

Flight Plan

STS-59

(FRR Cycle Trajectory - April 7 Launch)

Mission Operations Directorate
Operations Division

Final
February 11, 1994

NOTE
Cover replaced with PCN-1

<u>EVENT</u>			
Launch	07:07 CDT	Thur	April 7
KSC Landing	12:14 CDT	Sat	April 16

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas

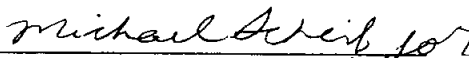


MISSION OPERATIONS DIRECTORATE

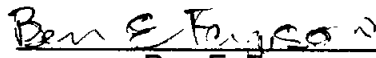
STS-59 FLIGHT PLAN

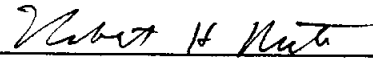
FINAL
February 11, 1994

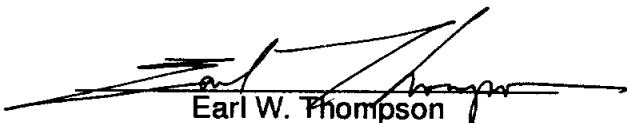
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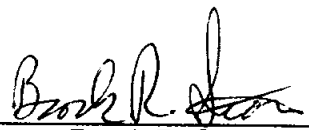

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Book Manager

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	FLT PLN-1610	FLT PLN-1614	FLT PLN-1618	
	FLT PLN-1611	FLT PLN-1615	FLT PLN-1619	
	FLT PLN-1612	FLT PLN-1616	FLT PLN-1620	Exemption #: N/A

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Nominal Timelines	DO4/M. Scheib	244-1149
Attitude & Pointing	DO4/L. Friedl	244-5754

FLIGHT PLAN
STS-59

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STS-59 FLIGHT PLAN FABRICATED ITEMS

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DAP A, DAP B TOC	6-5	FLT PLN-1a/59/O/B
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A1	6-6	FLT PLN-3a/59/O/A
DAP A2	6-6	FLT PLN-3b/59/O/A
A2	6-7	FLT PLN-4a/59/O/A
DAP A3	6-7	FLT PLN-4b/59/O/A
A3	6-7	FLT PLN-5a/59/O/A
DAP A4	6-7	FLT PLN-5b/59/O/A
A4	6-8	FLT PLN-6a/59/O/A
DAP A5	6-8	FLT PLN-6b/59/O/A
A5	6-8	FLT PLN-7a/59/O/A
DAP A6	6-8	FLT PLN-7b/59/O/A
A6	6-9	FLT PLN-8a/59/O/A
DAP A7	6-9	FLT PLN-8b/59/O/A
A7	6-9	FLT PLN-9a/59/O/A
DAP A8	6-9	FLT PLN-9b/59/O/A
A8	6-10	FLT PLN-10a/59/O/A
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DAP B2	6-11	FLT PLN-13b/59/O/A
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DAP B5	6-13	FLT PLN-16b/59/O/A
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DAP B6	6-13	FLT PLN-17b/59/O/A
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DAP B7	6-14	FLT PLN-18b/59/O/A
B7	6-14	FLT PLN-19a/59/O/A
DAP B8	6-14	FLT PLN-19b/59/O/A
B8	6-15	FLT PLN-20a/59/O/A
DAP B10	6-15	FLT PLN-20b/59/O/B
B10	6-15	FLT PLN-21a/59/O/A
DAP B11	6-15	FLT PLN-21b/59/O/A
B11	6-16	FLT PLN-22a/59/O/B
DAP B15	6-16	FLT PLN-22b/59/O/B
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INTRODUCTION

The STS-59 Flight Plan is the Flight Data File article that contains the on-orbit timeline. The Ascent, Post Insertion, Deorbit Prep, and Entry Checklists contain the detailed timelines that the Flight Plan does not cover. For continuity, the summary level timeline includes the entire flight.

This on-orbit timeline satisfies the objectives specified in the Flight Definition and Requirements Directive and the requirements of the STS-59 Flight Requirements Document. The Flight Plan, as part of the Flight Data File, meets the specifications of the STS-59 Flight Initialization Data Pack.

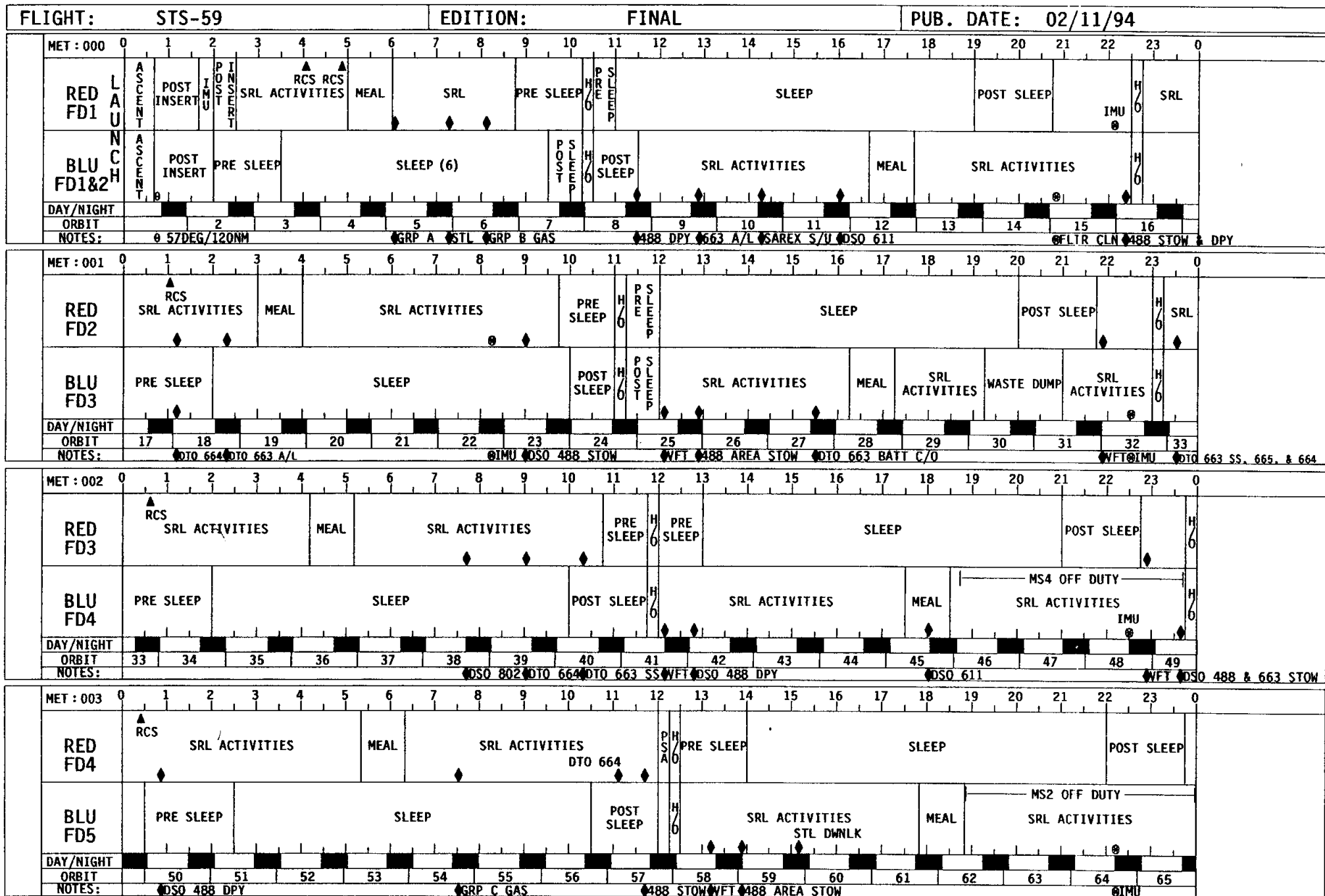
The flight profile used for this Flight Plan is for a launch date of April 7, 1994 at 12:07 GMT.

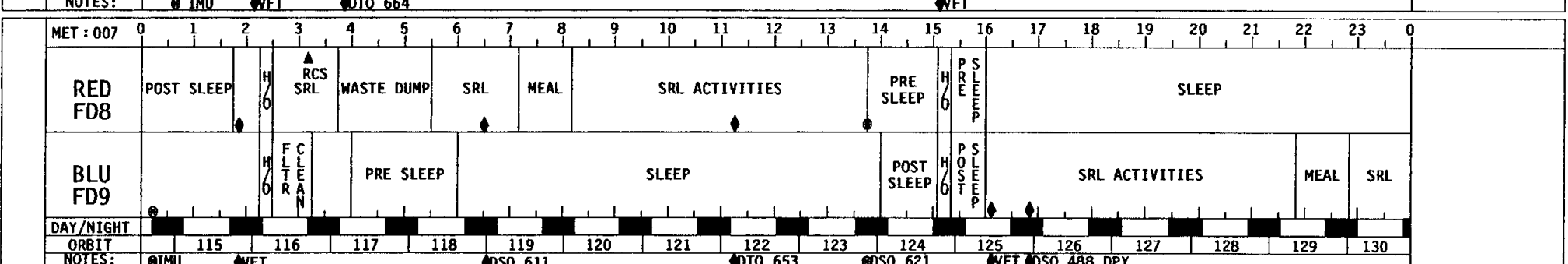
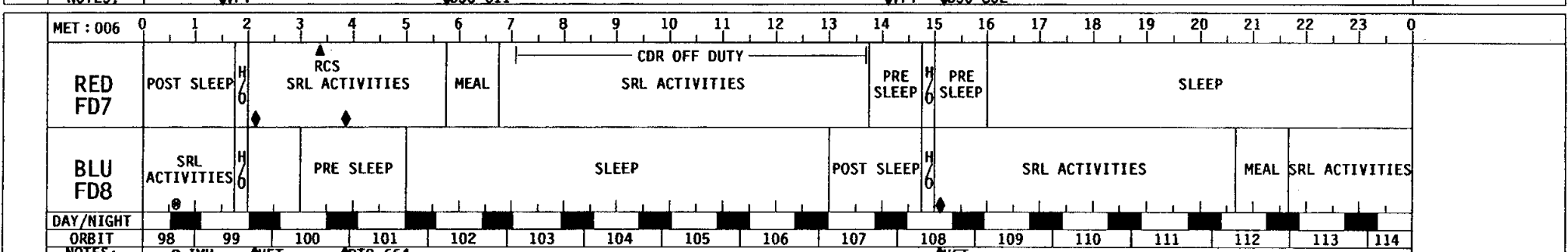
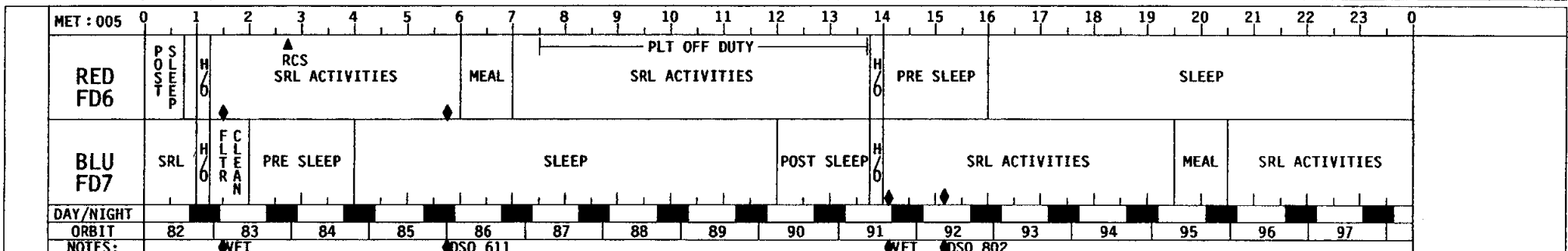
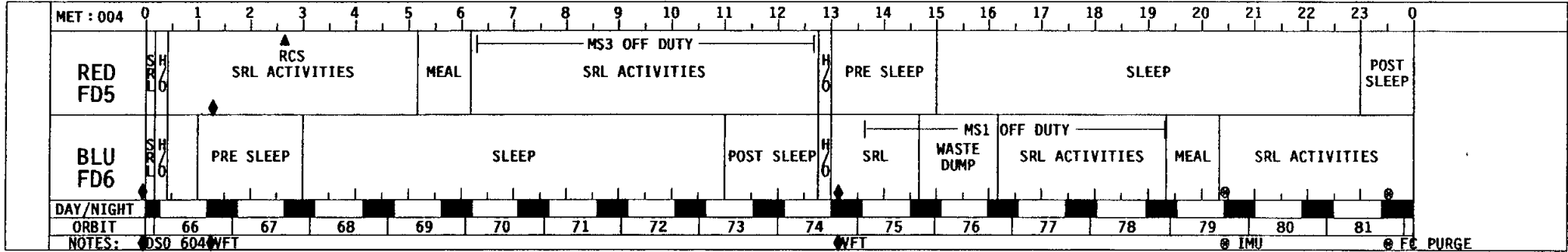
JSC-22359, Crew Scheduling Constraints (Appendix K, CPMP), Basic, Rev B, January 1992, has been used to build the timelines contained in this Flight Plan.

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

STS-59 OVERVIEW

OVERVIEW





MET: 008	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	0
RED FD9	POST SLEEP	COMF H/O	FCS C/O	SRL HOT FR	SRL	RCS SRL	MEAL	SRL ACTIVITIES	SRL & CABIN STOW	IMU/ HUD	SRL & CABIN STOW	PRE SLEEP	PSA	SLEEP (6.5)										POST SLEEP	
BLU FD10	SRL CAC OK ND F/ TV	COMF H/O	IMU/ COAS	PRE SLEEP			SLEEP						PSA	POST SLEEP	PL DEACT	CABIN STOW	MEAL								
DAY/NIGHT	[Day/Night Cycle]																								
ORBIT	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146									
NOTES:	OSO 488 STOW/DPY & 621 STL GRP D&E GAS OSO 488 STOW & 621 WFT SAREX STOW																								

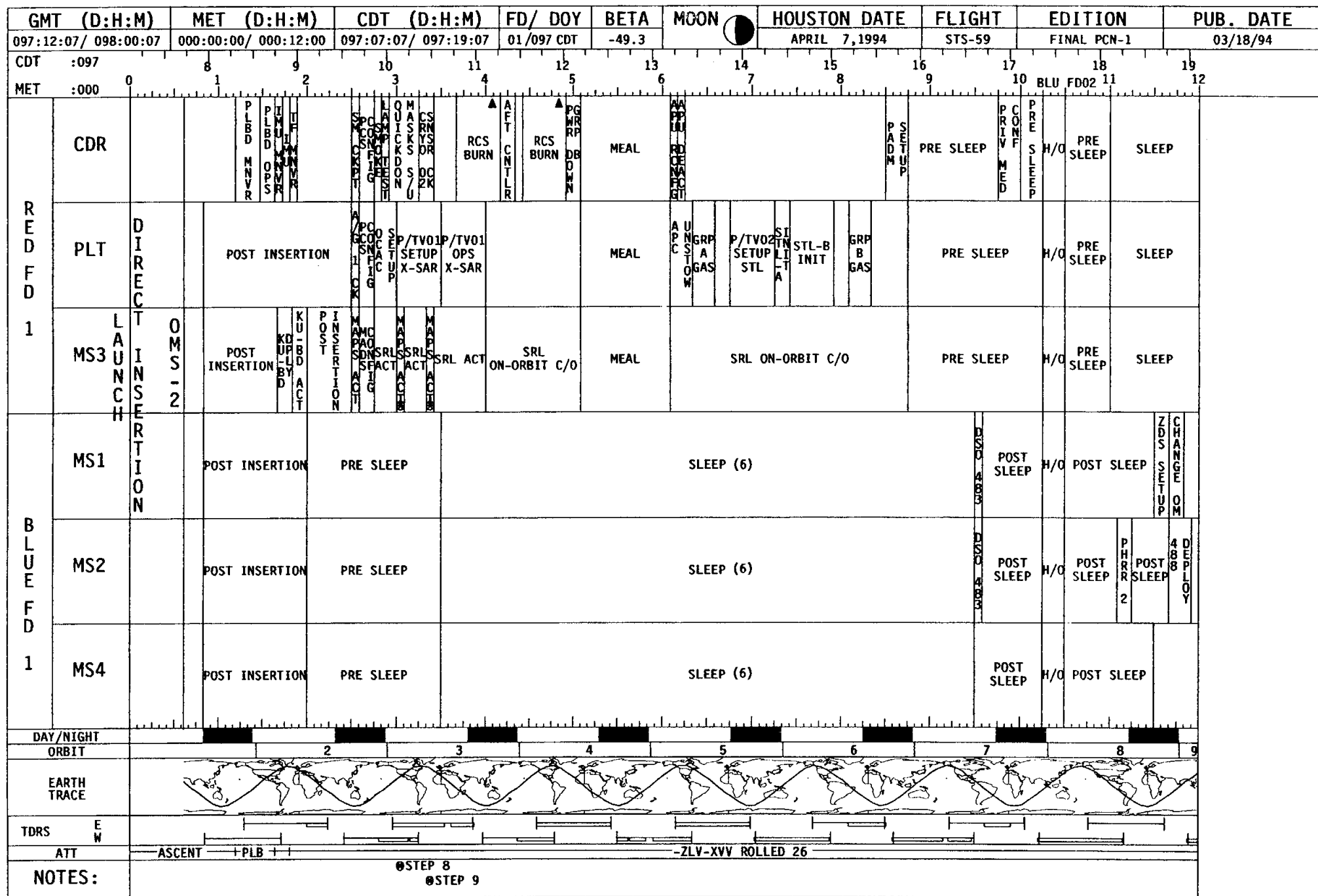
MET: 009	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	0
RED FD10	PSA	DEORBIT PREP			D/O	LANDING																			
BLU FD10	PSA	DEORBIT PREP			BURN	LANDING																			
DAY/NIGHT	[Day/Night Cycle]																								
ORBIT	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162									
NOTES:	OSO 603 IMU 04:12 * KSC LANDING 09/05:07																								

MET: 010	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	0
RED FD11																									
BLU FD11																									
DAY/NIGHT	[Day/Night Cycle]																								
ORBIT	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179								
NOTES:																									

MET: 011	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	0
RED																									
BLU																									
DAY/NIGHT	[Day/Night Cycle]																								
ORBIT																									
NOTES:																									

SUMMARY TIMELINE

SUMMARY TIMELINE



GMT (D:H:M)		MET (D:H:M)		CDT (D:H:M)		FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE					
098:00:07/ 098:12:07		000:12:00/ 001:00:00		097:19:07/ 098:07:07		/097 CDT	-48.5		APRIL 7, 1994	STS-59	FINAL PCN-1	03/18/94					
CDT	:097	20	21	22	23	0	CDT:098	1	2	3	4	5	6	7	0	MET:001	
MET	:000	12	13	14	15	16	17	18	19	20	21	22	RED FD02	23			
RED FD 1	CDR	SLEEP								POST SLEEP	VFT TESTS	ERGOMETER SETUP	H/O	4088 EXERCISE/DSO 624			
	PLT	SLEEP								POST SLEEP		ERGOMETER SETUP	H/O	ROWER SETUP	NOZ	NF	
	MS3	SLEEP								POST SLEEP			H/O	PHRR 2	PHRR 3	SSSS	
BLUE FD 2	MS1	VFT TESTS	CHANGE O M	SARTEX	PACKET	CHANGE O M	DSO 611	CHANGE O M	MEAL	CHANGE O M	ORB/PL FILTER CLN	IMNVR	TF	SARTEX	H/O	SARTEX	
	MS2		PHRR 1	PHRR 3			PHRR 1		MEAL			PHRR 2		PHRR 1	488	STOM	H/O
	MS4								MEAL								H/O
DAY/NIGHT																	
ORBIT																	
EARTH TRACE																	
TDRS																	
ATT		-ZLV-XVV ROLLED 26															
NOTES:		@PL UPDATE @SURREY, ENGLAND TEST @HOUSTON TEST B/U															

GMT (D:H:M)		MET (D:H:M)		CDT (D:H:M)		FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE		
098:12:07/ 099:00:07		001:00:00/ 001:12:00		098:07:07/ 098:19:07		/098 CDT	-47.5		APRIL 8, 1994	STS-59	FINAL PCN-1	03/18/94		
CDT	:098	8	9	10	11	12	13	14	15	16	17	18	19	
MET	:001	0	1	2	3	4	5	6	7	8	9	10	11	12
RED FD 2	CDR		MULTIAXIS RCS BURN	CHANGE OM	DT0 664	TF MNVR	663 DATA	CHANGE OM	MEAL	CHANGE OM	CHANGE OM	CHANGE OM	CHANGE OM	CHANGE OM
	PLT	PHRR 1	PHRR 2	PHRR 1	PHRR 2	PHRR 1	PHRR 2	PHRR 1	MEAL	PHRR 2	EXERCISE/DSO 608	PHRR 1	PHRR 2	PHRR 1
	MS3	PHRR 1	PHRR 2	PHRR 1	PHRR 2	PHRR 1	PHRR 2	PHRR 1	MEAL	PHRR 2	EXERCISE	PHRR 1	PHRR 2	PHRR 1
BLUE FD 2	MS1	PRE SLEEP							SLEEP				POST SLEEP H/O	POST SLEEP
	MS2	PRE SLEEP							SLEEP				POST SLEEP H/O	POST SLEEP
	MS4	PRE SLEEP							SLEEP				POST SLEEP H/O	POST SLEEP
DAY/NIGHT ORBIT		17	18	19	20	21	22	23	24	25				
EARTH TRACE														
TDRS ATT		+XVV		-ZLV-XVV BIASED 26						-ZLV-XVV ROLLED 26				
NOTES:		EXERCISE/DSO 624		AIRLOCK				PLAYA DEL REY, CA		DAVISVILLE, WV		ANTHONY, KS		

GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE																																																								
099:00:07 / 099:12:07	001:12:00 / 002:00:00	098:19:07 / 099:07:07	/098 CDT	-46.4		APRIL 8, 1994	STS-59	FINAL PCN-1	03/18/94																																																								
CDT :098	20	21	22	23	0	CDT:099	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	RED	FD03	0	MET:002																																
MET :001	12	13	14	15	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	41	42	43	44	45	46	47	48	49	50																										
RED FD 2	CDR	SLEEP										POST SLEEP					VFT TESTS	H/O					DTO 665	SSSSSS TTTTTT AAAAAA EEEEEE																																									
	PLT	SLEEP										POST SLEEP					H/O					CHANGE COM	TTTTTT AAAAAA EEEEEE SSSSSS																																										
	MS3	SLEEP										POST SLEEP					H/O					CHANGE COM	TTTTTT AAAAAA EEEEEE SSSSSS																																										
BLUE FD 3	MS1	VFT TESTS	CHANGE COM	EXERCISE/DSO 624	CHANGE COM	SABREOT	CHANGE COM	MEAL	CHANGE COM	NF MNVR	BATET	CHANGE COM	WASTE	DUMP INIT	CHANGE COM	NF MNVR	CHANGE COM	MDAUSM PSSM AETP DTE MUP	P/TV09 SETUP PAO	CHANGE COM	IMU MNV	NF MNVR	PAO OPP	H/O		DTO 664	SSSSSS TTTTTT AAAAAA EEEEEE																																						
	MS2	PHRR 2	488 SVC	SABREOT	PHRR 1 2	EXERCISE/DSO 624	PHRR 1	MEAL	PHRR 3 2	H/O					PHRR 1	PHRR 2	PHRR 3	PHRR 4	PHRR 5	PHRR 6	PHRR 7	PHRR 8	PHRR 9	PHRR 10	PHRR 11	PHRR 12	PHRR 13	PHRR 14	PHRR 15	PHRR 16	PHRR 17	PHRR 18	PHRR 19	PHRR 20	PHRR 21	PHRR 22	PHRR 23	PHRR 24	PHRR 25																										
	MS4	PHRR 1	PHRR 2	PHRR 3	PHRR 4	PHRR 5	PHRR 6	PHRR 7	PHRR 8	PHRR 9	PHRR 10	PHRR 11	PHRR 12	PHRR 13	PHRR 14	PHRR 15	PHRR 16	PHRR 17	PHRR 18	PHRR 19	PHRR 20	PHRR 21	PHRR 22	PHRR 23	PHRR 24	PHRR 25	PHRR 26	PHRR 27	PHRR 28	PHRR 29	PHRR 30	PHRR 31	PHRR 32	PHRR 33	PHRR 34	PHRR 35	PHRR 36	PHRR 37	PHRR 38	PHRR 39	PHRR 40																								
DAY/NIGHT	DAY		NIGHT		DAY		NIGHT		DAY		NIGHT		DAY		NIGHT		DAY		NIGHT		DAY		NIGHT		DAY		NIGHT		DAY		NIGHT		DAY		NIGHT		DAY																												
ORBIT	25		26		27		28		29		30		31		32		33		34		35		36		37		38		39		40		41		42		43																												
EARTH TRACE																																																																	
TDRS																																																																	
ATT	-ZLV-XVV ROLLED 26 +XVV -XVV +XVV +XVV																																																																
NOTES:	@PERSONAL CONTACT																									@AIRLOCK																									@PL UPDATE					@BALTIMORE, MD					@SLEEP STATION				

GMT (D:H:M)		MET (D:H:M)		CDT (D:H:M)		FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE				
099:12:07/ 100:00:07		002:00:00/ 002:12:00		099:07:07/ 099:19:07		/099 CDT	-45.1		APRIL 9, 1994	STS-59	FINAL PCN-1	03/18/94				
CDT :099		8		9		10	11	12	13	14	15	16	17	18	19	
MET :002		0		1		2	3	4	5	6	7	8	9	10	11	12
RED FD 3	CDR	MULT AXIS RCS BURN		EXERCISE/DSO 624		MEAL		P/TV7 OPS 802 FD		P/TV7 OPS 802 FD		PRE SLEEP		H/C		
	PLT	EXERCISE/DSO 608		MEAL		P/TV7 SETUP 802 FD		P/TV7 OPS 802 FD		PRE SLEEP		H/C				
	MS3	MEAL		P/TV02 OR 03 SETUP		EXERCISE		PRE SLEEP		H/C						
BLUE FD 3	MS1	PRE SLEEP		SLEEP		POST SLEEP		H/C								
	MS2	PRE SLEEP		SLEEP		POST SLEEP		H/C								
	MS4	PRE SLEEP		SLEEP		POST SLEEP		H/C								
DAY/NIGHT		ORBIT		EARTH TRACE		TDRS		ATT		NOTES:						
		33 34 35 36 37 38 39 40 41				E W		-XVV +XVV		BIASED -ZLV -XVV		@W. BLOOMFIELD, MI @SLEEP STATION @RICHARDSON, TX @SAN RAMON, CA				

GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
100:00:07/ 100:12:07	002:12:00/ 003:00:00	099:19:07/ 100:07:07	/099 CDT	-43.7		APRIL 9, 1994	STS-59	FINAL PCN-1	03/18/94

CDT :099	20	21	22	23	0	1	2	3	4	5	6	7	MET:003
MET :002	12	13	14	15	16	17	18	19	20	21	22	23	

RED FD 3	CDR	PRE SLEEP	SLEEP										POST SLEEP	VFT TESTS	H/O
	PLT	PRE SLEEP	SLEEP										POST SLEEP		H/O
	MS3	PRE SLEEP	SLEEP										POST SLEEP		H/O

BLUE FD 4	MS1	VFT TESTS	EXERCISE/DSO 624	CHANGE OM	SABOT	CHANGE OM	CHANGE OM	MEAL	DSO 611	CHANGE OM	NF MNR	CHANGE OM	V O R I C E	IMU	NF MNR	CHANGE OM	V O R I C E	603 DATA	H/O	
	MS2	4D BELLY	CHANGE OM	PHRR 3	PHRR 1	P/TVO2 OR 03 SETUP	P/R V O 3	EXERCISE/DSO 624	PHRR 1	MEAL	PHRR 2	PHRR 1	PHRR 2	PHRR 1	PHRR 2	PHRR 1	PHRR 2	PHRR 1	488 STOW	H/O
	MS4	PHRR 2	PHRR 1	PHRR 2	PHRR 1	PHRR 2	PHRR 1	PHRR 2	PHRR 1	MEAL	OFF DUTY/EXERCISE						PHRR 1	PHRR 2	H/O	

DAY/NIGHT	41	42	43	44	45	46	47	48	49
ORBIT									

EARTH TRACE									
TDRS	BIASED -ZLV -XV								
ATT	+XVV IMU +XVV -XVV								

NOTES:
 @PALTAMO, FINLAND @NORTHAMPTON, AUSTRALIA
 @EASTERN U.S. B/U
 @SLEEP STATION/STOW

GMT (D:H:M)		MET (D:H:M)		CDT (D:H:M)		FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE		
100:12:07/ 101:00:07		003:00:00/ 003:12:00		100:07:07/ 100:19:07		/100 CDT	-42.2	☉	APRIL 10, 1994	STS-59	FINAL PCN-1	03/18/94		
CDT	:100	8	9	10	11	12	13	14	15	16	17	18	19	
MET	:003	0	1	2	3	4	5	6	7	8	9	10	11	12
RED FD 4	CDR	MULT AXIS RCS BURN	CHANGE OM	DTO 664	EXERCISE/DSO 624		CHANGE OM	MEAL	CHANGE OM	CHANGE OM	CHANGE OM	CHANGE OM	CHANGE OM	CHANGE OM
	PLT		PHRR 1	PHRR 2	EXERCISE/DSO 608		CHANGE OM	P/TV09 SETUP PAO	PAO OPP	MEAL	PHRR 2	PHRR 1	PHRR 2	PHRR 3
	MS3	PHRR 3	PHRR 1	PHRR 2	PHRR 1	PHRR 2	PHRR 1	PHRR 2	PHRR 1	MEAL	PHRR 1	PHRR 2	PHRR 3	PHRR 1
BLUE FD 4	MS1		PRE SLEEP				SLEEP				POST SLEEP			
	MS2		PRE SLEEP				SLEEP				POST SLEEP			
	MS4		PRE SLEEP				SLEEP				POST SLEEP			
DAY/NIGHT	[Day/Night Cycle Bar]													
ORBIT	49	50	51	52	53	54	55	56	57					
EARTH TRACE	[Earth Trace Map]													
TDRS	E	[TDRS E Bar]												
ATT	-XVV	++XVV					BIASED -ZLV -XVV							
NOTES:	◎NORTHAMPTON, AUSTRALIA B/U ◎CENTRAL U.S. B/U ◎WESTERN U.S. B/U FLT PLN/59/FIN 1													

GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
101:00:07/ 101:12:07	003:12:00/ 004:00:00	100:19:07/ 101:07:07	/100 CDT	-40.6	●	APRIL 10, 1994	STS-59	FINAL PCN-1	03/18/94

CDT :100	20	21	22	23	0	CDT:101	1	2	3	4	5	6	7	MET:004
MET :003	12	13	14	15	16	17	18	19	20	21	22	23	0	

RED FD 4	CDR	FAM CONF	H/O	PRE SLEEP	SLEEP										POST SLEEP
	PLT	PRE SQUAD	H/O	PRE SLEEP	SLEEP										POST SLEEP
	MS3	PRE SQUAD	H/O	PRE SLEEP	SLEEP										POST SLEEP

BLUE FD 5	MS1	H/O	NF MNV	VFT TESTS	EXERCISE/DSO 624	CHANGE OM	CHANGE OM	CHANGE OM	TF MNV	CHANGE OM	MEAL	NO DEGR	NF MNV	SA ROBOT	CHANGE OM	SA REX	VOI CE	CHANGE OM	IN U	NF MNV	CHANGE OM	SA REX	PT MUL	DTO 664	
	MS2	H/O	PH RRR	1	PH RRR	2	PH RRR	1	PH RRR	2	MEAL	OFF DUTY/EXERCISE													
	MS4	H/O	PH RRR	1	PH RRR	2	PH RRR	1	PH RRR	2	EXERCISE/DSO 624	MEAL	PH RRR	1	PH RRR	2	PH RRR	1	PH RRR	2	PH RRR	1	PH RRR	2	PH RRR

DAY/NIGHT	58					59					60					61					62					63					64					65				
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TDRS	-ZLV +XVV					-XVV					+XVV					-XVV				
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NOTES: PRIV MED CONF DT0 656 @PALTAMO, FINLAND B/U @PL UPDATE

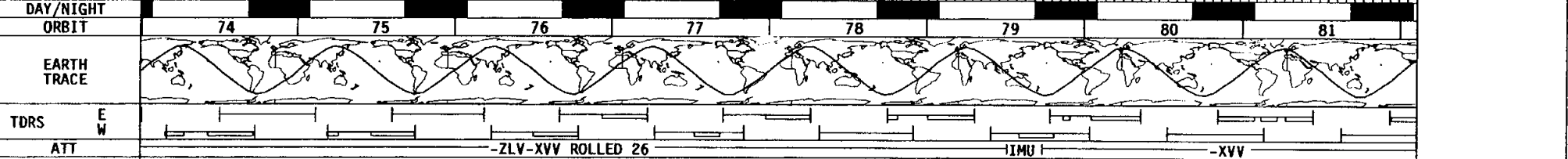
GMT (D:H:M)		MET (D:H:M)		CDT (D:H:M)		FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE										
101:12:07/ 102:00:07		004:00:00/ 004:12:00		101:07:07/ 101:19:07		/101 CDT	-38.9	●	APRIL 11, 1994	STS-59	FINAL PCN-1	03/18/94										
CDT	:101	8	9	10	11	12	13	14	15	16	17	18	19									
MET	:004	0	1	2	3	4	5	6	7	8	9	10	11	12								
RED FD 5	CDR	H/O	NF MNVR	TF MNVR	VFT TESTS	MULTI AXIS RCS BURN	CHANGE OM	EXERCISE/DSO 624	CHANGE OM	MEAL	NF MNVR	TF MNVR	CHANGE OM	SV ARX 9	CHANGE OM	NF MNVR	P/TV09 SETUP PAO	PAO OPP	TF MNVR	PS AD MLP		
	PLT	H/O	PHRR 2	PHRR 1	CHANGE OM	PHRR 2	CHANGE OM	EXERCISE/DSO 608	CHANGE OM	MEAL	PHRR 1	PHRR 2	PHRR 1	PHRR 2	PHRR 1	PHRR 2	PHRR 1	PHRR 2	PHRR 1	PHRR 2	PHRR 1	PHRR 2
	MS3	H/O	PHRR 2	PHRR 1	CHANGE OM	PHRR 2	CHANGE OM	EXERCISE/DSO 608	CHANGE OM	MEAL	PHRR 1	PHRR 2	PHRR 1	PHRR 2	PHRR 1	PHRR 2	PHRR 1	PHRR 2	PHRR 1	PHRR 2	PHRR 1	PHRR 2
BLUE FD 5	MS1	H/O	PRE SLEEP											SLEEP			POST SLEEP					
	MS2	H/O	PRE SLEEP											SLEEP			POST SLEEP					
	MS4	H/O	PRE SLEEP											SLEEP			POST SLEEP					
DAY/NIGHT		[Day/Night Cycle]																				
ORBIT		66 67 68 69 70 71 72 73																				
EARTH TRACE		[Earth Trace Map]																				
TDRS		[TDRS Schedule]																				
ATT		-XVV +XVV -ZLV-XVV ROLLED 26 +XVV -XVV +XVV -ZLV-XVV ROLLED 26																				
NOTES:		OFF DUTY/EXERCISE @PERSONAL CONTACT																				

GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
102:00:07/ 102:12:07	004:12:00/ 005:00:00	101:19:07/ 102:07:07	/101 CDT	-37.1	●	APRIL 11, 1994	STS-59	FINAL PCN-1	03/18/94

CDT :101	20	21	22	23	0	CDT:102	1	2	3	4	5	6	7	MET:005
MET :004	12	13	14	15	16	17	18	19	20	21	22	23	0	

RED FD 5	CDR	PRIM MED CONF	H/O	PRE SLEEP	SLEEP										POST SLEEP
	PLT		H/O	PRE SLEEP	SLEEP										POST SLEEP
	MS3		H/O	PRE SLEEP	SLEEP										POST SLEEP

BLUE FD 6	MS1	POST SLEEP	H/O	VFT TESTS	OFF DUTY/EXERCISE										MEAL	INU MNV R	TF MNV R	CHANGE OM	SABOT	CAMET	CHANGE OM	CC PURG M
	MS2	POST SLEEP	H/O	PHRR 2	CHANGE OM	P/TVO9 SETUP PAO	PAO OPP	WASTE INIT	CHANGE OM	WD AU SM PT HE OM	CHANGE OM	EXERCISE/DSO 624	CHANGE OM	PHRR 1	MEAL	PHRR 2	PHRR 1	PHRR 3				
	MS4	POST SLEEP	H/O	PHRR 1	PHRR 3	PHRR 1	PHRR 3	PHRR 1	PHRR 3	PHRR 1	PHRR 3	PHRR 1	PHRR 3	PHRR 1	PHRR 3	MEAL	PHRR 1	PHRR 3	EXERCISE/DSO 624			



NOTES: A OFF DUTY/EXERCISE MANUAL

GMT (D:H:M)		MET (D:H:M)		CDT (D:H:M)		FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE											
102:12:07/ 103:00:07		005:00:00/ 005:12:00		102:07:07/ 102:19:07		/102 CDT	-35.2	●	APRIL 12, 1994	STS-59	FINAL PCN-1	03/18/94											
CDT	:102	8	9	10	11	12	13	14	15	16	17	18	19										
MET	:005	0	1	2	3	4	5	6	7	8	9	10	11	12									
RED FD 6	CDR	POST SLEEP	H/O	CHANGE OM	VFT TESTS	PC CONF	MULT AXIS RCS BURN	CHANGE OM	P/TV02 OR 03 SETUP	P/TV02 OR 03 OPS	N F M N V R	MEAL	N F M N V R	TF M N V R	HER C O L O R	CR E A T I N G	CR E A T I N G	N F M N V R	CHANGE OM	EXERCISE/DSO 624	TF M N V R		
	PLT	POST SLEEP	H/O	P H R R R 2	W O B S D O W N	PC CONF		P H R R R 2	DSO 611		P H R R R 1		P H R R R 2	MEAL	P H R R R 3						OFF DUTY/EXERCISE		
	MS3	POST SLEEP	H/O	P H R R R 2	P H R R R 2	P H R R R 1								EXERCISE									
BLUE FD 6	MS1	PS ADT MUR	TF M N V R	H/O	ORB/PL FILTER CLN		PRE SLEEP														SLEEP		
	MS2			H/O			PRE SLEEP															SLEEP	
	MS4			H/O			PRE SLEEP															SLEEP	
DAY/NIGHT																							
ORBIT		82		83		84		85		86		87		88		89		90					
EARTH TRACE																							
TDRS																							
ATT		+XVV -ZLV-XVV ROLLED 26 +XVV -XVV +XVV																					
NOTES:		@PL UPDATE										@CABIN TEMP CNTL RECONFIG											

GMT (D:H:M)		MET (D:H:M)		CDT (D:H:M)		FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE						
103:00:07/ 103:12:07		005:12:00/ 006:00:00		102:19:07/ 103:07:07		/102 CDT	-33.3	●	APRIL 12, 1994	STS-59	FINAL PCN-1	03/18/94						
CDT	:102	20	21	22	23	0	CDT:103	1	2	3	4	5	6	7	0	MET:006		
MET	:005	12	13	14	15	16	17	18	19	20	21	22	23	24	25			
RED FD 6	CDR	CHANGE PS DTMUP OM		DTO 664	H/O	PRE SLEEP	SLEEP											
	PLT	OFF DUTY/EXERCISE		H/O	PRE SLEEP	SLEEP												
	MS3	OFF DUTY/EXERCISE		H/O	PRE SLEEP	SLEEP												
BLUE FD 7	MS1	POST SLEEP		H/O	VFT TESTS	P08 /P0 TS2 V O 7 M D	P08 /P0 TS2 V O 7 M D	P08 /P0 TS2 V O 7 M D	EXERCISE/DSO 624		CHANGE OM		MEAL		CHANGE OM		CHANGE OM	
	MS2	POST SLEEP		H/O	P/TV7 SETUP 802 MD	P08 /P0 TS2 V O 7 M D	P08 /P0 TS2 V O 7 M D	PHRR 2	EXERCISE/DSO 624		PHRR 3	PHRR 2	MEAL		MEAL	PHRR 2	PHRR 1	PHRR 1
	MS4	POST SLEEP		H/O	PHRR 1	PHRR 1	P08 /P0 TS2 V O 7 M D	EXERCISE/DSO 624		MEAL		P/TV09 SETUP PAO		PAO OPP	PHRR 1	PHRR 1	PHRR 1	PHRR 1
DAY/NIGHT		ORBIT		90	91	92	93	94	95	96	97	98						
EARTH TRACE																		
TDRS																		
ATT		BIASED -ZLV -XV																
NOTES:																		

GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE								
103:12:07/ 104:00:07	006:00:00/ 006:12:00	103:07:07/ 103:19:07	/103 CDT	-31.3	●	APRIL 13, 1994	STS-59	FINAL PCN-1	03/18/94								
CDT :103	8	9	10	11	12	13	14	15	16	17	18	19					
MET :006	0	1	2	3	4	5	6	7	8	9	10	11	12				
RED FD 7	CDR	POST SLEEP	H/O	VFT TESTS	MULTI AXIS RCS BURN	CHANGE OM	DTO 664	NF MNVR	CHANGE OM	MEAL	CHANGE OM	OFF DUTY/EXERCISE					
	PLT	POST SLEEP	H/O	P HRRR 1	CHANGE OM	EXERCISE/DSO 608	P HRRR 1	MEAL	CHANGE OM	P HRRR 2	PYR MNVR	CHANGE OM	WIND DOWN	CHANGE OM	CHANGE OM	CHANGE OM	VOICE
	MS3	POST SLEEP	H/O	P HRRR 2	CHANGE OM	MEAL	CHANGE OM	CHANGE OM	CHANGE OM	CHANGE OM	CHANGE OM	CHANGE OM	CHANGE OM	CHANGE OM	CHANGE OM	CHANGE OM	CHANGE OM
BLUE FD 7	MS1	CHANGE OM	H/O	PRE SLEEP	CHANGE OM	SLEEP	CHANGE OM	CHANGE OM	CHANGE OM	CHANGE OM	CHANGE OM	CHANGE OM					
	MS2	P HRRR 2 3	H/O	PRE SLEEP	CHANGE OM	SLEEP	CHANGE OM	CHANGE OM	CHANGE OM	CHANGE OM	CHANGE OM	CHANGE OM					
	MS4	CHANGE OM	H/O	PRE SLEEP	CHANGE OM	SLEEP	CHANGE OM	CHANGE OM	CHANGE OM	CHANGE OM	CHANGE OM	CHANGE OM					
DAY/NIGHT ORBIT	98	99	100	101	102	103	104	105	106								
EARTH TRACE																	
TDRS E W																	
ATT	+XVV	IMU	-XVV	+XVV	-XVV	+XVV	-XVV	+XVV	BIASED	-ZLV	-XVV						
NOTES:	●H/O BLUE TO RED ●PL UPDATE ●PERSONAL CONTACT										●PERSONAL CONTACT						

GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
104:00:07/ 104:12:07	006:12:00/ 007:00:00	103:19:07/ 104:07:07	/103 CDT	-29.2		APRIL 13, 1994	STS-59	FINAL PCN-1	03/18/94

CDT :103	20	21	22	23	0	CDT:104	1	2	3	4	5	6	7	0	MET:007
MET :006	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

R E D F D 7	CDR	OFF DUTY/EXERCISE	PRE SLEEP	PRE SLEEP	H/O	PRE SLEEP	SLEEP	
	PLT	PHRR 1	CHANGE OM	PRE SLEEP	PRE SLEEP	H/O	PRE SLEEP	SLEEP
	MS3	PHRR 1	CHANGE OM	PRE SLEEP	H/O	PRE SLEEP	SLEEP	

B L U E F D 8	MS1	SLEEP	POST SLEEP	H/O	VFT TESTS	EXERCISE/DSO 624	MEAL
	MS2	SLEEP	POST SLEEP	H/O	PHRR 2	EXERCISE/DSO 624	MEAL
	MS4	SLEEP	POST SLEEP	H/O	PHRR 2	EXERCISE/DSO 624	MEAL

DAY/NIGHT	106	107	108	109	110	111	112	113	114
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TDRS	E	W
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ATT	BIASED -ZLV -XVV	+XVV
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NOTES: @PERSONAL CONTACT

GMT (D:H:M)		MET (D:H:M)		CDT (D:H:M)		FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE							
104:12:07/ 105:00:07		007:00:00/ 007:12:00		104:07:07/ 104:19:07		/104 CDT	-27.1	☉	APRIL 14, 1994	STS-59	FINAL PCN-1	03/18/94							
CDT :104		8	9	10	11	12	13	14	15	16	17	18	19						
MET :007		0	1	2	3	4	5	6	7	8	9	10	11	12					
RED FD 8	CDR	POST SLEEP	VFT TESTS	H/O	MULT AXIS RCS BURN	CHASTE CHANGE OM	DUMP INIT	CHANGE OM	DT0 664	WD AUS TERR	CHANGE OM	TF MNV R	MEAL	NF MNV R	P/TV09 SETUP PAO	CHANGE OM	TF MNV R	CHANGE OM	DT0 653 ROWER EVAL
	PLT	POST SLEEP	H/O	PO8 /PO TS2 V O 7	WIND OW	PHRR 1 3	PHRR 2	DSO 611	MEAL	PHRR 1	EXERCISE/DSO 608	PHRR 2							
	MS3	POST SLEEP	H/O	P/TV7 SETUP 802 MD	PO8 /PO TS2 V O 7	PHRR 1 3	PHRR 2	MEAL	PAO OPP										
BLUE FD 8	MS1	CHANGE OM	PSA DT MUL P	CHANGE OM	H/O	ORB/PL FILTER CLN	PRE SLEEP	SLEEP											
	MS2	PHRR 1	SWAP 486	PHRR 2	H/O	PRE SLEEP	SLEEP												
	MS4	PHRR 1	PHRR 2	H/O	PRE SLEEP	SLEEP													
DAY/NIGHT		[Day/Night Cycle]																	
ORBIT		114	115	116	117	118	119	120	121	122									
EARTH TRACE		[Earth Trace Map]																	
TDRS		[TDRS Schedule]																	
ATT		-XVV +XVV -XVV +XVV																	
NOTES:		⊕PL UPDATE PHRR 1																	

GMT (D:H:M)		MET (D:H:M)		CDT (D:H:M)		FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE					
105:00:07/ 105:12:07		007:12:00/ 008:00:00		104:19:07/ 105:07:07		/104 CDT	-24.9		APRIL 14, 1994	STS-59	FINAL PCN-1	03/18/94					
CDT	:104	12	20	21	22	23	0	CDT:105	1	2	3	4	5	6	7	0	MET:008
MET	:007					BLU FD09	16		17	18	19	20	21	22	23		
RED FD 8	CDR	DTO 653 ROWER EVAL	PS AET DT MUP	CHANGE OM	PRE SLEEP	CONF MED H/O	FAM CONF		PRE SLEEP								SLEEP
	PLT	PHRR 1	CHANGE OM	PHRR 2	PRE SLEEP	PHRR 3	H/O		PRE SLEEP								SLEEP
	MS3	EXERCISE			PRE SLEEP	H/O			PRE SLEEP								SLEEP
BLUE FD 9	MS1	SLEEP	CHANGE OM	POST SLEEP	H/O	POST SLEEP	CHANGE OM	VFT TESTS	EXERCISE/DSO 624	CHANGE OM	MEAL	NF MNV	MEAL	CHANGE OM	PS AET DT MUP	PHRR 1	
	MS2	SLEEP	CHANGE OM	POST SLEEP	H/O	POST SLEEP	CHANGE OM	PHRR 1	EXERCISE/DSO 624	CHANGE OM	MEAL	PHRR 2	PHRR 3	CHANGE OM	PHRR 1		
	MS4	SLEEP	CHANGE OM	POST SLEEP	H/O	POST SLEEP	CHANGE OM	PHRR 1	EXERCISE/DSO 624	CHANGE OM	P/TV02 OR 03 SETUP	MEAL	PHRR 2	PHRR 3	CHANGE OM	PHRR 1	
DAY/NIGHT																	
ORBIT		122	123	124	125	126	127	128	129	130							
EARTH TRACE																	
TDRS																	
ATT		-ZLV-XVV ROLLED 26															
NOTES:		@PERSONAL CONTACT B/U															
		+XVV															

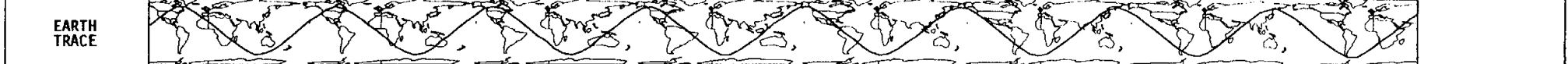
GMT (D:H:M)		MET (D:H:M)		CDT (D:H:M)		FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE														
105:12:07/ 106:00:07		008:00:00/ 008:12:00		105:07:07/ 105:19:07		/105 CDT	-22.7	●	APRIL 15, 1994	STS-59	FINAL PCN-1	03/18/94														
CDT	:105	8	9	10	11	12	13	14	15	16	17	18	19													
MET	:008	0	1	2	3	4	5	6	7	8	9	10	11	12												
RED FD 9	CDR	POST SLEEP	CREW CONF	H/O	FCS C/O	AD BEP SOL	RCS HOT	FI FIRE	POB/TS2 V O 7	D/O PREP BRIEF	DTG 603	MULTI AXIS RCS BURN	MEAL	NF MNR	DTO 664	CHANGE OM	EXERCISE/DSO 624	CHANGE OM	CABIN STOW	IMU						
	PLT	POST SLEEP	CREW CONF	H/O	FCS C/O	RCS HOT	FI FIRE	PHRR 27	POB/TS2 V O 7	D/O PREP BRIEF	PHRR 3	PHRR 1	CHANGE OM	MEAL	P/TV02 SETUP STL	SESE INTN LTL R-R AYBY	PHRR 2	GRP D GAS	WINDOW	PHRR 2	GRPP GAS	APC STOW	EXERCISE/DSO 608			
	MS3	POST SLEEP	CREW CONF	H/O	PHRR 1	PHRR 1	PHRR 1	PHRR 1	PHRR 1	PHRR 1	PHRR 1	PHRR 1	PHRR 1	MEAL	PHRR 1	PHRR 1	PHRR 1	PHRR 1	PHRR 1	PHRR 1	PHRR 1	PHRR 1	PHRR 1			
BLUE FD 9	MS1	P/TV04 SETUP	CONF	IMU	COAS CAL	POP/TVS	H/O	P/TV04 SETUP 802 MD	POB/TS2 V O 7	D/O PREP BRIEF	PRE SLEEP	PRE SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP			
	MS2	PHRR 2	488 STOW	CREW CONF	H/O	FCS C/O	RCS HOT	FI FIRE	POB/TS2 V O 7	D/O PREP BRIEF	PRE SLEEP	PRE SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP			
	MS4	PHRR 2	488 STOW	CREW CONF	H/O	FCS C/O	RCS HOT	FI FIRE	POB/TS2 V O 7	D/O PREP BRIEF	PRE SLEEP	PRE SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP			
DAY/NIGHT	[Day/Night Cycle]												[Day/Night Cycle]													
ORBIT	131												132		133		134		135		136		137		138	
EARTH TRACE	[Earth Trace Map]																									
TDRS	[TDRS Schedule]																									
ATT	-XVV IMU/COAS -XVV +XVV -XVV +XVV																									
NOTES:	VAPU HTR ACT @H/O BLUE TO RED @AFT STATION @PL UPDATE ■ APU HTR RECONFIG																									

GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
106:12:07/ 107:00:07	009:00:00/ 009:12:00	106:07:07/ 106:19:07	/106 CDT	-18.2		APRIL 16, 1994	STS-59	FINAL PCN-1	03/18/94

CDT	:106	8	9	10	11	12	13	14	15	16	17	18	19	
MET	:009	0	1	2	3	4	5	6	7	8	9	10	11	12

RED FD10	CDR	DEORBIT PREP	DEORBIT PREP										
	PLT	DEORBIT PREP	DEORBIT PREP	DEORBIT	K								
	MS3	ENT DSO PREP	DEORBIT PREP	BURN	LANDING								
BLUE FD10	MS1	DEORBIT PREP	DEORBIT PREP	BURN*									
	MS2	DEORBIT PREP	DEORBIT PREP										
	MS4	DEORBIT PREP	DEORBIT PREP										

DAY/NIGHT		147	148	149	150	151	152	153	154
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TDRS	E	W											
ATT			-XSI	IMU	COMM	ENTRY							

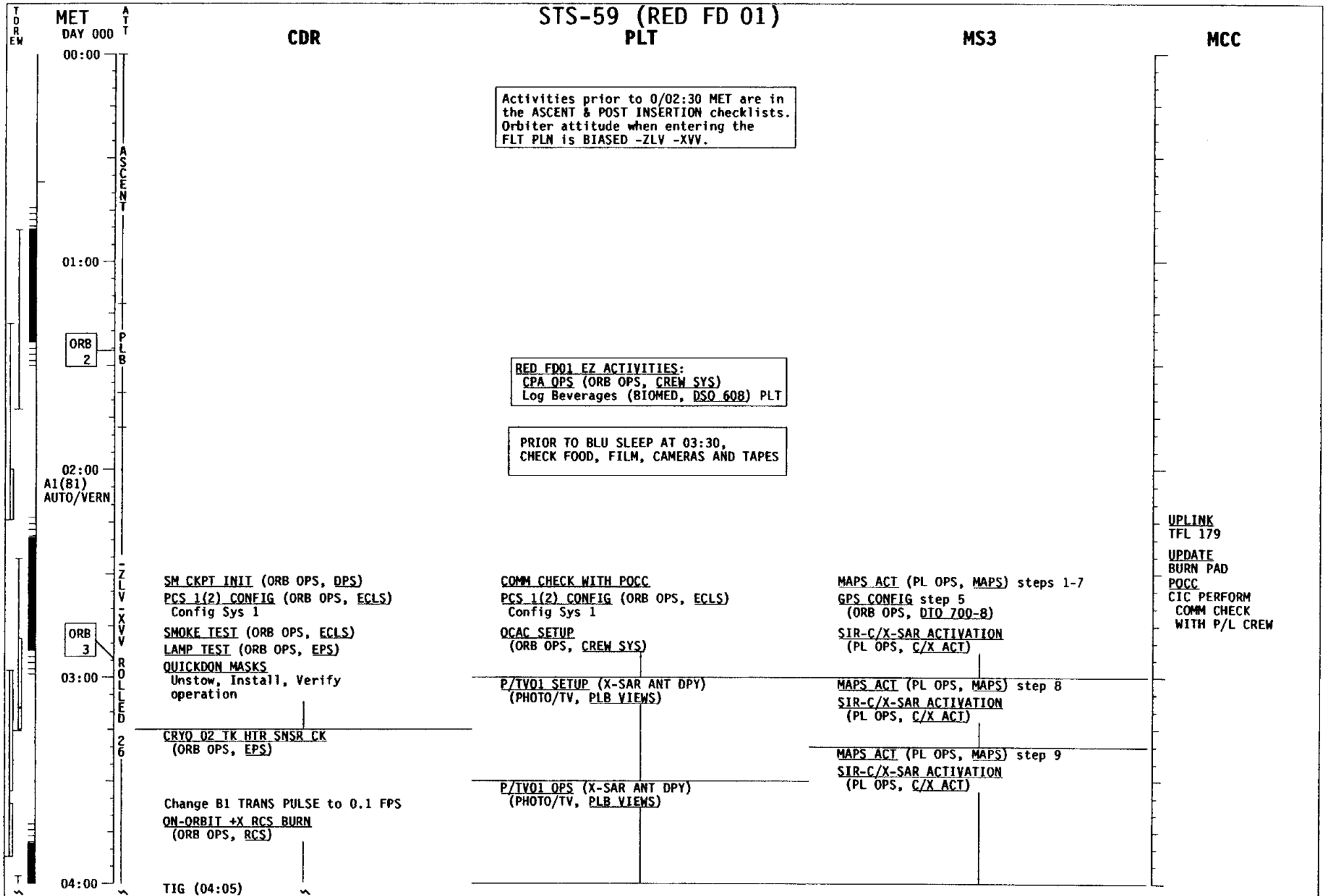
NOTES:			*DEORBIT BURN 09/04:12	KSC LANDING 09/05:07									
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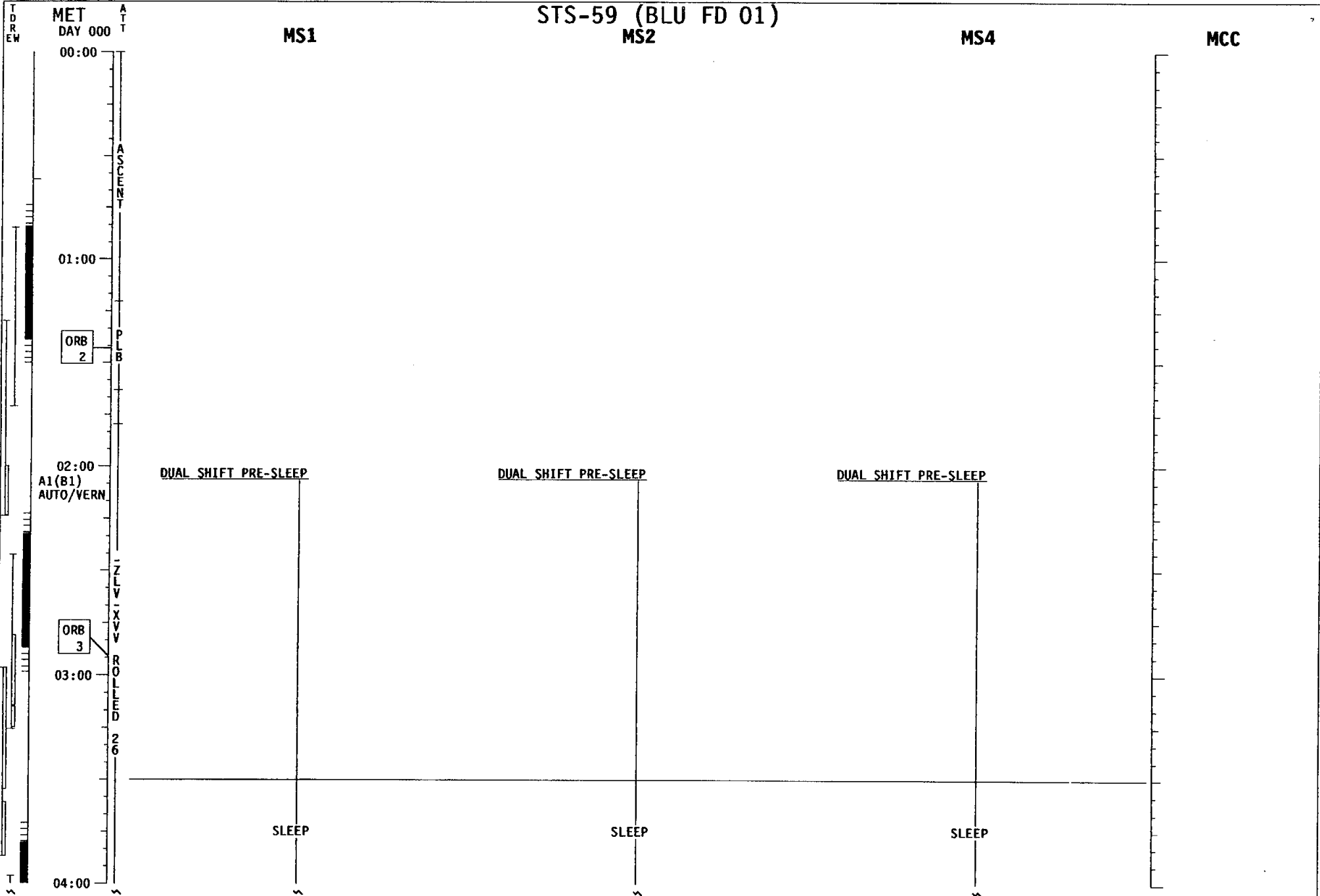
DETAILED TIMELINE

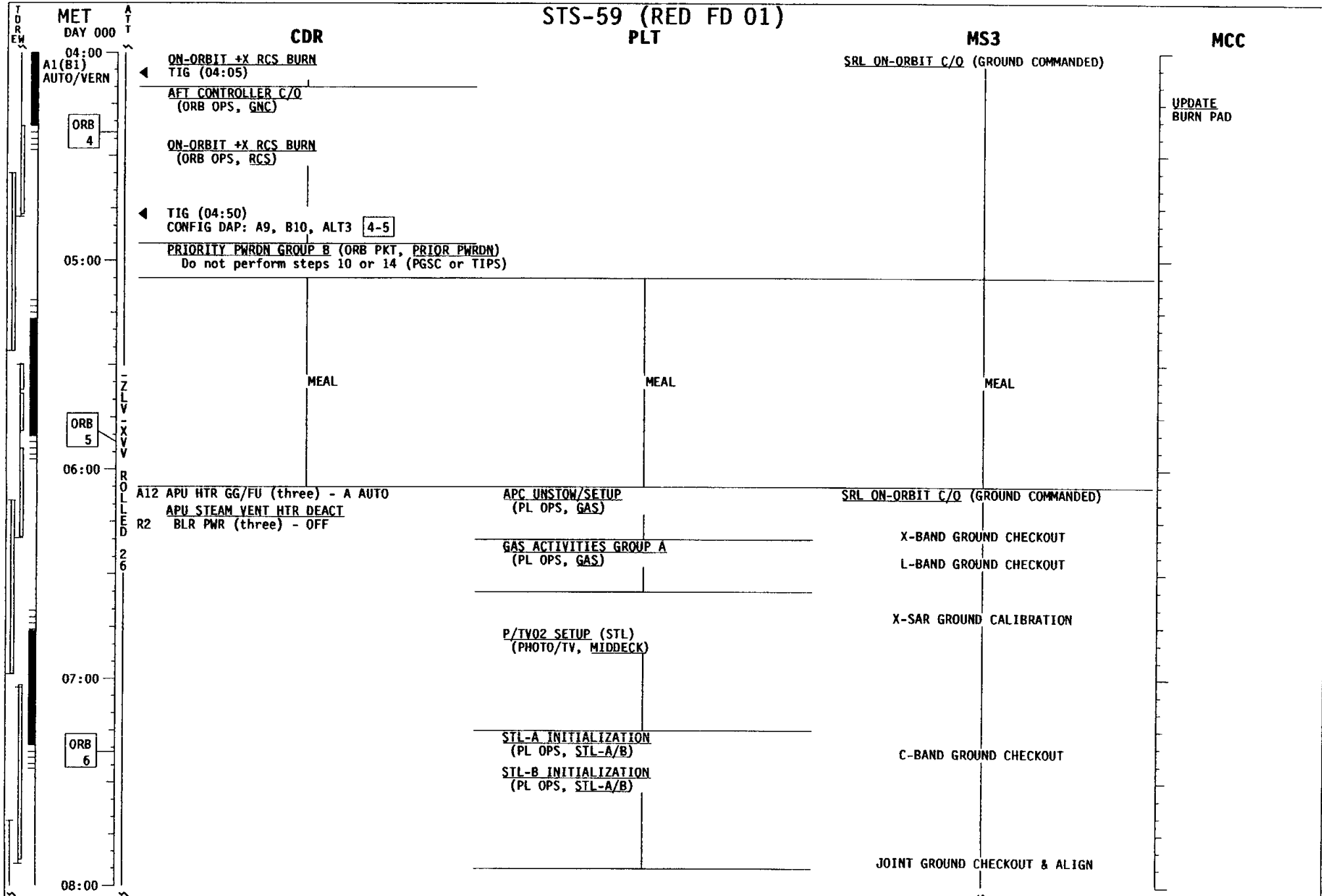
RED FD1	3-2
BLUE FD1	3-3
BLUE FD2	3-9
RED FD2	3-14
BLUE FD3	3-21
RED FD3	3-24
BLUE FD4	3-31
RED FD4	3-34
BLUE FD5	3-45
RED FD5	3-50
BLUE FD6	3-57
RED FD6	3-64
BLUE FD7	3-69
RED FD7	3-76
BLUE FD8	3-83
RED FD8	3-88
BLUE FD9	3-95
RED FD9	3-100
BLUE FD10	3-107
RED FD10	3-110

