

# Flight Plan

## STS-40

### (Flight Cycle R3 Trajectory)

Mission Operations Directorate  
Operations Division

Final, Rev B  
April 24, 1991

<u>EVENT</u>	<u>CDT</u>		
Launch	07:00	Sat	May 4
EDW Landing	10:50	Mon	May 13



National Aeronautics and  
Space Administration

Lyndon B. Johnson Space Center  
Houston, Texas

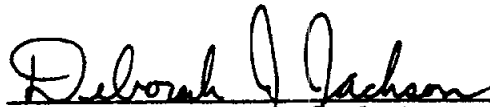


## MISSION OPERATIONS DIRECTORATE

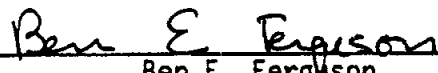
## STS-40 FLIGHT PLAN

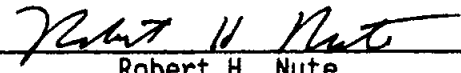
FINAL, REVISION B  
April 24, 1991


PREPARED BY:

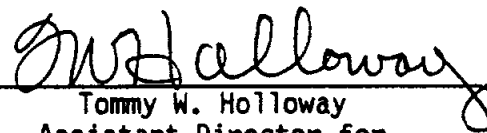
  
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STS-40 FLIGHT PLAN

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(\*) - Omit from flight book

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A7.....	7-8	FLT PLN-9a/40/0/B
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A10.....	7-10	FLT PLN-12a/40/0/A
DAP A11.....	7-10	FLT PLN-12b/40/0/A
A11.....	7-10	FLT PLN-13a/40/0/A
DAP A12.....	7-11	FLT PLN-13b/40/0/A
A12.....	7-11	FLT PLN-14a/40/0/A
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DAP B2.....	7-12	FLT PLN-16b/40/0/A
B2.....	7-12	FLT PLN-17a/40/0/A
DAP B3.....	7-13	FLT PLN-17b/40/0/A
B3.....	7-13	FLT PLN-18a/40/0/A
DAP B4.....	7-13	FLT PLN-18b/40/0/A
B4.....	7-13	FLT PLN-19a/40/0/A
DAP B5.....	7-14	FLT PLN-19b/40/0/A
B5.....	7-14	FLT PLN-20a/40/0/A
DAP B6.....	7-14	FLT PLN-20b/40/0/A
B6.....	7-14	FLT PLN-21a/40/0/A
DAP B7.....	7-15	FLT PLN-21b/40/0/A
B7.....	7-15	FLT PLN-22a/40/0/A
DAP B8.....	7-15	FLT PLN-22b/40/0/A
B8.....	7-15	FLT PLN-23a/40/0/B
DAP B9.....	7-16	FLT PLN-23b/40/0/B
B9.....	7-16	FLT PLN-24a/40/0/B
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## INTRODUCTION

The STS-40 Flight Plan is the flight data file article that contains the on-orbit timeline. It does not contain the detailed timelines that are covered in the Ascent, Post Insertion, Deorbit Prep, and Entry Checklists. For continuity, the entire flight is shown in the summary level timeline.

This on-orbit timeline satisfies the objectives specified in the Flight Definition and Requirements Directive and the requirements of the STS-40 Flight Requirements Document. The Flight Plan, as part of the Flight Data File, meets the specifications of the Flight Cycle R3 release F version of the STS-40 Flight Initialization Data Pack.

The flight profile used for this Flight Plan is for a launch date of May 4, 1991, at 7:00 CDT.

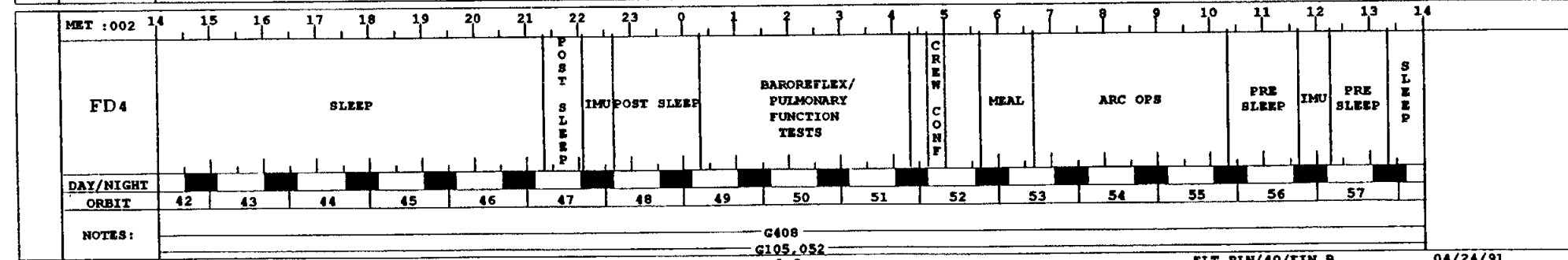
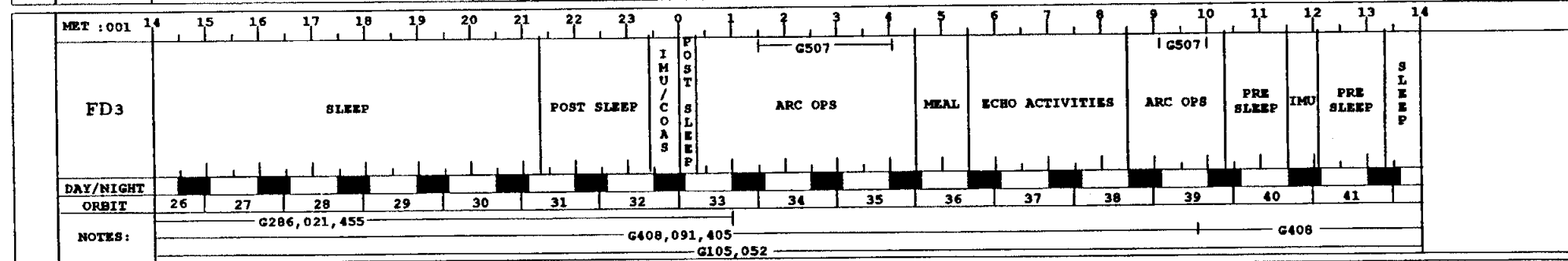
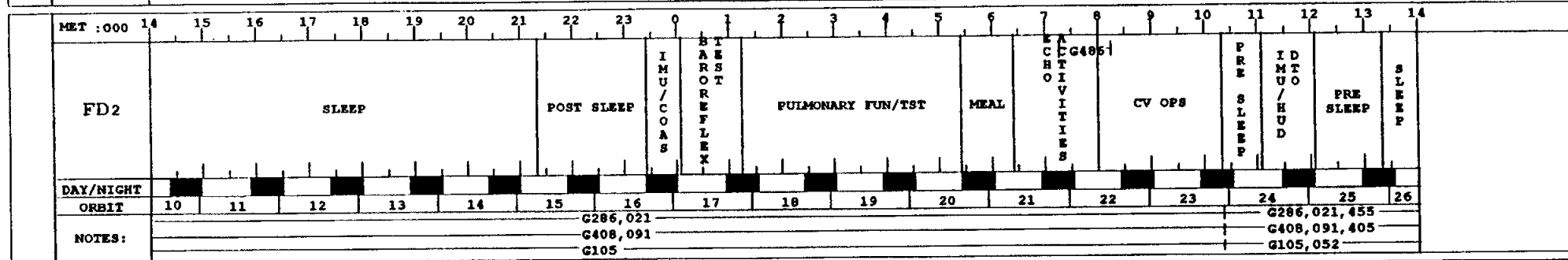
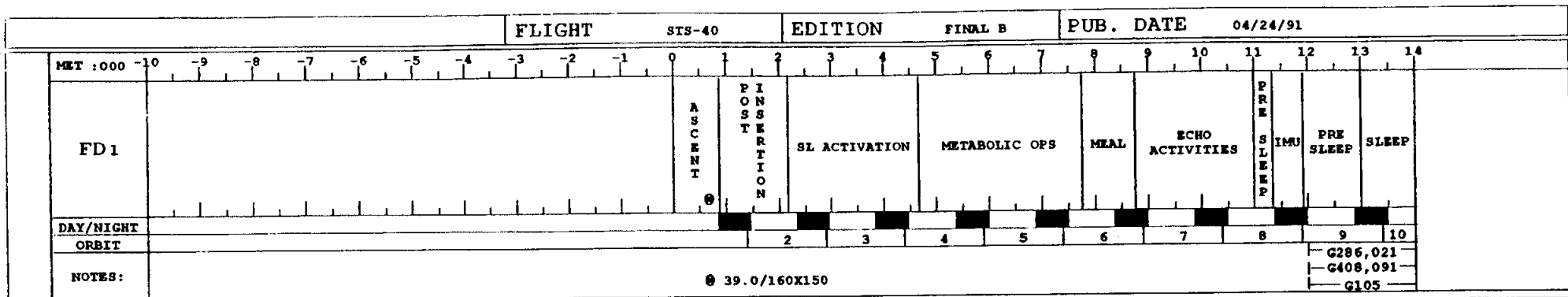
This Flight Plan assumes that the mission extension day for EDO capability testing will be nonoperational, if energy limitations dictate, and will be on Flight Day 7.

JSC-22359, Crew Scheduling Constraints (Appendix K, CPMP), Basic Rev A, January 1990, has been used to build the timelines contained in this Flight Plan. Exemption 1403 #9 allows for an 18 hour crew day on Flight Day 1. Exemption 1403 #8A allows use of the first hour of post sleep for payload activities. Exemption 1403 #10A allows the use of the first hour of presleep for payload activities.

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

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STS-40 OVERVIEW



		FLIGHT		STS-40		EDITION		FINAL B		PUB. DATE		04/24/91																																			
MET :003	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14																						
FD 5	SLEEP																							POST SLEEP	IMU	POST SLEEP	PULMONARY FUN/TST		LYMPH FIX	MEAL	ECHO/CV TESTS				PRE SLEEP	IMU	PRE SLEEP	SLEEP									
DAY/NIGHT	[Day/Night Cycle]																																														
ORBIT	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73																															
NOTES:	G408										G052,105																																				
MET :004	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14																						
FD 6	SLEEP																							POST SLEEP	IMU	POST SLEEP	ROOM TALKING		ECHO/CV TESTS		MEAL	ECHO/CV TESTS				ARC OPS	IDMTO/HUD	PRE SLEEP	SLEEP								
DAY/NIGHT	[Day/Night Cycle]																																														
ORBIT	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89																															
NOTES:	G052,105										SL PARTIAL DEACT																																				
MET :005	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14																						
FD 7	SLEEP																							POST SLEEP	IMU	POST SLEEP	OARE				MEAL					IDMTO/HUD	PRE SLEEP	SLEEP									
DAY/NIGHT	[Day/Night Cycle]																																														
ORBIT	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105																															
NOTES:																																															
MET :006	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14																						
FD 8	SLEEP																							POST SLEEP	IMU	POST SLEEP	MB OPS/BAROREFLEX				MEAL	ECHO/CV TESTS				ARC OPS	IDMTO/HUD	PRE SLEEP	SLEEP								
DAY/NIGHT	[Day/Night Cycle]																																														
ORBIT	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121																															
NOTES:	SL PARTIAL ACTIVATION																																														

		FLIGHT				STS-40				EDITION				FINAL B				PUB. DATE				04/24/91											
MET :007	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14								
FD 9	SLEEP											POST SLEEP		IMU	FCS C/O		ROTOR FIRE	ECHO TESTS		MEAL	CV OPS	S/L STOW		CABIN STOW		IMU	PRE SLEEP		S L E E P (7)				
DAY/NIGHT	[Day/Night Cycle]																																
ORBIT	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	S/L PARTIAL DEACT																
NOTES:	● DTO 902																																
MET :008	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14								
FD 10	SLEEP (7)											POST SLEEP	IMU	POST SLEEP	DEORBIT PREP				DE OR BIT	ED D W	LAN D I N G												
DAY/NIGHT	[Day/Night Cycle]																																
ORBIT	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	P/L CREW WAKE-UP																
NOTES:	● S/L DEACTIVATION																																
MET :009	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14								
FD																																	
DAY/NIGHT	[Day/Night Cycle]																																
ORBIT	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169																	
NOTES:																																	
MET :010	14	15	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14								
FD																																	
DAY/NIGHT	[Day/Night Cycle]																																
ORBIT	171		172	173	174	175	176	177	178	179	180	181	182	183	184	185																	
NOTES:																																	

SUMMARY TIMELINE











GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE											
126:12:00/ 127:00:00	002:00:00/ 002:12:00	126:07:00/ 126:19:00	03/126CST	-11.6		MAY 6, 1991	STS-40	FINAL B	04/24/91											
CDT :126	FD :03	MET :002	7	8	9	10	11	12	13	14	15	16	17	18	19					
STS	TRK MNV R	D/P	GRP D GAS	-Z S I MNV R	GRP E GAS	P/TV03P/TV03 SETUP ACT	GRP E GAS	TRK MNV R	MEAL	TRK MNV R	CNDS TK DUMP	D/O 6 2 3 8	-Z S I MNV R	GRP F GAS	GRP G GAS	TRK MNV R	PC IN F M E D	D/P	I M U MNV R	Z L V MNV R
	POST SLEEP		DSO 476 EXERCISE	DSO 476 EXERCISE			PS TE VT LU OP S		DTO 647 FLTR INSTL	DP TE OR F 6 4E 7V A L		DE TE OR F 6 4E 7V A L	DP TE OR F 6 4E 7V A L	P T V 1 1 9	DE TE OR F 6 4E 7V A L				PRE SLEEP	
			B O D Y M A S S			A R C I V I T Y	IV P U M P V E R I F	DSO 476 EXER (MS2)		B O D Y M A S S C A L	E C H O O P S	PS TE VT LU OP 7	L Y M P H F I X		E C H O O P S	PS TE VT LU OP 5			SD P U L M T P	SD P U L M T P
			MB OPS	IV P U M P V E R I F	A W A R E				C V S E T U P	L Y M P H F I X	C V C A L				C V S U B M A X E X E R				C V S T O W	
PL			ARC ACTIVITY PCDT-2			PS TE VT LU OP 1		ARC ACTIVITY PCDT-1		E C H O O P S			J O E P L L Y F I S H		E C H O O P S		ARC C H E C K	ARC V I D E O		
DAY/NIGHT																				
ORBIT		33	34	35	36	37	38	39	40											
GSTDN COVERAGE		-MIL -MLX -BDA -MAX	-GDX -MIL -MLX -BDA -CAN -VAN -GDS	-GDS -GDX -MIL -MLX -BDA -DKR -CAN -VAN	-GDS -GDX -MIL -MLX -BDA -DKR -VAN	-GDX -MIL -MLX -BDA -VAN -GDS	-GDX -MIL -MLX -BDA -VAN -GDS	-VAN -GDS -GDX												
TDRS E W																				
ATTITUDE		BIAS -YLV		-ZSI		BIAS -YLV -ZVV									+YLV -XVV		-ZSI		+ZLV +YVV	IMU
NOTES:				● SMI CAL											● DTO 0623 CABIN AIR MONITORING					● ZLV, -YVV

GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE										
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CDT :126																			
FD :03	12	20	21	22	23	0	CDT:127	1	2	3	4	5	6	7					
MET :002											FD 2104	22	23	0	MET:003				
STS	TRK MNVVR	SLEEP										ELV MNVVR	BODY MASS	IMU MNVVR	TRK MNVVR	SD PULM YF	SD PULM YF	TRK MNVVR	
	PRE SLEEP											POST SLEEP							
PL																			
DAY/NIGHT																			
ORBIT	41	42	43	44	45	46	47	48											
GSTDN COVERAGE	-DKR -DKR -MAX -CAN -MAX -CAN -MLX -MIL -MLX -BDA																		
TDRS																			
ATTITUDE	-ZLV -YVV +XLV -YVV -ZLV -YVV +ZLV +YVV IMU BIAS -ZLV -ZVV																		
NOTES:	-ZLV, -YVV    +XLV -YVV -ZLV, -YVV IMU ALIGN Δ PULMONARY TEST																		













GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE							
130:00:00/ 130:12:00	005:12:00/ 006:00:00	129:19:00/ 130:07:00	07 / 129 CST	3.0		MAY 9, 1991	STS-40	FINAL B	04/24/91							
CDT :129	19	20	21	22	23	0	CDT:130	1	2	3	4	5	6	7	0	MET:006
FD :06	12	13	14	15	16	17	18	19	20	21	22	23				
MET :005																
STS	TRK MNV R	PRE SLEEP	SLEEP										POST SLEEP	SD PU LM YP		
PL																
DAY/NIGHT																
ORBIT	89	90	91	92	93	94	95	96								
GSTDN			-DKR													
COVERAGE				-DKR -MAX	-CAN		-MAX									
TDRS	E W															
ATTITUDE			BIAS +XLV +YVV										-ZLV +YVV	IMU		
NOTES:	+XLV +YVV										-ZLV, +YVV					



GMT (D:H:M)		MET (D:H:M)		CDT (D:H:M)		FD/DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE						
131:00:00/ 131:12:00		006:12:00/ 007:00:00		130:19:00/ 131:07:00		08 / 130 CST	7.6		MAY 10, 1991	STS-40	FINAL B	04/24/91						
CDT	:130	19	20	21	22	23	0	CDT:131	1	2	3	FD	4	5	6	7	0	MET:007
FD	:07	12	13	14	15	16	17		18	19	20	21	22	23				
MET	:006																	
STS		TRK MNV VR	SLEEP										ZLV MNV VR	IMU MNV VR	TRK MNV VR	S/L ACT		
		PRE SLEEP														POST SLEEP		
													VOID/SALIVA	SD PU LM IF	IN IT	SD PU LM IF		
													MB OPS	CCU FWR	MB OPS			
PL													B O D Y M A S S	B O D Y M A S S	B O D Y M A S S			
DAY/NIGHT																		
ORBIT	105		106		107		108		109		110		111		112			
GSTDN COVERAGE			-DKR		--DKR -MAX				-MAX		-CAN		-MIL -MLX -BDA -MAX		-GDX -MIL -MLX -BDA -MIL -VAN -DKR -GDS			
TDRS																		
ATTITUDE	-ZLV +YVV		+XLV +YVV										-ZLV +YVV		+ZLV +YVV			
NOTES:	A SPLY DUMP TERM												-ZLV, +YVV		SPACELAB INGRESS CONFIG			

GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE					
131:12:00/ 132:00:00	007:00:00/ 007:12:00	131:07:00/ 131:19:00	08 / 131 CST	10.0		MAY 11, 1991	STS-40	FINAL B	04/24/91					
CDT :131	7	8	9	10	11	12	13	14	15	16	17	18	19	
FD :08	0	1	2	3	4	5	6	7	8	9	10	11	12	
MET :007														
STS	TERR MNV R	DTO 637 OCAC STOW	AI IN RE T M DE NV A L	DSO 611 MAS	P/TV03 SETUP	MEAL	P/TV03 ACT	AI IN RE T M DE NV A L	CHD 611 MAS	DSO 476 EXERCISE	DSO 476 EXERCISE	CHD 611 MAS HUD DTO	ZLV MNV R D/F MED	PC PRO INF MED
	POST SLEEP			DSO 476 EXER (MS2)						DO T C A C 6 3 7 E T U P	P T V 1 1 9	P T V 1 1 9	PRE SLEEP	
		MB OPS	BT AR S O T R E F L E X	BT AR S O T R E F L E X	S A L I V A	PS E T U P	MC E P S I T I O N S	MC E P S I T I O N S	JC E L E C T R O N I C	VOID/SALIVA	CV/SUB MAX EXER		SD PU LM YF	
		MB OPS		MB OPS						RAHF-SER	CV/SUB MAX EXER	ARC CHECK	ARC VIDEO	
PL		BT AR S O T R E F L E X	S A L I V A	CV S E T U P	CV C A L	CV C A L	PS E T U P			ECHO OPS	ECHO OPS	ECHO OPS	ECHO OPS	CV S T O W
DAY/NIGHT														
ORBIT		113	114	115	116	117	118	119	120					
GSTDN COVERAGE		-VAN -GDS -GDX -MIL -MLX -BDA	-VAN -GDS -GDX -MIL -MLX -BDA	-GDX -GDS -MIL -MLX		-VAN -GDS -GDX								
TDRS														
ATTITUDE					BIAS -YLV -ZVV						IMU/HUD	HUD	-ZLV +YVV	
NOTES:		▶ CV SETUP	⊙ NOISE MSMT (LOC 4) ⊙ SIM DEACT			⊙ DSO 611 - MAS	⊙ DTO 0623 CABIN AIR MONITORING			⊙ OCAC NOTES	⊙ FWD STATION ⊙ DTO 0785 HUD BACKUP TO COAS		⊙ -ZLV, +YVV	





GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE																																									
132:12:00/ 133:00:00	008:00:00/ 008:12:00	132:07:00/ 132:19:00	09/ 132 CST	14.9		MAY 12, 1991	STS-40	FINAL B	04/24/91																																									
CDT :132																																																		
FD :09																																																		
MET :008																																																		
STS	TRR DCAC MNVSTOM	DCAC MNVSTOM	FCS C/O	MEAL	DSO 904	GRK GAS AFC STOW	P/TV02P/TV02 SETUP ACT	902 MNV R	TRR MNV R	CH STOW 469	DSO STOW 469	JELLY FISH	IM JOC NEWS	EN TR NEWS	PL M NEWS	IM M NEWS	EL V M NEWS	FR M NEWS	CR M NEWS																															
	D/P	PS TE VI IU OP 4	BODY M ASS	DSO 476 EXER (MS2)	EXERCISE	EXERCISE	DSO 476 EXERCISE	CABIN STOW	PRE SLEEP																																									
			PULMONARY TEST	CV CAL	RC EV S T I E N T G	PS RE VI LU LF 6	STOW	S/L DEACTIVATION																																										
	MB OPS				RC EV S T I E N T G	RC EV S T I E N T G	CV STOW	DSO 476 EXERCISE																																										
PL	CV SETUP	ECHO OPS	PS TE VI IU OP 8	ECHO OPS			ECHO OPS	RESTING CV SET	EXERCISE																																									
DAY/NIGHT																																																		
ORBIT	129					130					131					132					133					134					135					136														
GSTDN COVERAGE	-VAN -GDS -GDX -MIL -MLX -BDA -DKR					-VAN -GDS -GDX -MIL -MLX -BDA					-GDS -GDX -MIL -MLX -VAN					-VAN -GDS -GDX																																		
TDRS																																																		
ATTITUDE	BIAS -YLV +ZVV																				OEX SUMS					BIAS -YLV +ZVV					IMU					-ZLV +YVV														
NOTES:	o APU HTR ACT v PTV105 SETUP					o APU HTR RECONFIG o APU COOL A					o QUESTIONAIRE					o DTO 902 OEX SUMS					o DTO 0623 CABIN AIR MONITORING					v RESTING CV SET					o BIASED +XLV -ZVV					o DSO 469 RADIATION DOSE DISTRIBUTION					o PARTIAL DEACT					o -ZLV, +YVV				

GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE								
133:00:00/ 133:12:00	008:12:00/ 009:00:00	132:19:00/ 133:07:00	09 / 132 CST	17.4		MAY 12, 1991	STS-40	FINAL B	04/24/91								
CDT :132	19	20	21	22	23	0	CDT:133	1	2	3	4	5	6	7	MET:009		
FD :09	12	13	14	15	16	17	18	19	FD :10	20	21	22	23	0			
MET :008																	
STS	TRK M N V R	SLEEP (7) ORBITER CREW										CP RW TR 40 P	I M U M N V R	- X S I M N V R	D P G I O R P 6 2 3 9	I M U M N V R	
	PRE SLEEP											POST SLEEP			DEORBIT PREP		
												S/L DEACT			CV ENTRY		
												POST SLEEP					
PL		SLEEP PAYLOAD CREW															
DAY/NIGHT																	
ORBIT	137	138	139	140	141	142	143	144									
GSTDN COVERAGE		-DKR	-DKR -MAX	-CAN	-BDA -MAX	-CAN	-MIL -MLX -BDA -MAX	-CAN	-BDA -MAX	-CAN	-MIL -MLX	-VAN -GDX -GDS -MIL	-DKR	-CAN	-MIL -MLX -BDA -DKR	CAN	
TDRS E W																	
ATTITUDE																	
NOTES:	⊕ +XLV +YVV										IMU			IMU/VERIF			⊕ DTD 0623 CABIN AIR MONITORING
	⊕ SPACELAB TOTAL POWERDOWN																
	⊕ OEX OARE ACT																



