

FLIGHT DATA FILE

Flight Plan

STS-56

(Flight Cycle Trajectory)

**Mission Operations Directorate
Operations Division**

**Final, Rev A
February 24, 1993**

| <u>EVENT</u> | <u>CST</u> | | |
|-----------------|------------|-----|----------|
| Launch | 23:56 | Wed | March 10 |
| SPARTAN Deploy | 00:41 | Sun | March 14 |
| SPARTAN GRAPPLE | 01:45 | Tue | March 16 |
| KSC Landing | 06:02 | Fri | March 19 |



National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas

BRANCH CHIEF
B. NUTE
BLDG T585/DH41
BOND. 1

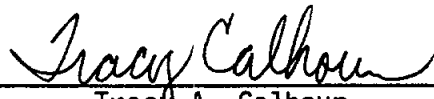


MISSION OPERATIONS DIRECTORATE

STS-56 FLIGHT PLAN

FINAL, REVISION A
February 24, 1993

PREPARED BY:



Tracy A. Calhoun
Book Manager

APPROVED BY:



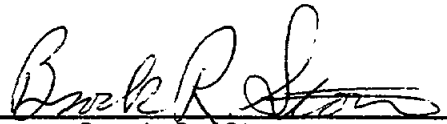
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| | | MULTI-804 |
| | | MULTI-807 |

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STS-56 FLIGHT PLAN

LIST OF EFFECTIVE PAGES

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REV A 02/24/93

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(*) - Omit from flight book

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STS-56 FLT PLN CUE CARDS

| <u>Title</u> | <u>Ref. Page</u> | <u>Card Code</u> |
|-----------------------|------------------|--------------------|
| DAP A, DAP B TOC..... | 5-5 | FLT PLN-1a/56/0/C |
| (Blank)..... | 5-5 | FLT PLN-1b/56/0/A |
| DAP A..... | 5-6 | FLT PLN-2a/56/0/A |
| DAP A1..... | 5-6 | FLT PLN-2b/56/0/A |
| A1..... | 5-6 | FLT PLN-3a/56/0/A |
| DAP A2..... | 5-7 | FLT PLN-3b/56/0/A |
| A2..... | 5-7 | FLT PLN-4a/56/0/A |
| DAP A3..... | 5-7 | FLT PLN-4b/56/0/A |
| A3..... | 5-7 | FLT PLN-5a/56/0/A |
| DAP A4..... | 5-8 | FLT PLN-5b/56/0/A |
| A4..... | 5-8 | FLT PLN-6a/56/0/A |
| DAP A5..... | 5-8 | FLT PLN-6b/56/0/A |
| A5..... | 5-8 | FLT PLN-7a/56/0/A |
| DAP A6..... | 5-9 | FLT PLN-7b/56/0/A |
| A6..... | 5-9 | FLT PLN-8a/56/0/A |
| DAP A7..... | 5-9 | FLT PLN-8b/56/0/A |
| A7..... | 5-9 | FLT PLN-9a/56/0/C |
| DAP A8..... | 5-10 | FLT PLN-9b/56/0/A |
| A8..... | 5-10 | FLT PLN-10a/56/0/A |
| DAP A9..... | 5-10 | FLT PLN-10b/56/0/A |
| A9..... | 5-10 | FLT PLN-11a/56/0/C |
| DAP A10..... | 5-11 | FLT PLN-11b/56/0/A |
| A10..... | 5-11 | FLT PLN-12a/56/0/C |
| DAP A11..... | 5-11 | FLT PLN-12b/56/0/B |
| A11..... | 5-11* | FLT PLN-29a/56/0/A |
| (Blank)..... | 5-12* | FLT PLN-29b/56/0/A |
| DAP B..... | 5-12 | FLT PLN-13a/56/0/A |
| DAP B1..... | 5-12 | FLT PLN-13b/56/0/A |
| B1..... | 5-12 | FLT PLN-14a/56/0/A |
| DAP B2..... | 5-13 | FLT PLN-14b/56/0/A |
| B2..... | 5-13 | FLT PLN-15a/56/0/A |
| DAP B3..... | 5-13 | FLT PLN-15b/56/0/A |
| B3..... | 5-13 | FLT PLN-16a/56/0/A |
| DAP B4..... | 5-14 | FLT PLN-16b/56/0/B |
| B4..... | 5-14 | FLT PLN-17a/56/0/A |
| DAP B5..... | 5-14 | FLT PLN-17b/56/0/A |
| B5..... | 5-14 | FLT PLN-18a/56/0/A |
| DAP B6..... | 5-15 | FLT PLN-18b/56/0/A |
| B6..... | 5-15 | FLT PLN-19a/56/0/A |
| DAP B7..... | 5-15 | FLT PLN-19b/56/0/A |
| B7..... | 5-15 | FLT PLN-20a/56/0/A |
| DAP B8..... | 5-16 | FLT PLN-20b/56/0/A |
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| B11..... | 5-17 | FLT PLN-24a/56/0/B |
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| DAP B13..... | 5-18* | FLT PLN-30b/56/0/A |
| B13..... | 5-18* | FLT PLN-31a/56/0/A |
| (Blank)..... | 5-19* | FLT PLN-31b/56/0/A |