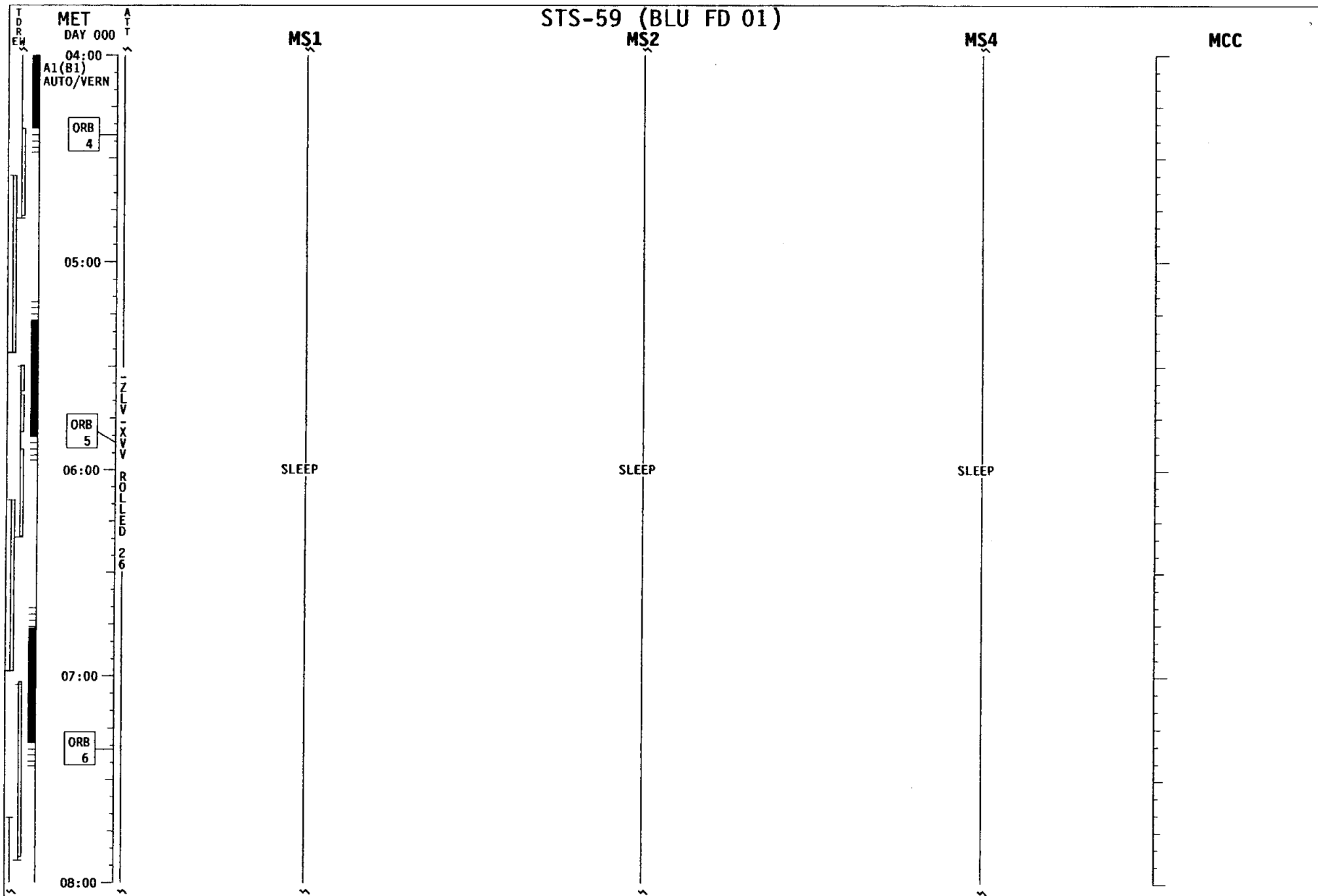
DETAILED
TIMELINE

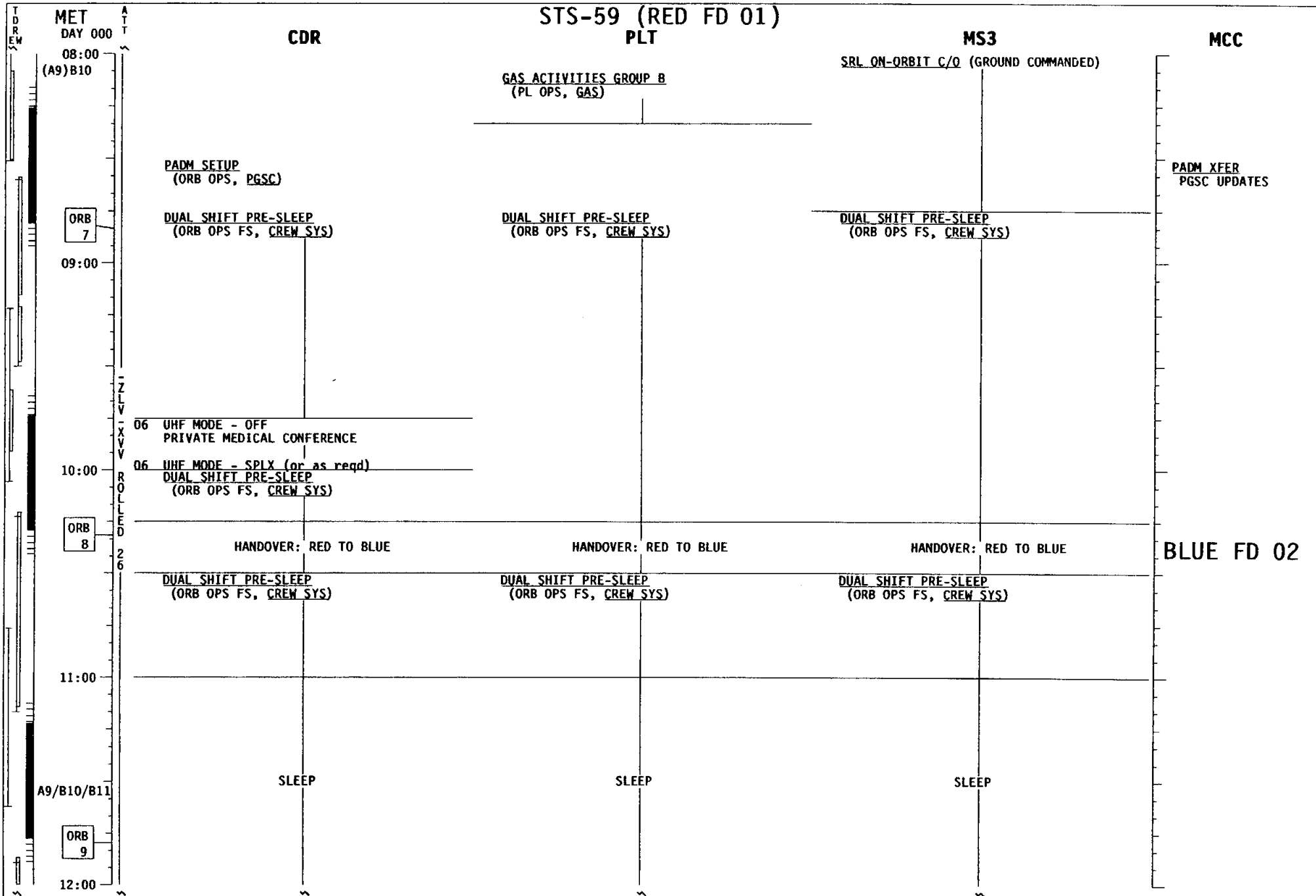
DETAILED TIMELINE

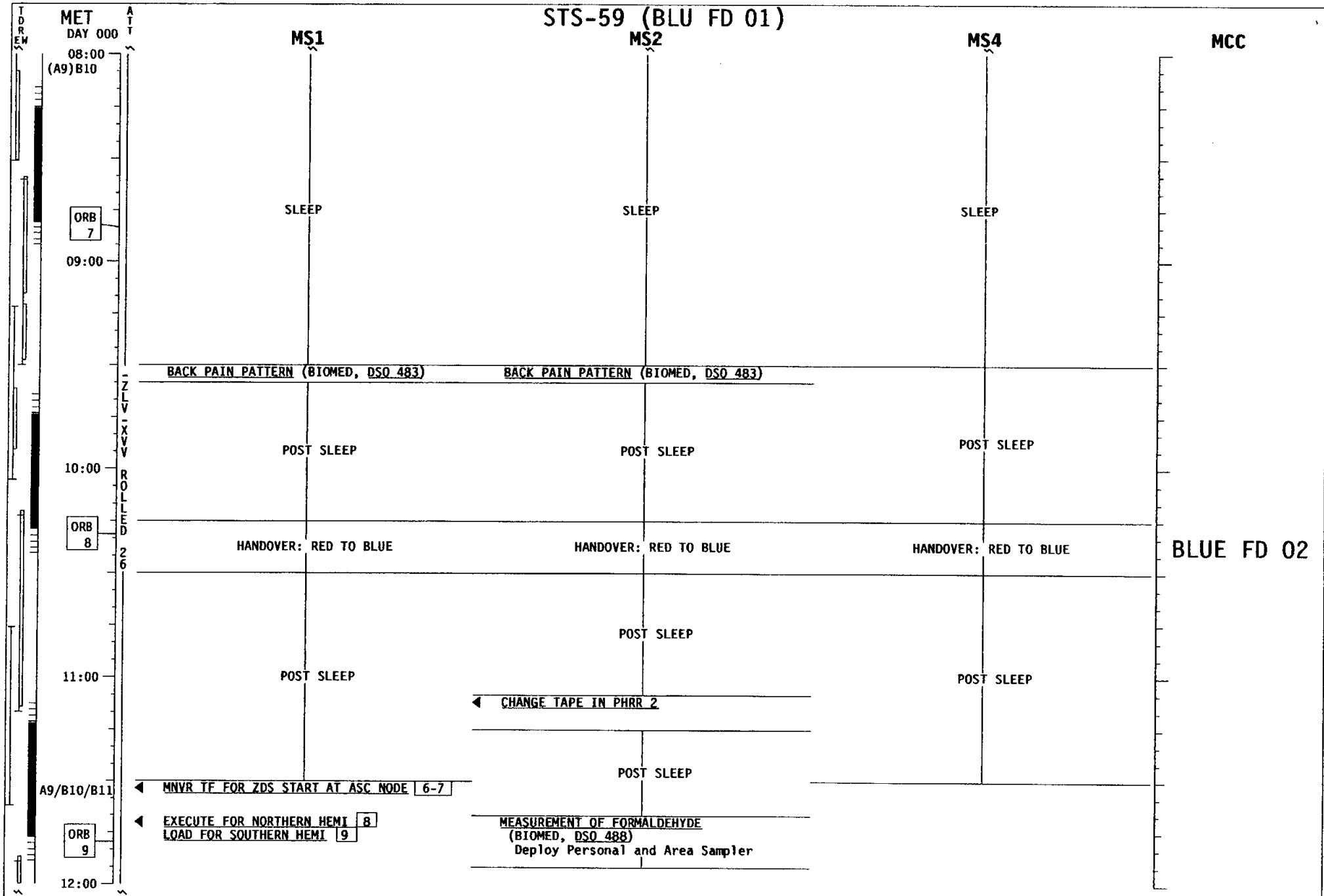


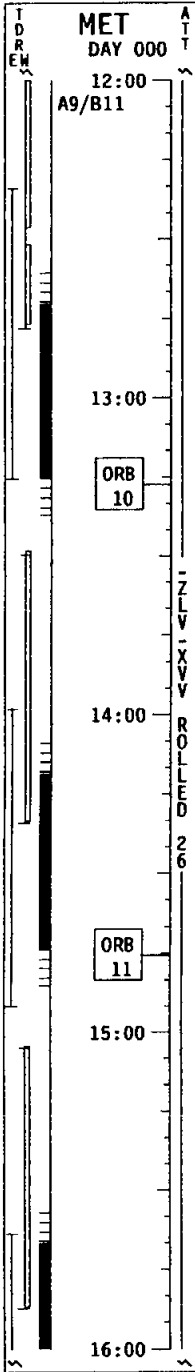












STS-59 (RED FD 01)

CDR

PLT

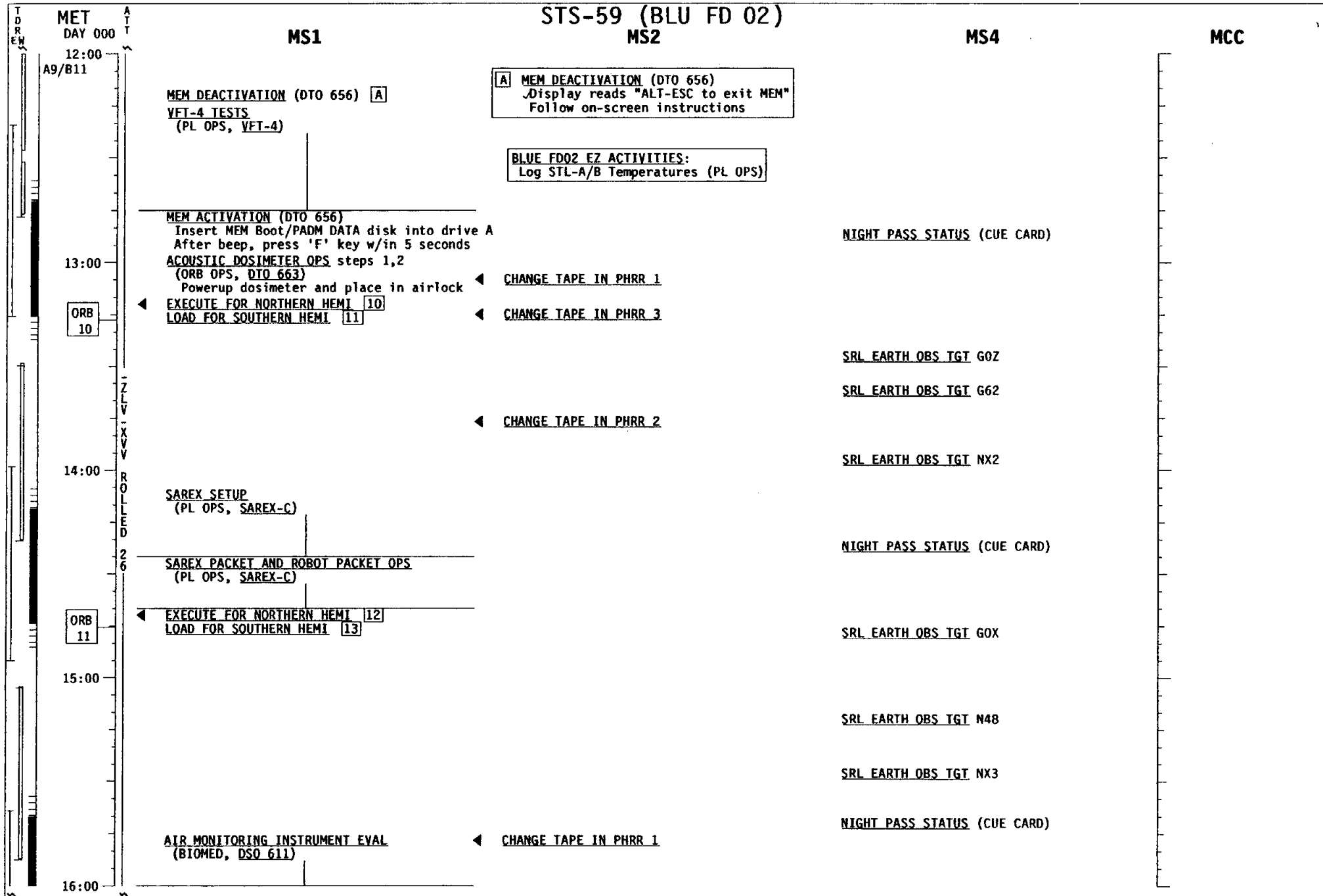
MS3

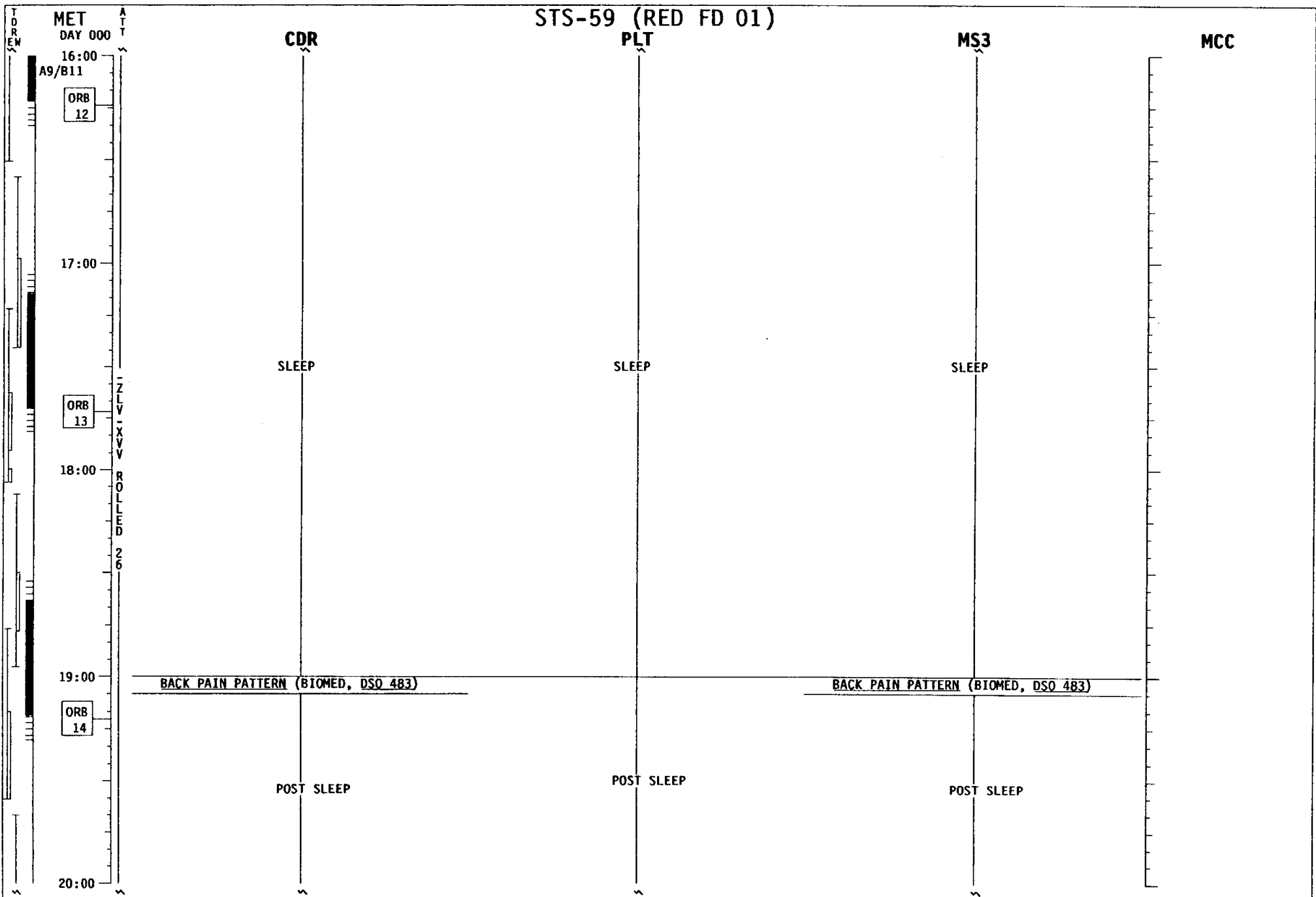
MCC

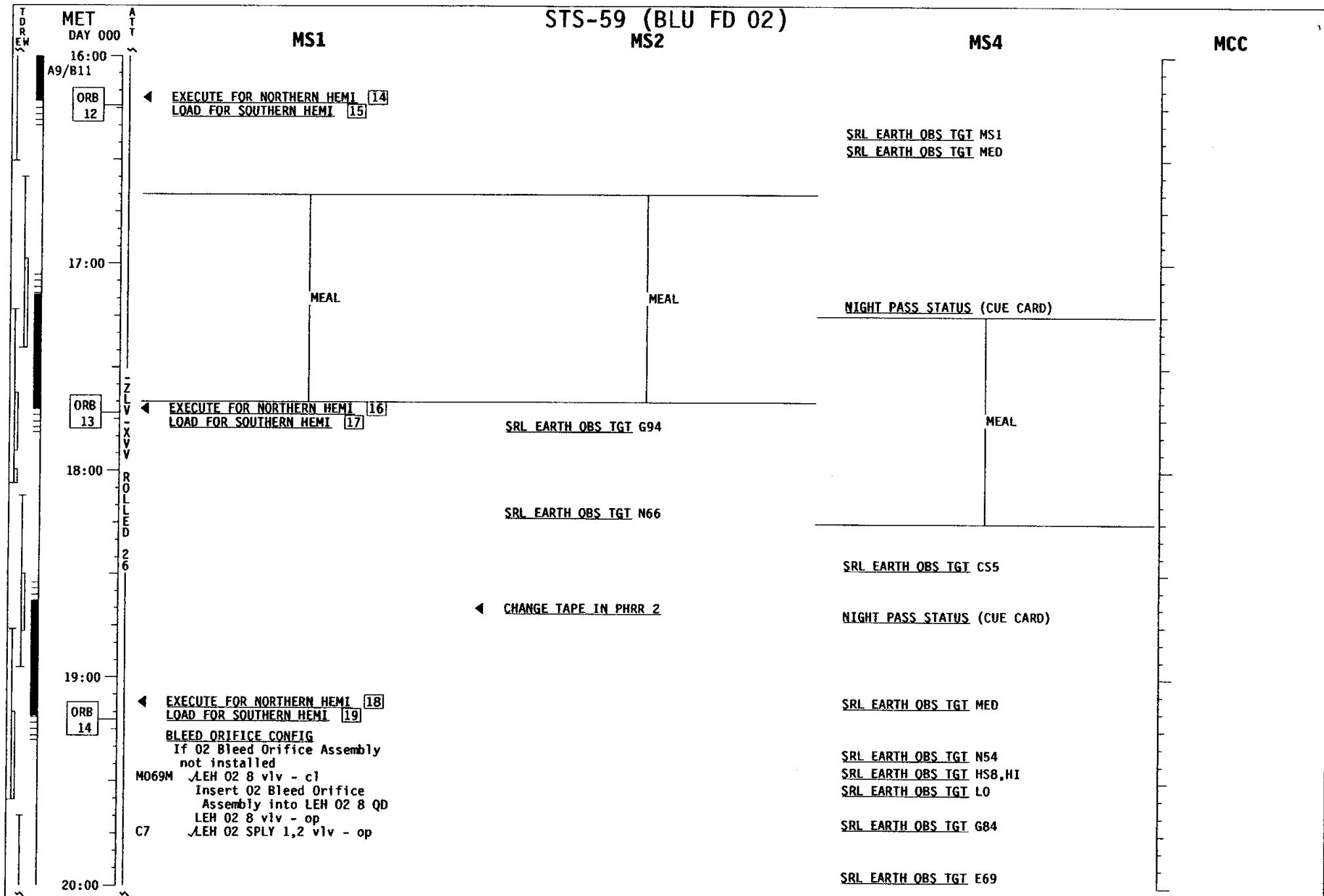
SLEEP

SLEEP

SLEEP







STS-59 (RED FD 01)

MET DAY 000
 20:00
 A9/B11
 ORB 15
 21:00
 22:00
 ORB 16
 23:00
 ORB 17
 001
 00:00

AT
 ZLV
 XVV
 ROLFED
 26
 IMU
 XVV
 XVV

CDR

PLT

MS3

MCC

POST SLEEP

POST SLEEP

POST SLEEP

MEM DEACTIVATION (DTO 656) [A]

VFT-4 TESTS
 (PL OPS, VFT-4)

[A] MEM DEACTIVATION (DTO 656)
 Display reads "ALT-ESC to exit MEM"
 Follow on-screen instructions

MEM ACTIVATION (DTO 656)
 Insert MEM Boot/PADM DATA disk into drive A
 After beep, press 'F' key w/in 5 seconds

POCC STATUS REPORT TO CREW

POCC
 PL STATUS

ERGOMETER SETUP steps 1-13
 (BIOMED, ERGO NOM OPS)

ERGOMETER SETUP steps 1-13
 (BIOMED, ERGO NOM OPS)

HANDOVER: BLUE TO RED

HANDOVER: BLUE TO RED

HANDOVER: BLUE TO RED

RED FD 02

FORMALDEHYDE (BIOMED, DSO 488)
 Deploy Personal Sampler

POWER SETUP
 (BIOMED, DTO 653)

◀ CHANGE TAPE IN PHRR 2

◀ CHANGE TAPE IN PHRR 3

NIGHT PASS STATUS (CUE CARD)

EXERCISE
 Don Heartwatch and
 log Exercise (BIOMED, DSO 624)

014 PRI RJD DRIVER, LOGIC (sixteen) - ON
 ◀ MNVR NF FOR ASC NODE [27-29]
 LOAD FOR NORTHERN HEMI [30]

SRL EARTH OBS TGT E30
 SRL EARTH OBS TGT E55
 SRL EARTH OBS TGT EB1
 SRL EARTH OBS TGT N61

STS-59 (BLU FD 02)

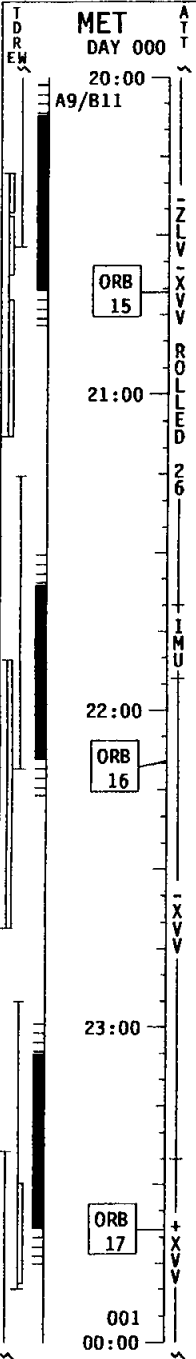
MET DAY 000

MS1

MS2

MS4

MCC



PADM SETUP
(ORB OPS, PGSC)

◀ CHANGE TAPE IN PHRR 1

SRL EARTH OBS TGT MED

NIGHT PASS STATUS (CUE CARD)

PADM XFER
PGSC UPDATES

ORB 15

EXECUTE FOR NORTHERN HEMI [20]
LOAD FOR SOUTHERN HEMI [21]

ORBITER FILTER CLEANING
(IFM, SCHEDULED MAINTENANCE)
PHRR and DORE FILTER CLEANING
(PL SYS, IFM)
STL-A/B FILTER CLEANING

SRL EARTH OBS TGT MED
SRL EARTH OBS TGT CS1,NBD
SRL EARTH OBS TGT LO

SRL EARTH OBS TGT GOY

21:00

◀ MNVR IMU ALIGN ATT [22]

FORMALDEHYDE (BIOMED, DSO 488)
Stow Personal Sampler

NIGHT PASS STATUS (CUE CARD)
POCC STATUS REPORT TO CREW

POCC
PL STATUS
SNAPSHOT
TFL 184

22:00

IMU ALIGN - S TRK (ORB OPS)
◀ MNVR IF FOR ASC NODE [23-24]
LOAD FOR NORTHERN HEMI [25]

◀ LOAD FOR SOUTHERN HEMI [26]

SRL EARTH OBS TGT N93,MED

ORB 16

VOICE OPS (SURREY TEST)
(PL OPS, SAREX-C) S2,W6
RISE=22:26 SET=22:34
IF not perviously performed on REV 3

HANDOVER: BLUE TO RED

HANDOVER: BLUE TO RED

HANDOVER: BLUE TO RED

RED FD 02

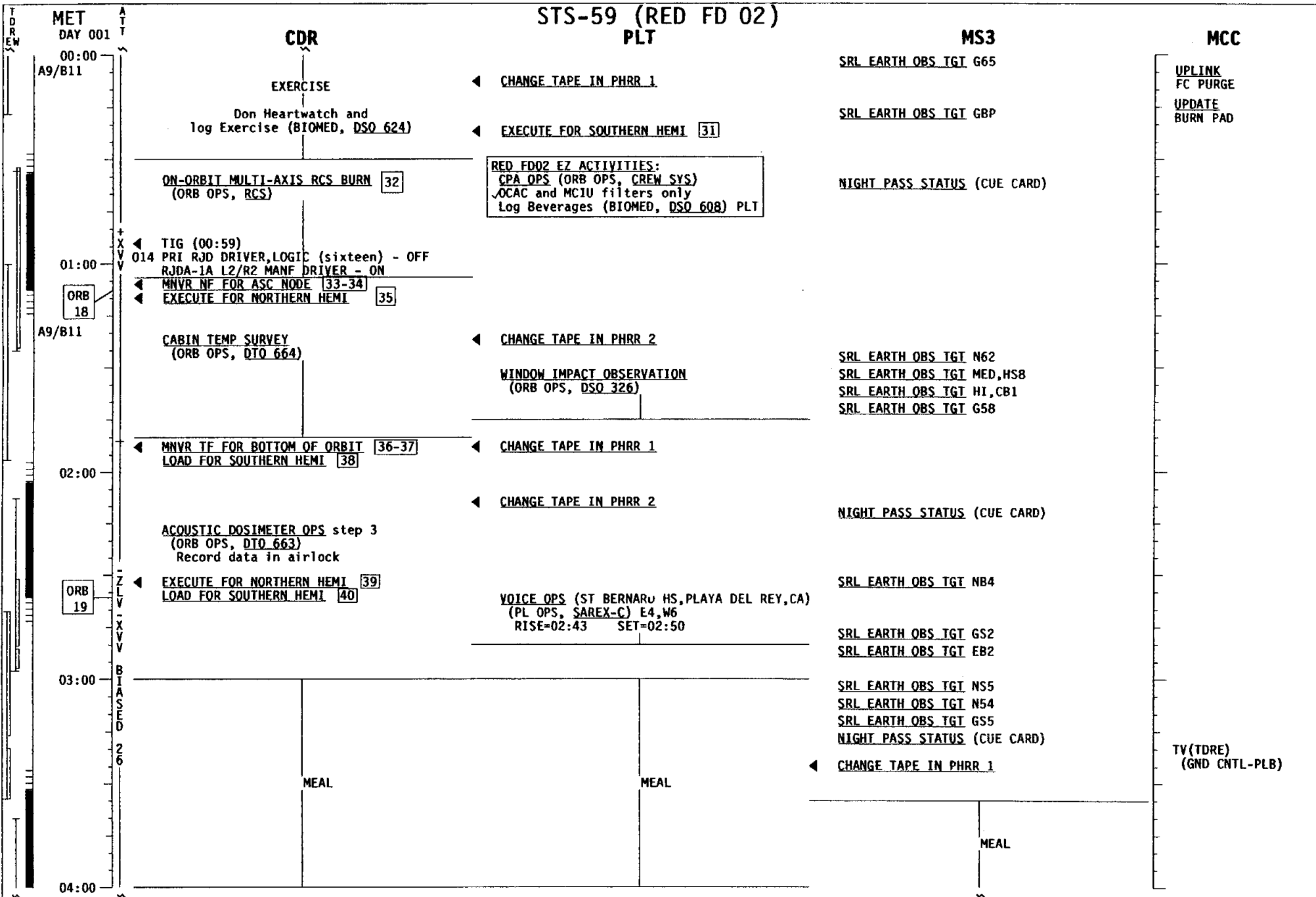
23:00

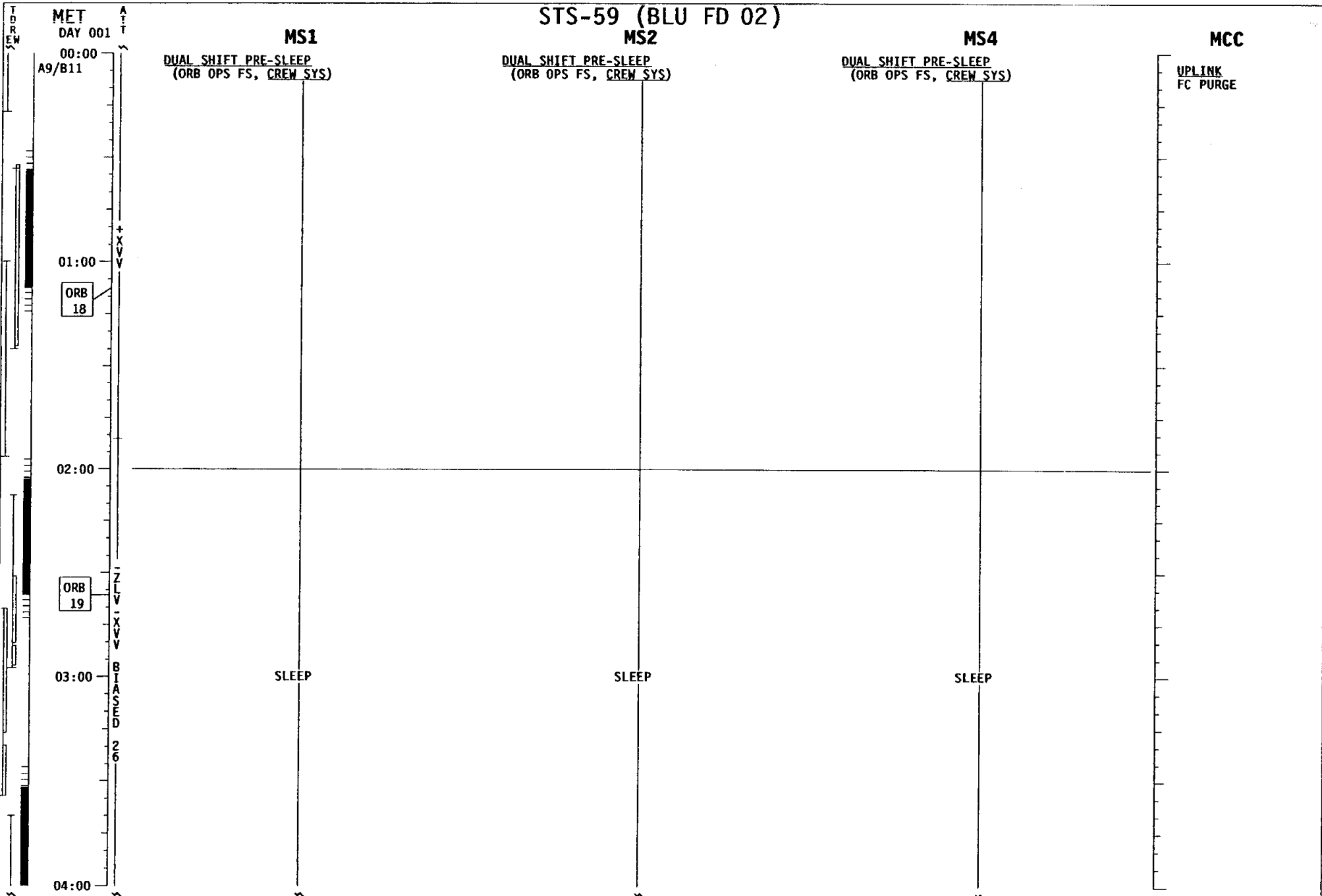
ORB 17

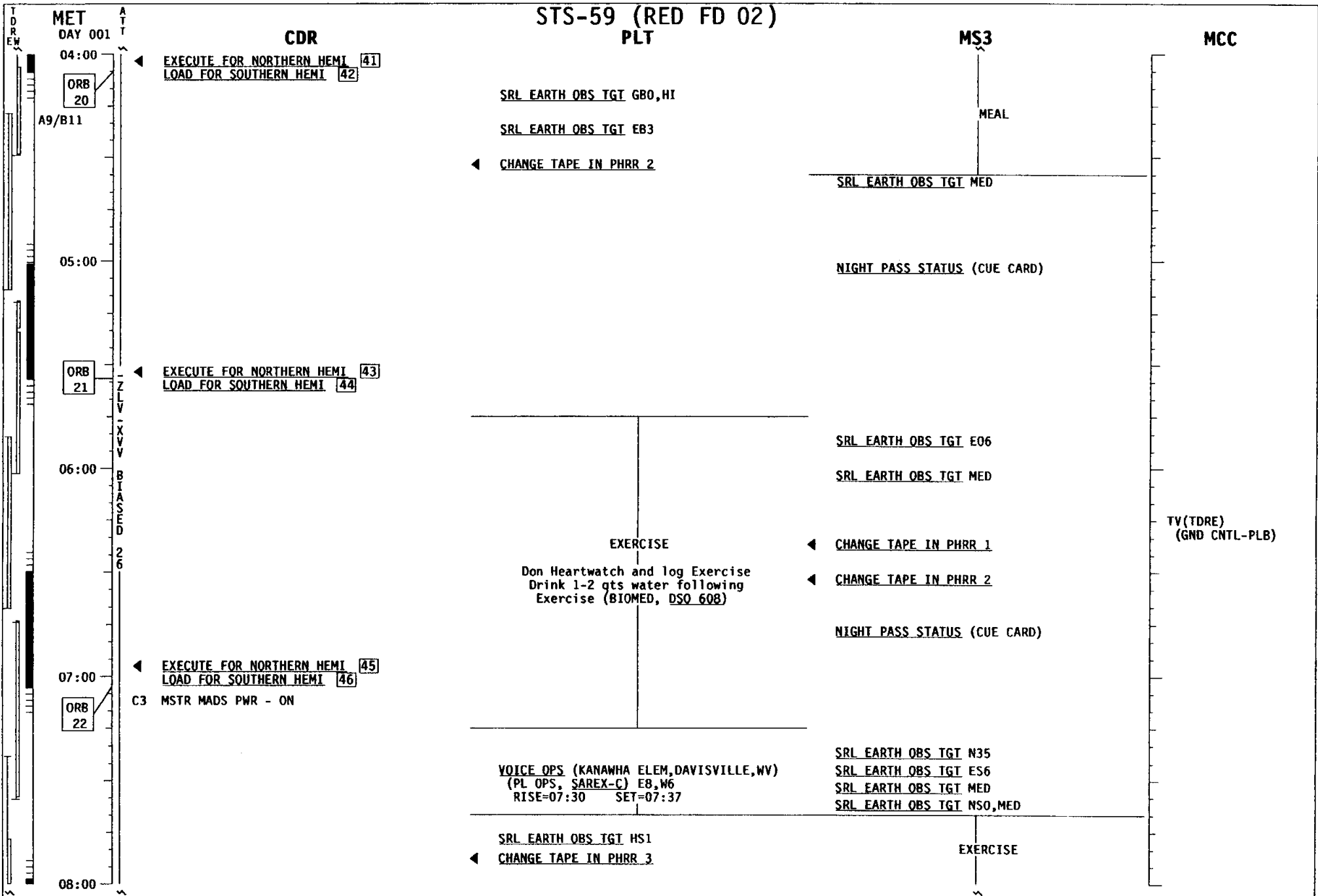
VOICE OPS (HOUSTON TEST B/U)
(PL OPS, SAREX-C) S1,W6
RISE=23:43 SET=23:48
If not perviously performed

001

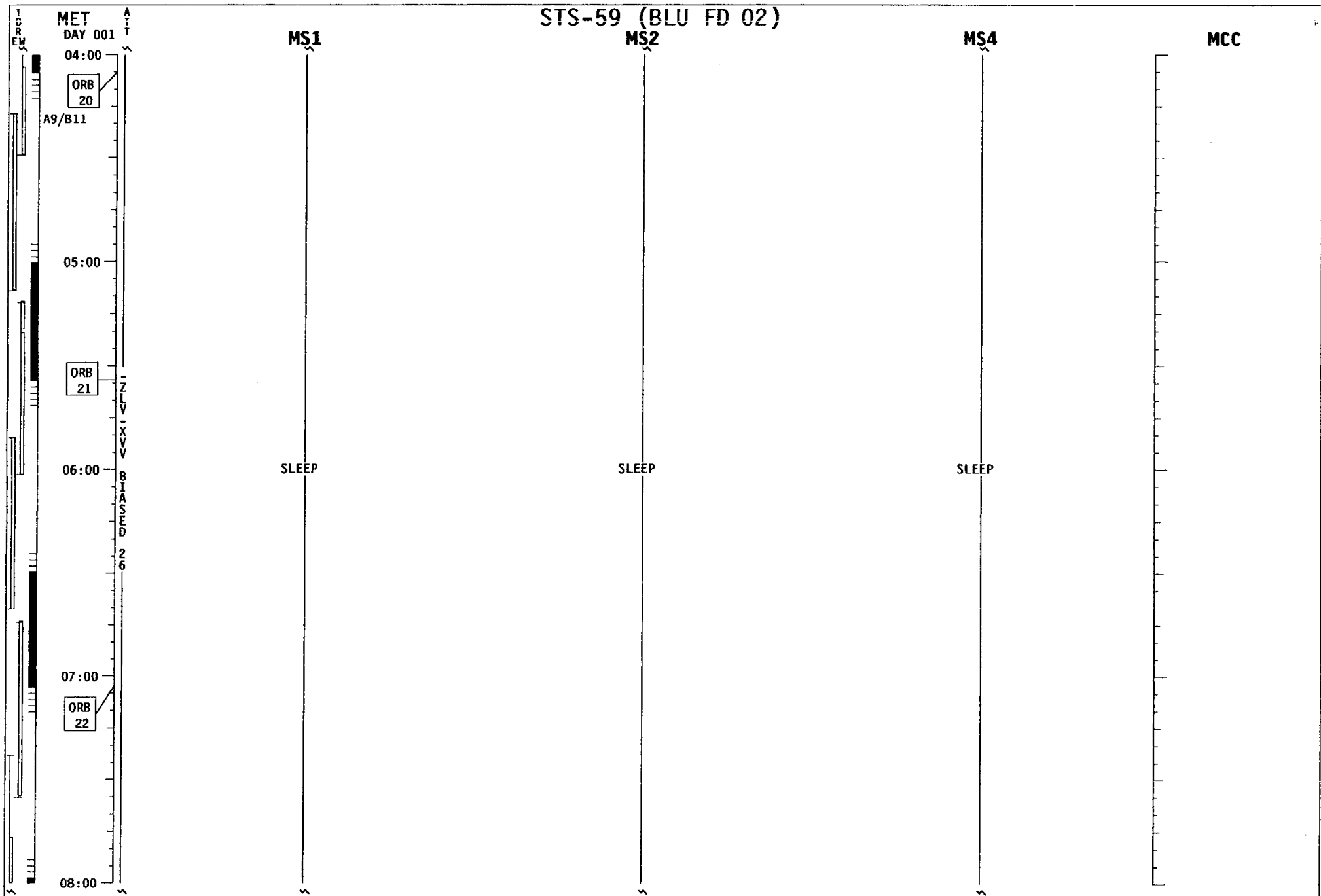
00:00







STS-59 (BLU FD 02)

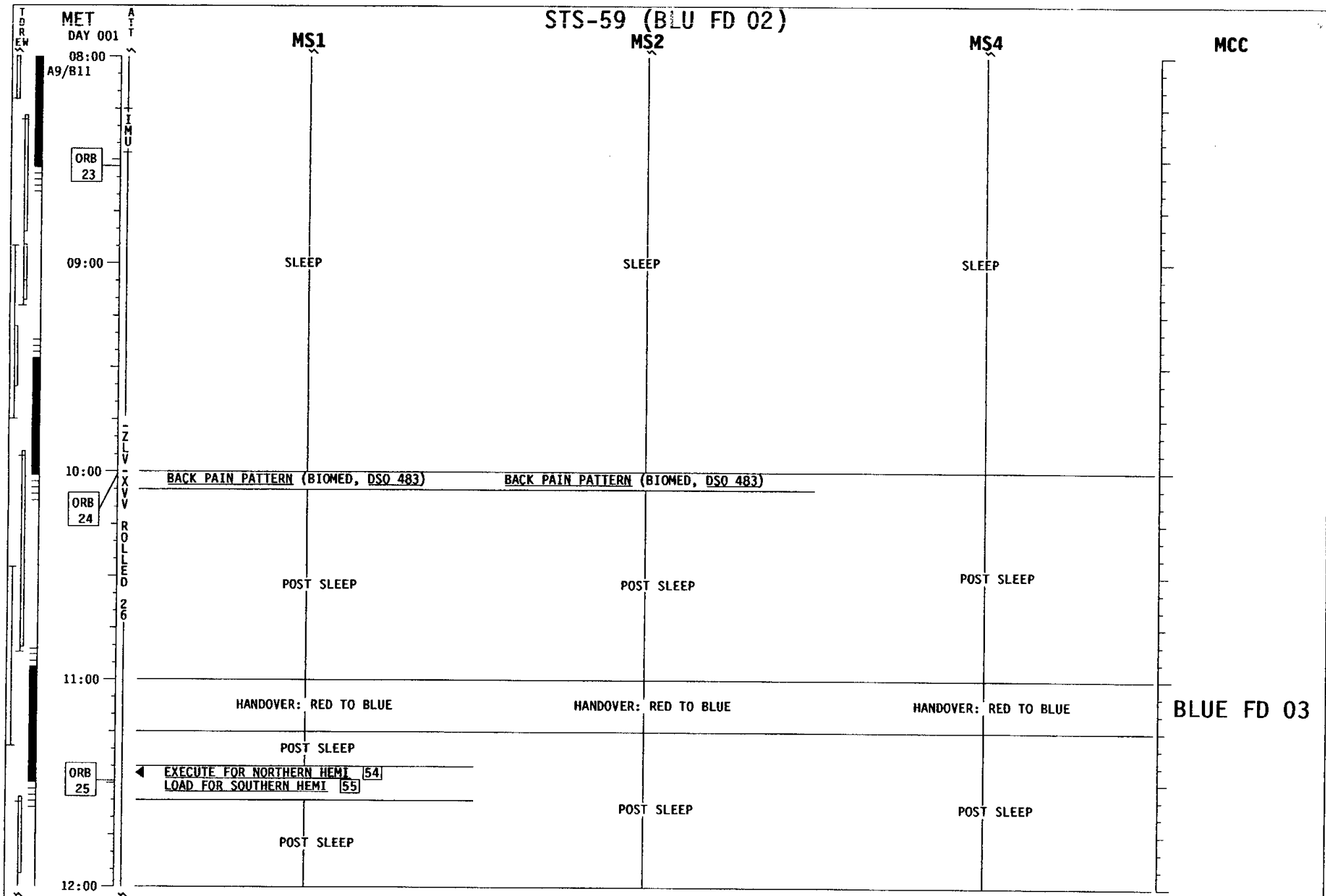


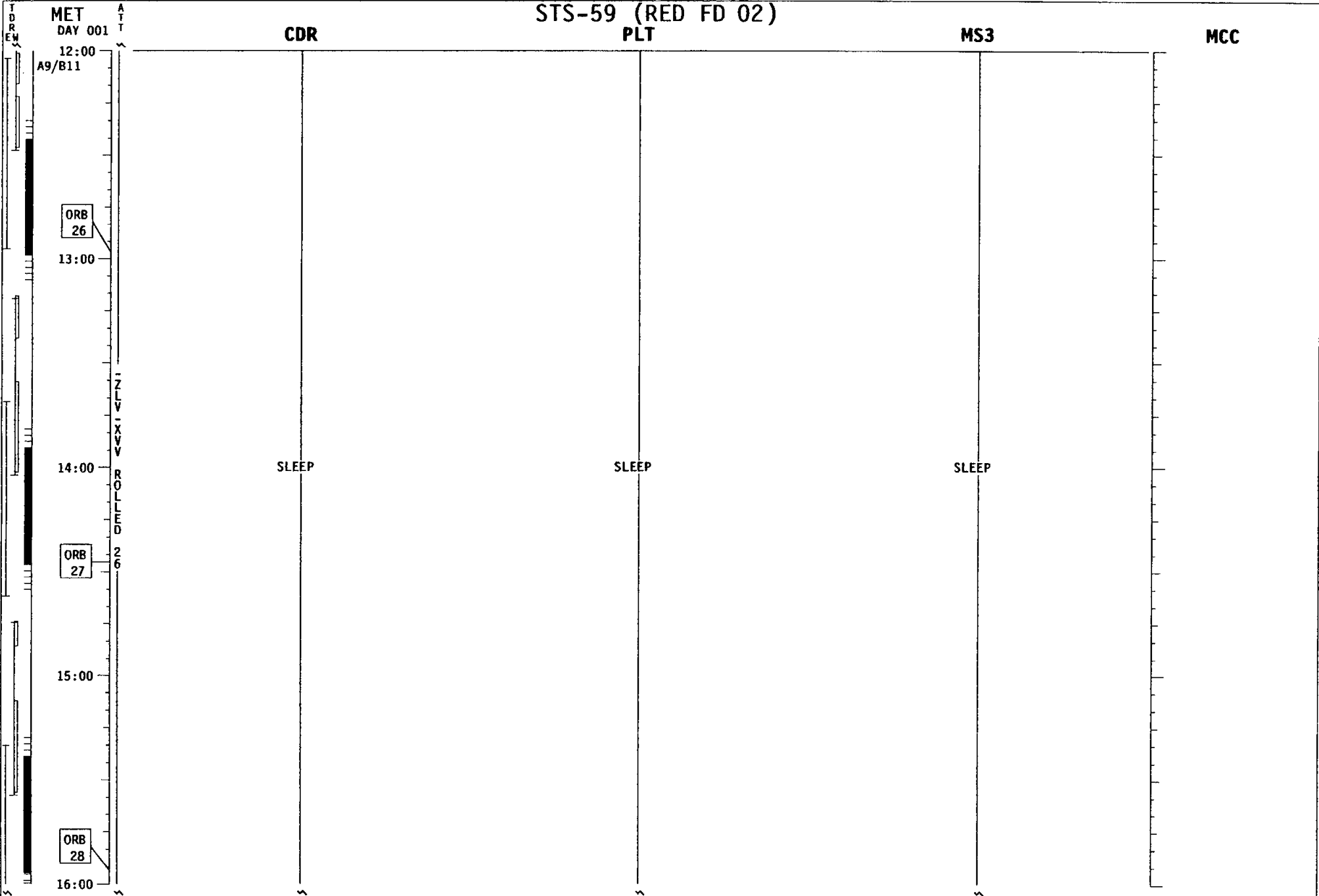
MET DAY 001		STS-59 (RED FD 02)		
		CDR	PLT	MS3
08:00 A9/B11	IMU	C3 MSTR MADS PWR - OFF	NIGHT PASS STATUS (CUE CARD)	EXERCISE
		◀ MNVR IMU ALIGN ATT [47] IMU ALIGN - S TRK (ORB OPS) ◀ MNVR TF FOR TOP OF ORBIT [48-49] LOAD FOR NORTHERN HEMI [50]	◀ CHANGE TAPE IN PHRR 1	
09:00	ZLV	◀ LOAD FOR SOUTHERN HEMI [51] DEPLOY RADIATORS (ORB OPS, ECLS)	SRL EARTH OBS TGT N35 SRL EARTH OBS TGT G04 SRL EARTH OBS TGT N06	VOICE OPS (ANTHONY ELEM, ANTHONY KS) (PL OPS, SAREX-C) E6,W6 RISE=09:00 SET=09:07
		FORMALDEHYDE (BIOMED, DSO 488) Stow Personal Sampler DUAL SHIFT PRE-SLEEP (ORB OPS FS, CREW SYS)	DUAL SHIFT PRE-SLEEP (ORB OPS FS, CREW SYS)	DUAL SHIFT PRE-SLEEP (ORB OPS FS, CREW SYS)
10:00	XVV	◀ EXECUTE FOR NORTHERN HEMI [52] LOAD FOR SOUTHERN HEMI [53] DUAL SHIFT PRE-SLEEP (ORB OPS FS, CREW SYS)		
		06 UHF MODE - OFF PRIVATE MEDICAL CONFERENCE		
11:00	RDL	06 UHF MODE - SPLX (or as reqd) PADM SETUP (ORB OPS, PGSC)		
		HANDOVER: RED TO BLUE	HANDOVER: RLD TO BLUE	HANDOVER: RED TO BLUE
12:00	6	DUAL SHIFT PRE-SLEEP (ORB OPS FS, CREW SYS)	DUAL SHIFT PRE-SLEEP (ORB OPS FS, CREW SYS)	DUAL SHIFT PRE-SLEEP (ORB OPS FS, CREW SYS)

SNAPSHOT
TFL 184

PADM XFER
PGSC UPDATES

STS-59 (BLU FD 02)





MET
DAY 001

STS-59 (RED FD 02)

CDR

PLT

MS3

MCC

12:00
A9/B11

ORB
26

13:00

14:00

ORB
27

15:00

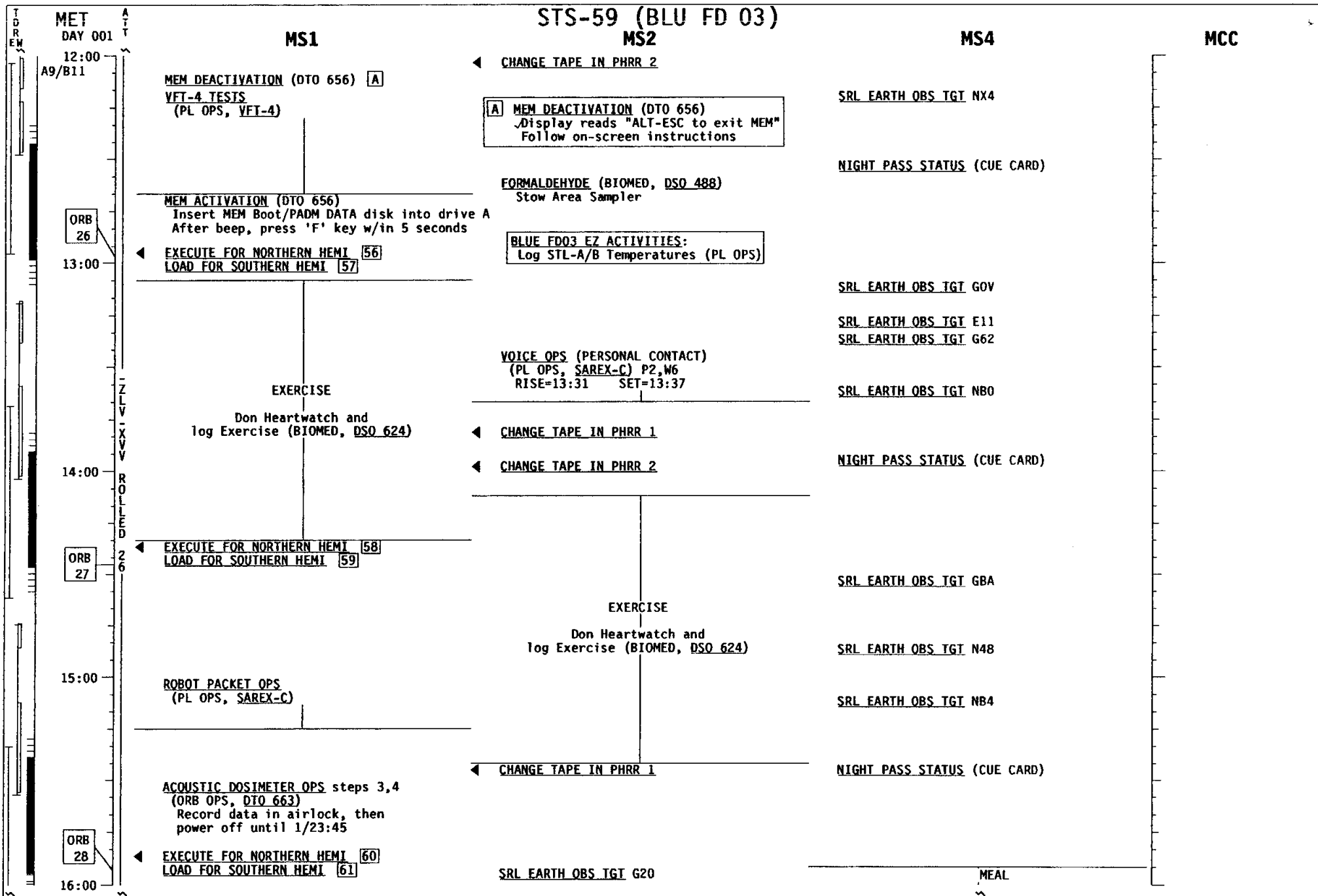
ORB
28

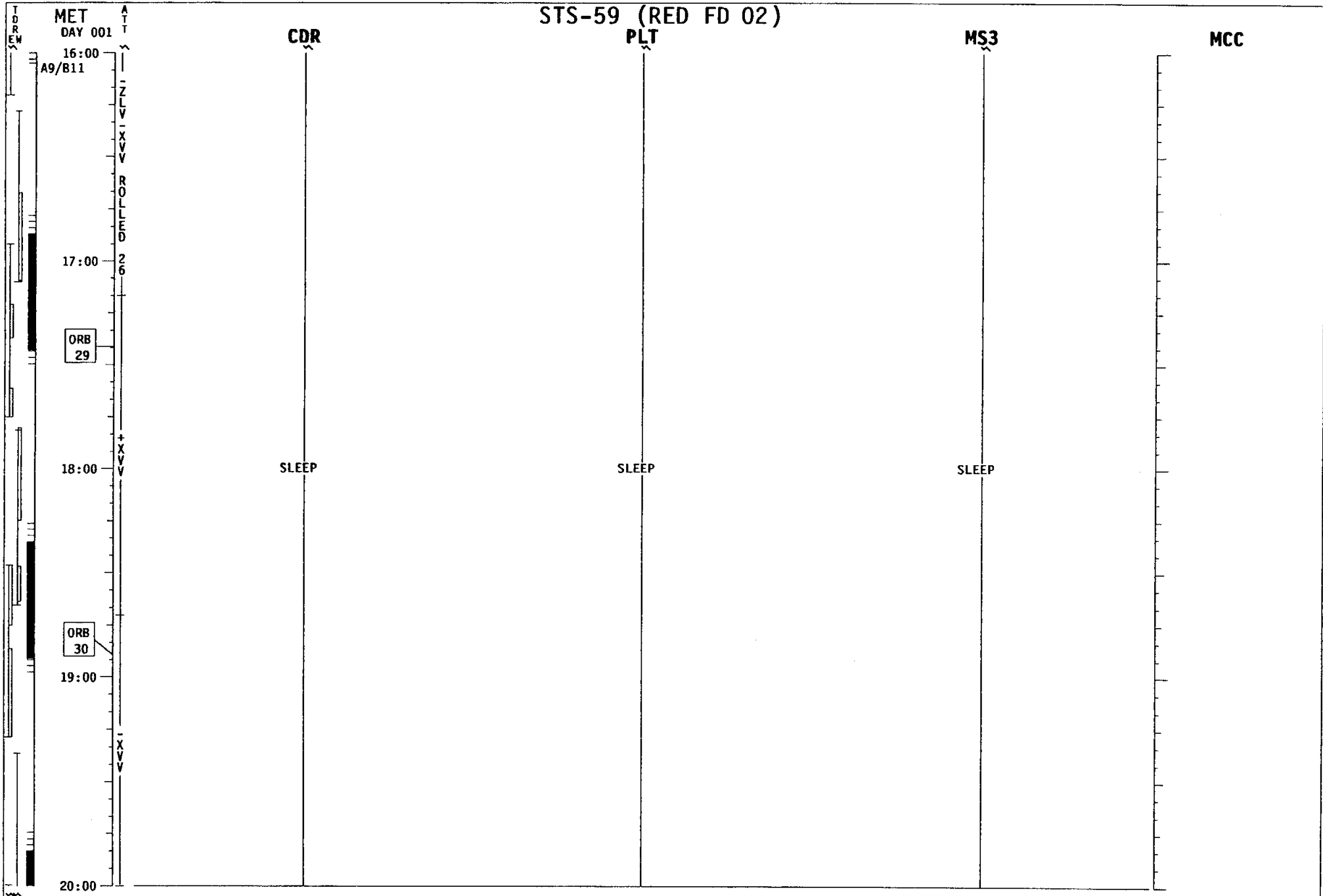
16:00

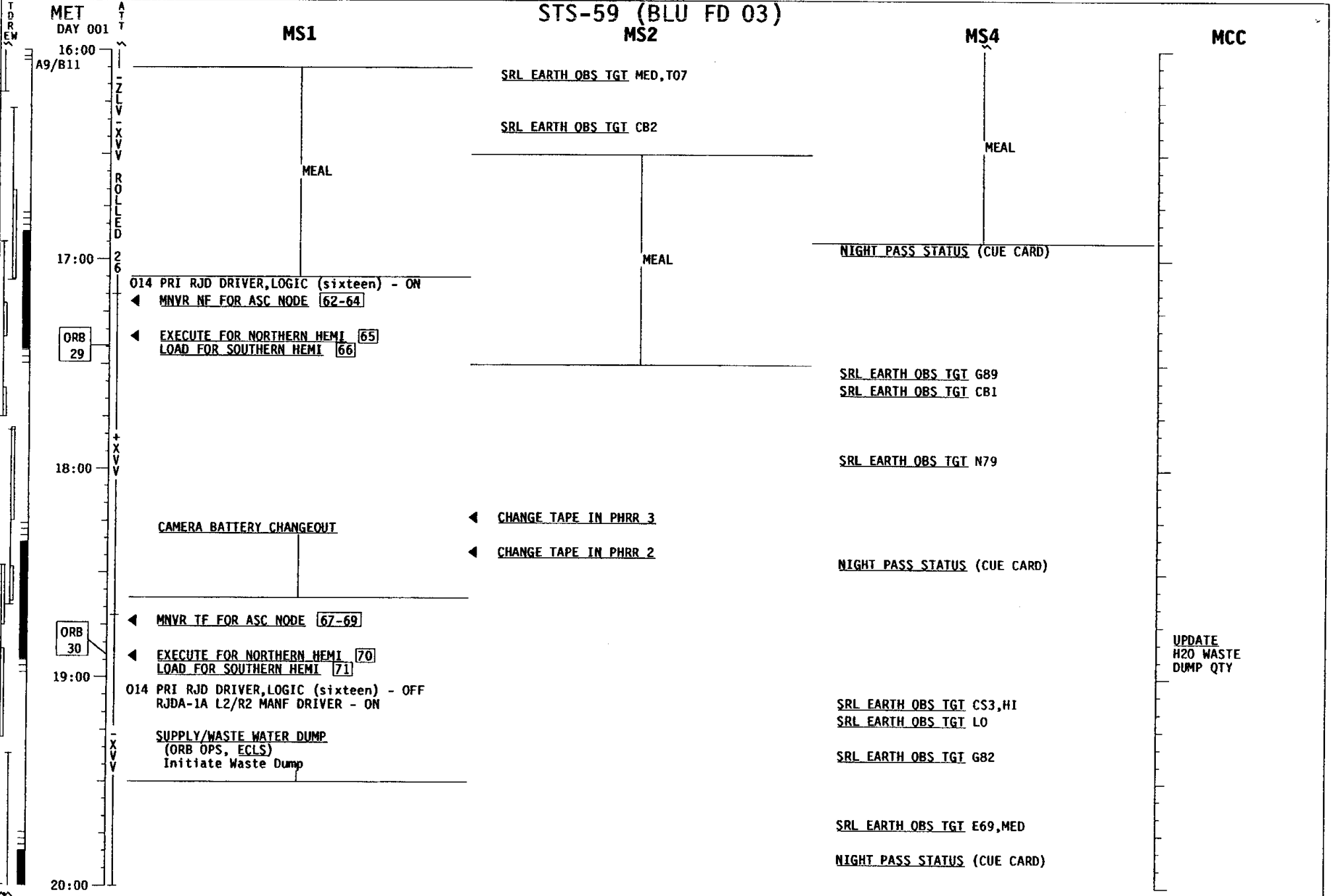
SLEEP

SLEEP

SLEEP







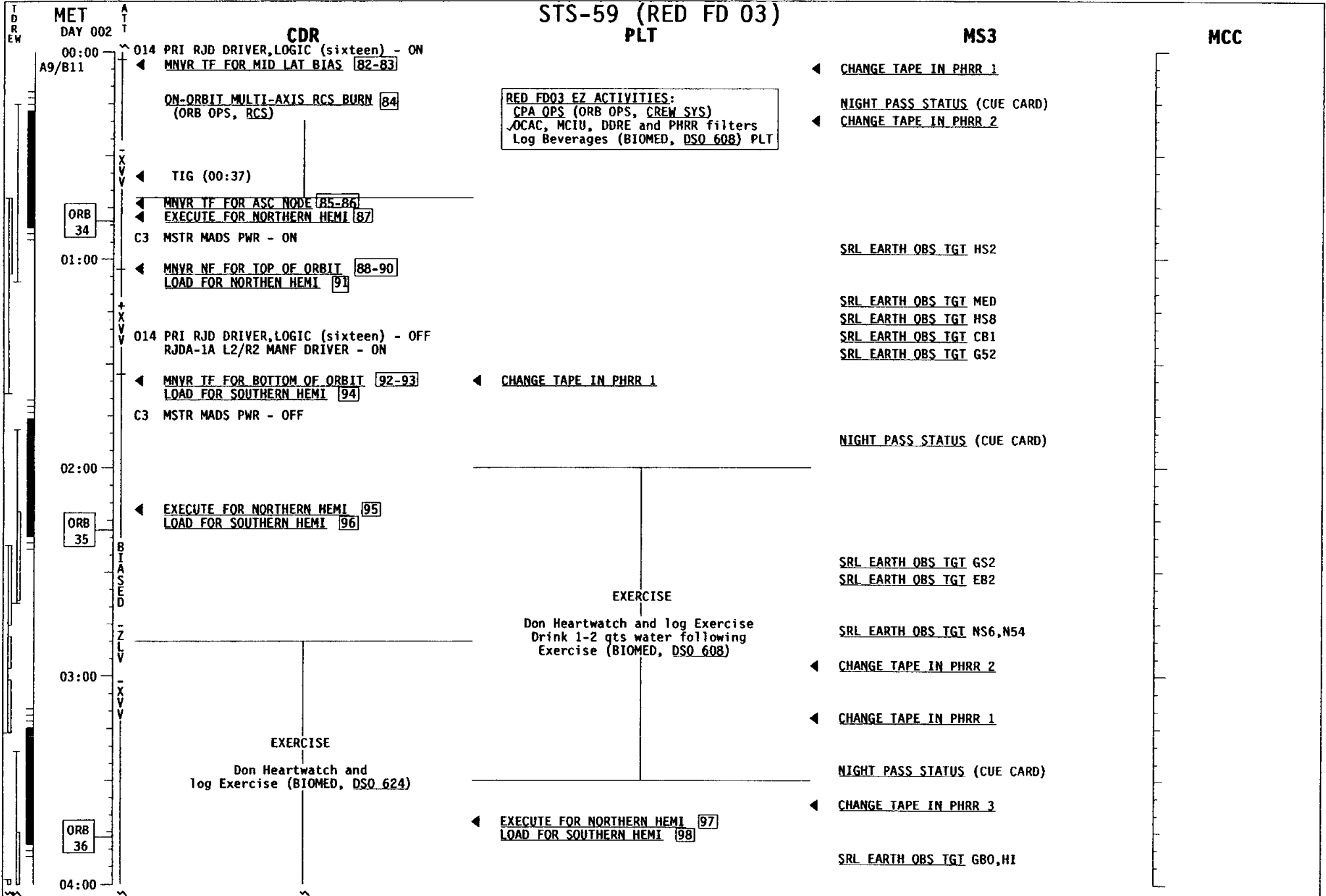
MET DAY 001		STS-59 (RED FD 03)		MCC	
CDR		PLT		MS3	
20:00 A9/B11		BACK PAIN PATTERN (BIOMED, DSO 483)		BACK PAIN PATTERN (BIOMED, DSO 483)	
ORB 31		POST SLEEP		POST SLEEP	
21:00		POST SLEEP		POST SLEEP	
22:00		MEM DEACTIVATION (DTO 656) [A] VFT-4 TESTS (PL OPS, VFT-4)		MEM DEACTIVATION (DTO 656) [A] Display reads "ALT-ESC to exit MEM" Follow on-screen instructions	
23:00		MEM ACTIVATION (DTO 656) Insert MEM Boot/PADM DATA disk into drive A After beep, press 'F' key w/in 5 seconds		MEM ACTIVATION (DTO 656) Insert MEM Boot/PADM DATA disk into drive A After beep, press 'F' key w/in 5 seconds	
00:00		HANDOVER: BLUE TO RED		HANDOVER: BLUE TO RED	
ORB 33		ACOUSTICAL SLM OPS (ORB OPS, DTO 665) All locations		LOAD FOR NORTHERN HEMI [81]	
002		ACOUSTIC DOSIMETER OPS steps 2,1 (ORB OPS, DTO 663) Place dosimeter in sleep station and powerup		POCC STATUS REPORT TO CREW SRL EARTH OBS TGT E58,ES5 SRL EARTH OBS TGT EB1 SRL EARTH OBS TGT NBG SRL EARTH OBS TGT G65 SRL EARTH OBS TGT N12 SRL EARTH OBS TGT GBP	