DETAILED TIMELINE

DETAILED  
TIMELINE

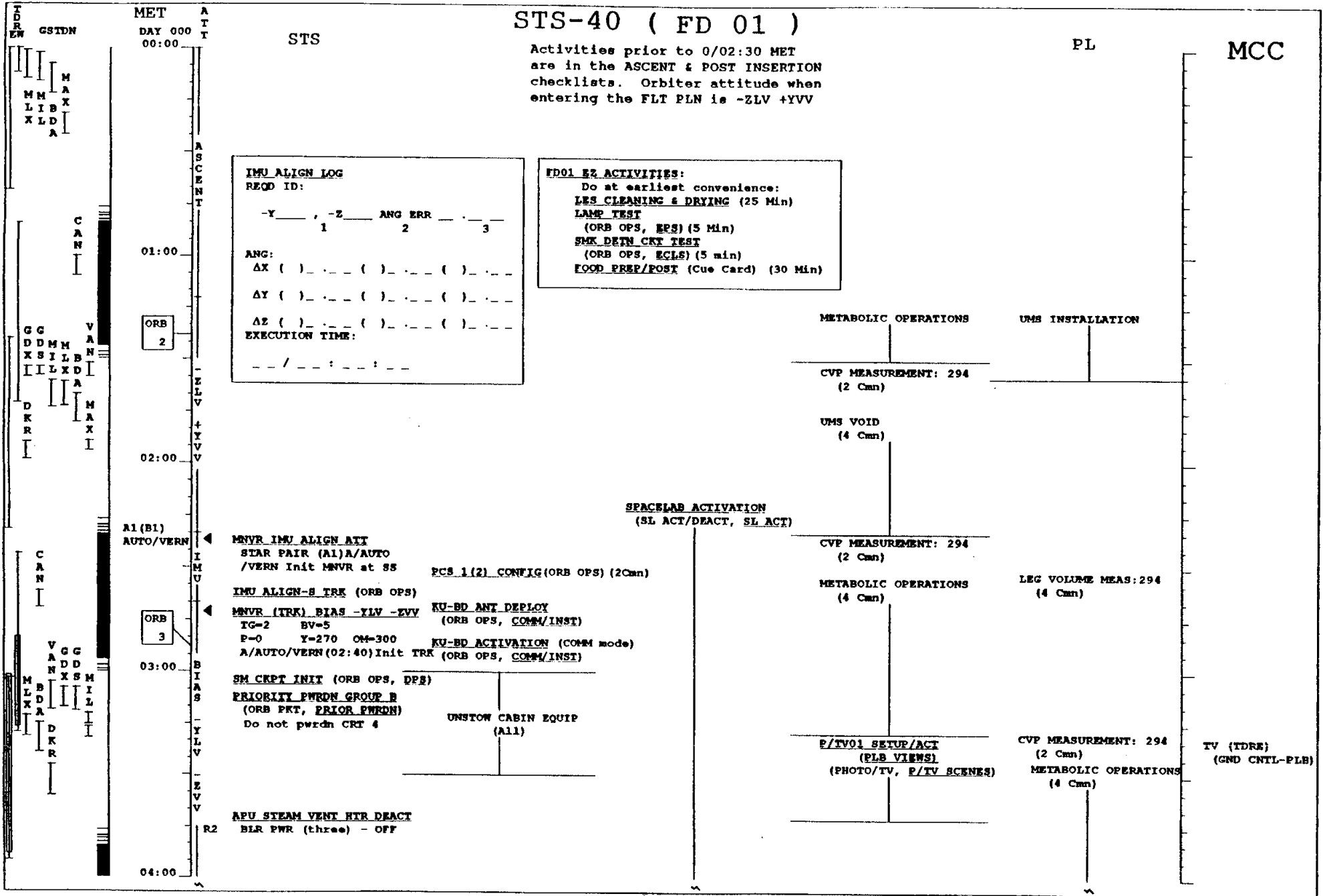
# DETAILED TIMELINE

## STS-40 ( FD 01 )

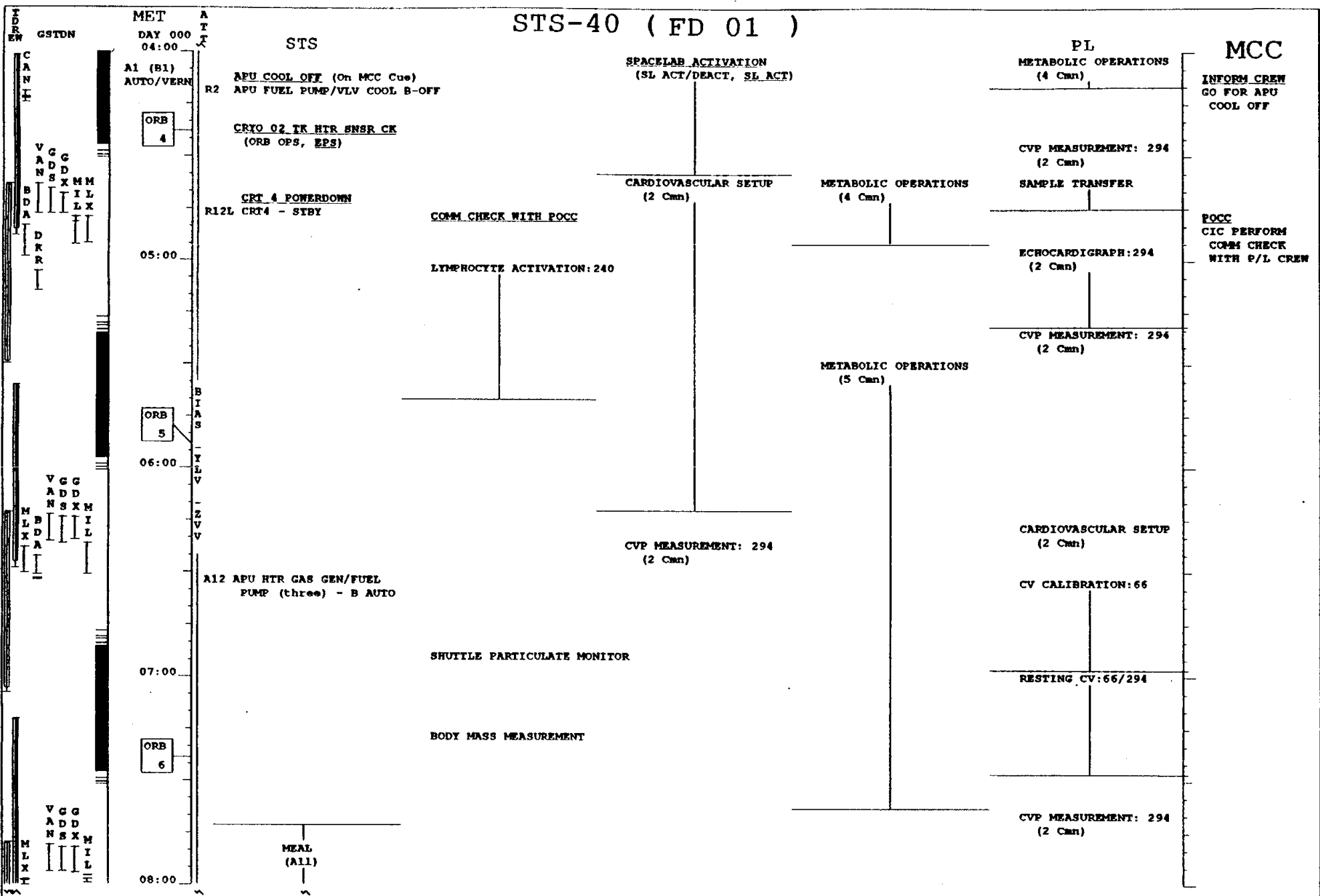
Activities prior to 0/02:30 MET  
are in the ASCENT & POST INSERTION  
checklists. Orbiter attitude when  
entering the FLT PLN is -ZLV +YVV

PL

MCC



# STS-40 ( FD 01 )



# STS-40 ( FD 01 )

PL

MCC

**MET**  
DAY 000  
08:00

A1 (B1)  
AUTO/VERN

ORB 7

09:00

ORB 8

10:00

ORB 9

12:00

CSIDN  
LI  
MM  
LI  
XL

VGG  
ADDX  
VANSX  
II

BIAS  
YL  
ZV  
IMU

STS

MEAL (All)

CAB AIR MONITORING (DTC 0623)  
(SL OPS, ECLSS)

GAS APC UNSTOW/SETUP  
(PL OPS, GAS)

JELLYFISH OPERATIONS

A12 APU HTR GC/FU (three) -A AUTO  
TR/FU/H2O SYS 1A, 2A, 3A -AUTO  
1B, 2B, 3B -OFF

EMED (PLT)  
(ECL, MB)  
PHOTO/TV 113 SETUP/ACT  
(CATH/RMVL)

DAILY PLANNING

PRIVATE MEDICAL CONFERENCE

MNVR IMU ALIGN ATT  
STAR PAIR (A1) A/AUTO  
/VERN Init MNVR at SS

IMU ALIGN - S TRK (ORB OPS)  
MNVR (TRK) -ELV, -YVV  
TG=2 BV=3 OM=90  
A/AUTO/VERN Init TRK

Do not perform  
ECLS, SUPPLY WATER DUMP

ORB/MODULE HUM SEP  
FOR WATER  
ACCUMULATION

PHOTO/TV108 SETUP  
(ECHO-OPS)

RESTING CV:66/294

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

ECHOCARDIOGRAPH:294  
(2 Cmn)

BODY MASS MEASUREMENT

BODY MASS MEASUREMENT

CVP MEASUREMENT: 294  
(2 Cmn)

PHOTO/TV 104 SETUP  
(BLOOD COLL)

ECHOCARDIOGRAPH:294  
(2 Cmn)

CVP MEASUREMENT: 294  
(2 Cmn)  
ECHOCARDIOGRAPH:294  
(2 Cmn)

BODY MASS MEASUREMENT  
(2 Cmn)

BODY MASS MEASUREMENT  
(2 Cmn)

CV STOW:66

T  
D  
R  
EW

GSTDN

MET

DAY 000  
12:00

A1 (B1)  
AUTO/VERN

13:00

ORB  
10

14:00

ORB  
11

15:00

16:00

A  
T  
T

Z  
L  
V  
-  
Y  
V  
V

+  
X  
L  
V  
-  
Y  
V  
V

# STS-40 ( FD 01 )

PL

MCC

STS

GAS ACTIVITIES GROUP A  
(PL OPS, GAS ASGMT)

PRE-SLEEP ACTIVITY  
(ORB OPS, CREW SYS)

← MNVR (TRK) +XLV -YVV  
TC-2 BV-1 OM-90  
A/AUTO/VERN (12:45) Init TRK

SLEEP



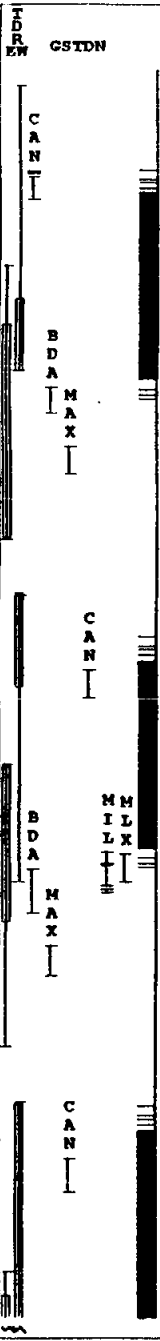


# STS-40 ( FD 02 )

PL

MCC

MET DAY 000 20:00  
 A1 (B1) AUTO/VERN  
 ORB 15 21:00  
 ORB 16  
 ORB 17  
 001 00:00  
 (A1) B5 MAN/VERN



STS  
 SLEEP

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

**FD02 EZ ACTIVITIES:**  
 FOOD PREP/POST (Cue Card) (30 Min)

UPLINK  
 REF SMT  
 NORMALIZATION

← **MNVR (TRK) -ZLV, +YV** SALIVA COLLECTION (3 Cmn) BODY MASS MEASUREMENT (2 Cmn) METABOLIC OPERATIONS (6 Cmn) UMS VOID (2 Cmn)  
 TG=2 BV=3 OM=270  
 A/AUTO/VERN (21:20) Init TRK

POST-SLEEP ACTIVITY (ORB OPS, CREW SYS) PLT Go to PCAP Vol. I page 3-14 until 0/22:12 BODY MASS MEASUREMENT UMS VOID

SALIVA COLLECTION (3 Cmn) PHOTO/TV 102 SETUP UMS VOID (3 Cmn)  
 SUPPLY WATER DUMP, steps 1&2 (BAROREFLEX) PULMONARY FUNC:198 BODY MASS MEASUREMENT SALIVA COLLECTION (2 Cmn) METABOLIC OPERATIONS (4 Cmn)

UPDATE  
 H2O SPLY DUMP  
 QTY TK A & B

019 /COAS PWR-OFF Mount COAS-AFT POST-SLEEP ACTIVITY (ORB OPS, CREW SYS)  
 SUPPLY WATER DUMP, steps 3&4 (ORB OPS, ECLS)

**COAS CALIBRATION LOG**  
 STAR ID: -Z 20 , ARCTURUS  
 STAR AVAIL: 23:24 TO 00:05  
 -Z Δ BIAS \_\_\_\_ , \_\_\_\_  
 UPDATE TIME: \_\_\_\_ / \_\_\_\_ : \_\_\_\_ : \_\_\_\_

← **MNVR IMU ALIGN/COAS CAL ATT**  
 STAR PAIR (A1)  
 A/AUTO/VERN Init MNVR at SS

IMU ALIGN - S TRK (ORB OPS)  
 COAS CALIBRATION (ORB OPS)  
 ← **MNVR (TRK) BIAS -YLV -ZV**  
 TG=2 BV=5  
 P=0 Y= 270 OM=300  
 A/AUTO/VERN (23:49) Init TRK

# STS-40 ( FD 02 )

PL

MCC

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

A  
T  
H  
E  
T  
I  
C  
A  
S  
Y  
L  
V  
Z  
V  
V

STS  
Change DAP B to B1  
019 COAS PWR - OFF Stow COAS POST-SLEEP ACTIVITY  
(ORB OPS, CREW SYS)

DAILY PLANNING

TELEPRINTER ACTIVATION (Cue Card) MB2 (PLT)  
(EPCL, MB)

METABOLIC OPERATIONS (5 Can)

01:00

ORB 18

02:00

ORB 19

03:00

04:00

SALIVA COLLECTION

AIR MON INST EVAL (DSO 611)  
(MED, MED DSOs)  
ARCHIVAL ORGANICS SAMPLER

PULMONARY FUNC:198  
(4 Can)

SPACE ACCEL MEAS SYS

BAROREFLEX TEST:022

SALIVA COLLECTION

SL MODULE AIR SAMPLE  
(SL OPS, ECLES)

PHOTO/TV 103 SETUP  
(198/PULM)

SALIVA COLLECTION

SALIVA COLLECTION

SLM SETUP (DSO 904)  
(ORB OPS, DSO 904)

BODY MASS MEASUREMENT

STS PARTICULATE SAMPLER

NOISE MEASUREMENT (DSO 904)  
(ORB OPS, DSO 904)  
Location 0

AEROBICS (DSO 476)  
(MED, MED DSOs)  
(MB2)

NOISE MEASUREMENT (DSO 904)  
(ORB OPS, DSO 904)  
Location 5

PHOTO/TV 102 SETUP  
(BAROREFLEX)

CCU POWER UP

BAROREFLEX TEST:022

SALIVA COLLECTION (4 Can)

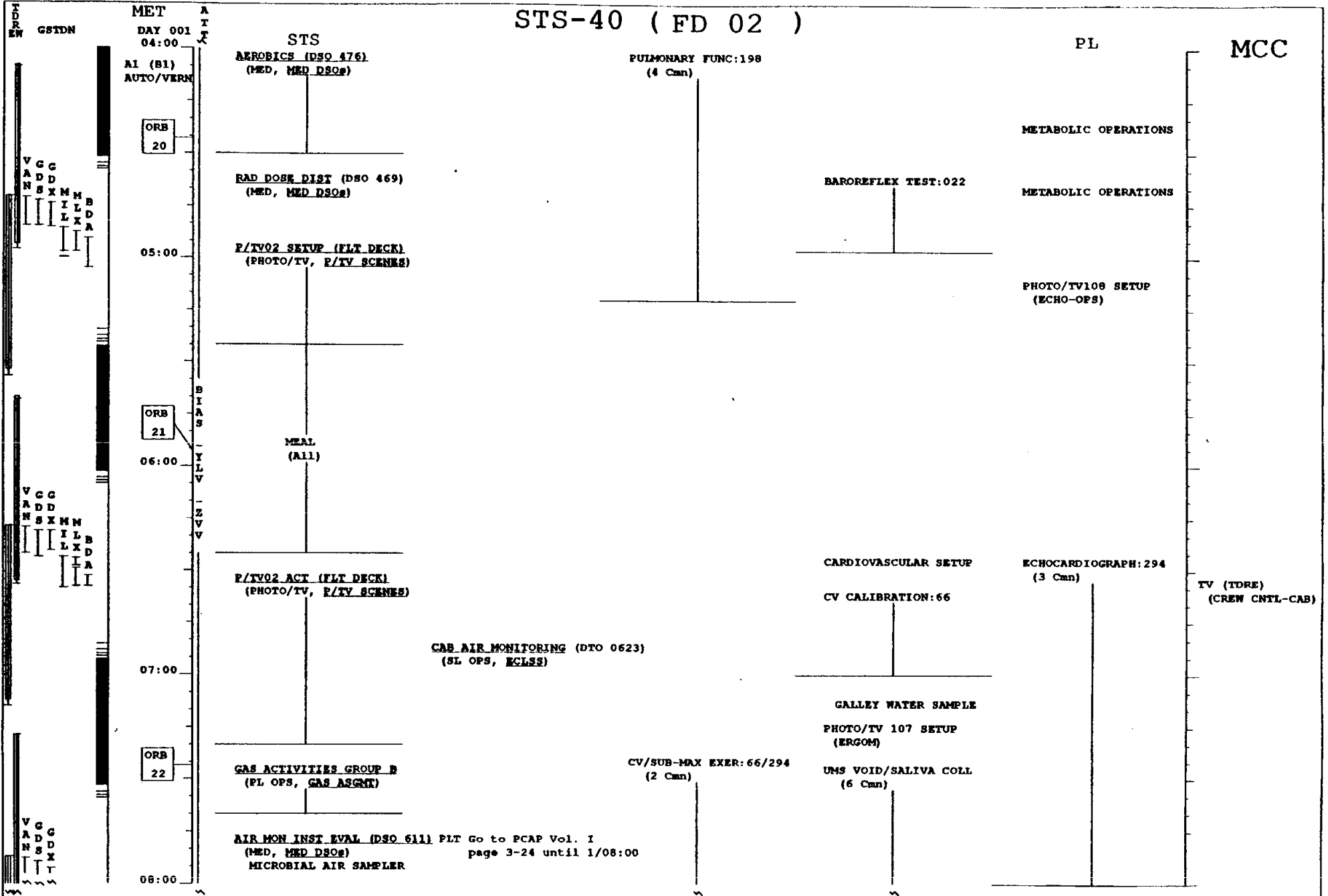
AEROBICS (DSO 476)  
(MED, MED DSOs)

BAROREFLEX TEST:022

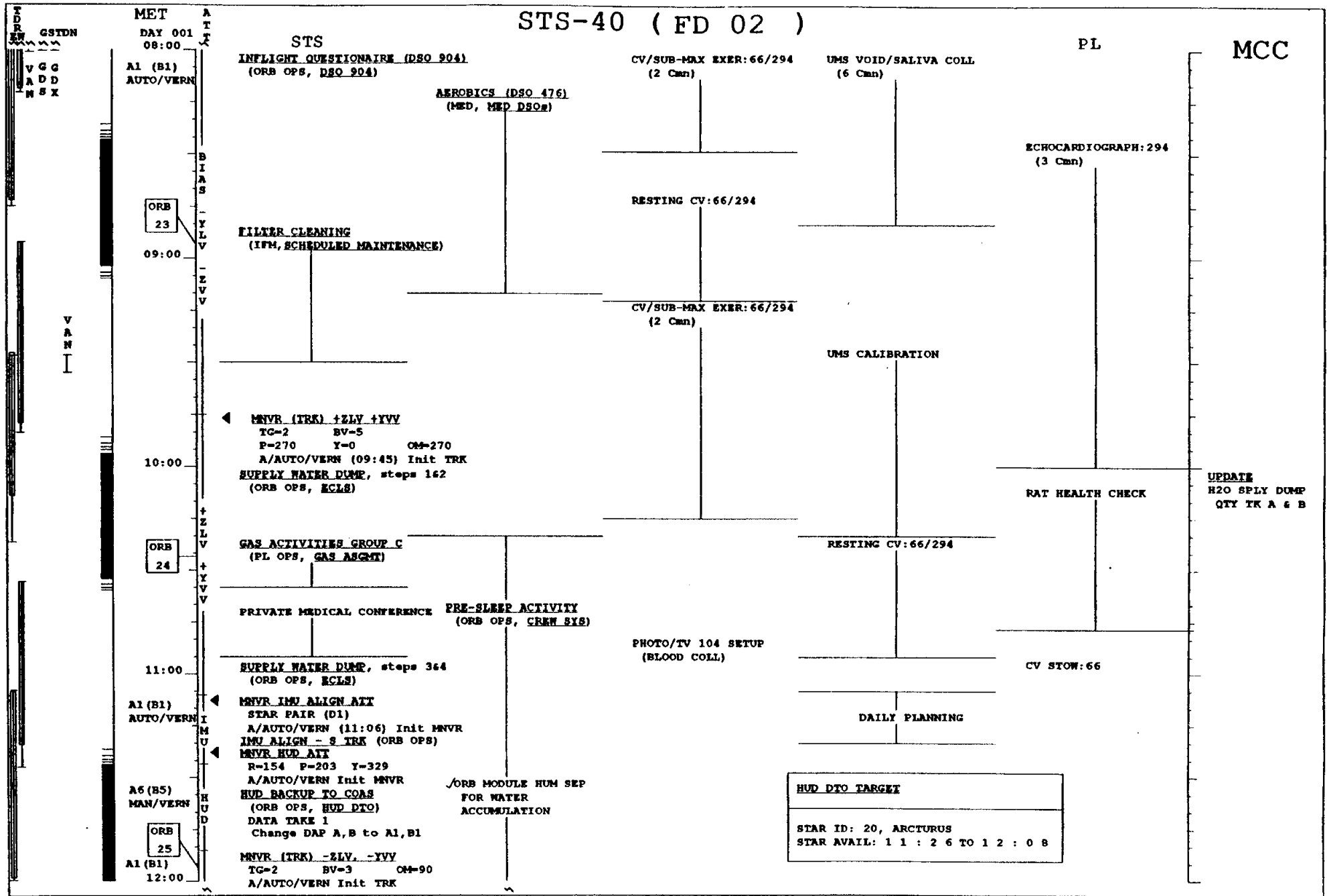
PHOTO/TV 102 SETUP  
(BAROREFLEX)

FORN  
GSDN  
MAX  
LIB  
XLD  
A  
CAN  
V  
D  
K  
R  
R  
V  
G  
A  
D  
D  
X  
S  
N  
S  
B  
D  
A  
M  
I  
L  
X

# STS-40 ( FD 02 )



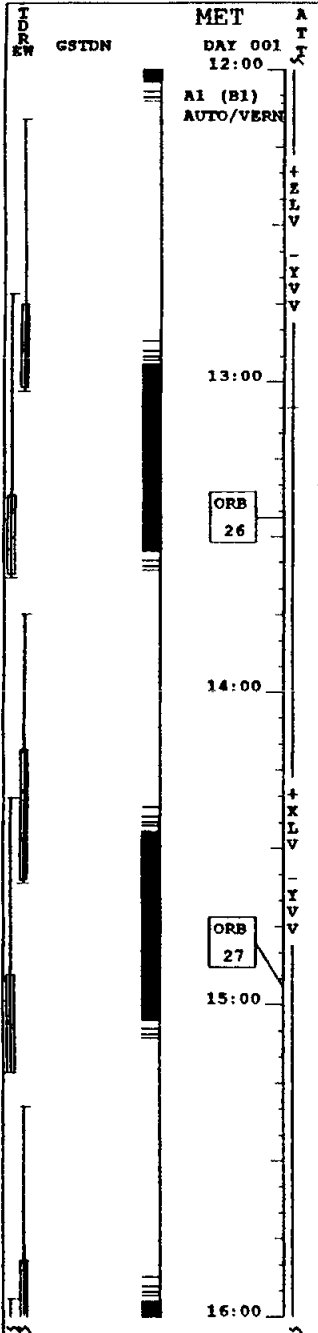
# STS-40 ( FD 02 )



# STS-40 ( FD 02 )

PL

MCC



STS

PRE-SLEEP ACTIVITY  
(ORB OPS, CREW SYS)

◀ MNR (TRK) +XLV, -YVV  
TG-2 BV-1 CM-90  
A/AUTO/VERN (13:05) Init TRK

SLEEP

IMU ALIGN LOG  
REQD ID:

-Y\_\_\_\_, -Z\_\_\_\_ ANG ERR \_\_\_\_ . \_\_\_\_  
          1          2          3

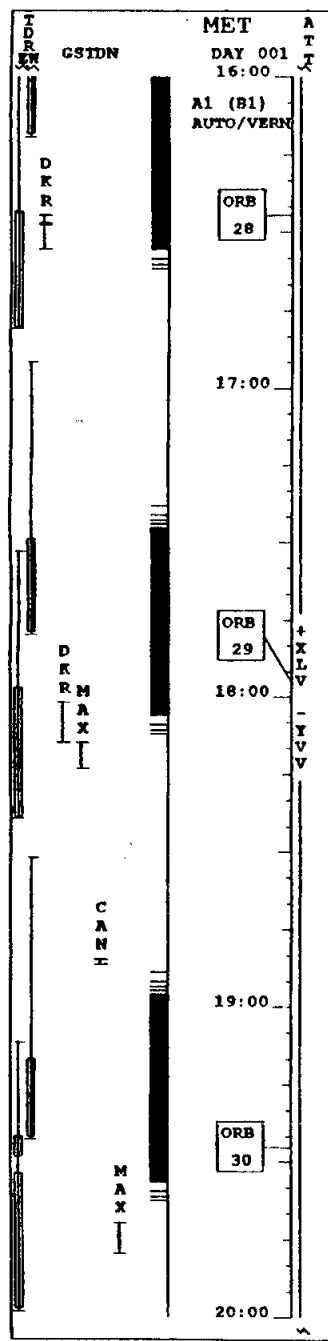
ANG:  
ΔX ( ) \_ . \_ . ( ) \_ . \_ . ( ) \_ . \_ .  
ΔY ( ) \_ . \_ . ( ) \_ . \_ . ( ) \_ . \_ .  
ΔZ ( ) \_ . \_ . ( ) \_ . \_ . ( ) \_ . \_ .

