

FLIGHT DATA FILE

Flight Plan

STS-30

(Cycle 2A Trajectory)

**Mission Operations Directorate
Operations Division**

**Final, Rev A
April 7, 1989**

<u>EVENT</u>	<u>CDT</u>		
Launch	13:24	Fri	Apr 28
Magellan Deploy	19:42	Fri	Apr 28
EDW Landing	14:20	Tue	May 2



National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas

MISSION OPERATIONS DIRECTORATE

STS-30 FLIGHT PLAN

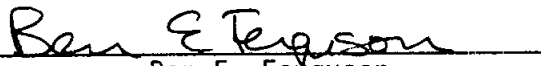
FINAL, REVISION A
April 7, 1989

PREPARED BY:



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Book Manager

APPROVED BY:



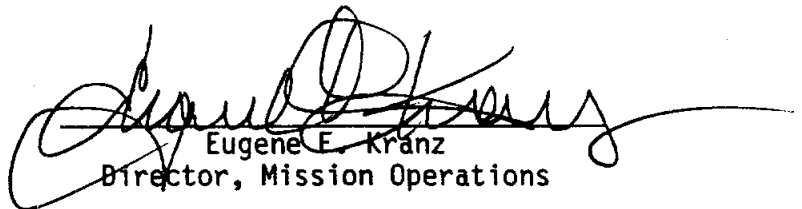
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Incorporates the following:

482#:	FLT PLN 642	FLT PLN 650	EXEMPTION#: 3
	FLT PLN 643	FLT PLN 651	
	FLT PLN 644	FLT PLN 652	
	FLT PLN 645	FLT PLN 653	
	FLT PLN 646	FLT PLN 654	
	FLT PLN 647	FLT PLN 655	
	FLT PLN 648	MULTI 78	
	FLT PLN 649	MULTI 93	

AREAS OF TECHNICAL RESPONSIBILITY

Book Manager	DH4/N. Woodbury	483--4479
Nominal Timelines	DH4/A. Griffith	483--4415
Pointing	DH4/R. Khatri	483--4460

STS-30 FLIGHT PLAN

LIST OF EFFECTIVE PAGES

FINAL 03/10/89

REV A 04/07/89

Sign Off...*	30/FIN A	4B-4.....	30/FIN A
ii.....*	30/FIN A	4C-1.....	30/FIN A
iii.....*	30/FIN A	4C-2.....	30/FIN A
iv.....*	30/FIN A	4C-3.....	30/FIN A
v.....	30/FIN A	4C-4.....	30/FIN A
vi.....	30/FIN A	4D-1.....	30/FIN A
vii.....	30/FIN A	4D-2.....	30/FIN A
viii.....	30/FIN A	4D-3.....	30/FIN A
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2-6.....	30/FIN A	4E-9.....	30/FIN A
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3-9.....	30/FIN A	6-4.....*	30/FIN A
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3-22.....	30/FIN A	7-9.....*	30/FIN A
3-23.....	30/FIN A	7-10.....*	30/FIN A
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4A-1.....	30/FIN A	7-16.....*	30/FIN A
4A-2.....	30/FIN A	8-1.....*	30/FIN A
4A-3.....	30/FIN A	8-2.....*	30/FIN A
4A-4.....	30/FIN A	8-3.....*	30/FIN A
4B-1.....	30/FIN A	8-4.....*	30/FIN A
4B-2.....	30/FIN A	8-5.....*	30/FIN A
4B-3.....	30/FIN A	8-6.....*	30/FIN A

(*) - Omit from flight book

STS-30 FLT PLN CUE CARDS

DAP Book Front Cover.....*	7-4	FLT PLN/30/0/BAS
UNIV PTG (Back of DAP Book Front Cover).....*	7-4	FLT PLN/30/0/BAS
DAP A TOC.....*	7-5	FLT PLN/30/0/FIN A
DAP A1.....*	7-5	FLT PLN/30/0/BAS
A1.....*	7-5	FLT PLN/30/0/BAS
DAP A2.....*	7-6	FLT PLN/30/0/BAS
A2.....*	7-6	FLT PLN/30/0/BAS
DAP A3.....*	7-6	FLT PLN/30/0/BAS
A3.....*	7-6	FLT PLN/30/0/BAS
DAP A4.....*	7-7	FLT PLN/30/0/BAS
A4.....*	7-7	FLT PLN/30/0/BAS
DAP A5.....*	7-7	FLT PLN/30/0/BAS
A5.....*	7-7	FLT PLN/30/0/BAS
DAP A6.....*	7-8	FLT PLN/30/0/BAS
A6.....*	7-8	FLT PLN/30/0/BAS
DAP A7.....*	7-8	FLT PLN/30/0/BAS
A7.....*	7-8	FLT PLN/30/0/BAS
DAP A8.....*	7-9	FLT PLN/30/0/BAS
A8.....*	7-9	FLT PLN/30/0/BAS
DAP A9.....*	7-9	FLT PLN/30/0/BAS
A9.....*	7-9	FLT PLN/30/0/BAS
DAP A10.....*	7-10	FLT PLN/30/0/BAS
A10.....*	7-10	FLT PLN/30/0/BAS
DAP A11.....*	7-10	FLT PLN/30/0/FIN A
A11.....*	7-10	FLT PLN/30/0/FIN A
(Blank).....*	7-11	FLT PLN/30/0/BAS
DAP B TOC.....*	7-11	FLT PLN/30/0/BAS
DAP B1.....*	7-11	FLT PLN/30/0/BAS
B1.....*	7-11	FLT PLN/30/0/BAS
DAP B2.....*	7-12	FLT PLN/30/0/BAS
B2.....*	7-12	FLT PLN/30/0/BAS
DAP B3.....*	7-12	FLT PLN/30/0/BAS
B3.....*	7-12	FLT PLN/30/0/BAS
DAP B4.....*	7-13	FLT PLN/30/0/BAS
B4.....*	7-13	FLT PLN/30/0/BAS
DAP B5.....*	7-13	FLT PLN/30/0/BAS
B5.....*	7-13	FLT PLN/30/0/BAS
DAP B6.....*	7-14	FLT PLN/30/0/BAS
B6.....*	7-14	FLT PLN/30/0/BAS
DAP B7.....*	7-14	FLT PLN/30/0/BAS
B7.....*	7-14	FLT PLN/30/0/BAS
DAP B8.....*	7-15	FLT PLN/30/0/BAS
B8.....*	7-15	FLT PLN/30/0/BAS
(Blank).....*	7-15	FLT PLN/30/0/BAS
DAP Book (Back Cover).....*	7-16	FLT PLN/30/0/BAS

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INTRODUCTION

The STS-30 Flight Plan is the flight data file article that contains the on-orbit timeline. It does not contain the detailed timelines that are covered in the Ascent, Post Insertion, Deorbit Prep, and Entry Checklists. The detailed deploy procedures required during the deploy timeframe are in the IUS Deploy Checklist. For continuity, the entire flight is shown in the summary level timeline.

This on-orbit timeline satisfies the objectives specified in the Flight Definition and Requirements Directive and the requirements of the STS-30 Flight Requirements Document. This Flight Plan, as part of the Flight Data File, meets the specifications of the Cycle 2A version of the STS-30 Flight Initialization Data Pack.

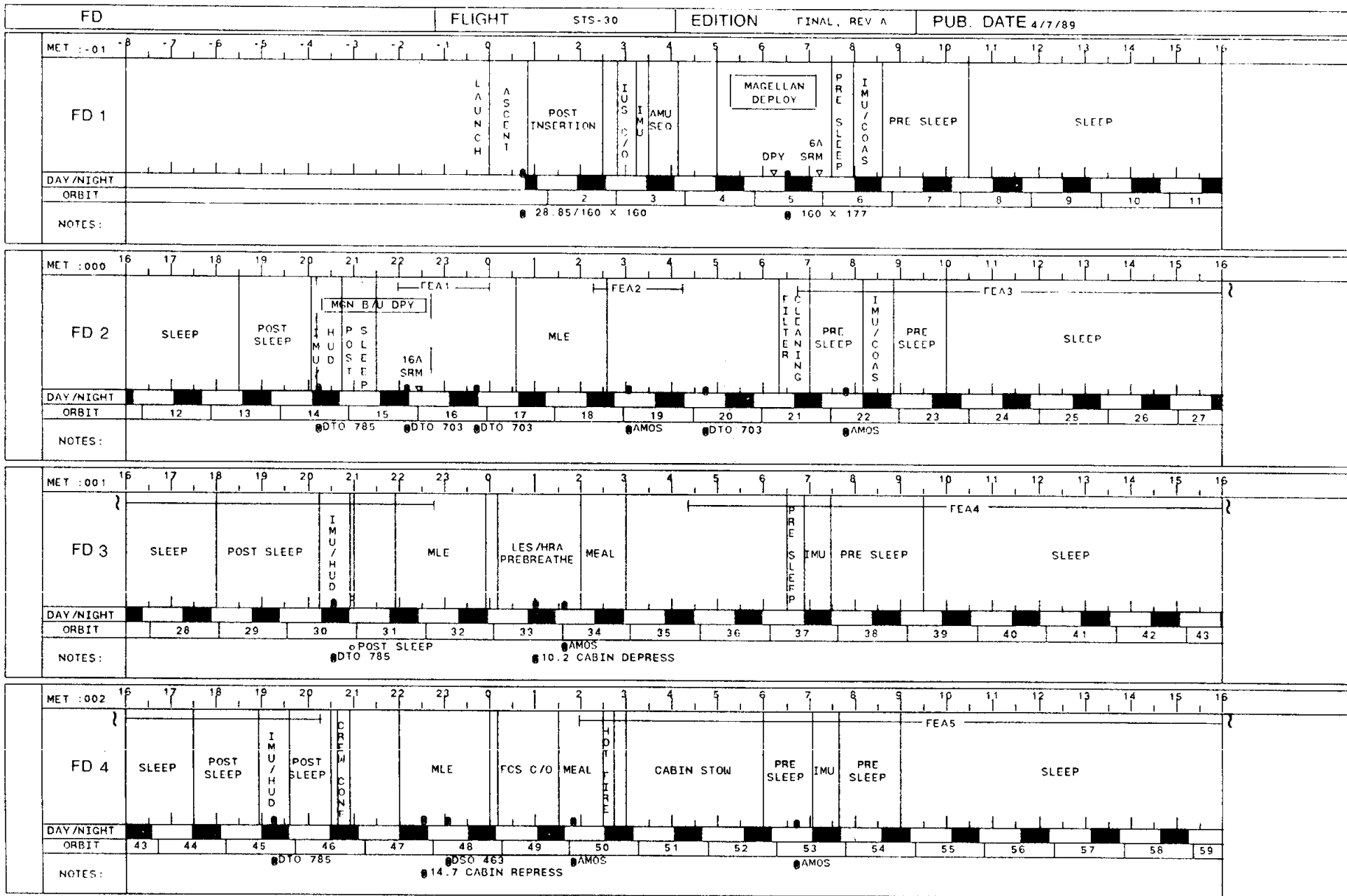
The flight profile used for this Flight Plan is for a launch date of April 28, 1989, at 13:24 CDT. Orbiter inertial attitudes are expressed relative to a Mean of 1950 (M50) reference frame.

JSC-22354 Crew Scheduling Constraints (Appendix K, CPMP), Basic, March 1987, has been used to build the timelines contained in this Flight Plan. An Exemption for a Flight day 2 EVA has been approved (Exemption Request #3) to specifically allow the unscheduled EVA plan shown in section 4-E.

The timelines formats used in this Flight Plan are based on JSC-19933, Timeline Format Definitions and Standard Notes, Revision B, May 25, 1987.

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STS-30 OVERVIEW

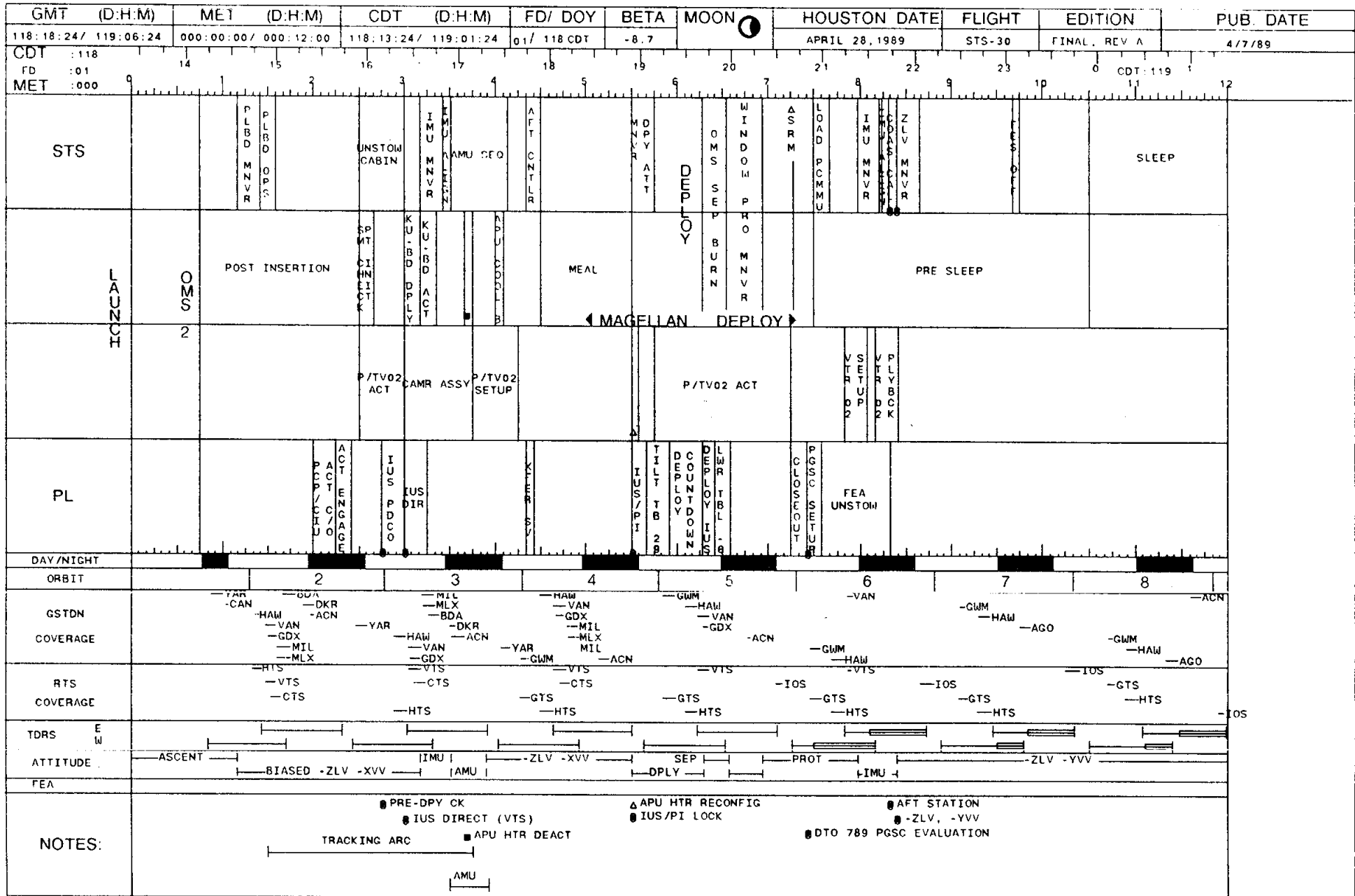


FD			FLIGHT STS-30			EDITION FINAL, REV A			PUB. DATE 4/7/89																	
MET : 003	16	17	18	19	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
FD 5	SLEEP	POST SLEEP	IMU POST SLEEP		DEORBIT PREP				DEORBIT	DEORBIT	DEORBIT	DEORBIT	DEORBIT	DEORBIT	DEORBIT	DEORBIT	DEORBIT	DEORBIT	DEORBIT	DEORBIT	DEORBIT	DEORBIT	DEORBIT	DEORBIT	DEORBIT	DEORBIT
DAY/NIGHT	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	
ORBIT	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74										
NOTES:																										

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SUMMARY TIMELINE

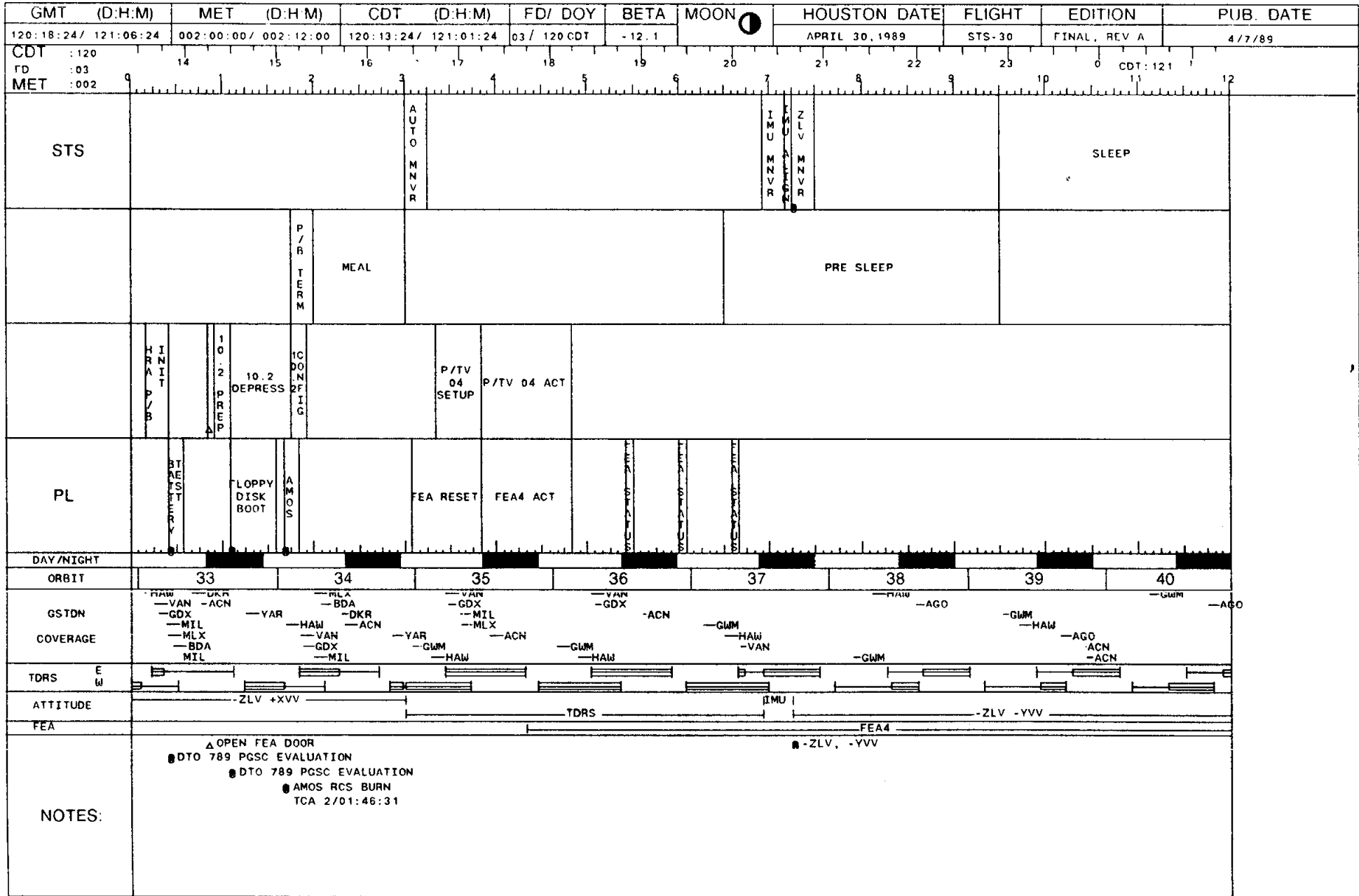
SUMMARY TIMELINE



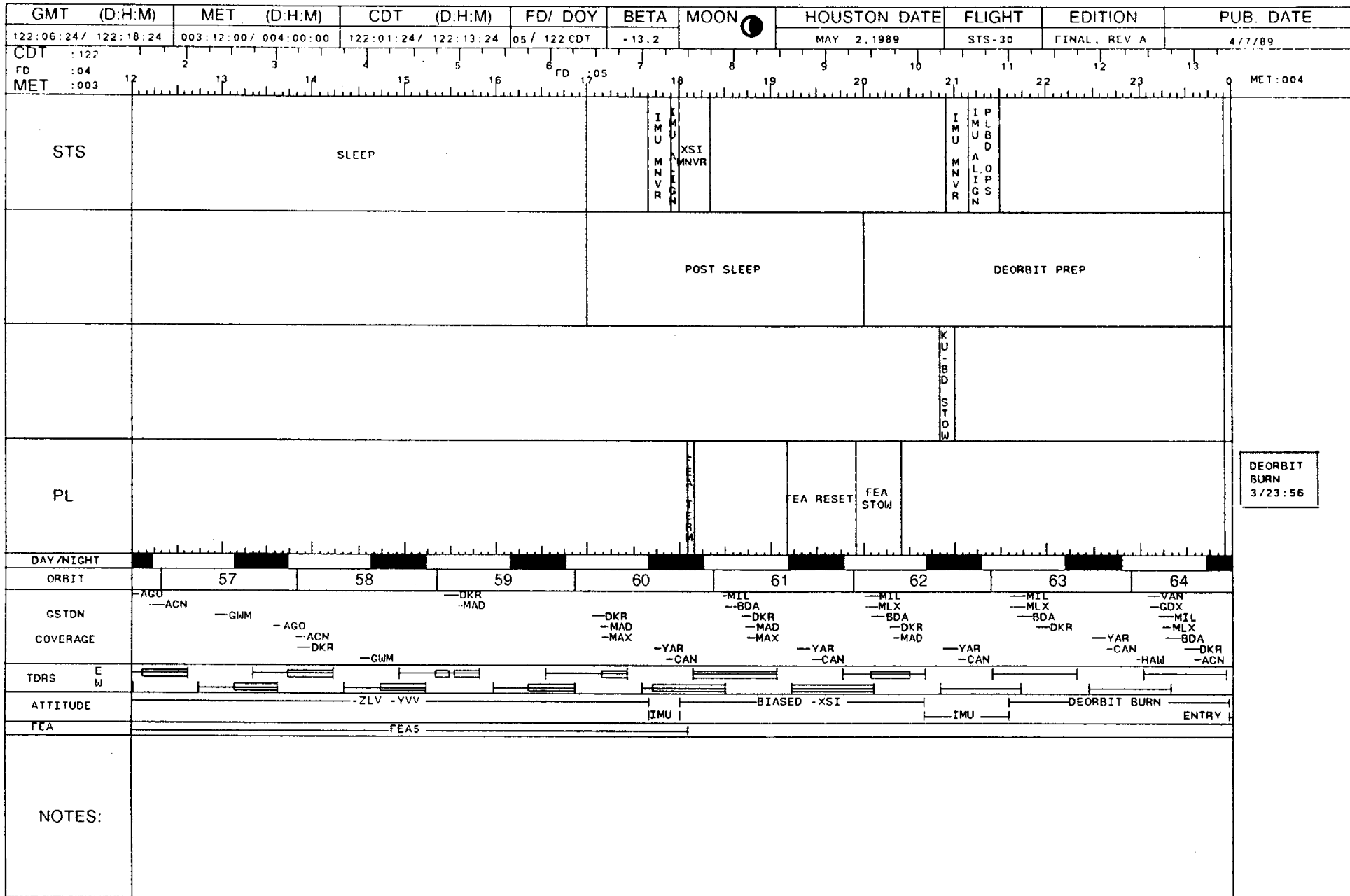
GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB DATE	
119:06:24 / 119:18:24	000:12:00 / 001:00:00	119:01:24 / 119:13:24	02 / 119 CDT	-9.8	☾	APRIL 29, 1989	STS-30	FINAL, REV A	4/7/89	
CDT :119										
FD :01										
MET :000									MET:001	
STS	SLEEP						IMU RVZM COAS MNV HUD DTO AUTO MNV			
						POST SLEEP				
							P/TV 04 SETUP	P/TV 04 ACT	YTR 02 SETUP YTR 02 PLYBCK	
PL								FEA1 ACT	FEA MONITOR	
DAY/NIGHT	[Day/Night Cycle: Night from 09:00 to 10:00, 11:00 to 12:00, 13:00 to 14:00, 15:00 to 16:00]									
ORBIT	9	10	11	12	13	14	15	16		
GSTDN	-GMM	-AGO -ACN	-GMM	-AGO -DKR		-BDA -DKR -MAD -MAX	-MIL -BDA -DKR -MAD -MAX	-MIL -MLX -BDA -DKR		
COVERAGE		-GMM -AGO -ACN -DKR			-DKR -MAD -MAX	-CAN	-YAR -CAN -MLX	-YAR -CAN	-YAR -CAN	
TDRS	E W	[TDRS Coverage]	[TDRS Coverage]	[TDRS Coverage]	[TDRS Coverage]	[TDRS Coverage]	[TDRS Coverage]	[TDRS Coverage]	[TDRS Coverage]	
ATTITUDE			-ZLV -YVV			IMU	HUD	TDRS		
FEA								FEA1		
NOTES:							● DTO 0785 HUD B/U TO COAS	● DTO 703 TDRS EARLY H/O		

GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE	
119:18:24 / 120:06:24	001:00:00 / 001:12:00	119:13:24 / 120:01:24	02 / 119 CDT	-10.6	☾	APRIL 29, 1989	STS-30	FINAL, REV A	4/7/89	
CDT : 119									CDT: 120	
FD : 02										
MET : 001										
STS	ZLV MNV R			AUTO MNV R		ZLV MNV R	IMU MNV R	COAS MNV R	ZLV MNV R	SLEEP
		MEAL		DISK TEST		FILTER CLEANING		PRE SLEEP		
	P/TV 03 SETUP	MLE PHOTO P/TV 03		FEA MONITOR		P/TV 07 SETUP		P/TV 07 ACT		
PL	TC AG SG O P U T P E R	FEA RESET	FEA2 ACT	AMOS		FEA RESET	FEA3 ACT			
DAY/NIGHT										
ORBIT	17	18	19	20	21	22	23	24		
GSTDN	-VAN -GDX -MIL -MLX -BDA -DKR	-HAW -VAN -GDX -MIL -MLX -BDA -DKR	-ACN -YAR -HAW -VAN -GDX -MIL -MLX	-BDA -ACN -YAR -HAW -VAN -GDX -MIL -MLX	-MLL -MLX -ACN -GWM -HAW -VAN -GDX	-GWM -HAW -AGO -GWM -HAW -VAN -GDX	-GWM -HAW -AGO -ACN	-GWM -HAW -AGO -ACN		
COVERAGE										
TDRS	E W KA									
ATTITUDE					TDRS		IMU I		-ZLV -YVV	
FEA			FEA2					FEA3		
NOTES:	● DTO 703 TDRS EARLY H/O ● -ZLV, +XVV		● AMOS RCS BURN TCA 1/03:09:52	● DTO 703 TDRS EARLY H/O ● -ZLV, +XVV	● DTO 789 PGSC EVALUATION ● DTO 789 PGSC EVALUATION		● FWD STATION ● -ZLV, -YVV		● AMOS RCS BURN TCA 1/07:59:07	

GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE	
120:06:24 / 120:18:24	001:12:00 / 002:00:00	120:01:24 / 120:13:24	03 / 120 CDT	-11.4	☾	APRIL 30, 1989	STS-30	FINAL, REV A	4/7/89	
CDT :120										
FD :02										
MET :001									MET:002	
STS	SLEEP					IMU MNV R	COAS MNV R	HUD OTO	ZLV MNV R	
								P/TV 07 SETUP		P/TV 07 ACT
								P/TV 03 SETUP		MLE PHOTO P/TV 03
PL										
DAY/NIGHT	[Day/Night Cycle: 25-32]									
ORBIT	25	26	27	28	29	30	31	32		
GSTDN COVERAGE	-GWM -AGO -ACN	-GWM -AGO -ACN -DKR	-GWM -AGO -ACN -DKR	-DKR -MAD	-DKR -MAD -MAX	-CAN -MIL -MLX -BDA -DKR -MAD -MAX	-YAR -CAN -MIL -MLX -BDA -DKR -MAD	-YAR -CAN -MIL -MLX -BDA -DKR -MAD	-YAR -CAN -MIL -MLX -BDA -DKR	-CAN
TDRS	[TDRS Coverage: E, W]									
ATTITUDE	-ZLV -YVV									
FEA	FEA3									
NOTES:	● DTO 0785 HUD B/U TO COAS ● -ZLV, +XVV									



GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE						
121:06:24/ 121:18:24	002:12:00/ 003:00:00	121:01:24/ 121:13:24	04 / 121 CDT	-12.6	☾	MAY 1, 1989	STS-30	FINAL, REV A	4/7/89						
CDT :121	FD :03	MET :002	FD :04						MET:003						
STS	SLEEP		POST SLEEP		IMU MNV R	COAS MNV R	HUD MNV R	COAS MNV R	HUD MNV R	AUTO MNV R	CREW COZ L	ZLV MNV R	OTO 728	1 4 7 R E P R E S S	
PL					P/TV 06 SETUP		P/S ACT	P/TV 03 SETUP	MLE PHOTO P/TV 03				TREADMILL		
DAY/NIGHT	[Day/Night Cycle: Night, Day, Night, Day, Night, Day, Night, Day, Night, Day]														
ORBIT	41		42		43		44		45		46		47		48
GSTDN	-ACN		-GWM		-AGO		-ACN		-DKR		-MIL		-MLX		-GDX
COVERAGE	-DKR		-MAD		-MAX		-YAR		-CAN		-MIL		-MAD		-BDA
TDRS	-GWM		-AGO		-CAN		-BDA		-DKR		-MIL		-MLX		-BDA
ATTITUDE	-ZLV		-YVV		-HUD		-IMU		-HUD		-TDRS		-ZLV		+XVV
FEA	FEA4														
NOTES:	<ul style="list-style-type: none"> ● DTO 0785 HUD B/U TO COAS ○ OPEN FEA DOOR ● DTO 0785 HUD B/U TO COAS ○ APU HTR ACT ● -ZLV, +XVV ● DSO 463 STRESS TEST ● DTO 728 KU BAND FRICTION 														



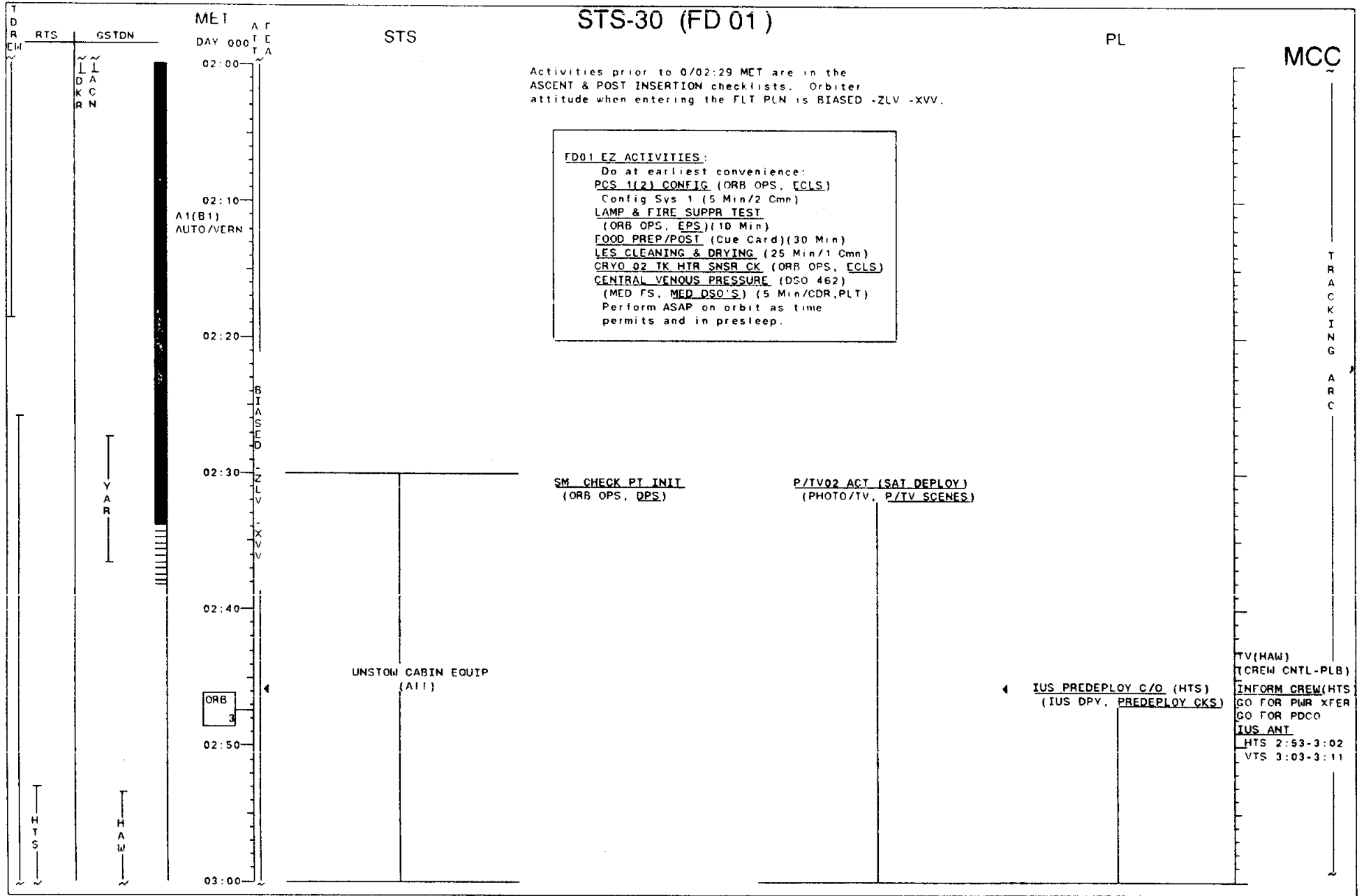
GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB DATE
122:18:24 / 123:06:24	004:00:00 / 004:12:00	122:13:24 / 123:01:24	05 / 122 CDT	-13.3		MAY 2, 1989	STS-30	FINAL, REV A	4/7/89
CDT :122									
FD :05									CDT:123
MET :004									
STS									
PL		EDW LANDING (4/00:56)							
DAY/NIGHT									
ORBIT	64	65	66	67	68	69	70	71	72
GSTDN									
COVERAGE									
TDRS									
ATTITUDE									
FEA									
NOTES:									

DETAILED TIMELINE

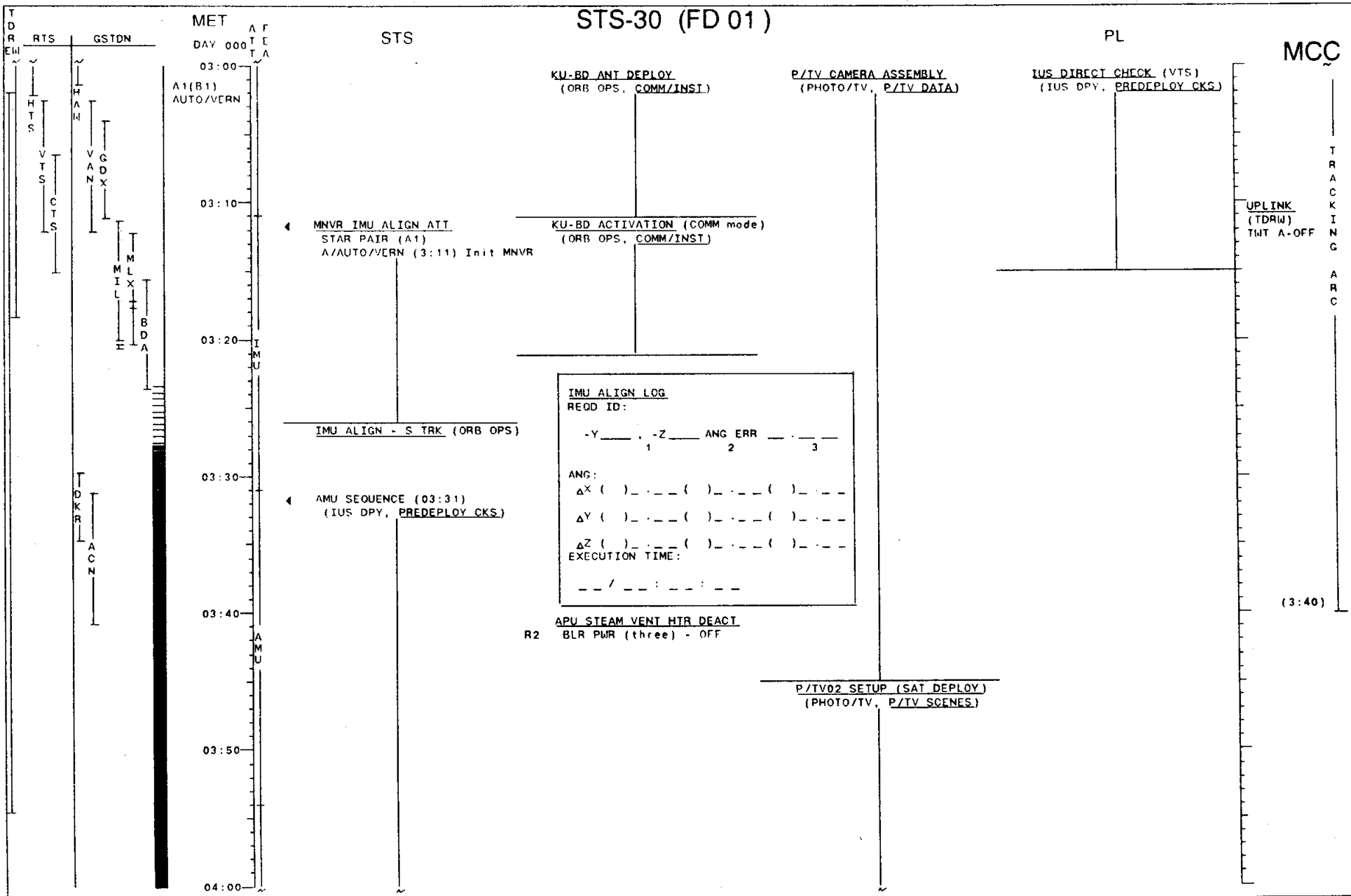
DETAILED
TIMELINE

DETAILED TIMELINE

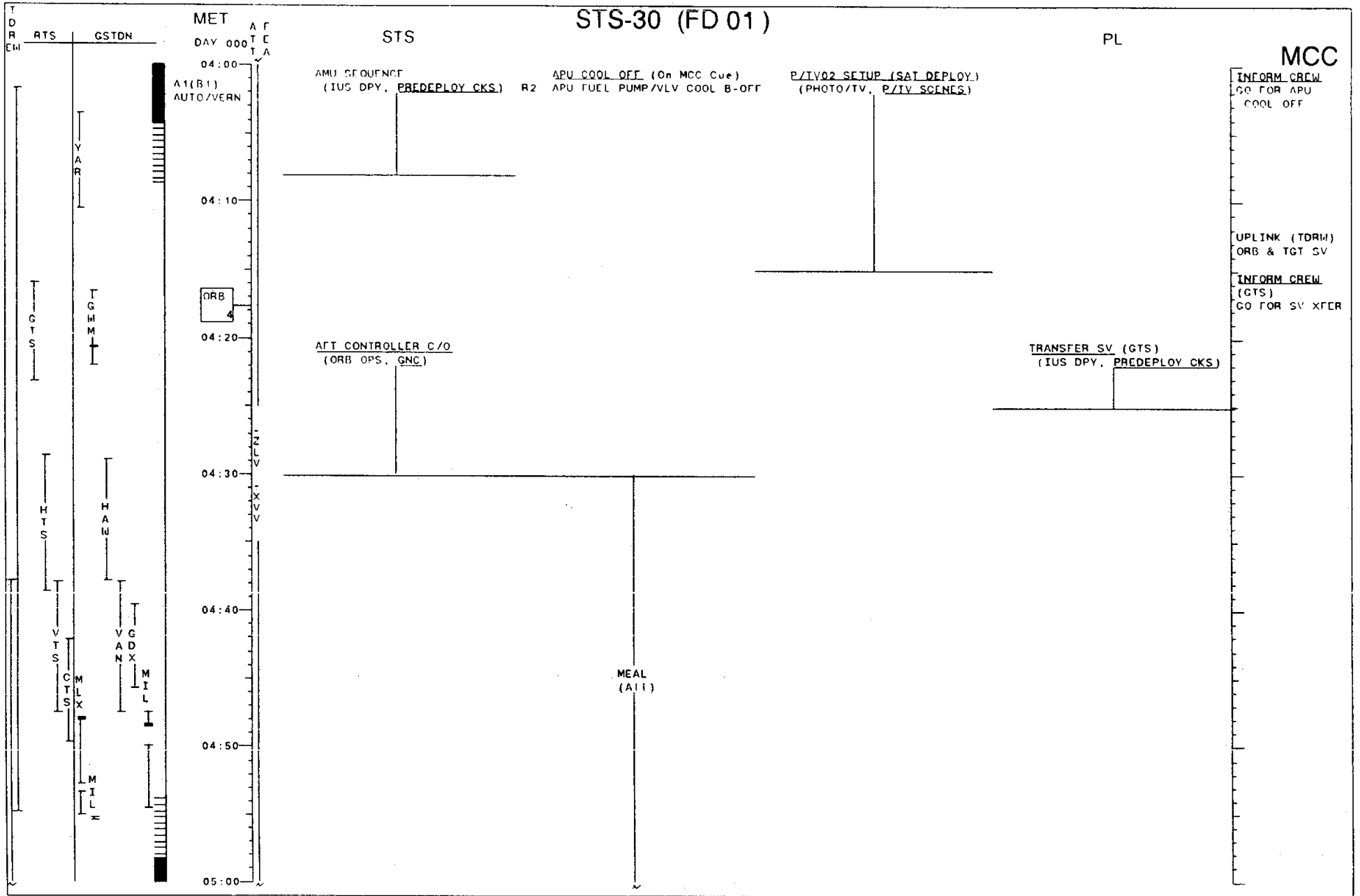
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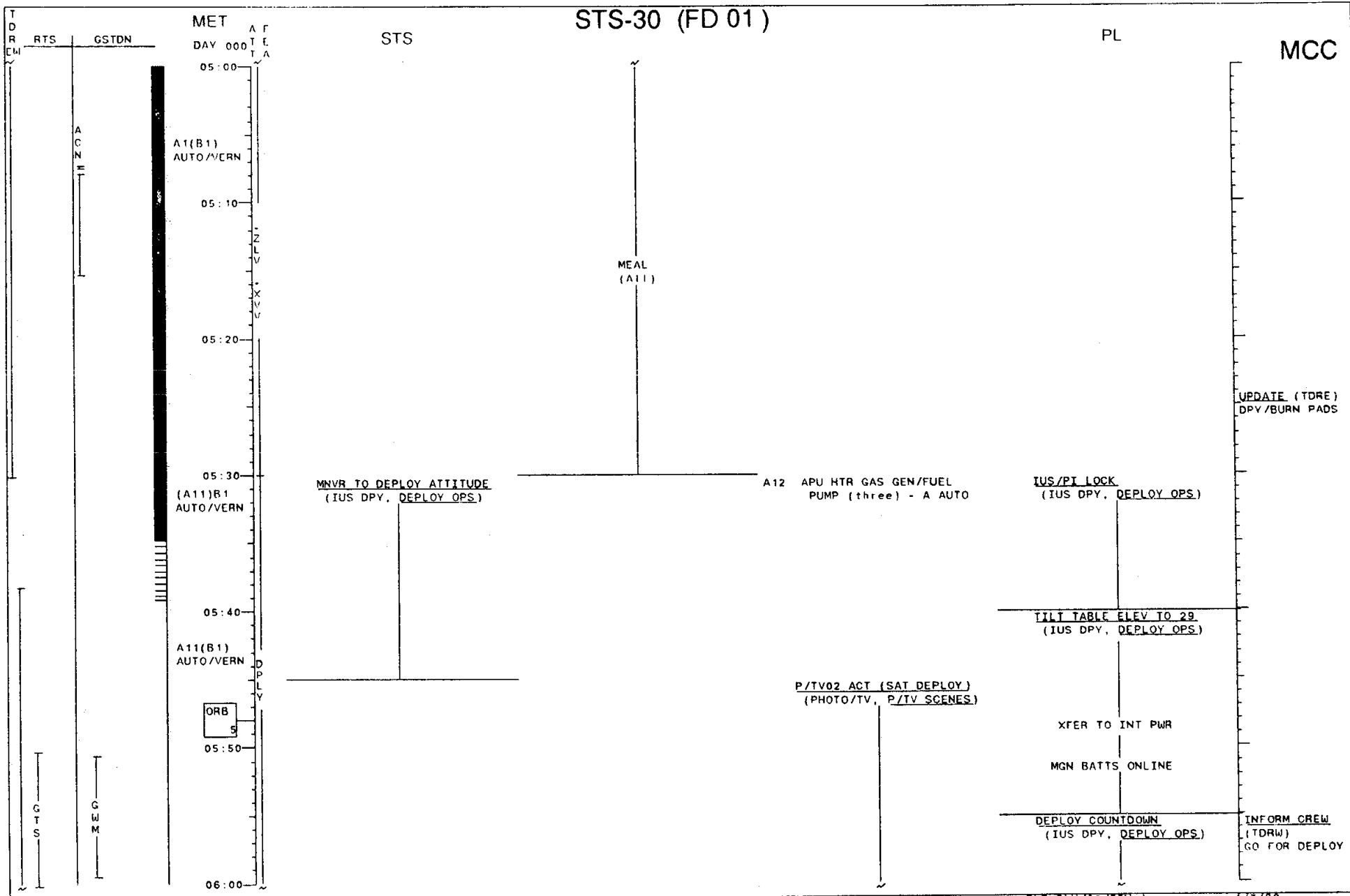


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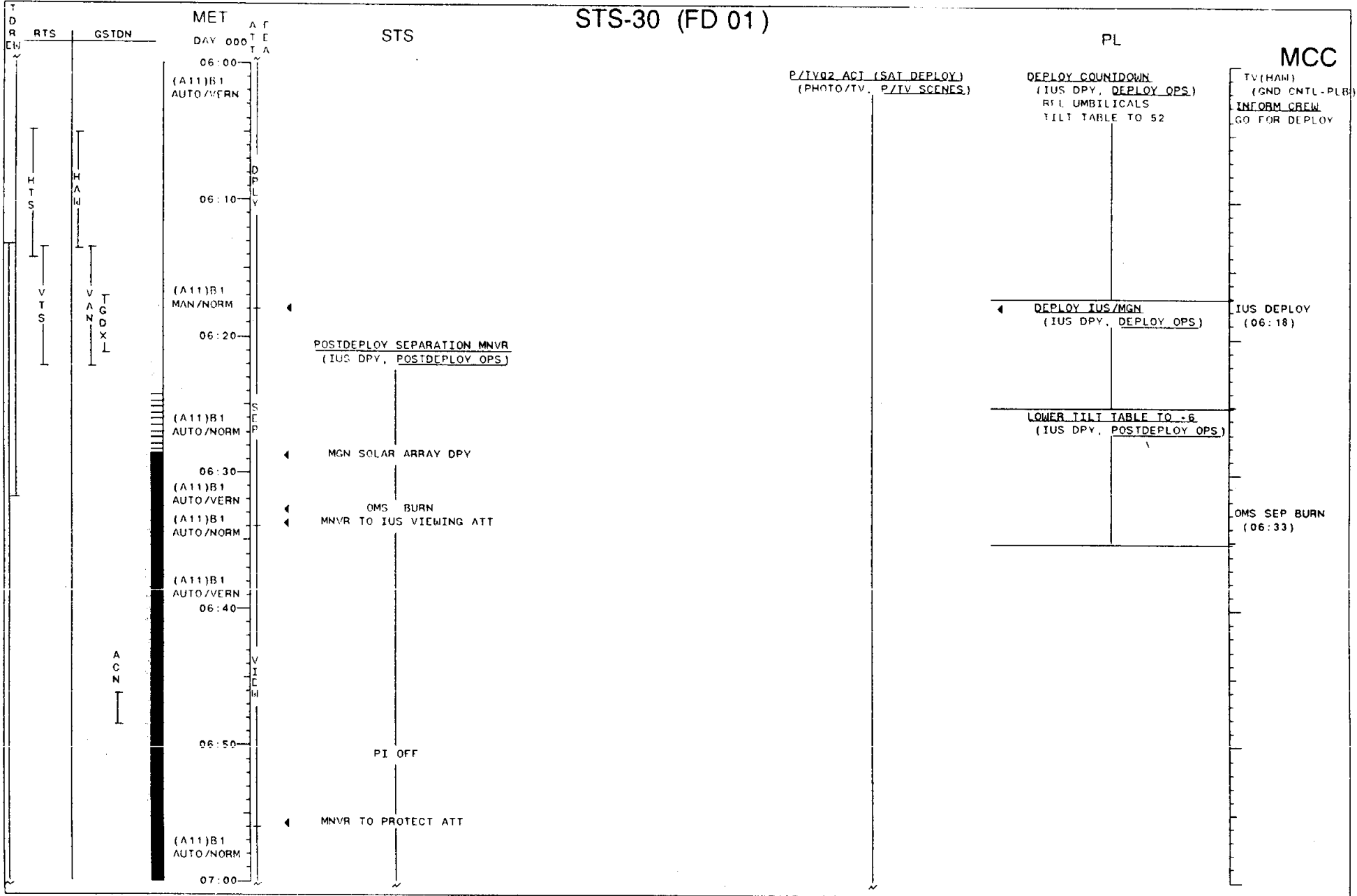


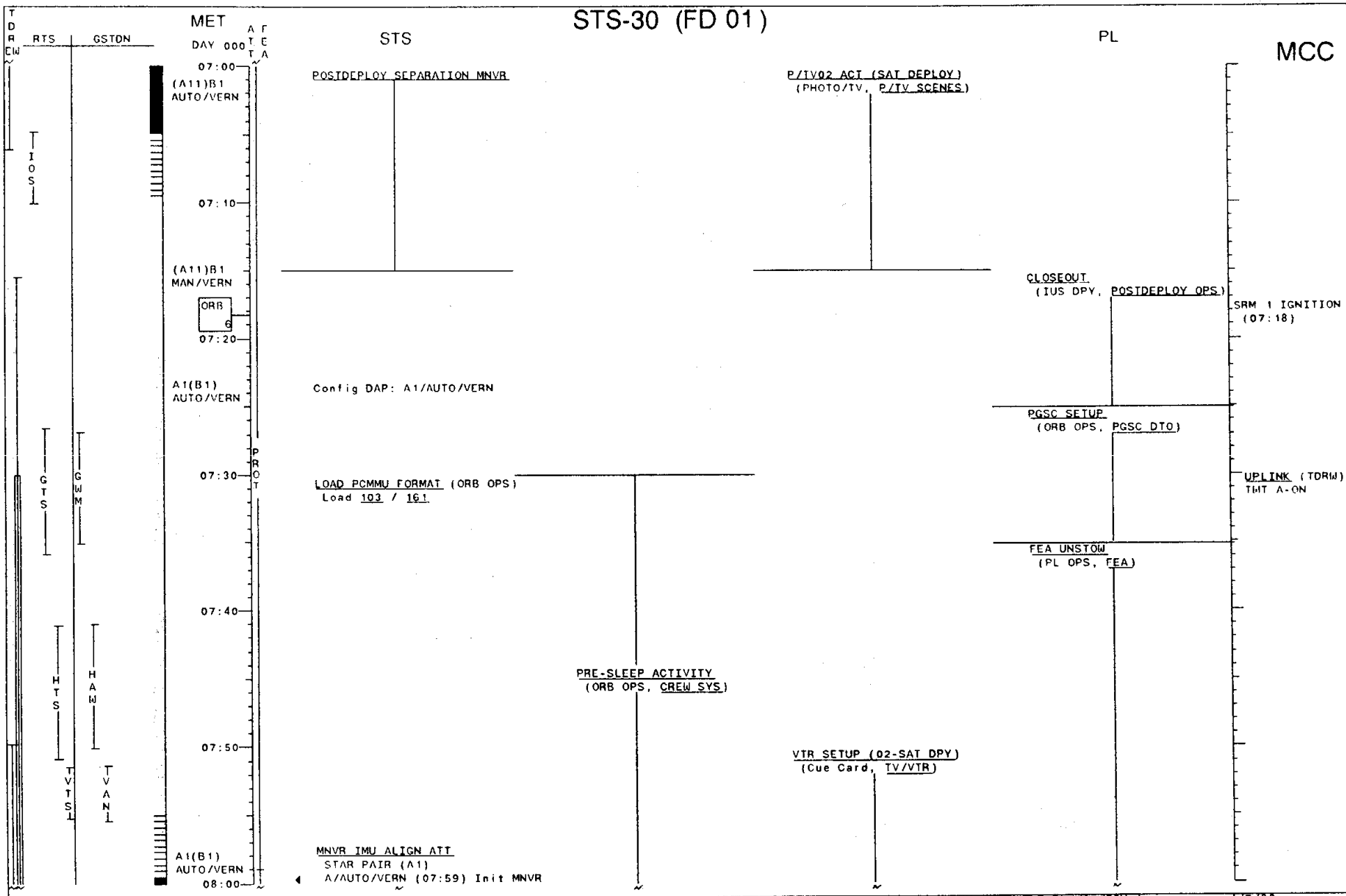
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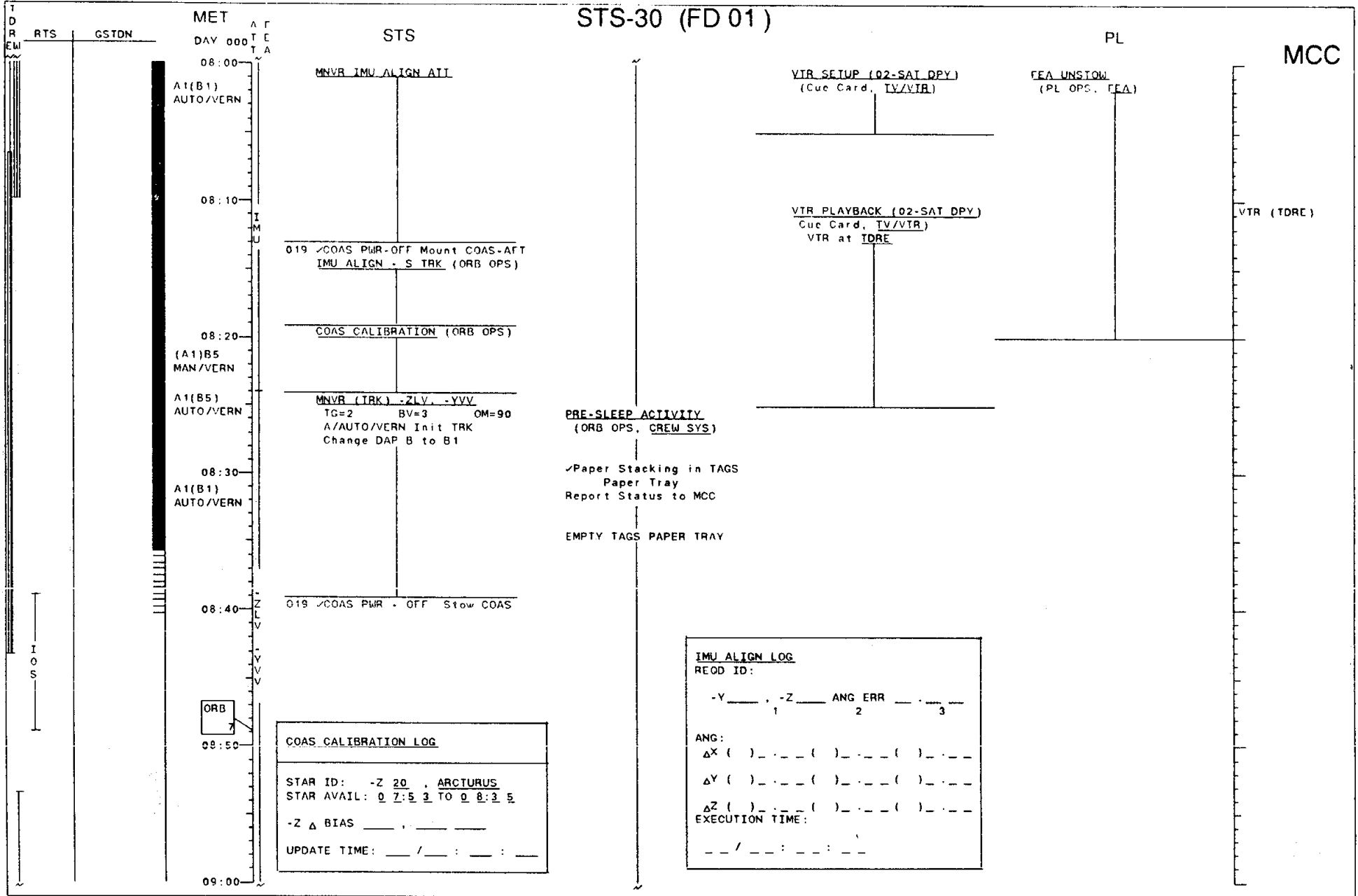