RED FD 03

POCC
PL STATUS
UPDATE
BURN PAD

STS-59 (BLU FD 03)

MET DAY 001	MS1	MS2	MS4	MCC
20:00 A9/B11	<p>◀ MNVR NF FOR ASC NODE [72-73]</p> <p>◀ EXECUTE FOR NORTHERN HEMI [74] LOAD FOR SOUTHERN HEMI [75]</p> <p>PADM SETUP (ORB OPS, PGSC)</p> <p>SUPPLY/WASTE WATER DUMP (ORB OPS, ECLS) Terminate Waste Dump</p> <p>P/TV09 SETUP (PHOTO/TV, PAO OPP)</p>		<p>SRL EARTH OBS TGT MED</p> <p>SRL EARTH OBS TGT NS6</p> <p>SRL EARTH OBS TGT G16</p> <p>SRL EARTH OBS TGT LO</p> <p>SRL EARTH OBS TGT GOW</p>	PADM XFER PGSC UPDATES
21:00	<p>ORB 31</p> <p>◀ EXECUTE FOR NORTHERN HEMI [76]</p>		<p>SRL EARTH OBS TGT G71</p> <p>NIGHT PASS STATUS (CUE CARD)</p>	
22:00	<p>IMU</p> <p>◀ MNVR IMU ALIGN ATT [77]</p> <p>IMU ALIGN - S TRK (ORB OPS)</p> <p>◀ MNVR NF FOR BOTTOM OF ORBIT [78-79] LOAD FOR SOUTHERN HEMI [80]</p> <p>P/TV09 OPERATIONS (PHOTO/TV, PAO OPP)</p> <p>Downlink available from 22:40 - 23:00</p>	<p>SRL EARTH OBS TGT N65</p> <p>◀ CHANGE TAPE IN PHRR 1</p> <p>NIGHT PASS STATUS (CUE CARD)</p> <p>◀ CHANGE TAPE IN PHRR 2</p>	<p>EXERCISE</p> <p>Don Heartwatch and Tog Exercise (BIOMED, DSO 624)</p>	<p>SNAPSHOT TFL 184</p> <p>TV(TDRW) (CREW CNTL-CAB)</p>
23:00	<p>HANDOVER: BLUE TO RED</p> <p>ORB 33</p> <p>CABIN TEMP SURVEY (ORB OPS, DIO 664)</p>	<p>HANDOVER: BLUE TO RED</p>	<p>HANDOVER: BLUE TO RED</p> <p>POCC STATUS REPORT TO CREW</p> <p>VOICE OPS (DEEP CREEK MS, BALTIMORE, MD) (PL OPS, SAREX-C) E9,W6 RISE=23:27 SET=23:34</p>	<p>RED FD 03</p> <p>POCC PL STATUS</p>
002 00:00				



STS-59 (BLU FD 03)

MS1

MS2

MS4

MCC

DUAL SHIFT PRE-SLEEP
(ORB OPS FS, CREW SYS)

DUAL SHIFT PRE-SLEEP
(ORB OPS FS, CREW SYS)

DUAL SHIFT PRE-SLEEP
(ORB OPS FS, CREW SYS)

SLEEP

SLEEP

SLEEP

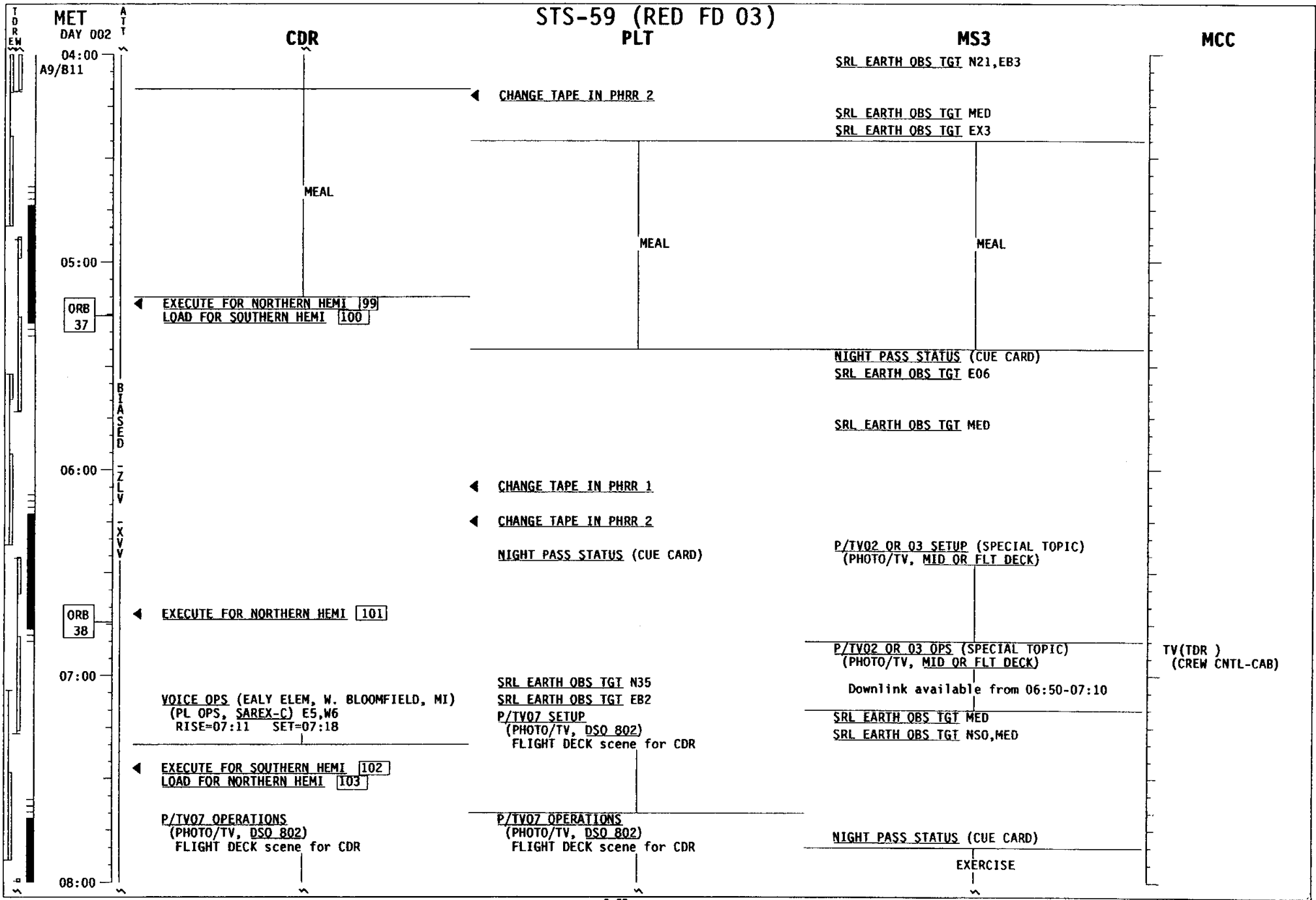
MET DAY 002
A9/B11
00:00
01:00
02:00
03:00
04:00

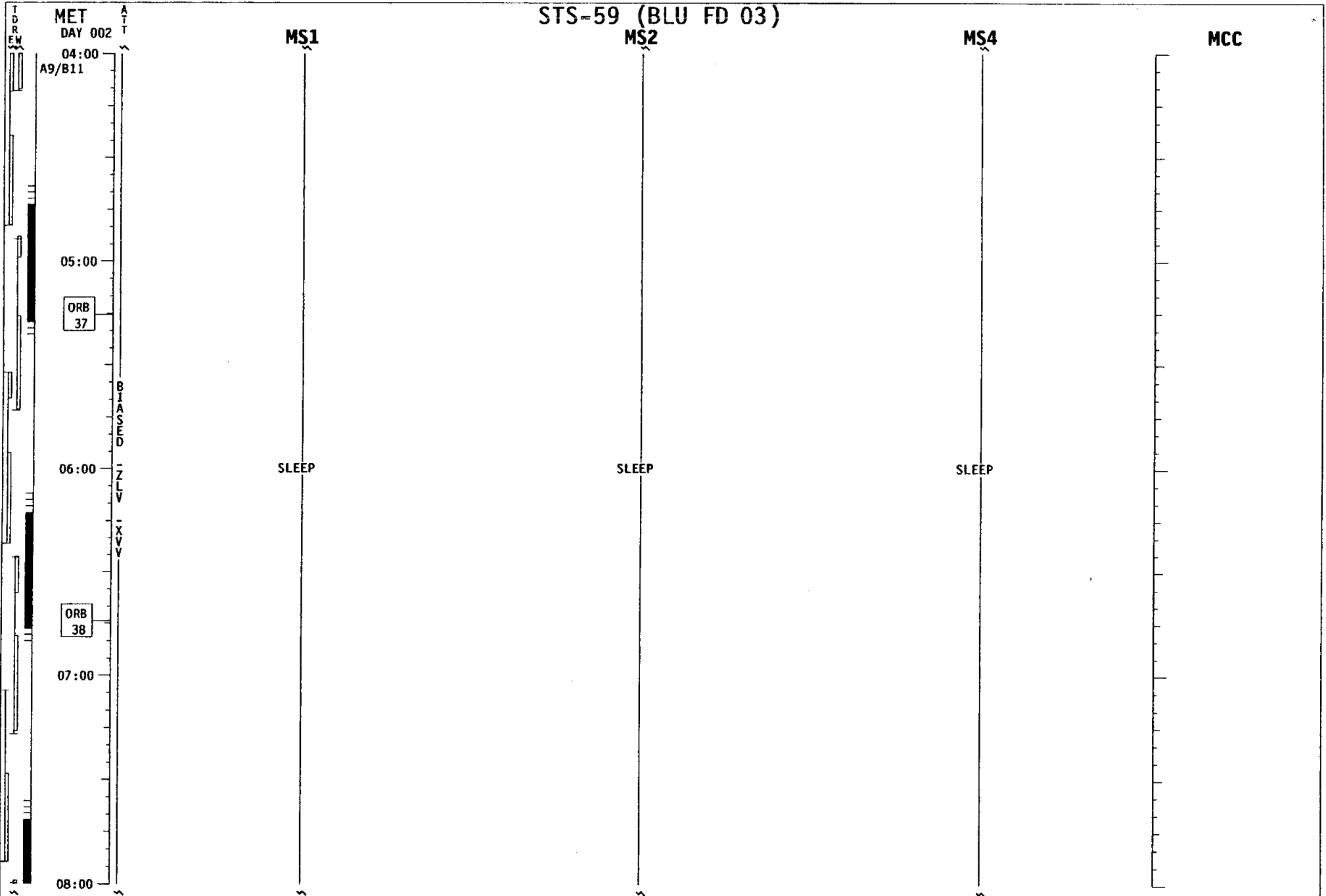
T O R E W
A P T
- X V V
+ X V V
B I A S S E D
- Z L V
- X V V

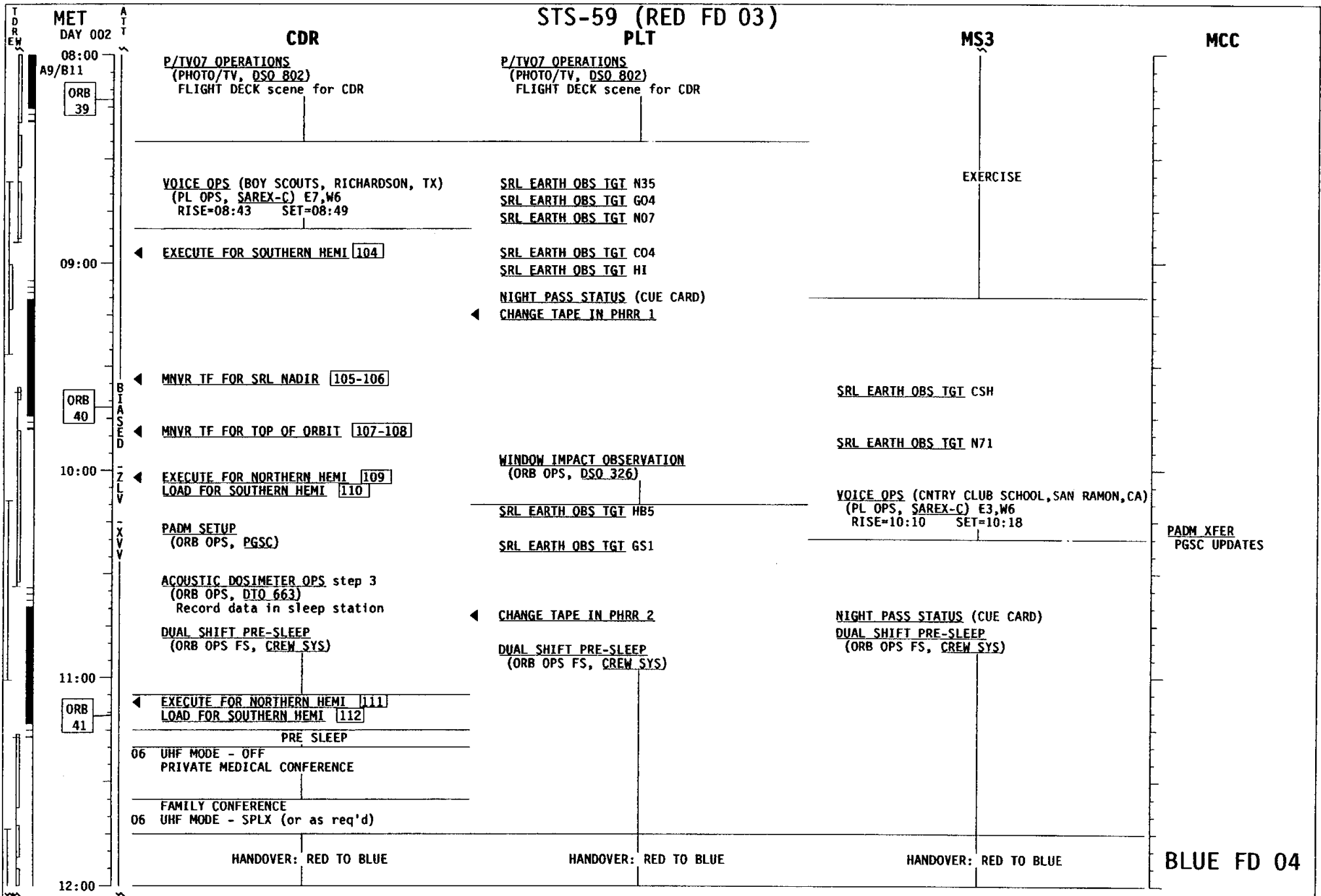
ORB
34

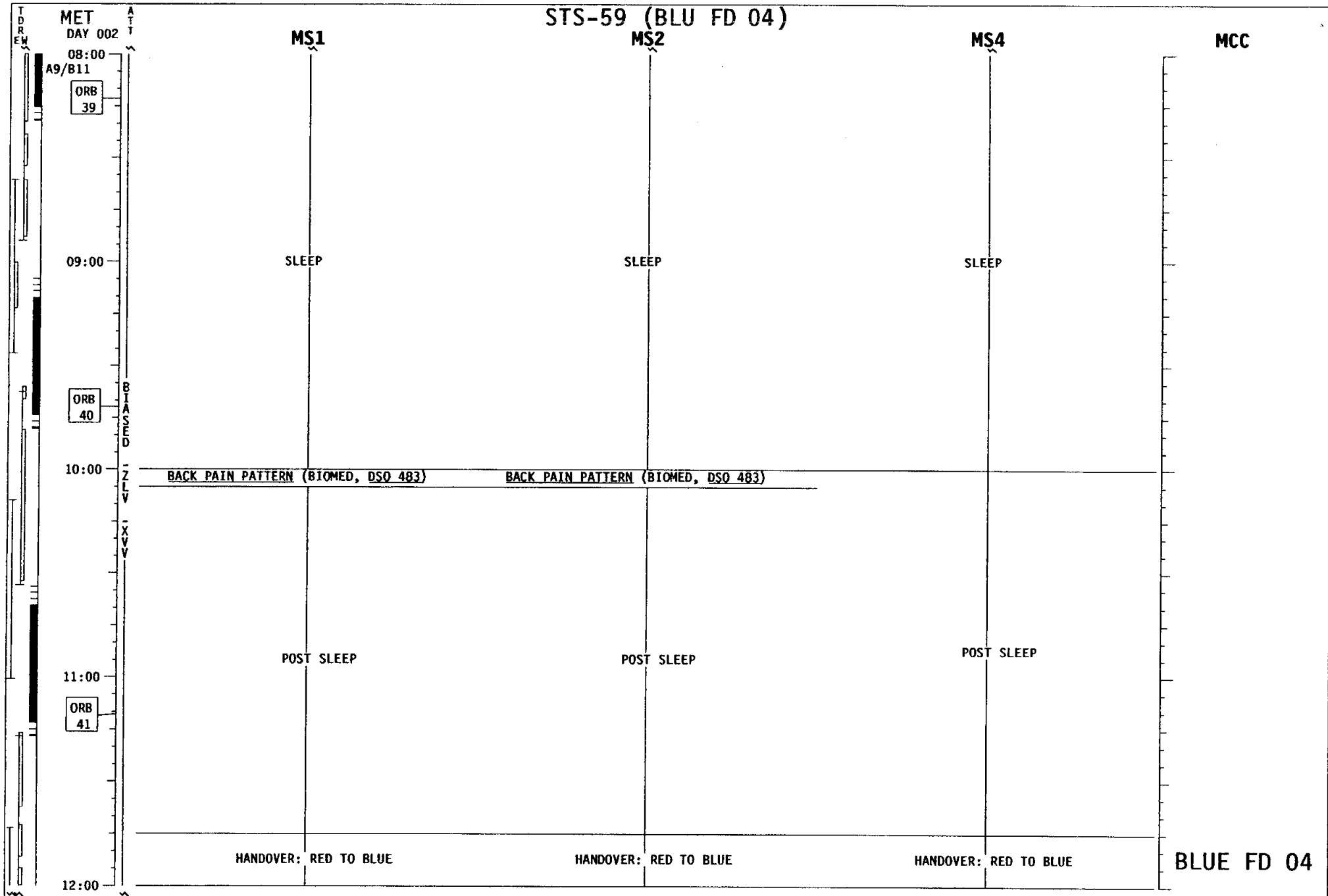
ORB
35

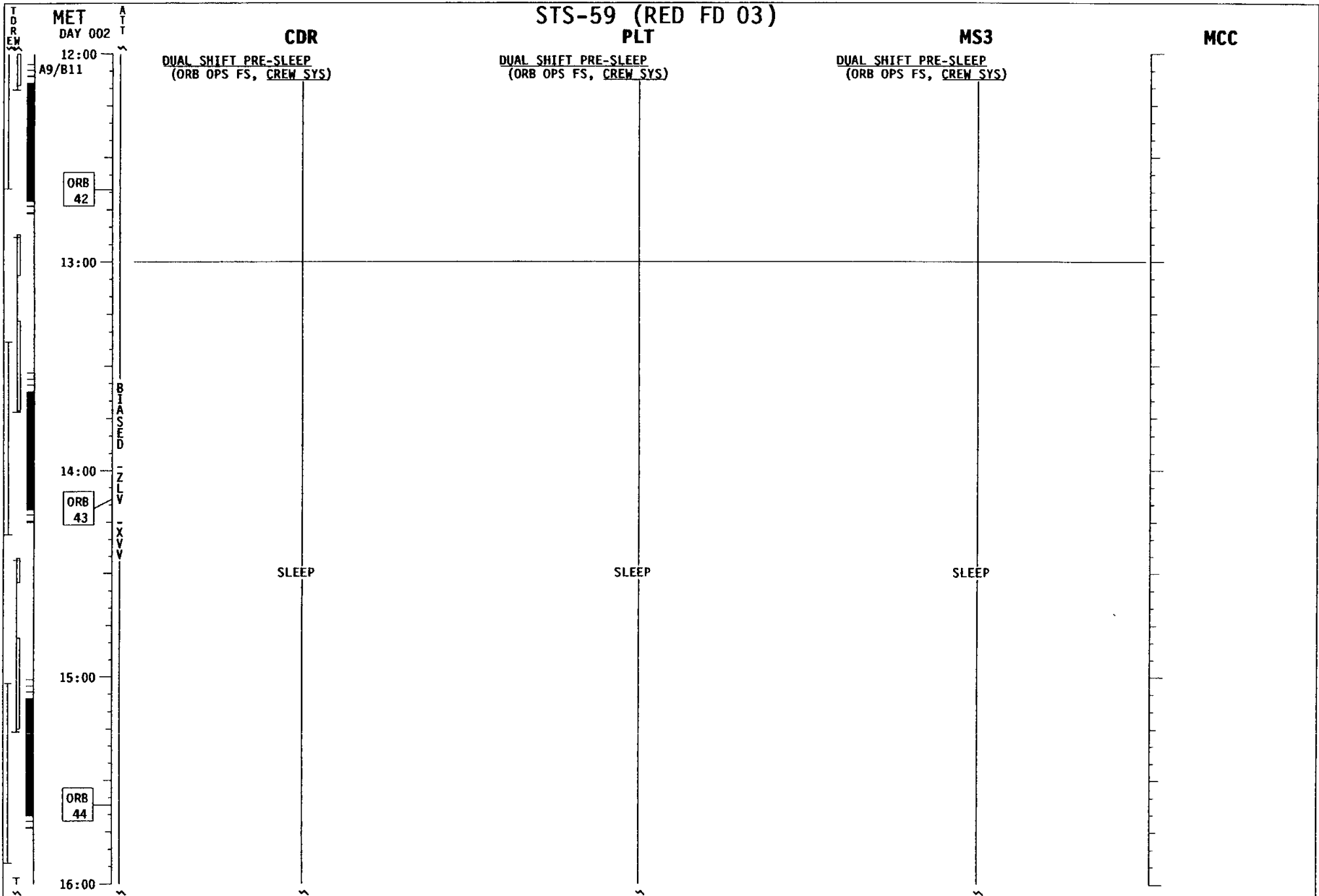
ORB
36

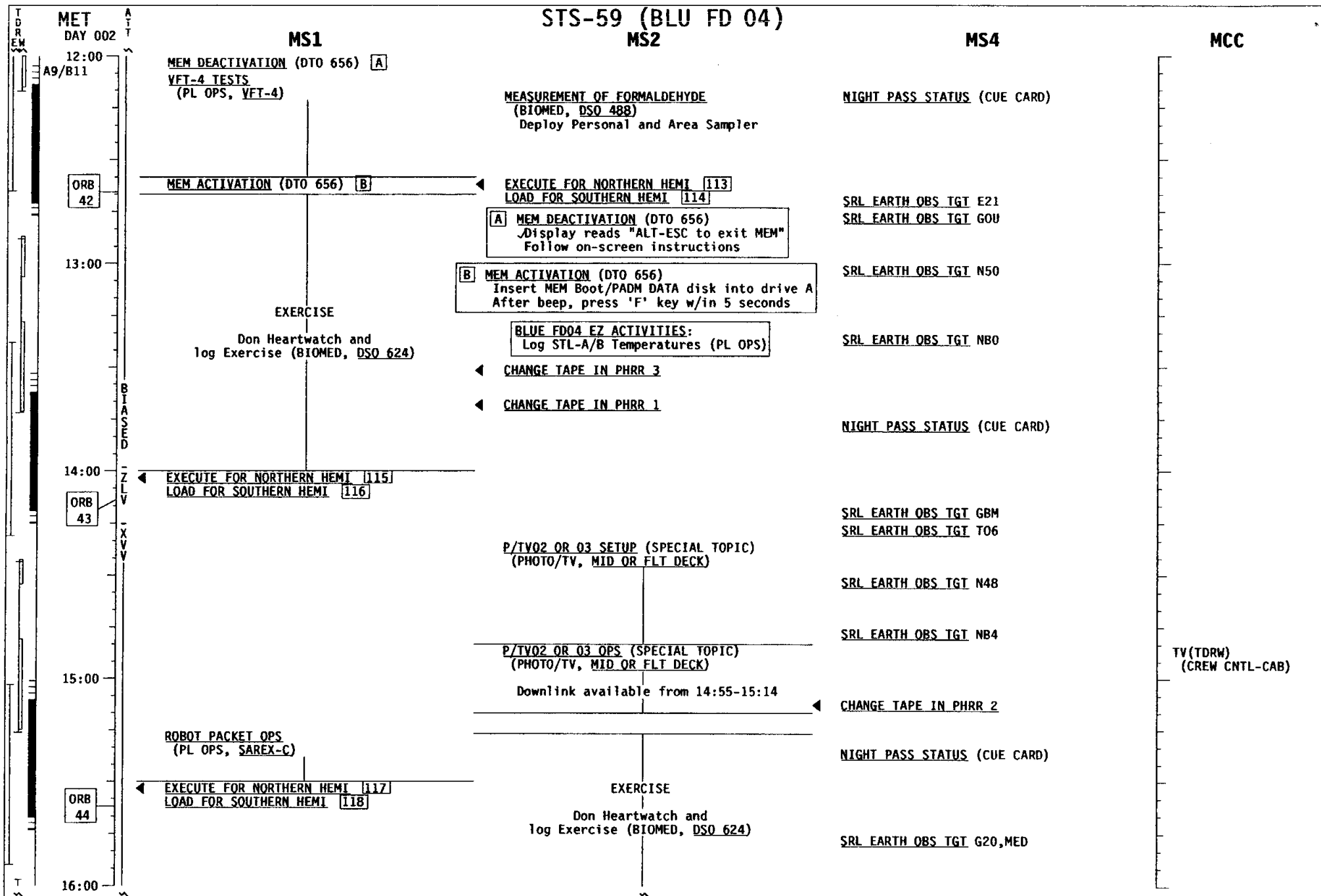


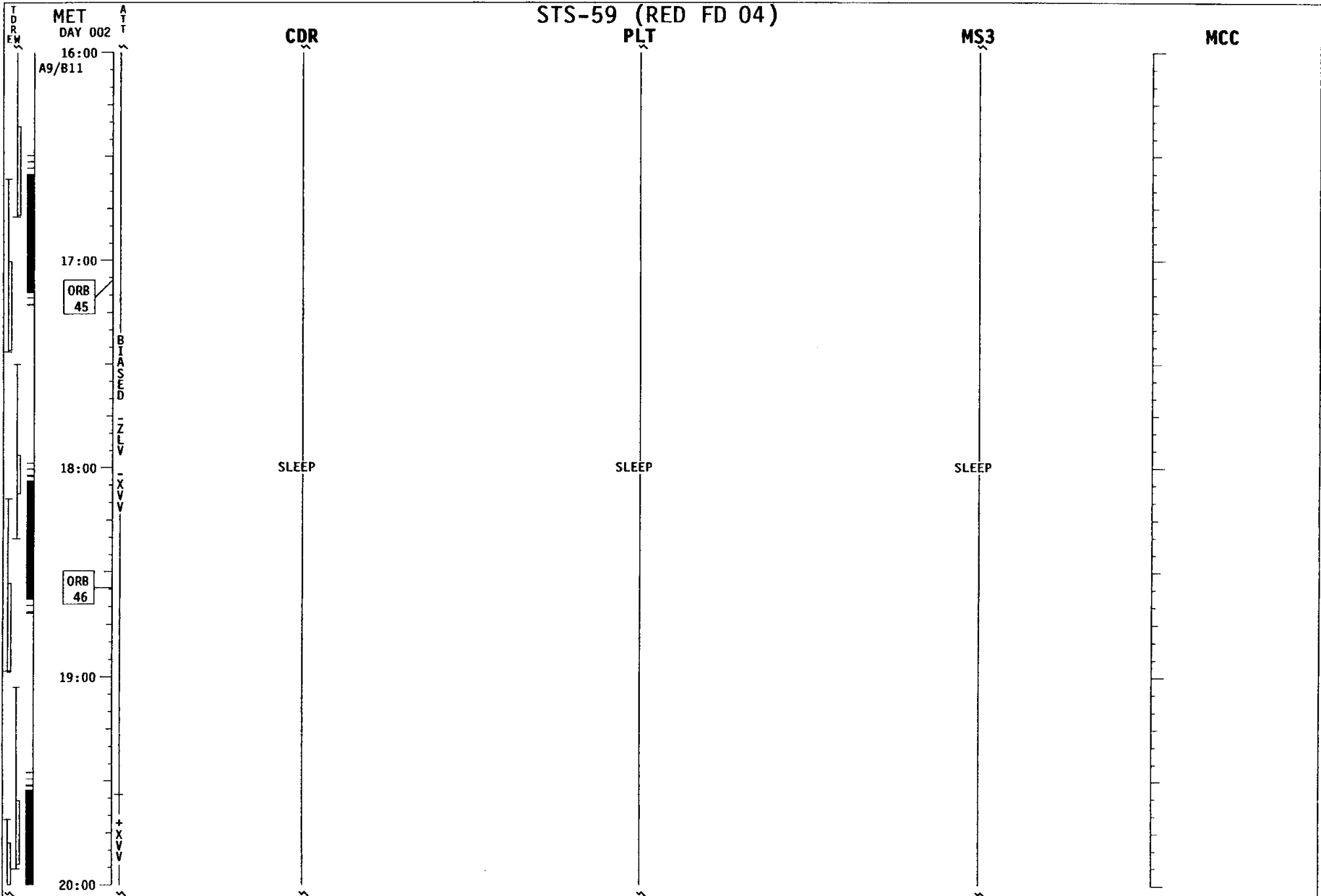


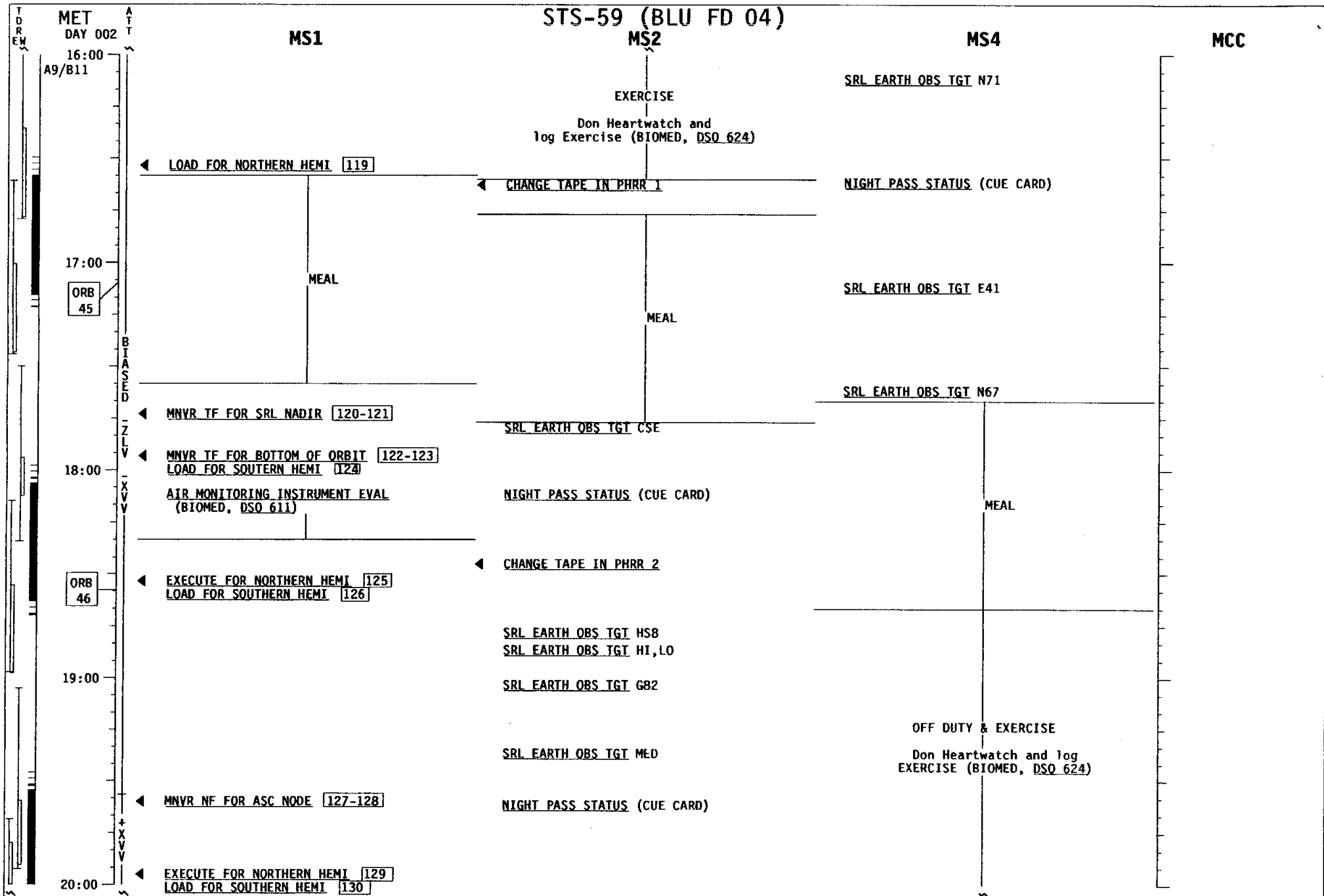


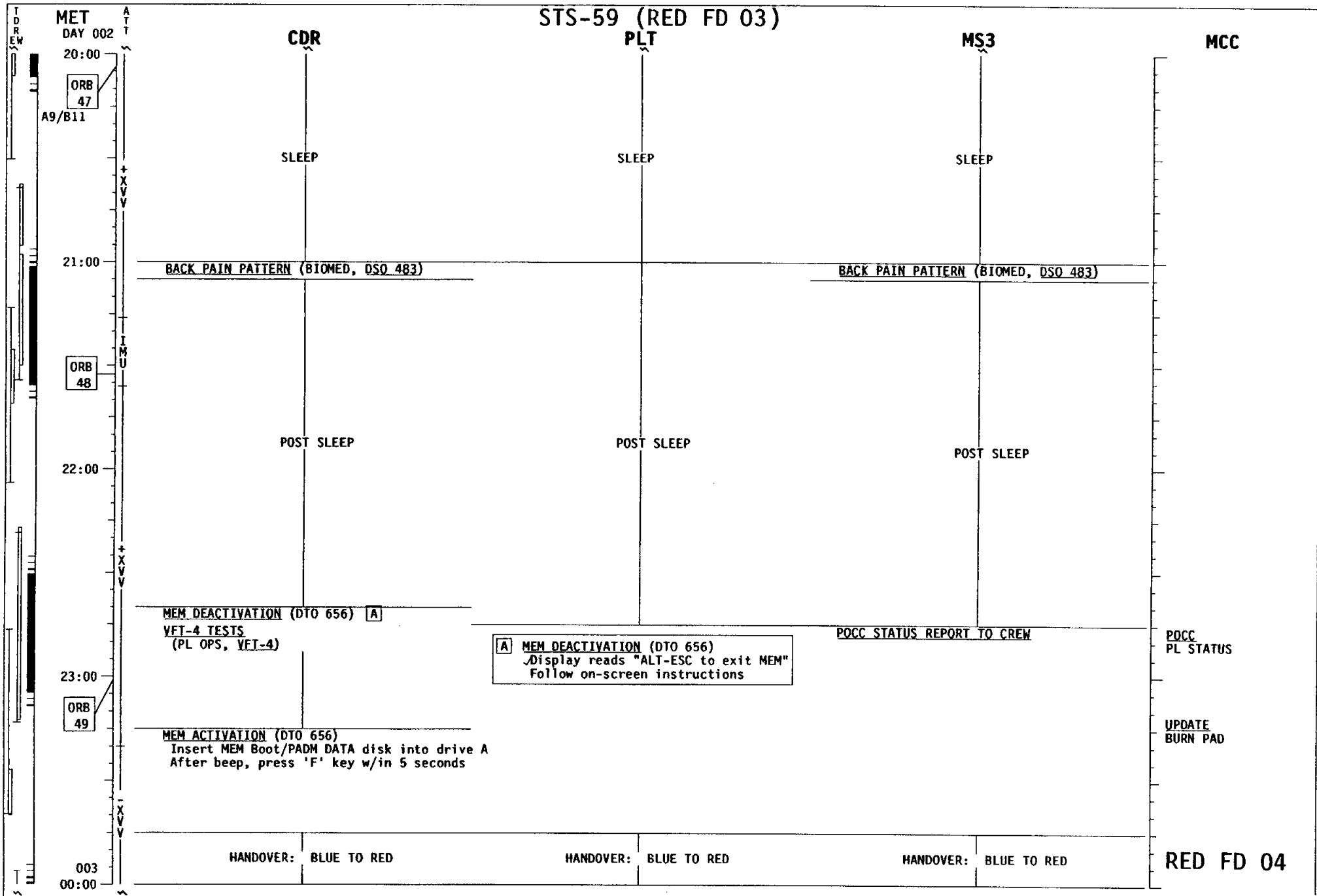




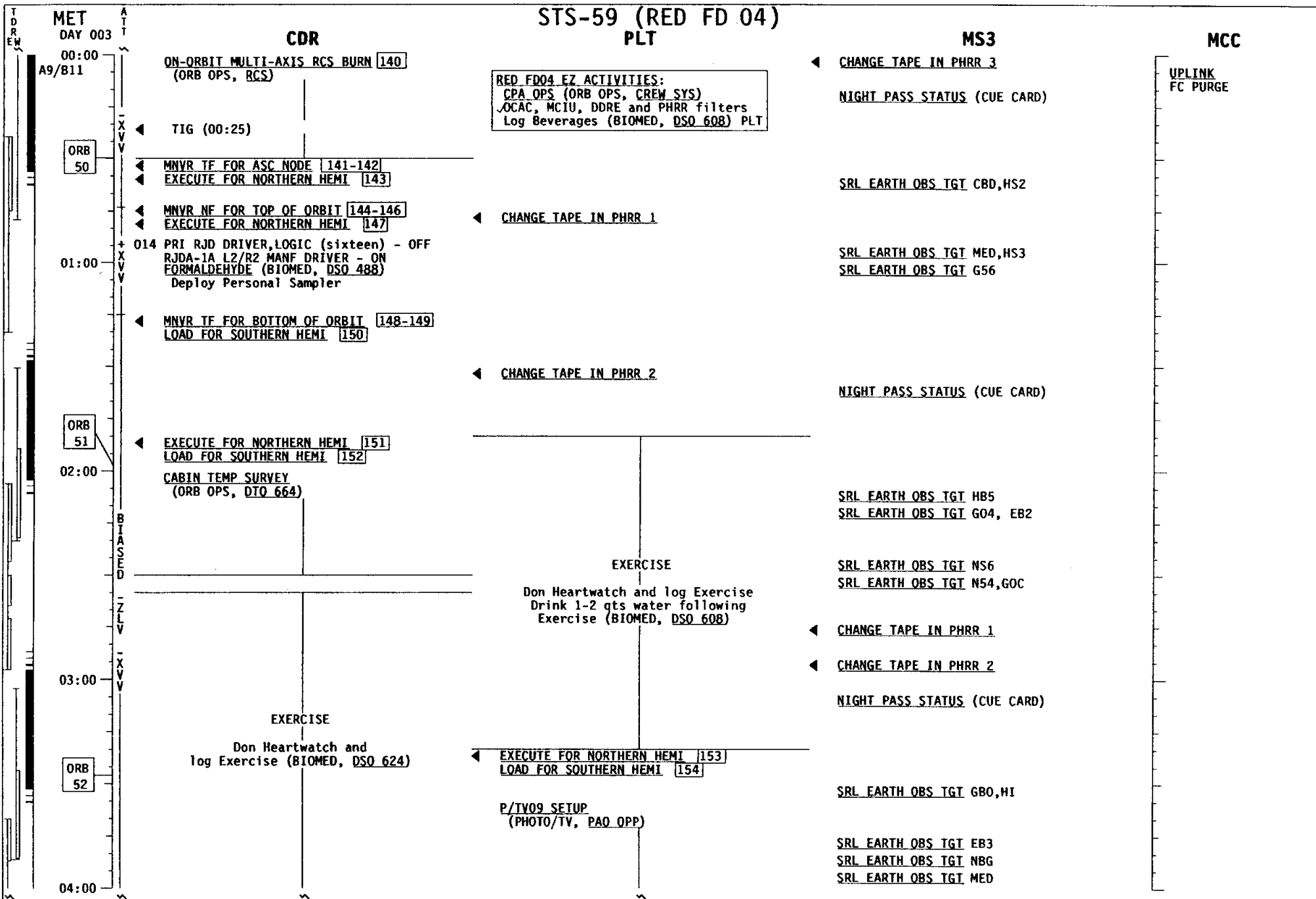








MET DAY 002		STS-59 (BLU FD 04)		MS4	MCC
		MS1	MS2		
20:00	ORB 47	VOICE OPS (PALTAMO SENIOR HS, PALTAMO, FINLAND) (PL OPS, SAREX-C) E2,W6 RISE=20:22 SET=20:28	SRL EARTH OBS TGT NS6, MED SRL EARTH OBS TGT MED SRL EARTH OBS TGT LO		
21:00		◀ MNVR IMU ALIGN ATT 131	◀ CHANGE TAPE IN PHRR 1 NIGHT PASS STATUS (CUE CARD)		SNAPSHOT TFL 184
22:00	ORB 48	IMU ALIGN - S TRK (ORB OPS) ◀ MNVR NF FOR TOP OF ORBIT 132-133		OFF DUTY & EXERCISE Don Heartwatch and log EXERCISE (BIOMED, DSO 624)	
22:00		◀ EXECUTE FOR NORTHERN HEMI 134 LOAD FOR SOUTHERN HEMI 135	SRL EARTH OBS TGT N65 SRL EARTH OBS TGT E03 SRL EARTH OBS TGT G23		PADM XFER PGSC UPDATES
23:00	ORB 49	PADM SETUP (ORB OPS, PGSC) VOICE OPS (NORTHAMPTON OGILVIE, AUSTRALIA) (PL OPS, SAREX-C) E1,W6 RISE=22:22 SET=22:29	◀ CHANGE TAPE IN PHRR 2 NIGHT PASS STATUS (CUE CARD) POCC STATUS REPORT TO CREW		POCC PL STATUS
23:00		◀ LOAD FOR NORTHERN HEMI 136 VOICE OPS (EASTERN U.S. SCHOOL) (PL OPS, SAREX-C) E5,E8,E9;W6 RISE=23:08 SET=23:15 Backup opportunity for MI,WV,MD	SRL EARTH OBS TGT E13 SRL EARTH OBS TGT N06 SRL EARTH OBS TGT ES5 SRL EARTH OBS TGT EB1		UPDATE BURN PAD
00:00		◀ MNVR TF FOR DESC NODE 137-138 LOAD FOR SOUTHERN HEMI 139 ACOUSTIC DOSIMETER OPS steps 3,5 (ORB OPS, DIO 663) Record data and stow for remainder of flight	FORMALDEHYDE (BIOMED, DSO 488) Stow Personal Sampler		
003 00:00		HANDOVER: BLUE TO RED	HANDOVER: BLUE TO RED	HANDOVER: BLUE TO RED	RED FD 04



STS-59 (BLU FD 04)

MS1

MS2

MS4

MCC

MET
DAY 003

00:00
A9/B11

ORB
50

DUAL SHIFT PRE-SLEEP
(ORB OPS FS, CREW SYS)

01:00

ORB
51

02:00

B
I
A
S
E
D

03:00

SLEEP

ORB
52

04:00

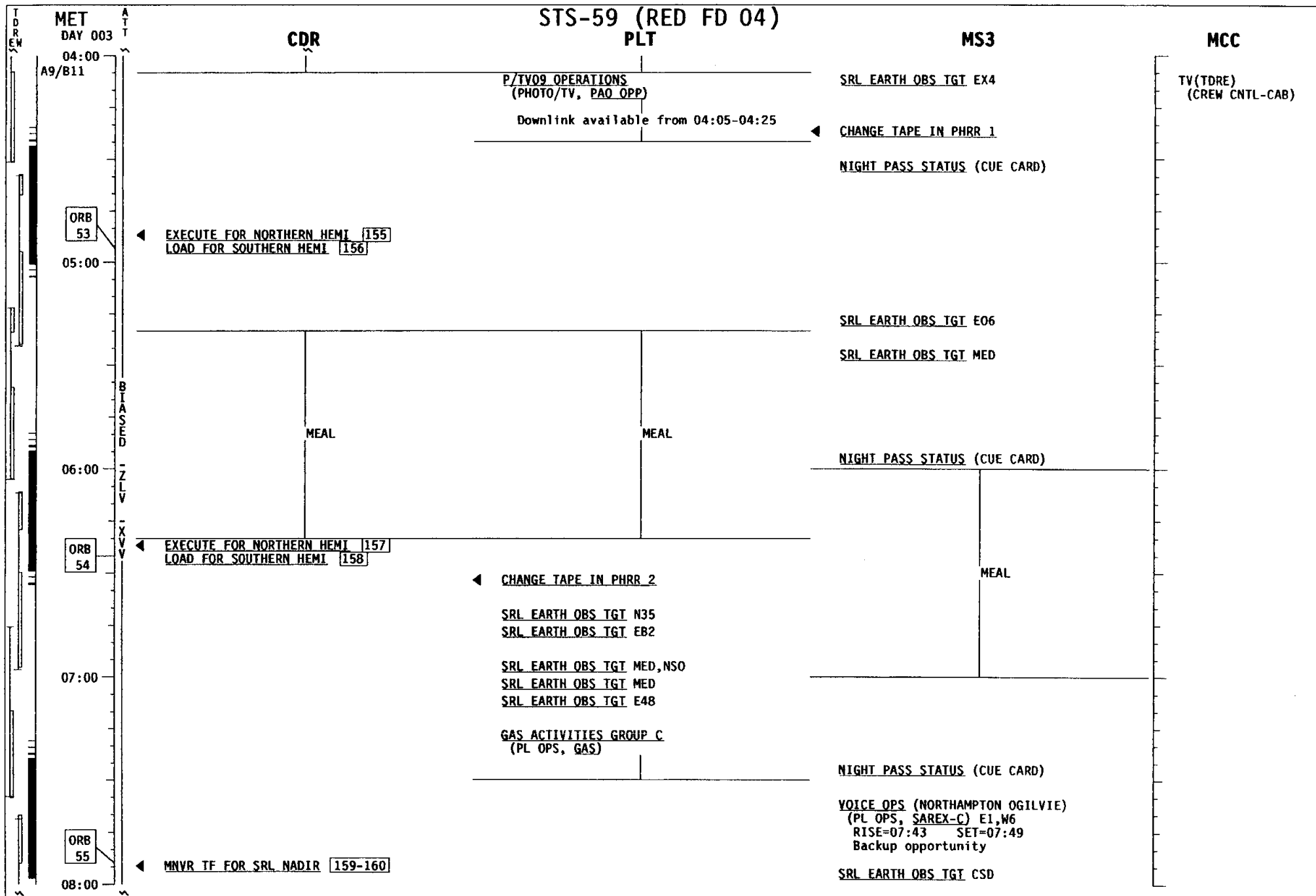
DUAL SHIFT PRE-SLEEP
(ORB OPS FS, CREW SYS)

SLEEP

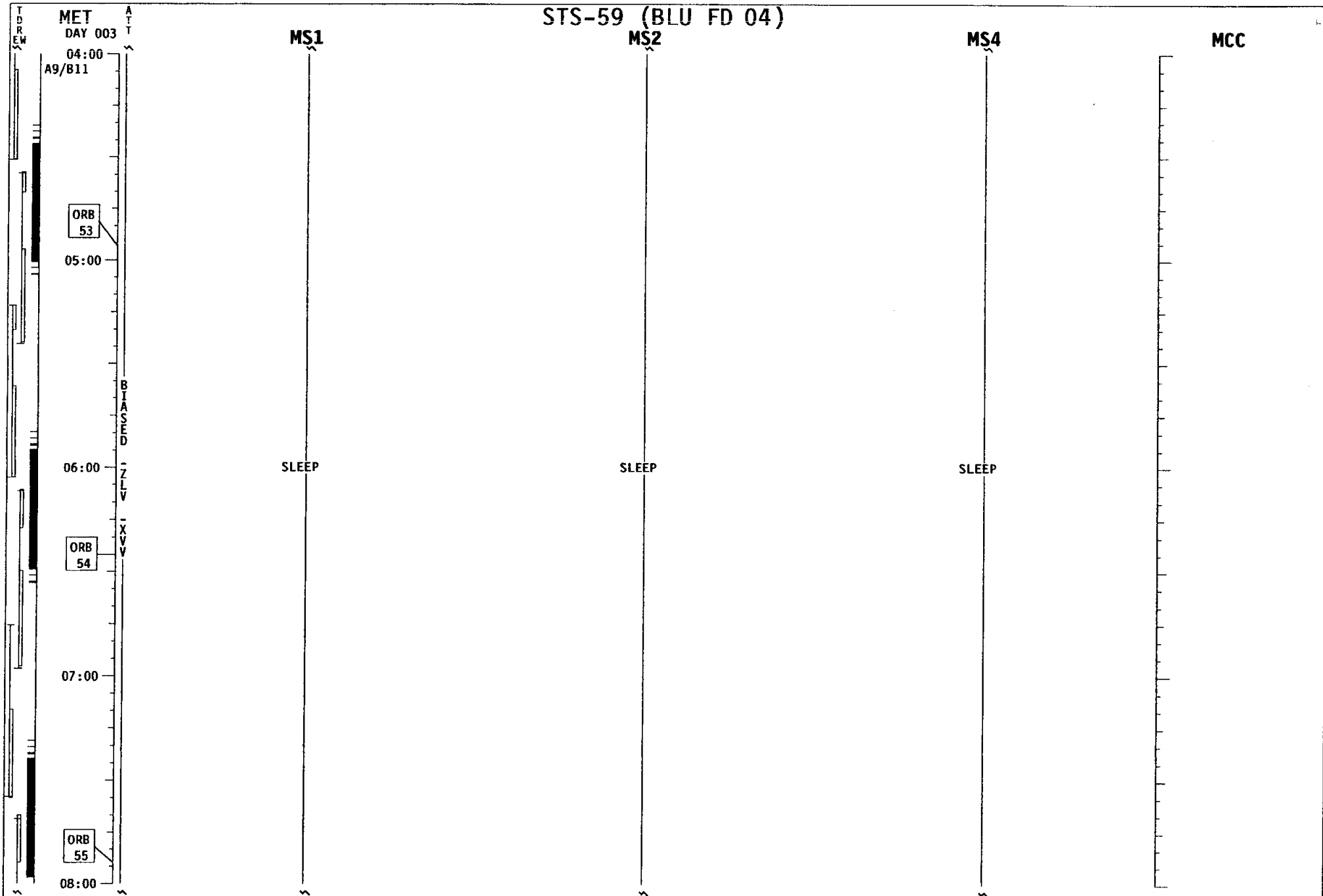
DUAL SHIFT PRE-SLEEP
(ORB OPS FS, CREW SYS)

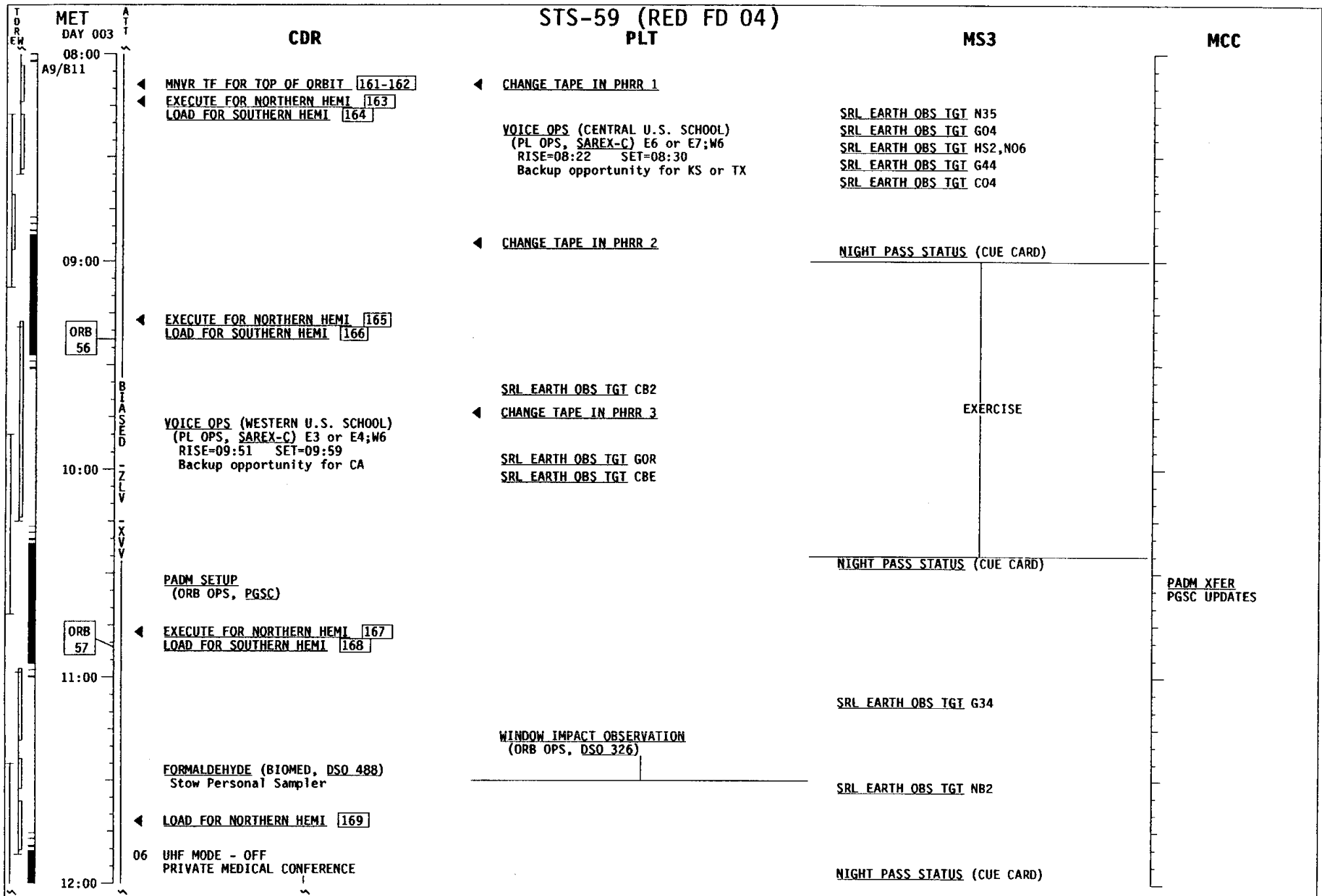
SLEEP

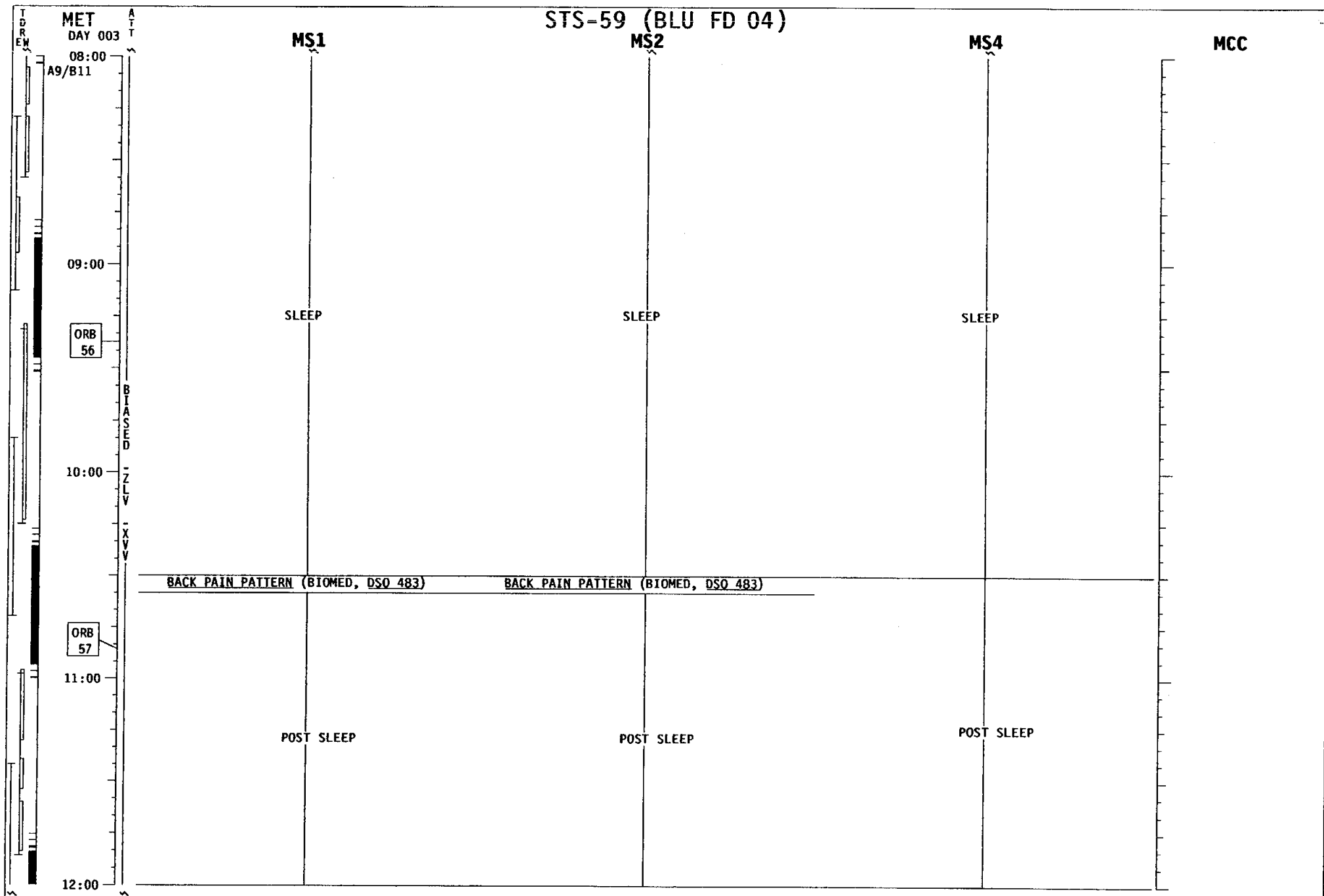
UPLINK
FC PURGE

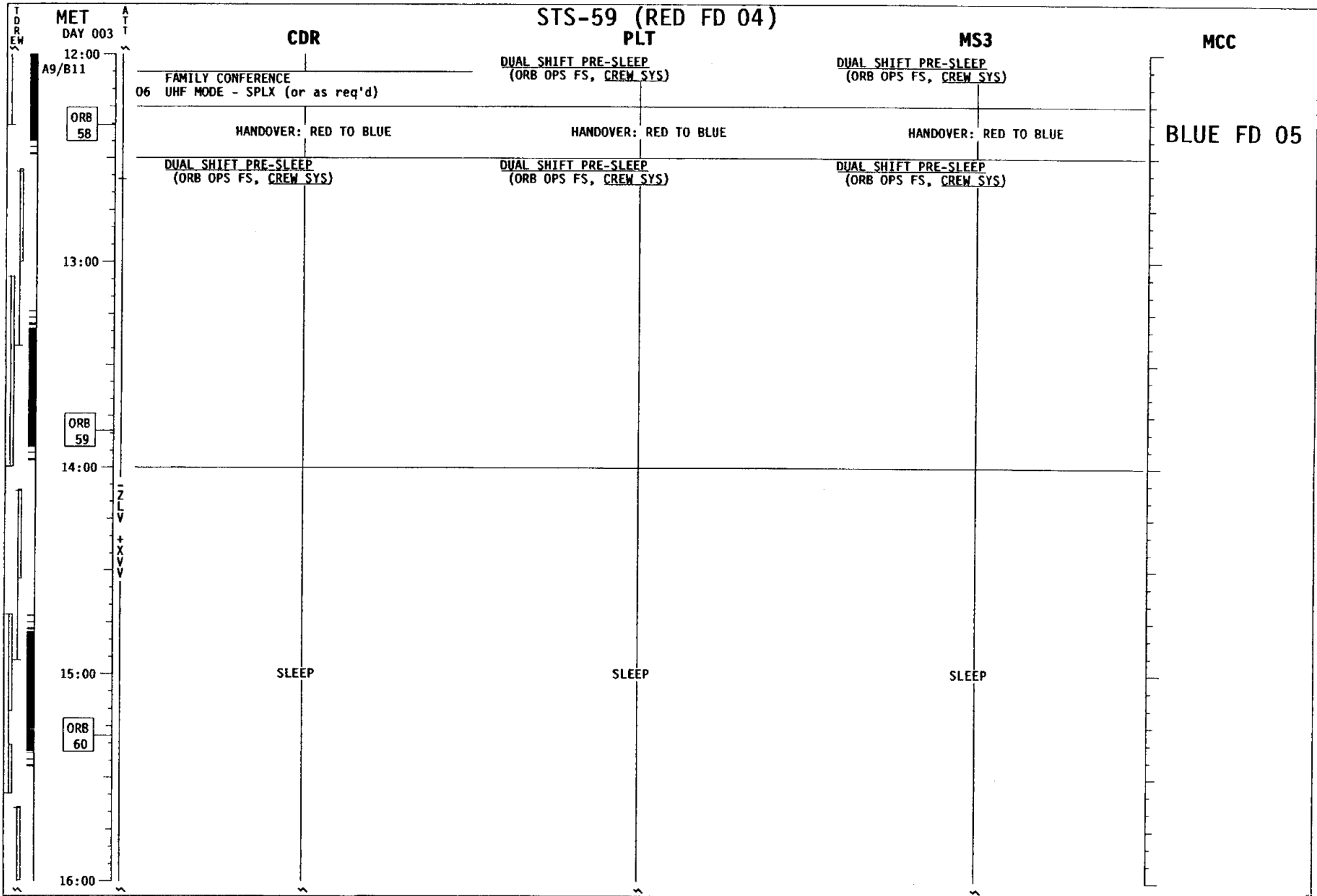


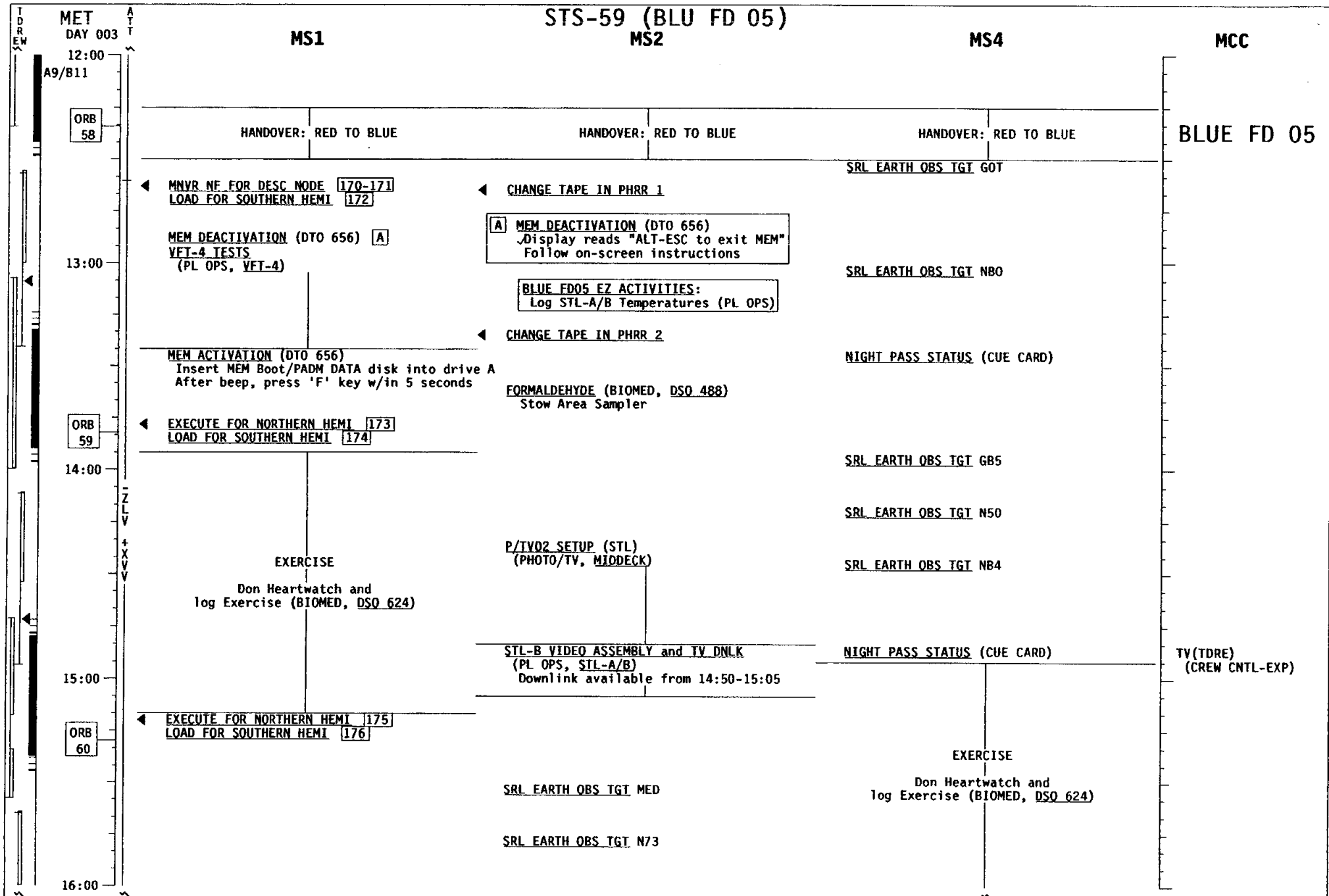
STS-59 (BLU FD 04)

