

Flight Data File Crew Activity Plan

STS 51-B

Spacelab 3

Mission Operations Directorate
Operations Division

Basic
September 13, 1984

<u>EVENT:</u>	<u>CST</u>		
Launch	17:30	Wed	November 21
Press Conference	04:45	Sun	November 25
NUSAT Deploy	03:30	Wed	November 28
Landing - KSC	17:34	Wed	November 28

14:30



National Aeronautics and
Space Administration

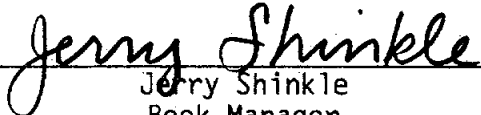
Lyndon B. Johnson Space Center
Houston, Texas

MISSION OPERATIONS DIRECTORATE

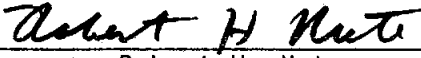
STS 51-B CREW ACTIVITY PLAN
SPACELAB 3

BASIC
September 13, 1984

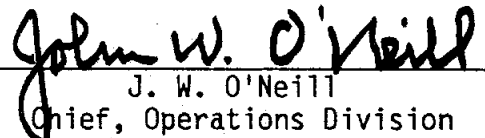
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This document is under the configuration control of the Crew Procedures Control Board (CPCB). All proposed changes must be submitted on standard JSC form 482 to DH4/FDF Manager, Bldg 4, Room 352, 713-483-2868.

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Changes to the distribution list should be submitted in writing to DH4/Gwen Butler, Bldg 4, Rm 373, 713-483-5224.

Incorporates 482
No: N/A

ACKNOWLEDGMENTS

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STS 51-B CREW ACTIVITY PLAN

LIST OF EFFECTIVE PAGES

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INTRODUCTION

The 51-B Crew Activity Plan is the flight data article that contains the on-orbit timeline. It does not contain the detailed timelines that are covered in the Ascent, Post Insertion, Deorbit Prep, and Entry checklists. For continuity, the entire flight is shown in the summary level timeline.

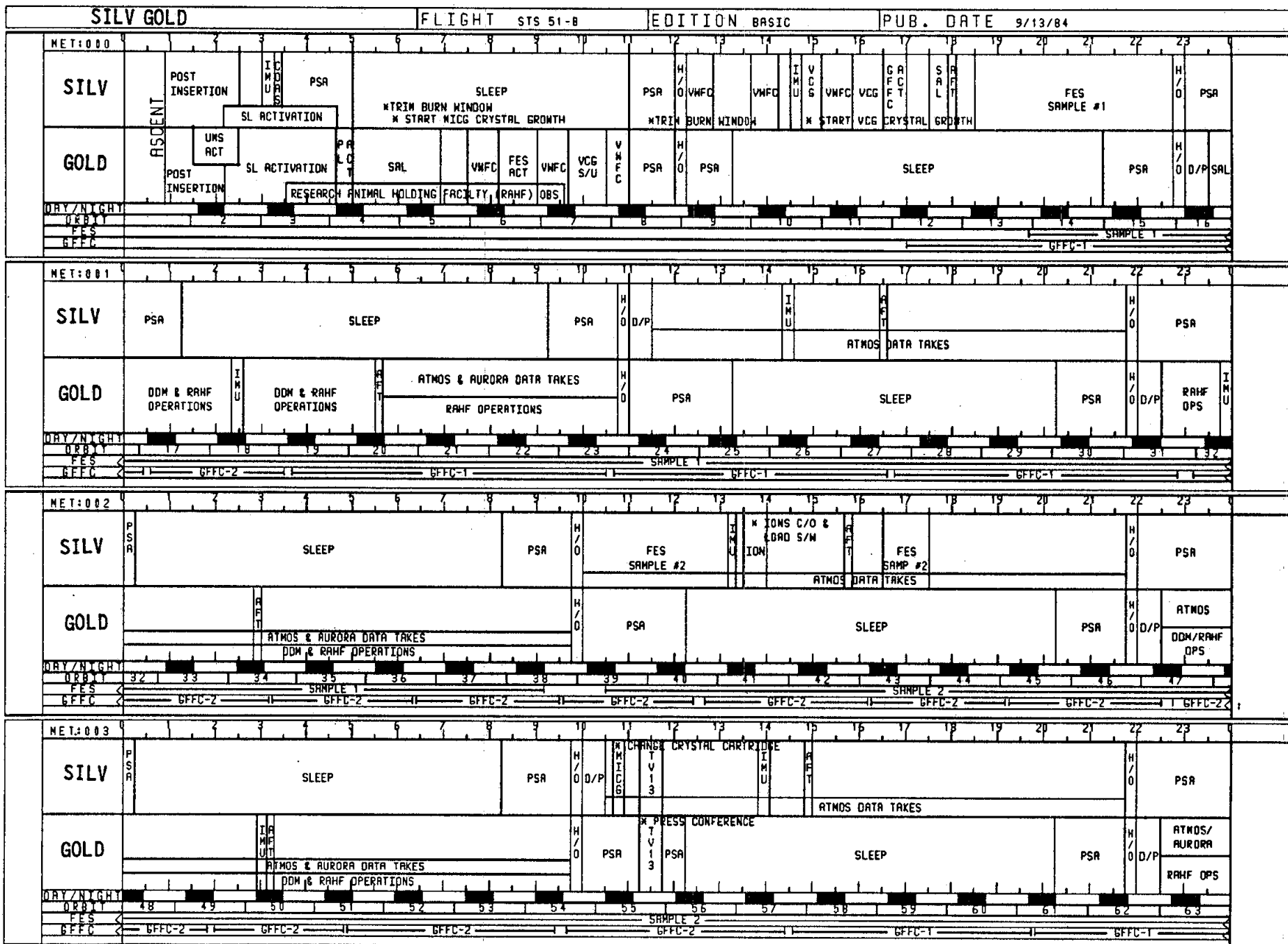
This on-orbit timeline satisfies the objectives specified in the Flight Definition and Requirements Directive and the requirements of the 51-B Flight Requirements Document (March 1984).

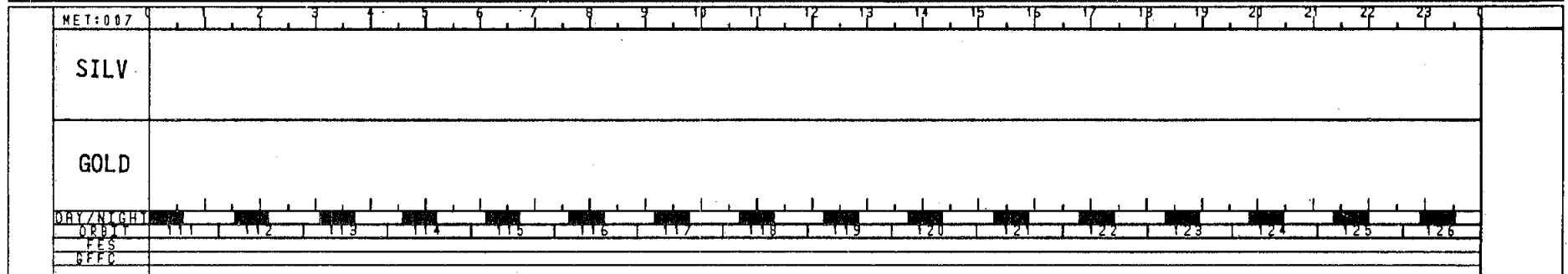
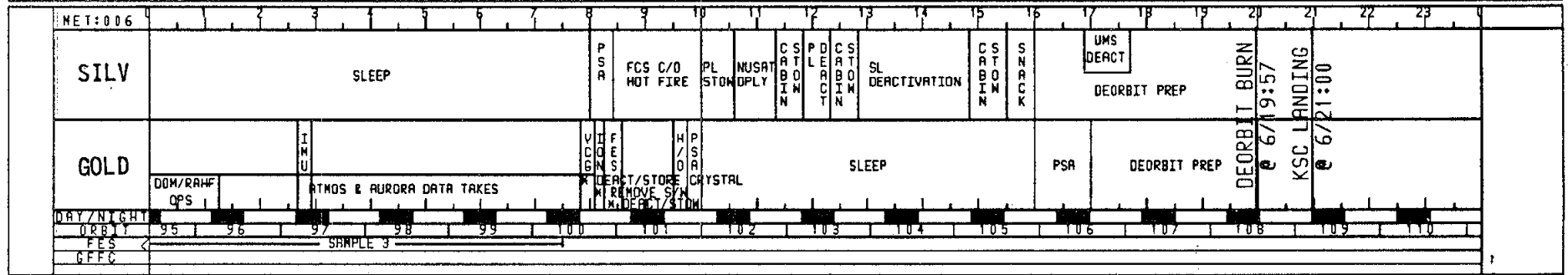
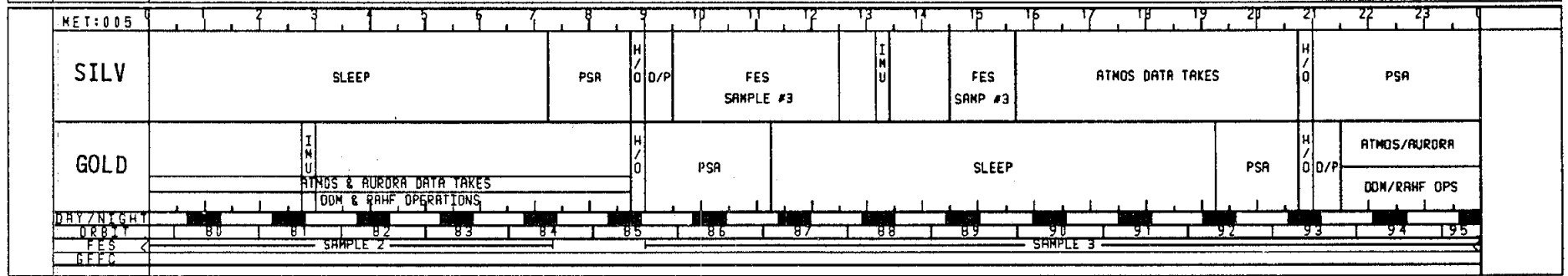
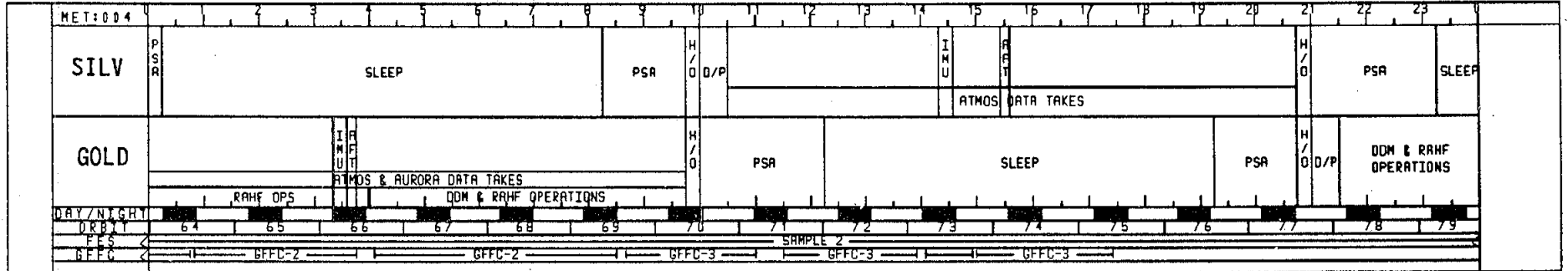
The flight profile (OFP Cycle 1 trajectory data) used for this Crew Activity Plan is for a launch date of November 21, 1984. The official launch date is January 17, 1985.

This edition agrees with the Basic Payload CAP (PCAP) produced by the Marshall Space Flight Center (MSFC) with the exception of the Northern Utah Satellite (NUSAT) deploy at 6/10:00.

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51-B OVERVIEW



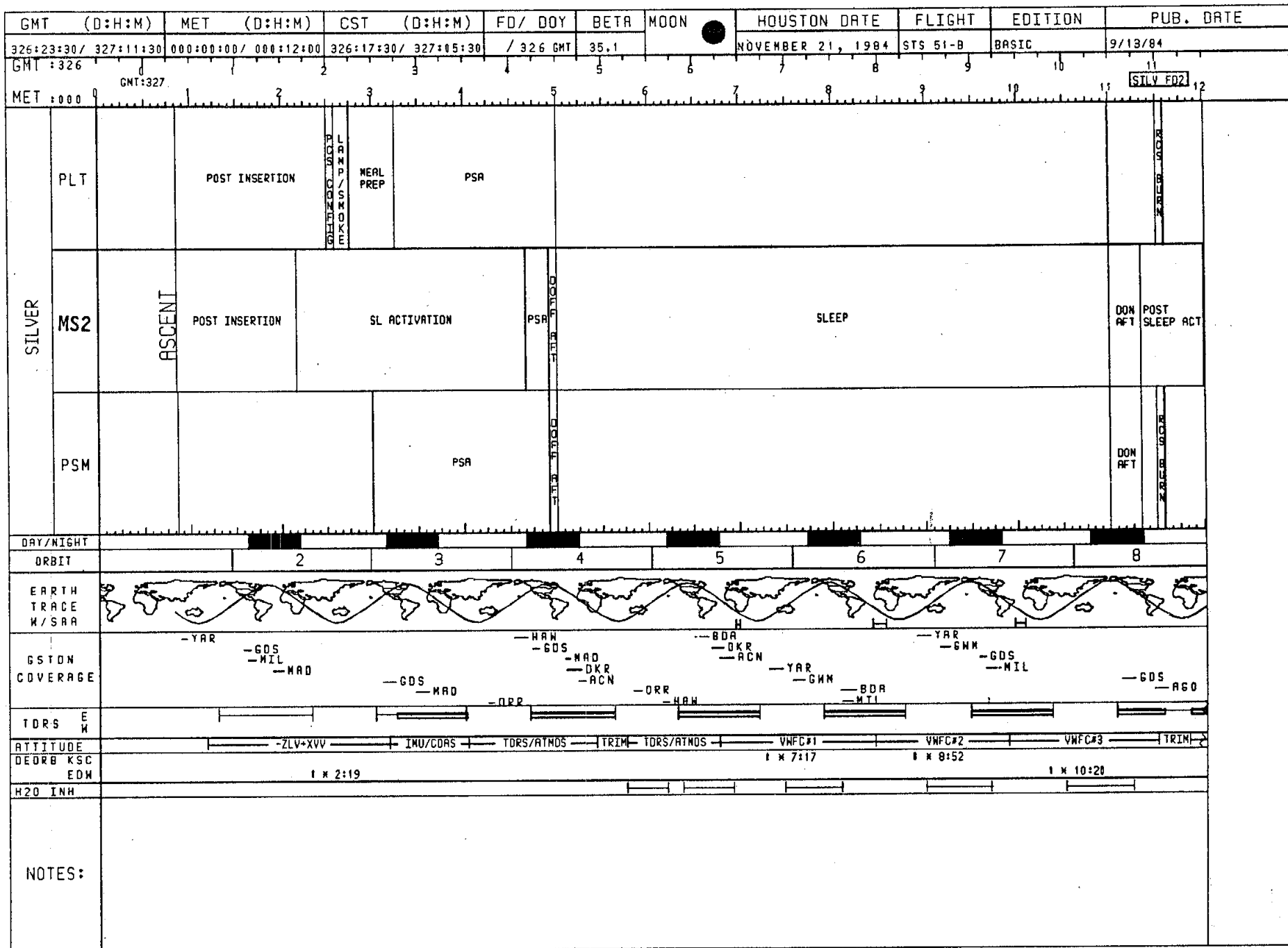


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SUMMARY TIMELINE

SUMMARY
TIMELINE

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE							
926:23:30 / 327:11:30	000:00:00 / 000:12:00	326:17:30 / 327:05:30	/ 926 GMT	35.1	☉	NOVEMBER 21, 1984	STS 51-B	BASIC	9/13/84							
GMT: 326	GMT: 327															
MET: 000																
GOLD	CDR	POST INSERTION	UNSTON CABIN	I M U M N V R	U T O M N V R	C A M R A S S Y	R C S B U R N	A U T O M N V R	P H R U P G R P A B	A U T O M N V R	L U N C H	A U T O M N V R	A U T O M N V R	R C S B U R N	A U T O M N V R	
	MST	POST INSERTION	SL ACTIVATION								LUNCH	FES-ACT		VCG	PRE SLEEP ACT	
	MS3	POST INSERTION	U M S - D P S	U N S T O N C A B I N							LUNCH	A R C - C	A R C - K	T V 0 3	3 5 M M / 0 3	U M S - C A L
	PSF		SL ACTIVATION								LUNCH	T V 0 5	V M F C		V M F C	1 6 M M / 0 3
DAY/NIGHT																
ORBIT	2		3		4		5		6		7		8			
EARTH TRACE W/SAA																
GSTON COVERAGE	<p>-YAR -GDS -MIL -MAD -GDS -MAD -DKR -ACN -ORR -HAM -BDA -DKR -ACN -YAR -GWN -GDS -MIL -GDS -AGO</p>															
TORS E M	<p>— ZLV-XVV — INU/COAS — TORS/ATMOS — TRIM — TORS/ATMOS — VNFC#1 — VNFC#2 — VNFC#3 — TRIM —</p>															
ATTITUDE DEORB KSC EDM	<p>1 x 2:19 1 x 7:17 1 x 8:52 1 x 10:20</p>															
H2O INH																
NOTES:	<p>o SL FIRE SMOKE TEST o APU HTR RECONFIG o PWR UP GRP B o AFT STATION o APU HTR DEACT o STATUS REPORT</p>															

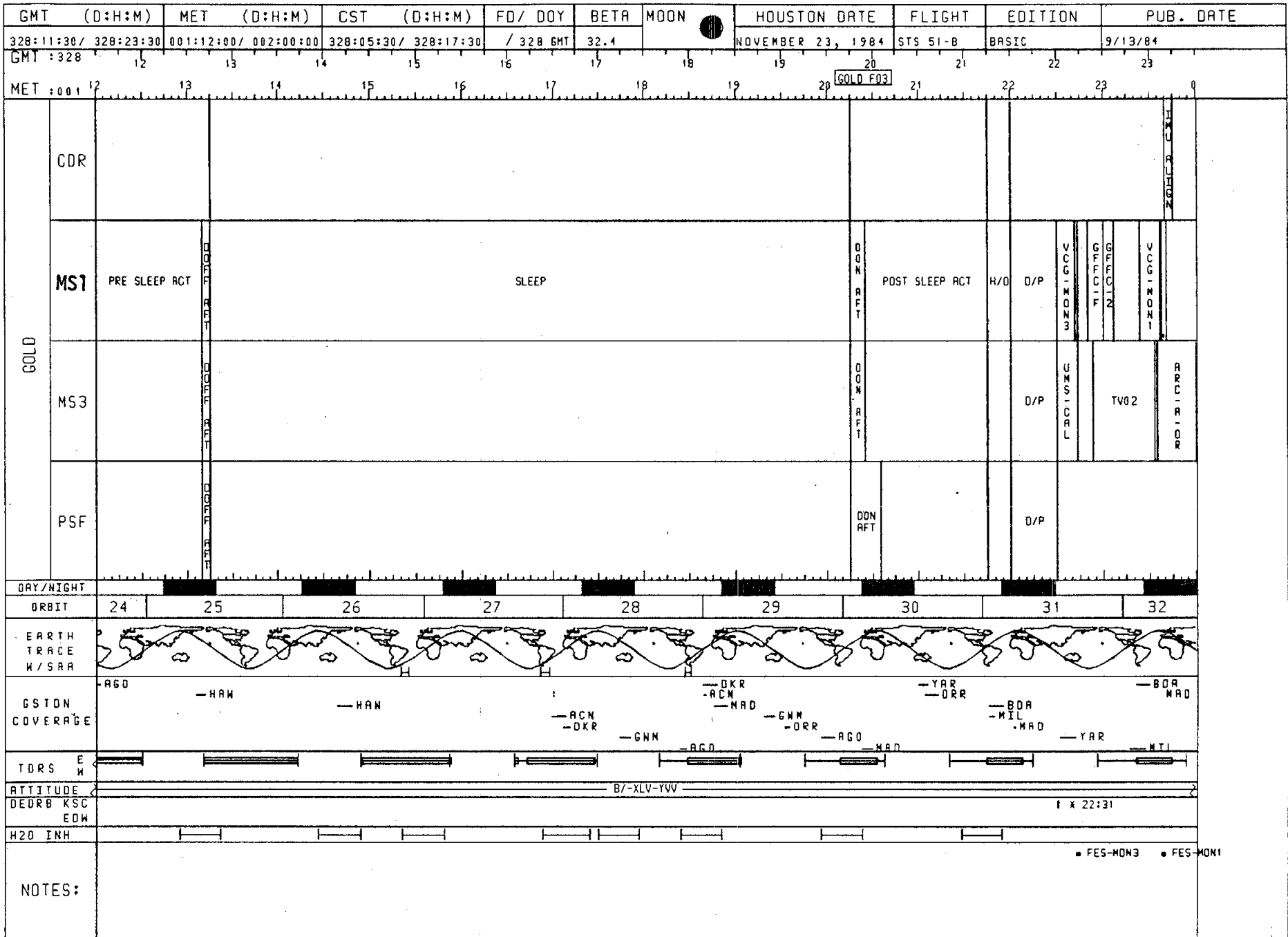


GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE	
327:11:30 / 327:23:30	000:12:00 / 001:00:00	327:05:30 / 327:17:30	/ 327 GMT	34.3		NOVEMBER 22, 1984	STS 51-B	BASIC	9/13/84	
MET : 000 12 13 14 15 16 17 18 19 20 21 GOLD FD2 22 23 0										
GOLD	CDR									
	MS1	H/O PRE SLEEP ACT	SLEEP				DOWN AFT	POST SLEEP ACT	H/O	D/P SAL STOW
	MS3						DOWN AFT		D/P	UNUSUAL RCR-ADR
	PSF						DOWN AFT		D/P	SAL OPS
DAY/NIGHT										
ORBIT										
EARTH TRACE W/SAA										
GSTON COVERAGE										
TDRS										
ATTITUDE	VNFC#4 VNFC#5 IMU VNFC#6 B/-XLV-YVV									
DEORB KSC EDM	1 x 22:05 x 23:40									
H2D INH										
NOTES:	8 VNFC STON									

GMT (D:H:M)		MET (D:H:M)		CST (D:H:M)		FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE		
327:11:30 / 327:23:30		000:12:00 / 001:00:00		327:05:30 / 327:17:30		/ 327 GMT	34.3	●	NOVEMBER 22, 1984	STS 51-B	BASIC	9/13/84		
GMT :327		12	13	14	15	16	17	18	19	20	21	22	23	
MET :000		12	13	14	15	16	17	18	19	20	21	22	23	
SILVER	PLT	H/O	PWR D N GRP B	AUTO M NVR	IMU M NVR	AUTO M NVR	TRK M NVR	EFS S C/O	LUNCH	SEJ QUA QUAUS	U O S M R M U	U O S M R M U	U O S M R M U	
	MS2	H/O	VWFC	D/P	VWFC	VWFC	U M S I G R L	GFFC-1	LUNCH	SEJ QUA QUAUS	ARC-K	TV05	U O S M R M U	
	PSM	H/O	D/P	VCG	VCG	VCG-MON1	VCG-MON2	LUNCH	FES-1	FES-1	FES-1	FES-1	FES-1	
DAY/NIGHT														
ORBIT		9	10	11	12	13	14	15	16					
EARTH TRACE W/SRA														
GSTDN COVERAGE		-GDS -AGO	-HAW	-HAW	-ACN	-GMM	-DKR -MAD	-GMM	-AGO -DKR -MAD	-RGO -BDA -MAD	-YAR -DRR	-MIL -MAD	-YAR	
TDRS E M														
ALTITUDE		VWFC#4	VWFC#5	IMU	VWFC#6	B/-XLV-YVV								
DEORB KSC EDW												* 22:05	* 23:40	
H2O INH														
NOTES:		▲ VCG-MON2 ▲ FES-1 ▲ VCG-MON2 ▲ VCG-MON1 ▲ FES-MON2 ▲ FES-MON3 ▲ VCG-MON1 ● STATUS REPORT												

GMT (D:H:M)		MET (D:H:M)		CST (D:H:M)		FD/DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE	
327:23:30 / 328:11:30		001:00:00 / 001:12:00		327:17:30 / 328:05:30		/ 327 GMT	33.4	●	NOVEMBER 22, 1984	STS 51-B	BASIC	9/13/84	
GMT : 327		GMT: 328											
MET : 001													
GOLD	CDR												
	MS1	SEL SHEET											
	MS3	ARC-B											
	PSF												
	DAY/NIGHT	[Shaded bars indicating day/night cycle]											
ORBIT	17 18 19 20 21 22 23 24												
EARTH TRACE W/SRA	[Map showing satellite ground track]												
GSTON COVERAGE	[Coverage map with labels: MIL, BDA, MAD, GDS, ACN, YAR, GWM, AGO]												
TORS E W	[Timeline of TORS events]												
ATTITUDE	[Attitude data]												
DEORB KSC EDH	[Deorbit data]												
H2O INH	[Humidity data]												
NOTES:	<ul style="list-style-type: none"> ■ FES-MON2 ■ FES-MON3 ■ FES-MON1 ■ FES-MON3 ■ FES-MON2 ■ FES-MON1 ■ FES-MON3 ■ FES-MON3 ■ STATUS REPORT ● FES-MON2 ■ FES-1 ● FES-MON3 ▲ ARC-D4 ● ATMOS SUNRISE DATA TAKE ● DTD 0623 SOLID SORBENT SAMPLER ● AURORA OBSERVATIONS ● ATMOS SUNRISE DATA TAKE 												

GMT (D:H:M)		MET (D:H:M)		CST (D:H:M)		FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE				
327:23:30 / 328:11:30		001:00:00 / 001:12:00		327:17:30 / 328:05:30		/ 327 GMT	33.4		NOVEMBER 22, 1984	STS 51-B	BASIC	9/13/84				
GMT : 327		MET : 001														
SILVER		SILV F03														
PLT																
MS2	PRE SLEEP ACT				SLEEP					DON RFT	POST SLEEP ACT	H/O	D/P	TV12		
PSM										DON RFT			D/P	VCG-MON2		
DAY/NIGHT	[Day/Night Cycle Bar]															
ORBIT	17	18	19	20	21	22	23	24								
EARTH TRACE W/SAA	[Earth Trace Map]															
GSTDN COVERAGE	-MIL -BDA -MAD		-GDS -MAD		-ORR -HAW		-GDS -MAD -DKR		-ACN -YAR -ORR -GMM		-YAR -GMM		-MIL -BDA	-YAR	-GDS -MTL	R60
TDRS E H	[TDRS Coverage Bars]															
ATTITUDE	B/-XLV-YVV															
DEORB KSC EDH	1 x 1:10	1 x 2:45							1 x 7:43	1 x 9:11	1 x 10:46					
H2O INH																
NOTES:														▲ FES-MON2 ■ ATMOS SUNSET DATA TAKE ● ATMOS SUNRISE DATA TAKE		



GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE											
328:11:30 / 328:23:30	001:12:00 / 002:00:00	328:05:30 / 328:17:30	/ 328 GMT	32.4		NOVEMBER 23, 1984	STS 51-B	BASIC	9/13/84											
MET : 001 12 13 14 15 16 17 18 19 20 21 22 23 0																				
SILVER	PLT	P/TV SUPTA		RSDS RECPTS		P/TV SUPTA		P/TV SUPTA		P/TV SUPTA		P/TV SUPTA		P/TV SUPTA		P/TV SUPTA		P/TV SUPTA		
	MS2	R/V-TAPE		DECIDER		LUNCH		ARC-K		H/D		PRE SLEEP ACT								
	PSM	VCC-MON3		VCC-MON3		LUNCH		VCC-MON3		VCC-MON3		VCC-MON3		VCC-MON3		VCC-MON3		VCC-MON3		
DAY/NIGHT																				
ORBIT	24	25	26	27	28	29	30	31	32											
EARTH TRACE W/SA																				
6 STDN COVERAGE	-HAM		-HAM		-ACN -DKR		-GNN		-DOR -ACN -MAD		-GNN -ORR		-AGO		-YAR -ORR		-BDR -MIL -MAD		-YAR	
TDRS	E		E		E		E		E		E		E		E		E		E	
ATTITUDE	B/-XLV-YVV																			
DEDRB KSC											* 22:31									
EDW																				
H2O INH																				
NOTES:	▲ FES-MON3 ▲ FES-MON3 ▲ FES-MON2 ▲ FES-MON3 ▲ FES-MON1 ▲ FES-MON1 ▲ FES-MON2 ● STATUS REPORT ● ATMOS SUNRISE DATA TAKE ● ATMOS SUNSET DATA TAKE ● ATMOS SUNRISE DATA TAKE ▲ FES-MON3 ● ATMOS SUNRISE DATA TAKE ● ATMOS SUNSET DATA TAKE ● ATMOS SUNSET DATA TAKE ● ATMOS SUNSET DATA TAKE																			

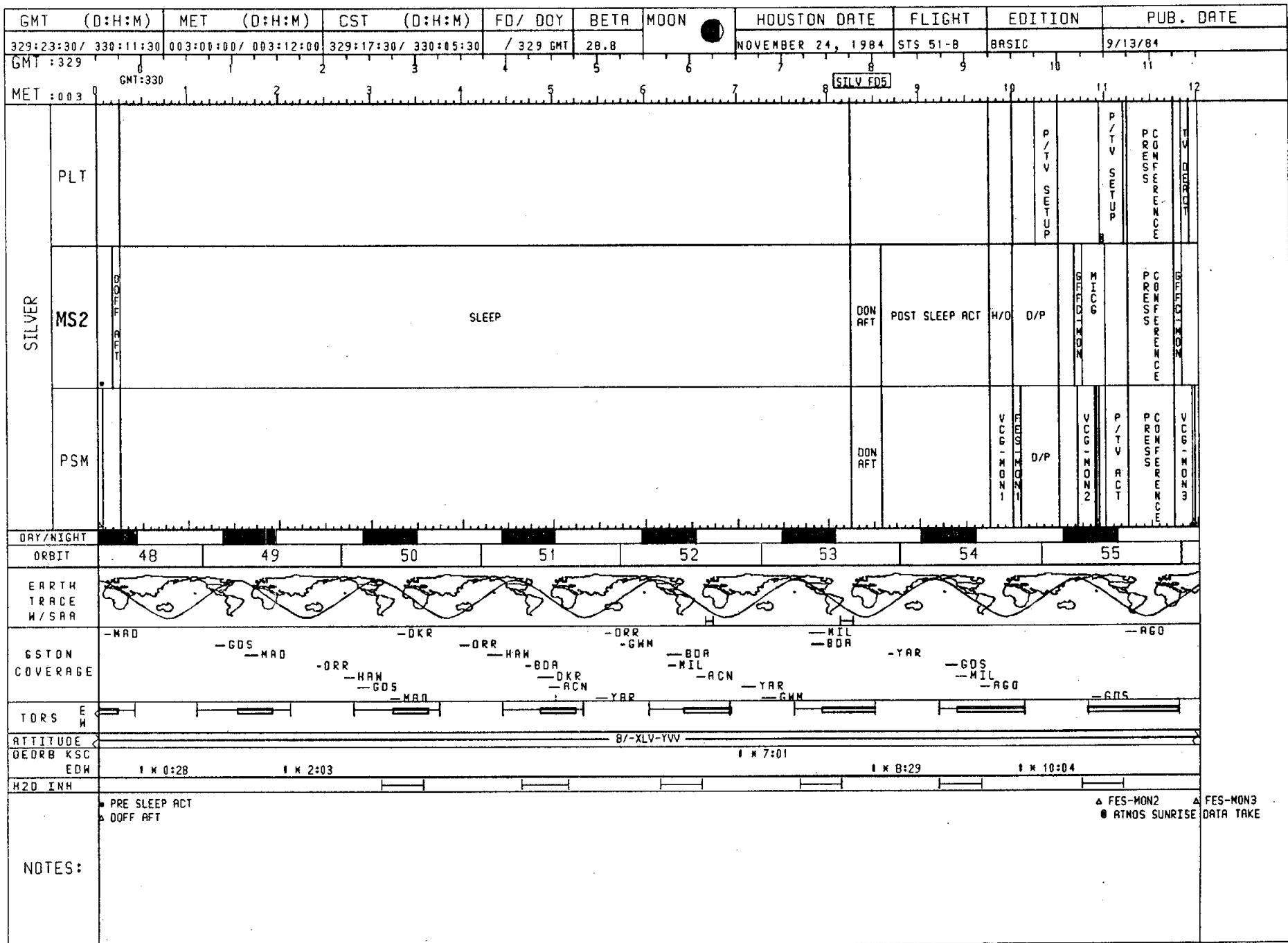
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328:23:30 / 329:11:30	002:00:00 / 002:12:00	328:17:30 / 329:05:30	/ 328 GMT	31.3		NOVEMBER 23, 1984	STS 51-B	BASIC	9/13/84											
GMT: 328 GMT: 329 MET: 002 1 2 3 4 5 6 7 8 9 10 11 12																				
GOLD	CDR	P/TV SETUP & ACT																		
	MS1																			
	MS3																			
	PSF																			
DAY/NIGHT	[Day/Night Cycle]																			
ORBIT	32 33 34 35 36 37 38 39 40																			
EARTH TRACE W/SAR	[Earth Trace]																			
GSTON COVERAGE	-YAR -GDS -MIL -MAD -HAW -GDS -MAD -DKR -ACN -BDA -DKR -ACN -YAR -GWN -GDS -MIL -GDS -MAD -ORR -HAW -BDA -MTI -GDS -RGO																			
TORS E M	[TORS E M]																			
ALTITUDE	B/XLV-YVV																			
DEORB KSC ECH	1 x 1:37 1 x 6:34 1 x 8:09 1 x 9:38																			
H2O INH	[H2O INH]																			
NOTES:	• FES-MON3 • VCG-MON1 • FES-MON2 • FES-MON2 • FES-MON3 • ARC-D4 • FES-MON2 • FES-2 • STATUS REPORT • FES-MON1 • FES-MON1 • FES-MON1 • FES-MON1 • FES-MON1 • FES-MON1 • FES-MON1 • FES-MON1 • FES-MON1 • AURORA OBSERVATIONS • AURORA OBSERVATIONS • ATMOS SUNRISE DATA TAKE • ATMOS SUNRISE DATA TAKE • ATMOS SUNRISE DATA TAKE • ATMOS SUNRISE DATA TAKE • ATMOS SUNRISE DATA TAKE • ATMOS SUNRISE DATA TAKE • DTO 0623 SOLID SORBENT SAMPLER																			

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE	
328:23:30 / 329:11:30	002:00:00 / 002:12:00	328:17:30 / 329:05:30	/ 328 GMT	31.3	●	NOVEMBER 23, 1984	STS 51-B	BASIC	9/13/84	
GMT : 328	MET : 002		GMT: 329		STLV FD4					
SILVER	PLT							P / TV SETUP	ALIGN	
	MS2	SLEEP				DDN AFT	POST SLEEP ACT	H/O	D/P	R / V - TAPE
	PSM					DDN AFT	FES-2		FES-2	FES-2
DAY/NIGHT	[Day/Night Cycle Bar]									
ORBIT	32	33	34	35	36	37	38	39	40	
EARTH TRACE W/SAA	[Earth Trace Map]									
GSTON COVERAGE	-YAR -GDS -NIL -MAD -HAW -GDS -MAD -DKR -ACN -BDA -DKR -ACN -YAR -GWN -GDS -NIL -GDS -MAD -GDS -MAD -ORR -HAW -ORR -GWN -BDA -MTI -GDS -AGO									
TORS E H	[TORS Bar]									
ATTITUDE	B/-XLV-YVV									
DEORB KSC EDW	1 x 1:37			1 x 6:34			1 x 8:09			1 x 9:38
H2O INH	[H2O INH Bar]									
NOTES:	PRE SLEEP ACT						▲ VCG-MON2 ▲ VCG-MON1 ● ATMOS SUNRISE DATA TAKE			

GMT (D:H:M)		MET (D:H:M)		CST (D:H:M)		FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE									
329:11:30 / 329:23:30		002:12:00 / 003:00:00		329:05:30 / 329:17:30		/ 329 GMT	30.1		NOVEMBER 24, 1984	STS 51-B	BASIC	9/13/84									
GMT : 329		12	13	14	15	16	17	18	19	20	21	22	23								
MET : 002		12	13	14	15	16	17	18	19	20	21	22	23								
										GOLD FD4											
GOLD	CDR											PRE SLEEP ACT									
	MS1	SLEEP										DOWN AFT	POST SLEEP ACT	H/O	D/P	GFFFC-1	GFFFC-2	TVI 8	VCG-MON3	VCG-MON1	VCG-MON1
	MS3											DOWN AFT			D/P	UMS-CAL	ARC-RDR	TVI 1			
	PSF											DOWN AFT			D/P			DDM-O/E			
DAY/NIGHT		[Day/Night Cycle]																			
ORBIT		40	41	42	43	44	45	46	47	48											
EARTH TRACE W/SAA		[Earth Trace]																			
GSTON COVERAGE		GDS -AGO -HRM -RCN -GMM -DOKR -MAD -AGO -BDA -MAD -YAR -NIL -BDA																			
TDRS E H		[TDRS Coverage]																			
ATTITUDE		B/-XLV-YVV																			
DEORB KSC EDM		1 21:22 1 x 22:57																			
H2O INH		[H2O INH]																			
NOTES:		PRE SLEEP ACT										FES-MON3 FES-MON1			8 ATMOS SUNSET DATA TAKE						

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE																
329:11:30 / 329:23:30	002:12:00 / 003:00:00	329:05:30 / 329:17:30	/ 329 GMT	30.1	●	NOVEMBER 24, 1984	STS 51-B	BASIC	9/13/84																
GMT : 329	12	13	14	15	16	17	18	19	20	21	22	23													
MET : 002	12	13	14	15	16	17	18	19	20	21	22	23	0												
SILVER	PLT		P/V SUR-DA		P/V SETUP		P/V SUR-DA	FUS ON	LUNCH		P/V SETUP	FUS ON		P/V SUR-DA	FUS ON		P/V SUR-DA	FUS ON		P/V SUR-DA	FUS ON		P/V SUR-DA	FUS ON	
	MS2		IONS		TV 17		LUNCH							ARC-K			H/O							PRE SLEEP ACT	
	PSM	FES-2	FES-2	FES-2	FES-2	FES-2	16MM/03	35MM/03		VCG-MON2	LUNCH	LUNCH	FES-2	FES-2	VCG-MON1	VCG-MON2	VCG-MON3	VCG-MON1	VCG-MON2	VCG-MON3	VCG-MON1	VCG-MON2	VCG-MON3	VCG-MON1	VCG-MON2
DAY/NIGHT																									
ORBIT	40	41	42	43	44	45	46	47	48																
EARTH TRACE W/SRA																									
GSTON COVERAGE	GDS -AGO	-HAN	-HAN	-RCN	-GMM	-RCN	-GMM	-RCN	-GMM	-RCN	-GMM	-RCN	-GMM	-RCN	-GMM	-RCN	-GMM	-RCN	-GMM	-RCN	-GMM	-RCN	-GMM	-RCN	
TDRS E H																									
ATTITUDE	B/-XLV-YVV																								
DEORB KSC EDW																									
H2O INH																									
NOTES:	▲ FES-MON3 ▲ FES-MON2 ▲ FES-MON3 ▲ FES-MON3 ▲ FES-MON1 ▲ FES-MON3 ▲ FES-MON2 ▲ FES-MON2 ▲ OFF AFT ▲ VCG-MON3 ▲ VCG-MON1 ▲ FES-MON2 ▲ VCG-MON3 ▲ FES-MON3 ▲ FES-MON3 ▲ STATUS REPORT ▲ FES-MON3 ▲ FES-MON1 ▲ FES-MON3 ▲ FES-MON3 ▲ FES-MON3 ▲ FES-MON3 ▲ ATMOS SUNSET DATA TAKE ■ ATMOS SUNRISE DATA TAKE ■ ATMOS SUNRISE DATA TAKE ■ ATMOS SUNSET DATA TAKE																								

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE															
329:23:30 / 330:11:30	003:00:00 / 003:12:00	329:17:30 / 330:05:30	/ 329 GMT	28.8		NOVEMBER 24, 1984	STS 51-B	BASIC	9/13/84															
GMT : 329 GMT: 330 MET : 003 1 2 3 4 5 6 7 8 9 10 11 12																								
GOLD	CDR		P/TV SETUP & ACT	LUNCH		PS/TTVUP		P/TV SETUP & ACT		PS/TTVUP		DRBB-TAPE		PS/TTVUP		DRBB-TAPE		PS/TTVUP		P/TV SETUP & ACT		PS/TTVUP		
	MS1	A/V-TAPE	ARC-E-DR	ARC-F-DR	LUNCH	ARC-F-DR	LUNCH	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR
	MS3	ARC-E-DR	ARC-F-DR	LUNCH	ARC-F-DR	LUNCH	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR	ARC-F-DR
	PSF	DDM-0/E	LUNCH	DDM-0/E	LUNCH	DDM-0/E	LUNCH	DDM-0/E	LUNCH	DDM-0/E	LUNCH	DDM-0/E	LUNCH	DDM-0/E	LUNCH	DDM-0/E	LUNCH	DDM-0/E	LUNCH	DDM-0/E	LUNCH	DDM-0/E	LUNCH	DDM-0/E
DAY/NIGHT	ORBIT	48	49	50	51	52	53	54	55															
EARTH TRACE W/SRA																								
GSTDN COVERAGE	-MAD -GDS -MAD -ORR -HAW -BDA -DOR -ACN -YAR -GDS -MIL -AGO -ORR -HAW -BDA -DOR -ACN -YAR -GDS -MIL -AGO																							
TORS																								
ATTITUDE	B/-XLV-YVV																							
DEORB KSC EDM	1 x 0:28 1 x 2:03 1 x 7:01 1 x 8:29 1 x 10:04																							
H2D INH																								
NOTES:	TV11 FES-MON1 FES-MON2 FES-MON3 FES-MON2 FES-MON2 FES-MON2 FES-MON1 STATUS REPORT FES-MON1 AURORA OBSERVATIONS CONFIG FOR ORB PCS ATMOS SUNRISE DATA TAKE ATMOS SUNRISE DATA TAKE AURORA OBSERVATIONS ATMOS SUNRISE DATA TAKE AURORA OBSERVATIONS ATMOS SUNRISE DATA TAKE DTD 0623 SOLID SORBENT SAMPLER ATMOS SUNRISE DATA TAKE ATMOS SUNRISE DATA TAKE																							



GMT (D:H:M)		MET (D:H:M)		CST (D:H:M)		FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE		
330:11:30 / 330:23:30		003:12:00 / 004:00:00		330:05:30 / 330:17:30		/ 330 GMT	27.4	☉	NOVEMBER 25, 1984	STS 51-B	BASIC	9/13/84		
MET : 003 12 13 14 15 16 17 18 19 20 21 22 23 0 GOLD E05														
GOLD	CDR												35MM/198	
	MS1	SLEEP								DOWN AFT	POST SLEEP ACT	H/O	D/P	VCG-MON3 D/P VCG-MON3 VCG-MON3 VCG-MON3
	MS3									DOWN AFT			D/P	UNSCAL ARC-RDR ARC-RDR
	PSF									DOWN AFT			D/P	TVID
DAY/NIGHT														
ORBIT														
EARTH TRACE W/SAR														
GSTON COVERAGE														
TDRS E W														
ATTITUDE														
DEORB KSC														
EDW														
H2O INH														
NOTES:														
PRE SLEEP ACT FES-MON3 FES-MON3 ATMOS SUNSET DATA TAKE AURORA OBSERVATIONS														