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

# STS-40 ( FD 02 )

PL

MCC







# STS-40 ( FD 03 )

PL

MCC

MET  
DAY 002  
00:00

A1 (B1)  
AUTO/VERN

**STS**  
**MNVR (TRK) BIAS -YLV -ZVU**  
 TG-2 BV-5  
 P=0 Y=270 OM-300 **POST-SLEEP ACTIVITY**  
 A/AUTO/VERN (00:00) Init TRK (ORB OPS, CREW SYS)  
 Change DAP B to B1

019 /COAS PWR - OFF Stow COAS

DAILY PLANNING

01:00

**GAS ACTIVITIES GROUP D**  
(PL OPS, GAS ASGMT)

**BMMD (PLT)**  
(EPCL, MB)

**METABOLIC OPERATIONS**  
(2 Cmn)

**GP WKSTATION OPS:PCDT-2**  
(2 Cmn)

ORB  
34

**MNVR (TRK) -ESI ATT**  
 TG-5 BV-3 OM-198  
 RA-42.55 DEC-+16.34  
 A/AUTO/VERN (01:20) Init TRK  
**GAS ACTIVITIES GROUP E**  
 (PL OPS, GAS ASGMT)  
 Step 1

**AEROBICS (DSO 476)**  
(MED, MED DSOs)

BODY MASS MEASUREMENT

STS PARTICULATE SAMPLER

(All) B9  
AUTO/VERN

02:00

**DAP CONFIG**

Item 23 + 0.05 Exec  
On MCC Call:  
Change DAP B to B9

**AEROBICS (DSO 476)**  
(MED, MED DSOs)

IV PUMP VERIFICATION

CALIBRATE SMMI

POSITION AWARENESS  
(2 Cmn)

ORB  
35

At ss **DAP CONFIG**  
Item 23 + 1.0 Exec

At SR: A/AUTO/VERN  
**DAP CONFIG**  
Item 23 + 0.05 Exec  
B/AUTO/VERN  
On MCC Call:  
Change DAP B to B9

**P/TV03 SETUP (MIDDECK)**  
(PHOTO/TV, P/TV SCENES)

CCU POWER UP

**PHOTO/TV 121 SETUP**  
(PCDT)

03:00

IV PUMP VERIFICATION

**RAFF FAN VERIF:PCDT-1**  
(2 Cmn)

**P/TV03 ACT (MIDDECK)**  
(PHOTO/TV, P/TV SCENES)

**AEROBICS (DSO 476)**  
(MED, MED DSOs)  
(MS2)

**UPLINK**  
EARLY TDRS H/O  
KU-BD ONLY

TV (TDRE)  
(CREW CNTRL-CAB)

04:00

# STS-40 ( FD 03 )

MCC

MET

DAY 002

04:00

A1 (B9)  
AUTO/VERN

ORB  
36

05:00

ORB  
37

06:00

07:00

ORB  
38

08:00

STS  
GAS ACTIVITIES GROUP E  
(PL OPS, GAS ASGMT)

Step 2  
MNVR (TRK) BIAS -YLV -XVY  
TG-2 BV-5  
P-0 Y-270 OM-300  
A/AUTO/VERN(04:10) Init TRK  
PHOTO/TV108 SETUP  
(ECHO-OPS)

AEROBICS (DSO 476)  
(MED, MED DSOs)  
(MS2)

CARDIOVASCULAR SETUP

PL  
RANF FAN VERIF:PCDT-1  
(2 Cmn)

MEAL  
(All)

FILTER INSTL (DTO 647)  
(ORB OPS, DTO 647)

BODY MASS MEASUREMENT  
CALIBRATION

ECHOCARDIOGRAPH:294  
(2 Cmn)

LYMPHOCYTE FIXATION: 240

CV CALIBRATION:66

JELLYFISH OPERATIONS

CV/SUB-MAX EXER:66/294  
(5 Cmn)

ECHOCARDIOGRAPH:294  
(2 Cmn)

MNVR (TRK)BIAS -YLV-XVY  
TG-2 BV-5  
P-0 Y-270 OM-29  
A/AUTO/VERN(07:30) Init TRK  
CONDENSATE TANK DUMP  
(SL OPS, ECLSS)

FILTER PERF EVAL (DTO 647)  
(ORB OPS, DTO 647)  
Steps a-e

PHOTO/TV 107 SETUP  
(ERGOM)

LYMPHOCYTE FIXATION: 240

ECHOCARDIOGRAPH:294  
(2 Cmn)

TDRN  
 GSTDN  
 VGG  
 ADDX  
 NSMM  
 ILLB  
 LIXD  
 A  
 VGG  
 ADDX  
 NSMM  
 ILLB  
 LIXD  
 A  
 VGG  
 ADDX  
 NSMM  
 ILLB  
 LIXD  
 A  
 VGG  
 ADDX  
 NSMM  
 ILLB  
 LIXD  
 A

# STS-40 ( FD 03 )

MET

DAY 002  
08:00

A1 (B9)  
AUTO/VERN

ORB 39

09:00

(All) B9  
AUTO/VERN

ORB 40

10:00

A1 (B1)  
AUTO/VERN

ORB 41

11:00

12:00

STS

CONDENSATE TANK DUMP  
(SL OPS, ECLS)

GAB AIR MONITORING (DTO 0623) (ORB OPS, DTO 647)  
(SL OPS, ECLS) Steps a-e

MNVR (TRK) -ZSI ATT  
TG-5 BV-3 OM-62  
RA-42.81 DEC-+16.42  
A/AUTO/VERN (08:50) Init TRK  
GAS ACTIVITIES GROUP F  
(PL OPS, GAS ASGMT)

DAP CONFIG  
Item 23 + 0.05 Exec  
On MCC Call:  
Change DAP B to B9

GAS ACTIVITIES GROUP G  
(PL OPS, GAS ASGMT)

MNVR (TRK) +ZLV +YVV  
TG-2 BV-5  
P-270 Y-0 OM-270  
A/AUTO/VERN (10:10) Init TRK

PRIVATE MEDICAL CONFERENCE

DAILY PLANNING

MNVR IMU ALIGN ATT  
STAR PAIR (A1)  
A/AUTO/VERN Init MNVR at SS

IMU ALIGN - S TRK (ORB OPS)

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

FILTER PERF EVAL (DTO 647)  
(ORB OPS, DTO 647)  
Steps a-e

FILTER PERF EVAL (DTO 647)  
(ORB OPS, DTO 647)  
Steps a-e  
PHOTO/TV 119  
(RAT-CR)

FILTER PERF EVAL (DTO 647)  
(ORB OPS, DTO 647)  
Steps f-1

PRE-SLEEP ACTIVITY  
(ORB OPS, CREW SYS)

PHOTO/TV 105 SETUP  
(RAT-CR)

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

SUPPLY WATER DUMP, steps 3&4  
(ORB OPS, ECLS)

CV/SUB-MAX EXER: 66/294  
(5 Cmn)

CV STOW: 66

PL  
ECHOCARDIOGRAPH: 294  
(2 Cmn)

RAT HEALTH CHECK

RODENT VIDEOTAPING

UPDATE  
H2O SPLY DUMP  
QTY TR A & B

MCC

# STS-40 ( FD 03 )

PL

MCC

**MET**  
 DAY 002  
 12:00  
 A1 (B1)  
 AUTO/VERN  
 A  
 T  
 T  
 E  
 L  
 V  
 Y  
 V  
 V  
 Y  
 V  
 V  
 +  
 X  
 L  
 V  
 Y  
 V  
 V  
 16:00

STS

PRE-SLEEP ACTIVITY  
 (ORB OPS, CREW SYS)

← MNR (TRK) +XLV, -YV  
 TG-2 BV-1 CM-90  
 A/AUTO/VERN (13:05) Init TRK

ORB 42

14:00

SLEEP

ORB 43

15:00

16:00

**IMU ALIGN LOG**

REQD ID:

-Y \_\_\_\_\_, -Z \_\_\_\_\_ ANG ERR \_\_\_\_\_  
           1                  2                  3

ANG:

$\Delta X$  ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_

$\Delta Y$  ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_

$\Delta Z$  ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_

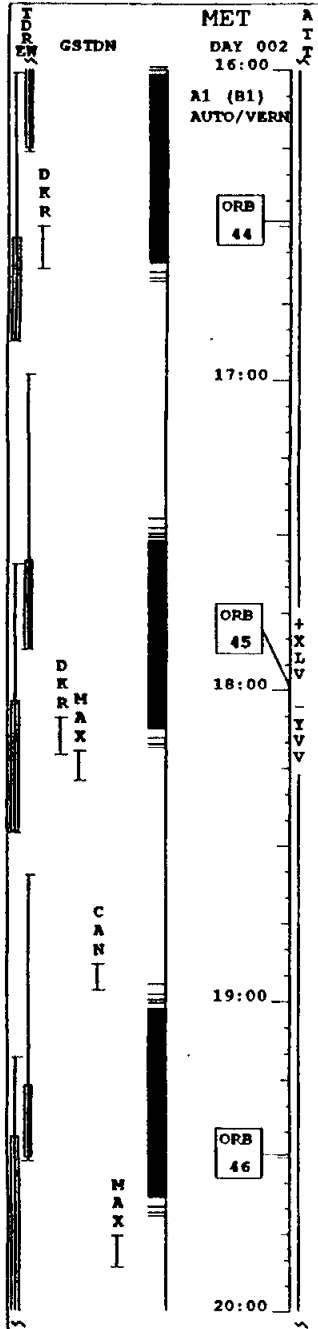
EXECUTION TIME:

\_ \_ / \_ \_ : \_ \_ : \_ \_

# STS-40 ( FD 03 )

PL

MCC



# STS-40 ( FD 04 )

PL

MCC

**FD04 EZ ACTIVITIES:**  
**FOOD PREP/POST** (Cue Card) (30 Min)

MET  
 DAY 002  
 20:00  
 A1 (B1)  
 AUTO/VERN  
 21:00  
 22:00  
 23:00  
 003  
 00:00

TD RW  
 GSDN  
 CAN  
 M L B D A  
 L X L A  
 M A X  
 C A N  
 M M I L B  
 L X D A  
 M A X  
 C A N

STS

SLEEP

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

**BMMD (PLT)**  
 (EPCL, MB)

**MNVR IMU ALIGN ATT**  
 STAR PAIR (A1)  
 A/AUTO/VERN Init MNVR at SS

**IMU ALIGN - S TRK (ORB OPS)**

**MNVR (TRK) +ELV +YVV**  
 TG-2 BV-5  
 P-270 Y-0 OM-270  
 A/AUTO/VERN(22:22) Init TRKPOST-SLEEP ACTIVITY  
**SUPPLY WATER DUMP, steps 1&2 (ORB OPS, CREW SYS)**  
 (ORB OPS, ECLS)

**SUPPLY WATER DUMP, steps 3&4**  
 (ORB OPS, ECLS)

**MNVR (TRK) BIAS -YLV -ZVV**  
 TG-2 BV-5  
 P-0 Y-270 OM-300  
 A/AUTO/VERN (23:45) Init TRK

PULMONARY FUNC:198

**METABOLIC OPERATIONS**  
 (4 Can)

**BODY MASS MEASUREMENT**  
 (5 Can)

**PHOTO/TV 103 SETUP**  
 (198/PULM)

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

**UPDATE**  
 H2O SPLY DUMP  
 QTY TR A & B



# STS-40 ( FD 04 )

PL

MCC

**MET**  
DAY 003  
04:00

**A1 (B1)**  
AUTO/VERN

**ORB 52**

VGG  
ADD  
NXX  
SM  
IL  
LX  
A

05:00

**ORB 53**

VGG  
ADD  
NXX  
SM  
IL  
LX  
A

06:00

**ORB 54**

07:00

08:00

**STS**

NOISE MEASUREMENT (DSO 904)  
(ORB OPS, DSO 904)  
Locations 0 - 2

PULMONARY FUNC:198  
(4 Cmn)

P/TV106 ACT (CREW CONF)  
(SL P/TV, P/TV SCENES)

CREW CONF  
(All)

NOISE MEASUREMENT (DSO 904)  
(ORB OPS, DSO 904)  
Location 8

MEAL  
(All)

CAB AIR MONITORING (DTO 0623)  
(SL OPS, ECLSS)  
P/TV04 SETUP (SL TOUR)  
(PHOTO/TV, P/TV SCENES)

P/TV04 ACT (SL TOUR)  
(PHOTO/TV, P/TV SCENES)

MED RESTRAINT SYSTEM TEST

EXERCISE  
(4 Cmn)

PHOTO/TV 109 SETUP  
(MRS)

RAT HEALTH CHECK

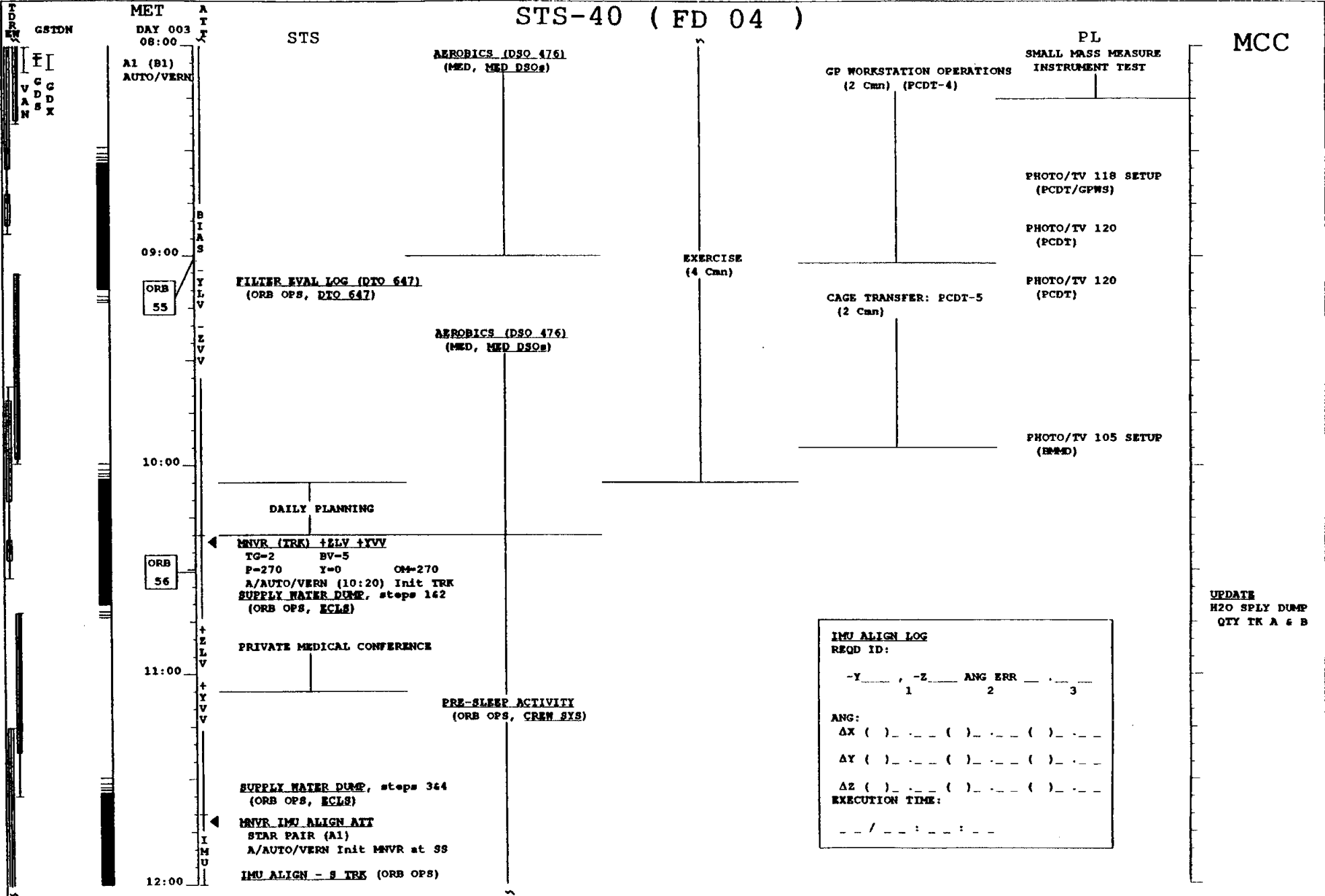
CAGE TRANSFER: ECDT-3  
(2 Cmn)

SMALL MASS MEASURE  
INSTRUMENT TEST

UPLINK  
EARLY TDRS W/O  
TV (TDRE)  
(CREW CNTRL-MOD)



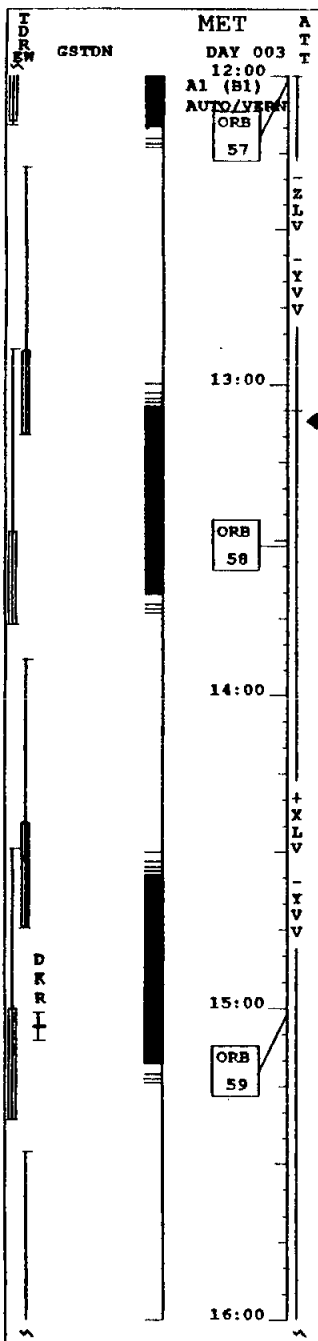
# STS-40 ( FD 04 )



# STS-40 ( FD 04 )

PL

MCC



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

PRE-SLEEP ACTIVITY  
 (ORB OPS, CREW SIS)

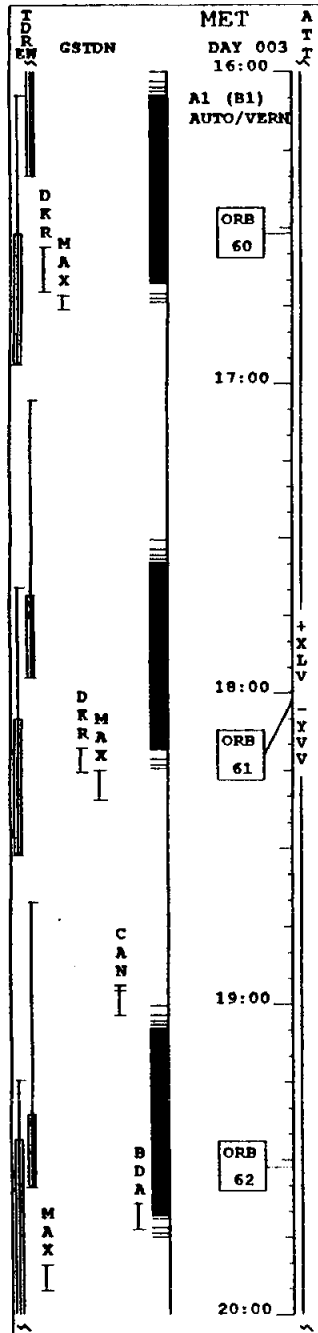
MNVR (TRK) +XLV, -YVV  
 TG-2 BV-1 OM-90  
 A/AUTO/VERN (13:05) Init TRK

SLEEP

# STS-40 ( FD 04 )

PL

MCC



# STS-40 ( FD 05 )

PL

MCC

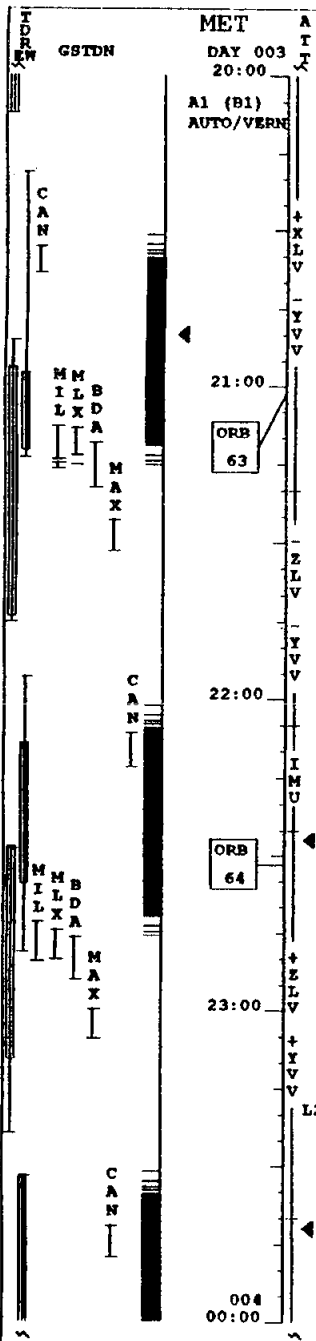
**EDOS EE ACTIVITIES:**  
**FOOD PREP/POST (Cue Card) (30 Min)**

**UPLINK**  
**EARLY TDPS N/O**

**BODY MASS MEASUREMENT**  
**(4 Cmn)**

**PULMONARY FUNC:198**

**UPDATE**  
**H2O SPLY DUMP**  
**QTY TR A & B**



MET DAY 003 20:00  
 A1 (B1) AUTO/VERN  
 21:00  
 ORB 63  
 22:00  
 ORB 64  
 23:00  
 004  
 00:00

STS

SLEEP

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

**EMMO (PLT)**  
**(EPCL, MB)**

**MNVR IMU ALIGN ATT**  
 STAR PAIR (A1)  
 A/AUTO/VERN Init MNVR at SS

**POST-SLEEP ACTIVITY**  
**(ORB OPS, CREW SIS)**

**IMU ALIGN - S TRK (ORB OPS)**  
**MNVR (TRK) +ELV +YVV**  
 TG=2 BV=5  
 P=270 Y=0 OM=270  
 A/AUTO/VERN (22:25) Init TRK  
**SUPPLY WATER DUMP, steps 1&2**  
**(ORB OPS, ECLS)**

**DO FC PURGE-MANUAL**  
**(CUE CARD)**

**/HUM SEPs for H2O**  
**accumulation, then**  
**HUMIDITY SEP RECONFIG**  
 HUMIDITY SEP B - OFF  
 A - ON

**SUPPLY WATER DUMP, steps 3&4**  
**(ORB OPS, ECLS)**

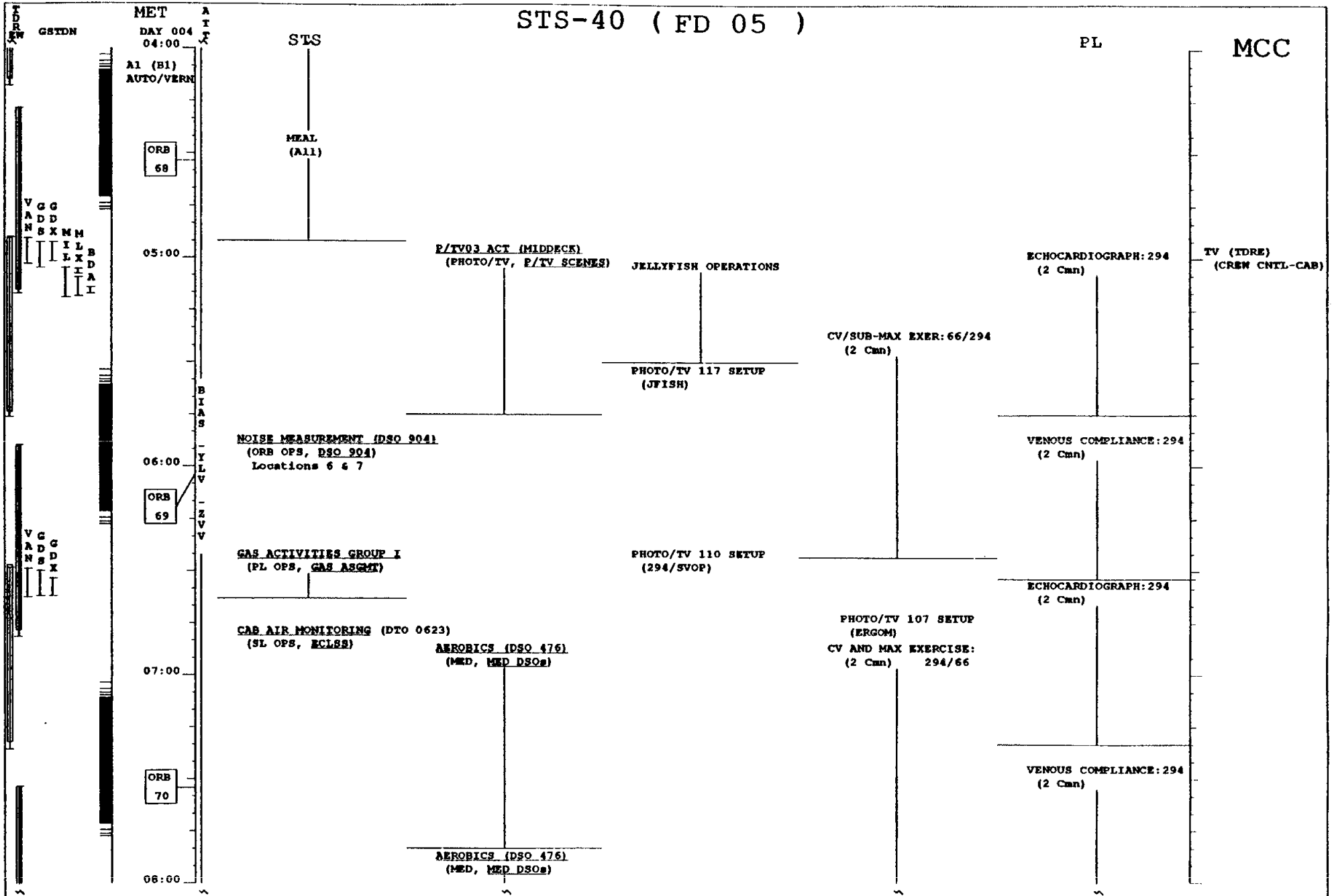
**MNVR (TRK) BIAS -ELV -EYV**  
 TG=2 BV=5  
 P= 0 Y= 270 OM=300

A/AUTO/VERN (23:40) Init TRK **DAILY PLANNING**

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



# STS-40 ( FD 05 )



MET DAY 004 04:00  
 A1 (B1) AUTO/VERN  
 ORB 68  
 05:00  
 B I A S  
 06:00  
 Y L V  
 Z V V  
 07:00  
 08:00

STS  
 MEAL (All)

P/TV03 ACT (MIDDECK)  
 (PHOTO/TV, P/TV SCENES)

JELLYFISH OPERATIONS

ECHOCARDIOGRAPH: 294  
 (2 Cmn)

TV (TDRE)  
 (CREW CNTRL-CAB)

CV/SUB-MAX EXER: 66/294  
 (2 Cmn)

PHOTO/TV 117 SETUP  
 (JFISH)

NOISE MEASUREMENT (DSO 904)  
 (ORB OPS, DSO 904)  
 Locations 6 & 7

VENOUS COMPLIANCE: 294  
 (2 Cmn)

GAS ACTIVITIES GROUP I  
 (PL OPS, GAS ASGMT)

PHOTO/TV 110 SETUP  
 (294/SVOP)

ECHOCARDIOGRAPH: 294  
 (2 Cmn)

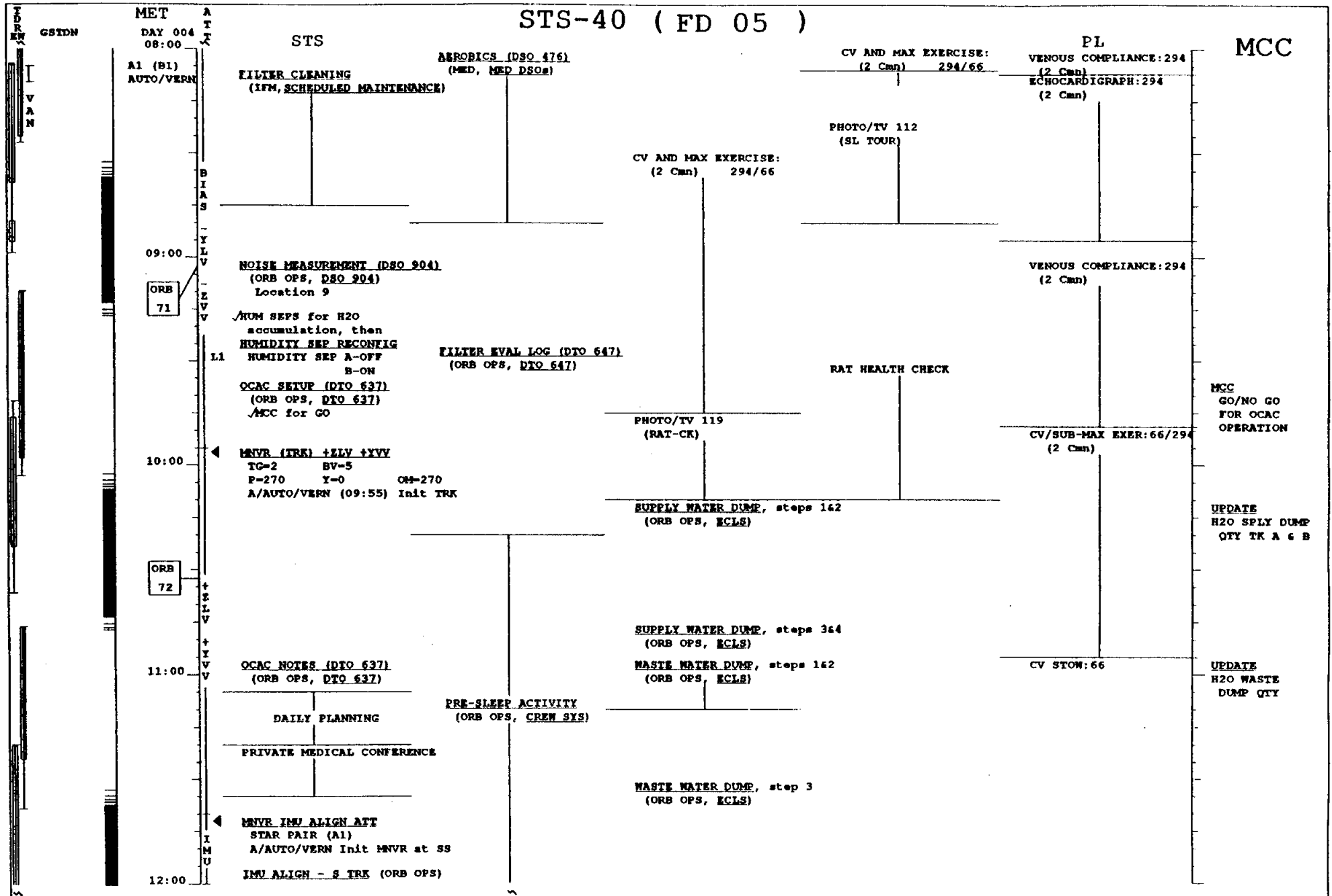
CAB AIR MONITORING (DIO 0623)  
 (SL OPS, ECLER)

