

STS-127/2JA

FD 15 Execute Package



MSG	Page(s)	Title
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143	18 - 20	ANDE-2 Deploy Summary (pdf)
141	---	DRAGONSAT AND ICU-ANDE2 DEPLOYS (pdf - Electronic Only)

Approved by FAO: T. Melroy

A handwritten signature in black ink on a light yellow rectangular background. The signature appears to read 'T. Melroy'.

Last Updated: Jul 29 2009 6:59AM GMT

JEDI (Joint Execute package Development and Integration), v2.04.0003

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MSG 139A - FD15 FLIGHT PLAN REVISION

1 MSG INDEX

2

3 <u>MSG NO.</u>	3 <u>TITLE</u>
4 139A	FD15 Flight Plan Revision
5 140A	FD15 Mission Summary
6 141	DRAGONSAT and ICU-ANDE2 Deploys
7 142B	LIOH Changeout Cue Card
8 143	ANDE-2 Deploy Summary

9

10 1. POST SLEEP CRYO CONFIG

11
12 For today's cryo config, O2 tanks 2 and 4 and H2 tanks 1 and 2 will be active. Also, O2
13 tank 4 will be depleted today.

14
15 **R1 O2,H2 MANF VLV TK2 (two) - OP (tb-OP)**
16 **H2 TK1 HTRS A,B (two) - AUTO**
17 **TK3 HTRS A,B (two) - OFF**
18

19 2. LIOH CHANGEOUT CUE CARD

20
21 MSG 142 is your new LIOH CHANGEOUT cue card. This cue card should be used for
22 the remainder of the mission starting with today's pre-sleep LiOH changeout.
23

24 3. COMBO DUMP DETAILS

25
26 Pregather Equipment

27 Prior to starting the dump, pregather the following equipment and temp stow on the
28 middeck:

- 29 a. Middeck: Condensate CWC s/n 5108.
30 b. Waste Water Dump (WWD) Filter from the BOB located in MA16D.
31 c. 8' Y-Y hose from the CHCK.
32

33 Simo Dump

34 Perform a simo dump using SUPPLY/WASTE WATER DUMP (ORB OPS, ECLS) p. 5-2.
35 MCC will TMBU FDA in steps B and K.
36

37 Waste dump valve open time will be ~15 minutes. Dump the waste tank to 5%.

38
39 Supply dump valve open time will be 35 minutes.
40

41 CWC Dump

42 After performing the Waste dump step I-2, perform CWC OVERBOARD DUMP (ORB
43 OPS, ECLS) p. 5-36. Perform steps A, D, E, F, and G. MCC-H will TMBU FDA in steps
44 B and H. Dump CWC s/n 5108, which was temp stowed on FD14.
45

46 Waste dump valve open time for CWC s/n 5108 will be ~11 minutes.
47

48 Stow CWC s/n 5108 in MF57C

49 Stow the WWD in a ziplock bag and return it to the BOB in MA16D.

50 Stow the Y-Y hose in a separate ziplock bag and return it to the CHCK.

END OF PAGE 1 OF 13, MSG 139A

MSG 139A - FD15 FLIGHT PLAN REVISION

1 4. IDP TRANSIENT

2
3 IDP 1 transient experienced during flyaround is consistent with a brief interruption of
4 power to the IDP from the power switch. IDP considered ok and can be used nominally.
5

6 5. MS2's OUTLOOK

7
8 Julie, we've reviewed your Outlook data for FD 10 (Friday) and FD 11 (Saturday). All
9 data available to us on the ground show that the e-mail messages you sent (which are
10 temporarily stored in your Outbox until the next mail synch) were correctly transmitted to
11 their recipients and then moved from your Outbox to your Sent Items. We can try to
12 investgate further if you like. To begin that process, could you please tell us what you
13 saw on board that indicated a problem with your outgoing mail? Thanks very much!
14

15 6. FD15 EVA UNPACK AND STOW DELTA

16
17 Great job on staying ahead of the EVA packing and transfer.

18
19 Please add one comment to the 'Unpack and Stow' (MSG 128): Before you stow Dave
20 and Chris' ECOKs in the EMUs, remove the luggage tag labels and put them in the
21 ECOKs first, as they were flown up. As you are well aware, these tags aren't certified to
22 fly loose in the HUT so this is just a friendly reminder.
23

24 It's been a great mission to watch and we all look forward to seeing you back on Earth.
25

26 7. ANDE 2 DEPLOY DETAILS

27
28 Message 143 provides the details behind the deploy sequence for FD16. We would like
29 to tag up with you at your discretion late in the day today to discuss the entry
30 preparations and the deploy timeline. Also, please note the pen & ink at the end of MSG
31 143.
32

33 8. REPLACE PAGES 2-52 THROUGH 2-54 AND 3-162 THROUGH 3-169

34
35
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51

END OF PAGE 2 OF 13, MSG 139A

REPLANNED

FD15

FD14 GMT 07/28/09 (209) 013/00 Day_013

MET 23 01 02 03 04 05 06 07 08 09 10 11 12

CDR POLANSKY	PRE SLEEP	SLEEP	POST SLEEP
PLT HURLEY	PRE SLEEP	SLEEP	POST SLEEP OBSS UNBERTH
MS1 CASSIDY	PRE SLEEP	SLEEP	PST SLP
MS2 PAYETTE	PRE SLEEP	SLEEP	POST SLEEP OBSS UNBERTH
MS3 MARSHBURN	PRE SLEEP	SLEEP	PST SLP
MS4 WOLF	PRE SLEEP	SLEEP	POST SLEEP
MS5 WAKATA	PRE SLEEP	SLEEP	POST SLEEP