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE																														
330:11:30 / 330:23:30	003:12:00 / 004:00:00	330:05:30 / 330:17:30	/ 330 GMT	27.4		NOVEMBER 25, 1984	STS 51-B	BASIC	9/13/84																														
MET : 003 12 13 14 15 16 17 18 19 20 21 22 23 0																																							
<table border="1"> <tr> <td>PLT</td> <td>P/TV SETUP</td> <td></td> <td>SCOR SCOR</td> <td>P/TV SETUP</td> <td>LUNCH</td> <td>P/TV SETUP</td> <td>FUEL ON</td> <td>P/TV SETUP</td> <td>FES ON</td> </tr> <tr> <td>MS2</td> <td></td> <td>TV17</td> <td>R/V-TAPE</td> <td></td> <td>LUNCH</td> <td></td> <td>TV20</td> <td>ARC-K</td> <td></td> </tr> <tr> <td>PSM</td> <td></td> <td></td> <td></td> <td>LUNCH</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>										PLT	P/TV SETUP		SCOR SCOR	P/TV SETUP	LUNCH	P/TV SETUP	FUEL ON	P/TV SETUP	FES ON	MS2		TV17	R/V-TAPE		LUNCH		TV20	ARC-K		PSM				LUNCH					
PLT	P/TV SETUP		SCOR SCOR	P/TV SETUP	LUNCH	P/TV SETUP	FUEL ON	P/TV SETUP	FES ON																														
MS2		TV17	R/V-TAPE		LUNCH		TV20	ARC-K																															
PSM				LUNCH																																			
DAY/NIGHT	[Day/Night Cycle]																																						
ORBIT	56	57	58	59	60	61	62	63																															
EARTH TRACE W/SAR	[Earth Trace Map]																																						
GSTON COVERAGE	-HAK	-HAN	-ACN -DKR	-GWM	-AGO -DKR	-MAD -ORR	-AGO -MAD	-YAR -MIL -MAD	-YAR -MIL -MAD																														
TDRS E M	[TDRS Coverage]																																						
ATTITUDE	B/-XLV-YVV																																						
DEORB KSC EDW	I 21:48																																						
H2O INH	[H2O Inhibition]																																						
NOTES:	<ul style="list-style-type: none"> ■ ATMOS SUNRISE DATA TAKE ▲ FES-MON3 ▲ FES-MON2 ▲ FES-MON3 ▲ FES-MON1 ▲ FES-MON2 ▲ FES-MON3 ▲ FES-MON1 ■ STATUS REPORT ■ ATMOS SUNSET DATA TAKE ■ ATMOS SUNSET DATA TAKE ■ ATMOS SUNSET DATA TAKE ■ ATMOS SUNSET DATA TAKE ○ FC PURGE HTR ON ○ FC PURGE HTR OFF ■ MANUAL ■ ATMOS SUNSET DATA TAKE ■ ATMOS SUNSET DATA TAKE 																																						

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
330:23:30 / 331:11:30	004:00:00 / 004:12:00	330:17:30 / 331:05:30	/ 330 GMT	25.9	●	NOVEMBER 25, 1984	STS 51-B	BASIC	9/13/84
GMT : 330									
	GMT:331								
	MET : 004								
GOLD	CDR	P/TV SETUP & ACT	P/TV SETUP & ACT	LUNCH					
	MS1			LUNCH					PRE SLEEP ACT
	MS3			LUNCH					
	PSF			LUNCH					
	DAY/NIGHT								
DRBIT	64	65	66	67	68	69	70	71	
EARTH TRACE W/SRA									
GSTDN COVERAGE	-GDS -MIL -MAD	-GDS -MAD	-GDS -MAD -DKR -ACN	-DKR -ACN -YAR	-GWM -BDA -MIL	-GWS -MIL	-GOS -AGO		-AGO
TDRS									
ATTITUDE	B/-XLV-YVV								
DEORB KSC EDW	1 x 0:54			1 x 5:52		1 x 7:27		1 x 8:55	
H2O INH									
NOTES:	<ul style="list-style-type: none"> • VCG-MON3 • FES-MON3 • FES-MON1 • FES-MON2 • FES-MON3 • FES-MON3 • FES-MON3 • FES-MON1 • FES-MON2 • FES-MON3 • ATMOS SUNRISE DATA TAKE • AURORA OBSERVATIONS • AURORA OBSERVATIONS • STATUS REPORT • AURORA OBSERVATIONS • AURORA OBSERVATIONS • ATMOS SUNRISE DATA TAKE • ATMOS SUNRISE DATA TAKE • DTD 0623 SOLID SORBENT SAMPLER • ATMOS SUNRISE DATA TAKE • ATMOS SUNRISE DATA TAKE 								

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
330:23:30 / 331:11:30	004:00:00 / 004:12:00	330:17:30 / 331:05:30	/ 330 GMT	25.9		NOVEMBER 25, 1984	STS 51-B	BASIC	9/13/84

GMT: 330	MET: 004									
	GMT: 331									
	STLV FD6									

SILVER	PLT									P / V	SETUP	
	MS2	PARCET	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	POST SLEEP ACT	H/O	D/P	REC'D 3
	PSM											REC'D 2

DRY/NIGHT										
ORBIT	64	65	66	67	68	69	70	71		



GSTON COVERAGE	-GDS -MIL	-MAD	-GDS -MAD	-MAD -DKR -ACN	-DKR -ACN	-YAR -GWM	-BDA -MIL	-GDS -MIL	-GDS -AGO	-AG
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TDRS E H										
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ATTITUDE	87-XLV-YVV									
GEORB KSC	1 x 5:52									
EDW	1 x 7:27									

H2O INH	1 x 8:55									
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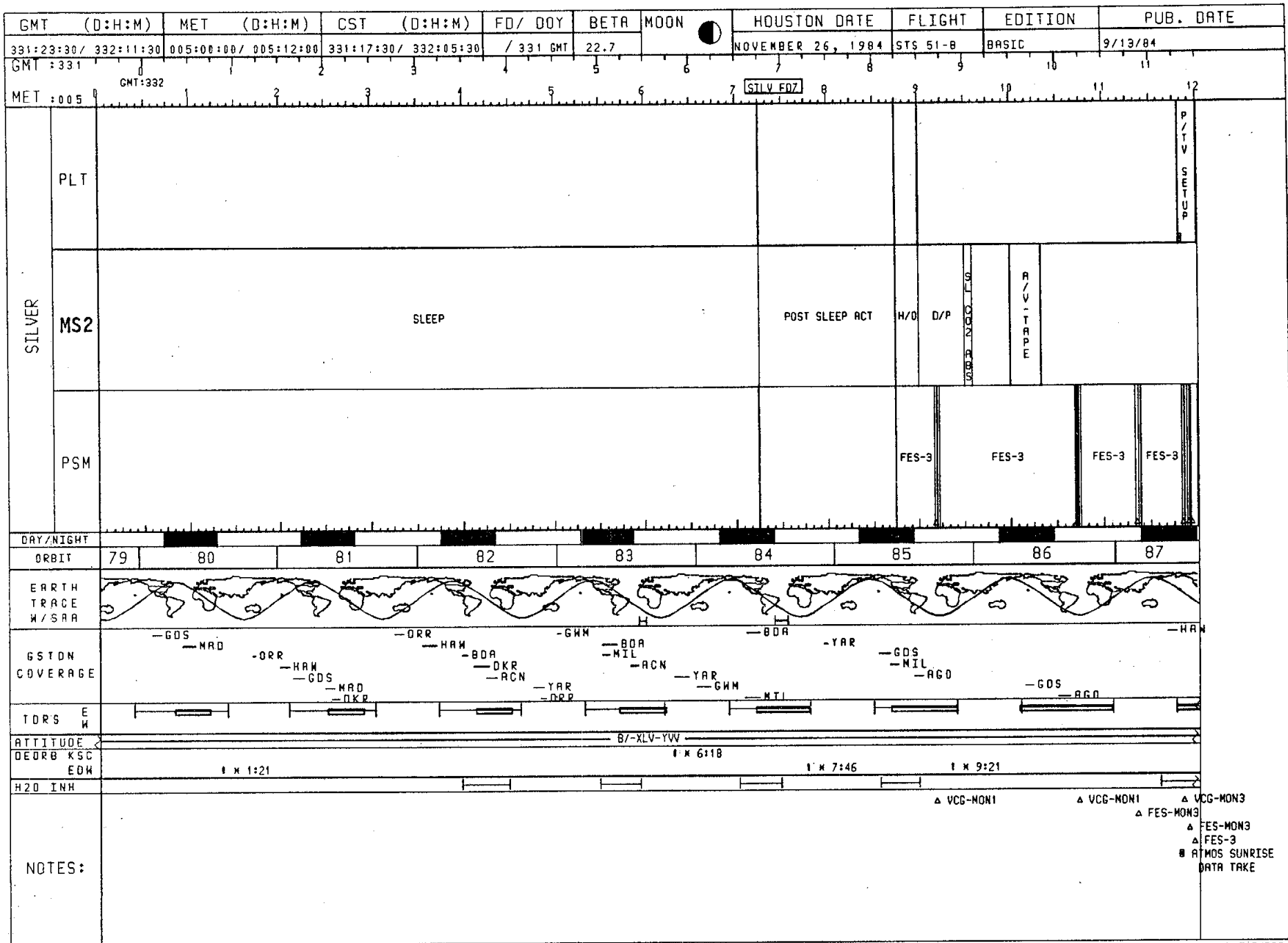
NOTES:

▲ FES-MON2
 ● ATMOS SUNRISE DATA TAKE

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE					
331:11:30 / 331:23:30	004:12:00 / 005:00:00	331:05:30 / 331:17:30	/ 331 GMT	24.9		NOVEMBER 26, 1984	STS 51-B	BASIC	9/13/84					
GMT : 331	12	13	14	15	16	17	18	19	20	21	22	23		
MET : 004	12	13	14	15	16	17	18	19	20	21	22	23		
COLD	CDR							FES ON						
	MS1	SLEEP						POST SLEEP ACT		H/O	D/P	VCG-MON2	VCG-MON3	VCG-MON1
	MS3							D/P		UNS-CAL	ARC-MASK			
	PSF							D/P		T V 1 B	DDM-0/E			
DRY/NIGHT														
ORBIT	72	73	74	75	76	77	78	79						
EARTH TRACE W/SRA														
GSTON COVERAGE	-HAN -HAN -ACN -GWN -AGO -DKR -MAD -YAR -BDA -ACN -DKR -MAD -ORR -AGO -BDA -YAR -NTI													
TORS														
ATTITUDE	B/-XLV-YVV													
DEORB KSC	f 20:40 f x 22:15													
H2O PNH														
NOTES:	■ PRE SLEEP ACT ■ FES-MON2 ■ FES-MON3 ■ FES-MON1 ■ ATMOS SUNSET DATA TAKE													

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE				
331:11:30 / 331:23:30	004:12:00 / 005:00:00	331:05:30 / 331:17:30	/ 331 GMT	24.3		NOVEMBER 26, 1984	STS 51-B	BASIC	9/13/84				
GMT : 331	12	13	14	15	16	17	18	19	20	21	22	23	
MET : 004	12	13	14	15	16	17	18	19	20	21	22	23	0
SILVER	PLT		P / TV SETUP			P / TV SETUP	FES ON	LUNCH					
	MS2												
	PSM												
DRY/NIGHT													
ORBIT		72	73	74	75	76	77	78	79				
EARTH TRACE W/SAA													
GSTON COVERAGE	-HAW -HAW -RCN -GMM -AGO -DKR -MAD -ORR -AGO -BDR -YAR -MIL -BDR -YAR -MIL -BDR -YAR -MIL -BDR -YAR												
TORS													
ATTITUDE	B/-XLV-YVV												
DEORB KSC	t 20:40 t 22:15												
EDW	23:46												
H2O INH													
NOTES:	▲ FES-MON3 ▲ FES-MON3 ▲ FES-MON2 ● GFFC-3 ▲ FES-MON3 ▲ FES-MON2 ■ STATUS REPORT ⊗ ATMOS SUNRISE DATA TAKE ⊗ ATMOS SUNSET DATA TAKE ⊗ ATMOS SUNSET DATA TAKE ⊗ ATMOS SUNSET DATA TAKE												

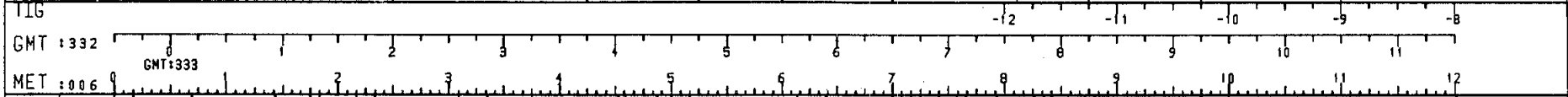
GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE	
331:23:30 / 332:11:30	005:00:00 / 005:12:00	331:17:30 / 332:05:30	/ 331 GMT	22.7		NOVEMBER 26, 1984	STS 51-B	BASIC	9/13/84	
GMT: 331 0 GMT: 332 1										
MET: 005 2 3 4 5 6 7 8 9 10 11 12										
GOLD	CDR	P/TV SETUP & ACT	DTO 0623	P/TV SETUP & ACT	LUNCH	P/TV SETUP & ACT	PSETTUP	PSETTUP	PSETTUP	PSETTUP
	MS1	VCG-MON3	ORBIT TAPE	AURORA	VCG-MON1	A/V TAPE	VCG-MON3	TV19	AURORA	TV19
	MS3	ARC-E-DR	ARC-F-DR	ARC-A-SR	TV10	LUNCH	ARC-K	A/V TAPE	ARC-C	ARC-D1/2
	PSF	DDM-0/E	LUNCH	TV18	DDM-0/E					
DAY/NIGHT										
ORBIT	79	80	81	82	83	84	85	86	87	
EARTH TRACE W/SAR										
GSTON COVERAGE	-GOS -MAD -ORR -HAW -ORR -HAW -GWM -BDA -MIL -ACN -YAR -GWM -BDA -YAR -GOS -MIL -AGO									
TORS E W										
ATTITUDE	B/-XLV-YVV									
DEORB KSC EDW	1 x 1:21			1 x 6:18			1 x 7:46		1 x 9:21	
H2O INH										
NOTES:	<ul style="list-style-type: none"> • FES-MON3 • FES-MON1 • FES-MON3 • FES-MON3 • FES-MON3 • FES-MON2 • FES-MON3 • FES-MON1 • FES-3 • STATUS REPORT • AURORA OBSERVATIONS • AURORA OBSERVATIONS • ATMOS SUNRISE DATA TAKE • ATMOS SUNRISE DATA TAKE • ATMOS SUNRISE DATA TAKE • DTO 0623 • SOLID SORBENT SAMPLER • AURORA OBSERVATIONS • ATMOS SUNRISE DATA TAKE 									



GMT (D:H:M)		MET (D:H:M)		CST (D:H:M)		FD/DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE	
332:11:30 / 332:23:30		005:12:00 / 006:00:00		332:05:30 / 332:17:30		/ 332 GMT	21.1		NOVEMBER 27, 1984	STS 51-B	BASIC	9/13/84	
GMT : 332		12	13	14	15	16	17	18	19	20	21	22	23
MET : 005		12	13	14	15	16	17	18	19	20	21	22	23
		GOLD F07											
GOLD	CDR												
	MS1	SLEEP											
	MS3	POST SLEEP ACT											
	PSF	H/D D/P											
DAY/NIGHT													
ORBIT	87	88	89	90	91	92	93	94	95				
EARTH TRACE W/SAA													
GSTDN COVERAGE													
TORS													
ATTITUDE	B/-XLV-YW												
DEORB KSC	21:06												
EDW													
H2O INH													
NOTES:	<ul style="list-style-type: none"> • FES-MON2 • FES-MON3 • VCG-MON1 • VCG • FES-MON1 • ATMOS SUNSET DATA TAKE • AURORA OBSERVATIONS 												

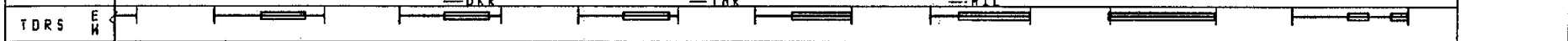
GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE				
332:11:30 / 332:23:30	005:12:00 / 006:00:00	332:05:30 / 332:17:30	/ 332 GMT	21.1		NOVEMBER 27, 1984	STS 51-B	BASIC	9/13/84				
GMT :332	12	13	14	15	16	17	18	19	20	21	22	23	0
MET :005	12	13	14	15	16	17	18	19	20	21	22	23	0
PLT			LUNCH										
MS2		TV 17		LUNCH			ARC-K			H/O		PRE SLEEP ACT	
PSM	FES-3	VCG-MON1	VCG-MON1	FES-3	VCG-MON2	VCG-MON3	LUNCH	VCG-MON3	VCG-MON2	VCG-MON3	VCG-MON1		
DAY/NIGHT													
ORBIT	87	88	89	90	91	92	93	94	95				
EARTH TRADE W/SAR													
GSTON COVERAGE													
TORS													
ATTITUDE	B/-XLV-YVV												
DEORB KSC	I 21:06												
H2O INH													
NOTES:	▲ FES-MON3 ▲ FES-MON2 ▲ FES-MON3 ▲ FES-MON3 ▲ FES-MON2 ▲ FES-MON3 ▲ FES-MON1 ■ ATMOS SUNRISE DATA TAKE ■ ATMOS SUNSET DATA TAKE ■ ATMOS SUNSET DATA TAKE ■ ATMOS SUNSET DATA TAKE ■ STATUS REPORT												

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
332:23:30/ 333:11:30	006:00:00/ 006:12:00	332:17:30/ 333:05:30	/ 332 GMT	19.3		NOVEMBER 27, 1984	STS 51-B	BASIC	9/13/84



GOLD	CDR	ORRB-TTAPPE	P/TV SETUP & ACT	DTO 0623	LUNCH	PS/TVUP	P/TV SETUP & ACT	PS/TVUP	CABIN STON	PS/TVUP	CABIN STON	PS/TVUP	FCS C/D						
	MS1	15NM/110	VCG-MON3	TV19	RURORR	VCG-MON1	R/V-TAPE	VCG-MON2	LUNCH	VCG-MON3	TV19	RURORR	VCG-MON2	FES-3	FES-DACT	MEAL PREP	R/V-TAPE	H/O S	SLEEP
	MS3	ARC-A-BR	ARC-A-SR	TV10	LUNCH	CABIN STON	UNSSAM	CABIN STON	ARC-K	ARC-C	ARC-D1/2	ARC-L	UNSSAM						
	PSF	DDM-O/E	LUNCH	CABIN STON	TV05														

DAY/NIGHT	ORBIT	95	96	97	98	99	100	101	102	103
-----------	-------	----	----	----	----	----	-----	-----	-----	-----



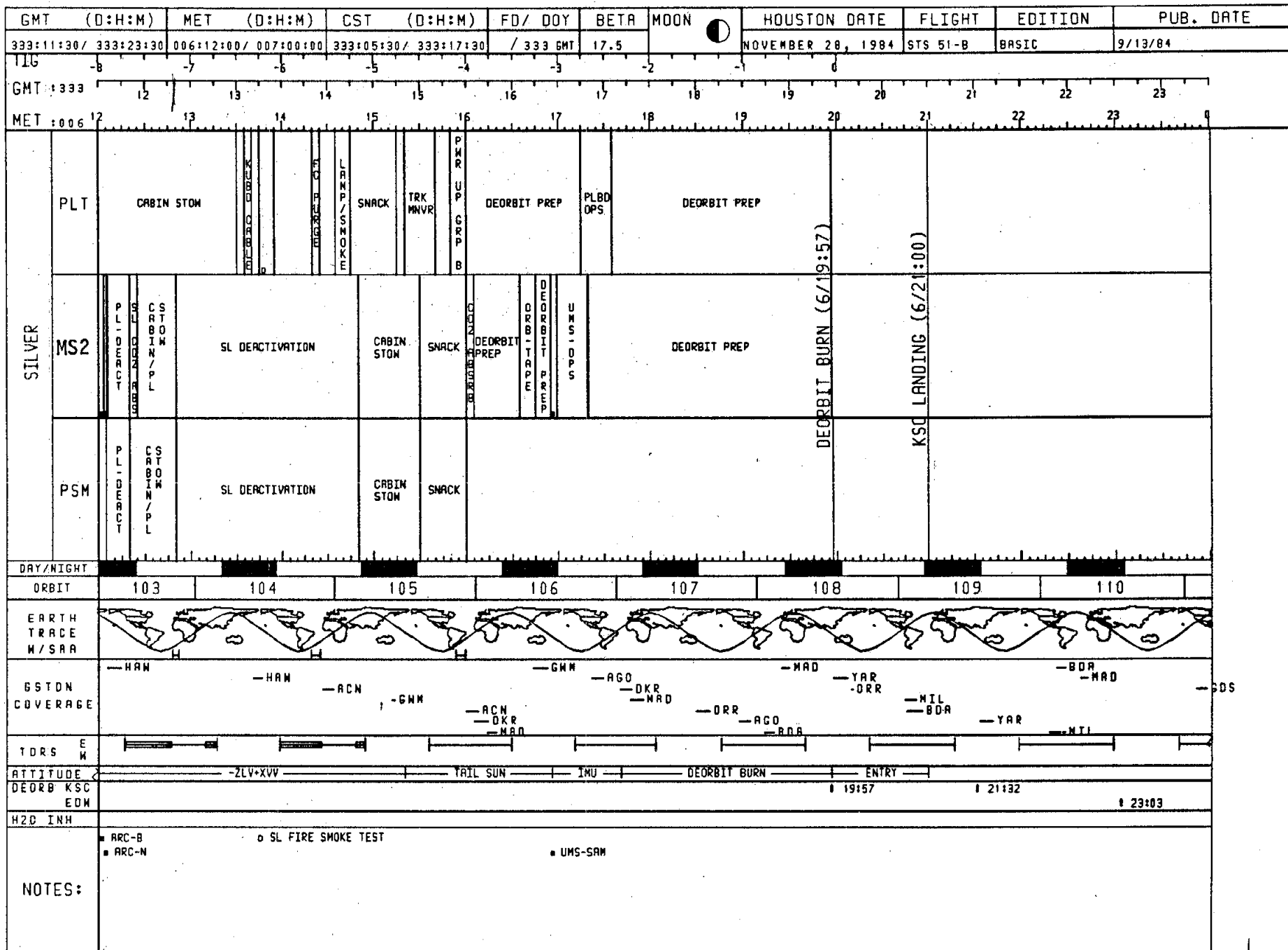
ATTITUDE	B/-XLV-YVV	DPLY	-ZLV+XVV
DEORB KSC	1 * 0:12	1 * 5:09	1 * 6:14
EDM			1 * 8:13

NOTES:

- FES-MON3 • FES-MON1 • FES-MON2 • FES-MON3 • FES-MON2 • FES-MON3
- AURORA OBSERVATIONS • ATMOS SUNRISE DATA TAKE • ATMOS SUNRISE DATA TAKE • IONS
- DTD 0623 SOLID SORBENT SAMPLER • ATMOS SUNRISE DATA TAKE • ATMOS SUNRISE DATA TAKE
- AURORA OBSERVATIONS • PWIR UP GRP B • ATMOS SUNRISE DATA TAKE

GMT (D:H:M)	MET (D:H:M)	CST (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE			
332:23:30 / 333:11:30	006:00:00 / 006:12:00	332:17:30 / 333:05:30	/ 332 GMT	19.3		NOVEMBER 27, 1984	STS 51-B	BASIC	9/13/84			
TIG						-12	-11	-10	-9	-8		
GMT :332	GMT:339											
MET :006	SILV FDB											
SILVER	PLT						POST SLEEP ACT	FCS C/O	RCS HOT FIRE	TRK M NVR	TRK M NVR	CABIN STOW
	MS2	SLEEP					POST SLEEP ACT	H/O	ARRIVAL CLEANUP	NUSAT DEPLOY	PL-STOW	ARC-B
	PSM									PL-STOW		P/TV SETUP
DAY/NIGHT												
ORBIT	95	96	97	98	99	100	101	102	103			
EARTH TRACE W/SAA												
GSTDN COVERAGE	--GDS --HAD --ORR --HAW --GDS --HAD --DKP --RCN --DKR --RCN --YAP --GWM --BDA --MIL --YAR --GWM --GDS --NTI --GDS --AG0 --AG0											
TORS E H												
ATTITUDE	B/-XLV-YVV											
DEORB KSC EDM	1 X 0:12 1 X 5:09 1 X 6:44 1 X 8:13											
H2O INH												
NOTES:												

GMT (D:H:M)		MET (D:H:M)		CST (D:H:M)		FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
333:11:30 / 333:23:30		006:12:00 / 007:00:00		333:05:30 / 333:17:30		/ 333 GMT	17.5		NOVEMBER 28, 1984	STS 51-B	BASIC	9/13/84
GMT : 333 12 13 14 15 16 17 18 19 20 21 22 23 MET : 006 12 13 14 15 16 17 18 19 20 21 22 23												
GOLD	CDR						DEORBIT PREP					
	MS1	SLEEP				POST SLEEP ACT	DEORBIT PREP	DEORBIT BURN (6/19:57)	KSC LANDING (6/21:00)			
	MS3						DEORBIT PREP					
	PSF											
DAY/NIGHT												
ORBIT	103	104	105	106	107	108	109	110				
EARTH TRACE W/SRA												
GSTDN COVERAGE	-HAW -HAW -ACN -GMM -ACN -DKR -MAD -YAR -BDA -MAD -BDS -ACN -DKR -MAD -DKR -MAD -ARR -AGO -BDA -MIL -BDA -YAR -MIL											
TDRS E W												
ATTITUDE	-ZLV+XVV TAIL SUN IMU DEORBIT BURN ENTRY											
DEORB KSC EDM	19:57 21:32 23:03											
H2O INH												
NOTES:	• ARC-FOIF											

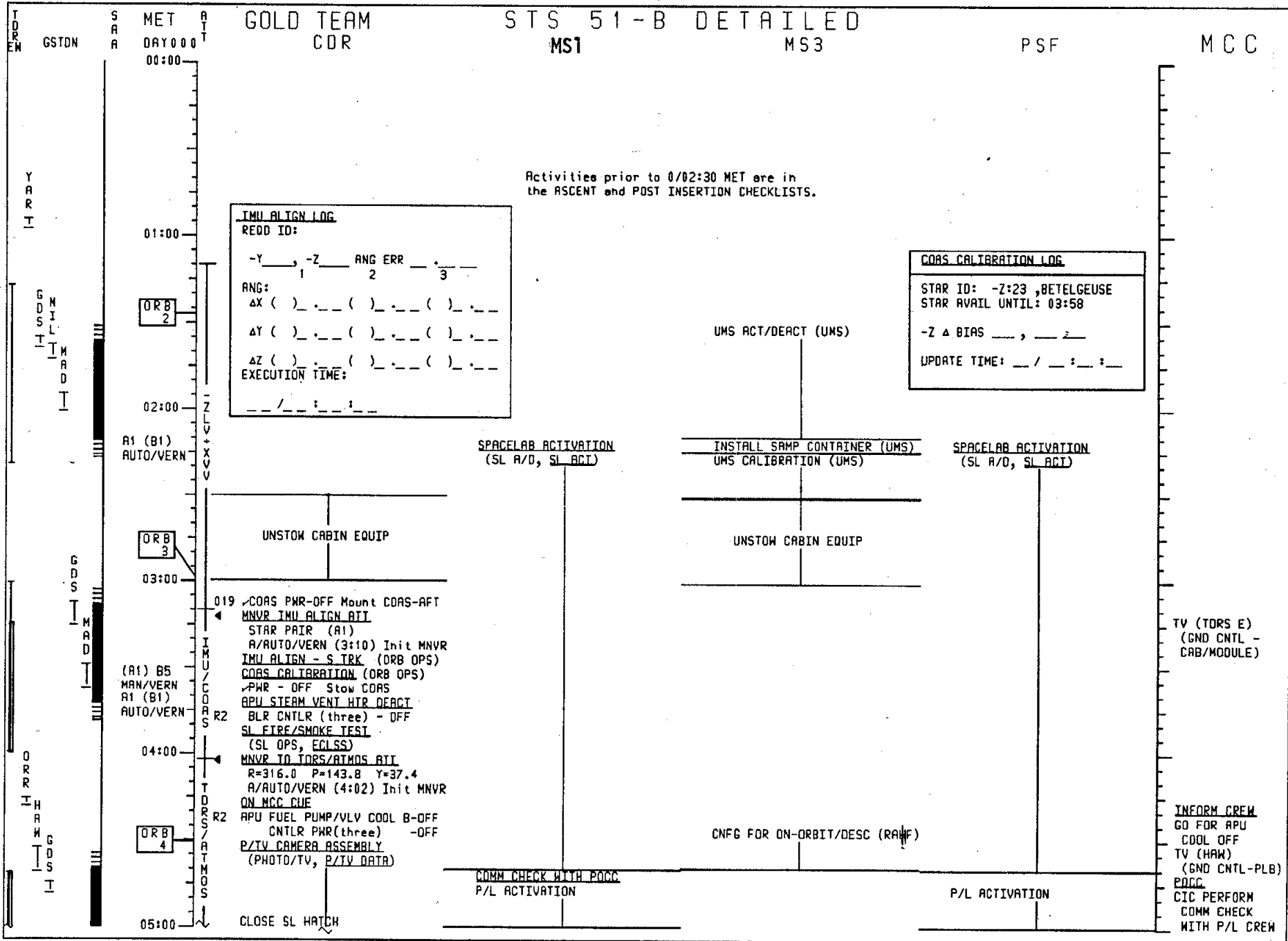


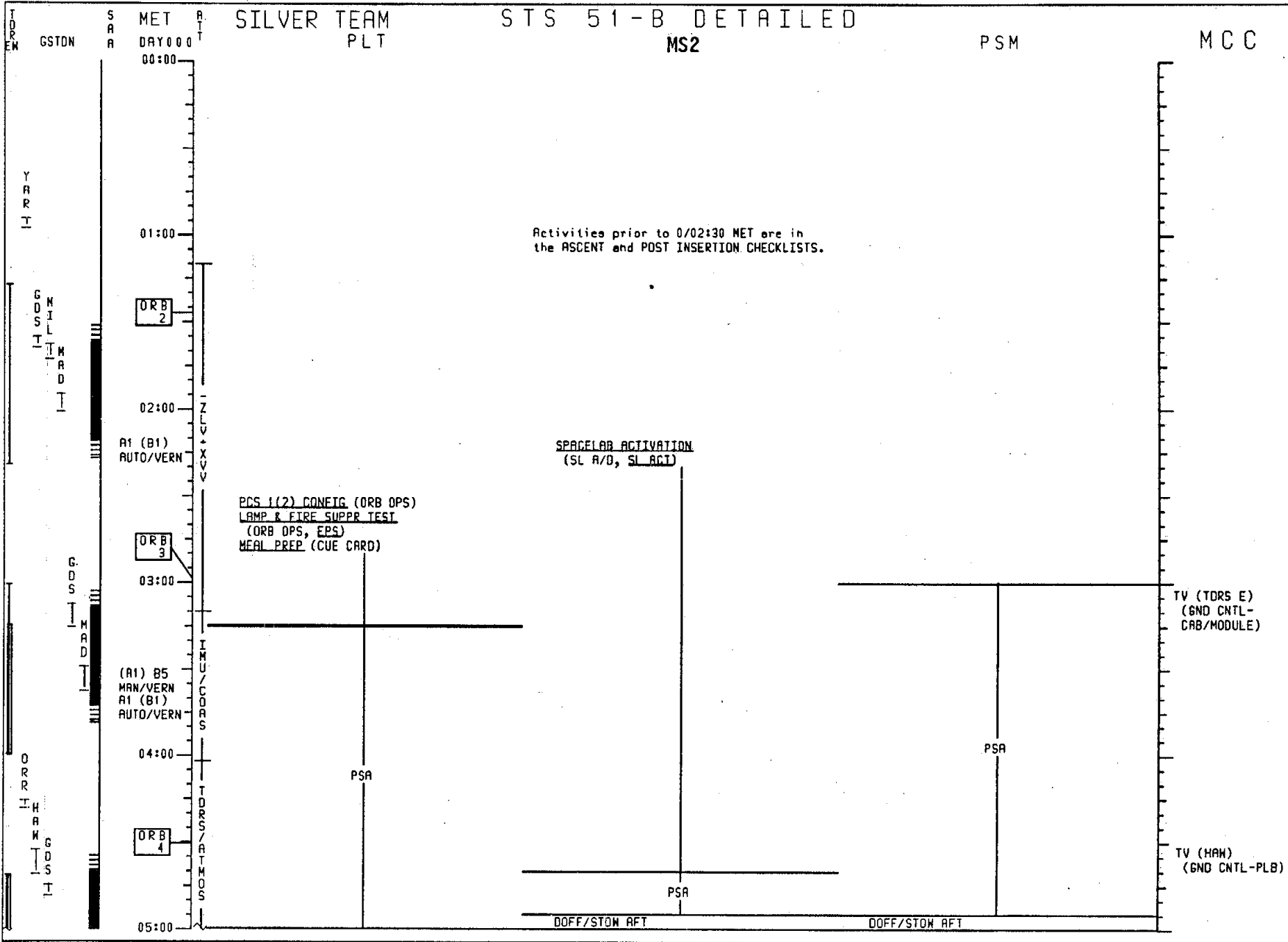
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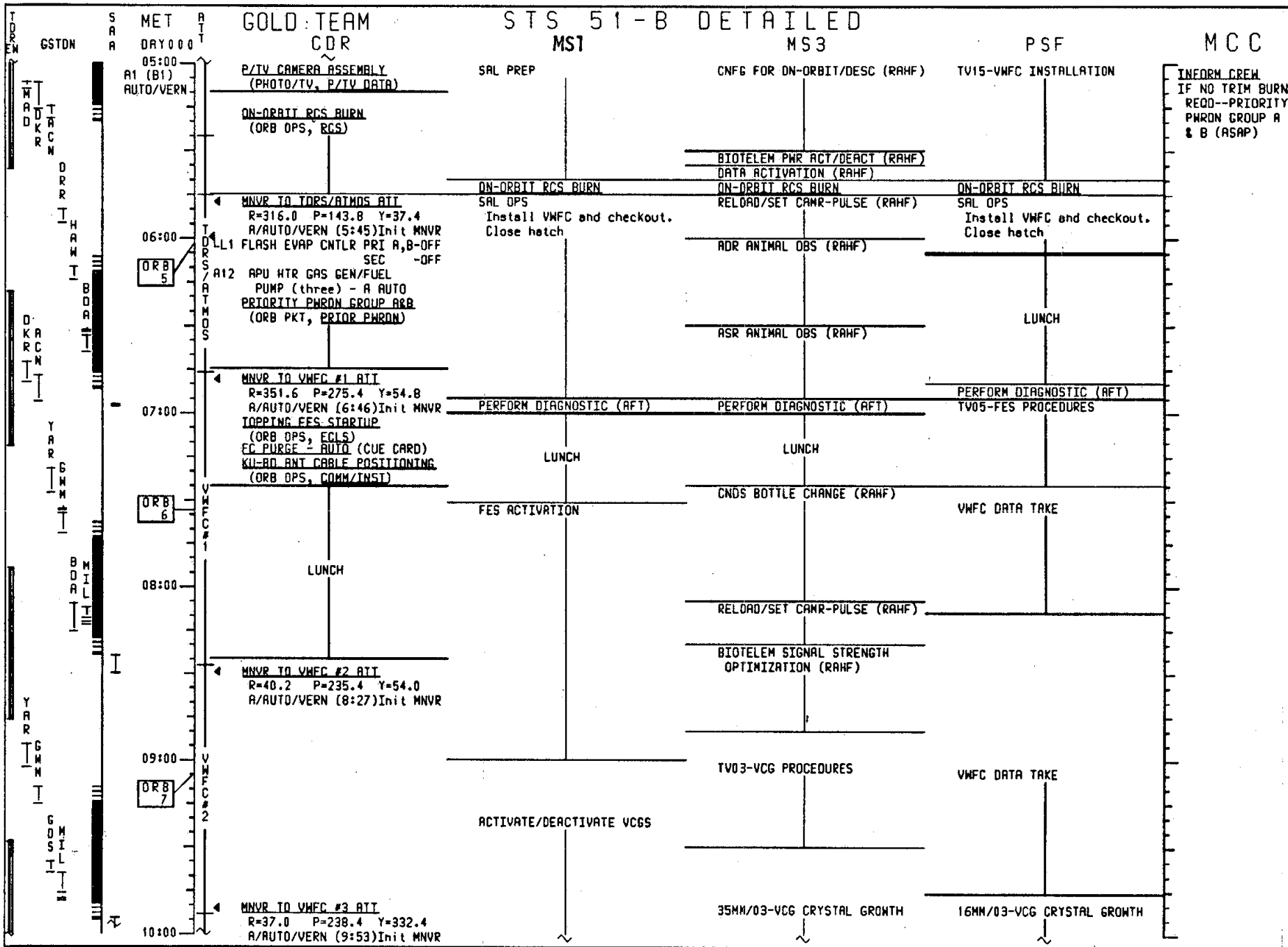
DETAILED TIMELINE