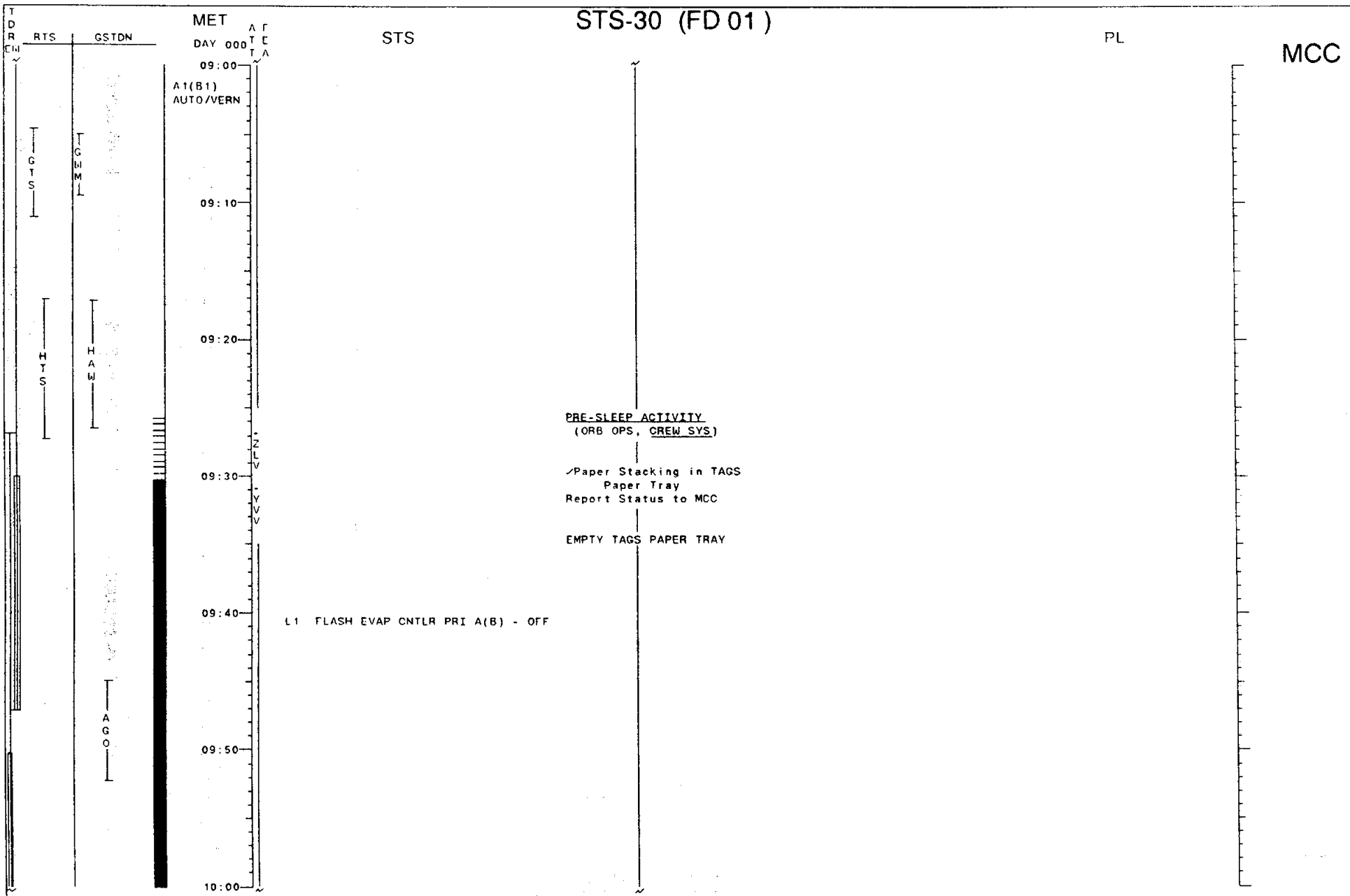


STS-30 (FD 01)

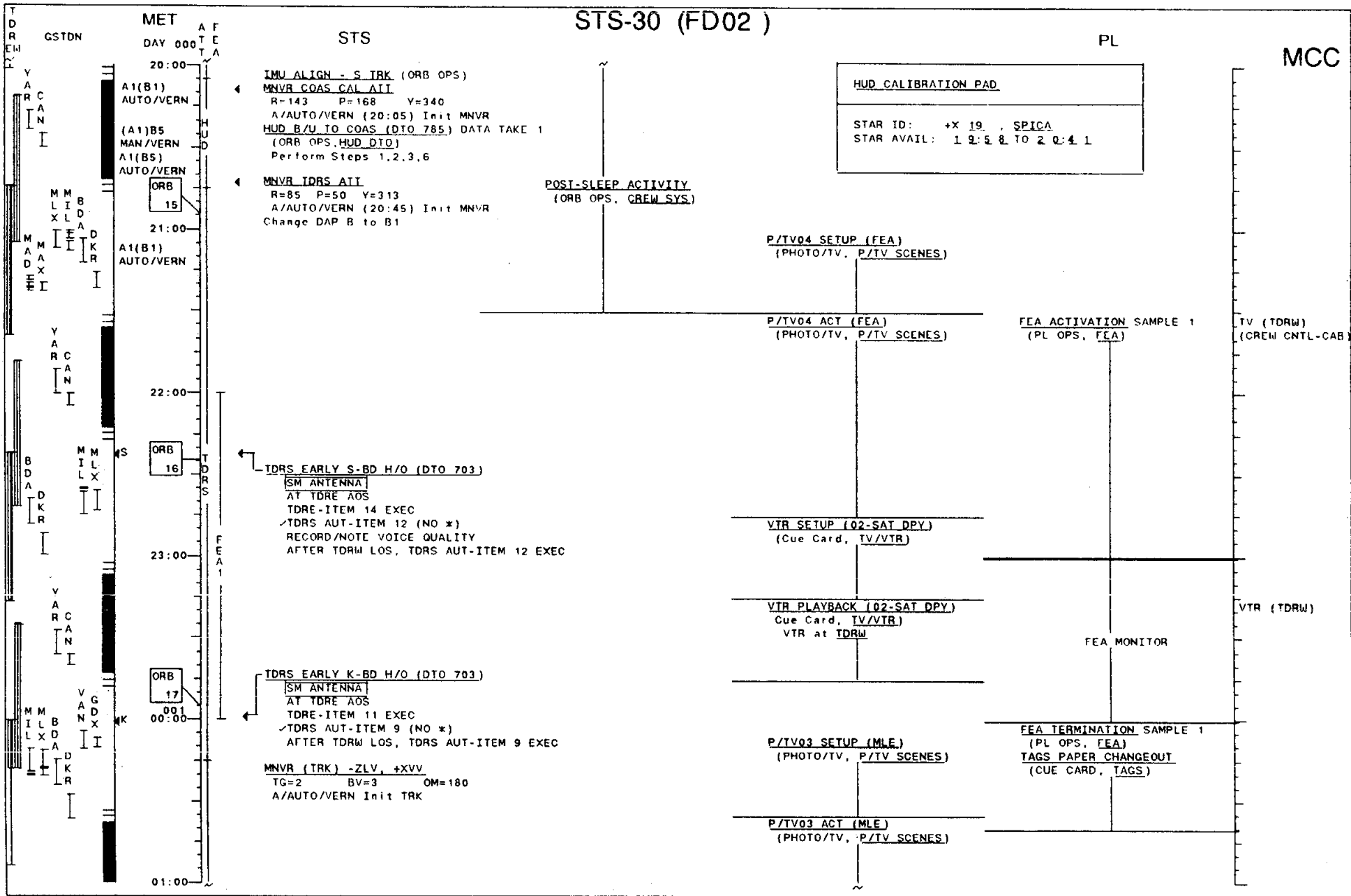


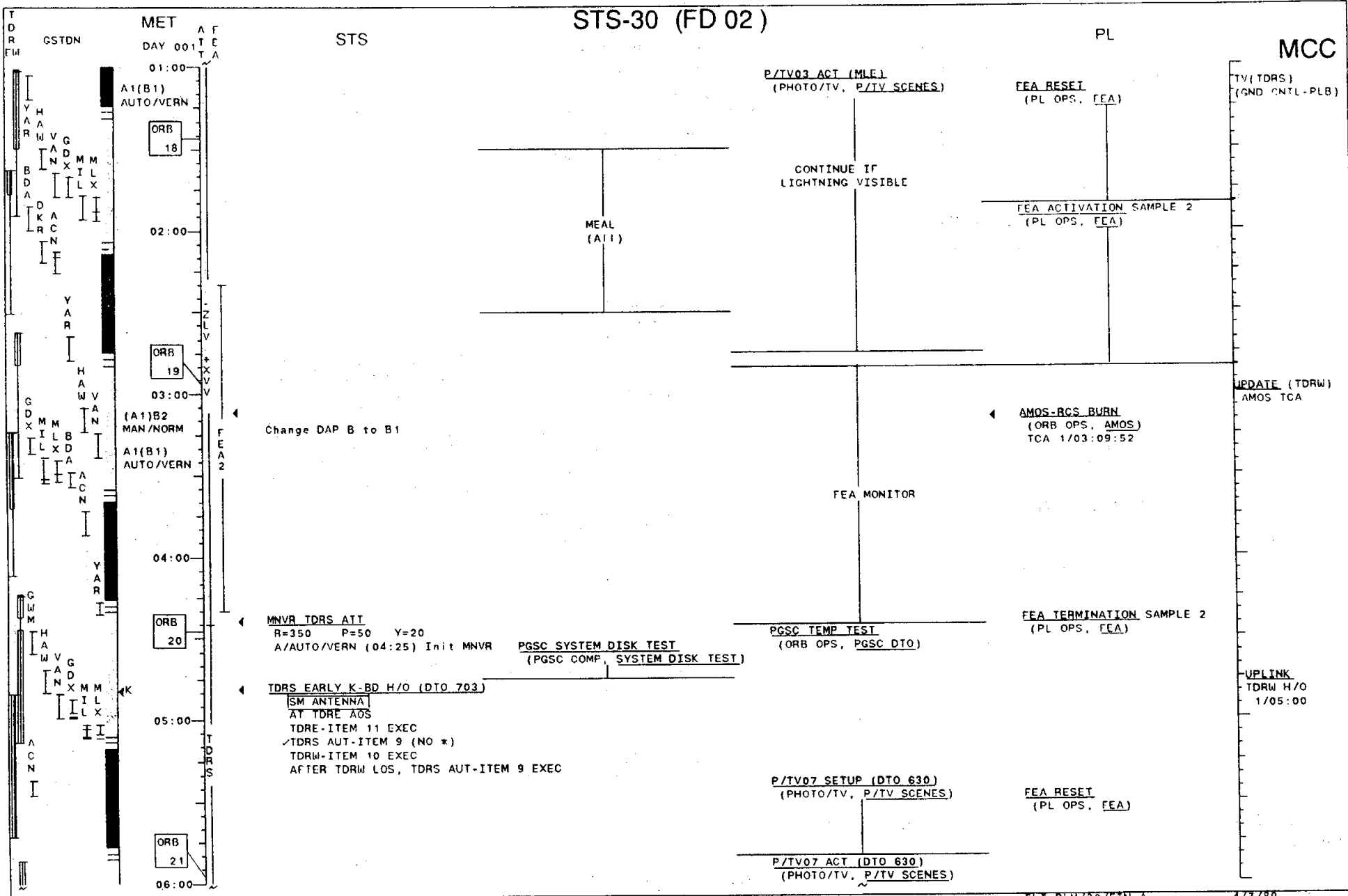


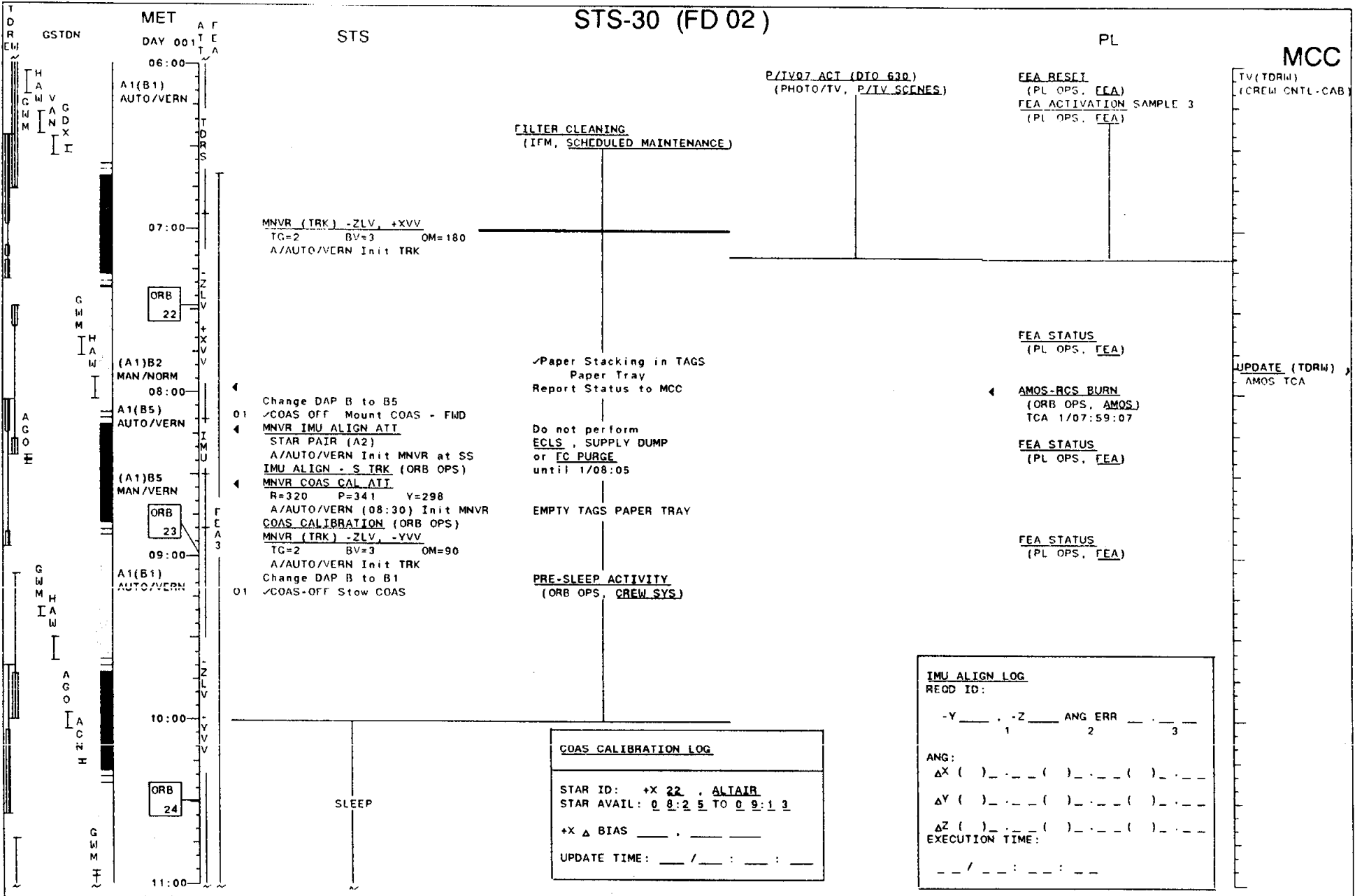




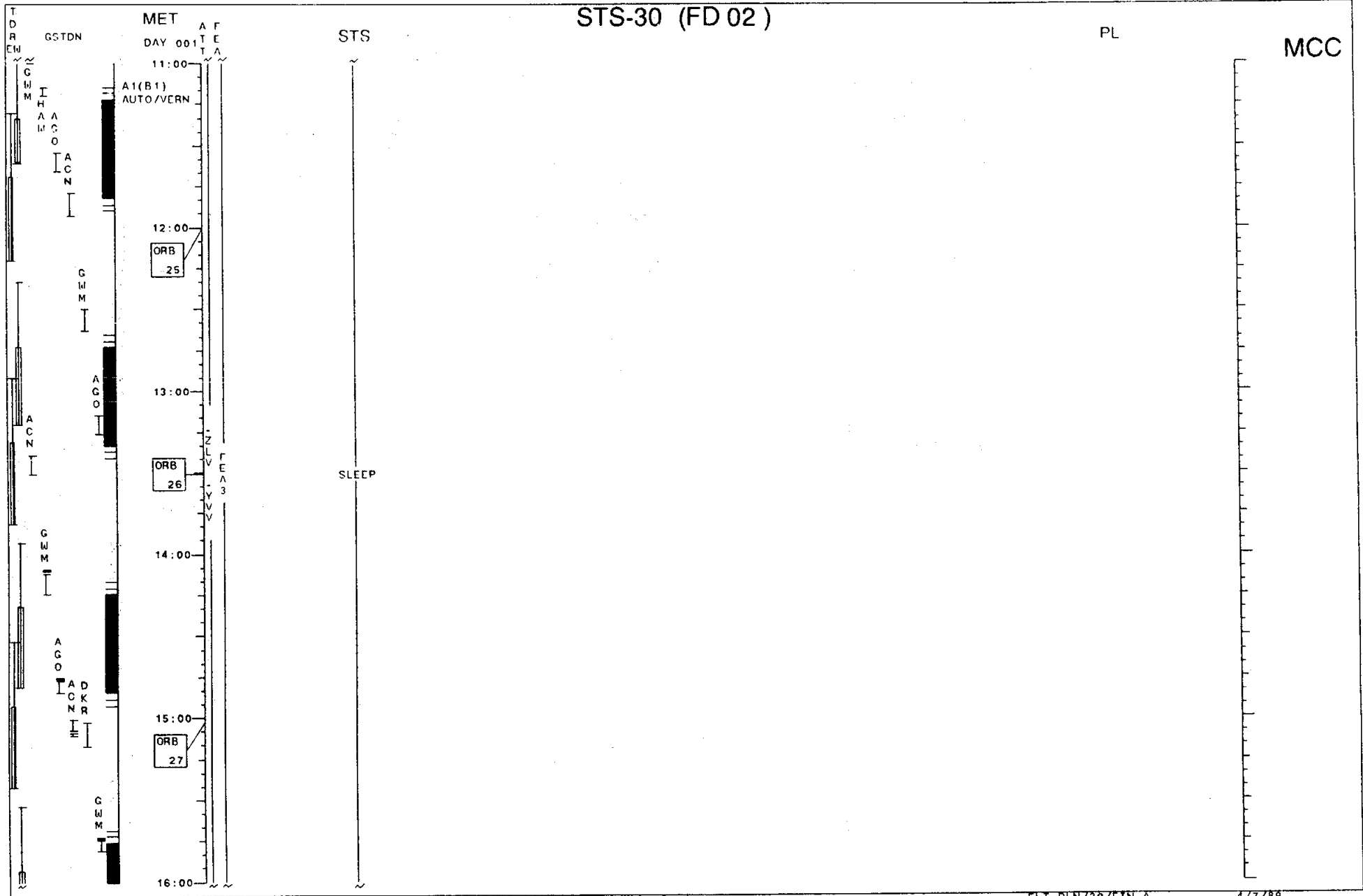
STS-30 (FD02)







STS-30 (FD 02)



STS-30 (FD 03)

MET
DAY 001

16:00
A1(B1)
AUTO/VERN

ORB 28

17:00

18:00
ORB 29

19:00

20:00
ORB 30

A1(B1)
AUTO/VERN

(A1)B5
MAN/VERN

21:00

TDR EN
GSTDN
D K R R M A D I I I
M M A A D X I I I
C A N N I
M I L L X H B D A I I I
M A X X I
Y A R C A N I I

A F T E R
Z L V
F E A 3
I M U
H U D

STS

SLEEP

FD03 EZ ACTIVITIES:

SALIVARY SCOP/DEX KINETICS (DSO 457)
(MED FS, MED DSO's) (5 min/CDR,MS2)
Samples at 24,36 hours post-dosing.
CENTRAL VEINOUS PRESSURE (DSO 462)
(MED FS, MED DSO's) (5 min/CDR,PLT)
Perform in Post-sleep and Pre-sleep.

✓Paper Stacking in TAGS
Paper Tray
Report Status to MCC

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

Do FC PURGE MANUAL (CUE CARD)

USE LAST TAGS MESSAGE
To sort Crew Messages
from TAGS DTO pages

MNVR IMU ALIGN ATT
STAR PAIR (D1)
A/AUTO/VERN (20:00) Init MNVR
IMU ALIGN - S TRK (ORB OPS)
MNVR COAS CAL ATT
R=143 P=168 Y=340
A/AUTO/VERN (20:20) Init MNVR
HUD B/U TO COAS (DTO 785) DATA TAKE 2
(ORB OPS, HUD DTO)
Perform Steps 1,2,3,6
Change DAP B to B1

PL

FD03 EZ ACTIVITIES:

EXERCISE (1 Hr/All)
FOOD PREP/POST (Cue card)(30 Min)
RCS REGULATOR RECONFIGURE
07/08 He PRESS A(three)-CL(tb-CL)
B(three)-GPC(tb-OP)
Perform A.M.(5 MIN)

Record MET ___ / ___ : ___
HEATER RECONFIG - B (ORB OPS, EPS)
Perform A.M. (5 Min)

Record MET ___ / ___ : ___
ECLS REDUNDANT COMPONENT C/O
(ORB OPS, ECLS)(10 Min)
Inform MCC when complete
PCS 1 (2) CONFIG (ORB OPS,ECLS)
Config Sys 2 (5 Min/2 Cmn)

Record MET ___ / ___ : ___
CAB TEMP CNTL RECONFIG
MD44F Pin CAB TEMP CNTLR actuator
linkage to actuator 2
L1 CAB TEMP CNTLR-2
(5 MIN)
Record MET ___ / ___ : ___
L1 HUMIDITY SEP RECONFIG
HUMIDITY SEP B-OFF
A-ON

IMU ALIGN LOG

REOD ID:

-Y ___ , -Z ___ ANG ERR ___
1 2 3

ANG:

ΔX () . . . () . . . () . . .

ΔY () . . . () . . . () . . .

ΔZ () . . . () . . . () . . .

EXECUTION TIME:

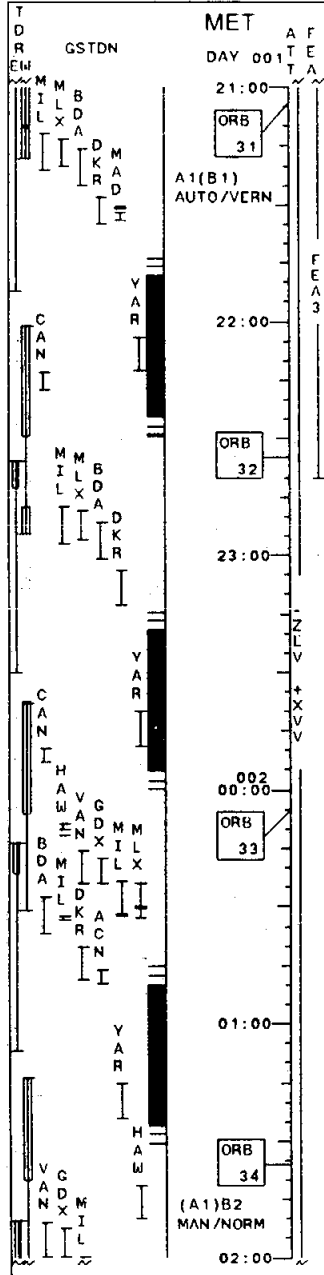
___ / ___ : ___ : ___

HUD CALIBRATION PAD

STAR ID: +X 19 , SPIGA
STAR AVAIL: 2 0:1 0 TO 2 0:5 3

MCC

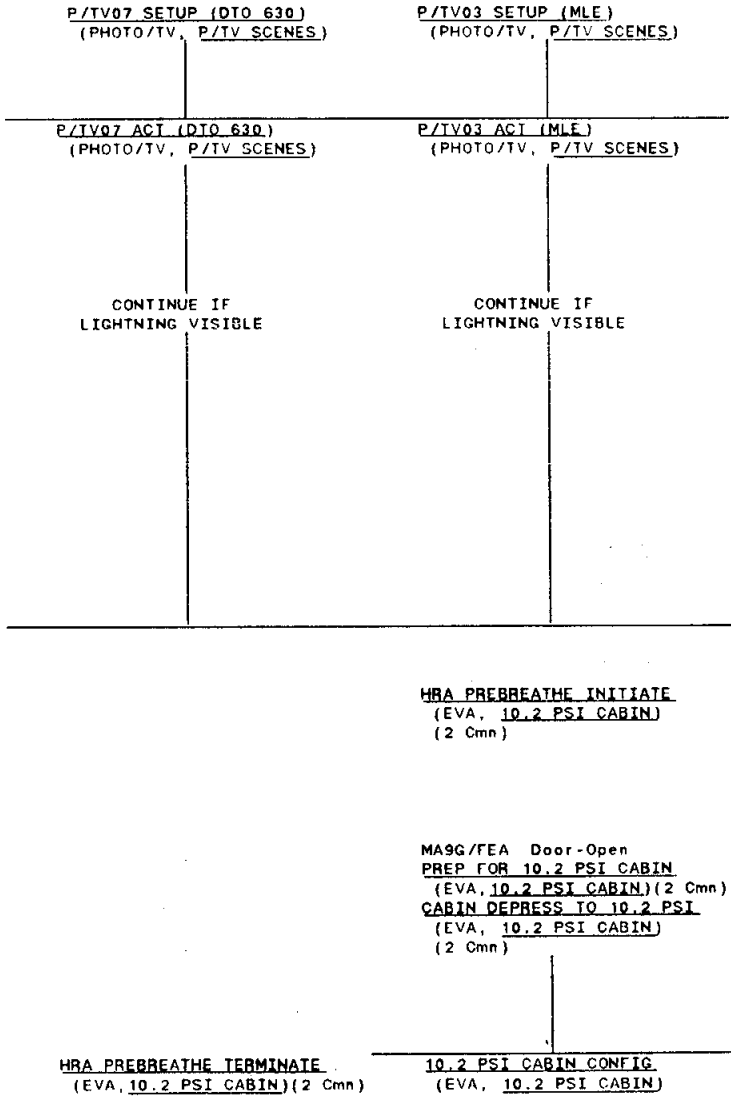
STS-30 (FD 03)



STS
MNVN (TRK) -ZLV +XVV
TC=2 BV=3 OM=180
A/AUTO/VERN Init TRK

EVA ASPIRIN PROTOCOL
(EVA, NOMINAL PROCS)

Change DAP B to B1

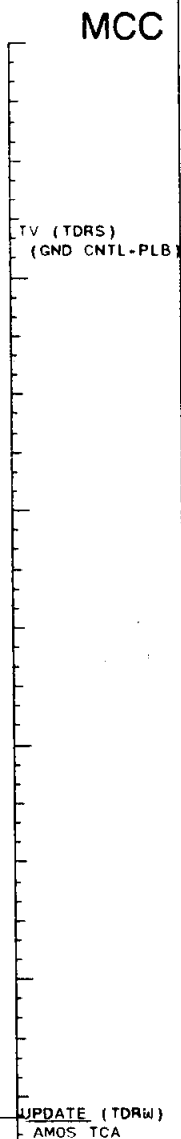


FEA TERMINATION SAMPLE 3
(PL OPS, FEA)

PGSC BATTERY TEST
(ORB OPS, PGSC DTO)

PGSC FLOPPY DISK BOOT TEST
(ORB OPS, PGSC DTO)

AMOS-RCS BURN
(ORB OPS, AMOS)
TCA 2/01:46:07

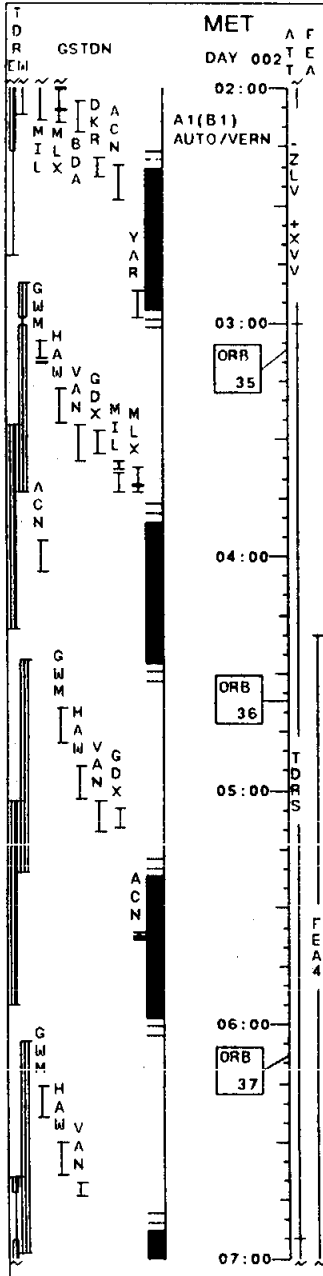


STS-30 (FD 03)

STS

PL

MCC



MET

DAY 002

02:00

A1(B1)
AUTO/VERN

03:00

ORB
35

04:00

ORB
36

05:00

06:00

ORB
37

07:00

TDRS MNVR

R=33 P=33 Y=10
A/AUTO/VERN (03:00) Init MNVR

MNVR IMU ALIGN ATT

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

MEAL
(All)