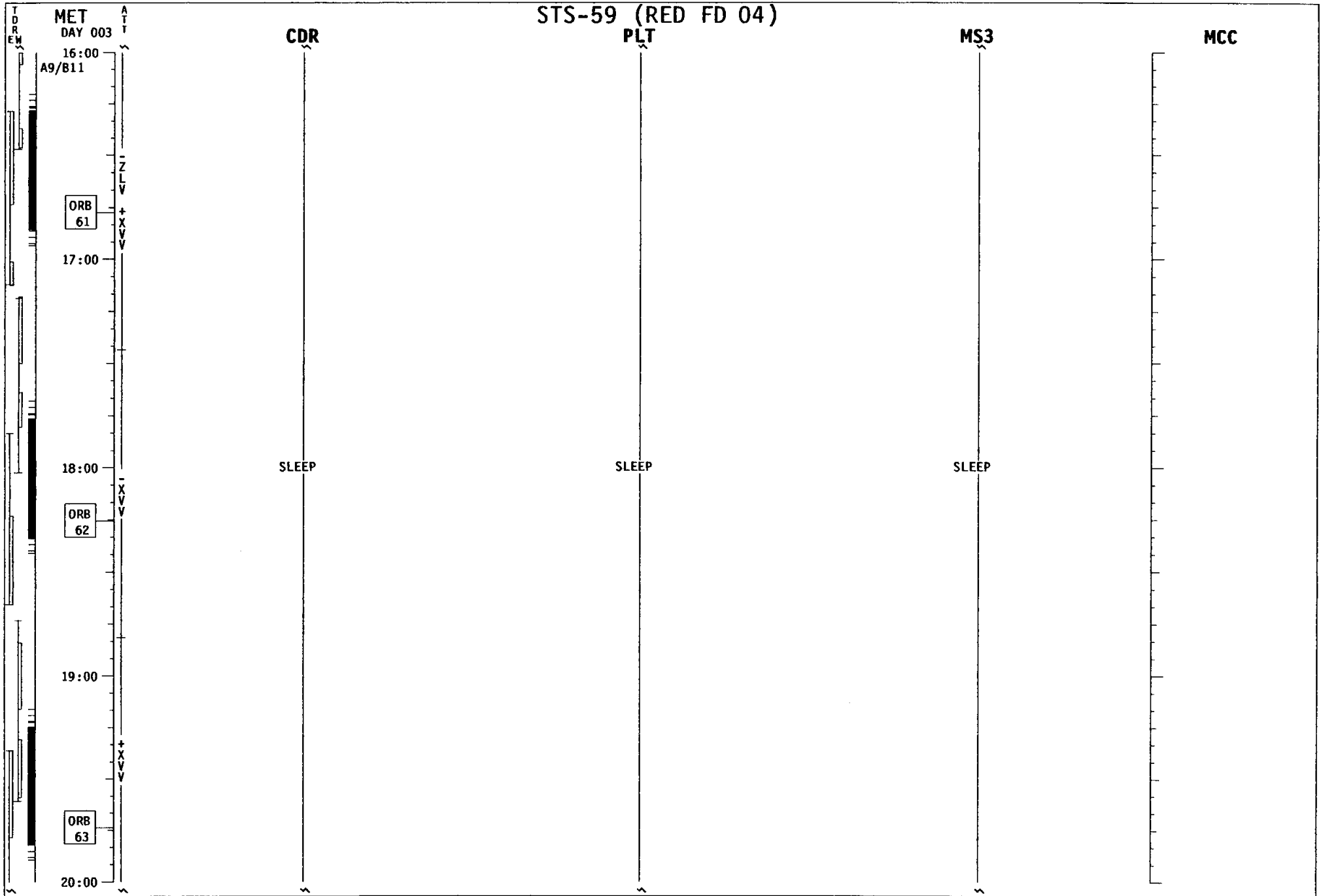


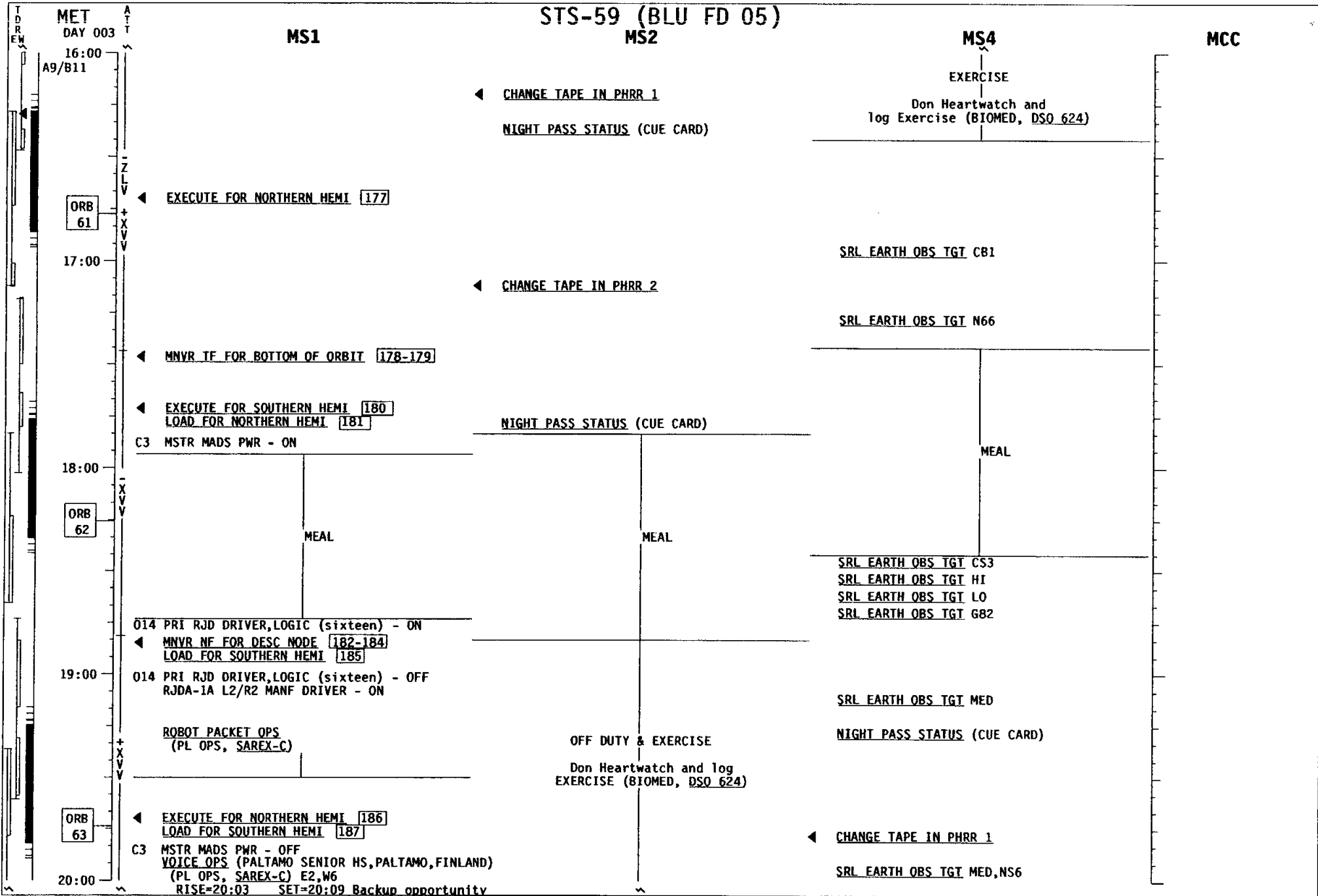


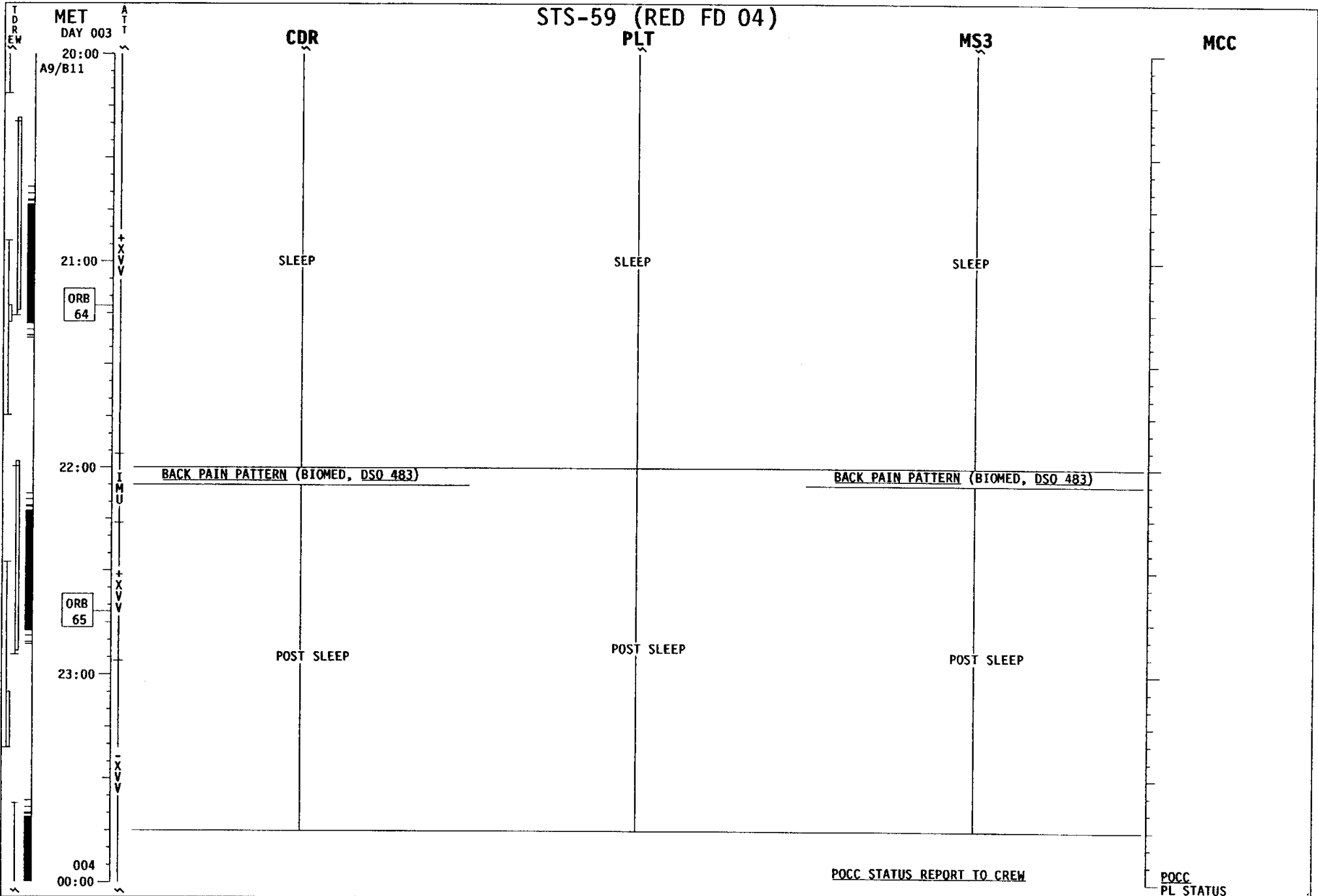












STS-59 (BLU FD 05)

MS1

MS2

MS4

MCC

MET DAY 003

20:00
A9/B11

VOICE OPS (FINLAND SCHOOL)
(PL OPS, SAREX-C) E2,W6
RISE=20:03 SET=20:09
Backup opportunity

21:00

ORB 64

EXECUTE FOR NORTHERN HEMI 188

22:00

MNVR IMU ALIGN ATT 189

IMU ALIGN - S TRK (ORB OPS)
MNVR NF FOR ASC NODE 190-191
LOAD FOR NORTHERN HEMI 192

23:00

ORB 65

014 PRI RJD DRIVER, LOGIC (sixteen) - ON

MNVR TF FOR TOP OF ORBIT 193-195
EXECUTE FOR NORTHERN HEMI 196
LOAD FOR SOUTHERN HEMI 197

PADM SETUP
(ORB OPS, PGSC)

CABIN TEMP SURVEY
(ORB OPS, DTO 664)

004
00:00

OFF DUTY & EXERCISE
Don Heartwatch and log
EXERCISE (BIOMED, DSO 624)

SRL EARTH OBS TGT MED,NBB
CHANGE TAPE IN PHRR 3

SRL EARTH OBS TGT LO,GOW
P/TV02 OR 03 SETUP (SPECIAL TOPIC)
(PHOTO/TV, MID OR FLT DECK)

P/TV02 OR 03 OPS (SPECIAL TOPIC)
(PHOTO/TV, MID OR FLT DECK)

Downlink available from 3/20:50-21:10

NIGHT PASS STATUS (CUE CARD)

SRL EARTH OBS TGT N65

SRL EARTH OBS TGT G23

NIGHT PASS STATUS (CUE CARD)
CHANGE TAPE IN PHRR 2

SRL EARTH OBS TGT N06
SRL EARTH OBS TGT HBO,EB1

SRL EARTH OBS TGT E25

SRL EARTH OBS TGT M01

CHANGE TAPE IN PHRR 1

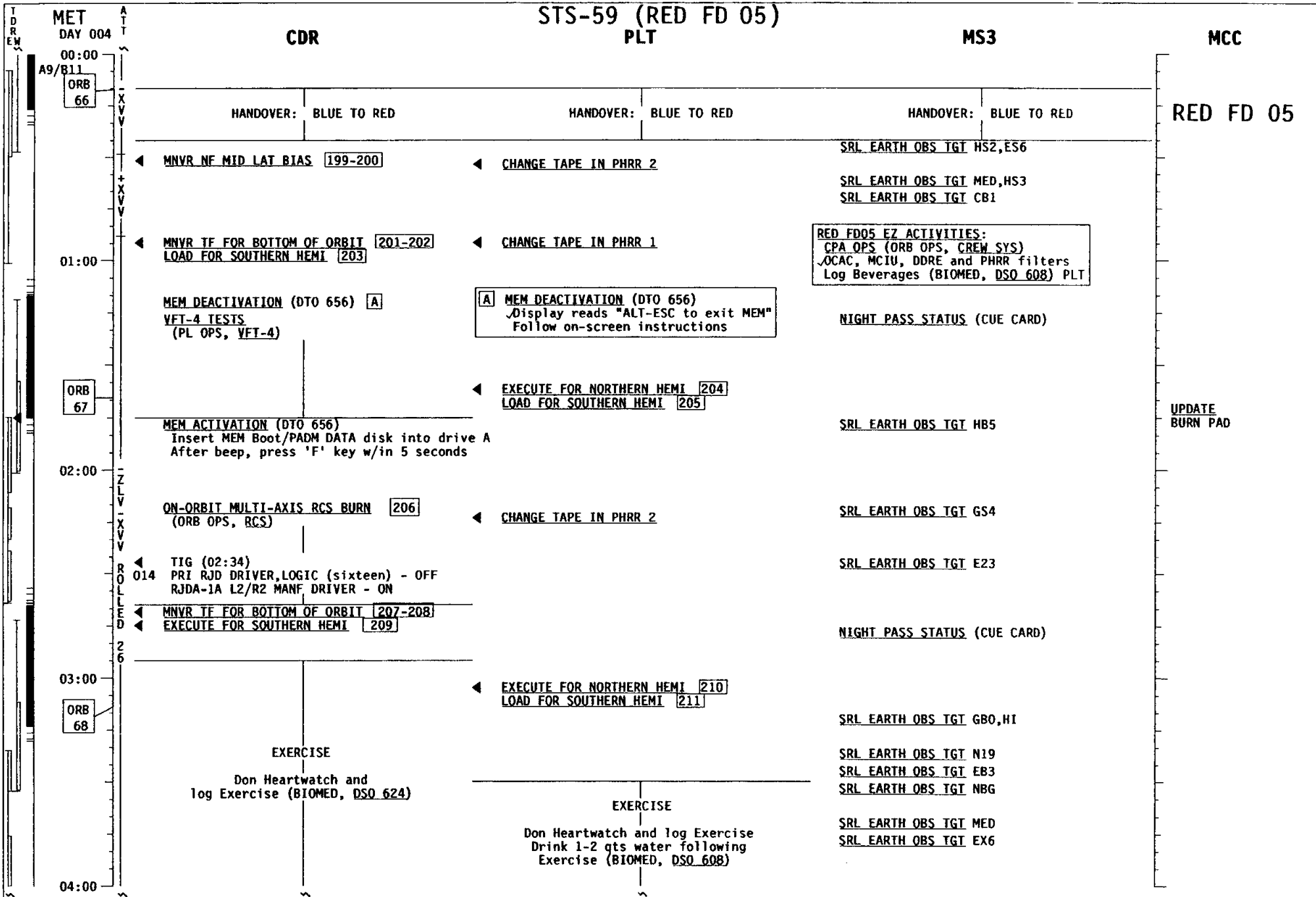
NIGHT PASS STATUS (CUE CARD)
POCC STATUS REPORT TO CREW

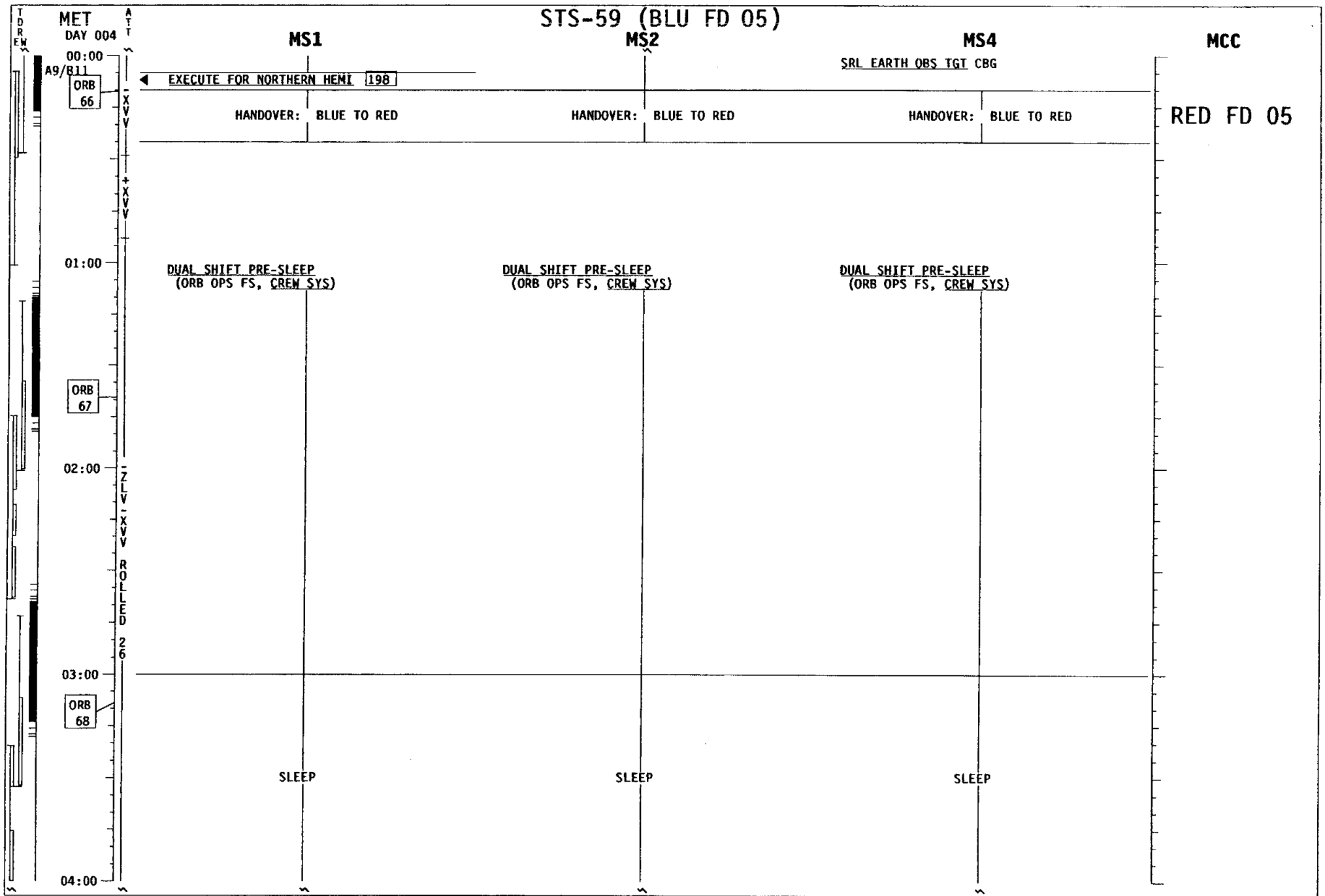
TV(TDRW)
(CREW CNTL-CAB)

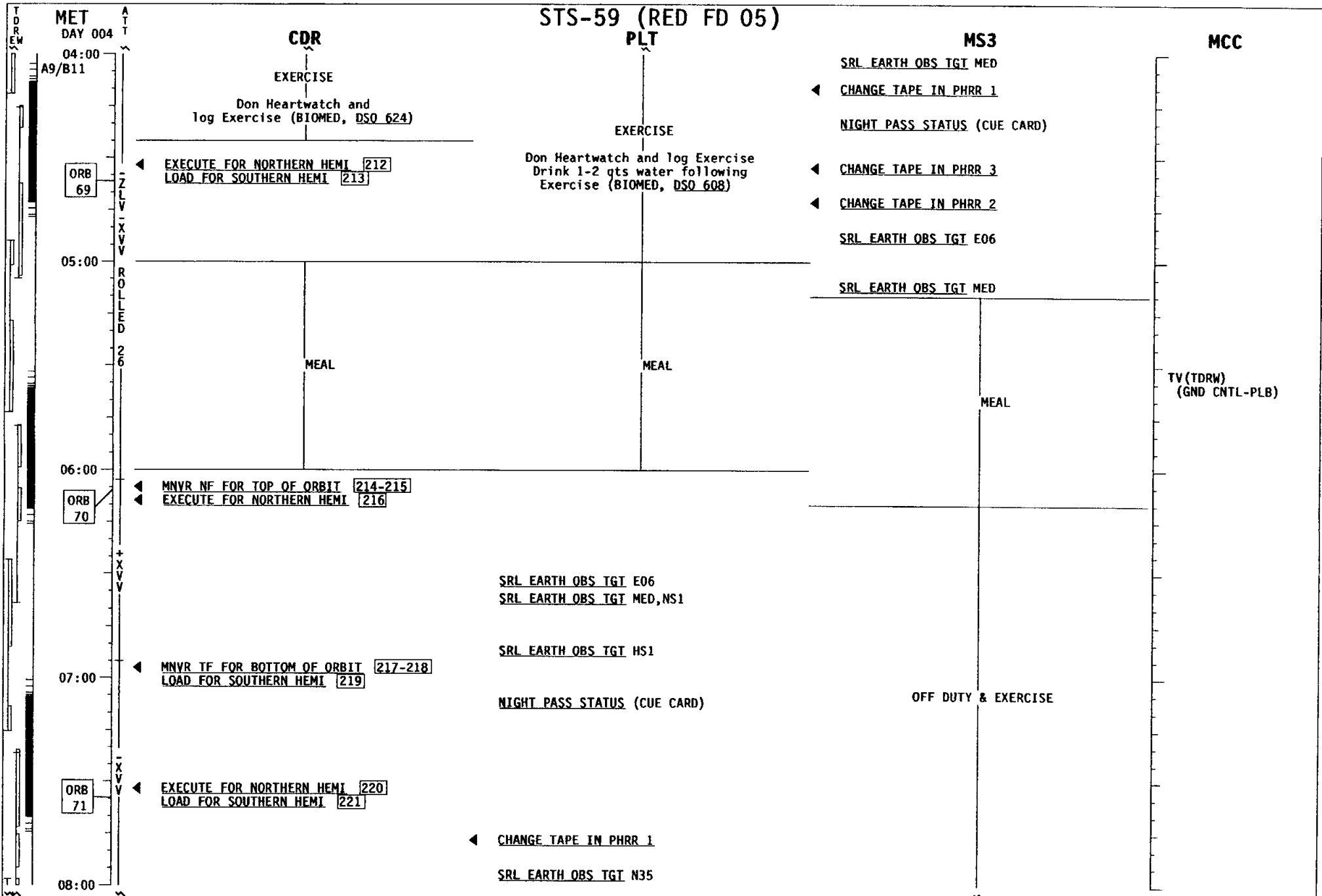
SNAPSHOT
TFL 184

PADM XFER
PGSC UPDATES

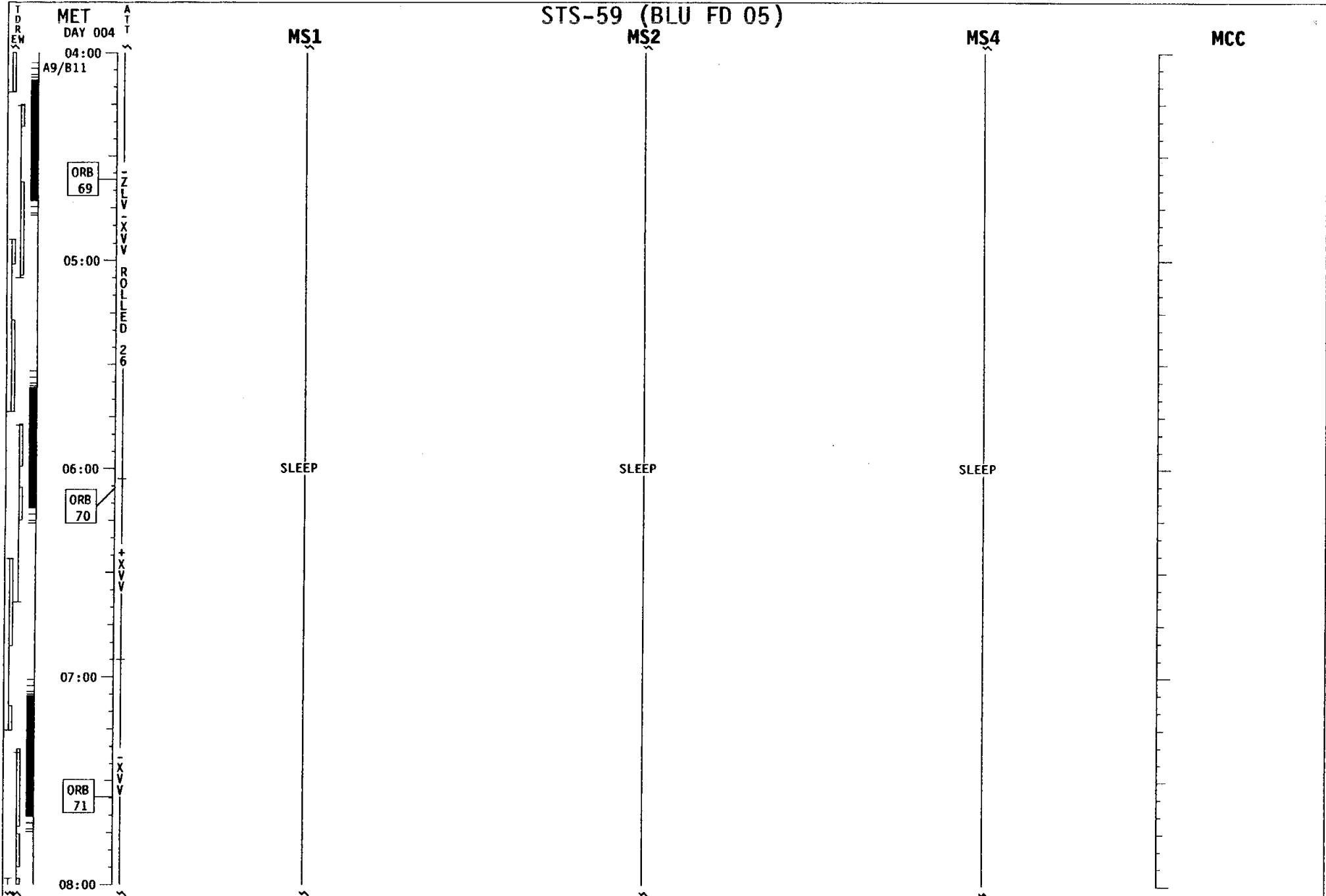
POCC
PL STATUS

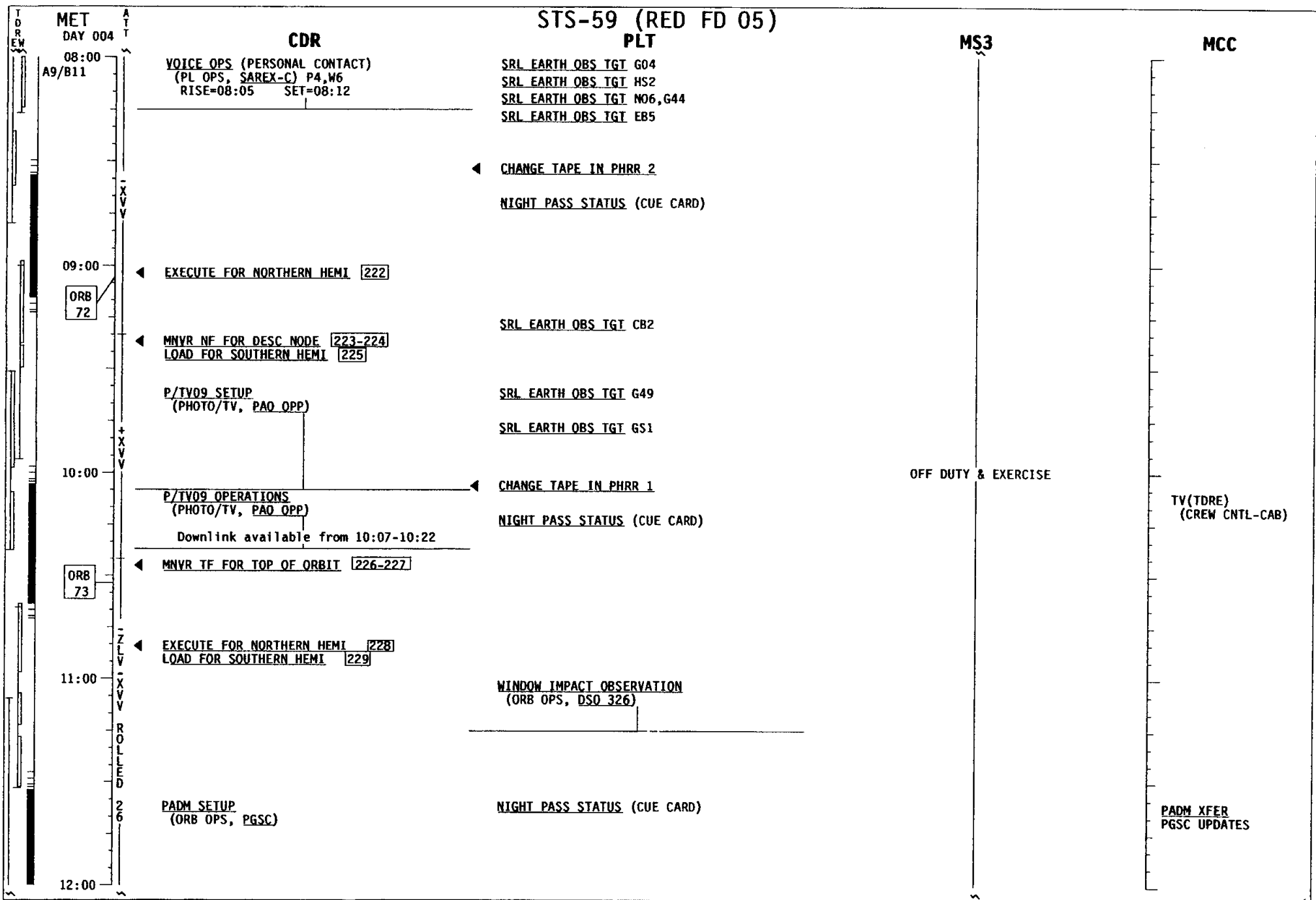


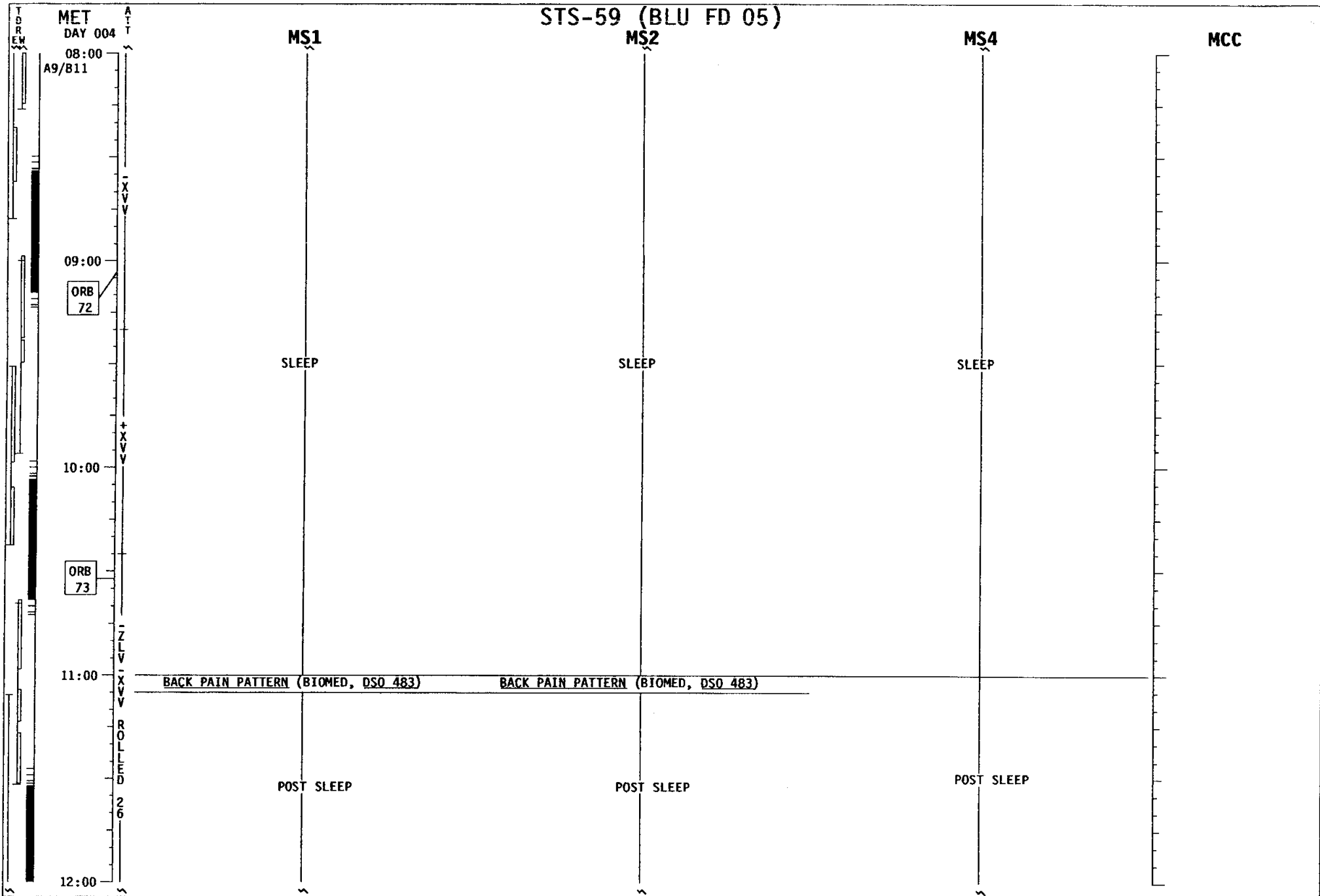


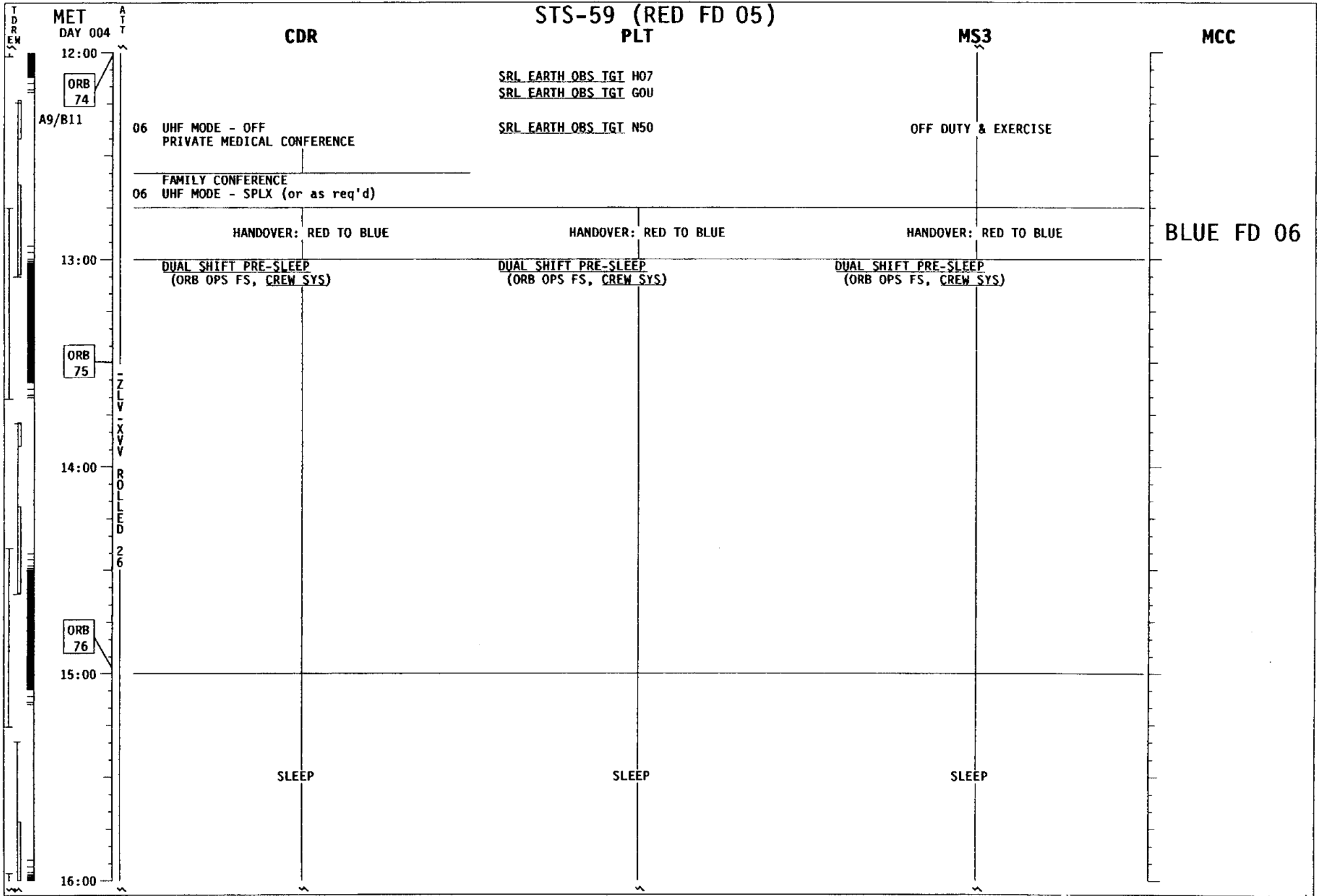


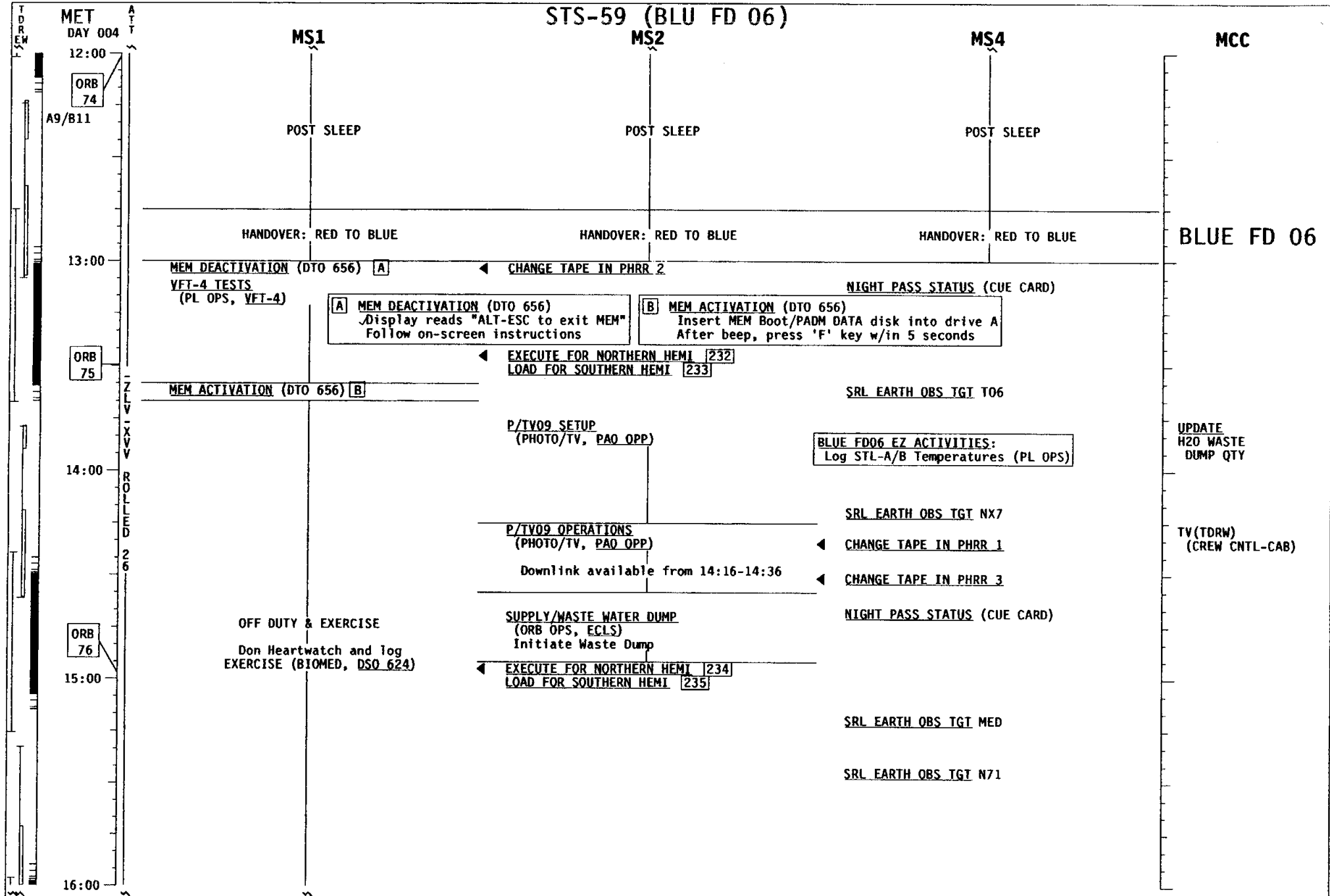
STS-59 (BLU FD 05)

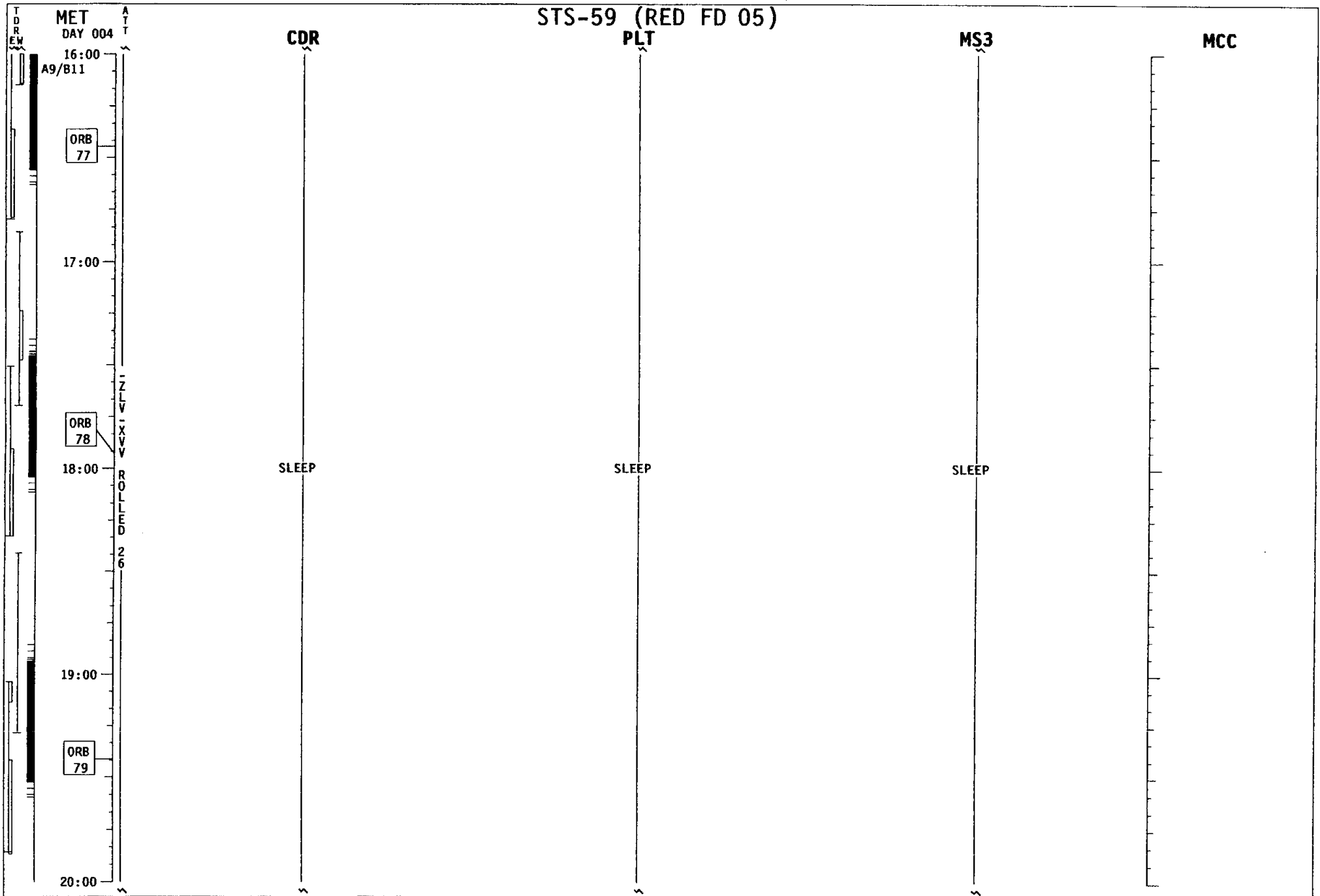


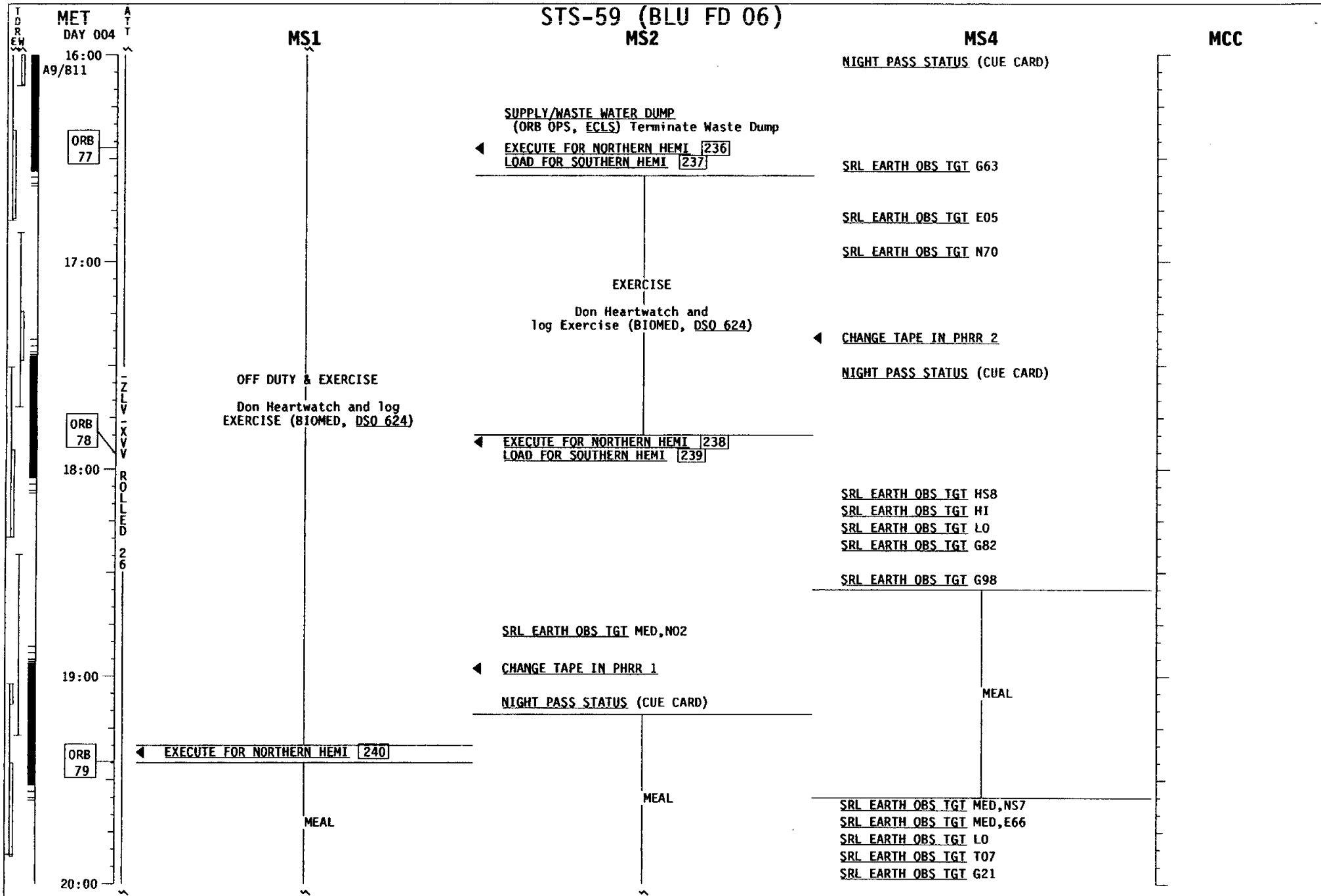


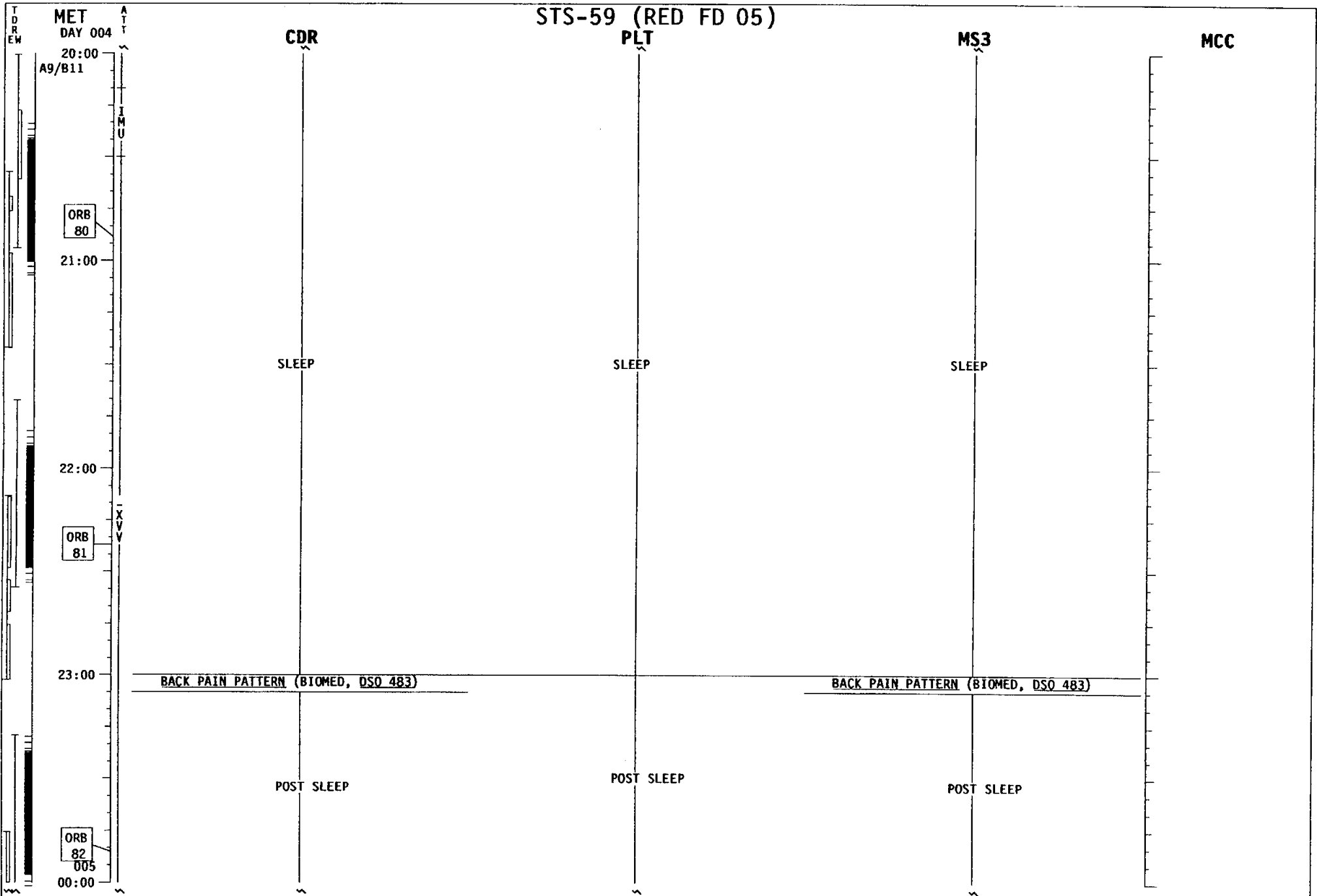


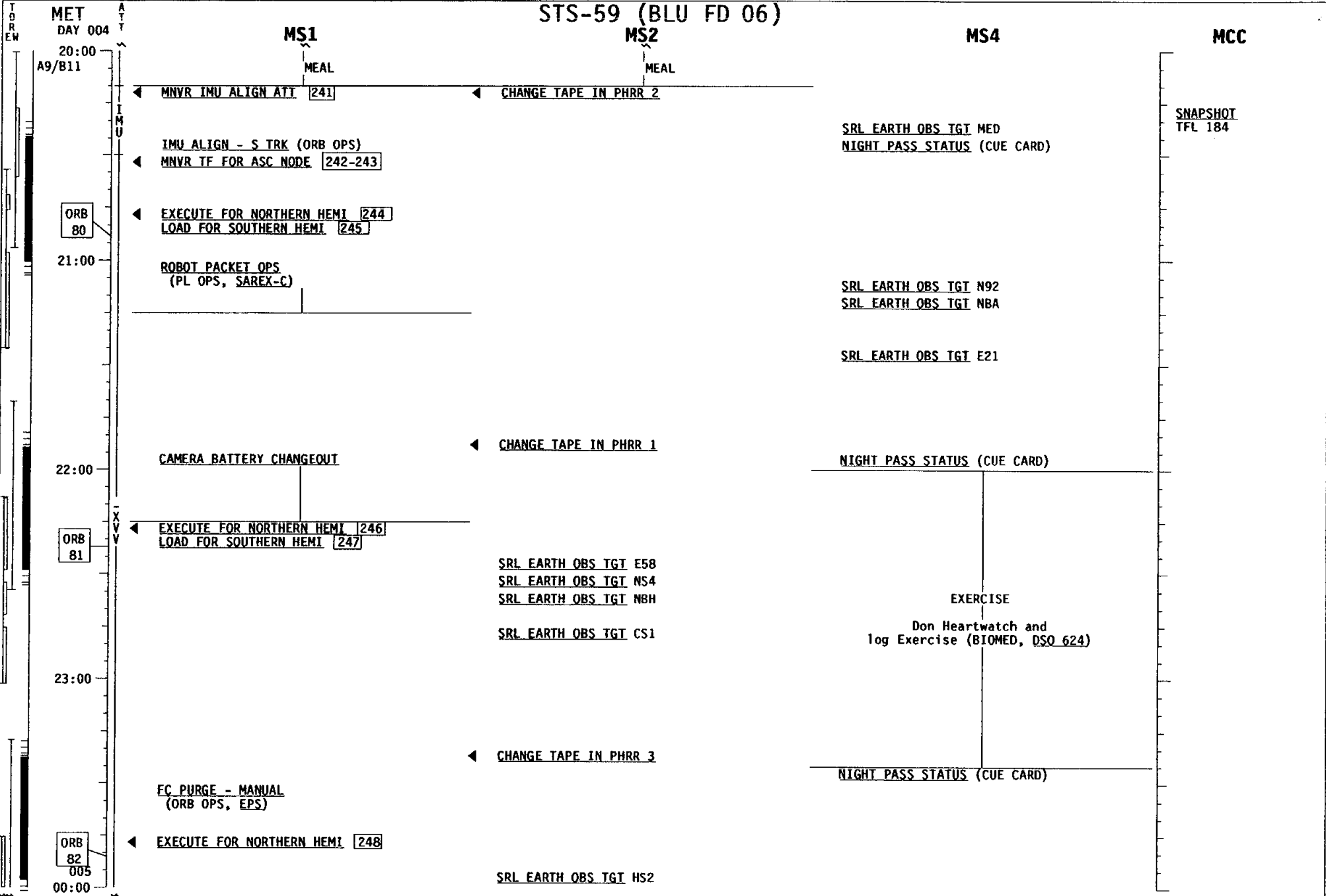


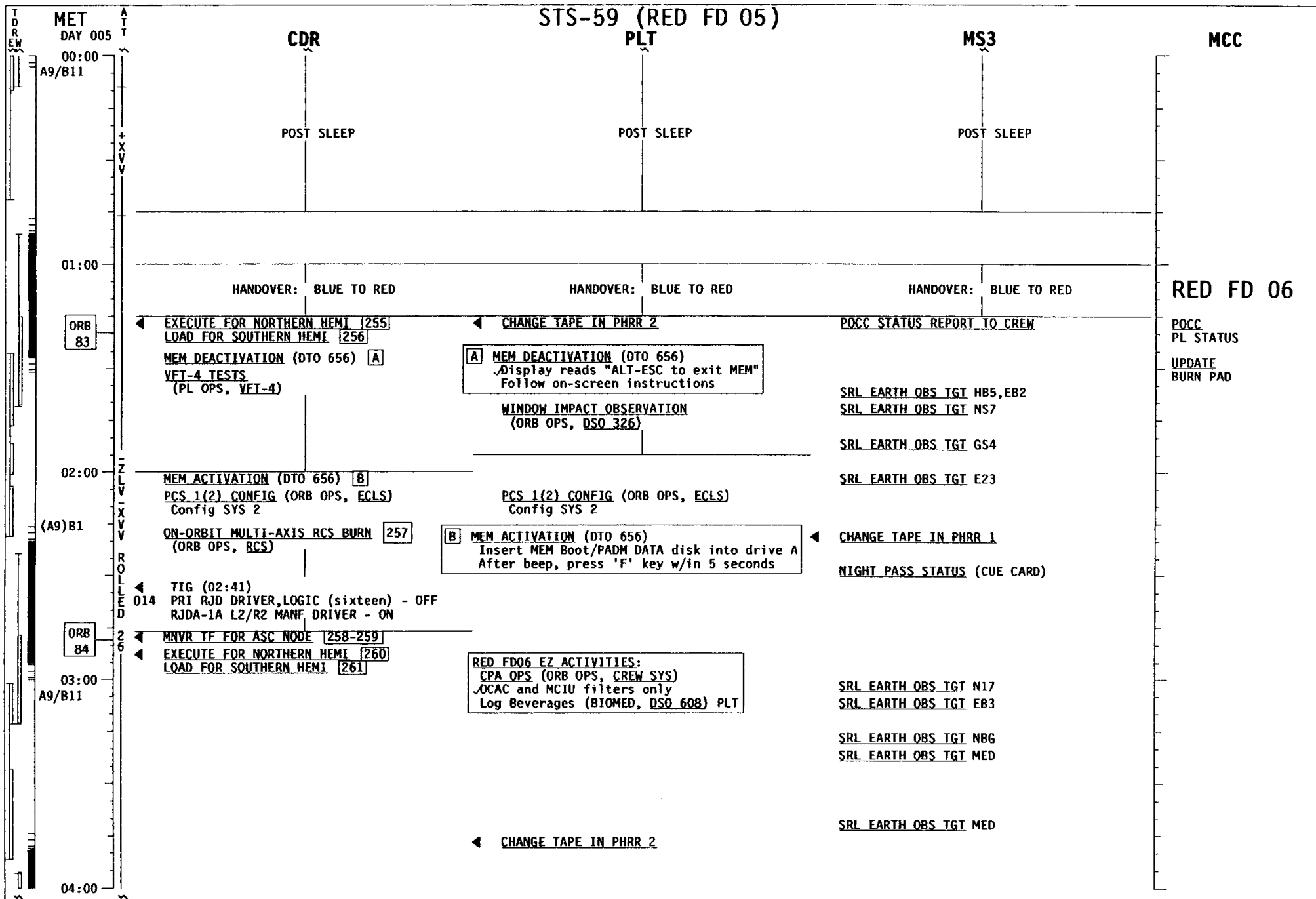


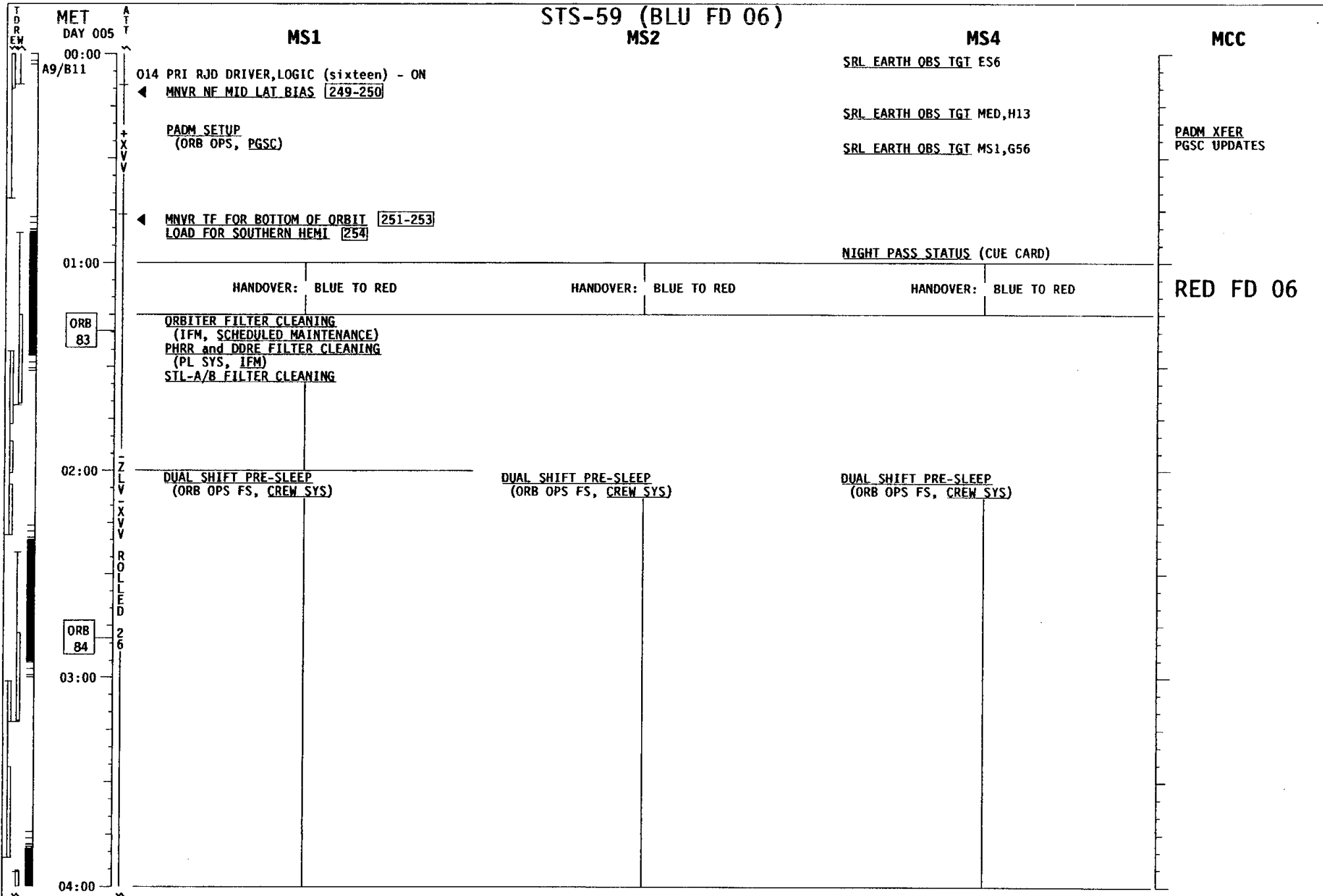


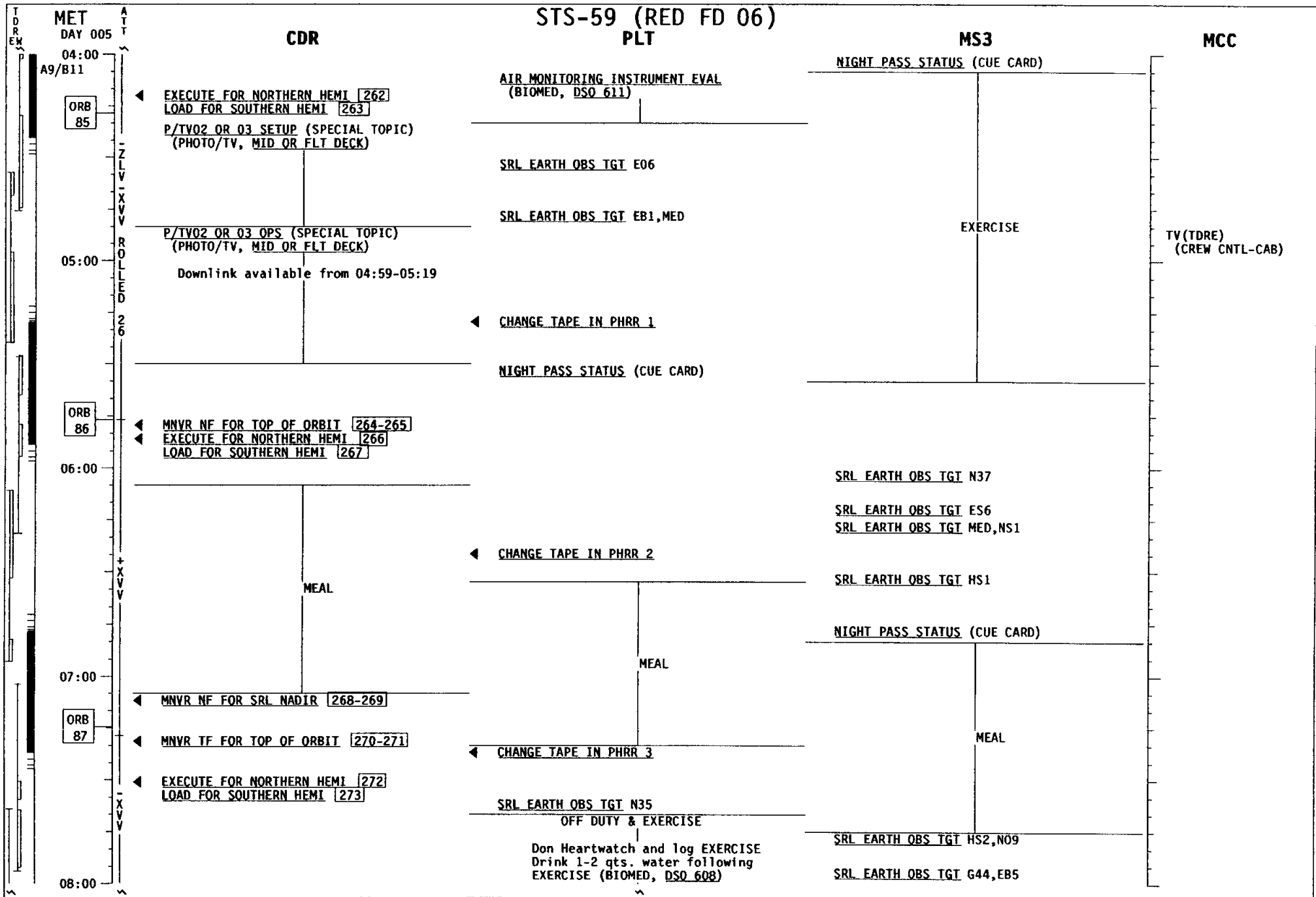












STS-59 (BLU FD 06)

