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J&T/442/R. Piasecki
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JSC/D053/T. McCracken
JSC/DO53/J. McCullough
JSC/D045/S. Curtis
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LMSC-W/R. Sheffield
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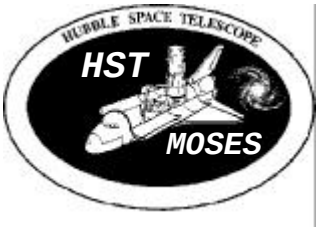
442/S. DePalo
442/FSS/E. Barksdale
442/FSS/C. Ivy
442/FSS/C. Manns
442/FSS/T. Schoeneweiss



LOCKHEED MARTIN

LMMS/P 506303
December 7, 1999

To: 441/Operations Servicing Mission Manager/A. Vernacchio

From: 440.8/MOSES/Operations Planning/L. Wilkinson, D. Smith

Subject: HST SM3A SMIT Launch Update #2 version for interim delivery

Attached is the Launch Update #2 version of the HST Third Servicing Mission-A Integrated Timeline (SMIT).

This timeline schedules four EVA days for servicing maintenance (see attached EVA scenario dated 8/12/99). All EVA crew and command activities are to be developed. The ephemeris used to populate the graphic orbital elements is predicted based on a launch date of 12/11/99.

If you have any questions or comments regarding the SMIT, please call Laura Wilkinson at 301-286-2244, or Dolores Smith at 301-286-2245.

Laura Wilkinson
MOSES Ops Planning

Dolores Smith
MOSES Ops Planning

HST

THIRD SERVICING MISSION INTEGRATED TIMELINE

SM3A LAUNCH UPDATE #2 VERSION

December 7, 1999

Launch on 12/11/99

SM3A LAUNCH UPDATE #2 VERSION

MET	SEQ #	SEQUENCE TITLE
-00:24:00	1	STOCC/MCC INTERFACE CHECKOUT #1
-00:23:52	2	THERMAL PREPARATION FOR APPENDAGE OPS
-00:23:47	3	LOAD AND VERIFY FORMAT "T"
-00:23:24	4	VERIFY OCS IN RETRIEVAL MODE
-00:10:00	5	STOCC/MCC INTERFACE CHECKOUT #2
-00:04:00	6	STOCC/MCC INTERFACE CHECKOUT #3
-00:01:00	7	STOCC/MCC INTERFACE CHECKOUT #4
00:02:00	8	LOAD SPC ZEROs
00:02:40	9	SSE ACTIVATION [12 min]
00:02:55	10	SERIAL RETRACTION OF HGAs
00:19:00	11	HST PGSC INSTALL AND CONFIG [30 min]
00:19:30	12	SSE CHECKOUT[40min]
00:20:10	13	FSS PREP FOR BERTHING [45min]
01:16:41	14	SAFE NSSC-1
01:16:48	15	TURN OFF FGEs BEFORE HWSP
01:17:01	16	POWER ON RMGA
01:17:03	17	PSEA TEST MODE BEFORE HWSP
01:18:40	18	PI CONFIG
01:18:45	19	DISABLE PSEA KA MONITORING
01:19:05	20	INITIATE HARDWARE SUNPOINT
01:19:49	21	RECONFIGURATION FOLLOWING H/W SUNPOINT
01:20:51	22	OTA BUS RECONFIG AFTER HWSP
01:21:02	23	TURN ON SIC&DH
01:21:08	24	TURN ON SADE & ENABLE EPS PROCESSING
01:21:33	25	POWER OFF GYROS 3 & 4
01:22:02	26	NON-ESSENTIAL LOAD REDUCTION
01:22:15	27	ORBITER TI BURN
01:22:17	28	TRANSITION TO PSP-BYPASS
01:22:46	29	DSBL S/M TESTS
01:23:08	30	LGA SWITCH
01:23:24	31	DSBL S/M TESTS & MCU AD CONFIGURATION
02:00:16	32	SWITCH TO T FORMAT
02:00:47	33	HST TO DRIFT MODE
02:01:03	34	SWITCH LGAs FOR PI OPS
02:01:50	35	LATCH & MATE HST [5min]
02:01:58	36	ACTIVATE HST EXTERNAL POWER
02:02:34	37	OTA HTR CONFIG
02:03:29	38	DMU BYPASS OFF
02:03:47	39	OPEN SPA TRIM RELAYS
02:03:51	40	ENABLE PRIMARY BATTERY HEATERS
02:03:53	41	SLEW SAs TO 0
02:03:58	42	RECONFIGURE PSEA
02:04:15	43	FGEs ON
02:04:24	44	HST PGSCA ON ORBIT CHECKOUT
02:06:00	45	KU-BAND ON ORBIT CHECKOUT
02:07:30	46	D FORMAT TELEMETRY TEST
02:16:00	47	GYRO-3 CONTROL HEATER ENABLE
02:17:24	48	TERMINATE HST PGSCA ON ORBIT CHECKOUT
02:20:00	49	RSU CHANGEOUT (INCLUDES PREP, C/O, ACTIVATION & A/T)
02:23:00	50	TURN OFF FGEs BEFORE VIK F/T

MET	SEQ #	SEQUENCE TITLE
02:23:10	51	CONFIGURE FOR VIK INSTALLATION
02:23:20	52	VIK INSTALLATION [1:10]
03:00:12	53	VIK ALIVENESS TEST
03:00:37	54	VIK FUNCTIONAL TEST
03:05:46	55	RGA FUNCTIONAL TEST
03:05:59	56	CONFIG NEW RATE GYRO COMPLEMENT
03:06:22	57	LOAD GYRO TABLES & DRIFT RATE BIASES
03:06:30	58	TURN ON FGEs AFTER VIK F/T
03:17:33	59	SLEW +SA TO -20
03:17:48	60	PREP FOR ADV COMPUTER 486/DF-224 CHANGEOUT
03:19:11	61	ADV COMPUTER 486 / DF-224 CHANGEOUT
03:21:05	62	ADVANCED COMPUTER 486 ALIVENESS TEST
03:21:59	63	FGS-2 CHANGEOUT (INCLUDES PREP,C/O,AT)
03:23:58	64	RE-ENABLE OTA HTR GROUPS (PART 1 OF 3)
04:00:03	65	ADVANCED COMPUTER 486 FUNCTIONAL TEST
04:00:33	66	RE-ENABLE OTA HTR GROUPS (PART 2 OF 3)
04:01:36	67	RE-ENABLE OTA HTR GROUPS (PART 3 OF 3)
04:02:44	68	SLEW +SA TO 0
04:02:59	69	FGS-2R FUNCTIONAL TEST
04:04:00	70	RELOAD GYRO & FHST TABLES
04:05:09	71	TELEMETRY LOAD FOR SOLID STATE DR PREP
04:19:10	72	OCE CABLE INSTALL(PREP,C/O)
04:19:41	73	OCE CABLE / AMS ALIVENESS TEST
04:19:49	74	SOLID STATE DR PREP
04:19:54	75	VERIFY SSA XMTR OFF
04:19:55	76	SSA XMTR CHANGEOUT [1 hr 15 min]
04:21:06	77	SSR/ESTR-3 CHANGEOUT (INCLUDES PREP, C/O)
04:21:55	78	SSR-1/SSR-3 ALIVENESS TEST
04:22:10	79	NOBL INSTALLATION ON SSM BAYS5-10[2:20]
04:22:10	80	SSAT-2R ALIVENESS TEST
04:22:44	81	FGS AMS FUNCTIONAL TEST
04:23:37	82	SSR-1/SSR-3 FUNCTIONAL TEST
05:19:04	83	SLEW SAs TO -30
05:19:25	84	INSTALL SSRFs ON FS/LS [3 hrs 50 min]
05:21:00	85	PARALLEL HGA DEPLOYMENT (PART 1)
05:23:30	86	TURN OFF FGEs BEFORE IMPEDANCE CHECK
06:00:48	87	SLEW +/-SAs TO 0
06:01:39	88	IMPEDANCE CHECK
06:02:29	89	PARALLEL HGA DEPLOYMENT (PART 2)
06:03:00	90	TURN ON FGEs AFTER IMPEDANCE CHECK
06:15:53	91	LOAD EPHEMERIS TABLES
06:16:09	92	RELOAD SMACs
06:16:27	93	VERIFY INITIAL FSW CONFIGURATION
06:16:43	94	PREP FOR BATTERY CHARGING
06:17:46	95	TURN OFF FGEs BEFORE DEPLOY
06:18:15	96	PSEA TEST MODE
06:19:03	97	OPEN TRIM RELAYS
06:19:07	98	POWER OFF SADE
06:19:11	99	CONFIG LGAs FOR RELEASE OPS
06:19:18	100	EXT PWR OFF & UMB DISCONNECT

MET	SEQ #	SEQUENCE TITLE
06:19:52	101	DMS: VERIFY STFS PRE-RELEASE CONFIGURATION
06:20:07	102	OPEN APERTURE DOOR
06:20:40	103	EPS RECONFIGURATION
06:20:50	104	PREP FOR RMS RELEASE OF HST
06:20:57	105	PSEA CONFIG FOR RELEASE & HST RELEASE
06:21:46	106	TRANSITION TO NORMAL MODE
06:21:55	107	RECONFIGURE HST LGA DIRECT TDRSS
06:22:16	108	MANEUVER TO BRIGHT EARTH AVOIDANCE ATTITUDE
06:22:32	109	CONFIGURE MCU AND RETR/DEPL HTRS FOR NORMAL OPS
06:22:40	110	TURN ON FGEs AFTER DEPLOY
07:00:06	111	FHST FOV CHECK
07:00:46	112	ATTITUDE DETERMINATION FOR FIRST HLGBU
07:00:52	113	ENABLE BATTERY SOC SAFEMODE TEST(S)
07:01:57	114	RE-CENTER HGA GIMBALS
07:05:47	115	FIRST LGBU/HGBU
07:06:12	116	ATTITUDE DETERMINATION FOR SECOND ARU
07:07:52	117	LOAD EPHEMERIS
07:08:30	118	TRANSITION TO NORMAL OPERATIONS / UPLINK 2ND ARU
07:08:50	119	ENABLE FGE MEMORY REFRESH, OPT. DIST. & B.O.P. TESTS
07:09:50	120	FHST/FHST ALIGNMENT (DATA COLLECT)
07:16:50	121	BACKUP FHST/FHST ALIGNMENT (DATA COLLECT)
07:22:45	122	LOAD HEALTH & SAFETY SPCs (FIRST OPPORTUNITY)
08:00:19	123	ATTITUDE DETERMINATION FOR SECOND HLGBU & THIRD ARU
08:03:15	124	SECOND LGBU / HGBU AND ARU
08:04:15	125	CONFIGURE HST HGA DIRECT TDRSS
08:04:26	126	SSAT-2R FUNCTIONAL TEST
08:08:15	127	FHST/FHST ALIGNMENT (COMPUTATION PHASE (24hrs))
09:15:00	128	SSE DEACTIVATION [15 min]

SMIT LEGEND

The format of the Servicing Mission Integrated Timeline is described as follows:

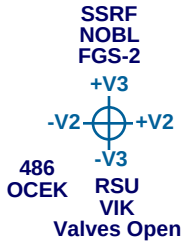
(a)	TIME	Incrementing from launch, time is shown in GMT (Greenwich Mean Time) and MET (Mission Elapsed Time). For GMT the day of the year is shown in the margin. For MET the day of mission is shown in the margin.
(b)	ORBIT#	The orbit number of the HST and or Orbiter is shown, as is the ascending node crossing. When the Orbiter begins preparations for rendezvous operations, the ORBIT# will be that of the Orbiter. Prior to rendezvous preparations the ORBIT# will be that of the HST.
(c)	DAY/NIGHT	The shaded intervals show when the HST is in the earth's shadow.
(d)	SAA	The thin line represents the entire SAA region. The thick shaded region represents SAA contour #1.
(e)	HST ATTITUDE	Shows the orientation of the HST as required to support the Servicing Mission.
(f)	ORBITER ATTITUDE	Shows the orientation of the Orbiter as required to support the Servicing Mission.
(g)	CREW SCHEDULE	Shows the crew activities and their activities involving the Orbiter e.g. crew sleep cycles, EVA prep etc..
(h)	ORBITER, CREW, SSE	Shows the Orbiter/Crew activities in support of the HST and the SSE (Space Support Equipment).
(i)	FUNCTIONAL COMMAND DESCRIPTION	Provides a functional description of the command and verification activities to support the Servicing Mission. A legend is provided in the margin to differentiate between the types of commands.
(j)	TLM FORMAT	Shows the telemetry format requirements for the engineering and science channels.
(k)	TDRSS/I&C	Shows the HST TDRSS coverage (MAF, SAF, MAR, SAR) and the zone-of-exclusion (ZOE). Also, when using the Shuttle Orbiter communications, PSP Bypass, the S-band and Ku-band coverage will be shown instead of the HST TDRS coverage. For HST TDRS coverage, the thin black line designates the return service and the thick line designates the forward service. For Orbiter coverage, the thin line is S-band and the thick line is Ku-band,
(l)	GROUND SYSTEM ACTIVITIES	Describes the major activities within the STOCC required to support the Servicing Mission.
(m)	MAJOR EVENTS	Gives an overview of activities including major protocols between the STOCC and JSC.

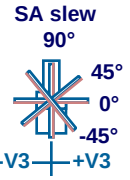
Goddard Space Flight Center

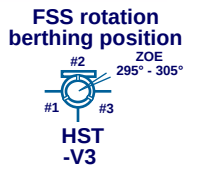
Hubble Space Telescope

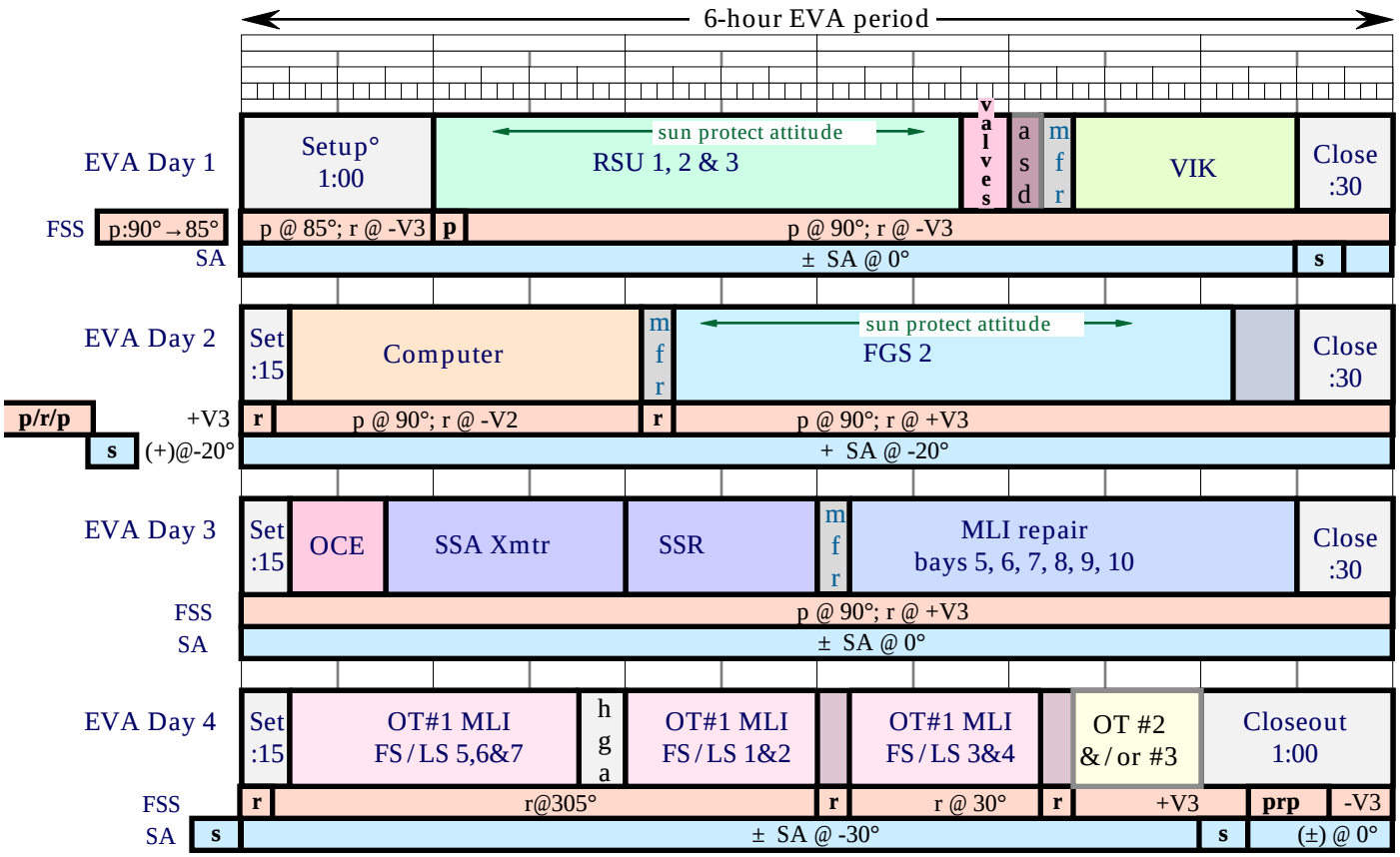
Flight Systems and Servicing Project

HST SM3A EVA Scenario
FSS p / r / p and SA slew prior to EVA 2 airlock depress
with FSS rotation to -V2 after depress









Baselined Tasks & Priorities

1. RSUs (RSU-1, -2, -3)
2. VIK
3. 486 Computer
4. FGS (FGS-2)
5. SSAT (SSAT-2)
6. SSR (ESTR-3)
7. Bay 5-10 MLI Repair
8. NICMOS valves open

Optional Tasks & Priorities

OT#1. FS / LS MLI Repair
OT#2. Handrail Covers
OT#3. ASLR for +V2 Doors

Required Setup	Task Times
Setup	1:00 (1st day)
	0:15 (nth day)
Closeup	0:30 (nth day)
	1:00 (last day)

° Includes BAPS Post installation
asd = aft shroud door latch contingency
mfr = crew change positions in manipulator foot restraint
hga = high gain antenna deployment

RM August 12, 1999

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

SHEET 1 OF 65 | 442 / 441 | DATE:Dec 7, 1999

TIME GMT: 344 MET: -00

0513 -24 | 0613 -23 | 0713 -22 | 0813 -21 | 0913 -20 | 1013 -19 | 1113 -18

ORBIT# (ascend node ∇): 52476 ∇ 52477 ∇ 52478 ∇ 52479

DAY / NIGHT

SAA

HST ATTITUDE: HST +V3 SUNPOINT

ORBITER ATT

CREW SCHED

ORBITER, CREW, SSE

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

1 • STOCC/MCC INTERFACE CHECKOUT #1

• STOCC CONTROL ESTABLISH COMMUNICATION AND COMMAND/DATA CONFIGURATIONS WITH JSC AND SYNCHRONIZE MET CLOCKS [8 min]

2 • THERMAL PREPARATION FOR APPENDAGE OPS

2 ΔC504-EPS: ENABLE RTRV/DPLY HTRS [2min]

2 ΔC505-EPS: CHANGE OTA & MECHANISM THERMAL LIMITS [2min]

RESTRICTION: HTRS MUST BE ENABLED AT LEAST 8HRS BEFORE USE OF LATCHES AND HINGES

3 • LOAD AND VERIFY FORMAT "T"

3 ΔD500-DMS: LOAD FORMAT "T" [5min]

3 ΔD037-DMS: CHANGE TO FORMAT "T" [1min]

3 ΔD033-DMS: CHANGE TO FORMAT "A" [2min]

4 • VERIFY OCS IN RETRIEVAL MODE

4 ΔE200-OTA: OCS INITIALIZATION [1min]

4 ΔE205-OTA: OCE CONFIGURE [5min]

4 ΔE505-OTA: ENBL OCE & STOW COARSE WEDGE MECHANISM [15min]

INITIAL CONDITIONS FOR SIs:

FOC	SAFE
COSTAR	SAFE
WFPC-II	SAFE W/ HEAT PIPE HTR ON
STIS	SAFE
NICMOS	SAFE
NSSC-1	NORMAL FORMAT, SOFT SAFING CONFIGURED

NOTE: THE TIMELINE BEGINS AT LAUNCH - 24hrs

COMM ENG: AN — TN — AN

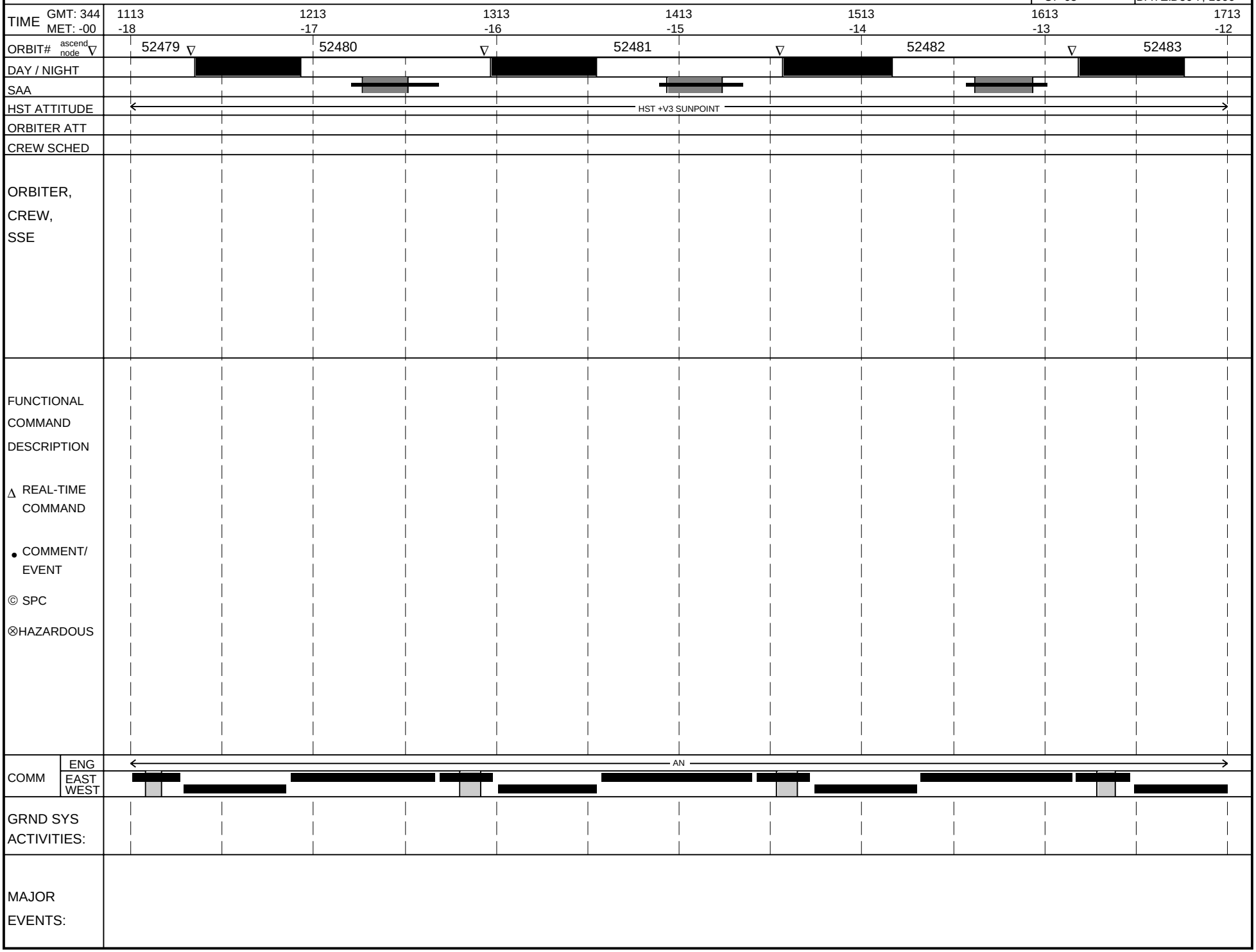
COMM EAST / WEST

GRND SYS ACTIVITIES:

MAJOR EVENTS:

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

SHEET 2 OF 65 | 442 / 441 | DATE:Dec 7, 1999



HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

SHEET 3 OF 65 | 442 / 441 | DATE:Dec 7, 1999

TIME GMT: 344 MET: -00	1713 -12	1813 -11	1913 -10	2013 -9	2113 -8	2213 -7	2313 -6
ORBIT# ascend node ∇	52483 ∇	52484 ∇	52485 ∇	52486 ∇	52487
DAY / NIGHT						
SAA						
HST ATTITUDE	← HST +V3 SUNPOINT →					
ORBITER ATT						
CREW SCHED						
ORBITER, CREW, SSE					• CREW WAKE UP • BEGIN FD1		
FUNCTIONAL COMMAND DESCRIPTION			**5 • STOCC/MCC INTERFACE CHECKOUT #2** • STOCC CONTROL INTERFACE CHECK WITH HOUSTON DATA FOR COMMANDING AND SYNCHRONIZE MET CLOCKS [3 min]				
COMM ENG	← AN →						
COMM EAST WEST							
GRND SYS ACTIVITIES:							
MAJOR EVENTS:							

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 344 MET: -00	2313 -6	0013 -5	0113 -4	0213 -3	0313 -2	0413 -1	0513 -0
ORBIT# ascend node ∇	52487	∇ 52488	∇ 52489	∇ 52490			
DAY / NIGHT							
SAA							
HST ATTITUDE	← HST +V3 SUNPOINT →						
ORBITER ATT							
CREW SCHED							

ORBITER, CREW, SSE

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

6 • STOCC/MCC INTERFACE CHECKOUT #3

• STOCC CONTROL INTERFACE CHECK WITH HOUSTON DATA FOR COMMANDING AND SYNCHRONIZE MET CLOCKS [3 min]

STOCC/MCC INTERFACE CHECKOUT #4 • 7

STOCC CONTROL INTERFACE CHECK WITH • HOUSTON DATA FOR COMMANDING AND SYNCHRONIZE MET CLOCKS [5 min]

ALL CONSOLES VERIFY READINESS FOR T-9 "GO FOR LAUNCH" •

COMM ENG ← AN →

COMM EAST WEST

GRND SYS ACTIVITIES:

MAJOR EVENTS:

• (T-3hr) COUNT COMM LINE CHECKOUT

(T-9min) STOCC GO FOR LAUNCH •

HST PROJECT GO FOR LAUNCH •

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 345 / MET: 00 — 0513 (0) | 0613 (1) | 0713 (2) | 0813 (3) | 0913 (4) | 1013 (5) | 1113 (6)

ORBIT# (ascend node ∇) — 52491 | 52492 | 52493 | 52494

DAY / NIGHT

SAA

HST ATTITUDE — HST +V3 SUNPOINT

ORBITER ATT — ASCENT | -ZLV +YVV | NC1 | -ZLV -XVV

CREW SCHED — LAUNCH | PRE SLEEP

ORBITER, CREW, SSE

- ASCENT TO PHASING ORBIT
- PLBD OPEN
- **9 • SSE ACTIVATION [12 min]**

SSE HTRS MUST BE ON WITHIN 2 HRS AFTER PLBD OPEN

ORBITER ATTITUDES ARE AS FOLLOWS:
-ZLV CARGO BAY TO EARTH
+ZLV CARGO BAY TO DEEP SPACE
-ZSI CARGO BAY TO SUN
+YVV RIGHT WING INTO VELOCITY VECTOR
+XVV NOSE INTO VELOCITY VECTOR

NOTE:
A DETAILED LISTING OF PAYLOAD SYSTEMS OPERATING PROCEDURES (PLSOPs) CAN BE FOUND IN THE PAYLOAD OPERATIONS CHECKLIST (PLOPS) AND THE DEPLOY CHECKLIST (HST DLY)

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

8 • LOAD SPC ZEROs

8 ΔD666-DMS: LOAD SPC ZEROs [20min]
8 ΔD502-DMS: LOAD REDPLY SUPP SPCs [4min]
8 ΔD730-LOAD RWA SPEED MGMT MACRO [3min]
8 D504-DMS: FSW INIT CONFIG [3min]
8 ΔD008b-DMS: DF-224 MEM DUMP [25min]

10 • SERIAL RETRACTION OF HGAs

10 ΔA001c-S&M: CONF MCU-A PRI & RED PS / MTR CUR [1min]
10 ΔA004-S&M: RELEASE HGA LATCHES [4min]
⊗10 Δ D550-DMS:ENB/ACT SUPPORT SPC MACRO [2min]
10 © D515-DMS: MODIFY HGA LIMITS FOR STOW [1min]
10 © H506-I&C: SLEW HGAs TO STOW POSITION [7min]
⊗10 Δ A503a-S&M: RETRACT -V3 HGA MAST [3min]
⊗10 Δ D550a-ENBL/ACT SPC SUPPORT MACRO [2min]
10 © A503-RETRACT -V3 HGA MAST [10min]
⊗10 Δ A507a-RETRACT +V3 HGA MAST [3min]
⊗10 Δ D550b-DMS: ENBL/ACT SPC MACRO [2min]
10 © A507-DMS: RETRACT +V3 HGA MAST [11min]
10 ΔCOP740-CONFIG GND SYS LIMITS [5min]

NOTE: THE SERVICING MISSION PRD WILL BE LOADED PRIOR TO LAUNCH

COMM — ENG: AN; EAST WEST

GRND SYS ACTIVITIES:
- COLLECT/VERIFY DF-224 DUMP
- MCCH, LCR/LSR: MONITOR SSE ACTIVITY

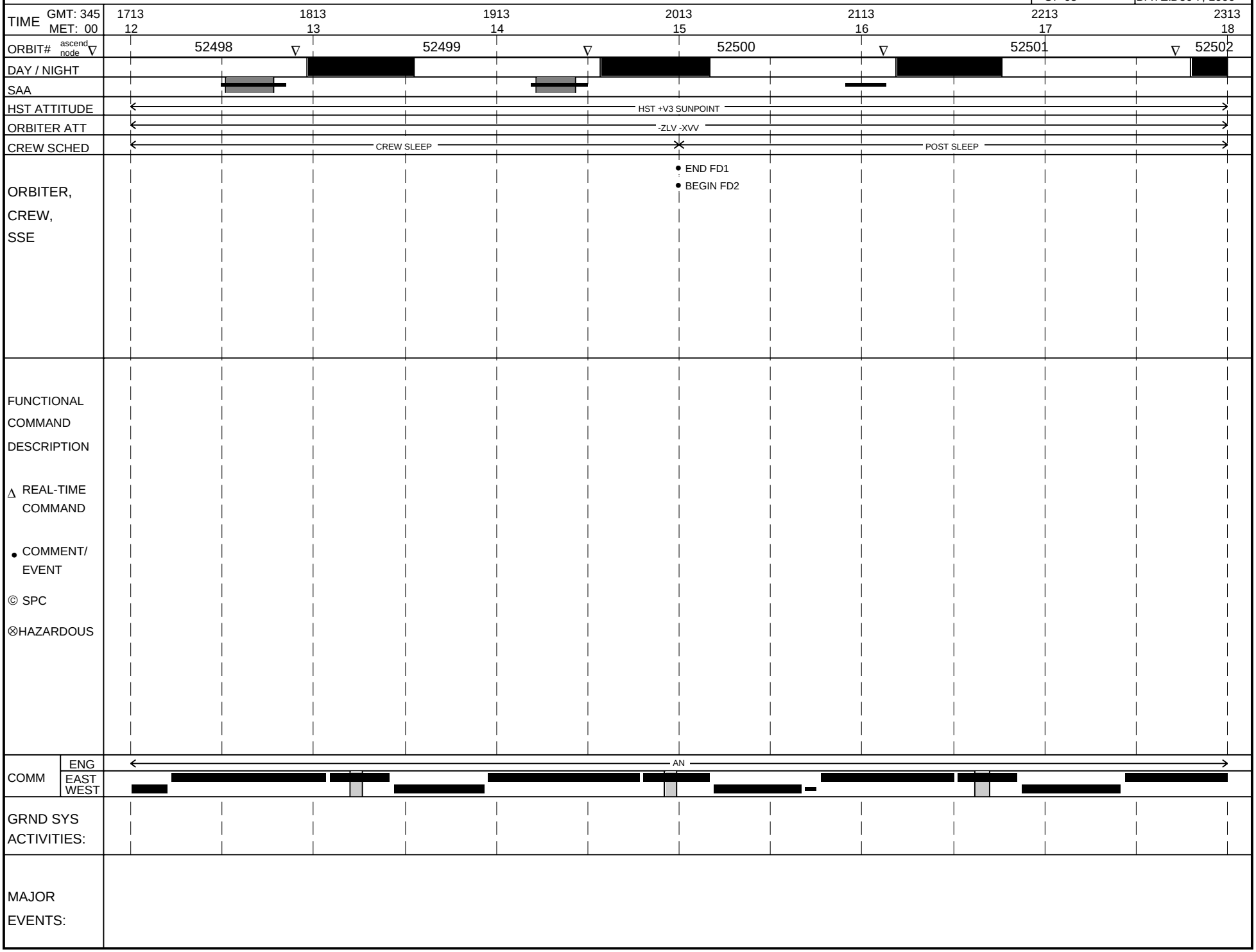
MAJOR EVENTS:
- LAUNCH
- HST GO FOR SERVICING MISSION
- HGA MASTS RETRACTED

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

SHEET 6 OF 65 | 442 / 441 | DATE:Dec 7, 1999

TIME	GMT: 345 MET: 00	1113 6	1213 7	1313 8	1413 9	1513 10	1613 11	1713 12
ORBIT#	ascend node ∇	52494 ∇	52495 ∇	52496 ∇	52497 ∇	52498		
DAY / NIGHT								
SAA								
HST ATTITUDE		HST +V3 SUNPOINT						
ORBITER ATT		-ZLV -XVV						
CREW SCHED		PRE SLEEP	CREW SLEEP					
ORBITER, CREW, SSE								
FUNCTIONAL COMMAND DESCRIPTION								
Δ REAL-TIME COMMAND								
• COMMENT/ EVENT								
© SPC								
⊗HAZARDOUS								
COMM ENG		AN						
COMM EAST WEST								
GRND SYS ACTIVITIES:		MCCH. LCR/LSR: MONITOR SSE ACTIVITY						
MAJOR EVENTS:								

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2



HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

SHEET 8 OF 65 | 442 / 441 | DATE:Dec 7, 1999

TIME GMT: 345 MET: 00	2313 18	0013 19	0113 20	0213 21	0313 22	0413 23	0513 24
ORBIT# ascend node ∇	52502 ∇		52503 ∇		52504 ∇		52505
DAY / NIGHT							
SAA							
HST ATTITUDE	HST +V3 SUNPOINT						
ORBITER ATT	-ZLV -XVV		NPC		-ZLV -XVV		
CREW SCHED	RMS PWR UP & C/O		SSE SURVEY		HST TOOL PREP	MEAL	EMU CHECKOUT

ORBITER, CREW, SSE

- CABIN DEPRESS TO 10.2 PSI
- RMS ACTIVATION & CHECK-OUT [60min]
- **11 • HST PGSC INSTALL AND CONFIG [30 min]**
- HST PGSC SETUP
- **12 • SSE CHECKOUT[40min]**
- SSE VISUAL INSPECTION [40min]
- **13 • FSS PREP FOR BERTHING [45min]**

FUNCTIONAL COMMAND DESCRIPTION

∆ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

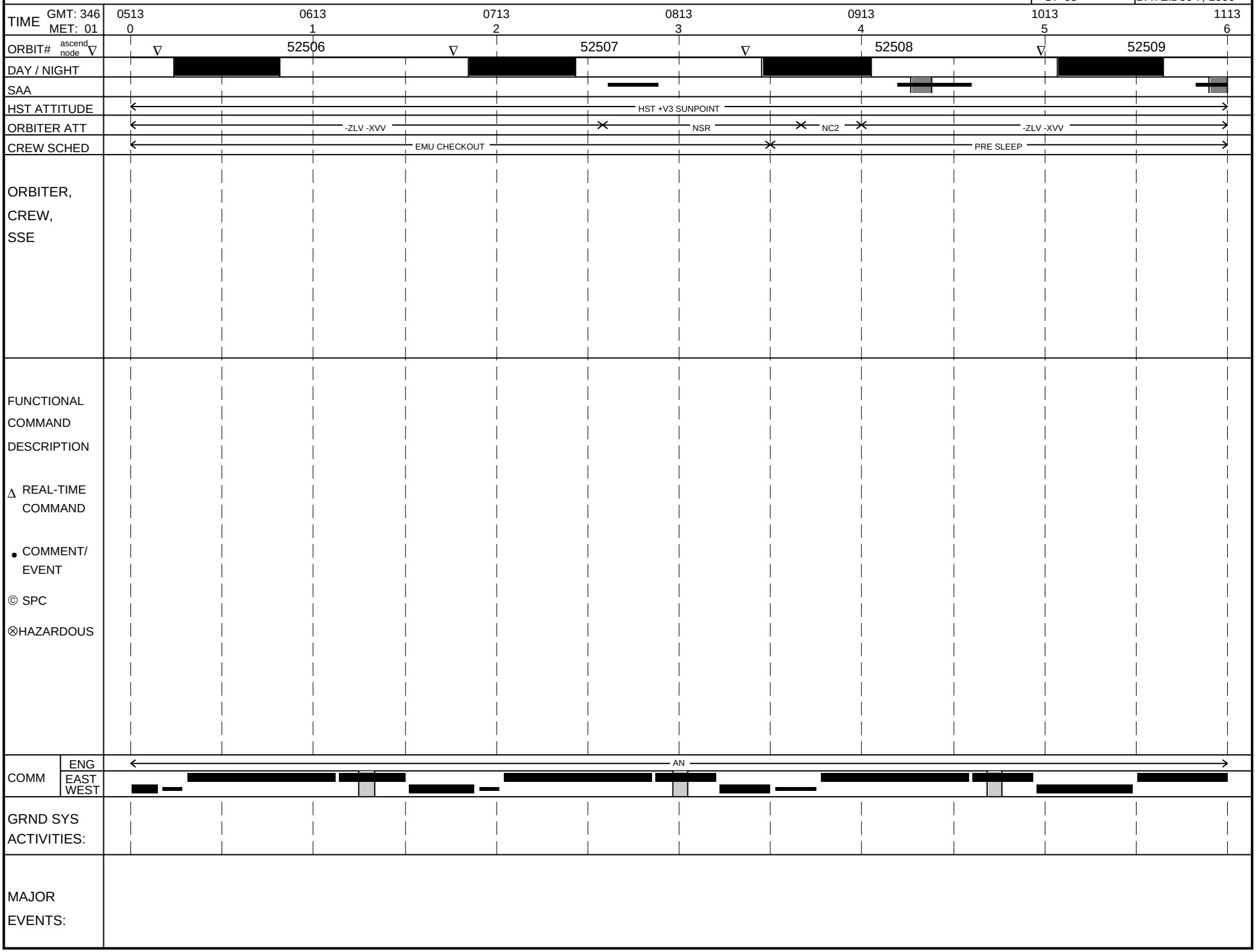
COMM: ENG — AN

COMM: EAST WEST

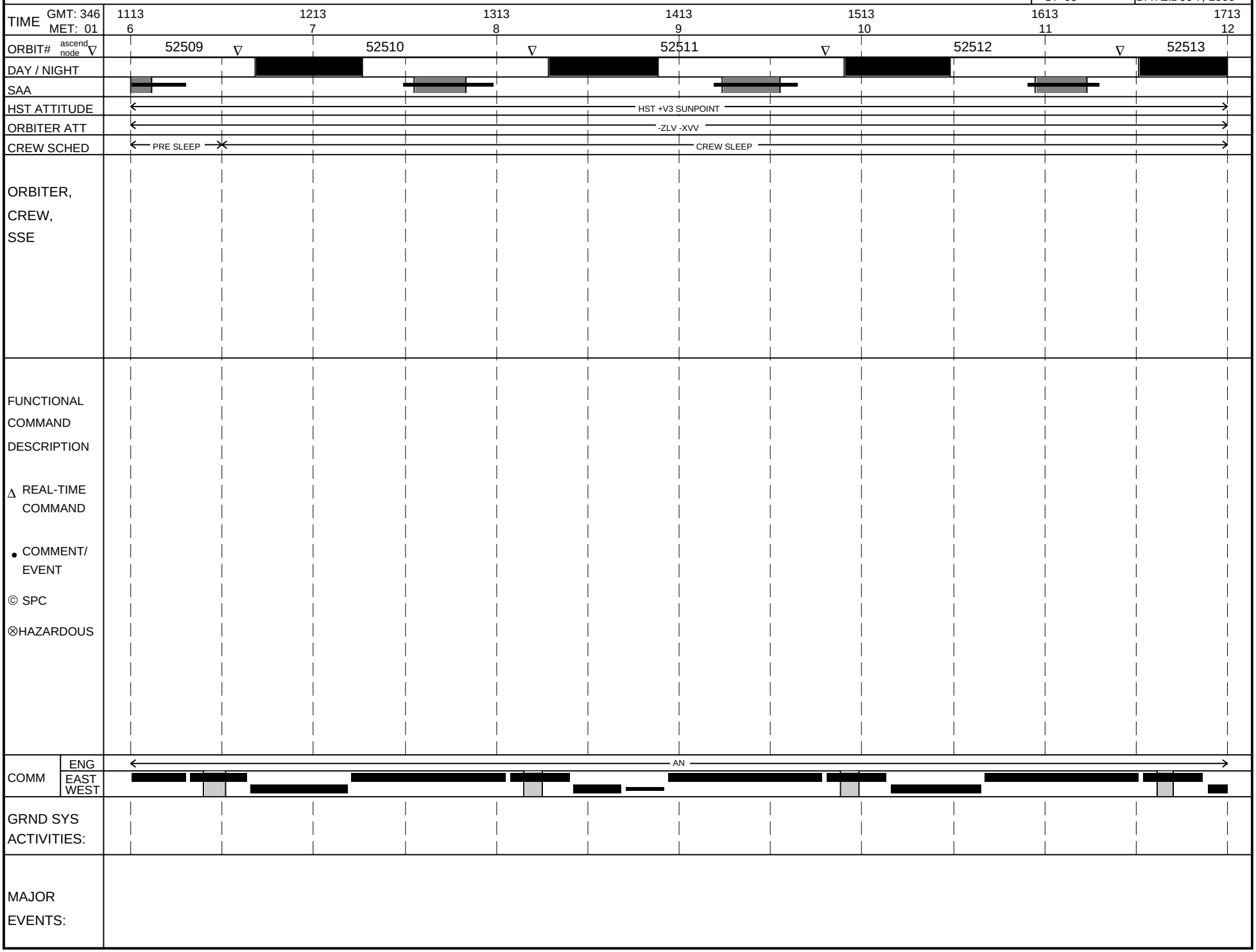
GRND SYS ACTIVITIES: MCCH, LCR/LSR MONITOR SSE CHECKOUT