AEROBICS (DSO 476)  
 (MED, MED DSOs)

PHOTO/TV 107 SETUP  
 (ERGOM)  
 CV AND MAX EXERCISE:  
 (2 Cmn) 294/66

VENOUS COMPLIANCE: 294  
 (2 Cmn)

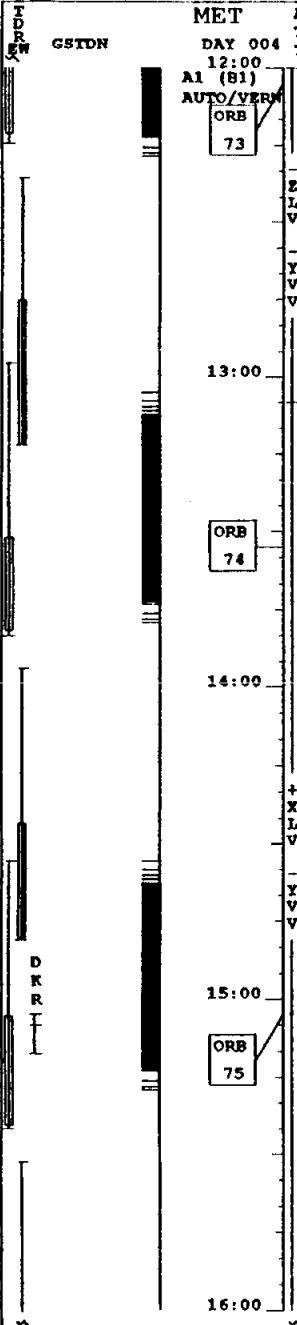
AEROBICS (DSO 476)  
 (MED, MED DSOs)



# STS-40 ( FD 05 )

PL

MCC



MET  
DAY 004  
12:00  
A1 (81)  
AUTO/VERN  
ORB  
73  
13:00  
ORB  
74  
14:00  
15:00  
ORB  
75  
16:00

STS  
MNVN (TRK) -XLV, -YVV  
TG-2 BV-3 OM-90  
A/AUTO/VERN Init TRK

PRE-SLEEP ACTIVITY  
(ORB OPS, CREW SYS)

MNVN (TRK) +XLV, -YVV  
TG-2 BV-1 OM-90  
A/AUTO/VERN (13:05) Init TRK

SLEEP

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



# STS-40 ( FD 05 )

PL

MCC

**TDR**  
**EW**

**GSDN**

**MET**  
DAY 004  
16:00

**AI (B1)**  
AUTO/VERN

**DKR**  
**MAX**

**CAN**

**MAX**

**CAN**

**MB**  
**LD**  
**XA**

**MIL**  
**MAX**

16:00  
17:00  
18:00  
19:00  
20:00

**ORB**  
76

**ORB**  
77

**ORB**  
78

**YVV**

**YVV**

STS

SLEEP

# STS-40 ( FD 06 )

PL

MCC

**FD06 EE ACTIVITIES:**  
**FOOD PREP/POST (Cue Card) (30 Min)**

**MET**  
 DAY 004  
 20:00  
 A1 (B1)  
 AUTO/VERN

**GSTDN**

CAN I  
 MM I  
 ILB I  
 LXD I  
 A I  
 M A X I

21:00

ORB 79

E L V  
 - Y V V

22:00

CAN I  
 V A N I  
 H M I  
 L X I  
 B D A I  
 M A X I R R I

ORB 80

23:00

E L V  
 + Y V V

005  
 00:00

STS

SLEEP

**MNVR (TRK) - ELV - YVV**  
 TG-2 BV-3 OM-90  
 A/AUTO/VERN Init TRK

CCU POWER UP

**BODY MASS MEASUREMENT**  
 (5 Cmn)

**LEG VOLUME MEAS:294**  
 (4 Cmn)

**UPLINK**  
 EARLY TDRS H/O

**MNVR IMU ALIGN ATT**  
 STAR PAIR (A1)  
 A/AUTO/VERN Init MNVR at SS

**IMU ALIGN - S TRK (ORB OPS)**

**MNVR (TRK) +ELV +YVV**  
 TG-2 BV-5  
 P-270 Y-0 OM-270  
 A/AUTO/VERN (22:28) Init TRK **POST-SLEEP ACTIVITY**  
**SUPPLY WATER DUMP, steps 1&2 (ORB OPS, CREW SYS)**

**IMU ALIGN LOG**  
 REQD ID:

-Y \_\_\_\_\_, -E \_\_\_\_\_ ANG ERR \_\_\_\_\_  
 1 2 3

ANG:

$\Delta X$  ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_

$\Delta Y$  ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_

$\Delta Z$  ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_

EXECUTION TIME:

\_ \_ / \_ \_ : \_ \_ : \_ \_

**SUPPLY WATER DUMP, steps 3&4**  
 (ORB OPS, ECLS)

**MNVR (TRK) BIAS -YLV -EVV**  
 TG-2 BV-5  
 P-0 Y-270 OM-300  
 A/AUTO/VERN (23:45) Init TRK

**UPDATE**  
 H2O SPLY DUMP  
 QTY TR A & B

# STS-40 ( FD 06 )

**MET**  
DAY 005  
09:00  
A1 (B1)  
AUTO/VERM

**STS**

**PL**

**MCC**

**ORB 81**

**ORB 82**

**ORB 83**

**MEAL (All)**

**01:00**

**02:00**

**03:00**

**04:00**

**TR**  
VANS  
GG  
ADD  
MM  
IL  
LX  
DA  
D  
KR  
R  
I  
L

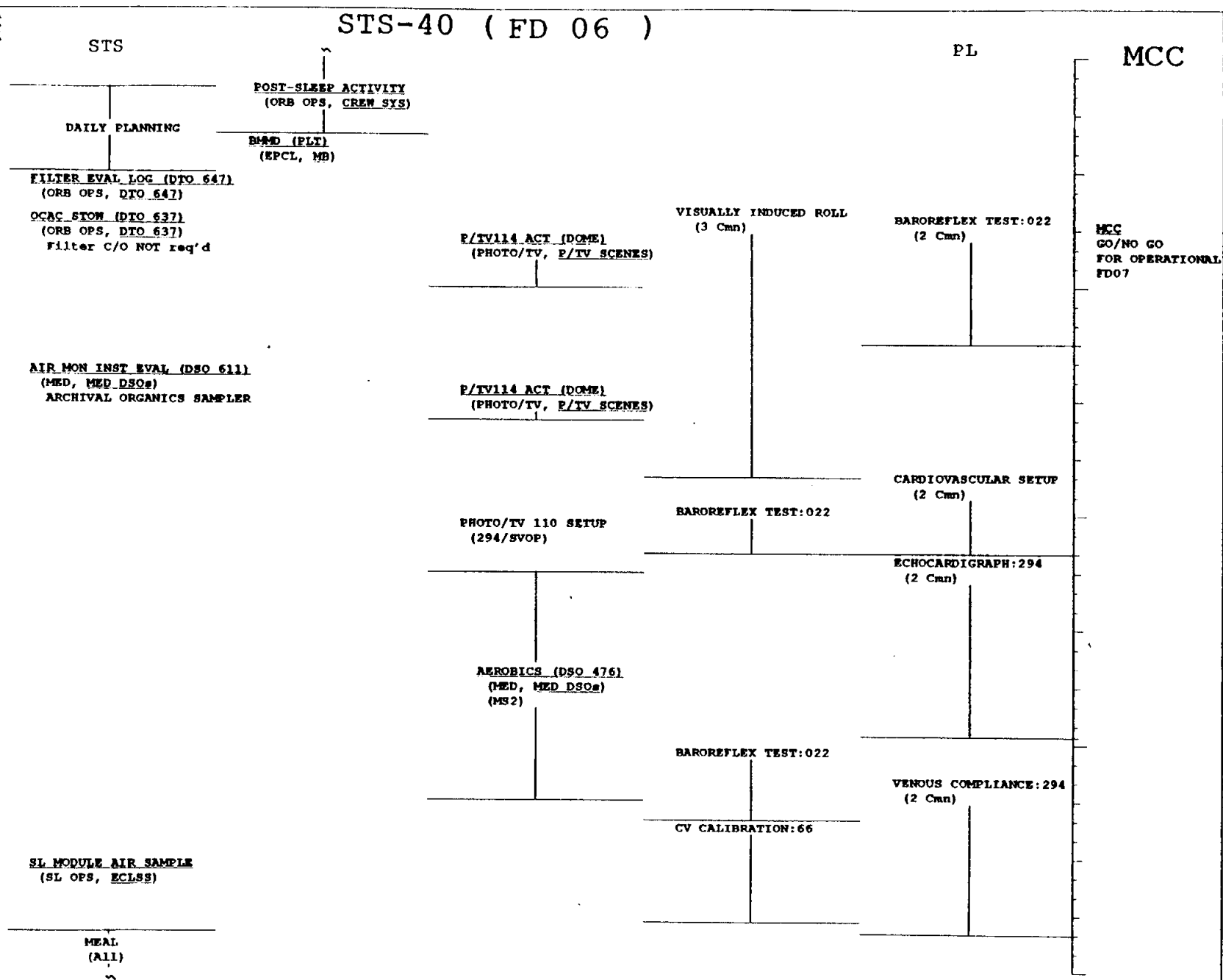
**CAN**  
I

**VANS**  
GG  
ADD  
MM  
IL  
LX  
DA  
D  
KR  
R  
I  
L

**GD**  
SM  
IL  
LX  
DA  
D  
KR  
R  
I  
L

**VG**  
AD  
NX  
B  
D  
A  
D  
KR  
R  
I  
L

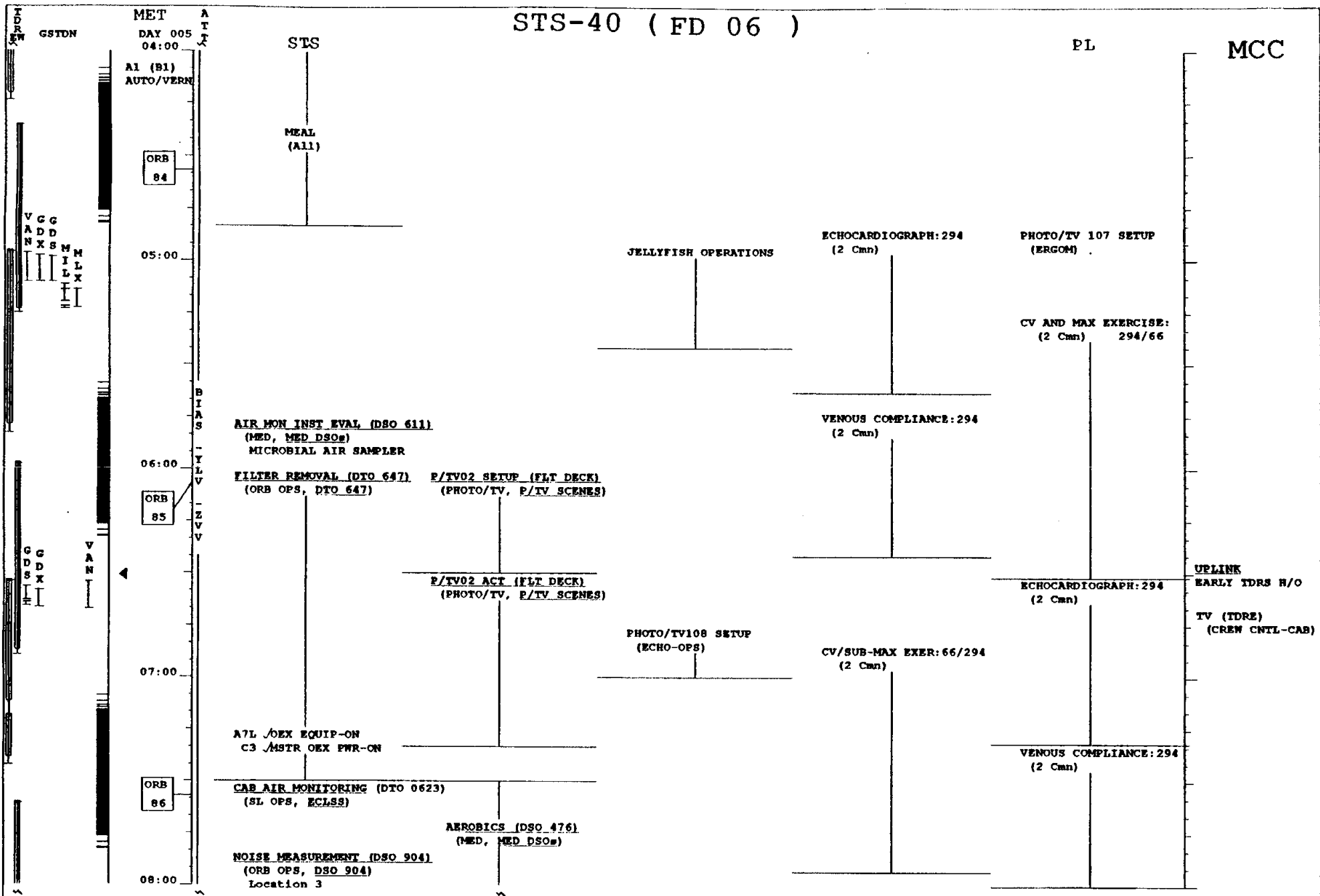
**B**  
I  
A  
S  
-  
Y  
L  
V  
-  
Z  
V  
V



# STS-40 ( FD 06 )

PL

MCC



# STS-40 ( FD 06 )

**MET**  
**DAY 005**  
**08:00**

**A1 (B1)**  
**AUTO/VERN**

**09:00**

**ORB 87**

**10:00**

**A6 (B5)**  
**MAN/VERN**

**ORB 88**

**A1 (B1)**  
**AUTO/VERN**

**11:00**

**12:00**

**STS**  
**NOISE MEASUREMENT (DSO 904)**  
**(ORB OPS, DSO 904)**  
**Location 3**

**AEROBICS (DSO 476)**  
**(MED, MED DSO#)**

**AEROBICS (DSO 476)**  
**(MED, MED DSO#)**

**CV/SUB-MAX EXER: 66/294**  
**(2 Cmn)**

**PL**  
**ECHOCARDIOGRAPH: 294**  
**(2 Cmn)**

**MCC**

**VENOUS COMPLIANCE: 294**  
**(2 Cmn)**

**OCAC SETUP (DTO 637)**  
**(ORB OPS, DTO 637)**  
**MCC for GO**

**GAS ACTIVITIES GROUP J**  
**(PL OPS, GAS ASGMT)**

**RAT HEALTH CHECK**

**PHOTO/TV 119**  
**(RAT-CK)**

**CV AND MAX EXERCISE:**  
**(2 Cmn) 294/66**

**MNVR IMU ALIGN ATT**  
**STAR PAIR (D1)**  
**A/AUTO/VERN (9:50) Init MNVR**  
**IMU ALIGN - S TRK (ORB OPS)**  
**MNVR HUD ATT**  
**R-154 P-203 Y-329**  
**A/AUTO/VERN Init MNVR**  
**HUD BACKUP TO COAS**  
**(ORB OPS, HUD DTO)**  
**DATA TAKE 2**  
**Change DAP A,B to A1,B1**

**HUD DTO TARGET**

**STAR ID: 20, ARCTURUS**  
**STAR AVAIL: 1 0 : 1 0 TO 1 0 : 5 2**

**SMALL MASS MEASURE**  
**INSTRUMENT TEST**

**MNVR (TRK) -ELV, +YVV**  
**TG-2 BV-3 OM-270**  
**A/AUTO/VERN (10:35) Init TRK**

**SUPPLY WATER DUMP, steps 162**  
**(ORB OPS, ECLS) CV STOW:66**

**OCAC NOTES (DTO 637)**  
**(ORB OPS, DTO 637)**

**DAILY PLANNING**

**PRE-SLEEP ACTIVITY**  
**(ORB OPS, CREW SYS)**

**SPACE ACCEL MEAS SYS**

**NON-OPS DAY PWRDN 1**

**SL EXIT CONFIGURATION, steps 164**  
**(SL ACT/DEACT, SL EXIT/**  
**INGRESS)**

**PRIVATE MEDICAL CONFERENCE**

**SUPPLY WATER DUMP, steps 364**  
**(ORB OPS, ECLS)**

**NON-OPS DAY PWRDN 1**  
**Perform the following steps**  
**from the PRIORITY PWRDN GROUP C**  
**(ORB PRT, PRIOR PWRDN)**  
**Omit PRIORITY PWRDN GROUP 3A**

06 STAR TRKR PWR (two)	- OFF
MDM PL2	- OFF
L1 FLASH EVAP CNTL PRI (two)	- OFF
SEC	- OFF
TOP EVAP HTR NOZ (two)	- OFF
DUCT	- OFF
ALL S-BAND PL PWR SYS	- OFF
CNTL -PNL, THEN	- CMD
AIR Recorders: OPS 2	- OFF
1	- RCD

**MCC**  
**GO/NO GO**  
**FOR OCAC**  
**OPERATION**

**UPDATE**  
**H2O SPLY DUMP**  
**QTY TR A & B**

# STS-40 ( FD 06 )

PL

MCC

MET  
DAY 005  
12:00  
A1 (B1)  
AUTO/VERN  
ORB 89  
13:00  
(A4) B10  
AUTO/VERN  
14:00  
ORB 90  
15:00  
ORB 91  
16:00

## STS

MRVR (TRK) GG  
TG-2 BV-5  
BODY VECTOR PER PAD  
A/AUTO/VERN (12:00) Init TRK

When in attitude,  
Change DAP A,B to A4,B10  
A/AUTO/VERN

wait 3 min, then

B/AUTO/VERN

OEX OARE ACTIVATION (T4)  
(ORB OPS FS, OEX OARE)

PRE-SLEEP ACTIVITY  
(ORB OPS, CREW SYS)

SLEEP

### IMU ALIGN LOG

REQD ID:

-Y \_\_\_ , -Z \_\_\_ ANG ERR \_\_\_  
1 2 3

ANG:

ΔX ( ) ( ) ( )

ΔY ( ) ( ) ( )

ΔZ ( ) ( ) ( )

EXECUTION TIME:

\_\_\_ / \_\_\_ : \_\_\_ : \_\_\_

### GC OARE PAD

PLANNED	ACTUAL
P 356.5	___
Y 1.0	___
OM 246.0	___

### COMMAND

PL RCDR - RCD  
OARE - RCD RDY  
OARE - QUIET ON



# STS-40 ( FD 07 )

PL

MCC

**MET**  
 DAY 005  
 20:00  
 (A4) B10  
 AUTO/VERN

I D R S W  
 G S I D N  
 M A X  
 C A N N I  
 M M I L B M M  
 I L X A D A I L X  
 M A X  
 C A N N I  
 V A G G D D M M  
 N X S S I L X  
 B D A I L X  
 D R R R I  
 C A N N I

B I A S  
 21:00 + X L V  
 + Y V V  
 22:00  
 A1 (B1)  
 AUTO/VERN  
 I M U  
 23:00 - Z L V  
 + Y V V  
 00:00

ORB 95  
 ORB 96

STS

SLEEP

**FD07 EZ ACTIVITIES:**  
 FOOD PREP/POST (Cue Card) (30 Min)

**IMU ALIGN LOG**  
 REQD ID:  
 -Y \_\_\_\_ , -Z \_\_\_\_ ANG ERR \_\_\_\_  
           1          2          3

ANG:  
 ΔX ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_  
 ΔY ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_  
 ΔZ ( ) \_ \_ \_ ( ) \_ \_ \_ ( ) \_ \_ \_

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

06 STAR TRKR PWR (two) -ON  
 Change DAP A, B to A1,B1  
**MNVR IMU ALIGN ATT**  
 STAR PAIR (A1)  
 A/AUTO/VERN Init MNVR at SS

**IMU ALIGN - S TRK (ORB OPS)**  
**MNVR (TRK) -ZLV, +YVV**  
 TG=2 BV=3 OM=270  
 A/AUTO/VERN (22:31) Init TRK **POST-SLEEP ACTIVITY**  
 (ORB OPS, CREW SYS)

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

06 STAR TRKR PWR (two) -OFF

A7L /OEX EQUIP -ON  
 C3 MSTR OEX PWR -ON  
 MET \_ / \_ : \_  
 Notify MCC

**SUPPLY WATER DUMP, steps 3&4**  
 (ORB OPS, ECLS)

**COMMAND**  
 OARE - QUIST OFF

**UPDATE**  
 H2O SPLY DUMP  
 QTY TR A & B

**COMMAND (OEX)**  
 1. CONT AT LABEL  
 2. LABEL 25  
 3. ENTER



# STS-40 ( FD 07 )

PL

MCC

MET

DAY 006

00:00

A1 (B1)

ORB 97

A7 (B8)

AUTO/VERN

(A7) B8

LVLH/NORM

A7 (B8)

AUTO/VERN

(A7) B8

LVLH/NORM

A7 (B8)

AUTO/VERN

01:00

(A7) B8

LVLH/NORM

A7 (B8)

AUTO/VERN

(A4) B8

MAN/VERN

ORB 98

A1 (B8)

AUTO/VERN

02:00

A1 (B8)

AUTO/VERN

02:00

ORB 99

A4 (B3)

MAN/VERN

04:00

## STS

MNVR (TRK) -ELV. +XVV

IG-2 BV-3 OM-180

A/AUTO/VERN (00:00) Init TRK

POST-SLEEP ACTIVITY

(ORB OPS, CREW SYS)

DAILY PLANNING

OEX OARE, STEP 1 (PITCH)

(ORB OPS, OEX OARE)

OEX OARE, STEP 2 (YAW)

(ORB OPS, OEX OARE)

OEX OARE, STEP 3 (ROLL)

(ORB OPS, OEX OARE)

MNVR (TRK) BIAS -ELV. +XVV

IG-2 BV-5 OM-180

P-70 Y=0

A/AUTO/VERN (01:05) Init TRK

OEX OARE, STEP 4

(ORB OPS, OEX OARE)

Change DAP A to A1

MNVR (TRK) -ELV. +YVV

IG-2 BV-3 OM-270

A/AUTO/VERN Init TRK

OCAC STOW (DTC 637)

(ORB OPS, DTC 637)

Filter C/O Req'd

AEROBICS (DSO 476)

(MED, MED DSOs)

(MS2)

GG FREE DRIFT, Steps 1 & 2 (OARE T1)

(ORB OPS, RCS)

BODY VECTOR PER PAD

A1U KU-BAND PWR-STBY

CREW SHOULD REMAIN AS

MOTIONLESS AS POSSIBLE

DURING FREE DRIFT

### GG OARE PAD

	PLANNED	ACTUAL
P	356.5	---
Y	1.00	---
OM	246	---

GG FREE DRIFT, Step 3

(ORB OPS, RCS)

A1U KU-BAND PWR-ON

COMMAND

OARE - QUIET ON

COMMAND (OEX)

1. ALL STOP

2. ENTER

OARE - QUIET OFF

COMMAND

OARE - QUIET ON

RECORD MET

/ : \_

MULTI-G LYMPHOCYTE  
STUDY AND  
DEACTIVATION: 240

# STS-40 ( FD 07 )

MET  
DAY 006  
04:00

A1 (B8)  
AUTO/VERN

(A4) B8  
AUTO/VERN

ORB  
100

05:00

A1 (B1)  
AUTO/VERN

ORB  
101

06:00

ORB  
102

07:00

08:00

STS  
Change DAP A, B to A1, B8

MNVR (TRK) +XLV +EVV (OARE T3, part 2)  
TG-2 BV-1 OM-180  
A/AUTO/VERN (04:10) Init TRK  
When in attitude,  
Change DAP A to A4  
DAP B set to B8  
A/AUTO/VERN  
Wait 3 min, then  
B/AUTO/VERN

MEAL  
(All)

Change DAP A, B to A1, B1

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

P/TV02 SETUP (FLT DECK)  
(PHOTO/TV, P/TV SCENES)

OEX OARE DEACTIVATION  
(ORB OPS, OEX OARE)

P/TV02 ACT (FLT DECK)  
(PHOTO/TV, P/TV SCENES)

MODE ZERO EXP OPS  
(PL OPS, MODE ZERO)

PL  
MULTI-G LYMPHOCYTE  
STUDY AND  
DEACTIVATION: 240

MCC

COMMAND  
OARE-QUIET OFF  
OARE-QUIET ON

COMMAND  
OARE-QUIET OFF

TV (IDRE)  
(CREW CNTL-CAB)

# STS-40 ( FD 07 )

PL

MCC

MET

DAY 006  
08:00

A1 (B1)  
AUTO/VERN

STS  
MODE ZERO EXP OPS  
(PL OPS, MODE ZERO)

AEROBICS (DSO 476)  
(MED, MED DSOs)

CAB AIR MONITORING (DTO 0623)  
(SI OPS, ECLSS)  
OCAC SETUP (DTO 637)  
(ORB OPS, DTO 637)  
MCC for GO

IMU ALIGN LOG

REQD ID:

-Y \_\_\_\_\_ -Z \_\_\_\_\_ ANG ERR \_\_\_\_\_  
1 2 3

ANG:

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

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

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

EXECUTION TIME:

\_\_\_\_ / \_\_\_\_ : \_\_\_\_ : \_\_\_\_

AEROBICS (DSO 476)  
(MED, MED DSOs)