P/TV04 SETUP (FEA)
(PHOTO/TV, P/TV SCENES)

FEA RESET
(PL OPS, FEA)

P/TV04 AGT (FEA)
(PHOTO/TV, P/TV SCENES)

FEA ACTIVATION SAMPLE 4
(PL OPS, FEA)

TV (TORE)
(GND CNTL-CAB)

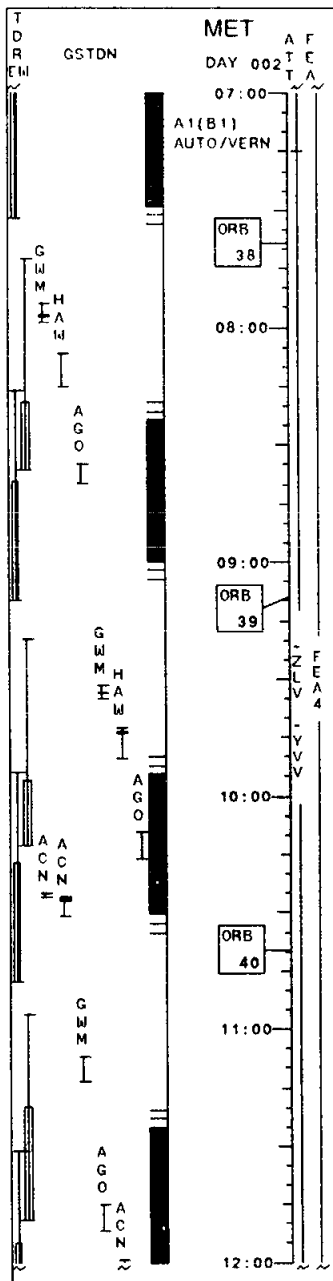
FEA STATUS
(PL OPS, FEA)

FEA STATUS
(PL OPS, FEA)

FEA STATUS
(PL OPS, FEA)

PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

STS-30 (FD 03)



STS

PL

MCC

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

✓Paper Stacking in TAGS
 Paper Tray
 Report Status to MCC

EMPTY TAGS PAPER TRAY

PRE-SLEEP ACTIVITY
 (ORB OPS, CREW SYS)

SLEEP

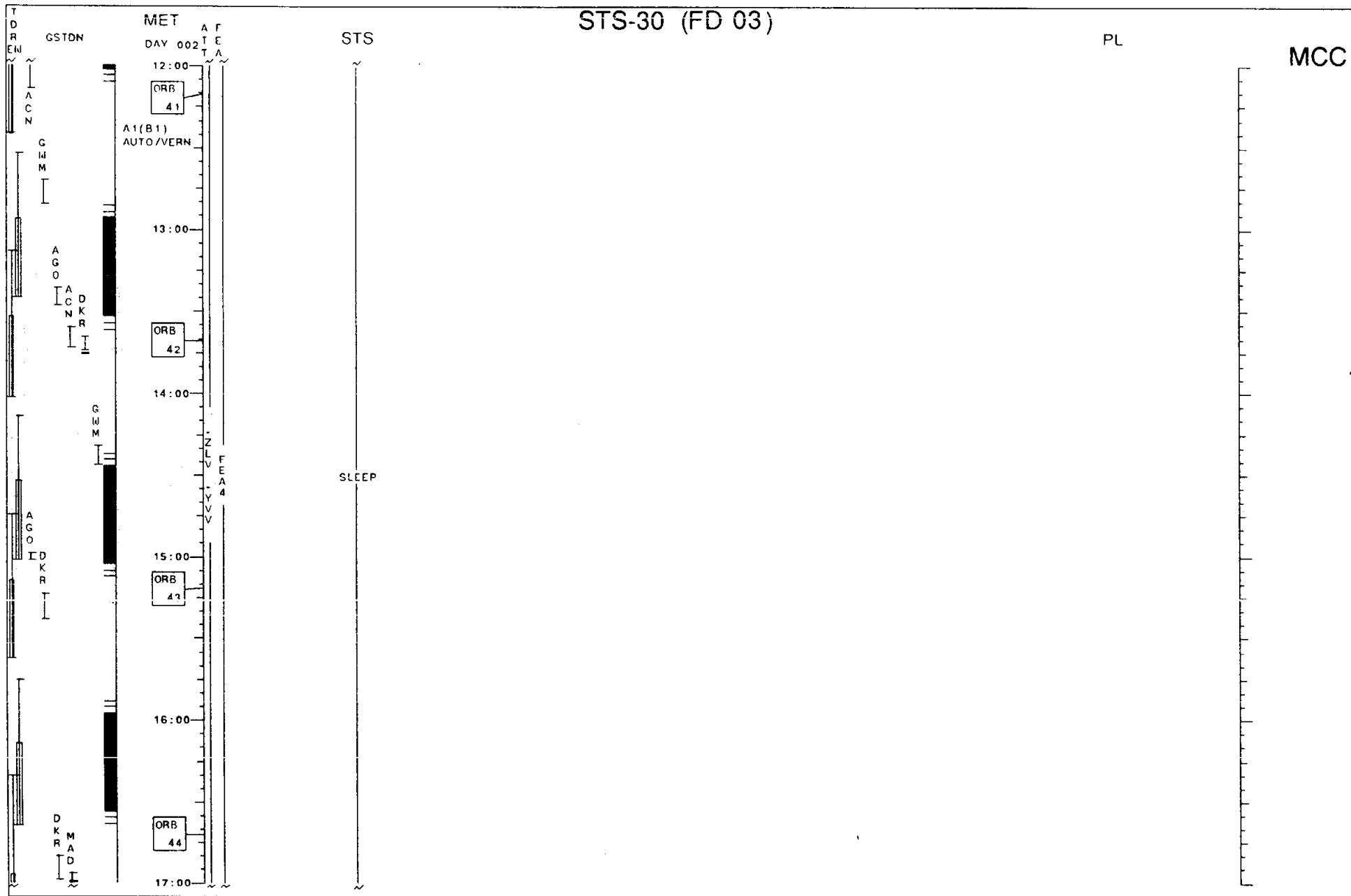
IMU ALIGN LOG
 REOD ID:

-Y _____ -Z _____ ANG ERR _____
 1 2 3

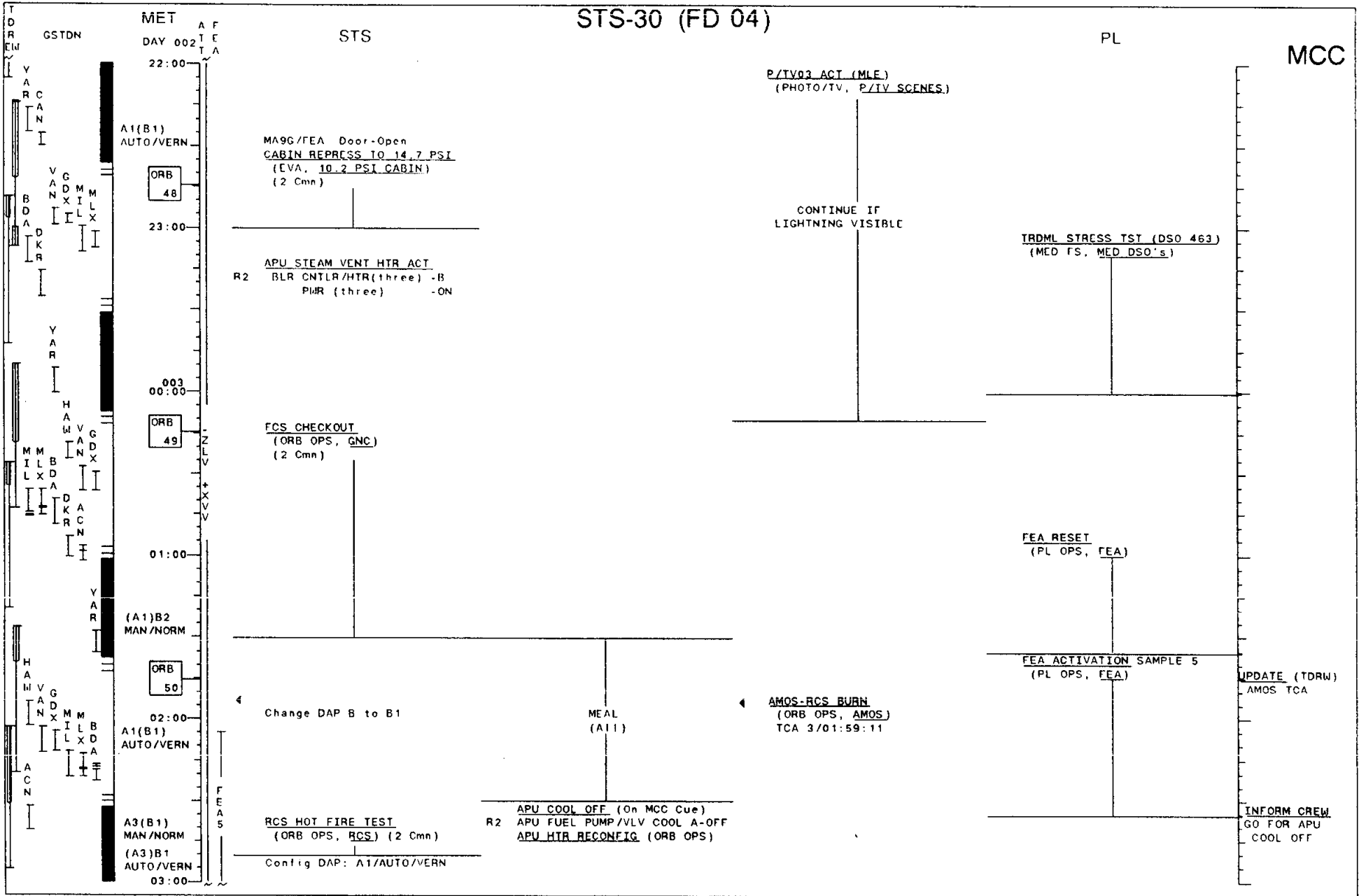
ANG:
 ΔX () _ _ _ () _ _ _ () _ _ _
 ΔY () _ _ _ () _ _ _ () _ _ _
 ΔZ () _ _ _ () _ _ _ () _ _ _

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

STS-30 (FD 03)



STS-30 (FD 04)



STS-30 (FD 04)

TDR EM

GSTDN

MET DAY 003

AFTER

03:00

ORB 51

A1(B1) AUTO/VERN

04:00

ORB 52

ZLV

05:00

FEAS

06:00

ORB 53

(A1)B2 MAN/NORM A1(B1) AUTO/VERN 07:00

IMU

08:00

ORB 54

STS

CABIN CONFIG/STOW (A11)

Do not perform ECLS, supply dump or FC PURGE until 3/06:55

Change DAP B to B1

PRE-SLEEP ACTIVITY (ORB OPS, CREW SYS)

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

✓Paper Stacking in TAGS Paper Tray

Report Status to MCC

EMPTY TAGS PAPER TRAY

IMU ALIGN LOG

READ ID:

-Y _____ -Z _____ ANG ERR _____

1 2 3

ANG:

ΔX () () () ()

ΔY () () () ()

ΔZ () () () ()

EXECUTION TIME:

___/___/___ : ___:___:___

PL

FEA STATUS (PL OPS, FEA)

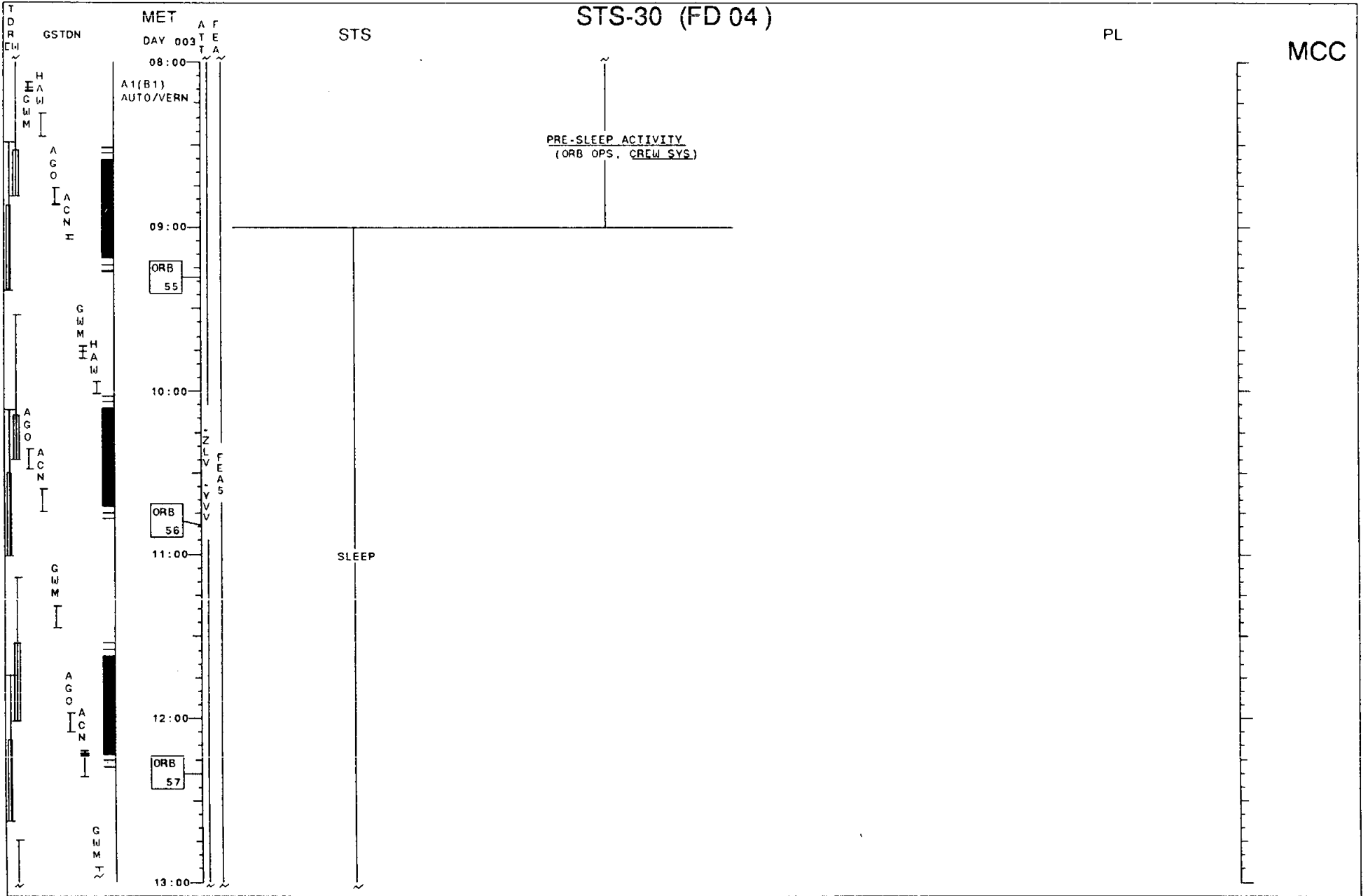
FEA STATUS (PL OPS, FEA)

FEA STATUS (PL OPS, FEA)

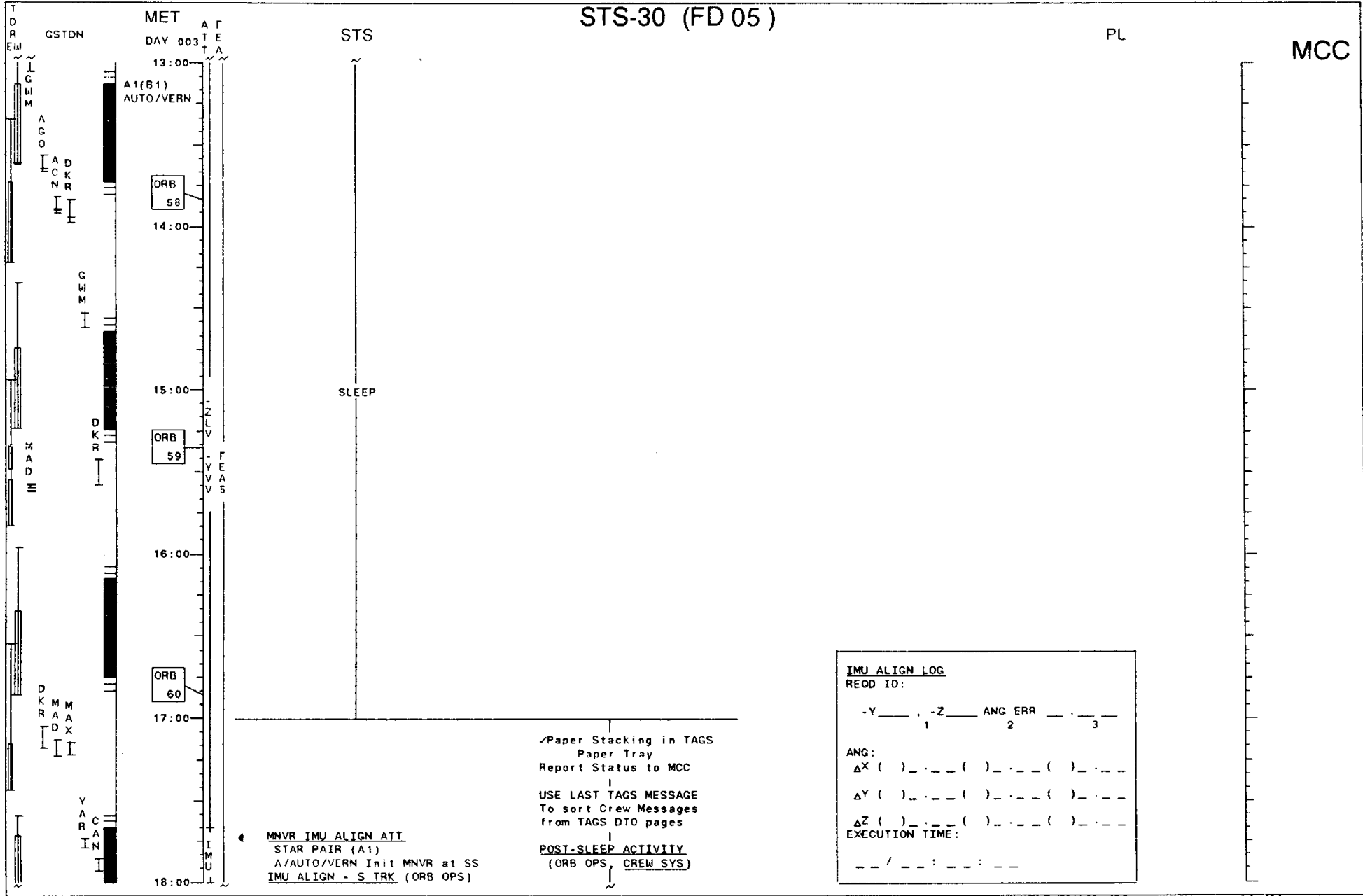
MCC

UPDATE (TDRW) AMOS TCA

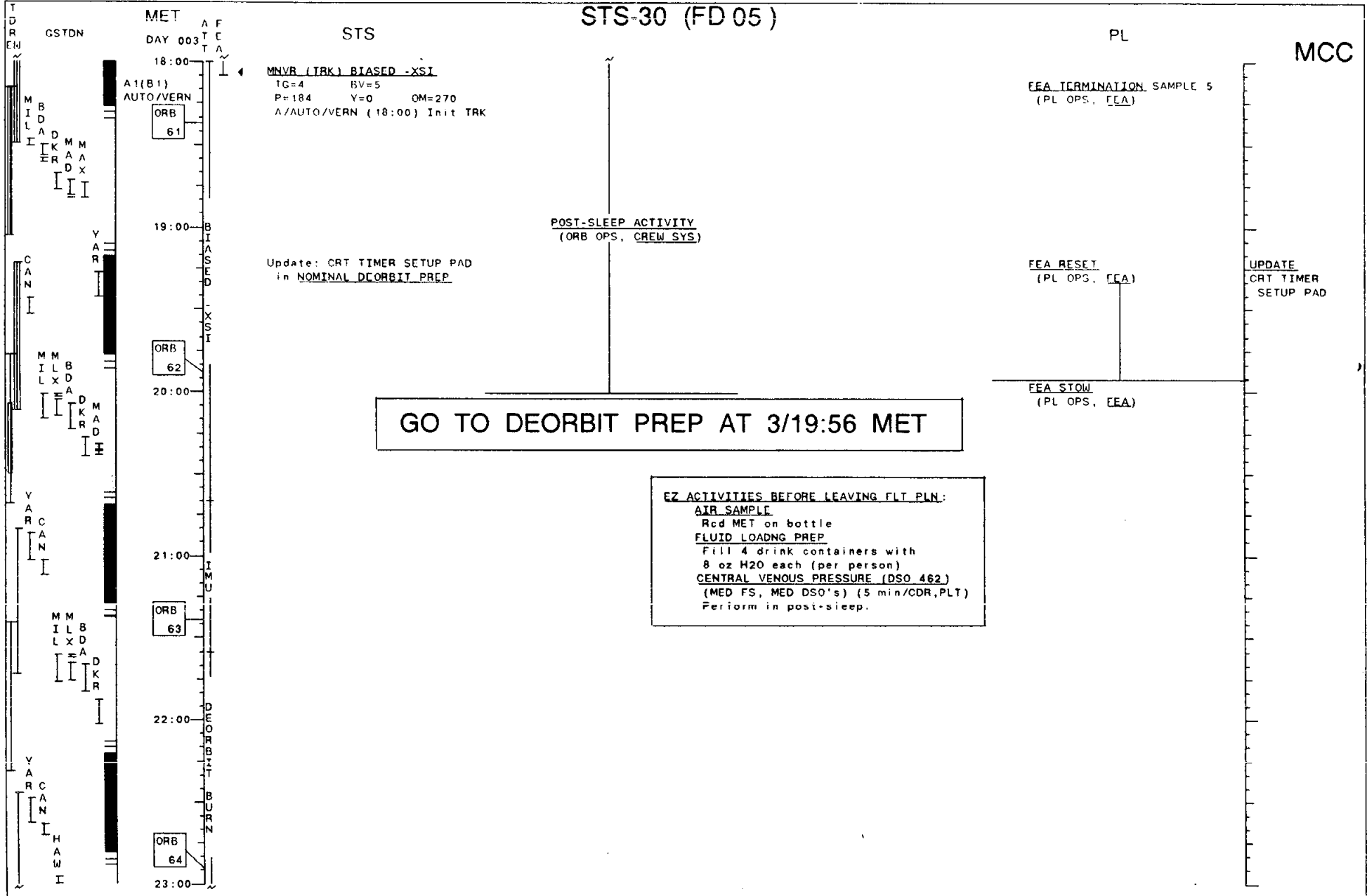
AMOS-RCS BURN (ORB OPS, AMOS) TCA 3/06:48:26



STS-30 (FD 05)



STS-30 (FD 05)



CONTINGENCY TIMELINES

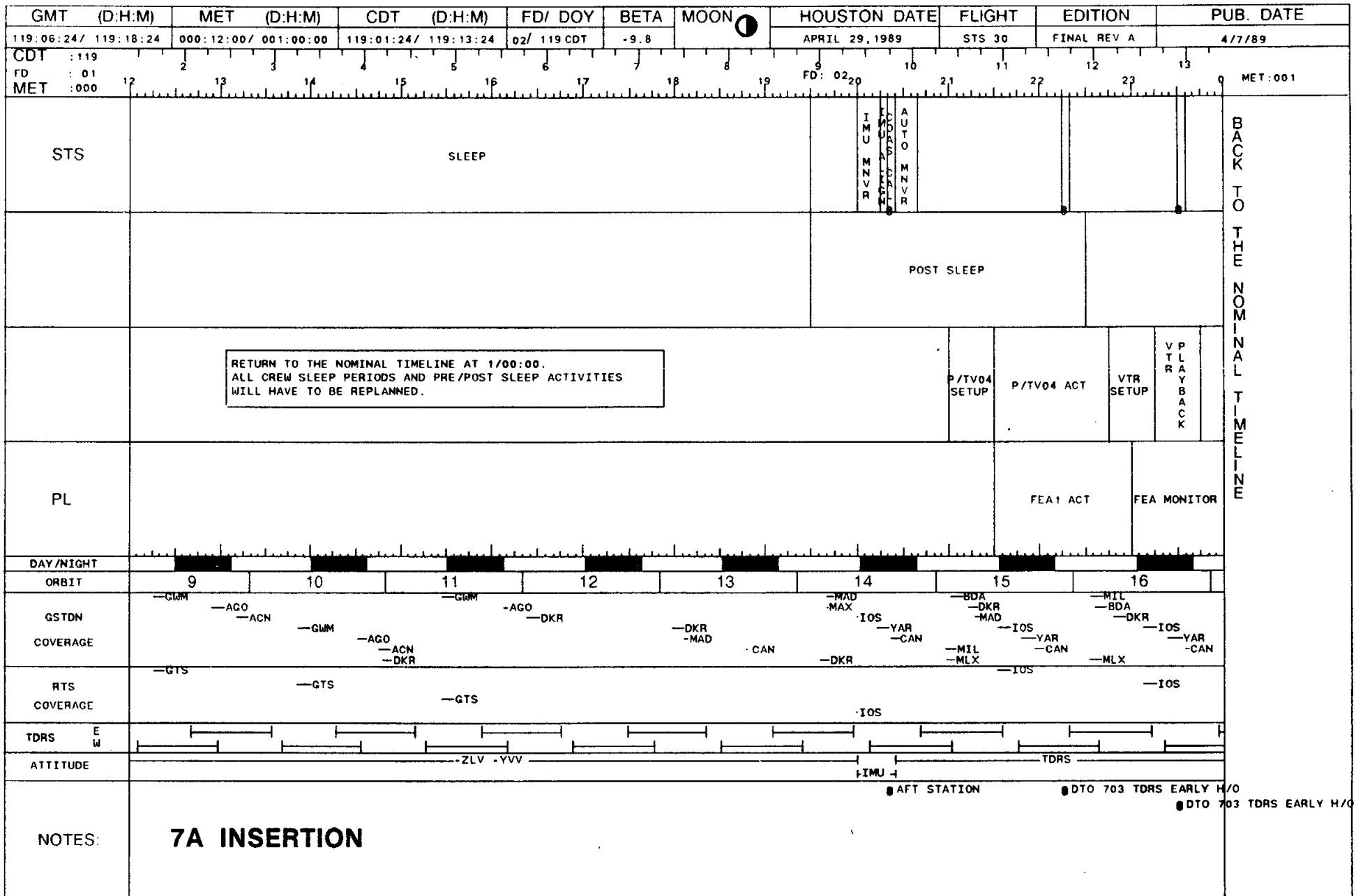
7A MAGELLAN INSERTION..... 4A-1
8A MAGELLAN INSERTION..... 4B-1
16A MAGELLAN INSERTION..... 4C-1
17A MAGELLAN INSERTION..... 4D-1
18A MAGELLAN (EVA) INSERTION..... 4E-1

CONTINGENCY
TIMELINES

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7A MAGELLAN INSERTION

The 7A Insertion Timeline is designed to accommodate delaying deployment of MGN to the 7A insertion opportunity. The nominal timeline is used until the GO/NO-GO point in the deploy countdown for the nominal (6A insertion) timeline. The timeline is based on the nominal Cycle 2A OMS-2 insertion.