MAJOR EVENTS:

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2



HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2



HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME — GMT: 346 / MET: 01

1713 (12) | 1813 (13) | 1913 (14) | 2013 (15) | 2113 (16) | 2213 (17) | 2313 (18)

ORBIT# (ascend node ∇): 52513 | 52514 | 52515 | 52516

DAY / NIGHT

SAA

HST ATTITUDE: HST +V3 SUNPOINT

ORBITER ATT: -ZLV -XVV | -ZLV +YVV | NC3 | NH

CREW SCHED: CREW SLEEP | POST SLEEP | HST RENDEZVOU

ORBITER, CREW, SSE

- END FD2
- BEGIN FD3
- WASTE WATER DUMP [1 hr 20 min]

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

14 • SAFE NSSC-1

14 ΔD700a-DISABLE PIT TOGGLE TEST [2min]

14 ΔD711a-TURN WFPC-II HEAT PIPE HTR OFF [2min]

14 ΔD702a-SAFE NSSC-1 [3min]

15 • TURN OFF FGEs BEFORE HWSP

15 ΔF107b-FGS: FSW FGS 1 TURN OFF [4min]

15 ΔF207b-FGS: FSW FGS 2 TURN OFF [2min]

15 ΔF307b-FGS: FSW FGS 3 TURN OFF [2min]

16 • POWER ON RMGA

16 ΔS003-POWER ON RMGA [2min]

PSEA TEST MODE BEFORE HWSP • 17

⊗17 Δ S002b-PSEA TEST MODE [102min]

COMM — ENG: AN | AF

COMM — EAST WEST

GRND SYS ACTIVITIES:

- FGSs OFF

MAJOR EVENTS:

THE FORMAT FOR THE FOLLOWING PAGES WILL BE 3 HOURS PER PAGE.

(Sheets 12 of 65 through 53 of 65)

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 346 MET: 01	2313 1800	2343 1830	0013 1900	0043 1930	0113 2000	0143 2030	0213 2100
ORBIT# ascend node ∇		52517		∇	52518		
DAY / NIGHT							
SAA							
HST ATTITUDE				HST +V3 SUNPOINT			
ORBITER ATT		NH	NC4		TGT TRK		
CREW SCHED			HST RENDEZVOUS OPS			PROX OPS	

ORBITER, CREW, SSE

18 • PI CONFIG

- IVA VERIFY HST PGSC IS OPERATIONAL AND CONFIG FOR 32K NORMAL DATA

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

• PSEA TEST MODE BEFORE HWSP (CONT.)

⊗ S002b (CONT.)

19 • DISABLE PSEA KA MONITORING

⊗19 Δ S503-DSBL PSEA KA MON [6min]

20 • INITIATE HARDWARE SUNPOINT

20 ΔD713-CHANGE TO FORMAT "D" [3min]
20 ΔS007-INITIATE HARDWARE SUNPOINT [3min]
20 ΔC521-CONNECT DIODE BUSES & TURN OFF BUS C [2min]
20 ΔD707-ENABLE SIC&DH PRIMARY & REDUNDANT TRAY HTRS [4min]
20 ΔD721-PWR ON DF-224 & LOAD SHORT VARIABLES [9min]
20 ΔC522-COMMAND CCC K42 TO LEVEL 1 [1min]
20 ΔD727-HALT CPU 2 [1min]

COMMAND V/T LEVEL IN ORBIT NIGHT OR ONCE SA BLANKET TEMP > 50°C (CARD 2.1.5.12, 3.1.5.14)

• TIMER B EXPIRES

MUST BE DONE AT LEAST 2 MINUTES PRIOR TO TIMER B EXPIRATION

21 • RECONFIGURATION FOLLOWING H/W SUNPOINT

21 ΔD720-PWR ON DMS & REESTABLISH COMMUNICATIONS [7min]
21 ΔG511-ZERO OUT RWA & MTE DIGITAL CMD REGISTERS [1min]
21 ΔD722-ACTIVATE VSS [8min]
21 ΔD715-CHANGE TO FORMAT "A" [3min]
21 ΔD726-SET CLOCK AND SYNC TO GMT [3min]
ΔD725-LOAD SERVICING MISSION MACROS [4min]
21 ΔD008c-DMS: DF-224 MEM DUMP [26min]
POWER ON GEAs [6min]-H507 Δ21
RECONFIGURE SAFEMODE TESTS & SMACs [1min]-D723 Δ21

DMS: FSW INIT CONFIG [3min]-D504a 21

OTA BUS RECONFIG AFTER HWSP • 22

FGE INIT [5min]-F602 Δ22
OTA BUSES 4,6,7 ON [3min]-E624 Δ22
FGS CONFIG [3min]-F601b Δ22

COMM

ENG: AF | DE | AN

EAST / WEST

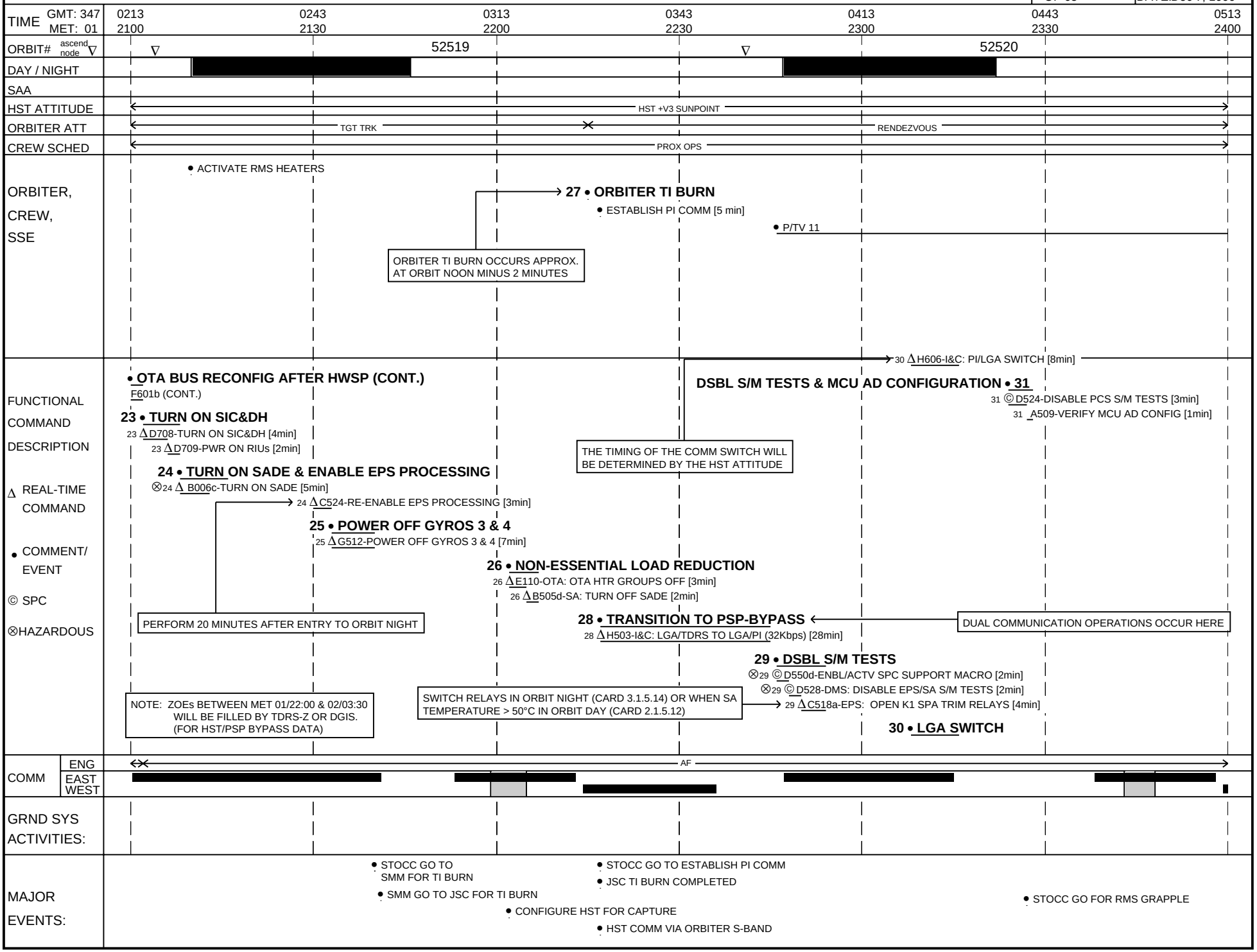
GRND SYS ACTIVITIES:

• PERFORM COARSE ATT DETERMINATION DURING EVERY ORBIT DAY PASS FOLLOWING HWSP INITIATION

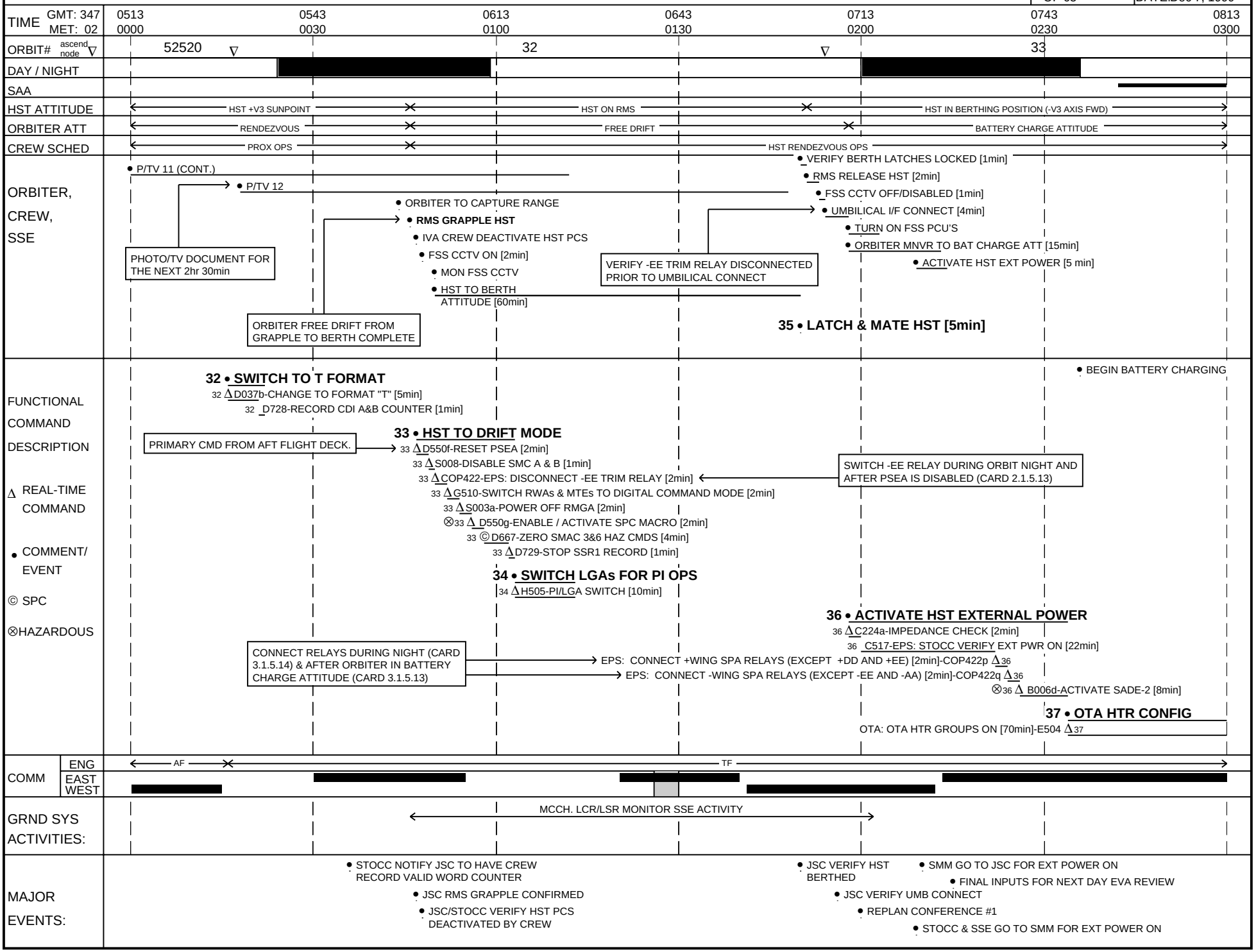
COLLECT/VERIFY DF-224 DUMP

MAJOR EVENTS:

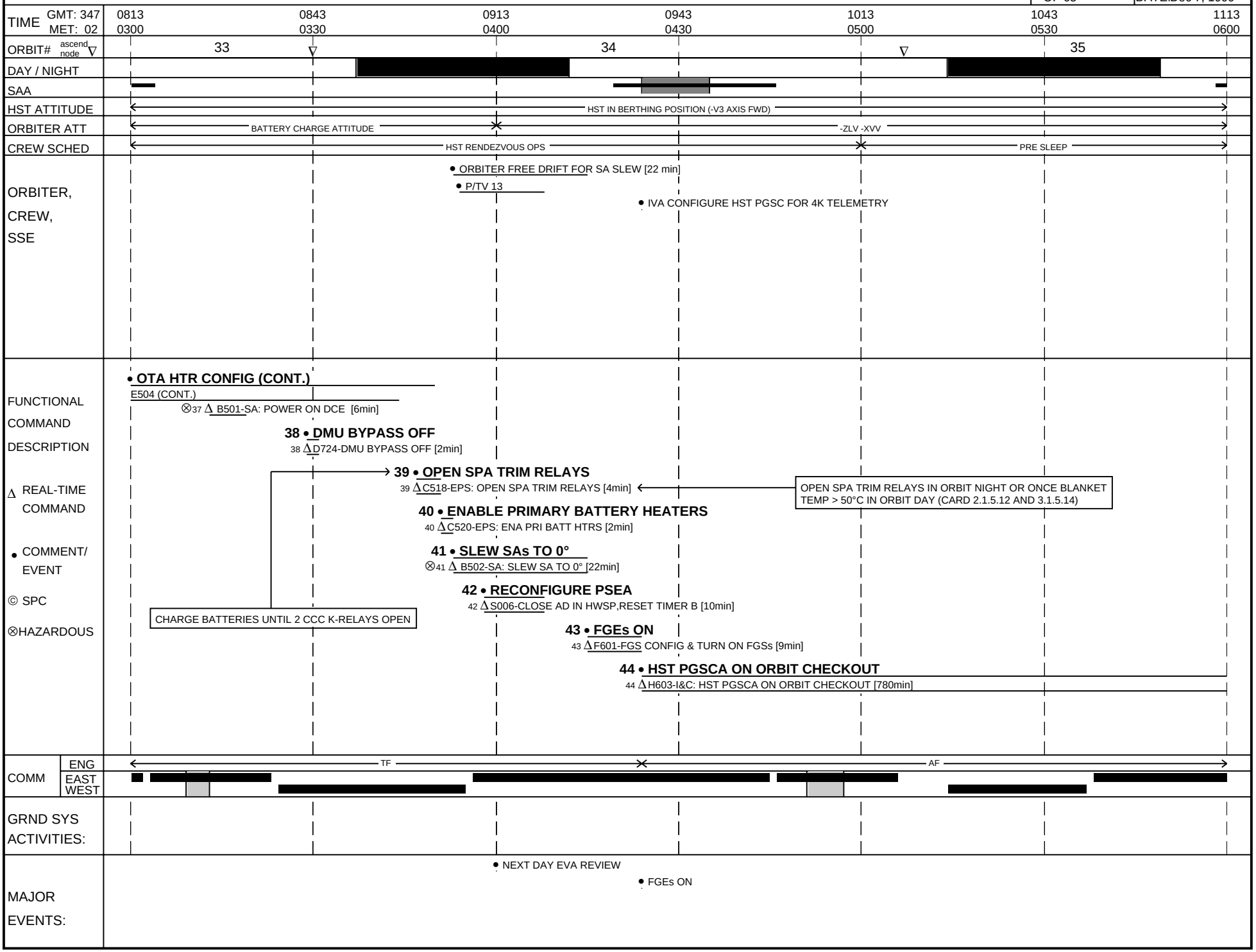
HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2



HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2



HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2



HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 347 MET: 02	1113 0600	1143 0630	1213 0700	1243 0730	1313 0800	1343 0830	1413 0900
ORBIT# ascend node ∇	35	∇		36	∇	37	
DAY / NIGHT							
SAA							
HST ATTITUDE	HST IN BERTHING POSITION (-V3 AXIS FWD)						
ORBITER ATT	-ZLV -XVV						
CREW SCHED	CREW SLEEP						

ORBITER, CREW, SSE

- SA STATIC TWIST ANALYSIS #1

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

- **HST PGSCA ON ORBIT CHECKOUT (CONT.)**

H603 (CONT.)

