STS-121 / ULF1.1

FD 05 Execute Package

MSG	Page(s)	Title
038A	1 - 2	FD05 Summary Timeline **(pdf)**
033A	3 - 14	FD05 Flight Plan Revision **(pdf)**
034	15 - 16	FD05 Mission Summary **(pdf)**
035	17 - 18	FD05 Transfer Message **(pdf)**
036	19	FD05 Water Summary **(pdf)**
037A	20 - 24	FD04 MMT Summary **(pdf)**

Approved by FAO: *L. Eadie*

Last Updated: Jul 8 2006 5:15AM GMT
JEDI *(**J**oint **E**xecute package **D**evelopment and **I**ntegration), v2.04.0003*

07/08/06 00:02:29 **REPLANNED**

GMT 07/08/06 (189): 07 08 09 10 11 12 13 14 15 16 17 18

MET Day 003: 12 13 14 15 16 17 18 19 20 21 22 23 004/00

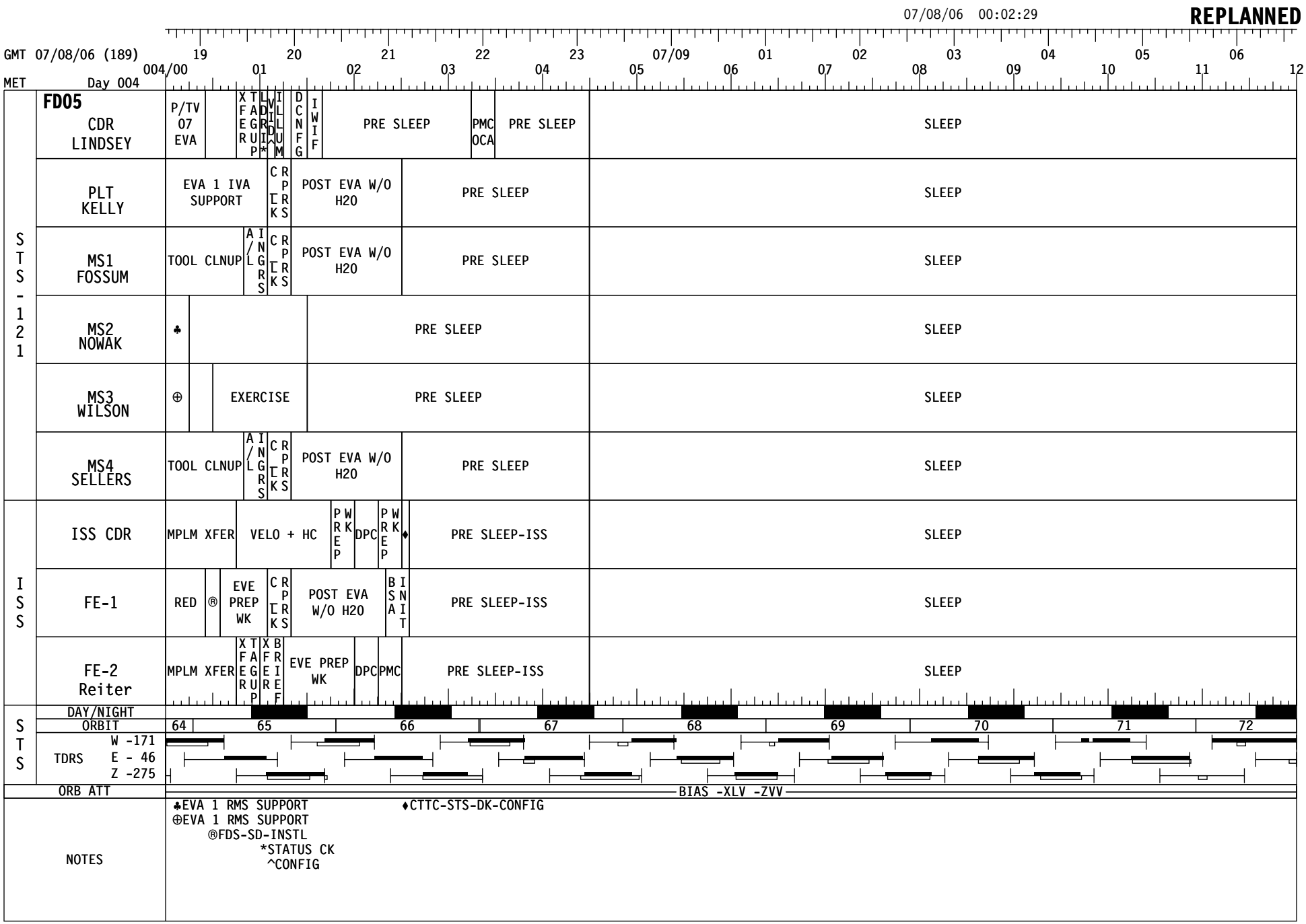
FD05

Crew	Activities (in time order)
STS-121 CDR LINDSEY	SLEEP; DSO; POST SLEEP; PMC A/G; POST SLEEP; MNVR DUMP; WASTE; INIT; P/TV 07 S/U; WSGIS; S/U; INHBT; PAD; WASTE; TERM; MNVR -XLV; IMU; CWC; INIT 5; EXERCISE; CWC; TERM 5; P/TV 07 EVA; ANT ^; P/TV 07 EVA; ANT ^; CWC; INIT 6; MEAL; CWC; TERM 6; CWC XFER (2); P/TV 07 EVA
STS-121 PLT KELLY	SLEEP; POST SLEEP; EVA PREP W/ ISS O2; EMU; PURGE; EMU PREBREATHE; C_LK DPRS; EVA 1 IVA SUPPORT
STS-121 MS1 FOSSUM	SLEEP; POST SLEEP; EVA PREP W/ ISS O2; EMU; PURGE; EMU PREBREATHE; C_LK DPRS; PST/; DPRS; EGRS; ZEN IUA R&R; TOOL SETUP; OBSS S/U-PART I; 1 EV POSN 1 EVAL; OBSS S/U PT II; 2 EV POSN 3 EVAL; 2 EV P1 PUSH EVAL; OBSS CLNUP
STS-121 MS2 NOWAK	SLEEP; DSO; POST SLEEP; EXERCISE; MPLM XFER; EVA 1 RMS SUPPORT
STS-121 MS3 WILSON	SLEEP; POST SLEEP; EVA PREP W/ ISS O2; EMU; PURGE; EMU PREBREATHE; EVA 1 RMS SUPPORT
STS-121 MS4 SELLERS	SLEEP; POST SLEEP; EVA PREP W/ ISS O2; EMU; PURGE; EMU PREBREATHE; C_LK DPRS; PST/; DPRS; EGRS; ZEN IUA R&R; TOOL SETUP; OBSS S/U-PART I; 1 EV POSN 1 EVAL; OBSS S/U PT II; 2 EV POSN 3 EVAL; 2 EV P1 PUSH EVAL; OBSS CLNUP
ISS CDR	SLEEP; POST SLEEP; MORN PREP WK; CMM; DPC; СОЖ; TVIS; MPLM XFER; MIDDAY-MEAL; MELFI XFER; OGS XFER; MPLM XFER
ISS FE-1	SLEEP; POST SLEEP; EVA PREP W/ ISS O2; EMU; PURGE; EMU PREBREATHE; C_LK DPRS; ♣; MIDDAY-MEAL; MPLM XFER; TVIS; RED
ISS FE-2 Reiter	SLEEP; POST SLEEP; PREP; WK; XFER; RVW; DPC; ⊕; ♦; SSC4; MPLM XFER; MIDDAY-MEAL; MELFI XFER; OGS XFER; MPLM XFER

STS: DAY/NIGHT; ORBIT 57 58 59 60 61 62 63 64; TDRS W -171, E - 46, Z -275

ORB ATT: BIAS -XLV -ZVV; BIAS -XLV +YVV; BIAS -XLV -ZVV

NOTES:
⊕HAM P/D
♦РМС-БРАСЛЕТ-FE-2
♣FDS-SD-REMOVE
^IWIF ACT
^WSGIS ACT


GMT 07/08/06 (189)
19 20 21 22 23 07/09 01 02 03 04 05 06
MET Day 004
004/00 01 02 03 04 05 06 07 08 09 10 11 12
STS-121
ISS
STS
FD05
CDR LINDSEY
P/TV 07 EVA
XFER
TAGUP
LVLH^
ILLUM
DCNFG
IWIF
PRE SLEEP
PMC
OCA
PRE SLEEP
SLEEP
PLT KELLY
EVA 1 IVA SUPPORT
CRTKS
CRRS
POST EVA W/O H20
PRE SLEEP
SLEEP
MS1 FOSSUM
TOOL CLNUP
A/L
INGRS
CRTKS
CRRS
POST EVA W/O H20
PRE SLEEP
SLEEP
MS2 NOWAK
♣
PRE SLEEP
SLEEP
MS3 WILSON
⊕
EXERCISE
PRE SLEEP
SLEEP
MS4 SELLERS
TOOL CLNUP
A/L
INGRS
CRTKS
CRRS
POST EVA W/O H20
PRE SLEEP
SLEEP
ISS CDR
MPLM XFER
VELO + HC
PRE
WKEP
DPC
PRE
WKEP
♦
PRE SLEEP-ISS
SLEEP
FE-1
RED
®
EVE PREP WK
CRTKS
CRRS
POST EVA W/O H20
BSAT
INIT
PRE SLEEP-ISS
SLEEP
FE-2 Reiter
MPLM XFER
XFER
TAGUP
XFER
BRIEF
EVE PREP WK
DPC
PMC
PRE SLEEP-ISS
SLEEP
DAY/NIGHT
ORBIT
64 65 66 67 68 69 70 71 72
TDRS
W -171
E - 46
Z -275
ORB ATT
BIAS -XLV -ZVV
NOTES
♣EVA 1 RMS SUPPORT
⊕EVA 1 RMS SUPPORT
®FDS-SD-INSTL
*STATUS CK
^CONFIG
♦CTTC-STS-DK-CONFIG