01 COAS -OFF Mount COAS -FWD  
06 STAR TRKR PWR (two) -ON

COAS CALIBRATION LOG

STAR ID: +X \_\_\_\_\_ , \_\_\_\_\_  
STAR AVAIL: \_\_\_\_ : \_\_\_\_ TO \_\_\_\_ : \_\_\_\_

+X Δ BIAS \_\_\_\_\_ , \_\_\_\_\_

UPDATE TIME: \_\_\_\_ / \_\_\_\_ : \_\_\_\_ : \_\_\_\_

09:00

ORB  
103

10:00

(A1) B5  
A6 (B5)  
MAN/VERN

ORB  
104

A1 (B1)  
AUTO/VERN

11:00

019 COAS PWR-OFF STOW COAS

PRE-SLEEP ACTIVITY  
(ORB OPS, CREW SYS)

DAILY PLANNING

PRIVATE MEDICAL CONFERENCE

HUD DTO TARGET

STAR ID: 20, ARCTURUS  
STAR AVAIL: 1 0 : 1 3 TO 1 0 : 5 5

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

SUPPLY WATER DUMP, steps 3&4  
(ORB OPS, ECLS)

MCC  
GO/NO GO  
FOR OCAC  
OPERATION

MULTI-G LYMPHOCYTE  
STUDY AND  
DEACTIVATION: 240

UPDATE  
H2O SPLY DUMP  
QTY TK A & B

# STS-40 ( FD 07 )

STS

PL

MCC

SUPPLY WATER DUMP, steps 364  
(ORB OPS, ECLS)

PRE-SLEEP ACTIVITY  
(ORB OPS, CREW SYS)

MNVR (TRK) +XLV, +YVV  
TG-2 BV-1 OM-270  
A/AUTO/VERN (13:05) Init TRK

SLEEP

MET  
DAY 006  
12:00  
A1 (B1)  
AUTO/VERN  
ORB  
105  
+XLV  
+YVV  
13:00  
ORB  
106  
14:00  
+XLV  
+YVV  
15:00  
ORB  
107  
16:00

GSTDN

DRRI

DRMAX



# STS-40 ( FD 08 )

PL

MCC

**MET**  
DAY 006  
20:00

A1 (B1)  
AUTO/VERN

MAX

CANN

MILXA  
MBLDA  
MAX

VAN  
GG  
DD  
SX  
MM  
IL  
LX  
BDA  
D  
MR  
IL

CANN

007  
00:00

**STS**

SLEEP

MNVR (TRK) -ELV, +YV  
TG-2 BV-3 OM-270  
A/AUTO/VERN Init TRK

ZPLT Go to PCAP Vol. I  
page 3-116 until 6/21:51

06 STAR TRKR PWR (two) -ON

MNVR IMU ALIGN ATT  
STAR PAIR (A1)  
A/AUTO/VERN Init MNVR at SS

IMU ALIGN - S TRK (ORB OPS)

MNVR (TRK) +ELV +YV  
TG-2 BV-5 OM-270  
P-270 Y-0  
A/AUTO/VERN (22:34) Init TRK

POST-SLEEP ACTIVITY  
(ORB OPS, CREW SYS)

POST NON-OPS DAY PWRUP 1

SL INGRESS CONFIGURATION, step 6  
(SL ACT/DEACT, SL EXIT/  
INGRESS)

**IMU ALIGN LOG**  
REQD ID:

-Y \_\_\_\_\_, -Z \_\_\_\_\_ ANG ERR \_\_\_\_\_  
1 2 3

ANG:  
ΔX ( ) ( ) ( )  
ΔY ( ) ( ) ( )  
ΔZ ( ) ( ) ( )

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

**FOOD PREP/POST (Cue Card) (30 Min)**

UMS VOID/SALIVA COLL  
(6 Cmn)

CCU POWER UP

SUPPLY WATER DUMP, steps 142  
(ORB OPS, ECLS)

SUPPLY WATER DUMP, steps 344  
(ORB OPS, ECLS)

**METABOLIC OPERATIONS**  
(6 Cmn)

**METABOLIC OPERATIONS**  
(4 Cmn)

**BODY MASS MEASUREMENT**  
(2 Cmn)

PHOTO/TV 102 SETUP  
(BAROREFLEX)

**BODY MASS MEASUREMENT**  
(3 Cmn)

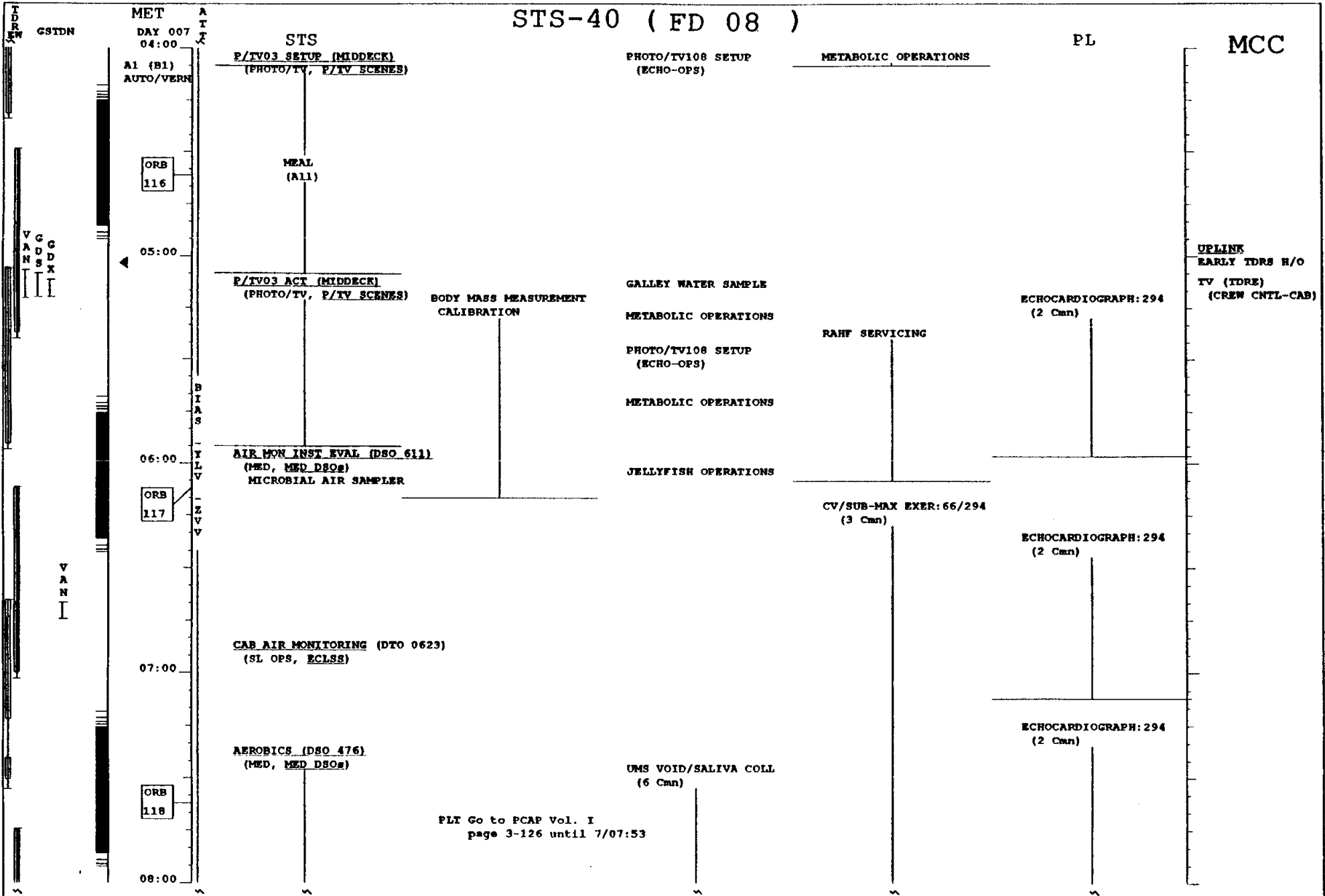
**POST NON-OPS DAY PWRUP 1**

AIR Recorders:OPS 2	- RCD
1	- RCD
ALL S-BAND PL PWR SYS	- 1
CNTL -PNL, THEN	- CMD
06 MDM PL2	- ON
CRT SM, I/O RESET	- ON
L1 TOP EVAP HTR NOZ (two)	- ON
DUCT	- ON
Wait 30 min then,	
FLASH EVAP CNTL PRI A	- ON

UPDATE  
H2O SPLY DUMP  
QTY TR A & B



# STS-40 ( FD 08 )





# STS-40 ( FD 08 )

MET  
DAY 007  
08:00

A1 (B1)  
AUTO/VERN

ORB  
119

(A1)B5  
A6(B5)  
MAN/VERN

ORB  
120

A1 (B1)  
AUTO/VERN

11:00

12:00

A  
T  
X  
B  
I  
A  
S  
Y  
L  
V  
Z  
V  
V  
H  
U  
D  
Z  
L  
V  
+  
Y  
V  
V

**STS**  
AEROBICS (DSO 476)  
(MED, MED DSOs)

---

AEROBICS (DSO 476)  
(MED, MED DSOs)

OCAC SETUP (DIO 637)  
(ORB OPS, DIO 637)  
/MCC for GO

PHOTO/TV 119  
(RAT-CK)

01 /COAS-OFF Mount COAS-FWD

PHOTO/TV 119  
(RAT-CK)

PHOTO/TV 105 SETUP  
(BRAD)

OCAC NOTES (DIO 637)  
(ORB OPS, DIO 637)  
MNVR IMU ALIGN ATT  
STAR PAIR (D1)  
A/AUTO/VERN (09:56) Init MNVR  
IMU ALIGN - S TRK (ORB OPS)  
MNVR HUD ATT

R-154 P-203 Y-329  
A/AUTO/VERN Init MNVR  
COAS CALIBRATION (ORB OPS)  
HUD BACKUP TO COAS  
(ORB OPS, HUD DIO)  
DATA TAKE 4

Change DAP A,B to A1,B1

MNVR (TRK) -SLV, +YV  
TG-2 BV-3 OM-270  
A/AUTO/VERN (10:46) Init TRK

DAILY PLANNING

---

PRIVATE MEDICAL CONFERENCE

PRE-SLEEP ACTIVITY  
(ORB OPS, CREW SYS)

UMS VOID/SALIVA COLL  
(4 Cmn)

CV/SUB-MAX EXER:66/294  
(3 Cmn)

CV/SUB-MAX EXER:66/294  
(3 Cmn)

RAT HEALTH CHECK

RODENT VIDEOTAPING

PL  
ECHOCARDIOGRAPH:294  
(2 Cmn)

ECHOCARDIOGRAPH:294  
(2 Cmn)

HUD DIO TARGET

---

STAR ID: 20, ARCTURUS  
STAR AVAIL: 1 0 : 1 6 TO 1 0 : 5 8

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

COAS CALIBRATION LOG

---

STAR ID: +X 20 , ARCTURUS  
STAR AVAIL: 1 0:1 6 TO 1 0:5 8

+X Δ BIAS \_\_\_\_\_

UPDATE TIME: \_\_\_\_ / \_\_\_\_ : \_\_\_\_ : \_\_\_\_

IMU ALIGN LOG

REQD ID:

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

1                      2                      3

ANG:

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

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

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

EXECUTION TIME:

\_ / \_ : \_ : \_

MCC

MCC  
GO/NO GO  
FOR OCAC  
OPERATION

UPDATE  
H2O SPLY DUMP  
QTY TR A & B

# STS-40 ( FD 08 )

PL

MCC

SUPPLY WATER DUMP, steps 344  
(ORB OPS, ECLS)

STS

PRE-SLEEP ACTIVITY  
(ORB OPS, CREW STS)

MANVR (TRK) +XLV, +YVV  
TG-2 BV-1 CM-270  
A/AUTO/VERN (13:05) Init TRK

SLEEP

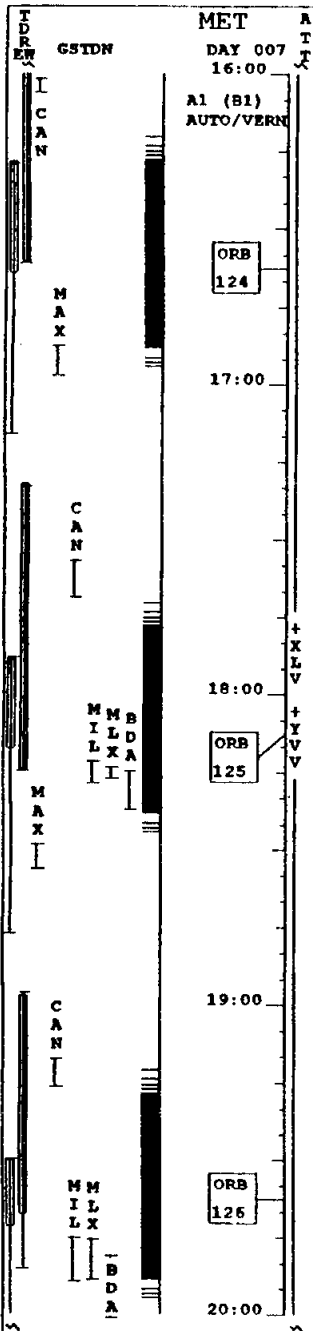
MET  
DAY 007  
12:00  
A1 (B1)  
AUTO/VERN  
ORB  
121  
Z  
L  
V  
+  
Y  
V  
V  
13:00  
ORB  
122  
14:00  
+  
X  
L  
V  
+  
Y  
V  
V  
15:00  
ORB  
123  
16:00

GSIDN

DRR

DRR  
MAX

# STS-40 ( FD 08 )



STS

SLEEP

PL

MCC

# STS-40 ( FD 09 )

PL

MCC

MET  
DAY 007  
20:00

A1 (B1)  
AUTO/VERN

**FD09 E2 ACTIVITIES:**  
FOOD PREP/POST (Cue Card) (30 Min)

STS

SLEEP

21:00

ORB  
127

**MNVR (TRK) - ELV, +YVV**  
TG-2 BV-3 OM-270  
A/AUTO/VERN (21:20) Init TRK

**BODY MASS MEASUREMENT**  
(3 Cmn)

**METABOLIC OPERATIONS**  
(4 Cmn)

**BODY MASS MEASUREMENT**  
(2 Cmn)

PULMONARY FUNC:198

CCU POWER UP

22:00

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

**UPDATE**  
H2O SPLY DUMP  
QTY TK A & B

23:00

ORB  
128

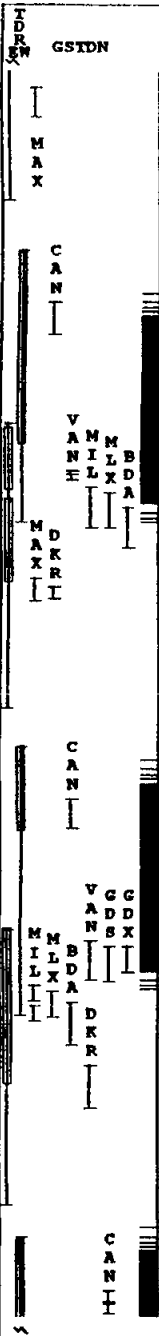
**POST-SLEEP ACTIVITY**  
**SUPPLY WATER DUMP, steps 3&4** (ORB OPS, CREW SYS)  
(ORB OPS, ECLS)  
**WASTE WATER DUMP, steps 1&2**  
(ORB OPS, ECLS)

**UPDATE**  
H2O WASTE  
DUMP QTY

**WASTE WATER DUMP, step 3 & 4**  
(ORB OPS, ECLS)

**MNVR IMU ALIGN ATT**  
STAR PAIR (A1)  
A/AUTO/VERN Init MNVR at 55 DAILY PLANNING

008  
00:00



# STS-40 (FD 09)

MET DAY 008  
 00:00  
 A1 (B1)  
 AUTO/VERN  
 ORB 129

ORB 130

ORB 131

04:00

STS  
 IMU ALIGN - S TRK (ORB OPS)  
 MNVR (TRK) BIAS -YLV +EVV  
 IG-2 BV-5  
 P-0 Y-270 CM-120  
 A/AUTO/VERN (00:05) Init TRK

DAILY PLANNING

QCAC STOW (DIO 637)  
 (ORB OPS, DIO 637)  
 Filter C/O NOT req'd

PHOTO/TV 104 SETUP  
 (BLOOD COLL)

APU STEAM VENT HTR ACT  
 BLR CNTLR/HTR(three) -B  
 PWR (three) -ON  
 BODY MASS MEASUREMENT

BODY MASS MEASUREMENT

HOT FIRE/FCS CONFIG [1]

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

EMMD (PLT)  
 (EPCL, MB)

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

POST HOT FIRE/FCS CONFIG [2]

APU HTR RECONFIG (ORB OPS)  
 SL MODULE AIR SAMPLE  
 (SL OPS, ECLSS)

AEROBICS (DSO 476)  
 (MED, MED DROs)  
 (MS2)

R2 APU COOL OFF (On MCC Cue)  
 APU FUEL PUMP/VLV COOL A-OFF

PULMONARY FUNC:198  
 (4 Cmn)

METABOLIC OPERATIONS  
 (2 Cmn)

CARDIOVASCULAR SETUP

ECHOCARDIOGRAPH:294  
 (2 Cmn)

PHOTO/TV 105 SETUP  
 (EMMD)

PHOTO/TV108 SETUP  
 (ECHO-OPS)

STS PARTICULATE SAMPLER

HOT FIRE/ FCS CONFIG [1]

06 MDM FF2,4 (two) -ON  
 FA4 -ON

GNC, I/O RESET  
 014:E, cb DDU L (two) -cl  
 015:E

014:F, PRI RJD LOGIC (eight) -ON  
 015:F, DRIVER (eight) -ON  
 016:F

ECHOCARDIOGRAPH:294  
 (3 Cmn)

POST HOT FIRE/ FCS CONFIG [2]

014:F, PRI RJD DRIVER (eight) -OFF  
 015:F, LOGIC (eight) -OFF  
 016:E

014:E, cb DDU L (two) -OFF  
 015:E

06 MDM FF2, 4 (two) -OFF  
 FA4

CV CALIBRATION:66

RESTING CV:66/294

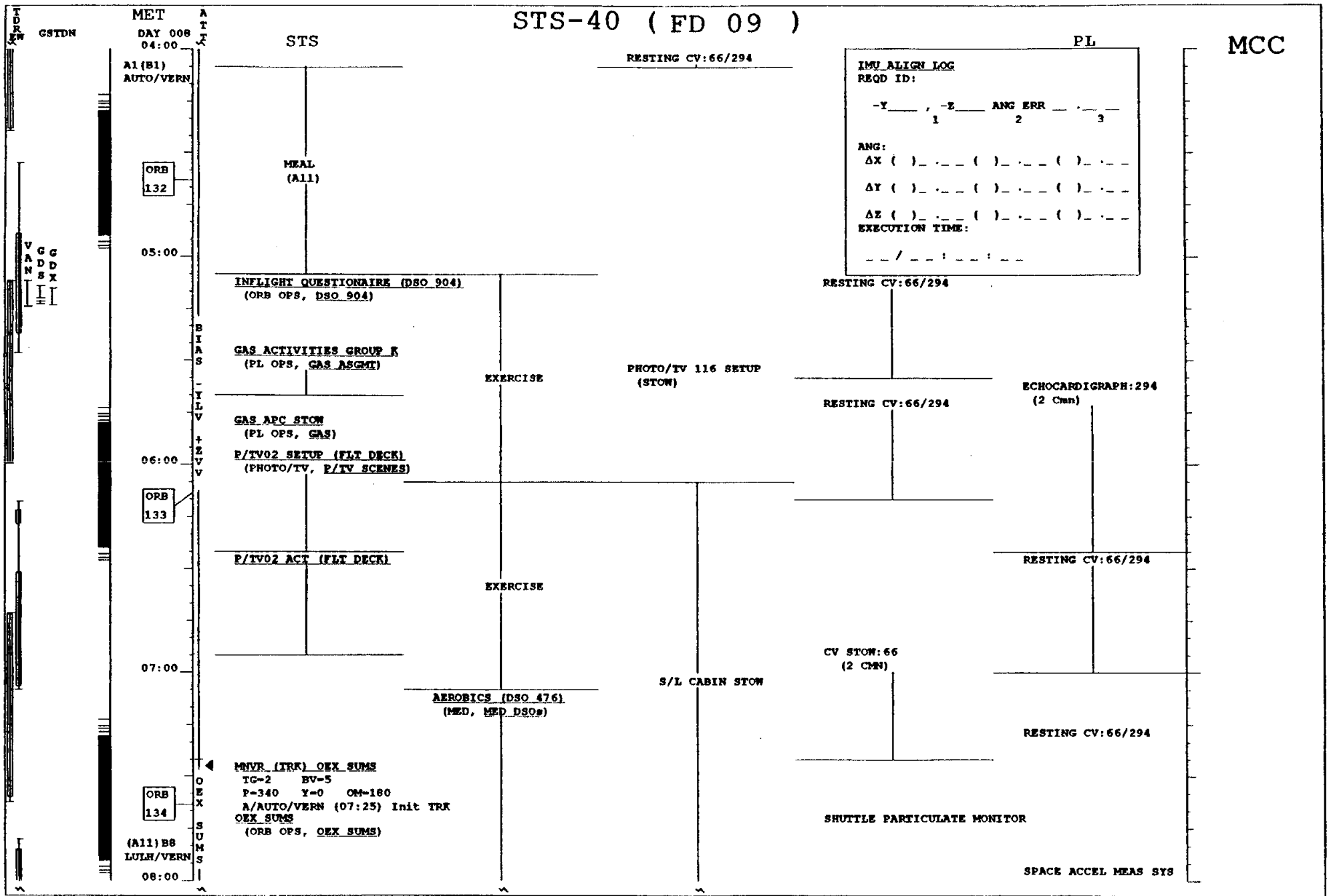
SPACE ACCEL MEAS SYS

MCC

PL

INFORM CREW  
 GO FOR APU  
 COOL OFF  
 TV (TDRE)  
 (CREW CNTL-CAB)

# STS-40 ( FD 09 )



GSTDN

MET DAY 008  
04:00

A1 (B1)  
AUTO/VERN

ORB  
132

05:00

INFLIGHT QUESTIONNAIRE (DSO 904)  
(ORB OPS, DSO 904)

GAS ACTIVITIES GROUP R  
(PL OPS, GAS ASGMT)

EXERCISE

PHOTO/TV 116 SETUP  
(STOW)

RESTING CV:66/294

IMU ALIGN LOG  
REQD ID:

-Y \_\_\_ , -Z \_\_\_ ANG ERR \_\_\_  
1 2 3

ANG:  
ΔX ( ) \_ . \_ . ( ) \_ . \_ . ( ) \_ . \_ .  
ΔY ( ) \_ . \_ . ( ) \_ . \_ . ( ) \_ . \_ .  
ΔZ ( ) \_ . \_ . ( ) \_ . \_ . ( ) \_ . \_ .  
EXECUTION TIME:  
\_ \_ / \_ \_ : \_ \_ : \_ \_

06:00

P/TV02 SETUP (FLT DECK)  
(PHOTO/TV, P/TV SCENES)

RESTING CV:66/294

ECHOCARDIOGRAPH:294  
(2 Cmn)

ORB  
133

P/TV02 ACT (FLT DECK)

EXERCISE

RESTING CV:66/294

07:00

AEROBICS (DSO 476)  
(MED, MED DSOs)

S/L CABIN STOW

CV STOW:66  
(2 CMN)

RESTING CV:66/294

ORB  
134

MNVR (TRK) OEX SUMS  
TC=2 BV=5  
P=340 Y=0 OM=180  
A/AUTO/VERN (07:25) Init TRK  
OEX SUMS  
(ORB OPS, OEX SUMS)

SHUTTLE PARTICULATE MONITOR

(All) B8  
LULN/VERN

08:00

SPACE ACCEL MEAS SYS

MCC

# STS-40 ( FD 09 )

PL

MCC

MET  
DAY 008  
08:00

A1 (B1)  
AUTO/VERN

09:00

ORB 135

10:00

ORB 136

11:00

12:00

**STS**  
Change DAP A,B to A1,B1 **AEROBICS (DSO 476) cont.**

**MNVR (TRK) BIAS -YLV +EVV**  
TG-2 BV-5  
P-0 Y-270 OM-120  
A/AUTO/VERN (08:05) Init TRK  
CAB AIR MONITORING (DTO 0623)  
(SL OPS, ECLSS)

**CRT 4 POWERUP**  
R12L CRT4 - ON

**RAD DOSE DIST (DSO 469)**  
(MED, MED DSOs)

**JELLYFISH OPERATIONS**

**IMU RECOVERY**  
(MAL, GNC FRP-3)  
ENTRY PLANNING

**MNVR IMU ALIGN ATT**  
STAR PAIR (A1)  
A/AUTO/VERN Init MNVR at SS

**IMU ALIGN - S TRK (ORB OPS)**  
**MNVR (TRK) -ELV, +YVV**  
TG-2 BV-3 OM-270 **PRE-SLEEP ACTIVITY**  
A/AUTO/VERN Init TRK (ORB OPS, CREW SYS)

**PRIVATE MEDICAL CONFERENCE**

Do not perform  
**ECLS, SUPPLY WATER DUMP**

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

**S/L CABIN STOW**

**SL PARTIAL DEACTIVATION**  
(SL ACT/DEACT, SL CONT OPS)

**AEROBICS (DSO 476)**  
(MED, MED DSOs)

**CRT 4 POWERDOWN**  
R12L CRT4 - STBY

**TREADMILL EXERCISE**

**IMU ALIGN LOG**  
REQD ID:

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

1 2 3

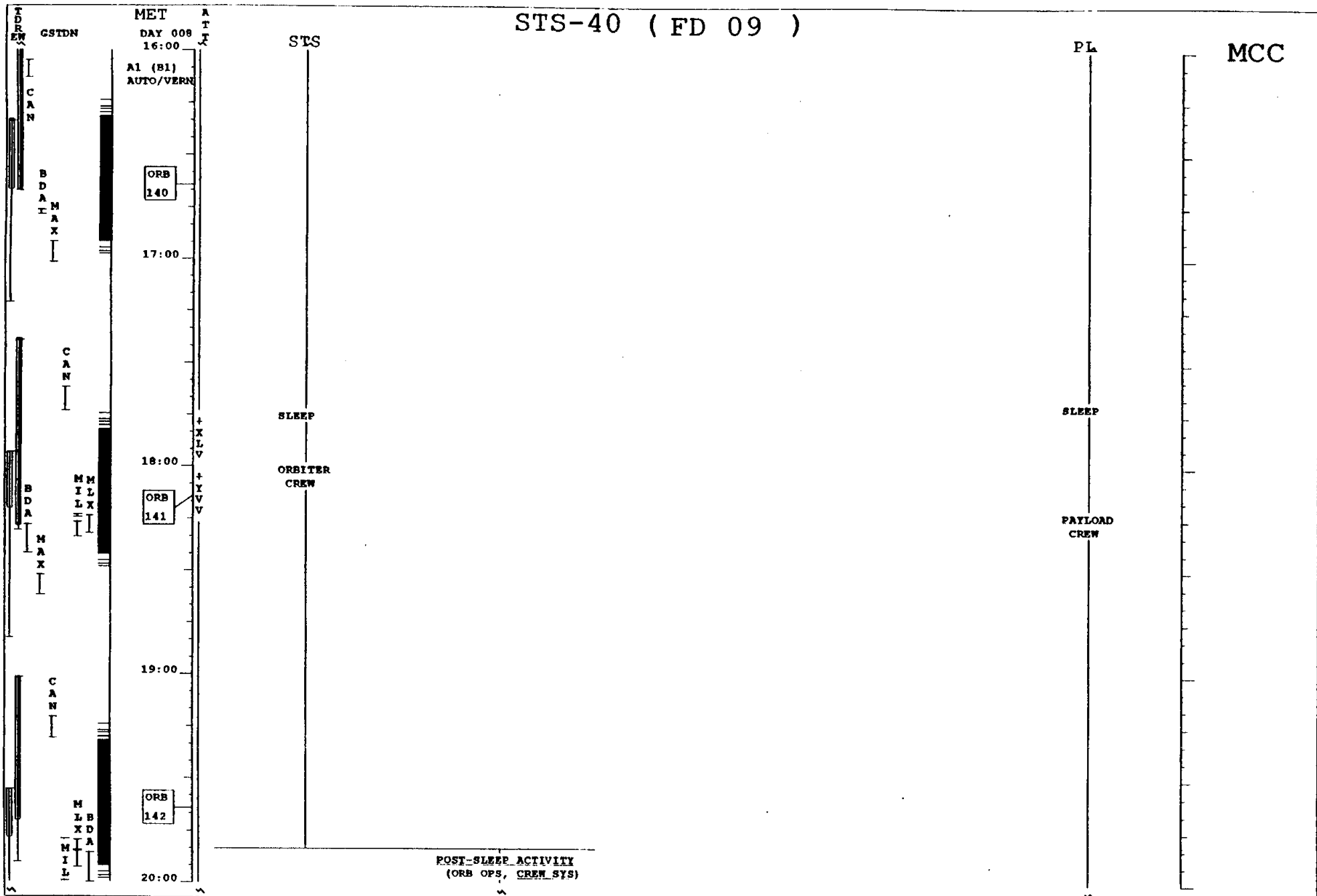
ANG:  
AX ( ) ( ) ( )  
AY ( ) ( ) ( )  
AZ ( ) ( ) ( )