45 • **KU-BAND ON ORBIT CHECKOUT**

45 ΔD503a-DMS: PLAYBACK SCIENCE SSR [24min]

PLAYBACK REQUIRES 6 MIN OF KU-BAND

46 • **D FORMAT TELEMETRY TEST**

46 ΔD704-ACTIVATE D FIXED FORMAT [18min]

46 ΔD705-ACTIVATE PROGRAMMABLE FORMAT A [6min]

46 ΔD679a-RECOVER SIC&DH [8min]

46 ΔD711-TURN ON WFPC-II HEAT PIPE HTR [2min]

46 ΔD706-SET WFPC-2 SAFING BIT [4min]

COMM

ENG: N/A — AF — D — AF — AN

EAST WEST

GRND SYS ACTIVITIES:

- CONFIGURE FOR KU-BAND
- CONFIGURE FOR PSP BYPASS

MAJOR EVENTS:

- SMIT REV A
- REPLAN CONFERENCE #2

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 347 MET: 02	1413 0900	1443 0930	1513 1000	1543 1030	1613 1100	1643 1130	1713 1200
ORBIT# ascend node ∇		37 ∇		38	∇	39	
DAY / NIGHT							
SAA							
HST ATTITUDE	HST IN BERTHING POSITION (-V3 AXIS FWD)						
ORBITER ATT	-ZLV -XVV						
CREW SCHED	CREW SLEEP						
ORBITER, CREW, SSE							
FUNCTIONAL COMMAND DESCRIPTION	• **HST PGSCA ON ORBIT CHECKOUT (CONT.)**						
	H603 (CONT.)						
COMM ENG	AN						
COMM EAST WEST							
GRND SYS ACTIVITIES:							
MAJOR EVENTS:	• SMIT REV B		• REPLAN CONFERENCE #3				

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 347 / MET: 02	1713 / 1200	1743 / 1230	1813 / 1300	1843 / 1330	1913 / 1400	1943 / 1430	2013 / 1500
ORBIT# (ascend node ∇)		39 ∇			40 ∇		41 ∇
DAY / NIGHT							
SAA							
HST ATTITUDE	HST IN BERTHING POSITION (-V3 AXIS FWD)						
ORBITER ATT	-ZLV -XVV						
CREW SCHED	CREW SLEEP					POST SLEEP	
ORBITER, CREW, SSE					• END FD3 • BEGIN FD4		
FUNCTIONAL COMMAND DESCRIPTION	• **HST PGSCA ON ORBIT CHECKOUT (CONT.)** H603 (CONT.)						
COMM ENG	AN						
COMM EAST WEST							
GRND SYS ACTIVITIES:							
MAJOR EVENTS:	• CMD PLAN REV C				• SMIT REV C		

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 347 MET: 02	2013 1500	2043 1530	2113 1600	2143 1630	2213 1700	2243 1730	2313 1800
ORBIT# ascend node ∇		41 ∇		42 ∇		
DAY / NIGHT							
SAA							
HST ATTITUDE			HST IN BERTHING POSITION (-V3 AXIS FWD)				
ORBITER ATT			-ZLV -XVV				
CREW SCHED		POST SLEEP		EVA PREP			

ORBITER, CREW, SSE

- IVA CONFIGURE HST PGSC FOR 32K DATA
- ORBITER FREE DRIFT [7 min]
- FSS PIVOT TO 85° [3 min]

FUNCTIONAL COMMAND DESCRIPTION

- **HST PGSCA ON ORBIT CHECKOUT (CONT.)**
  - H603 (CONT.)
- **47 • GYRO-3 CONTROL HEATER ENABLE**
  - 47 ΔG704-GYRO-3 CONTROL HEATER ENABLE [4min]
- **TERMINATE HST PGSCA ON ORBIT CHECKOUT • 48**
  - 48 ΔD037c-DMS: CHANGE TO FORMAT "T" [6min]

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

COMM

ENG	AN		TN
EAST WEST			

GRND SYS ACTIVITIES:

- SMM GO FOR EVA

MAJOR EVENTS:

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 347 MET: 02	2313 1800	2343 1830	0013 1900	0043 1930	0113 2000	0143 2030	0213 2100
ORBIT# ascend node ∇	43		∇		44		
DAY / NIGHT							
SAA							
HST ATTITUDE	HST IN BERTHING POSITION (-V3 AXIS FWD)						
ORBITER ATT	-ZLV -XVV				SUN PROTECT		
CREW SCHED	EVA PREP	A/L DEPR			EVA-1		

ORBITER, CREW, SSE

- ORBITER FREE DRIFT [7 min] (CONT.)
- SAMA 1
- **EVA CREW EGRESS [10 min]**
- **INITIAL EVA-1 SETUP [60 min]**
  (INCL INSTALL LGA PROTECT COVER & CONFIG INGRESS AIDS)
- P/TV 14
- **RSU CHANGEOUT [3 hr 10 min]**
- RSU-2R RETRIEVAL [15 min]
- OPEN COPE [5 min]
- RETRIEVE RSU-2R FROM COPE[5min]
- CLOSE COPE [5 min]
- OPEN -V3 DOORS [20 min]
- INSTALL BAPS SUPPORT POST
- ORBITER FREE DRIFT [11 min]
- FSS PIVOT TO 90°TARGET&INSERT BSP CENTER PIP-PINS [7 min]
- RETRACT FHST SEALS [10 min]
- OPEN -V3 AFT SHROUD DOORS [10 min]
- RSU-2 CHANGEOUT [25 min]
- DEMATE CONNS [4 min]
- RETRIEVE RSU-2R &STOW RSU-2[2 min]
- INSERT RSU-2R INTO HST [1 min]
- MATE CONNS[5min]
- REMOVE RSU-2 FROM HST[2min]

STOCC MONITOR RSU HOUSING TEMPS AFTER INSTALLATION OF EACH RSU. IF TEMP OF ANY RSU APPROACHES 5°C, ENABLE THAT RSU'S SURV HTR

FUNCTIONAL COMMAND DESCRIPTION

RSU CHANGEOUT (INCLUDES PREP, C/O, ACTIVATION & A/T) • **49**

49 Δ G602-PCS: POWER OFF GYROS AND CONTROL/SURV HTRS [6min]

NEED 10 MINUTES OF SPINDOWN BEFORE CREW CAN REMOVE RSU

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

COMM

ENG: ← TN →

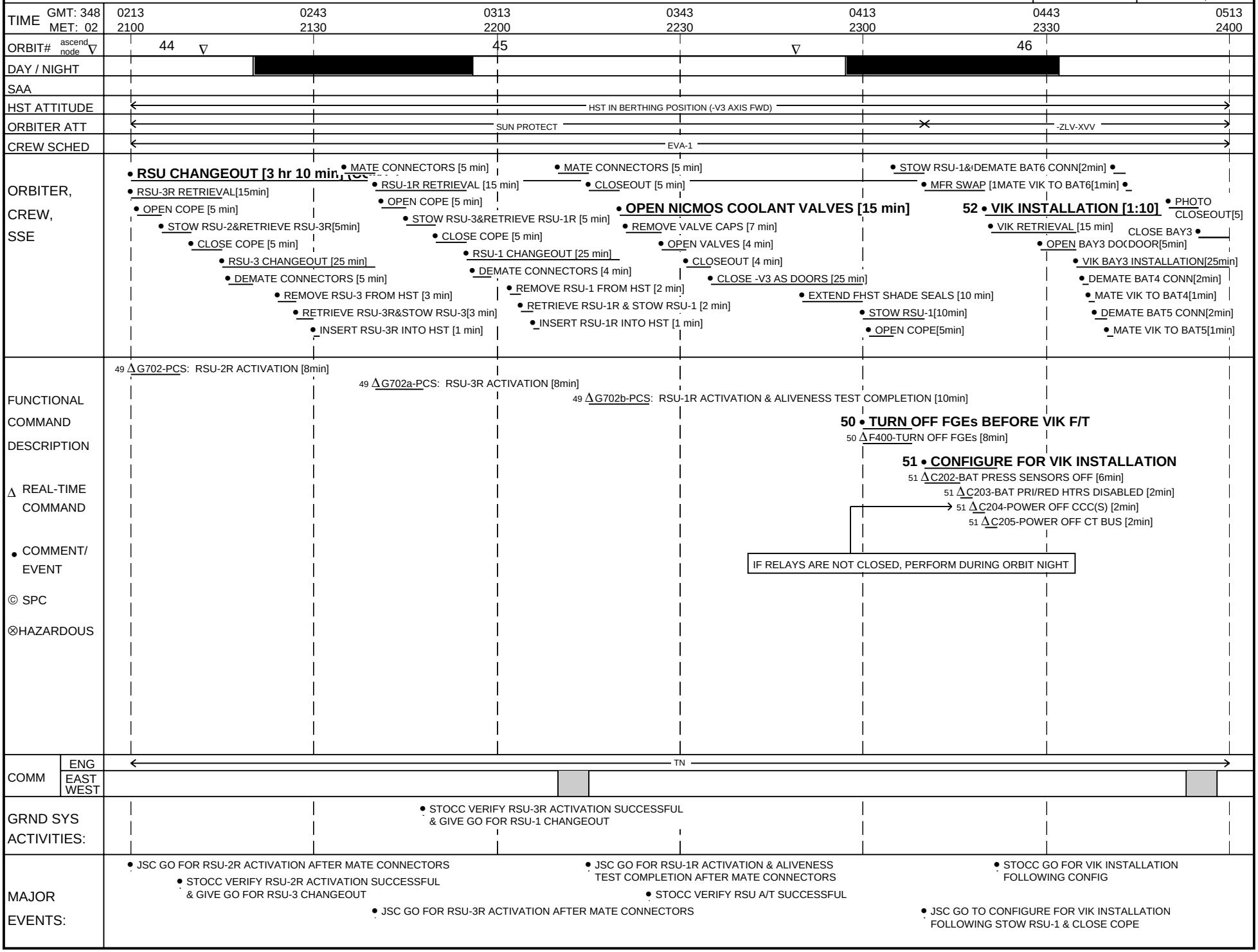
EAST / WEST

GRND SYS ACTIVITIES:

MAJOR EVENTS:

- BEGIN EVA-1
- JSC GO TO CONFIGURE FOR RSU C/O AT START OF RSU-2R RETRIEVAL
- STOCC GO FOR RSU-2 C/O FOLLOWING 10 MIN SPINDOWN

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2



HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 348 / MET: 03 — 0513/0000 | 0543/0030 | 0613/0100 | 0643/0130 | 0713/0200 | 0743/0230 | 0813/0300

ORBIT# (ascend node ∇): 46 ∇ | 47 | ∇ 48

DAY / NIGHT

SAA

HST ATTITUDE: HST IN BERTHING POSITION (-V3 AXIS FWD)

ORBITER ATT: -ZLV-XVV | BATTERY CHARGE ATTITUDE

CREW SCHED: EVA-1 | POST EVA | A/L REPR | POST EVA

ORBITER, CREW, SSE

- **VIK INSTALLATION [2.1.5]**
- CLOSE BAY 2 DOOR [5min]
- VIK BAY2 INSTALLATION [30 min]
- **EVA-1 FINAL CLOSEOUT [30 min] (INCLUDES INSPECT INGRESS AIDS)**
- OPEN BAY 2 DOOR [3 min]
- EVA CREW INSPECT J101 CONNECTOR FOR DEBRIS [5 min]
- DEMATE BATT1 CONN[2min]
- REMOVE BSP CENTER PIP-PINS [5 min]
- MATE VIK TO BATT1[1min]
- **END OF 6 HOUR EVA DAY**
- DEMATE BATT2 CONN[2min]
- **EVA CREW INGRESS [10 min]**
- MATE VIK TO BATT2[1min]
- ORBITER FREE DRIFT [22 min]
- DEMATE BATT 3 CONN [2 min]
- ORBITER MNVR TO BATT CHARGE ATT [30 min]
- MATE VIK TO BATT 3 [1 min]
- IVA CREW TURN OFF EXT ESS & EXT MAIN POWER [5min]
- PHOTO CLOSEOUT [5 min]

FUNCTIONAL COMMAND DESCRIPTION

53 • VIK ALIVENESS TEST

53 ΔC210-EPS: POWER ON CT BUS [2min]

53 ΔC212-EPS: TURN ON BAT PRESS SENSORS / RED BAT HTRS ENBL [2min]

53 ΔC213-POWER ON ALL CCC(S) [3min]

PERFORM DURING ORBIT NIGHT (CARD 2.1.5.10)

54 • VIK FUNCTIONAL TEST

⊗54 Δ B550b-SLEW SAs TO 100° [22min]

EXTERNAL ESSENTIAL & EXTERNAL MAIN POWER OFF [11min]-C208 Δ54

54 ΔC207-IMPEDANCE CHECK [1min]

EPS LOAD REDUCTION (OTA HTR GRP DIS) [9min]-C220 Δ54

EPS: CONNECT +/-WING SPA RELAYS (EXCEPT +DD AND +EE) [4min]-C215 Δ54

VERIFY KX1 RELAY OPEN/CLOSE [80min]-C216b 54

PERFORM DURING ORBIT NIGHT OR WHEN SA TEMP > 50°C IN ORBIT DAY (CARD 2.1.5.12 AND CARD 3.1.5.14)

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

COMM

ENG: TN

EAST WEST

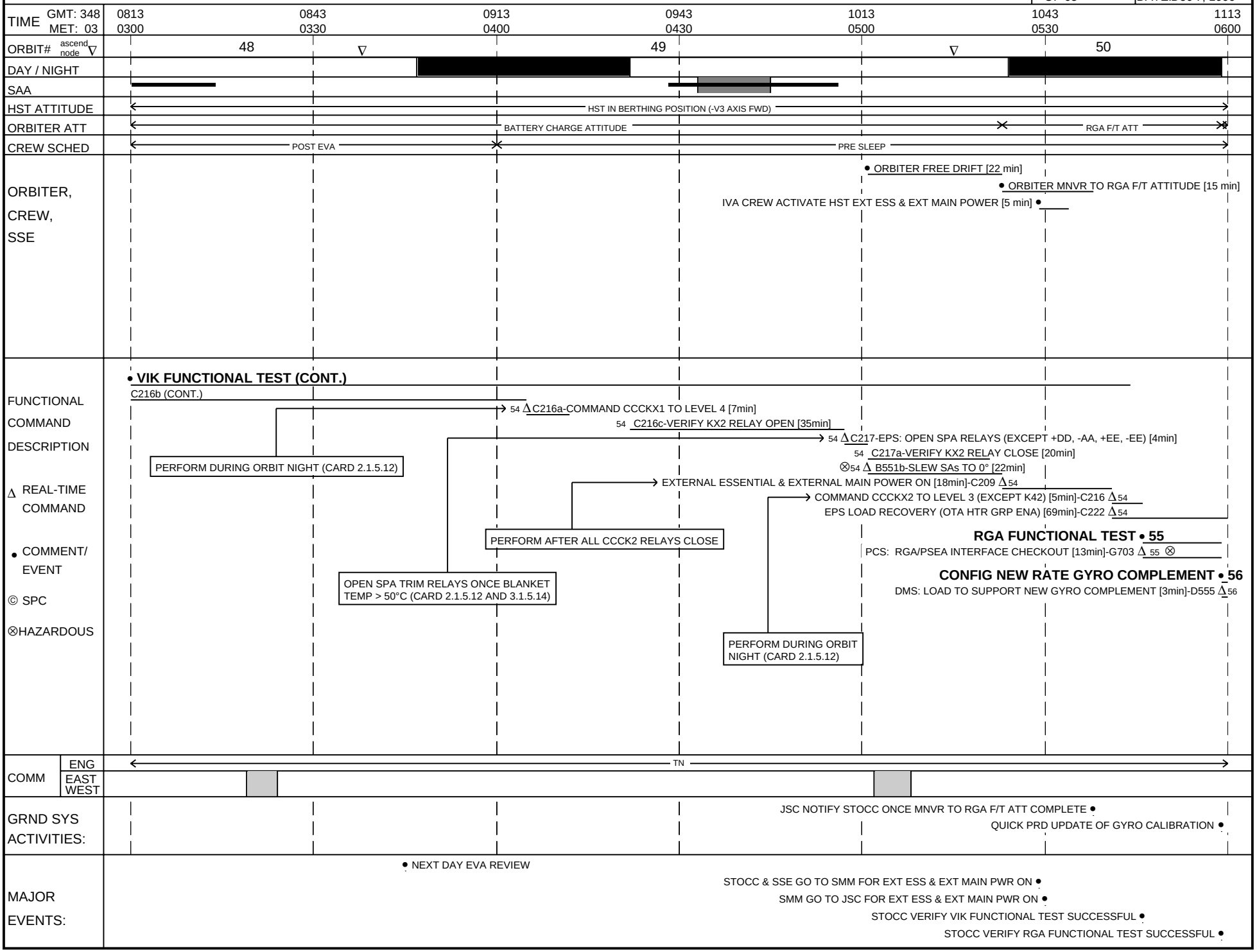
GRND SYS ACTIVITIES:

- JSC GO TO CLOSE TRIM RELAYS ONCE MNVR TO BATTERY CHARGE ATTITUDE IN PROGRESS & EXPECTED TO BE COMPLETE BY SUNRISE + 5 MINUTES

MAJOR EVENTS:

- JSC GO FOR VIK A/T FOLLOWING MATE VIK TO BATTERY 3
- STOCC & SSE GO TO SMM FOR EXT ESS & EXT MAIN PWR OFF
- SMM GO TO JSC FOR EXT ESS & EXT MAIN PWR OFF
- STOCC VERIFY VIK A/T SUCCESSFUL
- END EVA-1
- REPLAN CONFERENCE #1

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2



HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 348 MET: 03	1113 0600	1143 0630	1213 0700	1243 0730	1313 0800	1343 0830	1413 0900
ORBIT# ascend node ∇	50	∇	51		∇	52	
DAY / NIGHT			■			■	
SAA	▬				▬		
HST ATTITUDE	← HST IN BERTHING POSITION (-V3 AXIS FWD) →						
ORBITER ATT	← -ZLV-XVV →						
CREW SCHED	← CREW SLEEP →						
ORBITER, CREW, SSE			• SA STATIC TWIST ANALYSIS #2				
FUNCTIONAL COMMAND DESCRIPTION	C222 (CONT.)						
	• CONFIG NEW RATE GYRO COMPLEMENT (CONT.)						
	D555 (CONT.)						
	⊗56 Δ D550v-DMS: ENBL/ACT SPC SUPPORT MACRO [4min]						
	56 Δ D540a-DMS: COMPLETE IN-BAY CONFIG [4min]						
	56 Δ S001-CONFIGURE PSEA FOR NEW GYRO COMPLEMENT [12min]						
			57 • LOAD GYRO TABLES & DRIFT RATE BIASES				
			57 Δ R009a-LOAD GYRO TABLES AND DRIFT RATE BIASES [8min]				
			58 • TURN ON FGEs AFTER VIK F/T				
		58 Δ F401-TURN ON FGEs [7min]					
COMM ENG	← TN →						
COMM EAST WEST	▬				▬		
GRND SYS ACTIVITIES:		• FDF DELIVERS EPHEMERIS PRODUCTS TO ScI					
MAJOR EVENTS:	• SMIT REV A						
		• REPLAN CONFERENCE #2					

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 348 / MET: 03	1413 / 0900	1443 / 0930	1513 / 1000	1543 / 1030	1613 / 1100	1643 / 1130	1713 / 1200
ORBIT# (ascend node ∇)		52 ∇		53	∇	54	
DAY / NIGHT							
SAA							
HST ATTITUDE	HST IN BERTHING POSITION (-V3 AXIS FWD)						
ORBITER ATT	-ZLV-XVV						
CREW SCHED	CREW SLEEP						
ORBITER, CREW, SSE							
FUNCTIONAL COMMAND DESCRIPTION							
COMM ENG	TN						
COMM EAST WEST							
GRND SYS ACTIVITIES:							
MAJOR EVENTS:	• SMIT REV B		• REPLAN CONFERENCE #3				

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME	GMT: 348	1713	1743	1813	1843	1913	1943	2013
	MET: 03	1200	1230	1300	1330	1400	1430	1500

ORBIT# (ascend node ∇): 54 ∇ 55 ∇

DAY / NIGHT

SAA

HST ATTITUDE: HST IN BERTHING POSITION (-V3 AXIS FWD)

ORBITER ATT: -ZLV-XVV

CREW SCHED: CREW SLEEP | POST SLEEP

ORBITER, CREW, SSE

- END FD4
- BEGIN FD5

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

COMM — ENG: TN

COMM — EAST WEST

GRND SYS ACTIVITIES:

MAJOR EVENTS:

- CMD PLAN REV C
- SMIT REV C

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 348 / MET: 03	2013 / 1500	2043 / 1530	2113 / 1600	2143 / 1630	2213 / 1700	2243 / 1730	2313 / 1800
ORBIT# (ascend node ∇)		56		∇	57		
DAY / NIGHT		■			■		
SAA							
HST ATTITUDE	← HST IN BERTHING POSITION (-V3 AXIS FWD)					HST +V3 AXIS FWD →	
ORBITER ATT	← -ZLV-XVV						→
CREW SCHED	← POST SLEEP				EVA PREP		→
ORBITER, CREW, SSE					• ORBITER FREE DRIFT [48 min] • FSS PIVOT TO 75° [4 min] • FSS ROTATE TO +V3 POSITION [13 min] • FSS PIVOT TO 90° [4min]		
FUNCTIONAL COMMAND DESCRIPTION						**59 • SLEW +SA TO -20°** ⊗59 Δ B520-SLEW +SA TO -20° [15min]	
					PREP FOR ADV COMPUTER 486/DF-224 CHANGEOUT • 60 DISABLE PIT TOGGLE TEST [1min]-D700 Δ60 SAFE NSSC-1 [3min]-D702 Δ60		
COMM ENG	← TN						TF →
COMM EAST / WEST							
GRND SYS ACTIVITIES:							
MAJOR EVENTS:				• SMM GO FOR EVA			

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 348 MET: 03	2313 1800	2343 1830	0013 1900	0043 1930	0113 2000	0143 2030	0213 2100
ORBIT# ascend node ∇	57 ∇		58	∇	59		
DAY / NIGHT		■■■■■■■■■■			■■■■■■■■■■		
SAA							
HST ATTITUDE	← HST +V3 AXIS FWD →			← HST -V2 AXIS FWD →			
ORBITER ATT	← -ZLV-XVV →						
CREW SCHED	← EVA PREP →	← A/L DEPR →	← EVA-2 →				