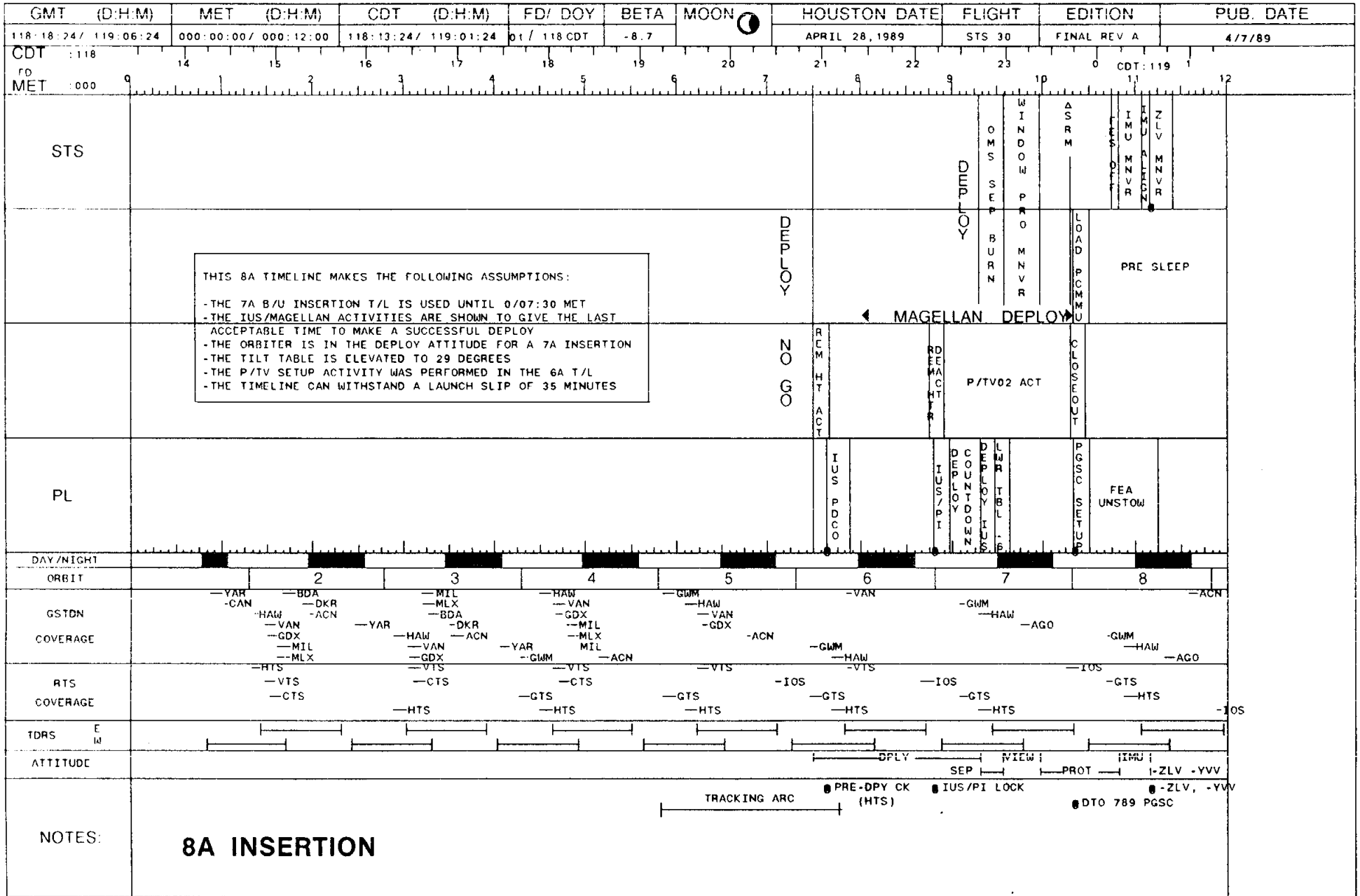


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8A MAGELLAN INSERTION

The 8A Insertion Timeline is designed to accommodate delaying deployment of MGN for the 8A insertion opportunity. The 7A insertion timeline is used up to the GO/NO-GO decision point in the deploy countdown. An 8A insertion will be considered if a high probability of deploying exists or if a 16A insertion cannot be accommodated due to orbiter or IUS/MGN problems. Additional assumptions are shown on page 4B-2. The timeline is based on the nominal Cycle 2A OMS-2 insertion.

8A MGN



GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE	
119:06:24 / 119:18:24	000:12:00 / 001:00:00	119:01:24 / 119:13:24	01 / 119 CDT	-9.8	☾	APRIL 29, 1989	STS 30	FINAL REV A	4/7/89	
CDT :119										
FD	12	13	14	15	16	17	18	19	20	
MET :000										
STS	SLEEP							IMU MUM RVM RZM RZM	AUTO RZM	
	PRE SLEEP								POST SLEEP	
	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> RETURN TO THE NOMINAL TIMELINE AT 1/00:00. ALL CREW SLEEP PERIODS AND PRE/POST SLEEP ACTIVITIES WILL HAVE TO BE REPLANNED. </div>								VTR SETUP	V P L A Y B A C K
PL										
DAY/NIGHT	[Day/Night Cycle]									
ORBIT	9	10	11	12	13	14	15	16		
GSTDN COVERAGE	-GUM	-AGO -ACN	-GUM	-AGO -DKR		-DKR	-CAN	-MIL -MLX -BDA -DKR	-MIL -BDA -DKR	
RTS COVERAGE	-GTS	-GTS	-GTS			-DKR	-YAR	-DKR -YAR -CAN	-YAR -CAN	
TDRS	[TDRS Coverage]									
ATTITUDE	-ZLV -YVV									
	AFT STATION									
NOTES:	8A INSERTION									

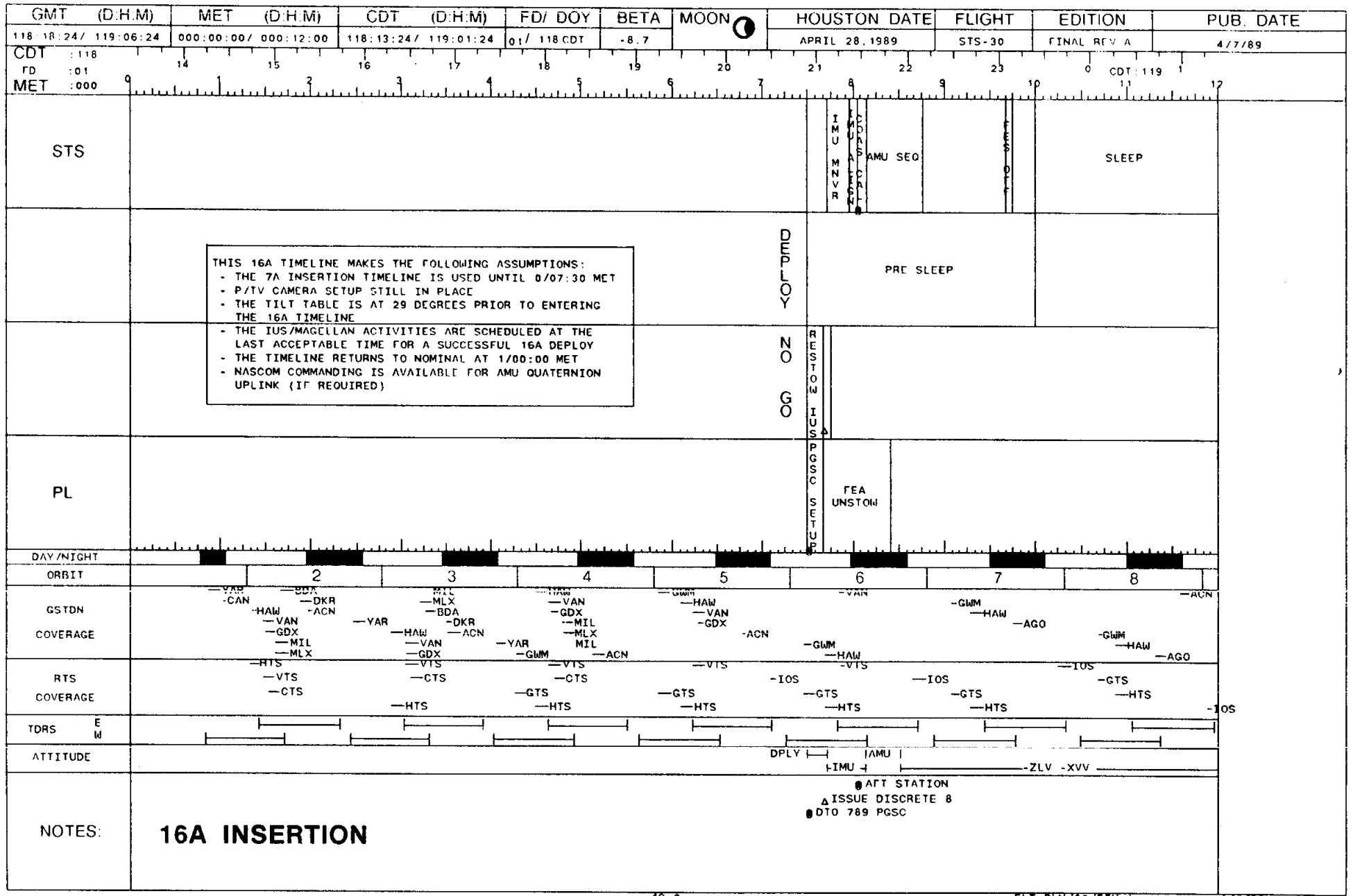
BACK TO THE NOMINAL TIMELINE

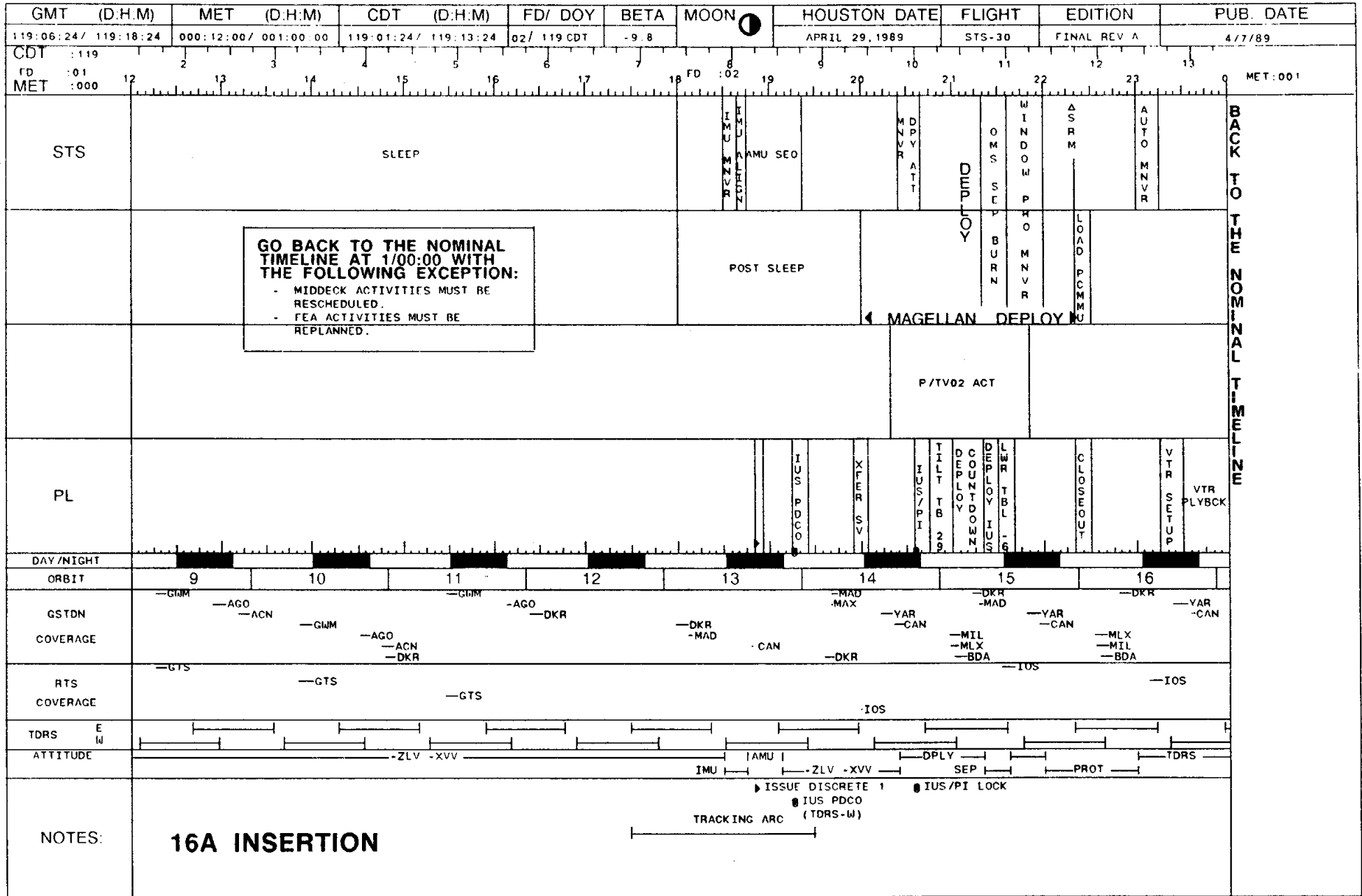
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16A MAGELLAN INSERTION

The 16A Insertion Timeline is designed to accommodate delaying deployment of MGN for the 16A insertion opportunity. The timeline assumes an attempt at 7A insertion failed at the GO/NO-GO decision point in the deploy countdown procedure. The timeline begins during crew pre-sleep and assumes the tilt table is at 29°, and that NASCOM commanding is available. Additional assumptions are shown on page 4C-2. The timeline is based on the nominal Cycle 2A OMS-2 insertion.

16A MGN





BACK TO THE NOMINAL TIMELINE

4 MAGELLAN DEPLOY

P/TV02 ACT

POST SLEEP

IMU
MNV
ATT
DPL
S
O
M
S
W
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D
O
W
P
A
S
R
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T
O
M
N
V
R

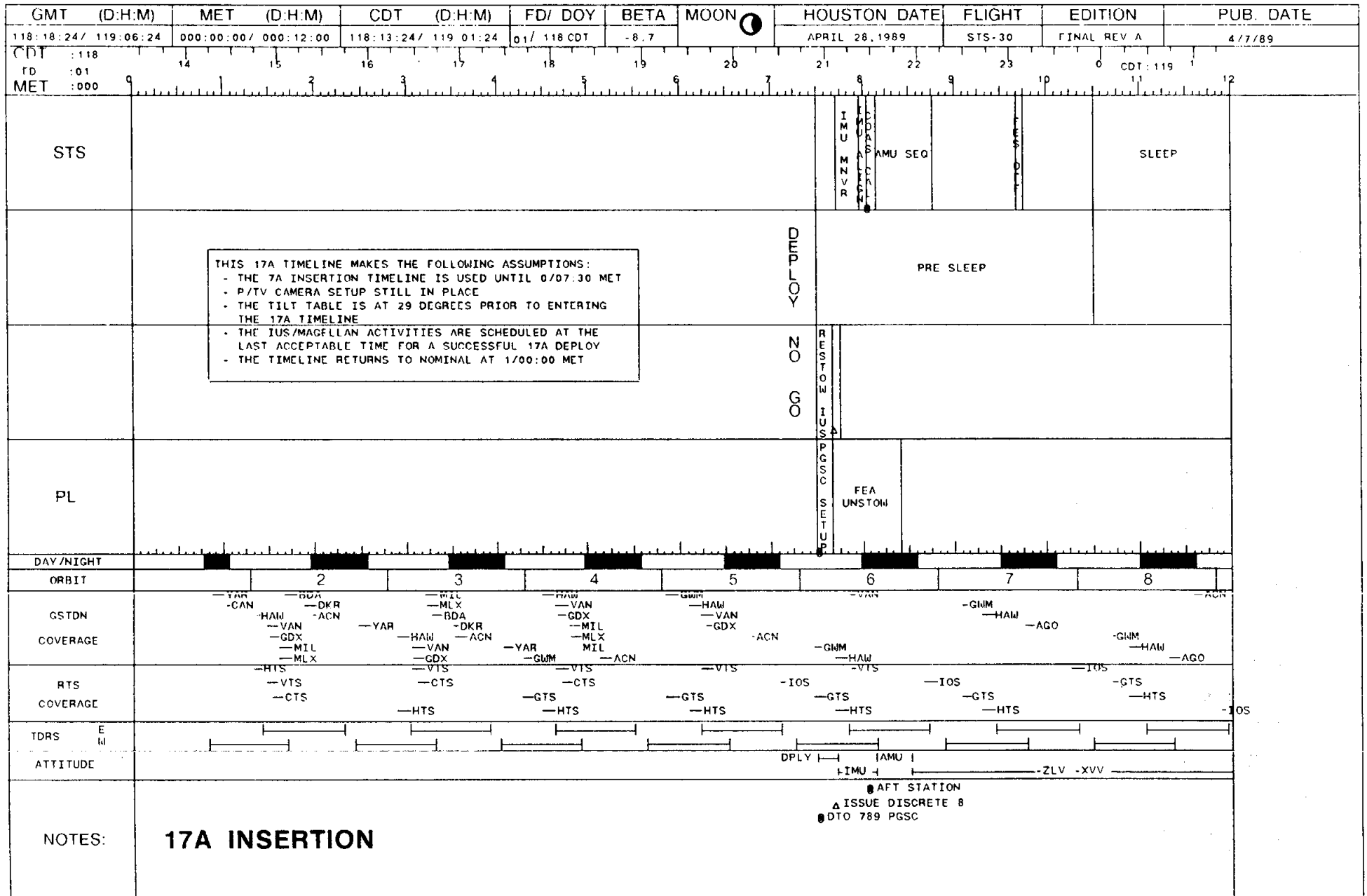
IUS
PDCO
XFER SV
IUS/PI
TILT
IUS/PI
C
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C
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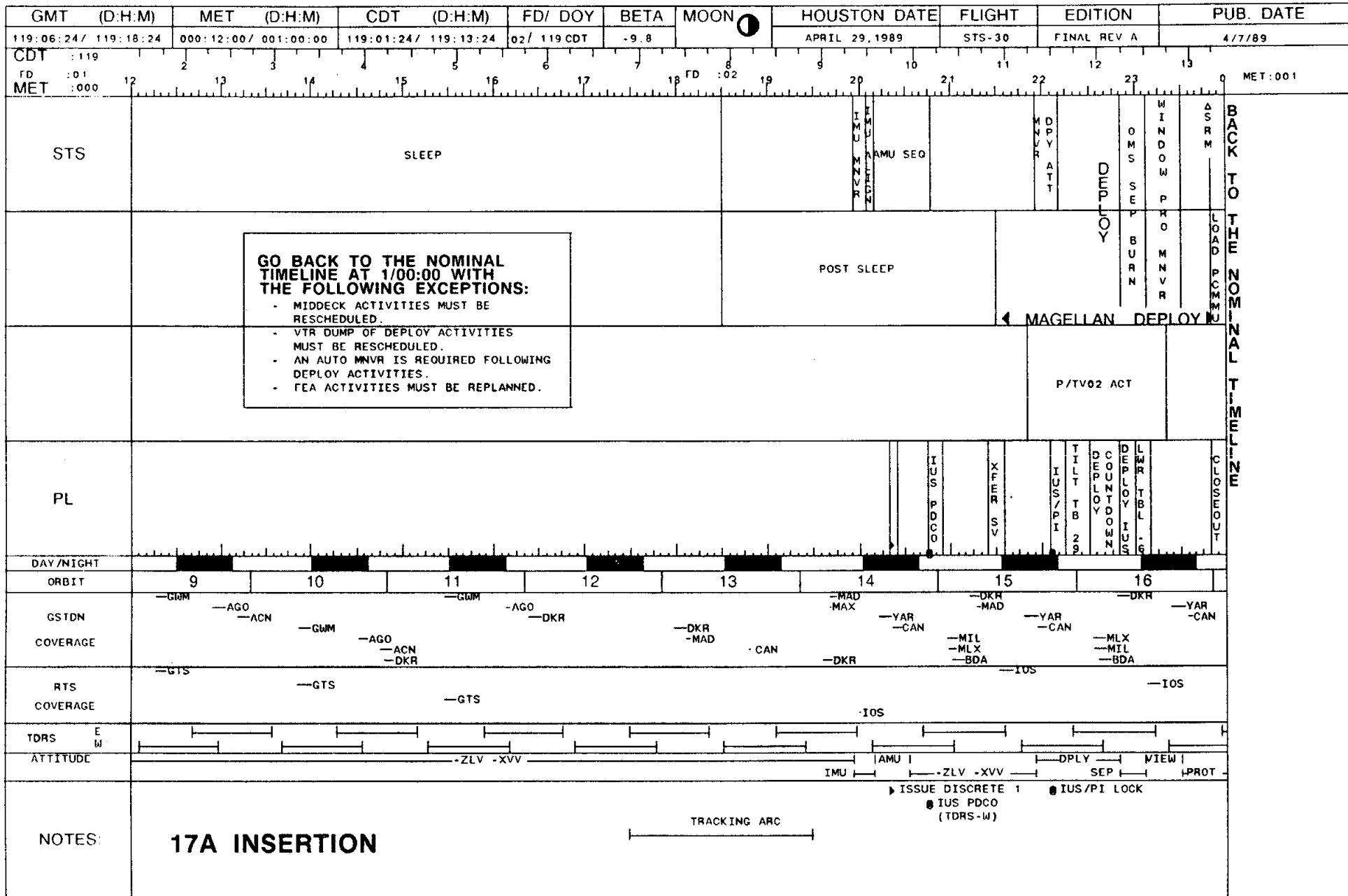
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17A MGN INSERTION

The 17A Insertion Timeline is designed to accommodate delaying deployment of MGN for the 17A insertion opportunity. The timeline assumes an attempt at 7A insertion failed at the GO/NO-GO decision point in the deploy countdown procedure. The timeline begins during crew pre-sleep and assumes the tilt table is at 29°. Additional assumptions are shown on page 4D-2. The timeline is based on the nominal Cycle 2A OMS-2 insertion.

17A MGN

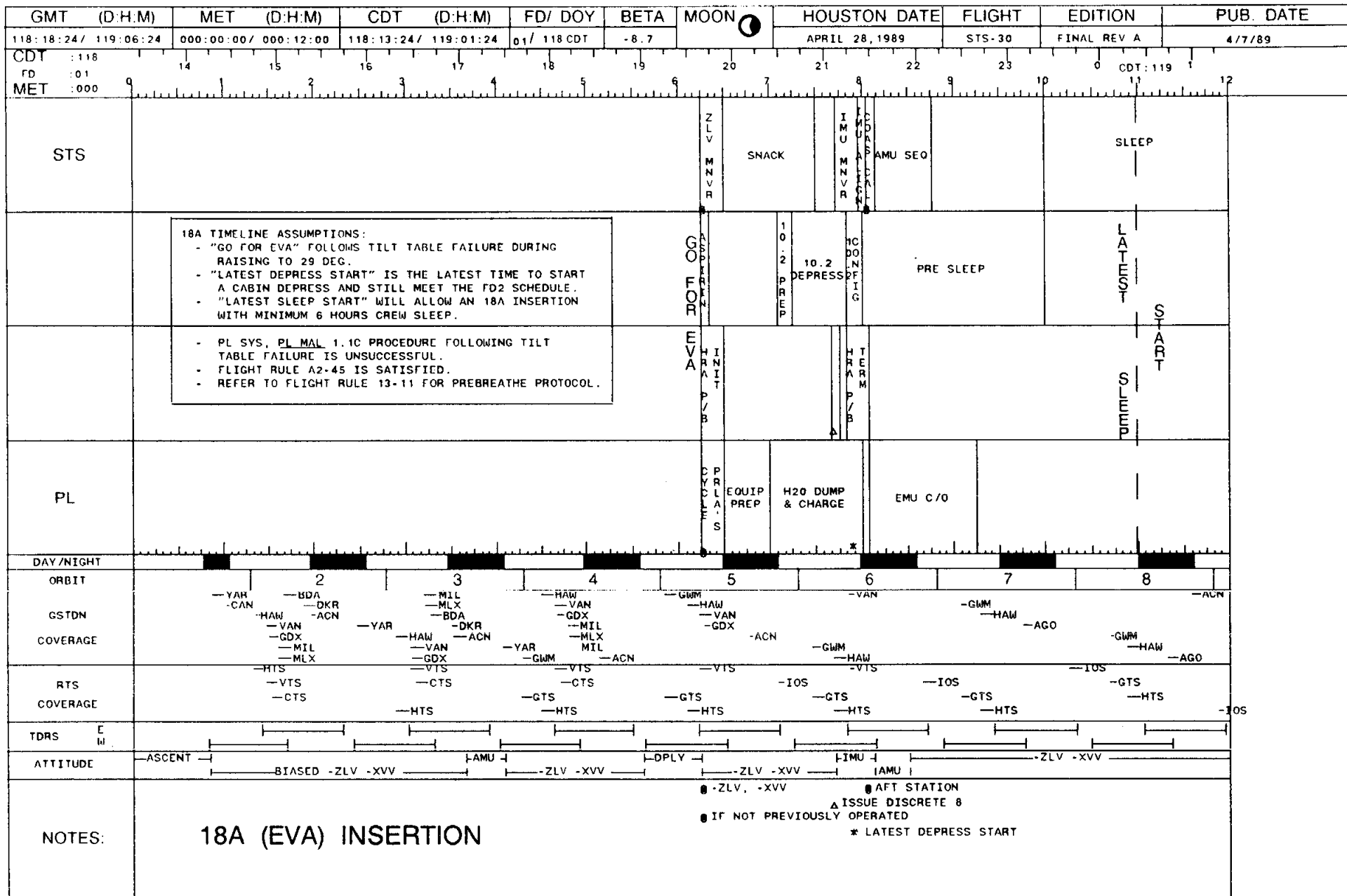


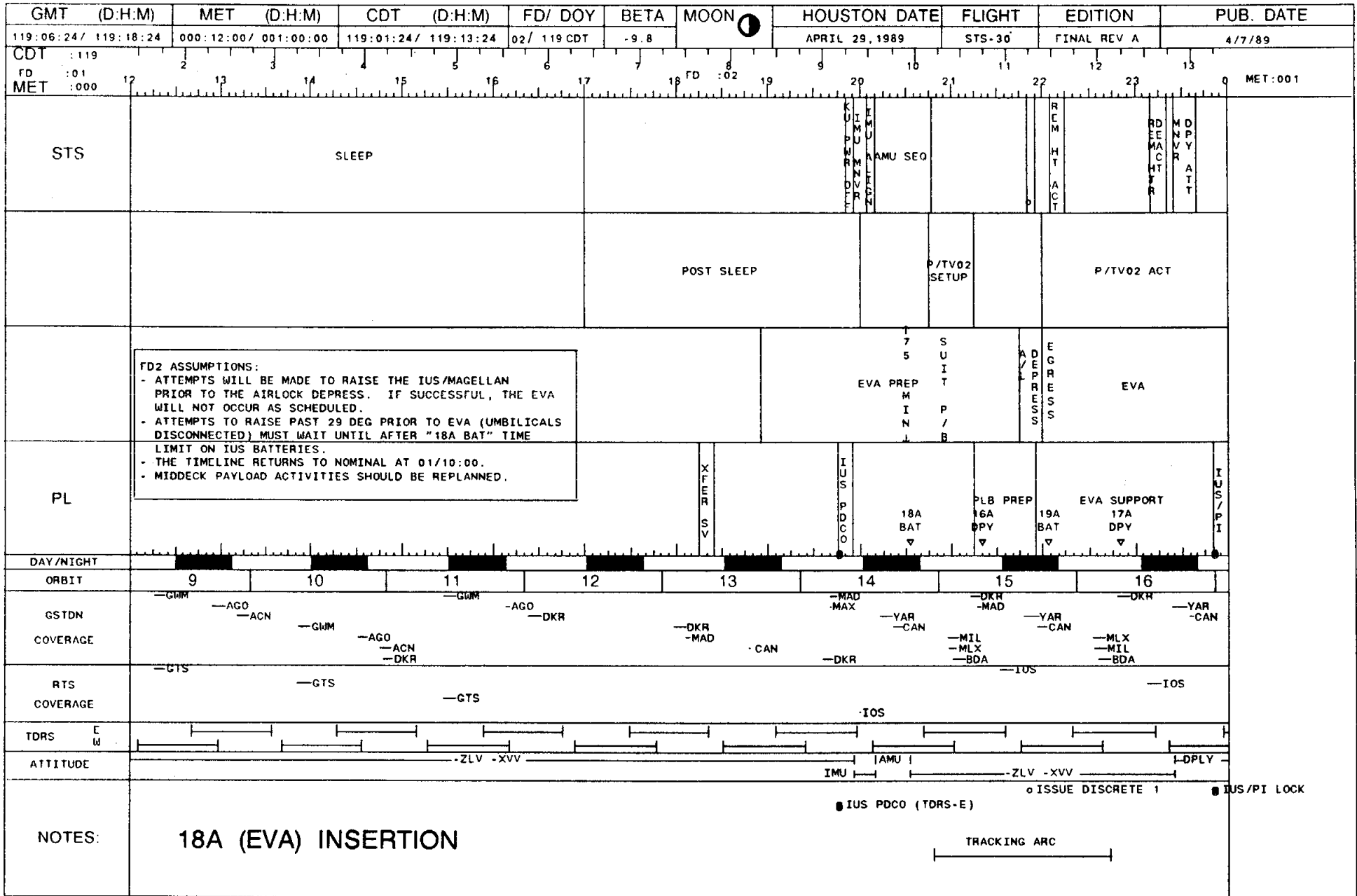


18A MGN (EVA) INSERTION

The 18A Insertion Timeline is designed to accommodate delaying deployment of MGN for the 18A insertion opportunity following an EVA to manually raise the tilt table. The decision to perform an EVA must be made by 6:15 MET in order to meet EVA preparation and equipment checkout constraints. The 10.2 psi cabin EVA protocol is used. There will be no Flight Day 1 EVA. The Contingency EVA Operations STS-30 Flight Supplement, Contingency EVA for Payload Failures Section, is the source document for the 18A insertion timeline. Additional assumptions are shown on pages 4E-2 and 4E-3. The timeline is based on the nominal Cycle 2A OMS-2 insertion.