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

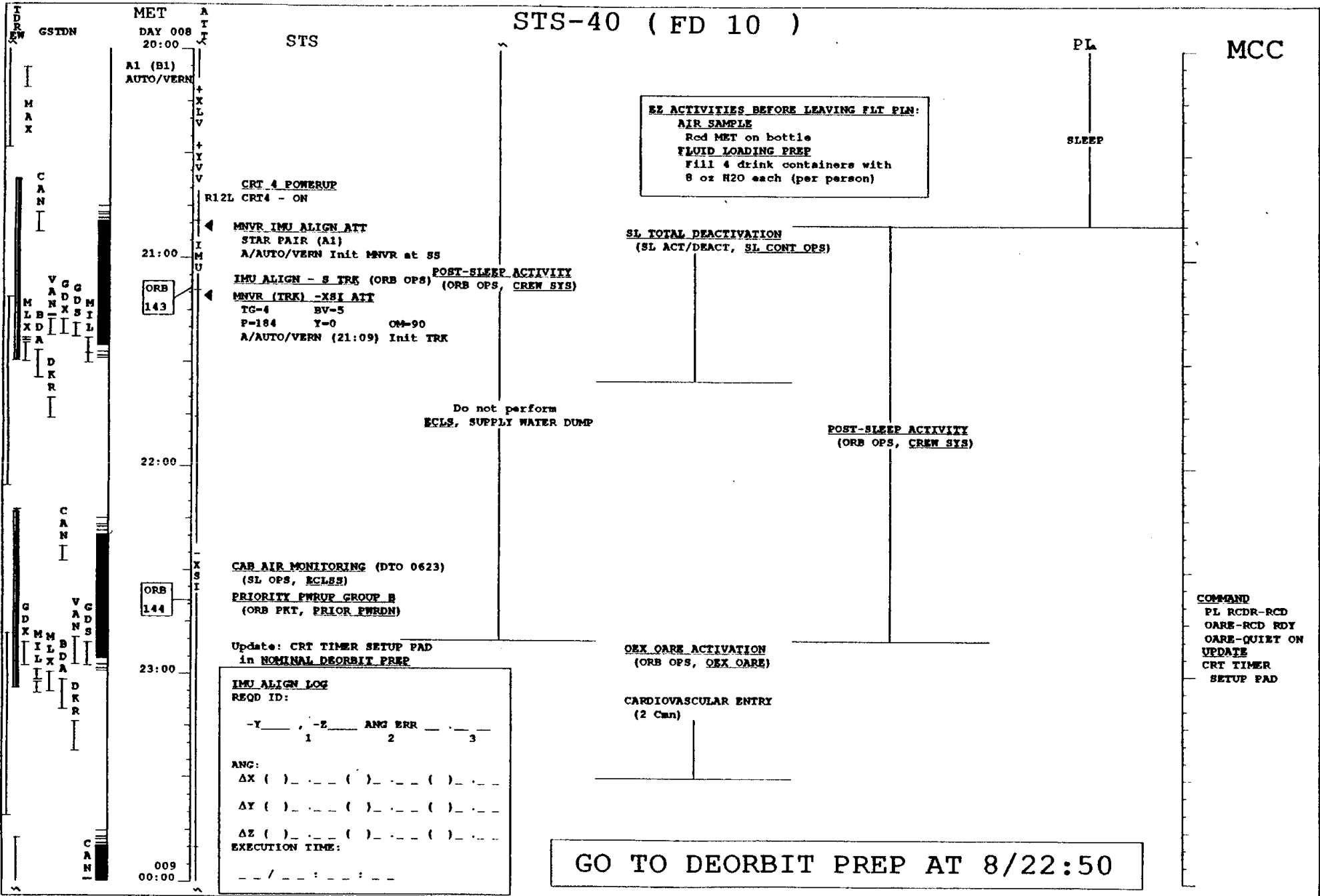




# STS-40 ( FD 09 )



# STS-40 ( FD 10 )



MET  
DAY 008  
20:00  
A1 (B1)  
AUTO/VERN  
21:00  
22:00  
23:00  
009  
00:00

STS

PL

MCC

**EE ACTIVITIES BEFORE LEAVING FLT PIN:**  
**AIR SAMPLE**  
 Red MET on bottle  
**FLUID LOADING PREP**  
 Fill 4 drink containers with  
 8 oz H2O each (per person)

**CRT 4 POWERUP**  
 R12L CRT4 - ON  
 MNVR IMU ALIGN ATT  
 STAR PAIR (A1)  
 A/AUTO/VERN Init MNVR at SS  
 21:00  
 IMU ALIGN - S TRK (ORB OPS)  
 MNVR (TRK) - XSI ATT  
 TG-4 BV-5  
 P-184 Y-0 OM-90  
 A/AUTO/VERN (21:09) Init TRK

**SL TOTAL DEACTIVATION**  
 (SL ACT/DEACT, SL CONT OPS)

Do not perform  
 ECLS, SUPPLY WATER DUMP

**POST-SLEEP ACTIVITY**  
 (ORB OPS, CREW SYS)

**CAB AIR MONITORING (DTC 0623)**  
 (SL OPS, ECLS)  
**PRIORITY PWRUP GROUP B**  
 (ORB PRT, PRIOR PWRDN)

**OEX OARE ACTIVATION**  
 (ORB OPS, OEX OARE)

Update: CRT TIMER SETUP PAD  
 in NOMINAL DEORBIT PREP

**IMU ALIGN LOG**  
 REQD ID:  
 -Y\_\_\_\_, -Z\_\_\_\_ ANG ERR \_\_\_\_  
           1          2          3

ANG:  
 ΔX ( ) \_\_\_\_ ( ) \_\_\_\_ ( ) \_\_\_\_  
 ΔY ( ) \_\_\_\_ ( ) \_\_\_\_ ( ) \_\_\_\_  
 ΔZ ( ) \_\_\_\_ ( ) \_\_\_\_ ( ) \_\_\_\_

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

**CARDIOVASCULAR ENTRY**  
 (2 Cmn)

**GO TO DEORBIT PREP AT 8/22:50**

**COMMAND**  
 PL RCDR-RCD  
 OARE-RCD RDY  
 OARE-QUIET ON  
 UPDATE  
 CRT TIMER  
 SETUP PAD

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**CONTINGENCY TIMELINES**

**CONTINGENCY  
TIMELINE**

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CONTINGENCY  
TIMELINE

## Two-Hour Launch Delay

The 2-Hour Launch Delay Timeline is designed assuming a launch at the end of the STS-40 2-hour launch window. The timeline deletes payload activities to be consistent with the reduction in Flight Day 1 crew time. For a launch delay less than 30 minutes, the nominal timeline will be used, and the noon meal will be reduced by the amount of slip. For a delay greater than 30 minutes the 2-hour launch delay timeline is executed. In the event that the launch delay is more than 30 minutes but less than 2 hours, experiment sessions may be added back to maximize the collection of science data for Flight Day 1.

2-HOUR  
LAUNCH DELAY

# 2-HOUR LAUNCH DELAY

GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
124:14:00/ 125:02:00	000:00:00/ 000:12:00	124:09:00/ 124:21:00	01/124 CST	-23.1		MAY 4, 1991	STS-40	FINAL B	04/24/91
CDT :124									
FD :01									
MET :000									
STS									
PL									
DAY/NIGHT									
ORBIT									
GSTDN									
COVERAGE									
TDRS									
ATTITUDE									
NOTES:	<div style="border: 1px solid black; padding: 5px; display: inline-block;">2 HOUR LAUNCH DELAY TIMELINE</div>								

STS-40  
ATTITUDE TIMELINE



Attitude Timeline

ATTITUDE  
TIMELINE

MET	MNVR OPTION		DAP	E/S	REMARKS	EVENT
1 0/01:12:00 22:54	TRK TGT=2 BV=3( 90.00, 0.00) OM=270.00	A1 AUTO NORM	DSC 0.200 DB AT 5.00 DB RT 0.20	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+ 90	-ZLV +YVV PLBD OPENING
2 0/02:20:00 33:26	MNVR R+312.00 P+151.00 Y+ 43.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 97 P 144	STAR PR A1 -Y ST: 51 -Z ST: 20	IMU ALIGN
3 0/02:40:00 52:20	TRK TGT=2 BV=5( 0.00,270.00) OM=300.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 270	LVLH R+ 90 P+180 Y+ 60	BIAS -YLV -ZVV TDRS COMM
4 0/11:22:00 32:03	MNVR R+312.00 P+151.00 Y+ 43.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 97 P 144	STAR PR A1	IMU ALIGN
5 0/11:42:00 53:59	TRK TGT=2 BV=3( 90.00, 0.00) OM= 90.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+270	-ZLV -YVV EARTH OBS
6 0/12:45:00 52:30	TRK TGT=2 BV=1( 0.00, 0.00) OM= 90.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 0 P 90	LVLH R+ 90 P+270 Y+ 0	+XLV -YVV SLEEP
7 0/21:20:00 35:00	TRK TGT=2 BV=3( 90.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+ 90	-ZLV +YVV WATER DUMP
8 0/23:24:00 37:27	MNVR R+312.00 P+151.00 Y+ 43.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 97 P 144	STAR PR A1	IMU ALIGN COAS CAL -Z COAS: 20
9 0/23:49:00 1/00:02:05	TRK TGT=2 BV=5( 0.00,270.00) OM=300.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 270	LVLH R+ 90 P+180 Y+ 60	BIAS -YLV -ZVV TDRS COMM
10 1/09:45:00 58:15	TRK TGT=2 BV=5(270.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 180	LVLH R+ 0 P+ 0 Y+270	+ZLV +YVV WATER DUMP
11 1/11:06:00 13:51	MNVR R+145.00 P+176.00 Y+353.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 143 P 282	STAR PR D1 -Y ST: 31 -Z ST: 12	IMU ALIGN
12 1/11:26:00 28:54	MNVR R+154.00 P+203.00 Y+329.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 143 P 233		DTO 785 (HUD) +X HUD: 20

\*\*\*ALL ATTITUDES IN MEAN OF 1950\*\*\*

Attitude Timeline

MET	MNVR OPTION		DAP	E/S	REMARKS	EVENT
1 1/11:51:00 59:20	TRK TGT=2 BV=3( 90.00, 0.00) OM= 90.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+270	-ZLV -YVV EARTH OBS
2 1/13:05:00 12:30	TRK TGT=2 BV=1( 0.00, 0.00) OM= 90.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 0 P 0	LVLH R+ 90 P+270 Y+ 0	+XLV -YVV SLEEP
3 1/21:20:00 35:00	TRK TGT=2 BV=3( 90.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+ 90	-ZLV +YVV WATER DUMP
4 1/23:28:00 41:48	MNVR R+320.00 P+333.00 Y+300.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 101 P 126	STAR PR A2 -Y ST: 20 -Z ST: 51	IMU ALIGN
5 1/23:45:00 51:41	MNVR R+204.00 P+203.00 Y+329.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 143 P 184		COAS CAL +X COAS: 20
6 2/00:00:00 09:42	TRK TGT=2 BV=5( 0.00,270.00) OM=300.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 270	LVLH R+ 90 P+180 Y+ 60	BIAS -YLV -ZVV TDRS COMM
7 2/01:20:00 29:58	TRK TGT=5 BV=3( 90.00, 0.00) OM=198.00 RA 42.55 DEC +16.34	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 90 P 0	INRTL R+ 96 P+346 Y+311	-ZSI GAS 507
8 2/04:10:00 22:42	TRK TGT=2 BV=5( 0.00,270.00) OM=300.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 270	LVLH R+ 90 P+180 Y+ 60	BIAS -YLV -ZVV TDRS COMM
9 2/07:30:00 37:25	TRK TGT=2 BV=5( 0.00,270.00) OM= 29.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 270	LVLH R+ 90 P+180 Y+331	BIAS -YLV -XVV CONDENSATE DUMP
10 2/08:50:00 57:57	TRK TGT=5 BV=3( 90.00, 0.00) OM= 62.00 RA 42.81 DEC +16.42	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 90 P 0	INRTL R+ 49 P+218 Y+ 30	-ZSI GAS 507
11 2/10:10:00 22:16	TRK TGT=2 BV=5(270.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 180	LVLH R+ 0 P+ 0 Y+270	+ZLV +YVV WATER DUMP
12 2/11:30:00 41:23	MNVR R+312.00 P+151.00 Y+ 43.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 96 P 143	STAR PR A1	IMU ALIGN

\*\*\*ALL ATTITUDES IN MEAN OF 1950\*\*\*

Attitude Timeline

MET	MNVR OPTION		DAP	E/S	REMARKS	EVENT
1 2/11:50:00 12:02:19	TRK TGT=2 BV=3( 90.00, 0.00) OM= 90.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+270	-ZLV -YVV EARTH OBS
2 2/13:05:00 12:30	TRK TGT=2 BV=1( 0.00, 0.00) OM= 90.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 0 P 180	LVLH R+ 90 P+270 Y+ 0	+XLV -YVV SLEEP
3 2/21:20:00 27:30	TRK TGT=2 BV=3( 90.00, 0.00) OM= 90.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+270	-ZLV -YVV EARTH OBS
4 2/22:02:00 10:04	MNVR R+312.00 P+151.00 Y+ 43.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 95 P 143	STAR PR A1	IMU ALIGN
5 2/22:22:00 29:14	TRK TGT=2 BV=5(270.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 180	LVLH R+ 0 P+ 0 Y+270	+ZLV +YVV WATER DUMP
6 2/23:45:00 58:15	TRK TGT=2 BV=5( 0.00,270.00) OM=300.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 270	LVLH R+ 90 P+180 Y+ 60	BIAS -YLV -ZVV TDRS COMM
7 3/10:20:00 33:15	TRK TGT=2 BV=5(270.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 180	LVLH R+ 0 P+ 0 Y+270	+ZLV +YVV WATER DUMP
8 3/11:40:00 49:36	MNVR R+312.00 P+151.00 Y+ 43.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 95 P 142	STAR PR A1	IMU ALIGN
9 3/12:00:00 14:08	TRK TGT=2 BV=3( 90.00, 0.00) OM= 90.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+270	-ZLV -YVV EARTH OBS
10 3/13:05:00 12:30	TRK TGT=2 BV=1( 0.00, 0.00) OM= 90.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 0 P 0	LVLH R+ 90 P+270 Y+ 0	+XLV -YVV SLEEP
11 3/21:20:00 27:30	TRK TGT=2 BV=3( 90.00, 0.00) OM= 90.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+270	-ZLV -YVV EARTH OBS
12 3/22:05:00 13:00	MNVR R+312.00 P+151.00 Y+ 43.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 94 P 142	STAR PR A1	IMU ALIGN

Attitude Timeline

MET	MNVR OPTION		DAP	E/S	REMARKS	EVENT
1 3/22:25:00 32:01	TRK TGT=2 BV=5(270.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 180	LVLH R+ 0 P+ 0 Y+270	+ZLV +YVV WATER DUMP
2 3/23:40:00 53:15	TRK TGT=2 BV=5( 0.00,270.00) OM=300.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 270	LVLH R+ 90 P+180 Y+ 60	BIAS -YLV -ZVV TDRS COMM
3 4/09:55:00 10:08:15	TRK TGT=2 BV=5(270.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 180	LVLH R+ 0 P+ 0 Y+270	+ZLV +YVV WATER DUMP
4 4/11:40:00 50:06	MNVR R+312.00 P+151.00 Y+ 43.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 94 P 142	STAR PR A1	IMU ALIGN
5 4/12:00:00 13:29	TRK TGT=2 BV=3( 90.00, 0.00) OM= 90.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+270	-ZLV -YVV EARTH OBS
6 4/13:05:00 12:30	TRK TGT=2 BV=1( 0.00, 0.00) OM= 90.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 0 P 0	LVLH R+ 90 P+270 Y+ 0	+XLV -YVV SLEEP
7 4/21:20:00 27:30	TRK TGT=2 BV=3( 90.00, 0.00) OM= 90.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+270	-ZLV -YVV EARTH OBS
8 4/22:08:00 16:00	MNVR R+312.00 P+151.00 Y+ 43.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 94 P 142	STAR PR A1	IMU ALIGN
9 4/22:28:00 34:49	TRK TGT=2 BV=5(270.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 180	LVLH R+ 0 P+ 0 Y+270	+ZLV +YVV WATER DUMP
10 4/23:45:00 58:15	TRK TGT=2 BV=5( 0.00,270.00) OM=300.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 270	LVLH R+ 90 P+180 Y+ 60	BIAS -YLV -ZVV TDRS COMM
11 5/09:50:00 10:01:57	MNVR R+145.00 P+176.00 Y+353.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 139 P 282	STAR PR D1	IMU ALIGN
12 5/10:10:00 12:54	MNVR R+154.00 P+203.00 Y+329.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 141 P 238		DTO 785 (HUD) +X HUD: 20

\*\*\*ALL ATTITUDES IN MEAN OF 1950\*\*\*

Attitude Timeline

MET	MNVR OPTION		DAP	E/S	REMARKS	EVENT
1 5/10:35:00 46:07	TRK TGT=2 BV=3( 90.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+ 90	-ZLV +YVV WATER DUMP
2 5/12:00:00 07:59	TRK TGT=2 BV=5(356.50, 1.00) OM=246.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 4 P 170	LVLH R+246 P+268 Y+357	BIAS +XLV +YVV GG OEX OARE
3 5/22:11:00 24:31	MNVR R+312.00 P+151.00 Y+ 43.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 93 P 141	STAR PR A1	IMU ALIGN
4 5/22:31:00 44:22	TRK TGT=2 BV=3( 90.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+ 90	-ZLV +YVV WATER DUMP
5 6/00:00:00 07:30	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 T 90 P 0	LVLH R+180 P+ 0 Y+ 0	-ZLV +XVV OEX OARE
6 6/00:25:00	LVLH ROT FREE ROTATION ABOUT +Y AXIS RATE=1.000	A7 LVLH NORM	DSC 1.000 DB AT 3.00 DB RT 0.20		LVLH R+180 P+ 0 Y+ 0	OEX OARE STEP 1 PITCH MNVR
7 6/00:31:00	LVLH	B8 AUTO NORM	DSC 0.200 DB AT10.00 DB RT 0.50	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+ 0	LVLH HOLD
8 6/00:40:00	LVLH ROT FREE ROTATION ABOUT +Z AXIS RATE=1.000	A7 LVLH NORM	DSC 1.000 DB AT 3.00 DB RT 0.20		LVLH R+180 P+ 0 Y+ 0	OEX OARE STEP 2 YAW MNVR
9 6/00:46:00	LVLH	B8 AUTO NORM	DSC 0.200 DB AT10.00 DB RT 0.50	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+ 0	LVLH HOLD
10 6/00:55:00	LVLH ROT FREE ROTATION ABOUT +X AXIS RATE=1.000	A7 LVLH NORM	DSC 1.000 DB AT 3.00 DB RT 0.20		LVLH R+180 P+ 0 Y+ 0	OEX OARE STEP 3 ROLL MNVR
11 6/01:01:00	LVLH	B8 AUTO NORM	DSC 0.200 DB AT10.00 DB RT 0.50	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+ 0	LVLH HOLD
12 6/01:05:00 06:40	TRK TGT=2 BV=5( 70.00, 0.00) OM=180.00	A7 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 70 P 0	LVLH R+180 P+340 Y+ 0	BIAS -ZLV +XVV OEX OARE

\*\*\*ALL ATTITUDES IN MEAN OF 1950\*\*\*

Attitude Timeline

MET	MNVR OPTION		DAP	E/S	REMARKS	EVENT
1 6/01:25:00	LVLH ROT FREE ROTATION ABOUT +Y AXIS RATE=0.054	B8 LVLH VERN	DSC 0.054 DB AT10.00 DB RT 0.50		LVLH R+180 P+340 Y+ 0	OEX OARE STEP 4 DRAG TEST
2 6/01:46:36	LVLH	B8 LVLH VERN	DSC 0.200 DB AT10.00 DB RT 0.50	EARTH T 0 P 0	LVLH R+180 P+270 Y+ 0	LVLH HOLD
3 6/01:50:00 02:00:00	TRK TGT=2 BV=3( 90.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+ 90	-ZLV +YVV EARTH OBS
4 6/03:05:00 12:59	TRK TGT=2 BV=5(356.50, 1.00) OM=246.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 4 P 170	LVLH R+246 P+268 Y+357	BIAS +XLV +YVV GG OEX OARE
5 6/04:10:00 15:31	TRK TGT=2 BV=1( 0.00, 0.00) OM=180.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 0 P 180	LVLH R+180 P+270 Y+ 0	+XLV +ZVV OEX OARE DRAG TEST
6 6/05:25:00 35:00	TRK TGT=2 BV=3( 90.00, 0.00) OM= 90.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+270	-ZLV -YVV EARTH OBS
7 6/09:53:00 10:03:32	MNVR R+145.00 P+176.00 Y+353.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 138 P 282	STAR PR D1	IMU ALIGN
8 6/10:13:00 15:54	MNVR R+154.00 P+203.00 Y+329.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 140 P 240		COAS CAL DTO 785 (HUD) +X COAS/HUD: 20
9 6/10:43:00 53:25	TRK TGT=2 BV=3( 90.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+ 90	-ZLV +YVV WATER DUMP
10 6/13:05:00 12:30	TRK TGT=2 BV=1( 0.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 0 P 270	LVLH R+270 P+270 Y+ 0	+XLV +YVV SLEEP
11 6/21:20:00 27:30	TRK TGT=2 BV=3( 90.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+ 90	-ZLV +YVV EARTH OBS
12 6/22:14:00 26:32	MNVR R+312.00 P+151.00 Y+ 43.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 92 P 140	STAR PR A1	IMU ALIGN

Attitude Timeline

MET	MNVR OPTION		DAP	E/S	REMARKS	EVENT
1 6/22:34:00 40:25	TRK TGT=2 BV=5(270.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 180	LVLH R+ 0 P+ 0 Y+270	+ZLV +YVV WATER DUMP
2 7/00:00:00 13:15	TRK TGT=2 BV=5( 0.00,270.00) OM=300.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 270	LVLH R+ 90 P+180 Y+ 60	BIAS -YLV -ZVV TDRS COMM
3 7/09:56:00 10:07:31	MNVR R+145.00 P+176.00 Y+353.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 137 P 282	STAR PR D1	IMU ALIGN
4 7/10:16:00 18:54	MNVR R+154.00 P+203.00 Y+329.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 140 P 241		COAS CAL DTO 785 (HUD) +X COAS/HUD: 20
5 7/10:46:00 56:05	TRK TGT=2 BV=3( 90.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+ 90	-ZLV +YVV WATER DUMP
6 7/13:05:00 12:30	TRK TGT=2 BV=1( 0.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 0 P 270	LVLH R+270 P+270 Y+ 0	+XLV +YVV SLEEP
7 7/21:20:00 27:30	TRK TGT=2 BV=3( 90.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+ 90	-ZLV +YVV WATER DUMP
8 7/23:45:00 56:59	MNVR R+312.00 P+151.00 Y+ 43.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 91 P 140	STAR PR A1	IMU ALIGN
9 8/00:05:00 17:10	TRK TGT=2 BV=5( 0.00,270.00) OM=120.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 270	LVLH R+270 P+ 0 Y+300	BIAS -YLV +ZVV TDRS COMM
10 8/07:25:00 33:21	TRK TGT=2 BV=5(340.00, 0.00) OM=180.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 20 P 180	LVLH R+180 P+250 Y+ 0	BIAS +XLV +ZVV DTO 902 (OEX)
11 8/07:45:00	ROT BV=5( 0.00,270.00)	A11 AUTO VERN	DSC 0.200 DB AT 0.50 DB RT 0.02		ROT R+342 START P+ 81 ATT Y+ 62	DTO 902 ROTATION
12 8/07:57:30	LVLH	B8 LVLH VERN	DSC 0.200 DB AT10.00 DB RT 0.50	EARTH T 180 P 169	LVLH R+180 P+ 90 Y+360	LVLH HOLD

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REMARKS	EVENT	
1 8/08:05:00 18:15	TRK TGT=2 BV=5( 0.00,270.00) OM=120.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 270	LVLH R+270 P+ 0 Y+300	BIAS -YLV +ZVV  TDRS COMM
2 8/10:18:00 30:50	MNVR R+312.00 P+151.00 Y+ 43.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 91 P 140	STAR PR A1	IMU ALIGN
3 8/10:38:00 51:57	TRK TGT=2 BV=3( 90.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+ 90	-ZLV +YVV  EARTH OBS
4 8/12:35:00 42:30	TRK TGT=2 BV=1( 0.00, 0.00) OM=270.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	EARTH T 0 P 270	LVLH R+270 P+270 Y+ 0	+XLV +YVV  SLEEP
5 8/20:49:00 21:02:30	MNVR R+312.00 P+151.00 Y+ 43.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 91 P 139	STAR PR A1	IMU ALIGN
6 8/21:09:00 17:54	TRK TGT=4 BV=5(184.00, 0.00) OM= 90.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 177 P 171	INRTL R+ 17 P+148 Y+313	TAIL SUN  COLDSOAK
7 8/23:50:00 52:15	MNVR R+345.00 P+133.00 Y+324.00	A1 AUTO VERN	DSC 0.200 DB AT 1.00 DB RT 0.02	SUN T 162 P 154	-Y ST: 22 -Z ST: 29	D/O IMU ALIGN
8 9/00:07:00 10:28	MNVR R+261.00 P+ 17.00 Y+348.00	B1 AUTO NORM	DSC 0.500 DB AT 3.00 DB RT 0.20	SUN T 71 P 220	-Y ST: 38 -Z ST: 43	IMU VERIF
9 9/02:35:00 37:45 TIG - 15:00	MNVR R+197.00 P+ 49.00 Y+ 48.00	* AUTO *	DSC 0.500 DB AT 3.50 DB RT 0.30	SUN T 50 P 314	TIG: 9/02:49:39	DEORBIT ATT



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

STS-40  
FLIGHT PLAN NOTES

FLIGHT PLAN NOTES  
(CONSTRAINTS AND GUIDELINES)

A. FLIGHT DESCRIPTION

The STS-40 (OV-102) launch from KSC on May 4, 1991, (Flight Cycle R3) will be into a 150 x 160 nm orbit at an inclination of 39.0 degrees. The mission duration will be 9 days. Nominal landing occurs at EDW on May 13, 1991.