ORBITER, CREW, SSE

- SAMA 2
- **EVA CREW EGRESS [10 min]**
- ORBITER FREE DRIFT [11min]
- FSS ROTATE TO -V2 [7min]
- **EVA CREW PREP FOR EVA-2 [30 min]**
  (INCLUDES BSP CENTER PIP-PINS INSERT)
- IVA CONFIG HST PGSC FOR 4K TELEMETRY
- OPEN LOPE [5 min]
- DF224/COP REMOVAL [40 min]
- DEMATE CONNECTORS [5 min]
- CLOSE LOPE [2 min]
- REMOVE DF-224/COP FROM HST [2 min]
- **COMPUTER INSTALLATION [1hr 55 min]**
- INITIAL PREP [5 min]
- OPEN BAY 1 DOOR [5 min]
- INSERT 486 INTO HST [1 min]
- MATE CONNECTORS [14 min]
- OPEN LOPE [2 min]
- COMPUTER SWAP [10 min]
- SWAP DF-224/COP FOR 486 [5 min]
- CLOSE LOPE [5 min]
- 486 INSTALLATION [35 min]

FUNCTIONAL COMMAND DESCRIPTION

61 • ADV COMPUTER 486 / DF-224 CHANGEOUT

61 Δ D641-ACTIVATE DE FORMAT [6min]

61 Δ D642-POWER OFF DF-224 [6min]

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

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COMM	ENG	← TF → ← DE →
	EAST WEST	■ ■

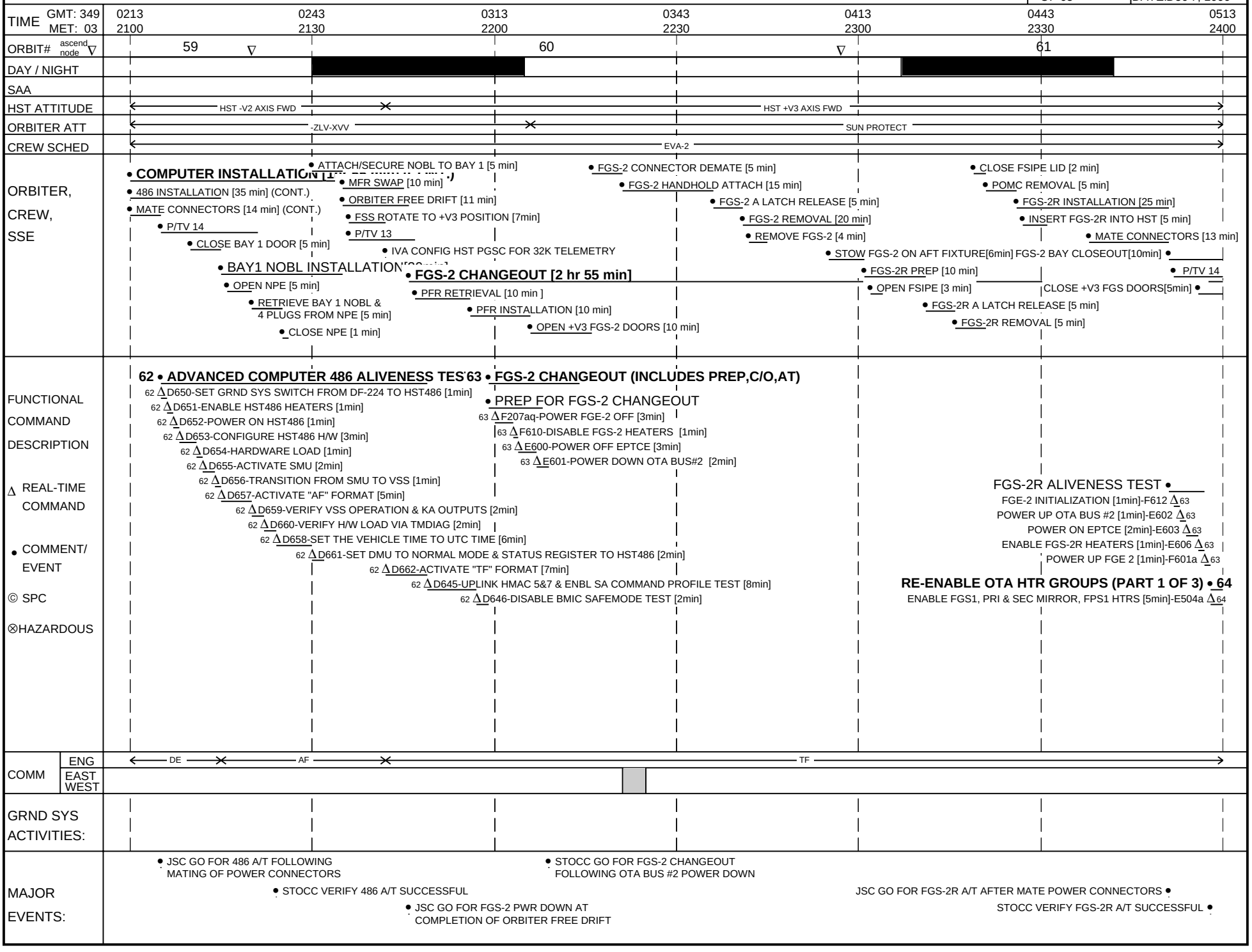
GRND SYS ACTIVITIES:

- STOCC GO FOR 486/DF-224 CHANGEOUT FOLLOWING POWER DOWN OF DF-224

MAJOR EVENTS:

- BEGIN EVA-2
- JSC GO TO CONFIG FOR 486/DF-224 CHANGEOUT FOLLOWING CREW EGRESS
- JSC GO TO POWER DOWN DF-224 AT START OF TRANSLATE TO BAY 1

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2



HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME — GMT: 349 / MET: 04

0513 0000 | 0543 0030 | 0613 0100 | 0643 0130 | 0713 0200 | 0743 0230 | 0813 0300

ORBIT# (ascend node ∇): 61 ∇ 62 ∇ 63

DAY / NIGHT

SAA

HST ATTITUDE: HST +V3 AXIS FWD

ORBITER ATT: SUN PROTECT | -ZLV -XVV | -ZLV +YVV

CREW SCHED: EVA-2 | POST EVA | A/L REPR | POST EVA

ORBITER, CREW, SSE

- **FGS-2 CHANGEOUT [2 hr 55 min] (C**
- STOW PFR [10 min]
- **EVA-2 FINAL CLOSEOUT [30 min]**
  (INCLUDES INSPECT INGRESS AIDS)
- FGS-2 BAY CLOSEOUT[10min] (CONT.)
- P/TV 14 (CONT.)
- CLOSE +V3 FGS DOORS[5min] (CONT.)
- FGS-2 INSTALLATION [20 min]
- OPEN FSIPE LID [5 min]
- IVA CONFIG HST PGSC FOR 4K TELEMETRY
- INSERT FGS-2 INTO FSIPE [5 min]
- FGS-2 A LATCH ENGAGE [10 min]
- CLOSE & SECURE FSIPE [5 min]
- IVA CONFIGURE HST PGSC FOR 32K TELEMETRY
- EVA CREW INSPECT J101 CONNECTOR FOR DEBRIS [5 min]
- REMOVE BSP CENTER PIP-PINS [5 min]
- **END OF 6 HOUR EVA DAY**
- **EVA CREW INGRESS [10 min]**
- ORBITER FREE DRIFT [15 min]
- IVA CONFIGURE HST PGSC FOR 4K TELEMETRY
- IVA CONFIGURE HST PGSC FOR 32K TELEMETRY

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

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- **RE-ENABLE OTA HTR GROUPS (PART 1 OF 3) (CONT.)**
  E504a (CONT.)
- DO NOT EXECUTE ANY FGS COMMANDING DURING SAA LEVEL 1 PASSAGE
- **68 • SLEW +SA TO 0°**
  SLEW +SA TO 0° [15min]-B521 © 68 ⊗
- **65 • ADVANCED COMPUTER 486 FUNCTIONAL TEST**
- **FGS-2R FUNCTIONAL TEST • 69**
  FILTER WHEEL VERIFICATION [4min]-E608 Δ 69
- 65 ΔD671-HALT THE CPM PROCESSING AND ACTIVATE D FORMAT [6min]
- 65 ΔD672-CONFIG 486 FOR OPS MODE STRING-1 & SET THERMISTOR [4min]
- 65 ΔD673-CONFIG HST486 INT MODULES FOR THE OPS, STRING-1 [3min]
- 65 ΔD674-UPLINK H/W LOAD AND ACTIVATE SMU [11min]
- 65 ΔD675-START VSS OPERATIONS AND ACTIVATE AF FORMAT [6min]
- **66 • RE-ENABLE OTA HTR GROUPS (PART 2 OF 3)**
- 66 ΔE504b-ENABLE FGS3, MAIN RING, FPS2 HTRS [4min]
- 65 ΔD676-VERIFY VSS OPS & KA OUTPUTS & VERIFY H/W LOAD [4min]
- 65 ΔD677-RESET STATUS REGISTER & VEHICLE CLOCK [3min]
- 65 ΔD678-SWITCH DMU TO NORMAL MODE [1min]
- 65 ΔD680-VERIFY HST HEALTH IN AF FORMAT [5min]
- 65 ΔD683-ACTIVATE HF FORMAT AND VERIFY HST HEALTH [15min]
- 65 ΔD681-UPLINK SM&S/M MACROS&DISABLE HLD MACROS & ENBL SA COMMAND PROFILE TEST [31min]
- **67 • RE-ENABLE OTA HTR GROUPS (PART 3 OF 3)**
- 67 ΔE504c-ENABLE FPS3 HTRS [2min]
- 65 ΔD679-RECOVER SIC&DH [12min]
- 65 ΔD682-PERFORM MEMORY DUMP [21min]
- 65 ΔD684-ACTIVATE TN FORMAT [11min]
- 65 ΔD685-TOGGLE RGA MODE [5min]
- ENABLE BMIC TASK & DISABLE BMIC TEST [4min]-D686 Δ 65
- EXECUTE AFTER OTA HTR GROUPS ENABLED IN PART 1 ARE HEATER CYCLING (~30 MIN)
- EXECUTE AFTER OTA HTR GROUPS ENABLED IN PART 2 ARE HEATER CYCLING (~30 MIN)

COMM

ENG: DE | AF | HF | N/A | TN

EAST WEST

GRND SYS ACTIVITIES:

- COMPUTE CLOCK CORRELATION PARAMETERS

MAJOR EVENTS:

- END EVA-2
- REPLAN CONFERENCE #1
- STOCC VERIFY 486 F/T SUCCESSFUL

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME — GMT: 349 / MET: 04

0813 0300 | 0843 0330 | 0913 0400 | 0943 0430 | 1013 0500 | 1043 0530 | 1113 0600

ORBIT# (ascend node ∇): 63 ∇ 64 ∇ 65

DAY / NIGHT

SAA

HST ATTITUDE: HST +V3 AXIS FWD

ORBITER ATT: -ZLV +YVV | -ZLV -XVV

CREW SCHED: POST EVA | PRE SLEEP

ORBITER, CREW, SSE

• WASTE WATER DUMP [1 hr 20 min]

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

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• FGS-2R FUNCTIONAL TEST (CONT.)

E608 (CONT.)

69 ΔE609-PMT DARK COUNT VERIFICATION [8min]

69 ΔE610-ITS ACQUISITION & FF3 POSITION VERIF [14min]

69 ΔE611-FIELD STOP ALIGNMENT VERIFICATION [9min]

69 ΔE612-FGS TO DEFAULT MODE [2min]

70 • RELOAD GYRO & FHST TABLES

70 ΔD555b-DMS: LOAD TO SUPPORT NEW GYRO COMPLEMENT [3min]

⊗70 ©D550t-DMS: ENBL/ACT SPC SUPPORT MACRO [4min]

70 ΔR009-LOAD GYRO TABLES AND DRIFT RATE BIASES [14min]

70 ΔD754-LOAD FHST ALIGNMENT TABLES [6min]

70 ΔD750-ENABLE EPS SOC FSW PROCESSING [26min]

70 ΔD751-TURN OFF QUATERNION PROPAGATION [2min]

70 ΔD752-SET HGA GIMBAL LIMIT TO 102 DEG [14min]

71 • TELEMETRY LOAD FOR SOLID STATE DR PREP

DMS: LOAD HST486 TLM ADJ LOAD FOR SSR-3 TELEM [6min]-D625 Δ71

71 ΔD626-DMS: OFF ENABLE FOR SSR-1 [1min]

COMM — ENG: TN | HN | TN

COMM — EAST WEST

GRND SYS ACTIVITIES:

MAJOR EVENTS:

• STOCC VERIFY FGS-2R FUNCTIONAL TEST SUCCESSFUL

• NEXT DAY EVA REVIEW

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 349 MET: 04	1113 0600	1143 0630	1213 0700	1243 0730	1313 0800	1343 0830	1413 0900
ORBIT# ascend node ∇		65	∇	66		∇ 67	
DAY / NIGHT							
SAA							
HST ATTITUDE	HST +V3 AXIS FWD						
ORBITER ATT	-ZLV -XVV						
CREW SCHED	CREW SLEEP						
ORBITER, CREW, SSE			• SA STATIC TWIST ANALYSIS #3				
FUNCTIONAL COMMAND DESCRIPTION Δ REAL-TIME COMMAND • COMMENT/ EVENT © SPC ⊗HAZARDOUS							
COMM ENG	TN						
COMM EAST WEST							
GRND SYS ACTIVITIES:							
MAJOR EVENTS:	• SMIT REV A	• REPLAN CONFERENCE #2					

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

SHEET 33 OF 65 | 442 / 441 | DATE:Dec 7, 1999

TIME GMT: 349 MET: 04	1413 0900	1443 0930	1513 1000	1543 1030	1613 1100	1643 1130	1713 1200
ORBIT# ascend node ∇		67 ∇		68 ∇		69 ∇	
DAY / NIGHT							
SAA							
HST ATTITUDE	HST +V3 AXIS FWD						
ORBITER ATT	-ZLV -XVV						
CREW SCHED	CREW SLEEP						
ORBITER, CREW, SSE							
FUNCTIONAL COMMAND DESCRIPTION							
COMM ENG	TN						
COMM EAST WEST							
GRND SYS ACTIVITIES:	• REPORT ON RGA IN-BAY POLARITY CHECK						
MAJOR EVENTS:	• SMIT REV B		• REPLAN CONFERENCE #3				

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

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HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME	GMT: 349	1713	1743	1813	1843	1913	1943	2013
	MET: 04	1200	1230	1300	1330	1400	1430	1500

ORBIT# (ascend node ∇): 69 ∇ 70

DAY / NIGHT

SAA

HST ATTITUDE: HST +V3 AXIS FWD

ORBITER ATT: -ZLV -XVV

CREW SCHED: CREW SLEEP | POST SLEEP

ORBITER, CREW, SSE

- END FD5
- BEGIN FD6

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

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COMM — ENG: TN

COMM — EAST WEST

GRND SYS ACTIVITIES:

MAJOR EVENTS:

- CMD PLAN REV C
- SMIT REV C

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 349 MET: 04	2013 1500	2043 1530	2113 1600	2143 1630	2213 1700	2243 1730	2313 1800
ORBIT# ascend node ∇	∇	71		∇	72		
DAY / NIGHT							
SAA							
HST ATTITUDE	← HST +V3 AXIS FWD →						
ORBITER ATT	← -ZLV -XVV →						
CREW SCHED	← POST SLEEP →				EVA PREP →		
ORBITER, CREW, SSE							
FUNCTIONAL COMMAND DESCRIPTION Δ REAL-TIME COMMAND • COMMENT/ EVENT © SPC ⊗HAZARDOUS							
COMM ENG	← TN →						
COMM EAST WEST							
GRND SYS ACTIVITIES:							
MAJOR EVENTS:				• SMM GO FOR EVA			

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME — GMT: 349 / MET: 04

2313 1800 | 2343 1830 | 0013 1900 | 0043 1930 | 0113 2000 | 0143 2030 | 0213 2100

ORBIT# (ascend node ∇): 72 ∇ | 73 ∇ | 74

DAY / NIGHT

SAA

HST ATTITUDE: HST +V3 AXIS FWD

ORBITER ATT: -ZLV -XVV

CREW SCHED: EVA PREP | A/L DEPR | EVA-3

ORBITER, CREW, SSE

- SAMA 3
- **EVA CREW EGRESS [10 min]**
- **INITIAL EVA-3 SETUP [15 min]**
  (INCLUDES BSP CENTER PIP-PINS INSERT)
- CLOSE BAY C DOOR [10 min]
- **76 • SSA XMTR CHANGEOUT [1 hr 15**
- SSAT-2 REMOVAL [45 min]
- OPEN BAY 5 DOOR [10 min]
- **• CONFIGURE OCE EK [30 min]**
- OCE EK MATE [20 min]
- OPEN BAY C DOOR [5 min]
- DEMATE/MATE CONN #11 [7 min]
- OCE-EK CLOSEOUT [4 min]
- P/TV 14
- DEMATE CONNECTORS [10 min]
- OPEN COPE [4 min]
- RETRIEVE SSAT-2R [5 min]
- CLOSE COPE [4 min]
- REMOVE SSAT-2 [1 min]
- SSAT-2R INSTALLATION [30 min]
- INSERT SSAT-2R [9 min]
- OPEN COPE [4 min]
- MATE CONNS[15min]
- STOW SSAT-2 [5 min]
- CLOSE COPE [4 min]

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

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72 • OCE CABLE INSTALL(PREP,C/O)

• PREP FOR OCE CABLE INSTALLATION

72 ΔE618-OCE INITIALIZATION [1min]

72 ΔF307aq-POWER DOWN FGE-3 [2min]

72 ΔE604-POWER DOWN OTA BUS #4 [1min]

73 • OCE CABLE / AMS ALIVENESS TEST

73 ΔF613-FGE-3 INITIALIZATION [1min]

73 ΔE619-OCE INITIALIZATION [1min]

73 ΔE605-POWER UP OTA BUS #4 [1min]

73 ΔF611-POWER UP FGE-3 [1min]

73 ΔE200a-POWER ON OCE/AMS [2min]

73 ΔE620-POWER OFF OCE/AMS [2min]

74 • SOLID STATE DR PREP

74 ΔD609-PUT TRI1/TRI3 IN STANDBY [2min]

74 ΔD632-DMS: SSR-1 POWER OFF [2min]

74 ΔD633-ADJUST LIMITS [1min]

75 • VERIFY SSA XMTR OFF

75 P300-VERIFY SSA XMTR OFF [5min]

COMM — ENG: TN

COMM — EAST WEST

GRND SYS ACTIVITIES:

- STOCC GO FOR OCE EK INSTALL AFTER OTA BUS#4 PWR DOWN
- STOCC GO FOR SSA XMTR CHANGEOUT FOLLOWING VERIFICATION OF SSA XMTR OFF

MAJOR EVENTS:

- BEGIN EVA-3
- JSC GO FOR OCE CABLE PREP FOLLOWING CREW EGRESS
- STOCC VERIFY OCE EK A/T SUCCESSFUL
- STOCC GO FOR SSR/ESTR-3 C/O FOLLOWING VERIFICATION OF SSR-1/ESTR-3 PWR OFF
- JSC GO FOR OCE EK A/T AND CONFIG FOR SSR/ESTR-3 C/O FOLLOWING MATE OF POWER CONN

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 350 / MET: 04 — 0213 2100 | 0243 2130 | 0313 2200 | 0343 2230 | 0413 2300 | 0443 2330 | 0513 2400