S T S - 1 2 7

DAY/NIGHT	206	207	208	209	210	211	212	213	214
ORBIT									
TDRS	W	E	Z						
ORB ATT									

*FILTER CK

NOTES

FLT PLN/127/FLIGHT

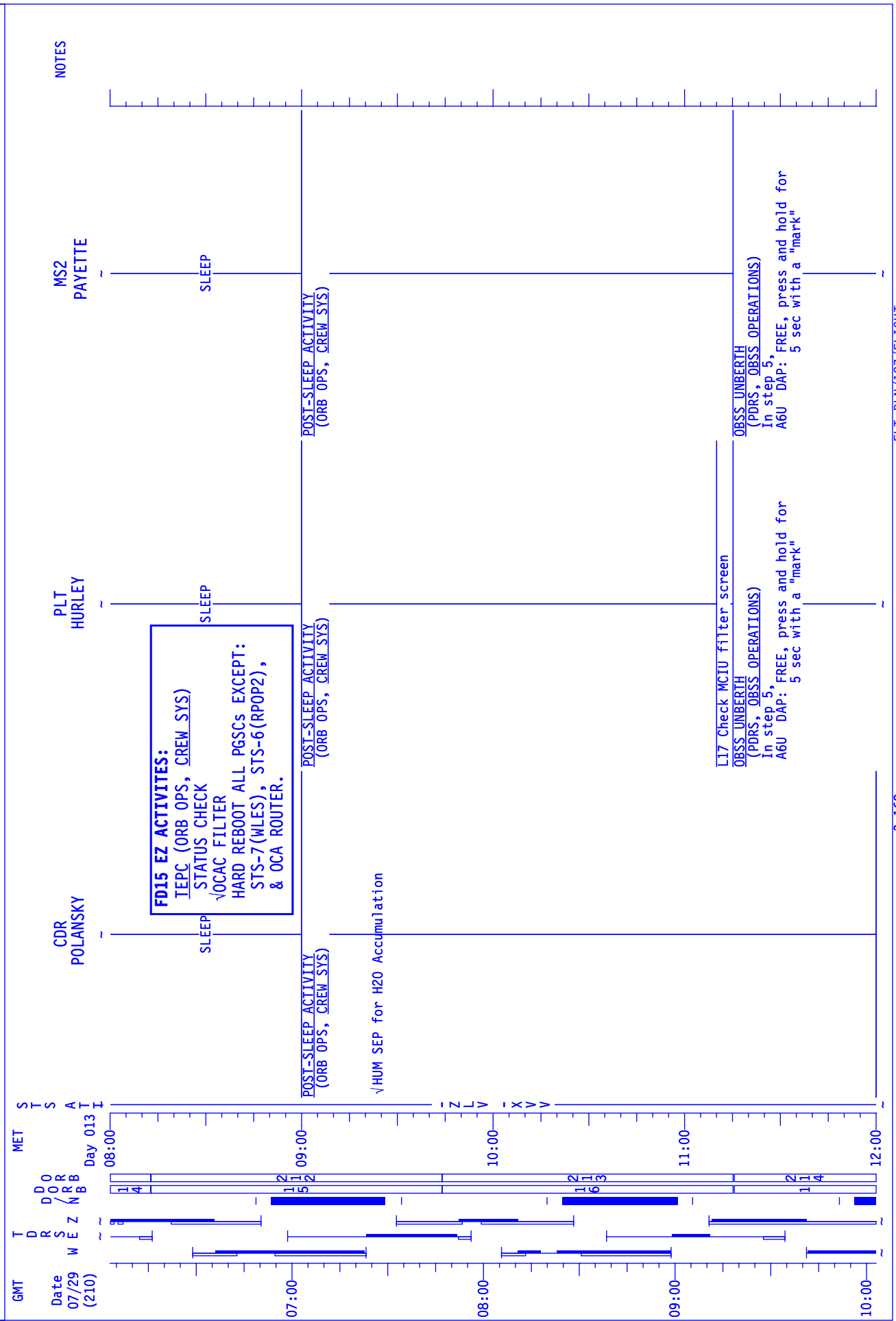
FD16

FD15 GMT 07/29/09 (210) Day 014 014/00 23 01 02 03 04 05 06 07 08 09 10 11 12

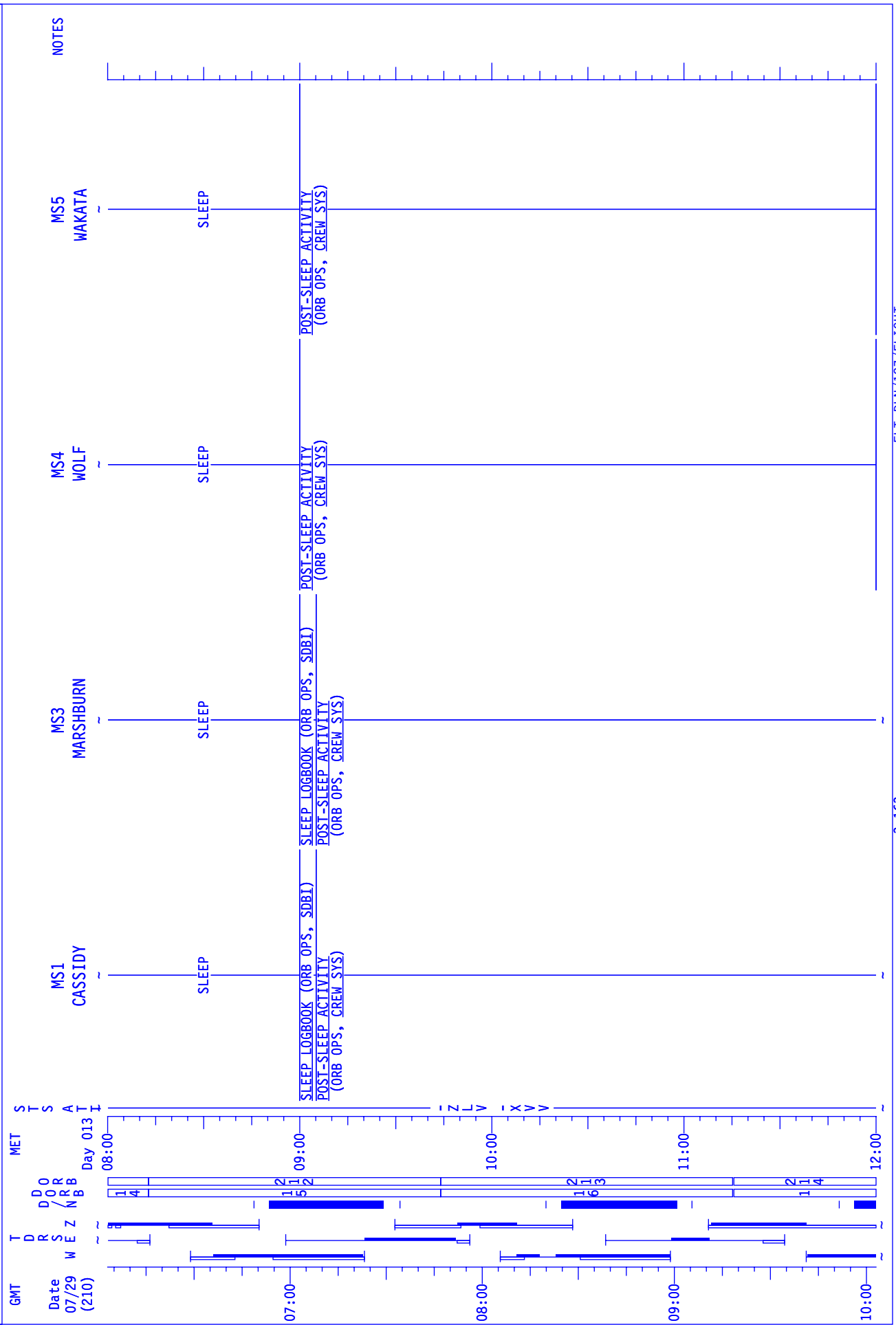
MET	01	02	03	04	05	06	07	08	09	10	11	12
CDR POLANSKY	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	POST SLEEP	POST SLEEP	PILOT OPS	FCS C/O		
PLT HURLEY	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	POST SLEEP	POST SLEEP	PILOT OPS	FCS C/O		
MS1 CASSIDY	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	POST SLEEP	POST SLEEP	FILTER CLEAN	CABIN STOW		
MS2 PAYETTE	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	POST SLEEP	POST SLEEP	EXERCISE	FCS C/O		
MS3 MARSHBURN	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	POST SLEEP	POST SLEEP	EXERCISE			
MS4 WOLF	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	POST SLEEP	POST SLEEP	EXERCISE	FCS C/O P/TV		
MS5 WAKATA	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	SLEEP	POST SLEEP	POST SLEEP	EXER CISE			
DAY/NIGHT ORBIT	222	223	224	225	226	227	228	229	230	231	232	233
TDRS												
ORB ATT												
NOTES	*HEATER ACT #STATUS CHECK %COMPACT %RATE DCNFG -ZLV -XVW FLT PLN/127/FLIGHT 2-54											