MSG INDEX

MSG NO.	TITLE
33	FD05 Flight Plan Revision
34	FD05 Mission Summary (13-0631)
35	FD05 Transfer Message (13-0632)
36	FD05 Water Summary
37	FD04 MMT Summary (13-0633A)
38	FD05 Summary Timeline

1. DCS 760 EVA CAMERA FLASH ISSUE

There are two possible reasons that the EVA Flash would not display "TTL BL" while performing the 760 EVA – CAMR w/FLASH procedure:

1) The EVA viewfinder may have backed off the camera contacts.
2) Flash Sync Cable was not connected securely to the Camr Hot Shoe on the camera or the Flash Sync Port on the front of the Flash.

Please perform the following before resuming with step 45 of the 760 EVA- CAMR w/FLASH procedure. Note: If DCS 760 Battery was left in the EVA Flash with Flash Power – ON, obtain a fresh battery and start in step 41.

1) Verify both ends of the Flash Sync Cable are properly installed. On the Camr Hot Shoe verify that the Flash Sync Cable is seated and locked (turn lever cw).
2) Using thumbs, press the bottom of the EVA Viewfinder towards lens.

2. FAILED HHL CABLE

During RNDZ Tools C/O on FD02, you reported that one of the Hand Held Laser cables was non-functional. To facilitate tracking and post-flight analysis, please report the serial number of the failed cable at your convenience.

3. UPDATE TO EVA INHIBIT PADS

Due to the loss of VERNs, EVA 1, 2, and 3 Inhibit Pads need to be changed as follows:

In the RCS block, step 1, change

√DAP: VERN, FREE, LO Z

to

√DAP: ALT, FREE, LO Z

Inhibit Pads may be found on the following pages of the EVA Checklist FS:
EVA 1 pg FS 7-7
EVA 2 pg FS 7-53
EVA 3 pg FS 7-90

4. WCS OPS

Just as an example of how closely Big Brother watches, we would like to remind you that remaining fluid in drink bags should not be poured down the WCS but stowed in Wet Trash (yes, they can tell). There is a concern that the additives may react with the oxone in the WCS to form precipitates, which may cause blockages in the waste lines.

5. RMS PROCEDURE DELTAS FOR EVA 1 SUPPORT

The APFR Certification Acceptance Requirements Document limits the translation velocity of the crew as a function of weight while ingressed in an APFR moving on the SRMS. Due to late RMS/OBSS analysis results, there are some deltas to the EVA 1 SUPPORT procedure in the PDRS Flight Supplement which recommend changing RMS rate selection to VERN in four places (COARSE only allowed during an OCAS).

In the EVA 1 SUPPORT (PDRS, EVA1) procedure, make the following pen and ink change to step 9 (FS 5-7), step 10 (FS 5-9), step 14b (FS 5-10), and step 17b (FS 5-17):

WAS: RATE - as reqd (VERN within 10 ft)
IS: RATE - VERN (RATE MIN tb - ON)

6. DTO 849/852 UPDATES

To protect for a potential WSGIS data take during EVA3, we would like to preserve battery life by deactivating WSGIS at the end of EVA1. See below for specific pen and ink changes to the EVA Checklist.

For IWIF, since we got the mission extension day we've added the IWIF data download activities that we discussed with you preflight. You will see a short activity each night and each morning for the next few days to start and stop the IWIF software starting tonight. The evening activity is to kick-off the data download just prior to pre-sleep and the morning activity will close-out the data download just after post-sleep.

7. EVA 1 CHECKLIST UPDATE

Please Pen & Ink the following change to IV column of CLEANUP (EVA, EVA1 TIMELINE), Step 10 (page FS 7-46)

WAS

IV: Deactivate IWIF:
WSGIS/IWIF Deactivation (ORB OPS, DTO), Steps A & B

IS

IV: Deactivate IWIF **& WSGIS** :
WSGIS/IWIF Deactivation (ORB OPS, DTO), Steps A, B, **C & D**

8. REPLACE PAGES 3-44 THROUGH 3-53.

STS-121/ULF 1.1 (FD 05)

REPLANNED

GMT Date 07/08 (189) | MET Day 003 | TDRS W E Z | ORB

CDR LINDSEY | PLT KELLY | MS2 NOWAK | MCC | NOTES

12:00
SLEEP | SLEEP | SLEEP

DSO 634 FLT SLP LOG (ORB OPS, DSOs) | DSO 634 FLT SLP LOG (ORB OPS, DSOs)

FD05 EZ ACTIVITIES
HARD REBOOT PGSCs (NOT WLES,RPOP2)
TEPC (STATUS CK)
(ORB OPS, CREW SYS)
OCAC FILTER INSPECT
L17 Check MCIU Filter Screen

07:00

13:00
POST-SLEEP ACTIVITY (ORB OPS, CREW SYS) | POST-SLEEP ACTIVITY (ORB OPS, CREW SYS)

08:00
06 √UHF MODE - OFF
PRIVATE MEDICAL CONFERENCE

EVA SYS: 1.215 EVA PREP
Ref. A/L & EMU Equip. Cue Card prior to hatch close for 10.2 DPRS

14:00
POST-SLEEP ACTIVITY (ORB OPS, CREW SYS) | POST-SLEEP ACTIVITY (ORB OPS, CREW SYS)

09:00

UPDATE UNIV PTG
TG=2 BV=5 P=157 Y=0 OM=270
B12/FREE/ALT Init TRK

15:00
SUPPLY/WASTE WATER DUMP (ORB OPS, ECLS)
Initiate Waste Dump
Ref. MSG 036

P/TVO7 EVA (PHOTO/TV, SCENES)
Setup

WSGIS/IWIF IV ANTENNA S/U (ORB OPS, DTO)