DETAILED
TIMELINE

DETAILED TIMELINE





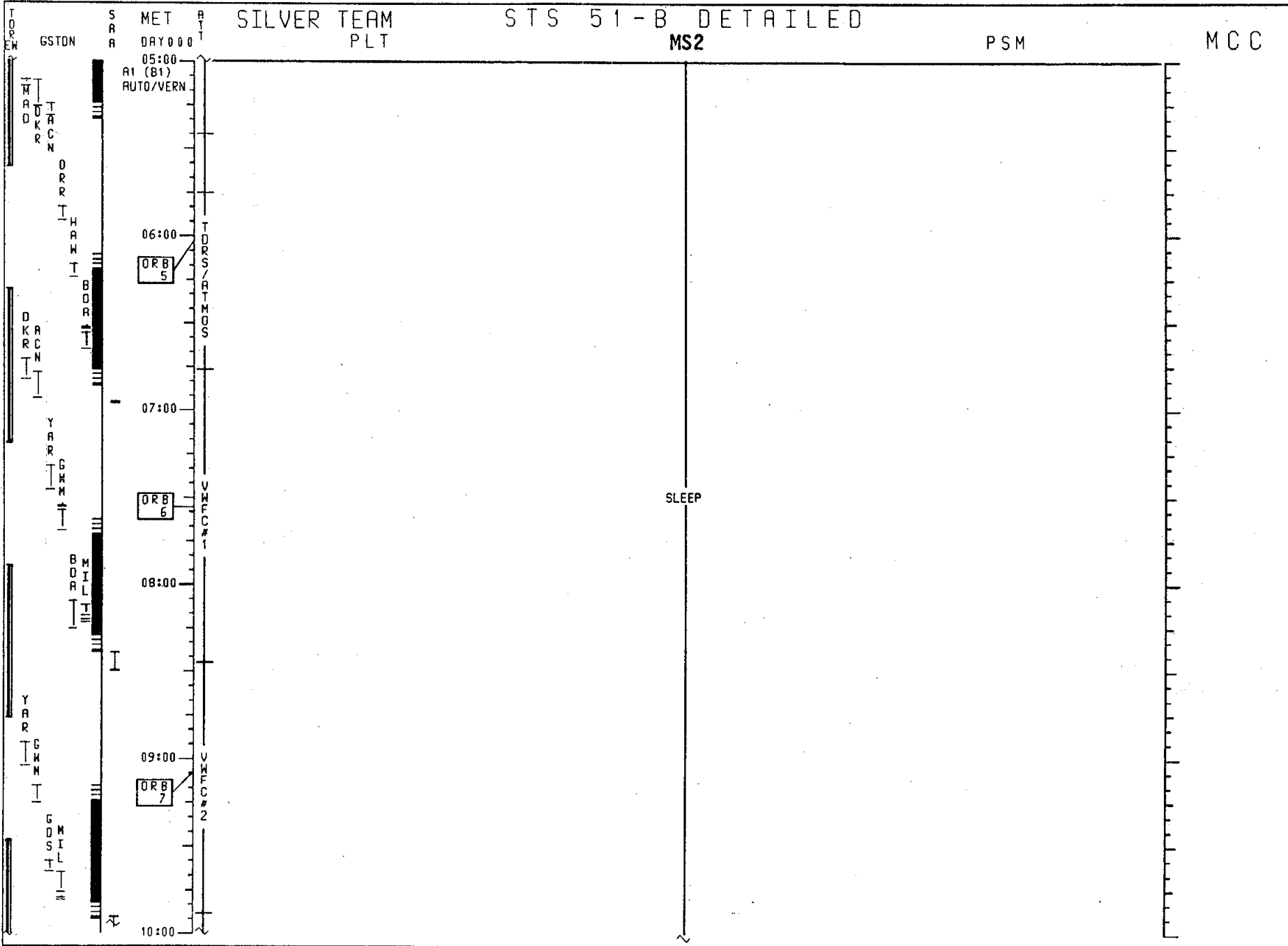


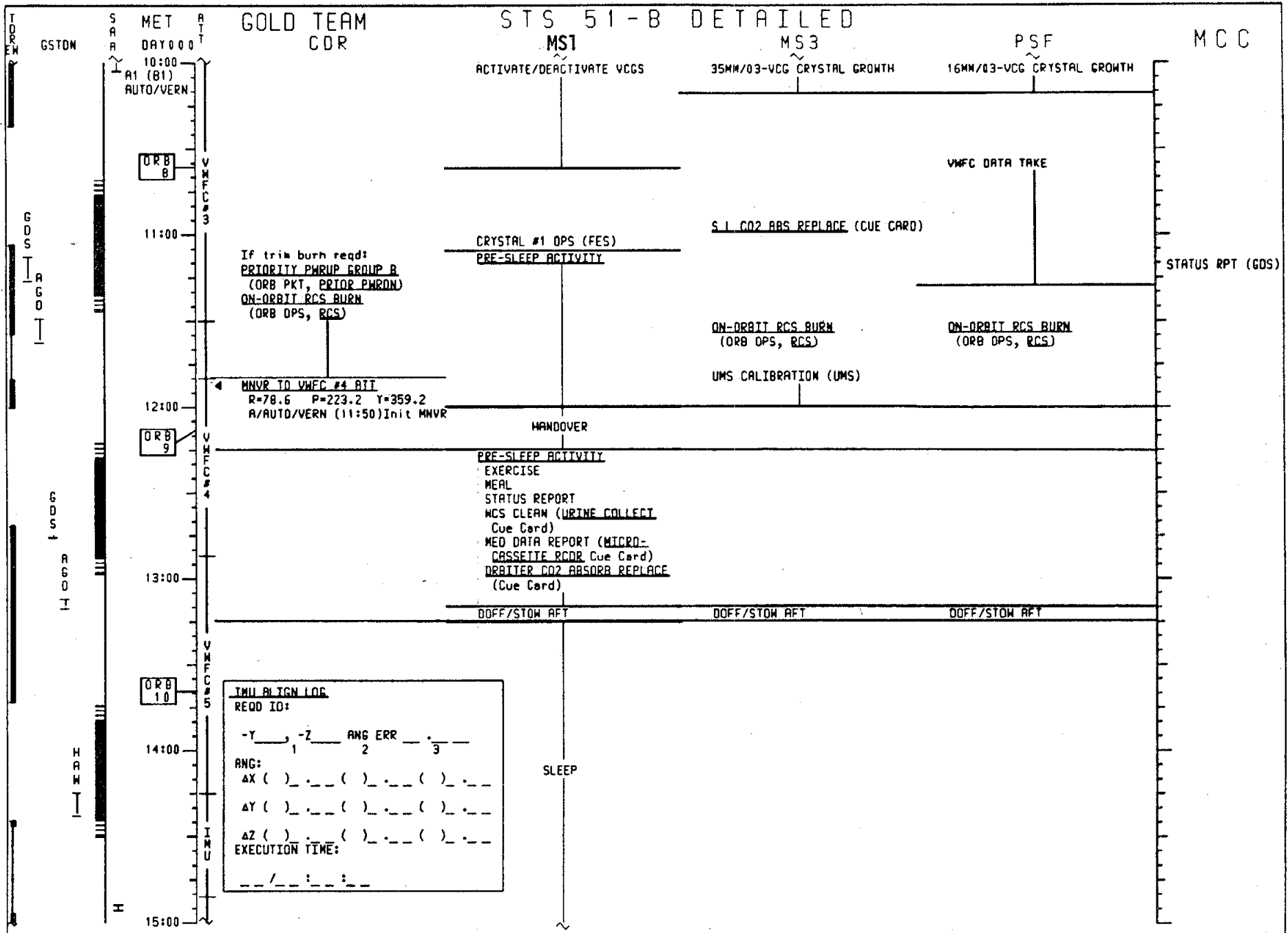
SILVER TEAM
PLT

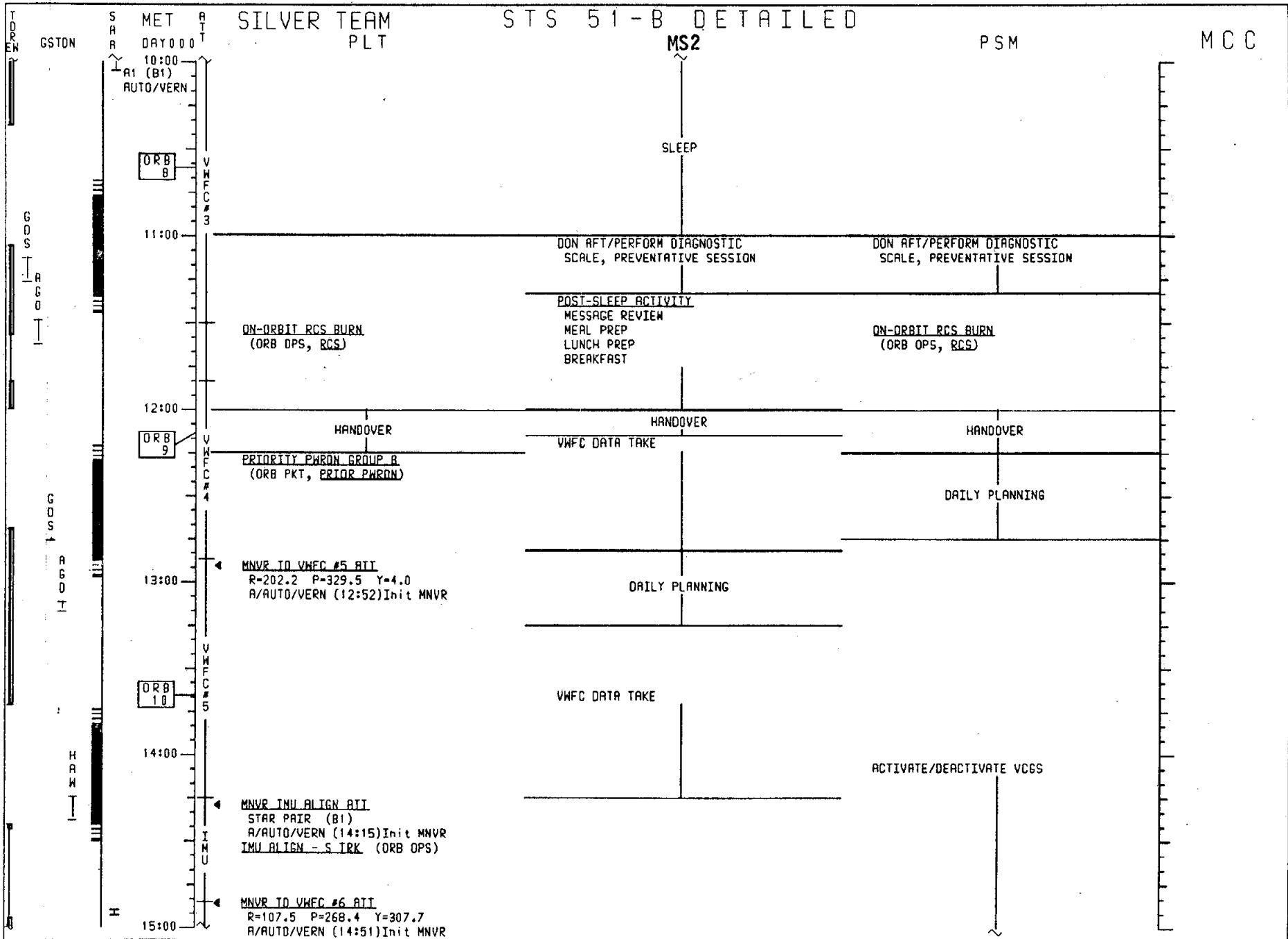
STS 51-B DETAILED
MS2

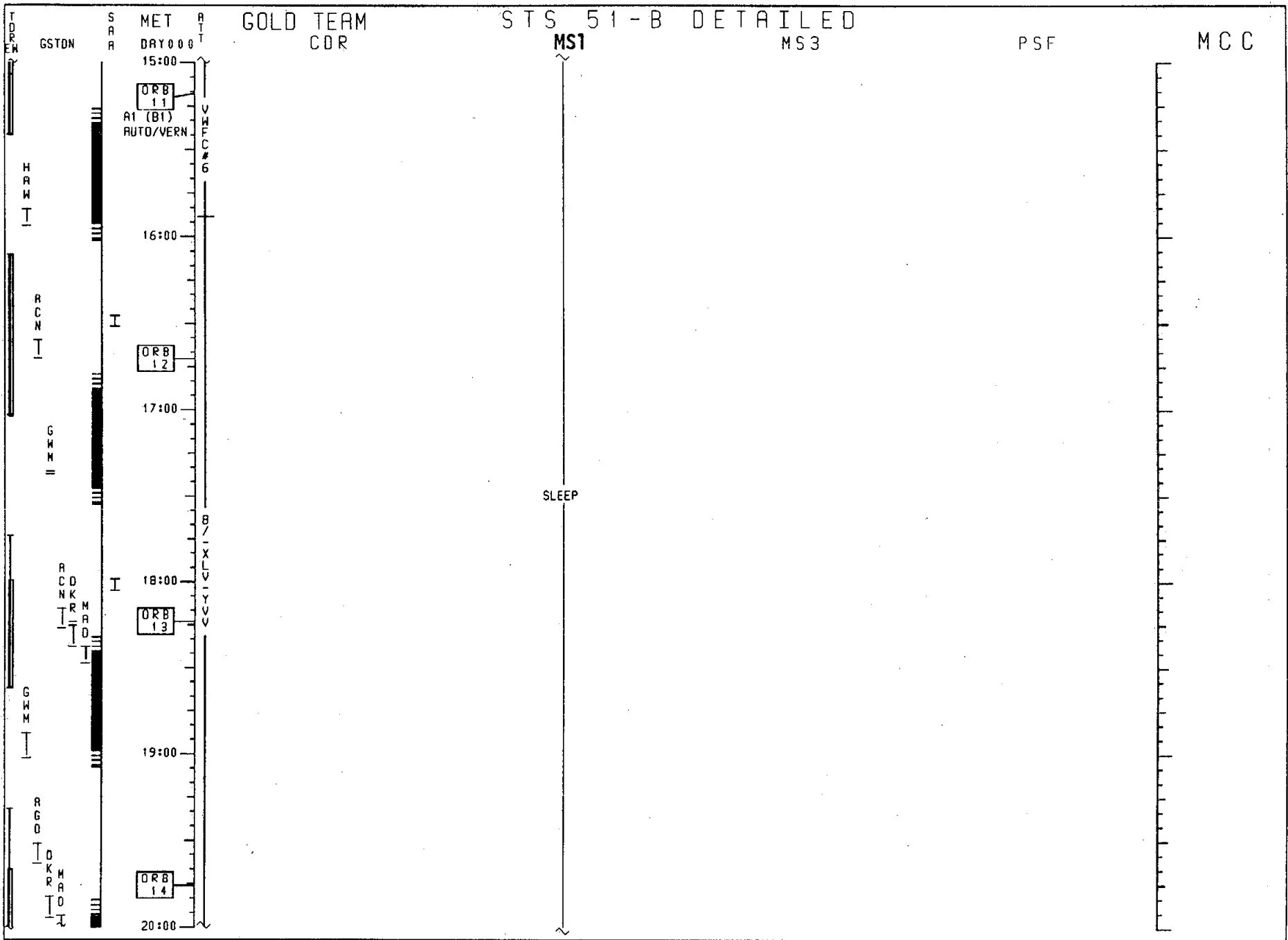
PSM

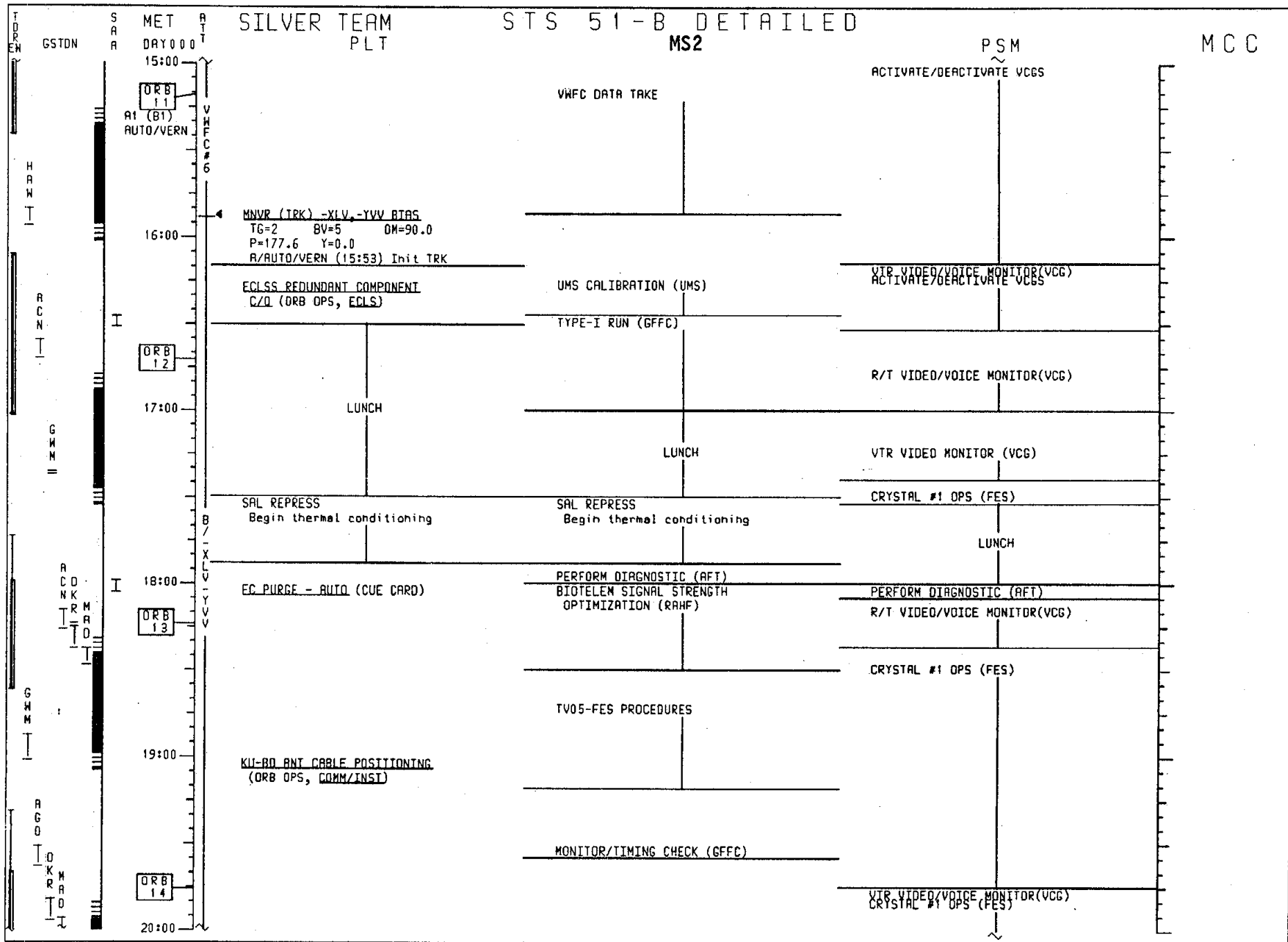
MCC

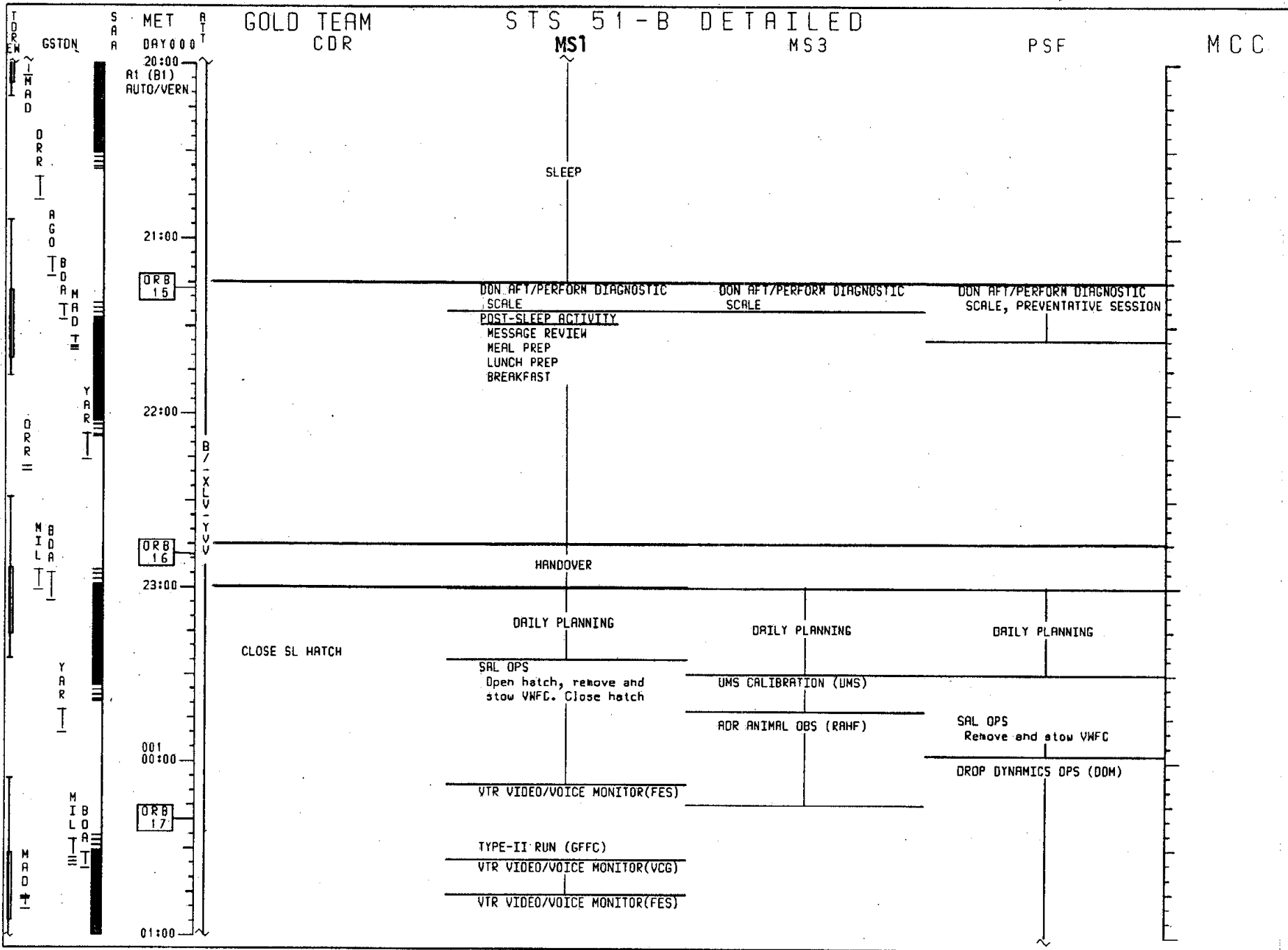


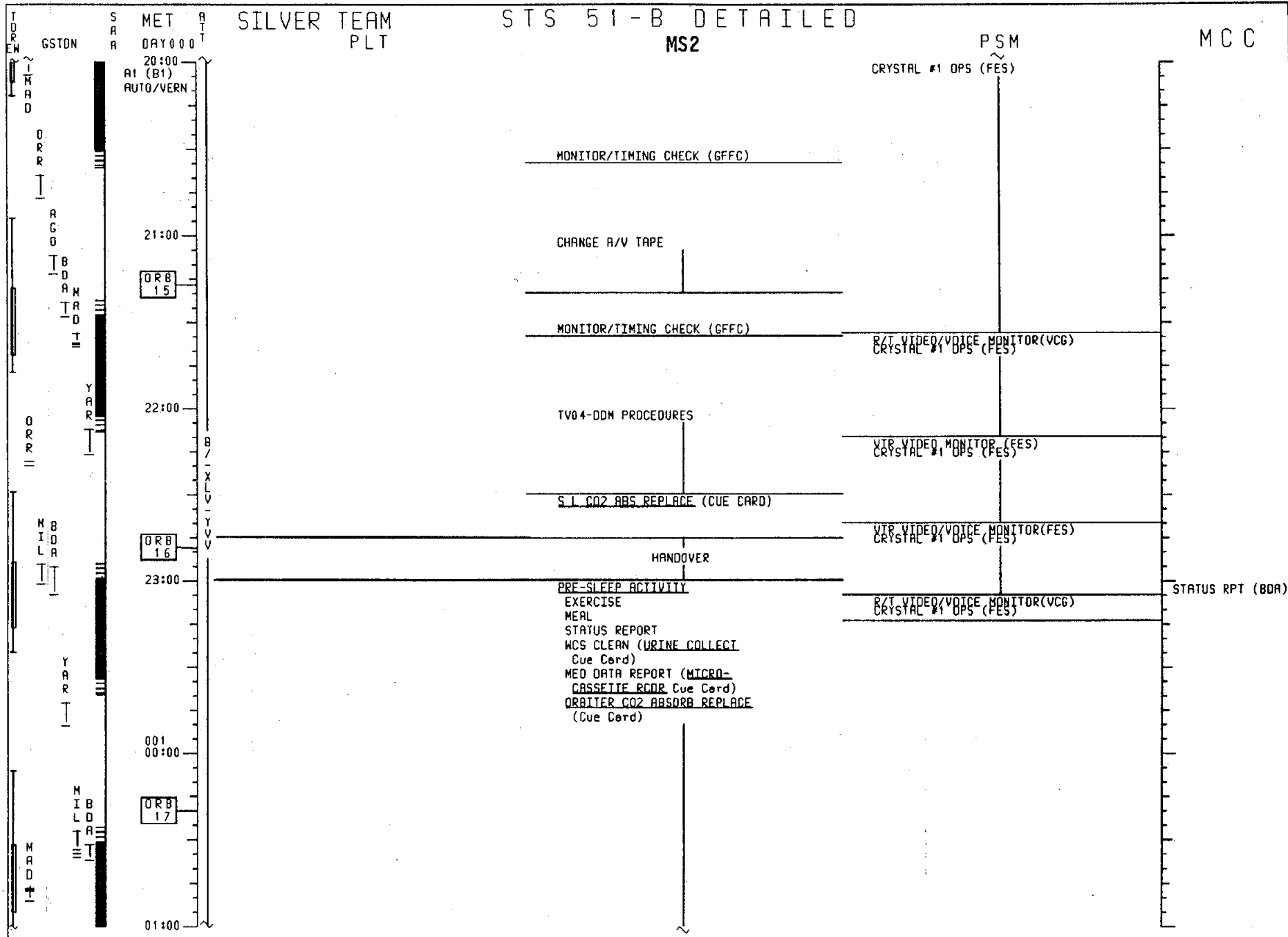


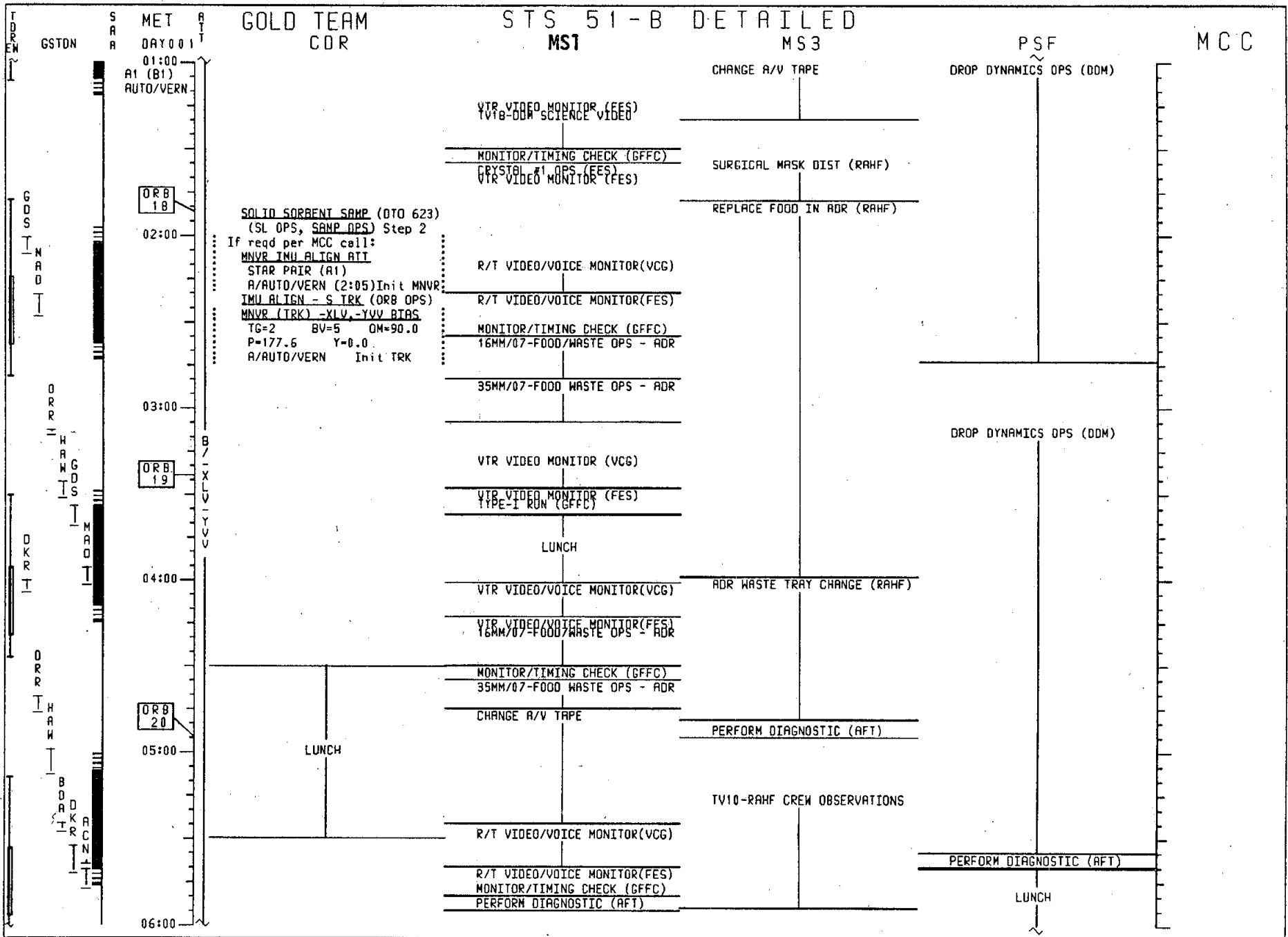












SILVER TEAM
PLT

STS 51-B DETAILED

MS2

PSM

MCC

MET
DAY 001
01:00
A1 (B1)
AUTO/VERN

PRE-SLEEP ACTIVITY

DOFF/STON AFT

DOFF/STON AFT

ORB
18

02:00

IMU_ALIGN.LOG

REQD ID:

-Y____, -Z____ ANG ERR ____
 1 2 3

ANG:

ΔX () . () . () .

ΔY () . () . () .

ΔZ () . () . () .

EXECUTION TIME:

___/___:___:___

ORB
19

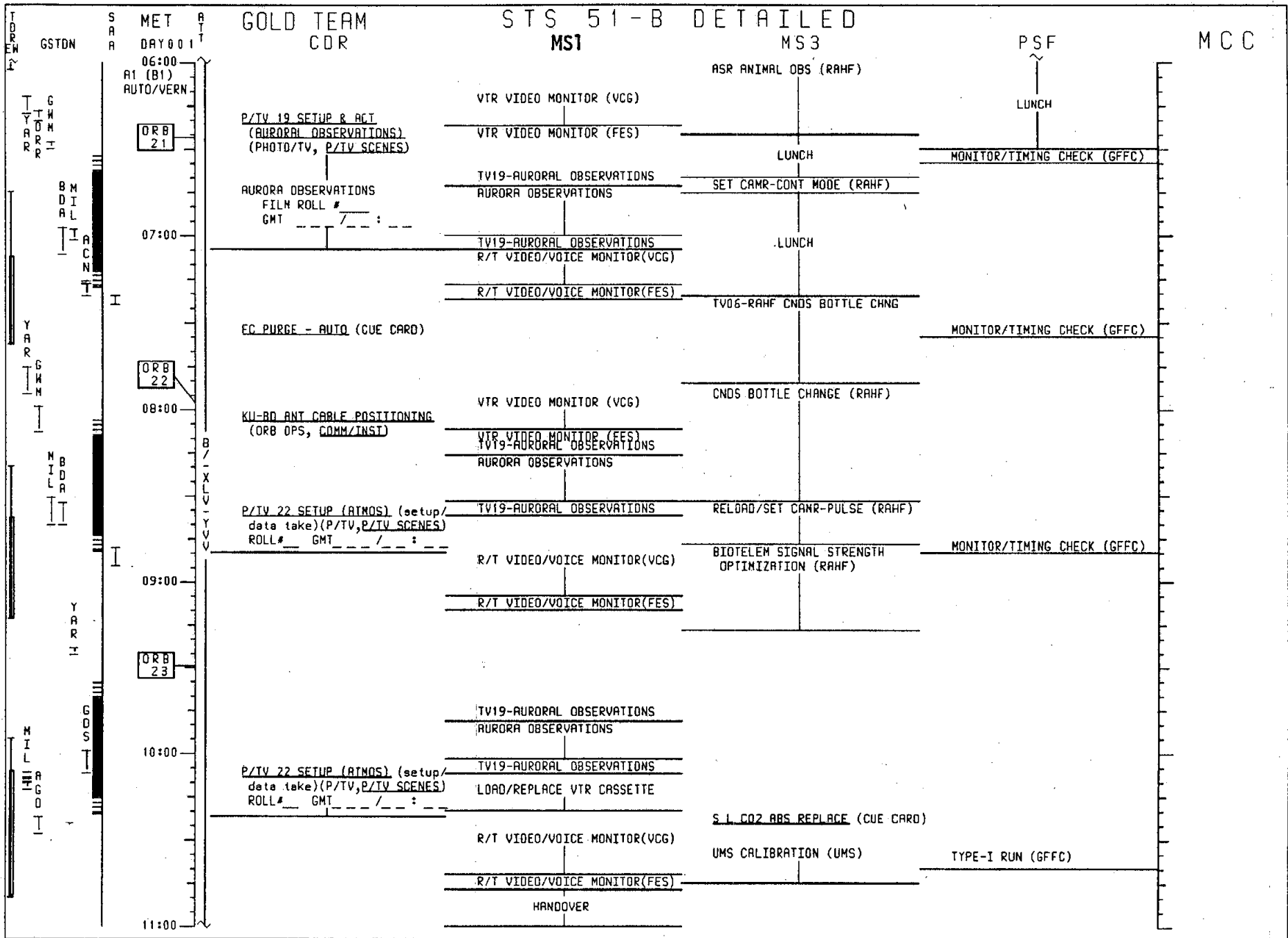
04:00

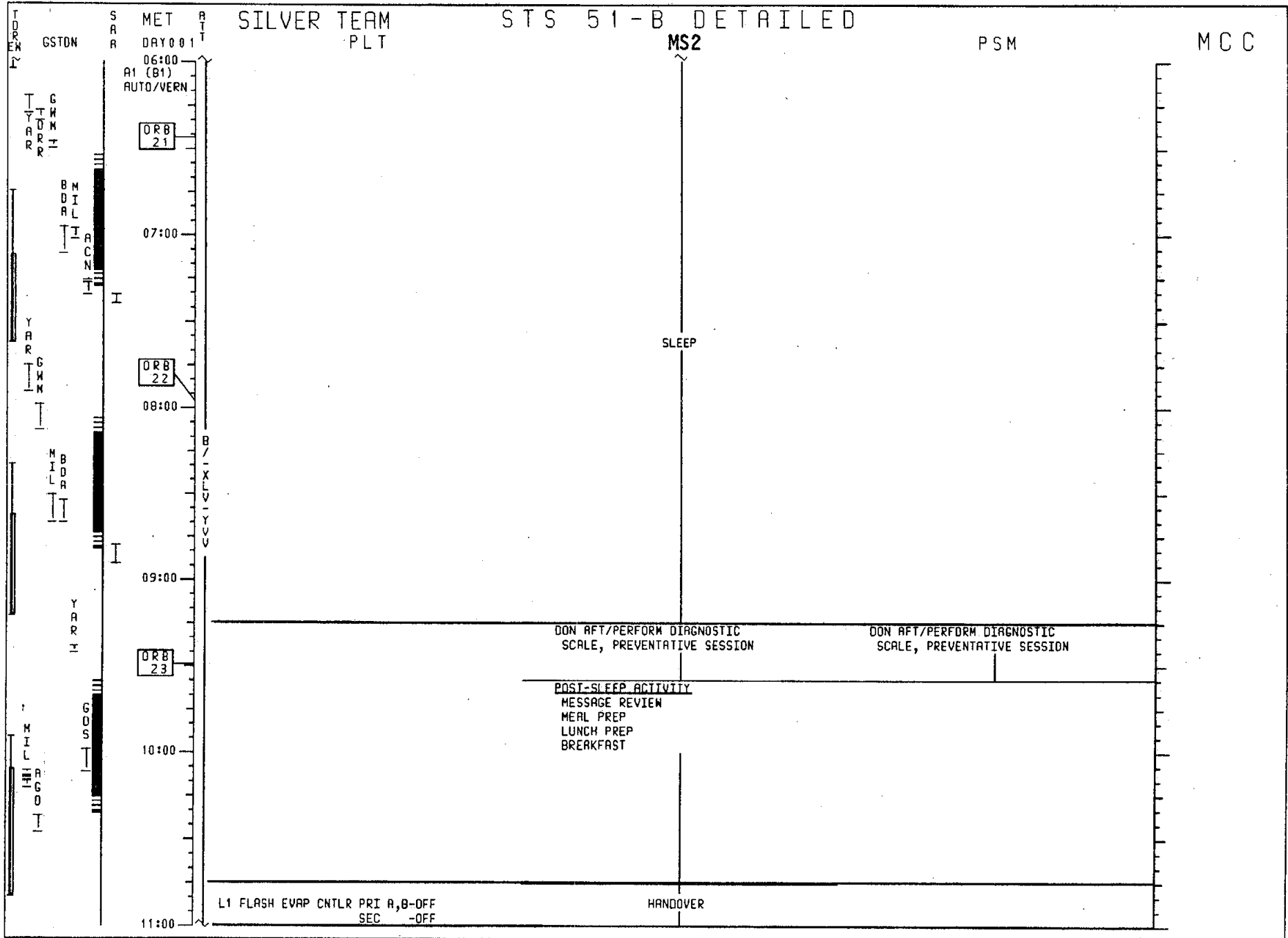
SLEEP

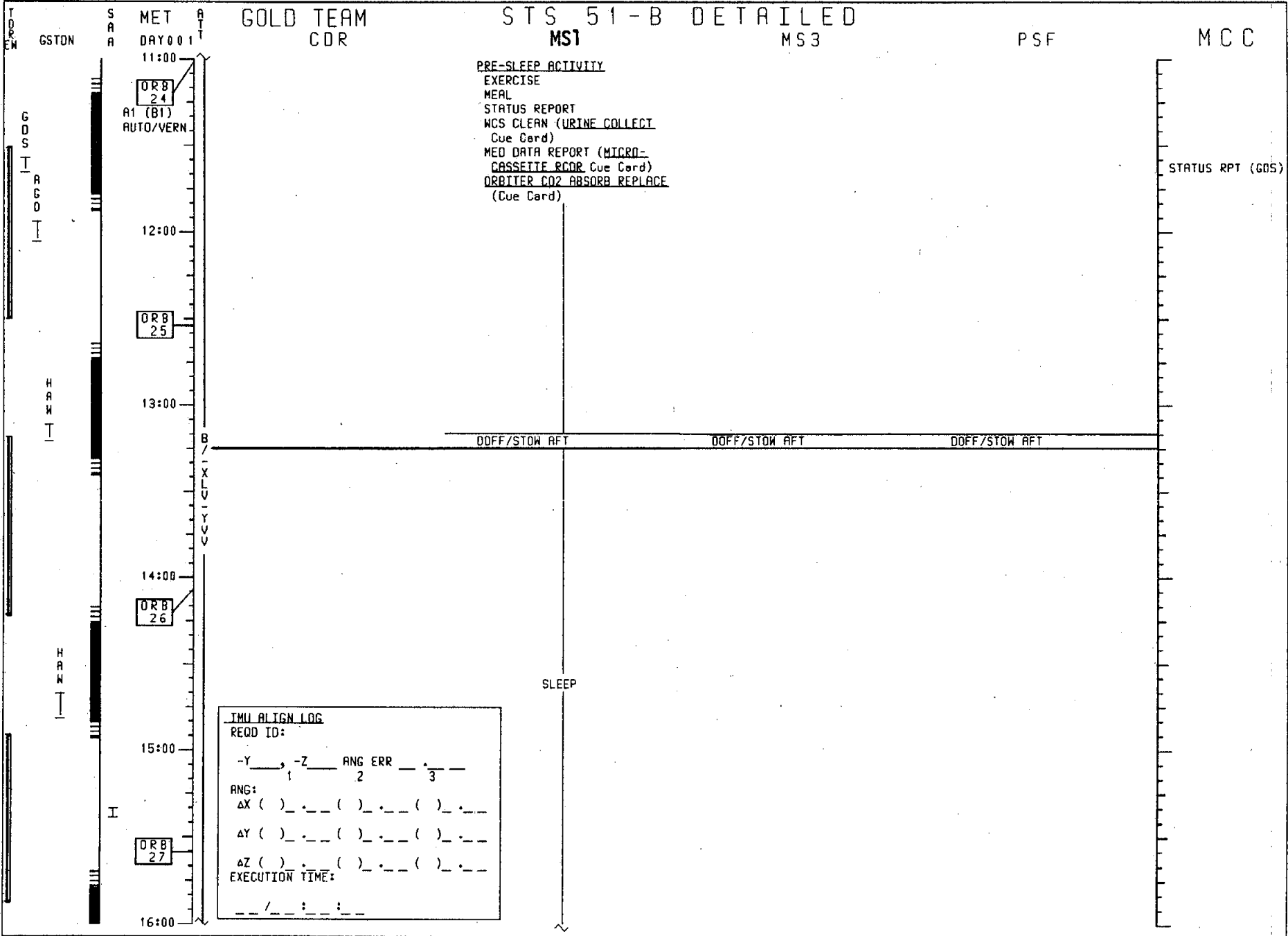
ORB
20

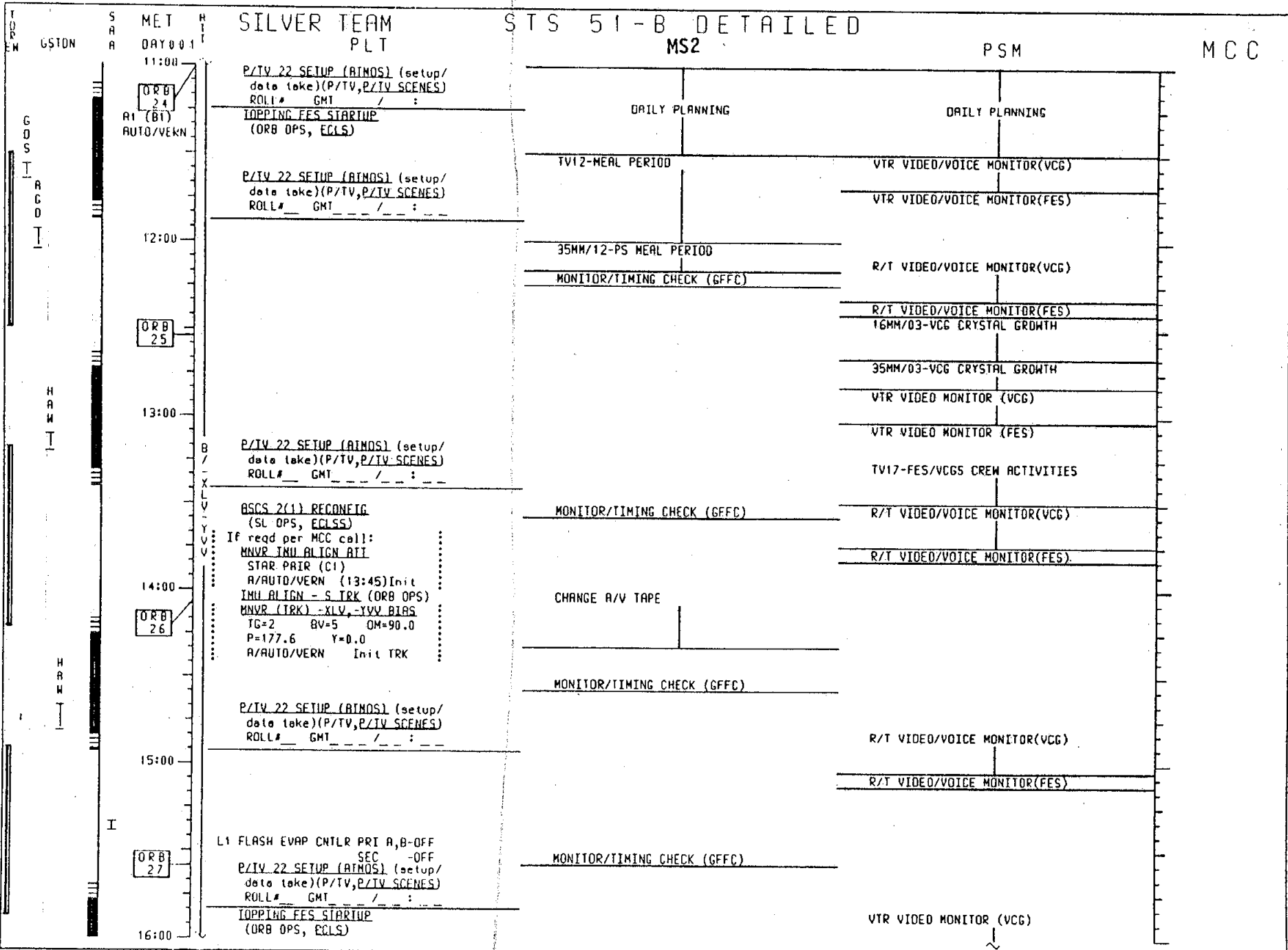
05:00

06:00









SILVER TEAM
PLT

STS 51-B DETAILED
MS2

PSM

MCC

MET
S A H
A R A
DAY 001
11:00
ORB 24
A1 (BT)
AUTO/VERN
12:00
ORB 25
13:00
B / X
V / Y
V / V
14:00
ORB 26
15:00
I
ORB 27
16:00

P/TV 22 SETUP (AIMOS) (setup/
date take)(P/TV,P/TV SCENES)
ROLL# GMT / :
TOPPING FES STARTUP
(ORB OPS, ECLS)

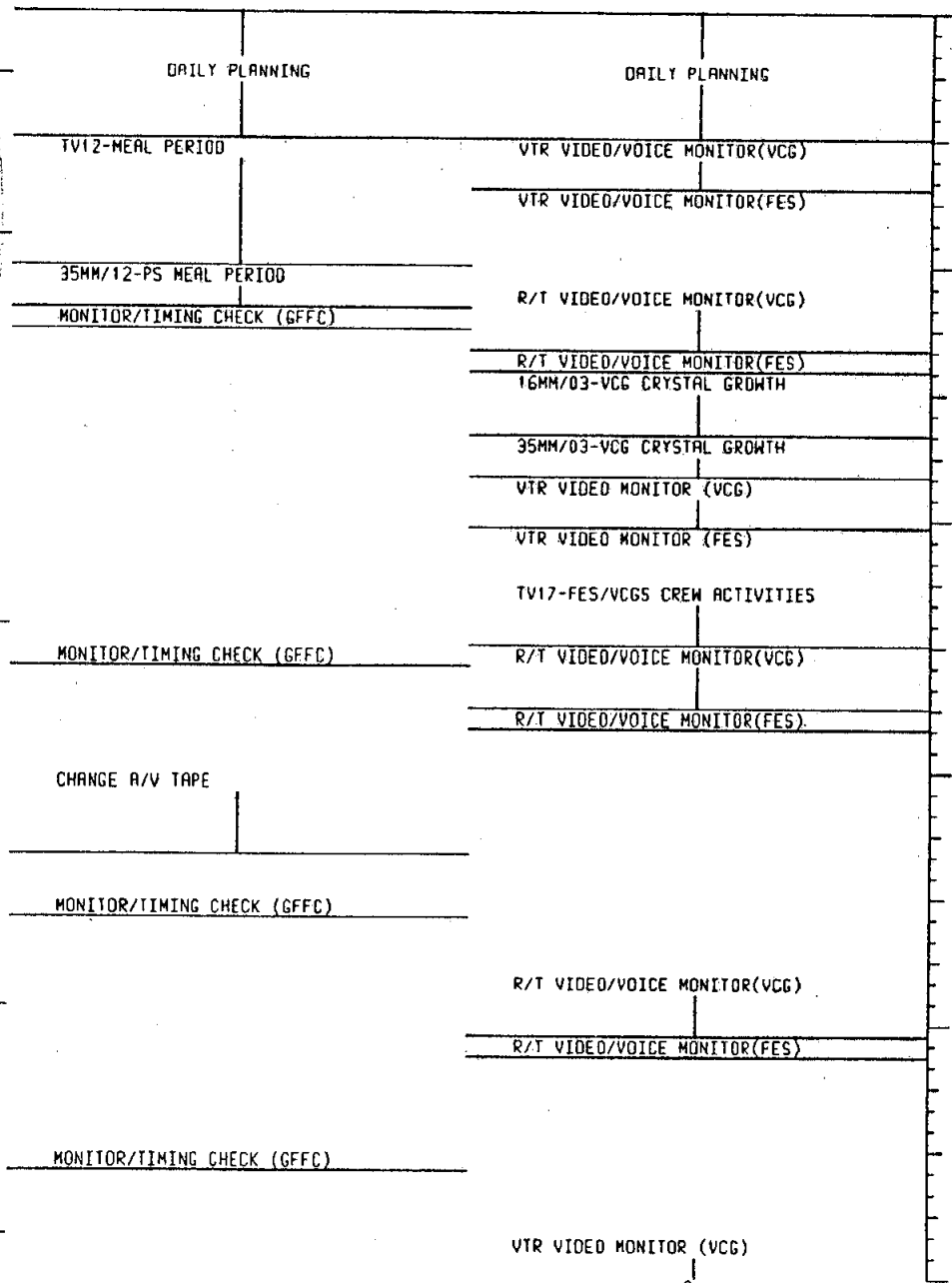
P/TV 22 SETUP (AIMOS) (setup/
date take)(P/TV,P/TV SCENES)
ROLL# GMT / :