ORBIT# (ascend node ∇) — 74 ∇ | 75 ∇ | 76

DAY / NIGHT

SAA

HST ATTITUDE — HST +V3 AXIS FWD

ORBITER ATT — -ZLV -XVV

CREW SCHED — EVA-3

ORBITER, CREW, SSE

- **• SSA XMTR CHANGEOUT**
- SSAT-2R INSTALLATION [30 min] (CONT.)
- MATE CONNS[15min] (CONT.)
- CLOSE COPE [4 min] (CONT.)
- PHOTO CLOSEOUT [5 min]
- OPEN COPE & REMOVE SSR-3 [5 min]
- SSR-3/ESTR-3 SWAP [5 min]
- STOW ESTR-3 IN COPE [1 min]
- CLOSE COPE [3 min]
- SSR-3 INSTALLATION [35 min]
- INSERT SSR [11 min]
- **• SSR/ESTR-3 CHANGEOUT [1hr]**
- ESTR-3 REMOVAL[20min]
- DEMATE T-HARNESS & CONNECTORS [5 min]
- REMOVE ESTR-3 [1 min]
- MATE CONNECTORS & J-HARNESS [8 min]
- CLOSEOUT [6 min]
- P/TV 14
- CLOSE BAY 5 DOOR [9 min]
- **79 • NOBL INSTALLATION ON SSM BAYS5-10[2:2**
- BAY 5 MLI REMOVAL [10 min]
- MFR SWAP [10 min]
- BAY 5 & 6 NOBL RETRIEVAL [15 min]
- OPEN NPE [4 min]
- RETRIEVE BAY 5&6 NOBL&PLUGS[10min]
- CLOSE NPE [1 min]
- BAY 5 & 6 NOBL INSTALLATION [15 min]
- INSTALL BAY 6 NOBL [4 min]
- INSTALL BAY 5 NOBL & PLUGS [5 min]
- BAY 7 & 8 MLI PATCH KIT REMOVAL [20 min]
- BAY 7 & 8 NOBL RETRIEVAL [15 min]
- OPEN NPE [4 min]
- RETRIEVE BAY 7 & 8 NOBL & PLUGS [10 min]
- CLOSE NPE [1 min]
- BAY 7 & 8 NOBL INSTALL[15min]
- INSTALL BAY 7 NOBL&PLUGS[5min]
- INSTALL BAY 8 NOBL & PLUGS [5 min]
- BAY 10 MLI PATCH KIT &MLI REMOVAL[20min]

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

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77 • SSR/ESTR-3 CHANGEOUT (INCLUDES PREP, C/O)

77 D634-PERFORM SSR/ESTR-3 CHANGEOUT [2min]

78 • SSR-1/SSR-3 ALIVENESS TEST

78 ΔD607-ADJUST LIMITS & VERIFY POWER [6min]

78 ΔD608-ENABLE 1Mbps SCIENCE DATA FILL & REC 30SEC 1Mbps SCIENCE [1min]

78 ΔD621-ADJUST LIMITS [1min]

VERIFY HGA FOV CLEAR → **80 • SSAT-2R ALIVENESS TEST**

⊗80 Δ P100-SSAT-2R ALIVENESS TEST [34min]

81 • FGS AMS FUNCTIONAL TEST

81 ΔE200b-POWER ON OCE/AMS [1min]

81 ΔE613-MOVE FF3 -/+/-DIRECTION USING AMS 1, MOTORS 1 & 2 [12min]

81 ΔE614-ITS ACQUISITION [9min]

81 ΔE615-MOVE FF3 +DIR USING AMS1, MOTORS 1&2 [6min]

81 ΔE616-ITS ACQUISITION [8min]

MOVE FF3 - DIRECTION USING AMS 1, MOTORS 1 & 2 [6min]-E622 Δ81

81 ΔE623-ITS ACQUISITION [8min]

FGS TO DEFAULT MODE [1min]-E617 Δ81

POWER OFF OCE/AMS [1min]-E621 Δ81

THIS SEQUENCE MUST BE EXECUTED COMPLETELY OUTSIDE OF ANY SAA LEVEL 1 PASSAGE

SSR-1/SSR-3 FUNCTIONAL TEST • 82

PREP FOR RECORDS [1min]-D616 Δ82

SSR1/P1/SA1&P2/SA2-.5MIN 1Mb REC,3MIN 1Mb REC, FOUR .5MIN 1Mb REC [5min]-D636 Δ82

SSR3/P1/SA1 & P2/SA2-3 MIN 1Mb, TWO 0.5 MIN 1Mb, 1MIN 32Kb, & 1MIN 4Kb RECS [6min]-D617 Δ

COMM — ENG: TN; EAST WEST

GRND SYS ACTIVITIES:

QUICK PRD UPDATE OF FGS-2R CALIBRATION •

MAJOR EVENTS:

- JSC GO FOR SSR-1/SSR-3 A/T FOLLOWING MATE J-HARNESS
- STOCC VERIFY SSR-1/SSR-3 A/T SUCCESSFUL
- JSC GO FOR SSAT A/T FOLLOWING BAY 5 DOOR CLOSURE
- STOCC VERIFY SSAT-2R A/T SUCCESSFUL
- STOCC VERIFY FGS AMS FUNCTIONAL TEST SUCCESSFUL

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 350 / MET: 05 — 0513/0000 | 0543/0030 | 0613/0100 | 0643/0130 | 0713/0200 | 0743/0230 | 0813/0300

ORBIT# (ascend node ∇) — 76 ∇ 77 ∇ 78

DAY / NIGHT

SAA

HST ATTITUDE — HST +V3 AXIS FWD

ORBITER ATT — -ZLV -XVV

CREW SCHED — EVA-3 | POST EVA | A/L REPR | POST EVA

ORBITER, CREW, SSE

- **NOBL INSTALLATION ON SSM BAY**
- **EVA-3 FINAL CLOSEOUT [30min] (INCLUDES INSPECT INGRESS AIDS)**
- BAY 10 MLI PATCH KIT &MLI REMOVAL[20min] (CONT.)
- EVA CREW INSPECT J101 CONN FOR DEBRIS [5 min]
- BAY 9 & 10 NOBL RETRIEVAL [15 min]
- REMOVE BSP CENTER PIP-PINS [5 min]
- OPEN NPE [4 min]
- **END OF 6 HOUR EVA DAY**
- RETRIEVE BAY 9 & 10 NOBL & PLUGS [10 min]
- **EVA CREW INGRESS [10 min]**
- CLOSE NPE [1 min]
- BAY 9 & 10 NOBL INSTALLATION [15 min]
- INSTALL BAY 9 NOBL [4 min]
- INSTALL BAY10 NOBL & PLUGS [5 min]

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

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- **SSR-1/SSR-3 FUNCTIONAL TEST (CONT.)**
- 82 ΔD619-CONFIGURE COM FOR 1Mb SSR PLAYBACK [6min]
- 82 ΔD618-PLAYBACK SSR1/P1/SA1 DATA [1min]
- 82 ΔD697-FOUR SHORT, ONE LONG PLAYBACKS SSR1/P2/SA2 [5min]
- 82 ΔD698-FOUR SHORT, ONE LONG PLAYBACKS SSR3/P1/SA1 [6min]
- 82 ΔD699-FOUR SHORT, ONE LONG PLAYBACKS SSR3/P2/SA2 [6min]
- 82 ΔD604-RECONFIGURE COM TO TRANSMIT 32K H-FORMAT ENGINEERING DATA [7min]
- 82 ΔD605-COLLECT 12MIN H-FORMAT ENG DATA [12min]
- 82 ΔD611-RECONFIGURE COM TO TRANSMIT T-FORMAT DATA [2min]
- 82 ΔD606-ANAYLSIS OF SSR1/SSR3 PLAYBACK & TELEMETRY DATA [10min]
- 82 ΔD610-DMS: SSR-1/SSR-3 TELEMETRY MONITOR LOAD [10min]

Ku-BAND

COMM — ENG: TN | P/B | HN | TN; EAST/WEST

GRND SYS ACTIVITIES:

- CONFIGURE FOR KU-BAND
- CONFIGURE FOR PSP BYPASS

MAJOR EVENTS:

- END EVA-3
- STOCC VERIFY SSR-1/SSR-3 F/T SUCCESSFUL
- REPLAN CONFERENCE #1

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 350 / MET: 05	0813 / 0300	0843 / 0330	0913 / 0400	0943 / 0430	1013 / 0500	1043 / 0530	1113 / 0600
ORBIT# (ascend node ∇)	78	∇	79		∇	80	
DAY / NIGHT							
SAA							
HST ATTITUDE	HST +V3 AXIS FWD						
ORBITER ATT	-ZLV -XVV						
CREW SCHED	POST EVA		PRE SLEEP				
ORBITER, CREW, SSE							
FUNCTIONAL COMMAND DESCRIPTION							
COMM ENG	TN						
COMM EAST WEST							
GRND SYS ACTIVITIES:							
MAJOR EVENTS:			● NEXT DAY EVA REVIEW				

Δ REAL-TIME COMMAND

● COMMENT/ EVENT

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HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 350 / MET: 05	1113 0600	1143 0630	1213 0700	1243 0730	1313 0800	1343 0830	1413 0900
ORBIT# (ascend node ∇)		80 ∇		81 ∇		82 ∇	
DAY / NIGHT							
SAA							
HST ATTITUDE	HST +V3 AXIS FWD						
ORBITER ATT	-ZLV -XVV						
CREW SCHED	CREW SLEEP						
ORBITER, CREW, SSE			• SA STATIC TWIST ANALYSIS #4				
FUNCTIONAL COMMAND DESCRIPTION							
COMM ENG	TN						
COMM EAST / WEST							
GRND SYS ACTIVITIES:							
MAJOR EVENTS:	• SMIT REV A	• REPLAN CONFERENCE #2					

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 350 / MET: 05	1413 0900	1443 0930	1513 1000	1543 1030	1613 1100	1643 1130	1713 1200
ORBIT# (ascend node ∇)		82 ∇			83 ∇		
DAY / NIGHT							
SAA							
HST ATTITUDE	HST +V3 AXIS FWD						
ORBITER ATT	-ZLV -XVV						
CREW SCHED	CREW SLEEP						

ORBITER, CREW, SSE

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

COMM		
	ENG	TN
	EAST / WEST	

GRND SYS ACTIVITIES:

MAJOR EVENTS:

- SMIT REV B
- REPLAN CONFERENCE #3

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 350 / MET: 05	1713 / 1200	1743 / 1230	1813 / 1300	1843 / 1330	1913 / 1400	1943 / 1430	2013 / 1500
ORBIT# (ascend node ∇)	84			∇	85		
DAY / NIGHT							
SAA							
HST ATTITUDE	HST +V3 AXIS FWD						
ORBITER ATT	-ZLV -XVV						
CREW SCHED	CREW SLEEP				POST SLEEP		
ORBITER, CREW, SSE					• END FD6 • BEGIN FD7		
FUNCTIONAL COMMAND DESCRIPTION							
COMM ENG	TN						
COMM EAST / WEST							
GRND SYS ACTIVITIES:							
MAJOR EVENTS:	• CMD PLAN REV C				• SMIT REV C		

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

SHEET 43 OF 65 | 442 / 441 | DATE:Dec 7, 1999

TIME GMT: 350 MET: 05	2013 1500	2043 1530	2113 1600	2143 1630	2213 1700	2243 1730	2313 1800
ORBIT# ascend node ∇	85 ∇		86	∇		87	
DAY / NIGHT							
SAA							
HST ATTITUDE	HST +V3 AXIS FWD						
ORBITER ATT	-ZLV -XVV						
CREW SCHED	POST SLEEP			EVA PREP			
ORBITER, CREW, SSE							
FUNCTIONAL COMMAND DESCRIPTION							
COMM ENG	TN						
COMM EAST WEST							
GRND SYS ACTIVITIES:							
MAJOR EVENTS:				• SMM GO FOR EVA			

FUNCTIONAL COMMAND DESCRIPTION legend:

- Δ REAL-TIME COMMAND
- • COMMENT/ EVENT
- © SPC
- ⊗ HAZARDOUS

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

SHEET 44 OF 65 | 442 / 441 | DATE:Dec 7, 1999

TIME	GMT: 350 / MET: 05	2313 / 1800	2343 / 1830	0013 / 1900	0043 / 1930	0113 / 2000	0143 / 2030	0213 / 2100
ORBIT#	ascend node ∇	87 ∇		88		∇	89	
DAY / NIGHT								
SAA								
HST ATTITUDE		HST +V3 AXIS FWD				HST 305° FWD		
ORBITER ATT		-ZLV -XVV						
CREW SCHED		EVA PREP	A/L DEPR			EVA-4		

ORBITER, CREW, SSE

- SAMA 4
- SSRFs 5,6,7 INSTALLATION [50 min]
- **EVA CREW EGRESS [10 min]**
- ORBITER FREE DRIFT [23 min]
- **INITIAL EVA-4 SETUP [15 min]**
  (INCLUDES BSP CENTER PIP-PINS INSERT)
- FSS ROTATE TO 305° POSITION [4 min]
- **84 • INSTALL SSRFs ON FS/LS [3 hrs 50 min]**
- SAFETY TETHER TRANSFER [10 min]
- RIB CLAMP/SSRFs 5,6,7 RETRIEVAL [15 min]
- SSRFs RIB CLAMPS INSTALLATION [20 min]

FUNCTIONAL COMMAND DESCRIPTION

83 • SLEW SAs TO -30°

⊗83 Δ B525-SLEW SAs TO -30° [17min]

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

COMM

ENG: TN

EAST / WEST

GRND SYS ACTIVITIES:

MAJOR EVENTS:

• BEGIN EVA-4

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME	GMT: 351	0213	0243	0313	0343	0413	0443	0513
	MET: 05	2100	2130	2200	2230	2300	2330	2400

ORBIT# (ascend node ∇): 89 ∇ 90 ∇ 91

DAY / NIGHT

SAA

HST ATTITUDE: HST 305° FWD | HST 30° FWD | HST +V3 AXIS FWD

ORBITER ATT: -ZLV -XVV

CREW SCHED: EVA-4

ORBITER, CREW, SSE

- **INSTALL SSRFs ON FS/LS [3 hrs 50 min] (CONT.)**
- SSRFs 1,2,3,4 RETRIEVAL [15 min]
- SSRF 1 INSTALLATION [25 min]
- SSRF 2 INSTALLATION [25 min]
- ORBITER FREE DRIFT [10 min]
- FSS ROTATE TO 30° POSITION [6 min]
- SSRF 3 INSTALLATION [25 min]
- SSRF 4 INSTALLATION [25 min]
- MFR SWAP [10 min]
- FSS ROTATE TO +V3 TARGET [3 min]
- SSRF CADDY STOW [10 min]
- **OPTIONAL HANDRAIL COVERS / ASLR FOR +V2 DOORS [45 min]**
- TOOL RETRIEVAL [5 min]
- ASLR RETRIEVAL [10 min]
- ASLR INSTALLATION [30 min]
- SAFETY TETHER RECONFIGURATION [10 min]
- ORBITER FREE DRIFT [7 min]

FUNCTIONAL COMMAND DESCRIPTION

- **85 • PARALLEL HGA DEPLOYMENT (PART 1)**
- ⊗85 Δ D550n-DMS: ENBL/ACT SPC SUPPORT MACRO [6min]
- ⊗85 © A005-S&M: DEPLOY HGA MASTS [14min]
- ⊗85 Δ D550s-DMS: ENBL/ACT SPC SUPPORT MACRO [2min]
- 85 © H515b-I&C: SLEW ±HGAs TO (0,0) [6min]
- 85 © D915a-DMS: RESTORE HGA DB LIMITS [1min]
- **TURN OFF FGEs BEFORE IMPEDANCE CHECK • 86**
- 86 Δ F402-TURN OFF FGEs [8min]

VERIFY HGA GIMBALS ARE WITHIN LIMITS BEFORE EXECUTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

COMM

ENG: TN

EAST / WEST

GRND SYS ACTIVITIES:

MAJOR EVENTS:

- JSC GO FOR HGA DEPLOYMENT AT COMPLETION OF SSRFs 5,6,7 INSTALLATION

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME — GMT: 351 / MET: 06

0513 0000 | 0543 0030 | 0613 0100 | 0643 0130 | 0713 0200 | 0743 0230 | 0813 0300

ORBIT# (ascend node ∇): 91 ∇ 92 ∇ 93

DAY / NIGHT

SAA

HST ATTITUDE: HST +V3 AXIS FWD | HST TO BERTHING POSITION (-V3 AXIS FWD)

ORBITER ATT: -ZLV -XVV | -ZLV +YVV

CREW SCHED: EVA-4 | POST EVA | A/L REPR | POST EVA

ORBITER, CREW, SSE

- **OPTIONAL HANDRAIL COVERS / ASLR FOR +V2 DOORS [45 min] (CONT.)**
- ASLR INSTALLATION [30 min] (CONT.)
- **EVA-4 FINAL CLOSEOUT - INCLUDES REMOVAL & STOWAGE OF LGA COVER & INGRESS AIDS [60 min]**
- ORBITER FREE DRIFT [51 min]
- EVA CREW INSPECT J101 CONNECTOR FOR DEBRIS [5 min]
- REMOVE BSP CENTER PIP-PINS & FSS PIVOT TO 75 ° TARGET [5 min]
- **END OF 6 HOUR EVA DAY**
- **EVA CREW INGRESS [10 min]**
- FSS ROTATE TO -V3 TARGET [13 min]
- FSS PIVOT TO 90° TARGET [4 min]
- IVA CREW TURN OFF HST EXT MAIN POWER [5 min]
- IVA CREW ACTIVATE HST EXTERNAL MAIN POWER [5 min]

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

87 • SLEW ±SAs TO 0°

⊗87 Δ B526-SLEW ±SAs TO 0° [17min]

88 • IMPEDANCE CHECK

88 Δ C223-EXTERNAL MAIN POWER OFF [12min]

88 Δ C224-VERIFY BATTERY IMPEDANCE [2min]

88 Δ C225-EXTERNAL MAIN POWER ON [17min]

PARALLEL HGA DEPLOYMENT (PART 2) • 89

DMS: SLEW +/- HGAs FOR STRUCT. CLEAR. [16min]-COP509 Δ89

S&M: RELAX HGA LATCHES [8min]-A008 Δ 89 ⊗

COMM — ENG: TN

COMM — EAST / WEST

GRND SYS ACTIVITIES:

MAJOR EVENTS:

- END EVA-4
- SMM GO TO JSC FOR EXT MAIN POWER ON
- REPLAN CONFERENCE #1
- STOCC & SSE GO TO SMM FOR EXTERNAL MAIN POWER OFF
- SMM GO TO JSC FOR EXTERNAL MAIN POWER OFF
- STOCC & SSE GO TO SMM FOR EXT MAIN POWER ON

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 351 / MET: 06	0813 / 0300	0843 / 0330	0913 / 0400	0943 / 0430	1013 / 0500	1043 / 0530	1113 / 0600
ORBIT# (ascend node ∇)		93 ∇		94 ∇		95	
DAY / NIGHT							
SAA							
HST ATTITUDE	HST TO BERTHING POSITION (-V3 AXIS FWD)						
ORBITER ATT	-ZLV +YVV			-ZLV -XVV			
CREW SCHED	POST EVA		PRE SLEEP				
ORBITER, CREW, SSE	• WASTE WATER DUMP [1 hr 30 min]						
FUNCTIONAL COMMAND DESCRIPTION	**90 • TURN ON FGEs AFTER IMPEDANCE CHECK**						
	90 Δ F403-TURN ON FGEs [7min]						
COMM ENG	TN						
COMM EAST WEST							
GRND SYS ACTIVITIES:			• GENERATE LGA AVAILABILITY REPORT FOR RELEASE				
MAJOR EVENTS:			• JSC TO EMAIL RELEASE ATTITUDE			• SMIT REV A	

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 351 MET: 06	1113 0600	1143 0630	1213 0700	1243 0730	1313 0800	1343 0830	1413 0900
ORBIT# ascend node ∇		95 ∇		96 ∇		97
DAY / NIGHT						
SAA						
HST ATTITUDE	HST TO BERTHING POSITION (-V3 AXIS FWD)					
ORBITER ATT	-ZLV -XVV					
CREW SCHED	CREW SLEEP					
ORBITER, CREW, SSE			• SA STATIC TWIST ANALYSIS #5			
FUNCTIONAL COMMAND DESCRIPTION Δ REAL-TIME COMMAND • COMMENT/ EVENT © SPC ⊗HAZARDOUS						
COMM ENG	TN					
COMM EAST WEST						
GRND SYS ACTIVITIES:		• FDF DELIVERS EPHEMERIS PRODUCTS TO ScI				
MAJOR EVENTS:	• REPLAN CONFERENCE #2				• SMIT REV B	

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 351 MET: 06	1413 0900	1443 0930	1513 1000	1543 1030	1613 1100	1643 1130	1713 1200
ORBIT# ascend node ∇	97		∇		98		
DAY / NIGHT							
SAA							
HST ATTITUDE	HST TO BERTHING POSITION (-V3 AXIS FWD)						
ORBITER ATT	-ZLV -XVV						
CREW SCHED	CREW SLEEP						
ORBITER, CREW, SSE							
FUNCTIONAL COMMAND DESCRIPTION Δ REAL-TIME COMMAND • COMMENT/ EVENT © SPC ⊗HAZARDOUS							
COMM ENG	TN						
COMM EAST WEST	▪						▬
GRND SYS ACTIVITIES:							
MAJOR EVENTS:		• REPLAN CONFERENCE #3				• CMD PLAN REV C	