S T S - 1 2 7

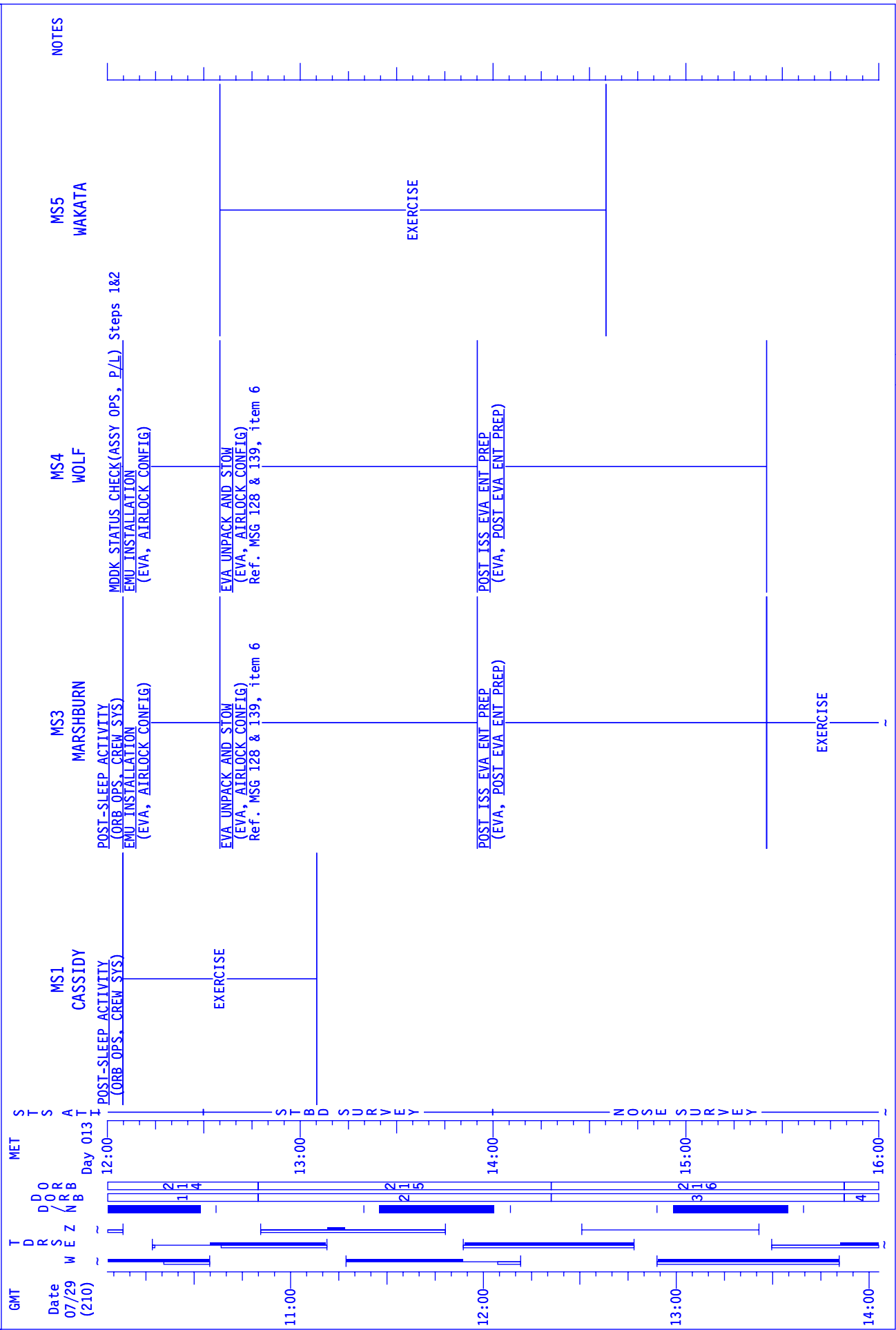
STS-127 FD (15)



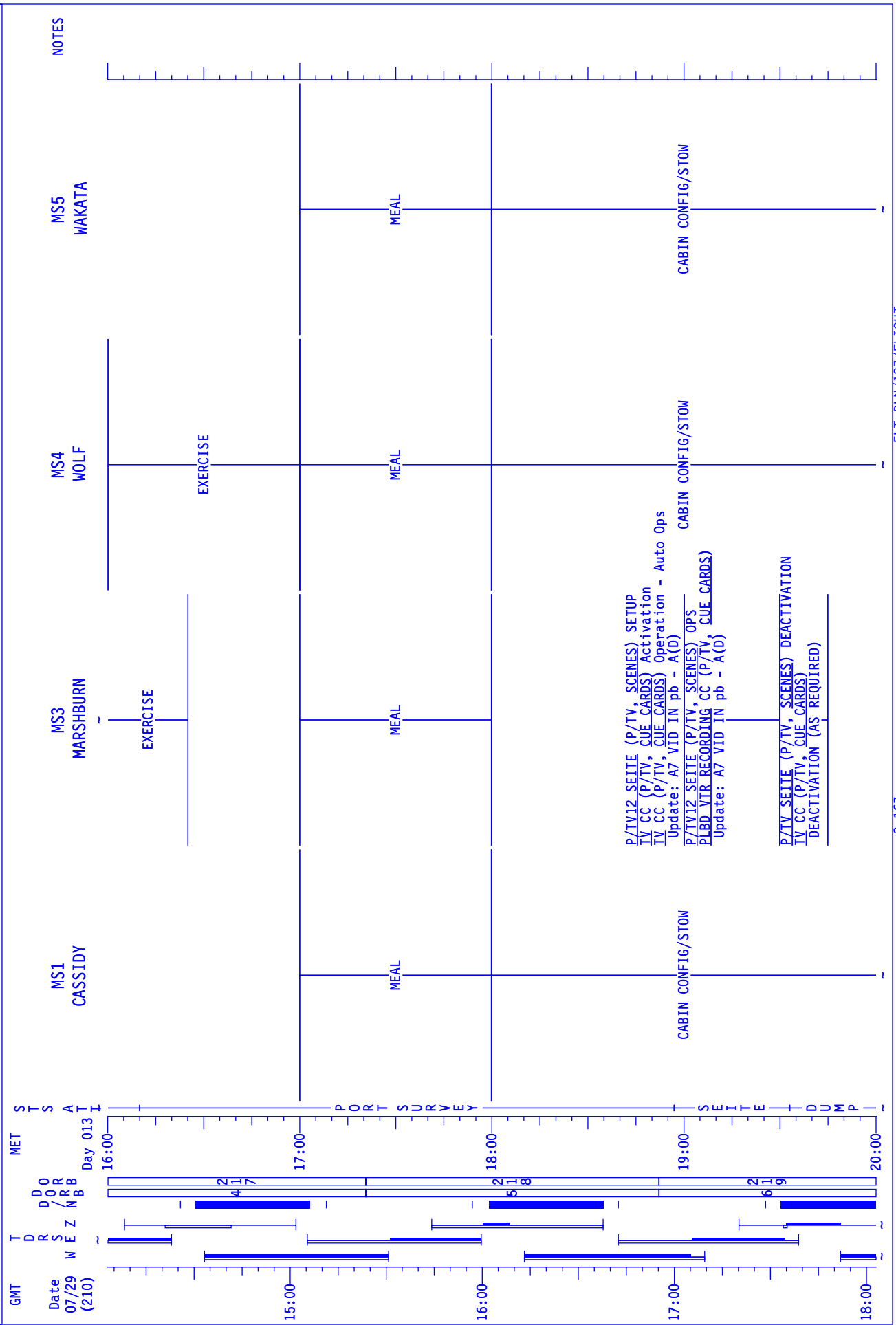
STS-127 FD (15)