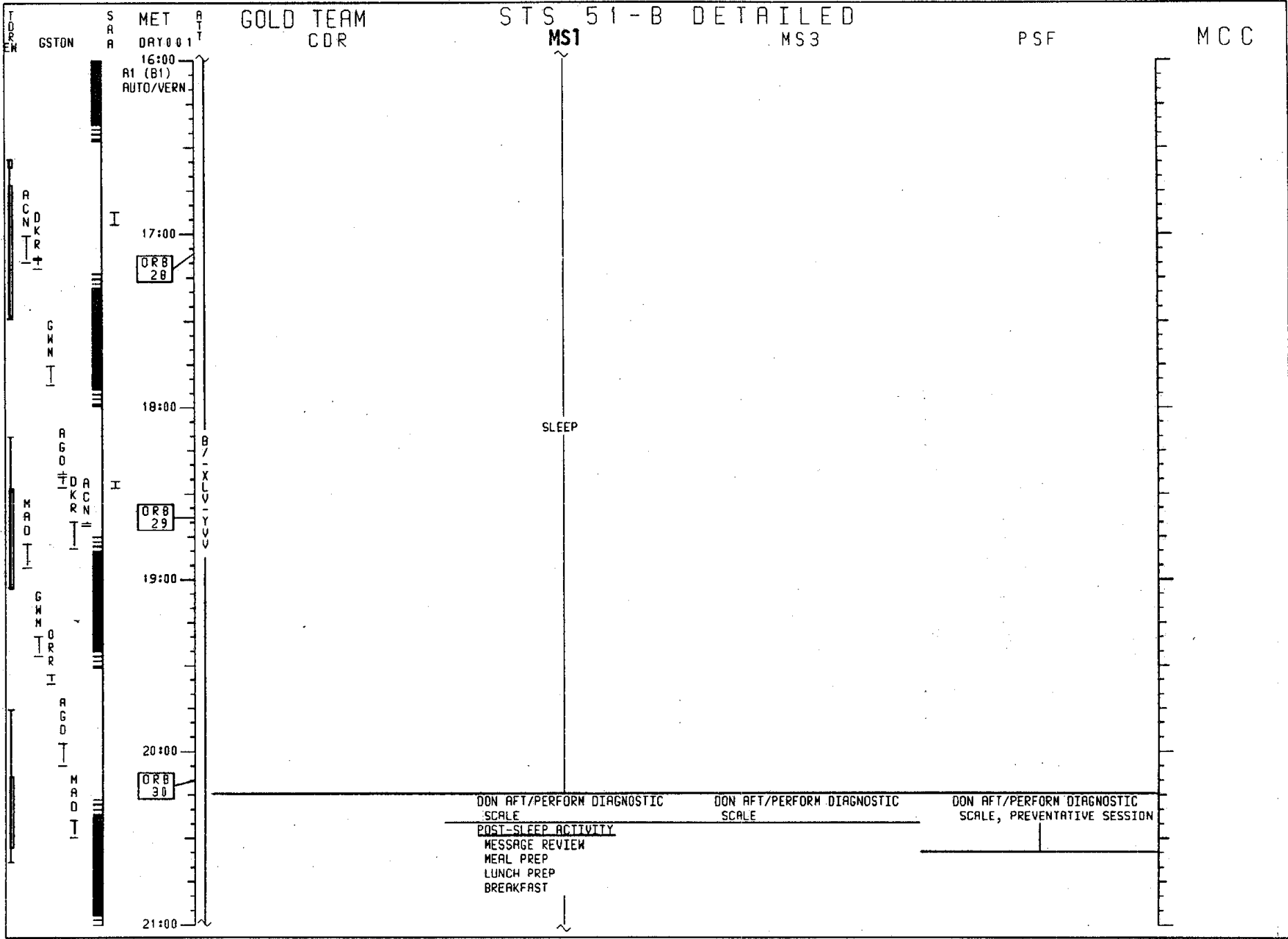
P/TV 22 SETUP (AIMOS) (setup/
date take)(P/TV,P/TV SCENES)
ROLL# GMT / :

BSCS 2(1) RECONFIG
(SL OPS, ECLSS)
If reqd per MCC call:
MNVR INH ALIGN AT
STAR PAIR (C1)
A/AUTO/VERN (13:45) Init
INH ALIGN - S TRK (ORB OPS)
MNVR (TRK) -XLV, -YVV BIAS
TG=2 BV=5 OM=90.0
P=177.6 Y=0.0
A/AUTO/VERN Init TRK

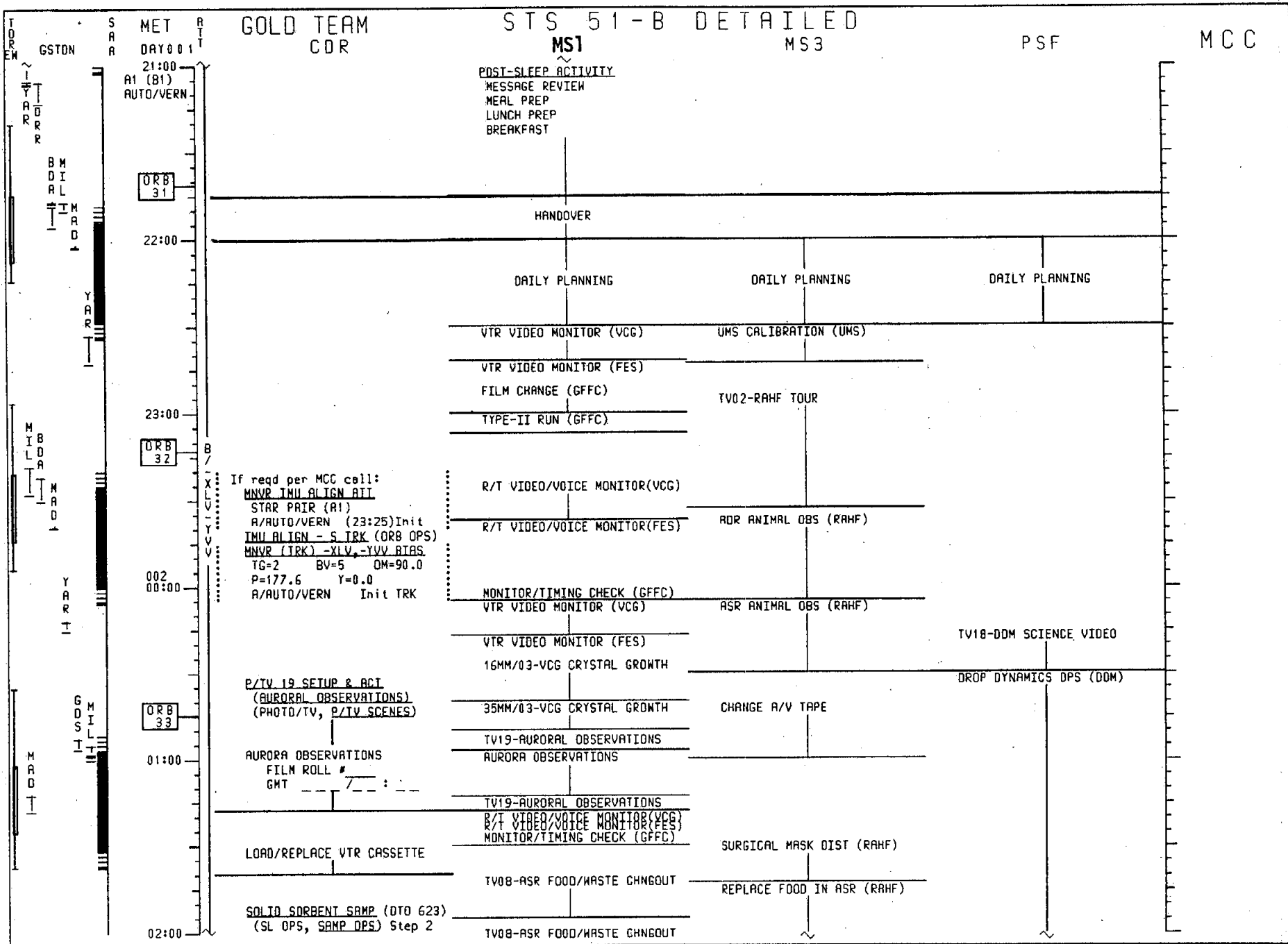
P/TV 22 SETUP (AIMOS) (setup/
date take)(P/TV,P/TV SCENES)
ROLL# GMT / :

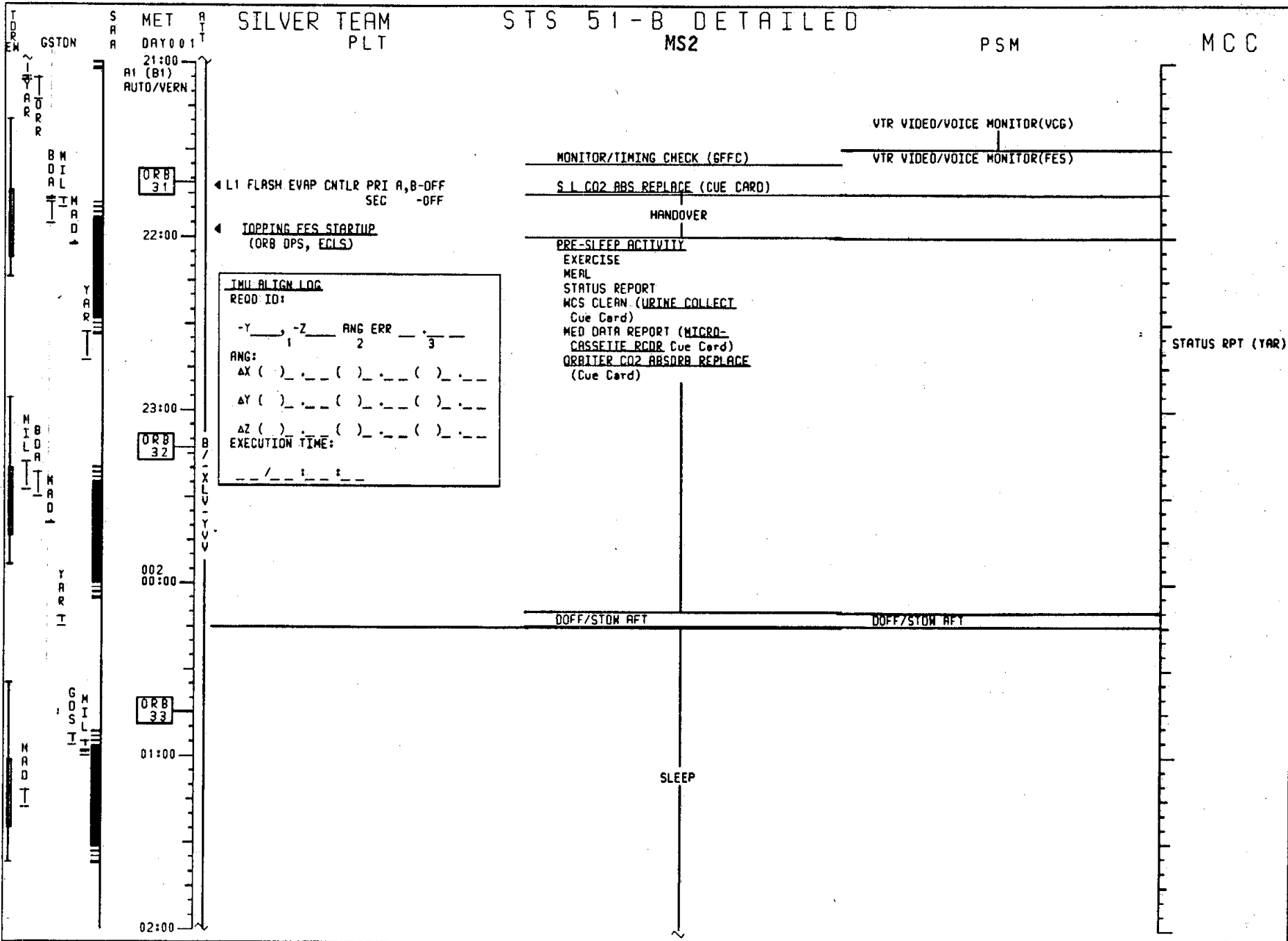
L1 FLASH EVAP CNTLR PRI A,B-OFF
SEC -OFF
P/TV 22 SETUP (AIMOS) (setup/
date take)(P/TV,P/TV SCENES)
ROLL# GMT / :
TOPPING FES STARTUP
(ORB OPS, ECLS)





SILVER TEAM PLT		STS 51-B DETAILED		MCC	
MET DAY 001		MS2		PSM	
16:00	AI (B1) AUTO/VERN		UMS CALIBRATION (UMS)	VTR VIDEO MONITOR (VEG)	
		LUNCH	PERFORM DIAGNOSTIC (AFT)	PERFORM DIAGNOSTIC (AFT)	
			TYPE-I RUN (GFFC)		
17:00	L1 FLASH EVAP CNTLR PRI A,B-OFF SEC -OFF P/TV 22 SETUP (ATMOS) (setup/ data take)(P/TV,P/TV SCENES) ROLL# GMT / : TOPPING FES STARTUP (ORB OPS, ECLS)	LUNCH		VTR VIDEO/VOICE MONITOR(VCG)	
			MONITOR/TIMING CHECK (GFFC)	VTR VIDEO/VOICE MONITOR(FES)	
				LUNCH	
				VTR VIDEO MONITOR (VCG)	
18:00	P/TV 22 SETUP (ATMOS) (setup/ data take)(P/TV,P/TV SCENES) ROLL# GMT / : L1 FLASH EVAP CNTLR PRI A,B-OFF SEC -OFF P/TV 22 SETUP (ATMOS) (setup/ data take)(P/TV,P/TV SCENES) ROLL# GMT / : TOPPING FES STARTUP (ORB OPS, ECLS)		MONITOR/TIMING CHECK (GFFC)	VTR VIDEO MONITOR (FES)	
				R/T VIDEO/VOICE MONITOR(VCG)	
19:00	EC PURGE - AUTO (CUE CARD)		MONITOR/TIMING CHECK (GFFC)	R/T VIDEO/VOICE MONITOR(FES)	
	KU-BD ANT CABLE POSITIONING (ORB OPS, COMM/INST)			VTR VIDEO MONITOR (VCG)	
				VTR VIDEO MONITOR (FES)	
20:00	L1 FLASH EVAP CNTLR PRI A,B-OFF SEC -OFF P/TV 22 SETUP (ATMOS) (setup/ data take)(P/TV,P/TV SCENES) ROLL# GMT / : TOPPING FES STARTUP (ORB OPS, ECLS)		BIOTELEM SIGNAL STRENGTH OPTIMIZATION (RAHF)	R/T VIDEO/VOICE MONITOR(VCG)	
				R/T VIDEO/VOICE MONITOR(FES)	
			MONITOR/TIMING CHECK (GFFC)		
21:00					





MET DAY 001
 21:00
 A1 (B1)
 AUTO/VERN
 22:00
 23:00
 002
 00:00
 01:00
 02:00

SILVER TEAM
PLT

STS 51-B DETAILED
MS2

PSM

MCC

ORB 31

◀ L1 FLASH EVAP CNTLR PRI A,B-OFF
SEC -OFF

ORB 32

◀ TOPPING FFS STARTUP
(ORB OPS, ECLS)

IMU ALIGN LOG
 REQ ID:
 -Y _____ -Z _____ ANG ERR _____
 1 2 3
 ANG:
 ΔX () . . . () . . . () . . .
 ΔY () . . . () . . . () . . .
 ΔZ () . . . () . . . () . . .
 EXECUTION TIME:
 ____ / ____ : ____

MONITOR/TIMING CHECK (6FFC)

S.L. CO2 ABS REPLACE (CUE CARD)

HANDOVER

PRE-SLEEP ACTIVITY

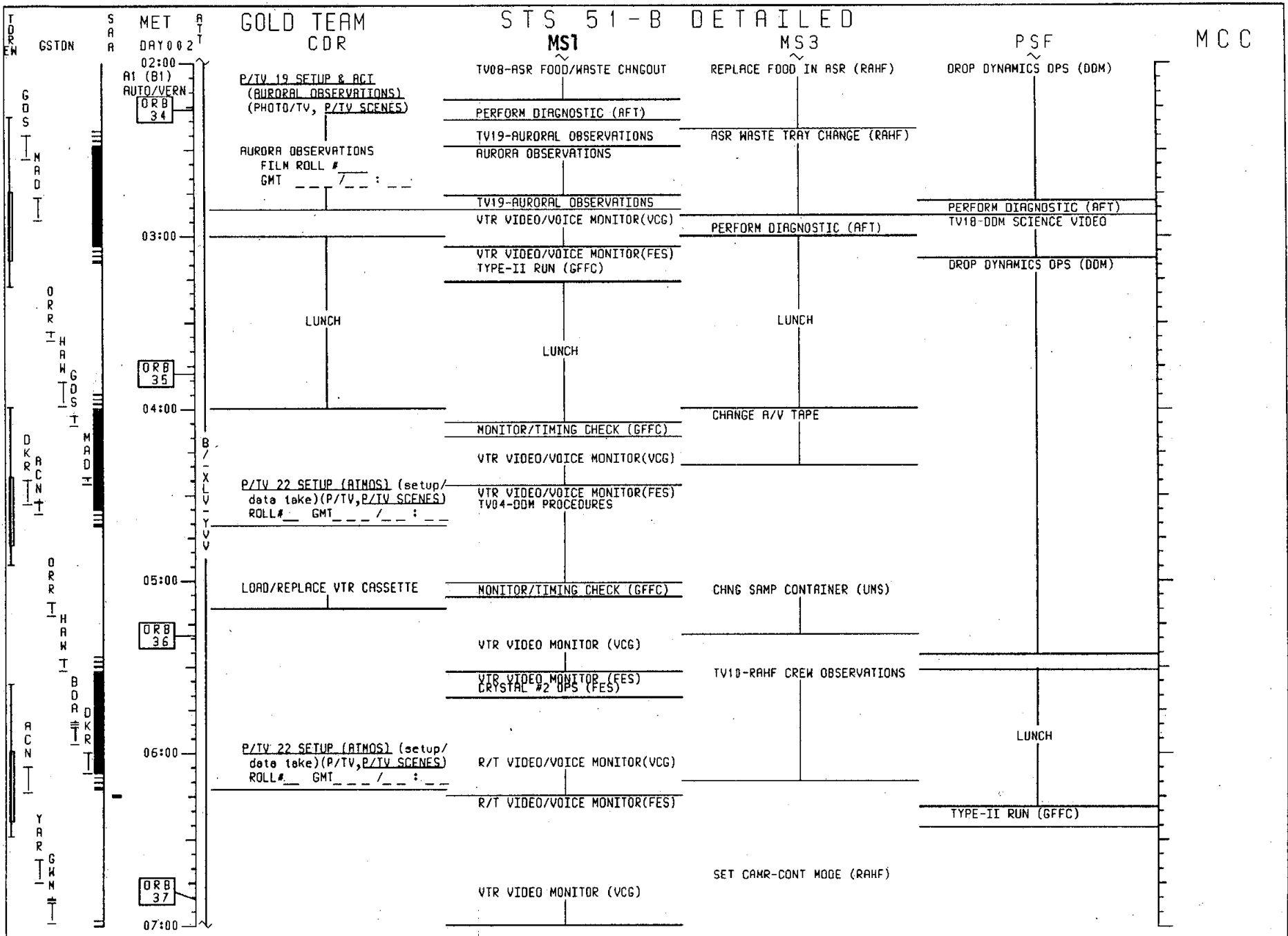
EXERCISE
 MEAL
 STATUS REPORT
 WCS CLEAN (URINE COLLECT
 Cue Card)
 MED DATA REPORT (MICRO-
 CASSETTE RCOR Cue Card)
 ORBITER CO2 ABSORB REPLACE
 (Cue Card)

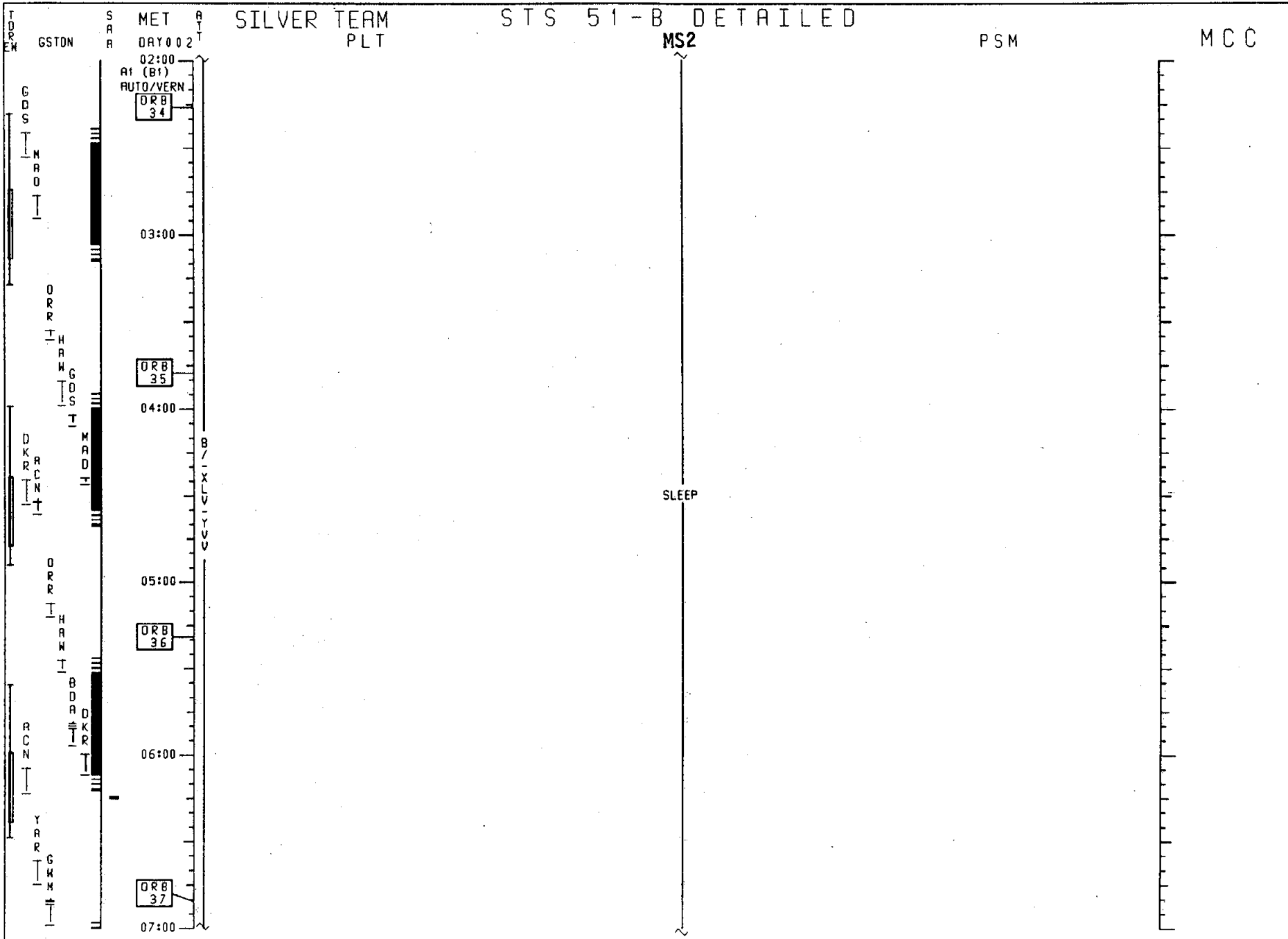
DOFF/STOW AFT

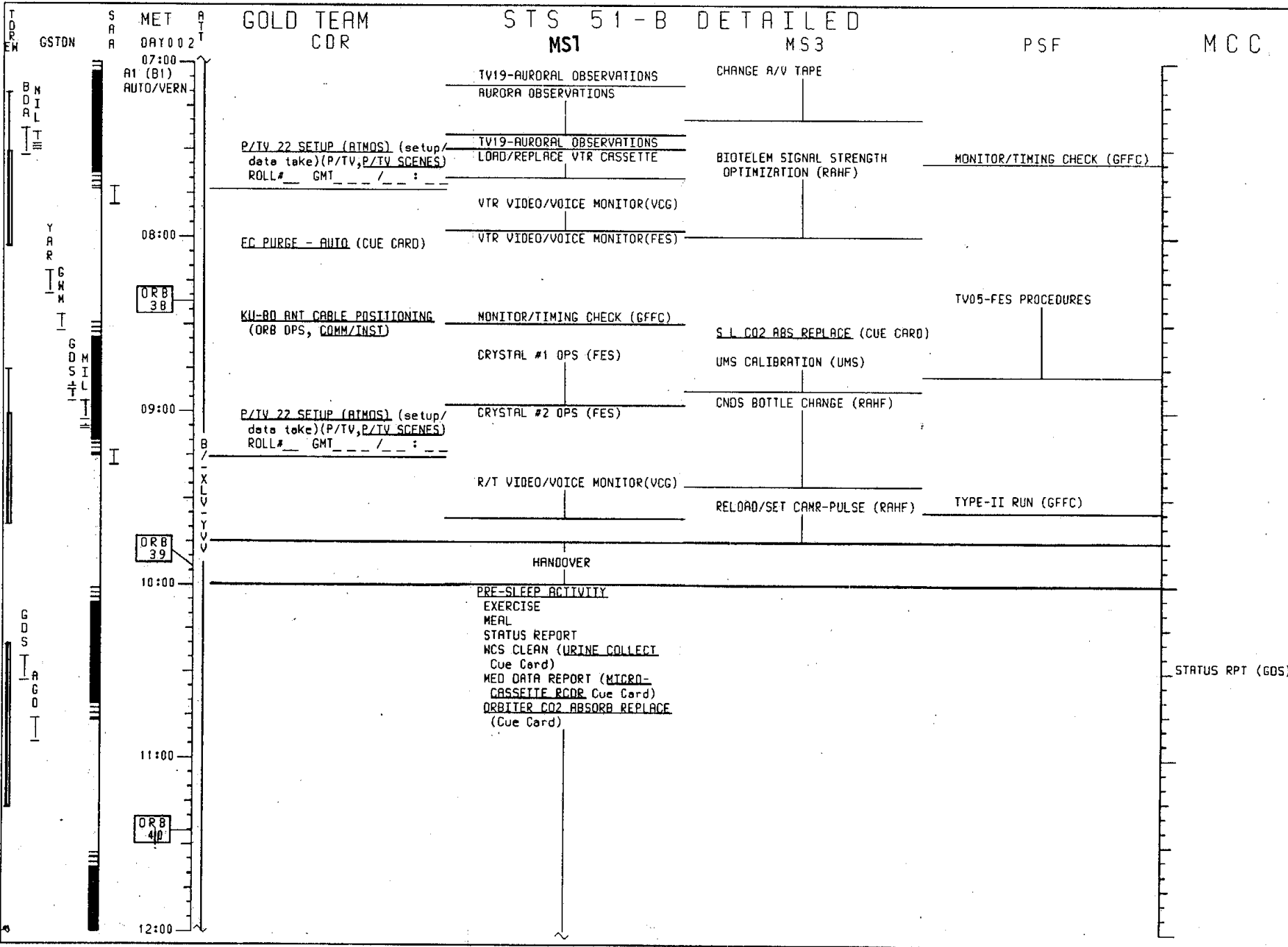
DOFF/STOW AFT

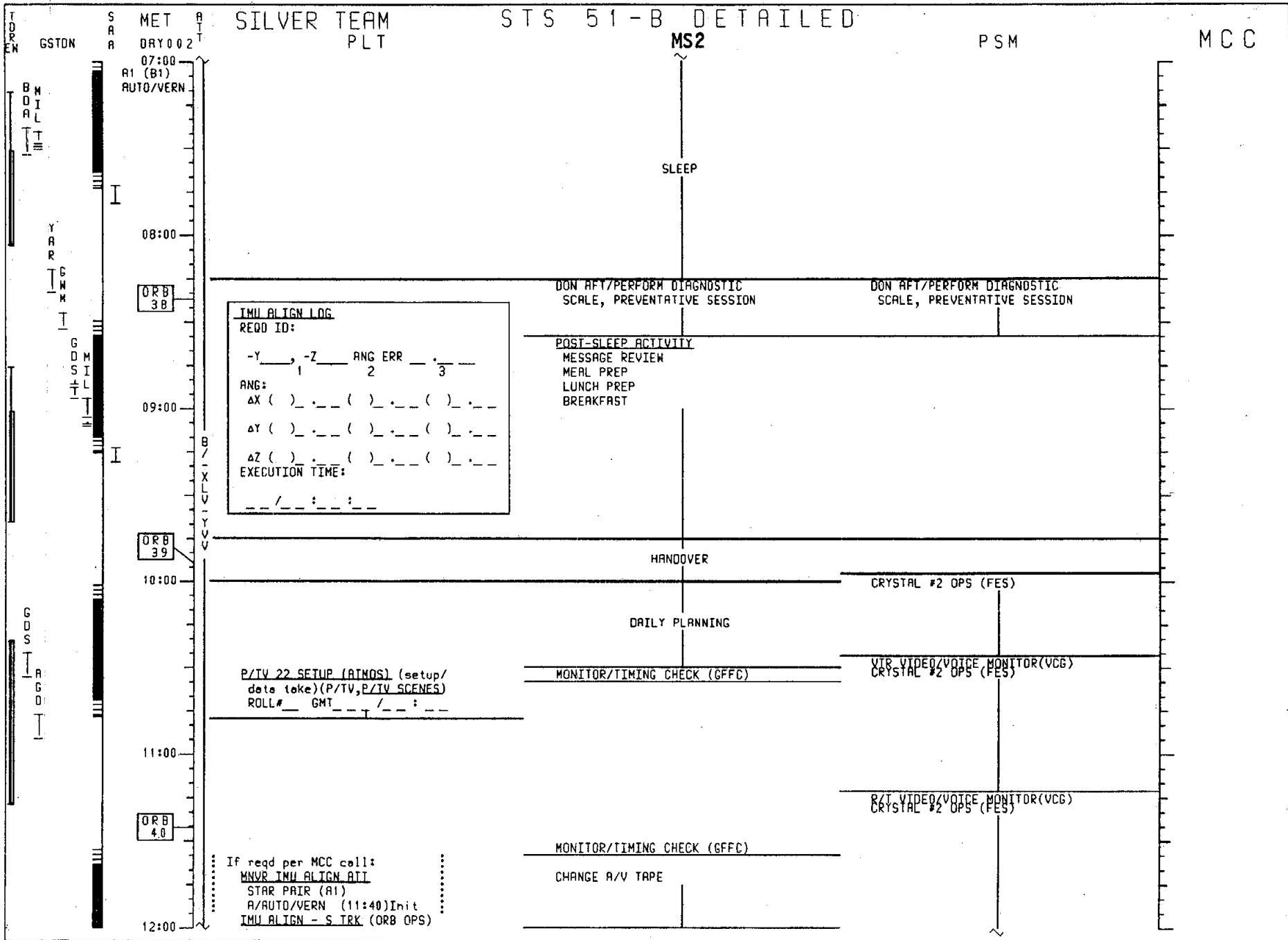
SLEEP

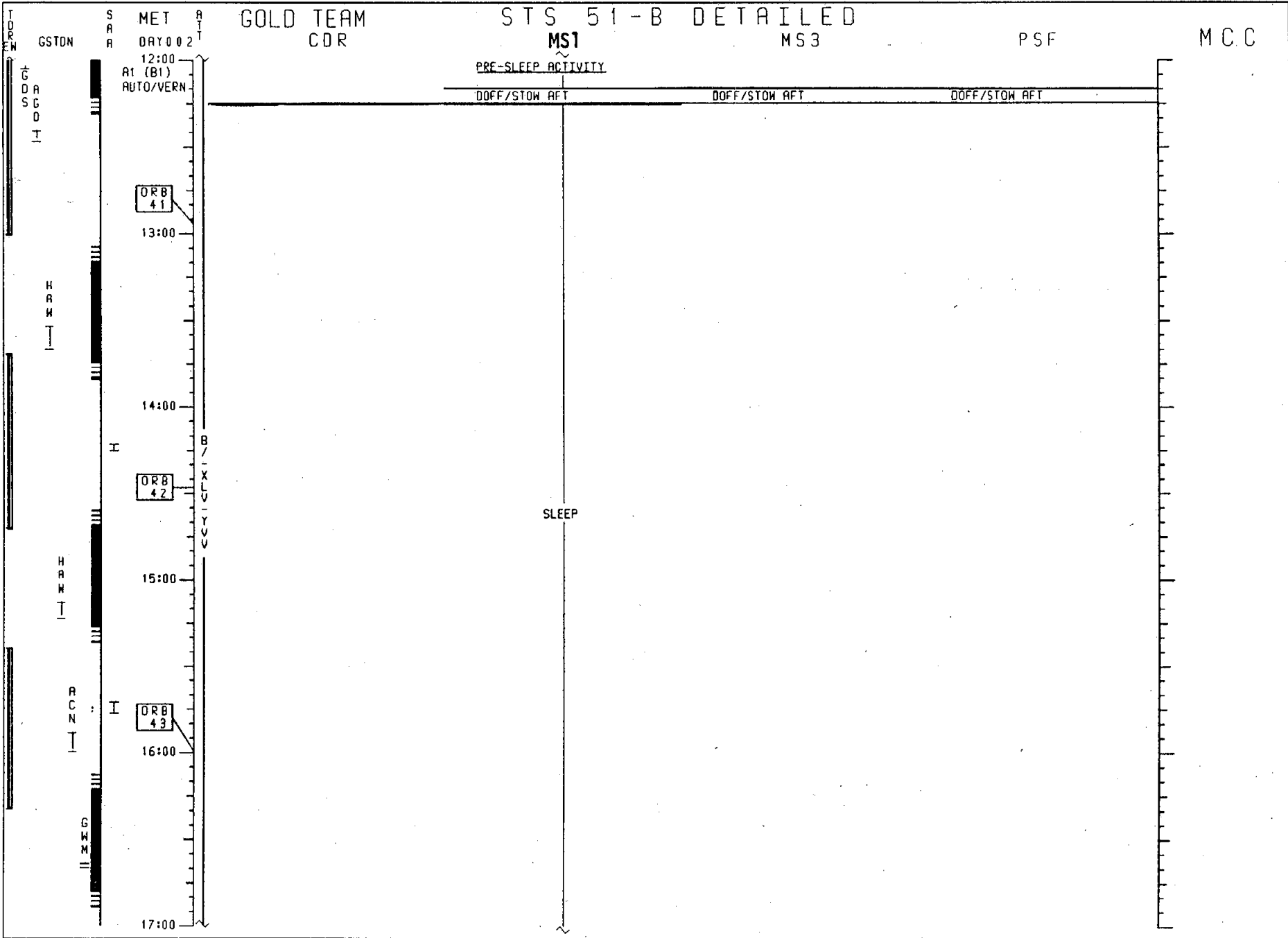
STATUS RPT (YAR)

