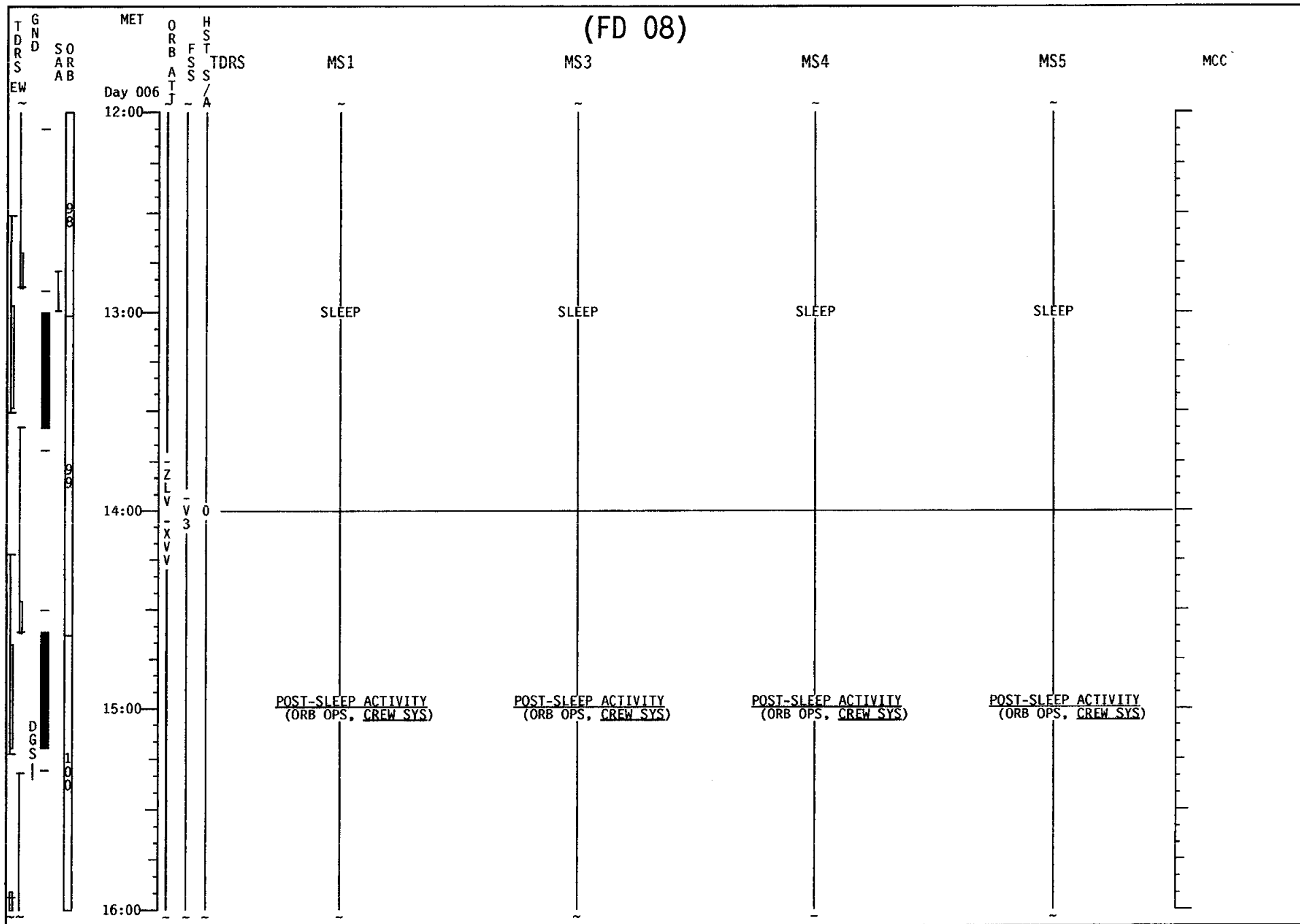
(FD 07)



(FD 08)

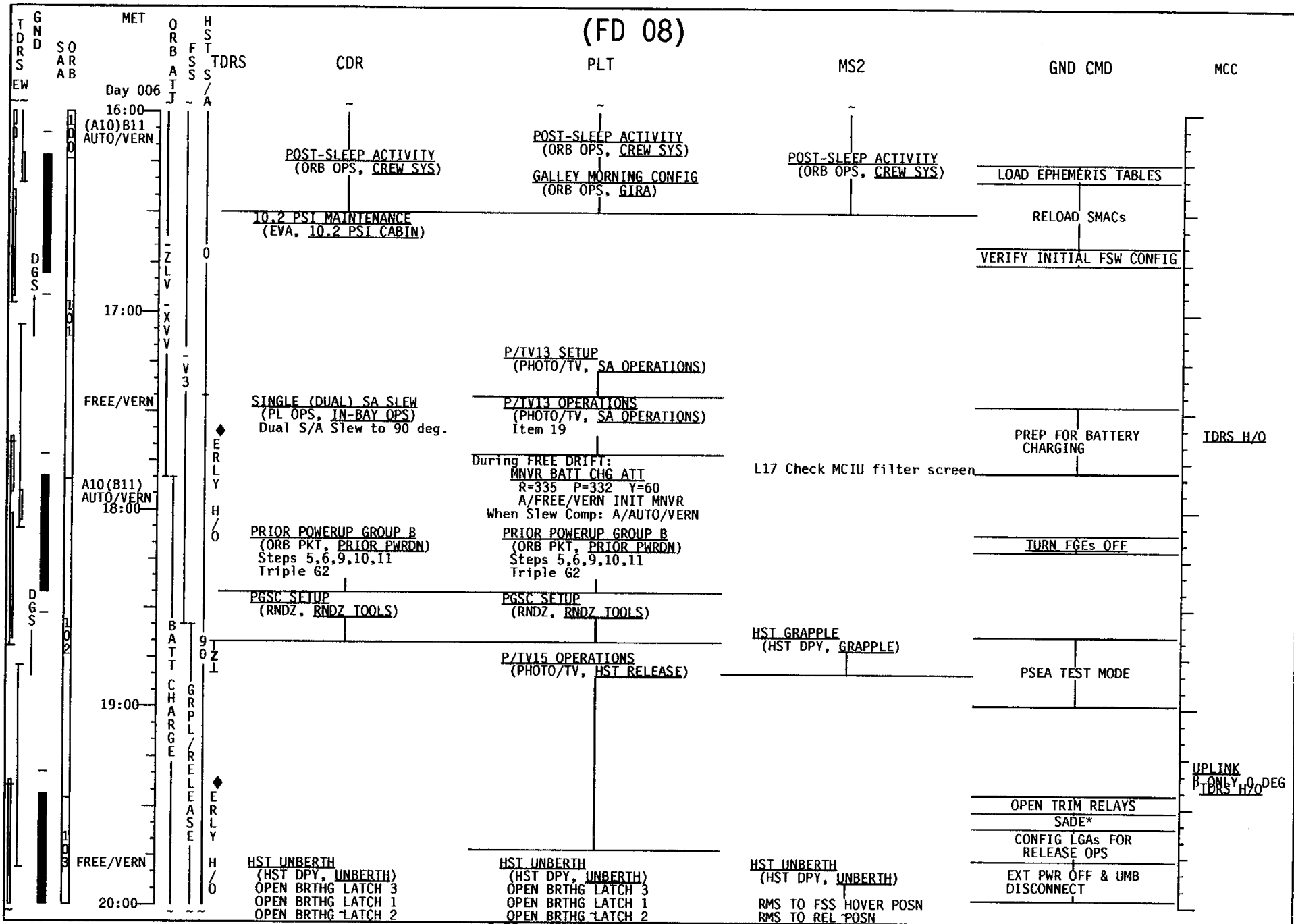


(FD 08)

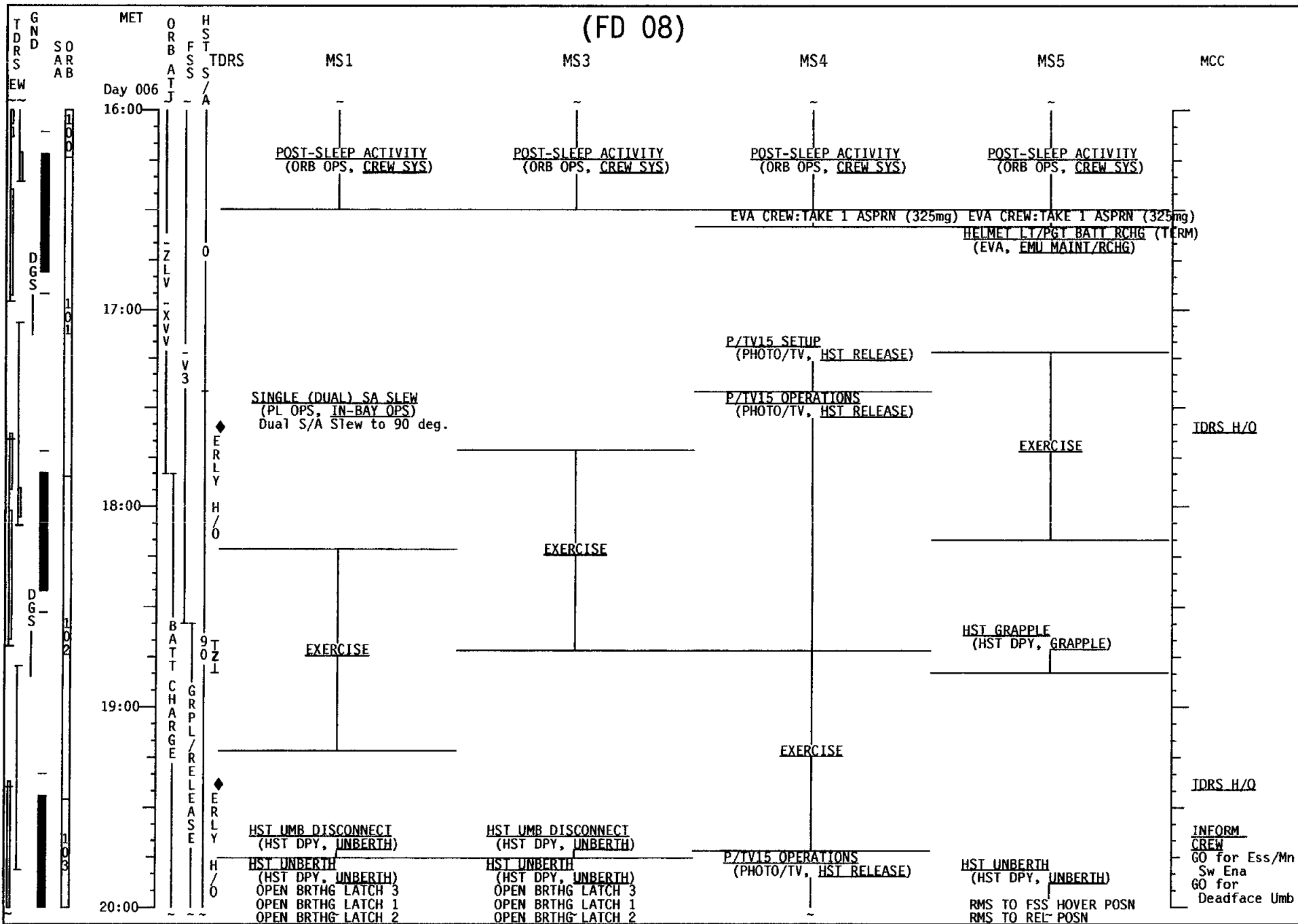




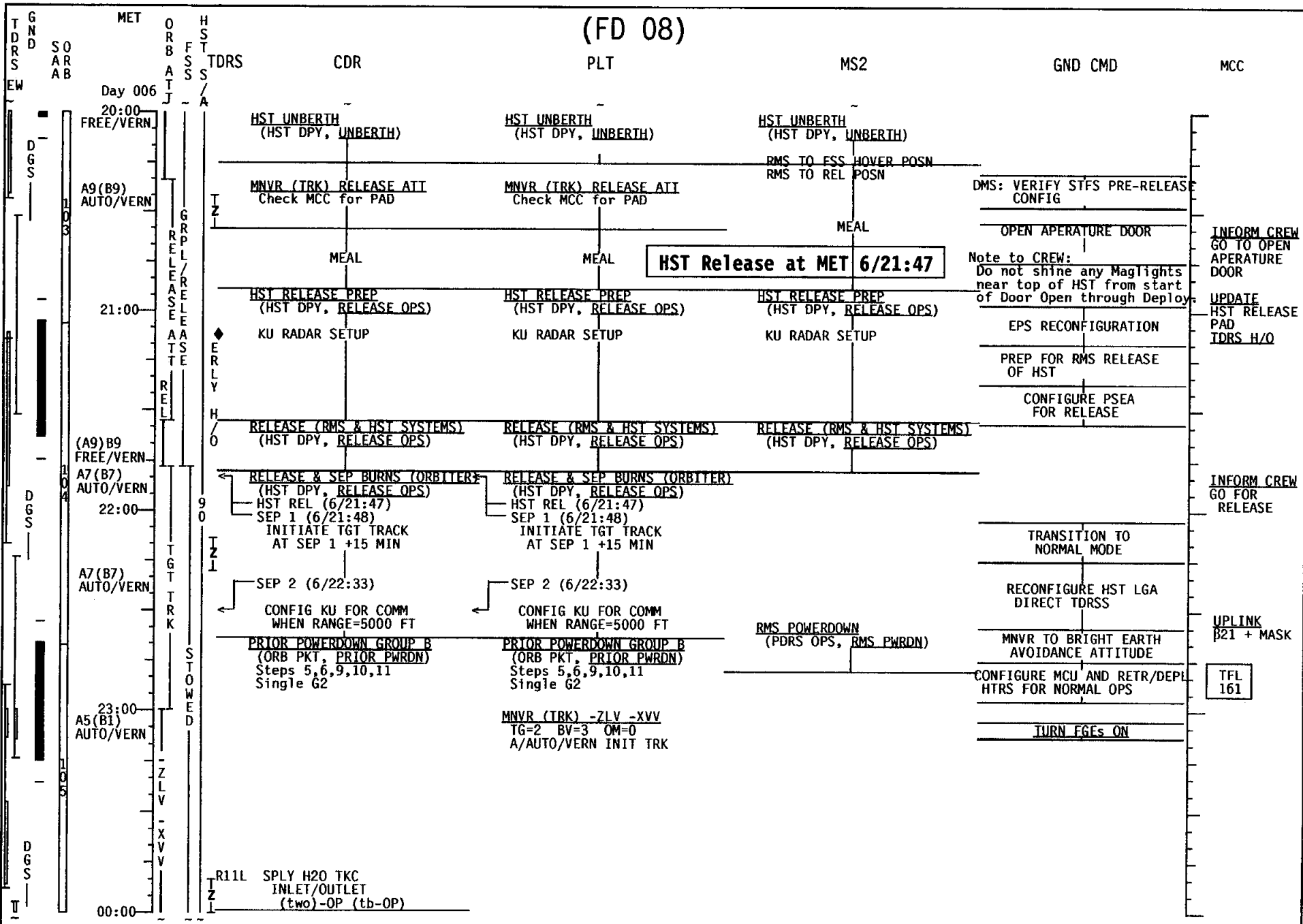
(FD 08)



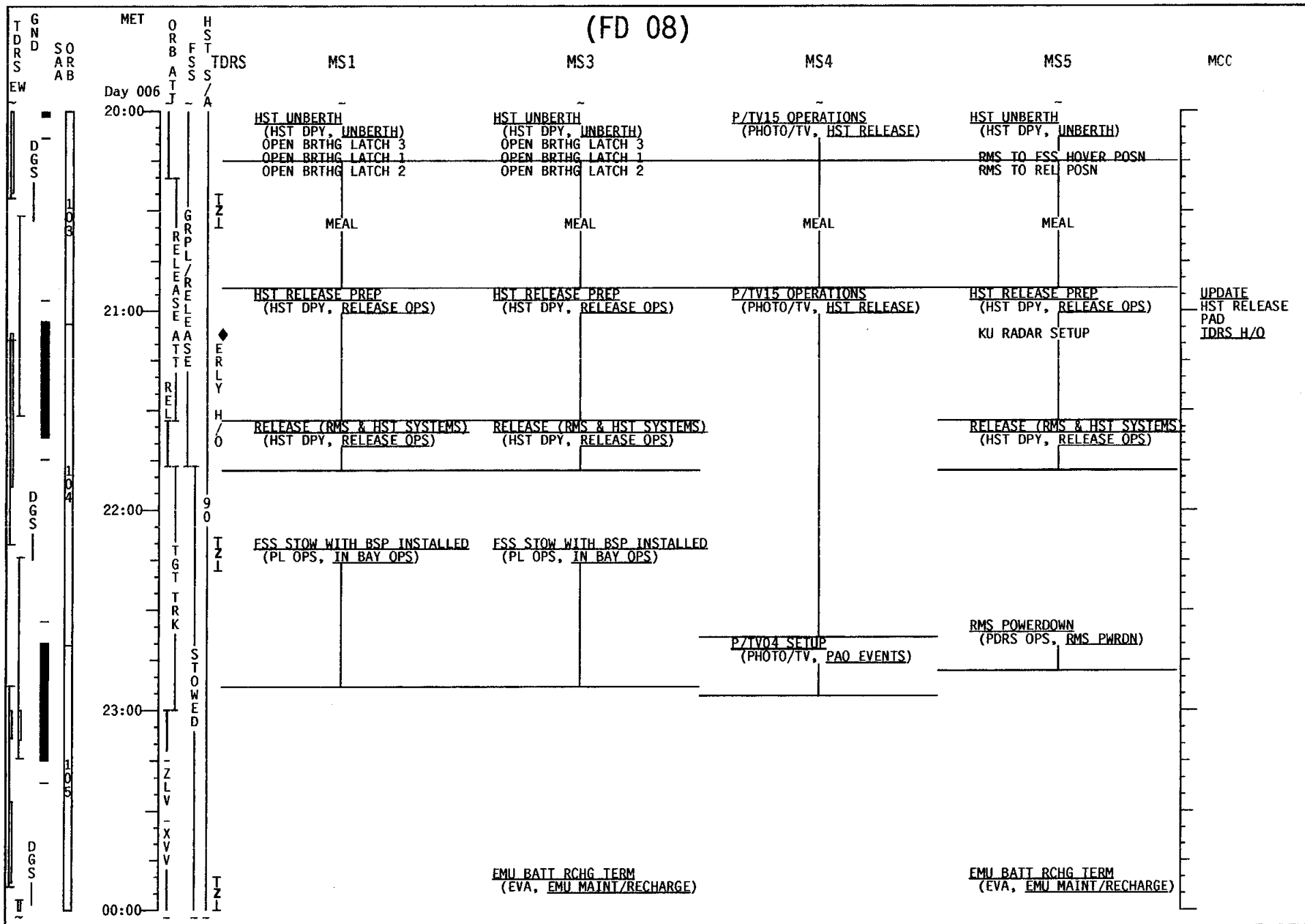
# (FD 08)



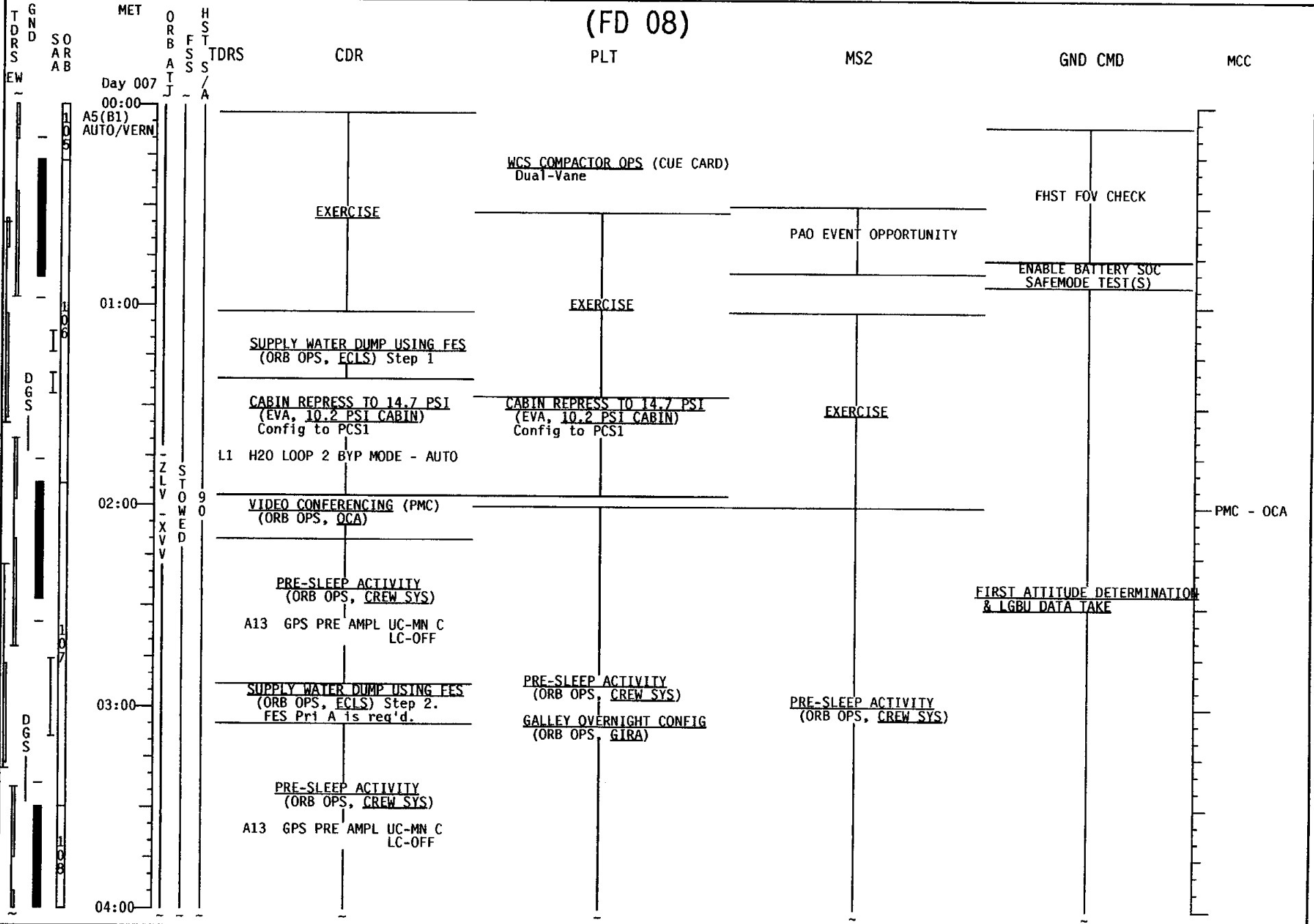
(FD 08)



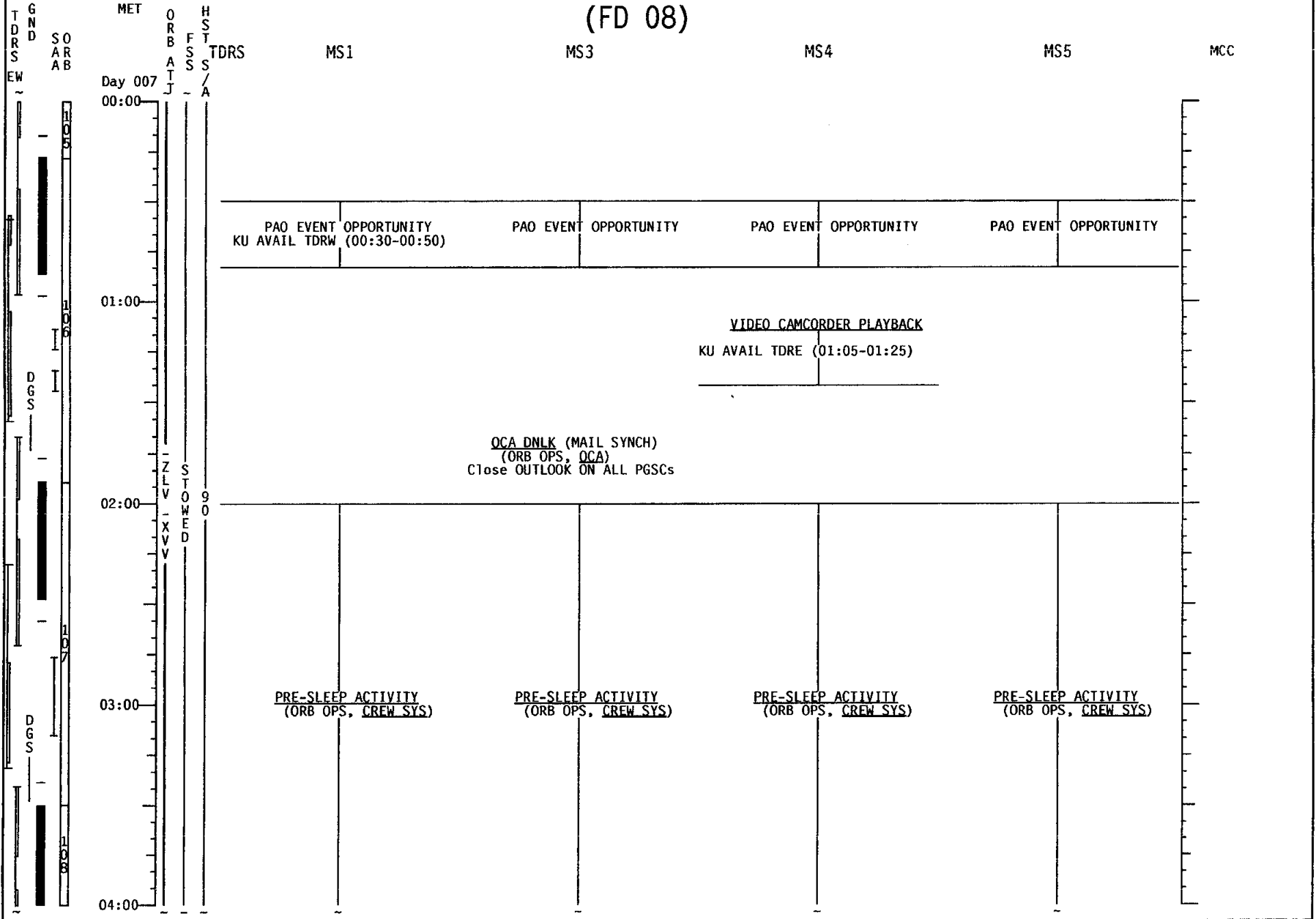
# (FD 08)