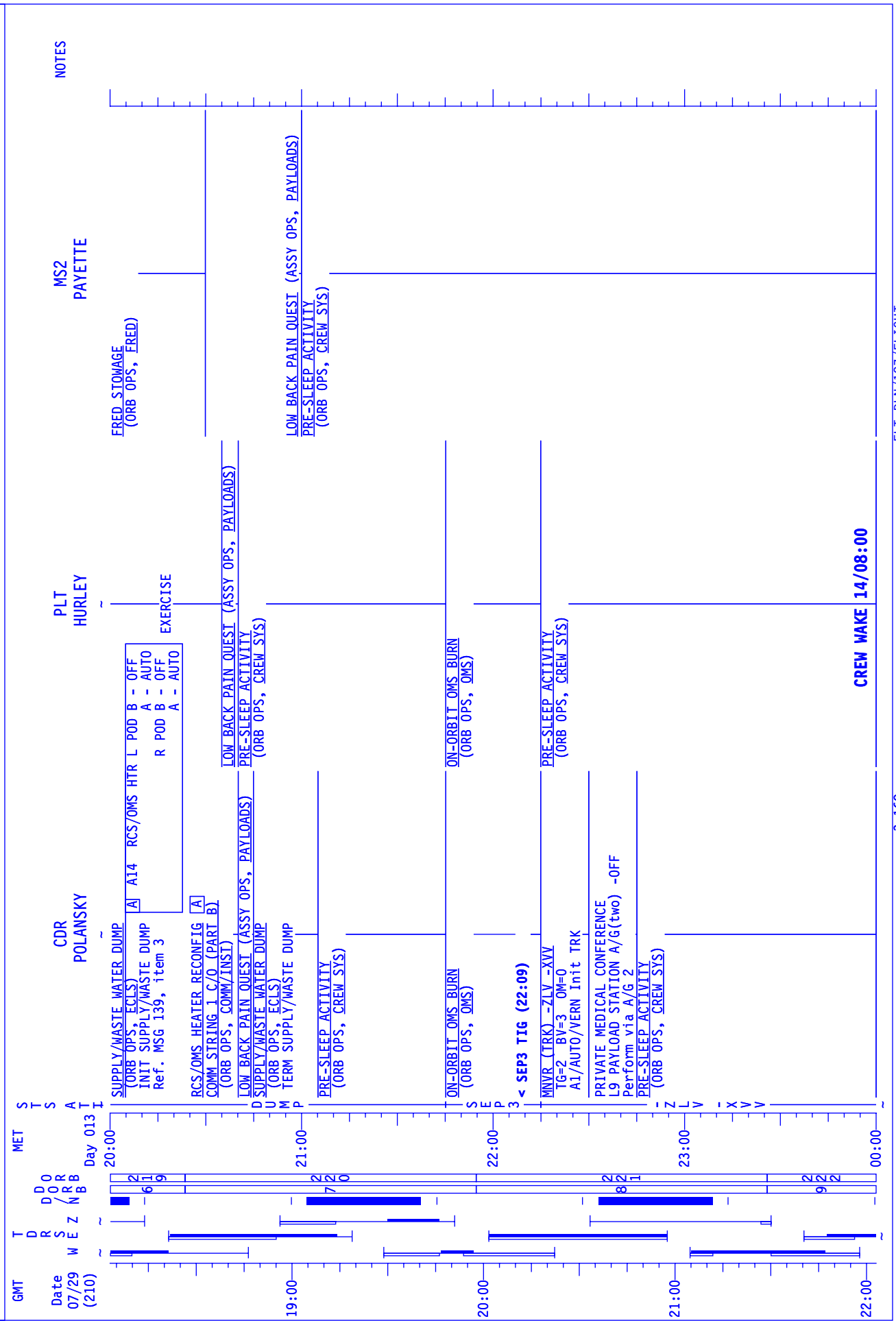
STS-127 FD (15)