10:00

EVA 1 INHIBIT PAD (EVA, EVA 1)
Ref. MSG 033, item 3

EXERCISE

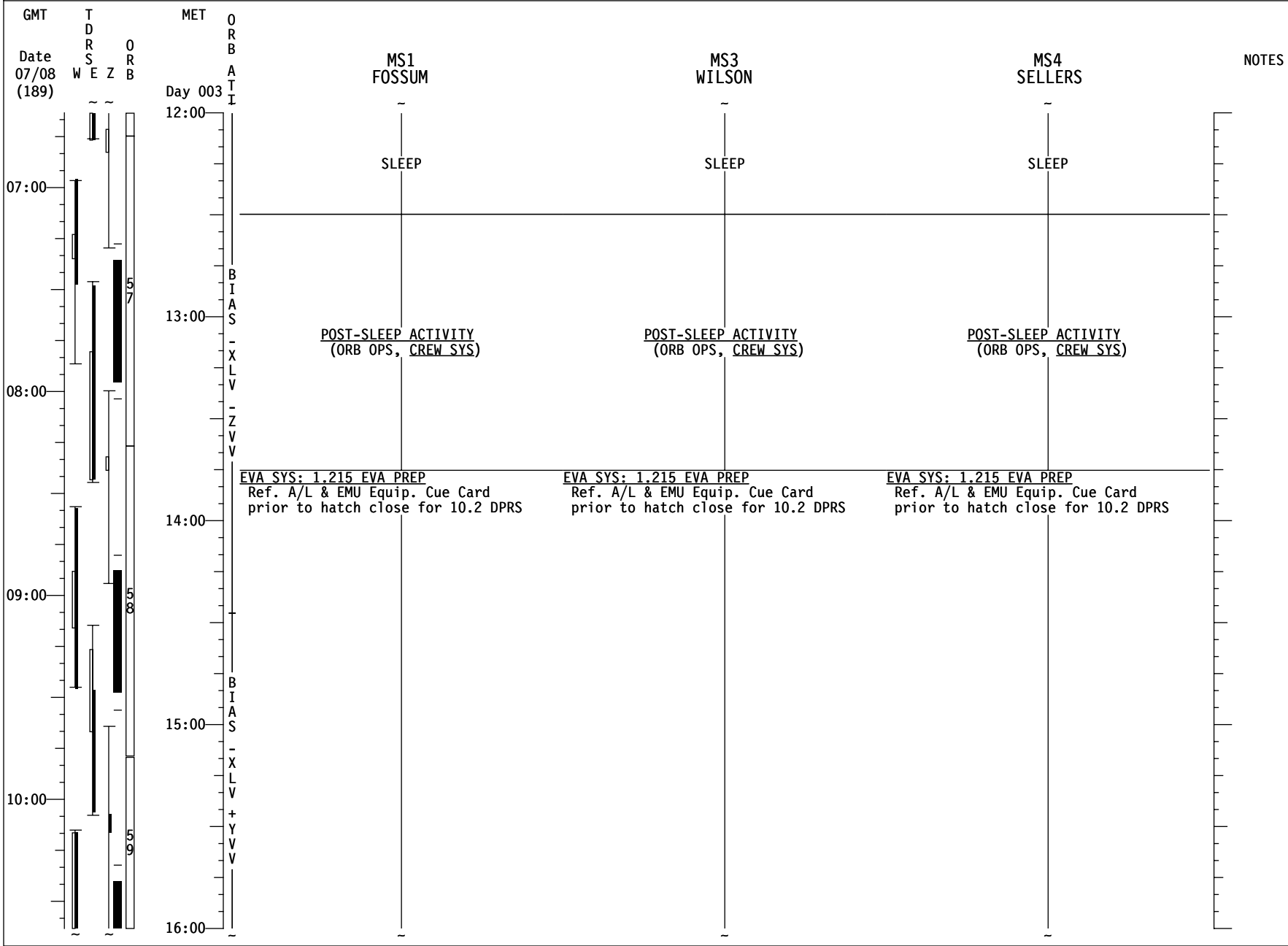
UPDATE H2O WASTE DUMP QTY

16:00

BIAS-XLV-ZVV | BIAS-XLV+YVV

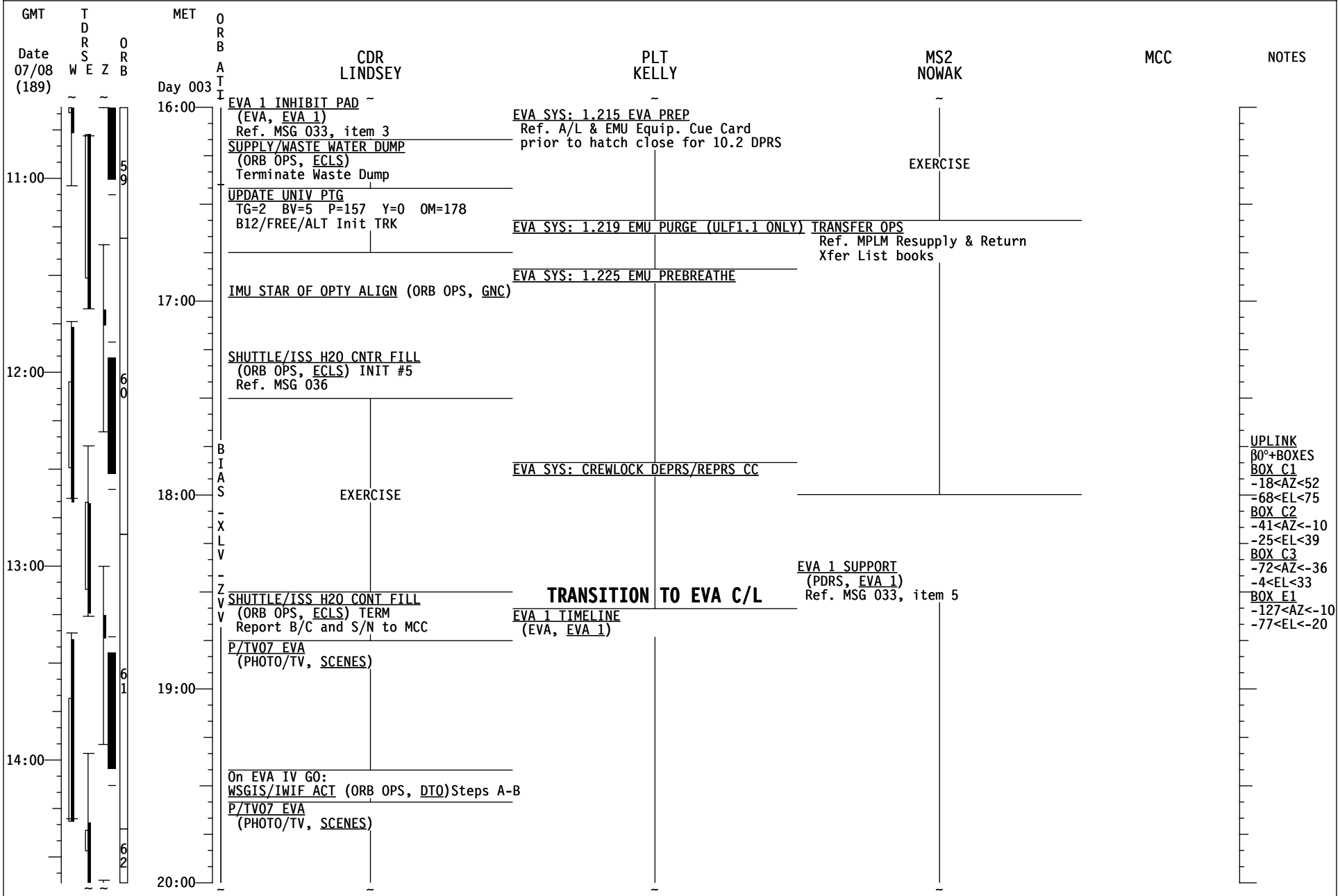
STS-121/ULF 1.1 (FD 05)

REPLANNED



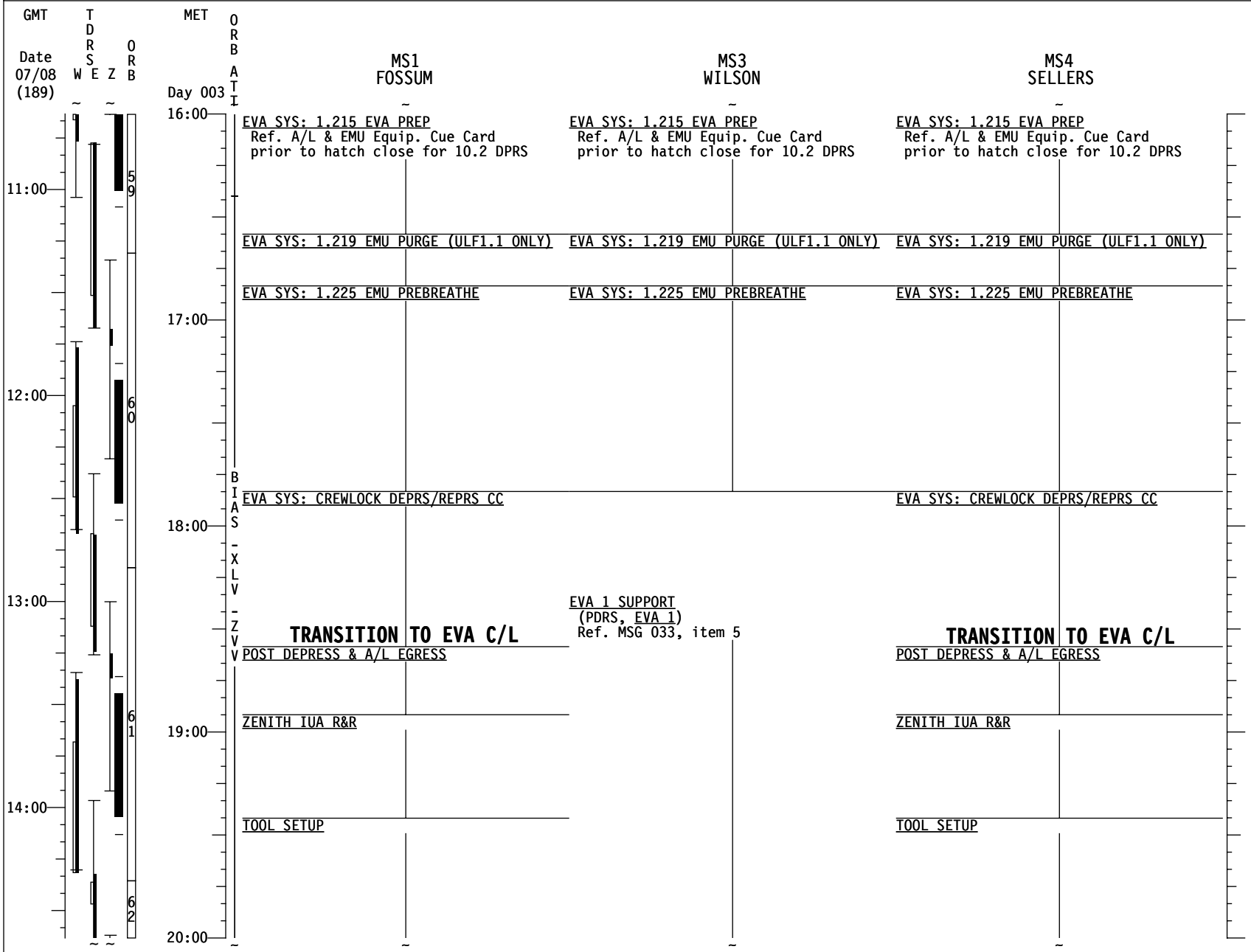
STS-121/ULF 1.1 (FD 05)