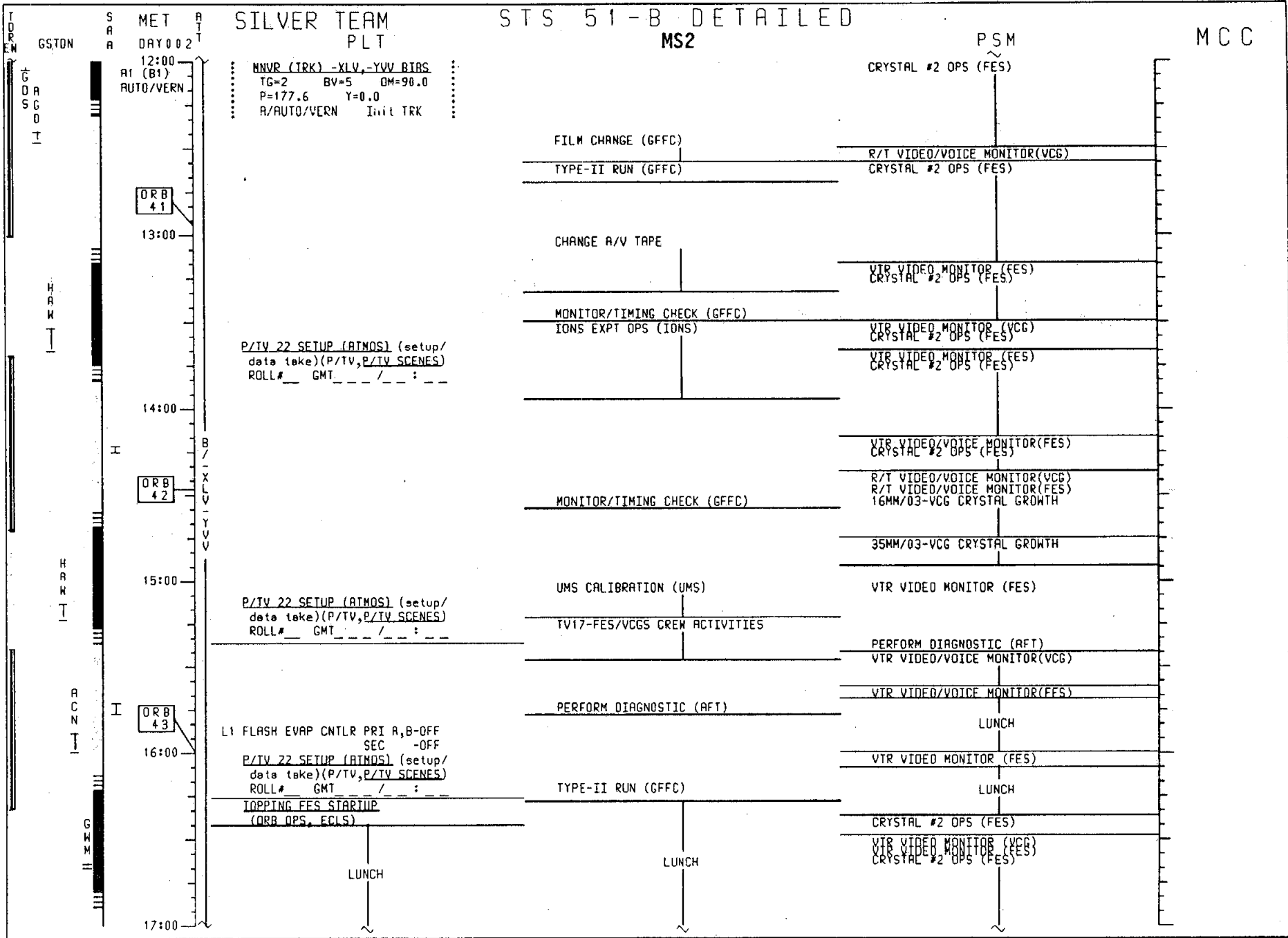


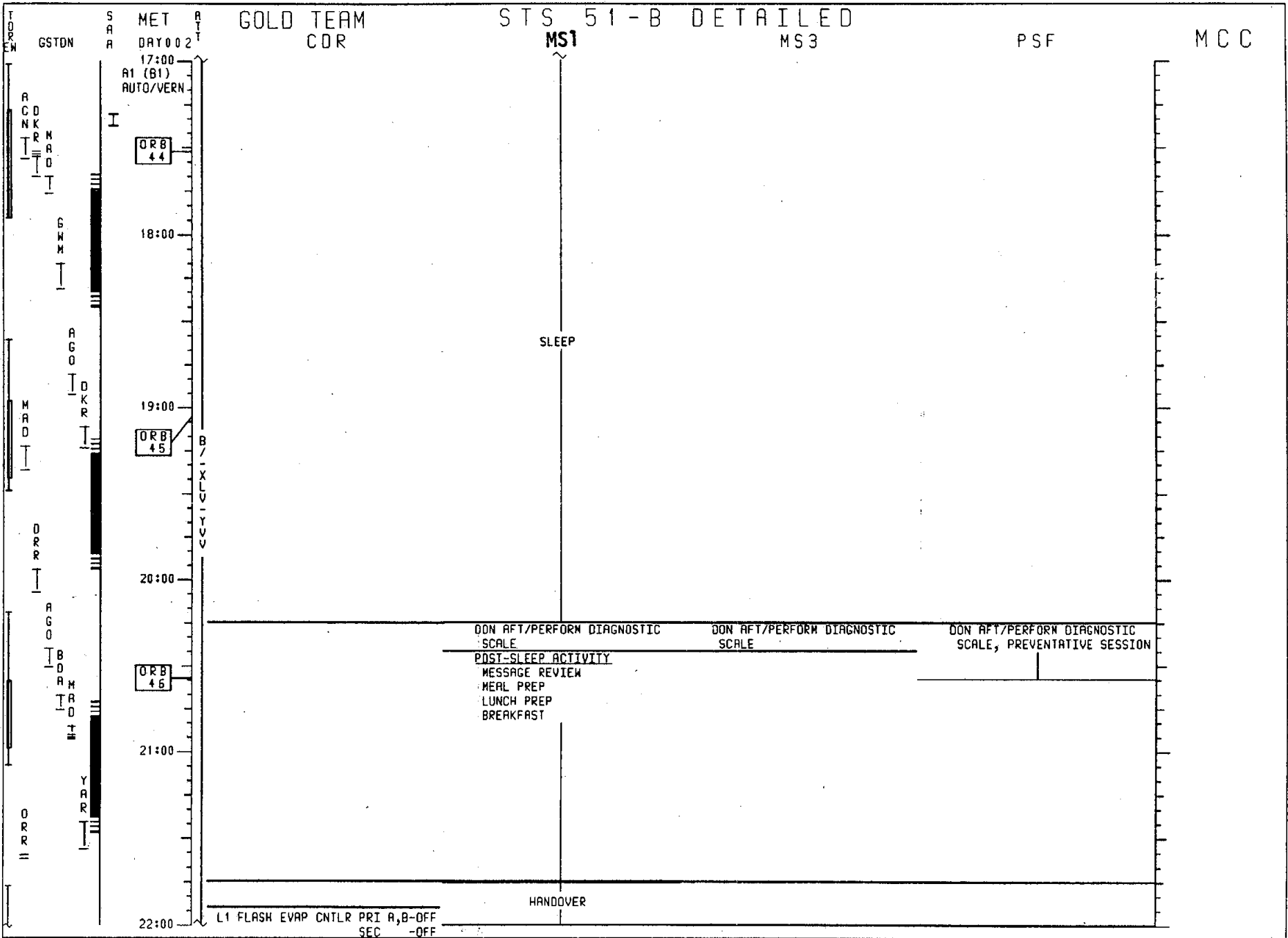


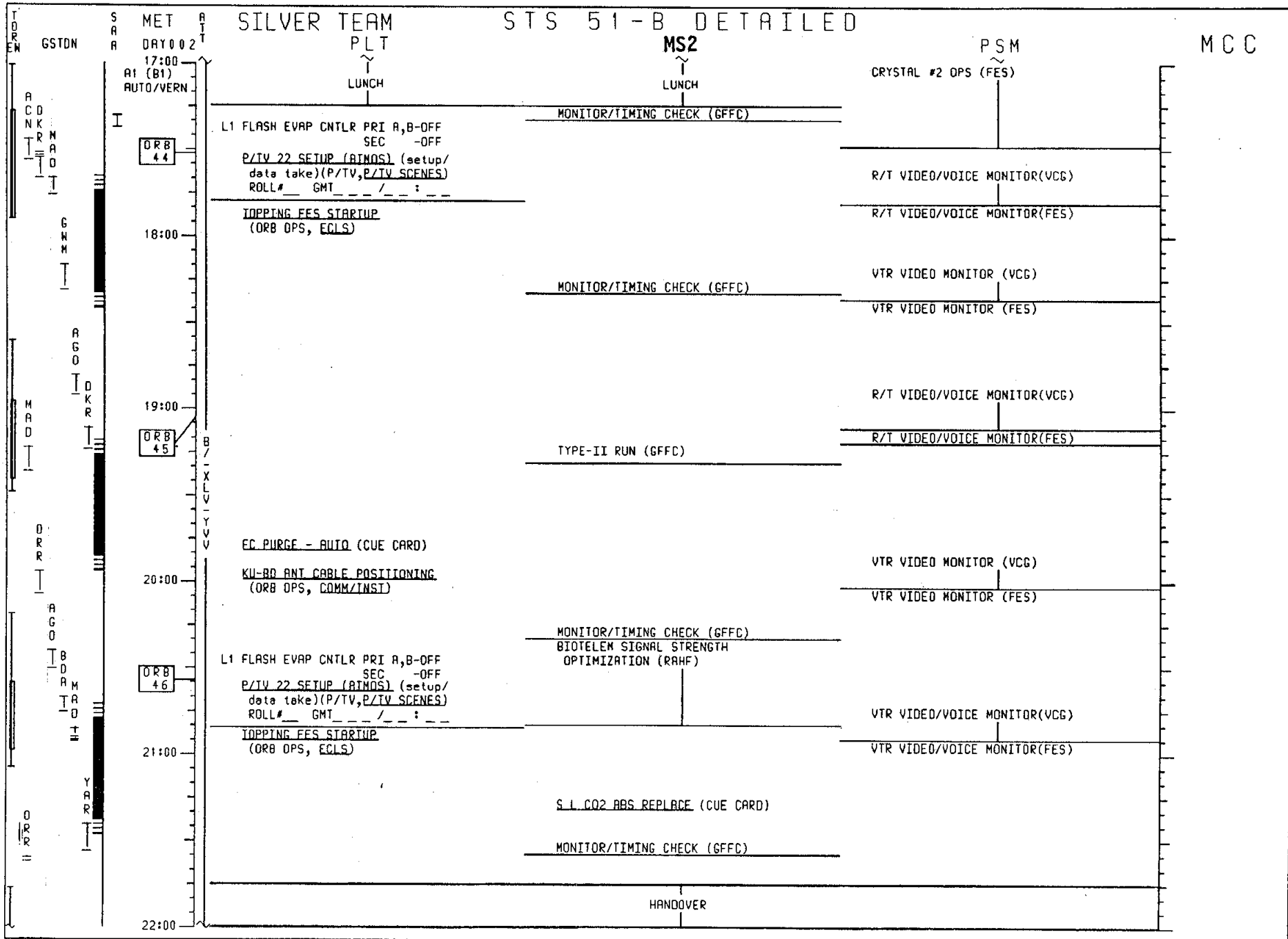




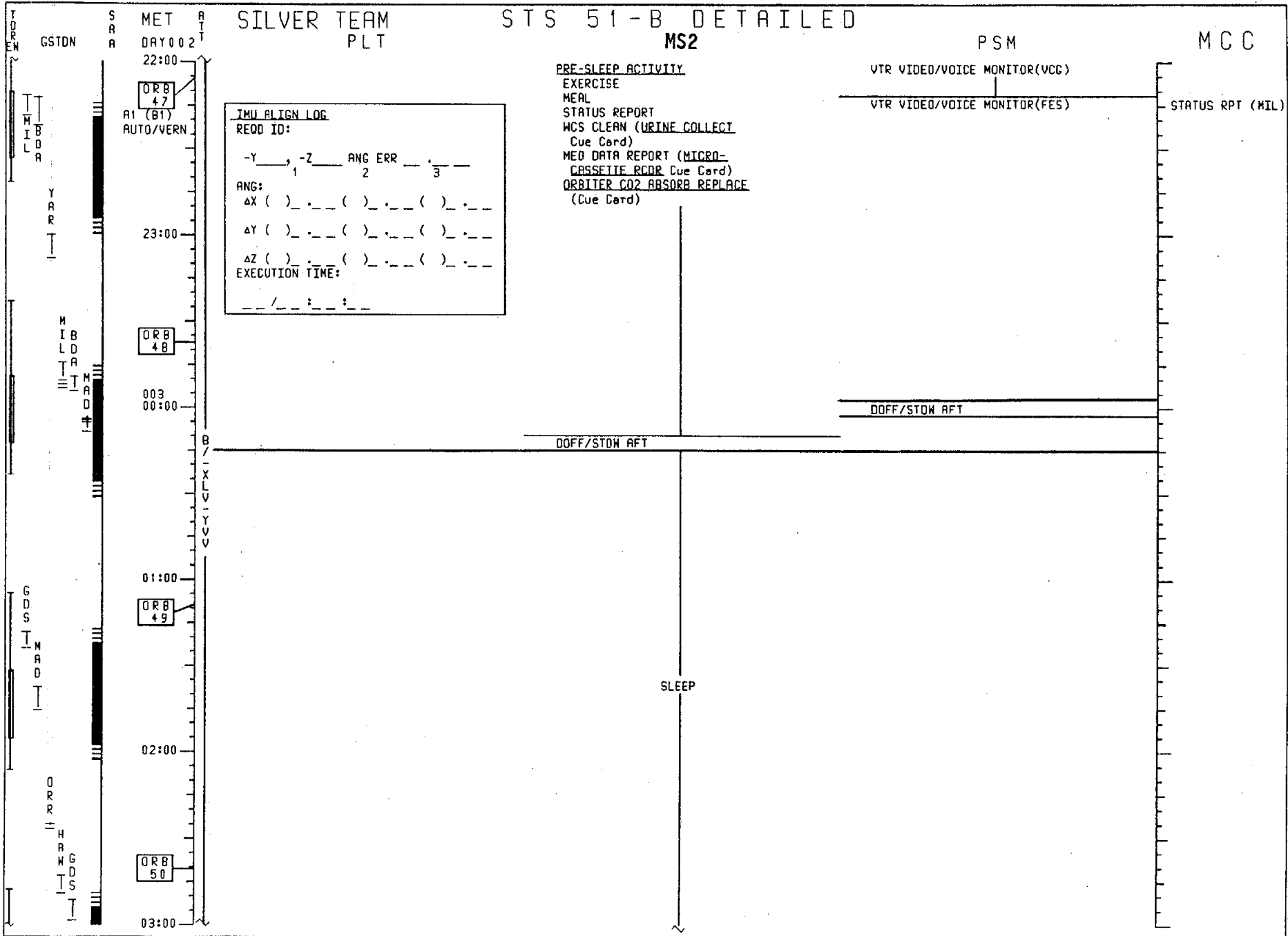








GOLD TEAM COR		STS 51-B DETAILED		MS1	MS3	PSF	MCC
22:00	ORB 47	P/TV 22 SETUP (ATMOS) (setup/ data take)(P/TV,P/TV SCENES) ROLL# GMT / : -	DAILY PLANNING	DAILY PLANNING	DAILY PLANNING		
	A1 (B1) AUTO/VERN	TOPPING FES STARTUP (ORB OPS, ECLS)	FILM CHANGE (GFFC)	UMS CALIBRATION (UMS)		DROP DYNAMICS OPS (DDM)	
			TYPE-II RUN (GFFC)				
			TV18-DDM SCIENCE VIDEO				
23:00			VTR VIDEO MONITOR (VCG)	ADR ANIMAL OBS (RAHF)			
			VTR VIDEO MONITOR (FES)				
	ORB 48		MONITOR/TIMING CHECK (GFFC)				
		If reqd per MCC call: MNR IMU ALIGN ATT STAR PAIR (A1) A/AUTO/VERN (23:50)Init IMU ALIGN - S TRK (ORB OPS) MNR (TRK) -XLV, -YVV BIAS TG=2 BV=5 GM=90.0 P=177.6 Y=0.0 A/AUTO/VERN Init TRK	R/T VIDEO/VOICE MONITOR(VCG)	TV11-PS SLEEP RESTRAINTS			
00:00			R/T VIDEO/VOICE MONITOR(FES)				
			CHANGE A/V TAPE	35MM/11-PS SLEEP RESTRAINTS			
			MONITOR/TIMING CHECK (GFFC)	SURGICAL MASK DIST (RAHF)			
				REPLACE FOOD IN ADR (RAHF)			
01:00	ORB 49	P/TV 19 SETUP & ACT (AURORAL OBSERVATIONS) (PHOTO/TV, P/TV SCENES)	TV07-ADR FOOD/WASTE CHNGOUT				
		AURORA OBSERVATIONS FILM ROLL # GMT / : -	TV19-AURORAL OBSERVATIONS AURORA OBSERVATIONS				
			TV19-AURORAL OBSERVATIONS R/T VIDEO/VOICE MONITOR(VCG)				
02:00		SOLID SOLBENT SAMP (DIO 623) (SL OPS, SAMP OPS) Step 2 LOAD/REPLACE VTR CASSETTE	R/T VIDEO/VOICE MONITOR(FES) TYPE-II RUN (GFFC)				
			TV07-ADR FOOD/WASTE CHNGOUT				
		LUNCH	PERFORM DIAGNOSTIC (AFT) 16MM/03-VCG CRYSTAL GROWTH	CHANGE A/V TAPE			
	ORB 50		35MM/03-VCG CRYSTAL GROWTH				
03:00			MONITOR/TIMING CHECK (GFFC)				



SILVER TEAM
PLT

STS 51-B DETAILED
MS2

PSM

MCC

MET
DAY 002
22:00

ORB 47
A1 (B1)
AUTO/VERN

IMU ALIGN LOG
REQD ID:
-Y ____ -Z ____ ANG ERR ____
 1 2 3
ANG:
ΔX () . () . () .
ΔY () . () . () .
ΔZ () . () . () .
EXECUTION TIME:
_ / _ : _ : _

PRE-SLEEP ACTIVITY
EXERCISE
MEAL
STATUS REPORT
WCS CLEAN (URINE COLLECT
Cue Card)
MED DATA REPORT (MICRO-
CASSETTE RCDR Cue Card)
ORBITER CO2 ABSORB REPLACE
(Cue Card)

VTR VIDEO/VOICE MONITOR(VCC)
VTR VIDEO/VOICE MONITOR(FES)

STATUS RPT (MIL)