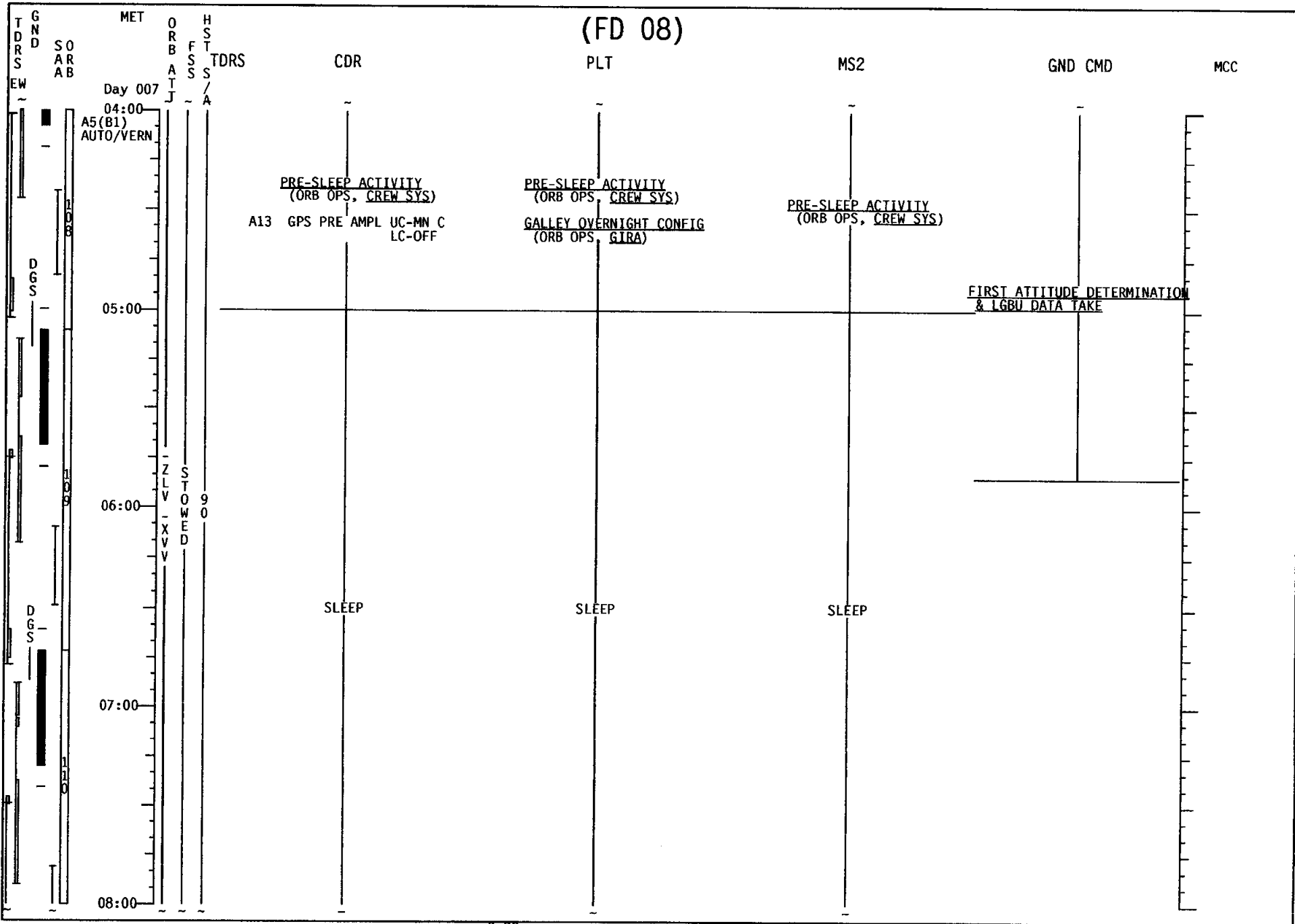
(FD 08)



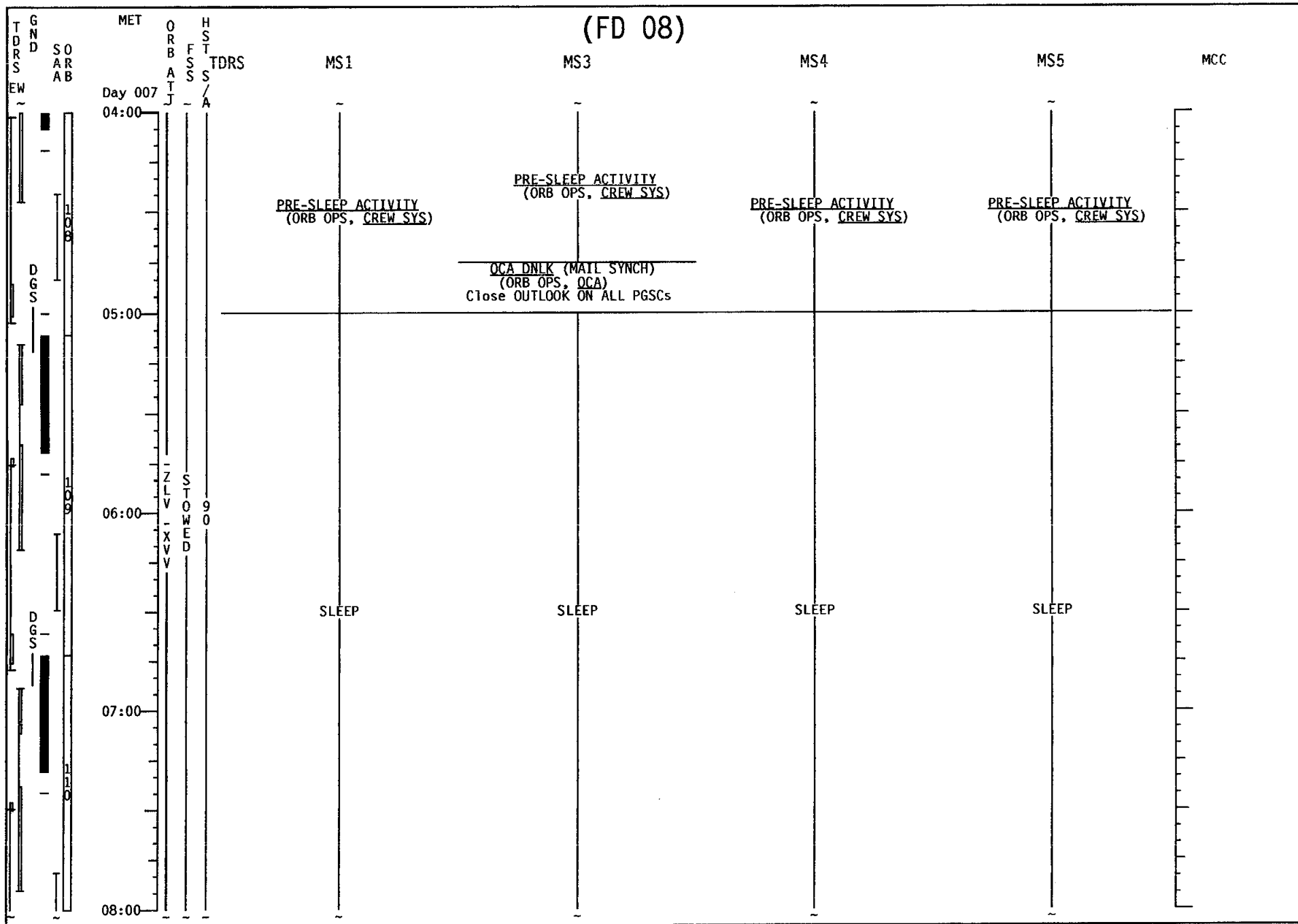
(FD 08)



(FD 08)

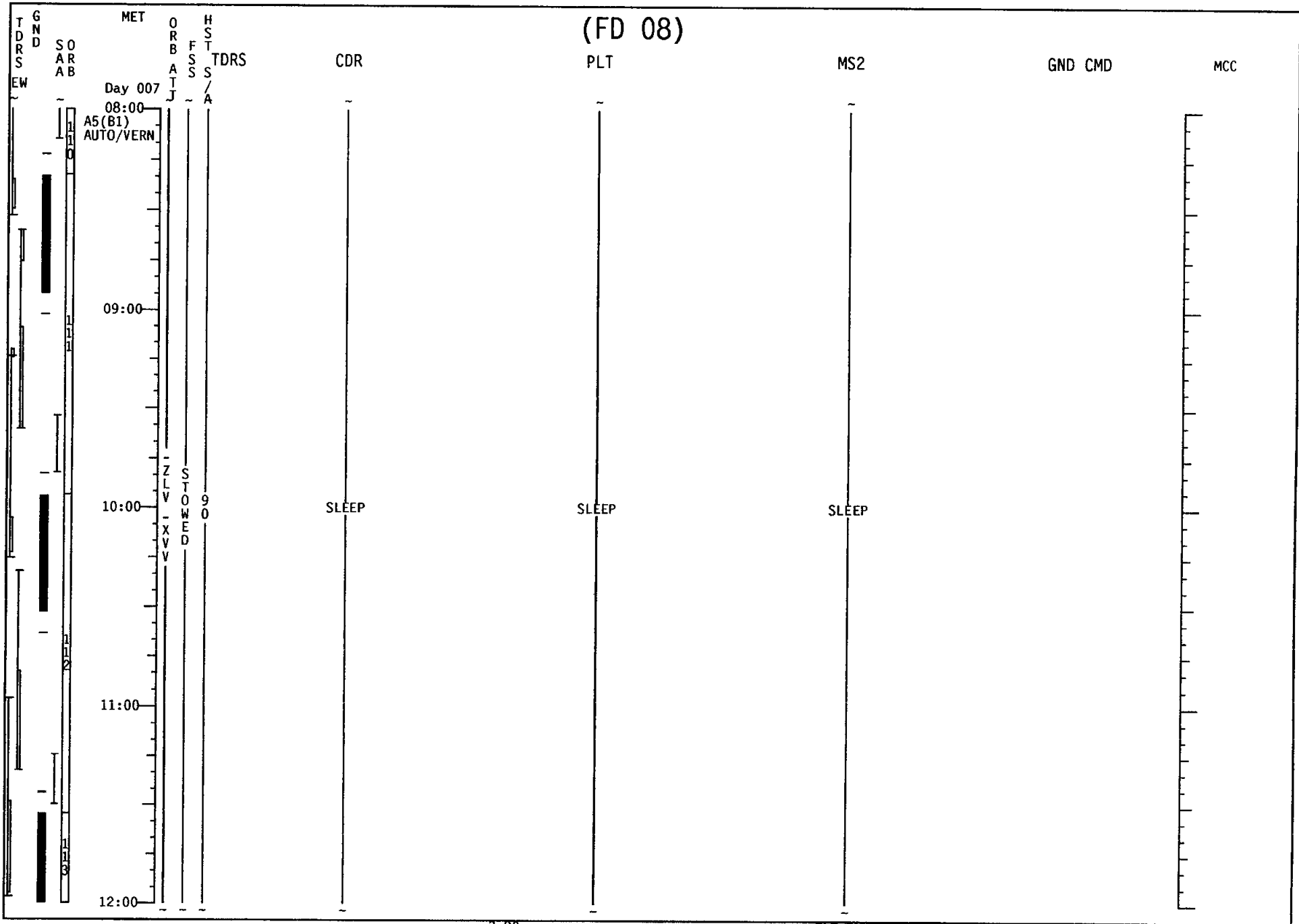


(FD 08)

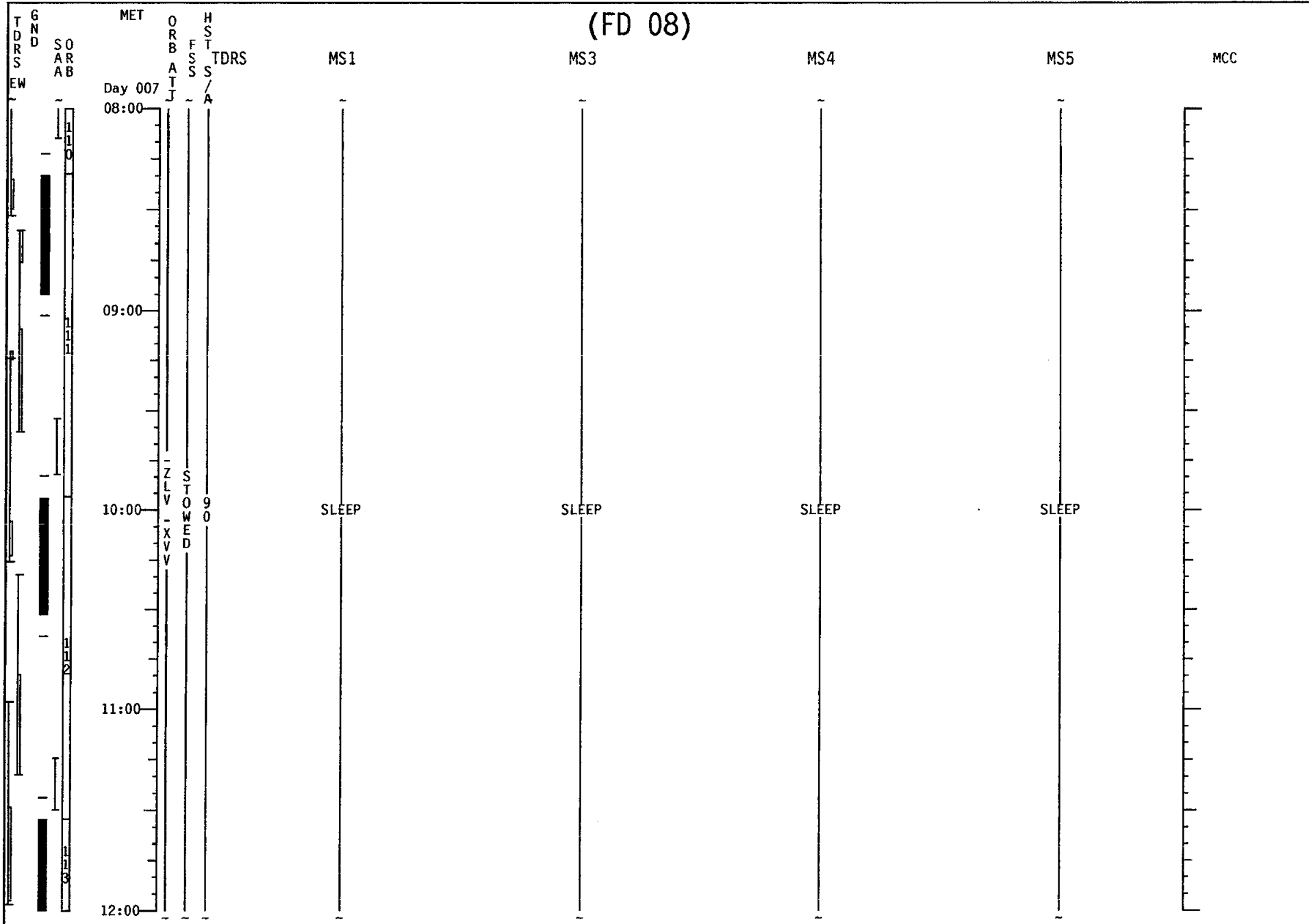




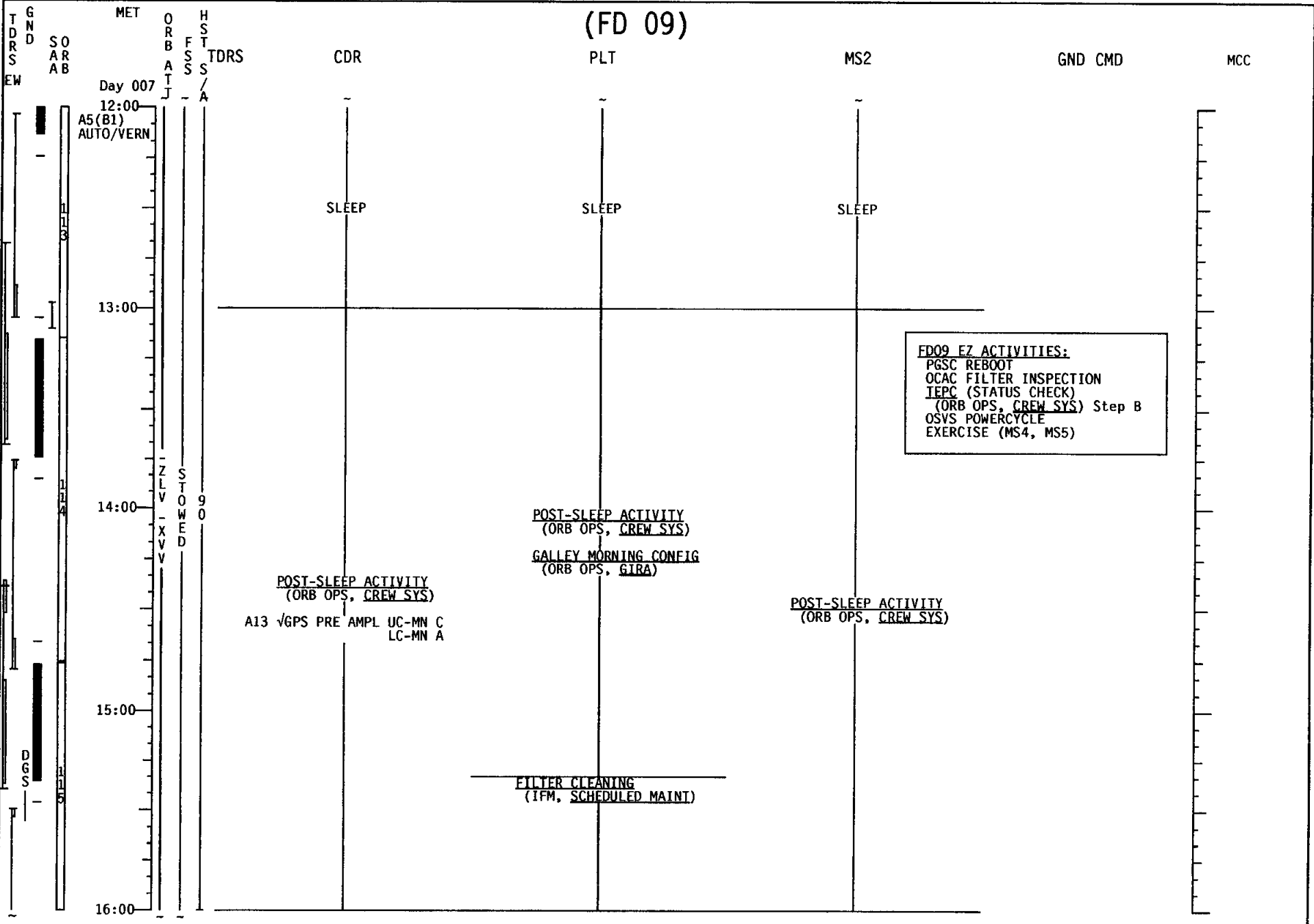
(FD 08)



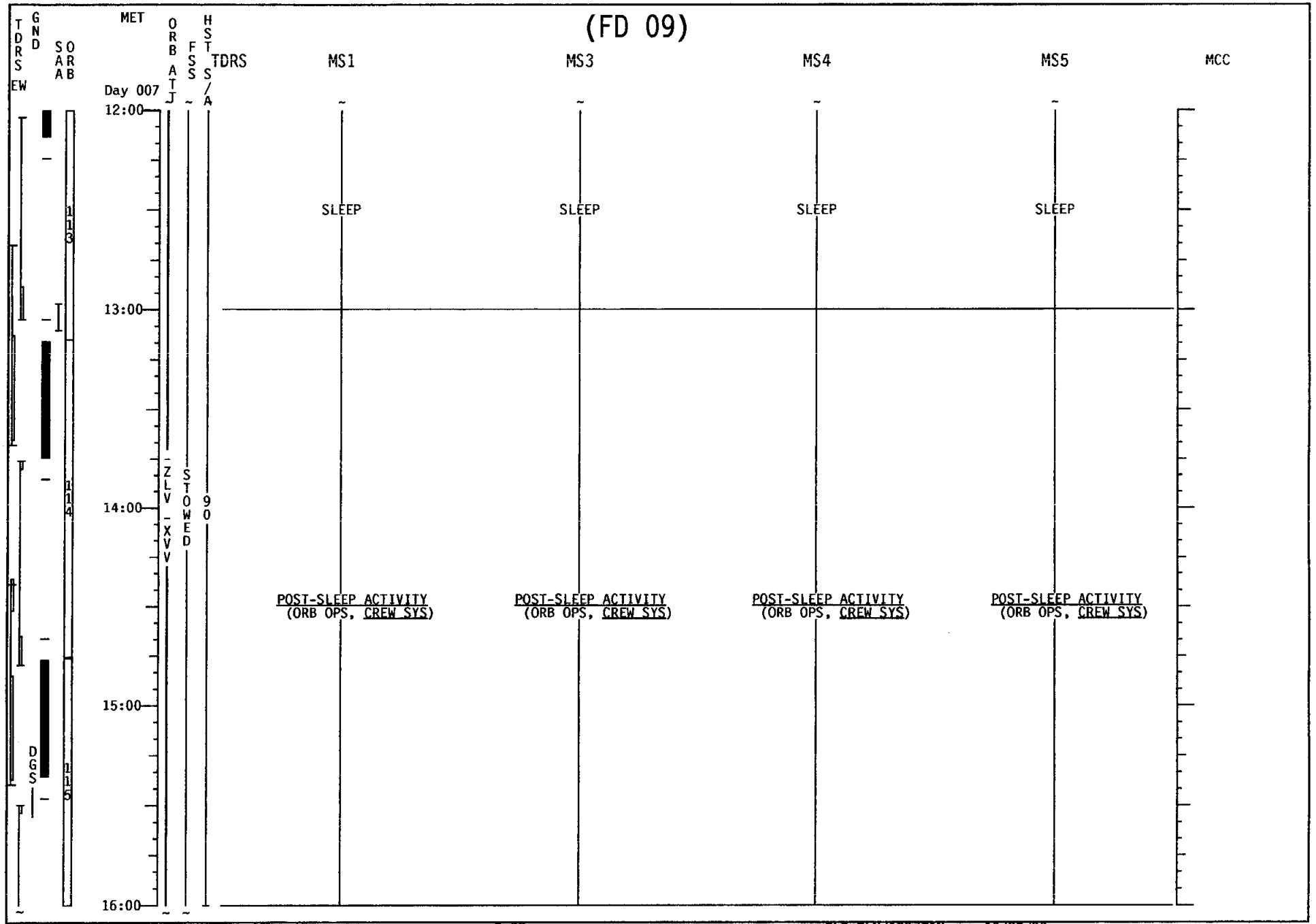
(FD 08)



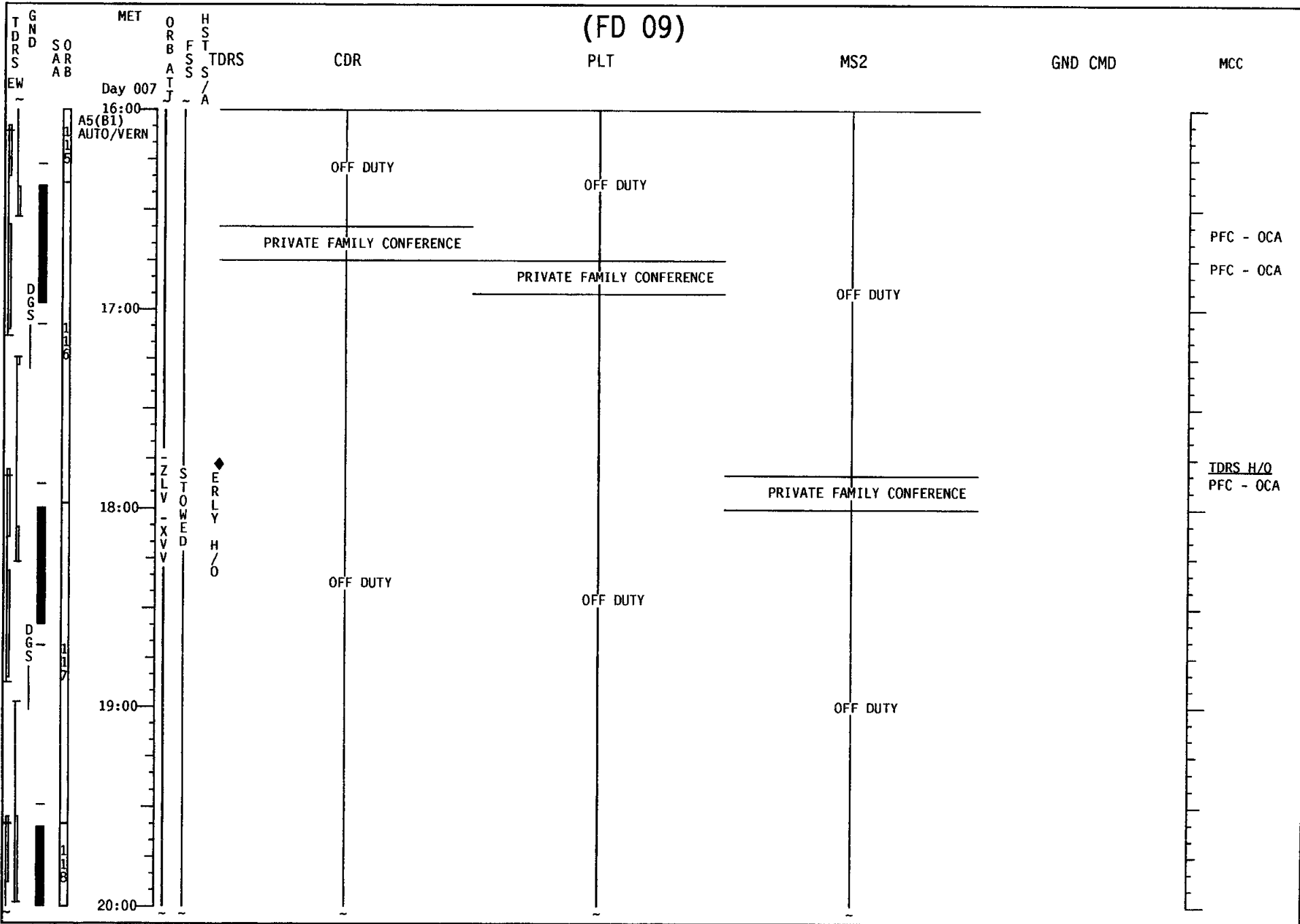
# (FD 09)