REPLANNED



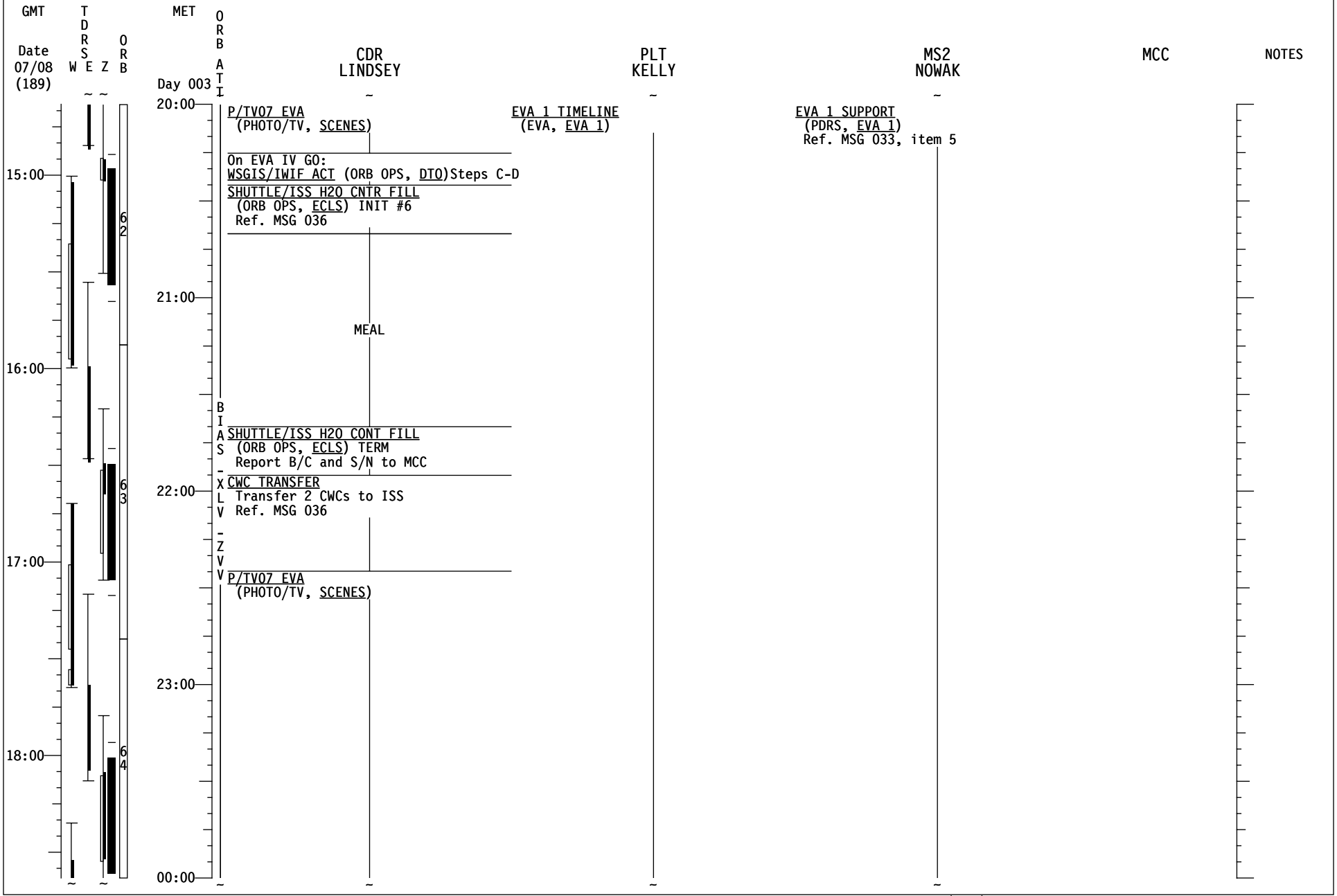
STS-121/ULF 1.1 (FD 05)

REPLANNED



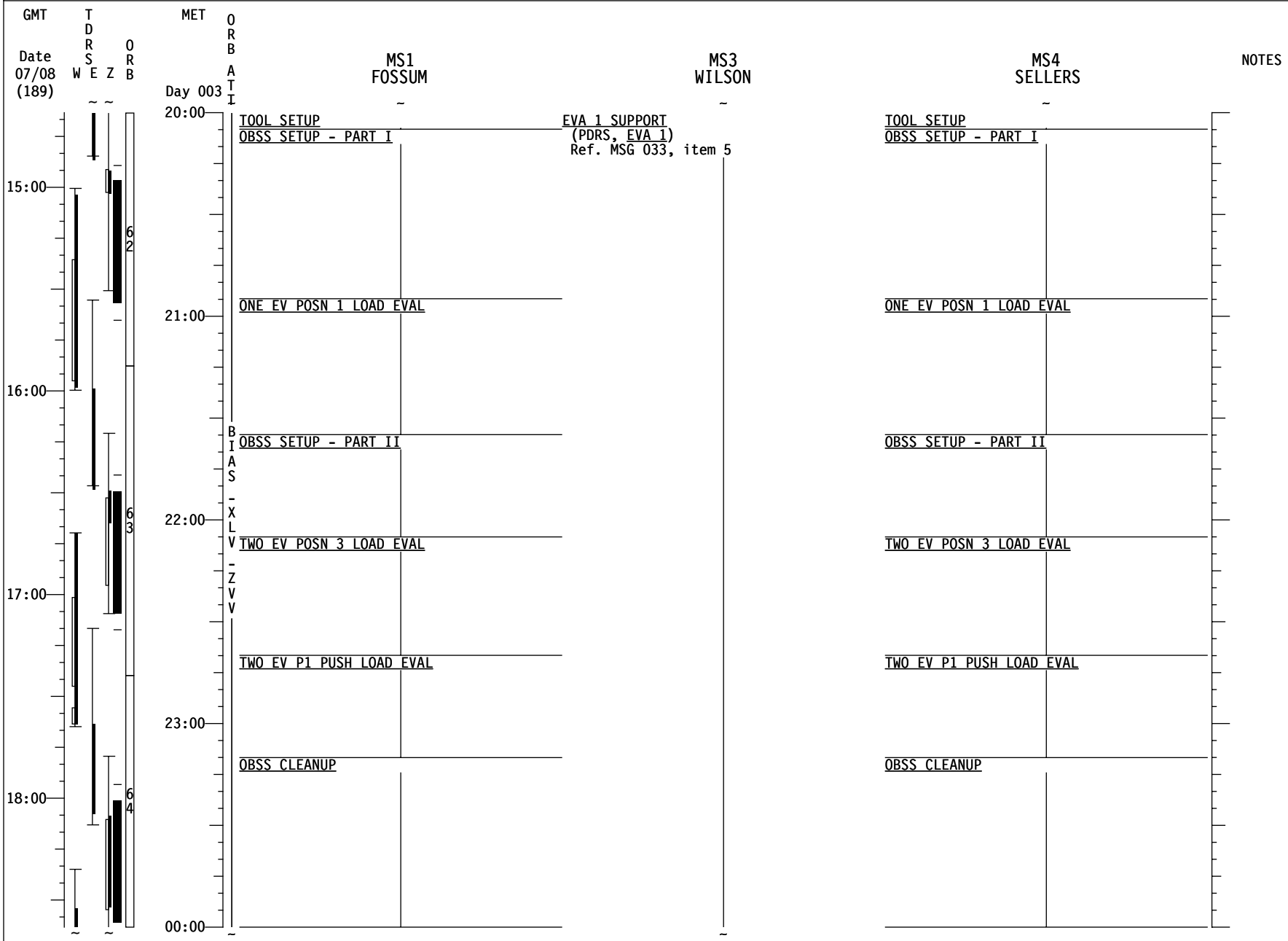
STS-121/ULF 1.1 (FD 05)

REPLANNED



STS-121/ULF 1.1 (FD 05)