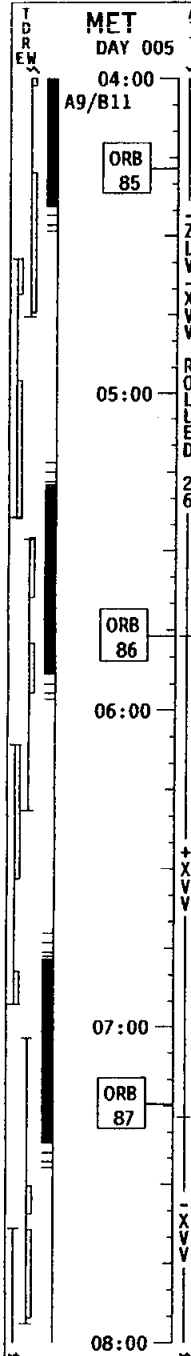
MET
DAY 005

MS1

MS2

MS4

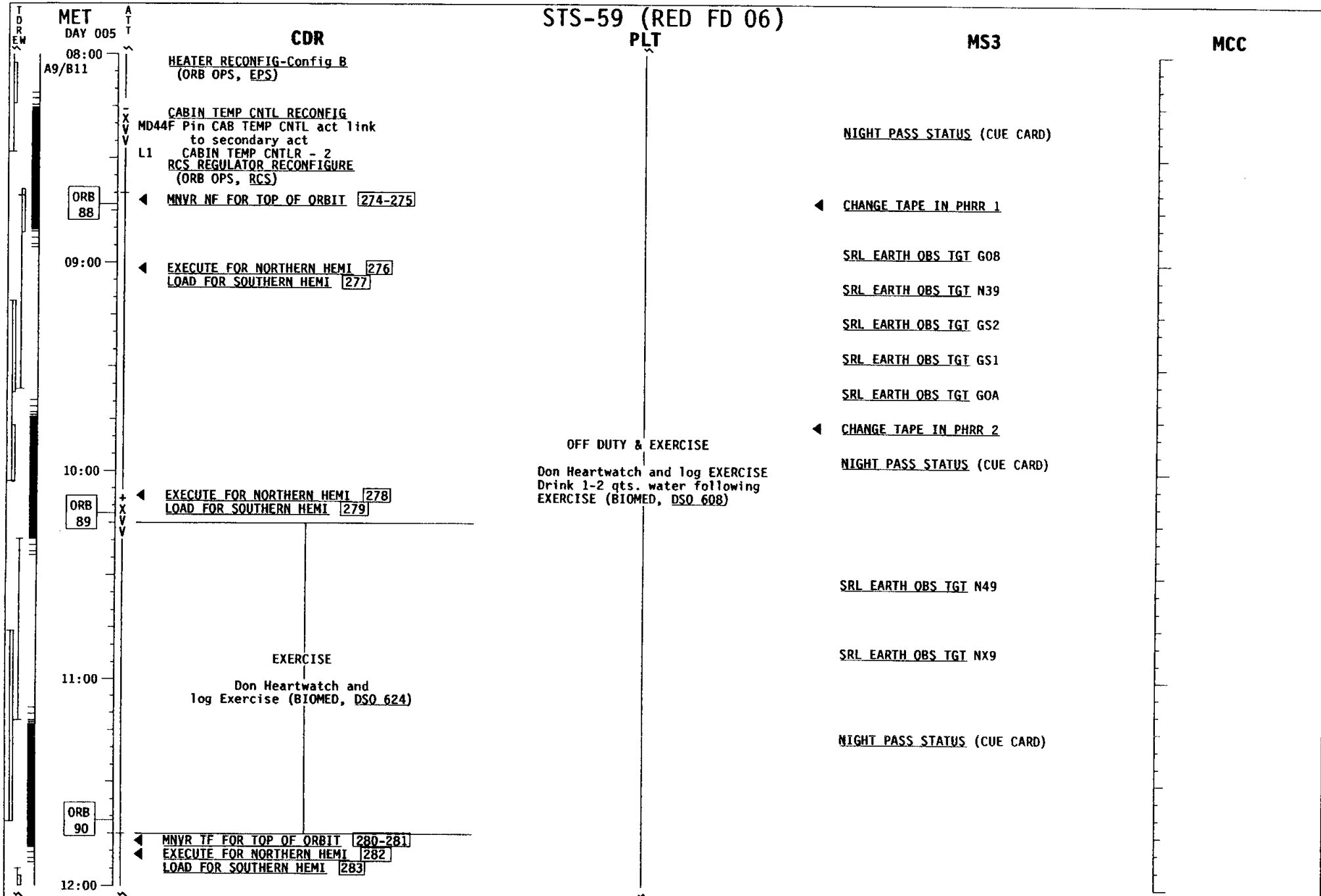
MCC

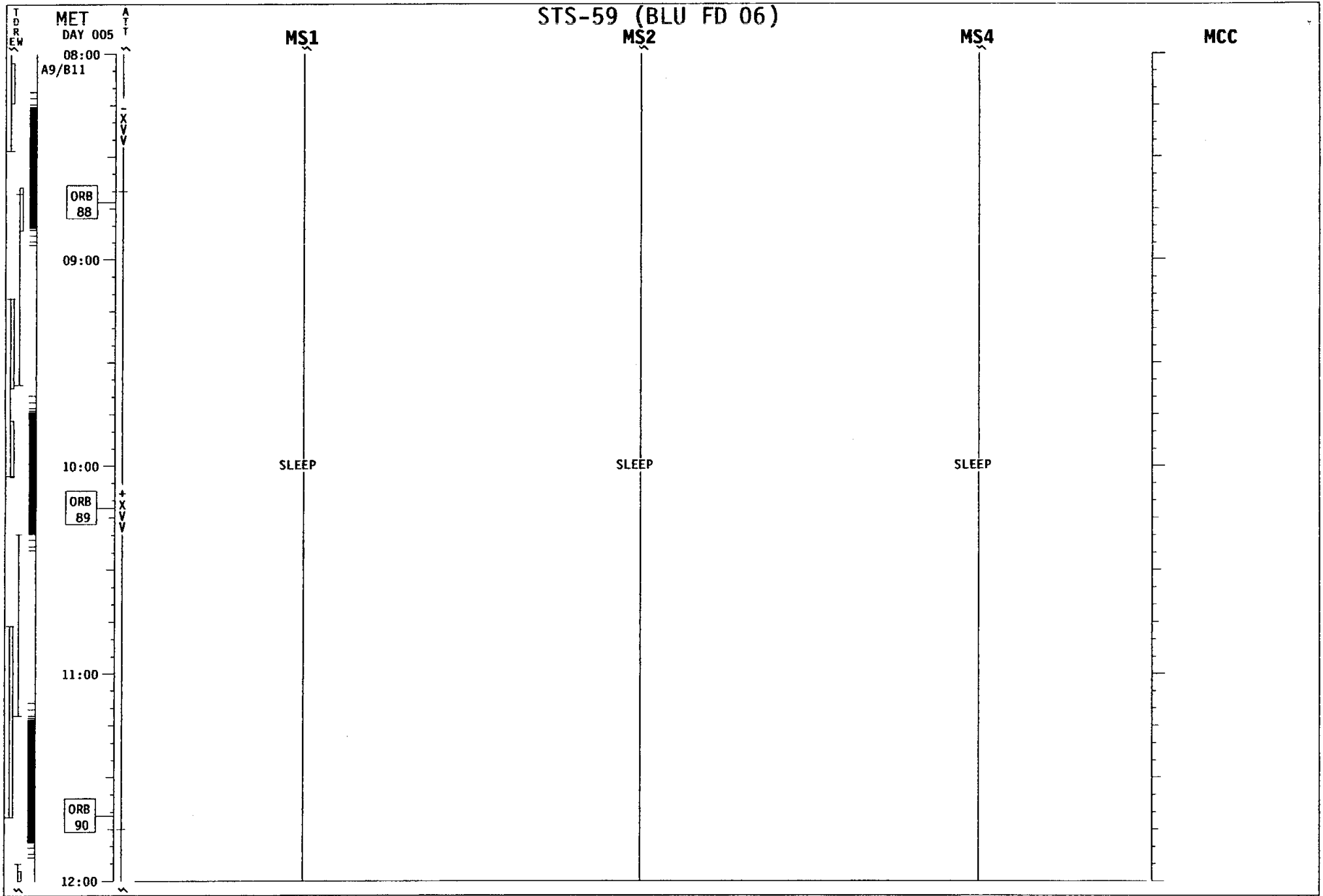


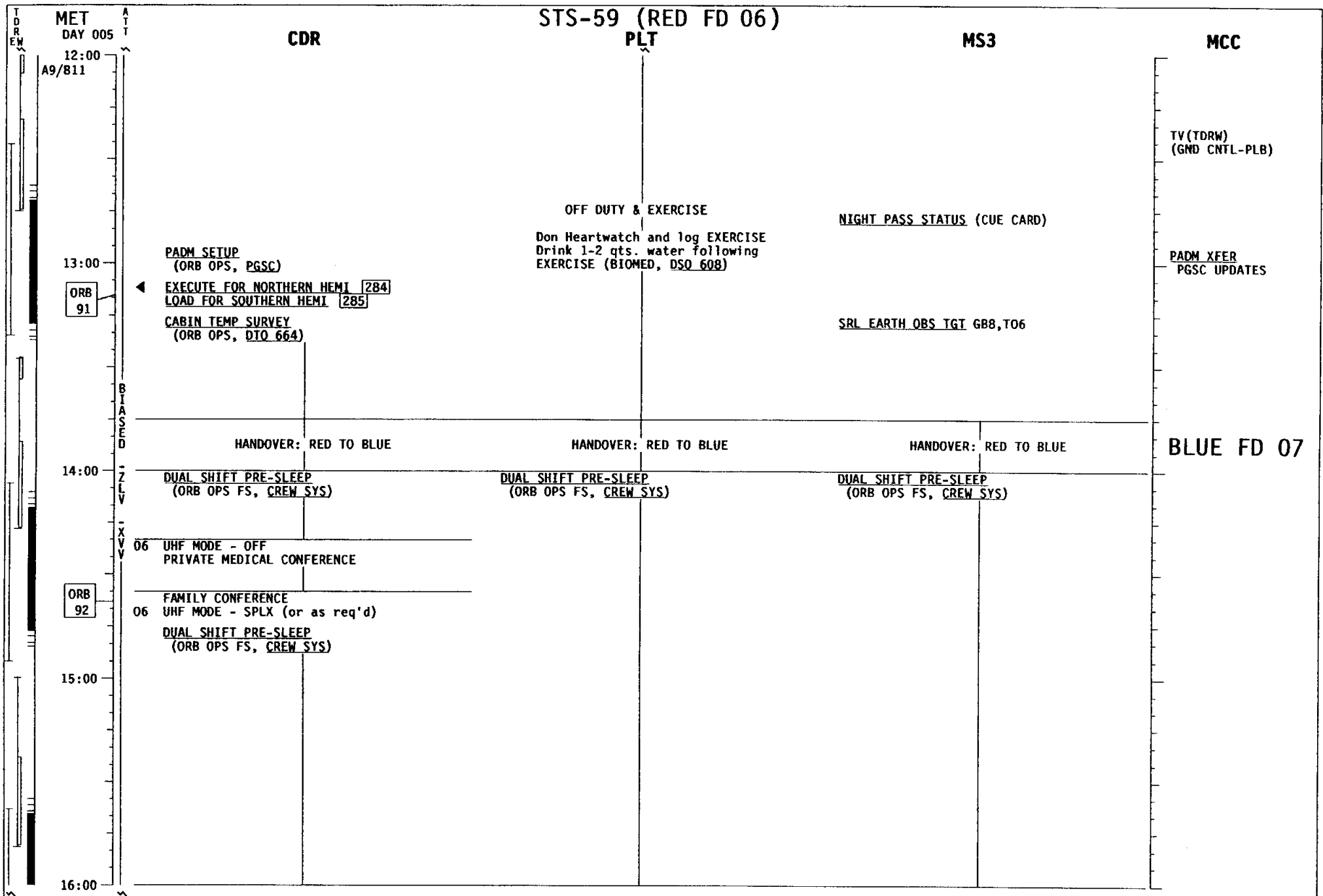
SLEEP

SLEEP

SLEEP







		STS-59 (BLU FD 07)				
MET DAY 005		MS1	MS2	MS4	MCC	
12:00	A9/B11	BACK PAIN PATTERN (BIOMED, DSO 483)				
		POST SLEEP	POST SLEEP	POST SLEEP		
13:00	ORB 91					
		HANDOVER: RED TO BLUE		HANDOVER: RED TO BLUE		
14:00		MEM DEACTIVATION (DTO 656) [A] VFT-4 TESTS (PL OPS, VFT-4)	P/TVO7 SETUP (PHOTO/TV, DSO 802) MIDDECK scene for MS1,MS2,MS4	◀ CHANGE TAPE IN PHRR 1 NIGHT PASS STATUS (CUE CARD)		BLUE FD 07
	ORB 92	MEM ACTIVATION (DTO 656) [B] ◀ EXECUTE FOR NORTHERN HEMI [286] LOAD FOR SOUTHERN HEMI [287] P/TVO7 OPERATIONS (PHOTO/TV, DSO 802) MIDDECK scene for MS1	[A] MEM DEACTIVATION (DTO 656) Display reads "ALT-ESC to exit MEM" Follow on-screen instructions P/TVO7 OPERATIONS (PHOTO/TV, DSO 802) MIDDECK scene for MS1	[B] MEM ACTIVATION (DTO 656) Insert MEM Boot/PADM DATA disk into drive A After beep, press 'F' key w/in 5 seconds SRL EARTH OBS TGT MED SRL EARTH OBS TGT E11 SRL EARTH OBS TGT N71		
15:00		P/TVO7 OPERATIONS (PHOTO/TV, DSO 802) MIDDECK scene for MS2	P/TVO7 OPERATIONS (PHOTO/TV, DSO 802) MIDDECK scene for MS2			
		P/TVO7 OPERATIONS (PHOTO/TV, DSO 802) MIDDECK scene for MS4	◀ CHANGE TAPE IN PHRR 2 NIGHT PASS STATUS (CUE CARD)	P/TVO7 OPERATIONS (PHOTO/TV, DSO 802) MIDDECK scene for MS4		
16:00						

STS-59 (RED FD 06)

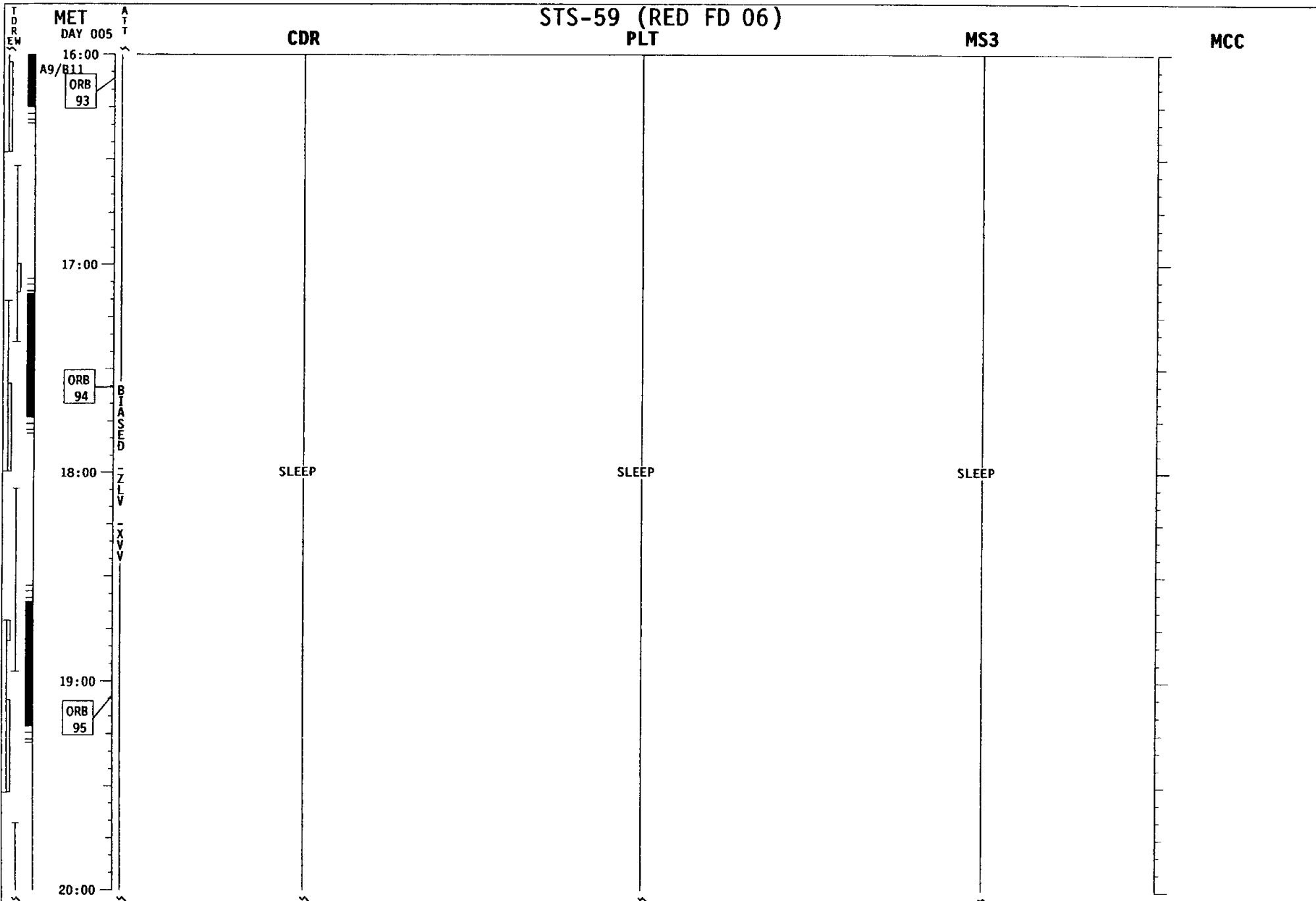
MET
DAY 005

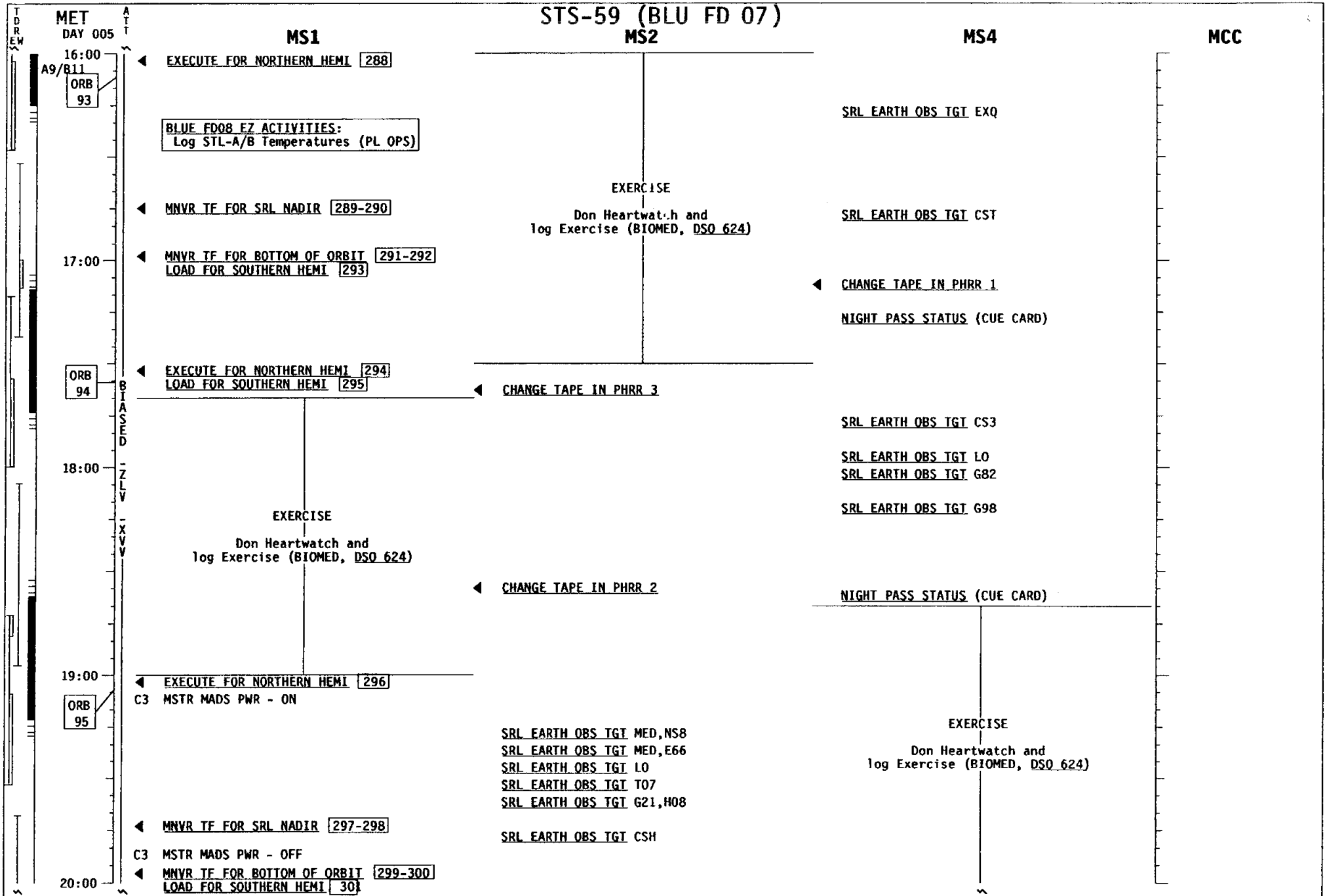
CDR

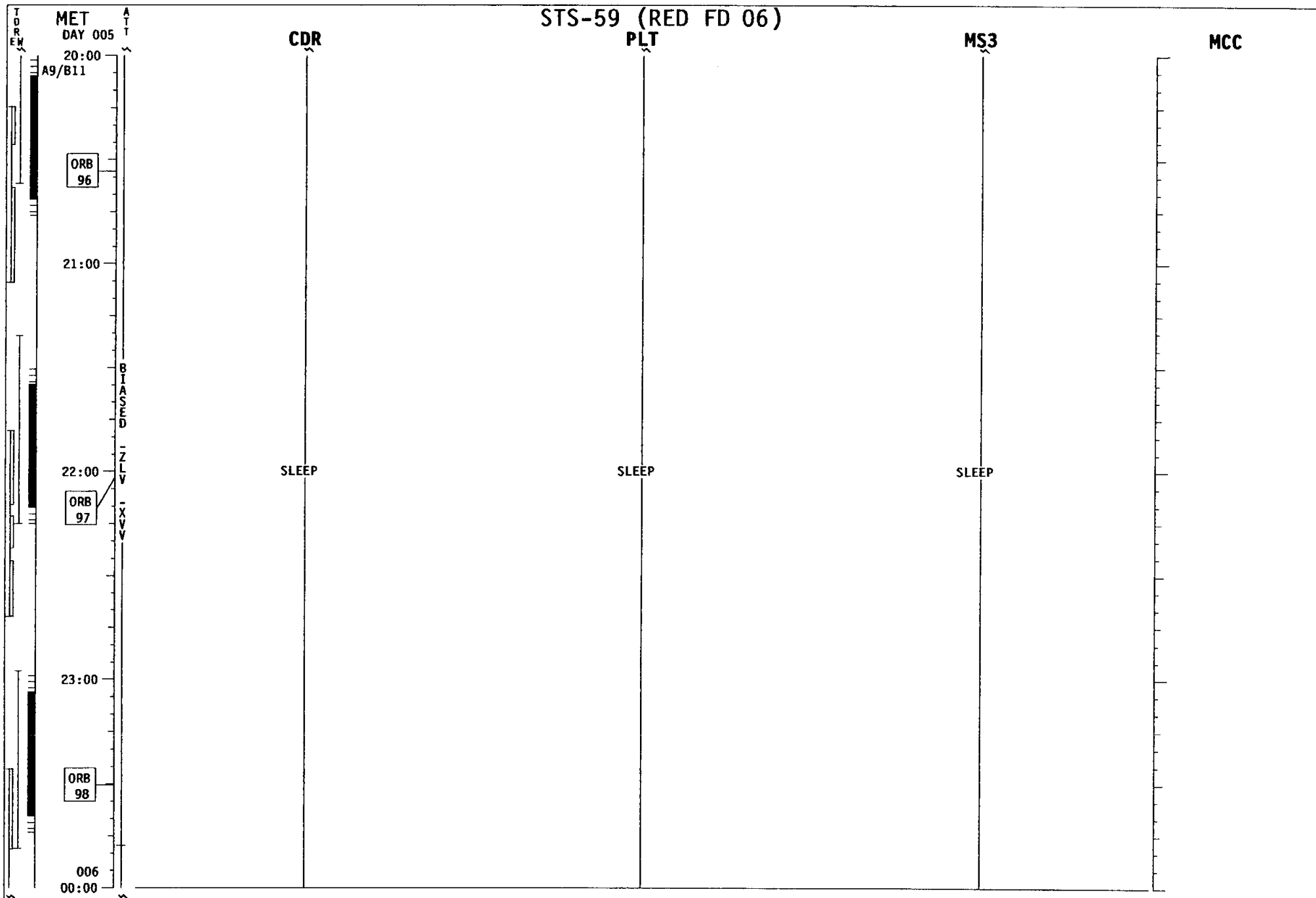
PLT

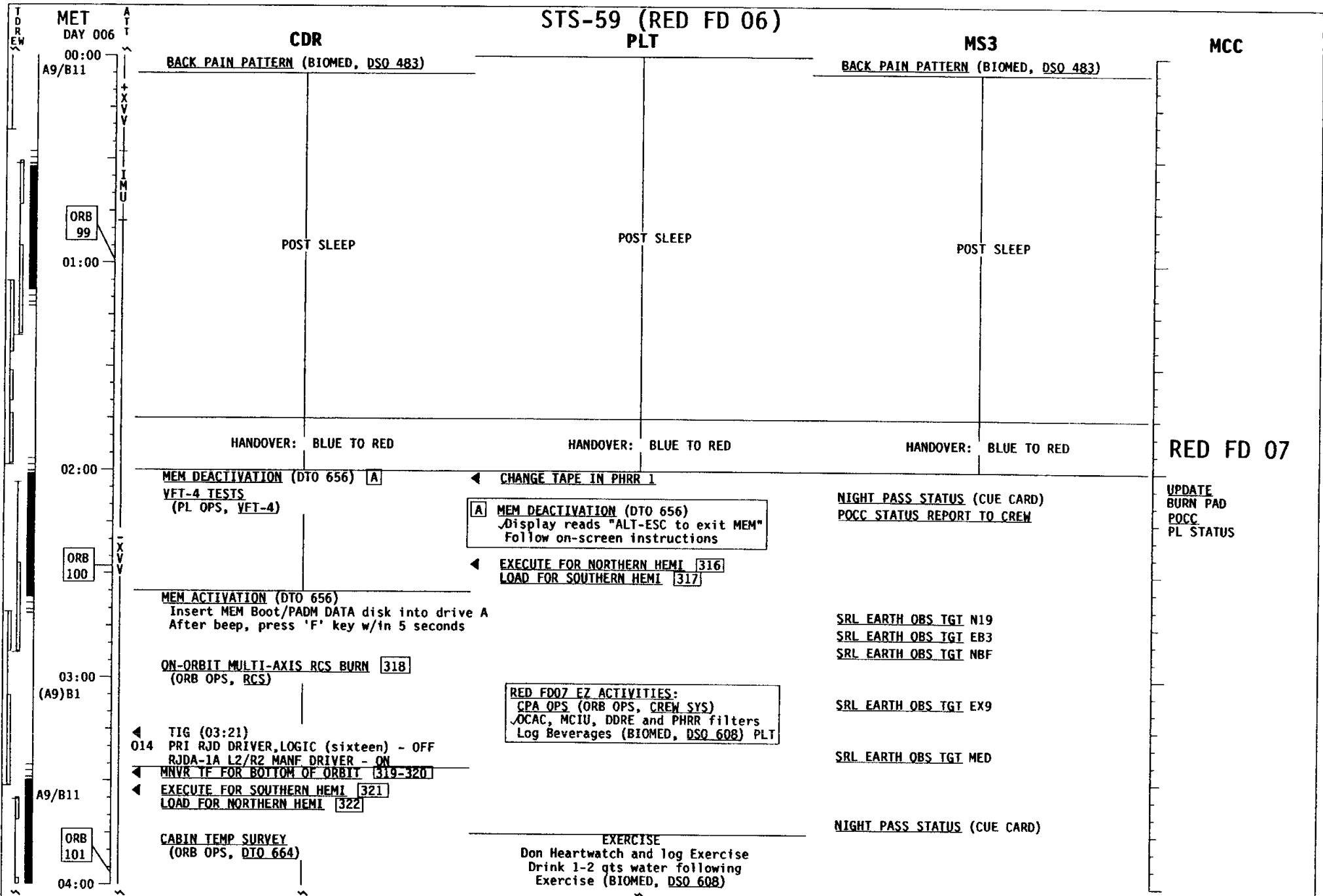
MS3

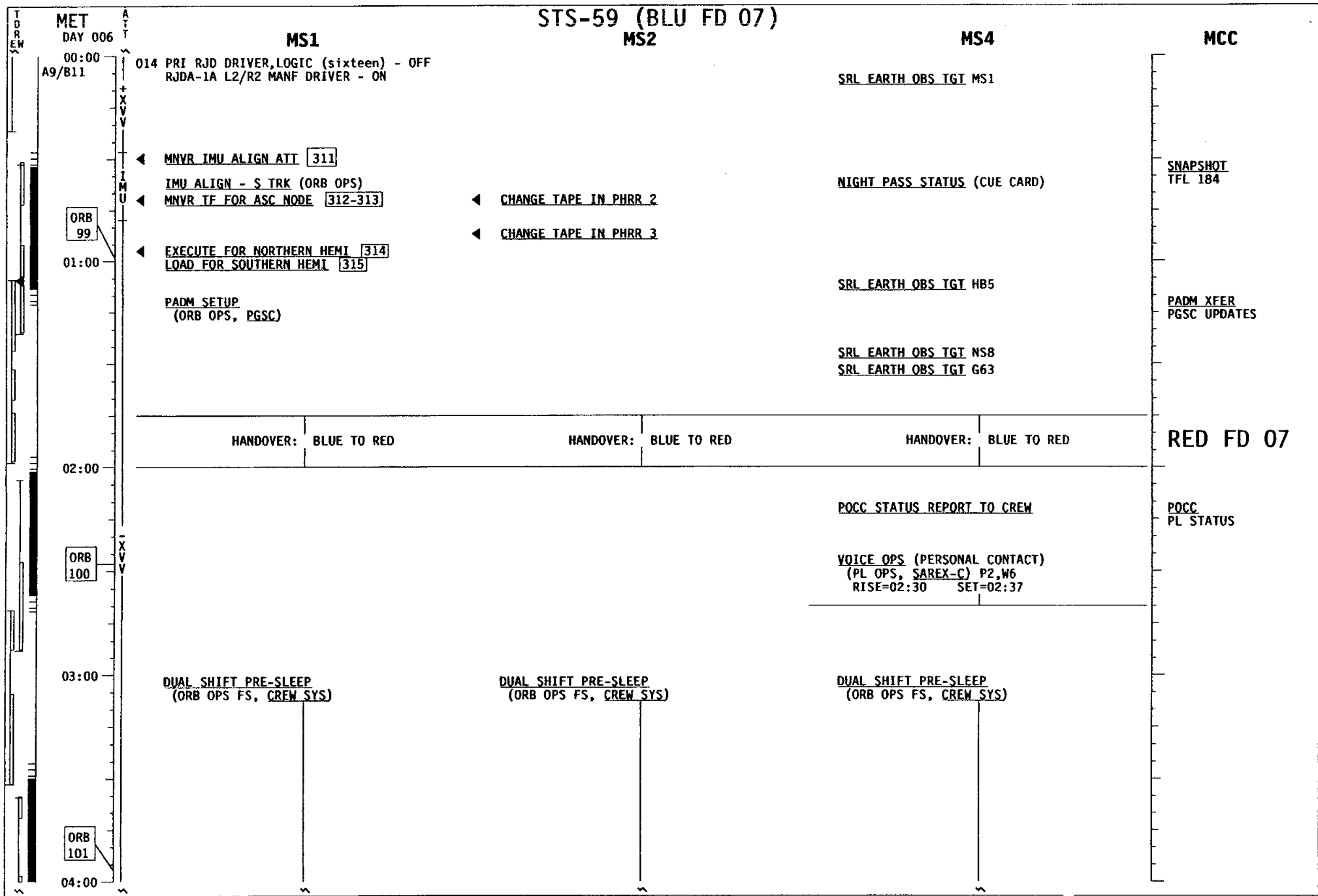
MCC

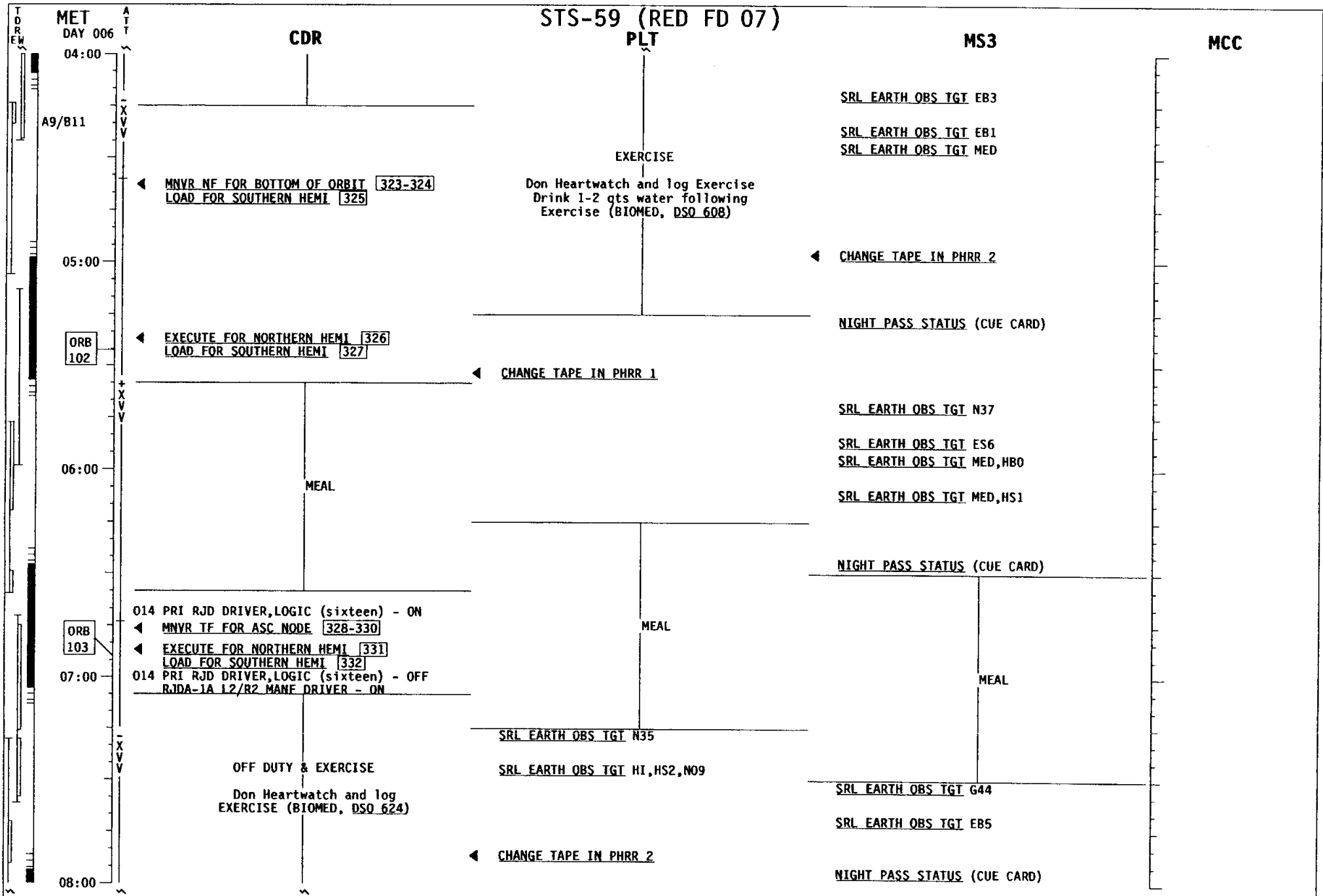




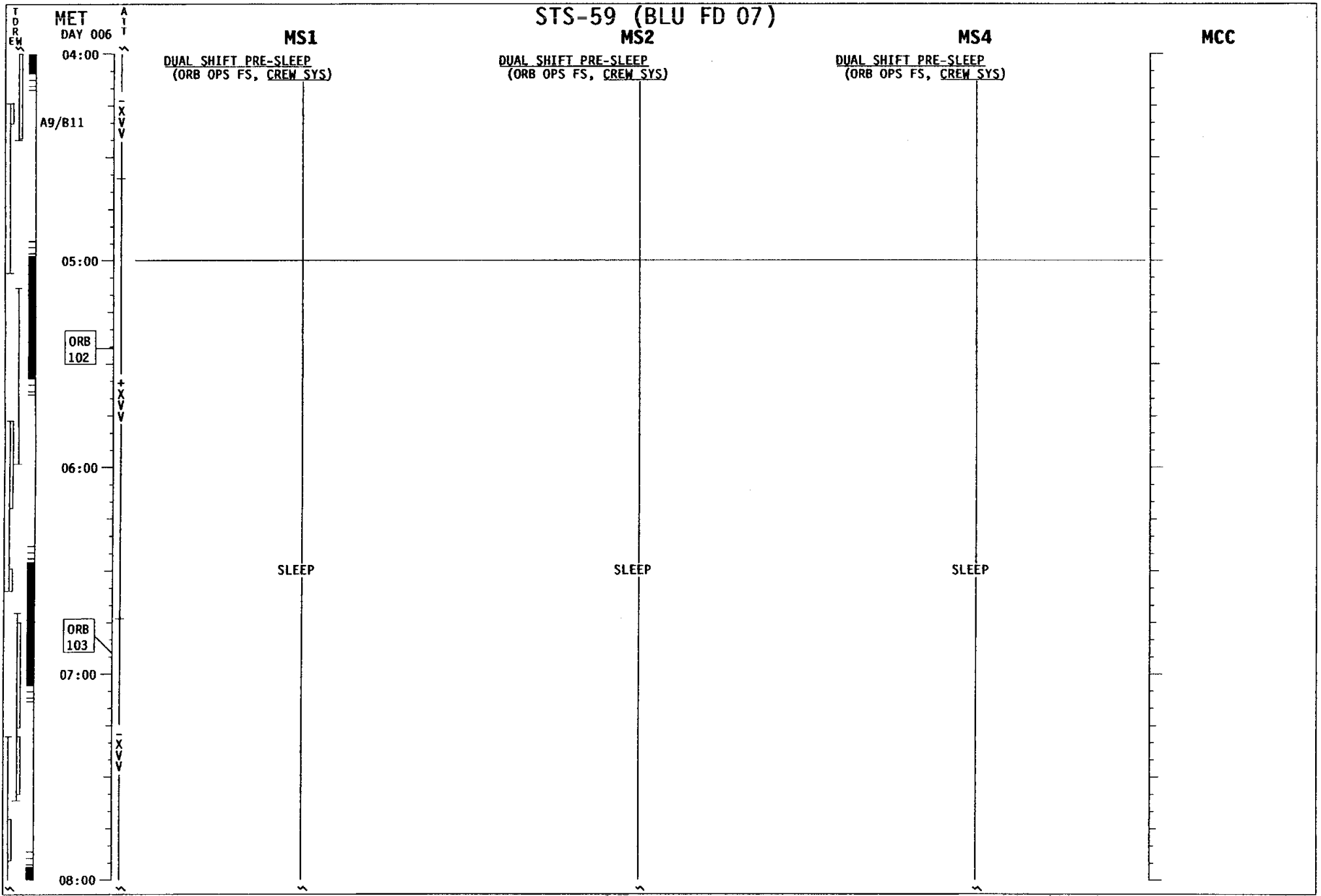


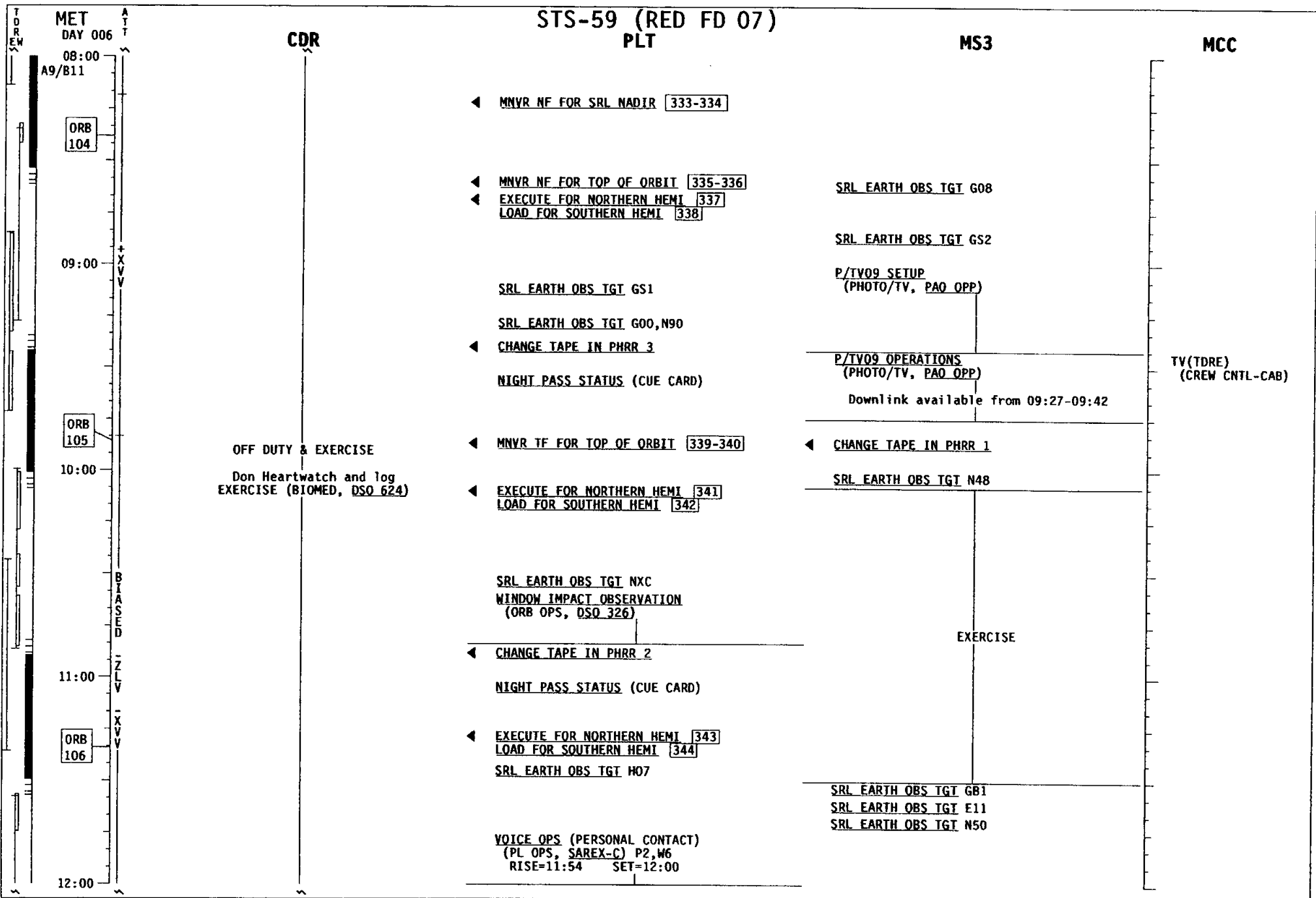




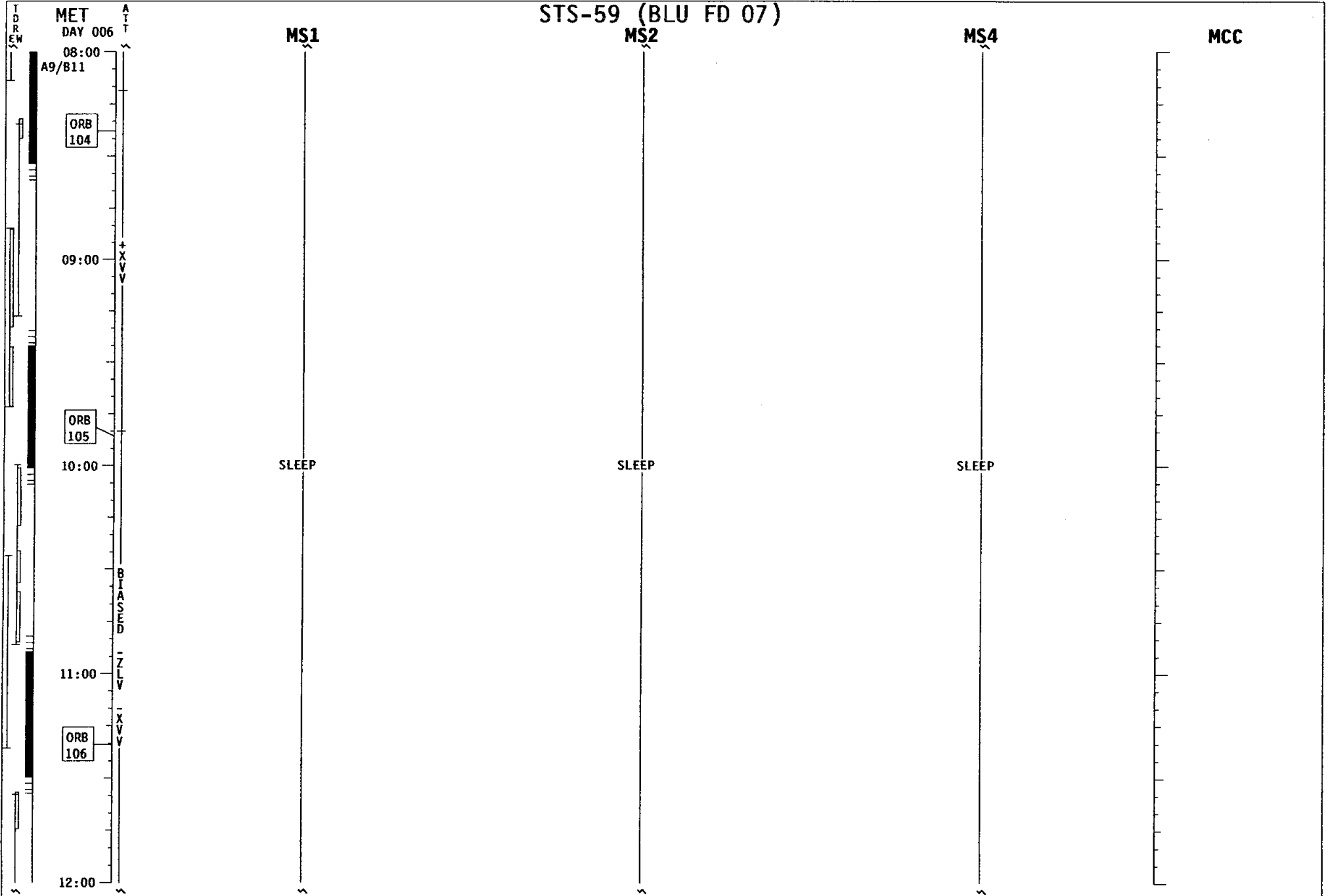


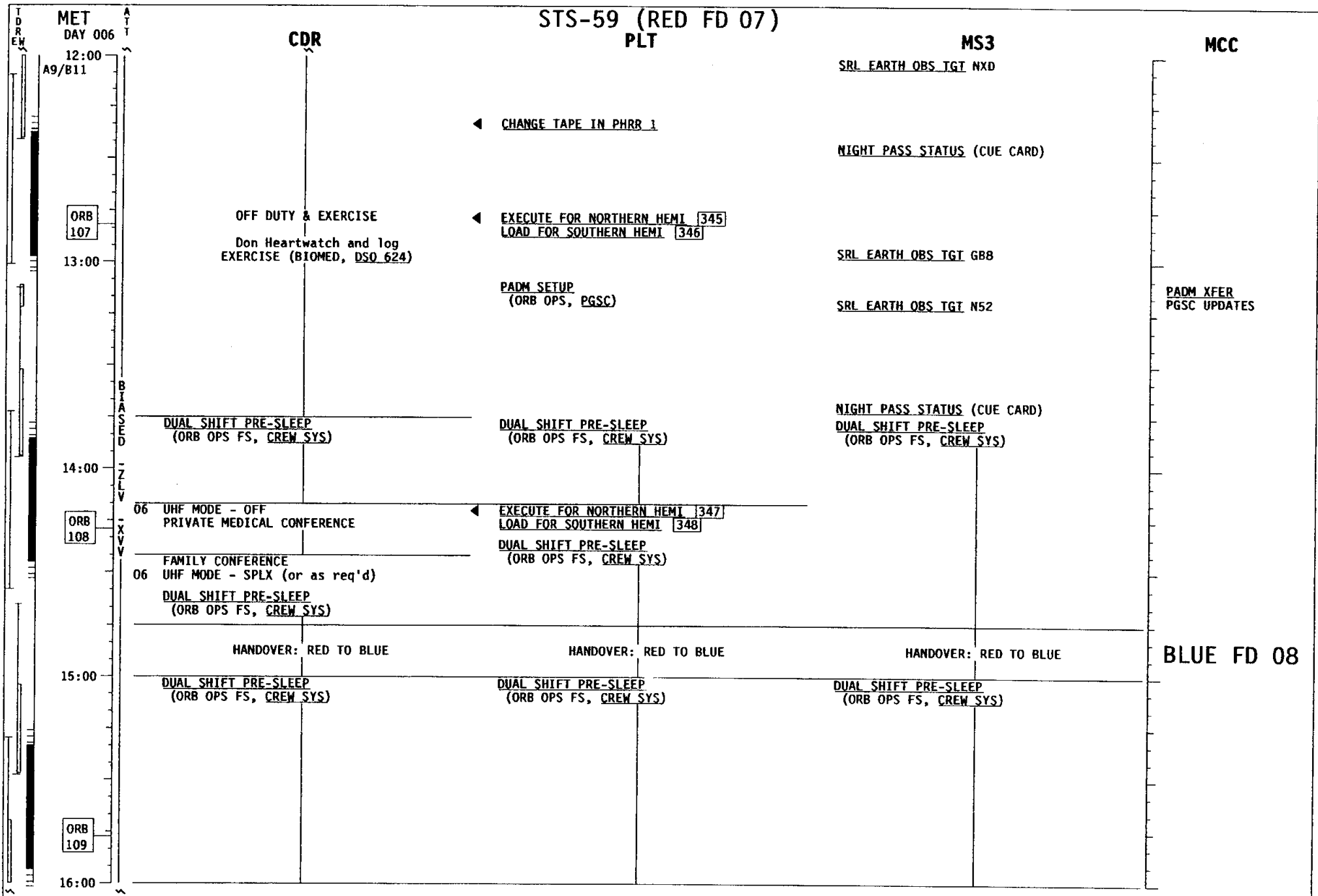
STS-59 (BLU FD 07)

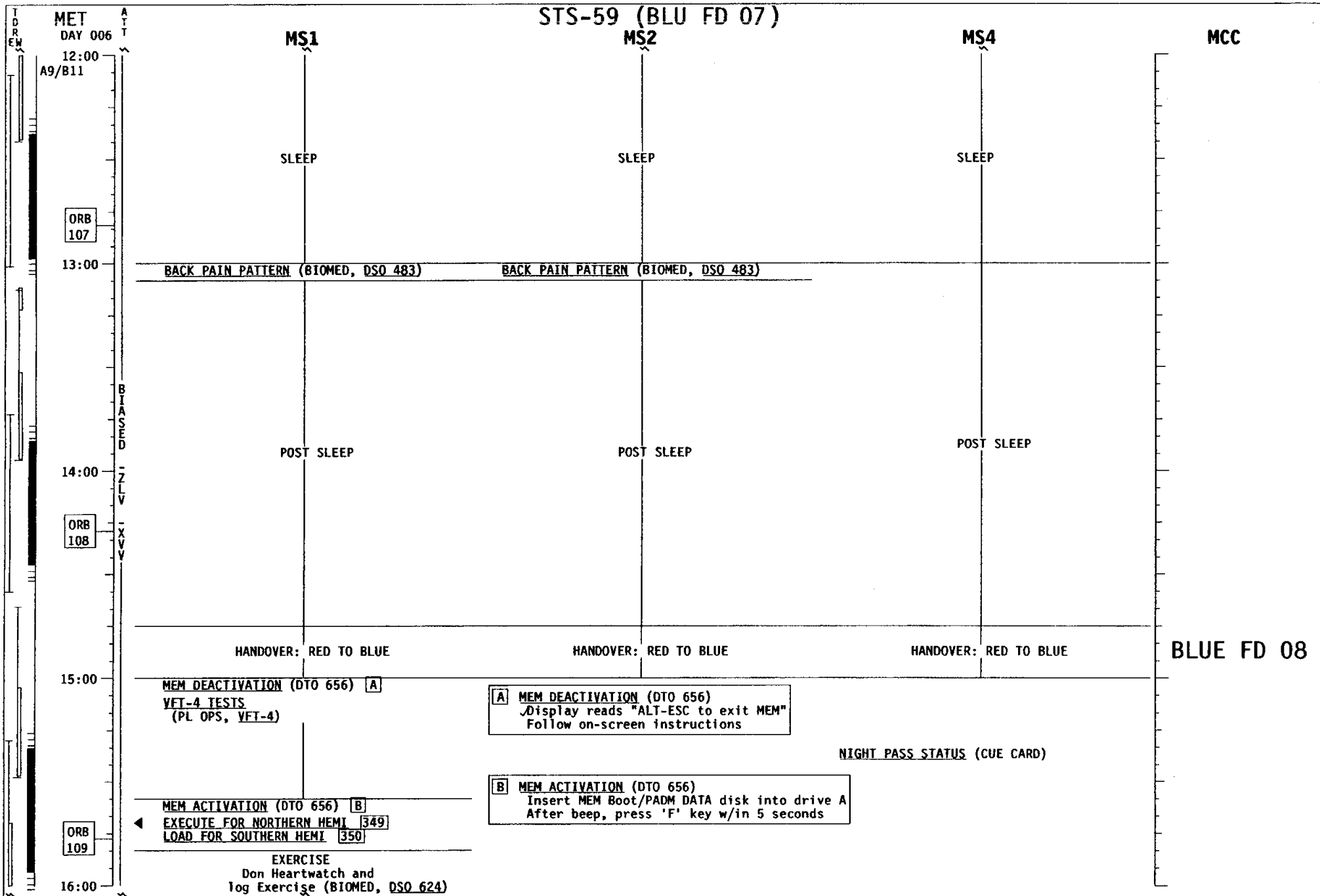


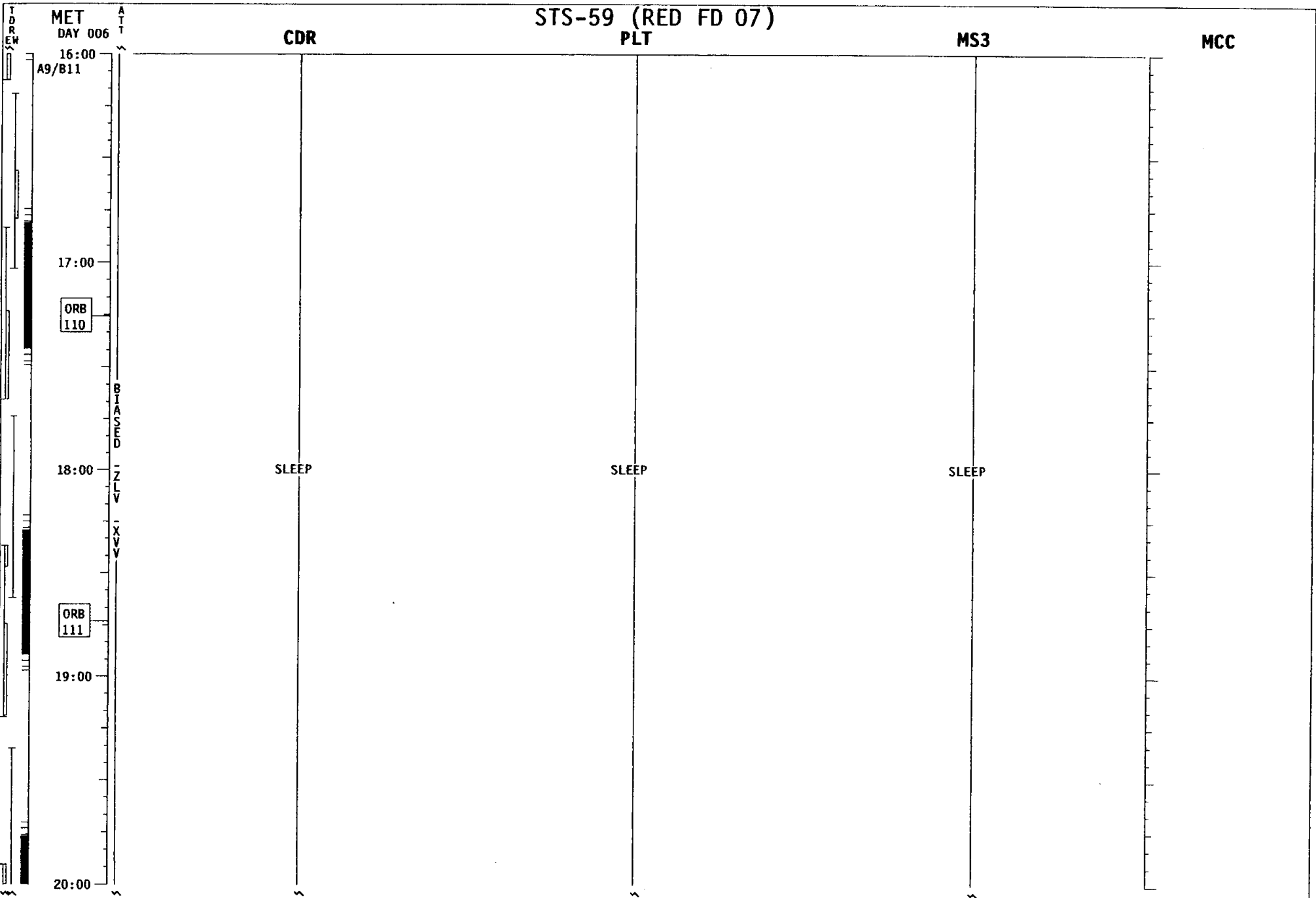


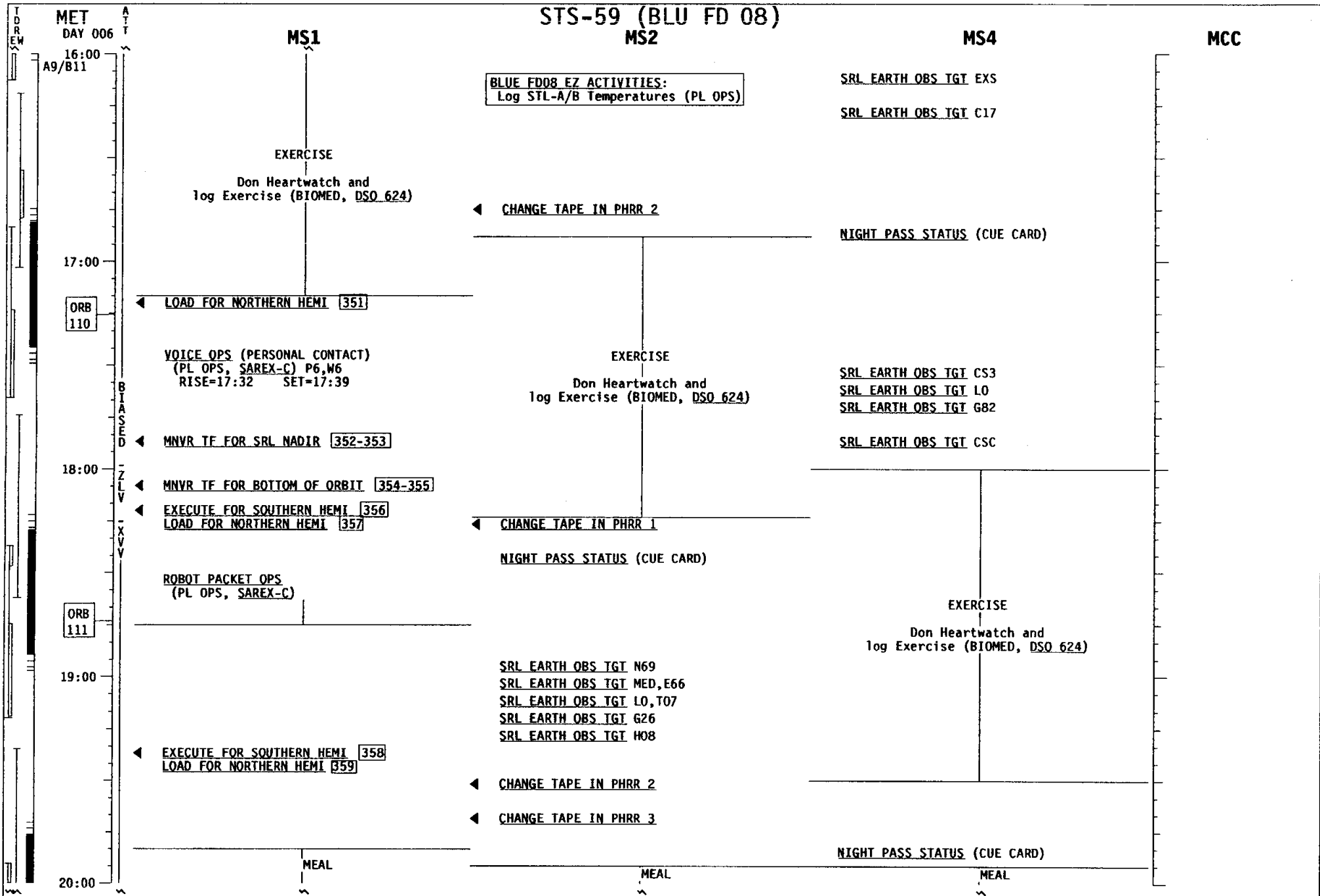
STS-59 (BLU FD 07)