18A MGN





GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/ DOY	BETA	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
119:18:24 / 120:06:24	001:00:00 / 001:12:00	119:13:24 / 120:01:24	02 / 119 CDT	-10.7	☉	APRIL 29, 1989	STS-30	FINAL REV A	4/7/89
CDT :119									
FD :02									
MET :001									
STS	DEPLOY	OMS SEP	WINDOW	SRM	AUTOMNVR	REPRESS			SLEEP
	P/TV02 ACT	BURN	PRO MNVR	LOAD PCMMU	VTR SETUP	MEAL			PRE SLEEP
	EVA	INGRESS	EGRESS	EVA	INGRESS	REPRESS	POST EVA	P/TV04 SETUP	P/TV04 ACT
PL	DEPLOY	DEPLOY	PLB PREP	EVA SUPPORT	PSUPP	FEA UNSTOW	FEA1 ACT	FEA MONITOR	FEA TERM
DAY/NIGHT									
ORBIT	17	18	19	20	21	22	23	24	
GSTDN	VAN	HAW	ACN	BDA	MIL	GWM	HAW	AGO	ACN
COVERAGE	MLX	MLX	MLX	MLX	MLX	MLX	MLX	MLX	MLX
RTS	VTS	VTS	VTS	VTS	VTS	VTS	VTS	VTS	VTS
COVERAGE	CTS	CTS	CTS	CTS	CTS	CTS	CTS	CTS	CTS
TDRS	SEP	VIEW	PROT	TDRS	TDRS	TDRS	TDRS	TDRS	TDRS
ATTITUDE	SEP	VIEW	PROT	TDRS	TDRS	TDRS	TDRS	TDRS	TDRS
NOTES:	<p>18A (EVA) INSERTION</p> <p>● DTO 789 PGSC</p> <p>● AFT STATION</p> <p>● -ZLV, -YVV</p>								

RETURN TO NOMINAL TIMELINE AT 1/10:00 MET

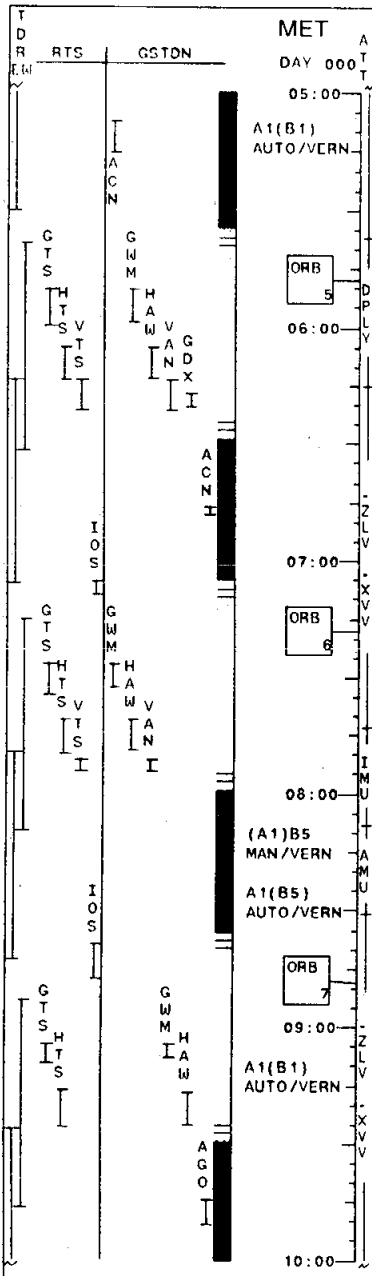
WITH THE EXCEPTION OF THE FOLLOWING ACTIVITIES:

- EMU MAIN/RECHRG
- POST EVA ENTRY PREP
- ALL SUBSEQUENT FEA ACTIVITIES MUST BE RESCHEDULED
- DTO/DSO ACTIVITIES MUST BE RESCHEDULED

STS-30 (FD01) 18A (EVA) INSERTION

PL

MCC



IMU ALIGN LOG
 REQD ID:
 -Y ____ , -Z ____ ANG ERR ____
 1 2 3

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

EXECUTION TIME:
 ____ / ____ : ____ : ____

COAS CALIBRATION LOG

STAR ID: -Z 20, ARCTURUS
 STAR AVAIL: 07:52 TO 08:35

-Z Δ BIAS ____

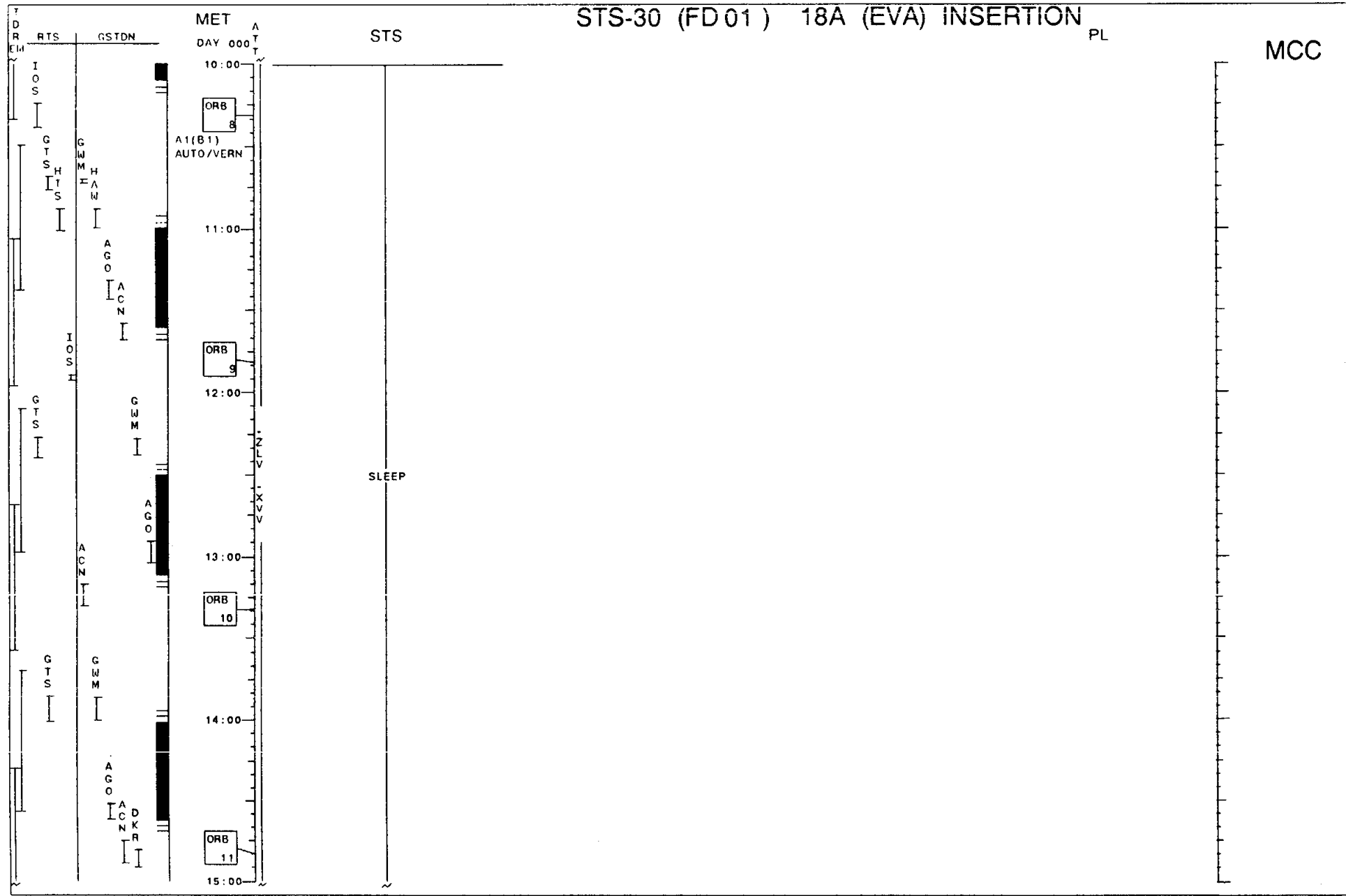
UPDATE TIME: ____ / ____ : ____ : ____

<p>MNVR (TRK) -ZLV, -XVV TG=2 BV=3 OM=0 A/AUTO/VERN Init TRK</p>	<p>EVA ASPIRIN PROTOCOL (EVA, NOMINAL PROCS)</p>	<p>HRA PREBREATHE INITIATE (EVA, 10.2 PSI CABIN) (2 Cmn)</p>	<p>CYCLE IUS PRLAS (If req'd) (IUS DPY, CONTINGENCY OPS)</p>	<p>UPDATE ATTITUDE FOR IUS STOWAGE, IMU ALIGN, SLEEP, AND PMC SCHEDULING</p>
<p>019 ✓COAS PWR-OFF Mount COAS-AFT</p>	<p>PREP FOR 10.2 PSI CABIN (EVA, 10.2 PSI CABIN)(2 Cmn) CABIN DEPRESS TO 10.2 PSI (EVA, 10.2 PSI CABIN) (2 Cmn)</p>	<p>RESET S/C DISC CMD INTERFACE (IUS DPY, CONTINGENCY OPS) HRA PREBREATHE TERMINATE (EVA, 10.2 PSI CABIN) (2 Cmn)</p>	<p>AIRLOCK PREP (EVA, EQUIP PREP) (2 Cmn)</p>	<p>H2O DUMP & H2O CHARGE (EVA, EMU MAINT/RECHARGE) EMU 1 & 2 (2 Cmn)</p>
<p>019 ✓COAS PWR - OFF Stow COAS Change DAP 8 to B1</p>	<p>10.2 PSI CABIN CONFIG (EVA, 10.2 PSI CABIN)</p>	<p>EMU CHECKOUT AT 10.2 PSI (EVA, EMU CHECKOUT) (2 Cmn)</p>	<p>IMU ALIGN - S TRK (ORB OPS) COAS CALIBRATION (ORB OPS) AMU SEQUENCE (08:09) (IUS DPY, PREDEPLOY CKS)</p>	<p>PRE-SLEEP ACTIVITY (ORB OPS, CREW SYS)</p>

STS-30 (FD 01) 18A (EVA) INSERTION

PL

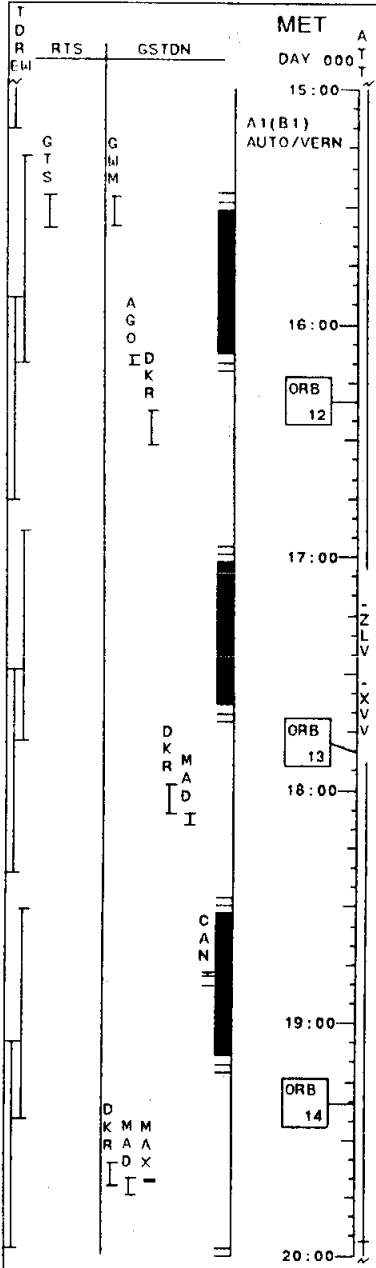
MCC



STS-30 (FD01) 18A (EVA) INSERTION

PL

MCC



STS
SLEEP

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

POST-SLEEP ACTIVITY
 (ORB OPS, CREW SYS)

EVA PREP
 (EVA, EVA PREP)
 (3 Cmn)

A1
KU PWR OFF
 /KU PWR - OFF
 /KU CNTL - CMD
MNVR IMU ALIGN ATT
 STAR PAIR (A2)
 A/AUTO/VERN (19:56) Init MNVR

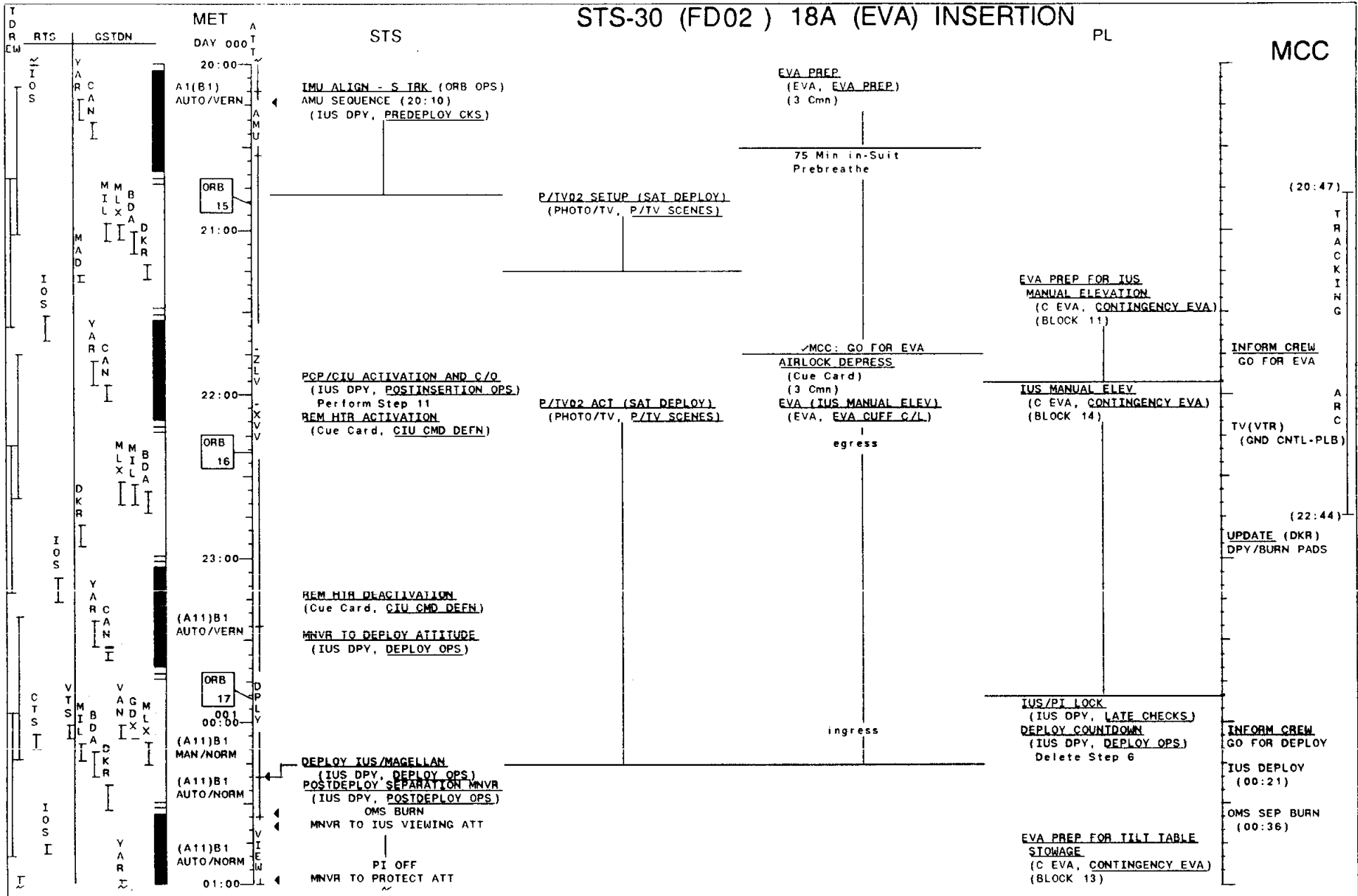
TRANSFER SV (TDRE)
 (IUS DPY, LATE CHECKS)

IUS PREDEPLOY C/O (TDRE)
 (IUS DPY, EARLY CHECKS)

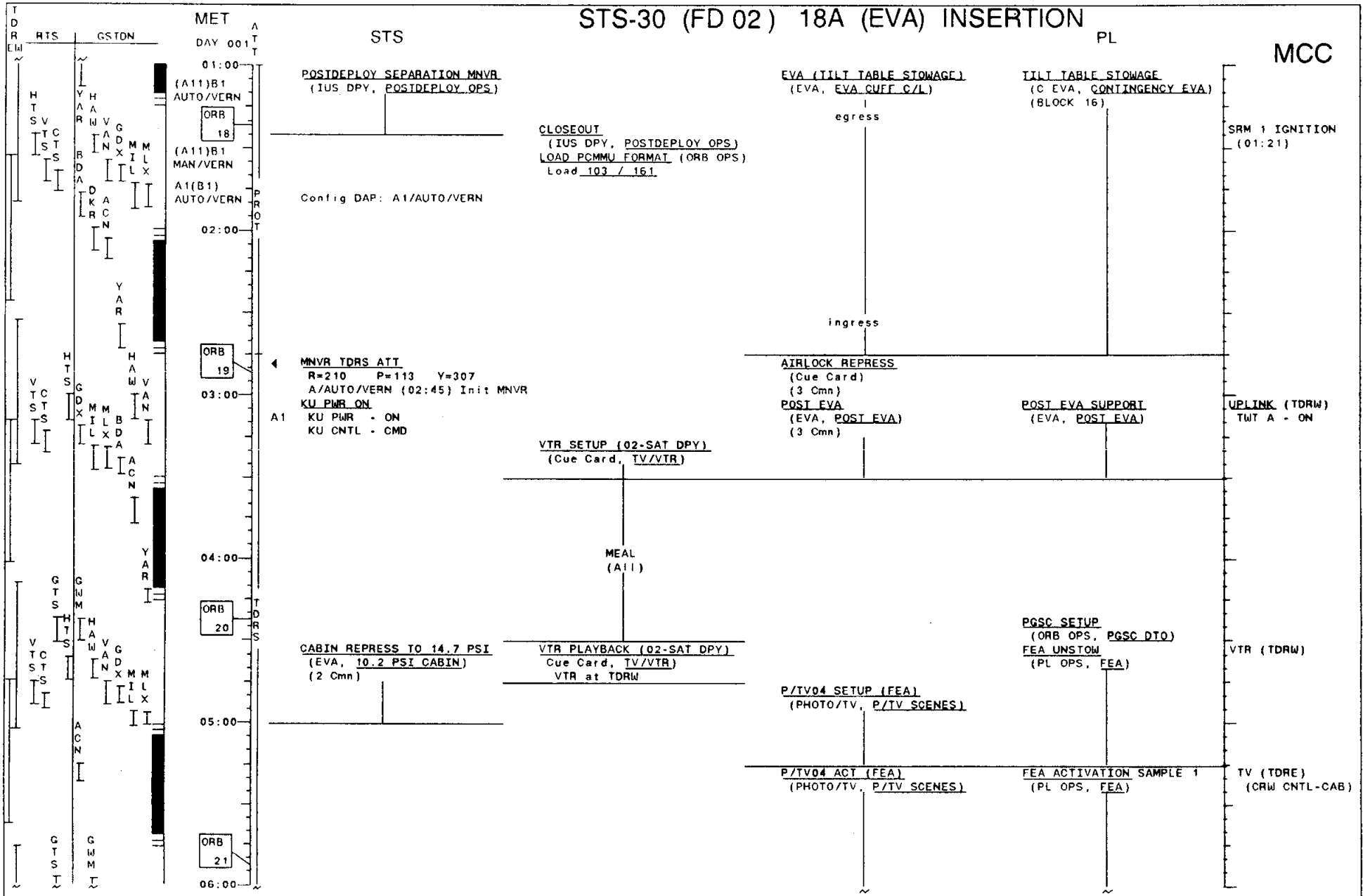
UPLINK (TDRE)
 ORB & TGT SV
INFORM CREW (TDRE)
 GO FOR SV XFER

INFORM CREW
 GO FOR PWR XFER
 GO FOR PDCO

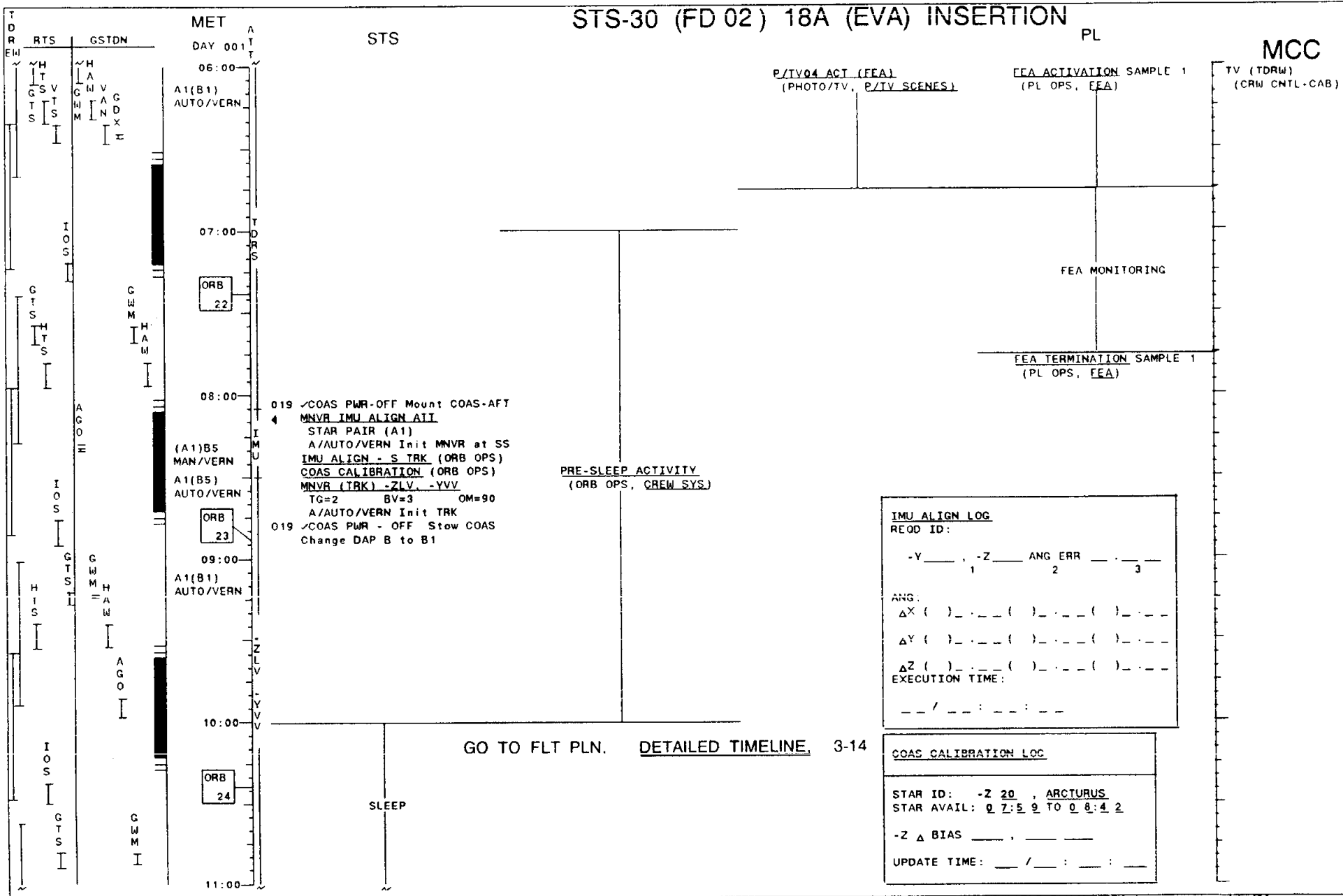
STS-30 (FD02) 18A (EVA) INSERTION



STS-30 (FD 02) 18A (EVA) INSERTION



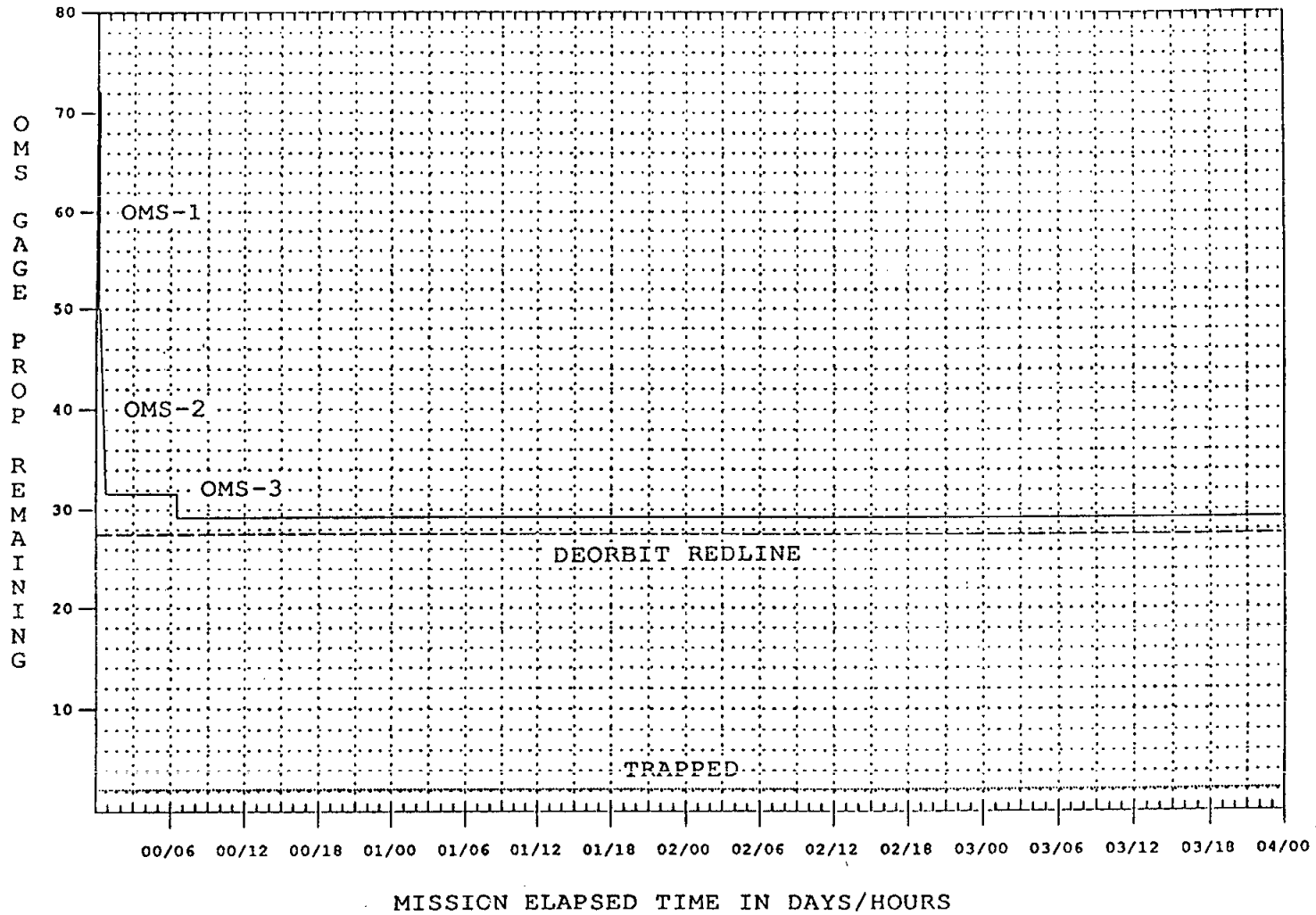
STS-30 (FD 02) 18A (EVA) INSERTION



CONSUMABLES CURVES

FIDP: CYCLE 2A GROUND RULES & CONSTRAINTS
CAP/ATL: BASIC, DECEMBER 20, 1988
CHARTS GENERATED BY: JOE R. INGERSOLL/R16G
CHARTS CHECKED BY: LARRY W. STRIMPLE/R16G
DATE OF GENERATION: MARCH 1, 1989

STS-30 OMS PROP REMAINING (% GAGE)