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 351 / MET: 06	1713 / 1200	1743 / 1230	1813 / 1300	1843 / 1330	1913 / 1400	1943 / 1430	2013 / 1500
ORBIT# ascend node ∇	98 ∇	99		∇	100		
DAY / NIGHT							
SAA							
HST ATTITUDE	HST TO BERTHING POSITION (-V3 AXIS FWD)						
ORBITER ATT	-ZLV -XVV						
CREW SCHED	CREW SLEEP				POST SLEEP		
ORBITER, CREW, SSE					• END FD7 • BEGIN FD8		
FUNCTIONAL COMMAND DESCRIPTION Δ REAL-TIME COMMAND • COMMENT/ EVENT © SPC ⊗HAZARDOUS							
COMM ENG	TN						
COMM EAST WEST							
GRND SYS ACTIVITIES:							
MAJOR EVENTS:				• SMIT REV C			

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 351	2013	2043	2113	2143	2213	2243	2313
TIME MET: 06	1500	1530	1600	1630	1700	1730	1800
ORBIT# (ascend node ∇)	100 ∇		101		∇	102	
DAY / NIGHT							
SAA							
HST ATTITUDE	HST TO BERTHING POSITION (-V3 AXIS FWD)						
ORBITER ATT	-ZLV -XVV				BATTERY CHARGE		
CREW SCHED	POST SLEEP			HST DEPLOYMENT			

ORBITER, CREW, SSE

- ORBITER FREE DRIFT [22 min]
- P/TV 13
- P/TV 15
- MANEUVER TO BATTERY CHARGE ATTITUDE [30 min]

PHOTO/TV DOCUMENT ENTIRE HST RELEASE OPS

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

91 • LOAD EPHEMERIS TABLES

91 ΔD032a-DMS: LOAD EPHEMERIS DATA [5min]

91 ΔD753-CLEAR EPHEMERIS DELTA TIME LIMIT EXCEED FLAG [2min]

92 • RELOAD SMACs

92 ΔD668-RELOAD SMAC, HMAC, ACQ LOGIC, & SM RECOVERY LOAD [18min]

93 • VERIFY INITIAL FSW CONFIGURATION

93 D009-DMS: VERIFY INITIAL HST FSW CONFIG [5min]

94 • PREP FOR BATTERY CHARGING

⊗94 Δ B518a-SLEW SOLAR ARRAYS TO 90° [22min]

EPS: CONNECT +WING SPA RELAYS (EXCEPT +DD AND +EE) [2min]-COP422m Δ94

EPS: CONNECT -WING SPA RELAYS (EXCEPT -EE & -AA) [2min]-COP422o Δ94

TURN OFF FGEs BEFORE DEPLOY • 95

TURN OFF FGEs [8min]-F404 Δ95

CONNECT RELAYS DURING NIGHT (CARD 3.1.5.14) AND AFTER ORBITER IN BATTERY CHARGE ATTITUDE (CARD 3.1.5.13)

NOTE: ZOEs BETWEEN MET 06/17:30 & 06/23:30 WILL BE FILLED BY TDRS-Z OR DGIS. (FOR HST/PSP BYPASS DATA)

COMM

ENG: TN

EAST / WEST

GRND SYS ACTIVITIES:

MAJOR EVENTS:

- JSC GO FOR SA SLEW
- BEGIN BATTERY CHARGING

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 351 / MET: 06 — 2313/1800 | 2343/1830 | 0013/1900 | 0043/1930 | 0113/2000 | 0143/2030 | 0213/2100

ORBIT# (ascend node ∇) — 102 ∇ | 103 ∇ | 104

DAY / NIGHT

SAA

HST ATTITUDE — HST TO BERTHIN; HST ON RMS (+V3 SUNPOINT)

ORBITER ATT — BATTERY CHARGE; RELEASE ATTITUDE

CREW SCHED — HST DEPLOYMENT

ORBITER, CREW, SSE

- VERIFY HST POSITION FOR GRAPPLE
- **HST GRAPPLE [15min]**

ORBITER FREE DRIFT FOR BERTHING LATCHES AND RMS MANEUVER

- IVA TURN OFF EXT PWR [3 min]
- IVA CREW DEADFACE UMBILICAL
- HST UMBILICAL DISCONNECT [2min]
- HST UNBERTH [3min]
- ORBITER FREE DRIFT [28 min]
- RMS MNVR HST TO RELEASE POSITION [25min]
- ORBITER TO RELEASE ATTITUDE [15 min]

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

96 • PSEA TEST MODE

96 ΔCOP408-EPS: DISABLE MCU MOTOR CURRENT PRI AND RED [4min]

⊗96 Δ S607-PSEA: ENABLE SMC's A/B [1min]

⊗96 Δ S002a-RUN PSEA TEST MODE (A/B SIDES) [13min]

96 ΔCOP408a-EPS: ENABLE MCU MOTOR CURRENT PRI AND RED [4min]

PERFORM AFTER 2 CCC K-RELAYS HAVE OPENED (CARD 2.1.5.7) AND DURING ORBIT NIGHT (CARD 2.1.5.12 AND 3.1.5.14)

97 • OPEN TRIM RELAYS

97 ΔC518b-EPS: OPEN SA TRIM RELAYS (EXCEPT +DD, -AA, +EE, -EE) [4min]

98 • POWER OFF SADE

98 ΔB505a-SA: TURN OFF SADE [4min]

99 • CONFIG LGAs FOR RELEASE OPS

99 ΔH601-I&C: CONFIG MAT TX 2 [7min]

100 • EXT PWR OFF & UMB DISCONNECT

100 C607-STOCC VERIFY READY FOR EXT POWER OFF [14min]

EPS SOC OF 265 AMP HOURS MINIMUM PRIOR TO RELEASE

PREP FOR RMS RELEASE OF HST • 104

EPS: VERIFY BAT SOC PRIOR TO REL [2min]-C600 Δ104

SA: ACTIVATE SADE-2R [4min]-B006b Δ104 ⊗

EPS: ENBL EPS SOC SAFEMODE TESTS [1min]-C602 Δ104

PSEA CONFIG FOR RELEASE & HST RELEASE • 105

CONFIGURE PSEA FOR KA ENABLE [6min]-S005 Δ105 ⊗

101 • DMS: VERIFY STFS PRE-RELEASE CONFIGURATION

101 D010-DMS: VERIFY STFS PRE-RELEASE CONFIG [2min]

ORBITER MUST BE AT RELEASE ATTITUDE

102 • OPEN APERTURE DOOR

⊗102 Δ A009-S&M: OPEN AD [6min]

102 ΔS005a-CONFIGURE PSEA FOR BOD [12min]

CONNECT RELAYS DURING NIGHT(CARD 3.1.5.14 & 2.1.5.11) & AFTER ORBITER IN RELEASE ATTITUDE (CARD 3.1.5.13)

EPS RECONFIGURATION • 103

EPS: CONNECT +WING SPA RELAYS (EXCEPT +DD AND +EE) [2min]-COP422k Δ103

EPS: CONNECT - WING SPA RELAYS (EXCEPT -AA) [2min]-COP422l Δ103

COMM

ENG — TN

EAST / WEST

GRND SYS ACTIVITIES:

MAJOR EVENTS:

- **GRAPPLE HST**
- STOCC & SSE GO TO SMM FOR EXT PWR OFF & UMBILICAL DISCONNECT
- SMM GIVE GO TO JSC FOR EXT PWR OFF & UMBILICAL DISCONNECT
- JSC GO TO OPEN APERTURE DOOR
- APERTURE DOOR OPEN
- EPS VERIFY SOC

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 352 0213 0243 0313 0343 0413 0443 0513
TIME MET: 06 2100 2130 2200 2230 2300 2330 2400

ORBIT# (ascend node ∇): 104 ∇ 52594 ∇ 52595

DAY / NIGHT

SAA

HST ATTITUDE: HST ON RMS (+V3 SUNPOINT) | HST INERTIAL +V3 TO SUN | HST BRIGHT EARTH AVOID ATT

ORBITER ATT: RELEASE ATTITUDE | RE | SEP | TGT TRK | -ZLV -XVV

CREW SCHED: HST DEPLOYMENT | POST DEPLOYMENT

ORBITER, CREW, SSE

- IVA CREW ACTIVATE SPC MACRO TO INIT QCI AND S/W SUNPOINT TIMER
- **HST RELEASE**
- HST RELEASE WINDOW [20 min]
- SEP 1
- FSS STOW [45min]
- SEP 2
- PI OFF

RELEASE WINDOW OPENS AT ORBIT NOON MINUS 22 MIN AND CLOSES AT ORBIT NOON MINUS 2 MIN.

CREW TO ACTIVATE MACRO 1 MINUTE AND 30 SECONDS PRIOR TO RMS RELEASE

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

• PSEA CONFIG FOR RELEASE & HST RELEASE (CONT.)

⊗ S005 (CONT.)

105 © D028-VERIFY SPC MAC EXECUTION TO INIT QCI & S/W SUNPOINT CONTROL [5min]

- INIT GYRO INTEGRATOR
- DMS: TRANSITION TO S/W SUNPOINT

AFTER S/W SP INITIATION, SUN CAPTURE IS ACHIEVED IN APPROXIMATELY 5 MIN.

106 • TRANSITION TO NORMAL MODE

106 Δ D023-DMS: TRANSITION TO NORMAL MODE [9min]

107 • RECONFIGURE HST LGA DIRECT TDRSS

107 Δ D033b-DMS: CHANGE TO "A" FORMAT [18min]

107 Δ H502a-I&C: I&C TO TDRS VIA LGAs [1min]

108 • MANEUVER TO BRIGHT EARTH AVOIDANCE ATTITUDE

108 Δ G800-PERFORM ARU/PRT [10min]

108 Δ S006b-CONFIGURE PSEA FOR NOT-CLOSE AD IN HWSP [6min]

109 • CONFIGURE MCU AND RETR/DEPL HTRS FOR NORMAL OPS

109 Δ C506-EPS: DISABLE RETR/DPLY HTRS & RESET THERMAL LIMITS [4min]

109 Δ A009a-S&M: TURN OFF MCU RED CONTROL PS & MTR CURRENT [4min]

110 • TURN ON FGEs AFTER DEPLOY

110 Δ F405-TURN ON FGEs [7min]

COMM

ENG: TN | AN

EAST WEST

GRND SYS ACTIVITIES:

CALCULATE/DETERMINE COARSE ATT

- STOCC GO FOR PI OFF

MAJOR EVENTS:

- STOCC GO FOR ACTIVATE SUNPOINT TIMER FOR RMS RELEASE
- **HST RELEASE**
- SMOV BEGINS
- JSC GO TO RECONFIGURE COMM LGA TO TDRSS
- COARSE ATTITUDE AVAIL
- JSC TO EMAIL RELEASE ATTITUDE
- UPLINK 1ST ARU AND PRT SLEW
- GYROS TO LO MODE

THE FORMAT FOR THE FOLLOWING PAGES WILL BE 6 HOURS PER PAGE.

(Sheets 54 of 65 through 65 of 65)

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 352 MET: 07 — 0513 (0) | 0613 (1) | 0713 (2) | 0813 (3) | 0913 (4) | 1013 (5) | 1113 (6)

ORBIT# (ascend node ∇) — 52595 ∇ 52596 ∇ 52597 ∇ 52598 ∇

DAY / NIGHT

SAA

HST ATTITUDE — HST BRIGHT EARTH AVOID ATT

ORBITER ATT — -ZLV -XVV

CREW SCHED — POST DEPLOYMENT | PRE SLEEP | CREW SLEEP

ORBITER, CREW, SSE

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

111 • FHST FOV CHECK

• PCS: FHST MAP MODES USING COP 346

PERFORM ADDITIONAL FHST MAPS DURING SUBSEQUENT ORBIT MIDNIGHTS IF NECESSARY AND FWD LINK AVAILABLE

112 • ATTITUDE DETERMINATION FOR FIRST HLGBU

• ATTITUDE DETERMINATION FOR FIRST HLGBU [300 MIN]

112 ΔCOP346j-PCS:FHST 1,2 MAP [20min]

113 • ENABLE BATTERY SOC SAFEMODE TEST(S)

113 ΔC601-ENABLE BATTERY SOC SAFEMODE TEST(S) [3min]

111 ΔCOP346h-PCS: FHST 1,2 MAP [10min]

111 ΔCOP346i-PCS: FHST 2,3 MAP [10min]

PERFORM ADDITIONAL FHST MAPS DURING SUBSEQUENT ORBIT MIDNIGHTS TO COMPUTE GYRO DRIFT RATE BIASES FOR LGBU

114 • RE-CENTER HGA GIMBALS

114 ΔH515a-I&C: SLEW ±HGAs TO (0,0) [9min]

FIRST LGBU/HGBU • 115

GYRO BIAS UPLINK PROCEDURE [10min]-ROP014 Δ115

COMM — ENG — AN

COMM — EAST WEST

GRND SYS ACTIVITIES:

CALCULATE GYRO BIASES

• FDF DELIVERS EPHEMERIS PRODUCTS TO ScI

• ScI DELIVERS EPHEMERIS PRODUCTS TO CCS

MAJOR EVENTS:

1st LGBU/HGBU •

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

SHEET 55 OF 65 | 442 / 441 | DATE:Dec 7, 1999

TIME GMT: 352 MET: 07 — 1113 (6) | 1213 (7) | 1313 (8) | 1413 (9) | 1513 (10) | 1613 (11) | 1713 (12)

ORBIT# (ascend node ∇) — 52599 ∇ 52600 ∇ 52601 ∇ 52602

DAY / NIGHT

SAA

HST ATTITUDE — HST BRIGHT EARTH AVOID ATT

ORBITER ATT — -ZLV -XVV

CREW SCHED — CREW SLEEP

ORBITER, CREW, SSE

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

⊗HAZARDOUS

• ATTITUDE DETERMINATION FOR FIRST HLGBU (CONT.)

ROP014 (CONT.)

116 • ATTITUDE DETERMINATION FOR SECOND ARU

116 ΔCOP346a-ATTITUDE DETERMINATION [100min]

117 • LOAD EPHEMERIS

117 ΔD032-DMS: LOAD EPHEMERIS DATA [5min]

118 • TRANSITION TO NORMAL OPERATIONS / UPLINK 2ND ARU

118 ΔD029-DMS: TRANSITION TO NORMAL OPS / 2ND ARU UPLINKED [20min]

119 • ENABLE FGE MEMORY REFRESH, OPT. DIST. & B.O.P. TESTS

119 ΔD506-DMS: ENABLE FGE MEMORY REFRESH [2min]

119 ΔD029a-DMS: ENABLE OPTICAL DISTORTION [2min]

119 ΔD521-DMS: ENABLE B.O.P. [4min]

120 • FHST/FHST ALIGNMENT (DATA COLLECT)

• PCS: ATTITUDE DETERMINATION

120 ΔCOP346k-PCS: FHST 1,2 MAP [10min]

120 ΔCOP346l-PCS: FHST MAP 1,3 [10min]

REPEAT FHST MAPS WITH DIFFERENT FHST COMBINATIONS FOR THE NEXT THREE ORBIT MIDNIGHTS AS NECESSARY AND FWD LINK AVAILABLE

COMM — ENG — AN

COMM — EAST WEST

GRND SYS ACTIVITIES:

DETERMINE FINE ATTITUDE

PROCESS ARU

CALCULATE O c/j

COLLECT FHST/FHST ALIGNMENT DATA [5 1/2 hrs]

MAJOR EVENTS:

• BEGIN FINE ATTITUDE DETERMINATION

• END FINE ATTITUDE DETERMINATION

• 2ND ARU UPLINKED

• BEGIN FHST/FHST ALIGNMENT DATA COLLECTION

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

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TIME GMT: 352 MET: 07	1713 12	1813 13	1913 14	2013 15	2113 16	2213 17	2313 18
ORBIT# ascend node ∇	∇	52603 ∇	52604 ∇	52605 ∇	52606		
DAY / NIGHT							
SAA							
HST ATTITUDE	HST BRIGHT EARTH AVOID ATT						
ORBITER ATT	-ZLV -XVV						
CREW SCHED	CREW SLEEP		POST SLEEP		OFF DUTY		

ORBITER, CREW, SSE

- END FD8
- BEGIN FD9

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

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- **FHST/FHST ALIGNMENT (DATA COLLECT) (CONT.)**
- PCS: ATTITUDE DETERMINATION (CONT.)
- 120 ΔCOP346m-PCS: FHST MAP 2,3 [10min]

PERFORM DURING ORBIT NIGHT

- **BACKUP FHST/FHST ALIGNMENT (DATA COLLECT)**
- **121**
- PCS: ATTITUDE DETERMINATION (BACKUP)
- PCS: FHST 1,2 MAP [10min]-COP346n Δ121
- PCS: FHST 1,3 MAP [10min]-COP346o Δ121
- PCS: FHST 2,3 MAP [10min]-COP346p Δ121

NOTE: BACKUP FHST/FHST ALIGNMENT

REPEAT FHST MAPS WITH DIFFERENT FHST COMBINATIONS FOR THE NEXT THREE ORBIT MIDNIGHTS AS NECESSARY AND FWD LINK AVAILABLE

COMM: ENG — AN; EAST WEST

GRND SYS ACTIVITIES:

- COLLECT FHST/FHST ALIGNMENT DATA [5 1/2 hrs]
- COLLECT FHST/FHST ALIGNMENT DATA [5 1/2 hrs]

MAJOR EVENTS:

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 352 MET: 07	2313 18	0013 19	0113 20	0213 21	0313 22	0413 23	0513 24
ORBIT# ascend node ∇	52606 ∇	52607 ∇	52608 ∇	52609 ∇	52610
DAY / NIGHT						
SAA						
HST ATTITUDE	HST BRIGHT EARTH AVOID ATT					
ORBITER ATT	-ZLV -XVV					
CREW SCHED	OFF DUTY					

ORBITER, CREW, SSE

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

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- **BACKUP FHST/FHST ALIGNMENT (DATA COLLECT) (CONT.)**
- PCS: ATTITUDE DETERMINATION (BACKUP) (CONT.)