REPLANNED



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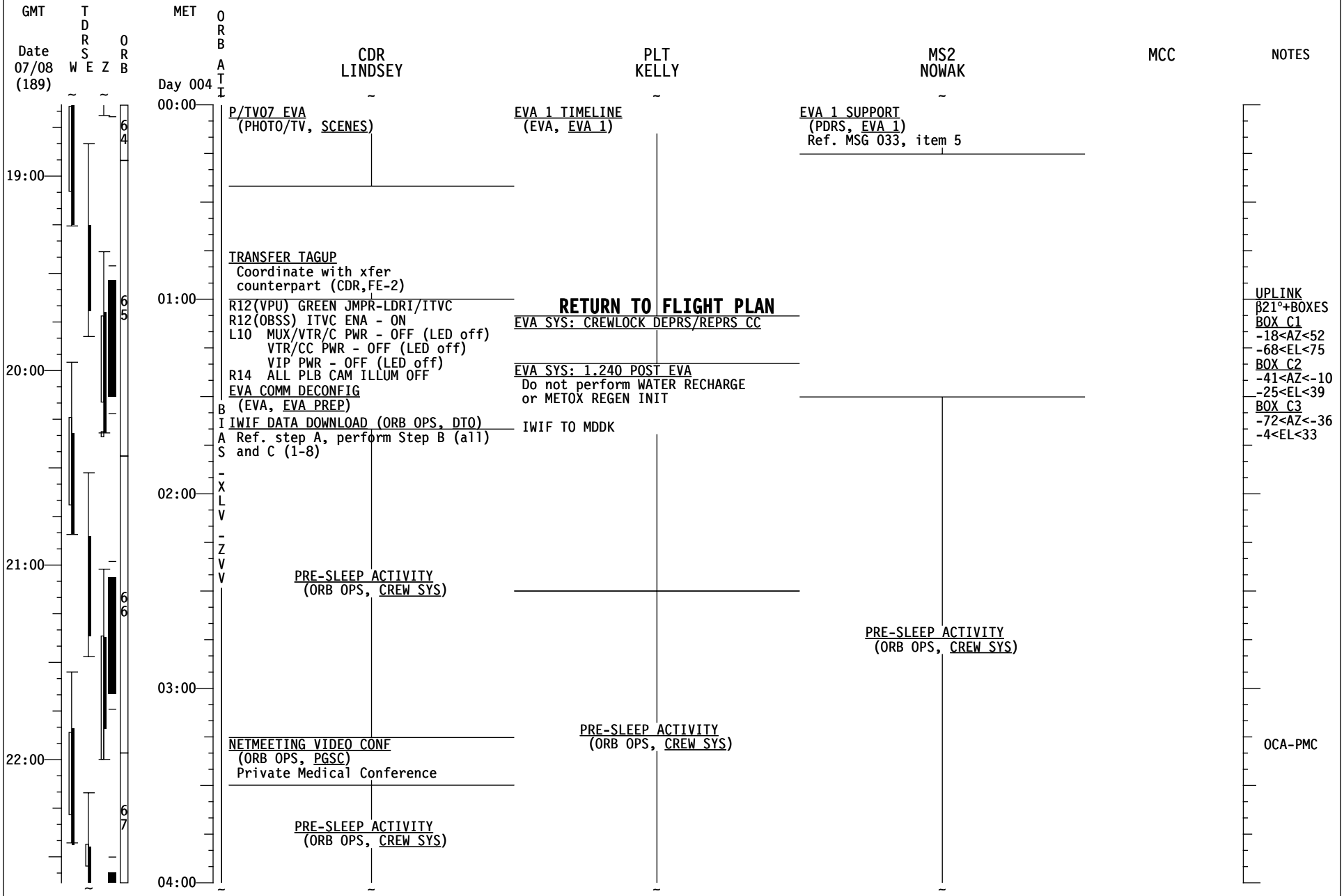
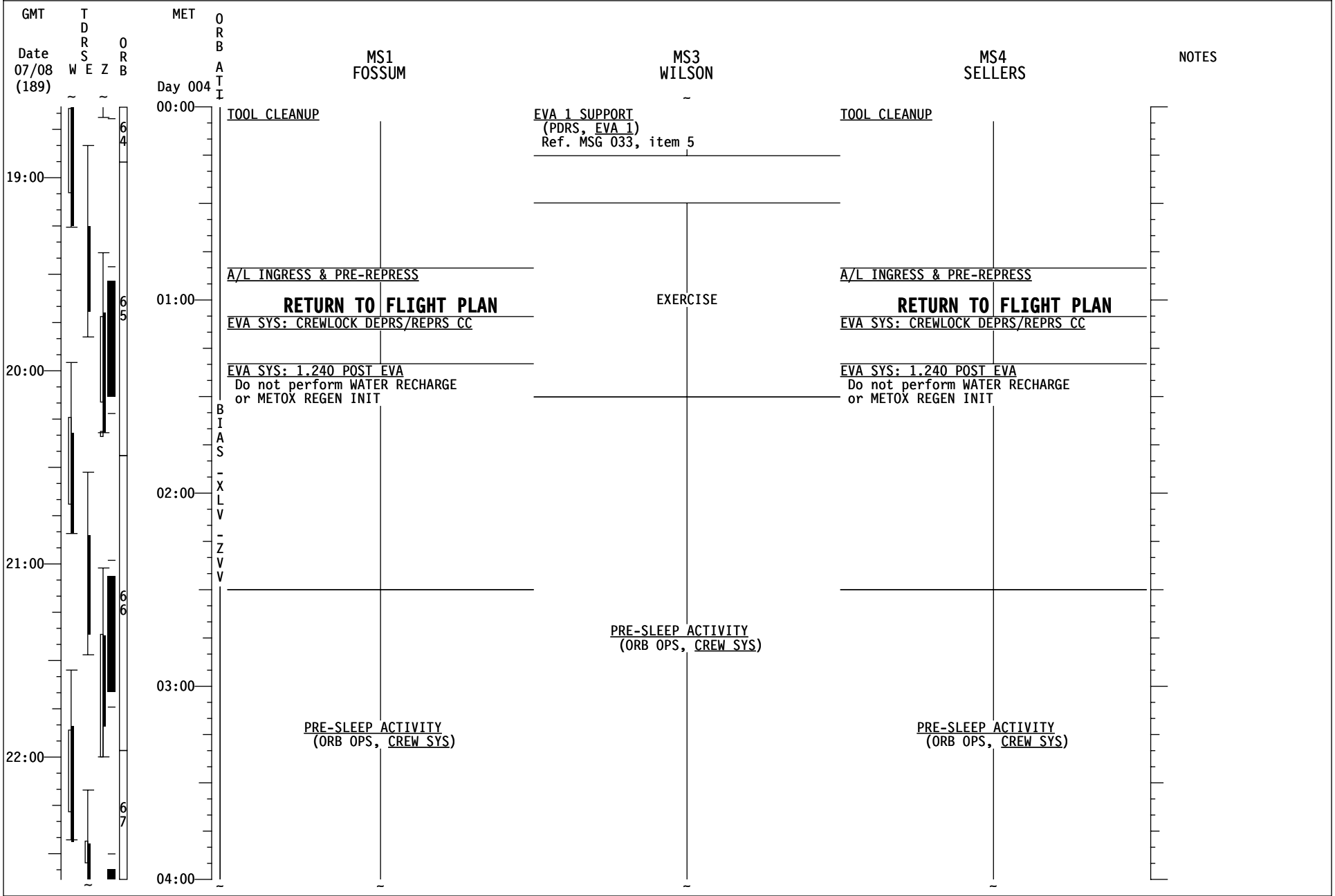