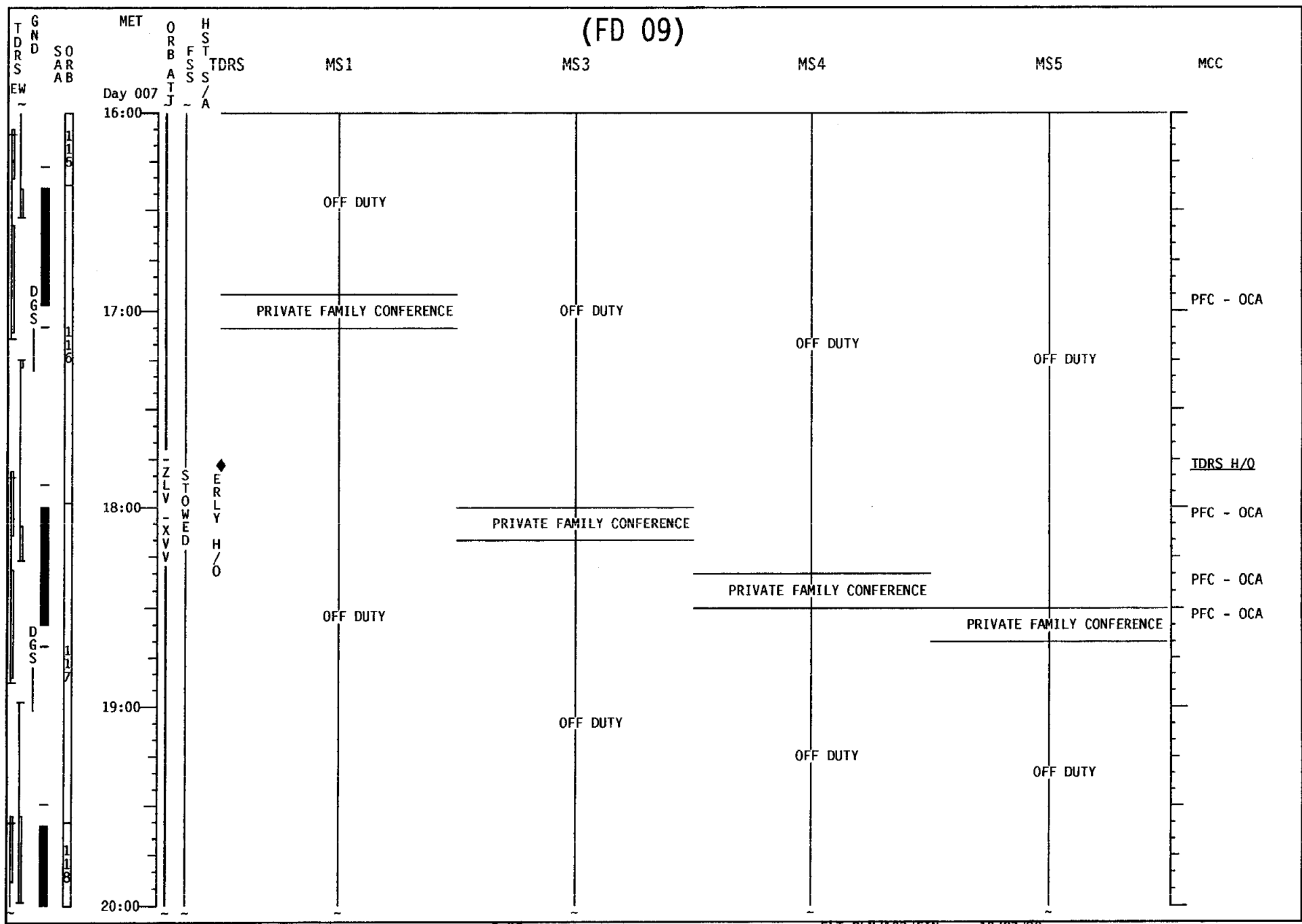
# (FD 09)



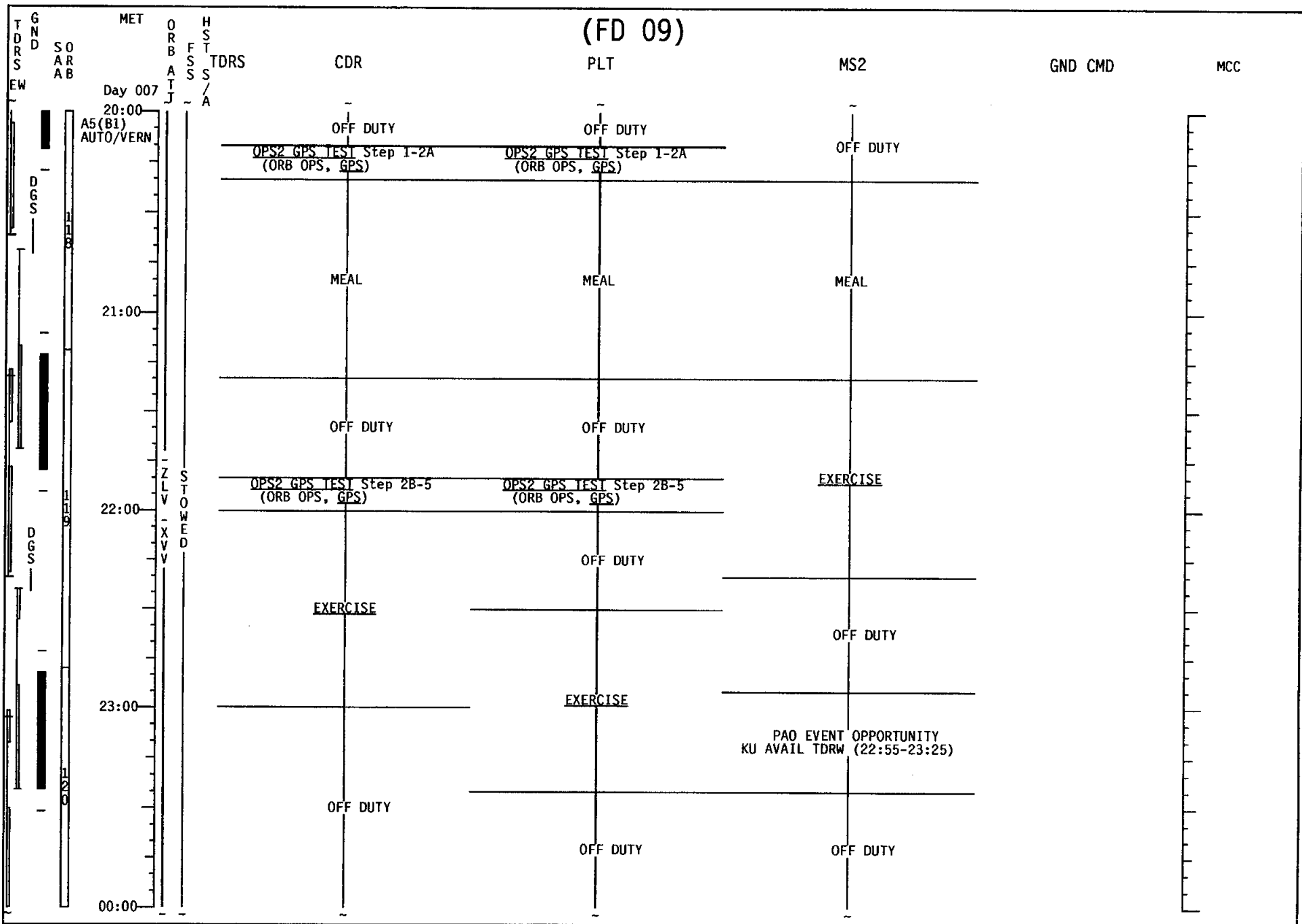
(FD 09)



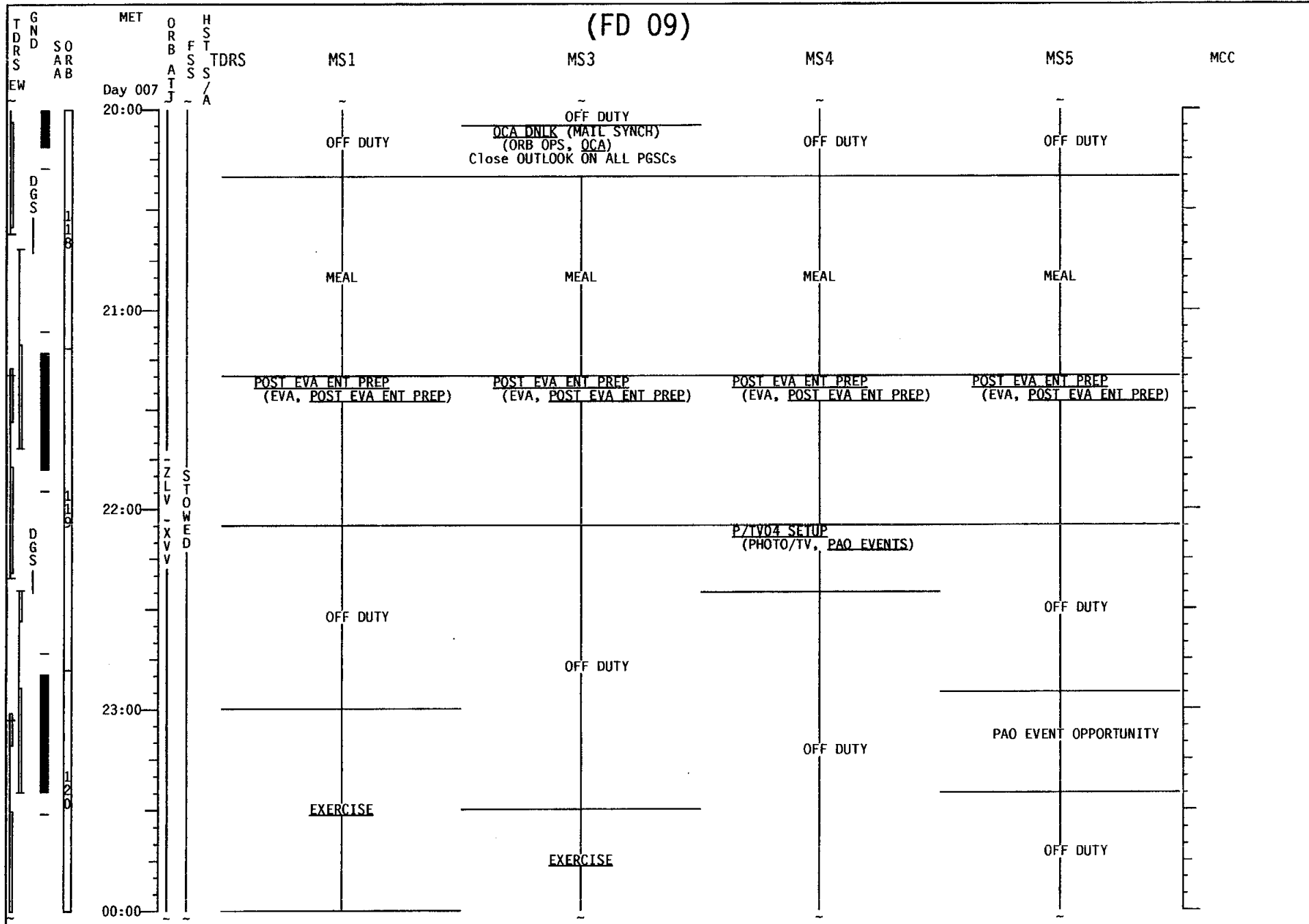
(FD 09)



# (FD 09)

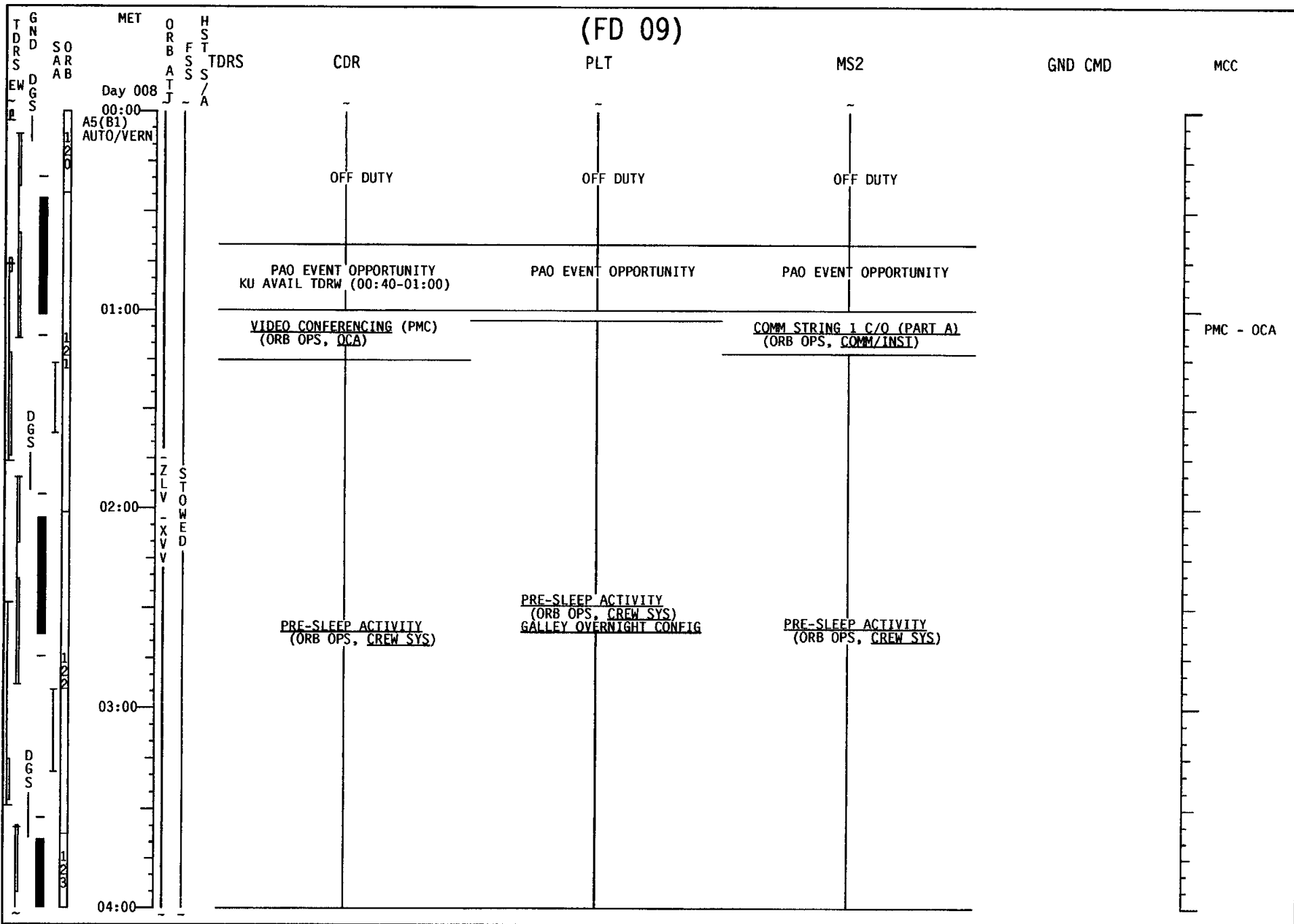


(FD 09)

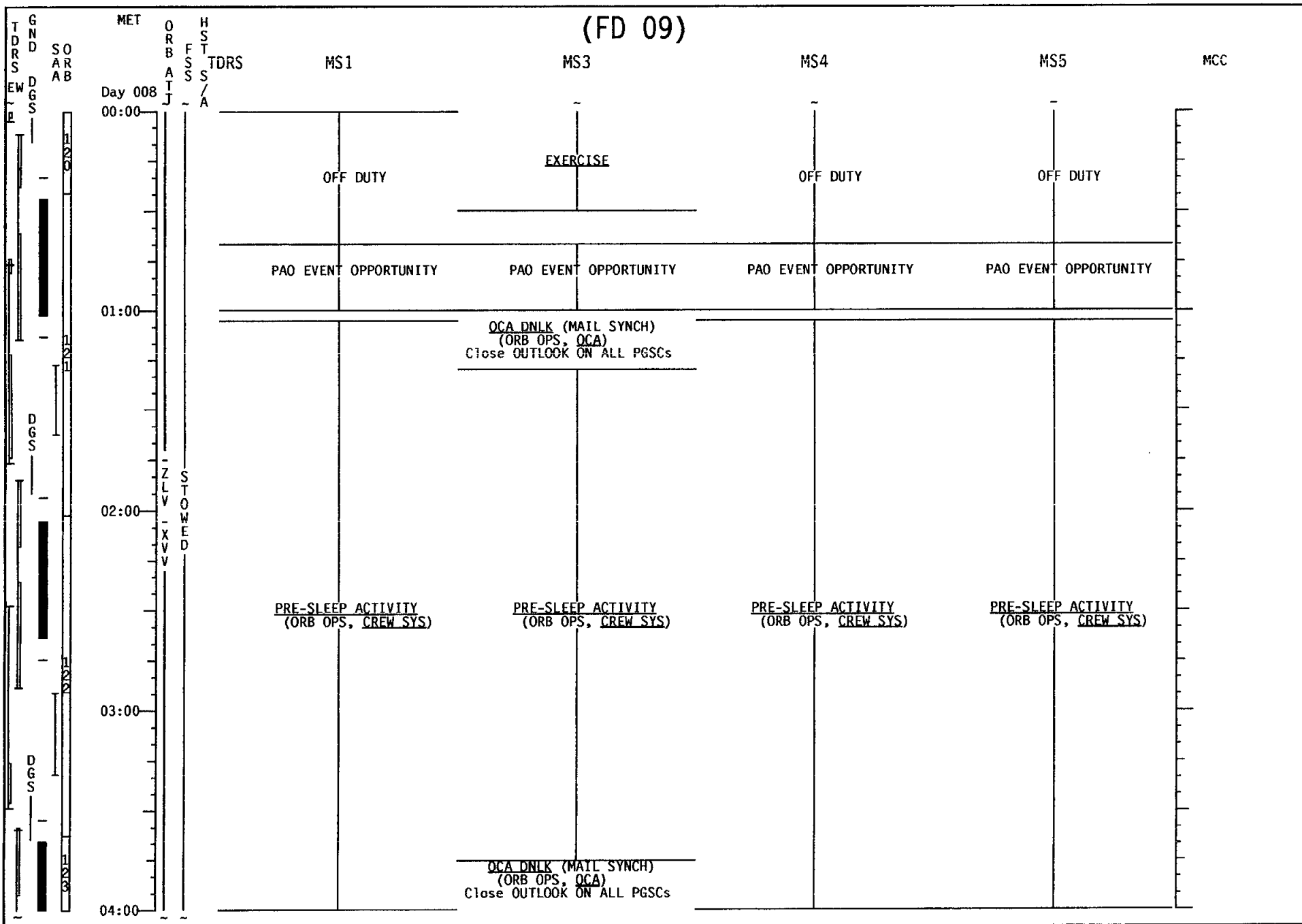




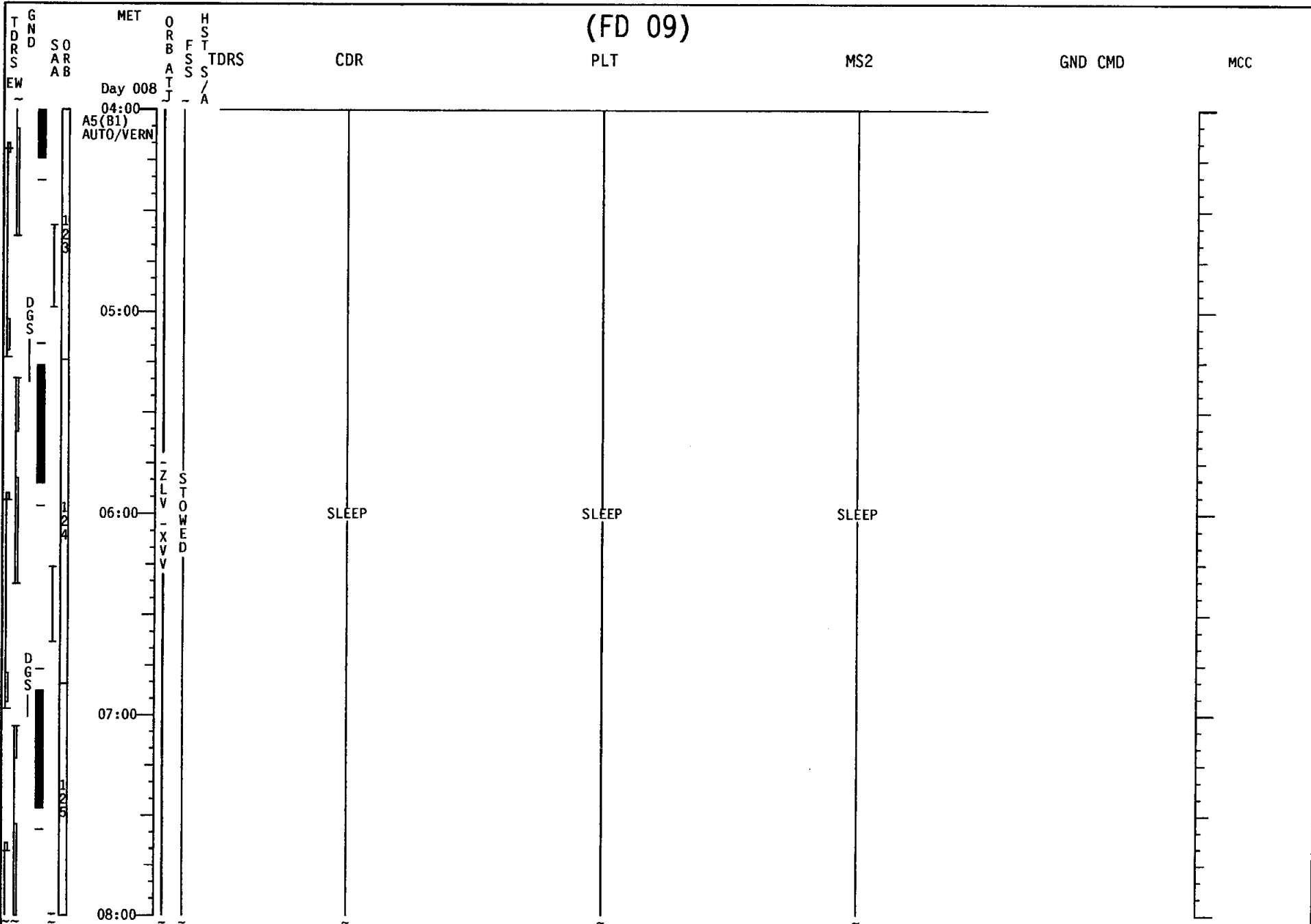
# (FD 09)



# (FD 09)



(FD 09)