Landing opportunities are:

		<u>Landing Orbit No.</u>	<u>Site</u>	<u>Local Time</u>
Nominal	Primary	147	EDW	08:50 PDT
	Backup	148	EDW	10:25 PDT
	Weather Alt.	146	KSC	10:24 EDT
1 Day Late	Primary	163	EDW	08:53 PDT
	Backup	162	EDW	07:18 PDT
	Weather Alt.	162	KSC	10:26 EDT
2 Days Late	Primary	178	EDW	07:20 PDT
	Backup	179	EDW	08:55 PDT
	Weather Alt.	178	KSC	10:28 EDT

Major Events

LAUNCH (KSC) May 4, 1991  
MET (DD/HH:MM:SS) 0/00:00:00  
 Day of year 124  
CDT/GMT 07:00/12:00

OMS-2  
MET (DD/HH:MM) 0/00:44  
 DV (fps) 196.7  
 ORBIT ha/hp (nm) 161/150

DEORBIT BURN  
MET (DD/HH:MM) 09/02:50

LANDING (EDW)  
MET (DD/HH:MM) 09/03:50  
 Day of year 133  
CDT/GMT 10:50/15:50

## B. CREW

1. There will be seven crewmembers flying this mission with each specialist assigned to the following tasks:

CDR - Bryan D. O'Conner  
PLT - Sidney M. Gutierrez  
MS1 - James P. Bagian  
MS2 - Tamara E. Jernigan  
MS3 - M. Rhea Seddon  
PS1 - Francis A. (Drew) Gaffney  
PS2 - Millie Hughes-Fulford

2. The crewmembers responsible for performing an EVA, should one become necessary, are: MS1 will be EV1, MS2 will be EV2, and PLT will be IVI.

## C. ORBITER SYSTEMS

### 1. Communications and Instrumentation

- a. The Operational Instrumentation (OI) system will nominally be managed from the ground through uplink real-time commands (RTCs) coordinated with the crew.
- b. TDRS coverage is assumed to be supported by TDRS-E (41 degrees W) and TDRS-W (171 degrees W) and is the prime mode of communication coverage.
- c. TDRS Ku-Band is the prime mode of real-time TV; however, there are also 3 GN sites available as backup (2-4 hour lead time required): GDS (GDX), MIL (MLX), VAN.
- d. TDRS-E and TDRS-W are assumed available to support Ku-Band uplink (e.g., TAGS).
- e. HDR uplink (e.g., Teleprinter) is available through TDRS-E and TDRS-W.
- f. The following sites will be available for launch support: MIL(MLX), BDA, OTS, IOS.
- g. GN sites are available on an on-orbit contingency support basis (2-4 hours call-up): MIL (MLX), BDA, DKR, GDS (GDX), VAN, DFR. NOTE: The DFR site is not indicated in this version of the Flight Plan. RID and CAN are available on an emergency support basis only.
- h. RTS sites are available for contingency on-orbit support: HTS, GTS, VTS, IOS, NHS, CTS, OTS.
- i. The following sites will be available for landing support: VAN, GDS (GDX), DFR.

## 2. Guidance and Navigation

- a. The orbiter state vector must be uplinked whenever downtrack error in the on-board vector becomes greater than 20 nm, but is usually uplinked when errors are greater than 5 nm. These are real-time calls.
- b. IMU alignments occur approximately every 12 hours in the pre-sleep and post-sleep activities and prior to major events requiring low navigation uncertainty.

## 3. Environmental Control and Life Support Subsystem (ECLSS)

- a. Two CO2 absorbers are installed prior to launch. On-orbit, the canisters are alternately replaced as required per the cue card.
- b. There are four supply water tanks and one waste water tank which are loaded for launch with volumes sufficient to meet a launch day deorbit opportunity with payload bay doors (PLBDs) failed closed. If waste water production exceeds storage capacity, a real-time call will be made to perform a waste tank dump. Provision is made for two supply water dumps per flight day. Management of supply water will be accomplished through the use of the supply water dump nozzle. The Flash Evaporator System (FES) will be on in standby mode.

## 4. DC Utility Power Usage

The following tables are the DC and AC Utility Power Outlet Schedules. The times of outlet reconfiguration during the mission are shown.

DC UTILITY POWER OUTLET SCHEDULE

OUTLET \ MET		PRELAUNCH	POST INSERTION	ON-ORBIT		DEORBIT PREP
			0/1:46	0/2:20	8/22:50	
MNA	019	PLT*	--	--	--	PLT*
	M052J	MS3*,PS1*,PS2*	AEMS (2)	AEMS (2)	AEMS (2)	MS3*,PS1*,PS2*
MNB	F1	--	--	--	--	--
	M013Q	AEMS (2)	UMS	UMS	UMS	AEMS (2)
MNC	A11	MS1*,MS2*	--	--	--	MS1*,MS2*
	A15 M030F	CDR*	IV PUMP/PGSC	IV PUMP/PGSC TPR	IV PUMP/PGSC TPR	CDR*
MNA OR MNB	L15	ORB REF/FREEZ	ORB REF/FREEZ	ORB REF/FREEZ	ORB REF/FREEZ	ORB/REF FREEZ
		--	--	--	--	--

NOTES: \* Crewmember suit fan

## AC UTILITY POWER OUTLET SCHEDULE

MET OUTLET		PRELAUNCH	POST INSERTION	ON-ORBIT		DEORBIT PREP
			0/1:46	0/2:20	8/22:50	
AC1	M052J	--	--	--	--	--
	F1	--	PGSC	PGSC	PGSC	--
AC3	M013Q	--	--	--	--	--
	A15	--	--	--	--	--

NOTE: Intermittent AC outlets are needed for the vacuum cleaner and the photo floodlight.

### D. TEXT UPLINK SYSTEM

1. The Text and Graphics System (TAGS) is a high-resolution facsimile system that scans text or graphics material and converts the analog SCAN data into serial digital data. This data is transmitted via a telemetry link to the cathode-ray tube hardcopier. Transmission time for an 8-1/2 by 11-inch page can vary from just over 1 minute to just over 16 minutes depending on the hardcopy resolution desired. The TAGS can only uplink images using Ku-Band. This Flight Plan assumes Ku-Band forward link is available for both TDRS-E and TDRS-W, and TAGS is the primary mode of text uplink. Instrumentation has the capability to uplink onboard hardcopier control commands via S-Band or Ku-Band for power on, advance, ready, standby, and off.
2. The teleprinter (TPR) will provide a backup on-orbit capability to receive and reproduce text-only data from MCC. The TPR uses S-Band and is not dependent on TDRS Ku-Band. TPR requires 1 to 2.5 minutes per message, depending on the number of lines (up to 66). Activation will be scheduled on FD2 and the TPR will remain on continuously until deactivation prior to seat ingress on entry day.

### E. TELEVISION/PHOTOGRAPHY

1. The CCTV systems provide two color, wide-angle cameras for in-cabin coverage. There will also be four PLB TV cameras. There are three different lens assemblies for the PLB cameras (color lens assembly, monochrome lens assembly, and wide-angle lens assembly). The type of lens assembly for each PLB camera is documented in the Flight Requirements Document.
2. There is a video tape recorder available with 30-minute cassettes.
3. Three camera systems are available: 35mm, 16mm, and 70mm.

## F. PAYLOADS

### 1. Spacelab Life Sciences - 1

The SLS-1 mission is the first Spacelab mission dedicated to life sciences research. Eighteen primary and eleven secondary in-flight payload elements will be flown. The scientific objectives of the mission require data to be gathered from animal and human subjects. The notations in parentheses represent payload identifiers used on the Flight Plan detailed pages.

#### 1.1 Primary Inflight Payload Elements:

##### Cardiovascular/Cardiopulmonary

- a. Influence of Weightlessness Upon Autonomic Cardiovascular Control. (022)

The carotid sinus baroreceptor reflex in humans is measured before, during, and after space flight to examine the relationship between the baroreflex response and the development of orthostatic intolerance.

- b. Inflight Study of Cardiovascular Deconditioning. (66/294R, 66/294 SM, 66/CAL, 294/66 MX)

The effects of zero gravity on circulatory and respiratory functions are determined for resting and exercising subjects by means of gas analysis, using a noninvasive rebreathing technique.

- c. Correlation of Macro- and Microcirculatory Alteration During Weightlessness. (RAT-CK, RAT-VID)

Changes in both resting cardiovascular function and microcirculation resulting from acute and prolonged exposure to zero gravity are detected by directly measuring arterial and venous blood pressures and atrial blood flow in rats.

- d. Pulmonary Function During Weightlessness. (198)

Human pulmonary function in zero gravity is observed by noninvasive measurement of parameters related to pulmonary gas exchange. Results will be compared to those obtained in Earth gravity.

- e. Cardiovascular Adaptation of White Rats to Decreased Gravity of Space Shuttle/Spacelab in Flight Conditions. (RAT-CK, RAT-VID)

Postflight techniques are employed to determine whether rats can be used as animal models to study fluid shifts and other cardiovascular changes associated with zero gravity.

- f. Cardiovascular Adaptation to Zero Gravity. (294/66 MX, ECHO, 294/LEG, 294/CVP, 66/294R, 66/294SM, 294/SVOP)

This study of cardiovascular function and dimensions uses a variety of test methods on subjects at rest and during exercise.



## Metabolic Investigations

- a. Regulation of Erythropoiesis During Space Flight. (RAT-CK, RAT-VID)

The roles of nutritional status and hemoconcentration in rat red blood cell production during space flight are studied.

- b. Protein Metabolism During Space Flight. (MB2, MB7)

Human whole-body protein metabolism is studied, using isotope-labeled glycine as a tracer to determine whether nitrogen loss is caused by decreased uptake and production of protein, or by increased mobilization and metabolism of muscle protein.

- c. Effect of Zero Gravity Exposure on Biochemical and Metabolic Properties of Skeletal Muscle. (RAT-CK, RAT-VID)

Alterations in the functional capacity of rat skeletal muscles are determined by the use of preflight and postflight exercise tests and tissue analysis.

- d. Regulation of Blood Volume During Space Flight. (RAT-CK, RAT-VID)

This investigation is designed to evaluate the use of rats as models for humans in hematological studies.

- e. Fluid-Electrolyte Regulation During Space Flight. (MB1, MB2, MB3, MB7)

Blood, urine, and saliva samples are analyzed for parameters that indicate changes in fluid, electrolyte, renal, and circulatory status of humans exposed to weightlessness.

- f. Bone, Calcium, and Space Flight. (RAT-CK, RAT-VID)

Analysis of rat wastes for tracer calcium added to the diet and bone morphology examinations are used to characterize bone loss attributable to microgravity.

- g. Lymphocyte Proliferation in Weightlessness. (24OACT, 24OFIX, 24OGFX, 24OGL)

The effects of stress and weightlessness on human lymphocyte function and proliferation are studied in samples exposed to specific mitogens.

- h. Skeletal Myosin Isoenzymes in Rats Exposed to Zero Gravity. (RAT-CK, RAT-VID)

The role of myosin isoenzymes and the alteration of muscles is studied, using inflight activity monitoring of rats and postflight tissue analysis.

- i. Influence of Space Flight on Erythrokinetics in Man. (MB2, MB3, MB4, and MB8)

Blood is collected from crewmembers to determine whether reduced red cell mass associated with microgravity is due to decreased production or increased hemolysis.

- j. Electron Microscopy, Electromyography, and Protease Activity of Rat Hind-Limb Muscles. (RAT-CK, RAT-VID)

Morphological, biochemical, and histochemical changes in muscles attributable to launch and reentry stress, inflight atrophy, and postflight repair are determined by inflight activity monitoring and postflight analysis of enzymes.

- k. Pathophysiology of Mineral Loss During Space Flight. (MB2 and MB8)

Dual stable isotopes of calcium are administered to crewmembers (one orally and one intravenously) to determine whether elevated fecal calcium is caused by decreased gastrointestinal absorption or by active gastrointestinal excretion.

#### Neuroscience

A Study of the Effects of Space Travel on Mammalian Gravity Receptors. (RAT-CK, RAT-VID)

The biochemical and structural integrity of the otolith organs of the rat are studied postflight to determine the chronic and/or progressive effects of space flight.

#### 1.2 Secondary/Other Inflight Payload Elements:

Accommodations for Life Sciences and Microgravity Science investigations will be augmented by the use of Spacelab Middeck Experiment (SMIDEX) rack inserts. SMIDEX will provide accommodations for backup hardware for primary investigations above, plus some of the following experiments, many of which require minimal crew involvement.

#### Life Sciences

- a. Effects of Microgravity-Induced Weightlessness on Aurelia Ephyra Differentiation and Statolith Synthesis. (J fish)

(Neuroscience) Jellyfish will be observed to determine how metamorphosis in microgravity affects development, swimming behavior, statolith mineralization, and overall morphology.

- b. Noninvasive Estimation of Central Venous Pressure During Space Flight.

This investigation uses a non-invasive technique to measure central venous pressure.

c. Vestibular Experiments in Spacelab. (AWARE, DOME)

A study of human vestibular function and adaptation is performed using several techniques with emphasis on otolith system measurements.

Microgravity Sciences

a. The Solid Surface Combustion Experiment. (SSCE)

SSCE will study combustion phenomena in microgravity.

b. Space Acceleration Measurement System. (SAMS)

Three triaxial sensor heads will be installed in Spacelab to record on-orbit acceleration levels.

Hardware Verification Tests

a. The Characterization of Airborne Particulate Matter will look for potentially hazardous particles and help determine their sources. (SPS)

b. Validation of IV Fluid System (IV PUMP) is a microgravity verification of Space Station Health Maintenance Facility (HMF) equipment and medical procedures.

c. The Particulate Containment Demonstration Test (PCDT) will be carried out utilizing the GPWS, the GPTU, and the RAHF.

d. The Small Mass Measurement Instrument (SMMI) is a rack-mounted Life-Sciences Laboratory Equipment (LSLE) item that can determine the mass of small objects.

e. Assembly of the Medical Restraint Systems (MRS), a prototype surgical workstation, will be evaluated in microgravity.

2. Get-Away Special (GAS) Canisters

Attached cargo operations will be performed with the 12 GAS canisters experiments contained in the GAS Bridge Assembly. The 12 GAS experiments are G021, G052, G091, G105, G286, G405, G408, G451, G455, G486, G507, G616.

a. G-021 is a European Space Agency experiment that will test new Solid State Micro Accelerator integrated circuits under low-gravity conditions.

b. G-052 is a GTE Laboratories Incorporated experiment. This experiment will melt and regrow gallium arsenide crystals with convective effects absent.

c. G-091 is a California State University, Northridge experiment. The Ball Bearing Experiment consists of a pellet of low-melting point tin-lead-bismuth alloy which will be melted under low gravity conditions.

- d. G-105 experiment is sponsored by the Alabama Space and Rocket Center and the Consortium for Materials Development in Space at the University of Alabama in Huntsville. This payload consists of six experiments performing various tests concerned with aqueous phases, growing organic crystals and thin films, electrodepositing various metallic materials, collecting cosmic ray interactions and measuring cosmic radiation on genetic and chromosomal structure of yeast.
- e. G-286 experiment is sponsored by OMNI Publications with the experiment contributed by students from Duke University. The experiment produces three types of lightweight foamed metal samples.
- f. G-405 is sponsored by the Frontiers of Science Foundation from Oklahoma City, Oklahoma. This experiment will record the formation of several types of chemical precipitates in the microgravity environment.
- g. G-408 is jointly sponsored by the MITRE Corporation and the Worcester Polytechnic Institute of Worcester, Massachusetts. G-408 consists of five experiments performing various tests including: determining whether low gravity promotes the growth of large zeolite crystals, studying several methods for measuring the behavior of a two-phase fluid system, photographing film fogging by radiation in low-Earth orbit, recording low level accelerations while in orbit and cataloguing the environmental conditions internal to the canister.
- h. G-451 is sponsored by Nissho Awai American Corporation and T. Sakata & Company of Japan. This experiment investigates possibilities of ecological alteration and mutation of plant species when flown in low Earth orbit.
- i. G-455 is sponsored by the Nissho Iwai and Iwai American Corporations. It consists of two experiments that investigate the structure and formation of crystal growth and defects in crystal growth in microgravity.
- j. G-486 is an experiment sponsored by Edysyn, Inc. of Van Nuys, California. The experiment investigates the process of soldering in microgravity and in a vacuum.
- k. G-507 is a NASA Goddard Space Flight Center (GSFC) experiment. This payload consists of two experiments, the Orbiter Stability Experiment (OSE) and a passive experiment to evaluate fogging of photographic emissions due to energetic particles. The OSE will measure the high frequency variations of the STS orbiter's orientation due to vibrations during routine in-flight operations.
- l. G-616 is sponsored by Thomas Hancock, a private researcher. This experiment will study the effects of cosmic rays, background radiation, and the Earth's magnetic field on floppy disk storage media. The experiment will also expose a large number of different plant seeds to the microgravity and related environment of near-Earth space.

3. Orbiter Experiments (OEX) Orbital Acceleration Research Experiment (OARE)

This experiment will primarily gather data to increase the data base for the fundamental aerothermodynamic flow phenomena in the upper atmosphere. This experiment will be performed as mission energy allowances and payload constraints permit.

4. MODE (Middeck O-Gravity Dynamics Experiment)

The MODE payload is designed to study two aspects of nonlinear behavior of space structures and contained fluids which are gravity dependent.

G. On-Orbit DTOs

1. Cabin Air Monitoring (DTO 623)

This DTO will use the solid sorbent sampler to continuously sample the Orbiter Atmosphere throughout the flight. The solid sorbent sampler is to be flown on all Spacelab manned module flights.

2. Radiator Performance (DTO 624)

Radiators are not normally planned to be deployed; however, if for some reason they are, consideration will be given to accomplishment of objectives of this DTO.

This DTO will obtain radiator performance data in the -ZSI attitude to assist in correlating and validating the Research and Engineering Directorate's Operational Radiator Data Base.

3. Camcorder Demonstration (DTO 630)

This DTO will evaluate the unique hardware aspects of a camcorder, as well as crew usage and interaction. Various factors affecting camera performance will be evaluated, including low-light level operation, macro zoom capability, and fiber optics accessories.

4. On-orbit Cabin Air Cleaner Evaluation (DTO 637)

This DTO will flight test a proposed system to filter the cabin air. Objectives include evaluation of the air velocity produced by the fan, noise generation, and general air quality.

5. Water Separator Filter Performance Evaluation (DTO 647)

This DTO will evaluate the performance of a filter installed at the inlet of the water separator. The proposed filter should remove debris from the air/water stream coming from the cabin heat exchanger.

6. HUD Backup to COAS (DTO 785)

This DTO will verify the suitability of the HUD as a star sighting device for IMU alignments.

7. OEX Shuttle Infrared Leeside Temperature Sensing (SILTS)  
(DTO 901)

This DTO will obtain flight leeside heating and flow-field data on a full-scale vehicle in a true entry environment for comparison with wind tunnel test results and theoretical predictions. In addition, a better understanding will be gained of aeroheating dynamics with application to more efficient heat shield designs.

8. OEX Shuttle Upper-Atmosphere Mass Spectrometer (SUMS) (DTO 0902)

This DTO gathers data on the air density and atmospheric constituents in the upper atmosphere where free transitional flow phenomena predominate. The information gathered will be used to calculate the aerodynamic force coefficients and derivatives over the entry trajectory and to evaluate design predictions. This DTO will only be performed as payload constraints permit.

H. On-Orbit DSOs

1. Inflight Radiation Dose Distribution (DSO 469)

This DSO will establish, evaluate, and verify analytical and measurement methods for assessing and managing health risks from exposure to space radiation. The radiation environment will be measured inside the orbiter with a tissue equivalent phantom of the human head. This phantom head will be mounted at a thinly shielded region of the starboard middeck wall. Characterization of the neutron components and of heavy ions from stopping protons will be accomplished.

2. Inflight Aerobic Exercise (DSO 476)

Daily inflight aerobic exercise will 1) inhibit the decrease in cardiac dimensions observed during space flight and thus improve postflight orthostatic tolerance, and 2) minimize the loss of aerobic capacity after flight. The objectives of this DSO are to document the effects of daily aerobic exercise on 1) protection of left ventricular dimensions, 2) postflight orthostatic function, and 3) the rate at which these factors return to their preflight baseline values during the postflight period. In addition, the effects of regular aerobic exercise on the maintenance of aerobic power and economy will be determined.

3. Air Monitoring Instrument Evaluation and Atmospheric Characterization (DSO 611)

This DSO will evaluate and verify air monitoring equipment to ensure proper function and operation inflight. In addition, data will be collected on contaminant levels to establish baseline levels and to evaluate potential risks to crew health and safety.

4. 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, In-Flight Crew Conference, and unscheduled TV Activities.

5. Documentary Motion Picture Photography (DSO 902)

This DSO requires documentary and public affair motion picture photography of significant activities which best depicts the basic capabilities of the Space Shuttle and key objectives. This DSO includes motion picture photography of Spacelab Module Activities, Flight Deck Activities, Middeck Activities, and any unscheduled Motion Picture Photography.

6. Documentary Still Photography (DSO 903)

This DSO requires still photography of crew activities in the orbiter, spacelab 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.

7. Assessment of Human Factors (DSO 904)

This DSO will analyze data from the sound and vibration recording devices relative to crew comments and crew performance. In addition, it will evaluate human-machine interactions during routine spacelab operations. (e.g., stowage, hand and foot restraints, wire and cable interface, etc.).

I. Timeline Formats

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

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STS-40 DAP BOOK

DAP A CONFIGURATIONS

	A1*	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
<u>TRANSLATION</u>												
PULSE ft/sec	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.05	0.10	
<u>ROTATION</u>												
DSC RT NORM °/sec	0.200	0.400	0.200	0.200	0.200	0.200	0.200	0.500	0.200	0.200	0.200	
VERN °/sec	0.200	0.400	0.200	0.008	0.200	0.200	0.200	0.200	0.200	0.200	0.200	
PULSE NORM °/sec	0.10	0.10	0.30	0.10	0.10	0.10	0.88	0.10	0.10	0.10	0.10	
VERN °/sec	0.010	0.010	0.010	0.010	0.050	0.010	0.010	0.010	0.010	0.010	0.010	
COMP NORM °/sec	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
VERN °/sec	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
<u>DEADBAND</u>												
ATT NORM (deg)	5.00	1.00	5.00	1.00	5.00	10.00	3.00	3.00	2.00	2.00	0.50	
VERN (deg)	1.000	1.000	1.000	0.070	1.000	1.000	1.000	1.000	1.000	1.000	0.500	
RATE NORM °/sec	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	
VERN °/sec	.020	.020	.020	.010	.020	.020	.020	.020	.020	.020	.020	
<u>JET OPT</u>												
P	1	1	3	1	1	3	3	1	1	1	3	
Y	1	1	3	3	1	3	2	1	1	1	3	
<u>CNTL ACCEL</u>												
	0	0	0	0	0	0	0	0	0	0	0	

\*I-LOADED OPS-2 DAP Configuration

DAP B CONFIGURATIONS

	B1*	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11
<u>TRANSLATION</u>											
PULSE ft/sec	0.02	0.02	0.02	0.02	0.02	0.05	0.01	0.02	0.02	0.02	
<u>ROTATION</u>											
DSC RT NORM °/sec	0.500	0.200	0.200	0.200	0.200	0.500	0.200	0.200	0.200	0.200	
VERN °/sec	0.200	0.200	0.200	0.008	0.016	0.200	0.200	0.200	0.016	0.200	
PULSE NORM °/sec	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	
VERN °/sec	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	
COMP NORM °/sec	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
VERN °/sec	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
<u>DEADBAND</u>											
ATT NORM (deg)	3.00	3.00	3.00	0.30	3.00	2.00	2.00	10.00	10.00	30.00	
VERN (deg)	1.000	1.000	1.000	0.100	0.033	1.000	1.000	10.000	0.100	30.000	
RATE NORM °/sec	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.50	0.20	0.50	
VERN °/sec	.020	.020	.020	.010	.020	.020	.020	.500	.020	.500	
<u>JET OPT</u>											
P	1	3	1	3	3	1	1	3	3	3	
Y	1	3	1	3	3	1	1	2	3	3	
<u>CNTL ACCEL</u>											
	0	0	0	0	0	0	0	0	0	0	

\*I-LOADED OPS-2 DAP Configuration

# DAP BOOK

HOOK  
VELCRO

FLT PLN-1a/40/0/A

FLT PLN-1b/40/0/A

UNIV PTG	
TGT ID = 1	Orbiting Vehicle
= 2	Earth ctr
= 3	Earth tgt
	Input LAT ( $\pm 90$ )
	LON ( $\pm 180$ , + = East)
	ALT (-3444.0 to 20000.0 nm)
= 4	Sun ctr
= 5	Celestial tgt
	Input RA (0-359.99)
	DEC ( $\pm 90$ )
= 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
= 1 thru 5	not used
JET OPT = 1	Normal
= 2	Nose only
= 3	Tail only

TOP



DAP            PURPOSE

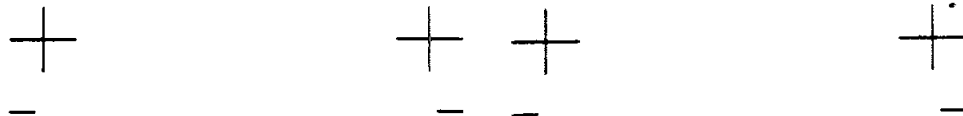
- A1 - NOMINAL  
IMU ALIGN  
LOSS OF VERN  
(NOSE & TAIL)
- A2 - PTC
- A3 - RCS HOT FIRE
- A4 - GG
- A5 - IMU ROTATION
- A6 - LOSS OF VERN  
(TAIL ONLY)
- A7 - DTO 910
- A8 - PRE/POST DEPLOY
- A9 - RENDEZVOUS
- A10 - PROX OPS
- A11 - DTO 902
- A12 - (Blank)