ORB 48

003
00:00

DOFF/STOW AFT

DOFF/STOW AFT

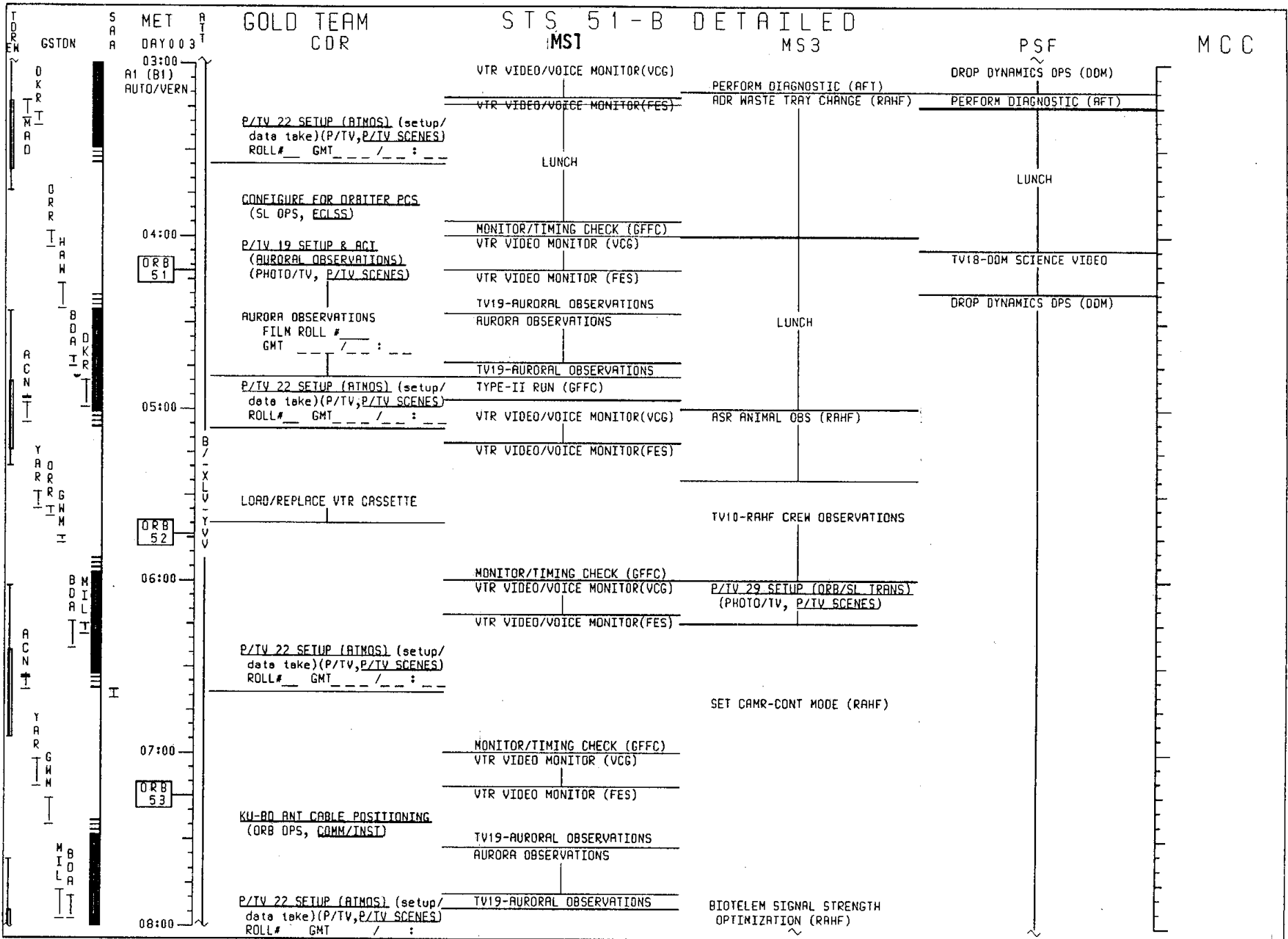
ORB 49

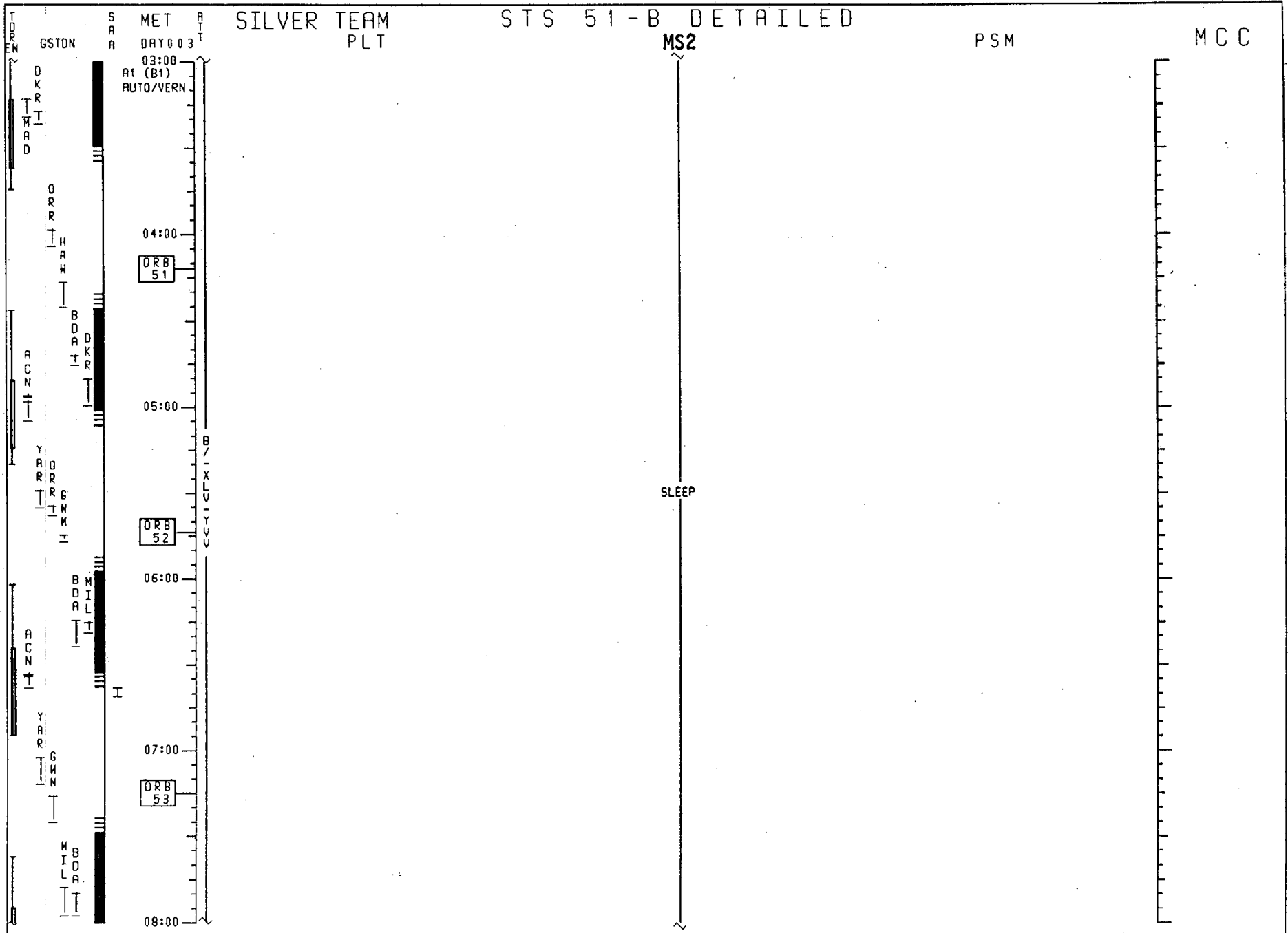
02:00

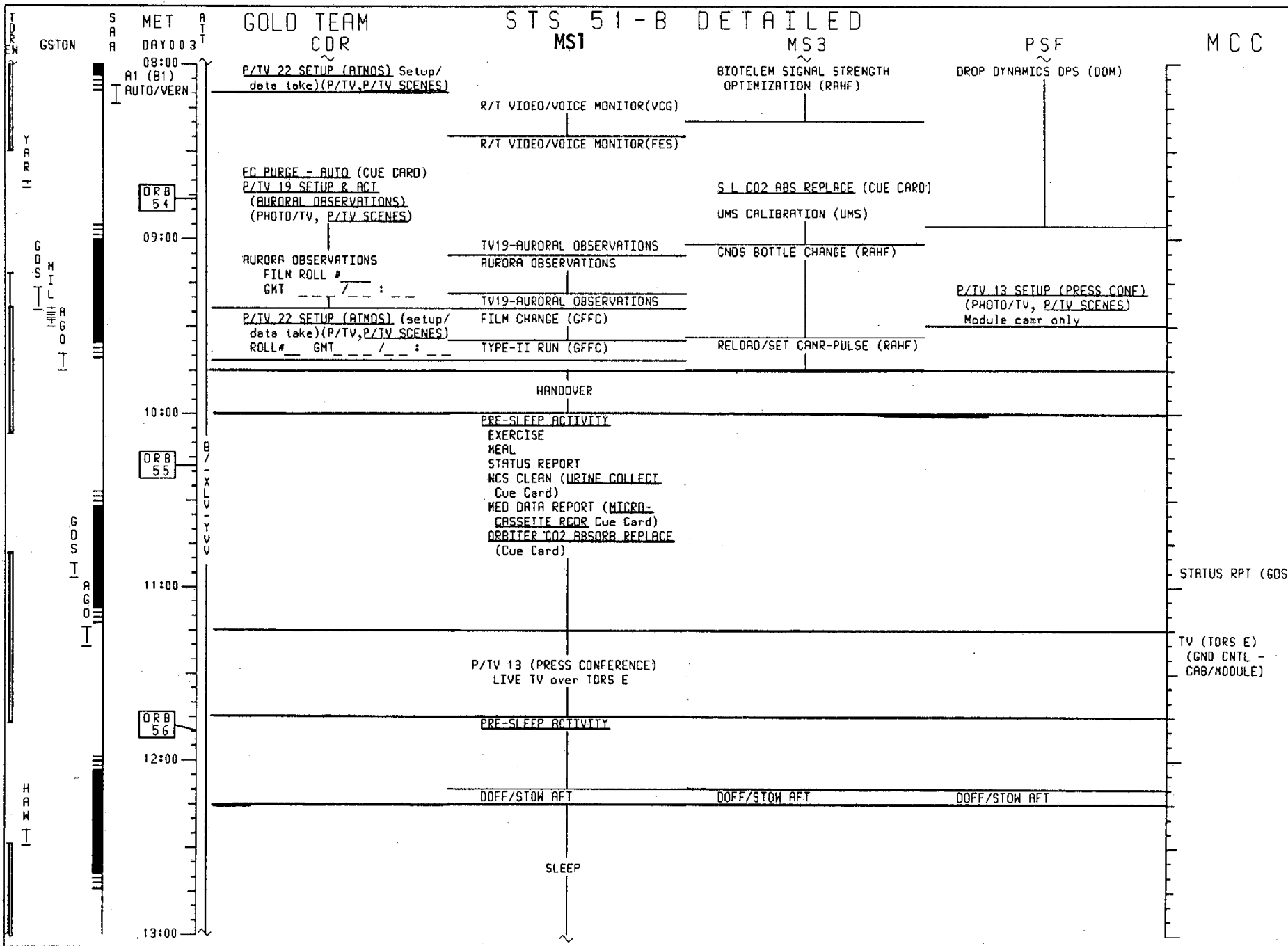
SLEEP

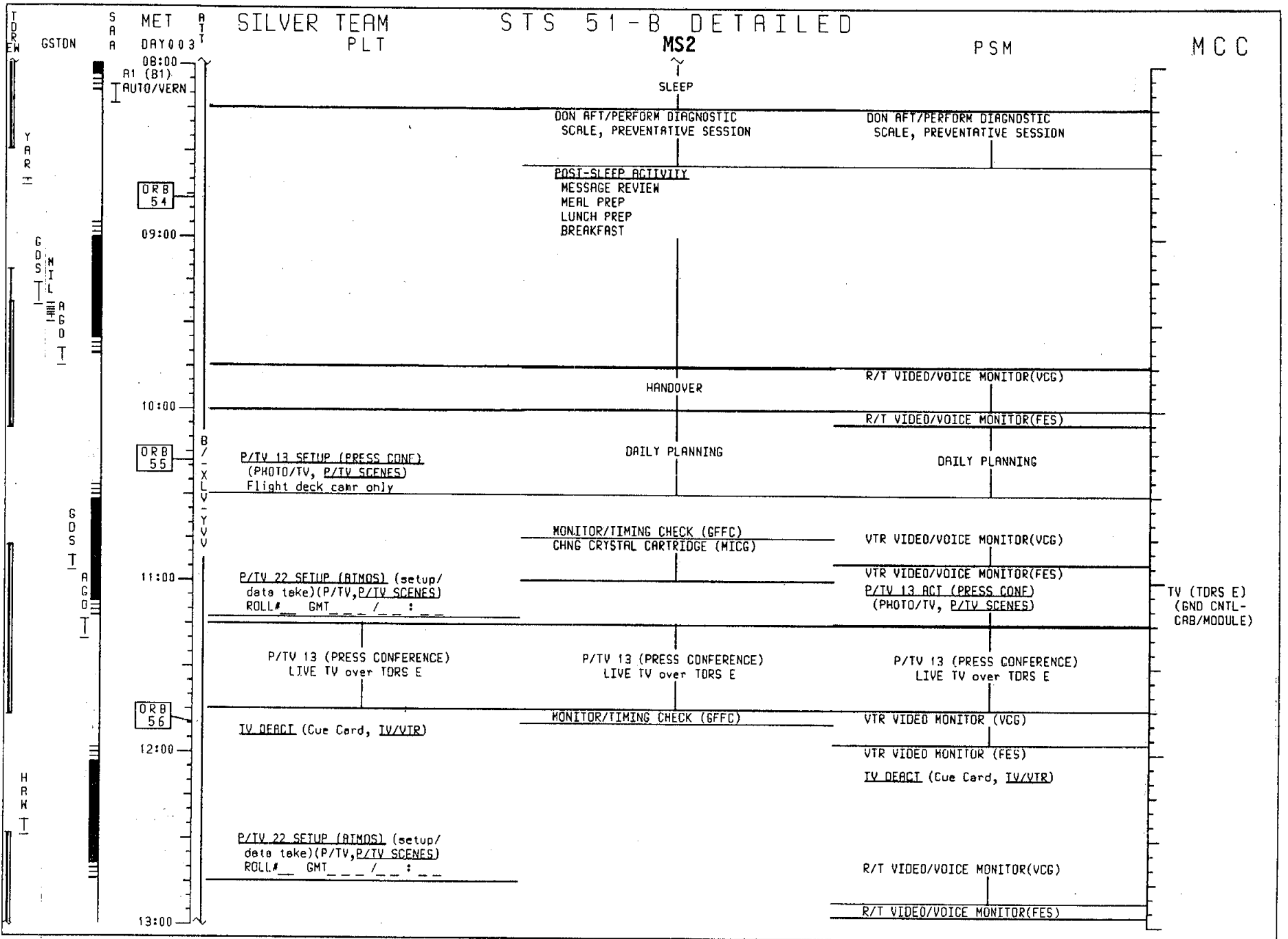
ORB 50

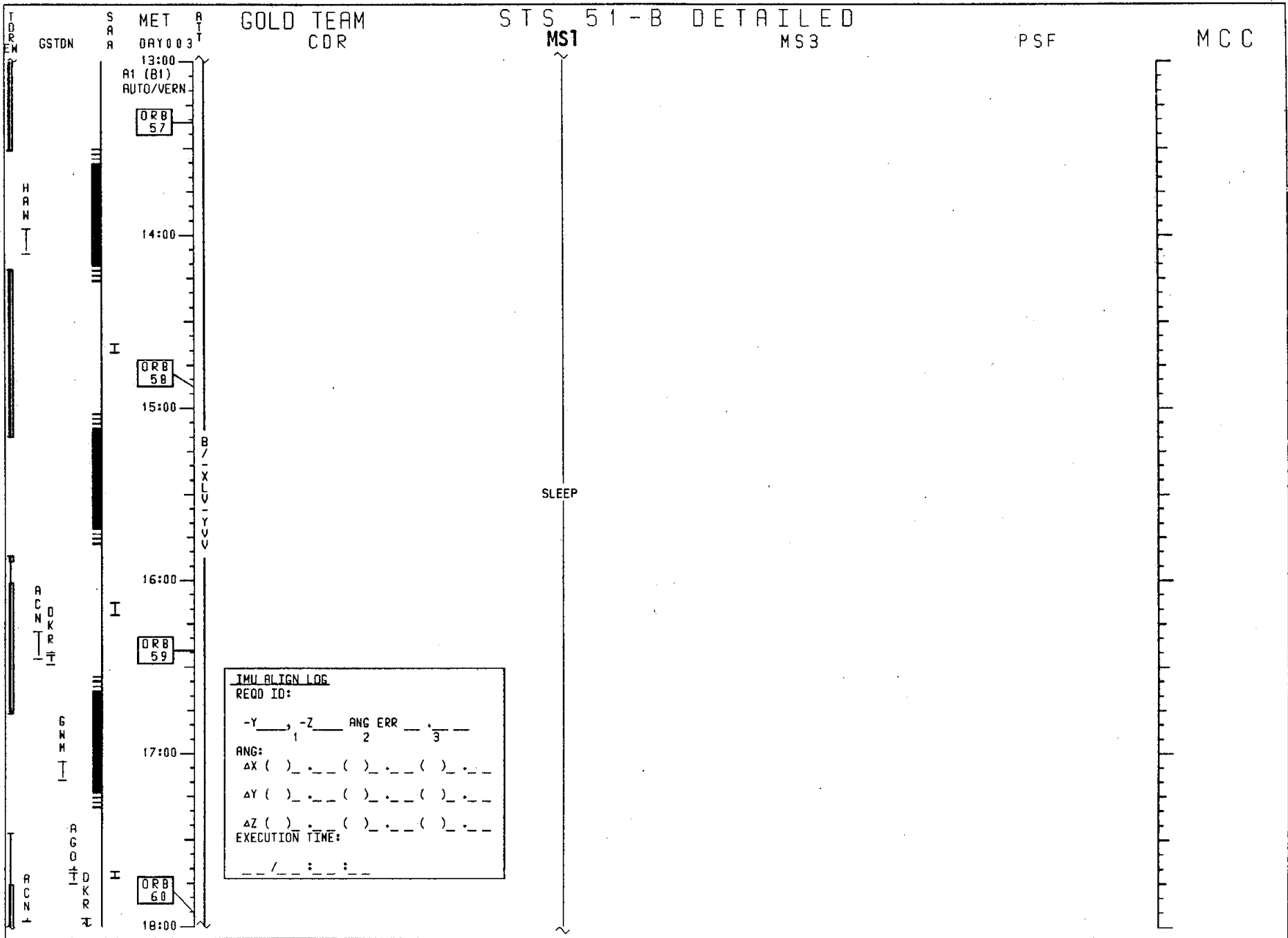
03:00

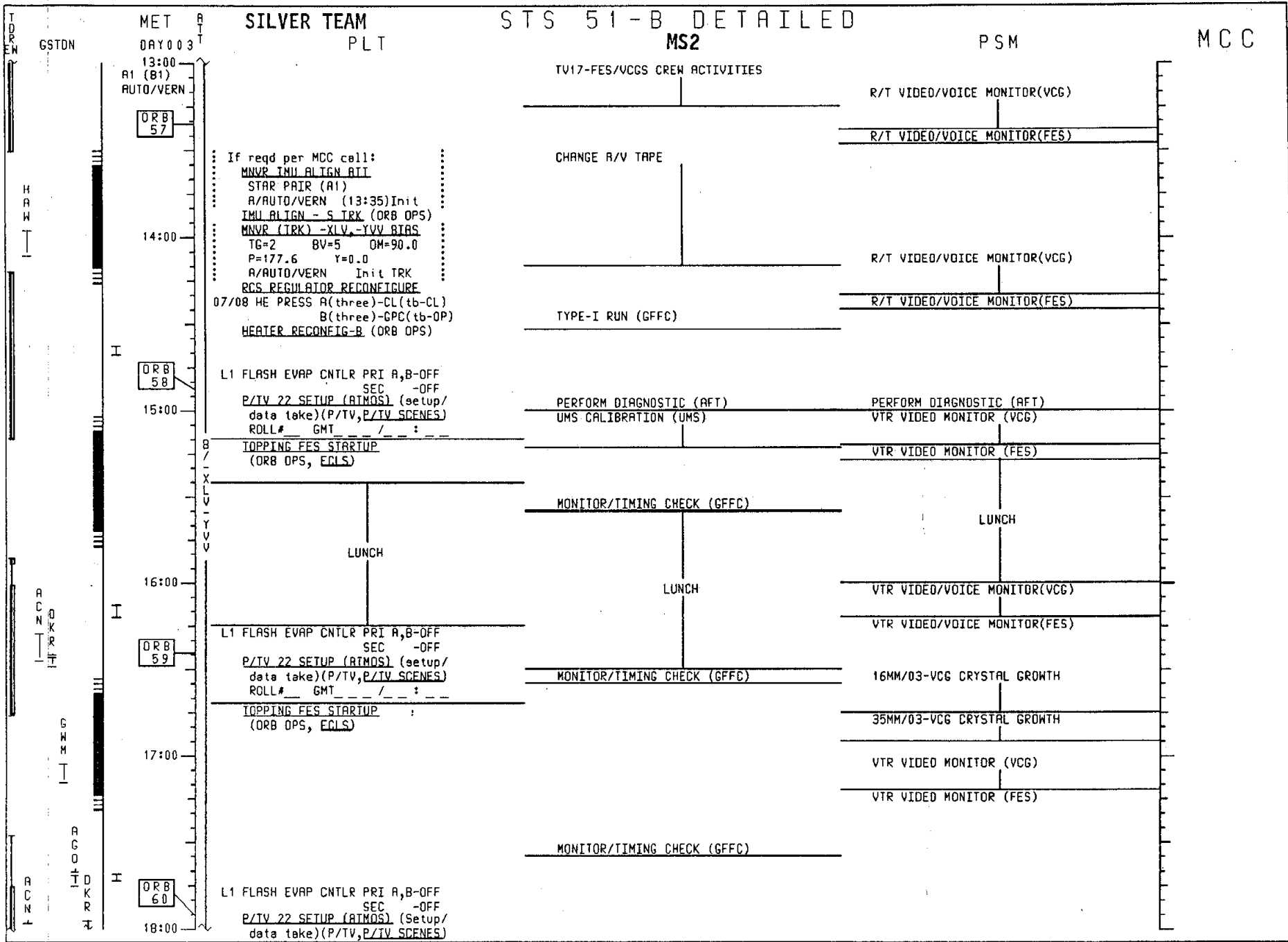


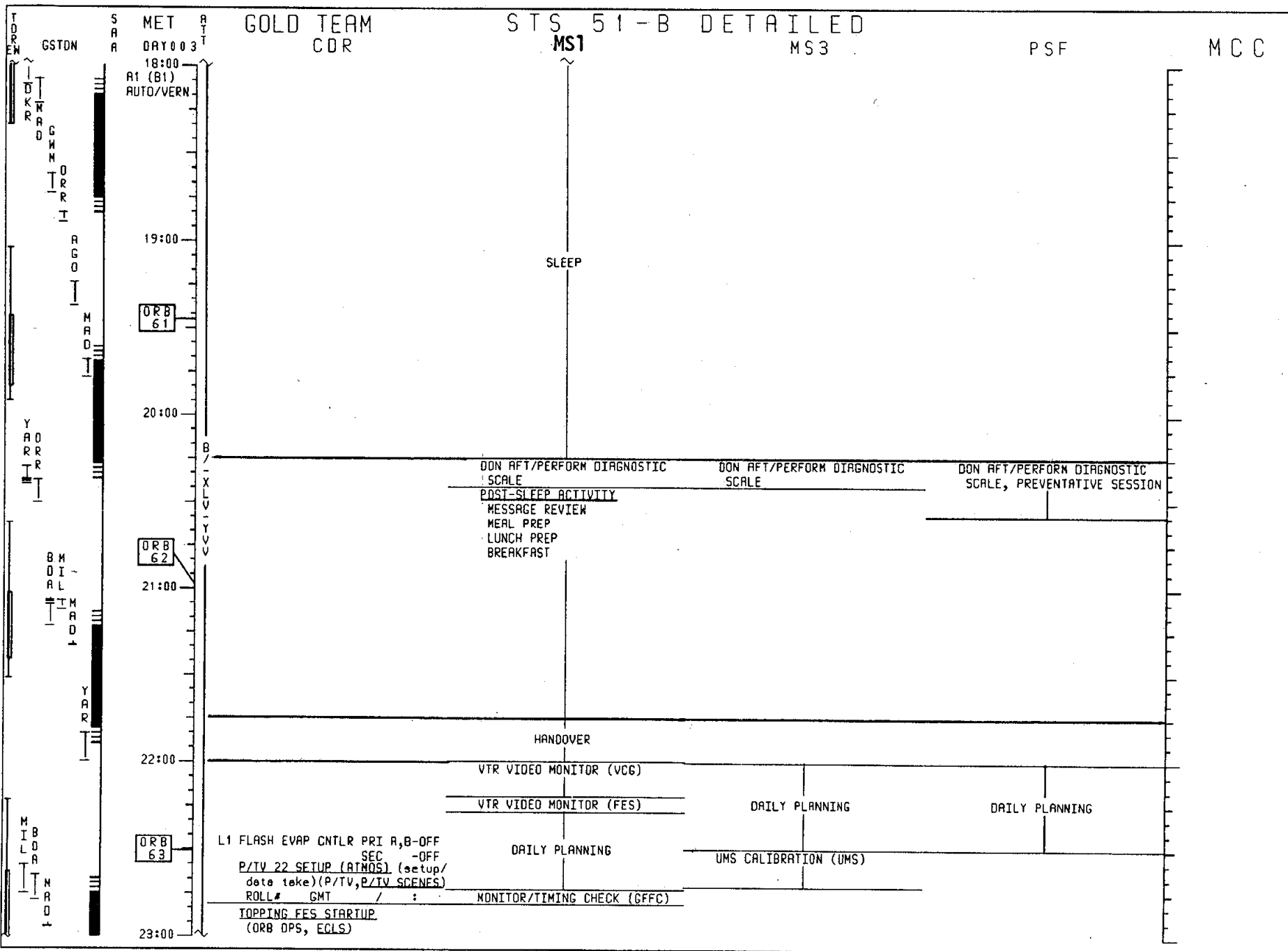


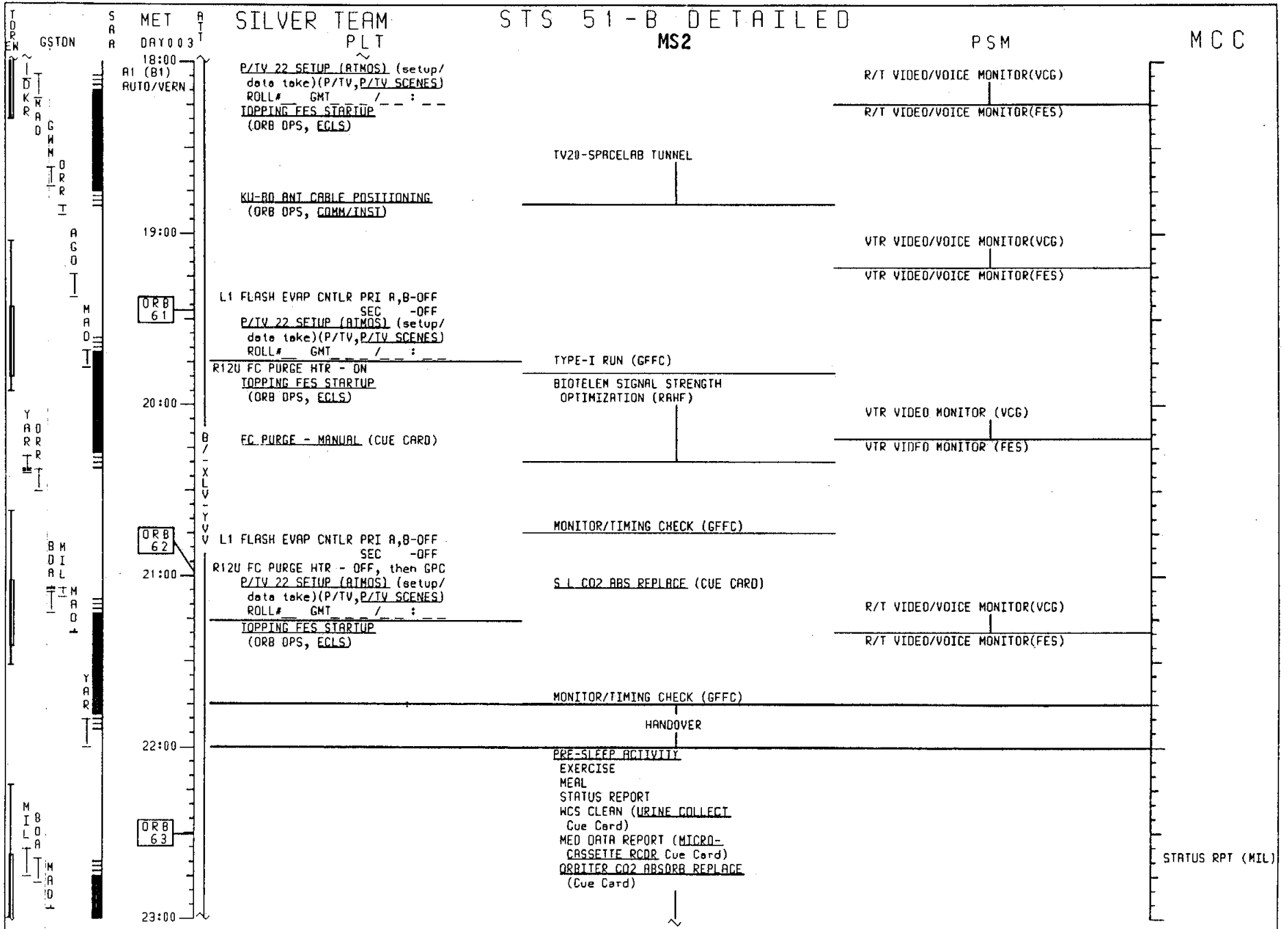


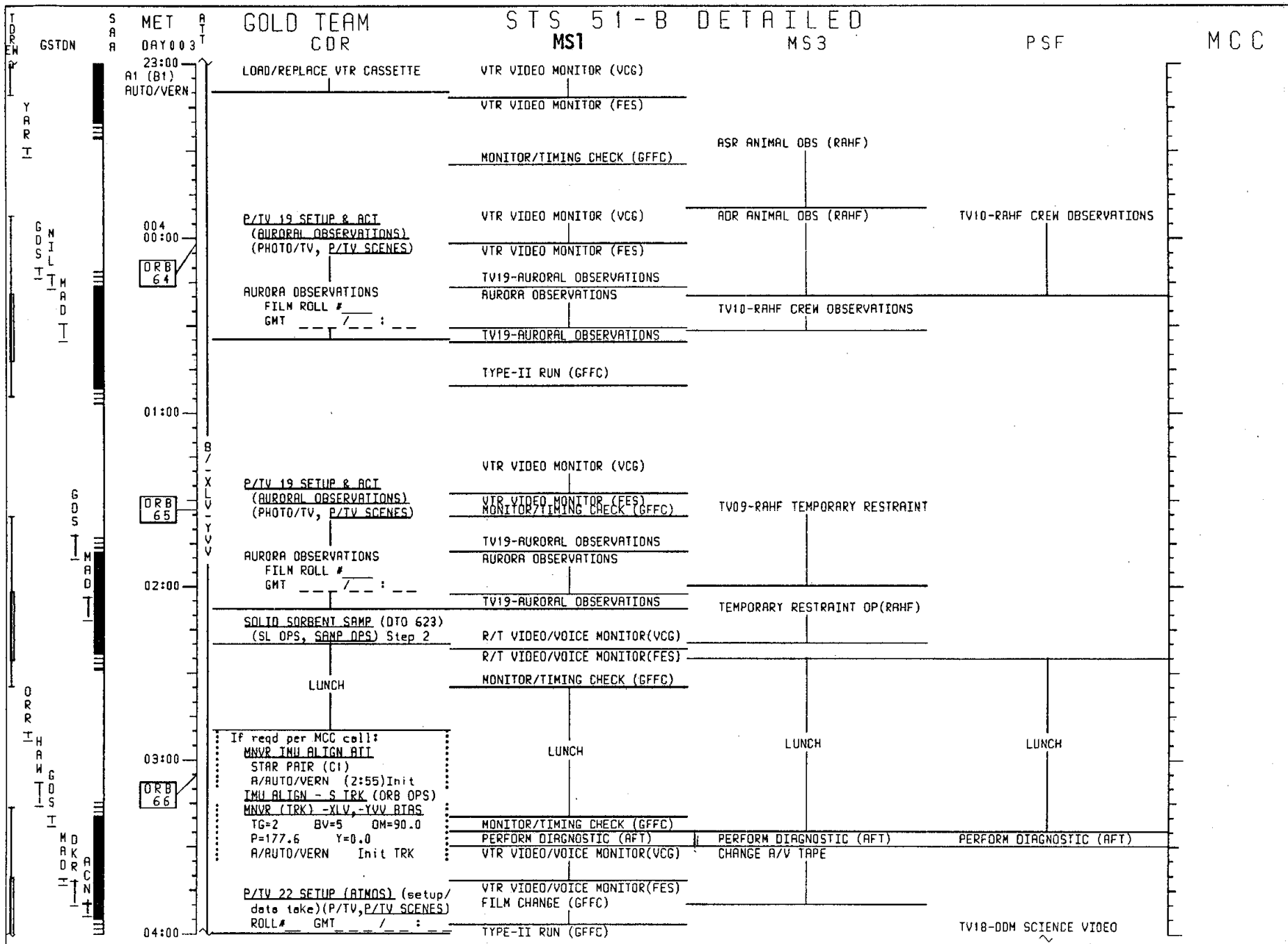


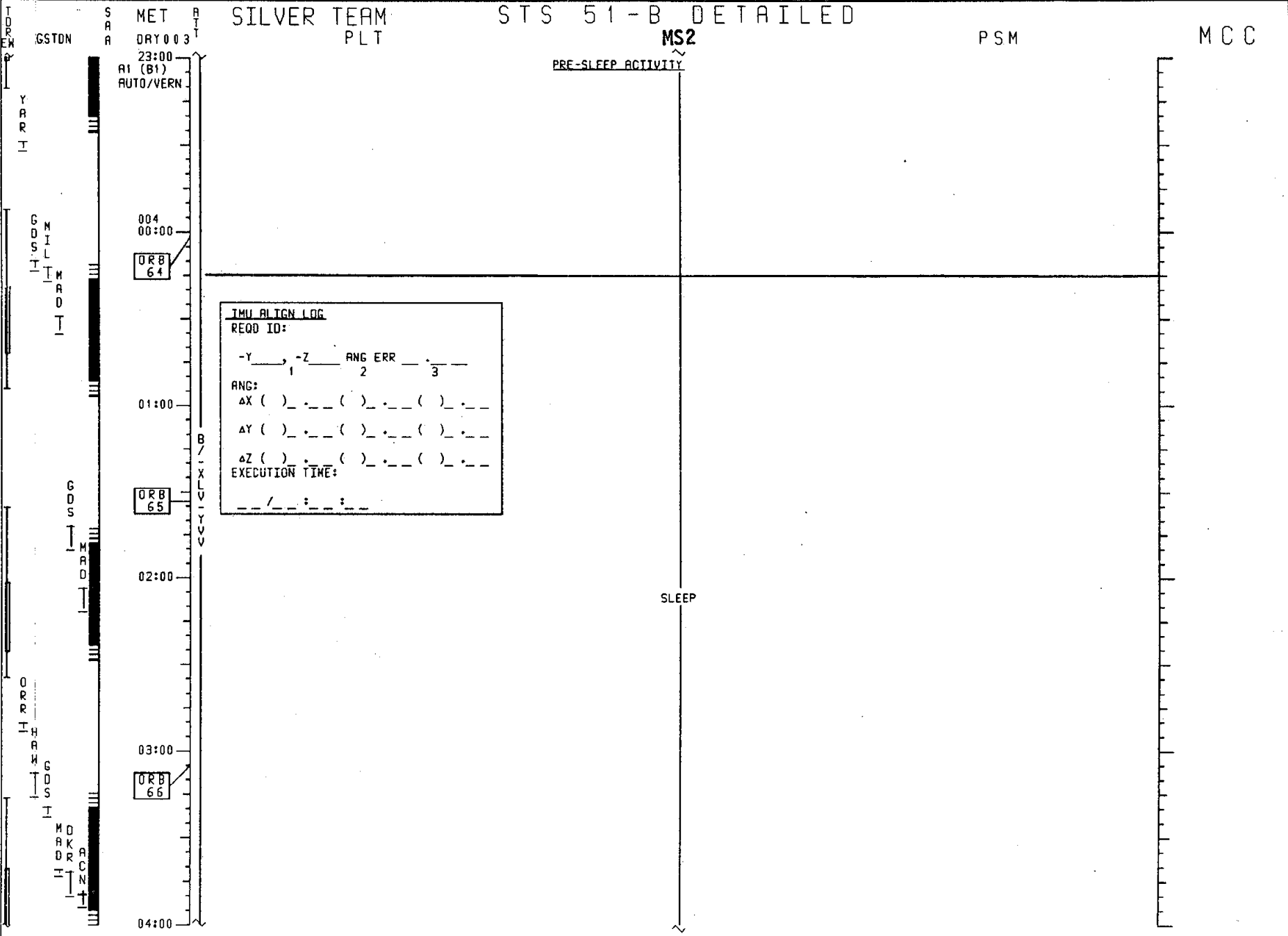


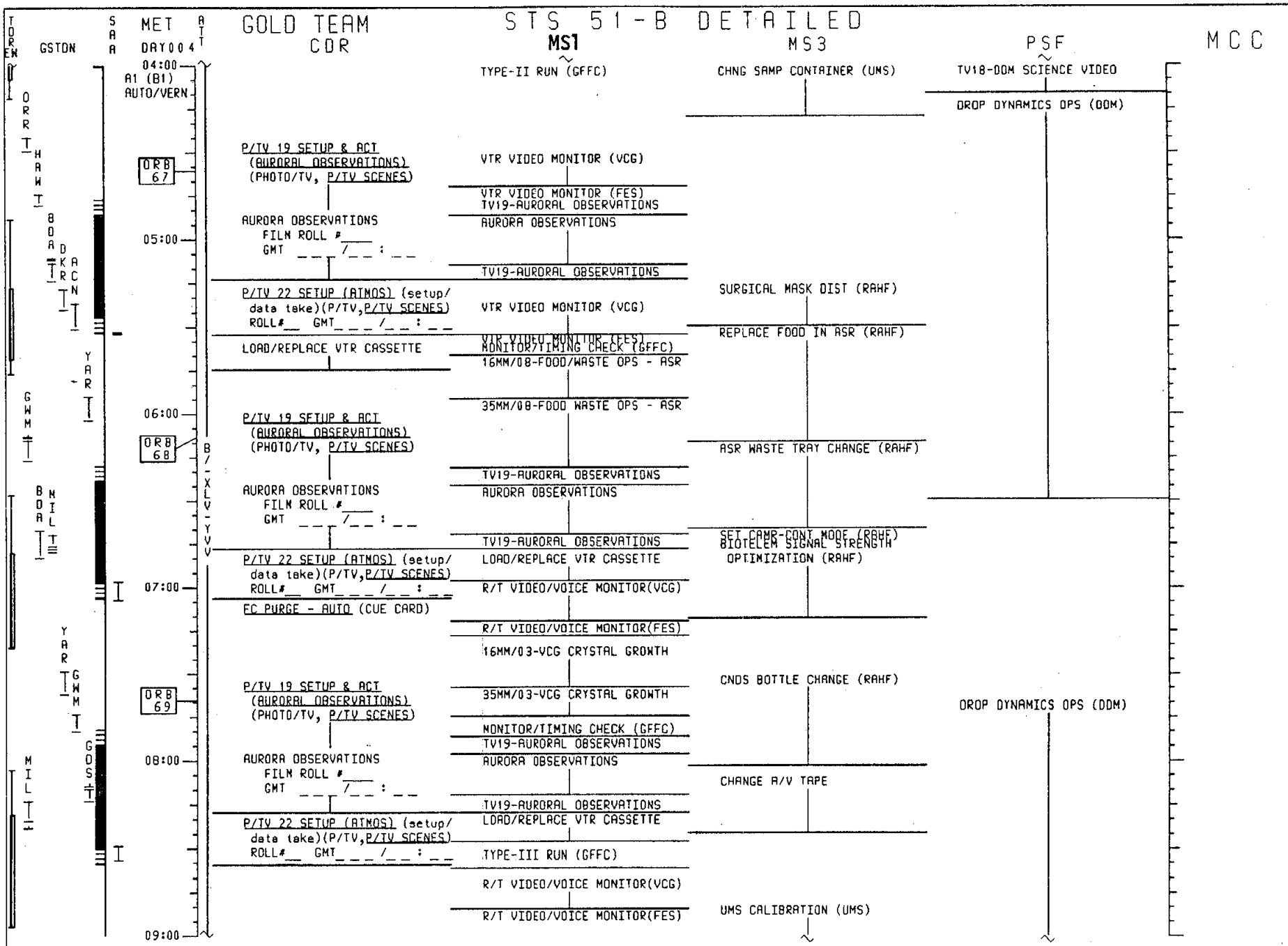










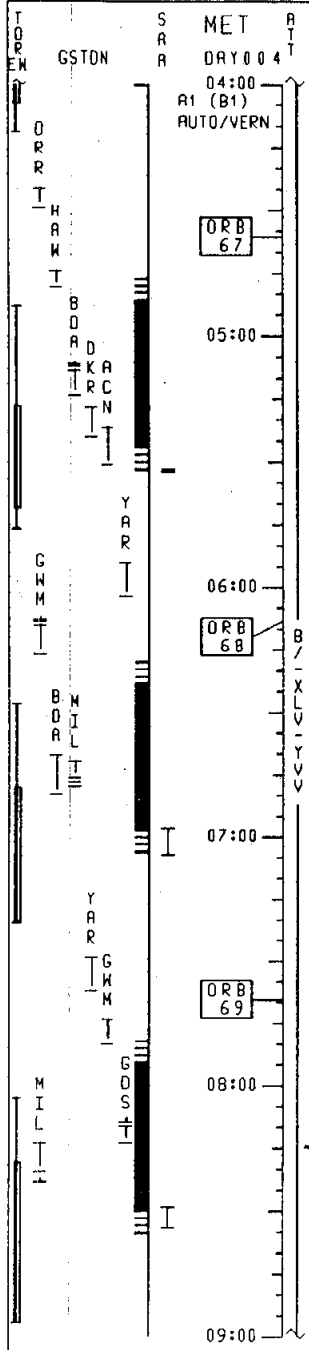


SILVER TEAM
PLT

STS 51-B DETAILED

PSM

MCC



ORB 67

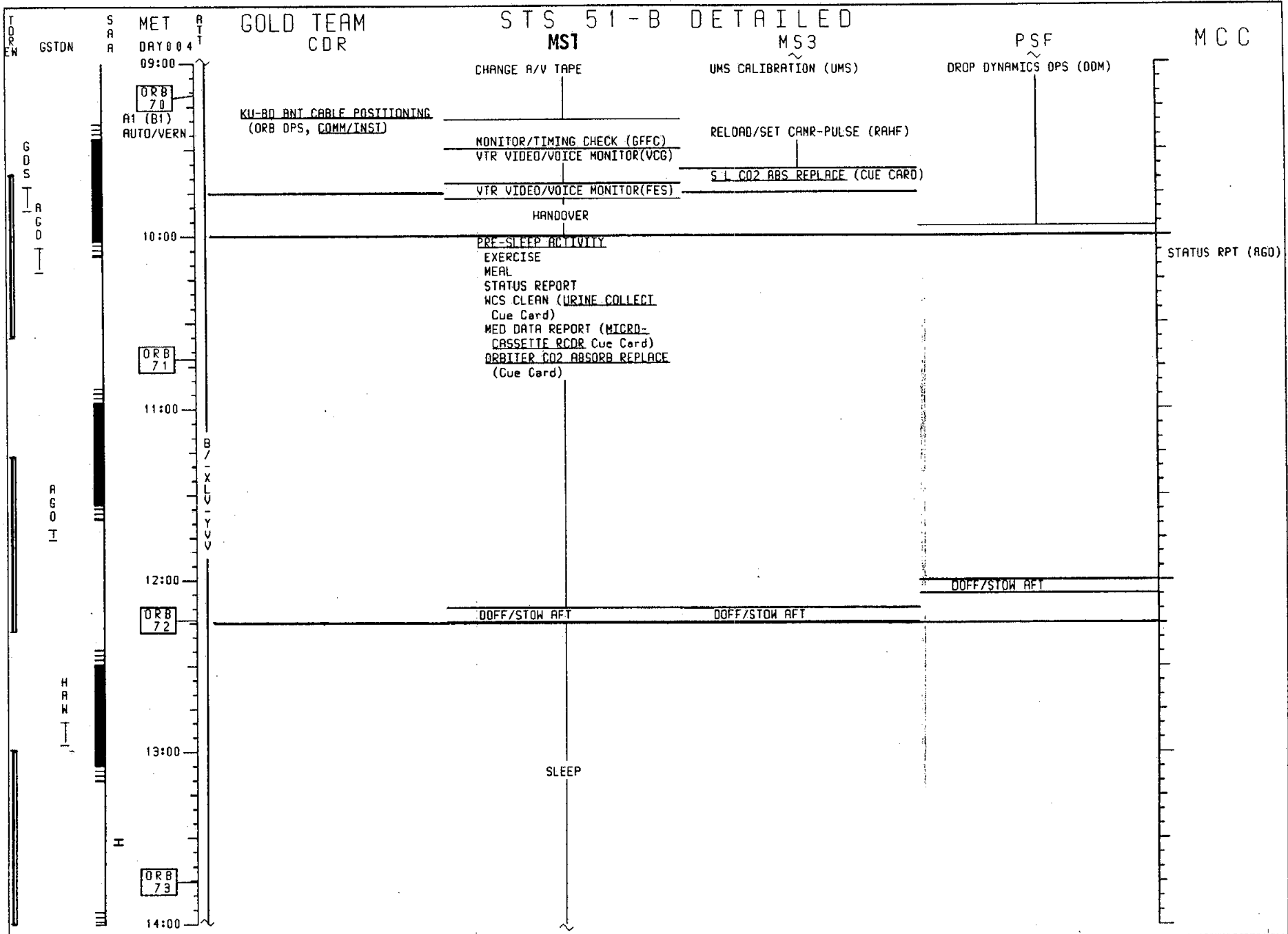
ORB 68

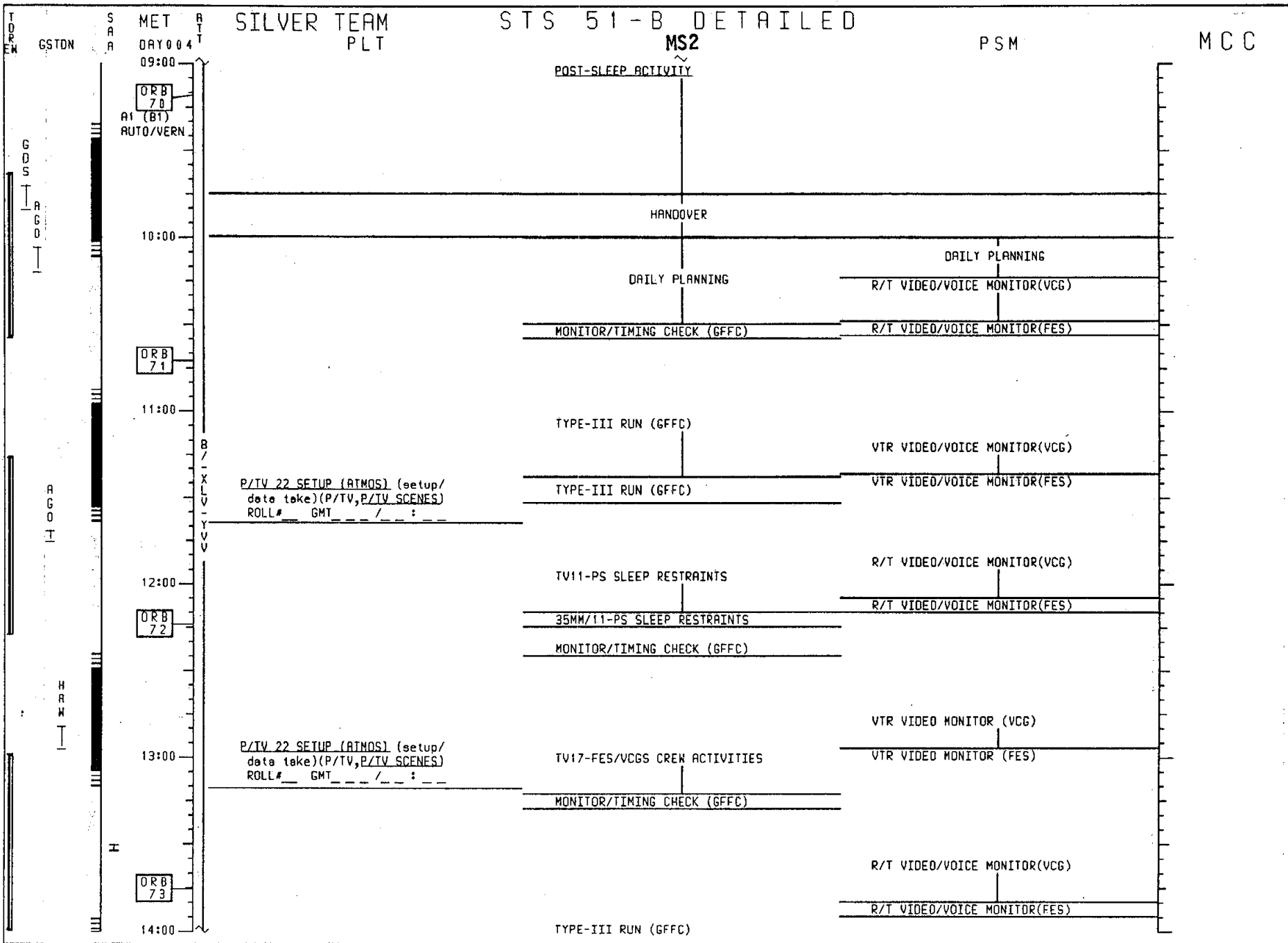
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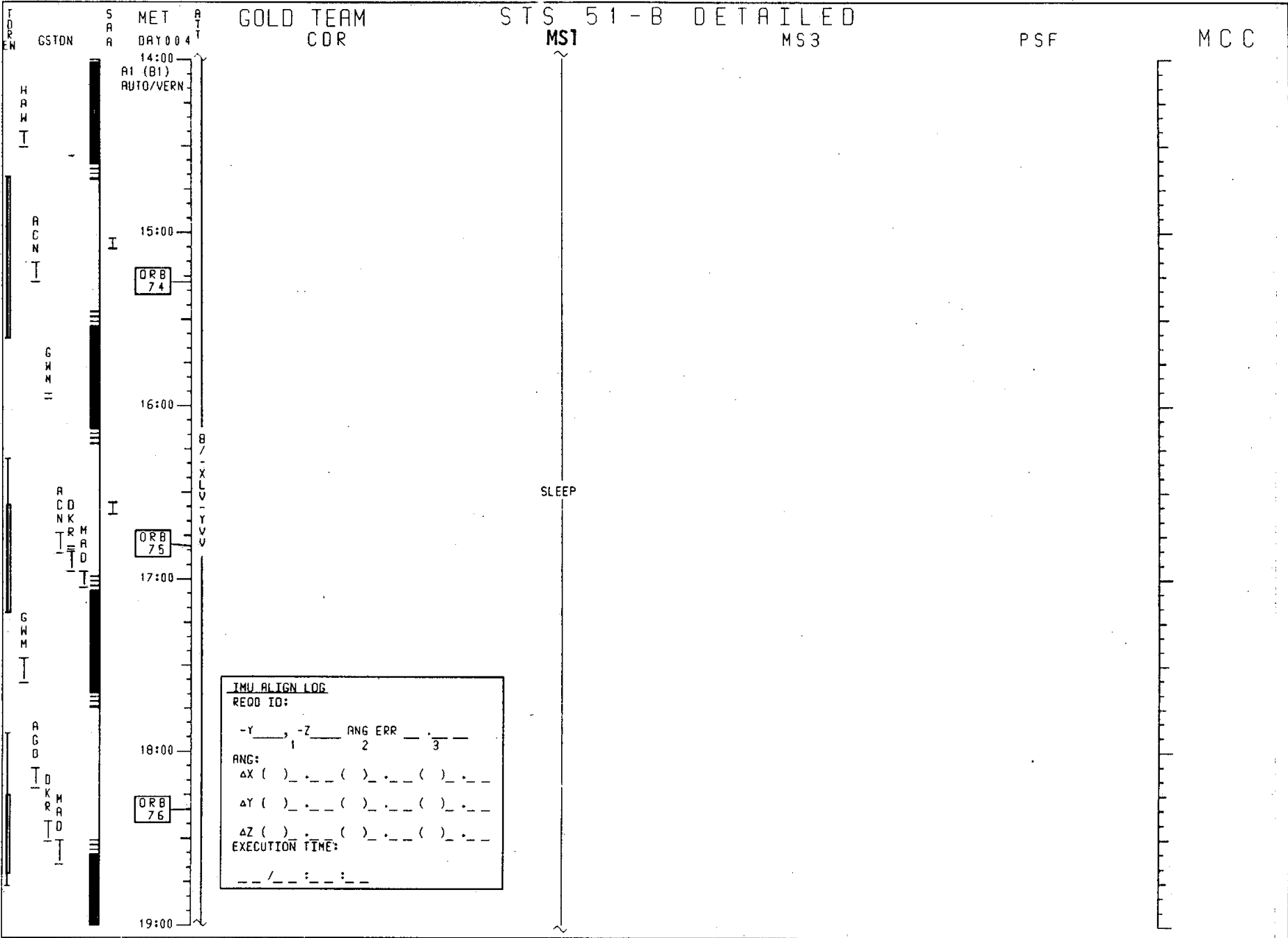
MS2

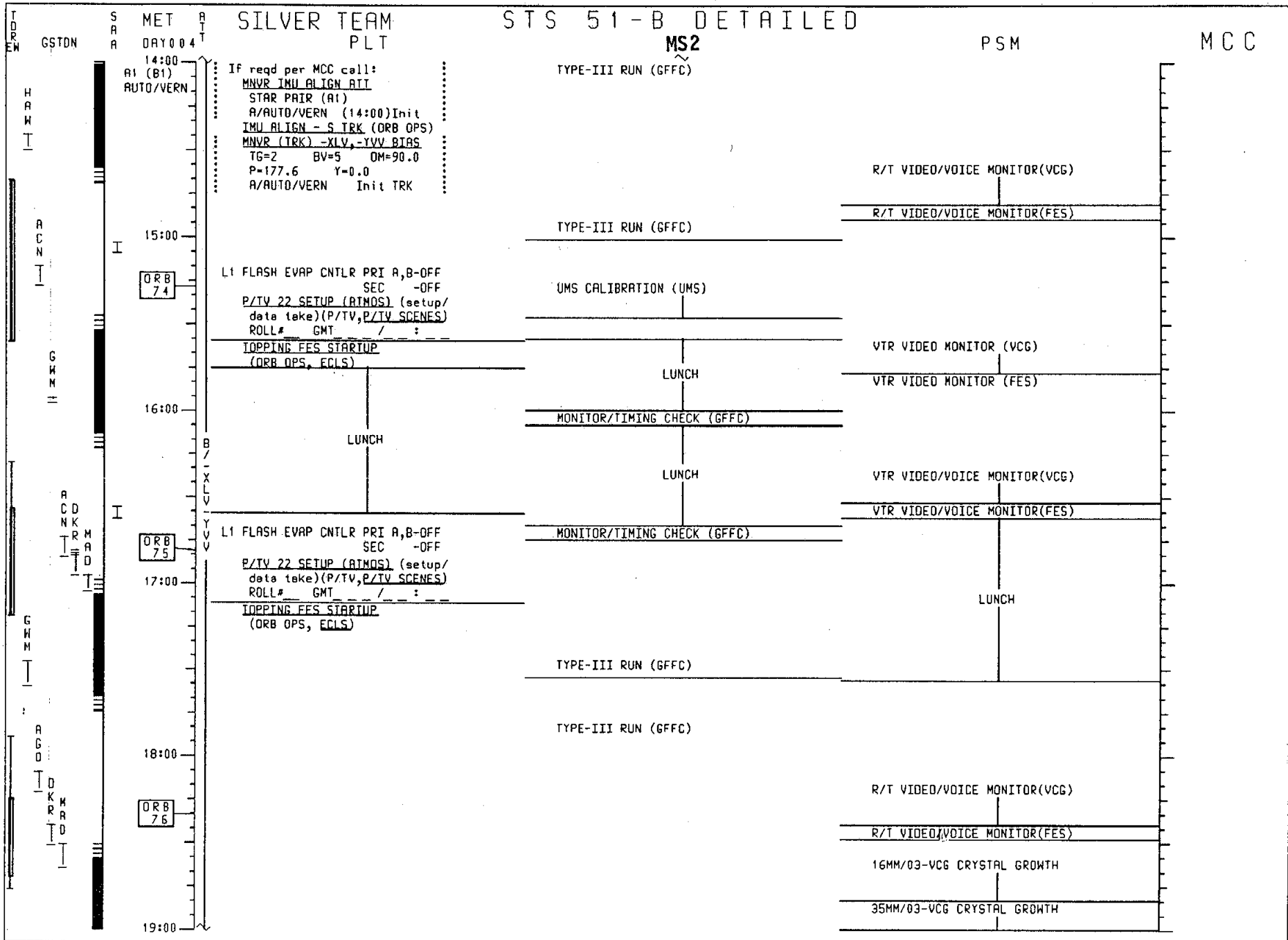
SLEEP

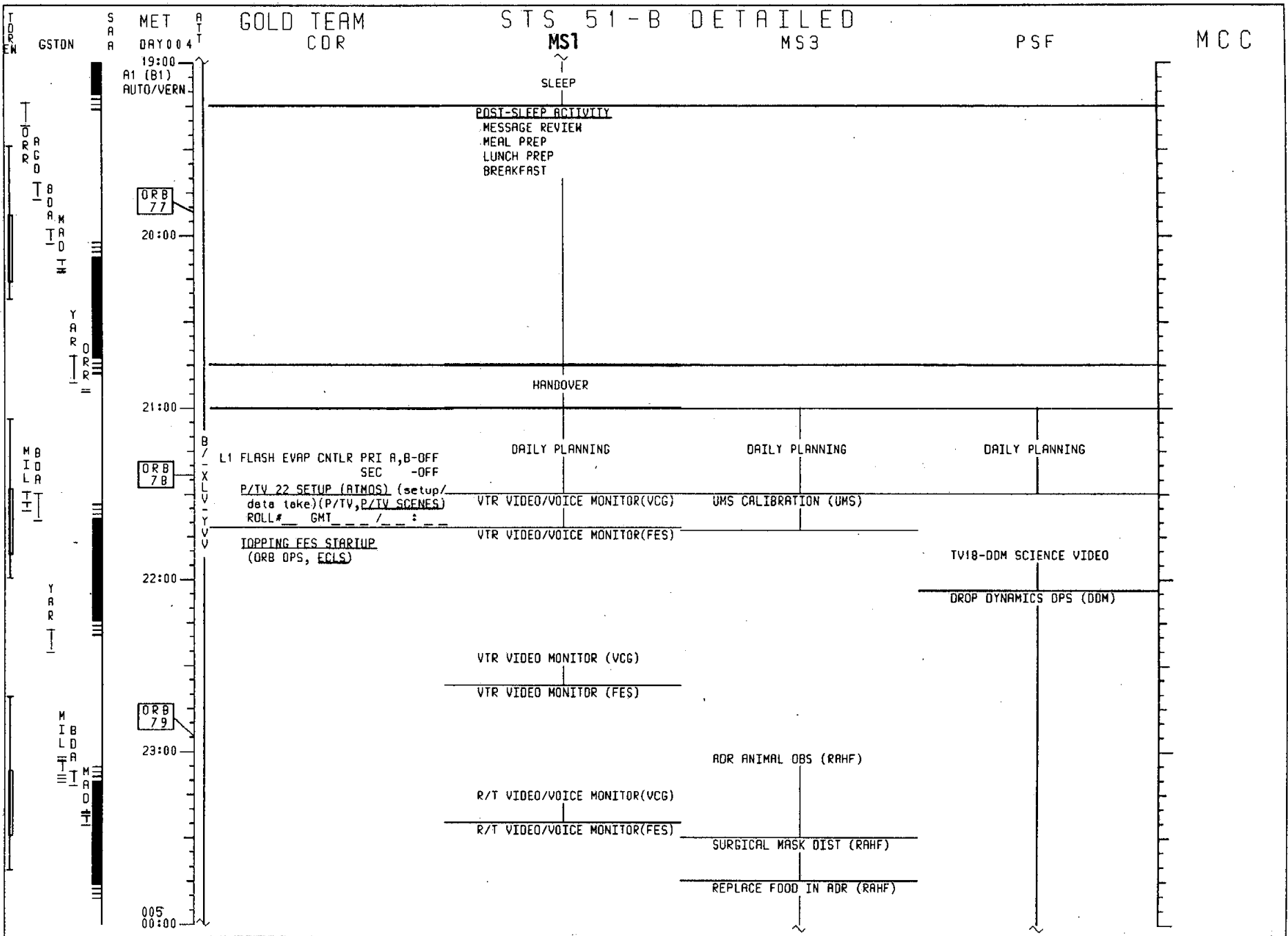
POST-SLEEP ACTIVITY
MESSAGE REVIEW
MEAL PREP
LUNCH PREP
BREAKFAST

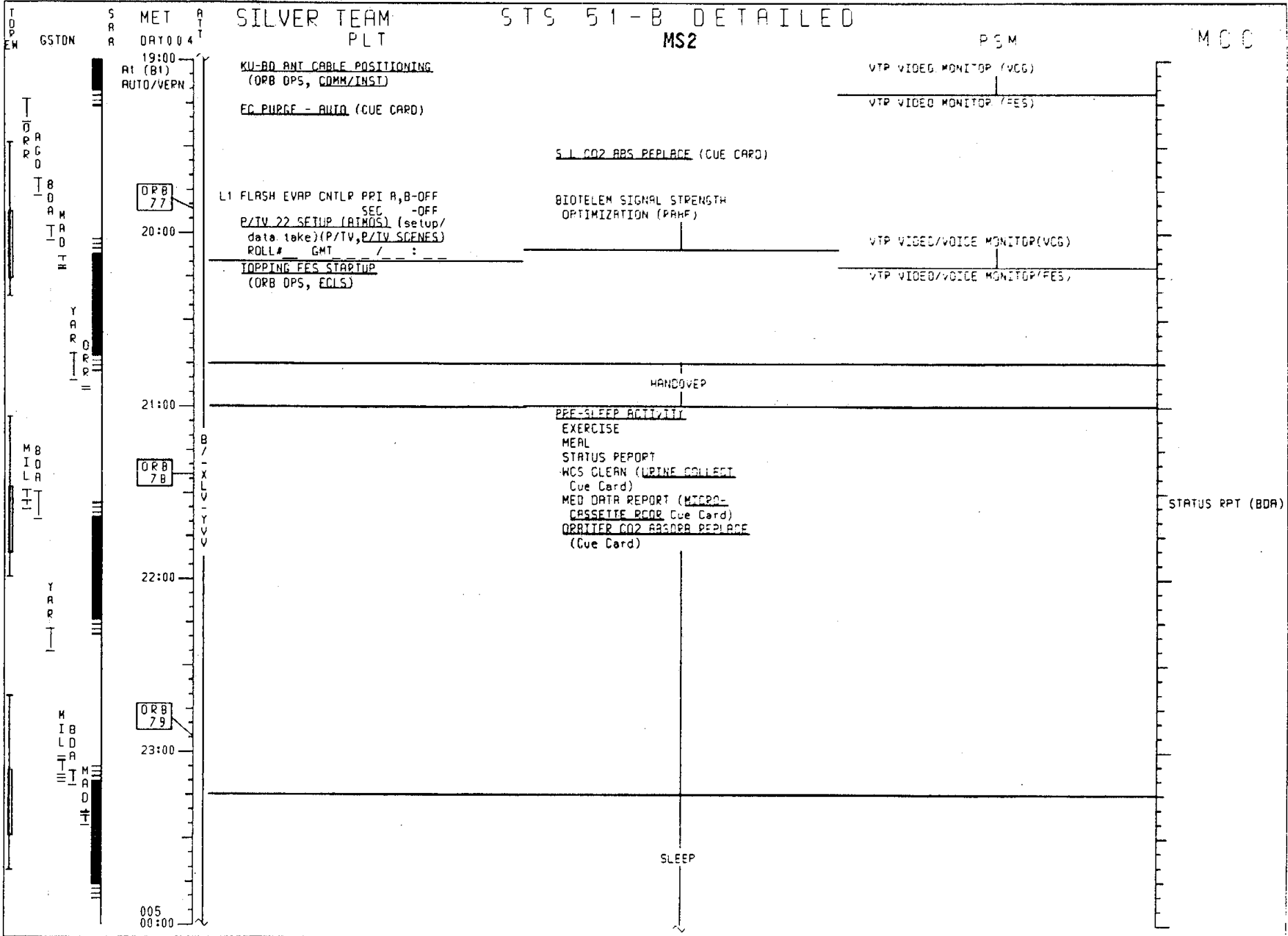


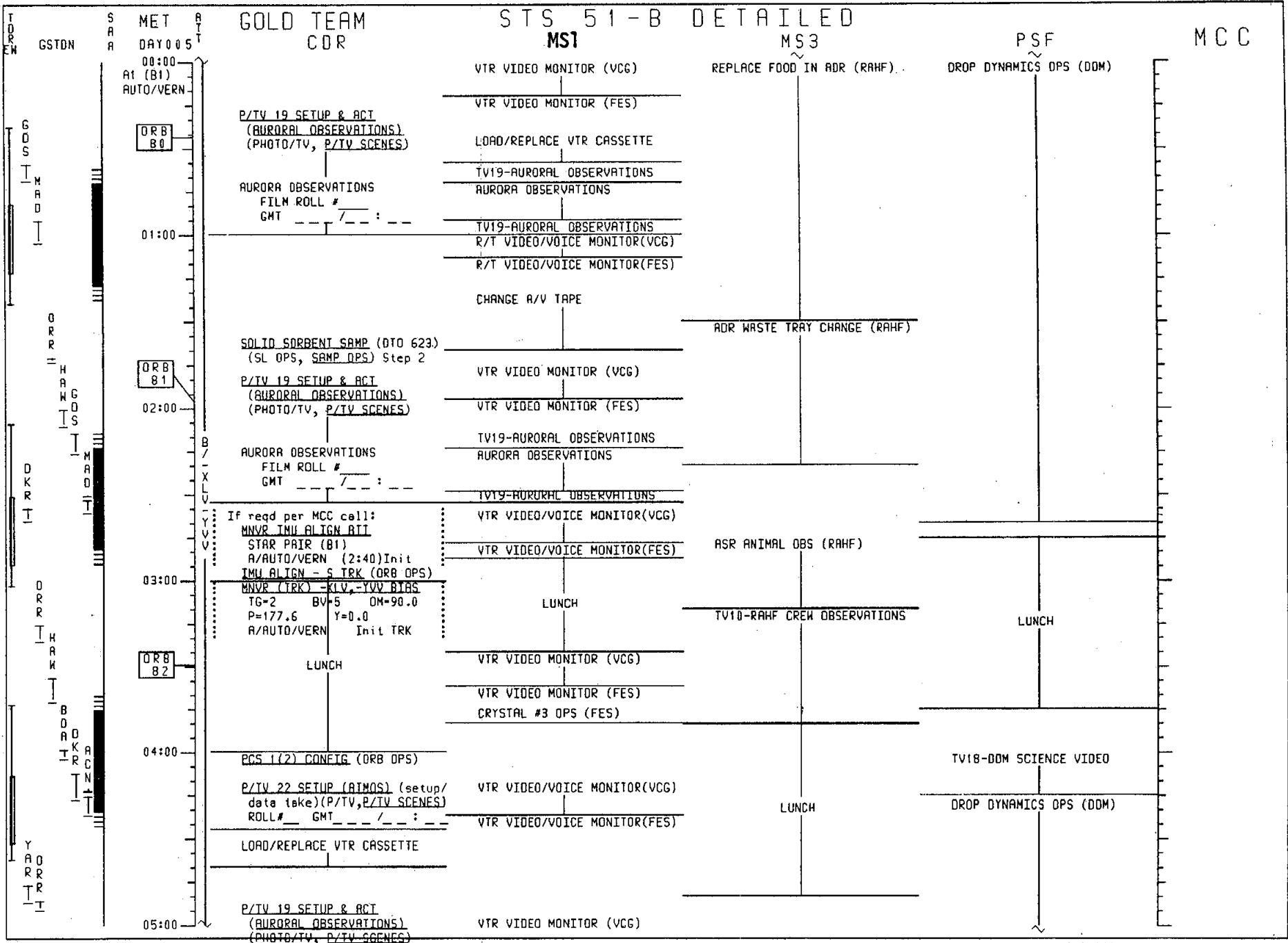












TDR EN
 GSTON
 MET
 S A R
 DAY 005
 00:00
 A1 (B1)
 AUTO/VERN
 01:00
 02:00
 03:00
 04:00
 05:00
 B / - X L V - Y V V

SILVER TEAM
PLT

STS 51-B DETAILED

MS2

PSM

MCC

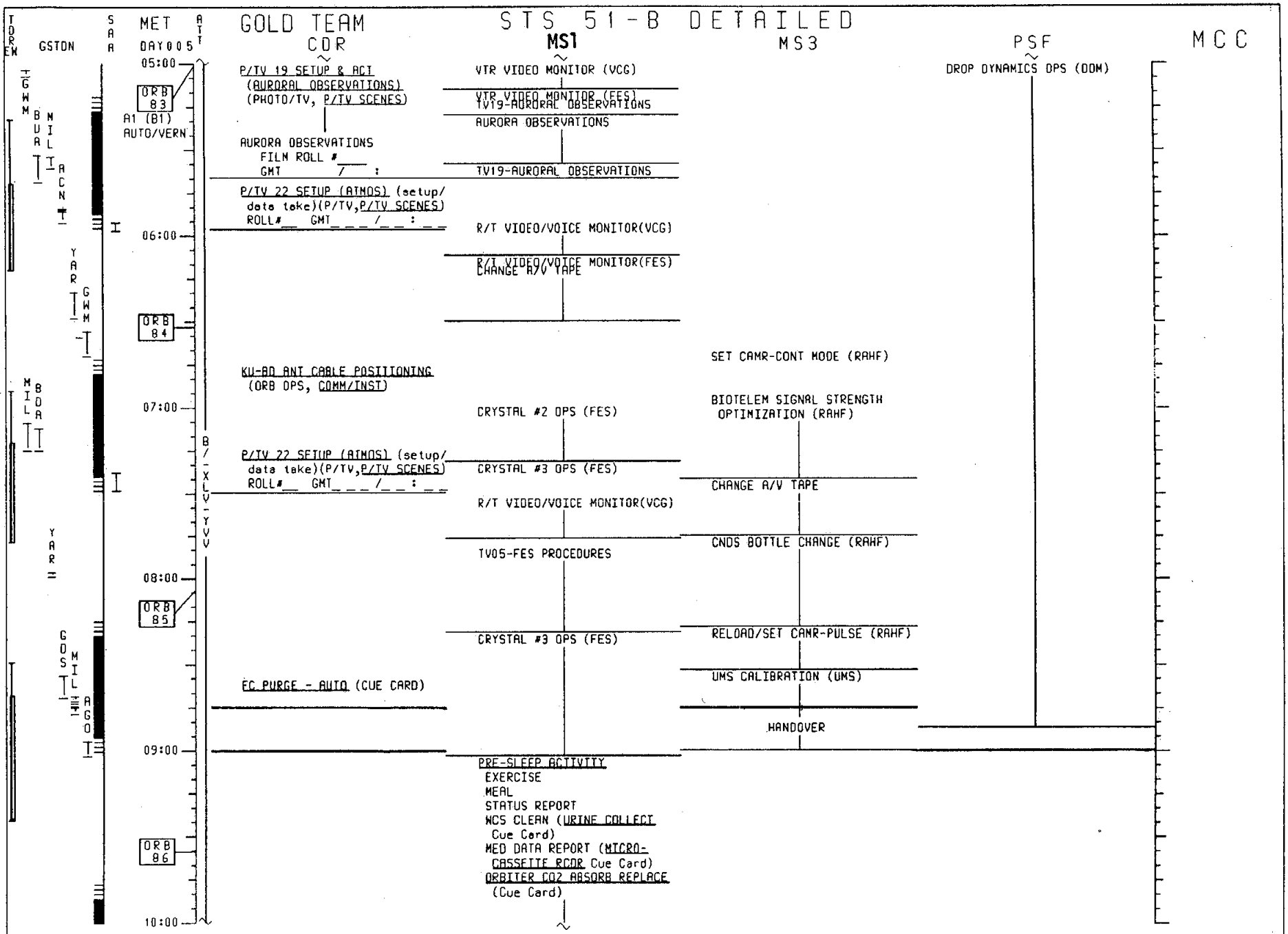
IMU ALIGN LOG
 RECD ID:
 -Y __, -Z __ ANG ERR __.
 1 2 3
 ANG:
 ΔX () . () . () .
 ΔY () . () . () .
 ΔZ () . () . () .
 EXECUTION TIME:
 / : :