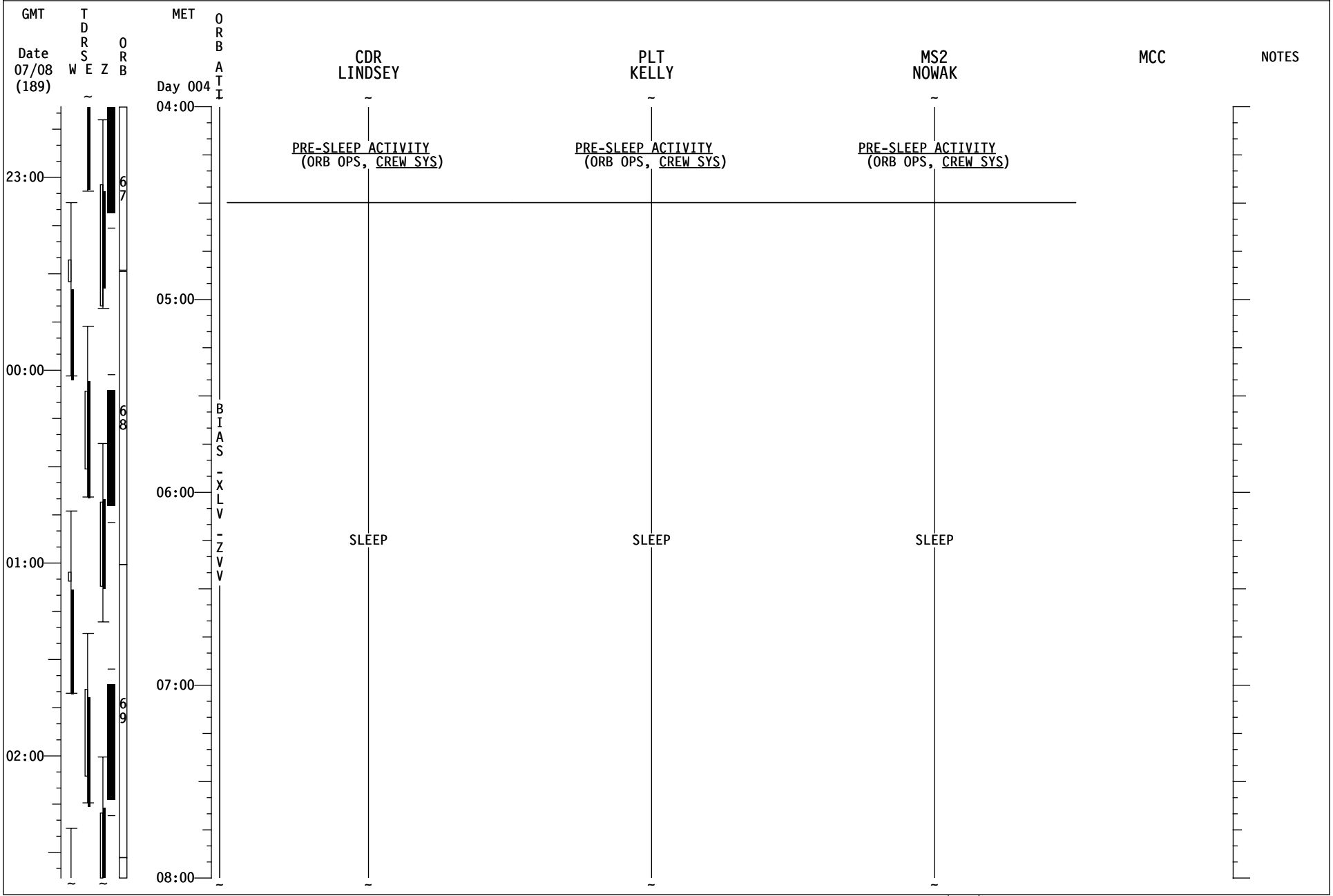
STS-121/ULF 1.1 (FD 05)

REPLANNED



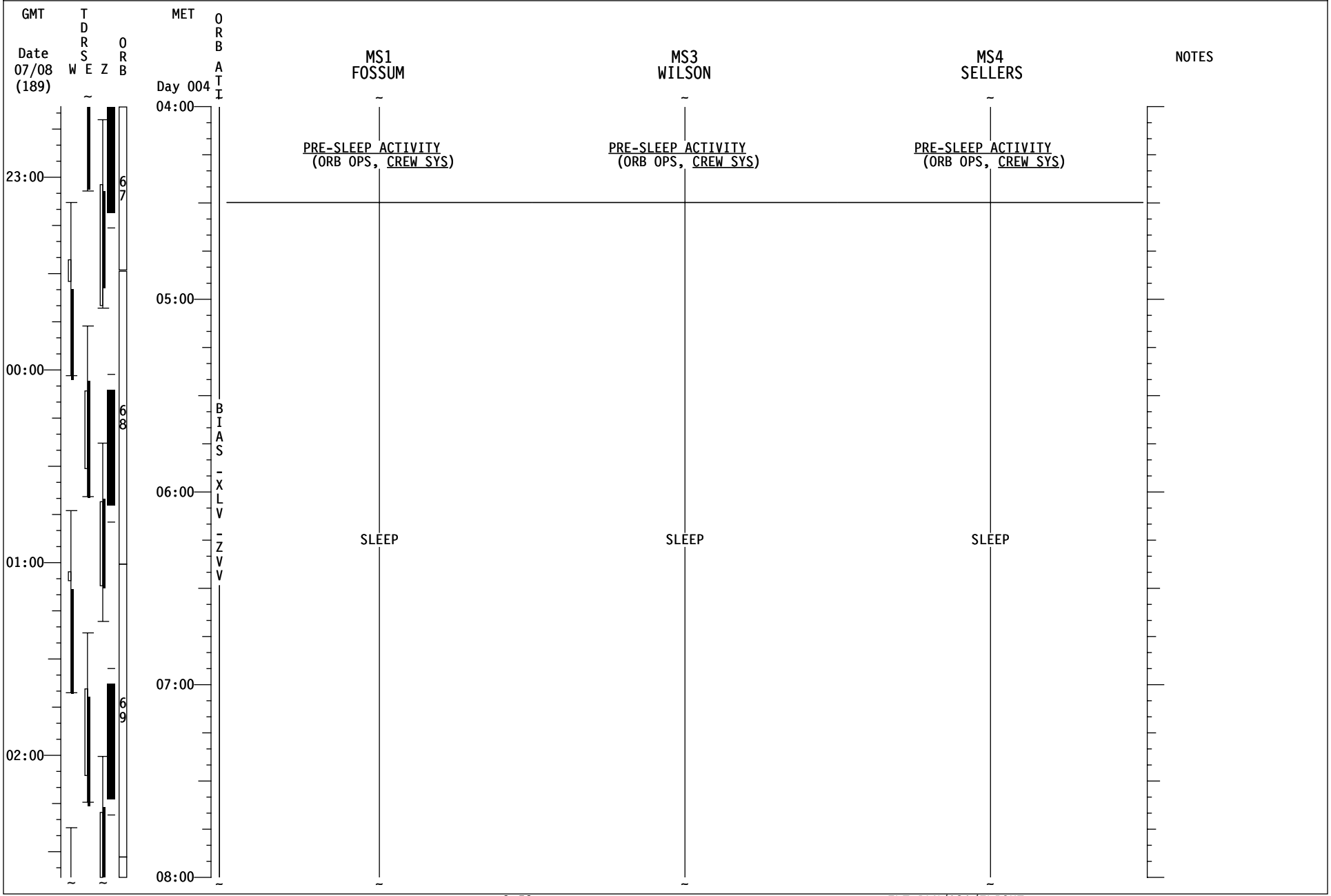
STS-121/ULF 1.1 (FD 05)

REPLANNED



STS-121/ULF 1.1 (FD 05)

REPLANNED



MSG 034 (13-0631) - FD05 MISSION SUMMARY

Good morning, Discovery!

Thanks for getting all the focused inspections done yesterday. It will be a big help to the team down here. Now that it's official, congratulations on getting that extra day. We're sure Piers and Mike are happy to get to do the 3rd EVA. And speaking of EVA, have fun today bouncing on the boom (sounds like a new country song).

YOUR CURRENT ORBIT IS: 191 X 178 NM

NOTAMS:

LAJES – TACAN 45X OUT OF SERVICE TILL 10 JUL
GUAM (GUA) – RWY 06L/24R CLOSED
AMBERLEY (AMB) – CLOSED
OCEANA (NTU) - RWY 23L/05R CLOSED
RIO GALLEGOS (AWG) - NOT APPROVED
ISTRES (FMI) – 33 RWY REMAINING MARKERS AVAIL ARE 300,600,900M

NEXT 2 PLS OPPORTUNITIES:

EDW22 ORB 64 – 3/23:36 (FEW100 FEW250, 200@7P10)
EDW22 ORB 80 – 4/23:59 (FEW100 FEW250, 200@7P10)

OMS TANK FAIL CAPABILITY:

L OMS FAILS: NO
R OMS FAILS: NO

LEAKING OMS PRPLT BURN:

L OMS LEAK: ALWAYS BURN RETROGRADE
R OMS LEAK: ALWAYS BURN RETROGRADE

OMS QUANTITIES(%)

L OMS	OX = 34.6	R OMS OX = 37.2	
	FU = 35.1		FU = 37.9

SUBTRACT I'CNCT COUNTER FOR CURRENT OMS QUANTITIES

DELTA V AVAILABLE:

OMS	362 FPS
ARCS (TOTAL ABOVE QTY1)	26 FPS
TOTAL IN THE AFT	388 FPS
ARCS (TOTAL ABOVE QTY2)	58 FPS
FRCS (ABOVE QTY 1)	36 FPS
AFT QTY 1	84 %
AFT QTY 2	46 %

SYSTEM	FAILURE	IMPACT	WORK AROUND
MED/ CHeCS	Two HRM Watches for STS EV crew cannot be located on Shuttle middeck. Per CCCD only 1 HRM on STS middeck (MF71M) which is designated for Exp. 14.	Alternate HRM watch for exercise PB is needed, per flight rule ULF1.1_C13-2. Data will not be able to be retrieved from the HRM on the Ground.	HRM watches and chest strap flown for ISS crewmembers will be used for exercise PB on EVA 1. ISS Crew will have to download HRM's to the MEC after every EVA (Crewtime: 5mins).

Good morning Thomas, Stephanie, and Steve,

Now that the MPLM is installed and hatch is open, we can get on with transfer! During the calldown yesterday, Thomas stated that layouts were deployed in the MPLM. Please let us know which layouts are deployed.