* Cue card code intentionally out of sequence

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| <u>Title</u> | <u>Ref. Page</u> | <u>Card Code</u> |
|------------------|------------------|--------------------|
| ALT DAP TOC..... | 5-19 | FLT PLN-25a/56/0/C |
| DAP ALT1..... | 5-19 | FLT PLN-25b/56/0/B |
| ALT1..... | 5-19 | FLT PLN-26a/56/0/B |
| DAP ALT2..... | 5-20 | FLT PLN-26b/56/0/B |
| ALT2..... | 5-20 | FLT PLN-27a/56/0/B |
| DAP ALT3..... | 5-20 | FLT PLN-27b/56/0/C |
| ALT3..... | 5-20* | FLT PLN-32a/56/0/A |
| (Blank)..... | 5-21* | FLT PLN-33b/56/0/A |
| UNIV PTG..... | 5-22 | FLT PLN-28a/56/0/B |
| (Blank)..... | 5-22 | FLT PLN-28b/56/0/B |

* Cue card code intentionally out of sequence

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INTRODUCTION

The STS-56 Flight Plan is the Flight Data File article that contains the on-orbit timeline. It does not contain the detailed timelines that are covered in the Ascent, Post Insertion, Rendezvous, Deorbit Prep, and Entry Checklists. The detailed rendezvous timelines and procedures are in the Rendezvous Checklist, as are the deploy procedures required during the deploy time frame. For continuity, the entire flight is shown in the summary level timeline.

This on-orbit timeline satisfies the objectives specified in the Flight Definition and Requirements Directive and the requirements of the STS-56 Flight Requirements Document. The Flight Plan, as part of the Flight Data File, meets modified specifications of the Flight Cycle version of the STS-56 Flight Initialization Data Pack.

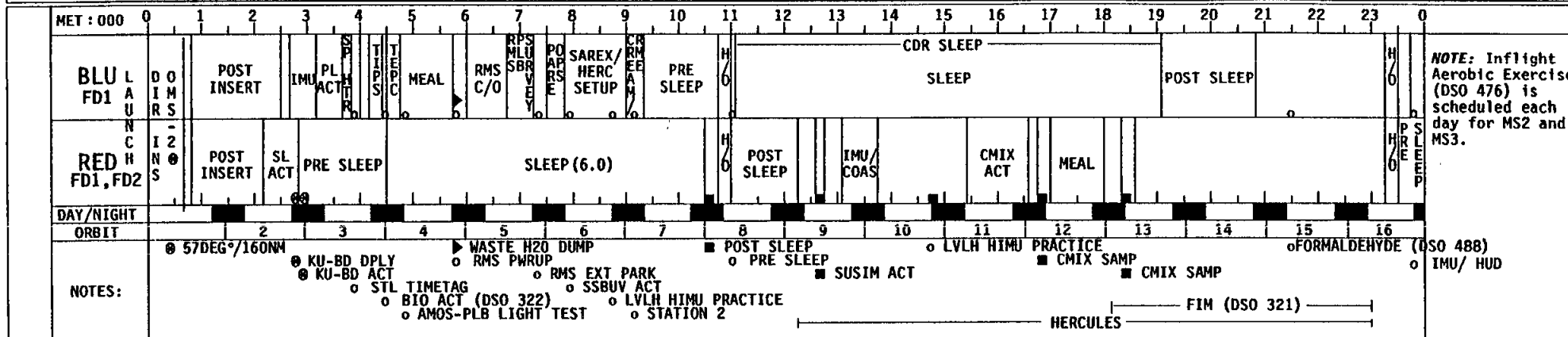
The flight profile used for this Flight Plan is for a launch date of March 11, 1993, at 05:56 GMT. Orbiter inertial attitudes are expressed relative to a Mean of 1950 (M50) reference frame.

JSC-22359, Crew Scheduling Constraints (Appendix K, CPMP), Rev B, January 1992, has been used to build the timelines contained in this Flight Plan. Note: The CDR is not assigned to a team and may adjust his hours real-time as necessary.

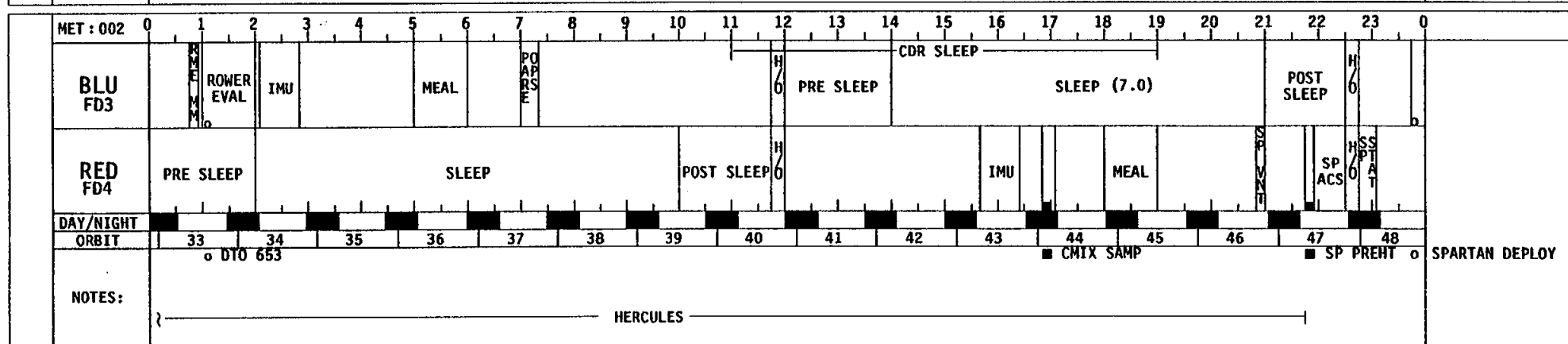
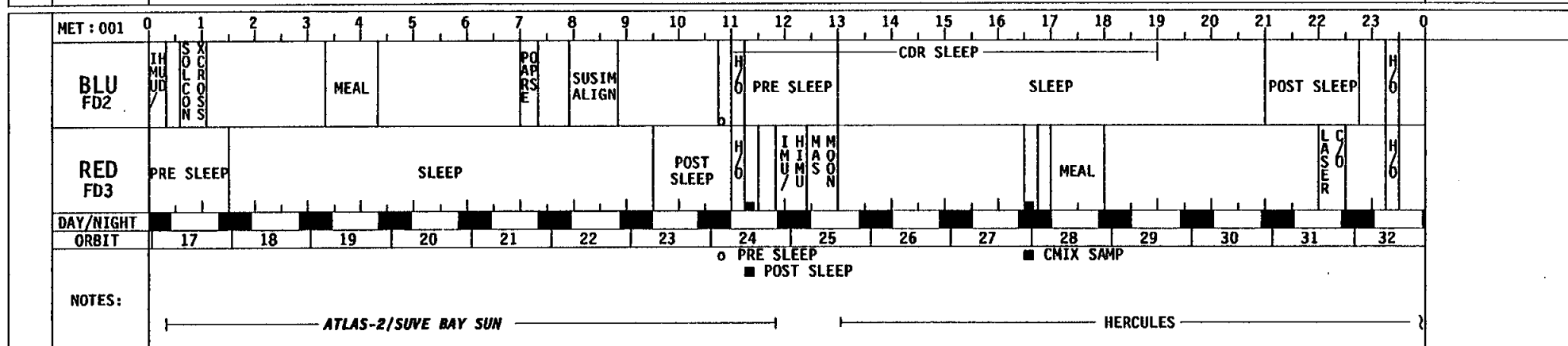
The timeline formats used in this Flight Plan are based on JSC-19933, Timeline Format Definitions and Standard Notes, Rev C, May 1990.