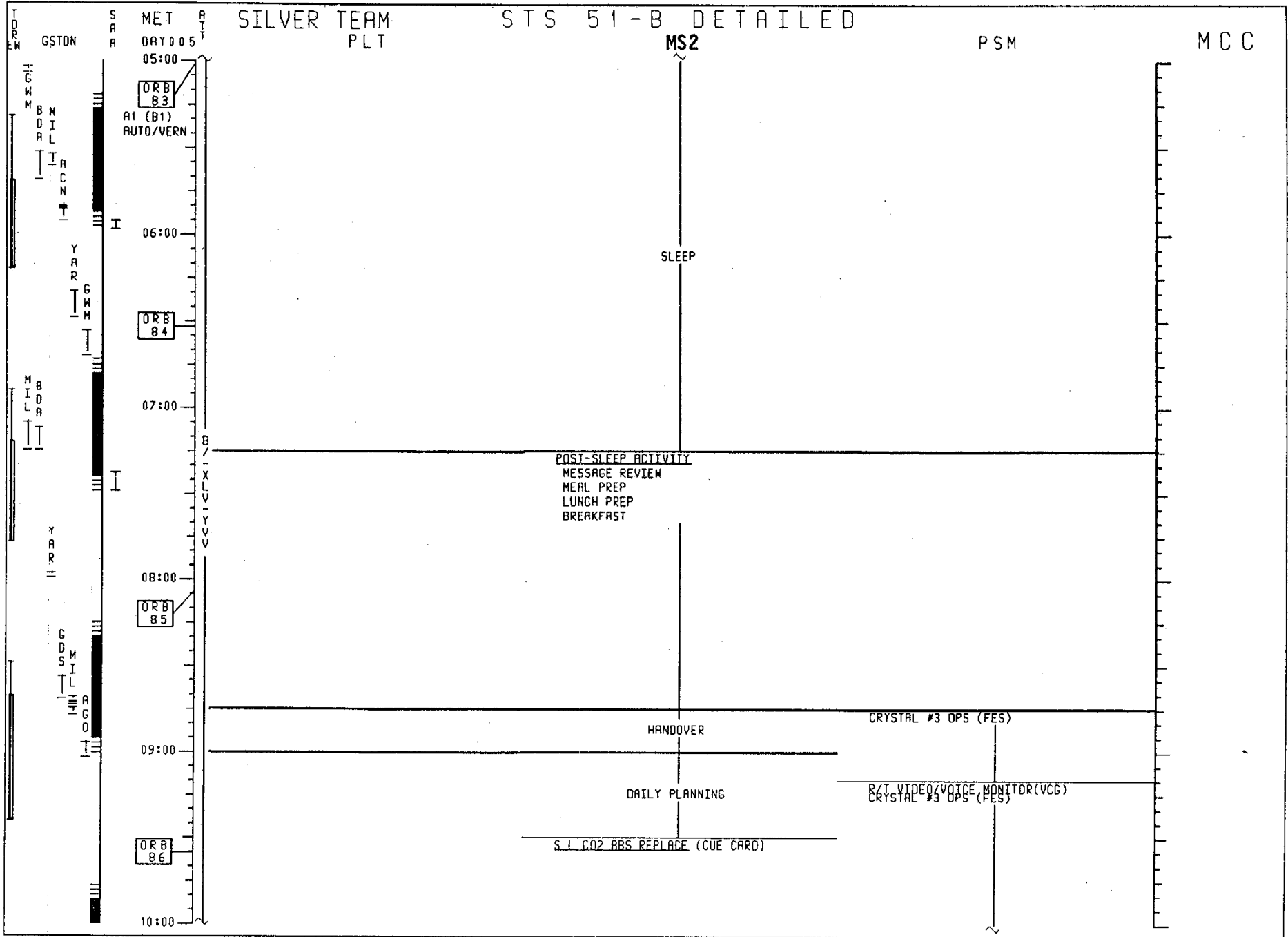
DRB 80

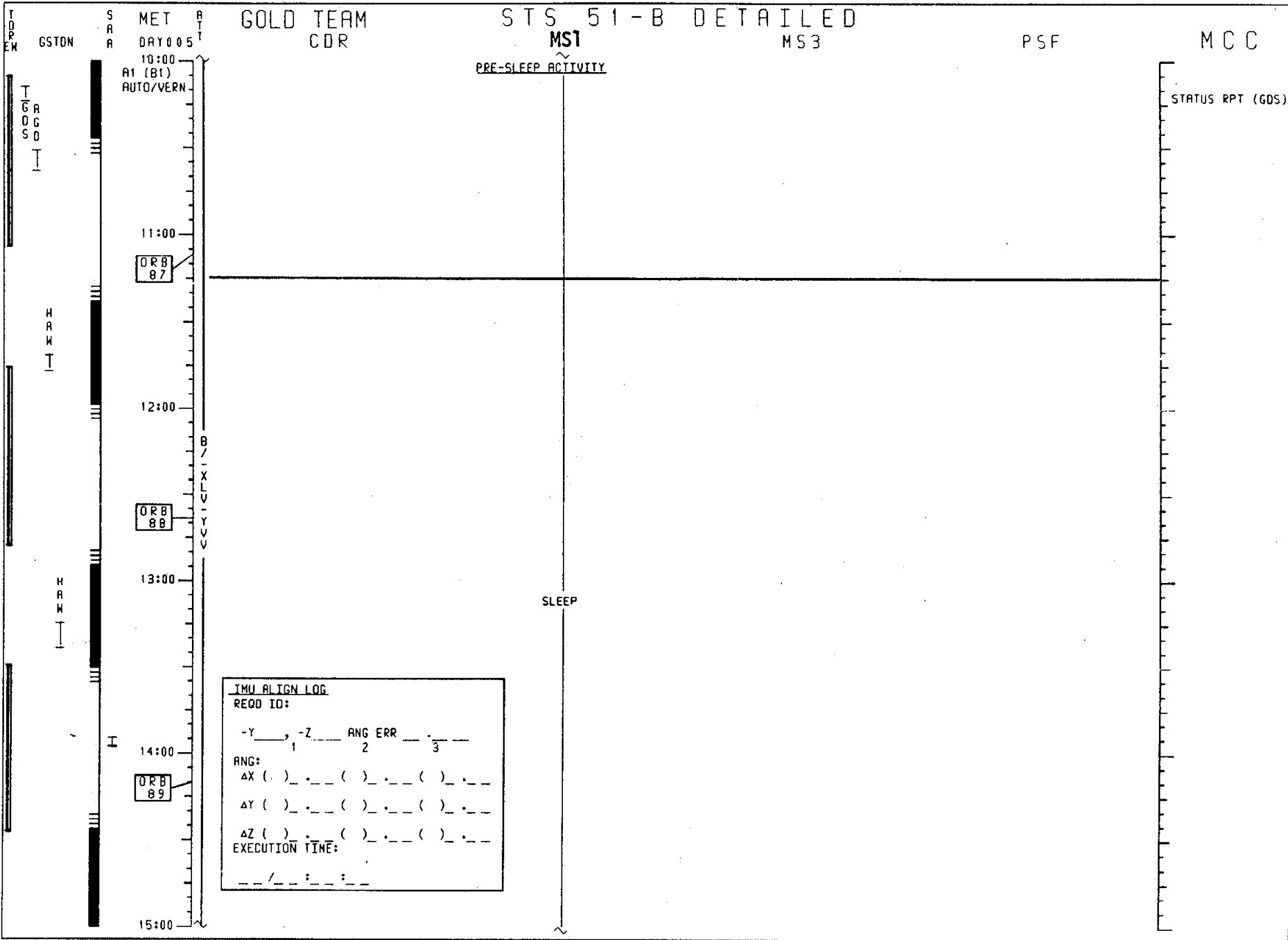
DRB 81

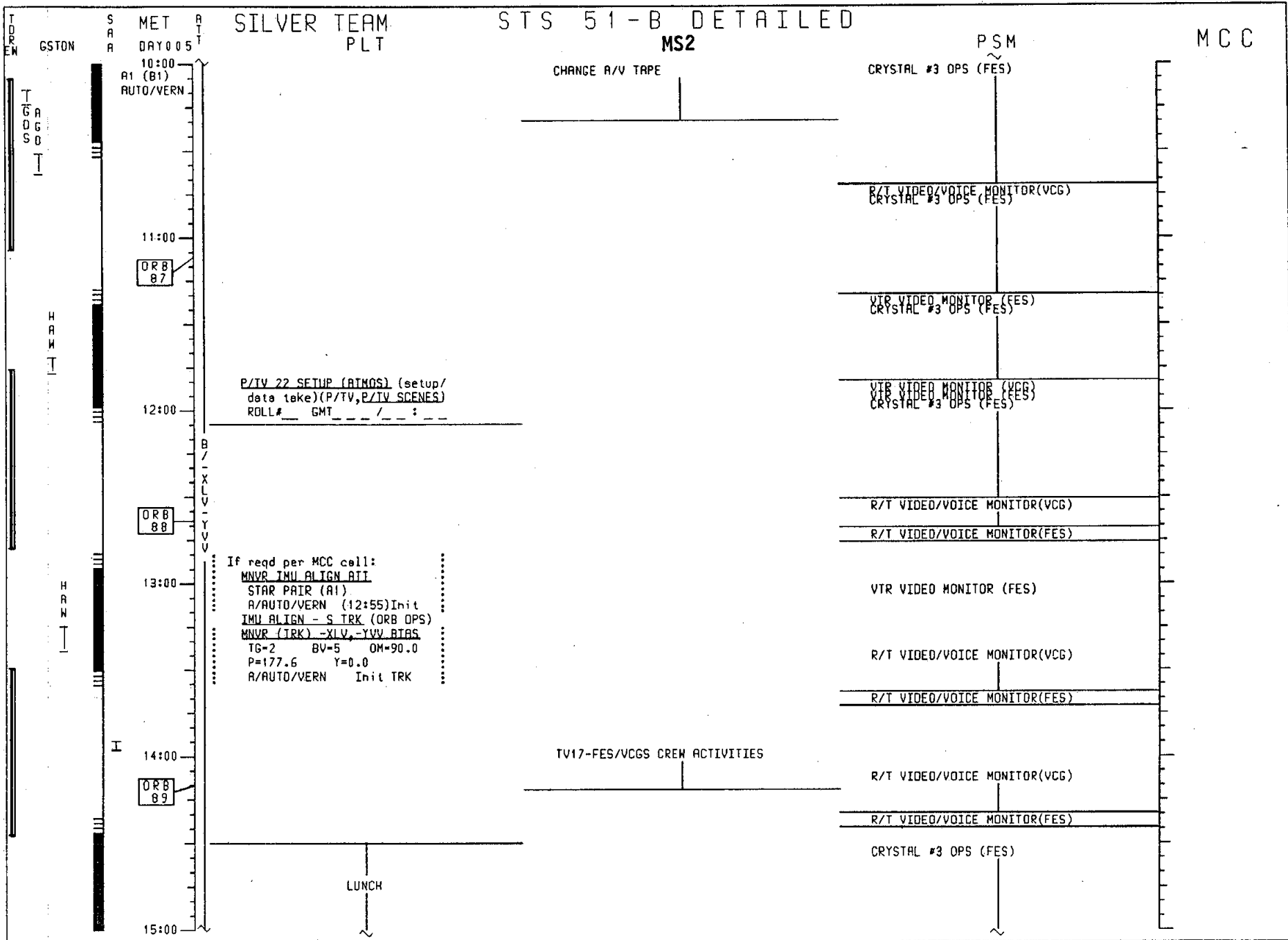
DRB 82

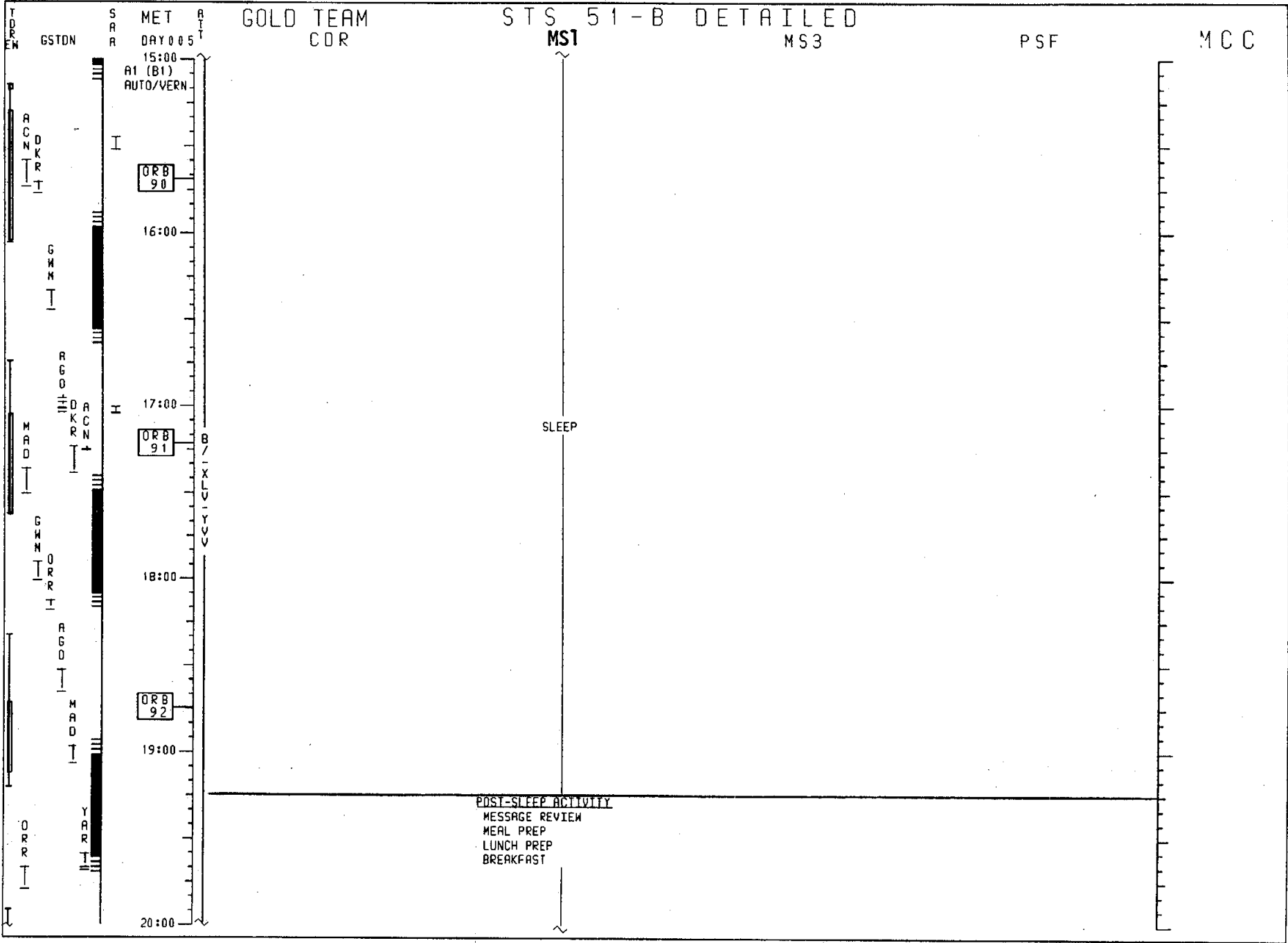
SLEEP

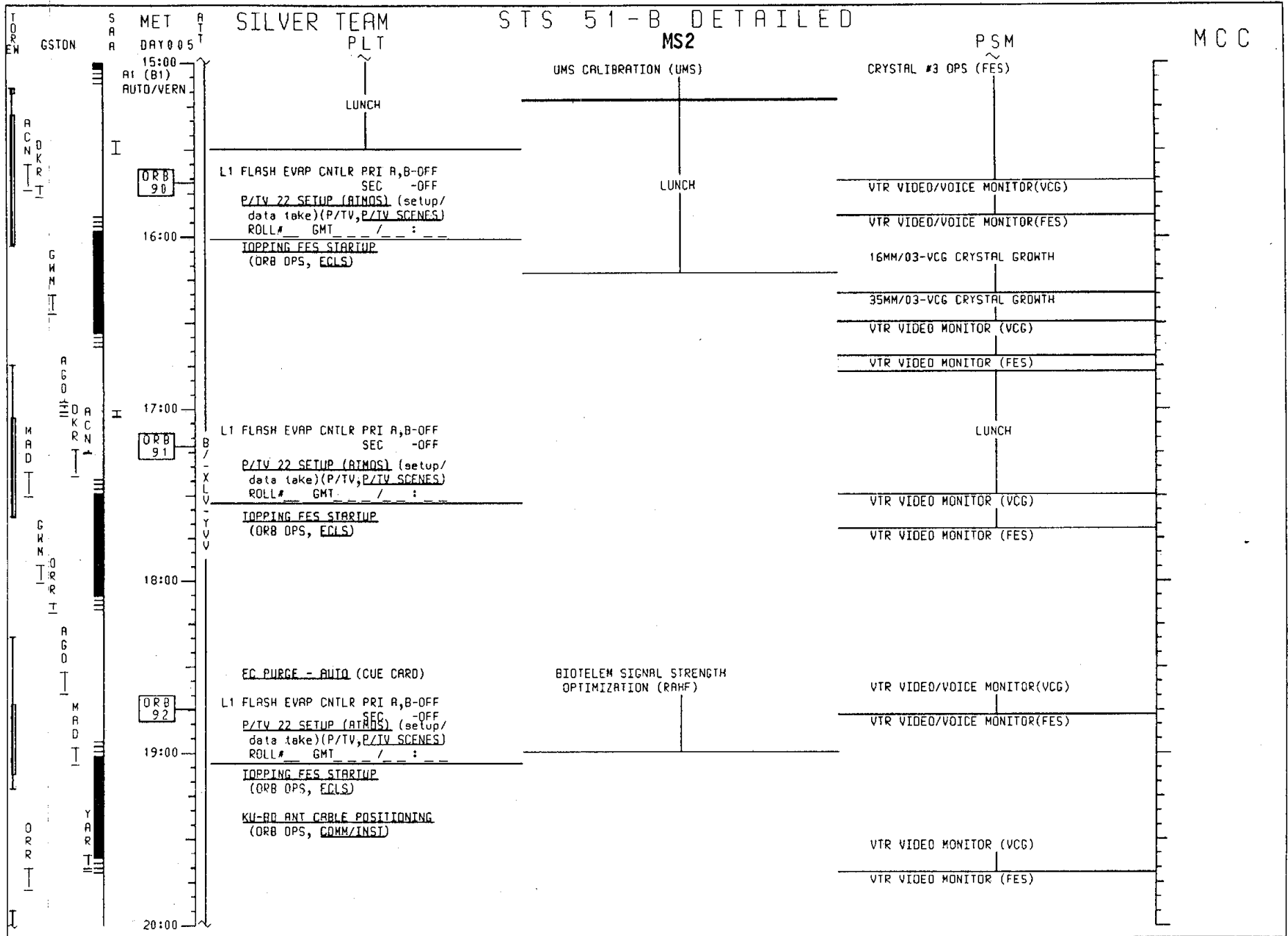


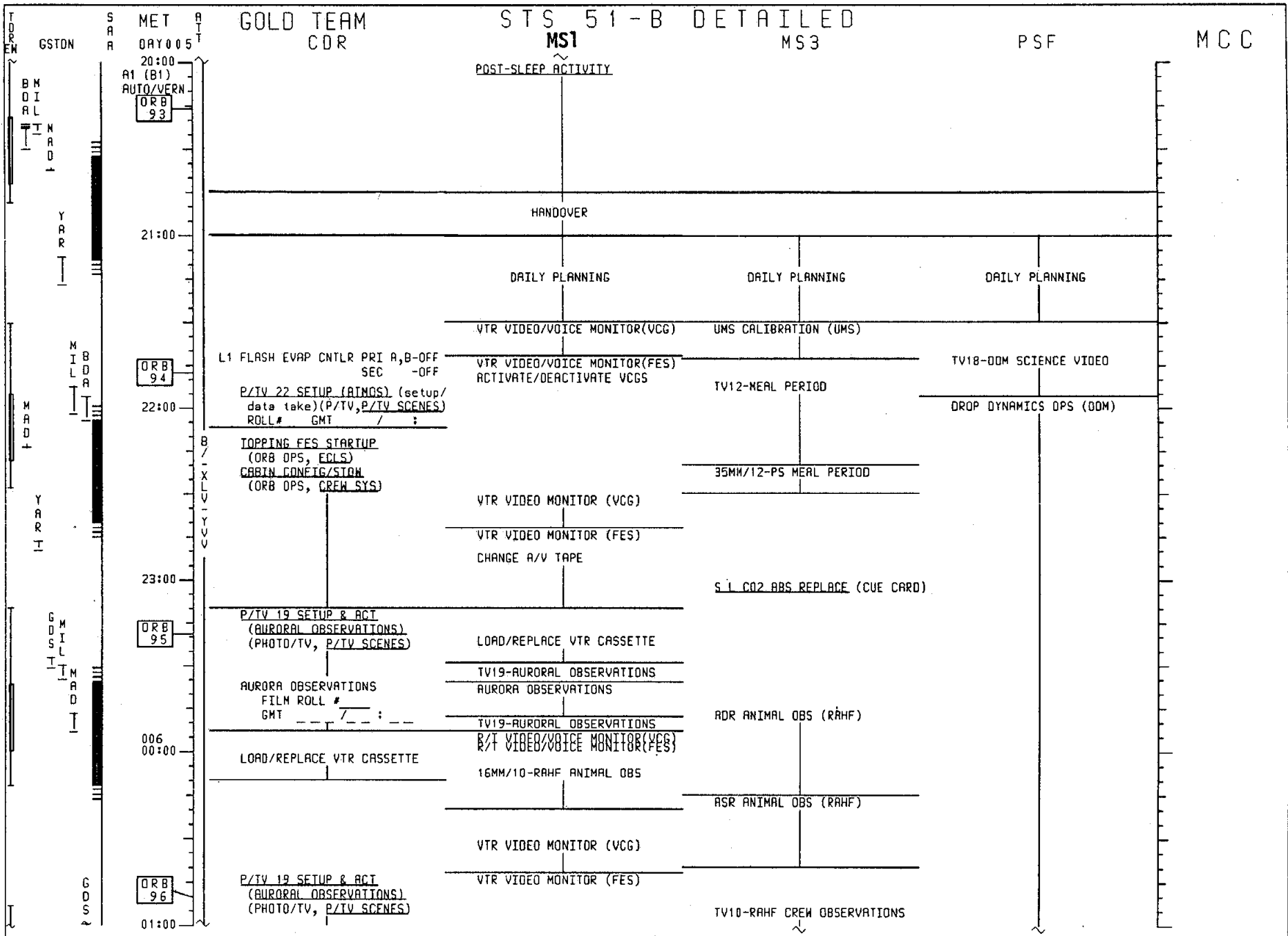


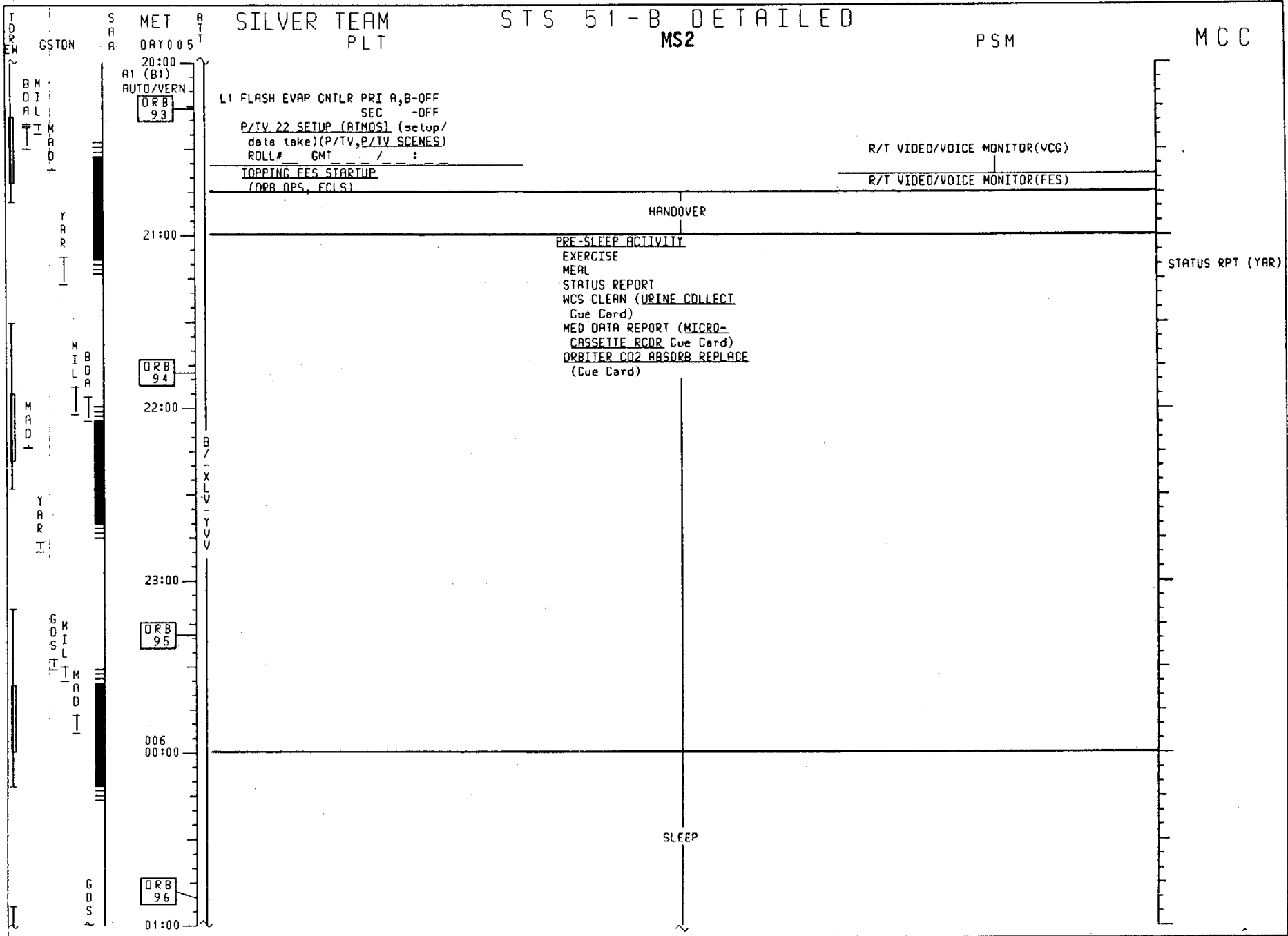




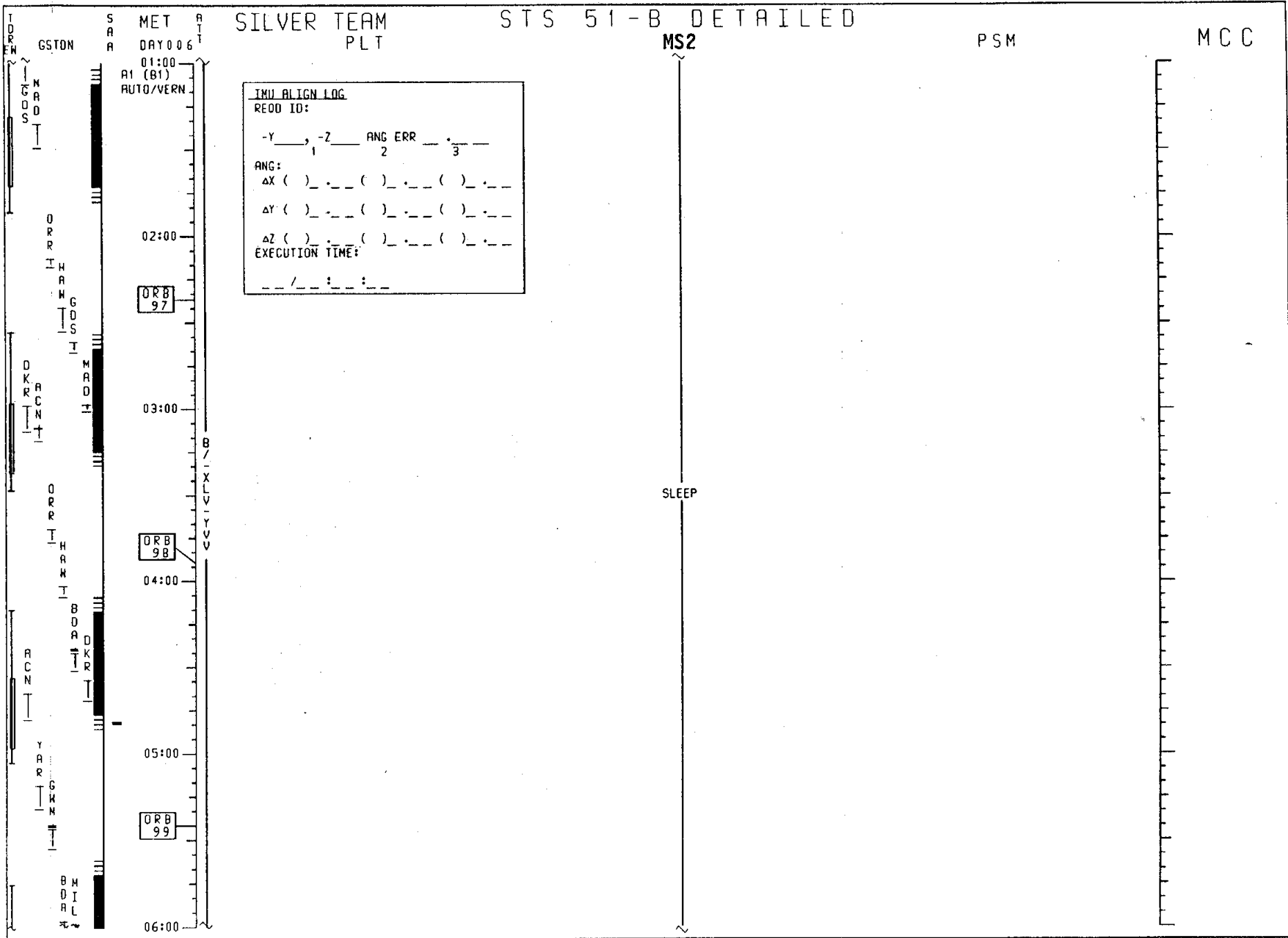


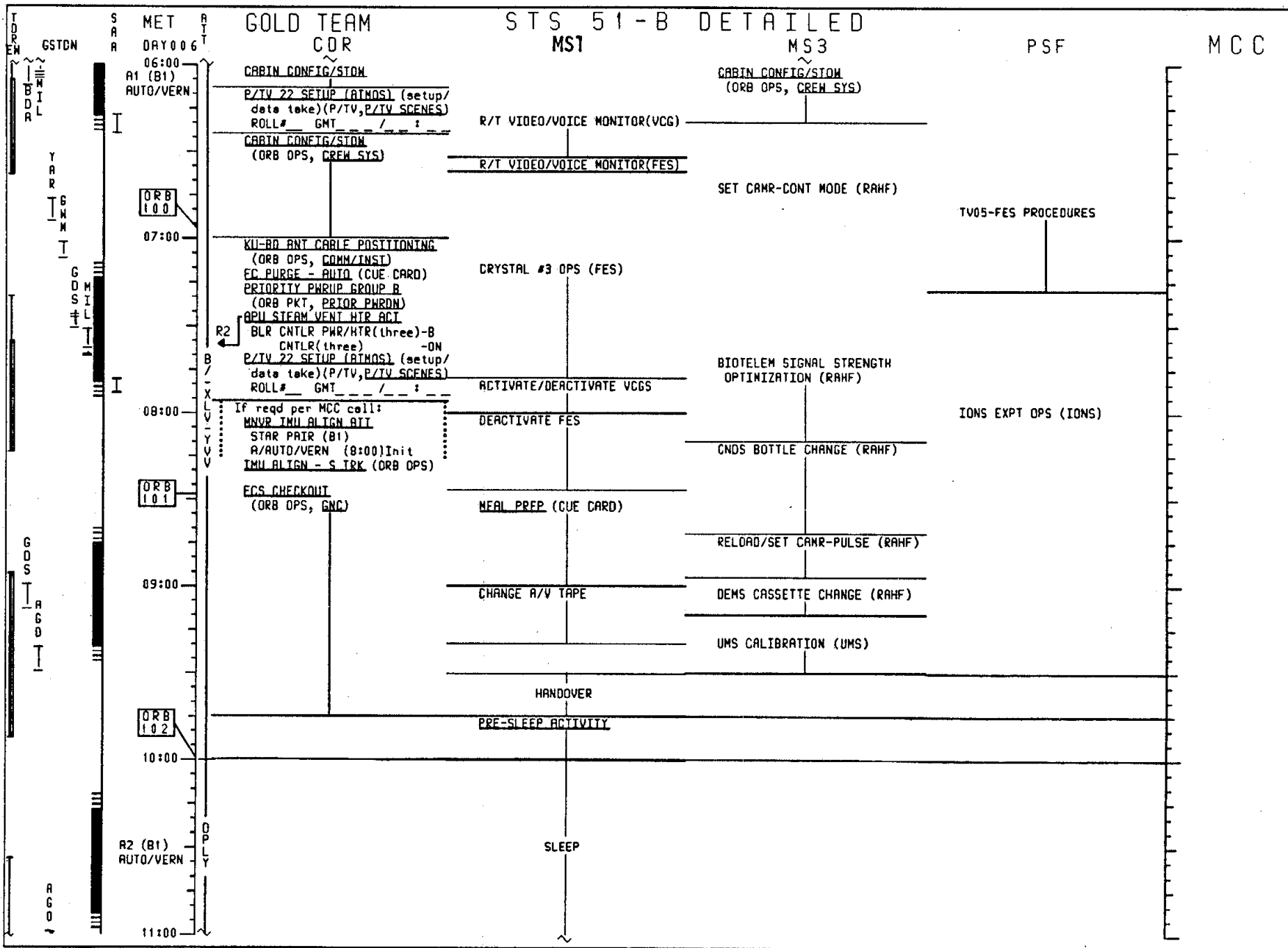


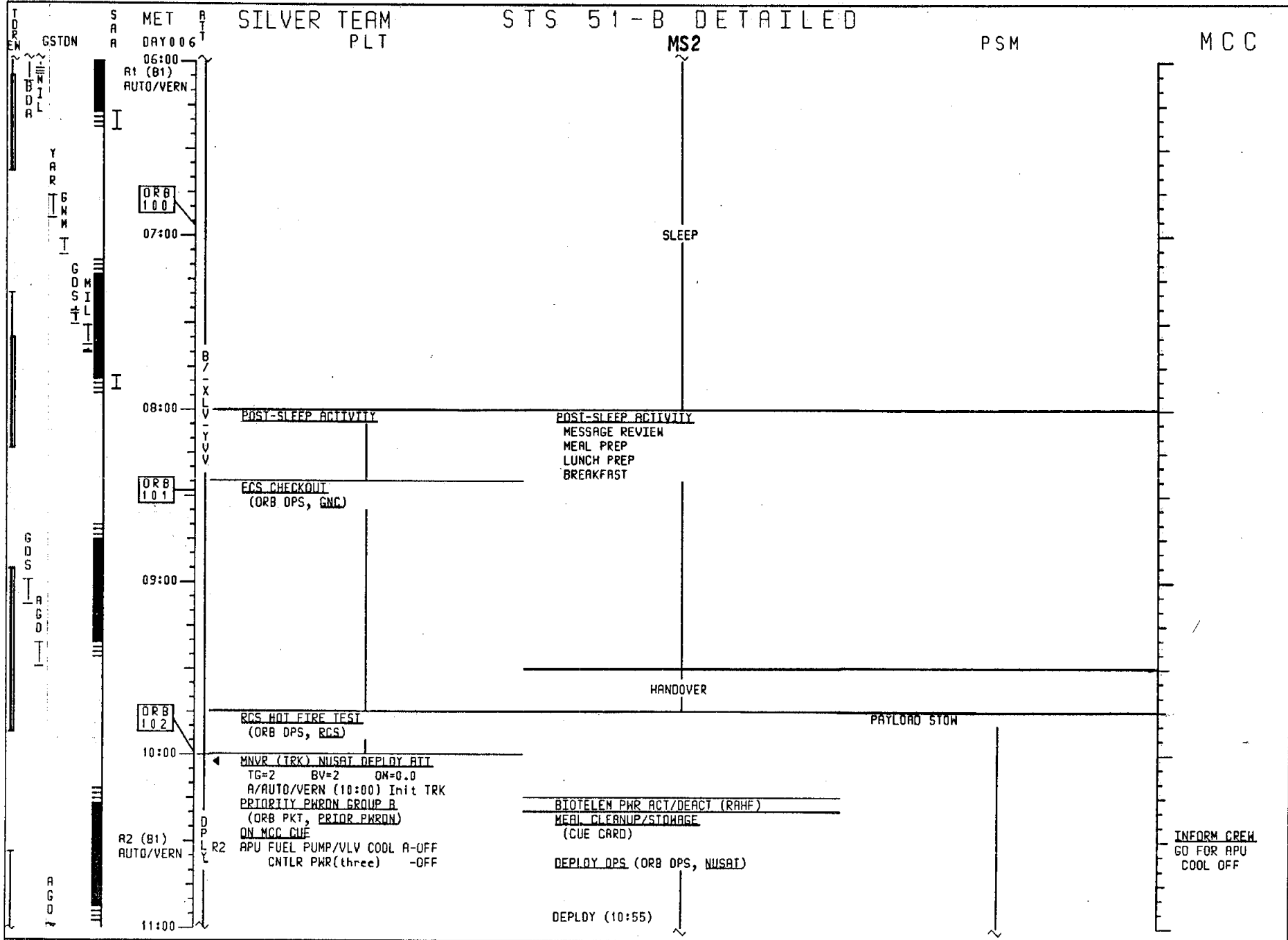


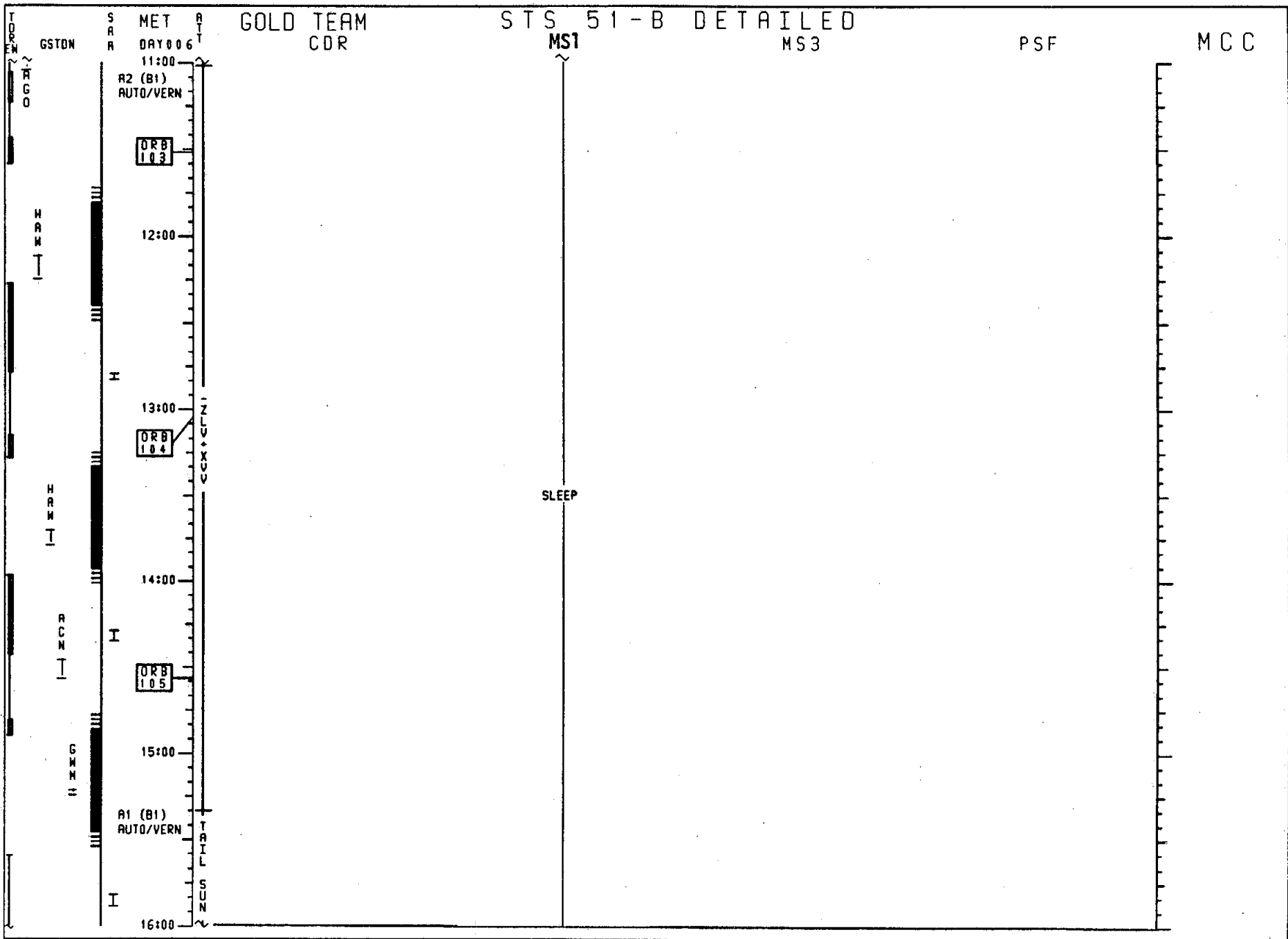


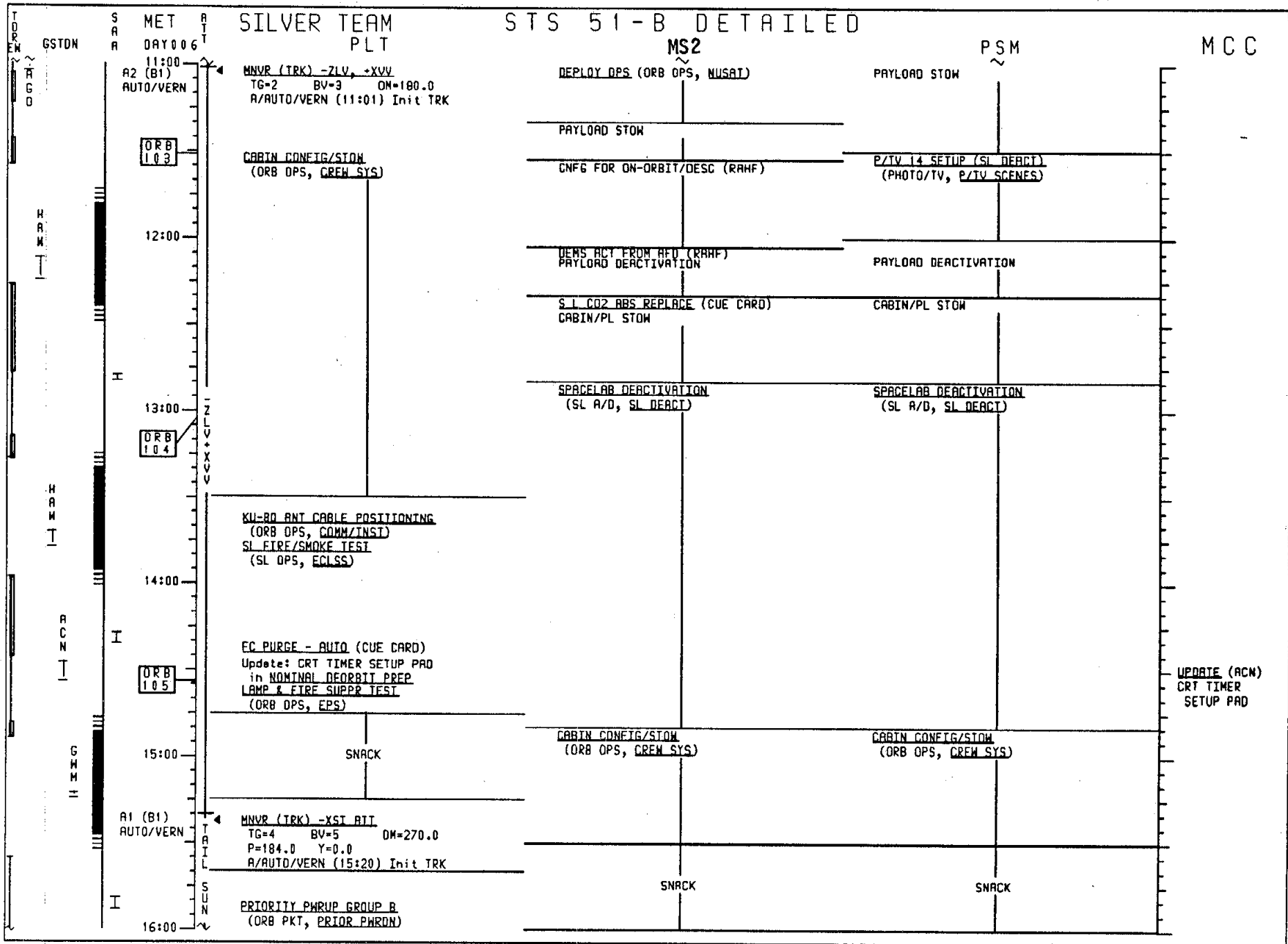
		GOLD TEAM CDR		STS 51-B DETAILED		MS3		PSF		MCC	
		AURORA OBSERVATIONS		TV19-AURORAL OBSERVATIONS		TV10-RAHF CREW OBSERVATIONS		DROP DYNAMICS OPS (DDM)			
MET DRY 006		FILM ROLL #		AURORA OBSERVATIONS							
A1 (B1) AUTO/VERN		GMT									
01:00		7 : - -									
02:00		If reqd per MCC call: MNRV IMU ALIGN ATT STAR PAIR (B1) A/AUTO/VERN (1:30) Init IMU ALIGN - S TRK (ORB OPS) MNRV (TRK) - XLV, -YVV BIAS TG-2 BV-5 OM-90.0 P=177.6 Y=0.0 A/AUTO/VERN Init TRK SOLID SORBENT SAMP (OTO 623) (SL OPS, SAMP OPS) Step 2		CHANGE A/V TAPE							
ORB 97		LUNCH		VTR VIDEO/VOICE MONITOR(VCG)		LUNCH		LUNCH			
03:00		P/TV 22 SETUP (ATMOS) (setup/ data take)(P/TV,P/TV SCENES) ROLL# GMT / - - :		LUNCH				CABIN CONFIG/STOW (ORB OPS, CREW SYS)		CABIN CONFIG/STOW (ORB OPS, CREW SYS)	
04:00		P/TV 19 SETUP & ACT (AURORAL OBSERVATIONS) (PHOTO/TV, P/TV SCENES)		VTR VIDEO MONITOR (VCG)		VTR VIDEO MONITOR (FES)					
05:00		AURORA OBSERVATIONS FILM ROLL # GMT / - - :		TV19-AURORAL OBSERVATIONS AURORA OBSERVATIONS		TV19-AURORAL OBSERVATIONS AURORA OBSERVATIONS					
06:00		P/TV 22 SETUP (ATMOS) (setup/ data take)(P/TV,P/TV SCENES) ROLL# GMT / - - :		VTR VIDEO/VOICE MONITOR(VCG)		VTR VIDEO/VOICE MONITOR(FES)		CHNG SAMP CONTAINER (UWS)			
ORB 98		LOAD/REPLACE VTR CASSETTE		VTR VIDEO MONITOR (VCG)		CABIN CONFIG/STOW (ORB OPS, CREW SYS)					
ORB 99		CABIN CONFIG/STOW (ORB OPS, CREW SYS)		VTR VIDEO MONITOR (FES)							