FLT PLN-2a/40/0/A



A1

TOP



DAP A1

A1

PURPOSE:

NOMINAL  
IMU ALIGN  
LOSS OF VERN  
(NOSE & TAIL)

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 0	6	COMP NORM
.0 0 0	7	VERN
5.0 0	8	DEADBAND ATT NORM
1.0 0 0	9	VERN
0.2 0	10	RATE NORM
.0 2 0	11	VERN
1	12	JET OPT. P
1	13	Y
0	14	CNTL ACCEL

FLT PLN-2b/40/0/A

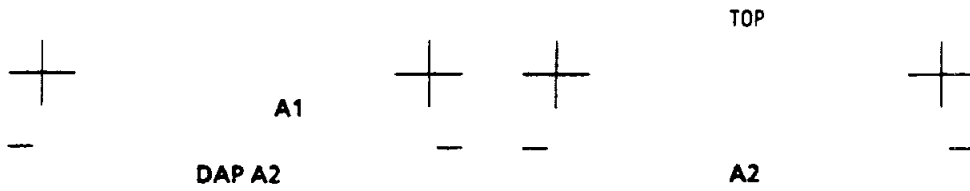


FLT PLN-3a/40/0/A



A2

TOP



PURPOSE:  
PTC

TRANSLATION  
PULSE  
0.1 0 1

ROTATION  
DSC RT NORM  
VERN  
PULSE NORM  
VERN  
COMP NORM  
VERN

DEADBAND  
ATT NORM  
VERN

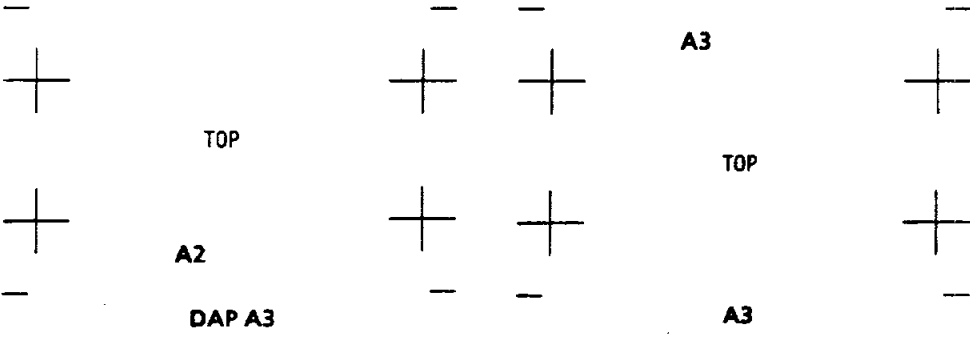
RATE NORM  
VERN

JET OPT P  
Y

CNTL ACCEL

FLT PLN-3b/40/0/A

FLT PLN-4a/40/0/A



PURPOSE:  
RCS HOT FIRE

TRANSLATION  
PULSE  
0.1 0 1

ROTATION  
DSC RT NORM  
VERN  
PULSE NORM  
VERN  
COMP NORM  
VERN

DEADBAND  
ATT NORM  
VERN

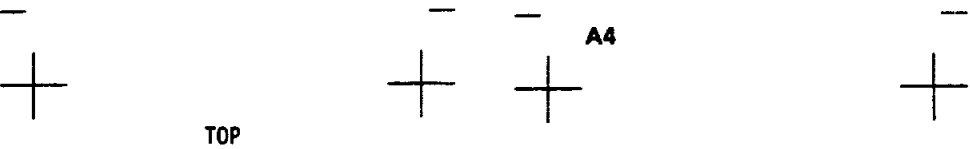
RATE NORM  
VERN

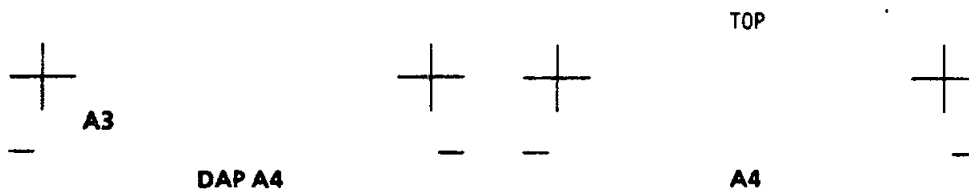
JET OPT P  
Y

CNTL ACCEL

FLT PLN-4b/40/0/A

FLT PLN-5a/40/0/A



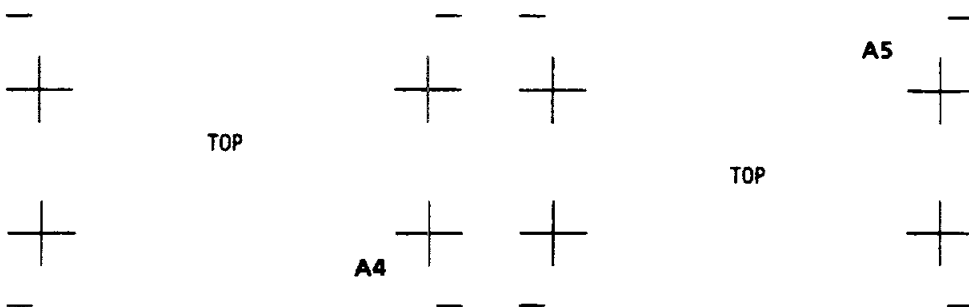


PURPOSE:  
GG

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

FLT PLN-5b/40/0/A

FLT PLN-6a/40/0/A

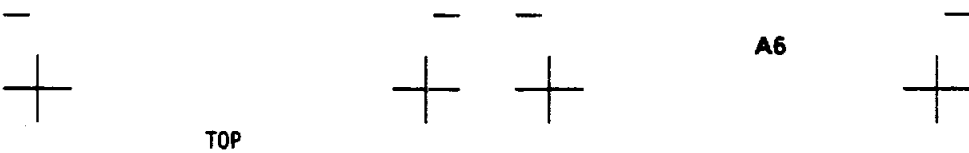


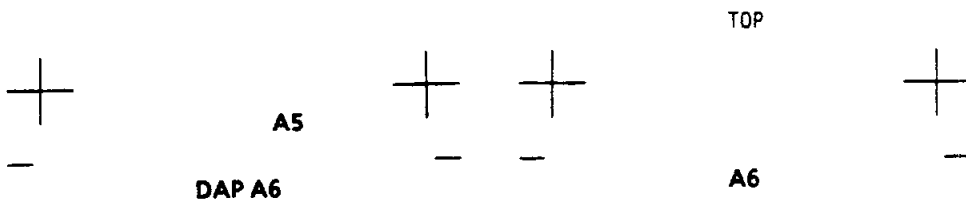
PURPOSE:  
IMU ROTATION

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

FLT PLN-6b/40/0/A

FLT PLN-7a/40/0/A





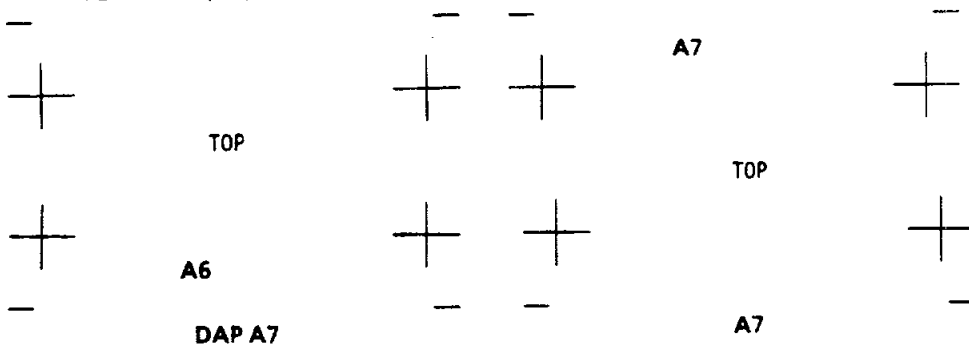
PURPOSE:

LOSS OF VERN  
(TAIL ONLY)

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

FLT PLN-7b/40/0/A

FLT PLN-8a/40/0/B



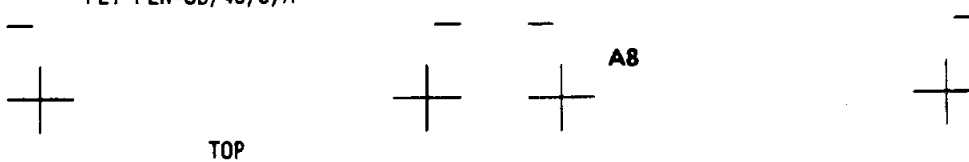
PURPOSE:

DTO 910

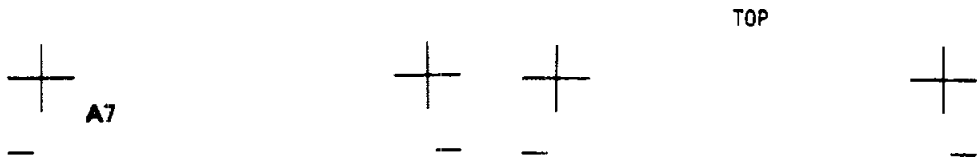
0.1 0	1	TRANSLATION	
		PULSE	
ROTATION			
0.2 0 0	2	DSC RT	NORM
0.2 0 0	3		VERN
0.8 0 0	4	PULSE	NORM
0.0 1 0	5		VERN
.0 0 0	6	COMP	NORM
.0 0 0	7		VERN
DEADBAND			
3.0 0	8	ATT	NORM
1.0 0 0	9		VERN
0.2 0	10	RATE	NORM
.0 2 0	11		VERN
3	12	JET OPT	P
2	13		Y
0	14	CNTL ACCEL	

FLT PLN-8b/40/0/A

FLT PLN-9a/40/0/B







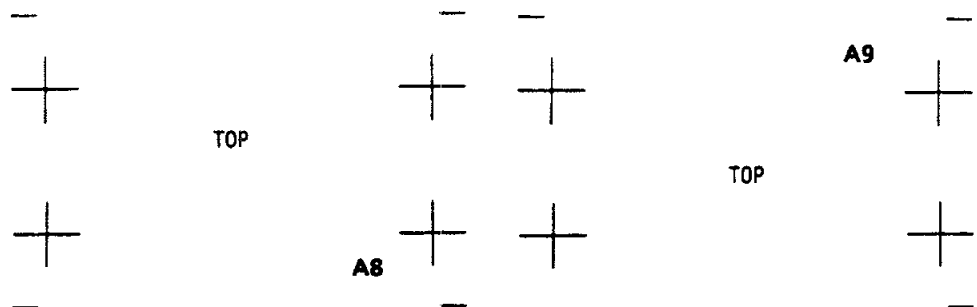
**DAP A8**  
 PURPOSE:  
 PRE/POST DEPLOY

**A8**

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 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-9b/40/0/A

FLT PLN-10a/40/0/A



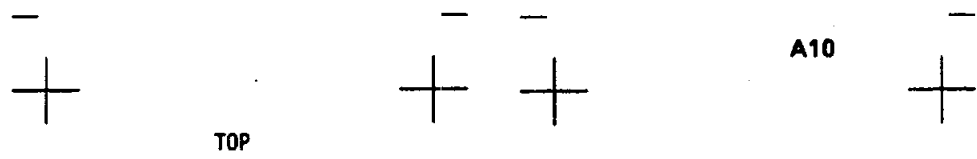
**DAP A9**  
 PURPOSE:  
 RENDEZVOUS

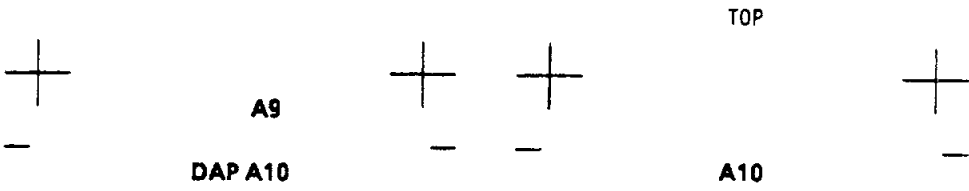
**A9**

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

FLT PLN-10b/40/0/A

FLT PLN-11a/40/0/A



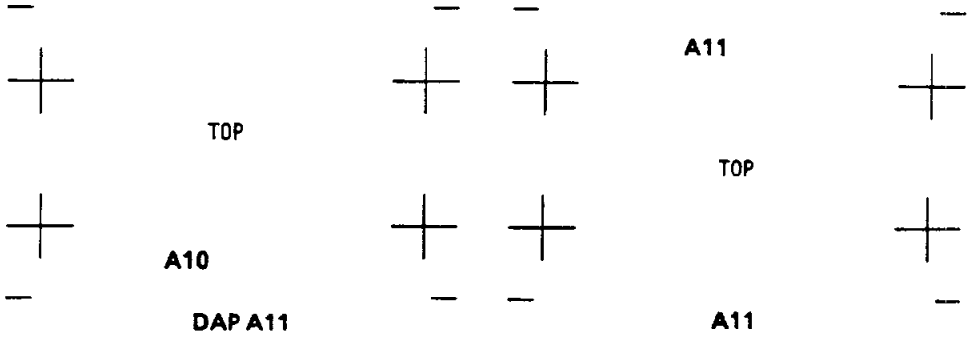


PURPOSE:  
PROX OPS

- |         |    |                      |
|---------|----|----------------------|
| 0.0 5   | 1  | TRANSLATION PULSE    |
| 0.2 0 0 | 2  | ROTATION DSC RT NORM |
| 0.2 0 0 | 3  | VERN                 |
| 0.1 0 0 | 4  | PULSE NORM           |
| 0.0 1 0 | 5  | VERN                 |
| .0 0 0  | 6  | COMP NORM            |
| .0 0 0  | 7  | VERN                 |
| 2.0 0   | 8  | DEADBAND 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                    |

FLT PLN-11b/40/0/A

FLT PLN-12a/40/0/A

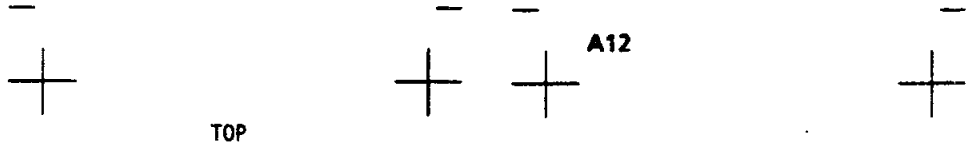


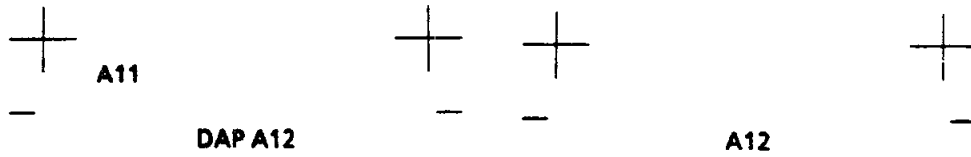
PURPOSE:  
DTO 902

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

FLT PLN-12b/40/0/A

FLT PLN-13a/40/0/A



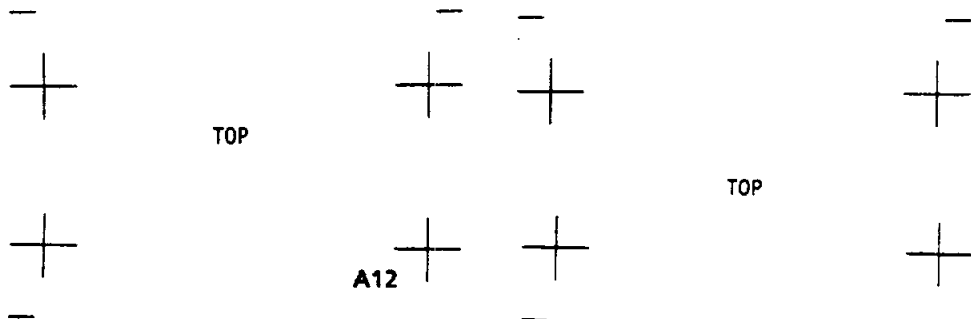


PURPOSE: (Blank)

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

FLT PLN-13b/40/0/A

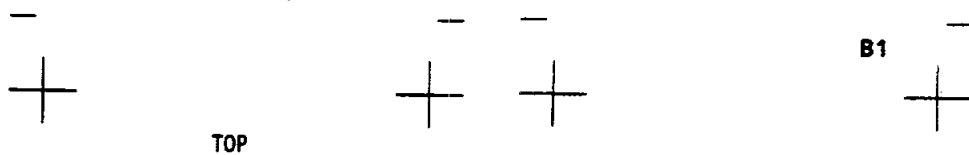
FLT PLN-14a/40/0/A

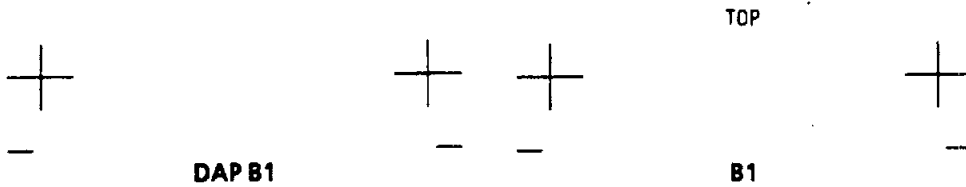


- | <u>DAP</u> | <u>PURPOSE</u>                                 |
|------------|--|
| B1         | - NOMINAL<br>PRCS IMU ALIGN<br>OMS & RCS BURNS |
| B2         | - LOSS OF VERN<br>(TAIL ONLY)                  |
| B3         | - LOSS OF VERN<br>(NOSE & TAIL)<br>GG MNVR     |
| B4         | - SSUS DEPLOY                                  |
| B5         | - COAS CAL                                     |
| B6         | - RENDEZVOUS                                   |
| B7         | - PROX OPS                                     |
| B8         | - DTO 910, 902                                 |
| B9         | - G507   |
| B10        | - OARE CAL                                     |
| B11        | - (Blank)                                      |

FLT PLN-14b/40/0/A

FLT PLN-15a/40/0/B





**DAP B1**

PURPOSE:

NOMINAL  
PRCS IMU ALIGN  
OMS & RCS BURNS

**B1**

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

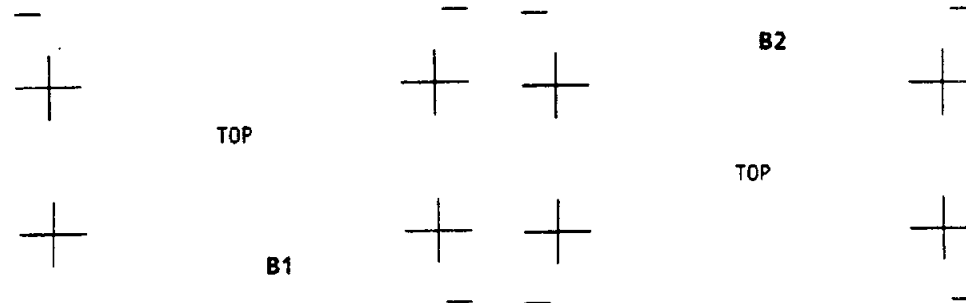
RATE	NORM 24	0.2	0	
	VERN 25	0.2	0	

JET OPT	P 26	1		
	Y 27	1		

CNTL ACCEL	28	0		
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FLT PLN-15b/40/0/A

FLT PLN-16a/40/0/A



TOP

**B2**

TOP

**B1**

**DAP B2**

PURPOSE:

LOSS OF VERN  
(TAIL ONLY)

**B2**

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

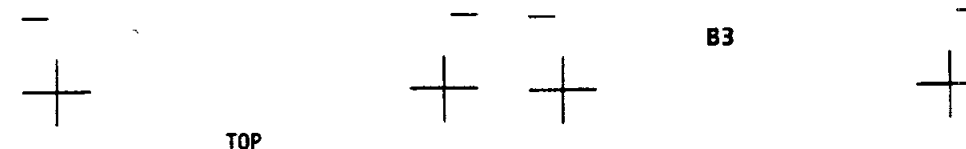
RATE	NORM 24	0.2	0	
	VERN 25	0.2	0	

JET OPT	P 26	3		
	Y 27	3		

CNTL ACCEL	28	0		
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FLT PLN-16b/40/0/A




FLT PLN-17a/40/0/A










TOP

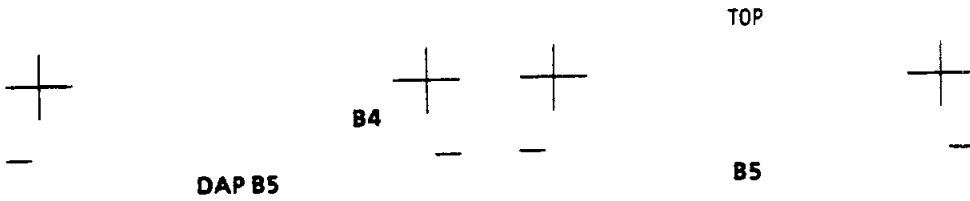
**B3**

TOP

 <b>B2</b> <hr/> <b>DAP B3</b> PURPOSE: LOSS OF VERN (NOSE & TAIL) GG MNVR	  <hr/> <b>B3</b>	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 FLT PLN-17b/40/0/A
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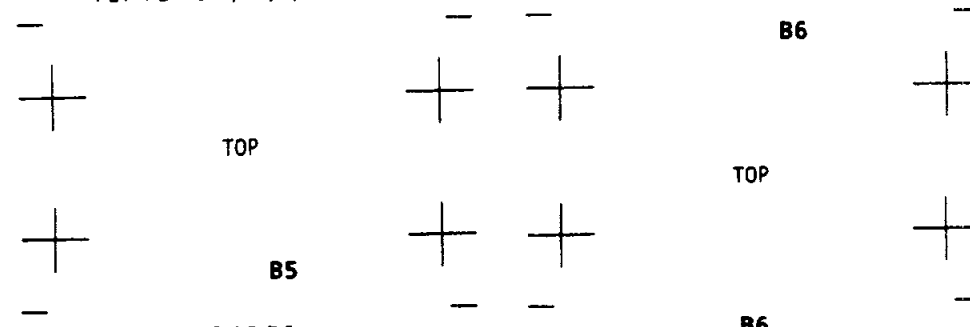
 TOP   <b>B3</b> <hr/> <b>DAP B4</b> PURPOSE: SSUS DEPLOY  FLT PLN-18b/40/0/A	  <hr/> <b>B4</b>	TRANSLATION PULSE 15 0.0 2  ROTATION DSC RT NORM 16 0.2 0 0 VERN 17 0.0 0 8 PULSE NORM 18 0.0 4 VERN 19 0.0 0 2 COMP NORM 20 .0 0 0 VERN 21 .0 0 0  DEADBAND ATT NORM 22 0.3 0 VERN 23 0.1 0 0  RATE NORM 24 0.2 0 VERN 25 .0 1 0  JET OPT P 26 3 Y 27 3  CNTL ACCEL 28 0 FLT PLN-19a/40/0/A
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 TOP	  <hr/> <b>B5</b>	
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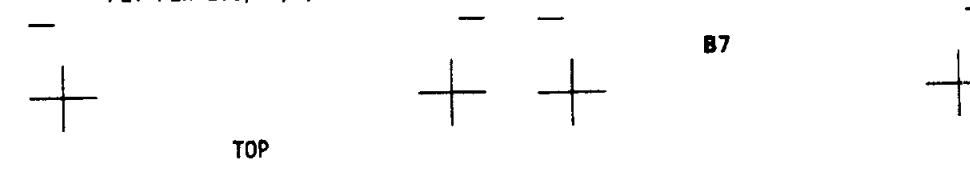
**DAP B5**  
 PURPOSE:  
 COAS CAL

**B5**  
 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 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 3  
 CNTL ACCEL 28 0  
 FLT PLN-19b/40/0/A  
 FLT PLN-20a/40/0/A

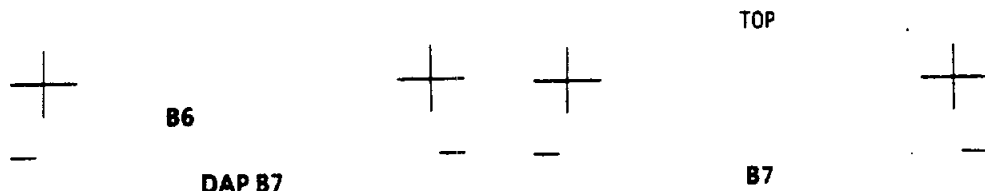


**DAP B6**  
 PURPOSE:  
 RENDEZVOUS

**B6**  
 TRANSLATION  
 PULSE 15 0.0 5  
 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 2.0 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  
 FLT PLN-20b/40/0/A  
 FLT PLN-21a/40/0/A



TOP

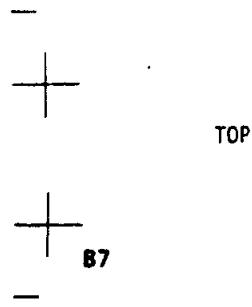


B6

DAP B7

PURPOSE:  
PROX OPS

FLT PLN-21b/40/0/A



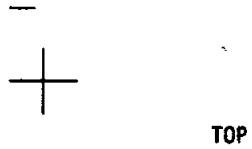
TOP

B7

DAP B8

PURPOSE:  
OTO 910, 902

FLT PLN-22b/40/0/A



TOP

TOP

B7

TRANSLATION				
PULSE	15	0.0	1	
ROTATION				
DSC RT	NORM 16	0.2	0	0
	VERN 17	0.2	0	0
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	2.0	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	

FLT PLN-22a/40/0/A

B8

TOP

B8

TRANSLATION				
PULSE	15	0.0	2	
ROTATION				
DSC RT	NORM 16	0.5	0	0
	VERN 17	0.5	0	0
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	1.0	0	0
	VERN 23	1.0	0	0
RATE	NORM 24	0.5	0	
	VERN 25	.5	0	0
JET OPT	P 26		3	
	Y 27		2	
CNTL ACCEL	28		0	

FLT PLN-23a/40/0/B

B9

TOP



B8



DAP B9

PURPOSE:  
G507

B9

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 4
	VERN	19	0.0 0 2
COMP	NORM	20	.0 0
	VERN	21	.0 0 0
DEADBAND			
ATT	NORM	22	1 0.0 0
	VERN	23	0.1 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

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B10

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B9



DAP B10

PURPOSE:  
OARE CAL

B10

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
	VERN	21	.0 0 0
DEADBAND			
ATT	NORM	22	3 0.0 0
	VERN	23	3 0.0 0
RATE			
	NORM	24	0.5 0
	VERN	25	0.5 0 0
JET OPT			
	P	26	3
	Y	27	3
CNTL ACCEL		28	0

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FLT PLN-25a/40/0/B



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B11





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B10



DAP B11

PURPOSE: (Blank)

B11

TRANSLATION PULSE 15

ROTATION

DSC RT NORM 16

VERN 17

PULSE NORM 18

VERN 19

COMP NORM 20

VERN 21

DEADBAND

ATT NORM 22

VERN 23

RATE NORM 24

VERN 25

JET OPT P 26

Y 27

CNTL ACCEL 28

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