STS-56 OVERVIEW

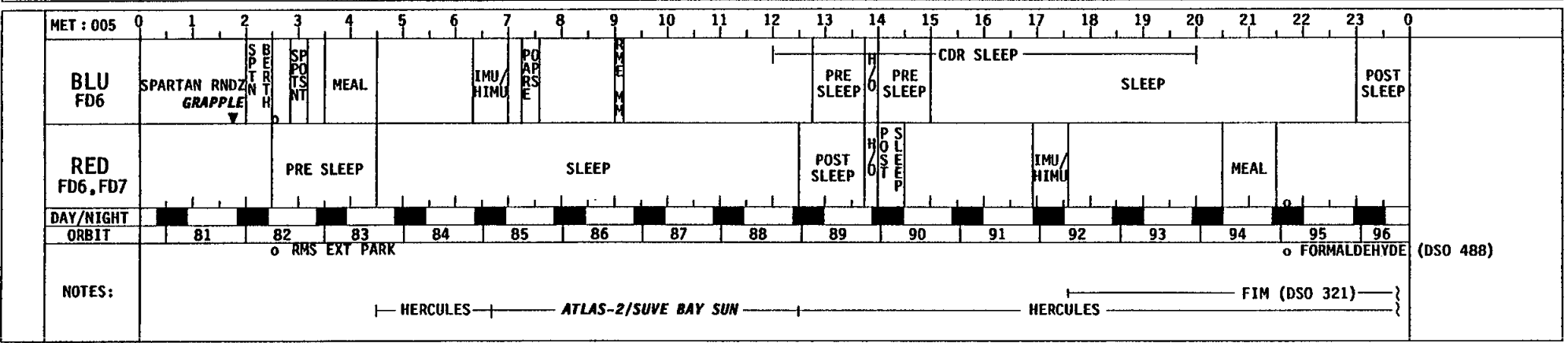
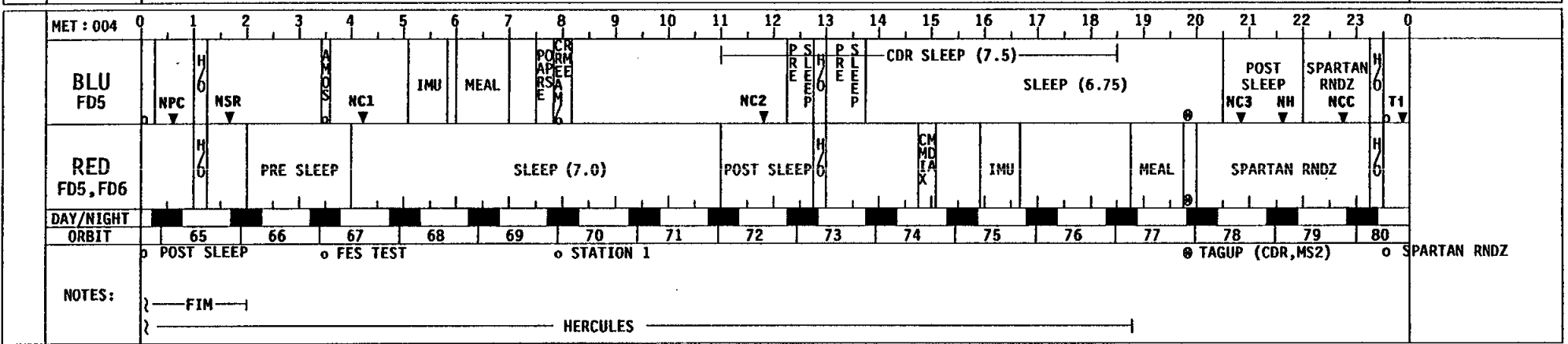
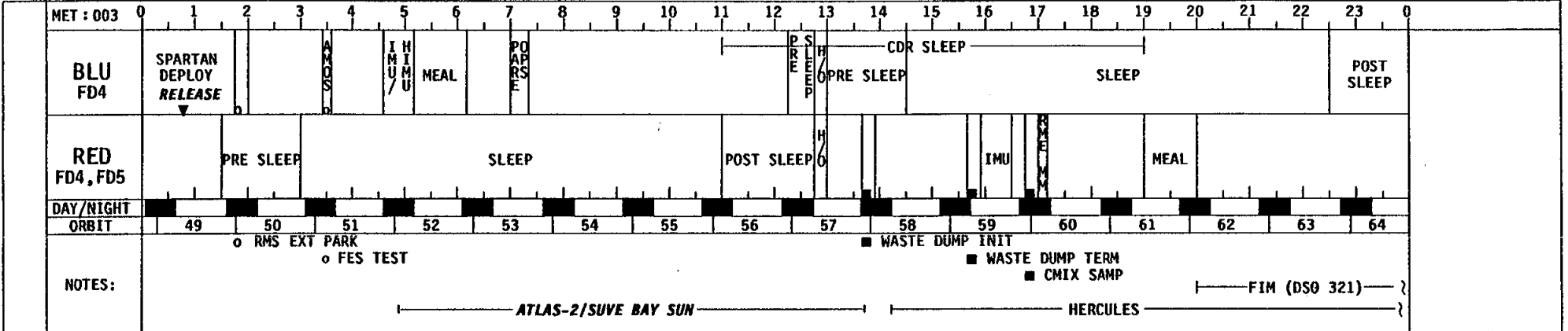