FD05 Transfer Choreography

- Transfer rtng TVIS treadmill into MPLM endcone bungee jail (to clear off CWC wall)
- Transfer items from A2 & F1 RSP fronts and fold front fences to provide clearance for rack transfers
- Verify rack translation path – maybe temp stow 2 EMUs from crewlock in MPLM
- Transfer items from LAB1O4 and LAB1P1 ZSR rack fronts:
  - Item 518 from LAB1P1 rack front to mddk temp stow
  - All other LAB1O4 and LAB1P1 rack front items to endcone bungee jail (all are MPLM rtn items)
- Transfer LAB1O4 ZSR to empty MPL1S1 bay
- Deact (ground)/remove P1 Smoke Detector
- Transfer LAB1P1 ZSR to empty MPL1P1 bay
- Transfer MELFI rack to LAB1O4 location (pivot pins, kbars are in MPLM)
- Transfer OGS rack to LAB1P1 location (pivot pins installed in LAB, kbars on ISS)
- Reinstall P1 Smoke Detector/react (ground)
- Transfer EMCS to LAB1O3_G1, install returning lockers (including MEPS) in ETR2
- Transfer/swap HRF dwrs from ETR to/from LAB1S2 HRF1

The Transfer List Excel file, FD05_TransferList_STS121.xls, is located on the KFX machine in **C:\OCA-up\transfer**.

For ISS, the Transfer List Excel file, FD05_TransferList_STS121.xls, is located in **K:\OCA-up\transfer**.

We've deleted the transfer of the spare Shuttle Access Point from the Transfer List because it's currently in use on the Shuttle. This was intended to swap with a prepacked ISS Access Point. This prepacked AP will need to be removed from Return Bag 509. We've added a note to Return Bag 509 to remove the ISS Access Point from this bag and leave it on ISS.

Please incorporate uplink pages as follows (call us with any questions!):

In the MDDK Transfer List Book
RESUPPLY tab
Replace Page Resupply 2
RETURN tab
Replace Page Return 1
Make the following Pen & Ink change (if desired):
Page Return 2: Item 451: Change weight from 15 to 13.65

(continued on next page)

In the MPLM Return Transfer List Book
LAYOUTS tab
Replace the following pages:
- L-8 (A2_C1 Mbag)
- L-9 (A2_H1 Mbag)
- L-12 (A4_A1 Mbag)
- L-16 (A4_K1 Mbag)
- L-20 (F1_H1 Mbag)
- L-25 (F4_A1 Mbag)
- L-31 (MPL1S1 and MPL1S2 Rack Layout)

RETURN tab
Replace the following pages:
- Page Return 18
- Page Return 22

-The Transfer Team-

MSG 036 - FD05 WATER SUMMARY

Today there will be a waste water dump and two CWCs filled for transfer to ISS.

At 3/15:05 MET, perform a waste water only dump using SUPPLY/WASTE WATER DUMP (ORB OPS, ECLS) p. 5-2. Perform Steps E, G and I. Dump the waste tank to 5%. Dump valve open duration will be approximately 31 minutes. MCC will TMBU all FDA.

The Shuttle/ISS H2O Container Fill initiations scheduled for CDR at MET 3/17:15 and 3/20:25 should contain the following details. Note the CWC bags used should be the ones retrieved from the MPLM on FD4.

SHUTTLE/ISS H2O CONT FILL INIT #5
(ORB OPS, ECLS)
Ag Biocide is req'd.
Sample is req'd.
Fill Duration: ~50 minutes
Report Serial Number and Barcode to MCC.

Following fill #5, at MET 3/20:25 CDR should perform:

SHUTTLE/ISS H2O CONT FILL INIT #6
(ORB OPS, ECLS)
Ag Biocide is req'd.
Sample is not req'd.
Fill Duration: ~50 minutes
Report Serial Number and Barcode to MCC.

After both fills are complete, transfer the CWCs to the water wall (NOD1P2) at MET 3/21:55 per the flight plan. If there is insufficient room for the bags at this ISS location, store CWCs on the FGB Floor and report to MCC.

FD4 MMT Crew Summary

The most significant MMT of the mission was held on FD 4 including an extensive review of the RPM tile photography and FD2 WLE RCC inspection data. The key decisions and results are summarized below.

Mission Extension: The cryo margins and other consumables currently support a 13+2 mission duration. The MMT formally decided to extend the mission by one day today in order to perform EVA #3. The current cryo margins are about 6 hours above a 13+2 mission.

TPS Inspection/Analysis - All RCC and tile inspection data including the FD4 focused inspections has been obtained by the Imagery and Debris Assessment Team (DAT). In other words as of the close of FD4, no additional OBSS inspection data has been requested for future flight days. The MMT, the flight control team, the DAT, and the Imagery teams appreciate all the hard work that you have put forth to obtain this data. Here's a brief summary of the analysis of the data as of the evening of FD4.

a)Tile Analysis - Based on the assessment of the all FD3 RPM imagery, the tile looks extremely clean and there were no areas identified that require a focus inspection (See Figure 1). In summary, except for the protruding gap fillers, as of FD 4 the tile has been cleared for entry. This is indicative of the outstanding performance of ET-119 and the associated debris environment that was observed by the ground cameras, ET feedline camera, ET handheld photography, and ET umbilical photography.

b) RCC Analysis - As an update to the FD3 MMT summary, all of the planned data was obtained on FD 2. After further review the two locations on the nose cap that appeared to be out of LDRI imagery field of view were recovered in other downlinked imagery. Other than the RCC focused inspections (nosecap, Panel 9R, and 5R), all other areas of the RCC have been cleared based on the FD 2 data. Analysts are reviewing the FD4 RCC focused inspection data and we hope to have a summary of those results for you after the FD 5 MMT.

c) ET Doors - The RPM imagery was evaluated and the lighting was determined to be acceptable for paint stripe evaluation. There is no evidence of off nominal thermal barrier protrusions, off-nominal steps, or that any of the paint stripe is visible. The ET Doors are closed, latched, and in a good config for entry (See Figure 2).

d) Thermal Blankets - In the RPM and the FD 2 cabin survey four slightly damaged thermal blankets have been identified for further analysis. There are no thermal issues with any of these blanket locations and the only concern is as a debris source. Two of these blankets on the port side aft of the hatch have been cleared as a debris source. The other two blankets are the blanket on the upper surface just aft of the F1U and F3U thrusters and the blanket on the port side just forward of the -Y star tracker. Both of these blankets are small (0.6 x 5.0 and 2.5 inches and 0.75 x 4.5 x 1.5 inches) and require additional transport analysis to clear. Ground commanded ISS camera images are being requested to provide additional detail of these two damaged blankets. (See Figure 3).

e) Gap Fillers - Three protruding gap fillers have been observed in the imagery. The port aft gap filler (Figure 4) observed in the LDRI imagery has been cleared for entry based on thermal, stress, and structural analysis. This gap filler is protruding approximately 0.5 inches and the prediction is that it will cause turbulent flow transition at approximately Mach 20-21 based on the analysis. Heating analysis was assessed conservatively assuming that transition occurred as early as Mach 25 and there were no aeroheating, thermal, or stress exceedances. This analysis included an evaluation of the elevon and elevon cove seal area.

The remaining two protruding gap fillers at the arrowhead and forward of the starboard ET umbilical door required FD 4 focused inspections to obtain better height data prior to being able to clear those areas. Results of analysis on these will be provided to you as soon as possible. See Figure 5 for view of gap fillers.

L5L Thruster: The MMT discussed the final plan for use of L5L during the mission. The decision is that this jet will not be used for the remainder of the mission and the temperature predictions currently show that the jet should not drop below the 40 degrees Fahrenheit leak limit. The remaining attitude maneuvers will be executed using either ISS USTO or ALT DAP. The plan is for the maneuvers prior to FD10 to be performed using ISS USTO and the last two (late inspection and undock) to be performed using ALT DAP.