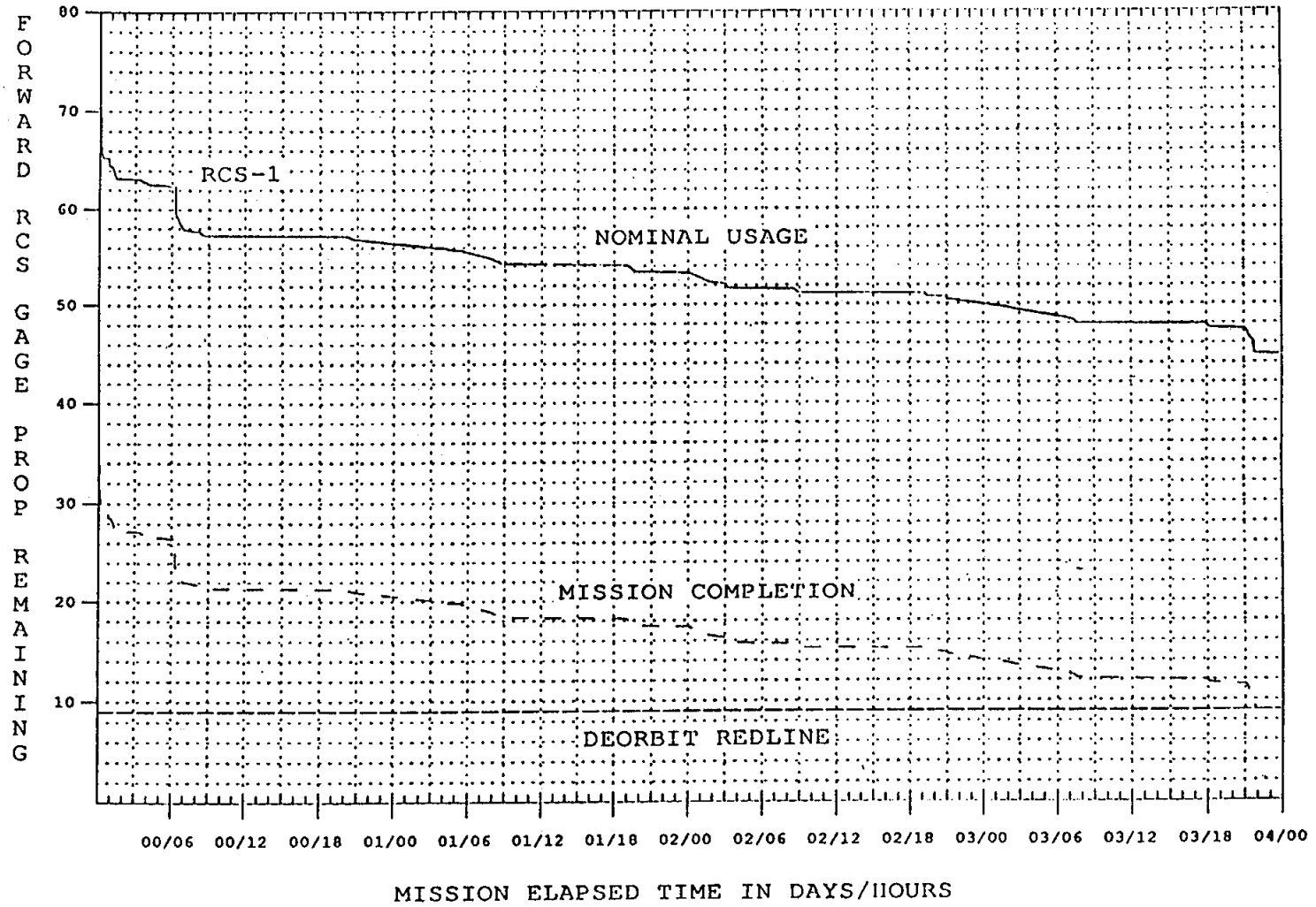


5-2

FLT PLN/30/FIN A

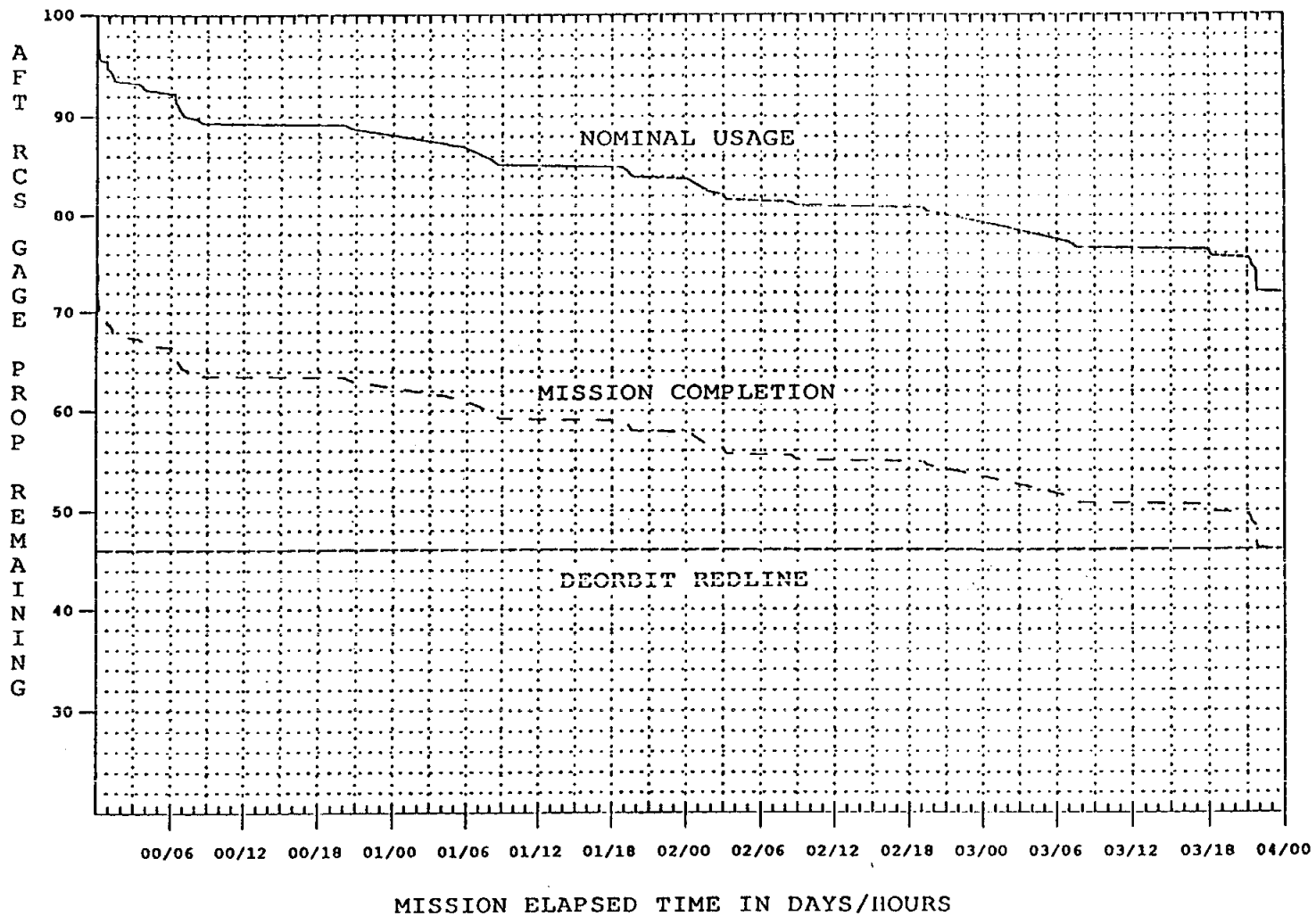
FIDP: CYCLE 2A GROUND RULES & CONSTRAINTS
CAP/ATL: BASIC, DECEMBER 20, 1988
CHARTS GENERATED BY: JOE R. INGERSOLL/R16G
CHARTS CHECKED BY: LARRY W. STRIMPLE/R16G
DATE OF GENERATION: MARCH 1, 1989

STS-30 FORWARD RCS PROP REMAINING (% GAGE)



FIDP: CYCLE 2A GROUND RULES & CONSTRAINTS
CAP/ATL: BASIC, DECEMBER 20, 1988
CHARTS GENERATED BY: JOE R. INGERSOLL/R16G
CHARTS CHECKED BY: LARRY W. STRIMPLE/R16G
DATE OF GENERATION: MARCH 1, 1989

STS-30 AFT RCS PROP REMAINING (% GAGE)



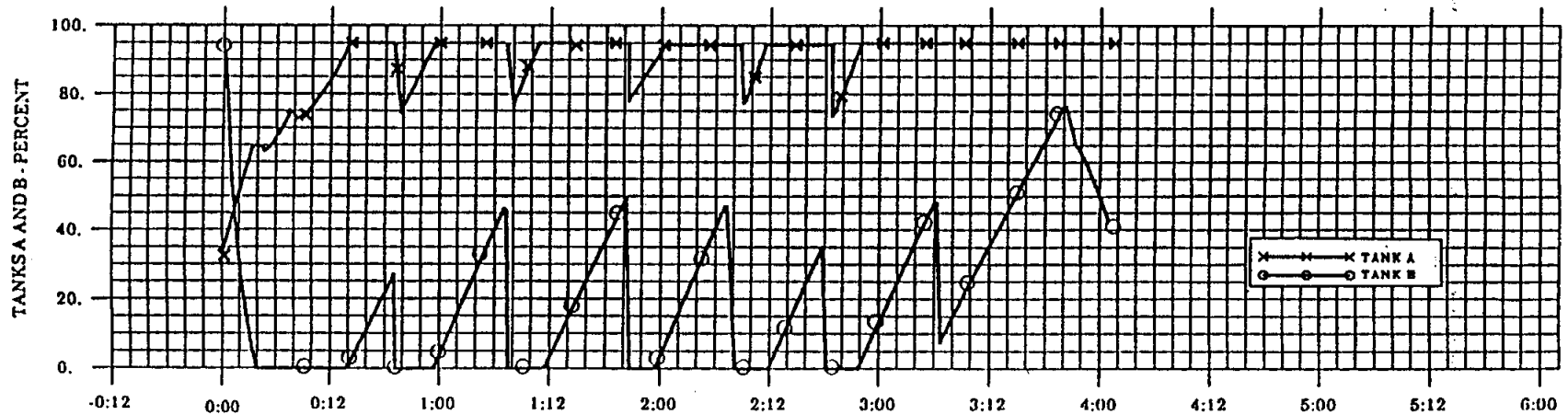
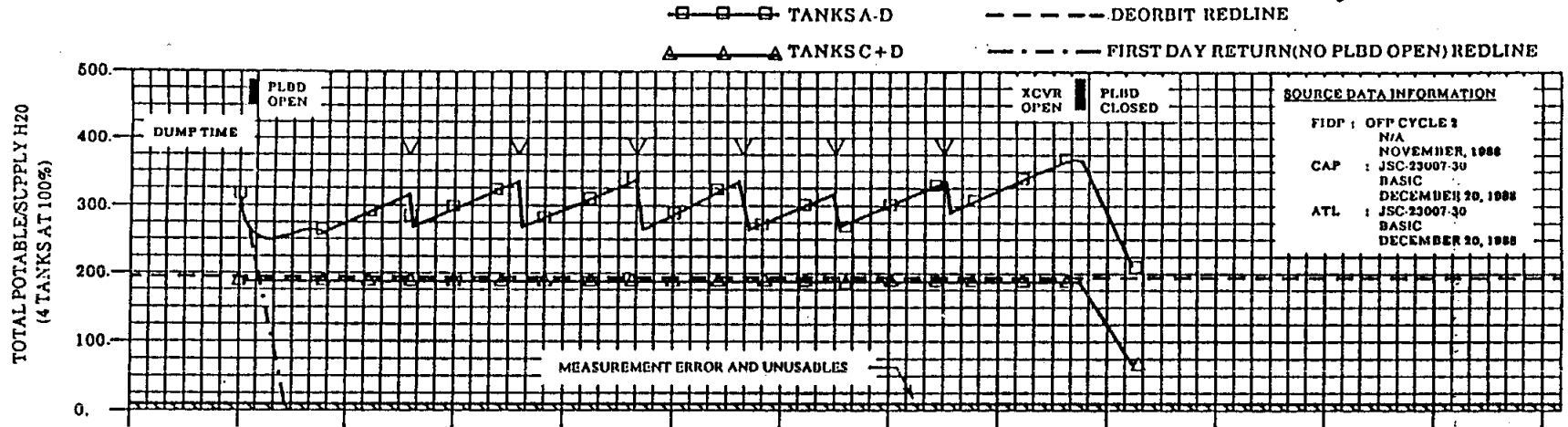
5-4

FLT PLN/30/FIN A

MISSION OPERATION DIRECTORATE
SYSTEMS DIVISION

PHILIP C. LAMCZYK
ANALYSIS DATE: 02/17/89
TRAJECTORY: OFP CYCLE 2

DATA CONFIRMED *Jrieder 2/24/89*



MISSION ELAPSED TIME, D:H

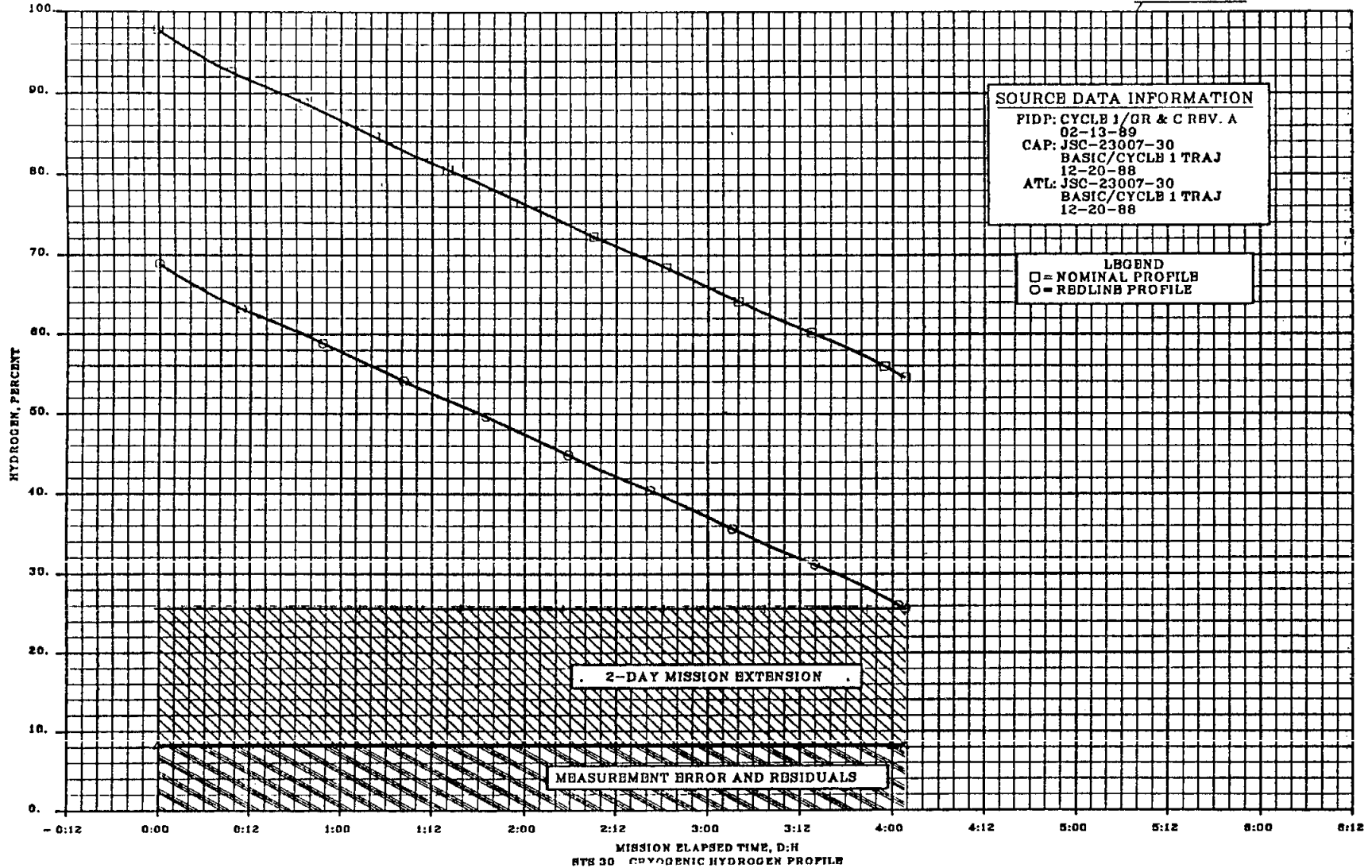
STS-30 SUPPLY WATER

5-5

FLT PLN/30/FIN A

DARREN E. PASBENDER
 ANALYSIS DATE: 02-24-89
 TRAJ CYCLE: CYCLE 2

MISSION OPERATIONS DIRECTORATE
 SYSTEMS DIVISION
 DATA CONFIRMED *[Signature]*

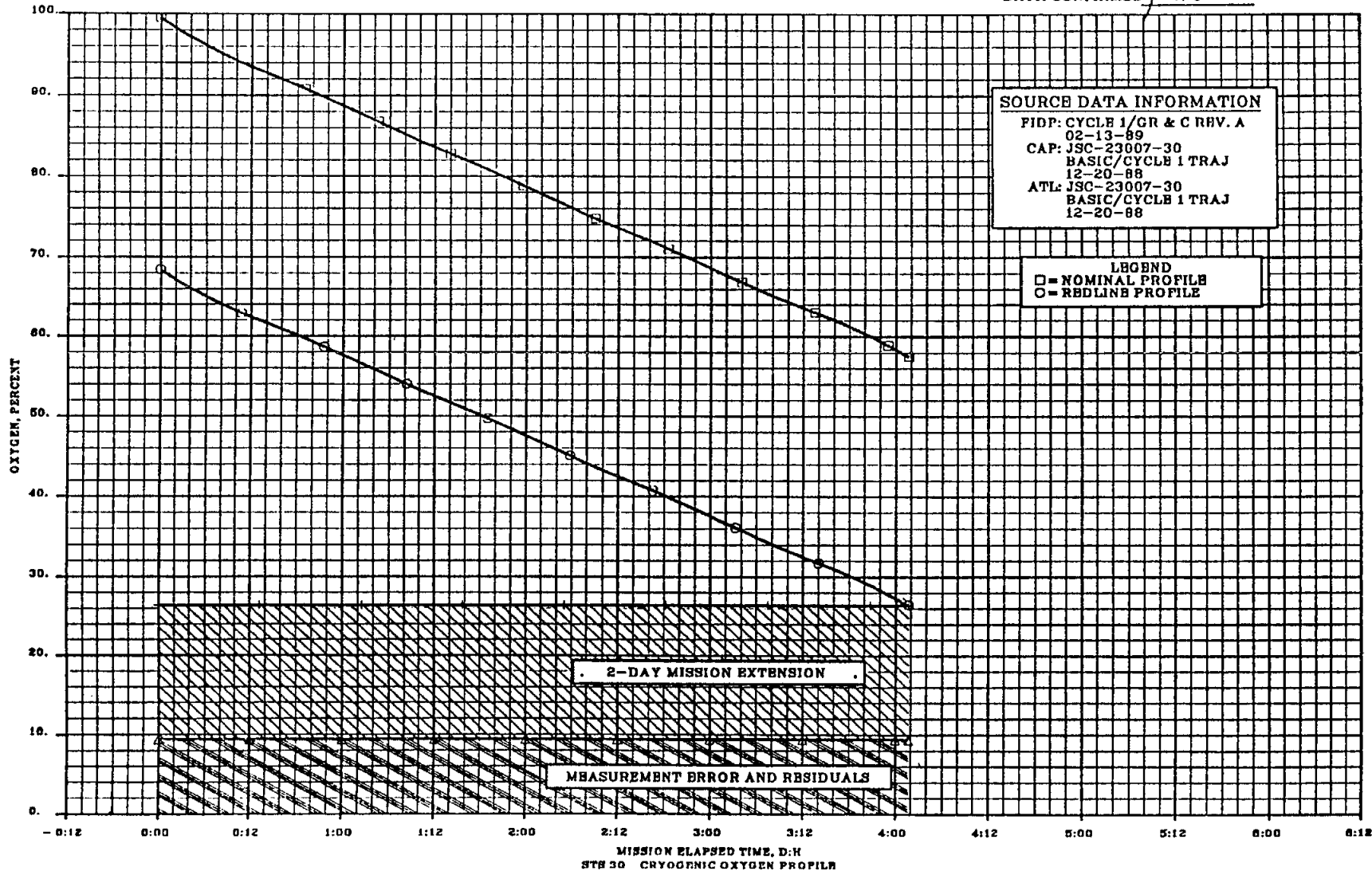


5-6

FLT PLN/30/FIN A

DARREN E. FASBENDER
ANALYSIS DATE: 02-24-89
TRAJ CYCLE: CYCLE 2

MISSION OPERATIONS DIRECTORATE
SYSTEMS DIVISION
DATA CONFIRMED *Paul Clark*



5-7

FLT PLN/30/FIN A

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will not be included in flight copies.

STS-30
FLIGHT PLAN NOTES

FLIGHT PLAN NOTES
(CONSTRAINTS AND GUIDELINES)

A. FLIGHT DESCRIPTION

The STS-30 (OV-104) launch from KSC on April 28, 1989 (Cycle 2A) will be into a 160 nm orbit at an inclination of 28.85 degrees. The mission duration will be 4 days. Nominal landing occurs at EDW on May 2, 1989.

Landing opportunities are:

		<u>Landing Orbit No.</u>	<u>Site</u>	<u>Local Time</u>
Nominal	Primary	65	EDW	12:20
	Backup	66	EDW	13:56
	Weather Alt.	65	NOR	13:22
1 Day Late	Primary	81	EDW	12:32
	Weather Alt.	81	NOR	13:34
2 Days Late	Primary	97	EDW	12:44
	Weather Alt.	97	NOR	13:46

MAJOR EVENTS

LAUNCH (KSC) April 28, 1989
 MET (DD/HH:MM:SS) 0/00:00:00
 Day of year 118
 CDT/GMT 13:24/18:24

OMS-2
 MET (DD/HH:MM:SS) (00/00:47)
 DV (fps) 195.1
 ORBIT ha/hp (nm) 160/160

MGN/IUS DEPLOY (6A INSERTION)
 MET (DD/HH:MM) (00/06:18)

OMS SEPARATION BURN
 MET (DD/HH:MM) (00/06:33)
 DV (fps) 31.0
 DT (MM:SS) 00:16
 ORBIT ha/hp (nm) 161/177

DEORBIT BURN
 MET (DD/HH:MM) (03/23:56)

LANDING (EDW)
 MET (DD/HH:MM) (04/00:56)
 Day of year 122
 CDT/GMT 14:20/19:20

B. CREW

1. The crewmembers responsible for performing an EVA, should one become necessary, are: MS2 will be EV1, MS1 will be EV2, and PLT will be IV1
2. There will be 5 crewmembers flying this mission, with each specialist assigned to the following tasks:

Walker (CDR) - Overall mission decisions, vehicle control, DPS, ECLSS, GNC, C&W, PCS, DTOs

Grabe (PLT) - APU/HYD, EPS, MPS, OMS/RCS, AMOS

Lee (MS1) - FDF, IUS/MGN

Thagard (MS2) - COMM/INST, EMU, Medical, PLBD/RAD, SPOC/HP41

Cleave (MS3) - CREW EQUIP, EARTH OBS, HABITABILITY, IFM, PHOTO/TV, FEA, MLE, DSOs

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. Pre-MGN deploy and from deorbit prep through landing, there are 13 GSTDN sites available for on-orbit coverage: CAN, MAD, GDY, MIL (MLX), BDA, HAW, GWM, AGO, ACN, YAR, DKR, IOS, and VAN. From post-deploy to deorbit prep, there will normally be two GSTDN sites selected per rev as a MGN backup and will be available on quick notice. All other GSTDN sites are available on a contingency call-up basis (90 minutes lead time required).
- d. TDRS Ku-band is the prime mode of real-time TV, however there are also 4 GSTDN sites available as backups on GDY, MIL (MLX), HAW, and VAN.
- e. There are 2 GSTDN sites available during ascent and entry for UHF voice only: YAR, IOS. These are available on a contingency call-up basis (90 minutes lead time required) throughout the rest of the flight.
- f. RTS sites are available for contingency support or when scheduled in advance (2 hour lead time required): HTS, GTS, VTS, IOS, and CTS.
- g. TDRS-W is assumed available to support Ku-band uplink (e.g., TAGS).

- h. HDR uplink (e.g., Teleprinter) is available through TDRS-E and TDRS-W.

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. In addition, state vectors must be uplinked for specified targets when utilizing an orbiting vehicle as a TGT ID with Universal Pointing.
- 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 an orbit 3 launch day deorbit with PLBDs failed closed. Normally two supply water dumps will occur per flight day. A real-time call will be made prior to each to inform the crew to what level each dump is made. Tanks A and B will be dumped to a level that will allow the tanks to be full prior to the next daily group of deorbit opportunities

4. DC Utility Power Usage

The following table is the DC Utility Power Outlet Schedule. This table shows the times of outlet reconfigurations during the mission.

STS-30 DC UTILITY POWER OUTLET SCHEDULE

MET OUTLET	PRELAUNCH	POST INSERTION	ON-ORBIT		DEORBIT PREP
019	PLT*	--	--	--	PLT*
M052J	MS3*	--	FEA	FEA	MS3*
F1	--	--	--	--	--
M013Q	--	--	--	--	--
A11	MS1*,MS2*	--	--	--	MS1*,MS2*
A15	CDR*	TPR	TPR	TPR	CDR*
M030F	--	--	--	--	--

NOTES:

*Crewmember suit fan

If an outlet column is blank, the outlet is not in use

U. 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. The TAGS system is operational with the operational status of TDRS-C in the 171 degree W position. This FLT PLN assumes TDRS-C is operational 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).

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. Four camera systems are available: 35mm, 16mm, 70mm, and 8mm camcorder to support DTO 630.

F. PAYLOADS

1. MAGELLAN

The MAGELLAN is a scientific payload which will be used to gather high resolution topographic data and altimetry of Venus. The spacecraft will use a 3.7 meter high gain antenna to gather synthetic Aperture Radar data revealing terrain features as small as 1 km. The nominal MGN/IUS deployment opportunity occurs approximately 60 minutes prior to the Node 6A (ascending) at 0/06:18 MET. Backup opportunities occur prior to 7A, 16A and 17A for the majority of the launch period. A contingency opportunity occurs 60 minutes prior to 8A (ascending) node.

2. IUS (Inertial Upper Stage)

The IUS is a two-stage solid propellant, inertially stabilized upper stage which will place MAGELLAN in a transfer orbit from earth to Venus. The IUS ignites its first stage (SRM-1) approximately 60 minutes after deployment. The two IUS stages burn in quick succession intercepting a hyperbolic earth escape vector and leading to an arrival at Venus approximately 480 days later.

3. FEA (Fluids Experiment Apparatus)

The FEA payload is a middeck experiment examining the application of floating zone processes and their effects on crystal quality. The apparatus is the size of one middeck locker. Ancillary FEA hardware includes a computer, Super 8mm camera, test samples, space parts, and 8mm and 35mm film. The apparatus consists of a heating element that moves along a track to melt and recrystallize the sample which is sealed in a pyrex tube. The Super 8mm camera and computer provide in-flight monitoring and postflight analysis of each test.

4. MLE (Mesoscale Lightning Experiment)

The MLE payload consists of the standard Orbiter cargo bay Television (TV) camera system (with no restrictions on the Closed Circuit Television (CCTV) camera lens configuration) and a dedicated STS standard Orbiter 35mm camera body with hr-min-sec data back and 85mm lens. The MLE camera will share lenses from the standard onboard Orbiter complement. The TV system is shared on a noninterference basis with primary mission objectives. The MLE objectives are to observe and record the visual characteristics of large scale lightning as seen from space using the onboard cargo bay TV and 35mm cameras and to develop a better understanding of this type of lightning.

5. AMOS (Air Force Maui Optical Site)

The primary objective of the AMOS activity is to use the Orbiter during cooperative overflights of Maui to obtain imagery and/or signature data to support the calibration of the AMOS ground-based sensors and to observe plume phenomenology. No unique onboard hardware is associated with the AMOS tests; crew and Orbiter participation are required to establish the controlled conditions for the Maui cooperative overflight.

G. ON-ORBIT DTOs

1. 8mm Camcorder Demonstration (DTO 0630)

The DTO will perform documentary cabin and exterior television. The equipment will be evaluated as a possible future enhancement to orbiter cabin television equipment.

2. TDRS to TDRS Handover Demonstration (DTO 0703)

The DTO will perform demonstrations of S-Band and Ku-Band TDRS to TDRS handover capability. Ku-Band handovers will involve Ku-Bd Return link only.

3. Ku-Band Antenna Friction (DTO 0728)

The purpose of this DTO is to provide Ku-band antenna gimbal friction data after eight radar high speed scans.

4. HUD Backup to COAS (DTO 0785)

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

5. Text and Graphics System Test (TAGS) (DTO 0786)

This DTO is designed to provide a significant confidence test and evaluation of TAGS under 0g and to generate data for comparison with data from 1g test conditions. Approximately 400 images will be sent.

6. Payload and General Support Computer Evaluation (DTO 789)

The Payload and General Support Computer (PGSC) is a portable computer that provides a common crew interface for a variety of STS payloads. The PGSC will also be used to functionally replace the SPOC (Shuttle Portable Onboard Computer.) The PGSC is a GRID CASE 1530 portable lap top computer. The purpose of this DTO is to evaluate the unique hardware aspects of the GRID CASE 1530, interactions with the middeck payloads, and crew functional interfaces.