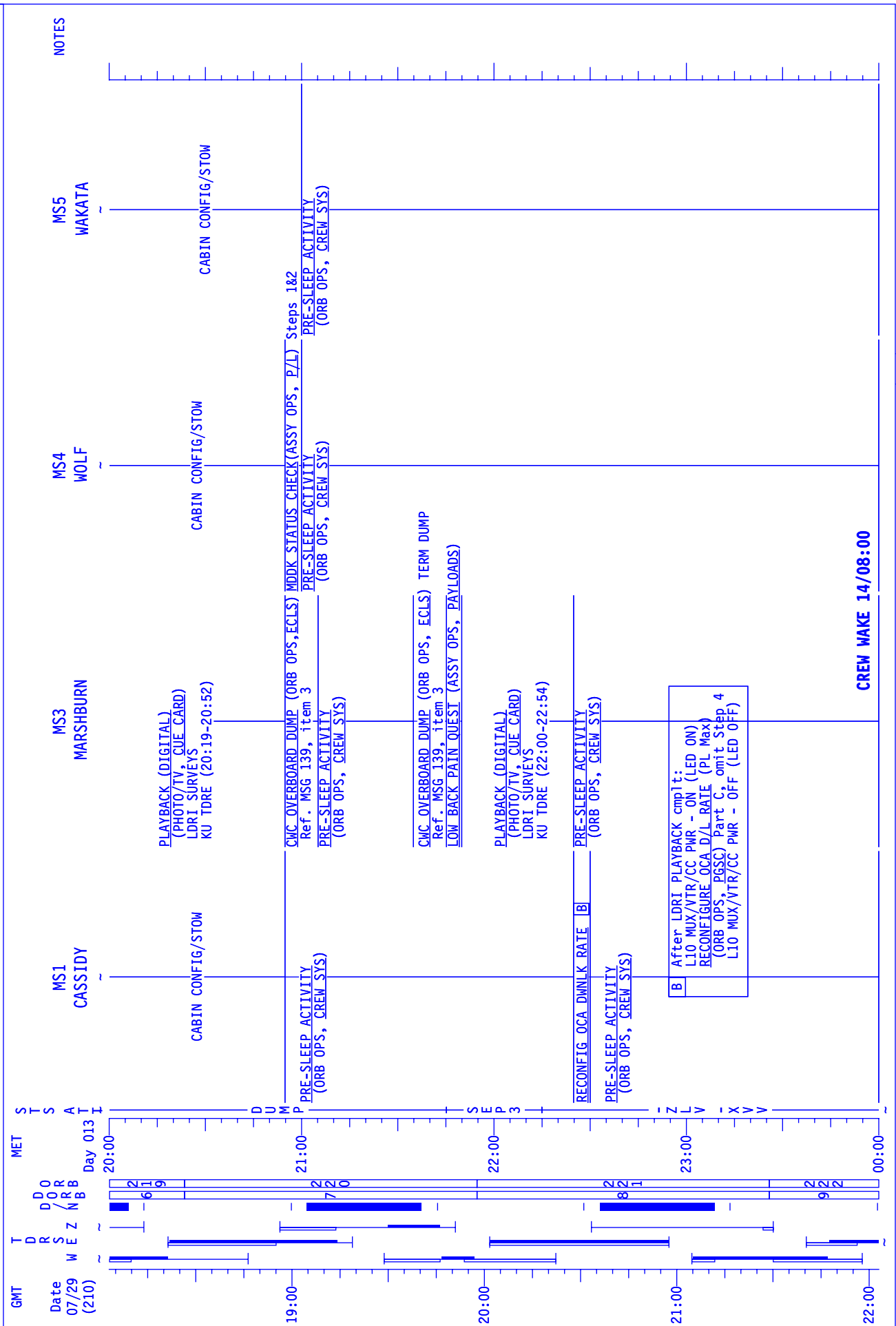
STS-127 FD (15)



STS-127 FD (15)



STS-127 FD (15)



MSG 140A - FD15 MISSION SUMMARY

1
2 Good morning, Endeavour!

3
4 We hope you enjoyed a good night's sleep, although the crew compartment might have
5 seemed a bit crowded after having all that room to spread out on ISS! Today we're looking
6 forward to supporting your final robotics operations for the flight. After all the complicated
7 arm-driving you've done already, late inspection should be a breeze for you.

8
9 We're also checking the weather forecasts and working on the plan to bring you safely home
10 in a couple of days.

11
12
13
14
15 YOUR CURRENT ORBIT IS: 189 X 180 NM

16
17 NOTAMS:

18
19 **NOTAMS –ONE CHANGE**

20
21 EDW - EDW IN USE. EDT ELS DAY / VFR ONLY.
22 EDW - LAKEBED RWY 15/33 - GREEN. RWY 18L - UNUSABLE.
23 NOR - LAKEBED RUNWAYS GREEN.
24 FMH - RWY 05/23 CLOSED.
25 DOV - RWY 01/19 CLOSED.
26 GUA - RWY 24R END LIGHTS OTS.
27 GUA - RWY 06R/24L CLOSED.
28 INN - CLOSED.
29 AMB - CLOSED.
30 ESN - RWY 03R/21L CLOSED.
31 YHZ - AERODROME LIGHTS OTS.
32 KBO - RWY 14L/32R CLOSED.
33 IKF - NOT USABLE. NO AGREEMENT.
34 BEN - NOT RECOMMENDED/NOT SUPPORTED.
35 **PTN - RWY 14/32 REOPENED.**