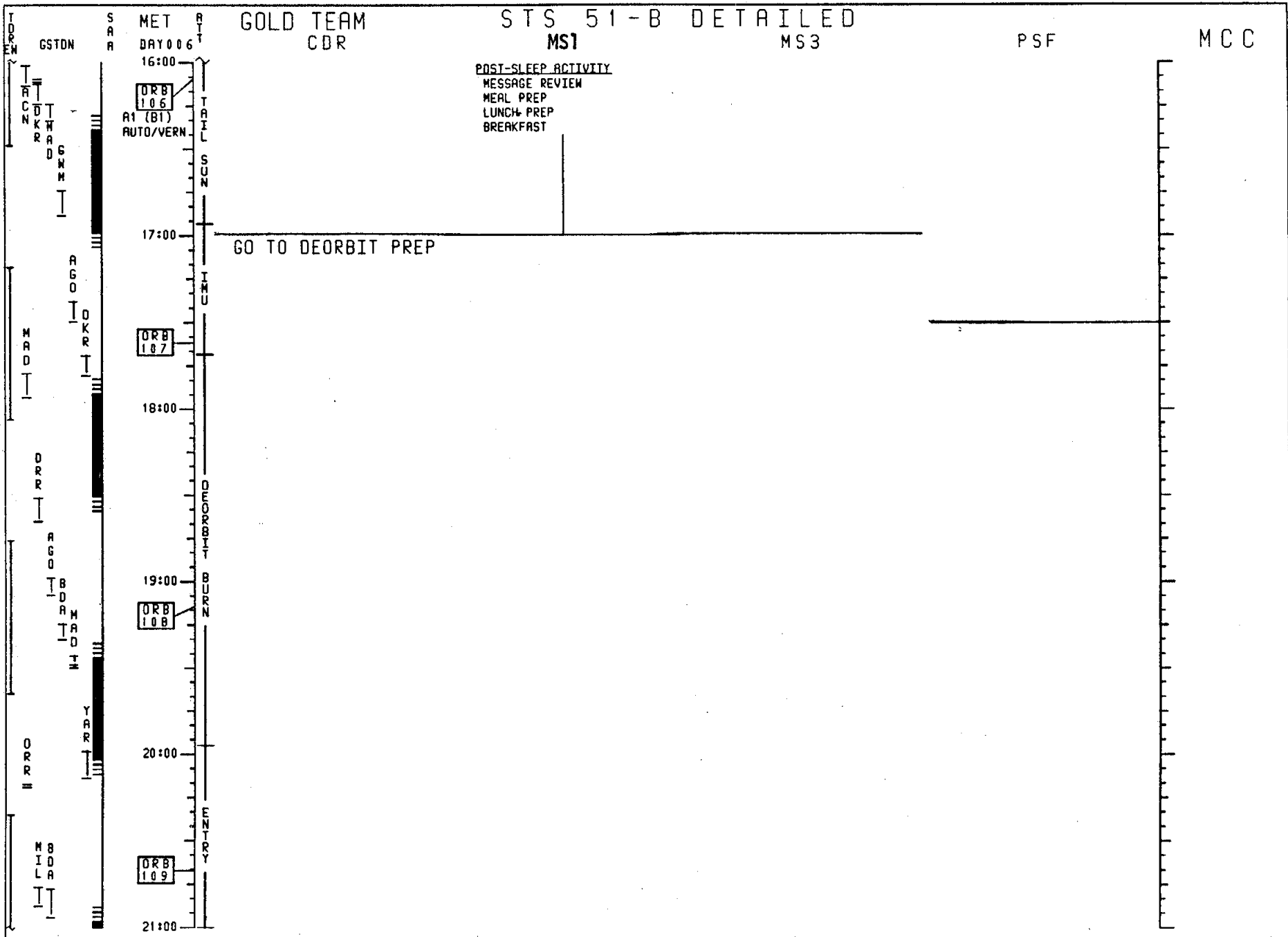












GOLD TEAM
CDR

STS 51-B DETAILED
MS1 MS3

PSF

MCC

POST-SLEEP ACTIVITY
MESSAGE REVIEW
MEAL PREP
LUNCH PREP
BREAKFAST

GO TO DEORBIT PREP

SILVER TEAM
PLT

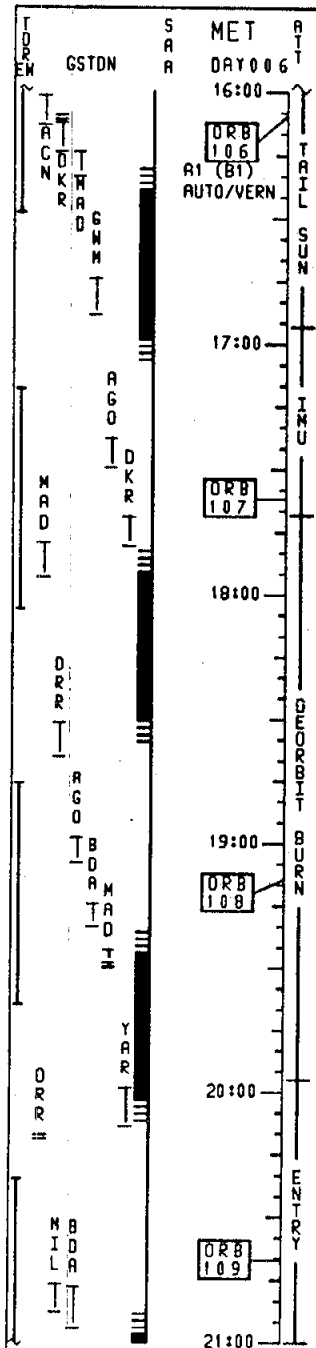
STS 51-B DETAILED
MS2

PSM

MCC

GO TO DEORBIT PREP

CO2 ABS REPLACE (CUE CARD)



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STS 51-B DAP BOOK

DAP A CONFIGURATIONS..... 4-2
DAP B CONFIGURATIONS..... 4-3
51-B DAP BOOK..... 4-4

DAP BOOK

DAP A CONFIGURATIONS

	A1*	A2	A3	A4	A5	A6
<u>TRANSLATION</u>						
PULSE ft/sec	0.10	0.10	0.10	0.10	0.10	0.10
<u>ROTATION</u>						
DSC RT						
NORM °/sec	0.200	0.400	0.200	0.200	0.200	0.200
VERN °/sec	0.200	0.400	0.200	0.008	0.200	0.200
PULSE						
NORM °/sec	0.10	0.10	0.30	0.10	0.10	0.10
VERN °/sec	0.010	0.010	0.010	0.010	0.050	0.010
COMP						
NORM °/sec	.00	.00	.00	.00	.00	.00
VERN °/sec	.000	.000	.000	.000	.000	.000
<u>DEADBAND</u>						
ATT						
NORM (deg)	5.000	1.00	5.00	1.00	5.00	5.00
VERN (deg)	1.000	1.000	1.000	0.070	1.000	1.000
RATE						
NORM °/sec	0.20	0.20	0.20	0.20	0.20	0.20
VERN °/sec	.020	.020	.020	.010	.020	.020
<u>JET OPT</u>						
P	1	1	3	1	1	3
Y	1	1	3	3	1	3
<u>CNTL ACCEL</u>						
	0	0	0	0	0	0

*I-loaded OPS-2 DAP Configuration

DAP BOOK

DAP B CONFIGURATIONS

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

*I-loaded OPS-2 DAP Configuration

DAP BOOK

HOOK
VELCRO

CAP/51-B/O/BAS

CAP/51-B/O/BAS

UNIV PTG	
TGT ID = 1	Orbiting Vehicle
= 2	Earth ctr
= 3	Earth tgt
	Input LAT (± 90)
	LON (± 180 , + = East)
	ALT (± 99.99 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	PTC ($\sim 2^\circ$ below +X)*
= 5	Optional
	Input P (0-359.99)
	Y (270-359.99, 0-90)
* input OM \rightarrow	OM (0-359.99)
MON AXIS	
= 1	+X
= 2	-X

G20 DAP CONFIG	
CNTL ACCEL = 0 Orbiter alone	JET OPT = 1 Normal
	= 2 Nose only
	= 3 Tail only

TOP



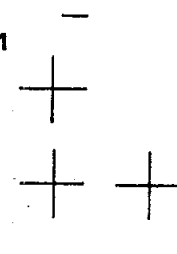
DAP PURPOSE

- A1 - NOMINAL
- ZLV
- IMU ALIGN
- TAIL ONLY CONTROL
- BACKOUT
- PRE/POST PAM DEPLOY
- OMS BURN
- TAIL-TO-SUN
- LOSS OF VERN
- A2 - PTC
- A3 - RCS HOT FIRE
- A4 - GG
- A5 - IMU ROTATION
- A6 - LOSS OF VERN
- (TAIL-ONLY)

CAP/51-B/O/BAS



A1



TOP



DAP A1

A1

PURPOSE:

- ZLV
- IMU ALIGN
- TAIL ONLY CONTROL
- BACKOUT
- PRE/POST PAM DEPLOY
- OMS BURN
- TAIL-TO-SUN
- LOSS OF VERN
- (NOSE & TAIL)

0.1 0

1 TRANSLATION PULSE

0.2 0 0

ROTATION

0.2 0 0

2 DSC RT NORM

0.1 0

3 VERN

0.0 1 0

4 PULSE NORM

.0 0

5 VERN

.0 0 0

6 COMP NORM

7 VERN

DEADBAND

5.0 0

8 ATT NORM

1.0 0 0

9 VERN

0.2 0

10 RATE NORM

.0 2 0

11 VERN

1

12 JET OPT P

1

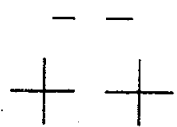
13 Y

0

14 CNTL ACCEL

CAP/51-B/O/BAS

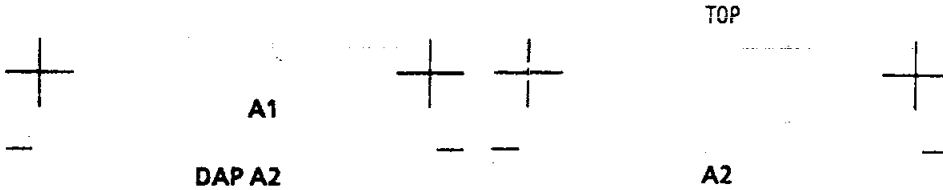
CAP/51-B/O/BAS



A2



TOP

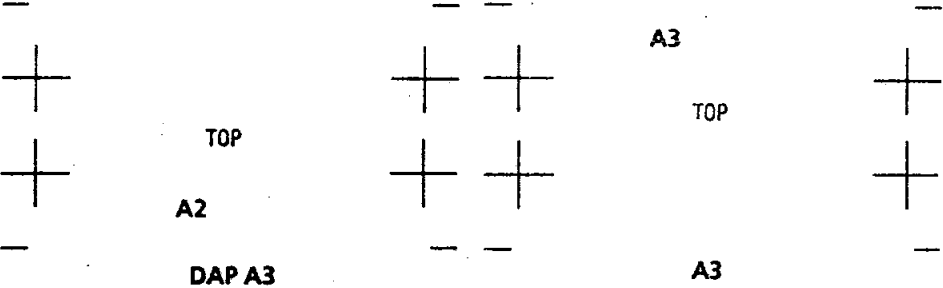


PURPOSE:
PTC

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

CAP/51-B/O/BAS

CAP/51-B/O/BAS



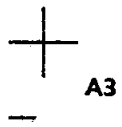
PURPOSE:
RCS HOT FIRE

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

CAP/51-B/O/BAS

CAP/51-B/O/BAS



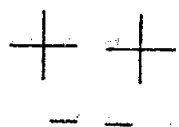


A3

DAP A4

PURPOSE:

GG



TOP

A4

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

CAP/51-B/O/BAS

CAP/51-B/O/BAS

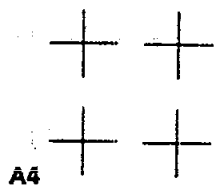


TOP

DAP A5

PURPOSE:

IMU ROTATION



A4

TOP

A5

0.1 0	1	TRANSLATION	
		PULSE	
0.2 0 0	2	ROTATION	
0.2 0 0	3	DSC RT	NORM
0.1 0	4	PULSE	VERN
0.0 5 0	5		NORM
.0 0	6	COMP	VERN
.0 0 0	7		NORM
		DEADBAND	
5.0 0	8	AFT	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	

CAP/51-B/O/BAS

CAP/51-B/O/BAS



TOP

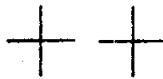
(reduced copy)



A6



A5



TOP



DAP A6

A6

PURPOSE:

LOSS OF VERN
(TAIL ONLY)

0.1 0

1

TRANSLATION
PULSE

0.2 0 0

2

ROTATION
DSC RT NORM

0.2 0 0

3

VERN

0.1 0

4

PULSE NORM

0.0 1 0

5

VERN

.0 0

6

COMP NORM

0 0 0

7

VERN

DEADBAND

5.0 0

8

ATT NORM

1.0 0 0

9

VERN

0.2 0

10

RATE NORM

0 2 0

11

VERN

3

12

JET OPT P

3

13

Y

0

14

CNTL ACCEL

CAP/51-B/O/BAS

CAP/51-B/O/BAS



TOP



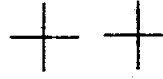
A7



TOP



A6



DAP

PURPOSE

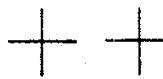
- B1 - NOMINAL
PRCS IMU ALIGN
TOP-TO-SUN
TAIL ONLY CONTROL
BACKOUT
OMS & RCS BURNS
- B2 - LOSS OF VERN
(TAIL ONLY)
- B3 - LOSS OF VERN;
GG MNVR
- B4 - PAM DEPLOY;
FRISBEE DEPLOY
- B5 - COAS CAL

CAP/51-B/O/BAS

CAP/51-B/O/BAS



TOP

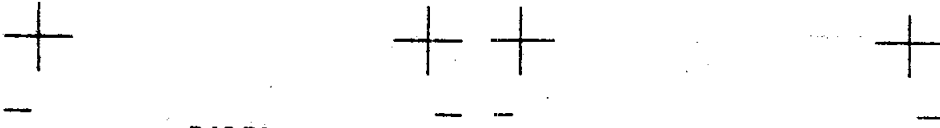


B1



(reduced copy)

TOP



DAP B1

B1

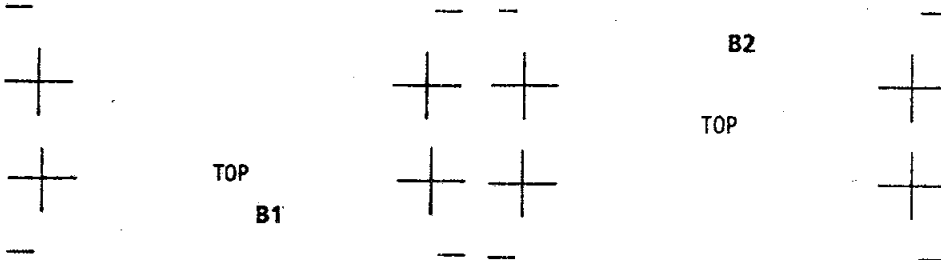
PURPOSE:

PRCS IMU ALIGN
TOP-TO-SUN
TAIL ONLY CONTROL BACKOUT
OMS & RCS BURNS

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

CAP/51-B/O/BAS

CAP/51-B/O/BAS



TOP

B1

B2

TOP

DAP B2

B2

PURPOSE:

LOSS OF VERN
(TAIL ONLY)

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

CAP/51-B/O/BAS

CAP/51-B/O/BAS



B3

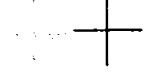
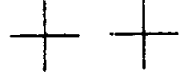
TOP

(reduced copy)

TOP



B2



DAP B3

PURPOSE:

LOSS OF VERN
(NOSE & TAIL)
GG MNVR

B3

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

CAP/51-B/O/BAS

CAP/51-B/O/BAS



B4

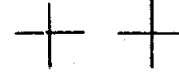


TOP

TOP



B3



DAP B4

PURPOSE:

PAM DEPLOY
FRISBEE DEPLOY

B4

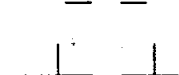
TRANSLATION			
PULSE	15	0.0	2
ROTATION			
DSC RT	NORM 16	0.2	0 0
	VERN 17	0.0	0 8
PULSE	NORM 18	0.0	4
	VERN 19	0.0	0 2
COMP	NORM 20	.0	0 0
	VERN 21	.0	0 0
DEADBAND			
ATT	NORM 22	0.3	0
	VERN 23	0.1	0 0
RATE			
	NORM 24	0.2	0
	VERN 25	0.1	0
JET OPT			
	P 26	1	
	Y 27	3	
CNTL ACCEL	28	0	

CAP/51-B/O/BAS

CAP/51-B/O/BAS



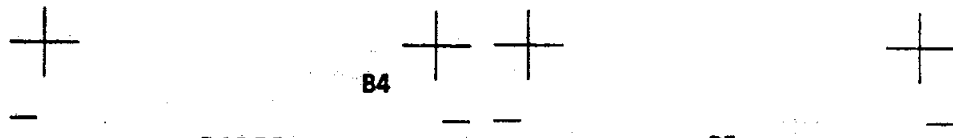
B5



TOP

(reduced copy)

TOP



B4

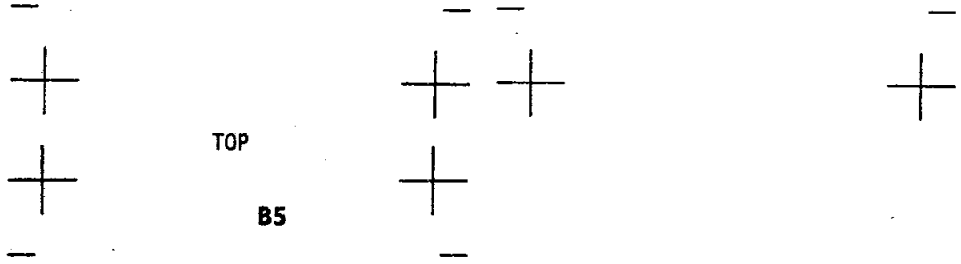
DAP B5

B5

PURPOSE:
COAS CAL

TRANSLATION			
PULSE	15	0.0	2
ROTATION			
DSC RT	NORM 16	0.2	0 0
	VERN 17	0.0	1 6
PULSE	NORM 18	0.0	0 4
	VERN 19	0.0	0 2
COMP	NORM 20	.0	0 0
	VERN 21	.0	0 0
DEADBAND			
ATT	NORM 22	3.0	0
	VERN 23	0.0	3 3
RATE			
	NORM 24	0.2	0
	VERN 25	.0	2 0
JET OPT	P 26		3
	Y 27		2
CNTL ACCEL	28		0

CAP/51-B/O/BAS



TOP

B5

CAP/51-B/O/BAS



TOP

TOP
BACK COVER 'DAP BOOK'



HOOK
VELCRO

CAP/51-B/O/BAS



STS 51-B ATTITUDE TIMELINE

ATTITUDE
TIMELINE

Attitude Timeline

MET	MNVR OPTION		DAP	E/S	REMARKS	EVENT
1 0/01:10:00	TRK TGT=2 BV=3(90.00, 0.00) OM=180.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH 0 90 0 0	LVLH R+180 P+ 0 Y+ 0	-ZLV +XVV
2 0/03:10:00 22:03	MNVR R+ 88.00 P+154.50 Y+ 7.50	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN 0 61 0 176	-ZST:23 -YST:46	IMU/COAS (A1)
3 0/04:02:00 13:30	MNVR R+316.00 P+143.80 Y+ 37.40	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN 0 90 0 315		TDRS/ATMOS
4 0/05:25:00 39:33	MNVR R+171.00 P+ 79.90 Y+ 36.10	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN 0 105 0 134		TRIM BURN
5 0/05:45:00 59:33	MNVR R+316.00 P+143.80 Y+ 37.40	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN 0 90 0 315		TDRS/ATMOS
6 0/06:46:00 59:13	MNVR R+351.60 P+275.40 Y+ 54.80	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN 0 151 0 205		VWFC#1
7 0/08:27:00 29:19	MNVR R+ 40.20 P+235.40 Y+ 54.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN 0 130 0 177		VWFC#2
8 0/09:53:00 59:48	MNVR R+ 37.00 P+238.40 Y+332.40	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN 0 70 0 193		VWFC#3
9 0/11:30:00 44:11	MNVR R+326.40 P+359.40 Y+311.30	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN 0 74 0 324		TRIM BURN #2
10 0/11:50:00 12:03:44	MNVR R+ 78.60 P+223.20 Y+359.20	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN 0 82 0 155		VWFC#4
11 0/12:52:00 13:04:27	MNVR R+202.20 P+329.50 Y+ 4.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN 0 131 0 71		VWFC#5
12 0/14:15:00 29:46	MNVR R+ 72.60 P+ 71.30 Y+311.60	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN 0 45 0 253	-ZST:12 -YST:19	IMU ALIGN (B1)

ATTITUDE
TIMELINE

Attitude Timeline

MET	MNVR OPTION		DAP	E/S	REMARKS	EVENT
1 0/14:51:00 15:05:10	MNVR R+107.50 P+268.40 Y+307.70	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN θ 65 φ 129		VWFC#6
2 0/15:53:00 16:07:52	TRK TGT=2 BV=5(177.60, 0.00) OM= 90.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH θ 178 φ 360	LVLH R+270 P+ 90 Y+358	-XLV -YVV BIASED
3 6/10:00:00 07:30	TRK TGT=2 BV=2(180.00, 0.00) OM= 0.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH θ 180 φ 0	LVLH R+ 0 P+ 90 Y+ 0	NUSAT DEPLOY ATTITUDE
4 6/11:01:00 16:00	TRK TGT=2 BV=3(90.00, 0.00) OM=180.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH θ 90 φ 0	LVLH R+180 P+ 0 Y+ 0	-ZLV +XVV
5 6/15:20:00 31:27	TRK TGT=4 BV=5(184.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN θ 176 φ 180	INRTL R+ 1 P+310 Y+ 58	-XSI
6 6/16:56:00 17:10:22	MNVR R+131.70 P+147.10 Y+290.60	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN θ 13 φ 343	-ZST:34 -YST:41	IMU ALIGH
7 6/17:16:00 17:54	MNVR R+295.00 P+275.80 Y+296.70	B1 AUTO NORM	DSC 0.500 DB AT 3.00 DB RT 0.20	SUN θ 55 φ 309	-ZST:33 -YST:19	IMU VERIF
8 6/17:41:00 43:49	MNVR R+280.80 P+301.00 Y+ 15.00	B1 AUTO NORM	DSC 0.500 DB AT 3.00 DB RT 0.20	SUN θ 136 φ 337		DEORBIT BURN ATTITUDE
9 6/19:56:42	OMS IGNITION	* AUTO *	DSC 0.500 DB AT 3.50 DB RT 0.30			DEORBIT BURN
10 6/20:02:00 05:43	MNVR R+ 34.40 P+ 67.80 Y+281.30	* AUTO *	DSC 0.500 DB AT 3.50 DB RT 0.30	SUN θ 30 φ 328		EI-5 ATTITUDE
11 6/20:23:55	LVLH	* AUTO *	DSC 0.500 DB AT 3.50 DB RT 0.30	EARTH θ 129 φ 180	LVLH R+ 1 P+ 39 Y+359	EI-5

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not be included in flight copies.

CREW ACTIVITY PLAN NOTES
(CONSTRAINTS AND GUIDELINES)

CREW..... 6-2
PAYLOADS..... 6-2

NOTES

A. CREW

1. There are 7 crewmen onboard divided into 2 teams: the SILVER team consisting of the PLT, MS2, and PSM (materials processing expert) and the GOLD team consisting of the CDR, MS1, MS3, and PSF (fluids expert). Each team works 12 hours, then is off duty for 12 hours.
2. Launch and Entry Seating - The CDR and PLT will occupy their normal flight deck seats. The MS2 (Thagard) will assume the role of Flight Engineer and sit on the flight deck behind and between the CDR and PLT. The MS1 (Lind) will sit on the flight deck to the right of the MS2. The MS3 and PSs will sit on the middeck.
3. The crewmen responsible for performing an EVA, should one become necessary, are: PLT and MS2.
4. The crewmen are assigned to the following tasks:
 - CDR (Overmyer) - ATMOS PHOTOS, AURORAL PHOTOS
 - PLT (Gregory) - ATMOS PHOTOS, NUSAT DEPLOY (photo/TV)
 - MS1 (Lind) - SL ACT/DEACT, FES/VCGS, VWFC, AURORAL OBS, MED DSOs
 - MS2 (Thagard) - SL ACT/DEACT, VWFC, NUSAT DEPLOY (prime), MED DSOs
 - MS3 (Thornton) - RAHF, UMS ACT/DEACT, MED DSOs

All P/L crew - GFFC, MICG, ATMOS, IONS, UMS

For AFT, MS2 and the PSs are the subjects and MS1 and MS3 controls

B. PAYLOADS

1. Spacelab Systems

a. Electrical Power Distribution System (EPDS)

The Spacelab is provided power via Orbiter fuel cells 2 and 3 through the Orbiter PRI P/L BUS to the SL MAIN-BUS. The Ascent and Entry power level is ≤ 1.5 KW. The on-orbit power level is 7 KW continuous and 12 KW peak. For a Fuel Cell failure on-orbit the power level will be 5KW continuous and 8KW peak.

b. Communications and Instrumentation

- 1) The HRM receives data from 24 separate input sources: 16 experiment channels, the HDRR, the Payload Recorder, the S/S and Experiment Computers, the 3 SL voice circuits (pre-multiplexed), and a GMT time signal. It multiplexes the various inputs it receives at any time and sends the data either to the KUSP for downlink, or back to the HDRR or PL RCDR. These inputs transmit data at many different data rates. In order for the HRM to know how to multiplex the data and for the ground to configure the data-receiving equipment properly, a series of formats have been identified for the HRM using

various combinations of the possible inputs. The HRM format is switched by the Subsystem Computer through either a Stored Program Command (SPC) or a Real-Time Command (RTC) from the INCO.

- 2) The HDRR is located in the Control Center rack of the SL. The tape could be changed manually by the crew. However, the time required to change tapes is very long, and it is much more efficient to dump to the ground than to reload. Consequently, no tape changes are planned. The recorder operates at 1 to 32 MBPS; it dumps in reverse order at 2,4,8,12,16,24, or 32 MBPS. At a rate of 32 MBPS a tape runs for 20 min. The HDRR and PL RCDR can direct dump to the KUSP or can be dumped through the HRM. (The PL RCDR is not planned to be used on this flight, so the HDRR will handle all payload data recording).
- 3) The SL Intercom System is tied to the Orbiter system and operates in 4 modes: air-to-ground, air-to-air, (for EVA), IC with Orbiter, IC internal. The master station (ICMS) is located at the Control Center rack with a remote at the Work Bench. Additional units can be put in racks 4, 7, and 10. A paging speaker is mounted in the end cone.

c. Environmental Control and Life Support (ECLS)

Because there will be a third payload crewman in the module on the **GOLD shift and there are animals** onboard, the change-out schedule and total number of canisters are not the same as SL-1. A changeout schedule has been developed wherein one or both of the module canisters will be changed out every 12 hours. This schedule appears in the PCAP and Orbit Ops C/L.

d. Command and Data Management (CDMS)

- 1) There are 3 computers in the Spacelab module: the Sub-systems Computer (SSC), the Experiment Computer (EXC), and a Backup Computer (BUC). The BUC is loaded with SSC software because losing the SSC is more critical than losing the EXC, and a timely recovery is necessary. One Mass Memory Unit (MMU) services all 3 computers and contains a copy of both the SSC and EXC software. Data is collected and transmitted to and from the computers to the systems and payload hardware by 7 Subsystem and 3 Experiment Remote Acquisition Units (RAUs), the Spacelab equivalent of the Orbiter MDMs. The crewman interfaces each computer through a Data Display Unit (DDU)

which is made up of a video display and keyboard. There will be one DDU in the Control Center rack (R2K) and one at the orbiter aft flight deck Payload Specialist station (panel L11).

- 2) The SSC performs 3 basic functions with the systems hardware:
 - (a) Sends commands to the H/W
 - (b) Monitors data from the H/W and transfers selected pieces to the Orbiter PCMMU and Spacelab High Rate Multiplexer (HRM) for downlink
 - (c) Detects and annunciates faults

The crewman can monitor the systems using either the SSC displays on the module or aft flight deck DDSs or the GPC displays on the flight deck CRTs.

- 3) The EXC performs similar functions to the SSC with the payload hardware plus several additional functions:
 - (a) Performs a checkout of payloads
 - (b) Controls payload operations through the use of automatic timelines (see item 4 below)
 - (c) Processes payload data for feedback to the H/W, display to the crew, or transmission to the ground through the HRM

- 4) The Experiment Computer Operating System (ECOS) uses master and subordinate timelines to control payload operations. At any time there can be one master T/L and up to 6 subordinates active in the computer. Other T/Ls are stored on the MMU for later use. The ECOS Timeline Monitor display is used to load T/Ls from the MMU; to start the T/Ls counting, and to display to the crewman which T/Ls are currently loaded. He can display up to 10 items from any T/L and watch as they get executed by the EXC at the corresponding GMT time. The Timeline Maintenance display is used to modify timelines before they are activated. The crewman can add, delete, or replace entries, or replace the execution time of entries. Timelines are called from the MMU into a Work Buffer (separate from the active timeline buffer), modified, then returned to the MMU.

e. Common Payload Support Equipment (CPSE)

The Scientific Airlock (SAL) will be flown to support the VWFC (see Introduction, page v). The Scientific Window Adapter Assembly (SWAA) will not be flown.

2. Spacelab Experiments

The following paragraphs give a brief description of the eleven experiments of Spacelab 3. Also, in each case this description is followed by a list of Marshall Space Flight Center model numbers involving crew action (as seen in the summary timeline) and their corresponding descriptions.

a. Fluid Experiment System (FES)

This system is used to grow triglycine sulfate (TGS) crystals by removing heat from a saturated solution through a seed crystal. The purposes of this investigation are: to develop a technique for crystal growth in microgravity, to study the growth environment and relate it to growth behavior, and to determine how microgravity influences the properties of the resultant crystal.

<u>MSFC MODEL</u>	<u>MODEL DESCRIPTION</u>
FES-ACT	EQUIP ACTIVATION
FES-DEACT	EQUIP DEACTIVATION
FES-1	CRYSTAL #1 OPS
FES-2	CRYSTAL #2 OPS
FES-3	CRYSTAL #3 OPS
FES-MON1	CREW MON - EARLY PHASE
FES-MON2	CREW MON - LATE PHASE
FES-MON3	

b. Vapor Crystal Growth System (VCGS)

The purpose of this experiment is to grow more-perfect crystals of mercuric iodide. They will be grown by vaporization and recondensation at 120° C in a special furnace and the growth process will be reversed if polycrystalline growth begins. These crystals should have fewer defects because of the microgravity environment.

<u>MSFC MODEL</u>	<u>MODEL DESCRIPTION</u>
VCG	ACTIVATE/DEACTIVATE VCGS
VCG-MON1	CREW MON - EARLY PHASE
VCG-MON2	CREW MON - LATE PHASE
VCG-MON3	

c. Mercuric Iodide Crystal Growth (MICG)

The purpose of this experiment is to grow near-perfect single crystals of mercury iodide. The process will be carried out in a two-zone furnace with sensors to collect temperature data. The investigators hope to find that the effects of convection are greatly reduced in the microgravity environment.

<u>MSFC MODEL</u>	<u>MODEL DESCRIPTION</u>
MICG	INITIATE MICG/ CHNG CRYSTAL CARTRIDGE

d. Dynamics of Rotating and Oscillating Free Drops (DROP)

The main objectives of this experiment are to study the equilibrium figures of a rotating drop and to study the large-amplitude oscillations of a liquid drop. Another objective is to establish the advantages of conducting future drop and bubble investigations in space using the Drop Dynamics Module (DDM).

<u>MSFC MODEL</u>	<u>MODEL DESCRIPTION</u>
DDM-1/2	FIRST TWO RUNS
DDM-0/E	SUBSEQUENT RUNS

e. Geophysical Fluid Flow Cell (GFFC)

The purpose of this experiment is to simulate global atmospheric flows of rotating planets and stars in hopes of answering questions about their mechanics. The investigator is trying to identify those external conditions of fluid viscosity, rotation, gravity, etc., which determine the mode of flow. Simulation will be accomplished with the use of a dielectric fluid between two concentric, rotating electrically conductive spherical shells.

<u>MSFC MODEL</u>	<u>MODEL DESCRIPTION</u>
GFFC-1	LONG DURATION RUN OPS
GFFC-2	SHORT DURATION RUN OPS
GFFC-3	SHORT RUN WITH CREW INTERVENTION
GFFC-F	FILM CHANGE
GFFC-MON	TIMING CHECK

f. Atmospheric Trace Molecules Spectroscopy (ATMOS)

The ATMOS investigation is designed to collect data on the chemistry and physics of Earth's upper atmosphere. It should determine the compositional structure of the upper atmosphere, and it should provide information useful in the design of future atmospheric studies. The investigation will use infrared absorption spectroscopy and will read sunlight that passes through the upper atmosphere with an interferometer.

<u>MSFC MODEL</u>	<u>MODEL DESCRIPTION</u>
70mm/22R	SUNRISE PHOTOGRAPHY
70mm/22S	SUNSET PHOTOGRAPHY

g. Research Animal Holding Facility - Verification Test (RAHF-VT)

The objective of this investigation is to verify the performance of the RAHF. The RAHF is designed to support animals from rodents to small primates. It will house four monkeys and twenty-four rats. The animals will be monitored during the mission, and the food and water used will be recorded.

<u>MSFC MODEL</u>	<u>MODEL DESCRIPTION</u>
ARC-A-SR	ASR (Ames Single Rack) ANIMAL OBS
ARC-A-DR	ADR (Ames Double Rack) ANIMAL OBS
ARC-B	CNFG FOR ON-ORBIT/DESC
ARC-C	EMPTY CONDENSATE BOTTLE
ARC-D1/2	RELOAD/SET CAMR-PULSE MODE
ARC-D4	SET CAMR-CONT MODE
ARC-E-SR	REPLACE FOOD IN ASR
ARC-E-DR	REPLACE FOOD IN ADR
ARC-F-SR	ASR HOUSEKEEPING
ARC-F-DR	ADR HOUSEKEEPING
ARC-FO1F	DEMS SAFING FOR ENTRY
ARC-H	TEMPORARY RESTRAINT OPS
ARC-MASK	UNSTOW SURGICAL MASKS

h. Dynamic Environment Measuring System (DEMS) and Biotelemetry System (BTS)

The objective of these investigations is to verify the performance of each of these systems while providing supporting data for the RAHF-VT. The DEMS is designed to measure noise, vibration and accelerations on the animals during launch and entry. The BTS measures basic physiological functions in research animals such as body temperature, heart rate, and ECG. The sensor packages will be implanted in four rats and four monkeys preflight, and data is then telemetered to an antenna in the cages and routed to the BTS.

<u>MSFC MODEL</u>	<u>MODEL DESCRIPTION</u>
ARC-I	BIOTELEMETRY PWR ACT/DEACT
ARC-J	DATA ACTIVATION
ARC-K	BIOTELEMETRY SIGNAL STRENGTH OPTIMIZATION
ARC-L	DEMS CASSETTE CHANGE
ARC-N	DEMS ACT FROM AFD

i. Urine Monitoring Investigation (UMI)

The primary objectives of the UMI are: verify the operation of the Urine Monitoring System (UMS), perform inflight calibration of the UMS, develop a procedure for measuring crew water intake, and verify a system of urine sample collection. The investigation will involve recording water intake of crewmembers from the galley and water supply. It will also use the UMS to measure urine volume of each crewmember and collect samples on two crewmembers.

<u>MSFC MODEL</u>	<u>MODEL DESCRIPTION</u>
UMS-OPS	UMS ACT/DEACT
UMS-SAM	CHNG/STOW UMS SAMPLE
UMS-CAL	UMS CALIBRATION

j. Autogenic Feedback Training (AFT)

AFT is designed to help crewmembers overcome the effects of Zero-Gravity Motion Sickness. The crewmembers receive extensive preflight autogenic feedback training. Then they practice on orbit and during motion sickness attacks. Crewmembers will wear monitoring instruments and data recorders, and feedback displays will be used.

<u>MSFC MODEL</u>	<u>MODEL DESCRIPTION</u>
AFT	CHANGE CASSETTE/PERFORM DIAGNOSTIC SCALE

k. Ionization States of Solar and Galactic Cosmic Ray Heavy Nuclei (IONS)

This experiment is designed to study the low-energy cosmic ray ions of C, N, O, Ne, Ca, and Fe. The detector system consists of layers of plastics that show a trail of damage after being penetrated by cosmic rays. Study of these trails on the ground gives data as to the energies of the ions in the cosmic rays.

<u>MSFC MODEL</u>	<u>MODEL DESCRIPTION</u>
IONS	IONS EXPT OPS

l. Very Wide Field Camera (VWFC)

This is a reflight of the payload flown on Spacelab 1. It will make a very general UV survey of a large part of the celestial sphere. The camera operates in both the photometric and spectrometric modes.

<u>MSFC MODEL</u>	<u>MODEL DESCRIPTION</u>
VWFC	SETUP AND OPS OF CAMERA IN SAL

m. Television and Photography

The following list describes the television and photography scenes that are payload related.

<u>MSFC MODEL</u>	<u>MODEL DESCRIPTION</u>
TV01	INITIAL SPACELAB INGRESS
TV02	RAHF TOUR
TV03	VCG OPS
TV04	DDM OPS
TV05	FES OPS
TV06	RAHF CONDENSATE BOTTLE CHANGE
TV07	RAT FOOD/WASTE MAINTENANCE
TV08	MONKEY FOOD/WASTE MAINTENANCE
TV09	RAHF TEMPORARY RESTRAINTS
TV10	ANIMAL OBSERVATION
TV11	PS SLEEP RESTRAINTS
TV12	TV12 - MEAL
TV13	TV13 - PRESS CONFERENCE
TV14	TV14 - SPACELAB DEACTIVATION AND EGRESS
TV15	SAL/VWFC OPS
TV17	FES OR VCG OPS
TV18	DDM OPS
TV19	AURORA OBSERVATIONS
TV20	SPACELAB TUNNEL OPS
16mm/03	VCG OPS
16mm/07	RAT FOOD MAINTENANCE
16mm/08	MONKEY WASTE TRAY OPS
16mm/10	ANIMAL OBSERVATION
35mm/03	VCG OPS
35mm/07	RAT FOOD MAINTENANCE
35mm/08	MONKEY FOOD/WASTE MAINTENANCE
35mm/11	PS SLEEP RESTRAINT
35mm/12	MEAL
35mm/19	AURORA OBSERVATIONS

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L. Wooten
EL62/J. Laux
JA11/H. G. Craft
JA21/J. W. Cremin (3)
MDTSCO, Bldg 4666
SOEP/R. K. Keen (6)
NA51/W. Weaver (2)
AS24D/Repository (5)

Goddard Space Flight Center

420.O/K. Parvis (3)
682/W. Neupert
732/D. Butler
742/J. Barrowman (6)
842/D. Henry (10)
850/G. Morse (2)
853.2/R. Morgan (10)
872/J. Teles (3)
932-SASC/G. Linebaugh

NASA Headquarters

EM-8/M. J. Sander
LF-6/R. Shafer
LFD-10/J. W. McCulla
MGF-9/E. Harkleroad
MGS-9/J. Lease (2)
MP-5/W. Hamby
OS-5/J. C. Harrington
OT-6/C. Lee
SB-3/A. E. Nicogossian

McDonnell Douglas - Houston

A1/T. Bruchmiller
J. French
R. LaCarna
A2/L. T. Guderian
A3/P. Dowty
C2/K. Eggers
C3/R. Corson
Y. W. Park
M. Rasmussen
C5/H. M. Ferrill (2)
D2/R. Theobald
M. D. Pipher (3)

Langley Research Center

258

Lockheed - Houston

C15/L. A. Martin (3)

Rockwell - Houston

ZC01/D. E. Hass

IBM - Houston

MC73/B. Kolkhorst

Kennedy Space Center

CS-MVD-2/C. B. Roberts (4)
CS-MVD-3/E. Nelson
CV-DEL-4/J. Zeman
MDTSCO/B. C. Adams (3)
T. Smith
J. Newsome
TO-NTS-KSC/J. Baltar (2)
VE-MSD-11/I. Velez
VT-A-1/R. W. Nygren (3)
VT-IOD/B. L. Steadman
ZK-25/Rockwell Tech Data (19)

Dryden Flight Research Facility

OS/G. P. Layton

TRW - Houston

D. Cooper

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SMS Data Library
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Honeywell Inc. Avionics Division

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Ford Aerospace - Houston

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