Day 008  
04:00  
A5(B1)  
AUTO/VERN

05:00

06:00

07:00

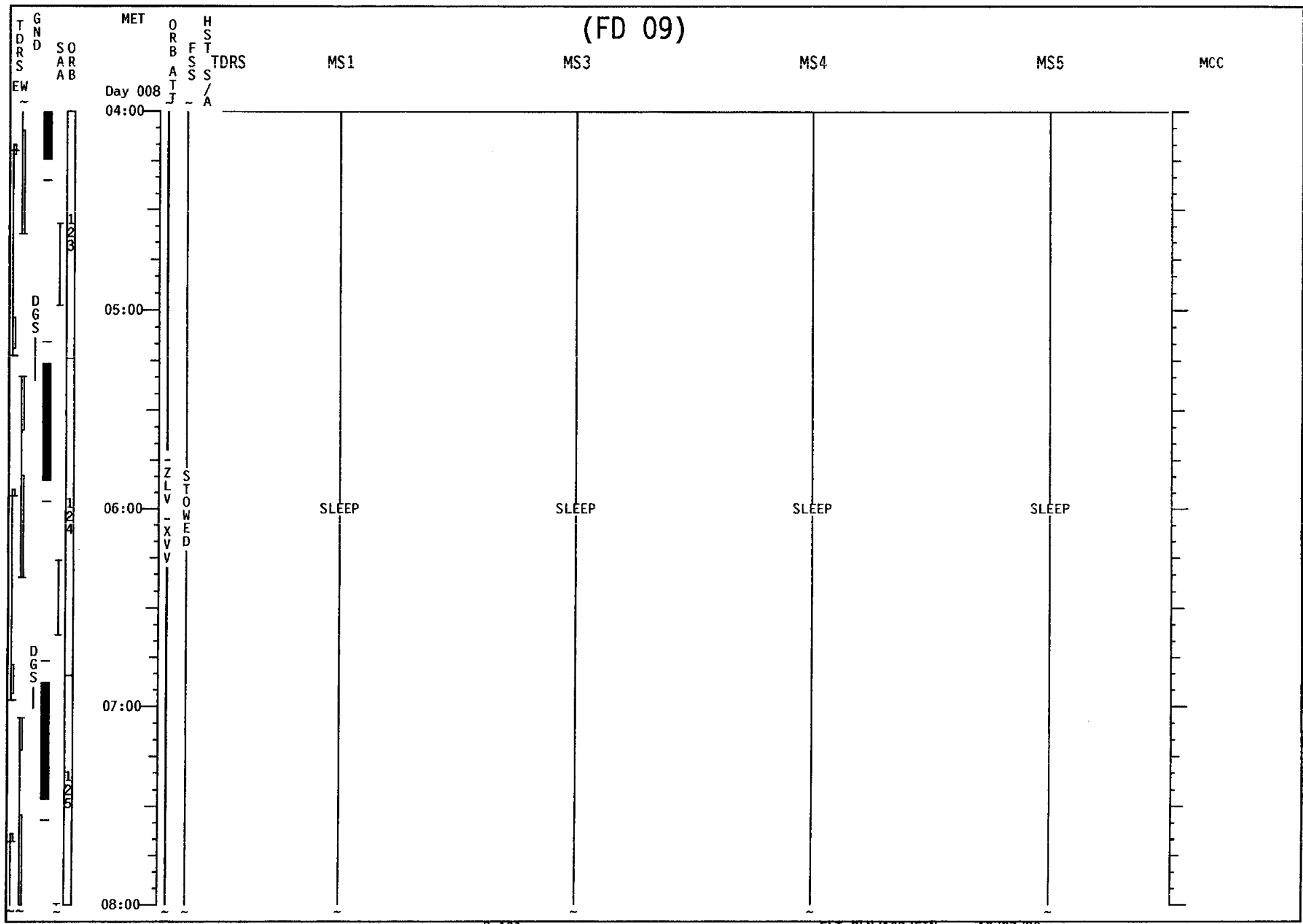
08:00

SLEEP

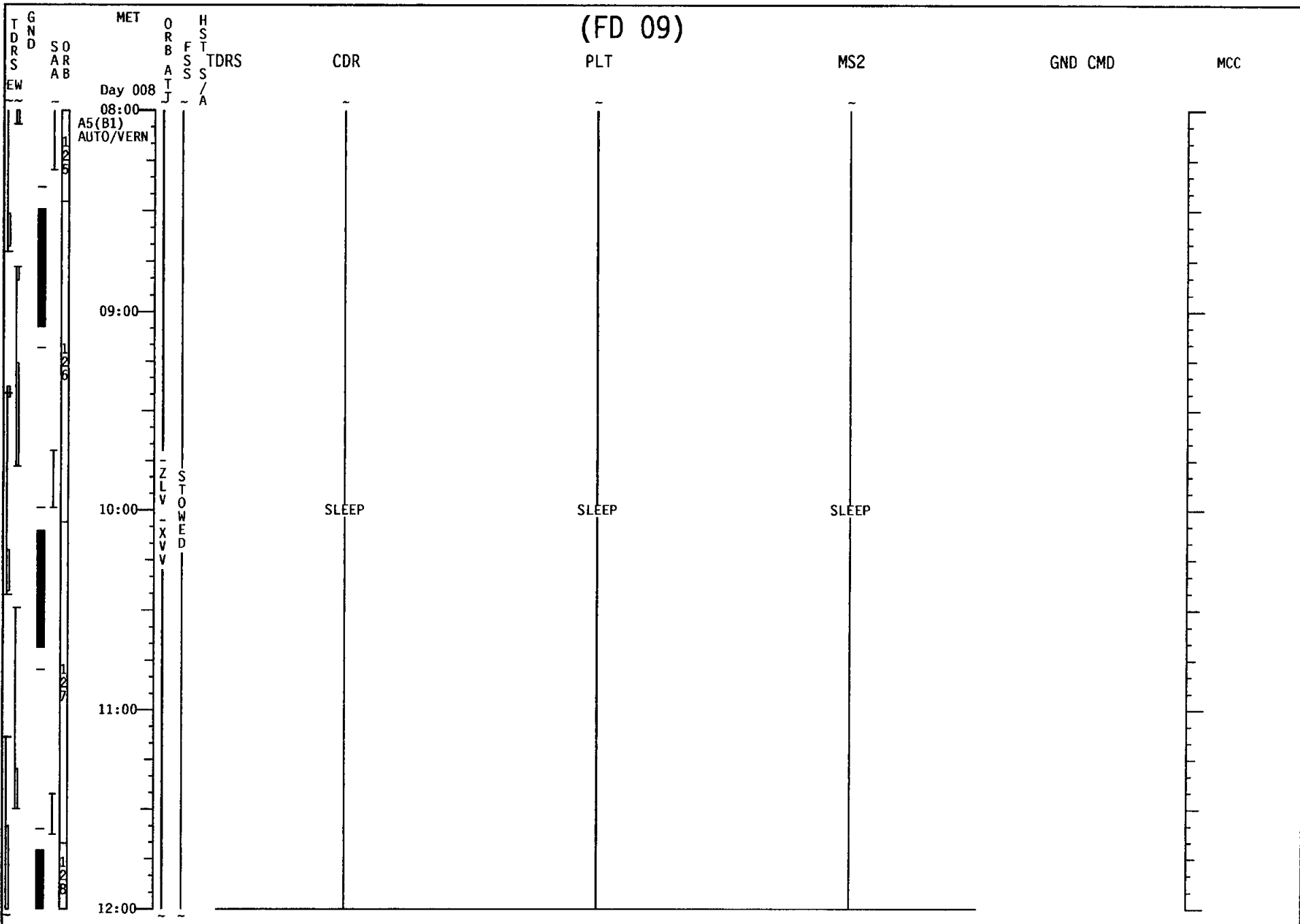
SLEEP

SLEEP

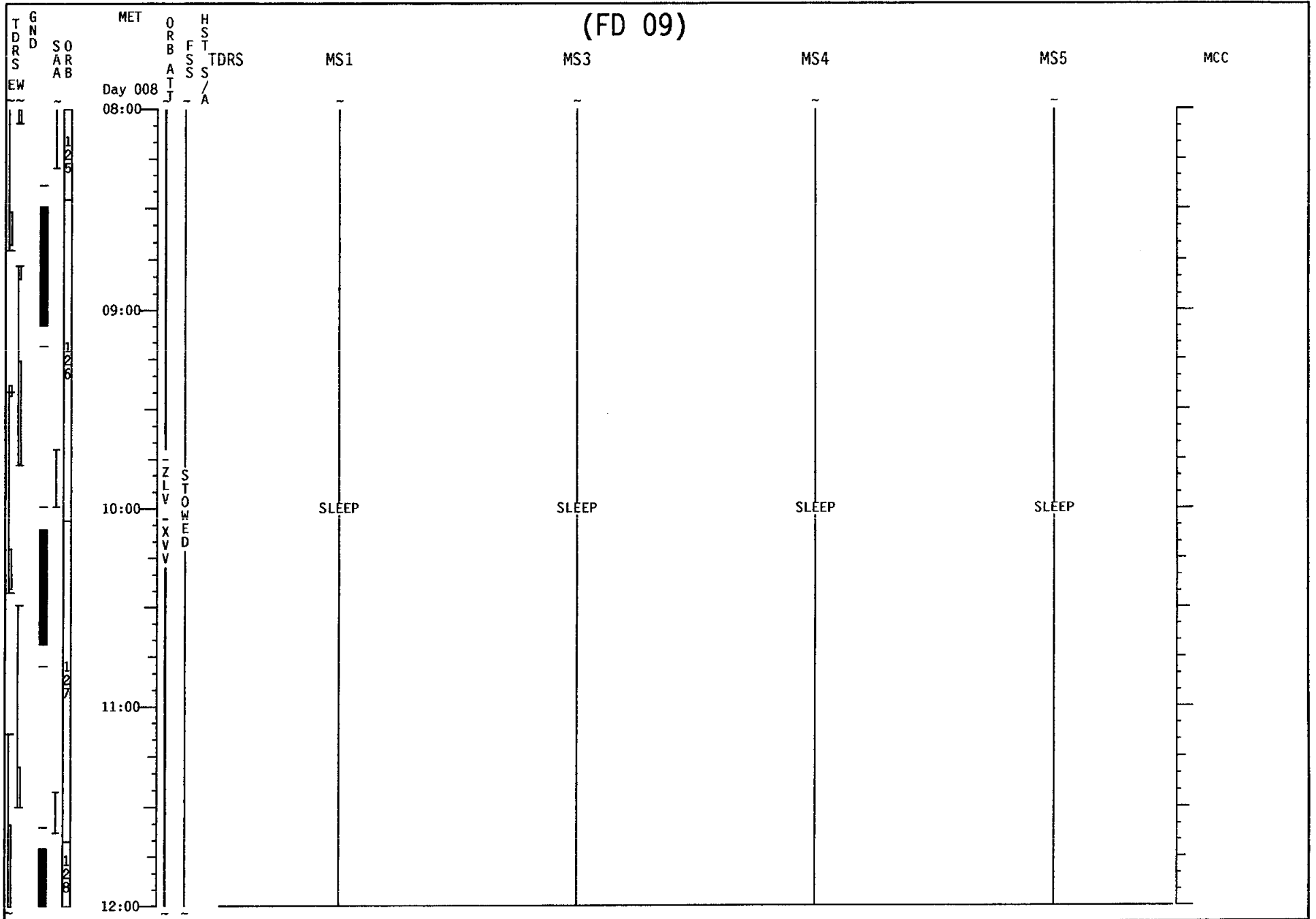
(FD 09)



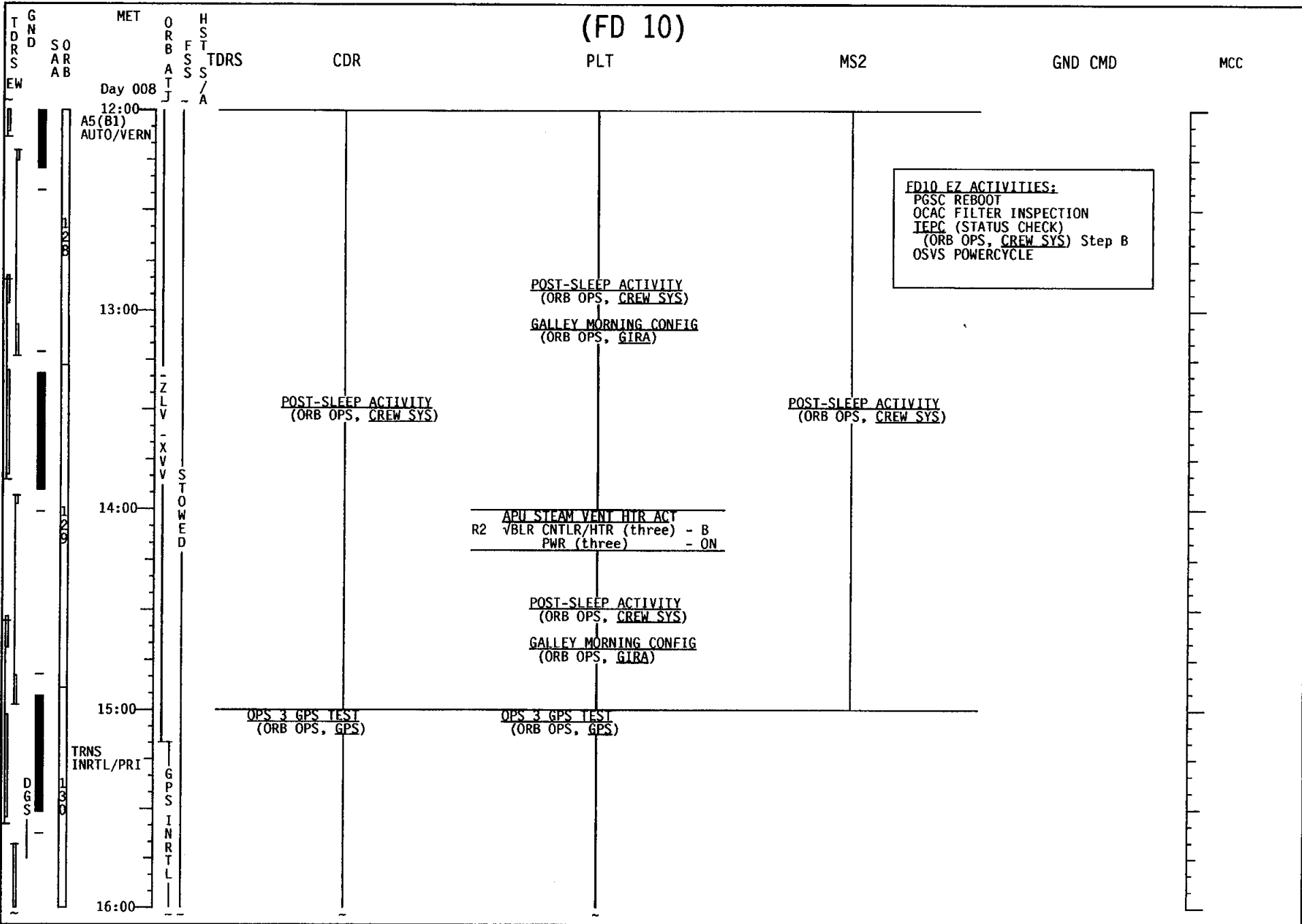
(FD 09)



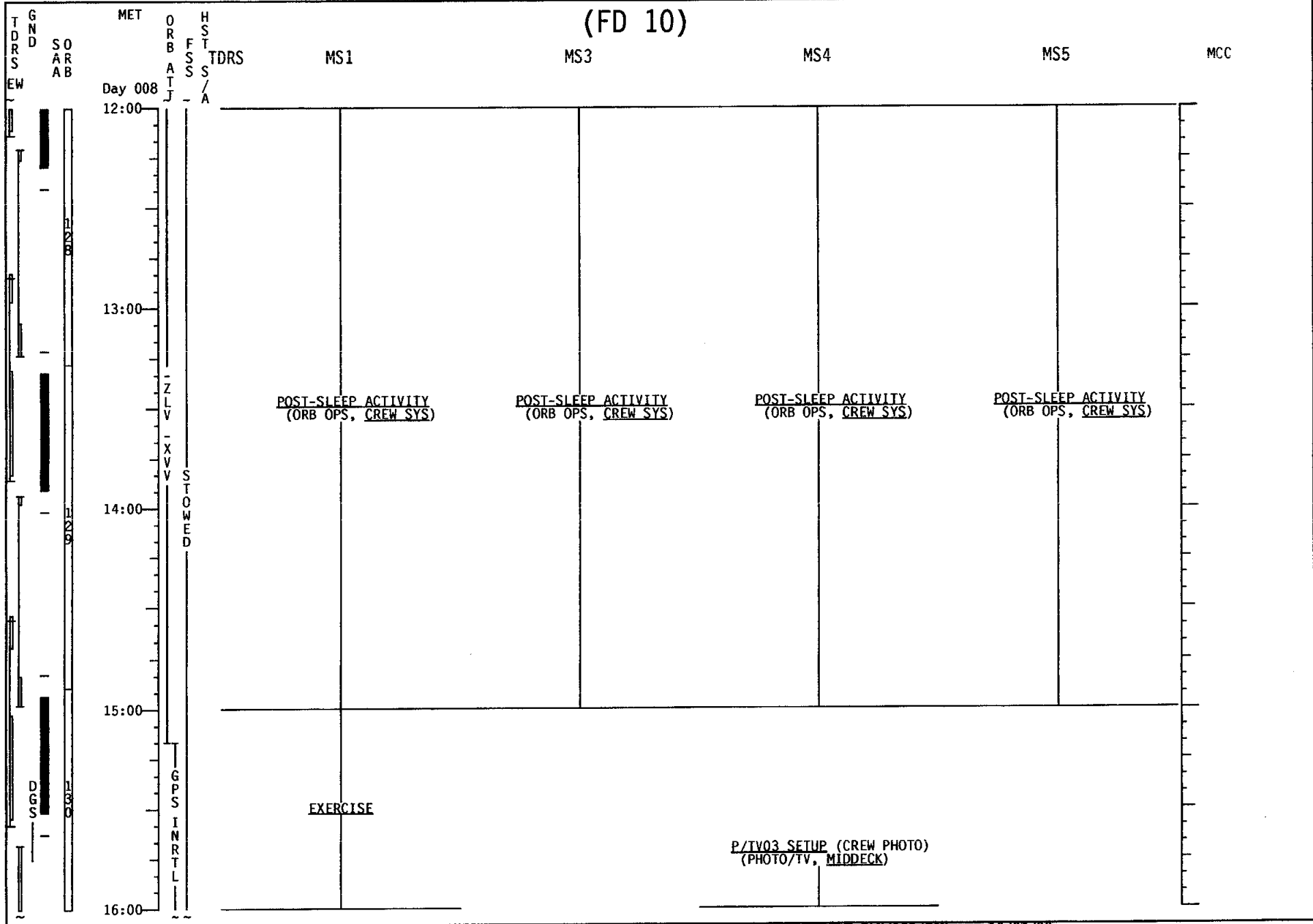
(FD 09)



(FD 10)

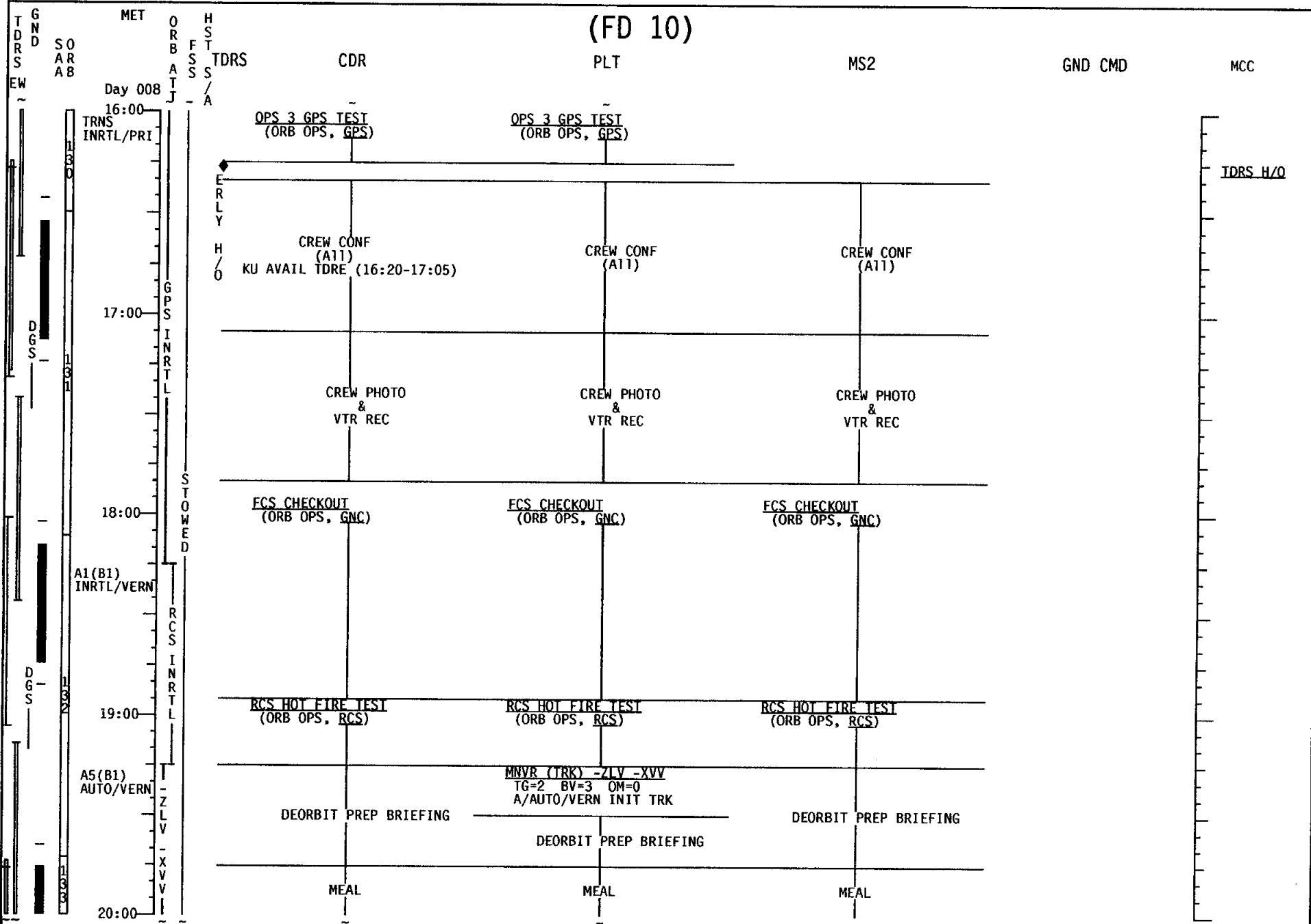


(FD 10)