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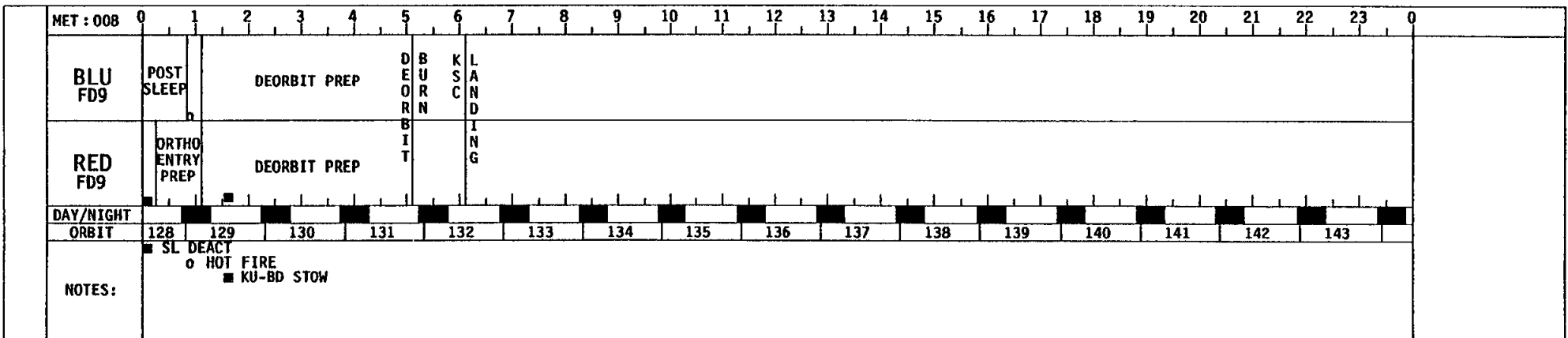
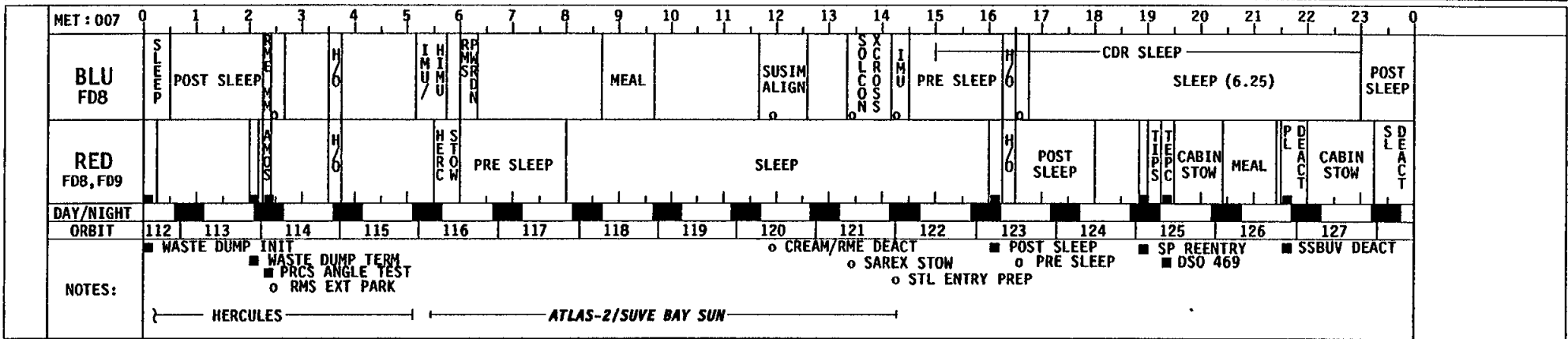
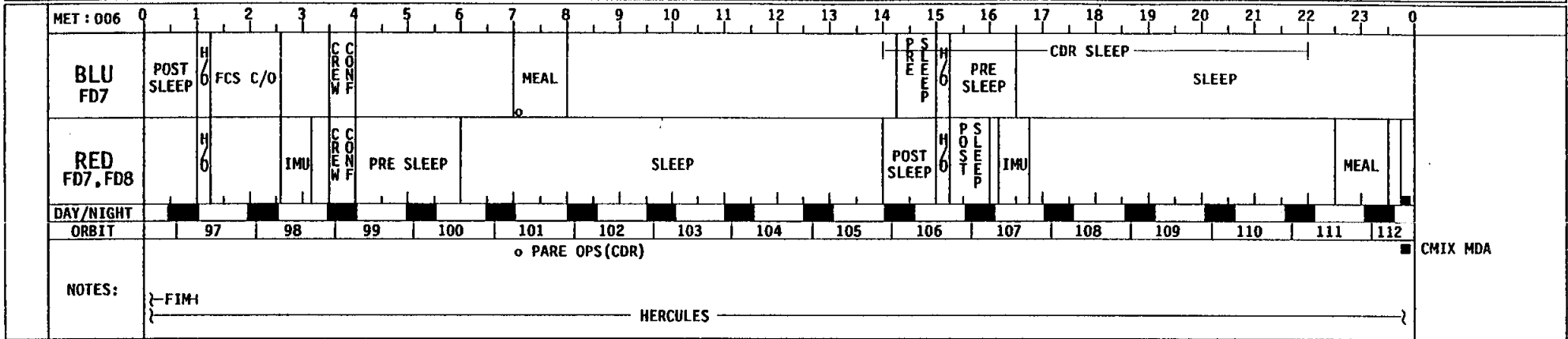