36
37 NEXT 2 PLS OPPORTUNITIES:

38
39 EDW22 ORB 219 – 13/19:41 SKC 7 220/10P17
40 EDW22 ORB 235 – 14/20:03 SKC 7 220/07P11

41
42 OMS TANK FAIL CAPABILITY:

43
44 L OMS FAILS: NO
45 R OMS FAILS: NO

46
47 LEAKING OMS PRPLT BURN:

48
49 L OMS LEAK: ALWAYS BURN RETROGRADE
50 R OMS LEAK: ALWAYS BURN RETROGRADE

51
END OF PAGE 1 OF 2, MSG 140A

LIOH CHANGEOUT

(7 crewmembers/Single Shift/FD 1-19)

FLIGHT DAY	POS A	POS B	CK CMPLT
LAUNCH	1	2	
PRE FD01	"	"	
POST FD02	3	4	
PRE FD02	5	6 *	
POST FD03	"	7	DOCKING
PRE FD03	8	"	
POST FD04	"	9	
PRE FD04	10	"	
POST FD05	"	11	
MID FD05	15	"	
PRE FD05	"	12	
POST FD06	"	13	
PRE FD06	STS-124 27	"	
POST FD07	"	STS-124 28	
PRE FD07	STS-126 24	"	
POST FD08	"	STS-126 25	
PRE FD08	STS-126 26	"	
POST FD09	"	STS-126 27	
PRE FD09	STS-126 28	"	
POST FD10	"	"	Russian LIOH
PRE FD10	"	STS-126 29	
POST FD11	"	"	Russian LIOH
PRE FD11	STS-126 30	14	
POST FD12	"	STS-126 31	
PRE FD12	STS-126 32	"	
POST FD13	"	"	Russian LIOH
PRE FD13	"	STS-126 33	
POST FD14	STS-126 35	"	
MID FD14	"	STS-126 36	HATCH CLOSE
PRE FD14	STS-126 37	"	
POST FD15	STS-126 _____	STS-126 _____	
PRE FD15	STS-126 _____ *	STS-126 _____ *	
POST FD16	STS-126 _____	16	
PRE FD16	17	"	
POST FD17	18	19	EOM
PRE FD17	20 *	21*	
POST FD18	22	23	EOM+1
PRE FD18	"	24	
POST FD19	25	26	EOM+2

*Reseal LIOH cans w/Gray Tape and stow
(Locations of canisters on back)

NOTE

This card is specifically used for the STS-127 mission with the orbiter conducting single shift operations with a shuttle crew size of 7 and ISS crew size of 6. This changeout scheme reflects FD3 docking with ISS, Vozdukh, and dual bed CDRA operation

LIOH CANISTER STOWAGE LOCATIONS

Ascent Stowage Locations

Orbiter:

MD52M (LiOH): Cans 1-31 *

ISS:

LAB1O3 STS-124 cans 27, 28

NOD1S4_D2/E2/F2: STS-126 cans 24-33, 35-42

Entry (EOM) Stowage Locations

Orbiter:

MD52M (LiOH): Cans 14-26 *

MD52M (LiOH): STS-124 cans 27, 28

MD52M (LiOH): STS-126 cans 24-26, 29-33,
35-42

* 2 LiOH cans installed in LiOH slots A and B

MSG 143 - ANDE-2 DEPLOY SUMMARY

1 Endeavour -

2 Congratulations! - You're heading into the home stretch on a very long and event filled
3 mission! We understand your concerns with stowing the cabin for entry, and we are aware
4 that delaying the Photo/TV equipment stow until after the deploy will cause an
5 inconvenience. We wanted to summarize for you why ANDE-2 deploy is required at the end
6 of FD16, and how vital the Photo/TV data captured will be to the experiment. We think that
7 with some strategic cabin stow ops on FD15, the stowing of the Photo/TV equipment
8 required at the end of the day should only take about 30 minutes. Thank you ahead of time
9 for all your hard work making this happen.

10
11 With regards to the timing of the ANDE-2 deploy at the end of the day on FD16, in order to
12 maximize the science gained from the ANDE-2 deploy, an overflight of either the Maui or
13 Millstone Hill groundsites is highly desired. Several factors (including lighting, timeline,
14 launch delays, etc.) have eliminated the Maui groundsite as a viable option for the overflight.
15 As the current plan stands, the overflight of Millstone Hill groundsite is actually the only
16 opportunity for the DoD to obtain the maximum amount of science from this deploy; it is a
17 true "cosmic convergence" when all five parts of the ANDE-2 will pass over the sensor at the
18 groundsite. Having a system of five objects with known trajectories, shapes, and relative
19 motion all within the field of view of the Millstone Hill Radar at the same time is a unique
20 opportunity.

- 21 • For the ground site, this deploy allows an opportunity for calibration (verifies the
22 Radar is providing accurate feedback against what is known from the P/TV) and
23 proof of capability (can the Radar track objects that are very close to each other and
24 separating at different velocities).
- 25 • For the ANDE-2 Satellites, this deploy opportunity allows immediate and definitive
26 tracking of the satellites (during the first ANDE flight on STS-116 there was no
27 immediate overflight by a ground station causing five+ days of lost science while the
28 Space Surveillance Network worked to acquire and catalogue the Sats), provides
29 accelerated targeting data for the Satellite Laser Ranging network, provides potential
30 verification that the Sats have not been stranded in their canisters, and provides
31 positive proof of the satellite system relative motion with shuttle.