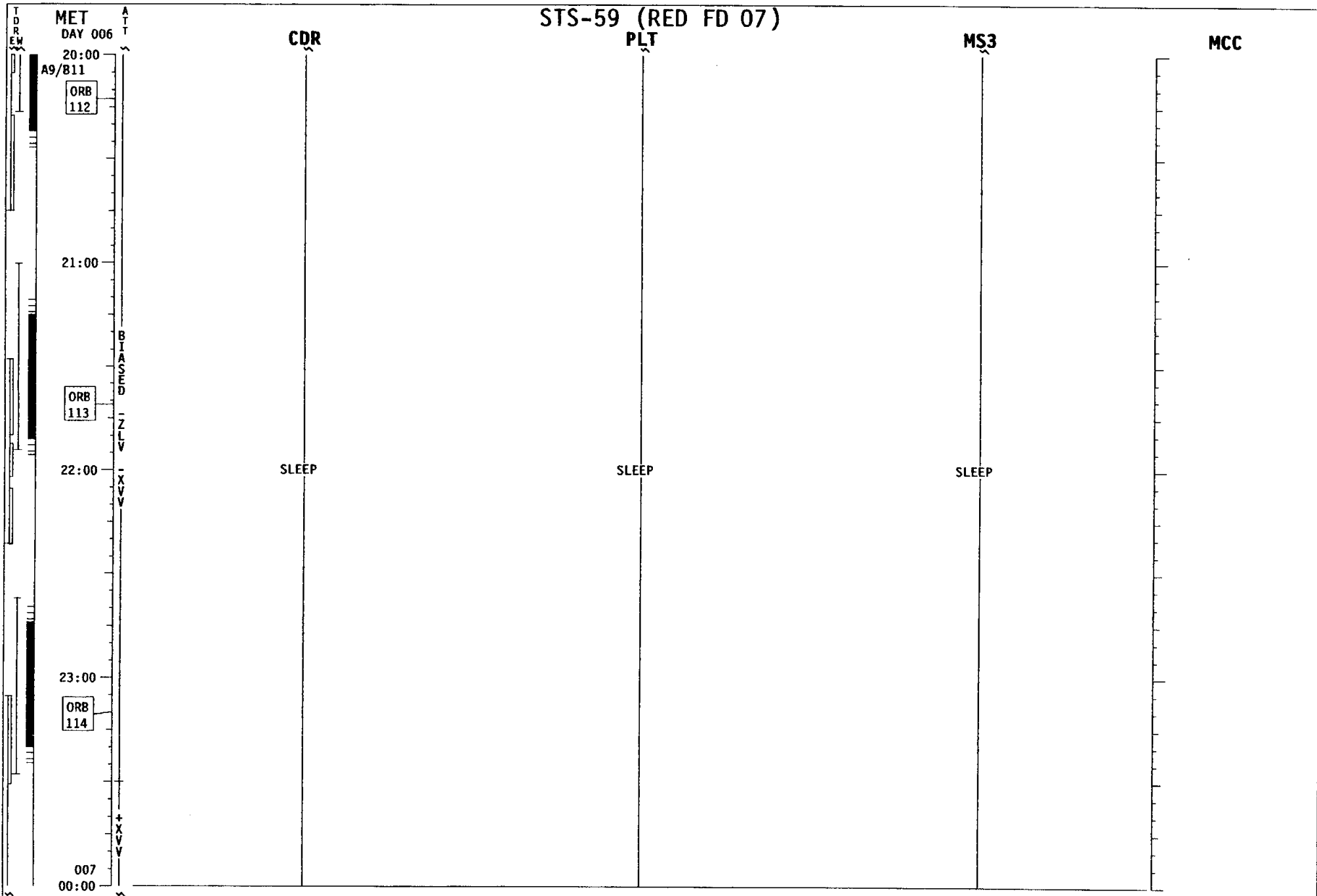


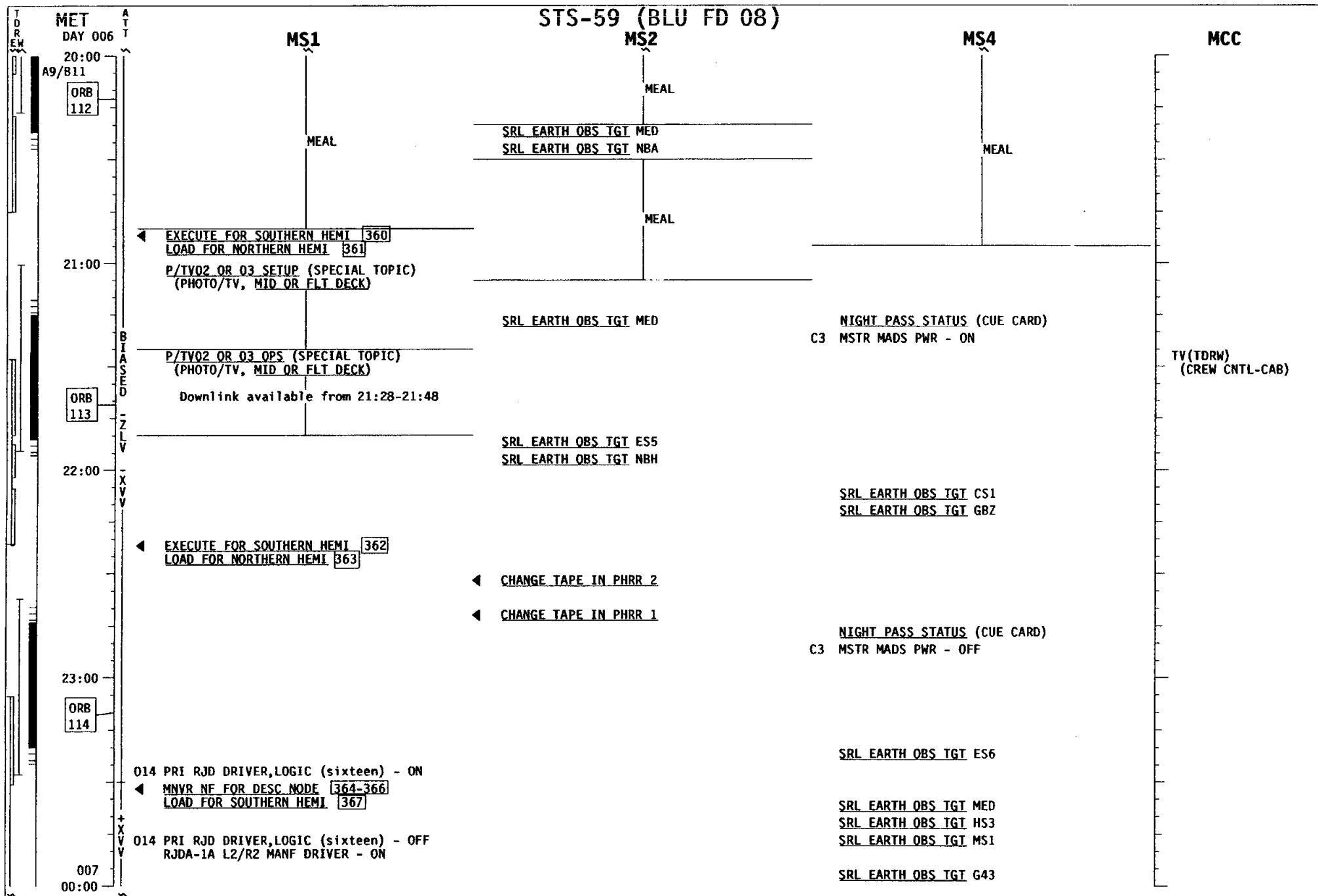


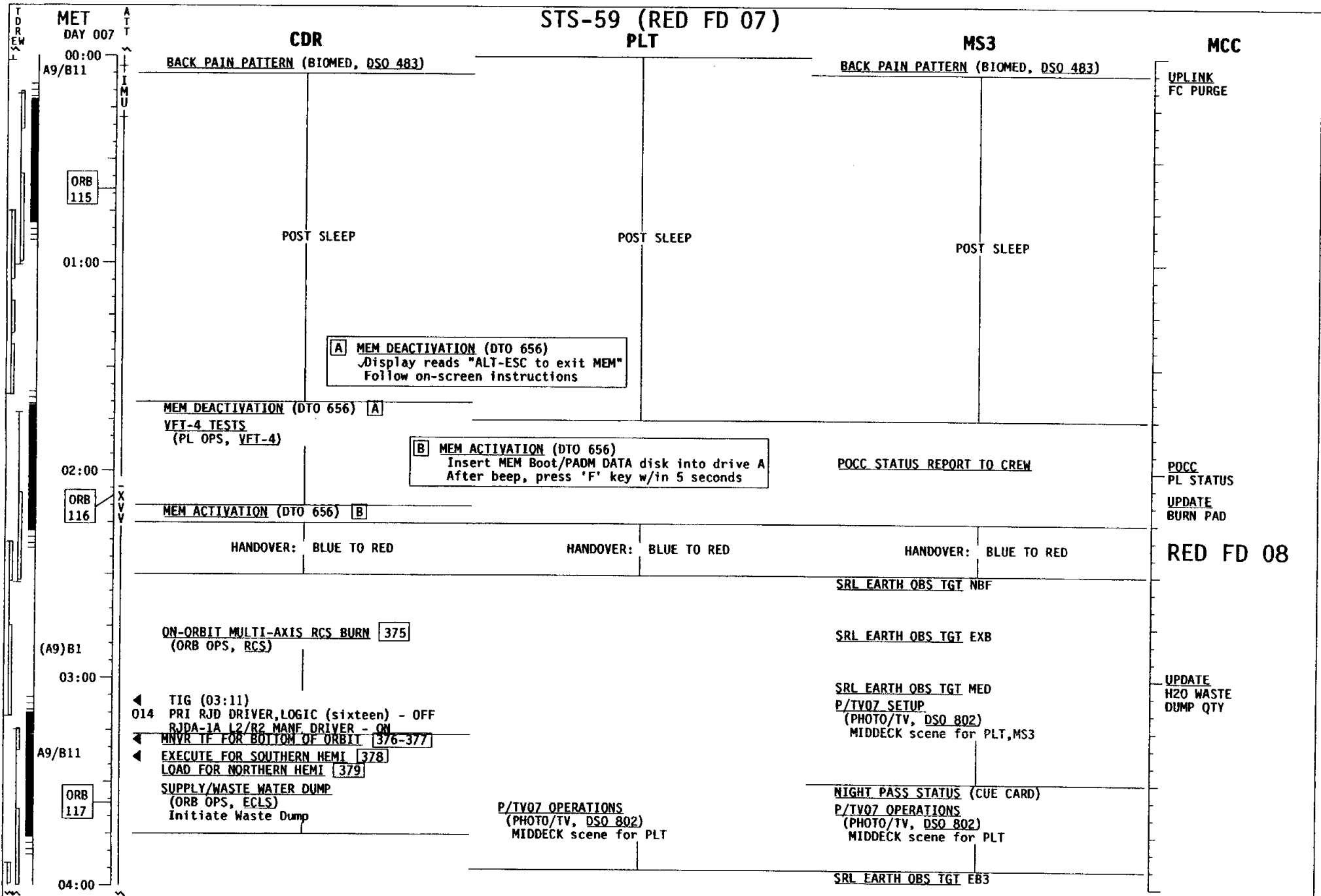












MET
DAY 007

STS-59 (BLU FD 08)

MS1

MS2

MS4

MCC

00:00

A9/B11

◀ MNVR IMU ALIGN ATT [368]

◀ CHANGE TAPE IN PHRR 1

IMU ALIGN - S TRK (ORB OPS)

◀ MNVR TF FOR ASC NODE [369-370]

HC DISCONNECT
(PL OPS, PHRR)
486 SETUP
(PL OPS, PHRR)

NIGHT PASS STATUS (CUE CARD)

UPLINK
FC PURGE
SNAPSHOT
TFL 184

ORB
115

◀ EXECUTE FOR NORTHERN HEMI [371]
LOAD FOR SOUTHERN HEMI [372]

486 STARTUP
(PL OPS, PHRR)

SRL EARTH OBS TGT HB5,EB2

SRL EARTH OBS TGT NS9

SRL EARTH OBS TGT GS4

SRL EARTH OBS TGT E23

01:00

PADM SETUP (ORB OPS, PGSC)

◀ CHANGE TAPE IN PHRR 2

NIGHT PASS STATUS (CUE CARD)
POCC STATUS REPORT TO CREW

POCC
PL STATUS
UPDATE
BURN PAD

02:00

ORB
116

◀ EXECUTE FOR NORTHERN HEMI [373]
LOAD FOR SOUTHERN HEMI [374]

HANDOVER: BLUE TO RED

HANDOVER: BLUE TO RED

HANDOVER: BLUE TO RED

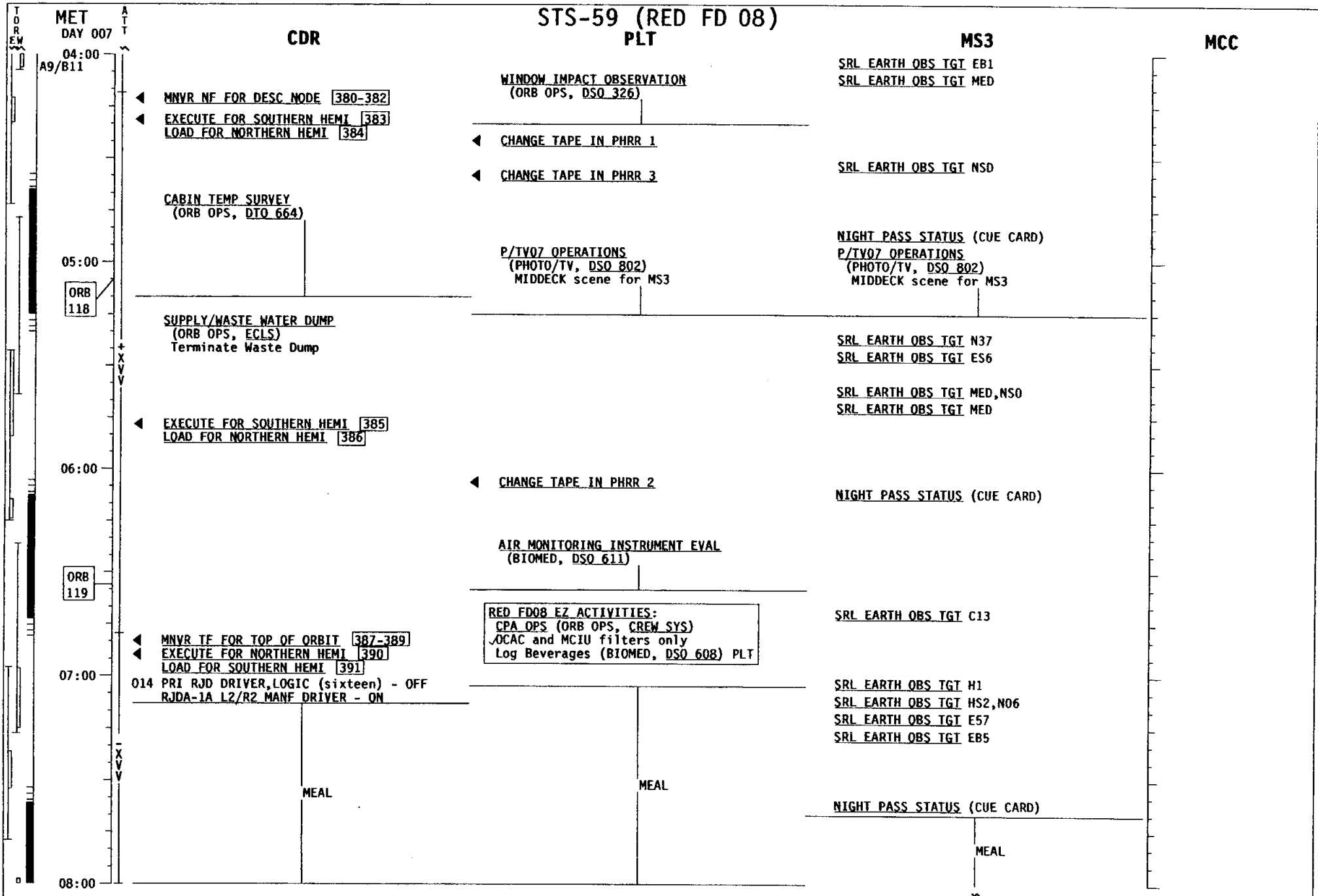
RED FD 08

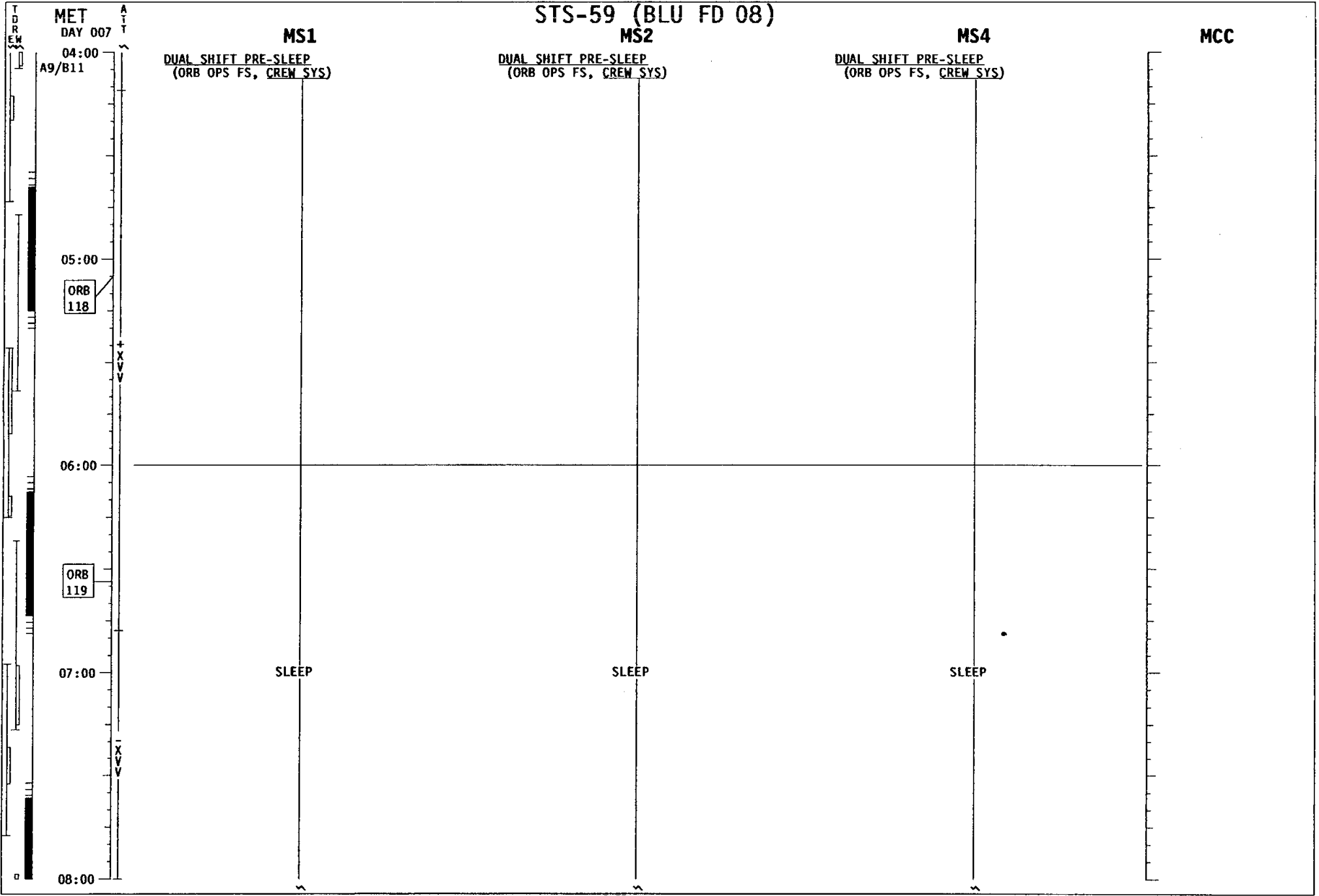
ORBITER FILTER CLEANING
(IFM, SCHEDULED MAINTENANCE)
PHRR and DDRE FILTER CLEANING
(PL SYS, IFM)
STL-A/B FILTER CLEANING

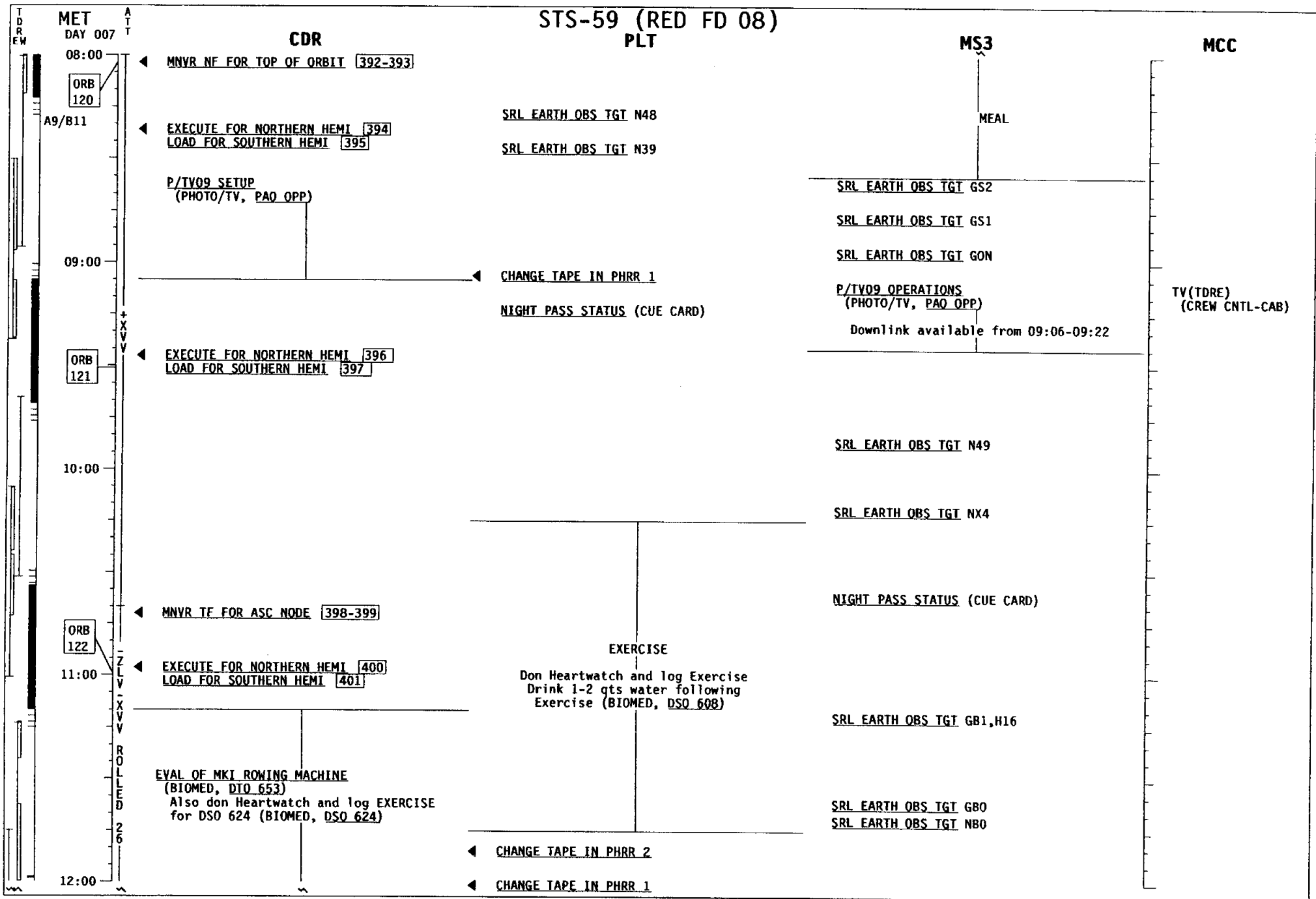
03:00

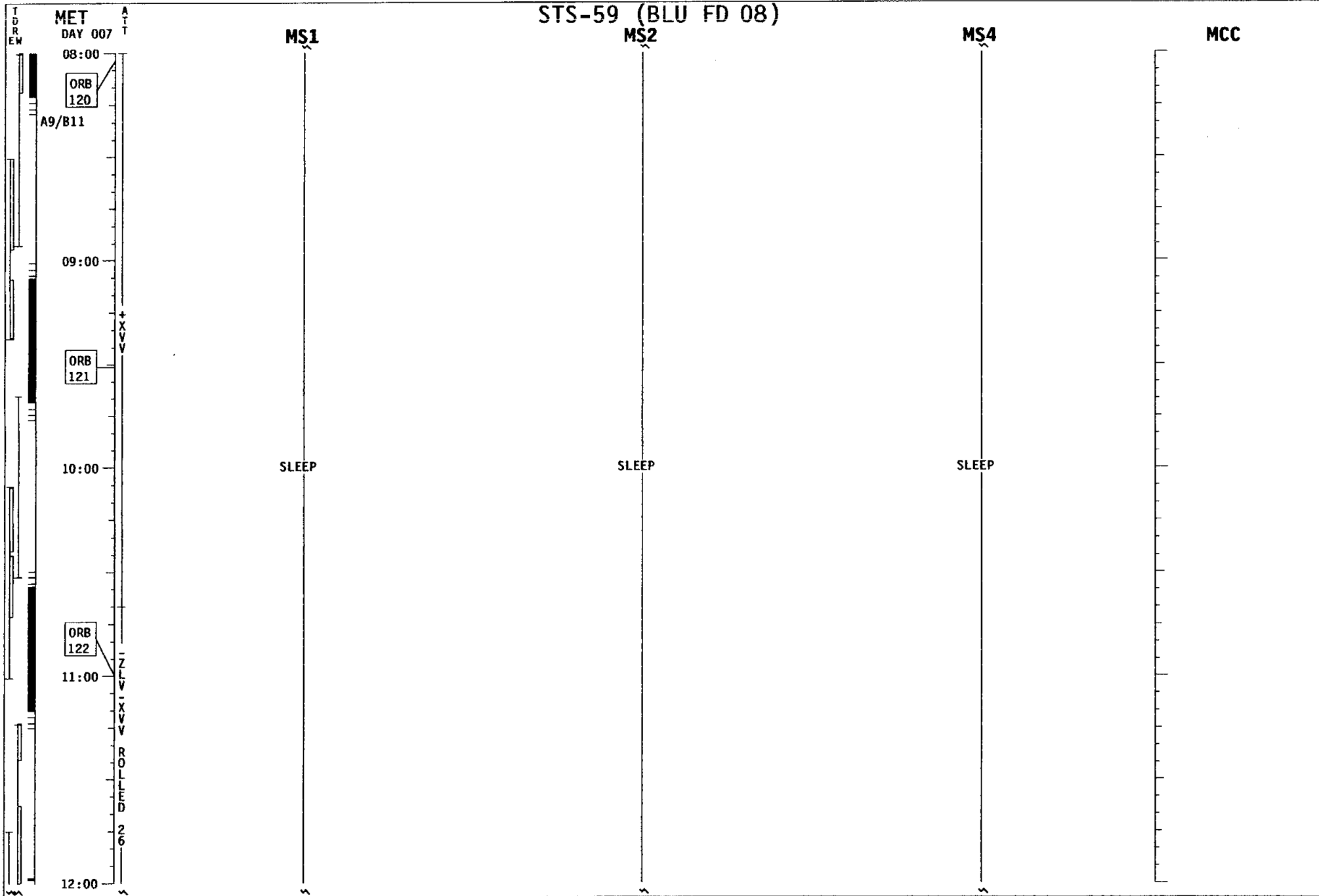
ORB
117

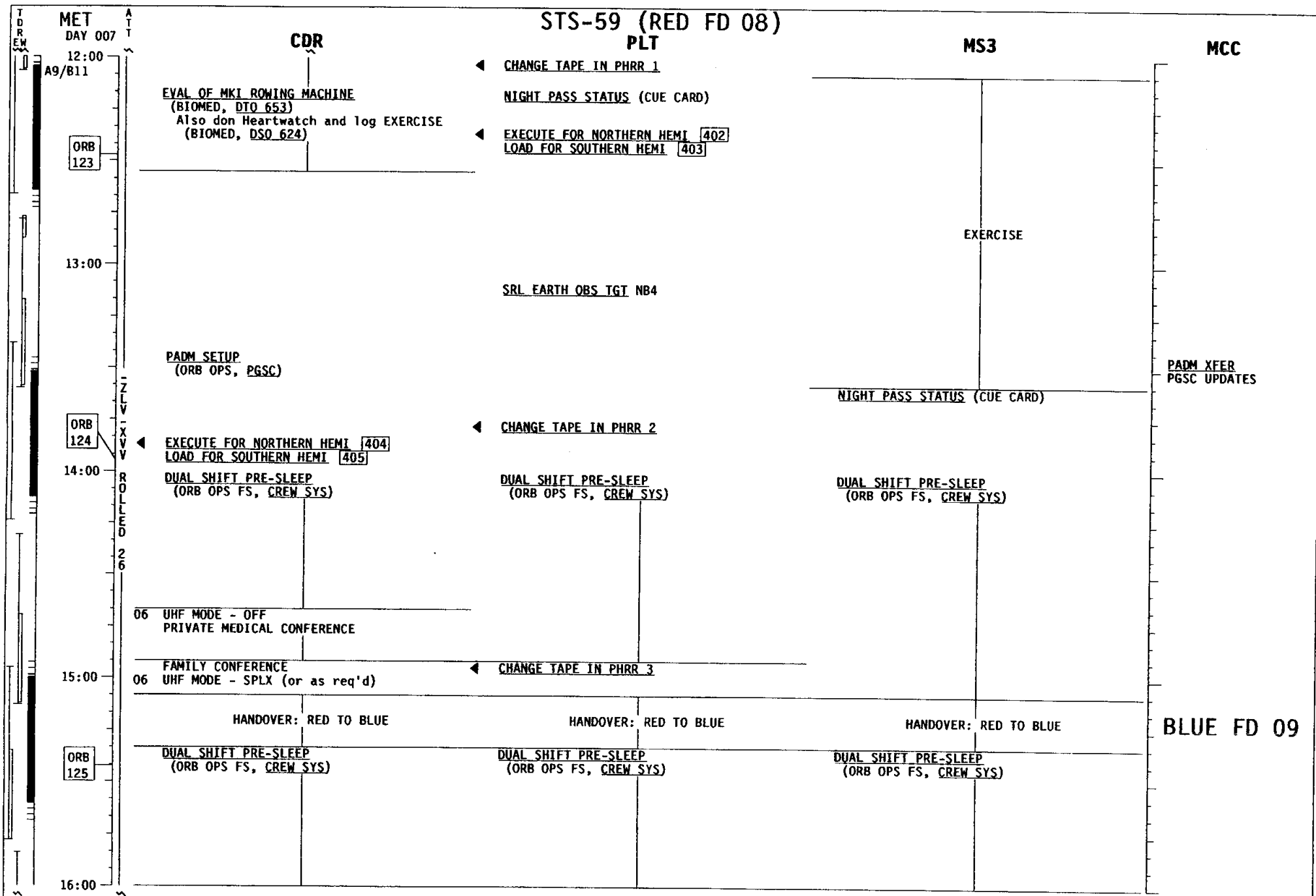
04:00

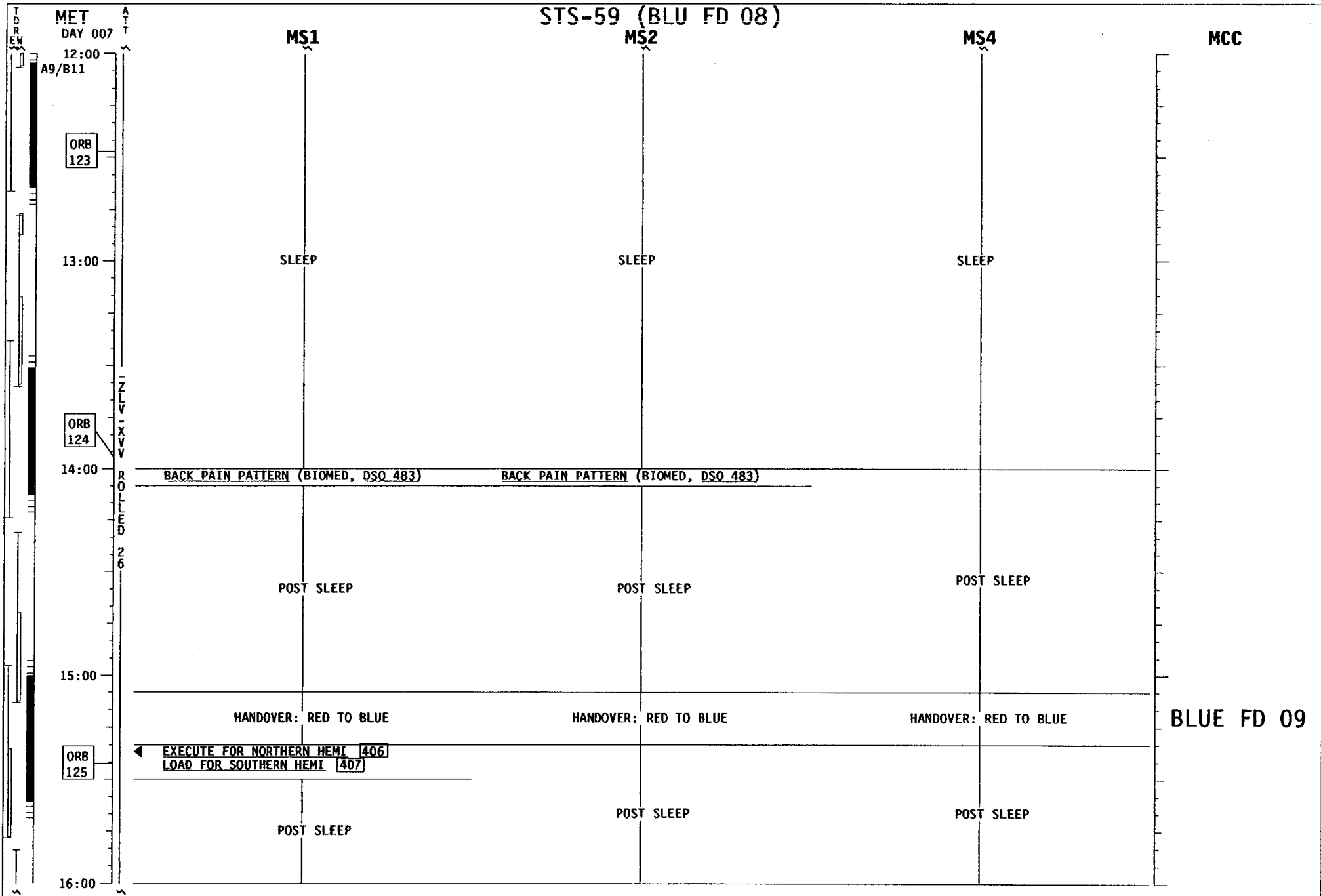


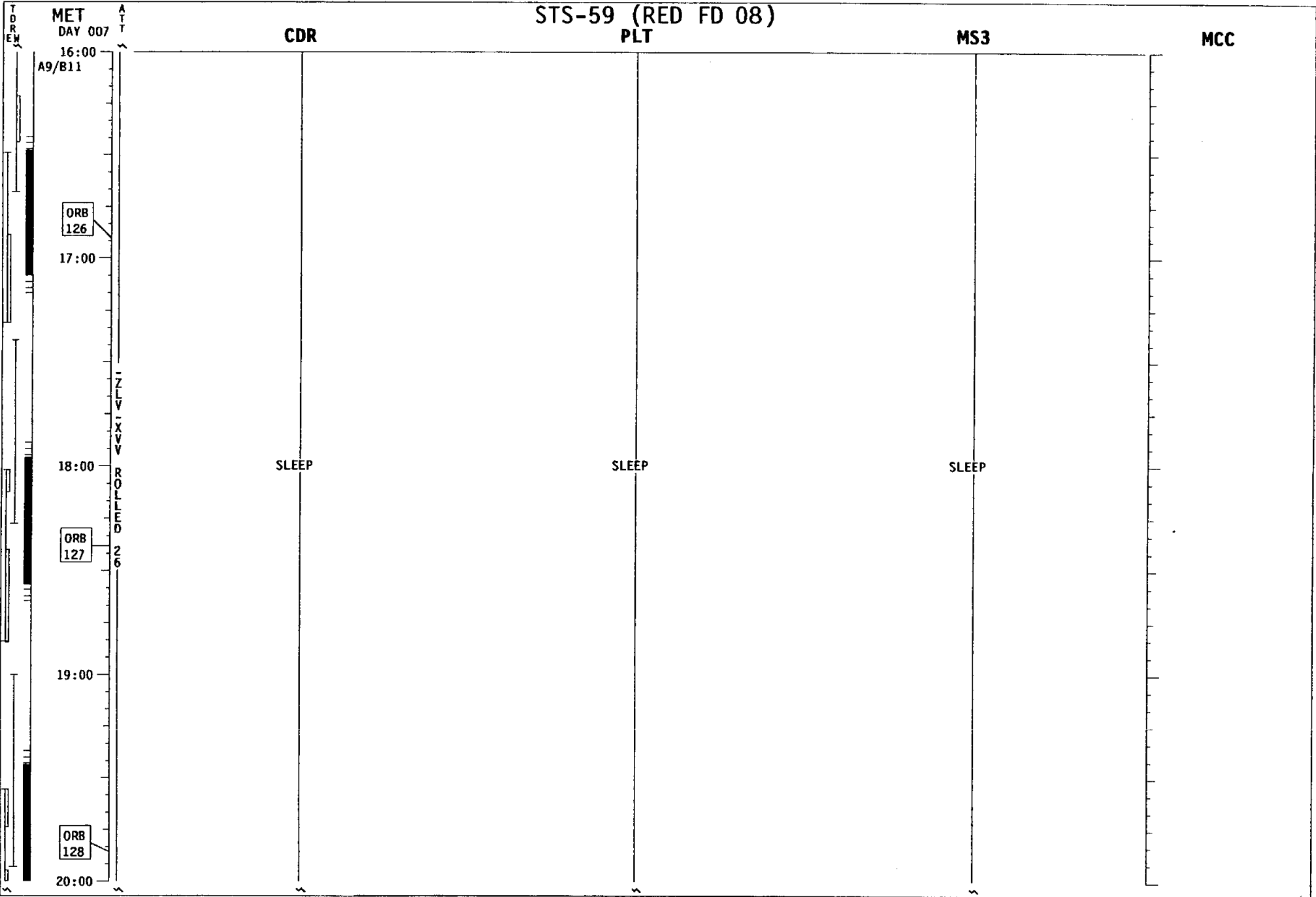


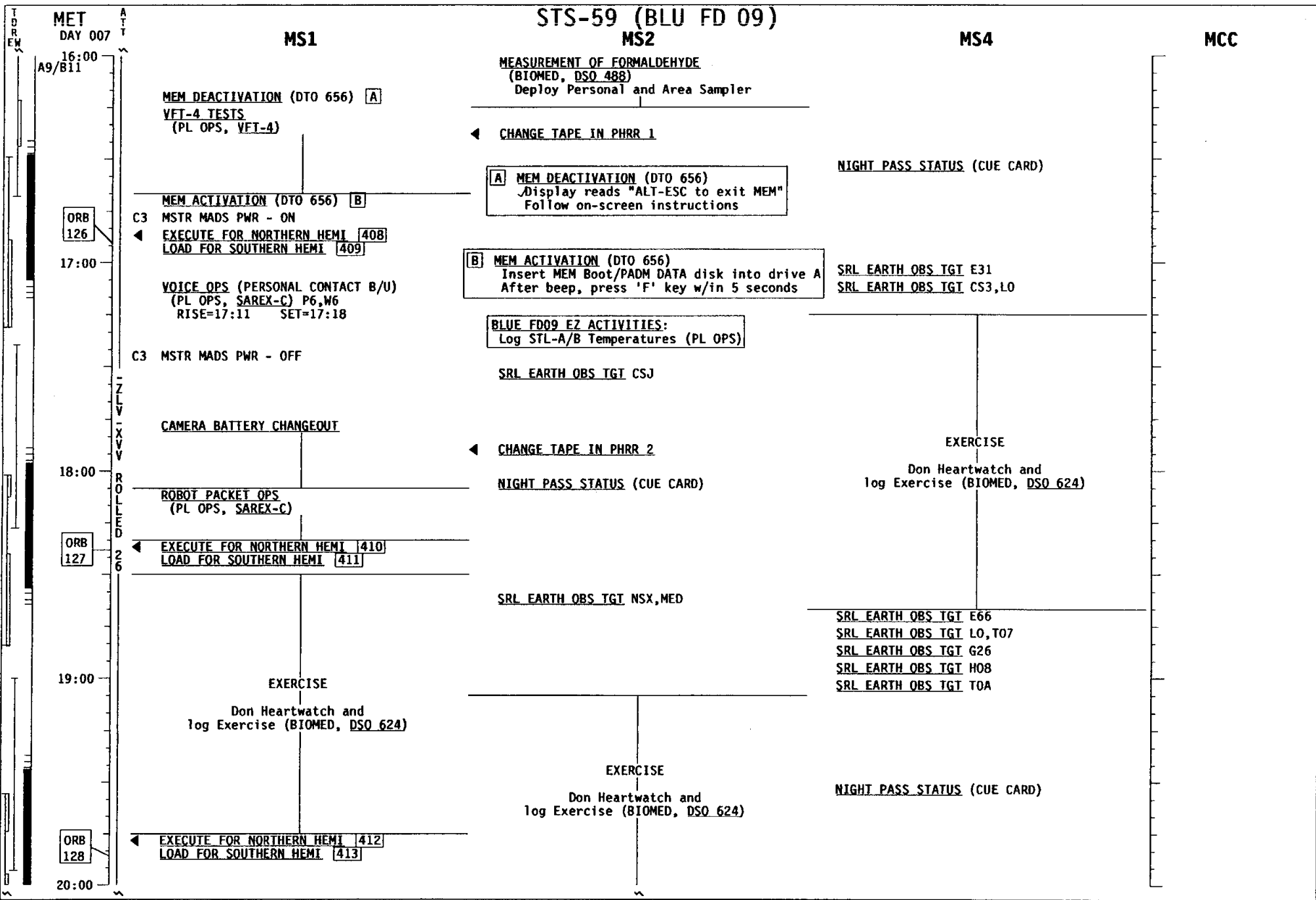


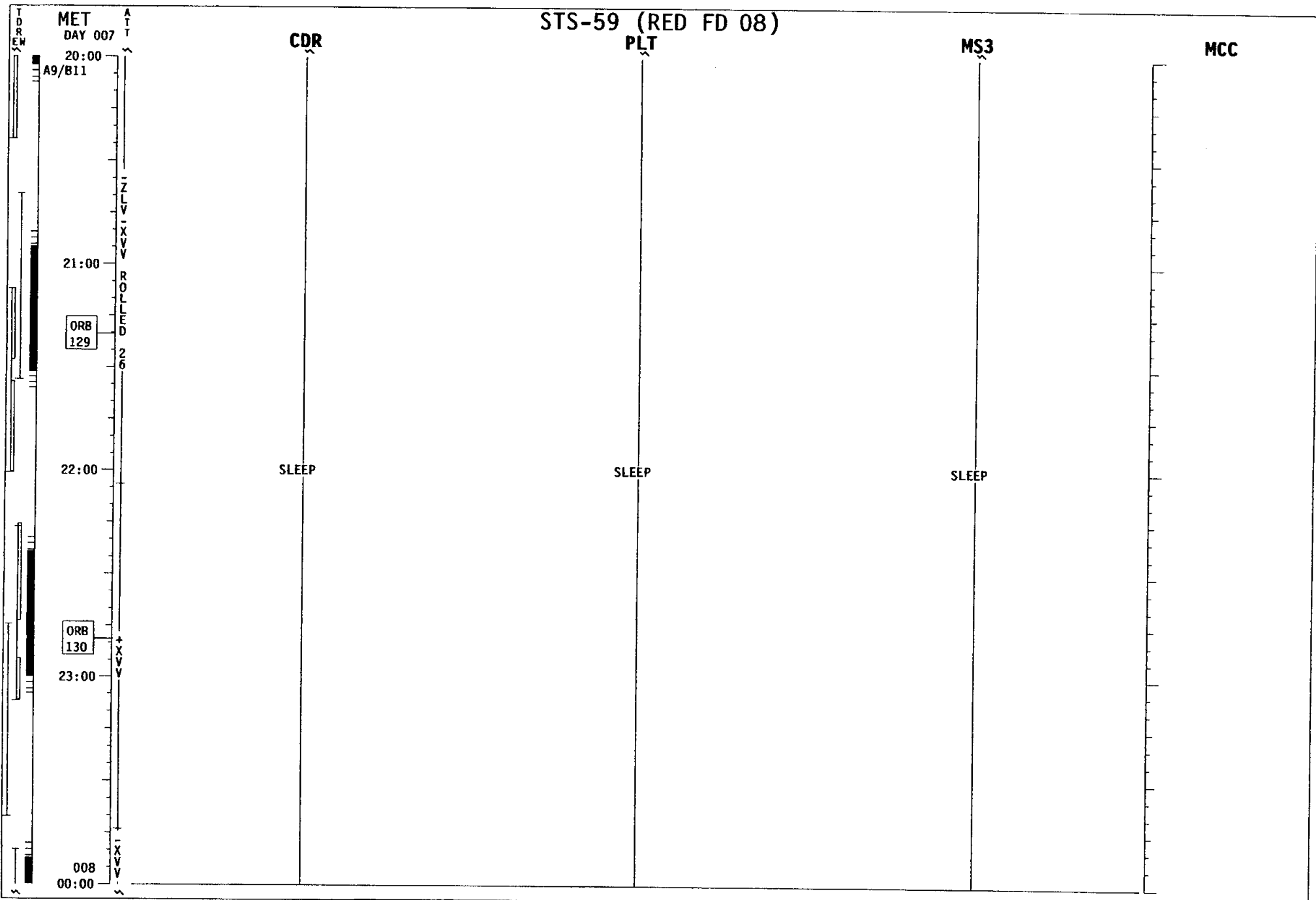


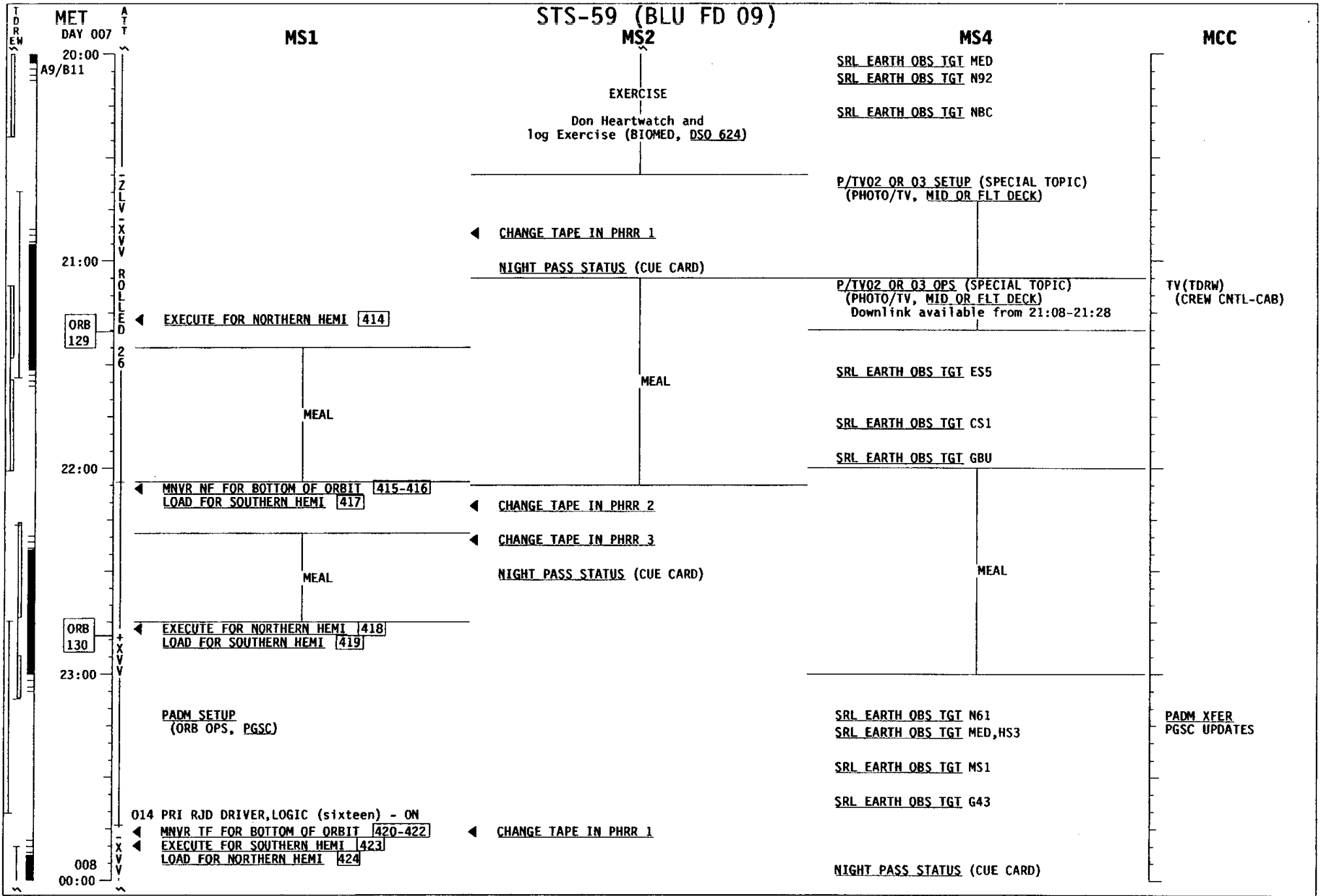


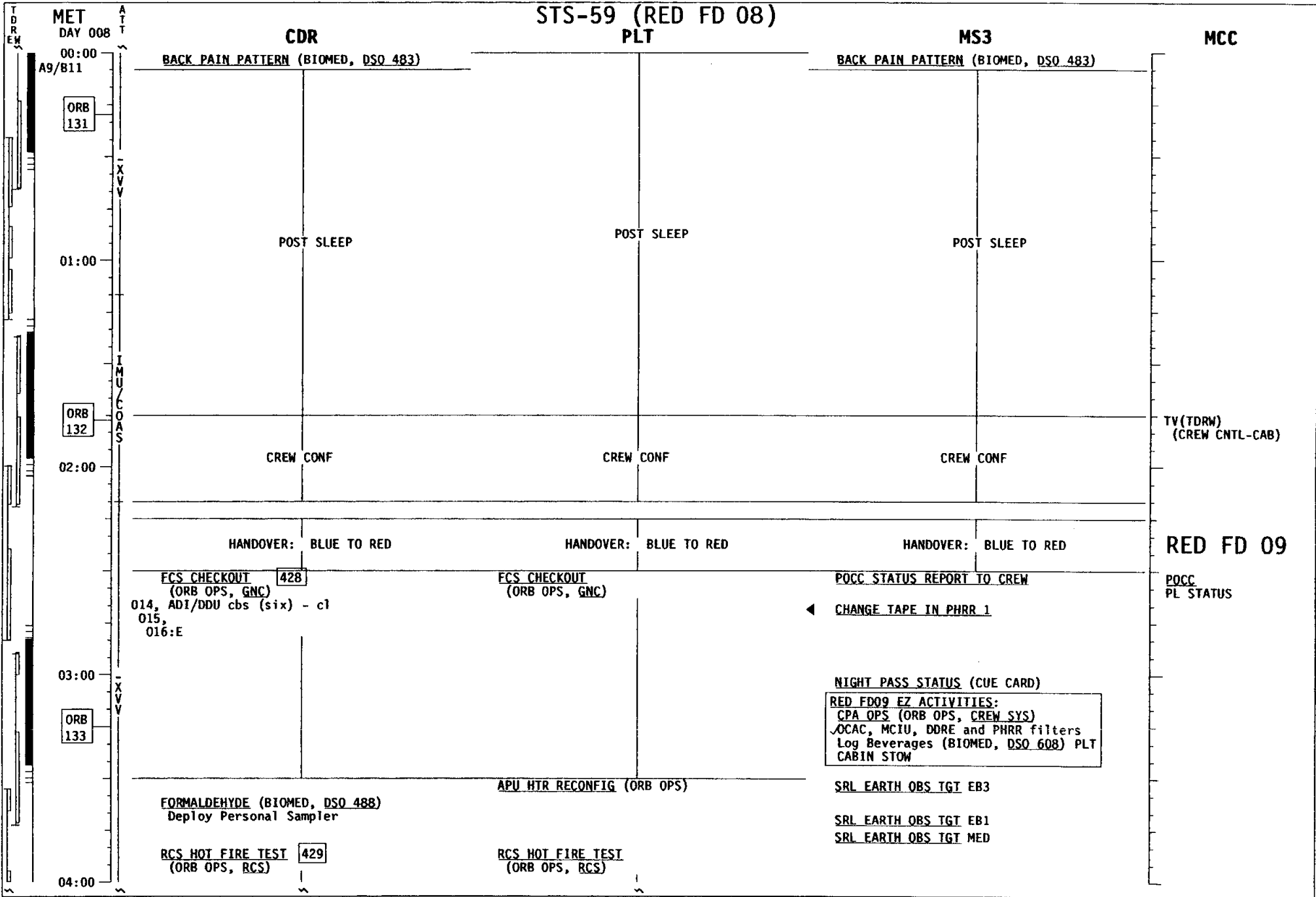












MET
DAY 008

STS-59 (BLU FD 09)

MS1

MS2

MS4

MCC

00:00
A9/B11

ORB
131

P/TV04 SETUP
(PHOTO/TV, CREW CONF)

NIGHT PASS STATUS (CUE CARD)

SRL EARTH OBS TGT HB5
SRL EARTH OBS TGT EB2

SRL EARTH OBS TGT NSX

SRL EARTH OBS TGT G94

01:00

CREW CONF AUDIO/TV CK

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

019 COAS PWR-OFF Mount COAS-AFT
MNVF IMU ALIGN ATT 425

CHANGE TAPE IN PHRR 2

IMU ALIGN - S TRK (ORB OPS)
COAS CALIBRATION (ORB OPS)

NIGHT PASS STATUS (CUE CARD)

FORMALDEHYDE (BIOMED, DSO 488)
Stow Personal Sampler

ORB
132

P/TV04 OPERATIONS
(PHOTO/TV, CREW CONF)
Downlink available from 8/01:46-02:10

CREW CONF

CREW CONF

02:00

MNVF TF - NO ZDS 426-427

HANDOVER: BLUE TO RED

HANDOVER: BLUE TO RED

HANDOVER: BLUE TO RED

RED FD 09

019 COAS PWR - OFF Stow COAS

FCS CHECKOUT
(ORB OPS, GNC)

03:00

ORB
133

COAS CALIBRATION LOG

STAR ID: -Z 20, ARCTURUS
STAR AVAIL: 01:22 TO 02:08

-Z Δ BIAS _____

UPDATE TIME: ___ / ___ : ___ : ___

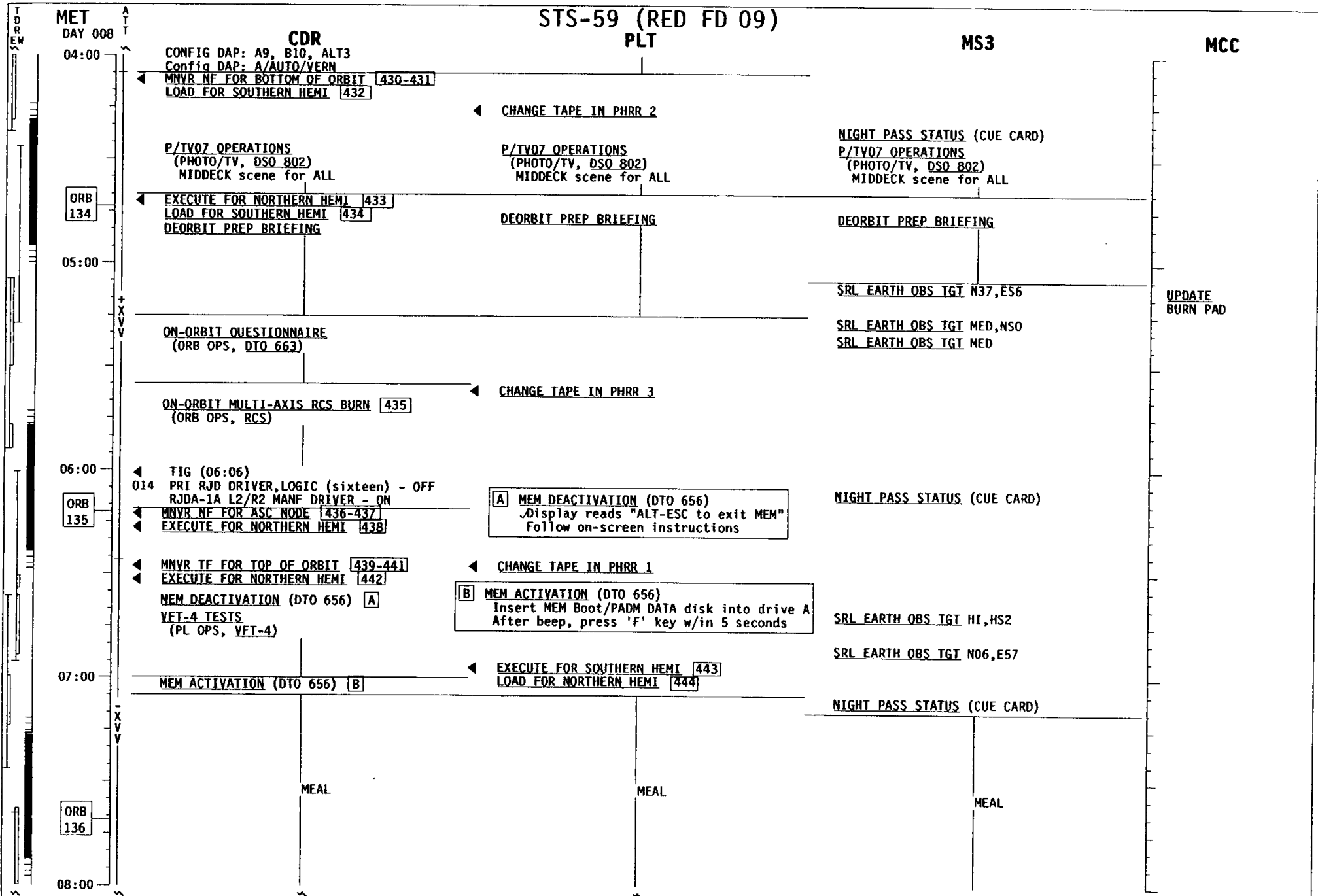
SRL EARTH OBS TGT EB3

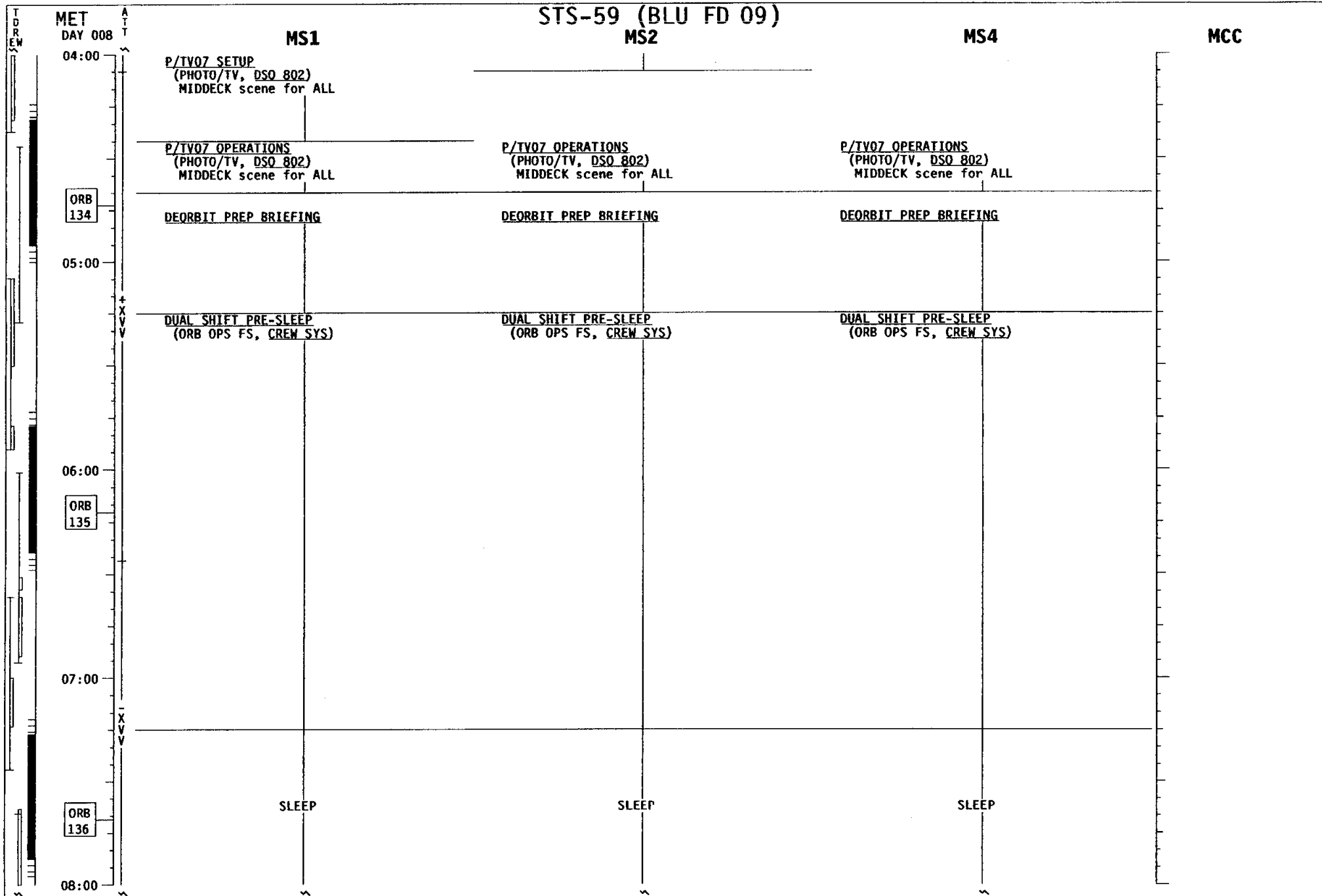
SRL EARTH OBS TGT EB1
SRL EARTH OBS TGT MED