NOTE: Inflight Aerobic Exercise (DSO 476) is scheduled each day for MS2 and MS3.



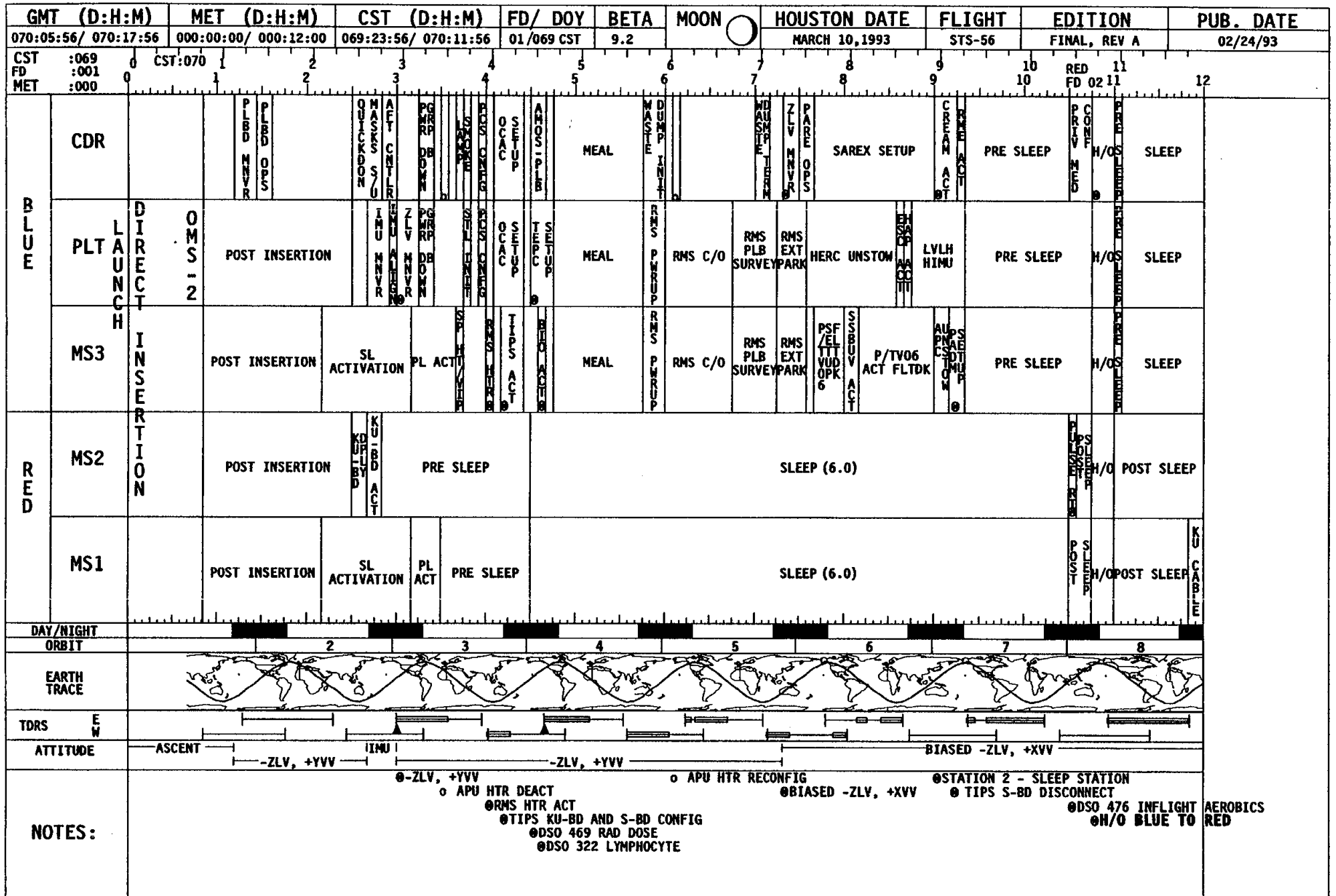
FLIGHT: STS-56 EDITION: FINAL, REV A PUB. DATE: 02/24/93