32
33 Unfortunately, attempting to put both of the satellite deploys in a single rev to improve the
34 timeline was not possible due to the orbital geometry leading up to the Millstone Hill
35 overflight (lighting/timing) . Therefore, your deployables were placed on separate revs,
36 maximizing science for both satellites. However, we have uplinked, as requested, the single
37 rev deploy procedure for your review, as a contingency in the event that DragonSat deploy
38 is delayed, the procedure is onboard and may be viewed electronically or printed at your
39 discretion. Reference Message 141.

40
41 The Photo/TV portion of the ANDE-2 deployment is a significant part of the overall science
42 gained. The detail and care taken by your crew in capturing imagery of the deploy is critical
43 to the success of this ~2 year long mission by the DoD to help optimize and correct errors in
44 the trajectory models used by every current manned NASA vehicle. Summarily,

- 45
46 • The Payload Bay cameras will capture the initial deploy, recording any
47 trajectory/deploy anomalies (initial tip-off/rotation/damage).
- 48 • The D2Xs will be used to determine any anomalies with the subsequent separation:
49 Will the o-rings/satellite interface stick to the spheres? Will the satellites get
50 stranded in their canisters? If they are stuck, did they come out? Was there any

END OF PAGE 1 OF 3, MSG 143

MSG 143 - ANDE-2 DEPLOY SUMMARY

- 1 damage to the Satellite surfaces that will change their “perfectly defined ballistic
2 number?”
- 3 • The G1 captures the separation sequence of the ICU itself- providing a detailed
4 record of what occurred. During the first flight of the ANDE system (STS-116) one of
5 the satellites initially stayed in its canister. The DoD has stated that it was with the
6 spectacular video from this mission that provided them initial proof that the satellite
7 came out ~40 minutes later and supplied them the data needed to redesign their
8 separation system to what you see today.

9
10 In addition, it is worth noting that you will be deploying the last planned free flying payloads
11 prior to shuttle retirement. It represents a significant milestone in shuttle history which
12 should be recorded.

13
14 Thank you, again, for your efforts and we hope that this sheds some insight into the
15 rationale behind the placement of ANDE-2 in the timeline and the importance of Photo/TV to
16 the success of the experiment.

17
18 **DRAGONSAT Deploy Notes:**

19
20 The **Preliminary** Deploy Window Open and Close MET times for DRAGONSAT (Assembly
21 Operations, step 1, page 227). These may be updated as required.

22
23 **DRAGONSAT:**

24 DEPLOY WINDOW OPEN MET = 014/14:30:00
25 DEPLOY WINDOW CLOSE MET = 014/15:05:00

26
27 The **Preliminary** vehicle rates for DRAGONSAT to use in (Assembly Operations, step 6,
28 page 228). These may be updated as required.

29 **DRAGONSAT Rates:**

30

	VERN	ALT
Pitch Rate (deg/sec)	-0.074 ≤Rate≤-0.034	-0.124 ≤Rate≤0.016
Roll Rate (deg/sec)	0.018 ≤Rate≤0.058	-0.032 ≤Rate≤0.108
Yaw Rate (deg/sec)	-0.02 ≤Rate≤0.02	-0.07 ≤Rate≤0.07

31
32 **ANDE-2 Deploy Notes:**

33
34 The **Preliminary** Deploy Window Open and Close MET times for ANDE-2 are as follows
35 (Assembly Operations, step 1, page 223). These may be updated as required.

36
37 **ANDE-2:**

38 DEPLOY WINDOW OPEN MET = 014/19:19:00
39 DEPLOY WINDOW CLOSE MET = 014/19:25:00

40
41 **Note:** The Deploy Window Close is based on the Orbiter AOS with the Millstone Hill
42 groundsite (30° above horizon) for maximum science. However, if this is not met for some
43 reason - the plan is to proceed with deploy. Lighting constraints for Photo/TV desire that
44 ANDE-2 is deployed NLT 10min prior to sunset (014/19:38:00).

45
END OF PAGE 2 OF 3, MSG 143

MSG 143 - ANDE-2 DEPLOY SUMMARY

1 The **Preliminary** vehicle rates for ANDE-2 (Assembly Operations, step 6, page 224). These
2 may be updated as required.

3
4
5

ANDE2 Rates:

	VERN	ALT
Pitch Rate (deg/sec)	-0.074 ≤Rate≤-0.034	-0.124 ≤Rate≤0.016
Roll Rate (deg/sec)	0.018 ≤Rate≤0.058	-0.032 ≤Rate≤0.108
Yaw Rate (deg/sec)	-0.02 ≤Rate≤0.02	-0.07 ≤ Rate ≤ 0.07

6
7
8

Please make the following P&I to page 224 of the Assembly Ops:

9
10

WAS:

11
12
13

8. DEPLOY/SAFE
-00:00 SSP1 ANDE2 PRE-ARM/SAFE – PRE-ARM (tb-gray)

14
15
16

IS:

8. DEPLOY/SAFE
-00:30 SSP1 ANDE2 PRE-ARM/SAFE – PRE-ARM (tb-gray)

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END OF PAGE 3 OF 3, MSG 143