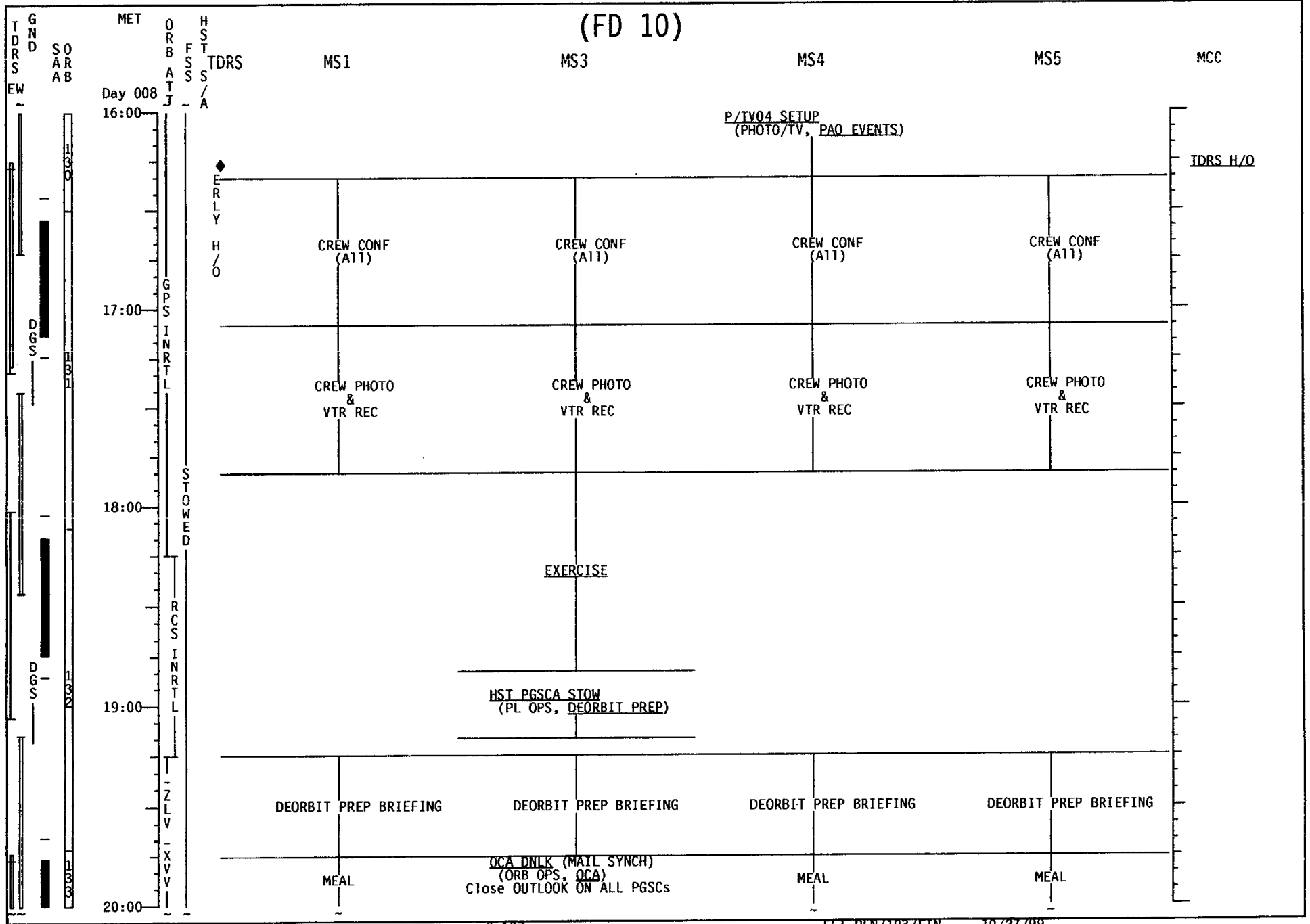




# (FD 10)



# (FD 10)

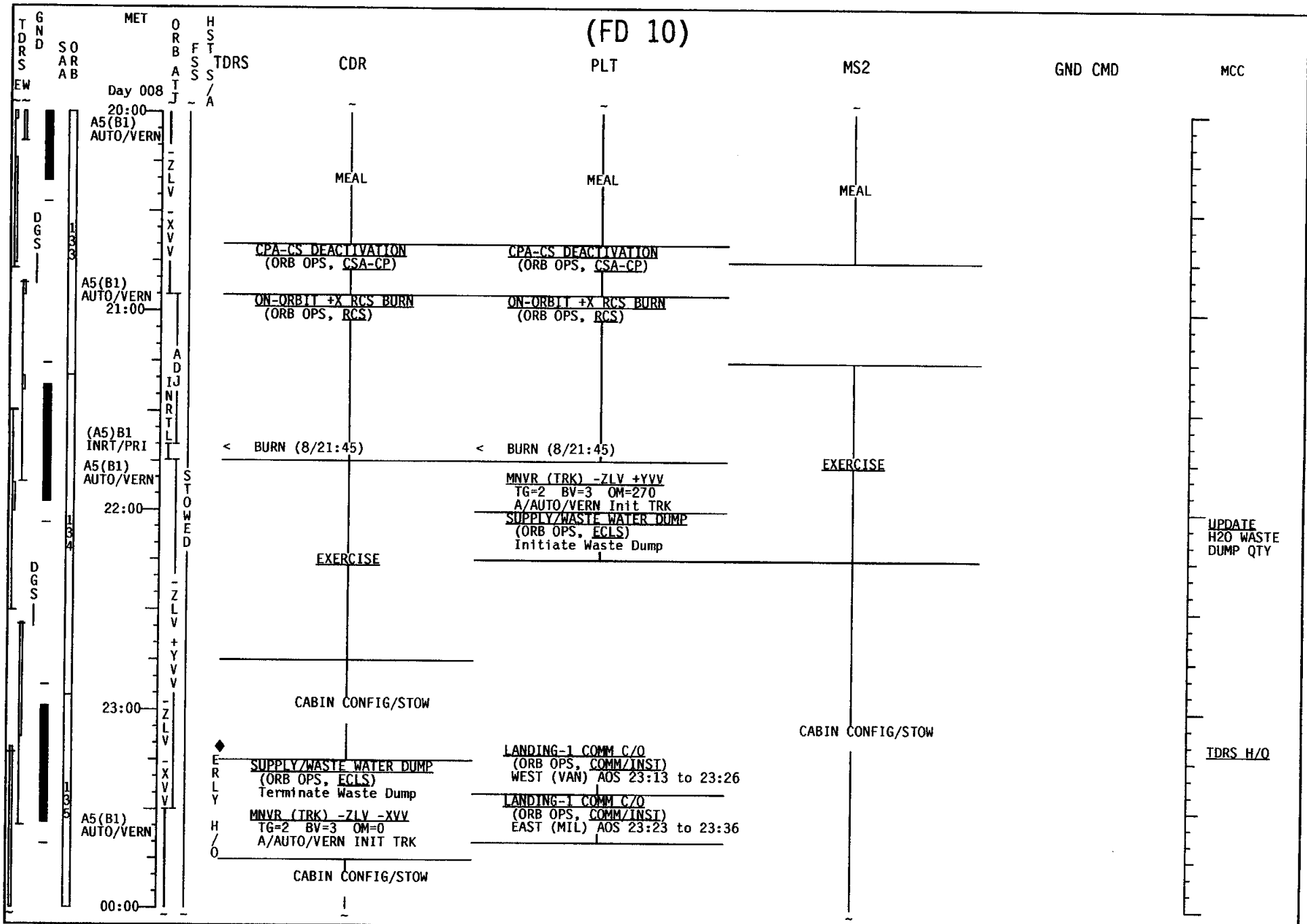


MET Day 008  
16:00  
17:00  
18:00  
19:00  
20:00

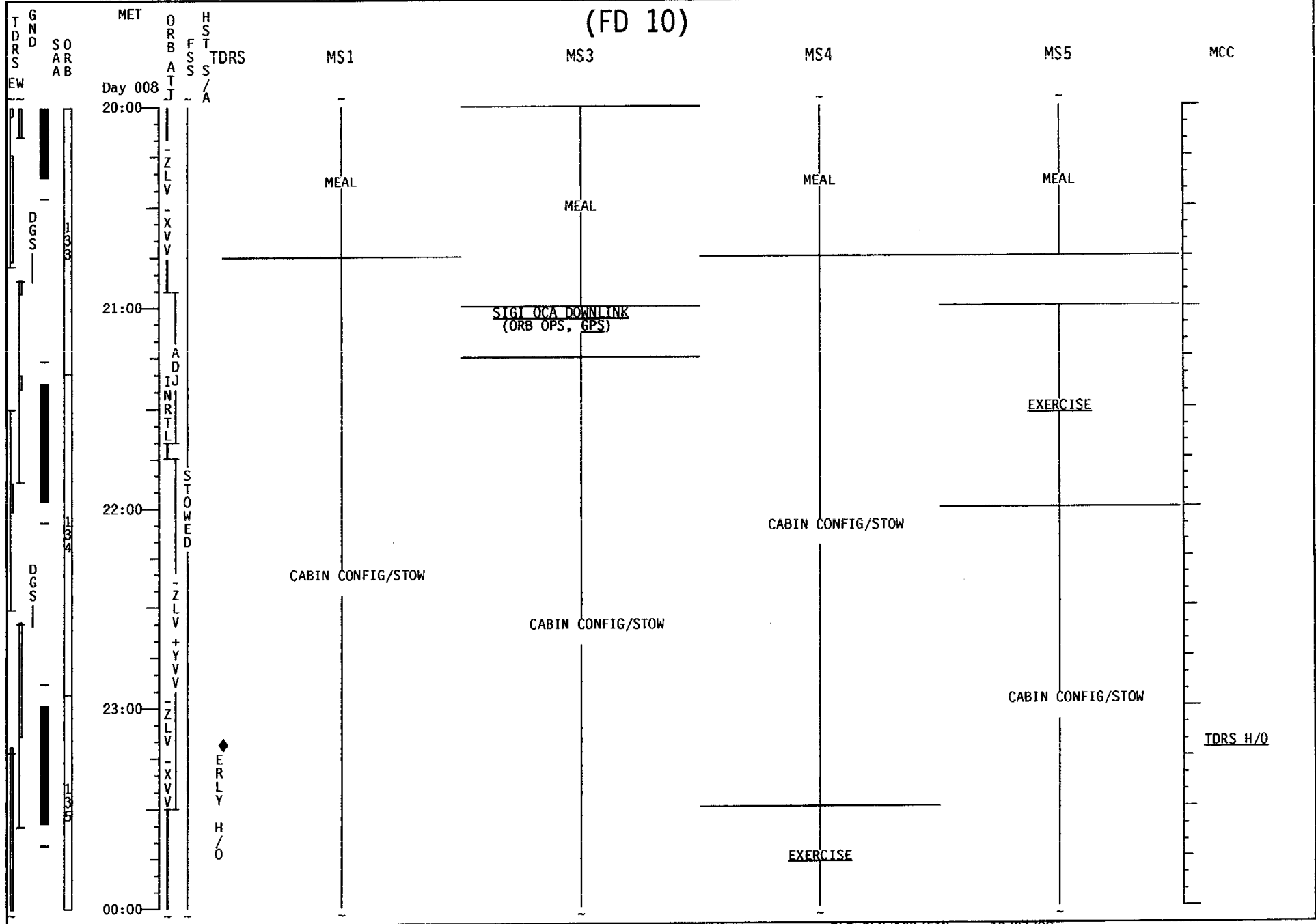
TDRS  
GND  
SO  
AR  
AB  
EW  
D  
G  
S  
D  
G  
S  
D  
G  
S

ORBIT  
FSS  
HST  
TDRS  
J  
GPS  
INRTL  
STOWED  
RCS  
INRTL  
ZLV  
XVV

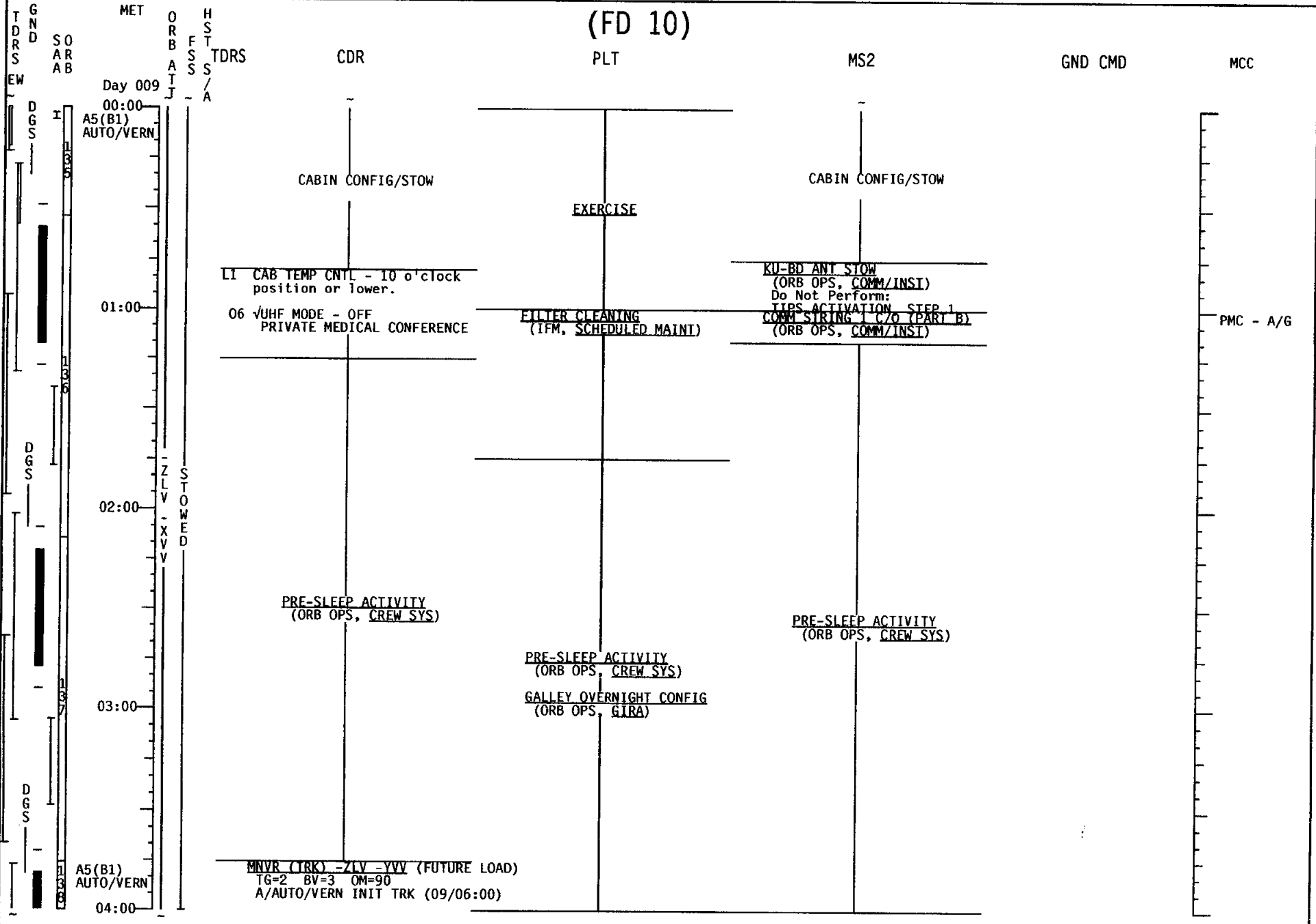
(FD 10)



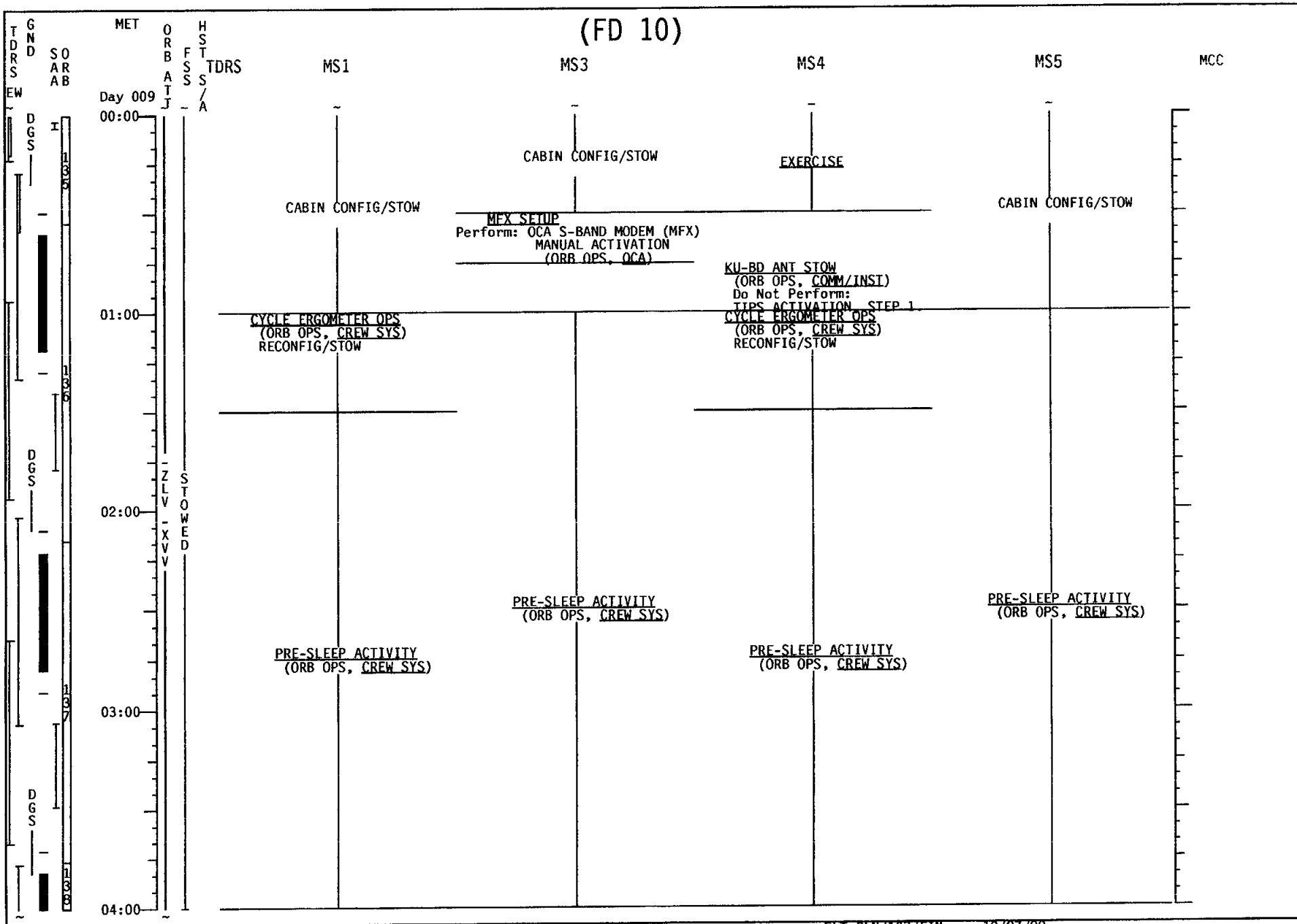
(FD 10)



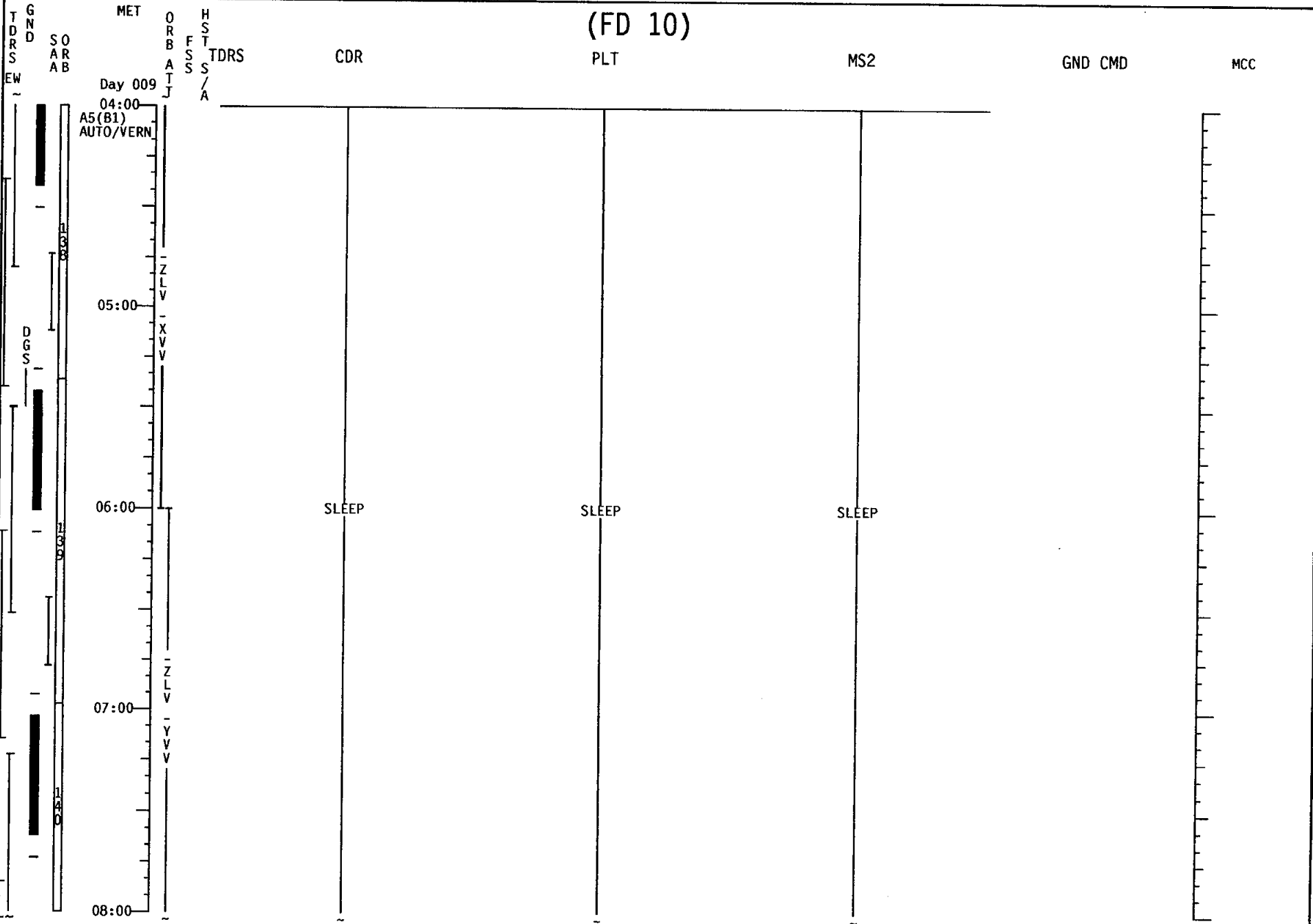
(FD 10)



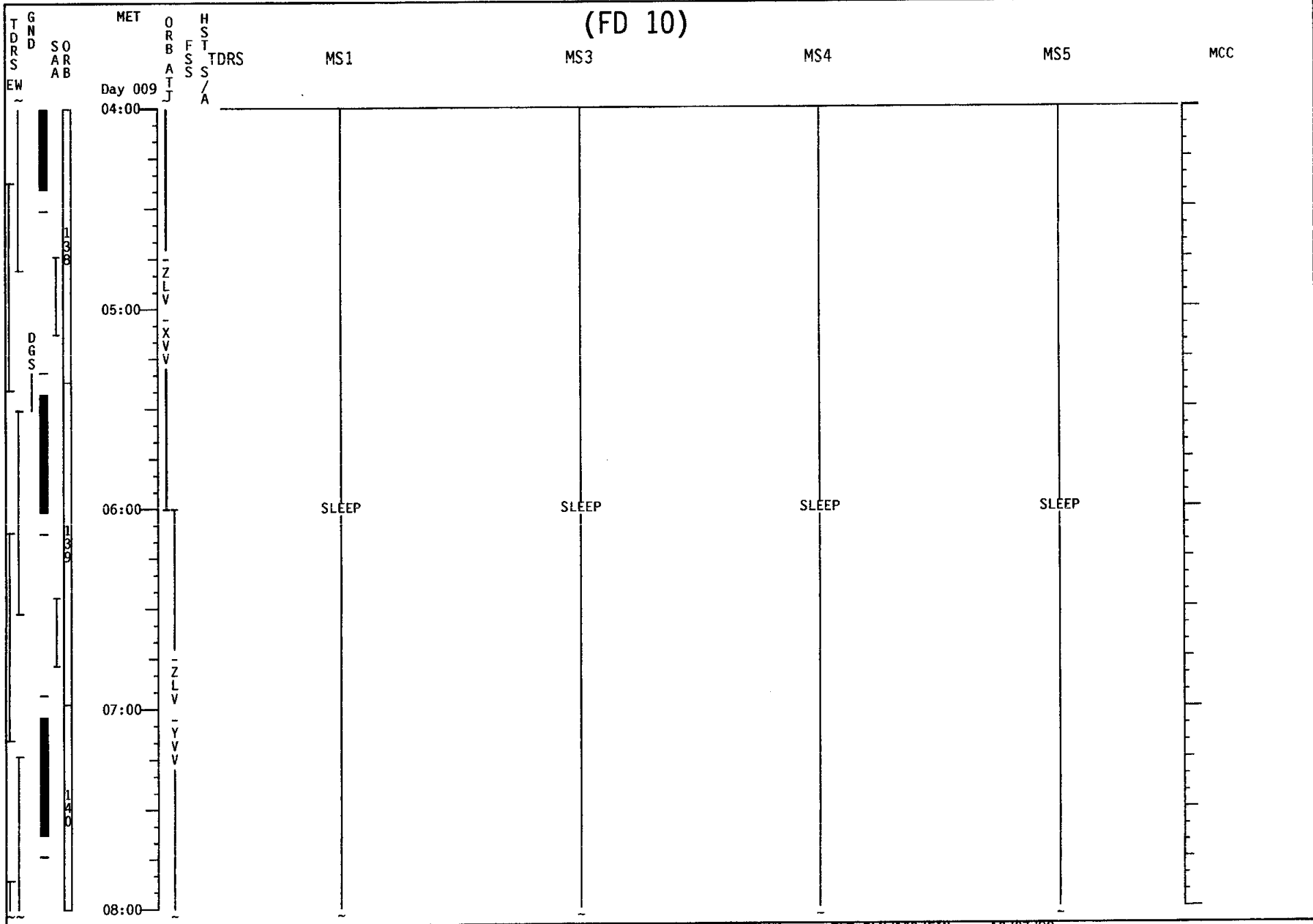
(FD 10)



(FD 10)



(FD 10)





(FD 10)

TDRS  
GND  
SO  
AR  
AB  
EW

MET  
Day 009  
08:00  
A5(B1)  
AUTO/VERN

ORB  
ATT  
J

H  
S  
T  
F  
S  
S  
/A

Z  
L  
V  
Y  
V  
V

11:40  
11:41  
11:42  
11:43  
11:44  
11:45  
11:46  
11:47  
11:48  
11:49  
11:50  
11:51  
11:52  
11:53  
11:54  
11:55  
11:56  
11:57  
11:58  
11:59  
12:00