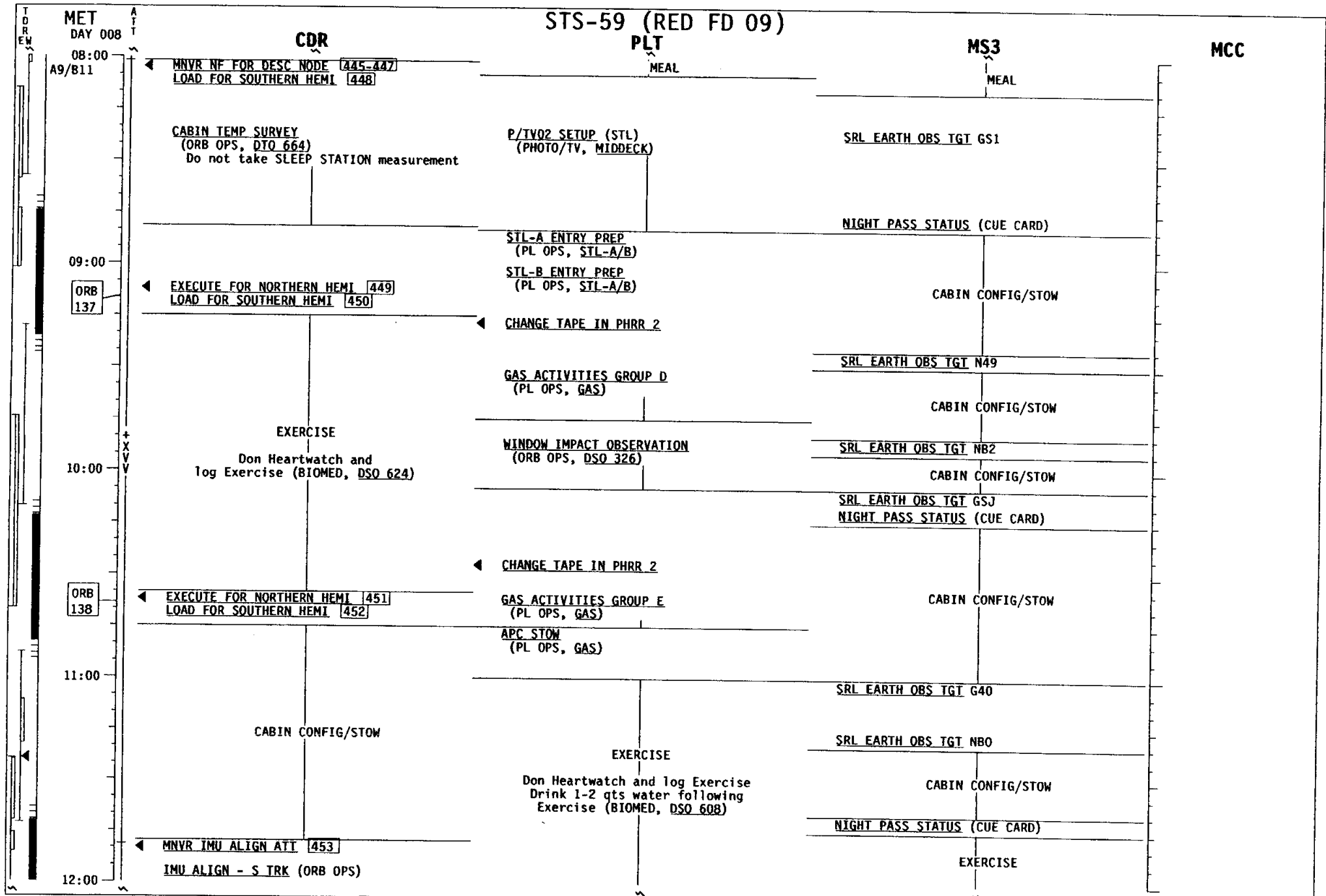
04:00

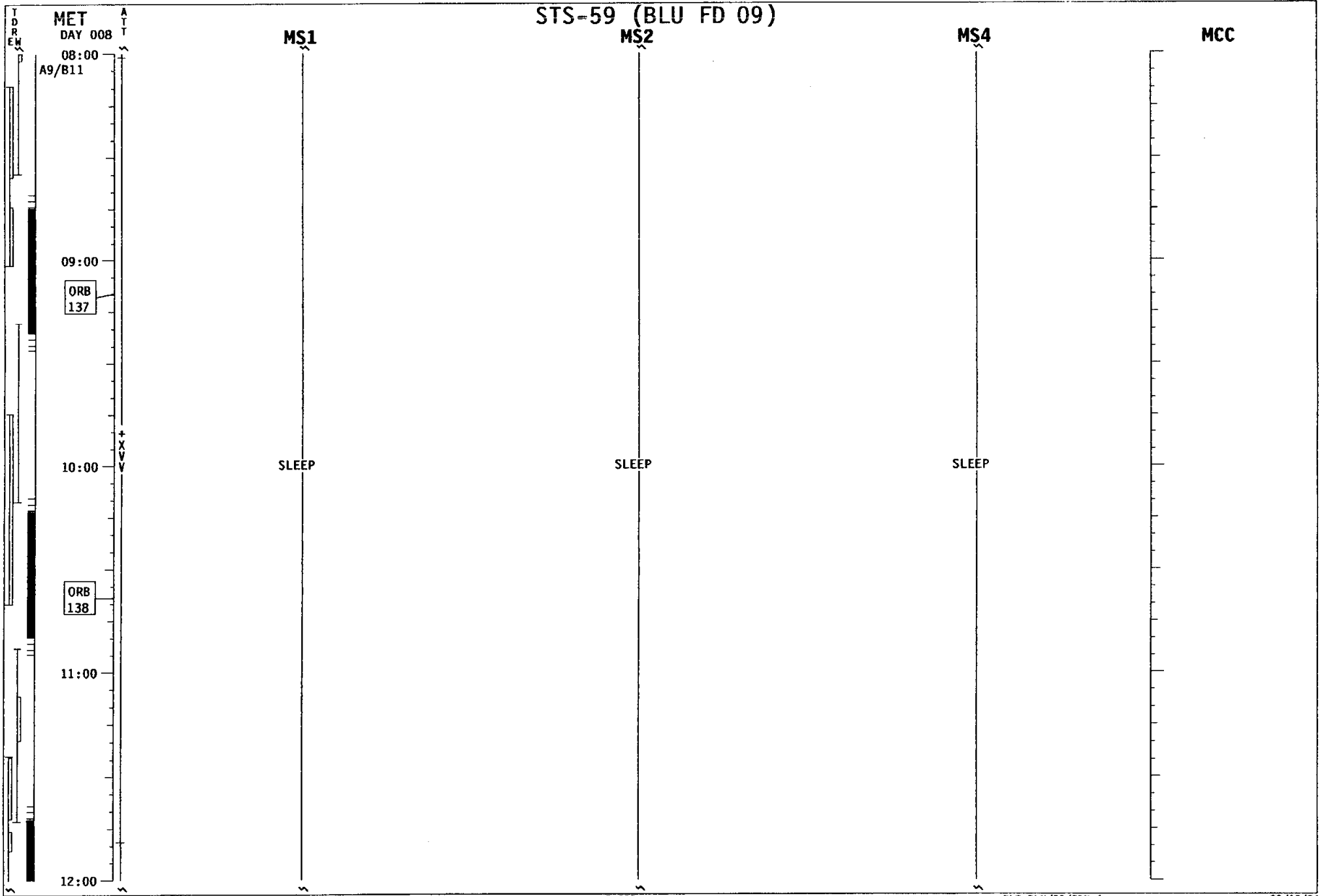
P/TV07 SETUP
(PHOTO/TV, DSO 802)
MIDDECK scene for ALL

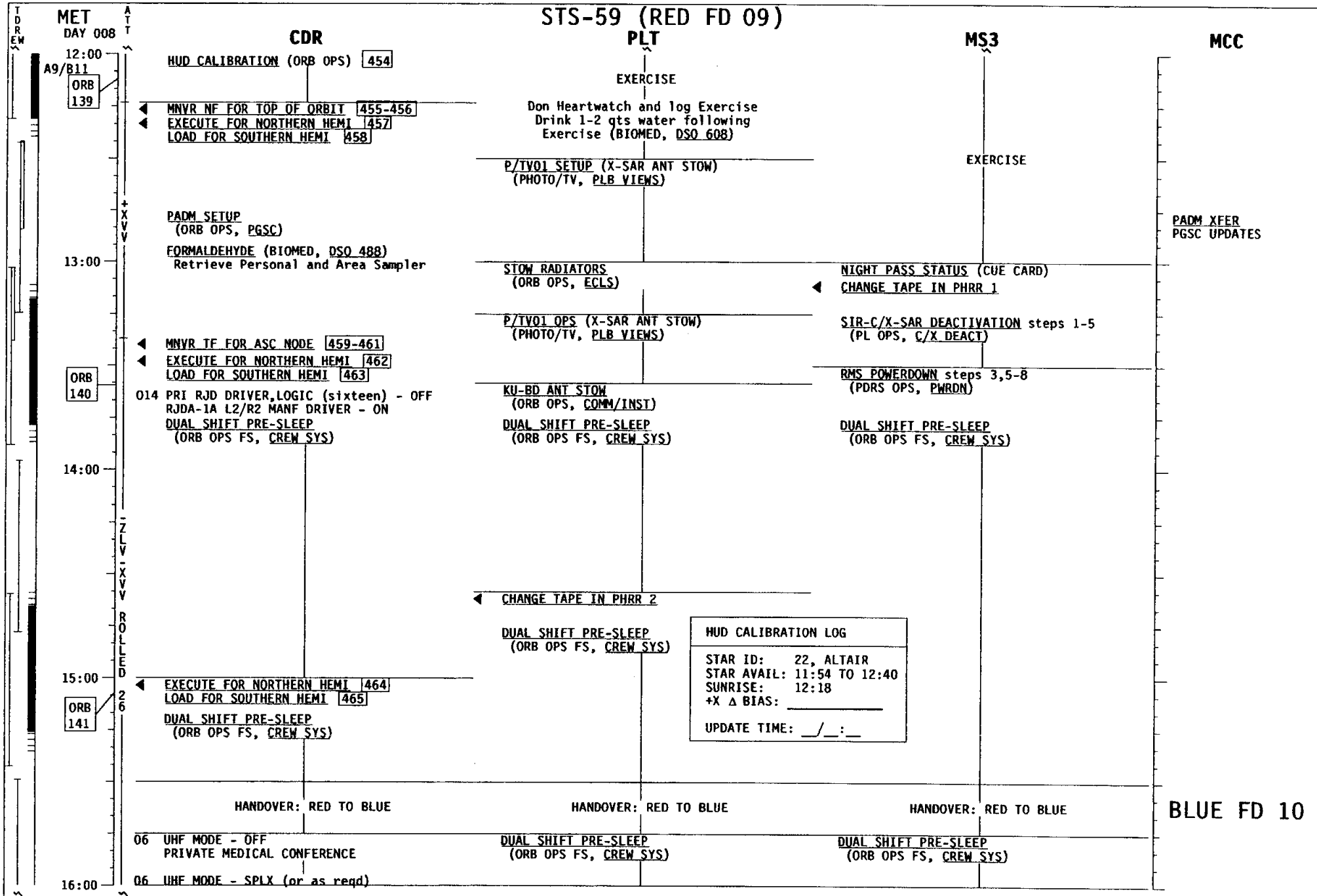
RCS HOT FIRE TEST
(ORB OPS, RCS)



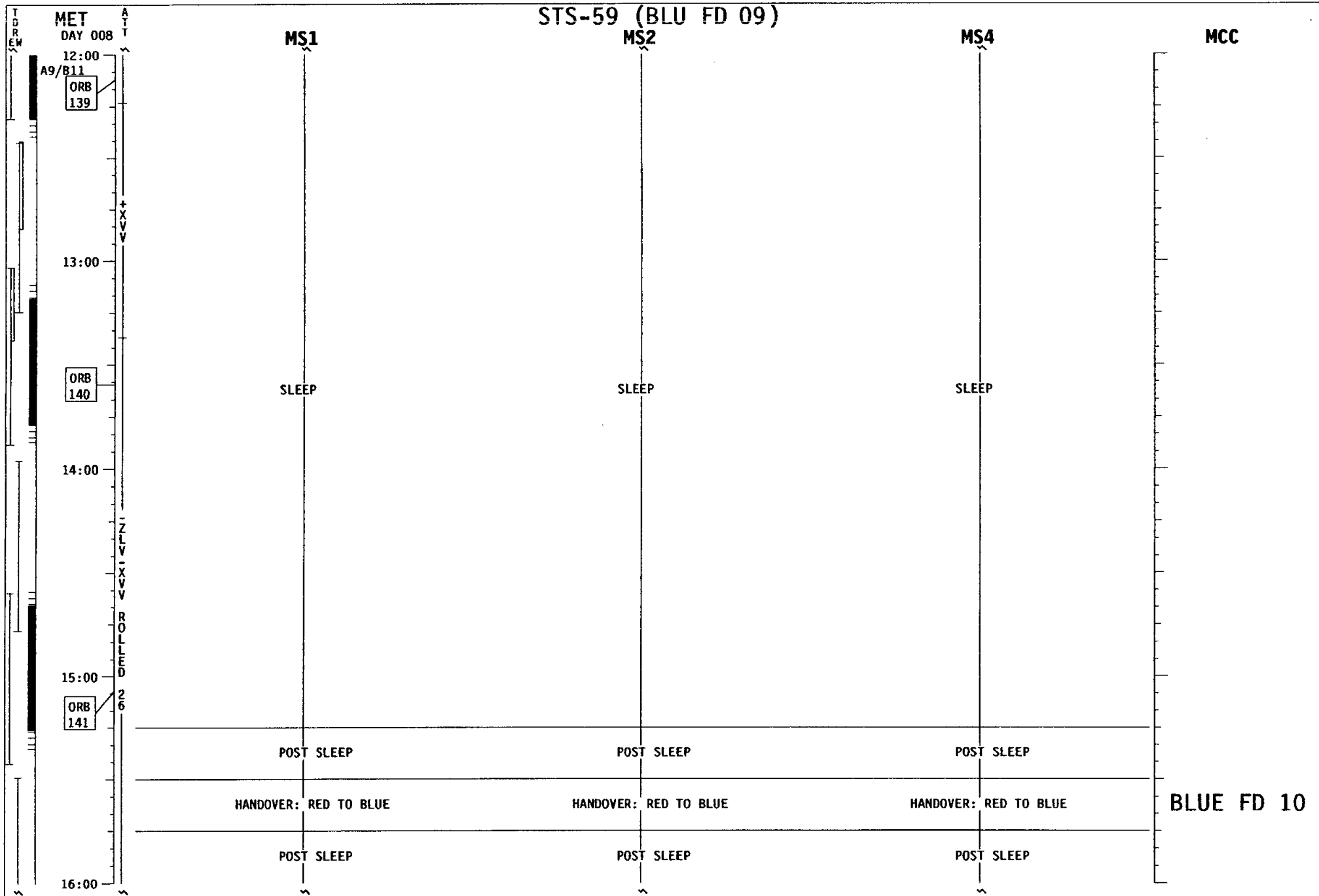


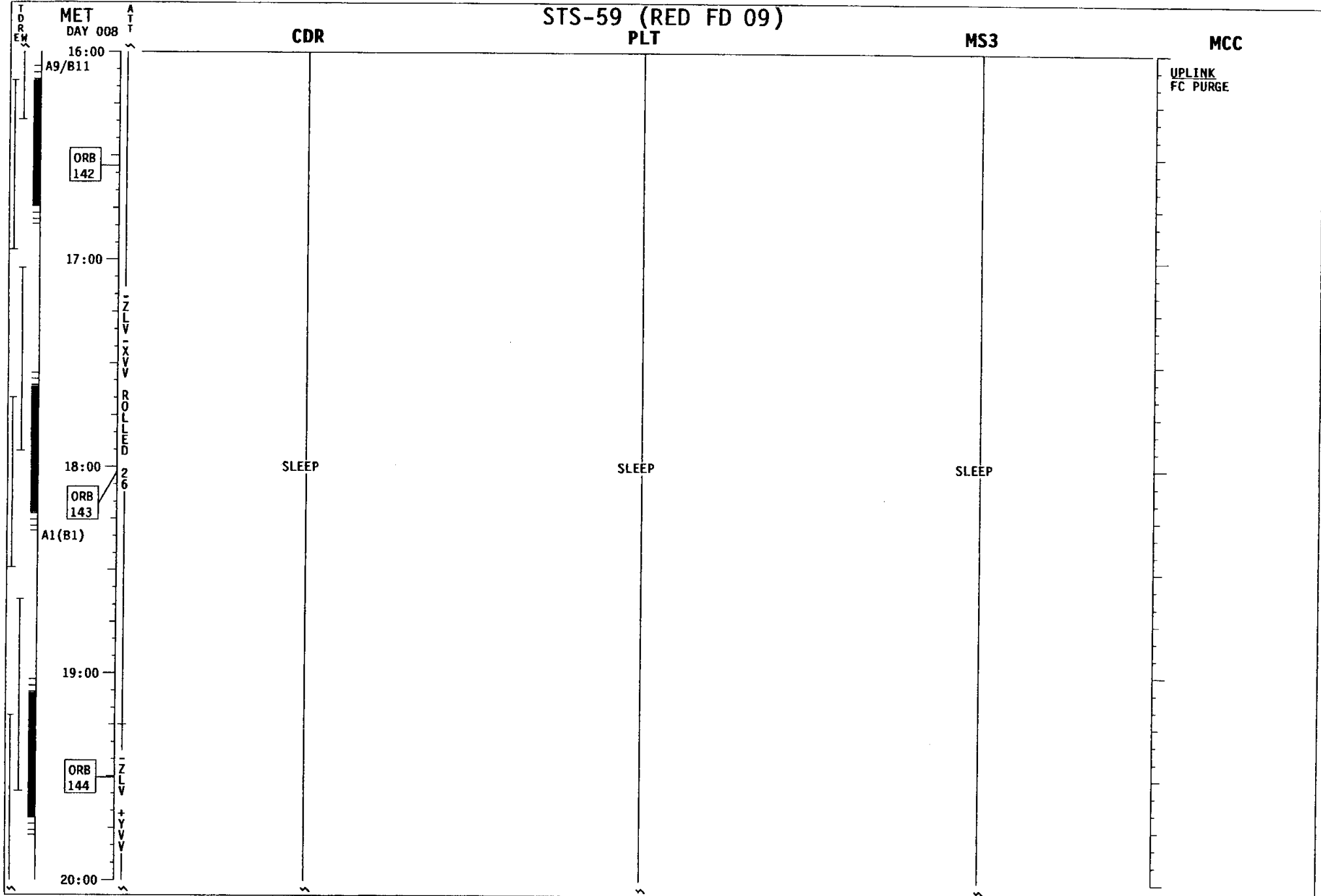


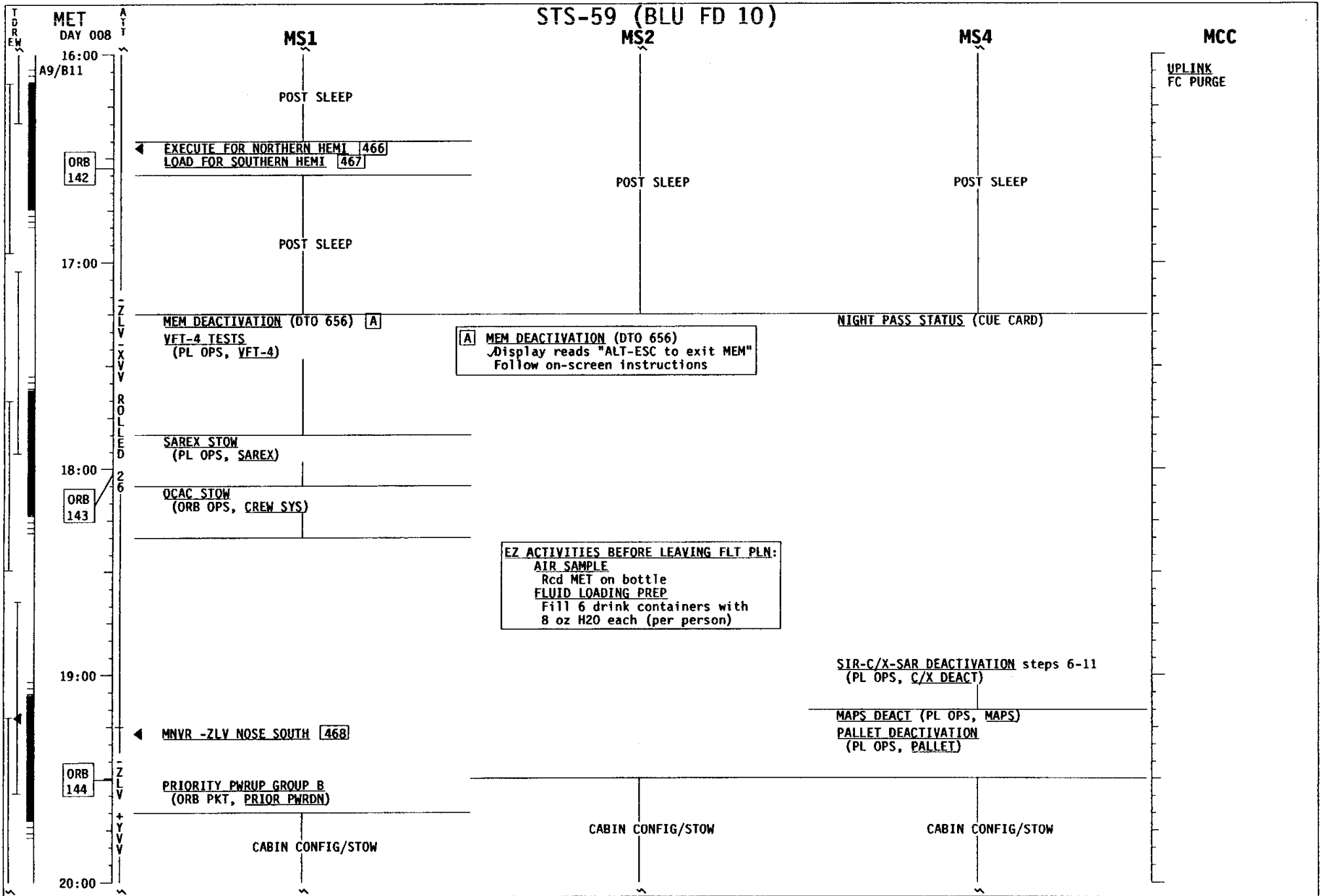


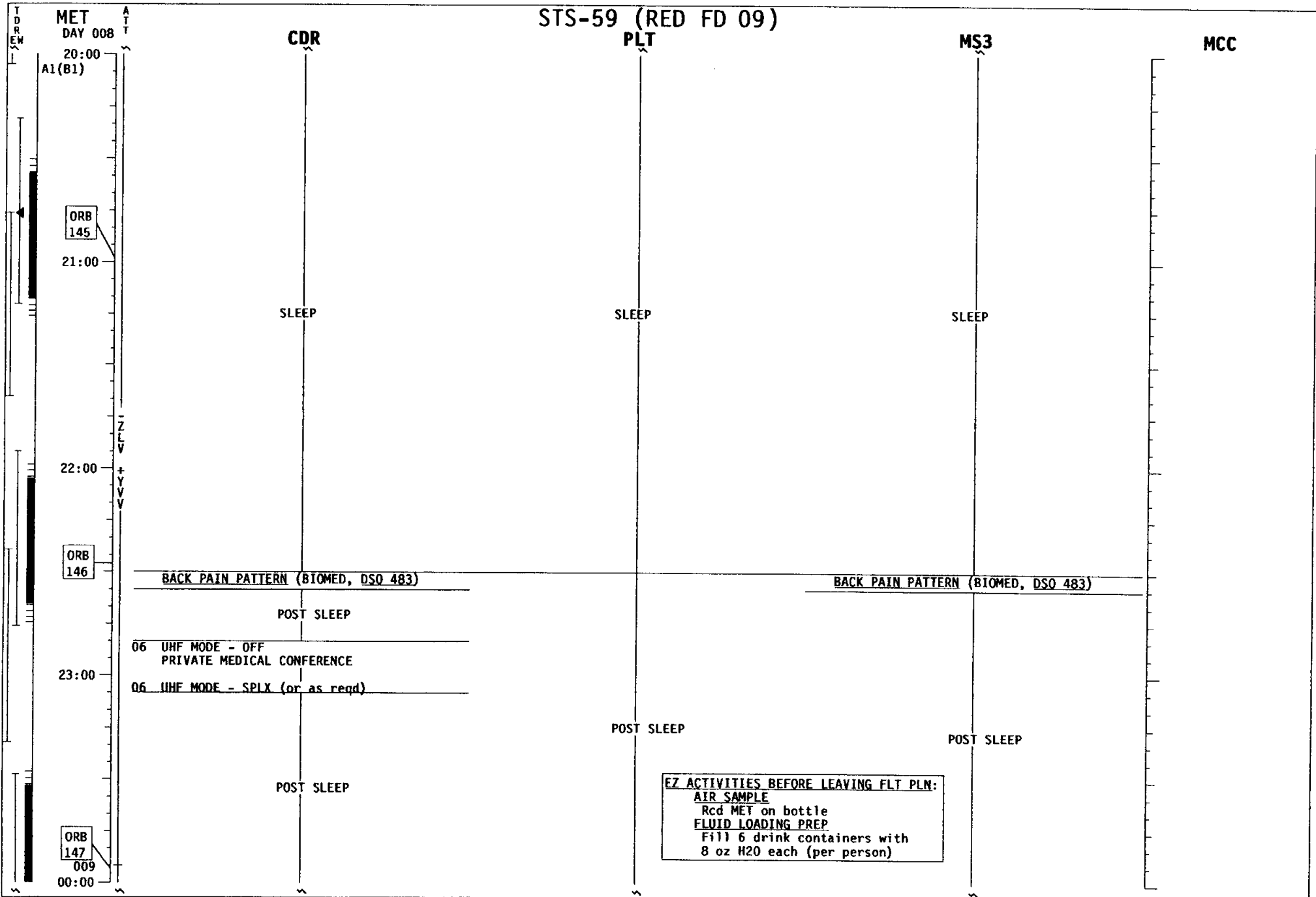


STS-59 (BLU FD 09)

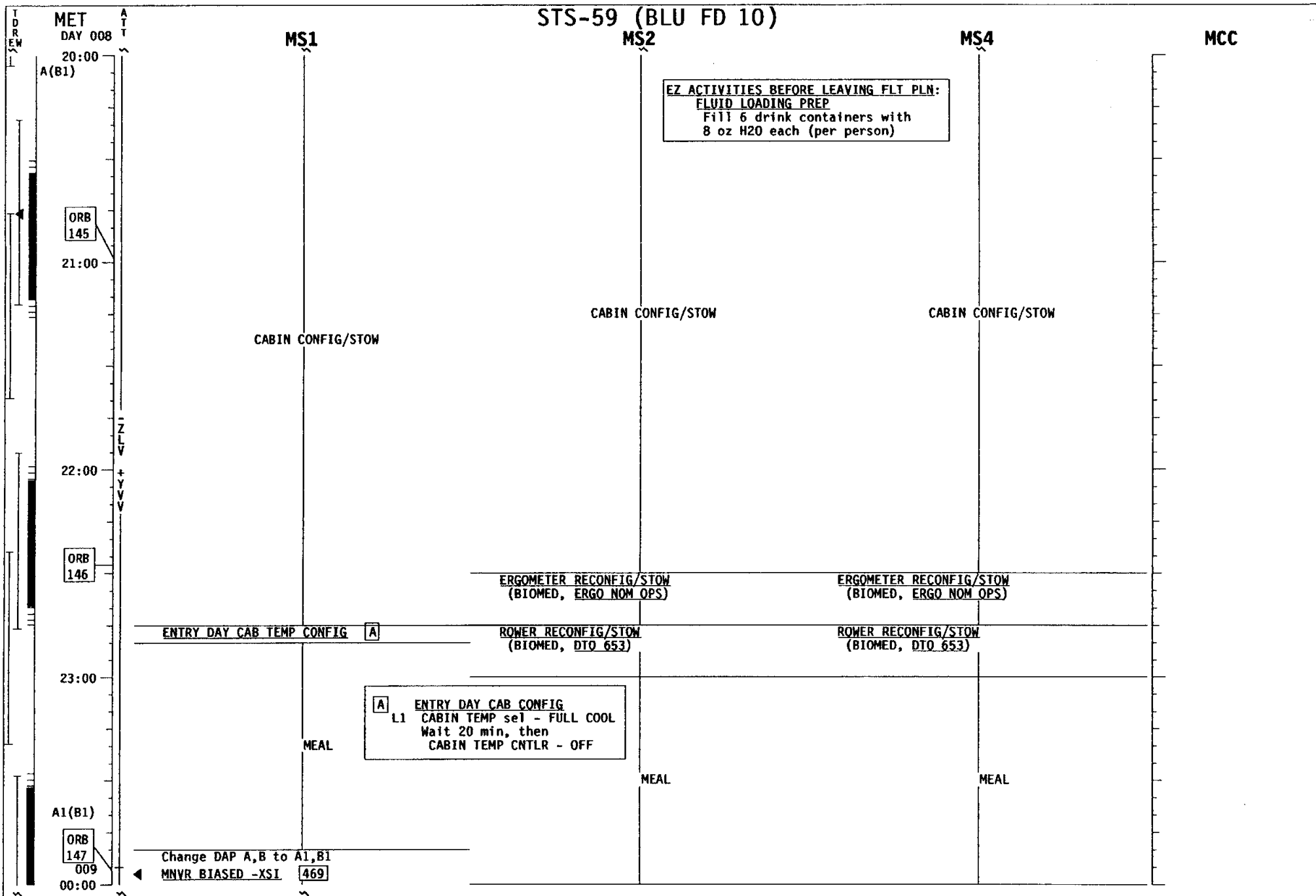




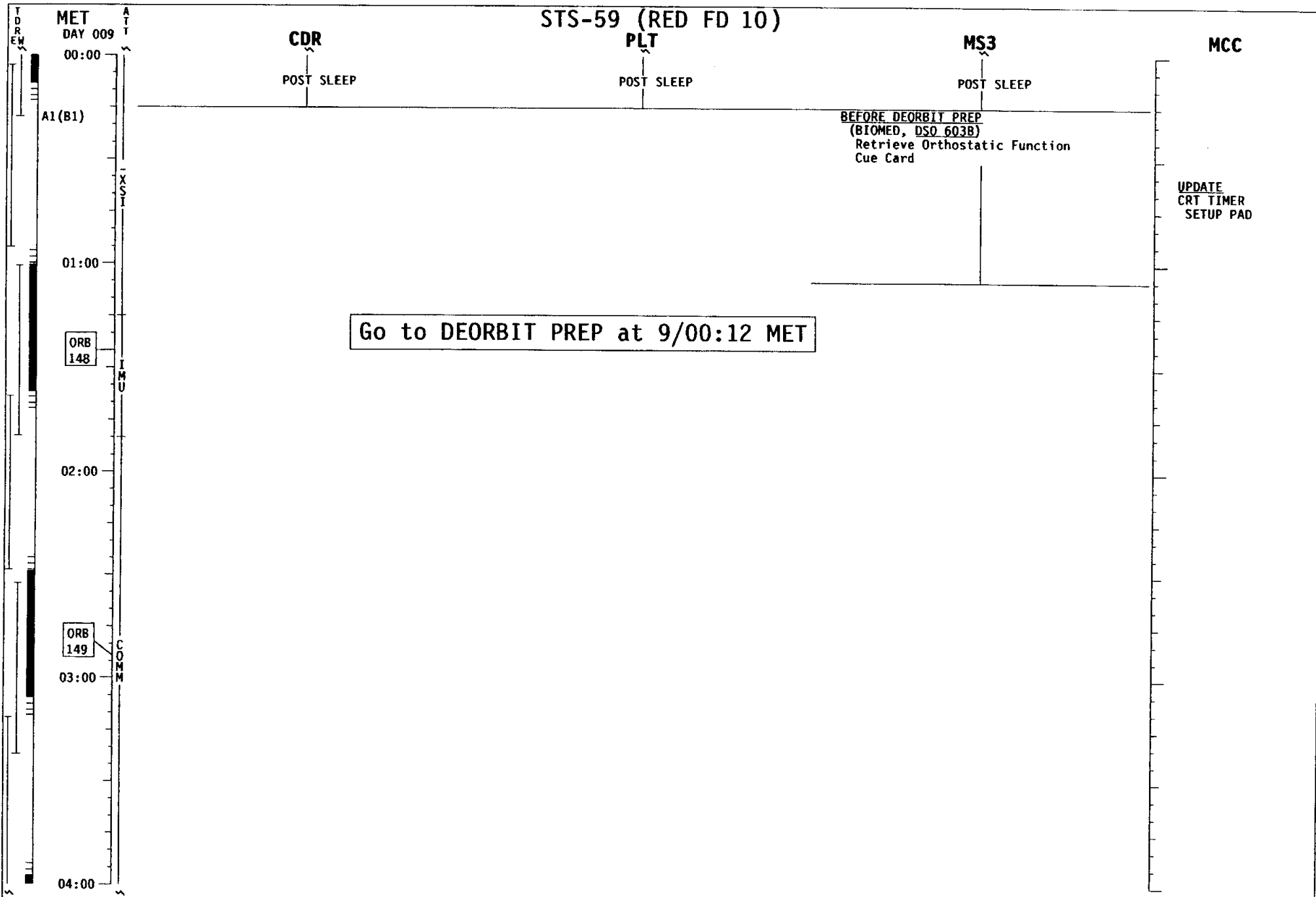




STS-59 (BLU FD 10)



STS-59 (RED FD 10)



STS-59 (BLU FD 10)

MET DAY 009
 00:00
 A1 (B1)
 01:00
 ORB 148
 02:00
 ORB 149
 03:00
 04:00

MS1

MS2

MS4

MCC

Go to DEORBIT PREP at 9/00:12 MET

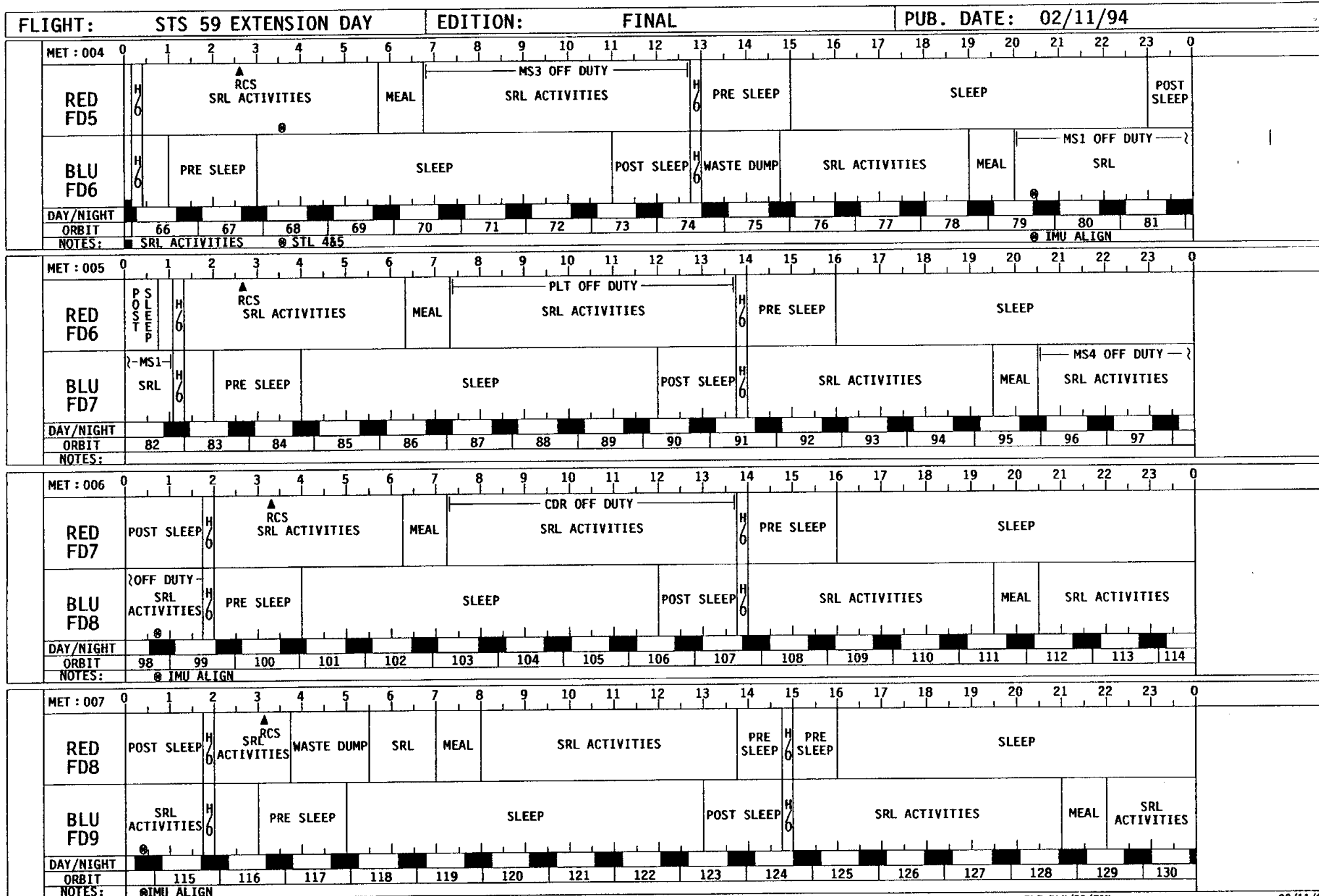
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EXTENSION DAY TIMELINE

EXTENSION DAY
TIMELINE

EXTENSION DAY TIMELINE

FLIGHT: STS 59 EXTENSION DAY		EDITION: FINAL										PUB. DATE: 02/11/94													
MET : 000	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	0
RED FD1	LAUNCH	ASCENT	POST INSERT	IMU	SRL ACTIVITIES	RCS RCS	MEAL	SRL ACTIVITIES	PRE SLEEP	PSLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	POST SLEEP				H/O	SRL
BLU FD1&2	ASCENT	POST INSERT	PRE SLEEP				SLEEP (6)			POST SLEEP	H/O	POST SLEEP	SRL ACTIVITIES		MEAL	SRL ACTIVITIES								H/O	
DAY/NIGHT																									
ORBIT																									
NOTES:																									
MET : 001	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	0
RED FD2		RCS	SRL ACTIVITIES	MEAL			SRL ACTIVITIES			PRE SLEEP	H/O	PSLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	POST SLEEP			H/O	SRL
BLU FD3		PRE SLEEP					SLEEP			POST SLEEP	H/O	POST SLEEP	SRL ACTIVITIES		MEAL	SRL	WASTE DUMP				SRL	ACTIVITIES		H/O	
DAY/NIGHT																									
ORBIT	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33								
NOTES:																									
MET : 002	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	0
RED FD3		RCS	SRL ACTIVITIES	MEAL			SRL ACTIVITIES			PRE SLEEP	H/O	PRE SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	POST SLEEP			H/O	
BLU FD4		PRE SLEEP					SLEEP			POST SLEEP	H/O	SRL ACTIVITIES		MEAL	SRL	ACTIVITIES								H/O	
DAY/NIGHT																									
ORBIT	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49								
NOTES:																									
MET : 003	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	0
RED FD4		RCS	SRL ACTIVITIES	MEAL			SRL ACTIVITIES			PS/OA	PRE SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	POST SLEEP			H/O	
BLU FD5		PRE SLEEP					SLEEP			POST SLEEP	H/O	SRL ACTIVITIES		MEAL											
DAY/NIGHT																									
ORBIT	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65									
NOTES:																									



MET: 008	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	0			
RED FD9	POST SLEEP		H/O	SRL ACTIVITIES			▲ RCS	MEAL	SRL ACTIVITIES				PRE SLEEP	H/O	PSLEEP	SLEEP												
BLU FD10	SRL ACTIVITIES		H/O	PRE SLEEP		SLEEP								POST SLEEP	H/O	PSLEEP	SRL ACTIVITIES				MEAL	SRL						
DAY/NIGHT	[Day/Night Cycle]																											
ORBIT	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146												
NOTES:	@ IMU ALIGN														@ IMU ALIGN													

MET: 009	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	0			
RED FD10	POST SLEEP		CONF	H/O	FCS C/O	HOT FR	SRL	▲ RCS	MEAL	SRL ACTIVITIES		SRL & CABIN STOW	IMU/ HUD	SRL & CABIN STOW	PRE SLEEP	H/O	PSLEEP	SLEEP (6.25)				POST SLEEP						
BLU FD10	CAC OK	ND FT V	IMU/ COAS	CONF	H/O	PRE SLEEP		SLEEP						PH SA	POST SLEEP	SRL	PL DEACT	CABIN STOW		MEAL								
DAY/NIGHT	[Day/Night Cycle]																											
ORBIT	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162												
NOTES:	@ CONCAP & STL																											

MET: 010	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	0			
RED FD11	DEORBIT PREP				D/O	LANDING																						
BLU FD11	DEORBIT PREP				BURN	LANDING																						
DAY/NIGHT	[Day/Night Cycle]																											
ORBIT	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179											
NOTES:	@ IMU ALIGN														* KSC LANDING 10/04:56													

MET: 011	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	0			
RED																												
BLU																												
DAY/NIGHT	[Day/Night Cycle]																											
ORBIT																												
NOTES:																												

ATTITUDE TIMELINE

STS-59 ATTITUDE TIMELINE	5-2
ZERO DOPPLER STEERING (ZDS) DIAGRAMS	5-51

ATTITUDE
TIMELINE

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
1 000/00:30:00 MET	INRTL R=264.00 MNVR P=126.00 Y= 25.00	TRN AUTO PRI	DSC 0.500 DB AT 3.50 DB RT 0.20	SUN R 240 P 119	OMS-2 TIG: 0/00:35	OMS-2 Burn
2 000/01:12:00 MET 20:09	INRTL R=345.00 MNVR P=133.00 Y=324.00	A1 AUTO PRI	DSC 0.200 DB AT 5.00 DB RT 0.20	SUN R 214 P 139	Star Pair -Y: 22 -Z: 29	Post Insertion PLBD Open IMU Align
3 000/01:35:00 MET 39:26	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00	B1 AUTO PRI	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward ZDS: None
4 000/05:00:00 MET	Configure DAPs: DAP A to A9 DAP B to B10 ALT to ALT3				Orb Adjust: 0/04:05 Circ Burn: 0/04:50	Post Burn DAP Config
5	On MCC call B10/AUTO/VERN					Collapse DBs

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

5-2

RED FD 1

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

ATTITUDE
TIMELINE

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
6 000/11:30:00 MET 20	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Start ZDS at: Asc. Node
7	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Config DAPs Load ZDS DSC RT
8 000/11:47:43 MET 12:32:01	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward Begin ZDS: Northern Hemis
9 000/12:32:08 MET 13:16:26	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
10 000/13:16:33 MET 14:00:51	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
11 000/14:00:59 MET 45:17	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
12 000/14:45:25 MET 15:29:43	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
13 000/15:29:51 MET 16:14:09	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
14 000/16:14:16 MET 58:34	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
15 000/16:58:42 MET 17:43:00	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
16 000/17:43:08 MET 18:27:26	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
17 000/18:27:34 MET 19:11:52	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.

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

5-3

BLUE FD 2

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
18 000/19:12:00 MET 56:18	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
19 000/19:56:25 MET 20:40:43	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
20 000/20:40:51 MET 21:25:09	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
21 000/21:25:17 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: S. Hemis.

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

5-4

BLUE FD 2

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
22 000/21:40:00 MET 50:24 IMU: 22-24	INRTL R=320.00 MNVR P=333.00 Y=300.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 111 P 78	Star Pair A2 -Y: 20 -Z: 51	IMU Align
23 000/21:54:00 MET 22:08:56 * IMU *	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Start ZDS at: Asc. Node
24 * IMU *	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DBs Load ZDS DSC RT
25 000/22:09:43 MET 54:01	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward Begin ZDS: Northern Hemis
26 000/22:54:09 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: S. Hemis.
27 000/23:25:00 MET 30:55 * PRCS MNVR *	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00 * Reset DAP B10	A9 AUTO ALT3	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward Start ZDS at: Asc. Node
28	When in att. A9/AUTO/VERN When in A9 DBs B10/AUTO/VERN					Collapse DBs
29	When rates damp B11/AUTO/VERN					Load ZDS DSC RT
30 000/23:38:34 MET 001/00:22:52	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward Begin ZDS: Northern Hemis
31 001/00:22:58 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Nose Forward ZDS: S. Hemis.
32 Trim: 32-34	Following Trim Burn, reset ZDS				Trim TIG: 1/00:59	Trim Burn
33 001/01:01:00 MET 06 * Trim *	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward Start ZDS at: Asc. Nose

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

5-5

RED FD 2

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
34	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN				Collapse DBs Load ZDS DSC RT	
* Trim *						
35 001/01:07:23 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01		Nose Forward Begin ZDS: Northern Hemis	
36 001/01:51:00 MET 02:05:41	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Bott. of Orbit
37	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN				Collapse DBs Load ZDS DSC RT	
38 001/02:14:02 MET 36:11	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Begin ZDS: Southern Hemis
39 001/02:36:15 MET 03:20:33	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
40 001/03:20:40 MET 04:04:58	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
41 001/04:05:06 MET 49:24	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
42 001/04:49:31 MET 05:33:49	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
43 001/05:33:57 MET 06:18:15	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
44 001/06:18:22 MET 07:02:40	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
45 001/07:02:48 MET 47:06	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.

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

5-6

RED FD 2

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
46 001/07:47:14 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: S. Hemis.
47 001/08:15:00 MET 20:29	INRTL R=298.00 MNVR P=318.00 Y= 49.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 25 P 43	Star Pair B2 -Y: 49 -Z: 60	IMU Align
IMU: 47-50						
48 001/08:28:00 MET 37:47	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 0.10 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Top of Orbit
* IMU *						
49	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DBs Load ZDS DSC RT
* IMU *						
50 001/08:53:52 MET 09:16:01	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward Begin ZDS: Northern Hemis
* IMU *						
51 001/09:16:05 MET 10:00:23	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
52 001/10:00:30 MET 44:48	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
53 001/10:44:56 MET 11:29:14	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.

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

5-7

RED FD 2

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
54 001/11:29:22 MET 12:13:40	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
55 001/12:13:43 MET 58:01	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
56 001/12:58:08 MET 13:42:26	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
57 001/13:42:33 MET 14:26:51	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
58 001/14:26:58 MET 15:11:16	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
59 001/15:11:23 MET 55:41	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
60 001/15:55:48 MET 16:40:06	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
61 001/16:40:13 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: S. Hemis.
62 001/17:10:00 MET 15:55	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00 * PRCS MNVR * * Reset DAP B10	A9 AUTO ALT3	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward Start ZDS at: Asc. Node
63	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
64	When rates damp B11/AUTO/VERN					Load ZDS DSC RT
65 001/17:24:39 MET 18:08:57	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward Begin ZDS: Northern Hemis

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

5-8

BLUE FD 3

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
66 001/18:09:04 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Nose Forward ZDS: S. Hemis.
67 001/18:42:00 MET 47:56	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00 * PRCS MNVR * * Reset DAP B10	A9 AUTO ALT3	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Start ZDS at: Asc. Node
68	When in att. A9/AUTO/VERN When in A9 DBs B10/AUTO/VERN					Collapse DB
69	When rates damp B11/AUTO/VERN					Load ZDS DSC RT
70 001/18:53:29 MET 19:37:47	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward Begin ZDS: Northern Hemis
71 001/19:37:54 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: S. Hemis.
72 001/20:00:00 MET 14:40	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward Start ZDS: Asc. Node
73	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
74 001/20:22:19 MET 21:06:37	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward Begin ZDS: Northern Hemis
75 001/21:06:44 MET 51:02	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward ZDS: S. Hemis.
76 001/21:51:09 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Nose Forward ZDS: N. Hemis.
77 001/22:11:00 MET 20:17	INRTL R=132.00 MNVR P=348.00 Y=339.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 311 P 38	Star Pair -Y: 57 -Z: 18	IMU Align

IMU: 77-80

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

5-9

BLUE FD 3

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
78 001/22:26:00 MET 39:56	TGT=2 BV=5 P= 90.00 Y=334.00 OM=180.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 0.00	Nose Forward Start ZDS at: Bott. of Orbit
* IMU *						
79	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
* IMU *						
80 001/22:57:47 MET 23:19:56	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward Begin ZDS: Southern Hemis
* IMU *						

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

5-10

BLUE FD 3

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT
81 001/23:20:00 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01		Nose Forward ZDS: N. Hemis.
82 002/00:02:00 MET 07:56	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 1.50 * PRCS MNVR * * Reset DAP B10	A9 AUTO ALT3	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=358.50 Tail Forward ZDS: None Mid. Lat. Bias
83	When in att. A9/AUTO/VERN When in A9 DBs B10/AUTO/VERN				Collapse DB
84	Following Trim Burn, reset ZDS Trim: 84-86			Trim TIG: 2/00:37	Trim Burn
85 002/00:40:00 MET 28	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00 * Trim * * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00 Tail Forward Start ZDS at: Asc. Node
86	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN * Trim *				Collapse DB Load ZDS DSC RT
87 002/00:48:47 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01		Tail Forward Begin ZDS: Northern Hemis
88 002/01:03:00 MET 08:57	TGT=2 BV=5 P= 90.00 Y=334.00 OM=180.00 * PRCS MNVR * * Reset DAP B10	A9 AUTO ALT3	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 0.00 Nose Forward Start ZDS at: Top of Orbit
89	When in att. A9/AUTO/VERN When in A9 DBs B10/AUTO/VERN				Collapse DB
90	When rates damp B11/AUTO/VERN				Load ZDS DSC RT
91 002/01:11:00 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00 * Reset DAP B10	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01		Nose Forward Begin ZDS: Northern Hemis
92 002/01:33:00 MET 47:40	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00 Tail Forward Start ZDS at: Bott. of Orbit

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

5-11

RED FD 3

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP		E/S	REF ATT/REMARKS	EVENT
93	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
002/01:55:24 MET 02:17:33	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Begin ZDS: Southern Hemis
002/02:17:36 MET 03:01:54	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
002/03:02:01 MET 46:19	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
002/03:46:26 MET 04:30:44	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
002/04:30:51 MET 05:15:09	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
002/05:15:15 MET 59:33	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
002/05:59:40 MET 06:43:58	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
002/06:44:05 MET 07:28:23	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
002/07:28:30 MET 08:12:48	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
002/08:12:54 MET 57:12	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
002/08:57:19 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: S. Hemis.

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

5-12

RED FD 3

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
105 002/09:32:00 MET 35:20	TGT=2 BV=5 P= 90.00 Y= 14.00 OM= 0.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 14 P 90	LVLH R=346.00 P=180.00 Y= 0.00	Tail Forward SRL Nadir ZDS: None
106	When in att. B10/AUTO/VERN					Collapse DB
107 002/09:47:00 MET 50:20	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Top of Orbit
108	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
109 002/10:03:56 MET 26:05	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
110 002/10:26:09 MET 11:10:27	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
111 002/11:10:34 MET 54:52	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
112 002/11:54:58 MET 12:39:16	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.

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

5-13

RED FD 3

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
113 002/12:39:21 MET 13:23:39	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
114 002/13:23:45 MET 14:08:03	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
115 002/14:08:09 MET 52:27	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
116 002/14:52:34 MET 15:36:52	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
117 002/15:36:58 MET 16:21:16	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
118 002/16:21:23 MET 17:05:41	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
119 002/17:05:47 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: N. Hemis.
120 002/17:42:00 MET 45:20	TGT=2 BV=5 P= 90.00 Y= 14.00 OM= 0.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 14 P 90	LVLH R=346.00 P=180.00 Y= 0.00	Tail Forward SRL Nadir ZDS: None
121	When in att. B10/AUTO/VERN					Collapse DB
122 002/17:54:00 MET 57:20	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Bott. of Orbit
123	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
124 002/18:12:24 MET 34:33	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Begin ZDS: Southern Hemis

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

5-14

BLUE FD 4

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
125 002/18:34:36 MET 19:18:54	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
126 002/19:19:01 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: S. Hemis.
127 002/19:34:00 MET 48:34	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward Start ZDS at: Asc. Node
128	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
129 002/20:03:25 MET 47:43	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward Begin ZDS: Northern Hemis
130 002/20:47:50 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Nose Forward ZDS: S. Hemis.
131 002/21:16:00 MET 30:35	INRTL R=298.00 MNVR P=318.00 Y= 49.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 25 P 41	Star Pair B2 -Y: 49 -Z: 60	IMU Align
IMU: 131-134						
132 002/21:36:00 MET 49:49	TGT=2 BV=5 P= 90.00 Y=334.00 OM=180.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 0.00	Nose Forward Start ZDS at: Top of Orbit
* IMU *						
133	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
* IMU *						
134 002/21:54:26 MET 22:16:35	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward Begin ZDS: Northern Hemis
* IMU *						
135 002/22:16:38 MET 23:00:56	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward ZDS: S. Hemis.
136 002/23:01:03 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Nose Forward ZDS: N. Hemis.

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

5-15 BLUE FD 4 FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003
B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
137 002/23:20:00 MET 34:37	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward Start ZDS at: Desc. Node
138	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
139 002/23:45:27 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward Begin ZDS: Southern Hemis

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

5-16

BLUE FD 4

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
140	Following Trim Burn, reset ZDS			Trim TIG: 3/00:25	Trim Burn	
Trim: 140-142						
141 003/00:27:00 MET 03	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Start ZDS at: Asc. Node
142	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
* Trim *						
143 003/00:29:49 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward Begin ZDS: Northern Hemis
144 003/00:44:00 MET 49:57	TGT=2 BV=5 P= 90.00 Y=334.00 OM=180.00 * Reset DAP B10	A9 AUTO ALT3	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 0.00	Nose Forward Start ZDS at: Top of Orbit
* PRCS MNVR *						
145	When in att. A9/AUTO/VERN When in A9 DBs B10/AUTO/VERN					Collapse DB
146	When rates damp B11/AUTO/VERN					Load ZDS DSC RT
147 003/00:52:01 MET 01:14:10	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward Begin ZDS: Northern Hemis
148 003/01:15:00 MET 29:40	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Bott. of Orbit
149	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
150 003/01:36:25 MET 58:34	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Begin ZDS: Southern Hemis
151 003/01:58:37 MET 02:42:55	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.

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

5-17

RED FD 4

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
T52 003/02:43:01 MET 03:27:19	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
T53 003/03:27:25 MET 04:11:43	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
T54 003/04:11:49 MET 56:07	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
T55 003/04:56:13 MET 05:40:31	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
T56 003/05:40:37 MET 06:24:55	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
T57 003/06:25:01 MET 07:09:19	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
T58 003/07:09:25 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: S. Hemis.
T59 003/07:53:00 MET 56:21	TGT=2 BV=5 P= 90.00 Y= 14.00 OM= 0.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 14 P 90	LVLH R=346.00 P=180.00 Y= 0.00	Tail Forward SRL Nadir ZDS: None
T60	When in att. B10/AUTO/VERN					Collapse DB
T61 003/08:07:00 MET 10:20	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Top of Orbit
T62	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
T63 003/08:16:02 MET 38:11	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward Begin ZDS: Northern Hemis

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

5-18

RED FD 4

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
164 003/08:38:14 MET 09:22:32	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
165 003/09:22:38 MET 10:06:56	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
166 003/10:07:02 MET 51:20	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
167 003/10:51:26 MET 11:35:44	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
168 003/11:35:50 MET 12:20:08	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
169 003/12:20:11 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: N. Hemis.

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

5-19

RED FD 4

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
170 003/12:36:00 MET 50:34	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward Start ZDS at: Desc. Node
171	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
172 003/13:04:35 MET 48:53	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward Begin ZDS: Southern Hemis
173 003/13:48:59 MET 14:33:17	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward ZDS: N. Hemis.
174 003/14:33:22 MET 15:17:40	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward ZDS: S. Hemis.
175 003/15:17:46 MET 16:02:04	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward ZDS: N. Hemis.
176 003/16:02:10 MET 46:28	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward ZDS: S. Hemis.
177 003/16:46:34 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Nose Forward ZDS: N. Hemis.
178 003/17:26:00 MET 40:44	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Bott. of Orbit
179	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
180 003/17:53:10 MET 18:15:19	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Begin ZDS: Southern Hemis
181 003/18:15:21 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: N. Hemis.

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

5-20

BLUE FD 5

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
182 003/18:49:00 MET 54:56	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00 * PRCS MNVR * * Reset DAP B10	A9 AUTO ALT3	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward Start ZDS at: Desc. Node
183	When in att. A9/AUTO/VERN When in A9 DBs B10/AUTO/VERN					Collapse DB
184	When rates damp B11/AUTO/VERN					Load ZDS DSC RT
185 003/18:59:45 MET 19:44:03	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward Begin ZDS: Southern Hemis
186 003/19:44:09 MET 20:28:27	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward ZDS: N. Hemis
187 003/20:28:33 MET 21:12:51	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward ZDS: S. Hemis
188 003/21:12:56 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Nose Forward ZDS: N. Hemis
189 003/21:56:00 MET 22:06:25	INRTL R=126.00 MNVR P=303.00 Y= 44.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 218 P 47	Star Pair D1 -Y: 57 -Z: 55	IMU Align
IMU: 189-191						
190 003/22:16:00 MET 29:02	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00 * IMU * * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward Start ZDS at: Asc. Node
191	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN * IMU *					Collapse DB Load ZDS DSC RT
192 003/22:41:44 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Nose Forward Begin ZDS: Northern Hemis
193 003/22:56:00 MET 23:01:57	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00 * PRCS MNVR * * Reset DAP B10	A9 AUTO ALT3	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Top of Orbit

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

5-21 BLUE FD 5 FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP		E/S	REF ATT/REMARKS	EVENT
194	When in att. A9/AUTO/VERN When in A9 DBs B10/AUTO/VERN					Collapse DB
195	When rates damp B11/AUTO/VERN					Load ZDS DSC RT
196 003/23:03:56 MET 26:05	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward Begin ZDS: Northern Hemis
197 003/23:26:08 MET 004/00:10:26	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
198 004/00:10:28 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: N. Hemis.

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

5-22

BLUE FD 5

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
199 004/00:29:00 MET 34:56	TGT=2 BV=5 P= 90.00 Y=334.00 OM=181.50 * Reset DAP B10	A9 AUTO ALT3	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 1.50	Nose Forward ZDS: None Mid. Lat. Bias
* PRCs MNVR *						
200	When in att. A9/AUTO/VERN When in A9 DBs B10/AUTO/VERN					Collapse DB
201 004/00:53:00 MET 01:07:53	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Bott. of Orbit
202	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
203 004/01:17:03 MET 39:12	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Begin ZDS: Southern Hemis
204 004/01:39:15 MET 02:23:33	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
205 004/02:23:38 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: S. Hemis.
206	Following Trim Burn, reset ZDS				Trim TIG: 4/02:34	Trim Burn
Trim: 206-209						
207 004/02:36:00 MET 09	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Bott. of Orbit
* Trim *						
208	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
* Trim *						
209 004/02:45:50 MET 03:07:59	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Begin ZDS: Southern Hemis
* Trim *						
210 004/03:08:01 MET 52:19	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.

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

5-23

RED FD 5

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
211 004/03:52:25 MET 04:36:43	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
212 004/04:36:48 MET 05:21:06	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
213 004/05:21:11 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: S. Hemis.
214 004/06:03:00 MET 17:42	TGT=2 BV=5 P= 90.00 Y=334.00 OM=180.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 0.00	Nose Forward Start ZDS at: Top of Orbit
215	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
216 004/06:27:47 MET 49:56	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward Begin ZDS: Northern Hemis
217 004/06:55:00 MET 07:09:40	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Bott. of Orbit
218	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
219 004/07:12:10 MET 34:19	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Begin ZDS: Southern Hemis
220 004/07:34:22 MET 08:18:40	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
221 004/08:18:45 MET 09:03:03	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
222 004/09:03:08 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: N. Hemis.

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

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
223 004/09:20:00 MET 34:35	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward Start ZDS at: Desc. Node
224	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
225 004/09:47:32 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Nose Forward Begin ZDS: Southern Hemis
226 004/10:25:00 MET 39:46	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Top of Orbit
227	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
228 004/10:54:07 MET 11:16:16	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward Begin ZDS: Northern Hemis
229 004/11:16:18 MET 12:00:36	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
230 004/12:00:39 MET 44:57	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
231 004/12:45:02 MET 13:29:20	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.