SUMMARY TIMELINE

SUMMARY TIMELINE



| GMT (D:H:M) | | MET (D:H:M) | | CST (D:H:M) | | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | | | |
|-----------------------|---|-----------------------|-------------------|-----------------------|------|------------|-----------|-----------------|----------------|-----------|------------------|-----------|------------------|---------|-----------|-------------------|
| 070:17:56 / 071:05:56 | | 000:12:00 / 001:00:00 | | 070:11:56 / 070:23:56 | | R2/070 CST | 11.5 | ☉ | MARCH 11, 1993 | STS-56 | FINAL, REV A | 02/24/93 | | | | |
| CST | :070 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 0 | | |
| RED FD | :002 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | | |
| MET | :000 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 0 | | |
| | | | | | | | | | BLU | FD 02 | | | | MET:001 | | |
| BLUE | CDR | SLEEP | | | | | | | POST SLEEP | | FILTER CLEANING | | | H/O | HUD CAL | |
| | PLT | SLEEP | | | | | | | POST SLEEP | | | HERCULES | DRINK | | H/O | HUD CAL |
| | MS3 | SLEEP | | | | | | | POST SLEEP | | | PACTV 104 | DSO 476 EXERCISE | | H/O | ADP TAL IN ALG SY |
| RED | MS2 | POST SLEEP | SLOM EIR | SLETTUP | COAS | ZLV | LVLH HIMU | ACT | MEAL | ERG SETUP | DSO 476 EXERCISE | HERCULES | DRINK | H/O | PRE SLEEP | |
| | MS1 | POST SLEEP | SADP TAL ELIN PSY | SUS | COAS | PSM/ED | LVLH HIMU | P/TV07 ACT MDDK | MEAL | ERG SETUP | | | | H/O | PRE SLEEP | |
| DAY/NIGHT | [Day/Night Cycle] | | | | | | | | | | | | | | | |
| ORBIT | [Orbit Diagram] | | | | | | | | | | | | | | | |
| EARTH TRACE | [Earth Trace Diagram] | | | | | | | | | | | | | | | |
| TDRS | [TDRS Diagram] | | | | | | | | | | | | | | | |
| ATTITUDE | BIASED -ZLV, +XV | | | | | | | | | | | | | | | |
| NOTES: | <p> @MDA 4 HEATER ON @AFT STATION @BIASED -ZLV, +XV @MAS EXPLANATION @MDA 2 @FIX 1: Samples 6,8 @DSO 321 FREQ INTERFERENCE MEAS @FIX 1: Samples 1,3,7,9 @DSO 476 INFLIGHT AEROBICS @DSO 488 FORMALDEHYDE - DEPLOY @BLEED ORF CNFG @DSO 321 FREQ INTERFERENCE MEASUREMENT @H/O RED TO BLUE </p> | | | | | | | | | | | | | | | |
| | <p> HERCULES NOTE: RED FD02 HERCULES OBS performed by MS2 or MS1 as available. </p> | | | | | | | | | | | | | | | |

| GMT (D:H:M) | | MET (D:H:M) | | CST (D:H:M) | | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | | | | | | | | | | | | |
|----------------------|------|----------------------|---------|-----------------------|---|-----------------------|------|-----------------------|----------------|-----------------------|--------------|-----------------------|---------|-----------------------|----|-----------------------|--|----------------|--|---------------------------------|--|---------------------------|--|--------------------|--|
| 071:05:56/ 071:17:56 | | 001:00:00/ 001:12:00 | | 070:23:56/ 071:11:56 | | 82/070 CST | 13.9 | | MARCH 11, 1993 | STS-56 | FINAL, REV A | 02/24/93 | | | | | | | | | | | | | |
| CST | :070 | 0 | CST:071 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | | | | | | | | | |
| BLU FD | :002 | 0 | | | | | | | | | | | RED | | | | | | | | | | | | |
| MET | :001 | 0 | | | | | | | | | | | FD 0310 | | | | | | | | | | | | |
| BLUE | CDR | S VOICEX | | S VOICEX | | S FAREV | | P/TV04 SETUP EDUC | | P/TV04 ACT EDUC | | S VOICEX | | PARE OPS | | P/TV05 ACT SUSIM | | PRE SLEEP | | PRE SLEEP | | SLEEP | | | |
| | PLT | I INIT | | I INIT | | I INIT | | I INIT | | I INIT | | I INIT | | I INIT | | I INIT | | I INIT | | I INIT | | I INIT | | H/OPRE SLEEP | |
| | MS3 | K U | | K U | | K U | | K U | | K U | | K U | | K U | | K U | | K U | | K U | | K U | | H/OPRE SLEEP | |
| RED | MS2 | PRE SLEEP | | PRE SLEEP | | PRE SLEEP | | PRE SLEEP | | PRE SLEEP | | PRE SLEEP | | PRE SLEEP | | PRE SLEEP | | PRE SLEEP | | PRE SLEEP | | PRE SLEEP | | H/OPRE SLEEP | |
| | MS1 | PRE SLEEP | | PRE SLEEP | | PRE SLEEP | | PRE SLEEP | | PRE SLEEP | | PRE SLEEP | | PRE SLEEP | | PRE SLEEP | | PRE SLEEP | | PRE SLEEP | | PRE SLEEP | | H/OPRE SLEEP | |
| DAY/NIGHT | | ORBIT | | EARTH TRACE | | TDRS | | ATTITUDE | | NOTES: | | | | | | | | | | | | | | | |
| | | 17 | | 18 | | 19 | | 20 | | 21 | | 22 | | 23 | | 24 | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | -ZSI | | -ZSI | | -ZSI | | -ZSI | | -ZSI | | -ZSI | | -ZSI | | -ZSI | | SUSIM | | -ZSI | | -ZSI | | -ZSI | |
| | | IROT | | IROT | | IROT | | IROT | | IROT | | IROT | | IROT | | IROT | | IROT | | IROT | | IROT | | IMU | |
| | | ROYAL GRAM SCHOOL | | ROYAL GRAM SCHOOL B/U | | ROYAL GRAM SCHOOL B/U | | ROYAL GRAM SCHOOL B/U | | ROYAL GRAM SCHOOL B/U | | ROYAL GRAM SCHOOL B/U | | ROYAL GRAM SCHOOL B/U | | ROYAL GRAM SCHOOL B/U | | UNATEGO SCHOOL | | DSO 488 FORMALDEHYDE - RETRIEVE | | DSO 476 INFLIGHT AEROBICS | | SOLCON EXPLANATION | |
| | | | | PASS 1 | | | | | | | | | | | | | | | | | | | | SUVE DEACT | |