CDR

PLT

MS2

GND CMD

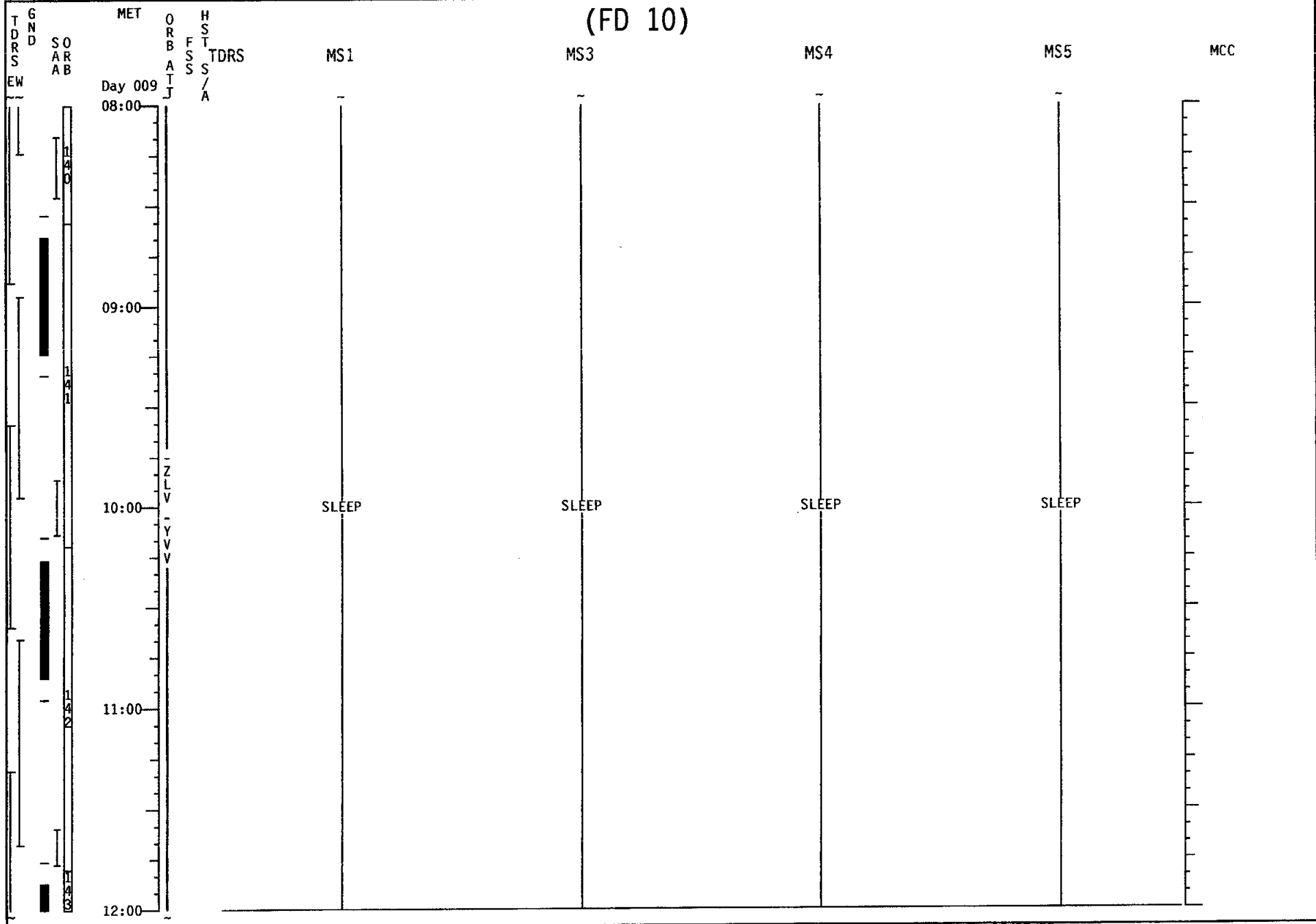
MCC

SLEEP

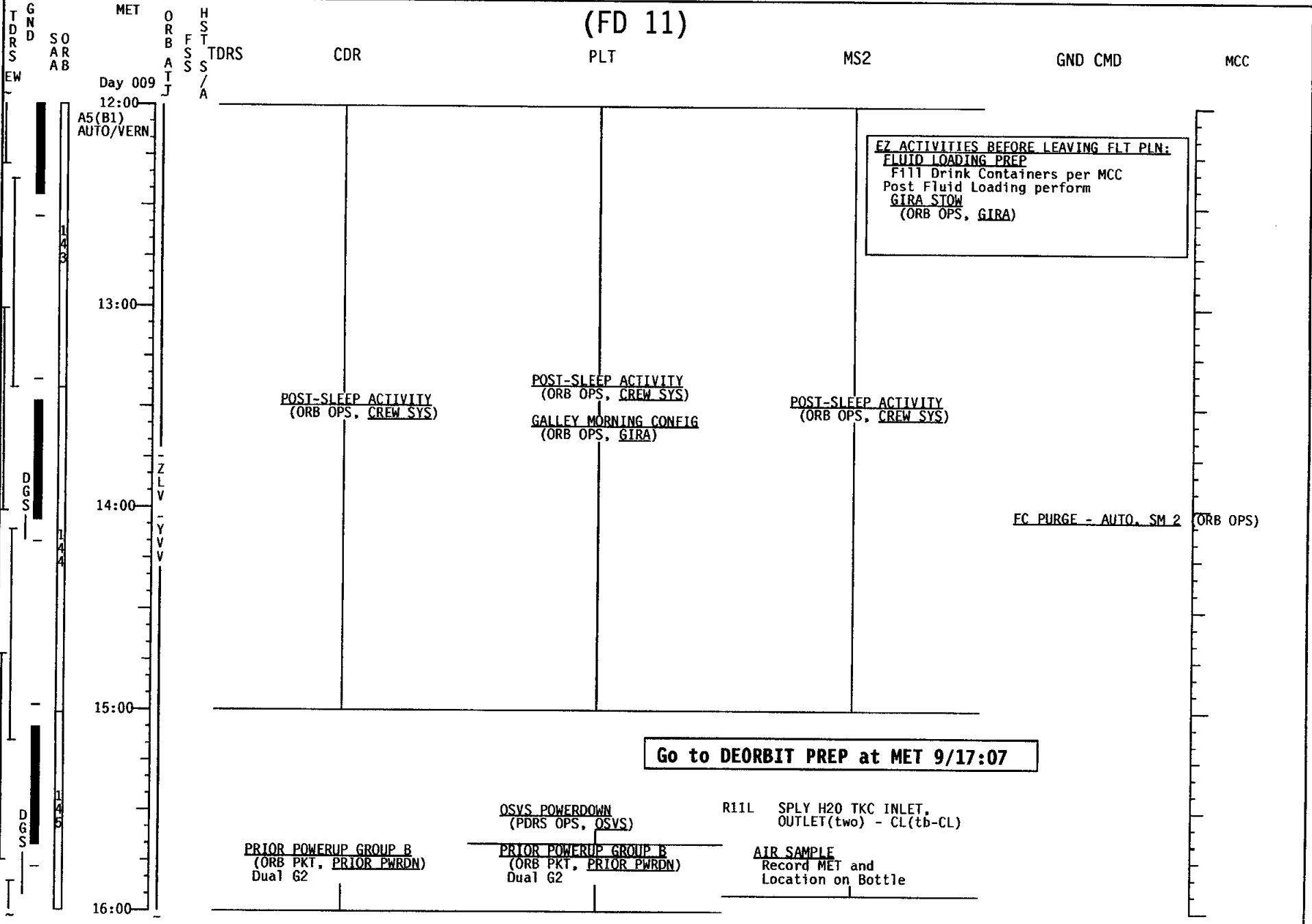
SLEEP

SLEEP

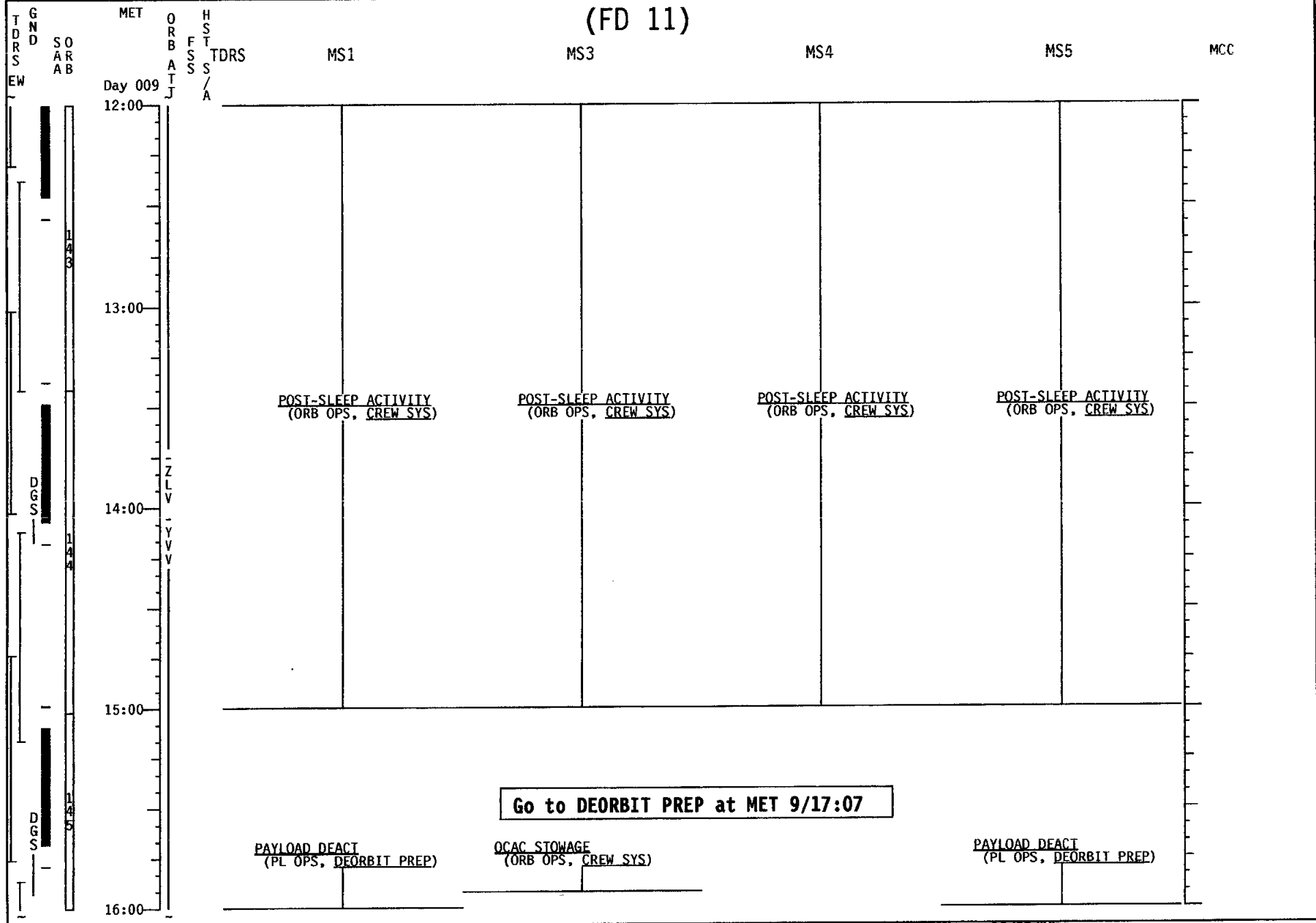
(FD 10)



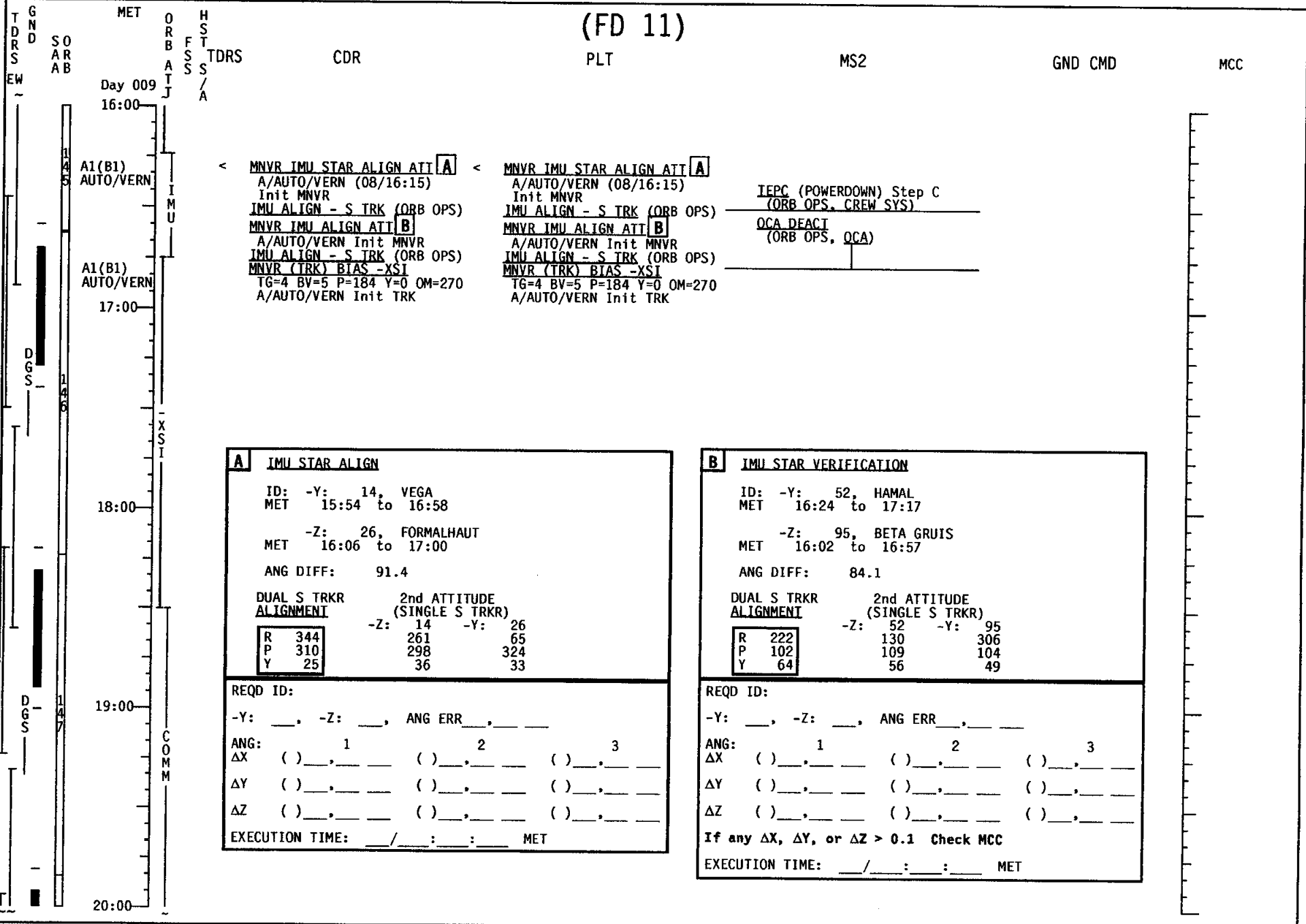
(FD 11)



(FD 11)



(FD 11)



< MNVR IMU STAR ALIGN ATT **A** <  
 A/AUTO/VERN (08/16:15)  
 Init MNVR  
IMU ALIGN - S TRK (ORB OPS)  
MNVR IMU ALIGN ATT **B**  
 A/AUTO/VERN Init MNVR  
IMU ALIGN - S TRK (ORB OPS)  
MNVR (TRK) BIAS -XSI  
 TG=4 BV=5 P=184 Y=0 OM=270  
 A/AUTO/VERN Init TRK

< MNVR IMU STAR ALIGN ATT **A** <  
 A/AUTO/VERN (08/16:15)  
 Init MNVR  
IMU ALIGN - S TRK (ORB OPS)  
MNVR IMU ALIGN ATT **B**  
 A/AUTO/VERN Init MNVR  
IMU ALIGN - S TRK (ORB OPS)  
MNVR (TRK) BIAS -XSI  
 TG=4 BV=5 P=184 Y=0 OM=270  
 A/AUTO/VERN Init TRK

IEPC (POWERDOWN) Step C  
(ORB OPS, CREW SYS)

OCA DEACT  
(ORB OPS, OCA)

**A IMU STAR ALIGN**

ID: -Y: 14, VEGA  
 MET 15:54 to 16:58

-Z: 26, FORMALHAUT  
 MET 16:06 to 17:00

ANG DIFF: 91.4

DUAL S TRKR ALIGNMENT	2nd ATTITUDE (SINGLE S TRKR)	
R 344	-Z: 14	-Y: 26
P 310	261	65
Y 25	298	324
	36	33

REQD ID:

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

ANG: ( ) 1 ( ) 2 ( ) 3

ΔX ( ) \_\_, \_\_ ( ) \_\_, \_\_ ( ) \_\_, \_\_

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

ΔZ ( ) \_\_, \_\_ ( ) \_\_, \_\_ ( ) \_\_, \_\_

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

**B IMU STAR VERIFICATION**

ID: -Y: 52, HAMAL  
 MET 16:24 to 17:17

-Z: 95, BETA GRUIS  
 MET 16:02 to 16:57

ANG DIFF: 84.1

DUAL S TRKR ALIGNMENT	2nd ATTITUDE (SINGLE S TRKR)	
R 222	-Z: 52	-Y: 95
P 102	130	306
Y 64	109	104
	56	49

REQD ID:

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

ANG: ( ) 1 ( ) 2 ( ) 3

ΔX ( ) \_\_, \_\_ ( ) \_\_, \_\_ ( ) \_\_, \_\_

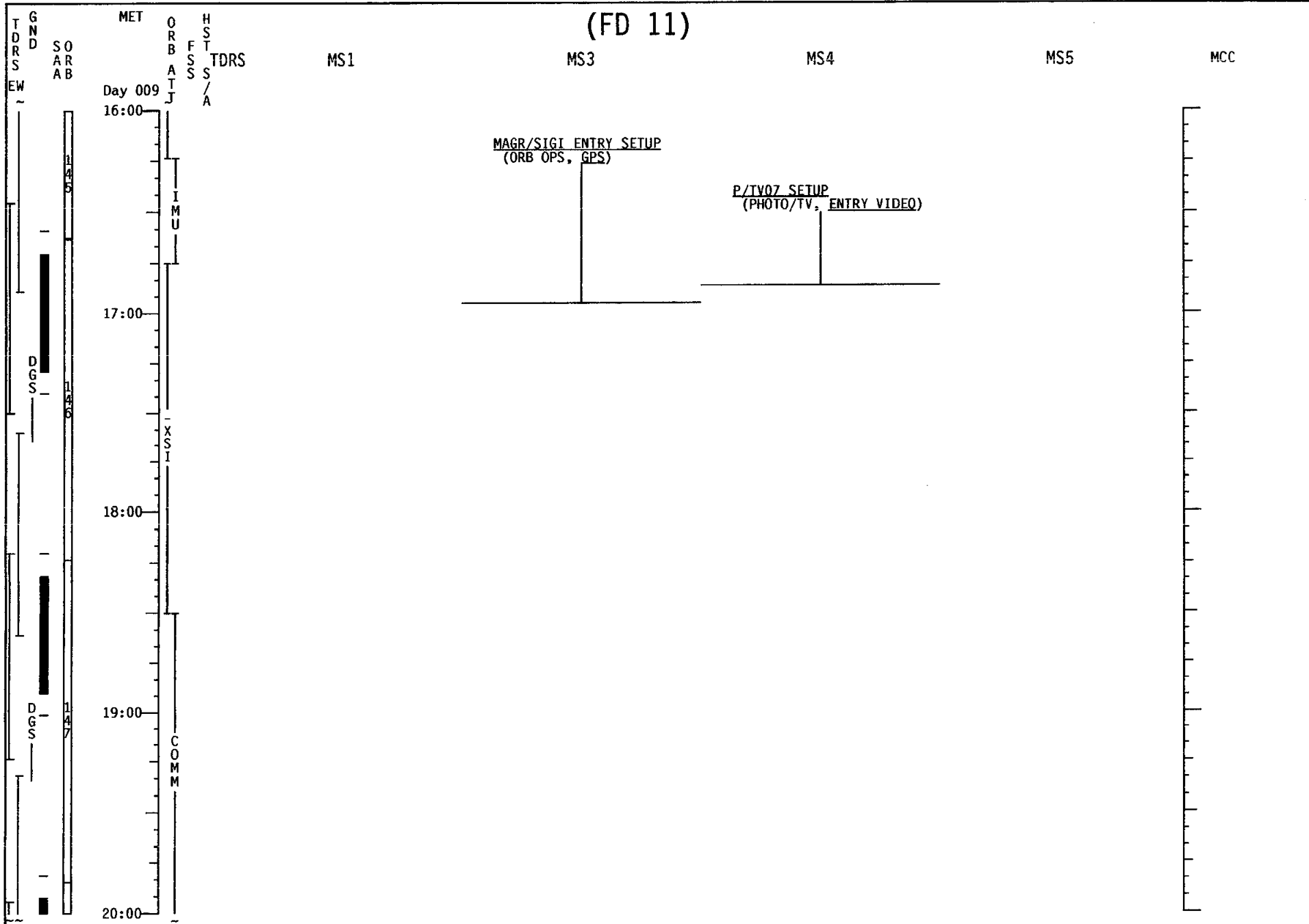
ΔY ( ) \_\_, \_\_ ( ) \_\_, \_\_ ( ) \_\_, \_\_

ΔZ ( ) \_\_, \_\_ ( ) \_\_, \_\_ ( ) \_\_, \_\_

If any ΔX, ΔY, or ΔZ > 0.1 Check MCC

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

(FD 11)



**This Page Intentionally Blank**

MDF TIMELINE

**MDF  
TIMELINE**



**STS-103 HST-SM3 Overview Timeline**  
**MINIMUM DURATION FLIGHT WITH FD02 RNDZ, EVA AND DEPLOY**  
**ON SAME DAYS, FD04 LANDING**

0/	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	
FD 1														PI	RMS C/O	SSE SURV	SSE C/O	Pre Sleep	Sleep						
10.2/14.7															10.2 DEPR										

0/	12	13	14	15	16	17	18	19	20	21	22	23	1/0	1	2	3	4	5	6	7	8	9	10	11
FD 2	Sleep		Post Sleep		HST Grapple (1/01:07 ↑)										FCS C/O	Pre Sleep		Sleep						
10.2/14.7					EMU C/O; HST TOOL, EQUIP, A/L PREP										SURVEY									

1/	12	13	14	15	16	17	18	19	20	21	22	23	2/0	1	2	3	4	5	6	7	8	9	10	11
FD 3	Sleep		Post Sleep					EVA 1 (5:15)					HST DEPLOY ↑			Pre Sleep		Sleep						
10.2/14.7					Pre-EVA			SET UP	RSU 1,2,3 CHANGEOUT	CLOSE OUT	Post-EVA, EVA ENTRY PREP													

2/	12	13	14	15	16	17	18	19	20	21	22	23	3/0
FD 4	Post Sleep		CABIN STOW		D/O PREP			ENT	KSC LANDING				
10.2/14.7													

14.7	
10.2	

**MDF  
TIMELINE**

**STS-103 HST-SM3 Overview Timeline**  
**MINIMUM DURATION FLIGHT WITH FD03 RNDZ, EVA AND DEPLOY**  
**ON SAME DAYS, FD05 LANDING**

0/	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11
FD 1														POST INSERTION				Pre Sleep				Sleep		
10.2/14.7																								
0/	12	13	14	15	16	17	18	19	20	21	22	23	1/0	1	2	3	4	5	6	7	8	9	10	11
FD 2		Sleep			Post Sleep													Pre Sleep				Sleep		
10.2/14.7																								
1/	12	13	14	15	16	17	18	19	20	21	22	23	2/0	1	2	3	4	5	6	7	8	9	10	11
FD 3		Sleep			Post Sleep													Pre Sleep				Sleep		
10.2/14.7																								
2/	12	13	14	15	16	17	18	19	20	21	22	23	3/0	1	2	3	4	5	6	7	8	9	10	11
FD 4		Sleep		Post Sleep														EVA 1 (5:15)				HST DEPLOY ↑	Pre Sleep	Sleep (6:00)
10.2/14.7																								
3/	12	13	14	15	16	17	18	19	20	21	22	23	4/0											
FD 5		Post Sleep			CABIN STOW					D/O PREP		ENT												KSC LANDING
10.2/14.7																								
14.7																								
10.2																								

**STS-103 HST-SM3 Overview Timeline REV A**  
**MINIMUM DURATION FLIGHT WITH FD03 RNDZ, EVA AND DEPLOY**  
**ON SEPARATE DAYS, FD06 LANDING**

0/	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11
FD 1																	POST INSERTION		Pre Sleep					
10.2/14.7																								

0/	12	13	14	15	16	17	18	19	20	21	22	23	1/0	1	2	3	4	5	6	7	8	9	10	11
FD 2		Sleep			Post Sleep													Pre Sleep						Sleep (8:30)
10.2/14.7																								

1/	12	13	14	15	16	17	18	19	20	21	22	23	2/0	1	2	3	4	5	6	7	8	9	10	11
FD 3		Sleep			Post Sleep													Pre Sleep						Sleep
10.2/14.7																								

2/	12	13	14	15	16	17	18	19	20	21	22	23	3/0	1	2	3	4	5	6	7	8	9	10	11
FD 4		Sleep		Post Sleep														Pre Sleep						Sleep
							Pre-EVA		SET UP	RSU 1,2,3 CHANGEOUT	CLOSE OUT			Post-EVA										
10.2/14.7																								

3/	12	13	14	15	16	17	18	19	20	21	22	23	4/0	1	2	3	4	5	6	7	8	9	10	11
FD 5		Sleep			Post Sleep													Pre Sleep						Sleep
10.2/14.7																								

4/	12	13	14	15	16	17	18	19	20	21	22	23	5/0
FD 6		Sleep			Post Sleep								
10.2/14.7													

14.7	
10.2	

STS-103 DAP TABLE

STS-103  
DAP TABLE

**STS-103  
DAP TABLE**

<u>DAP</u>	<u>PURPOSE</u>
A1	- NOMINAL
A2	- PTC
A3	- GG
A4	- PRE/POST DEPLOY
A5	- AFT PROP SAVINGS (NOSE & TAIL)
A6	- LOSS OF VERN (TAIL ONLY)
A7	- RNDZ
A8	- PROX OPS
A9	- HST RMS
A10	- HST BERTHED
A13	- RBAR CONFIG

<u>DAP</u>	<u>PURPOSE</u>
B1	- NOM OMS & RCS BURNS
B2	- LOSS OF VERN (TAIL ONLY)
B3	- LOSS OF VERN (NOSE & TAIL)
B4	- SSUS DEPLOY
B5	- COAS CAL
B6	-
B7	- RNDZ
B8	- PROX OPS
B9	- HST RELEASE
B10	- NORMAL HST BERTHED
B11	- SLO HST BERTHED
B12	- SLO HST RMS
B13	- RBAR CONFIG
B14	- VRCS REBOOST/ORBIT CONJUNC

POST DOCKING FLIGHT PLAN WILL DIRECT A  
PERMANENT CHANGE TO DAPs A10 & B10

PRI		
RATE DEAD BAND	=	0.10
ALT		
RATE DEAD BAND	=	0.20
JET OPTION	=	ALL
DELAY	=	0.00
VERN		
ATTITUDE DEAD BAND	=	2.000
RATE DEAD BAND	=	0.020
CNTL ACC	=	0

UNIV PTG	
<p>TGT ID = 1 Orbiting Vehicle            = 2 Earth ctr            = 3 Earth tgt                Input LAT (<math>\pm 90</math>)                        LON (<math>\pm 180</math>, + = East)                        ALT (-3444.0 to 20000.0 nm)            = 4 Sun ctr            = 5 Celestial tgt                Input RA (0-359.99)                        DEC (<math>\pm 90</math>)            = 11-110 Nav Stars</p>	
<p>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)</p>	
<p>MON AXIS = 1 +X            = 2 -X</p>	

CNTL ACC = 0	UNLOADED RMS
= 1	NODE LOW HOVER
= 2	NODE PRE-INSTALL
= 3	NODE ON ODS
= 4	FGB GRAPPLE (VERNS)
= 5	FGB GRAPPLE (PRCS)
= 6	FGB PRE-INSTALL (VERNS)
= 7	FGB PRE-INSTALL (PRCS)
= 8	MATED STACK
= 9	REBOOST OF MATED STACK

STS-103 GENERIC DAP A CONFIGURATIONS

	ITEM #	A1	A2	A3	A4	A6
<b>PRI</b>						
ROT RATE	10(50)	0.2000	0.4000	0.2000	0.5000	0.2000
ATT DB	11(51)	5.00	1.00	1.00	3.00	5.00
RATE DB	12(52)	0.20	0.20	0.20	0.20	0.20
ROT PLS	13(53)	0.10	0.10	0.10	0.10	0.10
COMP	14(54)	.000	.000	.000	.000	.000
P OPTION	15(55)	ALL	ALL	ALL	ALL	TAIL
Y OPTION	16(56)	ALL	ALL	TAIL	ALL	TAIL
TRAN PLS	17(57)	0.10	0.10	0.10	0.10	0.10
<b>ALT</b>						
RATE DB	18(58)	0.200	0.200	0.200	0.200	0.070
JET OPT	19(59)	ALL	ALL	ALL	ALL	TAIL
# JETS	20(60)	2	2	2	2	1
ON TIME	21(61)	0.08	0.08	0.08	0.08	0.08
DELAY	22(62)	0.00	0.00	0.00	0.00	0.00
<b>VERN</b>						
ROT RATE	23(63)	0.2000	0.4000	0.0080	0.2000	0.2000
ATT DB	24(64)	1.000	1.000	0.070	1.000	1.000
RATE DB	25(65)	.020	.020	.010	.020	.020
ROT PLS	26(66)	0.010	0.010	0.010	0.010	0.010
COMP	27(67)	.000	.000	.000	.000	.000
CNTL ACC	28(68)	0	0	0	0	0
PURPOSE		NOMINAL	PTC	GG	PRE/POST DEPLOY	LOSS OF VERN (TAIL ONLY)