H. ON-ORBIT DSOs

1. Inflight Salivary Pharmacokinetics of Scopolamine and Dextroamphetamine (DSO 457)

The purpose of this DSO is to investigate the pharmacokinetics of anti-motion sickness agents during space flight and predict the resultant therapeutic consequences. The crewmember will take the drug after an 8-hour fast, and take salivary samples at required intervals during the flight day.

2. Noninvasive Estimation of Central Venous Pressure During Spaceflight (DSO 462)

The objective of this investigation is to measure physiological adaptations to the headward fluid shift seen in microgravity. The noninvasive technique of determining central venous pressure (CVP) uses a mouthpiece instrument utilizing doppler flowmetry. The specified crewmember will take measurements as early as possible on flight day 1 and during pre- and post-sleep as time permits during the remainder of the flight.

3. Inflight Holter Monitoring (DSO 463)

The objective of this investigation is to document the frequency of cardiac rhythm abnormalities during space flight without the complicating factors of the EVA environment. It will record the ECG for a least 24 hours, including periods at rest, during treadmill exercise and post-exercise.

4. Preflight Adaptation Training (DSO 468)

The purpose of this DSO is to obtain reactions to the stimulus rearrangement produced by a prototype trainer before and immediately following orbital flight. The bulk of this DSO is done on the ground. In-flight the crewmember(s) are asked to document (via cassette tape recorder) perceived self-motion/surround motion accompanying slow head motions during reentry and descent.

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 B, May 25, 1987.

J. OTHER

1. A Helmet Retention Assembly (HRA) and Launch Escape Suit (LES) Helmet prebreathe rehearsal will be performed. During the prebreathe, the cabin will be depressed to 10.2 psia per the normal EVA prep protocol. The cabin will be repressed to 14.7 psia after approximately 24 hours. The test will determine helmet flowrates and suitability of the hardware to support EVA preparations.

STS-30 DAP BOOK

DAP A CONFIGURATIONS

	A1*	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11
<u>TRANSLATION</u>											
PULSE ft/sec	0.10	0.10	0.10	0.10	0.10	0.10		0.10	0.10	0.05	0.25
<u>ROTATION</u>											
DSC RT NORM °/sec	0.200	0.400	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
PULSE NORM °/sec	0.10	0.10	0.30	0.10	0.10	0.10		0.10	0.10	0.10	0.05
VERN °/sec	0.010	0.010	0.010	0.010	0.050	0.010		0.010	0.010	0.010	0.010
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)	5.00	1.00	5.00	1.00	5.00	5.00		3.00	2.00	2.00	1.00
VERN (deg)	1.000	1.000	1.000	0.070	1.000	1.000		1.000	1.000	1.000	1.000
RATE NORM °/sec	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	.010
<u>JET OPT</u>											
P	1	1	3	1	1	3		1	1	1	3
Y	1	1	3	3	1	3		1	1	1	3
CNTL ACCEL	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
<u>TRANSLATION</u>								
PULSE ft/sec	0.02	0.02	0.02	0.02	0.02	0.05	0.01	
<u>ROTATION</u>								
DSC RT NORM °/sec	0.500	0.200	0.200	0.200	0.200	0.500	0.200	
VERN °/sec	0.200	0.200	0.200	0.008	0.016	0.200	0.200	
PULSE NORM °/sec	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	
COMP NORM °/sec	.00	.00	.00	.00	.00	.00	.00	
VERN °/sec	.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	
VERN (deg)	1.000	1.000	1.000	0.100	0.033	1.000	1.000	
RATE NORM °/sec	0.20	0.20	0.20	0.20	0.20	0.20	0.20	
VERN °/sec	.020	.020	.020	.010	.020	.020	.020	
<u>JET OPT</u>								
P	1	3	1	3	3	1	1	
Y	1	3	1	3	3	1	1	
<u>CNTL ACCEL</u>								
	0	0	0	0	0	0	0	

*I-LOADED OPS-2 DAP Configuration

DAP BOOK

HOOK
VELCRO

FLT PLN/30/0/BAS

FLT PLN/30/0/BAS

UNIV PTG	
TGT ID = 1	Orbiting Vehicle
= 2	Earth ctr
= 3	Earth tgt
	Input LAT (± 90)
	LON (± 180 , + = East)
	ALT (-3444.0 to 20000.0 nm)
= 4	Sun ctr
= 5	Celestial tgt
	Input RA (0-359.99)
	DEC (± 90)
= 11-110	Nav Stars
BODY VECT = 1	+X*
= 2	-X*
= 3	-Z*
= 4	PTC (-2° below +X)*
= 5	Optional
	Input P (0-359.99)
	Y (270-359.99, 0-90)
* input OM →	OM (0-359.99)
MON AXIS = 1	+X
2	-X
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 - (Blank)
- A8 - PRE/POST DEPLOY
- A9 - RENDEZVOUS
- A10 - PROX OPS
- A11 - IUS

FLT PLN/30/0/FIN A



A1



DAP A1

PURPOSE:

- NOMINAL
- IMU ALIGN
- LOSS OF VERN
(NOSE & TAIL)

FLT PLN/30/0/BAS



TOP

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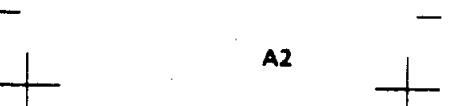
TOP



A1

- 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
- 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/30/0/BAS



A2

FLT PLN/30/FIN A



A1

DAP A2

PURPOSE:

PTC

FLT PLN/30/0/BAS



TOP



A2

DAP A3

PURPOSE:

RCS HOT FIRE

FLT PLN/30/0/BAS



TOP

(reduced copy)

TOP

A2

0.1 0 1 TRANSLATION PULSE

0.4 0 0	2	ROTATION
0.4 0 0	3	DSC RT NORM
0.1 0 0	4	VERN
0.0 1 0	5	PULSE NORM
0.0 1 0	6	VERN
.0 0 0	7	COMP NORM
		VERN

1.0 0 0	8	DEADBAND
1.0 0 0	9	ATT NORM
		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/30/0/BAS



A3

TOP



A3

0.1 0 1 TRANSLATION PULSE

0.2 0 0	2	ROTATION
0.2 0 0	3	DSC RT NORM
0.3 0 0	4	VERN
0.0 1 0	5	PULSE NORM
0.0 1 0	6	VERN
.0 0 0	7	COMP NORM
		VERN

5.0 0 0	8	DEADBAND
1.0 0 0	9	ATT NORM
		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/30/0/BAS



A4

FLT PLN/30/FIN A



A3

DAP A4

PURPOSE:
GG

FLT PLN/30/0/BAS



TOP



A4

DAP A5

PURPOSE:
IMU ROTATION

FLT PLN/30/0/BAS



TOP

(reduced copy)



TOP

A4

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

FLT PLN/30/0/BAS



A5

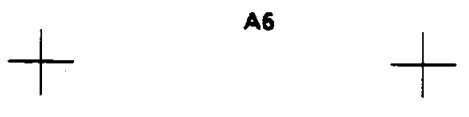
TOP



A5

- 0.1 0 1 TRANSLATION PULSE
- 0.2 0 0 2 DSC RT NORM
- 0.2 0 0 3 VERN
- 0.0 1 0 4 PULSE NORM
- 0.0 5 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/30/0/BAS



A6

FLT PLN/30/FIN A



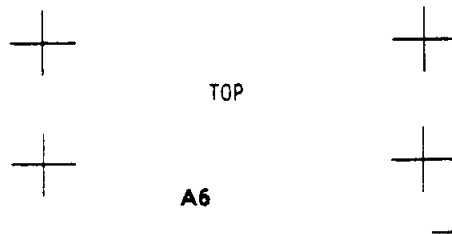
A5

DAP A6

PURPOSE:

LOSS OF VERN
(TAIL ONLY)

FLT PLN/30/0/BAS



TOP

A6

DAP A7

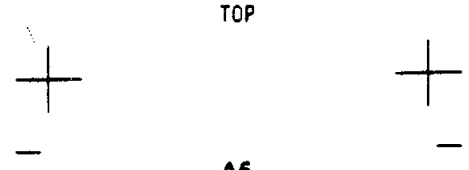
PURPOSE: (Blank)

FLT PLN/30/0/BAS



TOP

(reduced copy)

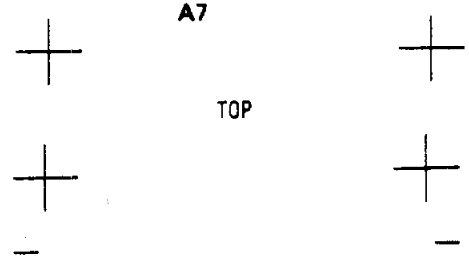


TOP

A6

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

FLT PLN/30/0/BAS



A7

TOP

A7

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

FLT PLN/30/0/BAS



A8

FLT PLN/30/FIN A



A7

DAP A8

PURPOSE:

PRE/POST DEPLOY

FLT PLN/30/0/BAS



TOP

A8

DAP A9

PURPOSE:

RENDEZVOUS

FLT PLN/30/0/BAS



TOP

(reduced copy)



TOP

A8

TRANSLATION
PULSE

0.1 0 1

ROTATION

0.5 0 0 2 DSC RT NORM

0.2 0 0 0 3 VERN

0.1 0 0 0 4 PULSE NORM

0.0 1 0 0 5 VERN

.0 0 0 0 6 COMP NORM

.0 0 0 0 7 VERN

DEADBAND

3.0 0 8 ATT NORM

1.0 0 0 9 VERN

0.2 0 10 RATE NORM

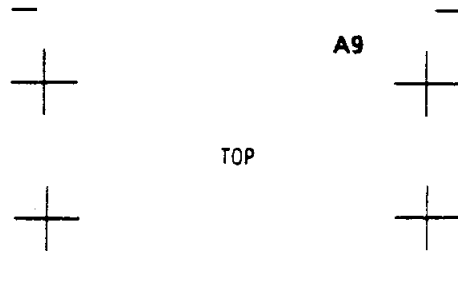
.0 2 0 11 VERN

1 12 JET OPT P

1 13 Y

0 14 CNTL ACCEL

FLT PLN/30/0/BAS



A9

TOP

A9

TRANSLATION
PULSE

0.1 0 1

ROTATION

0.2 0 0 2 DSC RT NORM

0.2 0 0 0 3 VERN

0.1 0 0 4 PULSE NORM

0.0 1 0 0 5 VERN

.0 0 0 0 6 COMP NORM

.0 0 0 0 7 VERN

DEADBAND

2.0 0 8 ATT NORM

1.0 0 0 9 VERN

0.2 0 10 RATE NORM

.0 2 0 11 VERN

1 12 JET OPT P

1 13 Y

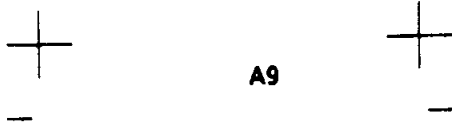
0 14 CNTL ACCEL

FLT PLN/30/0/BAS



A10

FLT PLN/30/FIN A



A9

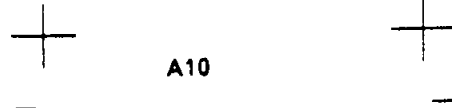
DAPA10

PURPOSE:
PROX OPS

FLT PLN/30/0/BAS



TOP



A10

DAPA11

PURPOSE:
IUS

FLT PLN/30/0/FIN A



TOP

(reduced copy)

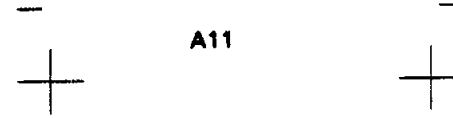


TOP

A10

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

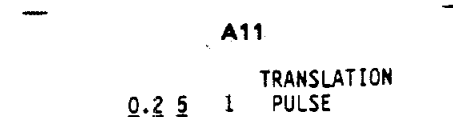
FLT PLN/30/0/BAS



A11



TOP



A11

0.2	5	1	TRANSLATION	
			PULSE	
ROTATION				
0.2	0	0	2	DSC RT NORM
0.2	0	0	3	VERN
0.0	5	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	0	10	RATE NORM
.0	1	0	11	VERN
3			12	JET OPT P
3			13	Y
0			14	CNTL ACCEL

FLT PLN/30/0/FIN A

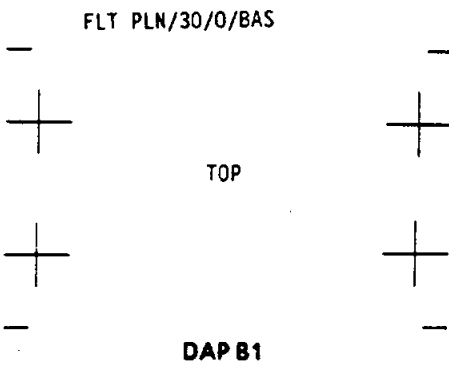


FLT PLN/30/FIN A

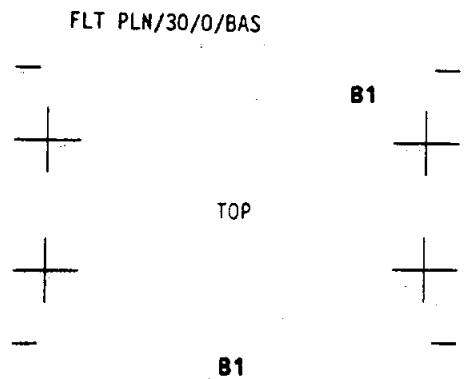


DAP PURPOSE

- B1 - NOMINAL
 PRCS IMU ALIGN
 OMS & RCS BURNS
- B2 - LOSS OF VERN
 (TAIL ONLY)
- B3 - LOSS OF VERN
 (NOSE & TAIL)
 GG MNVR
- B4 - SSUS DEPLOY
- B5 - COAS CAL
- B6 - RENDEZVOUS
- B7 - PROX OPS
- B8 - (Blank)



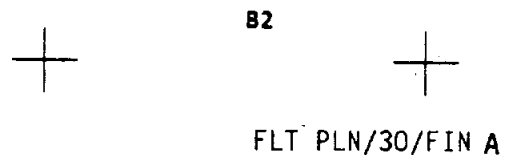
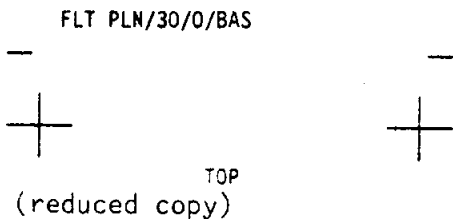
PURPOSE:
NOMINAL
PRCS IMU ALIGN
OMS & RCS BURNS



B1

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

FLT PLN/30/0/BAS





B1

DAP B2

PURPOSE:

LOSS OF VERN
(TAIL ONLY)

FLT PLN/30/0/BAS



TOP

B2

DAP B3

PURPOSE:

LOSS OF VERN
(NOSE & TAIL)
GG MNVR

FLT PLN/30/0/BAS



TOP

(reduced copy)



TOP

B2

TRANSLATION				
PULSE	15	0.0	2	

ROTATION				
DSC RT	NORM	16	0.2	0 0
	VERN	17	0.2	0 0 0
PULSE	NORM	18	0.0	0 0 4
	VERN	19	0.0	0 0 2
COMP	NORM	20	.0	0 0 0
	VERN	21	.0	0 0 0

DEADBAND				
ATT	NORM	22	3.0	0
	VERN	23	1.0	0 0 0

RATE	NORM	24	0.2	0
	VERN	25	0.2	0

JET OPT	P	26		3
	Y	27		1

CNTL ACCEL 28 0

FLT PLN/30/0/BAS



B3

TOP

B3

TRANSLATION				
PULSE	15	0.0	2	

ROTATION				
DSC RT	NORM	16	0.2	0 0
	VERN	17	0.2	0 0 0
PULSE	NORM	18	0.0	0 0 4
	VERN	19	0.0	0 0 2
COMP	NORM	20	.0	0 0 0
	VERN	21	.0	0 0 0

DEADBAND				
ATT	NORM	22	3.0	0
	VERN	23	1.0	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/30/0/BAS



B4

FLT PLN/30/FIN A



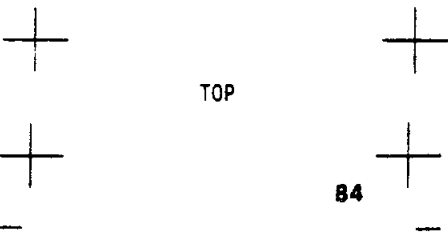
B3

DAP B4

PURPOSE:

SSUS DEPLOY

FLT PLN/30/0/BAS



TOP

B4

DAP B5

PURPOSE:

COAS CAL

FLT PLN/30/0/BAS



TOP

(reduced copy)



TOP

B4

TRANSLATION PULSE 15 0.0 2

ROTATION
 DSC RT NORM 16 0.2 0 0
 VERN 17 0.0 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

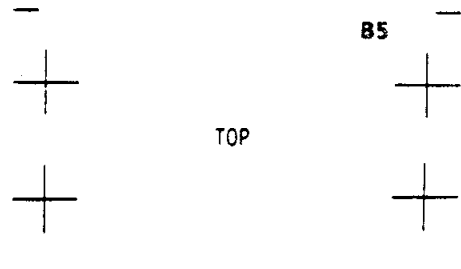
DEADBAND
 ATT NORM 22 0.3 0
 VERN 23 0.1 0 0

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/30/0/BAS



B5

TOP

B5

TRANSLATION PULSE 15 0.0 2

ROTATION
 DSC RT NORM 16 0.2 0 0
 VERN 17 0.0 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

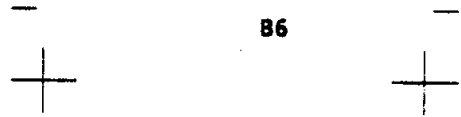
DEADBAND
 ATT NORM 22 3.0 0
 VERN 23 0.0 0 0

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/30/0/BAS



B6

FLT PLN/30/FIN A

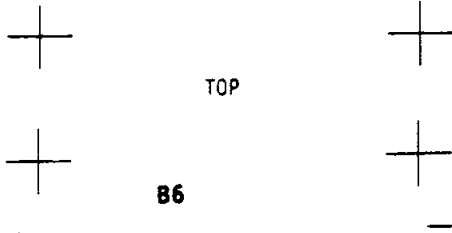


B5

DAP B6

PURPOSE:
RENDEZVOUS

FLT PLN/30/0/BAS



TOP

B6

DAP B7

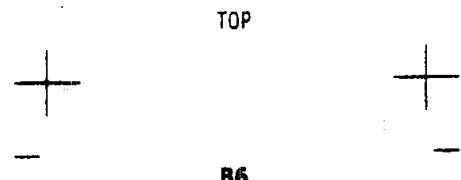
PURPOSE:
PROX OPS

FLT PLN/30/0/BAS



TOP

(reduced copy)



TOP

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 0 4
VERN 19 0.0 0 0
COMP NORM 20 0.0 0 0
VERN 21 0.0 0 0

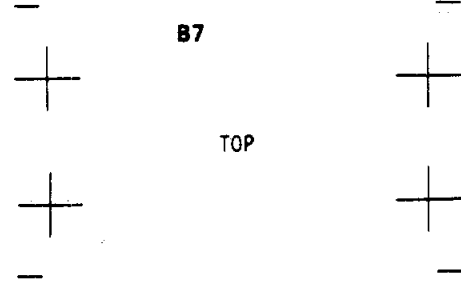
DEADBAND
ATT NORM 22 2.0 0
VERN 23 1.0 0 0

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/30/0/BAS



B7

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 0
VERN 21 0.0 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/30/0/BAS



B8

FLT PLN/30/FIN A



B7



TOP



DAP B8

PURPOSE: (Blank)

B8

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
FLT PLN/30/0/BAS

FLT PLN/30/0/BAS



TOP



B8



FLT PLN/30/0/BAS



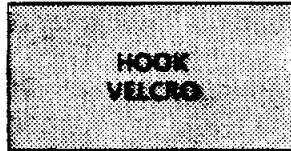
TOP

(reduced copy)



FLT PLN/30/FIN A

TOP
BACK COVER 'DAP BOOK'



FLT PLN/30/0/BAS



STS-30 ATTITUDE TIMELINE

ATTITUDE
TIMELINE

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REMARKS	EVENT
1 0/01:10:00 24:23	TRK TGT=2 BV=5(90.00, 10.00) OM= .00	A1 DSC .200 AUTO DB AT 5.00 NORM DB RT .20	EARTH T 90 P 10	LVLH R+350 P+180 Y+ 0	BIASED -ZLV TAIL FWD
2 0/03:11:00 25:33	MNVR R+289.00 P+184.00 Y+ 55.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 88 P 143	STAR PR A1	IMU ALIGN
3 0/03:32:00 42:00	MNVR R+145.00 P+212.00 Y+ 69.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 70 P 263		AMU SEQUENCE ATTITUDE #2
4 0/03:43:00 52:57	MNVR R+ 25.00 P+ 18.00 Y+355.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 52 P 102		AMU SEQUENCE ATTITUDE #3
5 0/03:54:00 04:08:11	TRK TGT=2 BV=3(90.00, .00) OM= .00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	EARTH T 90 P 0	LVLH R+ 0 P+180 Y+ 0	-ZLV TAIL FWD
6 0/05:30:00 42:46	TRK TGT=4 BV=5(275.70, .00) OM=270.00 DEPLOY 0/06:17:40	B1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 84 P 180	INRTL R+220 P+273 Y+342	MAGELLAN DEPLOY ATT
7 0/06:18:40	ROT BV=0(.00,270.00)	B1 DSC .430 MAN DB AT 3.00 NORM DB RT .20		ROT R+220 START P+273 ATT Y+342	-2.2 FPS SEP BEGIN -70 DEGREE PITCH
8 0/06:18:48	ROT BV=0(.00,270.00)	B1 DSC .860 MAN DB AT 3.00 NORM DB RT .20		ROT R+221 START P+276 ATT Y+344	SEP CUTOFF CONTINUE -70 DEG PITCH DOWN
9 0/06:20:07	CANCEL END OF -70 DEGREE	B1 DSC .500 MAN DB AT 3.00 NORM DB RT .20	SUN T 13 P 178	INRTL R+214 P+329 Y+ 29	END OF -70 DEGREE PITCH
10 0/06:24:40 29:02	MNVR R+293.00 P+106.00 Y+282.00	B1 DSC .500 AUTO DB AT 3.00 NORM DB RT .20	SUN T 131 P 272	TIG 0/06:32:40	OMS SEP ATT
11 0/06:34:40 40:14	TRK TGT=1 BV=3(90.00, .00) OM= .00	B1 DSC .500 AUTO DB AT 3.00 NORM DB RT .20	SUN T 39 P 113		IUS VIEWING ATT
12 0/06:56:40 59:32	TRK TGT=1 BV=5(320.00, .00) OM=347.00	B1 DSC .500 AUTO DB AT 3.00 NORM DB RT .20	SUN T 22 P 70		WINDOW PROTECT ATT

ATTITUDE
TIMELINE

ALL ATTITUDES IN MEAN OF 1950

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REMARKS	EVENT
1 0/07:17:40	CANCEL	B1 DSC .200 MAN DB AT 1.00 VERN DB RT .02	SUN T 22 P 70	INRTL R+303 P+316 Y+ 33	INRTL HOLD
	SRM1 0/07:17:40				
2 0/07:59:00 08:10:54	MNVR R+289.00 P+184.00 Y+ 55.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 88 P 143	STAR PR A1 -Z COAS: 20 -Y ST: 17	IMU ALIGN -Z COAS
3 0/08:24:00 37:55	TRK TGT=2 BV=3(90.00, .00) OM= 90.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	EARTH T 90 P 0	LVLH R+ 0 P+180 Y+270	-ZLV NOSE NORTH
4 0/19:45:00 53:22	MNVR R+145.00 P+176.00 Y+353.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 149 P 283	STAR PR D1	IMU ALIGN
5 0/20:05:00 06:16	MNVR R+143.00 P+168.00 Y+340.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 164 P 289	+X STAR:19	DTO 785 HUD COAS DTO
6 0/20:45:00 53:01	MNVR R+ 85.00 P+ 50.00 Y+313.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 103 P 56		TDRS E AND W KU ATTITUDE
7 1/00:15:00 28:23	TRK TGT=2 BV=3(90.00, .00) OM=180.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+ 0	-ZLV NOSE FWD
8 1/04:25:00 33:47	MNVR R+350.00 P+ 50.00 Y+ 20.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 61 P 159		TDRS E AND W KU ATTITUDE
9 1/06:55:00 07:08:48	TRK TGT=2 BV=3(90.00, .00) OM=180.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+ 0	-ZLV NOSE FWD
10 1/08:10:00 21:15	MNVR R+ 2.00 P+ 27.00 Y+291.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 110 P 126	STAR PR A2	IMU ALIGN
11 1/08:30:00 31:39	MNVR R+320.00 P+341.00 Y+298.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 98 P 129	+X COAS: 22	+X COAS CAL
12 1/08:50:00 09:02:04	TRK TGT=2 BV=3(90.00, .00) OM= 90.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	EARTH T 90 P 0	LVLH R+ 0 P+180 Y+270	-ZLV NOSE NORTH

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REMARKS	EVENT
1 1/20:00:00 08:57	MNVR R+145.00 P+176.00 Y+353.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 148 P 283	STAR PR D1	IMU ALIGN
2 1/20:20:00 21:16	MNVR R+143.00 P+168.00 Y+340.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 163 P 289	+X STAR: 19	DTO 785 HUD COAS DTO
3 1/20:55:00 21:09:04	TRK TGT=2 BV=3(90.00, .00) OM=180.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+ 0	-ZLV NOSE FWD
4 2/03:00:00 07:05	MNVR R+ 33.00 P+ 33.00 Y+ 10.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 54 P 109		TDRS E AND W ATTITUDE
5 2/06:55:00 07:04:25	MNVR R+289.00 P+184.00 Y+ 55.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 85 P 143	STAR PR A1	IMU ALIGN
6 2/07:15:00 28:18	TRK TGT=2 BV=3(90.00, .00) OM= 90.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	EARTH T 90 P 0	LVLH R+ 0 P+180 Y+270	-ZLV NOSE NORTH
7 2/18:45:00 54:52	MNVR R+145.00 P+176.00 Y+353.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 147 P 283	STAR PR D1	IMU ALIGN
8 2/19:05:00 06:16	MNVR R+143.00 P+168.00 Y+340.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 162 P 288	+X STAR: 19	DTO 785 HUD COAS DTO
9 2/19:20:00 28:09	MNVR R+314.00 P+341.00 Y+298.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 99 P 136	+X STAR: 22	DTO 785 HUD COAS DTO 2nd STAR ATT
10 2/19:40:00 44:33	MNVR R+224.00 P+293.00 Y+306.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 100 P 189	CREW CONF	TDRS WEST KU ATT
11 2/20:55:00 21:07:45	TRK TGT=2 BV=3(90.00, .00) OM=180.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	EARTH T 90 P 0	LVLH R+180 P+ 0 Y+ 0	-ZLV NOSE FWD
12 3/07:05:00 15:06	MNVR R+289.00 P+184.00 Y+ 55.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 85 P 143	STAR PR A1	IMU ALIGN

Attitude Timeline

MET	MNVR OPTION	DAP	E/S	REMARKS	EVENT
1 3/07:25:00 37:52	TRK TGT=2 BV=3(90.00, .00) OM= 90.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	EARTH T 90 P 0	LVLH R+ 0 P+180 Y+270	-ZLV NOSE NORTH
2 3/17:40:00 48:59	MNVR R+289.00 P+184.00 Y+ 55.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 85 P 142	STAR PR A1	IMU ALIGN
3 3/18:00:00 11:59	TRK TGT=4 BV=5(184.00, .00) OM=270.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 176 P 178	INRTL R+168 P+165 Y+321	TAIL SUN COLD SOAK RADIATORS
4 3/20:55:00 21:06:06	MNVR R+344.00 P+321.00 Y+352.00	A1 DSC .200 AUTO DB AT 1.00 VERN DB RT .02	SUN T 49 P 86	-Z ST: 28 -Y ST: 43	D/O IMU ALIGN ATTITUDE
5 3/21:15:00 17:09	MNVR R+ 15.00 P+283.00 Y+ 44.00	B1 DSC .500 AUTO DB AT 3.00 NORM DB RT .20	SUN T 43 P 358	-Z ST: 54 -Y ST: 27	IMU VERIF ATTITUDE
6 3/21:35:00 37:13	MNVR R+ 51.00 P+193.00 Y+ 57.00	B1 DSC .500 AUTO DB AT 3.00 NORM DB RT .20	SUN T 81 P 13	TIG: 03/23:55:25	DEORBIT BURN ATTITUDE

ALL ATTITUDES IN MEAN OF 1950

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R21D/J. Nichols

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