| GMT (D:H:M) | | MET (D:H:M) | | CST (D:H:M) | | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | | |
|----------------------|--|----------------------|---------------|----------------------|------|--------------|------------------|--------------|----------------|------------|--------------|-------------------|-----------------|-------------------|-----------------|
| 071:17:56/ 072:05:56 | | 001:12:00/ 002:00:00 | | 071:11:56/ 071:23:56 | | R3/071 CST | 16.2 | | MARCH 12, 1993 | STS-56 | FINAL, REV A | 02/24/93 | | | |
| CST | :071 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 0 | |
| RED FD | :003 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | |
| MET | :001 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | MET:002 | |
| BLUE | CDR | SLEEP | | | | | | | POST SLEEP | | | P/TV04 SETUP EDUC | LASER C/O | H/O | P/TV04 ACT EDUC |
| | PLT | PRE SLEEP | SLEEP | | | | | | | POST SLEEP | | | H/O | P/TV04 ACT EDUC | |
| | MS3 | PRE SLEEP | SLEEP | | | | | | | POST SLEEP | | | H/O | ADP TAL IN ALG SY | P/TV04 ACT EDUC |
| RED | MS2 | HERCULES OBS | HERCULES OBS | | MEAL | HERC OBS | DSO 476 EXERCISE | HERCULES OBS | | | H/O | P/TV04 ACT EDUC | | | |
| | MS1 | HERCULES OBS | PAS/CO TTV102 | HERCULES OBS | MEAL | HERCULES OBS | DSO 476 EXERCISE | HERCULES OBS | | | LASER C/O | H/O | P/TV04 ACT EDUC | | |
| DAY/NIGHT | | | | | | | | | | | | | | | |
| ORBIT | | | | | | | | | | | | | | | |
| EARTH TRACE | | | | | | | | | | | | | | | |
| TDRS | | | | | | | | | | | | | | | |
| ATTITUDE | | | | | | | | | | | | | | | |
| NOTES: | <p>IMU 1 FMS MN 1</p> <p>VSUVE DEACT IMU MNVR VP/TV102 S/U SOLCON BIASED -ZLV, +XVV</p> <p>FIX 2: Samples 1,6,8 FIX 1: Samples 2,4,5</p> <p>DSO 488 FORMALDEHYDE - RETRIEVE DSO 476 INFLIGHT AEROBICS D70 700-2 LASER DEVICE H/O RED TO BLUE</p> | | | | | | | | | | | | | | |

| GMT (D:H:M) | | MET (D:H:M) | | CST (D:H:M) | | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | | |
|----------------------|------|---|-----------------------|----------------------|--------------------------|-------------------------|-----------------------|------------------------|-----------------------|-----------------------|---------------------|-----------------|--------------|-----|-----|
| 072:05:56/ 072:17:56 | | 002:00:00/ 002:12:00 | | 071:23:56/ 072:11:56 | | B3/071 CST | 18.6 | | MARCH 12, 1993 | STS-56 | FINAL, REV A | 02/24/93 | | | |
| CST | :071 | 0 | CST:072 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| BLU FD | :003 | | | | | | | | | | | | 10 RED | | |
| MET | :002 | | | | | | | | | | | | FD 04 | | |
| BLUE | CDR | SARTEX FASTV VOICE | DTO 653 ROWER EVAL | MEAL | SARTEX VOICE | P/TV04 SETUP EDUC | SARTEX PARE OPS | P/TV04 ACT EDUC | SARTEX VOICE | PRE SLEEP | PROMPT MED | PRE SLEEP | SLEEP | | |
| | PLT | HERC OBS | DTO 653 ROWER EVAL | HERC OBS | SARTEX VOICE | HERC OBS | MEAL | HERCULES OBS | | | | HERCULES OBS | HONK HONK | H/O | |
| | MS3 | PSETUP TV100 MAS | ACT MAS | KU CABLE | PSF TEL VUD OPK | P/TV06 ACT FLTDK | MEAL | PSETUP TV100 MAS | P/TV100 ACT MAS | P/TV04 ACT EDUC | DSO 476 EXERCISE | SARTEX VOICE | | | H/O |
| RED | MS2 | PRE SLEEP | | | | | SLEEP | | | | | | POST SLEEP | | H/O |
| | MS1 | PRE SLEEP | | | | | SLEEP | | | | | | POST SLEEP | | H/O |
| DAY/NIGHT | | | | | | | | | | | | | | | |
| ORBIT | | 33 34 35 36 37 38 39 40 | | | | | | | | | | | | | |
| EARTH TRACE | | | | | | | | | | | | | | | |
| TDRS | | | | | | | | | | | | | | | |
| ATTITUDE | | BIASED -ZLV, +XVV IMU/ATMOS | | | | | | | | | | | | | |
| NOTES: | | @PASS 2 @SEDBERGH SCHOOL @MEMORY MODULE REPLACEMENT @-ZLV, +XVV @PORTUGAL SCHOOL @S.AFRICA SCHOOL @DSO 322 LYMPHOCYTE @PASS 3 @TISHOMINGO SCHOOL @MCWHIRTER SCHOOL @DSO 476 INFLIGHT AEROBICS | | | | | | | | | | | | | |