STS-103 FLT SPECIFIC DAP A CONFIGURATIONS

	ITEM #	A5	A7	A8	A9	A10	A13
<b>PRI</b>							
ROT RATE	10(50)	<b>0.0650</b>	0.2000	0.2000	<b>0.1000</b>	<b>0.1000</b>	<b>0.0500</b>
ATT DB	11(51)	5.00	2.00	<b>1.00</b>	5.00	<b>10.00</b>	<b>2.00</b>
RATE DB	12(52)	0.20	0.20	<b>0.10</b>	0.20	0.20	0.20
ROT PLS	13(53)	0.10	0.10	0.10	<b>0.04</b>	<b>0.04</b>	0.10
COMP	14(54)	.000	.000	.000	.000	.000	.000
P OPTION	15(55)	ALL	ALL	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	ALL
Y OPTION	16(56)	ALL	ALL	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	ALL
TRAN PLS	17(57)	0.10	0.10	0.05	<b>0.05</b>	<b>0.05</b>	0.10
<b>ALT</b>							
RATE DB	18(58)	0.070	<b>0.100</b>	0.200	<b>0.100</b>	<b>0.100</b>	<b>0.100</b>
JET OPT	19(59)	ALL	ALL	ALL	<b>TAIL</b>	<b>TAIL</b>	ALL
# JETS	20(60)	1	2	2	2	2	2
ON TIME	21(61)	0.08	0.08	0.08	0.08	0.08	0.08
DELAY	22(62)	0.00	0.00	0.00	<b>7.50</b>	<b>12.30</b>	0.00
<b>VERN</b>							
ROT RATE	23(63)	<b>0.0650</b>	<b>0.0160</b>	0.2000	<b>0.1000</b>	<b>0.1000</b>	<b>0.0500</b>
ATT DB	24(64)	1.000	1.000	1.000	<b>2.000</b>	1.000	1.000
RATE DB	25(65)	.020	.020	.020	<b>.050</b>	.020	.020
ROT PLS	26(66)	0.010	0.010	0.010	<b>0.005</b>	<b>0.005</b>	0.010
COMP	27(67)	.000	.000	.000	.000	.000	.000
CNTL ACC	28(68)	0	0	0	<b>1(2,3)</b>	<b>4(5)</b>	0
PURPOSE		AFT PROP SAVINGS (NOSE & TAIL)	RNDZ	PROX OPS	HST RMS	HST BERTHED	RBAR CONFIG

Note: **BOLD-ITALIC** indicate a change from the I-load

STS-103 DAP B - GENERIC

	ITEM #	B1	B2	B3	B4	B5	B6
<b>PRI</b>							
ROT RATE	30(50)	0.5000	0.2000	0.2000	0.2000	0.2000	0.5000
ATT DB	31(51)	3.00	3.00	3.00	0.30	3.00	3.00
RATE DB	32(52)	0.20	0.20	0.20	0.20	0.20	0.20
ROT PLS	33(53)	0.04	0.04	0.04	0.04	0.04	0.04
COMP	34(54)	.000	.000	.000	.000	.000	.000
P OPTION	35(55)	ALL	TAIL	ALL	TAIL	TAIL	ALL
Y OPTION	36(56)	ALL	TAIL	ALL	TAIL	TAIL	ALL
TRAN PLS	37(57)	0.10	0.02	0.02	0.02	0.02	0.02
<b>ALT</b>							
RATE DB	38(58)	0.200	0.070	0.070	0.200	0.200	0.200
JET OPT	39(59)	ALL	TAIL	ALL	ALL	ALL	ALL
# JETS	40(60)	2	1	1	2	2	2
ON TIME	41(61)	0.08	0.08	0.08	0.08	0.08	0.08
DELAY	42(62)	0.00	0.00	0.00	0.00	0.00	0.00
<b>VERN</b>							
ROT RATE	43(63)	0.2000	0.2000	0.2000	0.0080	0.0160	0.2000
ATT DB	44(64)	1.000	1.000	1.000	0.100	0.033	1.000
RATE DB	45(65)	.020	.020	.020	.010	.020	.020
ROT PLS	46(66)	0.002	0.002	0.002	0.002	0.002	0.002
COMP	47(67)	.000	.000	.000	.000	.000	.000
CNTL ACC	48(68)	0	0	0	0	0	0
PURPOSE		NOM OMS & RCS BURNS	LOSS OF VERN (TAIL ONLY)	LOSS OF VERN (NOSE & TAIL)	SSUS DEPLOY )	COAS CAL	



STS-103 DAP B CONFIGURATIONS

	ITEM #	B7	B8	B9	B10	B11	B12	B13	B14
<b>PRI</b>									
ROT RATE	30(50)	0.5000	0.2000	<b>0.1000</b>	<b>0.0500</b>	<b>0.0500</b>	<b>0.0500</b>	<b>0.0500</b>	<b>0.1000</b>
ATT DB	31(51)	2.00	<b>1.00</b>	<b>2.00</b>	<b>5.00</b>	<b>10.00</b>	<b>5.00</b>	<b>2.00</b>	<b>5.00</b>
RATE DB	32(52)	0.20	<b>0.10</b>	0.20	0.20	0.20	0.20	0.20	0.20
ROT PLS	33(53)	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
COMP	34(54)	.000	.000	.000	.000	.000	.000	.000	.000
P OPTION	35(55)	ALL	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	ALL	<b>TAIL</b>
Y OPTION	36(56)	ALL	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	ALL	<b>TAIL</b>
TRAN PLS	37(57)	0.05	0.01	<b>0.01</b>	<b>0.01</b>	<b>0.05</b>	<b>0.05</b>	<b>0.05</b>	<b>0.01</b>
<b>ALT</b>									
RATE DB	38(58)	<b>0.100</b>	0.200	<b>0.100</b>	<b>0.100</b>	<b>0.100</b>	<b>0.100</b>	<b>0.100</b>	<b>0.100</b>
JET OPT	39(59)	ALL	ALL	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	ALL	<b>TAIL</b>
# JETS	40(60)	2	2	2	2	2	2	2	2
ON TIME	41(61)	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
DELAY	42(62)	0.00	0.00	<b>7.50</b>	<b>12.30</b>	<b>12.30</b>	<b>7.50</b>	0.00	<b>12.30</b>
<b>VERN</b>									
ROT RATE	43(63)	0.2000	0.2000	<b>0.0240</b>	0.2000	<b>0.0160</b>	<b>0.0400</b>	<b>0.0500</b>	<b>0.4000</b>
ATT DB	44(64)	1.000	1.000	<b>0.500</b>	<b>3.000</b>	1.000	<b>2.000</b>	1.000	1.00
RATE DB	45(65)	.020	.020	<b>.030</b>	.020	.020	<b>.050</b>	.020	.020
ROT PLS	46(66)	0.002	<b>0.010</b>	<b>0.005</b>	<b>0.005</b>	<b>0.005</b>	<b>0.005</b>	0.002	<b>0.040</b>
COMP	47(67)	.000	.000	.000	.000	.000	.000	.000	.000
CNTL ACC	48(68)	0	0	<b>1</b>	<b>4(5)</b>	<b>4(5)</b>	<b>1(2,3)</b>	0	<b>4(5)</b>
PURPOSE		RNDZ	PROX OP	HST RE- LEASE	NORMAL HST BERTHED	SLOW HST BERTHED	SLOW HST RMS	RBAR CONFIG	VRCS REBOOST/ ORBIT CONJUNC

Note: **BOLD-ITALIC** indicate a change from I-load or prior flight DAP configuration

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

**This Page Intentionally Blank**

**ATTITUDE TIMELINE**

Attitude Timeline

MET/GMT	MNVR OPTION		DAP	E/S	REF ATT/REMARKS	EVENT
1 000/01:00:00 MET 336/10:31:00 GMT						STS 103 Flight Launch 2 December 1999 336/09:31:00 Z
2 000/01:12:00 MET 39:12 336/10:43:00 GMT 11:10:12	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=270.00	A5 AUTO ALT	RATE 0.0650 DB AT 5.00 DB RT 0.070	EARTH R 0 P 90	LVLH R= 0.00 P=180.00 Y= 90.00	-ZLV +YVV PLBD Open Att Stars
3 000/04:55:00 MET 05:22:41 336/14:26:00 GMT 53:41	INRTL R=285.00 MNVR P= 23.00 Y= 8.00	A5 AUTO VERN	RATE 0.0650 DB AT 1.000 DB RT 0.020	SUN R 15 P 107	Up better Sband	NC-1 OMS 2ENG Posi Heads Up TIG 00/05:29:00
4 000/05:35:00 MET 06:11:15 336/15:06:00 GMT 42:15	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00	A5 AUTO VERN	RATE 0.0650 DB AT 1.000 DB RT 0.020	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y= 0.00	-ZLV -XVV Crew Sleep
5 000/21:40:00 MET 337/07:11:00 GMT						NPC Multi-axis TIG 00/21:40:00
6 000/21:45:00 MET 337/07:16:00 GMT	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00	A5 AUTO VERN	RATE 0.0650 DB AT 1.000 DB RT 0.020	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y= 0.00	-ZLV -XVV Debris
7 001/03:15:00 MET 35:29 337/12:46:00 GMT 13:06:29	INRTL R=287.00 MNVR P= 23.00 Y= 0.00	A5 AUTO VERN	RATE 0.0650 DB AT 1.000 DB RT 0.020	SUN R 12 P 100	Up better Sband	NSR OMS 2ENG Posi Heads Up TIG 01/03:46:00
8 001/03:50:00 MET 337/13:21:00 GMT		A5 LVLH VERN	RATE 0.0650 DB AT 1.000 DB RT 0.020	EARTH R 180 P 121	LVLH R=359.62 HOLD P= 31.29 Y=359.84	Post Burn Hold
9 001/04:20:00 MET 25:57 337/13:51:00 GMT 56:57	INRTL R= 73.00 MNVR P=202.00 Y=357.00	A1 AUTO VERN	RATE 0.2000 DB AT 1.000 DB RT 0.020	SUN R 168 P 77	Sband Comm OK Up or Down	NC-2 RCS +X Posi Heads Up TIG 01/04:34:00
10 001/04:40:00 MET 05:17:18 337/14:11:00 GMT 48:18	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00	A5 AUTO VERN	RATE 0.0650 DB AT 1.000 DB RT 0.020	EARTH R 0 P 90	LVLH R= 0.00 P=180.00 Y= 0.00	-ZLV -XVV Crew Sleep
11 001/14:45:00 MET 15:08:05 338/00:16:00 GMT 39:05	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=270.00	A5 AUTO VERN	RATE 0.0650 DB AT 1.000 DB RT 0.020	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y= 90.00	-ZLV +YVV H2O Dump stars
12 001/18:00:00 MET 338/03:31:00 GMT					FDO wanted a placeholder for unlikely burn	NC-3 OMS 2ENG Posi Heads Up TIG 01/18:00:00

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

Attitude Timeline

MET/GMT	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT
13 001/18:30:00 MET 42:13 338/04:01:00 GMT 13:13	INRTL R= 58.00 MNVR P=228.00 Y= 52.00	A7 RATE 0.2000 AUTO DB AT 1.000 VERN DB RT 0.020	SUN R 166 P 136	Up FDO request	NH RCS +X Posi Heads Up TIG 01/18:46:00
14 001/18:50:00 MET 338/04:21:00 GMT		A7 RATE 0.2000 LVLH DB AT 1.000 VERN DB RT 0.020	EARTH R 180 P 117	LVLH R=359.79 HOLD P= 26.85 Y= 0.00	Post Burn Hold
15 001/19:25:00 MET 31:15 338/04:56:00 GMT 05:02:15	INRTL R=292.00 MNVR P= 33.00 Y=331.00	A7 RATE 0.2000 AUTO DB AT 1.000 VERN DB RT 0.020	SUN R 10 P 69	Up FDO request	NC-4 RCS +X Posi Heads Up TIG 01/19:41:00
16 001/19:45:00 MET 54:43 338/05:16:00 GMT 25:43	TGT=2 BV=1 P= 0.00 Y= 0.00 OM= 0.00	A7 RATE 0.2000 AUTO DB AT 1.000 VERN DB RT 0.020	EARTH R 114 P 0	LVLH R= 0.00 P=270.00 Y= 0.00	Target Track
17 001/22:55:00 MET 338/08:26:00 GMT					TI Multi-axis TIG 01/22:55:00
18 001/23:00:00 MET 31:15 338/08:31:00 GMT 09:02:15	TGT=2 BV=5 P=345.00 Y= 0.00 OM= 0.00	A7 RATE 0.0080 AUTO DB AT 1.000 VERN DB RT 0.020	EARTH R 180 P 15	LVLH R= 0.00 P=285.00 Y= 0.00	LVLH Equip
19 001/23:32:00 MET 44:49 338/09:03:00 GMT 15:49	TGT=2 BV=5 P=335.00 Y= 0.00 OM= 0.00	A7 RATE 0.0130 AUTO DB AT 1.000 VERN DB RT 0.020	EARTH R 180 P 25	LVLH R= 0.00 P=295.00 Y= 0.00	LVLH Equip
20 001/23:45:00 MET 002/00:04:50 338/09:16:00 GMT 35:50	TGT=2 BV=5 P=310.00 Y= 0.00 OM= 0.00	A7 RATE 0.0210 AUTO DB AT 1.000 VERN DB RT 0.020	EARTH R 180 P 50	LVLH R= 0.00 P=320.00 Y= 0.00	LVLH Equip
21 002/00:05:00 MET 27:13 338/09:36:00 GMT 58:13	TGT=2 BV=5 P=270.00 Y= 0.00 OM= 0.00	A7 RATE 0.0300 AUTO DB AT 1.000 VERN DB RT 0.020	EARTH R 180 P 90	LVLH R= 0.00 P= 0.00 Y= 0.00	RBAR Crossing @ Noon -5 min 2/00:28:00
22 002/01:05:00 MET 338/10:36:00 GMT		A8 RATE 0.2000 INRT DB AT 1.000 VERN DB RT 0.020	SUN R 162 P 151	INRTL R= 41.27 HOLD P=246.98 Y= 63.56	INERTIAL for Grapple
23 002/01:07:00 MET 338/10:38:00 GMT					HST GRAPPLE @ SS +3 min
24 002/01:10:00 MET 338/10:41:00 GMT				HST at -V3 FSS pivot at 90 SA slew at 90	FREE Drift for HST Berth

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

Attitude Timeline

MET/GMT	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT
25 002/02:05:00 MET 11:26 338/11:36:00 GMT 42:26	INRTL R=328.00 MNVR P=328.00 Y= 56.00	A10 RATE 0.1000 AUTO DB AT 1.000 VERN DB RT 0.020	SUN R 360 P 170	-Y: 26 2/02:08-2/03:02 -Z: 86 Continuous AOS	Battery Charge also IMU Align UL C871 if prob
26 002/03:40:00 MET 338/13:11:00 GMT				SA slew to 0	FREE Drift for SA slew
27 002/04:00:00 MET 06:35:59 338/13:31:00 GMT 16:06:59	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00	B11 RATE 0.0160 AUTO DB AT 1.000 VERN DB RT 0.020	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y= 0.00	-ZLV -XVV Crew Sleep
28 002/17:55:00 MET 339/03:26:00 GMT				FSS Pivot to 85	FREE Drift for FSS Pivot
29 002/18:00:00 MET 339/03:31:00 GMT	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00	B11 RATE 0.0160 AUTO DB AT 1.000 VERN DB RT 0.020	EARTH R 0 P 90	LVLH R= 0.00 P=180.00 Y= 0.00	-ZLV -XVV
30 002/18:50:00 MET 57:35 339/04:21:00 GMT 28:35	TGT=2 BV=5 P=135.00 Y= 0.00 OM= 7.00	A10 RATE 0.1000 AUTO DB AT 1.000 VERN DB RT 0.020	EARTH R 360 P 135	LVLH R=355.04 P=134.79 Y=355.06	BIAS -ZLV -XVV for RSU EVA Sunrise Protect
31 002/19:45:00 MET 339/05:16:00 GMT				FSS pivot to 90	FREE Drift for BSP install and FSS pivot
32 002/19:51:00 MET 20:00:35 339/05:22:00 GMT 31:35	INRTL R= 79.00 MNVR P=145.00 Y=343.00	A10 RATE 0.1000 AUTO DB AT 1.000 VERN DB RT 0.020	SUN R 180 P 45		BIAS +XSI for RSU EVA Sunset Protect
33 002/20:25:00 MET 46:35 339/05:56:00 GMT 06:17:35	TGT=2 BV=5 P=135.00 Y= 0.00 OM= 7.00	A10 RATE 0.1000 AUTO DB AT 1.000 VERN DB RT 0.020	EARTH R 360 P 135	LVLH R=355.04 P=134.79 Y=355.06	BIAS -ZLV -XVV for RSU EVA Sunrise Protect
34 002/21:28:00 MET 37:33 339/06:59:00 GMT 07:08:33	INRTL R= 79.00 MNVR P=145.00 Y=343.00	A10 RATE 0.1000 AUTO DB AT 1.000 VERN DB RT 0.020	SUN R 180 P 45		BIAS +XSI for RSU EVA Sunset Protect
35 002/22:02:00 MET 23:45 339/07:33:00 GMT 54:45	TGT=2 BV=5 P=135.00 Y= 0.00 OM= 7.00	A10 RATE 0.1000 AUTO DB AT 1.000 VERN DB RT 0.020	EARTH R 360 P 135	LVLH R=355.04 P=134.79 Y=355.06	BIAS -ZLV -XVV for RSU EVA Sunrise Protect
36 002/23:04:00 MET 13:33 339/08:35:00 GMT 44:33	INRTL R= 79.00 MNVR P=145.00 Y=343.00	A10 RATE 0.1000 AUTO DB AT 1.000 VERN DB RT 0.020	SUN R 180 P 45		BIAS +XSI for RSU EVA Sunset Protect

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

Attitude Timeline

MET/GMT	MNVR OPTION	DAI	DAP	E/S	REF ATT/REMARKS	EVENT
37 002/23:39:00 MET 54:12 339/09:10:00 GMT 25:12	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00	A10 AUTO VERN	RATE 0.1000 DB AT 1.000 DB RT 0.020	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y= 0.00	-ZLV -XVV VIK EVA
38 003/00:45:00 MET 339/10:16:00 GMT					SA slew to 100	FREE Drift for SA slew
39 003/01:10:00 MET 36:42 339/10:41:00 GMT 11:07:42	INRTL R=330.00 MNVR P=327.00 Y= 57.00	A10 AUTO VERN	RATE 0.1000 DB AT 1.000 DB RT 0.020	SUN R 360 P 170	-Y: 26 3/02:17-3/03:11 -Z: 86 3/02:51-3/03:39	Battery Charge for VIK funct also IMU Align UL C871 if prob
40 003/05:10:00 MET 339/14:41:00 GMT					SA slew to 0	FREE Drift for SA slew
41 003/05:25:00 MET 37:42 339/14:56:00 GMT 15:08:42	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=335.00	A10 AUTO VERN	RATE 0.1000 DB AT 1.000 DB RT 0.020	EARTH R 0 P 90	LVLH R= 0.00 P=180.00 Y= 25.00	BIAS -ZLV -XVV for RSU Test +25 Y better Sb
42 003/07:00:00 MET 04:10 339/16:31:00 GMT 35:10	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00	A10 AUTO VERN	RATE 0.1000 DB AT 1.000 DB RT 0.020	EARTH R 0 P 90	LVLH R= 0.00 P=180.00 Y= 0.00	-ZLV -XVV for Crew Sleep
43 003/17:00:00 MET 340/02:31:00 GMT					FSS pivot to 75 HST to +V3 FSS pivot to 90	FREE Drift for FSS PRP to setup for A/L Depress
44 003/17:35:00 MET 340/03:06:00 GMT					SA slew to -20	FREE Drift for +V2 SA slew
45 003/17:50:00 MET 340/03:21:00 GMT	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00	B11 AUTO VERN	RATE 0.0160 DB AT 1.000 DB RT 0.020	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y= 0.00	-ZLV -XVV
46 003/19:00:00 MET 340/04:31:00 GMT					HST to -V2	FREE Drift for HST rotate
47 003/19:15:00 MET 340/04:46:00 GMT	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00	B11 AUTO VERN	RATE 0.0160 DB AT 1.000 DB RT 0.020	EARTH R 0 P 90	LVLH R= 0.00 P=180.00 Y= 0.00	-ZLV -XVV Computer EVA
48 003/20:45:00 MET 52:31 340/06:16:00 GMT 23:31	TGT=2 BV=5 P=135.00 Y= 0.00 OM=357.00	A10 AUTO VERN	RATE 0.1000 DB AT 1.000 DB RT 0.020	EARTH R 0 P 135	LVLH R= 2.12 P=134.96 Y= 2.12	BIAS -ZLV -XVV for FGS EVA Sunrise Protect

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



Attitude Timeline

MET/GMT	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
49 003/21:25:00 MET  340/06:56:00 GMT				HST to +V3	FREE Drift for FSS rotate	
50 003/21:37:00 MET 46:33 340/07:08:00 GMT 17:33	INRTL R= 94.00 MNVR P=143.00 Y=343.00	A10 AUTO VERN	RATE 0.1000 DB AT 1.000 DB RT 0.020	SUN R 166 P 46	BIAS +XSI for FGS EVA Sunset Protect	
51 003/22:12:00 MET 34:31 340/07:43:00 GMT 08:05:31	TGT=2 BV=5 P=135.00 Y= 0.00 OM=357.00	A10 AUTO VERN	RATE 0.1000 DB AT 1.000 DB RT 0.020	EARTH R 0 P 135	LVLH R= 2.12 P=134.96 Y= 2.12	BIAS -ZLV -XVV for FGS EVA Sunrise Protect
52 003/23:14:00 MET 23:31 340/08:45:00 GMT 54:31	INRTL R= 94.00 MNVR P=143.00 Y=343.00	A10 AUTO VERN	RATE 0.1000 DB AT 1.000 DB RT 0.020	SUN R 166 P 46	BIAS +XSI for FGS EVA Sunset Protect	
53 003/23:48:00 MET 004/00:10:10 340/09:19:00 GMT 41:10	TGT=2 BV=5 P=135.00 Y= 0.00 OM=357.00	A10 AUTO VERN	RATE 0.1000 DB AT 1.000 DB RT 0.020	EARTH R 0 P 135	LVLH R= 2.12 P=134.96 Y= 2.12	BIAS -ZLV -XVV for FGS EVA Sunrise Protect
54 004/00:51:00 MET 01:00:30 340/10:22:00 GMT 31:30	INRTL R= 94.00 MNVR P=143.00 Y=343.00	A10 AUTO VERN	RATE 0.1000 DB AT 1.000 DB RT 0.020	SUN R 166 P 46	BIAS +XSI for FGS EVA Sunset Protect	
55 004/01:25:00 MET 41:25 340/10:56:00 GMT 11:12:25	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00	A10 AUTO VERN	RATE 0.1000 DB AT 1.000 DB RT 0.020	EARTH R 0 P 90	LVLH R= 0.00 P=180.00 Y= 0.00	-ZLV -XVV
56 004/02:15:00 MET  340/11:46:00 GMT				SA slew to 0	FREE Drift for SA slew	
57 004/02:30:00 MET 04:03:45 340/12:01:00 GMT 13:34:45	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=270.00	B11 AUTO VERN	RATE 0.0160 DB AT 1.000 DB RT 0.020	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y= 90.00	-ZLV +YVV H2O Dump stars
58 004/05:25:00 MET 06:58:45 340/14:56:00 GMT 16:29:45	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00	B11 AUTO VERN	RATE 0.0160 DB AT 1.000 DB RT 0.020	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y= 0.00	-ZLV -XVV Crew Sleep OCE EK EVA
59 004/18:50:00 MET 19:57:06 341/04:21:00 GMT 05:28:06	TGT=2 BV=5 P=147.00 Y= 29.00 OM= 36.00	B11 AUTO VERN	RATE 0.0160 DB AT 1.000 DB RT 0.020	EARTH R 46 P 137	LVLH R=315.04 P=132.82 Y= 0.50	BIAS -ZLV -XVV for Bay 5 Door SSAT2 SSR3 EVA
60 004/22:10:00 MET 23:17:06 341/07:41:00 GMT 08:48:06	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00	B11 AUTO VERN	RATE 0.0160 DB AT 1.000 DB RT 0.020	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y= 0.00	-ZLV -XVV NOBL EVA Crew Sleep

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

Attitude Timeline

MET/GMT	MNVR OPTION	DAP		E/S	REF ATT/REMARKS	EVENT
61 005/19:05:00 MET 342/04:36:00 GMT					SA slew to -30	FREE Drift for SA slew
62 005/19:15:00 MET 342/04:46:00 GMT					HST to bias +V2 Bias is 305 deg	FREE Drift for HST rotate
63 005/19:30:00 MET 342/05:01:00 GMT	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00	B11 AUTO VERN	RATE 0.0160 DB AT 1.000 DB RT 0.020	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y= 0.00	-ZLV -XVV MLI repair Hand rail cover
64 005/22:20:00 MET 342/07:51:00 GMT					HST to bias -V3 Bias is 30 deg	FREE Drift for HST rotate
65 005/22:35:00 MET 342/08:06:00 GMT	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00	B11 AUTO VERN	RATE 0.0160 DB AT 1.000 DB RT 0.020	EARTH R 0 P 90	LVLH R= 0.00 P=180.00 Y= 0.00	-ZLV -XVV MLI repair Hand Rail cover
66 005/23:30:00 MET 342/09:01:00 GMT					HST to +V3	FREE Drift for HST rotate
67 005/23:45:00 MET 342/09:16:00 GMT	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00	B11 AUTO VERN	RATE 0.0160 DB AT 1.000 DB RT 0.020	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y= 0.00	-ZLV -XVV AS Latch Repair
68 006/00:50:00 MET 342/10:21:00 GMT					SA slew to 0	FREE Drift for SA slew
69 006/01:05:00 MET 342/10:36:00 GMT					FSS pivot to 75 HST to -V3 FSS pivot to 90	FREE Drift for BSP pin rmv and FSS PRP for release setup
70 006/01:35:00 MET 03:08:45 342/11:06:00 GMT 12:39:45	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=270.00	B11 AUTO VERN	RATE 0.0160 DB AT 1.000 DB RT 0.020	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y= 90.00	-ZLV +YVV H2O Dump
71 006/04:40:00 MET 06:13:45 342/14:11:00 GMT 15:44:45	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00	B11 AUTO VERN	RATE 0.0160 DB AT 1.000 DB RT 0.020	EARTH R 0 P 90	LVLH R= 0.00 P=180.00 Y= 0.00	-ZLV -XVV Crew Sleep
72 006/17:25:00 MET 343/02:56:00 GMT					SA slew to 90	FREE Drift for SA slew