LOAD HEALTH & SAFETY SPCs (FIRST OPPORTUNITY) • 122

122 ΔD565-DMS: LOAD H/S SPCs [7min]

122 ΔD036-DMS: SET TIMED PROCESSOR [2min]

COMM: ENG — AN

COMM: EAST WEST

GRND SYS ACTIVITIES: COLLECT FHST/FHST ALIGNMENT DATA [5 1/2 hrs]

MAJOR EVENTS:

• FHST/FHST ALIGNMENT DATA COLLECTION COMPLETE

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 353 MET: 08 — 0513 (0) | 0613 (1) | 0713 (2) | 0813 (3) | 0913 (4) | 1013 (5) | 1113 (6)

ORBIT# (ascend node ∇) — 52610 ∇ | 52611 ∇ | 52612 ∇ | 52613 ∇

DAY / NIGHT

SAA

HST ATTITUDE — HST BRIGHT EARTH AVOID ATT

ORBITER ATT — -ZLV -XVV

CREW SCHED — OFF DUTY | PRE SLEEP | CREW SLEEP

ORBITER, CREW, SSE

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

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123 • ATTITUDE DETERMINATION FOR SECOND HLGBU & THIRD ARU

• PCS: ATTITUDE DETERMINATION

123 ΔCOP346q-PCS: FHST 1,2 MAP [10min]

PERFORM ADDITIONAL FHST MAP DURING FOLLOWING ORBIT MIDNIGHT IF NECESSARY AND FWD LINK AVAILABLE

• LOAD HEALTH & SAFETY SPCs (LAST OPPORTUNITY)

124 • SECOND LGBU / HGBU AND ARU

124 ΔROP014a-DMS: GYRO BIAS UPLINK PROCEDURE [10min]

• 3RD ARU

125 • CONFIGURE HST HGA DIRECT TDRSS

125 ΔH006-I&C: INITIATE HGA POINTING MANAGEMENT [1min]

125 ΔH003-I&C: CONFIGURE LGA/TDRS TO HGA/TDRS [6min]

126 • SSAT-2R FUNCTIONAL TEST

126 ΔP200-ACTIVATE SSA TRANSMITTER [9min]

126 ΔP201-PLAYBACK SCIENCE DATA RECORDER [30min]

DEACTIVATE SSA TRANSMITTER [2min]-P202 Δ126

COMM — ENG — AN

COMM — EAST WEST

GRND SYS ACTIVITIES:

• FDF DELIVERS ALL EPHEMERIS PRODUCTS TO ScI

• ScI DELIVERS EPHEMERIS PRODUCT TO CCS

• UPLINK EPHEMERIS LOAD FOR H&S SMS

MAJOR EVENTS:

• UPLINK SECOND LGBU/HGBU AND THIRD ARU

• **BEGIN HEALTH & SAFETY LOAD**

• HST COMM VIA STANDARD TDRSS SERVICE USING HGA

STOCC VERIFY SSAT-2R F/T SUCCESSFUL •

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

SHEET 59 OF 65 | 442 / 441 | DATE:Dec 7, 1999

TIME GMT: 353 / MET: 08	1113 / 6	1213 / 7	1313 / 8	1413 / 9	1513 / 10	1613 / 11	1713 / 12
ORBIT# (ascend node ∇)	52614	∇	52615	∇	52616	∇	52617
DAY / NIGHT							
SAA							
HST ATTITUDE	HST BRIGHT EARTH AVOID ATT						
ORBITER ATT	-ZLV -XVV						
CREW SCHED	CREW SLEEP						

ORBITER, CREW, SSE

FUNCTIONAL COMMAND DESCRIPTION

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

© SPC

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127 • FHST/FHST ALIGNMENT (COMPUTATION PHASE (24hrs))

COMM: ENG — AN

COMM: EAST / WEST

GRND SYS ACTIVITIES: COMPUTE FHST/FHST ALIGNMENT (24 hrs)

MAJOR EVENTS:

• BEGIN FHST/FHST ALIGNMENT COMPUTATION PHASE

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

SHEET 60 OF 65 | 442 / 441 | DATE:Dec 7, 1999

TIME GMT: 353 MET: 08	1713 12	1813 13	1913 14	2013 15	2113 16	2213 17	2313 18
ORBIT# ascend node ∇	52617 ∇	52618 ∇	52619 ∇	52620 ∇	52621
DAY / NIGHT					
SAA					
HST ATTITUDE	HST BRIGHT EARTH AVOID ATT				
ORBITER ATT	-ZLV -XVV		OPS3		
CREW SCHED	POST SLEEP		OFF DUTY		
ORBITER, CREW, SSE	• END FD 9 • BEGIN FD 10						
FUNCTIONAL COMMAND DESCRIPTION Δ REAL-TIME COMMAND • COMMENT/ EVENT © SPC ⊗HAZARDOUS							
COMM ENG							
COMM EAST WEST							
GRND SYS ACTIVITIES:	COMPUTE FHST/FHST ALIGNMENT (24 hrs)						
MAJOR EVENTS:							

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

SHEET 61 OF 65 | 442 / 441 | DATE:Dec 7, 1999

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

SHEET 62 OF 65 | 442 / 441 | DATE:Dec 7, 1999

TIME GMT: 354 MET: 09	0513 0	0613 1	0713 2	0813 3	0913 4	1013 5	1113 6
ORBIT# ascend node ∇	52625	∇ 52626	∇ 52627	∇ 52628			
DAY / NIGHT							
SAA							
HST ATTITUDE							
ORBITER ATT	-ZLV -XVV					-ZLV -YVV	
CREW SCHED	OFF DUTY	PRE SLEEP			CREW SLEEP		
ORBITER, CREW, SSE							
FUNCTIONAL COMMAND DESCRIPTION							
Δ REAL-TIME COMMAND							
• COMMENT/ EVENT							
© SPC							
⊗HAZARDOUS							
COMM ENG							
COMM EAST WEST							
GRND SYS ACTIVITIES:	COMPUTE FHST/FHST ALIGNMENT (24 hrs)						
MAJOR EVENTS:							

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

SHEET 63 OF 65 | 442 / 441 | DATE:Dec 7, 1999

TIME GMT: 354 MET: 09	1113 6	1213 7	1313 8	1413 9	1513 10	1613 11	1713 12
ORBIT# ascend node ∇	∇	52629 ∇	52630 ∇	52631 ∇	52632		
DAY / NIGHT							
SAA							
HST ATTITUDE							
ORBITER ATT	← -ZLV -YVV →						
CREW SCHED	← CREW SLEEP →						
ORBITER, CREW, SSE							
FUNCTIONAL COMMAND DESCRIPTION							
Δ REAL-TIME COMMAND							
• COMMENT/ EVENT							
© SPC							
⊗HAZARDOUS							
COMM ENG							
COMM EAST WEST							
GRND SYS ACTIVITIES:	← COMPUTE FHST/FHST ALIGNMENT (24 hrs) → • FDF DELIVERS ALL EPHEMERIS PRODUCTS TO ScI			• ScI DELIVERS EPHEMERIS PRODUCT TO CCS		• UPLINK EPHEMERIS LOAD FOR ScI SMS	
MAJOR EVENTS:							• Sci INST SMS BEGINS

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

SHEET 64 OF 65 | 442 / 441 | DATE:Dec 7, 1999

TIME GMT: 354 MET: 09	1713 12	1813 13	1913 14	2013 15	2113 16	2213 17	2313 18
ORBIT# ascend node ∇	52632 ∇	52633 ∇	52634 ∇	52635 ∇	52636
DAY / NIGHT					
SAA					
HST ATTITUDE					
ORBITER ATT	← -ZLV -YVV →			IMU	-XSI	COMM →
CREW SCHED	← POST SLEEP →					
ORBITER, CREW, SSE	• END FD 10 • BEGIN FD 11			**128 • SSE DEACTIVATION [15 min]**	• DE-ORBIT PREPARATIONS • PLBD OPS	
FUNCTIONAL COMMAND DESCRIPTION Δ REAL-TIME COMMAND • COMMENT/ EVENT © SPC ⊗HAZARDOUS						
COMM ENG						
COMM EAST WEST						
GRND SYS ACTIVITIES:						
MAJOR EVENTS:				• SSE CLOSEOUT	• PAYLOAD BAY DOORS CLOSED	

HST THIRD SERVICING MISSION INTEGRATED TIMELINE: SM3A LAUNCH UPDATE #2

TIME GMT: 354 MET: 09	2313 18	0013 19	0113 20	0213 21	0313 22	0413 23	0513 24
ORBIT# ascend node ∇	52636 ∇	52637 ∇	52638 ∇	52639 ∇	52640
DAY / NIGHT					
SAA					
HST ATTITUDE					
ORBITER ATT	← COMM →	× D/O BURN →	× ENTRY →		
CREW SCHED					
ORBITER, CREW, SSE	• DE-ORBIT PREPARATIONS (CONT.)	• DE-ORBIT BURN	• ORBITER LANDING		
FUNCTIONAL COMMAND DESCRIPTION					
COMM ENG					
COMM EAST WEST					
GRND SYS ACTIVITIES:					
MAJOR EVENTS:		• DE-ORBIT BURN			

Δ REAL-TIME COMMAND

• COMMENT/ EVENT

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ACRONYM LIST

A

A/1	FOC Side A
A/L	Airlock
ACE	Actuator Control Electronics
ACP	Alternate Command Plan
ACQ	Acquisition
ACS	Advanced Camera for Surveys
AD	Aperture Door
ADV	Advanced
AFD	Aft Flight Deck
AMS	Actuator Mechanism Subsystem
AP	Application Processor
APS	Antenna Pointing System
ARU	Attitude Reference Update
ASCS	Aft Shroud Cooling System
ASIPE	Axial Scientific Instrument Protective Enclosure
AT	Aliveness Test
ATC	Absolute Time Command
ATCS	Absolute Time Command Sequence
ATP	Absolute Time Pointer
ATT	Attitude

B

B/2	FOC Side B
B/U	Backup
BAPS	Berthing and Positioning System
BAT	Battery
BO	Bright Object
BOD	Bright Object Detector
BOT	Beginning of Tape
BOP	Bright Object Protection
BPRC	Battery Protection and Reconditioning Circuit
Bps	Bits per second
BSP	BAPS Support Post

C

C/D	Command and Data
C/L	Checklist
C/O	Check-out
CAD	Coarse Attitude Determination
CAL	Calibration
CAP	Command Acceptance Pulse
CAS	Command Activity Sequence
CASH	Cross Aft Shroud Harness
CCB	Continuous Command Block
CCC	Charge Current Controller
CCD	Charge Coupled Device
CCTV	Closed Circuit Television
CDI	Command Data Interface (Module in DMU)
CIF	Computer Interface (Module in DMU)
CM	Contamination Monitor

CMD	Command or Command (Module in DMU)
COAS	Crew Optical Alignment Sight
COM	Communications (Module in DMU)
COMM	Communications
CONN	Connector
COP	Contingency Operations Procedure/Coprocessor
COPE	Contingency ORU Protective Enclosure
COS	Cosmic Origins Spectrograph
COSTAR	Corrective Optics Space Telescope Axial Replacement
CPL	Capillary Pump Loop
CSS	Coarse Sun Sensor
CU/SDF	Control Unit/Science Data Formatter
CVL	Cryo Vent Line

D

D/O	De-orbit
DB	Diode Bus
DCE	Deployment Control Electronics
DEC	Declination
DF	Data Flow
DF-224	HST/SSM On-Board Computer
DGIS	Diego Garcia
DIM	Data Interface Module
DIU	Data Interface Unit
DIUI	Data Interface Unit Interface(Module in DMU)
DMS	Data Management (Subsystem)
DMU	Data Management Unit
DOB	Deployable Optical Bench
DOC	Data Operations Center
DR	Data Recorder

E

EC	EVA Crew
ECA	Electronic Control Assembly
ECU	Electronic Control Unit
EMU	Extra-vehicular Mobility Unit
ENG	Engineering
EON	Enter Orbit Night
EOT	End of Tape
EP/TCE	Electrical Power and Thermal Control Electronics
EP/TCS	Electrical Power and Thermal Control System
EPS	Electrical Power (Subsystem)
ESM	Electronics Support Module
ESS	Essential
ESTR	Engineering and Science Tape Recorder
ETR	Engineering Tape Recorder
EVA	Extra-vehicular Activity
EXT	External

F

FAD	Fine Attitude Determination
FCS	Flight Control System
FD	Flight Day

FDA	Fault Detection and Annunciation
FDF	Flight Dynamics Facility
FGE	Fine Guidance Electronics
FGS	Fine Guidance Sensor
FHST	Fixed Head Star Tracker
FHST	Fixed Head Star Tracker Interface (Module in DMU)
FLGA	Forward Low Gain Antennae
FMT	Format
FOC	Faint Object Camera
FOS	Faint Object Spectrograph
FOV	Field of View
FP	Fuse Plug
FPS	Focal Plane Structure
FS	Forward Shell
FSIPE	FGS SI Protective Enclosure
FSS	Fixed Support System/Flight Servicing Structure
FSW	Flight Software
FT	Functional Test
FWD	Forward
FWM	Filter Wheel Mechanism

G

GBU	Gyro Bias Update
GCMR	Ground Control Message Request
GEA	Gimbal Electronics Assembly
GG	Gravity Gradient
GHRS	Goddard High Resolution Spectrograph
GMT	Greenwich Mean Time
GRND	Ground
GS	Guide Star
GSTDN	Ground Spaceflight Tracking and Data Network

H

H/S	Health & Safety
H/V	High Voltage
H/W	Hardware
HAZ	Hazardous
HCP	Hazard Command Procedure
HGA	High Gain Antenna
HGBU	High Gyro Bias Update
HLD	High Level Discreet
HRG	Hemispherical Resonator Gyro
HRS	High Resolution Spectrograph
HST	Hubble Space Telescope
HSTP	Hubble Space Telescope Project
HTR(S)	Heater(s)

I

I/F	Interface
I&C	Instrumentation and Communications (Subsystem)
IBM	In-Board Motor
IDS	Image Dissection System (Wavefront Sensor)
IMU	Inertial Measurement Unit Alignment (Shuttle Orbiter)

INV1	Inverter 1
INT	Internal
ITS	Internal Test Source
IVA	Intravehicular Activity

J

JSC	Johnson Space Center

K

KA	Keep Alive
KSC	Kennedy Space Center
Kbps	1000 bits per Second

L

LCR	Launch Control Room
LED	Light Emitting Diode
LGA	Low Gain Antenna
LGBU	Low Gyro Bias Update
LOPE	Large ORU Protective Enclosure
LOS	Line of Sight
LS	Light Shield
LSR	Launch Support Room

M

MA	Multiple Access
MAF	Multiple Access Forward
MAR	Multiple Access Return
MAT	Multiple Access Transponder
Mbps	Megabits per second
MCC	Mission Control Center
MCCH	Mission Control Center Houston
MCE	Monitor Control Electronics
MCU	Mechanisms Control Unit
ME	Momentum Exchange
MET	Mission Elapsed Time
MFR	Manipulator Foot Restraint
MLI	Multi-Layer Insulation
MNV	Maneuver
MOC	Mission Operations Contractor
MOR	Mission Operations Room
MR	Main Ring
MSS	Magnetic Sensing System
MTE	Magnetic Torquer Electronics
MTP	Master Timing Pulse
Mv	Magnitude (visual)

N

NA	Not Applicable
NASA	National Aeronautics and Space Administration
NC1,2,3	Nominal Catchup [burn]
NCC	Network Control Center, NICMOS Cryogenic Cooler
NCS	NICMOS Cooling System
NH	Nominal Height [burn]
NICMOS	Near Infrared Camera Multi-Object Spectrometer
NLT	No later than
NOBL	New Outer Blanket Layer
NPE	NOBL Protective Enclosure
NSR1	Nominal Stable Rate [burn]
NSSC-1	NASA Standard Spacecraft Computer, Model 1

O

OBC	On-Board Computer
OBM	Out-Board Motor
OBS	Observation
OCE EK	Optical Control Electronics Enhancement Kit
OCS	Optical Control (Sub)System
OCXOS	Oven Controlled Crystal Oscillators
OLD	Off-Load Device
OP(S)	Operation(s)
ORU	Orbital Replacement Unit
ORUC	Orbital Replacement Unit Carrier
OTA	Optical Telescope Assembly (Subsystem)
OV	Orbital Verification

P

P/B	Playback
P/TV	Photo/Television
PASS	POCC Application Software Support
PCDS	Power Converter and Distribution System
PCS	Pointing Control (Subsystem)
PCU	Power Control Unit
PDA	Photon Detector Assembly
PDB	Project Data Base
PDM	Primary Deployment Mechanism or SA Primary Deployment
PDU	Power Distribution Unit
PFR	Portable Foot Restraint
PGSC	Payload General Support Computer
PE	Perkin Elmer
PI	Payload Interrogator
PIP	Payload Integration Plan
PIT	Processor Interface Table
PLBD	Payload Bay Door
PLOP	Payload Systems Operating Procedure
PM	Primary Mirror
PMT	Photomultiplier Tube
PN	Pseudo-random Noise
POAM	PASS Operations and Maintenance
POCC	Payload Operations Control Center
POMC	Pick Off Mirror Cover
PORTS	Preliminary Operations Requirements & Test Support
PRCS	Primary Reaction Control System
PRI	Primary

PROC	Procedure
PROMS	Programmable Read Only Memories
PROX	Proximity
PRT	Planned Real Time (command)
PS	Power Supply
PSEA	Pointing and Safemode Electronics Assembly
PSI	Pounds per Square Inch
PSP	Payload Signal Processor
PSS	Payload Safing Sequence or Panel Support Structure
PSTOL	PORTS Systems Test and Operations Language
PWR	Power

Q

Q c/i	Command Quaternion
QCM	Quartz Crystal Microbalance

R

R/T	Real Time
RA	Right Ascension
RAC	Rigid Array Carrier
RAM	Random Access Memory
RBM	Radial Bay Module
REC	Record
RED	Redundant
REL	Release
REV	Revision
RFM	Refocusing Mechanism
RGA	Rate Gyro Assembly
RGAI	Rate Gyro Assembly Interface (Module in DMU)
RIU	Remote Interface Unit
RK	Repair Kit
RMGA	Retrieval Mode Gyro Assembly
RMS	Remote Manipulator System
ROP	Routine Operations Procedure
RS	Reed-Solomon Error Correction Encoding
RSU	Rate Sensor Unit
RTCS	Relative Time Command Sequence
RTRVL	Retrieval
RWA	Reaction Wheel Assembly

S

S&M	Structures & Mechanisms (Subsystem)
S/C	Spacecraft
S/M	Safemode
S/W	Software
SA	Solar Array, Storage Area
SA2	Solar Array Two (Replacement Array)
SA3	Solar Array Three (Replacement Array)
SAA	South Atlantic Anomaly
SAC	Second Axial Carrier
SADE	Solar Array Drive Electronics
SADM	Solar Array Drive Mechanism
SAF	Single Access Forward

SAGA	Solar Array Gain Augmentation
SAR	Single Access Return
SAS	Statistical Analysis System
SCAR	Spacecraft Analysis Room
SCHF	Spacecraft Characteristics File
ScI	Science Institute
SCI	Science
SCP	Stored Command Processor
SD	Science Data
SDF	Science Data Formatter
SDM	Secondary Deployment Mechanism or SA Secondary Deployment
SDS	Science Data Store
SEC	Secondary
SHM	Shutter Mechanism
SI	Science Instrument
SI C&DH	Science Instrument Control & Data Handling (Subsystem)
SIPE	Science Instrument Protective Enclosure
SM	Secondary Mirror, Servicing Mission, Safemode
SMAC	Safemode Macro
SMC	Safe Mode Computer
SMIT	Servicing Mission Integrated Timeline
SMM	Servicing Mission Manager
SMOV	Servicing Mission Observatory Verification
SMS	Science Mission Specification
SMU	Safemode Utility
SOC	State of Charge
SOFA	Selectable Optical Filter Assembly
SOPE	Small ORU Protective Enclosure
SP	Sunpoint
SPA	Solar Panel Assembly
SPC	Stored Program Command
SSA	S-band Single Access
SSE	Space Support Equipment
SSM	Support Systems Module
SSPC	Stored Special Processor Commands (DF-224 Special Processor)
SSR	Solid State Data Recorder
SSRF	Shell/Shield Replacement Fabric
ST	Space Telescope
STDOC	Space Telescope Data Operations Center
STFS	Space Telescope Flight Software
STIK	STIS Thermal Interface Kit
STIS	Space Telescope Imaging Spectrograph
STOCC	Space Telescope Operations Control Center
STR	Science Tape Recorder
STS	Space Transportation System

T

TAC	Telemetry and Command Processor
TBD	To be Determined
TBS	To be Specified
TC	Thermal Control
TCE	Thermal Control Electronics
TCS	Thermal Control Subsystem
TDRS(S)	Tracking and Data Relay Satellite (System)
TFC	Telemetry Format and Controls (Module in DMU)
TI	Terminal Initiation
TIK	Thermal Interface Kit
TIM	Timing (Module in DMU)
TLM	Telemetry
TP	Timed Processor

TPF	Temporary Parking Fixture
TR	Tape Recorder
TRI	Tape Recorder Interface (Module in DMU)
TSB	Temporary Storage Bracket
TSPC	Timed Special Processor
TTL	Thermal Control Table

U

U/D	Update
UCB	Uninterruptable Command Block
UMB	Umbilical
UTC	Universal Time Coordinated

V

V1	Vehicle Axis (V1, V2, V3)
VECT	Vector
VEL	Velocity
VEL AB	Velocity Aberration
VIK	V/T Improvement Kit
VSC	Voltage Sensing Circuit
VSS	Vehicle Support Software

W

w/o	without
WF	Wide Field
WF/PC	Wide Field Planetary Camera
WF/PC-2	Wide Field Planetary Camera 2
WFS	Wavefront Sensor

X

-XLV	Orbiter -X body axis (tail) pointed to Local Vertical
XMTR	Transmitter
-XSI	Orbiter -X body axis (tail) pointed to Solar Inertial
+XSI	Orbiter +X body axis (nose) pointed to Solar Inertial
-XVV	Orbiter –X body axis (tail) pointed to Velocity Vector

Y

-YLV	Orbiter –Y body axis pointed to Local Vertical(Earth center)
+YVV	Orbiter +Y body axis pointed to Velocity Vector
-YVV	Orbiter –Y body axis pointed to Velocity Vector

Z

-ZLV	Orbiter -Z body axis (cargo bay) pointed to Local Vertical
+ZLV	Orbiter +Z body axis (belly) pointed to Local Vertical
ZOE	Zone of Exclusion (TDRSS)
-ZSI	Orbiter –Z body axis pointed to Solar Inertial
+ZSI	Orbiter +Z body axis pointed to Solar Inertial
+ZVV	Orbiter +Z body axis pointed to Velocity Vector