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

5-25

RED FD 5

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
232 004/13:29:25 MET 14:13:43	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
233 004/14:13:47 MET 58:05	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
234 004/14:58:11 MET 15:42:29	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
235 004/15:42:33 MET 16:26:51	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
236 004/16:26:56 MET 17:11:14	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
237 004/17:11:19 MET 55:37	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
238 004/17:55:42 MET 18:40:00	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
239 004/18:40:05 MET 19:24:23	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
240 004/19:24:28 MET 20:08:46	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
241 004/20:10:00 MET 23:04	INRTL R=126.00 MNVR P=303.00 Y= 44.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 218 P 47	Star Pair D1 -Y: 57 -Z: 55	IMU Align
IMU: 241-243						
242 004/20:30:00 MET 43:39	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Start ZDS at: Asc. Node
* IMU *	* Reset DAP B10					
243	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
* IMU *						

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

5-26

BLUE FD 6

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
244 004/20:53:14 MET 21:37:32	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
245 004/21:37:37 MET 22:21:55	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
246 004/22:22:00 MET 23:06:18	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
247 004/23:06:23 MET 50:41	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
248 004/23:50:46 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: N. Hemis.
249 005/00:09:00 MET 14:56	TGT=2 BV=5 P= 90.00 Y=334.00 OM=181.50 * PRCS MNVR * * Reset DAP B10	A9 AUTO ALT3	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 1.50	Nose Forward ZDS: None Mid. Lat. Bias
250	When in att. A9/AUTO/VERN When in A9 DBs B10/AUTO/VERN					Collapse DB
251 005/00:46:00 MET 51:57	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00 * PRCS MNVR *	A9 AUTO ALT3	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Bott. of Orbit
252	When in att. A9/AUTO/VERN When in A9 DBs B10/AUTO/VERN					Collapse DB
253	When rates damp B11/AUTO/VERN					Load ZDS DSC RT
254 005/00:57:18 MET 01:19:27	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Begin ZDS: Southern Hemis

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

5-27

BLUE FD 6

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
255 005/01:19:29 MET 02:03:47	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
256 005/02:03:52 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: S. Hemis.
257	Following Trim Burn, reset ZDS				Trim TIG: 5/02:41	Trim Burn
Trim: 257-259						
258 005/02:43:00 MET 05	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Start ZDS at: Asc. Node
259	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
* Trim *						
260 005/02:48:14 MET 03:32:32	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
261 005/03:32:37 MET 04:16:55	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
262 005/04:17:00 MET 05:01:18	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
263 005/05:01:23 MET 45:41	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
264 005/05:46:00 MET 06:00:40	TGT=2 BV=5 P= 90.00 Y=334.00 OM=180.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 0.00	Nose Forward Start ZDS at: Top of Orbit
265	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
266 005/06:07:57 MET 30:06	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward Begin ZDS: Northern Hemis

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

5-28

RED FD 6

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
267 005/06:30:08 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Nose Forward ZDS: S. Hemis.
268 005/07:05:00 MET 08:20	TGT=2 BV=5 P= 90.00 Y= 14.00 OM=180.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 14 P 90	LVLH R=166.00 P= 0.00 Y= 0.00	Nose Forward SRL Nadir ZDS: None
269	When in att. B10/AUTO/VERN					Collapse DB
270 005/07:17:00 MET 32:00	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Top of Orbit
271	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
272 005/07:36:42 MET 58:51	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward Begin ZDS: Northern Hemis
273 005/07:58:53 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: S. Hemis.
274 005/08:40:00 MET 54:43	TGT=2 BV=5 P= 90.00 Y=334.00 OM=180.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 0.00	Nose Forward Start ZDS at: Top of Orbit
275	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
276 005/09:05:28 MET 27:37	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward Begin ZDS: Northern Hemis
277 005/09:27:39 MET 10:11:57	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward ZDS: S. Hemis.
278 005/10:12:02 MET 56:20	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward ZDS: N. Hemis.

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

5-29

RED FD 6

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
279 005/10:56:24 MET 11:40:42	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward ZDS: S. Hemis.
280 005/11:45:00 MET 59:40	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Top of Orbit
281	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
282 005/12:02:56 MET 25:05	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward Begin ZDS: Northern Hemis
283 005/12:25:06 MET 13:09:24	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
284 005/13:09:27 MET 53:45	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
285 005/13:53:49 MET 14:38:07	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.

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

5-30

RED FD 6

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
286 005/14:38:11 MET 15:22:29	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
287 005/15:22:33 MET 16:06:51	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
288 005/16:06:56 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: N. Hemis.
289 005/16:43:00 MET 46:20	TGT=2 BV=5 P= 90.00 Y= 14.00 OM= 0.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 14 P 90	LVLH R=346.00 P=180.00 Y= 0.00	Tail Forward SRL Nadir ZDS: None
290	When in att. B10/AUTO/VERN					Collapse DBs
291 005/16:57:00 MET 17:00:20	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Bott. of Orbit
292	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DBs Load ZDS DSC RT
293 005/17:13:29 MET 35:38	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Begin ZDS: Southern Hemis
294 005/17:35:40 MET 18:19:58	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
295 005/18:20:02 MET 19:04:20	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
296 005/19:04:25 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: N. Hemis.
297 005/19:42:00 MET 45:20	TGT=2 BV=5 P= 90.00 Y= 14.00 OM= 0.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 14 P 90	LVLH R=346.00 P=180.00 Y= 0.00	Tail Forward SRL Nadir ZDS: None

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

5-31

BLUE FD 7

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
298	When in att. B10/AUTO/VERN				Collapse DBs	
299 005/19:55:00 MET 58:20	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Bott. of Orbit
300	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN				Collapse DBs Load ZDS DSC RT	
301 005/20:10:58 MET 33:07	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Begin ZDS: Southern Hemis
302 005/20:33:09 MET 21:17:27	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
303 005/21:17:31 MET 22:01:49	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
304 005/22:01:54 MET 46:12	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
305 005/22:46:16 MET 23:30:34	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
306 005/23:30:38 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: N. Hemis.
307 005/23:48:00 MET 53:50	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	A9 AUTO ALT3	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward Start ZDS at: Desc. Node
* PRCS MNVR *	* Reset DAP B10					
308	When in att. A9/AUTO/VERN When in A9 DBs B10/AUTO/VERN				Collapse DBs	
309	When rates damp B11/AUTO/VERN				Load ZDS DSC RT	

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

5-32

BLUE FD 7

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
310 006/00:14:57 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Nose Forward Begin ZDS: Southern Hemis
311 006/00:28:00 MET 34:53	INRTL R=312.00 MNVR P=151.00 Y= 43.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 158 P 114	Star Pair A1 -Y: 51 -Z: 20	IMU Align
IMU: 311-313						
312 006/00:40:00 MET 52:39	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Start ZDS at: Asc. Node
313	* IMU *					
	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DBs Load ZDS DSC RT
314 006/00:59:19 MET 01:43:37	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward Begin ZDS: Northern Hemis
315 006/01:43:41 MET 02:27:59	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.

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

5-33

BLUE FD 7

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	HNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
316 006/02:28:03 MET 03:12:21	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
317 006/03:12:24 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: S. Hemis.
318	Following Trim Burn, reset ZDS				Trim TIG: 6/03:21	Trim Burn
Trim: 318-321						
319 006/03:23:00 MET 10	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Bott. of Orbit
* Trim * * Reset DAP B10						
320	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DBs Load ZDS DSC RT
* Trim *						
321 006/03:34:35 MET 56:44	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Begin ZDS: Southern Hemis
* Trim *						
322 006/03:56:47 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: N. Hemis.
323 006/04:36:00 MET 50:45	TGT=2 BV=5 P= 90.00 Y=334.00 OM=180.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 0.00	Nose Forward Start ZDS at: Bott. of Orbit
* Reset DAP B10						
324	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DBs Load ZDS DSC RT
325 006/05:03:19 MET 25:28	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward Begin ZDS: Southern Hemis
326 006/05:25:30 MET 06:09:48	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward ZDS: N. Hemis.
327 006/06:09:52 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Nose Forward ZDS: S. Hemis.

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

5-34

RED FD 7

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
328 006/06:44:00 MET 49:56	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00 * PRCS MNVR * * Reset DAP B10	A9 AUTO ALT3	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Start ZDS at: Asc. Node
329	When in att. A9/AUTO/VERN When in A9 DBs B10/AUTO/VERN					Collapse DBs
330	When rates damp B11/AUTO/VERN					Load ZDS DSC RT
331 006/06:54:14 MET 07:38:32	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward Begin ZDS: Northern Hemis
332 006/07:38:36 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: S. Hemis.
333 006/08:11:00 MET 25:51	TGT=2 BV=5 P= 90.00 Y= 14.00 OM=180.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 14 P 90	LVLH R=166.00 P= 0.00 Y= 0.00	Nose Forward SRL Nadir ZDS: None
334	When in att. B10/AUTO/VERN					Collapse DBs
335 006/08:34:00 MET 37:20	TGT=2 BV=5 P= 90.00 Y=334.00 OM=180.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 0.00	Nose Forward Start ZDS at: Top of Orbit
336	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DBs Load ZDS DSC RT
337 006/08:45:08 MET 09:07:17	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward Begin ZDS: Northern Hemis
338 006/09:07:20 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Nose Forward ZDS: S. Hemis.
339 006/09:50:00 MET 10:04:41	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Top of Orbit

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

5-35

RED FD 7

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003
B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
340	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN				Collapse DB Load ZDS DSC RT	
341 006/10:13:52 MET 36:01	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward Begin ZDS: Northern Hemis
342 006/10:36:03 MET 11:20:21	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
343 006/11:20:25 MET 12:04:43	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
344 006/12:04:44 MET 49:02	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
345 006/12:49:04 MET 13:33:22	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
346 006/13:33:26 MET 14:17:44	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
347 006/14:17:47 MET 15:02:05	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
348 006/15:02:09 MET 46:27	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.

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

5-36

RED FD 7

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
349 006/15:46:30 MET 16:30:48	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
350 006/16:30:51 MET 17:15:09	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
351 006/17:15:13 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: N. Hemis.
352 006/17:50:00 MET 53:20	TGT=2 BV=5 P= 90.00 Y= 14.00 OM= 0.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 14 P 90	LVLH R=346.00 P=180.00 Y= 0.00	Tail Forward SRL Nadir ZDS: None
353	When in att. B10/AUTO/VERN					Collapse DB
354 006/18:03:00 MET 06:20	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Bott. of Orbit
355	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
356 006/18:21:46 MET 43:55	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Begin ZDS: Southern Hemis
357 006/18:43:56 MET 19:28:14	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
358 006/19:28:17 MET 20:12:35	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
359 006/20:12:39 MET 56:57	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
360 006/20:57:00 MET 21:41:18	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.

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

5-37 BLUE FD 8 FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
361 006/21:41:21 MET 22:25:39	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
362 006/22:25:43 MET 23:10:01	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
363 006/23:10:04 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: N. Hemis.
364 006/23:30:00 MET 35:51	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00 * PRCS MNVR * * Reset DAP B10	A9 AUTO ALT3	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward Start ZDS at: Desc. Node
365	When in att. A9/AUTO/VERN When in A9 DBs B10/AUTO/VERN					Collapse DB
366	When rates damp B11/AUTO/VERN					Load ZDS DSC RT
367 006/23:54:26 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Nose Forward Begin ZDS: Southern Hemis
368 007/00:03:00 MET 08:22	INRTL R=312.00 MNVR P=151.00 Y= 43.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 157 P 113	Star Pair A1 -Y: 51 -Z: 20	IMU Align
IMU: 368						
369 007/00:18:00 MET 30:45	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Start ZDS at: Asc. Node
370	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
371 007/00:38:44 MET 01:23:02	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward Begin ZDS: Northern Hemis
372 007/01:23:05 MET 02:07:23	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.

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

5-38

BLUE FD 8

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP		E/S	REF ATT/REMARKS	EVENT
373 007/02:07:26 MET 51:44	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
374 007/02:51:47 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: S. Hemis.

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

5-39

BLUE FD 8

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
375	Following Trim Burn, reset ZDS			Trim TIG: 7/03:11	Trim Burn	
Trim: 375-378						
376 007/03:12:00 MET 02	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Bott. of Orbit
* Trim *						
377	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN				Collapse DB Load ZDS DSC RT	
* Trim *						
378 007/03:13:58 MET 36:07	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Begin ZDS: Southern Hemis
* Trim *						
379 007/03:36:08 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: N. Hemis.
* PRCS MNVR *						
380 007/04:11:00 MET 16:57	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00 * Reset DAP B10	A9 AUTO ALT3	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward Start ZDS at: Desc. Node
* PRCS MNVR *						
381	When in att. A9/AUTO/VERN When in A9 DBs B10/AUTO/VERN				Collapse DB	
382	When rates damp B11/AUTO/VERN				Load ZDS DSC RT	
383 007/04:20:29 MET 05:04:47	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward Begin ZDS: Southern Hemis
384 007/05:04:50 MET 49:08	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward ZDS: N. Hemis.
385 007/05:49:10 MET 06:33:28	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward ZDS: S. Hemis.
386 007/06:33:32 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Nose Forward ZDS: N. Hemis.

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

5-40

RED FD 8

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
387 007/06:48:00 MET 53:57	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00 * Reset DAP B10	A9 AUTO ALT3	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Top of Orbit
388	When in att. A9/AUTO/VERN When in A9 DBs B10/AUTO/VERN					Collapse DB
389	When rates damp B10/AUTO/VERN					Load ZDS DSC RT
390 007/06:55:43 MET 07:17:52	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward Begin ZDS: Northern Hemis
391 007/07:17:53 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: S. Hemis.
392 007/08:00:00 MET 14:42	TGT=2 BV=5 P= 90.00 Y=334.00 OM=180.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 0.00	Nose Forward Start ZDS at: Top of Orbit
393	When in att: B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
394 007/08:24:25 MET 46:34	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward Begin ZDS: Northern Hemis
395 007/08:46:35 MET 09:30:53	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward ZDS: S. Hemis.
396 007/09:30:56 MET 10:15:14	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward ZDS: N. Hemis.
397 007/10:15:17 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Nose Forward ZDS: S. Hemis.
398 007/10:40:00 MET 54:42	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Start ZDS at: Asc. Node

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

5-41

RED FD 8

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
399	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN				Collapse DB Load ZDS DSC RT	
400 007/10:59:38 MET 11:43:56	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward Begin ZDS: Northern Hemis
401 007/11:43:58 MET 12:28:16	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
402 007/12:28:17 MET 13:12:35	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
403 007/13:12:37 MET 56:55	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
404 007/13:56:57 MET 14:41:15	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
405 007/14:41:18 MET 15:25:36	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.

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

5-42

RED FD 8

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
406 007/15:25:39 MET 16:09:57	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
407 007/16:09:59 MET 54:17	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
408 007/16:54:20 MET 17:38:38	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
409 007/17:38:40 MET 18:22:58	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
410 007/18:23:01 MET 19:07:19	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
411 007/19:07:21 MET 51:39	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
412 007/19:51:42 MET 20:36:00	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
413 007/20:36:03 MET 21:20:21	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
414 007/21:20:23 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: N. Hemis.
415 007/22:04:00 MET 18:41	TGT=2 BV=5 P= 90.00 Y=334.00 OM=180.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 0.00	Nose Forward Start ZDS at: Bott. of Orbit
416	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
417 007/22:26:54 MET 49:03	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward Begin ZDS: Southern Hemis

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

5-43

BLUE FD 9

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
418 007/22:49:05 MET 23:33:23	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward ZDS: N. Hemis.
419 007/23:33:25 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Nose Forward ZDS: S. Hemis.
420 007/23:44:00 MET 49:56	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00 * PRCS MVNR * * Reset DAP B10	A9 AUTO ALT3	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Bott. of Orbit
421	When in att. A9/AUTO/VERN When in A9 DBs B10/AUTO/VERN					Collapse DB
422	When rates damp B11/AUTO/VERN					Load ZDS DSC RT
423 007/23:55:35 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward Begin ZDS: Southern Hemis
424 008/00:17:42 MET 01:01:59	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
425 008/01:10:00 MET 21:46	INRTL R=312.00 MNVR P=151.00 Y= 43.00 IMU: 425-427	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 157 P 112	Star Pair A1 -Y: 51, -Z: 20 COAS star: 20, Arcturus	IMU Align -Z COAS Cal
426 008/01:37:00 MET 42:28	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00 * IMU/COAS *	A9 AUTO ALT3	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward ZDS: None
427	When in att. A9/AUTO/VERN When in A9 DBs B10/AUTO/VERN * IMU/COAS *					Collapse DB

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

5-44

BLUE FD 9

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
428 008/02:30:00 MET	FCS Checkout				Tail Forward ZDS: None	
429 008/03:50:00 MET	RCS Hotfire				Tail Forward ZDS: None	
430 008/04:05:00 MET 20:00	TGT=2 BV=5 P= 90.00 Y=334.00 OM=180.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 0.00	Nose Forward Start ZDS at: Bott. of Orbit
431	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN				Collapse DB Load ZDS DSC RT	
432 008/04:21:33 MET 43:42	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward Begin ZDS: Southern Hemis
433 008/04:43:43 MET 05:28:01	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward ZDS: N. Hemis.
434 008/05:28:03 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Nose Forward ZDS: S. Hemis.
435	Following trim burn, reset ZDS				Trim TIG: 8/06:06	Trim Burn
Trim: 435-437						
436 008/06:08:00 MET 04	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00 * Trim * * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward Start ZDS at: Asc. Node
437	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN * Trim *					Collapse DB Load ZDS DSC RT
438 008/06:12:23 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Nose Forward Begin ZDS: Northern Hemis
439 008/06:26:00 MET 31:57	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 0.00 * PRCS MNVR * * Reset DAP B10	A9 AUTO ALT3	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 0.00	Tail Forward Start ZDS at: Top of Orbit

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

5-45

RED FD 9

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAF	E/S	REF ATT/REMARKS	EVENT	
440	When in att. A9/AUTO/VERN When in A9 DBs B10/AUTO/VERN				Collapse DB	
441	When rates damp B10/AUTO/VERN				Load ZDS DSC RT	
442 008/06:34:34 MET 56:43	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward Begin ZDS: Northern Hemis
443 008/06:56:43 MET 07:41:01	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
444 008/07:41:04 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Tail Forward ZDS: N. Hemis.
445 008/08:01:00 MET 06:51	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00 * PRCS MNVR * * Reset DAP B10	A9 AUTO ALT3	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward Start ZDS at: Desc. Node
446	When in att. A9/AUTO/VERN When in A9 DBs B10/AUTO/VERN				Collapse DB	
447	When rates damp B10/AUTO/VERN				Load ZDS DSC RT	
448 008/08:25:24 MET 09:09:42	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward Begin ZDS: Southern Hemis
449 008/09:09:44 MET 54:02	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward ZDS: N. Hemis.
450 008/09:54:04 MET 10:38:22	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y=356.00	Nose Forward ZDS: S. Hemis.
451 008/10:38:24 MET 11:22:42	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward ZDS: N. Hemis.

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

5-46

RED FD 9

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
452 008/11:22:44 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Nose Forward ZDS: S. Hemis.
453 008/11:49:00 MET 54:50	INRTL R=320.00 MNVR P=333.00 Y=300.00	A9 AUTO ALT3	DSC 0.500 DB AT 3.00 DB RT 0.20	SUN R 115 P 84	Star Pair A2 -Y: 20 -Z: 51	IMU Align
IMU: 453-457						
454 008/12:00:00 MET 43	INRTL R=334.00 MNVR P=348.00 Y=295.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 115 P 88	HUD Star: 22, Altair Sunrise 8/12:18	HUD Cal
* IMU/HUD *						
455 008/12:14:00 MET 26:08	TGT=2 BV=5 P= 90.00 Y=334.00 OM=180.00 * Reset DAP B10	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 0.00	Nose Forward Start ZDS at: Top of Orbit
* IMU/HUD *						
456	When in att. B10/AUTO/VERN When rates damp B11/AUTO/VERN					Collapse DB Load ZDS DSC RT
* IMU/HUD *						
457 008/12:29:12 MET 51:21	TGT=2 BV=5 P= 90.00 Y=334.00 OM=184.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R=206.00 P= 0.00 Y= 4.00	Nose Forward Begin ZDS: Northern Hemis
* IMU *						
458 008/12:51:21 MET	TGT=2 BV=5 P= 90.00 Y=334.00 OM=176.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01			Nose Forward ZDS: S. Hemis.
459 008/13:22:00 MET 27:55	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00 * Reset DAP B10	A9 AUTO ALT3	DSC 0.500 DB AT 3.00 DB RT 0.20	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward Start ZDS at: Asc. Node
* PRCS MNVR *						
460	When in att. A9/AUTO/VERN When in A9 DBs B10/AUTO/VERN					Collapse DB
461	When rates damp B11/AUTO/VERN					Load ZDS DSC RT
462 008/13:35:41 MET 14:19:59	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward Begin ZDS: Northern Hemis
463 008/14:20:01 MET 15:04:19	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.

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

5-47

RED FD 9

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP		E/S	REF ATT/REMARKS	EVENT
464 008/15:04:21 MET 48:39	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
465 008/15:48:40 MET 16:32:58	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.

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

5-48

RED FD 9

FLT PLN/59/FIN

SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003

B11 to B10: Item 17 + 0.04

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REF ATT/REMARKS	EVENT	
466 008/16:33:00 MET 17:17:18	TGT=2 BV=5 P= 90.00 Y=334.00 OM= 4.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y=356.00	Tail Forward ZDS: N. Hemis.
467 008/17:17:20 MET 18:01:38	TGT=2 BV=5 P= 90.00 Y=334.00 OM=356.00	B11 AUTO VERN	DSC 0.003 DB AT 0.10 DB RT 0.01	EARTH R 334 P 90	LVLH R= 26.00 P=180.00 Y= 4.00	Tail Forward ZDS: S. Hemis.
468 008/18:15:00 MET 22:26	TGT=2 BV=3 P= 90.00 Y= 0.00 OM=270.00	A9 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH R 360 P 90	LVLH R= 0.00 P=180.00 Y= 90.00	-ZLV Nose South SRL Deact
469 008/23:55:00 MET 009/00:09:33	TGT=4 RA= 23.781 BV=5 DEC= 9.920N P=195.00 Y=350.00 OM= 90.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN R 214 P 162	INRTL R= 41.87 P=164.56 Y=319.06	-XSI Radiator Coldsoak Biased for comm
470 009/01:15:00 MET 27:40	INRTL R=260.00 MNVR P=317.00 Y= 1.00	A1 AUTO PRI	DSC 0.200 DB AT 5.00 DB RT 0.20	SUN R 138 P 38	Star Pair: -Y: 44 -Z: 43	Deorbit Align
471 009/01:35:00 MET 39:55	INRTL R=344.00 MNVR P=151.00 Y=294.00	B1 AUTO PRI	DSC 0.500 DB AT 3.00 DB RT 0.20	SUN R 262 P 136	Star Pair: -Y: 60 -Z: 49	Deorbit Verif
472 009/01:50:00 MET 52:35	INRTL R= 29.00 MNVR P=118.00 Y=318.00	B1 AUTO PRI	DSC 0.500 DB AT 3.00 DB RT 0.20	SUN R 158 P 134		Deorbit Comm
473 009/03:57:00 MET 04:01:02	INRTL R=135.00 MNVR P= 95.00 Y=359.00	TRN AUTO PRI	DSC 0.500 DB AT 3.50 DB RT 0.20	SUN R 21 P 105	Deorbit TIG: 9/04:12:30	Deorbit Burn

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

5-49 BLUE FD 10 & EOM FLT PLN/59/FIN

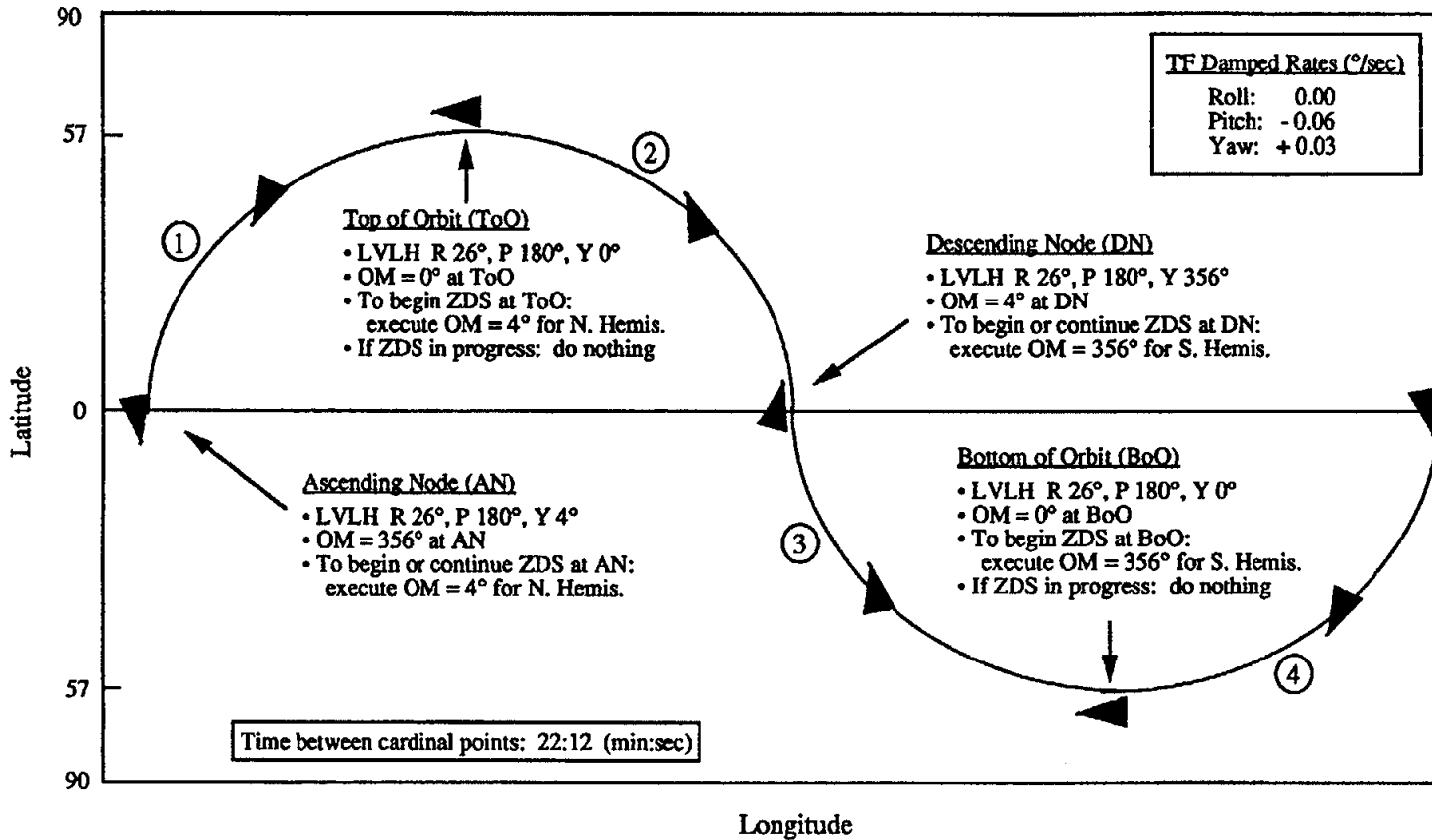
SRL-ZDS DAP B10/B11 Changes

GNC 20 DAP CONFIG

B10 to B11: Item 17 + 0.003
B11 to B10: Item 17 + 0.04

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STS-59 Zero Doppler Steering (ZDS): Cardinal Points and Omicrons
TAIL FORWARD ATTITUDE (+26° Roll-biased -ZLV -XVV)



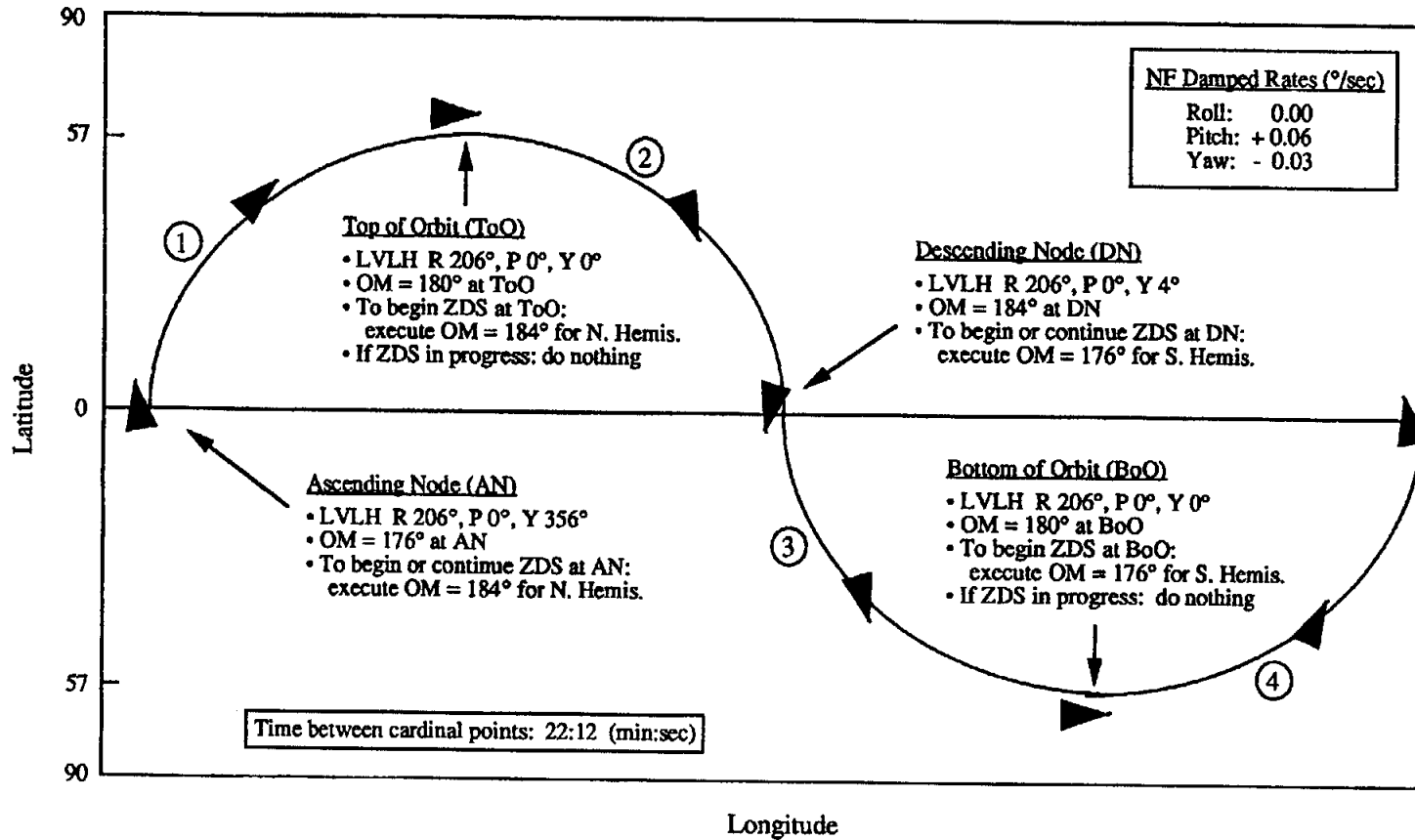
- ① If mnvr to TF finishes between AN and ToO: exec 0° OM on A9, collapse DB & begin ZDS at ToO.
- ② If mnvr to TF finishes between ToO and DN: exec 4° OM on A9, collapse DB & begin ZDS at DN.
- ③ If mnvr to TF finishes between DN and BoO: exec 0° OM on A9, collapse DB & begin ZDS at BoO.
- ④ If mnvr to TF finishes between BoO and AN: exec 356° OM on A9, collapse DB & begin ZDS at AN.

DAP Strategy with Verniers:

Mnvr Nose/Tail: A9/Vern or ALT3
 Collapse DB: B10/Vern (0.04 °/sec)
 Perform ZDS: B11/Vern (0.003 °/sec)

(Note: B10 and B11 only differ in their discrete rates; both have SRL's 0.1° att db & 0.01°/sec rate db.)

STS-59 Zero Doppler Steering (ZDS): Cardinal Points and Omicrons
 NOSE FORWARD ATTITUDE (+26° Roll-biased -ZLV +XVV)



- ① If mnvr to NF finishes between AN and ToO: exec 180° OM on A9, collapse DB & begin ZDS at ToO.
- ② If mnvr to NF finishes between ToO and DN: exec 184° OM on A9, collapse DB & begin ZDS at DN.
- ③ If mnvr to NF finishes between DN and BoO: exec 180° OM on A9, collapse DB & begin ZDS at BoO.
- ④ If mnvr to NF finishes between BoO and AN: exec 176° OM on A9, collapse DB & begin ZDS at AN.

DAP Strategy with Verniers:

Mnvr Nose/Tail: A9/Vern or ALT3
 Collapse DB: B10/Vern (0.04 °/sec)
 Perform ZDS: B11/Vern (0.003 °/sec)

(Note: B10 and B11 only differ in their discrete rates; both have SRL's 0.1° att db & 0.01°/sec rate db.)

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

STS-59 DAP BOOK

DAP A CONFIGURATIONS

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

*I-LOADED OPS-2 DAP Configuration

DAP B CONFIGURATIONS

	ITEM #	B1*	B2	B3	B4	B5	B6	B7	B8	B10	B11	B15
TRANSLATION												
PULSE ft/sec	15	0.10	0.10	0.10	0.10	0.10		0.05	0.01	0.10	0.10	0.10
ROTATION												
DSC RT NORM °/sec	16	0.500	0.200	0.200	0.200	0.200		0.500	0.200	0.200	0.200	0.200
VERN °/sec	17	0.200	0.200	0.200	0.008	0.016		0.200	0.200	0.040	0.003	0.040
PULSE NORM °/sec	18	0.04	0.04	0.04	0.04	0.04		0.04	0.04	0.04	0.04	0.04
VERN °/sec	19	0.002	0.002	0.002	0.002	0.002		0.002	0.002	0.002	0.002	0.002
COMP NORM °/sec	20	.00	.00	.00	.00	.00		.00	.00	.00	.00	.00
VERN °/sec	21	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000
DEADBAND												
ATT NORM (deg)	22	3.00	3.00	3.00	0.30	3.00		2.00	2.00	2.00	2.00	1.00
VERN (deg)	23	1.000	1.000	1.000	0.100	0.033		1.000	1.000	0.100	0.100	0.100
RATE NORM °/sec	24	0.20	0.20	0.20	0.20	0.20		0.20	0.20	0.20	0.20	0.20
VERN °/sec	25	.020	.020	.020	.010	.020		.020	.020	.010	.010	.010
JET OPT												
P	26	1	3	1	3	3		1 or 3	1	3	3	3
Y	27	1	3	1	3	3		1 or 3	1	3	3	3
CNTL ACCEL	28	0	0	0	0	0		0	0	0	0	0

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

ALT DAP CONFIGURATIONS

	ITEM #	ALT1*	ALT2	ALT3
RATE DEADBAND	32	0.200	0.070	0.100
JET OPTION	33	1	1 or 3	3
NUMBER OF JETS	34	2	1	2
ON TIME	35	0.08	0.08	0.08
DELAY	36	0.00	0.00	0.00

*I-LOADED OPS-2 DAP Configuration

<u>DAP</u>	<u>PURPOSE</u>	<u>DAP</u>	<u>PURPOSE</u>
A1	- NOMINAL IMU ALIGN LOSS OF VERN (NOSE & TAIL)	B1	- NOMINAL PRCS IMU ALIGN OMS & RCS BURNS
A2	- PTC	B2	- LOSS OF VERN (TAIL ONLY)
A3	- GG	B3	- LOSS OF VERN (NOSE & TAIL) GG MNVR
A4	- PRE/POST DEPLOY	B4	- SSUS DEPLOY
A5	- (Blank)	B5	- COAS CAL
A6	- LOSS OF VERN (TAIL ONLY)	B6	- (Blank)
A7	- RENDEZVOUS	B7	- RENDEZVOUS
A8	- PROX OPS	B8	- PROX OPS
A9	- SRL MNVRS STS-59 IMU ALIGN	B10	- ZDS DB COLLAPSE SRL LOSS OF VERN (YAW BIASED)
		B11	- ZDS SLOW MNVRS
		B15	- SRL LOSS OF VERN (NON-YAW BIASED)

FLT PLN-1a/59/O/B

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FLT PLN-1b/59/O/A

(reduced copy)



DAP A

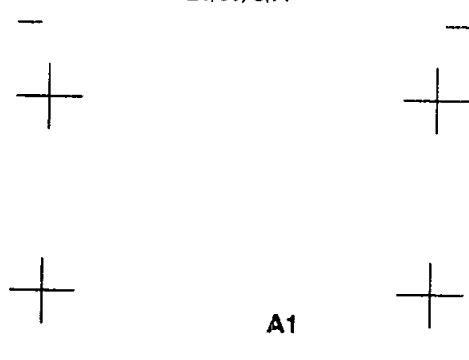
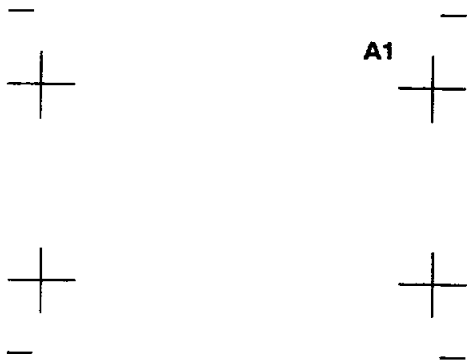
DAP A1

PURPOSE:

NOMINAL
IMU ALIGN
LOSS OF VERN
(NOSE & TAIL)

FLT PLN-2a/59/O/A

FLT PLN-2b/59/O/A



A1

DAP A2

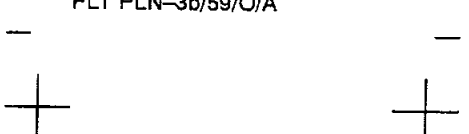
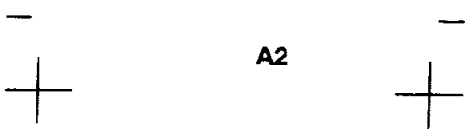
PURPOSE:

PTC

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

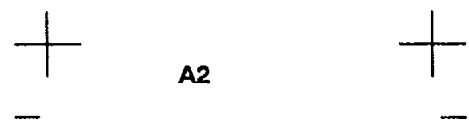
FLT PLN-3a/59/O/A

FLT PLN-3b/59/O/A



A2

(reduced copy)



A2

A2

DAP A3

0.10 1 TRANSLATION PULSE

ROTATION

0.400 2 DSC RT NORM

0.400 3 VERN

0.10 4 PULSE NORM

0.010 5 VERN

.00 6 COMP NORM

.000 7 VERN

DEADBAND

-1.00 8 ATT NORM

-1.000 9 VERN

0.20 10 RATE NORM

.020 11 VERN

1 12 JET OPT P

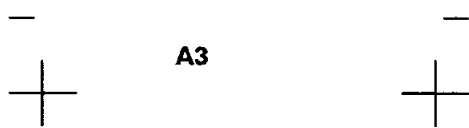
1 13 Y

0 14 CNTL ACCEL

PURPOSE:
GG

FLT PLN-4a/59/O/A

FLT PLN-4b/59/O/A



A3



A3

0.10 1 TRANSLATION PULSE

ROTATION

0.200 2 DSC RT NORM

0.008 3 VERN

0.10 4 PULSE NORM

0.010 5 VERN

.00 6 COMP NORM

.000 7 VERN

DEADBAND

-1.00 8 ATT NORM

-0.070 9 VERN

0.20 10 RATE NORM

.010 11 VERN

1 12 JET OPT P

3 13 Y

0 14 CNTL ACCEL

DAP A4

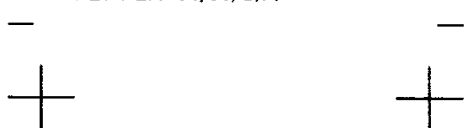
PURPOSE:
PRE/POST DEPLOY

FLT PLN-5a/59/O/A

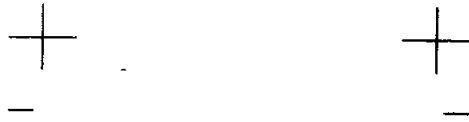
FLT PLN-5b/59/O/A



A4



(reduced copy)



A4

0.1 0 1 TRANSLATION PULSE

ROTATION

0.5 0 0 2 DSC RT NORM

0.2 0 0 3 VERN

0.1 0 4 PULSE NORM

0.0 1 0 5 VERN

.0 0 6 COMP NORM

.0 0 0 7 VERN

DEADBAND

.3 0 0 8 ATT NORM

.1 0 0 0 9 VERN

0.2 0 10 RATE NORM

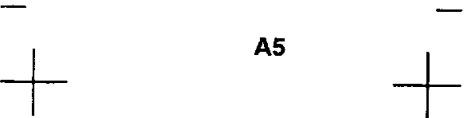
.0 2 0 11 VERN

1 12 JET OPT P

1 13 Y

0 14 CNTL ACCEL

FLT PLN-6a/59/O/A



A5



A5

--- 1 TRANSLATION PULSE

ROTATION

--- 2 DSC RT NORM

--- 3 VERN

--- 4 PULSE NORM

--- 5 VERN

--- 6 COMP NORM

--- 7 VERN

DEADBAND

--- 8 ATT NORM

--- 9 VERN

--- 10 RATE NORM

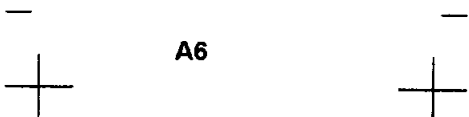
--- 11 VERN

- 12 JET OPT P

- 13 Y

- 14 CNTL ACCEL

FLT PLN-7a/59/O/A



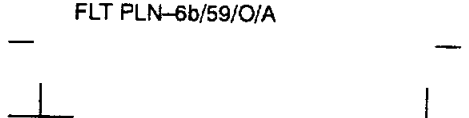
A6



A4

DAP A5

PURPOSE:
(Blank)



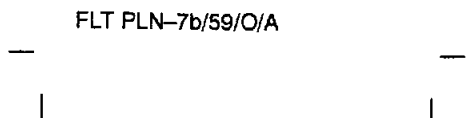
FLT PLN-6b/59/O/A



A5

DAP A6

PURPOSE:
LOSS OF VERN
(TAIL ONLY)



FLT PLN-7b/59/O/A

(reduced copy)



A6

DAP A7

0.10 1 TRANSLATION PULSE

ROTATION

0.200 2 DSC RT NORM
 0.200 3 VERN
 0.10 4 PULSE NORM
 0.010 5 VERN
 .00 6 COMP NORM
 .000 7 VERN

DEADBAND

5.00 8 ATT NORM
 1.000 9 VERN

0.20 10 RATE NORM
 .020 11 VERN

3 12 JET OPT P
 3 13 Y

0 14 CNTL ACCEL

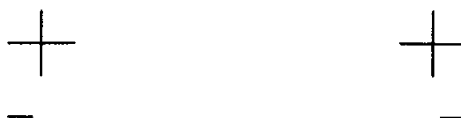
PURPOSE:
RENDEZVOUS

FLT PLN-8a/59/O/A

FLT PLN-8b/59/O/A



A7



A7

DAP A8

0.10 1 TRANSLATION PULSE

ROTATION

0.200 2 DSC RT NORM
 0.200 3 VERN
 0.10 4 PULSE NORM
 0.010 5 VERN
 .00 6 COMP NORM
 .000 7 VERN

DEADBAND

2.00 8 ATT NORM
 1.000 9 VERN

0.20 10 RATE NORM
 .020 11 VERN

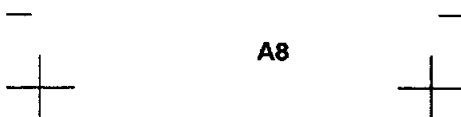
1 or 3 12 JET OPT P
 1 or 3 13 Y

0 14 CNTL ACCEL

PURPOSE:
PROX OPS

FLT PLN-9a/59/O/A

FLT PLN-9b/59/O/A



A8



(reduced copy)



A8

0.05 1 TRANSLATION PULSE

ROTATION

0.200 2 DSC RT NORM

0.200 3 VERN

0.10 4 PULSE NORM

0.010 5 VERN

.00 6 COMP NORM

-0.00 7 VERN

DEADBAND

-2.00 8 ATT NORM

-1.000 9 VERN

0.20 10 RATE NORM

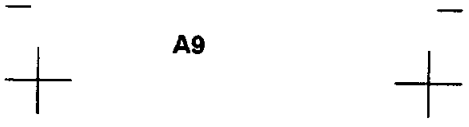
.020 11 VERN

1 12 JET OPT P

1 13 Y

0 14 CNTL ACCEL

FLT PLN-10a/59/O/A



A9



A9

0.10 1 TRANSLATION PULSE

ROTATION

0.500 2 DSC RT NORM

0.200 3 VERN

0.10 4 PULSE NORM

0.010 5 VERN

.00 6 COMP NORM

-0.00 7 VERN

DEADBAND

-3.00 8 ATT NORM

-1.000 9 VERN

0.20 10 RATE NORM

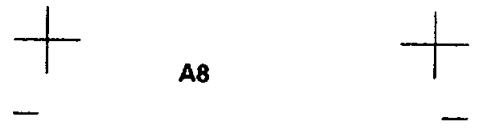
.020 11 VERN

3 12 JET OPT P

3 13 Y

0 14 CNTL ACCEL

FLT PLN-11a/59/O/A

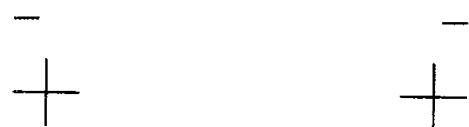


A8

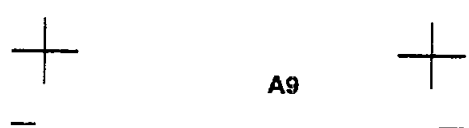
DAP A9

PURPOSE:

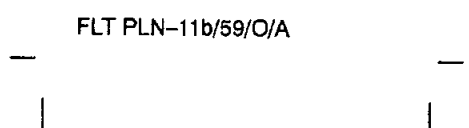
SRL MNVRS
STS-59 IMU ALIGN



FLT PLN-10b/59/O/A



A9



FLT PLN-11b/59/O/A

(reduced copy)



DAP B



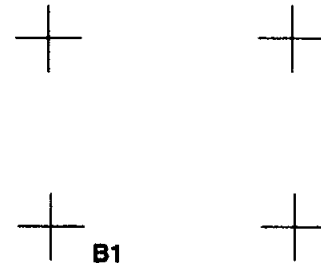
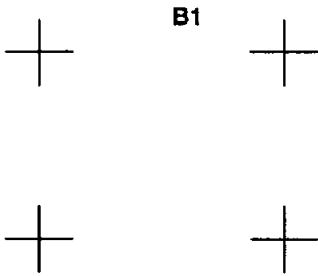
DAP B1

PURPOSE:

NOMINAL
PRCS IMU ALIGN
OMS & RCS
BURNS

FLT PLN-12a/59/O/A

FLT PLN-12b/59/O/A



B1

DAP B2

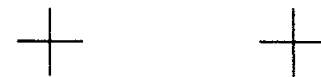
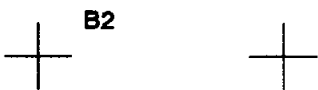
PURPOSE:

LOSS OF VERN
(TAIL ONLY)

15	<u>0.1 0</u>
16	<u>0.5 0 0</u>
17	<u>0.2 0 0</u>
18	<u>0.0 4</u>
19	<u>0.0 0 2</u>
20	<u>.0 0</u>
21	<u>.0 0 0</u>
22	<u> 3.0 0</u>
23	<u>-1.0 0 0</u>
24	<u>0.2 0</u>
25	<u>.0 2 0</u>
26	<u> 1</u>
27	<u> 1</u>
28	<u> 0</u>

FLT PLN-13a/59/O/A

FLT PLN-13b/59/O/A



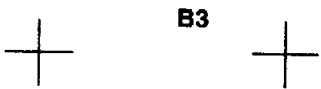
(reduced copy)



B2

15	0.1 0
16	0.2 0 0
17	0.2 0 0
18	0.0 4
19	0.0 0 2
20	.0 0
21	.0 0 0
22	_ 3.0 0
23	- 1.0 0 0
24	0.2 0
25	.0 2 0
26	3
27	3
28	0

FLT PLN-14a/59/O/A



B3



B3

15	0.1 0
16	0.2 0 0
17	0.2 0 0
18	0.0 4
19	0.0 0 2
20	.0 0
21	.0 0 0
22	_ 3.0 0
23	- 1.0 0 0
24	0.2 0
25	.0 2 0
26	1
27	1
28	0

FLT PLN-15a/59/O/A



B4



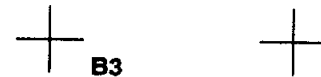
B2

DAP B3

PURPOSE:

LOSS OF VERN
(NOSE & TAIL)
GG MNVR

FLT PLN-14b/59/O/A



B3

DAP B4

PURPOSE:

SSUS DEPLOY

FLT PLN-15b/59/O/A



(reduced copy)



B4

15	<u>0.1 0</u>
16	<u>0.2 0 0</u>
17	<u>0.0 0 8</u>
18	<u>0.0 4</u>
19	<u>0.0 0 2</u>
20	<u>.0 0</u>
21	<u>.0 0 0</u>
22	<u>- 0.3 0</u>
23	<u>- 0.1 0 0</u>
24	<u>0.2 0</u>
25	<u>.0 1 0</u>
26	<u>3</u>
27	<u>3</u>
28	<u>0</u>

FLT PLN-16a/59/O/A



B5



B5

15	<u>0.1 0</u>
16	<u>0.2 0 0</u>
17	<u>0.0 1 6</u>
18	<u>0.0 4</u>
19	<u>0.0 0 2</u>
20	<u>.0 0</u>
21	<u>.0 0 0</u>
22	<u>- 3.0 0</u>
23	<u>- 0.0 3 3</u>
24	<u>0.2 0</u>
25	<u>.0 2 0</u>
26	<u>3</u>
27	<u>3</u>
28	<u>0</u>

FLT PLN-17a/59/O/A



B6



B4

DAP B5

PURPOSE:
COAS CAL

FLT PLN-16b/59/O/A



B5

DAP B6

PURPOSE:
(Blank)

FLT PLN-17b/59/O/A



(reduced copy)



B6

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

FLT PLN-18a/59/O/A



B6

DAP B7

PURPOSE:
RENDEZVOUS



B7



B7

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

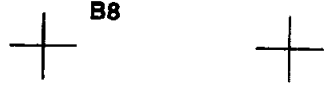
FLT PLN-19a/59/O/A



B7

DAP B8

PURPOSE:
PROX OPS



B8



(reduced copy)

FLT PLN-19b/59/O/A

FLT PLN/59/FIN



B8

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

FLT PLN-20a/59/O/A



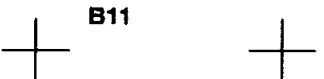
B10



B10

15	<u>0.10</u>
16	<u>0.200</u>
17	<u>0.040</u>
18	<u>0.04</u>
19	<u>0.002</u>
20	<u>.00</u>
21	<u>.000</u>
22	<u>-2.00</u>
23	<u>-0.100</u>
24	<u>0.20</u>
25	<u>.010</u>
26	3
27	3
28	0

FLT PLN-21a/59/O/A



B11



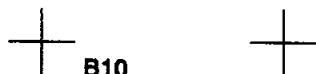
B8

DAP B10

PURPOSE:

ZDS DB
COLLAPSE
SRL LOSS OF
VERN
(YAW BIASED)

FLT PLN-20b/59/O/B



B10

DAP B11

PURPOSE:

ZDS SLOW
MNVRS

FLT PLN-21b/59/O/A



(reduced copy)



B11

DAP B15

15	<u>0.10</u>
16	<u>0.200</u>
17	<u>0.003</u>
18	<u>0.04</u>
19	<u>0.002</u>
20	<u>.00</u>
21	<u>.000</u>
22	<u>2.00</u>
23	<u>-0.100</u>
24	<u>0.20</u>
25	<u>.010</u>
26	<u>3</u>
27	<u>3</u>
28	<u>0</u>

PURPOSE:
SRL LOSS
OF VERN
(NON-YAW
BIASED)

FLT PLN-22a/59/O/B

FLT PLN-22b/59/O/B



B15

15	<u>0.10</u>
16	<u>0.200</u>
17	<u>0.040</u>
18	<u>0.04</u>
19	<u>0.002</u>
20	<u>.00</u>
21	<u>.000</u>
22	<u>1.00</u>
23	<u>-0.100</u>
24	<u>0.20</u>
25	<u>.010</u>
26	<u>3</u>
27	<u>3</u>
28	<u>0</u>

FLT PLN-28a/59/O/A

FLT PLN-28b/59/O/A



(reduced copy)

+	<u>DAP</u>	<u>PURPOSE</u>	+
	ALT1	- NOMINAL I-LOAD	
	ALT2	- LOSS OF VERN	
	ALT3	- SRL PRCS MNVRS	

+	DAP ALT1	+
	PURPOSE:	
	NOMINAL I-LOAD	

FLT PLN-23a/59/O/A

FLT PLN-23b/59/O/A

+	ALT1	+
---	-------------	---

+		+
---	--	---

+	ALT1	+
	RATE DB	
	32	<u>0.2 0 0</u>
	JET OPT	
	33	1
	# JETS	
	34	<u>2</u>
	ON TIME	
	35	<u>- 0.0 8</u>
	DELAY	
	36	<u>- 0.0 0</u>
	FLT PLN-24a/59/O/A	

+	DAP ALT2	+
	PURPOSE:	
	LOSS OF VERN	
	FLT PLN-24b/59/O/A	

+	ALT2	+
---	-------------	---

+	ALT1	+
---	-------------	---

+	ALT2	+	+	DAP ALT3	+
	RATE DB			PURPOSE:	
	32	0.0 7 0			
	JET OPT			SRL PRCS	
	33	1 or 3		MNVRS	
	# JETS				
	34	1			
	ON TIME				
	35	- 0.0 8			
	DELAY				
	36	- 0.0 0			
	FLT PLN-25a/59/O/A			FLT PLN-25b/59/O/A	

+	ALT3	+	+	ALT2	+
---	-------------	---	---	-------------	---

+	ALT3	+	+	+	+
	RATE DB				
	32	0.1 0 0			
	JET OPT				
	33	3			
	# JETS				
	34	2			
	ON TIME				
	35	- 0.0 8			
	DELAY				
	36	0.0 0			
	FLT PLN-26a/59/O/A			FLT PLN-26b/59/O/A	

+	ALT3	+	+	+	+
---	-------------	---	---	---	---

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

FLT PLN-27a/59/O/A

FLT PLN-27a/59/O/A is mounted on the back of the DAP Book

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STS-59
FLIGHT PLAN NOTES

**FLIGHT PLAN NOTES
(CONSTRAINTS AND GUIDELINES)**

A. FLIGHT DESCRIPTION

Orbiter: OV105/Endeavour
 Inclination: 57.0°
 Altitude: 119 x 120
 Duration: 9 + 1 + 2

B. MAJOR EVENTS

<u>EVENT</u>	<u>MET</u>	<u>DATE</u>	<u>CDT</u>	<u>GMT</u>	<u>ΔV</u>	<u>ORBIT</u>
Launch	0/00:00	4/7/94	07:07	97/12:07	--	--
OMS-2	0/00:33	4/7/94	07:40	97/12:40	164	120/121
D/O Burn	09:04:12	4/16/94	11:19	106/16:19	294	115/116
Landing	09:05:07	4/16/94	12:14	106/17:14	--	--

C. LANDING OPPORTUNITIES:

		<u>Landing Orbit</u>		<u>Site</u>	<u>Local Time</u>
		<u>No.</u>			
Nominal	Primary	150	KSC	13:14 EDT	
	1 Rev late	151	EDW	11:39 PDT	
1 Day Late	Primary	166	KSC	12:52 EDT	
	1 Rev late	167	EDW	11:17 PDT	
2 Days Late	Primary	182	KSC	12:30 EDT	
	1 Rev late	183	EDW	10:55 PDT	

D. CREW

CDR – Sidney M. Gutierrez
 PLT – Kevin P. Chilton
 MS1 – Jerome Apt
 MS2 – Michael R. Clifford
 MS3 – Linda M. Godwin
 MS4 – Thomas D. Jones

E. COMMUNICATIONS

TDRS Support: East (41° W), West (174° W)
 Backup Real-Time TV: GDS(GDX), MIL(MLX)
 Contingency GSTDN: MIL(MLX), BDA(BDX), DFR, GDS(GDX), and DKR (UHF voice only)
 Contingency RTS: HTS, GTS, VTS, IOS, CTS, DGS, NHS; OTS, and IDS also have VHF capability

Lead time for site call-up: GSTDN – 2 hr, RTS – 4 hr

**FLT PLN
NOTES**

F. TEXT UPLINK SYSTEM

The TIPS (Raytheon's TDU-850 Thermal Impulse Printer System) is a high-speed, gray-shade recorder employing a fixed thermal head to produce a line print. The recording medium is direct recording thermal paper. TIPS will provide onorbit capability to receive and reproduce data from MCC during onorbit operations. The information may be transmitted over the air-to-ground (nominally A/G 2) voice channel or through Ku-band forward link. Typical applications will include a hard copy of computer-generated data and pictorial information reproduced in almost photographic quality.

G. TELEVISION/PHOTOGRAPHY

1. The orbiter CCTV system provides in-cabin Camcorder coverage. There will also be four PLB TV Cameras and an RMS Wrist Camera. There are two different lens assemblies for the PLB and RMS Cameras (monochrome and wide-angle lens assemblies). The type of lens assembly for each Camera is documented in the Flight Requirements Document.
2. The orbiter has one TEAC 8mm video tape recorder (VTR) available which uses 120-minute cassettes.
3. Three Camera systems are available: 16mm, 35mm, and 70mm.

H. PAYLOADS

1. Space Radar Laboratory - 1 (SRL-1)

SRL-1 is a dedicated Earth observation payload which studies vegetation, hydrology, tectonics, topography, and global carbon monoxide distribution. The SRL payload is installed on a standard Spacelab 3-m MDM pallet and a Multipurpose Equipment Support Structure (MPSS).

SRL-1 consists of the following experiments:

- a. Spaceborne Imaging Radar - C (SIR-C)

SIR-C is the third generation of imaging radars flown on the shuttle. SIR-C is comprised of two antennas, C-band and L-band, with the capability of transmitting and receiving any combination of horizontally and vertically polarized L- and C-band signals.

- b. X-band Synthetic Aperature Radar (X-SAR)

X-SAR is a follow-up to the Microwave Remote Sensing Experiment (MRSE) flown as part of the Spacelab-1 mission. X-SAR consists of an X-band radar which will transmit and receive vertically polarized signals.

- c. Measurement of Air Pollution from Satellites (MAPS)

The MAPS experiment is a reflight of Earth photography and carbon monoxide sensing equipment flown on two earlier missions. MAPS is installed on an MPSS with a tilted support structure to compensate for the rolled orbiter attitude. This orientation points the MAPS optical axis toward nadir.

d. Applied Physics Laboratory (APL)

MAPS will observe ocean wave images and perform real-time processing of the image data. The APL is installed on the standard Spacelab pallet.

2. Space Tissue Loss (STL)

The objective of STL is to validate models of muscle, bone, and endothelial biochemical and functional loss induced by microgravity stress. STL will evaluate cytoskeleton, metabolism, membrane integrity, and protease activity in target cells; in addition, STL will test tissue loss pharmaceuticals for efficacy. Two units will be flown for this mission.

3. Consortium for Materials Development in Space Complex Autonomous Payload - IV (CONCAP-IV)

The CONCAP-IV is a secondary payload contained in a standard GAS canister on the GAS Bridge Assembly (GBA). The CONCAP experiment will grow crystals and thin films via physical vapor transport. The payload will be activated during ascent by a baroswitch. Deactivation is performed by the crew as late as possible to allow a long crystal growing period. CONCAP is scheduled in the FLIGHT PLAN as part of the GAS Group A, D, and E activities.

4. Shuttle Amateur Radio Experiment - II (SAREX-II)

SAREX-II is a middeck payload capable of two-way communication with amateur radio stations in the Line of Sight (LOS) of the orbiter. An antenna is mounted in either window 1 or 6. Configuration C is capable of operating in a Robot mode and Voice mode. SAREX-II will operate in the Robot mode for the majority of the flight. Intermittent voice operations will be performed as time permits.

5. Visual Function Tester - 4 (VFT-4)

VFT-4 will measure the near and far point of clear vision, as well as the ability to change focus within the range of clear vision. This payload will provide data to evaluate onorbit refractive and accommodative changes in vision over a period of several days, derive a quantitative model of refractive changes in vision, and provide a database for microgravity effects on vision. The VFT tester is a handheld, battery-powered device that the crewmembers look into to measure changes in their vision parameters. Testing will be conducted once daily by the assigned crewmembers.

6. Get-Away Special (GAS) Canisters

Attached cargo operations will be performed with the three GAS canister experiments mounted on the GAS Bridge Assembly (GBA). The three GAS experiments are G-203, G-300, and G-458.

- a. The G-203 experiment will observe the crystal forming characteristics of water.
- b. The G-300 experiment will perform thermal conductivity measurements on distilled water and two silicon oils in microgravity.
- c. The G-458 experiment will cultivate cellular slime molds under conditions of microgravity and observe their growth.

I. ON-ORBIT DTOs

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

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

2. PGSC Single Event Upset Monitor (DTO 656)

The objective of this DTO is to determine Payload and General Support Computer (PGSC) random access memory susceptibility to single event upset (SEU) caused by cosmic radiation. This data could lead to procedure changes and software or hardware changes to reduce radiation effects.

3. Acoustical Noise Dosimeter Data (DTO 663)

The primary purpose of this DTO is to obtain baseline data of time-averaged acoustical noise levels in the middeck and sleep stations using an audio dosimeter. Additionally, crewmembers will complete a questionnaire during the flight regarding noise levels.

4. Cabin Temperature Survey (DTO 664)

The purpose of this DTO is to compile a temperature profile of the crew cabin in a variety of orbiter attitudes and configurations and to correlate the cabin temperature sensor reading with the cabin temperature profile during onorbit operations. Cabin temperatures will be logged each flight day.

5. Acoustical Noise Sound Level Data (DTO 665)

This DTO will use a Sound Level Meter to obtain baseline data of octave-band acoustical noise levels in the middeck and flight deck during routine orbiter and experiment operations.

6. Global Positioning System Development Flight Test (DTO 700-8)

This DTO will demonstrate the performance and operation of the Global Positioning System (GPS) utilizing a modified GPS receiver processor and the existing orbiter GPS antennas. The GPS will estimate the orbiter's position, velocity, measurement discretely, and attitude during ascent, onorbit, entry, and landing phases. The GPS receiver output data will be recorded on the Modular Auxiliary Data System (MADS) recorder.

J. ON-ORBIT DSOs

1. Window Impact Observations (DSO 326)

The objective of this DSO is to link window damages found during turnaround processing to a mission time, attitude, and altitude. The crewmembers will check the windows daily for new abrasions and will record their findings in a log. This data will aid significantly in the analysis of shuttle window impacts in the effort to identify the sources of these damages.

2. Back Pain Pattern in Microgravity (DSO 483)

This study will collect information about the back pain pattern and height changes experienced by astronauts during flight. Crewmembers participating in this DSO are required to record height measurements and log back pain symptoms daily.

3. Measurement of Formaldehyde Using Passive Dosimetry (DSO 488)

The purpose of this DSO is to collect data on levels of formaldehyde in the cabin air to establish baseline levels and to evaluate potential risks to crewmembers' health and safety. Area samples will be collected in the middeck on an early, mid and late FD. In addition, personal samples will be collected from crewmembers for 12-hour intervals on an early, mid, and late FD.

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

The objective of this DSO is to measure the changes in orthostatic function of crewmembers during the actual stresses of entry, landing, and egress from the orbiter. Crewmembers will don and calibrate equipment prior to deorbit preparation. At LES donning, they will connect cables and power the equipment. Verbal comments will be recorded during entry, landing, and egress.

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

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

6. Air Monitoring Instrument Evaluation and Atmosphere Characteristics (DSO 611)

DSO 611 is designed to evaluate and verify air monitoring equipment to ensure proper function and operation inflight. The Microbial Air Sampler (MAS) will be used to collect data on the contaminants that affect crew health and safety. Samples will be collected on an early, mid, and late FD in the middeck and flight deck.

7. Pre and Postflight Measurement of Cardiorespiratory Responses to Submaximal Exercise (DSO 624)

For this DSO the crewmembers will wear heart watches during exercise and log exercise to help evaluate the changes in aerobic capacity pre-, in-, and postflight. These evaluations will help develop optimal exercise protocols to prevent decrements in nominal cardiorespiratory response.

8. Educational Activities (DSO 802)

The purpose of this DSO is to produce an educational video product with scenes recorded onorbit and on the ground. The crew will film several scenes onorbit using the Camcorder.

9. Documentary Television (DSO 901)

This DSO requires live television transmission or VTR dumps of crew activities and spacecraft functions which include: Payload Bay Views, STS and payload crew activities, VTR downlink of Crew Activities, Inflight Crew Conference, and unscheduled TV activities.

10. Documentary Motion Picture Photography (DSO 902)

DSO 902 requires documentary and public affairs motion picture photography of significant activities which best depict the basic capabilities of the space shuttle and key objectives. This DSO includes motion picture photography of flight deck activities, middeck activities, and any unscheduled motion picture photography.

11. Documentary Still Photography (DSO 903)

This DSO requires still photography of crew activities in the orbiter, and mission-related scenes of general public and historical interest. Still photography with 70mm format for exterior photography and 35mm format for interior photography is required.

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** PRIORITY MAIL **

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553.3/SLADE, M. (2)

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EO61/CHIEF DATA MGMT
ES44/HILL, C.K.
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(03/21/94 - TLISTER)