Figure 1 - Overall look at tile and gap fillers on the left side (arrowhead, aft port wing, and starboard ET door)

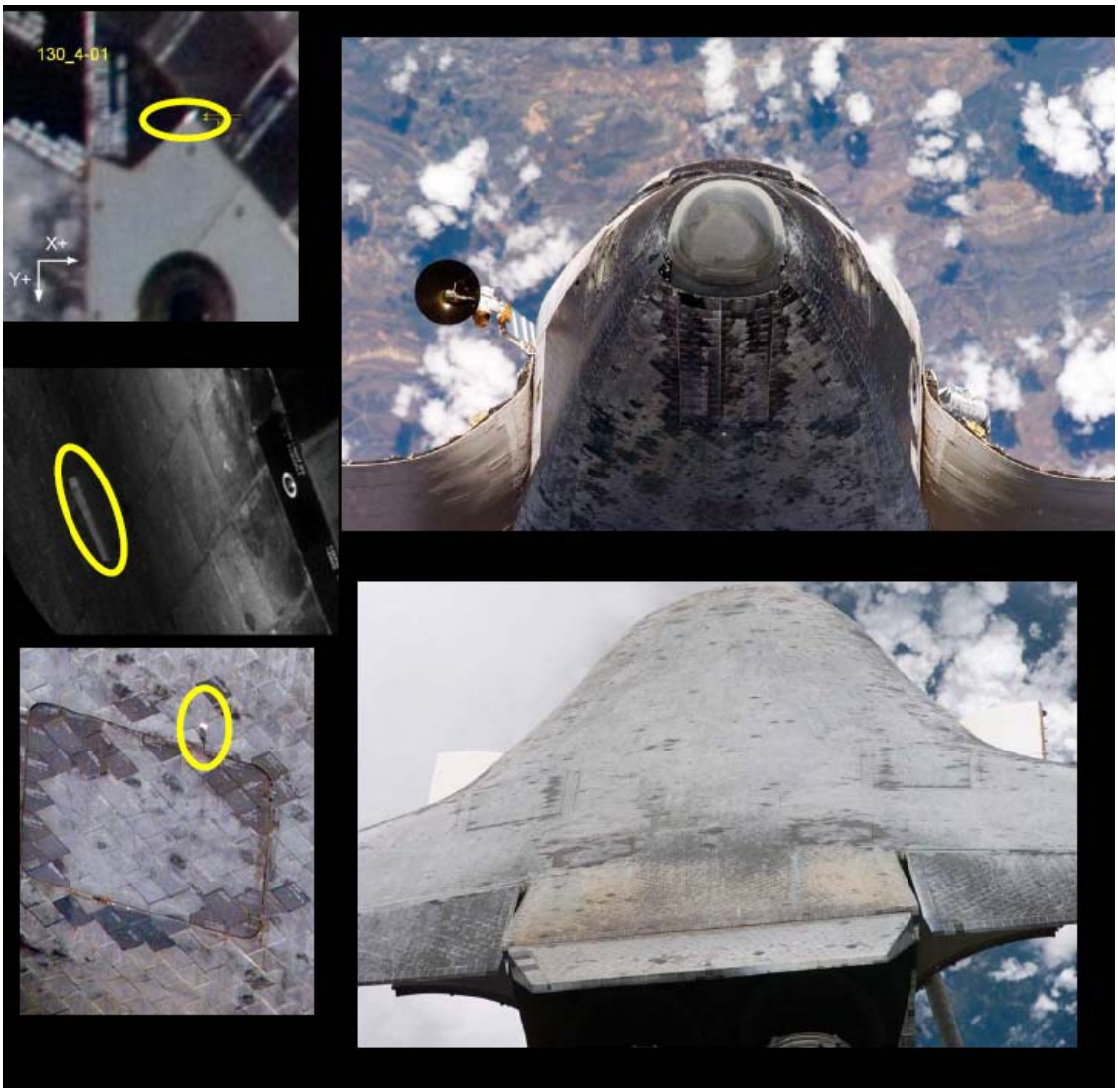


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Figure 2 ET Door Imagery

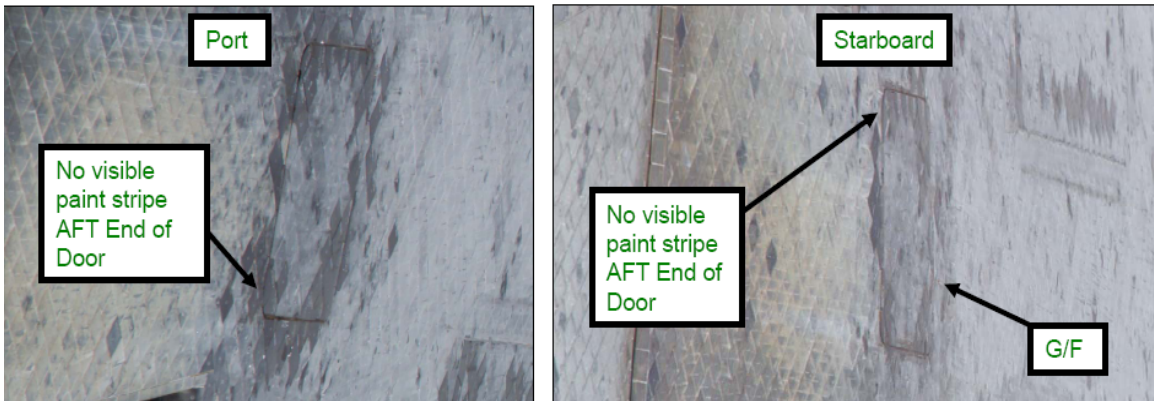

Figure 3 Thermal Blanket Near Up Firing FRCS Thrusters (Bottom) and Port Side (Top)

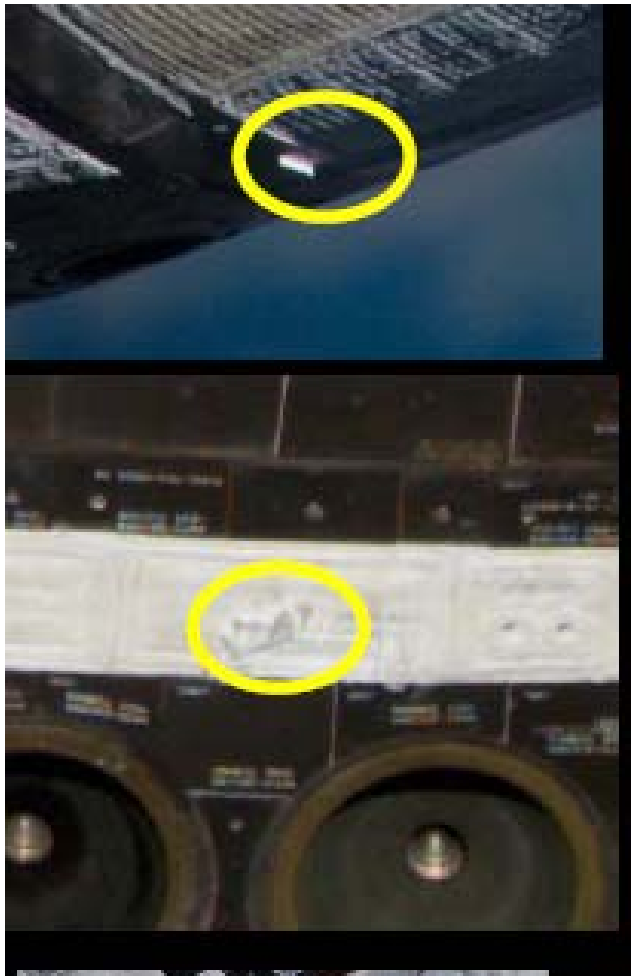

Figure 4 Port Wing Gap Filler

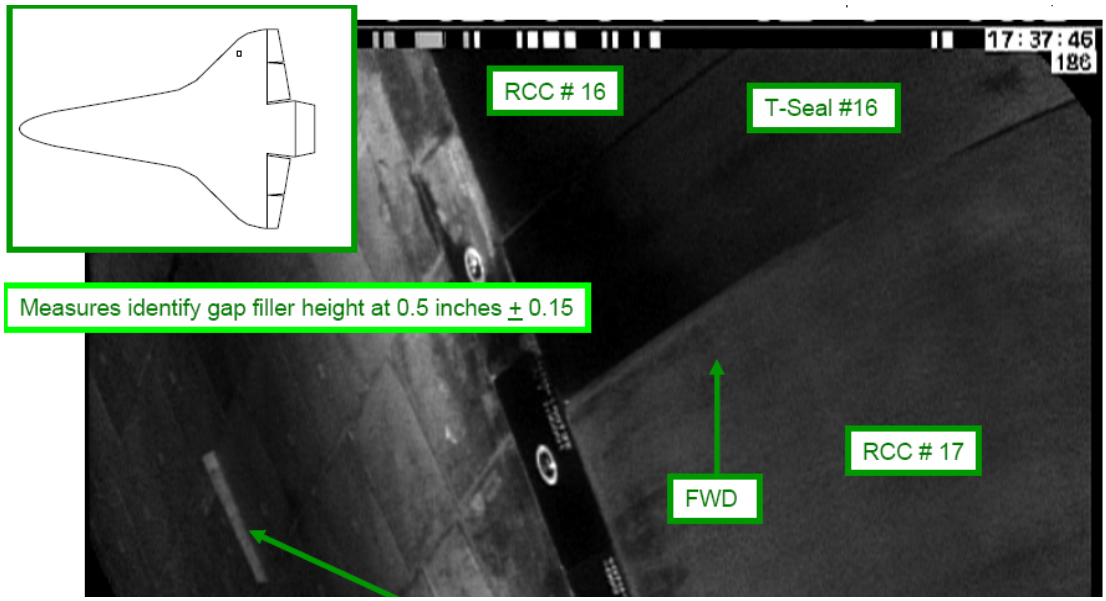

Figure 5 Arrowhead Gap Filler (Left Top) and Gap Filler on Tile Forward of Starboard ET Door (Bottom Right)