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

Attitude Timeline

MET/GMT	MNVR OPTION	DAI	E/S	REF ATT/REMARKS	EVENT
73 006/17:50:00 MET 18:14:14 343/03:21:00 GMT 45:14	INRTL R=335.00 MNVR P=322.00 Y= 60.00	A10 RATE 0.1000 AUTO DB AT 1.000 VERN DB RT 0.020	SUN R 360 P 170	-Y: 26 6/18:52-6/19:46 -Z: 86 6/17:50-6/18:25	Battery Charge also IMU Align UL C871 if prob
74 006/19:45:00 MET 343/05:16:00 GMT					FREE Drift for HST unberth
75 006/20:20:00 MET 35:59 343/05:51:00 GMT 06:06:59	TGT=5 RA= 254.870 BV=5 DEC= -22.718S P=180.00 Y= 55.00 OM=270.00	A9 RATE 0.1000 AUTO DB AT 2.000 VERN DB RT 0.050	SUN R 90 P 125	INRTL R=146.25 P=211.90 Y= 40.12	RELEASE Setup Beta = +2.45
76 006/21:47:00 MET 343/07:18:00 GMT					HST RELEASE @ Noon - 22 min
77 006/21:53:00 MET 22:32:27 343/07:24:00 GMT 08:03:27	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=180.00	A7 RATE 0.0680 AUTO DB AT 1.000 VERN DB RT 0.020	EARTH R 0 P 90	LVLH R=180.00 P= 0.00 Y= 0.00	Target Track RBAR (above)
78 006/22:33:00 MET 343/08:04:00 GMT					SEP2 RCS -X Retro when -ZADI P270 TIG 06/22:33:00
79 006/22:35:00 MET 53:45 343/08:06:00 GMT 24:45	TGT=2 BV=2 P=180.00 Y= 0.00 OM=180.00	A7 RATE 0.0800 AUTO DB AT 1.000 VERN DB RT 0.020	EARTH R 0 P 180	LVLH R=180.00 P= 90.00 Y= 0.00	Target Track -VBAR (behind)
80 006/23:00:00 MET 46:09 343/08:31:00 GMT 09:17:09	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00	A5 RATE 0.0650 AUTO DB AT 1.000 VERN DB RT 0.020	EARTH R 0 P 90	LVLH R= 0.00 P=180.00 Y= 0.00	-ZLV -XVV Crew Sleep Off Duty Day Crew Sleep
81 008/15:10:00 MET 345/00:41:00 GMT		TRN RATE 0.5000 INRT DB AT 3.50 PRI DB RT 0.20	SUN R 355 P 77	INRTL R=300.67 HOLD P= 14.12 Y=338.88	OPS3 GPS Test DTO 700-14
82 008/18:15:00 MET 345/03:46:00 GMT		A1 RATE 0.2000 INRT DB AT 1.000 VERN DB RT 0.020	SUN R 355 P 77	INRTL R=300.67 HOLD P= 14.12 Y=338.88	FCS Checkout 2 RCS Hot Fire Inertial Hold
83 008/19:15:00 MET 57:51 345/04:46:00 GMT 05:28:51	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00	A5 RATE 0.0650 AUTO DB AT 1.000 VERN DB RT 0.020	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y= 0.00	-ZLV -XVV
84 008/20:55:00 MET 21:41:09 345/06:26:00 GMT 07:12:09	TGT=2 BV=5 P= 97.00 Y= 0.00 OM=180.00	A5 RATE 0.0650 AUTO DB AT 1.000 VERN DB RT 0.020	EARTH R 0 P 97	LVLH R=180.00 P= 7.00 Y= 0.00	PERIGEE ADJUST RCS -X Posi Heads Down Setup

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

Attitude Timeline

MET/GMT	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT
85 008/21:44:30 MET 345/07:15:30 GMT		B1 INRT DB AT 3.00 PRI DB RT 0.20	RATE 0.5000 SUN R 5 P 80	INRTL R=241.54 HOLD P=181.94 Y= 1.57	INERTIAL Hold
86 008/21:50:00 MET 22:13:55 345/07:21:00 GMT 44:55	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=270.00	A5 AUTO DB AT 1.000 VERN DB RT 0.020	RATE 0.0650 EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y= 90.00	-ZLV +YVV Water dump
87 008/23:30:00 MET 53:05 345/09:01:00 GMT 24:05	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00	A5 AUTO DB AT 1.000 VERN DB RT 0.020	RATE 0.0650 EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y= 0.00	-ZLV -XVV Crew Sleep
88 009/06:00:00 MET 23:05 345/15:31:00 GMT 54:05	TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 90.00	A5 AUTO DB AT 1.000 VERN DB RT 0.020	RATE 0.0650 EARTH R 0 P 90	LVLH R= 0.00 P=180.00 Y=270.00	-ZLV -YVV EOM Thermal
89 009/16:15:00 MET 25:10 346/01:46:00 GMT 56:10	INRTL R=344.00 MNVR P=310.00 Y= 25.00	A1 AUTO DB AT 1.000 VERN DB RT 0.020	RATE 0.2000 SUN R 295 P 140	-Y: 14 -Z: 26	IMU Align 9/16:06-9/17:01
90 009/16:30:00 MET 37:31 346/02:01:00 GMT 08:31	INRTL R=222.00 MNVR P=102.00 Y= 64.00	A1 AUTO DB AT 1.000 VERN DB RT 0.020	RATE 0.2000 SUN R 56 P 129	-Y: 52 -Z: 95	IMU Verif 9/16:24-9/16:58 Mnvr off nose
91 009/16:45:00 MET 50:33 346/02:16:00 GMT 21:33	TGT=4 BV=5 RA= 257.935 DEC= -22.983S P=184.00 Y= 0.00 OM=270.00	A1 AUTO DB AT 1.000 VERN DB RT 0.020	RATE 0.2000 SUN R 180 P 176	INRTL R= 68.59 P=292.88 Y= 60.51	-XSI Coldsoak
92 009/18:30:00 MET 32:58 346/04:01:00 GMT 03:58	INRTL R=165.00 MNVR P=279.00 Y= 36.00	TRN AUTO DB AT 3.50 PRI DB RT 0.20	RATE 0.5000 SUN R 90 P 150		COMM Attitude
93 009/20:45:00 MET 50:31 346/06:16:00 GMT 21:31	INRTL R= 53.00 MNVR P=202.00 Y= 38.00	TRN AUTO DB AT 3.50 PRI DB RT 0.20	RATE 0.5000 SUN R 186 P 122		D/O Burn TIG 9/20:57:00

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

This Page Intentionally Blank

**FLIGHT PLAN NOTES**

FLIGHT PLAN NOTES  
(CONSTRAINTS AND GUIDELINES)

A. FLIGHT DESCRIPTION

Orbiter: OV103/Discovery  
 Launch Window: 42 min  
 Inclination: 28.45°  
 Rendezvous Altitude: 324 nm  
 Duration: 10 + 2 days

B. MAJOR EVENTS

<u>EVENT</u>	<u>MET</u>	<u>DATE</u>	<u>CST</u>	<u>GMT</u>	<u>ΔV</u>	<u>HP/HA</u>
Launch	00/00:00	12/02/99	03:31	09:31	--	--
OMS2	00/00:45	12/02/99	04:16	10:16	338.4	224/315
NC1	00/05:29	12/02/99	09:00	15:00	95.0	280/315
NPC	00/21:40	12/03/99	01:11	07:11	2.0	312/323
NSR	02/03:46	12/03/99	07:17	13:17	64.4	315/319
NC2	01/04:34	12/03/99	08:05	14:05	4.0	314/324
NC3						
NH	01/18:46	12/03/99	22:17	04:17	7.0	318/324
NC4	01/19:41	12/03/99	23:12	05:12	4.5	319/326
TI	01/22:55	12/04/99	02:26	08:26	2.9	319/328
HST Grapple	02/01:07	12/04/99	04:38	10:38	--	319/329
EVA-1 Start	02/18:45	12/04/99	22:16	04:16	--	--
EVA-2 Start	03/18:55	12/05/99	22:26	04:26	--	--
EVA-3 Start	04/18:55	12/06/99	22:26	04:26	--	--
EVA-4 Start	05/18:55	12/07/99	22:26	04:26	--	--
HST Release	05/21:48	12/09/99	01:19	07:19	--	319/329
Sep - 1	05/21:49	12/09/99	01:20	07:20	1.0	320/328
Sep - 2	05/22:33	12/09/99	02:04	08:04	2.5	319/327
Deorbit	09/20:57	12/12/99	00:28	06:28	--	--
Landing	09/22:07	12/12/99	01:38	07:38	--	--

C. LANDING OPPORTUNITIES

		<u>Landing Orbit</u>	<u>Site</u>	<u>Local Time</u>	<u>MET</u>
		<u>No.</u>			
Nominal	Primary	149	KSC	02:38	09/22:07
	1 Rev Late	150	KSC	03:20	09/23:49
1 Day Late	Primary	164	KSC	02:43	10/22:17
	1 Rev Late	165	KSC	04:30	10/23:59

FLIGHT PLAN NOTES

#### D. CREW

CDR – Curtis L. Brown  
PLT – Scott J. Kelly  
MS1 – Steven L. Smith  
MS2 – Jean–Francois Clervoy (France/ESA)  
MS3 – John M. Grunsfeld  
MS4 – C. Michael Foale  
MS5 – Claude Nicollier (Switzerland/ESA)

#### E. COMMUNICATIONS

TDRS Support: East (47° W), West (171° W), Z (85° E)

##### NOTE

In the TDRS Bands on the Summary and Detail Timeline pages, the TDRS AOS/LOS are shifted later approximately 1.5 min for the West satellites. The tool used to propagate the TDRS AOS/LOS does not yet account for the change to East 47° or West 171° satellites

Back–up Real–time TV: Merritt Island – MIL (MLX)  
Contingency GSTDN: MLX\*, WLP  
Contingency RTS: Hawaii (HTS), CGS, Diego Garcia (DGS), Oak Hanger (OTS\*), and HNS

\*UHF capability

Lead time for site callup – GSTDN – 2 hr, RTS – 4 hr

#### F. IMU ALIGNS

Routine IMU aligns are expected to occur every 72 hr. If stars of opportunity are not available in the flown attitude, the orbiter will be required to maneuver to an IMU attitude for alignment or will use the uplinkable star capability for IMU alignment.

The timeline reflects the recent change of moving the end–of–mission IMU alignments out of Deorbit Prep to just prior to Deorbit Prep, as directed from the April 1998 Ascent/Entry Flight Techniques Panel.

#### G. OFF DUTY

Off duty periods for the crew are scheduled for Flight Day 9 (5.25 hr).

#### H. PAYLOADS

The primary objective of this flight is to perform the operations necessary to fulfill the on–orbit servicing of the Hubble Space Telescope Servicing Mission 3A (HST SM3A). The primary servicing task is to install three new Rate Sensor Units (RSUs). The secondary servicing tasks are to install Voltage Improvement Kits (VIKs) for the batteries, replace the DF–224 computer with a 486 computer, replace the Fine Guidance Sensor (FGS) #2, replace the S–band Single Axis Transmitter (SSAT) #2, replace the Engineering/Science Tape Recorder (E/STR) 3 with a Solid State Recorder (SSR), install New Outer Blanket Layers (NOBL) on the support systems module (SSM) bays, and open the Near Infrared Camera and Multi–Object Spectrometer (NICMOS) coolant valves. Scheduled EVA get–ahead tasks include Forward Shroud/Light Shield (FS/LS) Multilayer Insulation (MLI) repair with Shield/Shell Replacement Fabric (SSRF), installation of covers on several HST handrails, and maintenance on the Aft Shroud Door latches by installing Aft Shroud Door Latch Repair (ASLR) kits.



I. DETAILED TEST OBJECTIVES (DTO)

1. SINGLE STRING GLOBAL POSITIONING SYSTEM (MAGR) (DTO 700-14)

The purpose of this experiment is to demonstrate the performance of the operations of the GPS during Orbiter ascent, on-orbit operations, entry, and landing phases utilizing a modified military GPS receiver processor and the existing Orbiter GPS antennas.

2. SPACE INTEGRATED GLOBAL POSITIONING SYSTEM/INERTIAL NAVIGATION SYSTEM (SIGI) (DTO 700-15)

The SIGI is intended to replace the shuttle onboard TACAN, and eventually, the HAINS Inertial Measurement Units. The SIGI DTO will mitigate the technical and schedule risks of applying this new technology to the shuttle navigation systems by evaluating the system's performance in space flight. The SIGI unit will be mounted in Avionics Bay 3B and will be commanded by the PGSC.

J. DETAILED SUPPLEMENTAL OBJECTIVES (DSO)

There are no on-orbit DSOs scheduled for this flight.

K. MEDICAL SCIENCES DIVISION (MSD)

1. TISSUE EQUIVALENT PROPORTIONAL COUNTER (MSD 005)

TEPC monitors the amount of radiation exposure undergone by the crew while on orbit. It measures radiation cumulatively, but also has a real-time liquid crystal display readout. This experiment allows flight surgeons to analyze data and will aid in designing better shielding for the future crews on the International Space Station. TEPC will be premounted to the starboard middeck wall. It will be activated on FD01 and deactivated on FD11. Daily status checks are scheduled in each day's Easy Block.

BNA-DOWNEY  
FC94/IMPASTATO, J.  
FC95/FRIEND, R.

---

NASA GSFC  
441/VERNACCHIO, A. (7)  
442/HST LIBRARY (2)  
442/KAMEN, B. (2)  
442/LUNDQUIST, R. (2)  
530/MORSE, G.

---

NASA HEADQUARTERS  
ME/PERRY, C.F. (2)  
ME/POSEY, G.  
MZD/MILLER, H.  
PM/MC CULLA, J.W.  
UD/DOARN, C.  
US/ZWIERKO, R.

---

NASA KSC  
AB-F1/GRINTER, K.  
F264/LINTEREUR, P.  
FA-31/MCBREARTY, J.C.  
FF-S-A/CREW QUARTERS  
KSC/KSC TECH LIBRARY-D  
PZ-A3/SOWASH, S. (2)  
USK-215/KELLY, T.E.  
USK-247/HOOPER, J. (2)  
USK-550/VITT OFFICE

---

NASA LERC  
TSC 333-1/CARLISLE-MORGAN, K.L.

---

NASA MSFC  
NASA--MSFC  
DOCUMENTATION REPOSITORY  
BUILDING 4491  
MAIL CODE AD330  
MSFC, AL 35812  
AT01D/TECH DOC REPOSITORY  
CA10/BERG, J.  
EL23/JOHNSON, DALE  
EO52/CHIEF DATA MGMT  
FD34/ETOV LEAD  
NTI/MARSHAL OPERATIONS

---

FALCON AIR FORCE BASE  
LAUNCH OPS  
50 OSS/OSPL  
300 O'MALEY AVENUE  
SUITE 26  
FALCON, CO 80912-5000  
LAUNCH OPERATIONS OFF

---

\*\* U.S. MAIL \*\*

---

DYNATHERM CORPORATION  
1 BEAVER COURT  
HUNT VALLEY, MD 21030  
BIENERT, W.

---

PHILLIPS LABORATORY  
3550 ABERDEEN AVE. SE  
KIRTLAND AFB, NM 87117  
STOYANOF, LT.M.

---

SWALES AEROSPACE  
5050 POWDER MILL ROAD  
BELTSVILLE, MD 20705  
BRENNAN, P.

---

US NAVAL RESEARCH LAB  
4555 OVERLOOK AVE. SW  
WASHINGTON D.C., 20375  
ATTN: MR. J.C. GARNER  
CODE: 8134  
8134/GARNER, J.C.

---

ALLIED SIGNAL CORPORATION  
GODDARD CORPORATE PARK  
7515 MISSION DRIVE  
LANHAM, MD 20706  
NOG/MMU/SIDOTTIL, J. (2)

---

BOEING-CALIFORNIA  
5301 BOLSA AVE. BLDG 17-7  
7D-45 HUNTINGTON BEACH  
CA 92647-2099  
HO17-D415/MUHAR, M.M.  
HO17-D416/SINCLAIR, G.M.  
HO17-D709/WARD, J.

---

BOEING-HUNTSVILLE  
BLDG 48-19  
P.O. BOX 240002  
HUNTSVILLE, AL 35824-6402  
ATTN:SPACELAB DCC  
MAILSTOP: JC-64  
JC-34/SPACEHAB LIBRARY

---

CANADIAN SPACE AGENCY  
6767 ROUTE DE L'AEROPORT  
ST.HUBERT, QUEBEC  
CANADA  
J3Y 8Y9  
ATTN: LIBRARY  
CANADA/GAGNON, M.

---

DRAPER LABORATORIES  
555 TECHNOLOGY SQUARE  
CAMBRIDGE, MA 02139-3539  
77/ZIMPFER, D.  
KACHMAR, P.

---

GTE GOVERNMENT SYSTEMS CORP-NM  
P O BOX 9000  
LAS CRUCES, NM 88004  
TOA/HENDERSON, J.

---

HAMILTON STANDARD  
BRADLEY FIELD RD.  
WINDSOR LOCKS, CT 06096  
1A-2-X65/AUMAN, J.

---

INTERMETRICS, INC., HST  
1100 HERCULES SUITE 300  
HOUSTON, TX 77058  
ATTN:/COLE, D.

---

INTERMETRICS, INC., WV  
100 UNIVERSITY DRIVE  
FAIRMONT, WV 26554  
SHRIVER, SELENA

---

NASA GSFC-AL  
116 JETPLEX CIRCLE  
MADISON, AL 35758  
442/OLSON, K.

---

SPAR AEROSPACE  
9445 AIRPORT ROAD  
BRAMPTON, ONTARIO  
CANADA L6S4J3  
WOODLAND, C. (2)

---

=====  
Total 451  
(10/29/99 - FERNANCA)

---

NOTE  
\* FOR CHANGES \*  
\* IN DISTRIBUTION \*  
\* OR ADDRESS CORRECTIONS \*  
\* CONTACT THE \*  
\* PROCEDURES MANAGEMENT \*  
\* OFFICE AT MAILCODE DO35 \*  
\* OR (281) 244-1184 \*

---

FLIGHT DATA FILE  
Distribution  
103 FLT PLN FSP FIN

\*\* JSC \*\*

AP3/BRANCH DISTRIBUTION (10)  
AP3/PAO DISTRIBUTION (50)  
AP5/SCHOER, R.K.  
BT4/ROSE, HAROLD  
BT4/SLATER, RICK  
C44/HANCOCK, L.  
CA/WETHERBEE, J.D.  
CA4/KWIATKOWSKI, T.W.  
CB/CB FDF REP (4)  
CB/CHIEF, ASTRONAUT OFF.  
CB/FAMILY ESCORT MGR  
DA2/STONE, B.R.  
DAB2/ACTION CENTER  
DF/WOOD, C. (4)  
DF22/DPS FDF REP (4)  
DF24/INCO FDF REP (6)  
DF25/LEAD ODIN (2)  
DF5/MMACS LEAD OFFICER (3)  
DF53/OSO LIBRARY MGR. (2)  
DF62/GNC GROUP LEAD (3)  
DF63/PROP GROUP LEAD (4)  
DF64/LEAD ADCO (2)  
DF73/ELEC SYS GROUP LEAD (4)  
DF73/LEAD EGIL  
DF73/SYSTEMS LIBRARY  
DF74/PHALCON LIBRARY  
DF82/EECOM (5)  
DF83/ECLSS (3)  
DJ4/QUICK, T.K. (3)  
DM2/FLIGHT DESIGN MANAGER  
DM21/LOWES, F.B.  
DM3/LEAD TOPO  
DM32/ORBIT FDO GROUP LEAD (7)  
DM43/DM CONSOLE LIBRARY (2)  
DM43/HEAD  
DM46/ENTRY FDO  
DM46/LSO  
DO12/OPS SAFETY OFFICE  
DO13/FULLER, S.M.  
DO13/HOUSTON SUPPORT GROUP (6)  
DO2/SALINAS, L.  
DO35/BROWN, P.P.  
DO35/FDF LIBRARY

DO35/HANCOCK, P.D.  
DO352/TECH EDITOR  
DO353/BOND/BLUE SHELF (10)  
DO353/FDF FLIGHT LEAD  
DO353/FDF MNGR/RESERVE (15)  
DO4/BOOK MANAGER FLT PLN (20)  
DO4/FAO TEAM (15)  
DO4/LEAD FAO (2)  
DO4/POINTING (4)  
DO4/SHUTTLE FLT PLANNING (3)  
DO44/HEAD  
DO45/SECTION HEAD  
DO512/WEBB, R.  
DO53/CAVALLARO, J.H.  
DO53/MCCULLOUGH, J.A. (9)  
DO54/HASBROOK, A.  
DP/CHIEF  
DT32/TEAM LEAD  
DT34/CONTROL PROP (5)  
DT35/DPS/NAV TRAIN LEAD (4)  
DT36/SHUTTLE SYSTEMS (2)  
DT36/SPENCER, J.  
DT37/CARGO SYSTEMS (3)  
DT37/SHUTTLE COMMUNICATIONS (2)  
DT45/THARP, D. (2)  
DX22/ROBOTICS SECTION (5)  
DX25/RMS TRAINING GROUP (2)  
DX32/EVA (4)  
DX33/CREW SYSTEMS  
DX34/BOOK MANAGER P/TV (2)  
EC/CTSD LIBRARY  
EC3/ROTTER, H.A.  
EC5/ANDERSON, S. (2)  
EC5/CHANG, C.M.  
EE2/RCA SUPPORT  
EG/CRITELLI, S.  
ES3/CHANG, Y. PHD  
ES62/DAVIS, R.  
EV/111/LIBRARY  
EV14-LIB/ASD-14-LIB  
EV3/PHAN, C. (2)  
EV711/MORRIS, P.  
GP23/STIC (6)  
GP28/DULING, D.A.  
GS45/FISK, LINDA  
MER/30 LIBRARY  
MO/P2/WOLFER, J.  
MT3/BANKS, W.R.  
MT3/MANAGER (3)  
MV6/RMS INTEGRATION (3)  
NC4/LEAD  
NC62/MARTINEZ, M. (2)  
NS44/LLOYD, S.

OA/WARD, D.K.  
SD/CLIFTON, J. (4)  
SD-KI/SCARLETT, J.  
SD24/SURGEON (2)  
SD26/PANDER, L. (5)  
SD3/PUTCHA, L.  
SD3621/SOUTH, D.  
SN3/BRETZ, D.  
SN3/CHRISTIANSEN, E.  
SN3/HARDY, A.C.  
SN5/EOL  
SP33/HARRIS, C.D.  
SP43/HEINOL, C.  
SP44/KLOERIS, V.  
USH-434C/ODRC GROUP  
ZR1/USAF TECHNICAL LIBRARY (3)  
ZS8/ASSGND LEAD FORECASTER

\*\* JSC OFFSITE \*\*

HUGHES TRAINING  
TSC/LIBRARY

LOCKHEED-MARTIN-HOUSTON  
C102/STEPHENS, K.  
C33/CHU, J.  
C70/KEENER, J.F.

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

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

BOEING-HOUSTON  
13100 SPACE CENTER BLVD.  
HOUSTON, TX 77059  
HS-22/FLIGHT/STAGE MANAGER  
HS-43/OPERATIONS LEAD  
JHOU2640/FULCHER, C. (12)  
ZC01/ASUNCION, C.  
ZC01/BEYER, M.D.

ZC01/CORONADO, D.J.  
ZC01-555/DE VAULT, G.M.  
ZC03-17/BRYAN, L.W.

BOEING-HOUSTON  
ZC01/BATTLE, H.H.

\*\* POUCH MAIL \*\*

SPACE CENTER HOUSTON  
1601 NASA ROAD 1  
HOUSTON, TX 77058  
ATTN: MBO'S - MAILCODE AP5  
AP5/FUHRMAN, N.

UNITED SPACE ALLIANCE-HOUSTON  
633L/PROJECT OFFICE LIBRARY (3)  
USH-422D/LIBRARY, PROPULS. SYS  
USH-423E/PROX OPS LIBRARY  
USH-423E/TRAJECTORY LIBRARY  
USH-423H/NAVIGATION LIBRARY (2)  
USH-482L/MISSION ENGINEER  
USH-485L/KOCEN, M.  
USH-626L/TRAVLOS, J.A.  
USH-636X/SAIL/GN&C  
USH423-E/RENDEZVOUS LIBRARY  
ZC01/DISTEFANO, F.J.  
ZC01/JENKINS, L.W.  
ZC01/KAGAWA, R.  
ZC20/MEREDITH, M.

BNA-DOWNEY  
841-2, AC85/TAYLOR, B.N.  
AA10/BUIS, A.  
AA05/WOOLHOUSE, D.L.  
AC28/HARPER, L.  
AD60/MC MILLAN, B.J.  
AD75/STS DATA MGMT  
AE 70/JAIMES, A.J.  
AE85/BRYON, K.  
FA19/FERGUS, E.M.  
FA35/GULSBY, J.A.  
FB13/INGRAM, K.  
FB14/ITO, J.K.  
FB75/MC DERMOTT, W.A.  
FC94/GOOSSENS, M.H.