| GMT (D:H:M) | | MET (D:H:M) | | CST (D:H:M) | | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | | | | | | | | | | | | |
|----------------------|-----|---|---|--|---------------------------------------|---|--|--|---------------------|--|--|-----------|-------|--|---|--|---|--|---|--|----|--|----|-------|----|
| 073:05:56/ 073:17:56 | | 003:00:00/ 003:12:00 | | 072:23:56/ 073:11:56 | | B4/072 CST | 23.2 | | MARCH 13, 1993 | STS-56 | FINAL, REV A | 02/24/93 | | | | | | | | | | | | | |
| CST :072 | 0 | CST:073 | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | RED | 12 |
| BLU FD :004 | 0 | | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | FD 05 | 12 |
| MET :003 | 0 | | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 |
| BLUE | CDR | SPARTAN DEPLOY SEP 1 SEP 2 SEP 3 | | DBA O M N Z N | PR O T I V M E D | MEAL | VOIC E S A E R I E X | VOIC E S A E R I E X | PARE O P S | VOIC E S A E R I E X | VOIC E S A E R I E X | PRE SLEEP | SLEEP | | | | | | | | | | | | |
| | PLT | SPARTAN DEPLOY | | RMS E X T P A R K | DB O M N Z N | MEAL | ROTOR | ROTOR | ROTOR | ROTOR | ROTOR | ROTOR | ROTOR | | | | | | | | | | | | |
| | MS3 | SPARTAN DEPLOY UMBERTH DERIDGE 2 | | RMS E X T P A R K | DB O M N Z N | DSO 476 E X E R C I S E | MEAL | ROTOR | ROTOR | ROTOR | ROTOR | ROTOR | ROTOR | | | | | | | | | | | | |
| RED | MS2 | P/TV09 ACT SPARTAN | | PRE SLEEP | | SLEEP | | POST SLEEP | | | | | | | | | | | | | | | | | |
| | MS1 | PRE SLEEP | | SLEEP | | POST SLEEP | | | | | | | | | | | | | | | | | | | |
| DAY/NIGHT | | | | | | | | | | | | | | | | | | | | | | | | | |
| ORBIT | | | | | | | | | | | | | | | | | | | | | | | | | |
| EARTH TRACE | | | | | | | | | | | | | | | | | | | | | | | | | |
| TDRS | | | | | | | | | | | | | | | | | | | | | | | | | |
| ATTITUDE | | SPARTAN DEPLOY -ZLV, +XVV IMU -ZSI IROT -ZSI IROT -ZSI IROT -ZSI IROT -ZSI IROT -ZSI | | | | | | | | | | | | | | | | | | | | | | | |
| NOTES: | | @OTO 700-2 LASER CHECKOUT @OUTER DOOR OPEN ■ PCS CONFIG o HTR CONFIG @LEHIGH SCHOOL @ARMAND BAYOU SCHOOL @DSO 488 FORMALDEHYDE - RETRIEVE @SOLSPEC EXPLANATION @DSO 476 INFLIGHT AEROBICS | | | | | | | | | | | | | | | | | | | | | | | |

| GMT (D:H:M) | | MET (D:H:M) | | CST (D:H:M) | | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | |
|----------------------|------|---|-----|----------------------|-----------|------------|------|------|----------------|-------------|--------------|-----------|-------------|-------|
| 074:05:56/ 074:17:56 | | 004:00:00/ 004:12:00 | | 073:23:56/ 074:11:56 | | B5/073 CST | 27.8 | | MARCH 14, 1993 | STS-56 | FINAL, REV A | 02/24/93 | | |
| CST | :073 | CST:074 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| BLU FD | :005 | | | | | | | | | | | | RED | FD 06 |
| MET | :004 | | | | | | | | | | | | | |
| BLUE | CDR | MULTI-AXIS BURN NSR | H/O | RCS BURN | MEAL | RCS BURN | | | | PRE SLEEP | | | SLEEP (7.5) | |
| | PLT | MULTI-AXIS BURN | H/O | RCS BURN | MEAL | RCS BURN | | | | PRE SLEEP | | | SLEEP (7.5) | |
| | MS3 | | H/O | | | | | | | | | | | |
| RED | MS2 | | H/O | | PRE SLEEP | | | | | SLEEP (7.0) | | | POST SLEEP | |
| | MS1 | FILTER CLEANING | H/O | | PRE SLEEP | | | | | SLEEP (7.0) | | | POST SLEEP | |
| DAY/NIGHT | | [Day/Night Cycle] | | | | | | | | | | | | |
| ORBIT | | [Orbit Diagram] | | | | | | | | | | | | |
| EARTH TRACE | | [Earth Trace Diagram] | | | | | | | | | | | | |
| TDRS | | [TDRS Diagram] | | | | | | | | | | | | |
| ATTITUDE | | [Attitude Diagram] | | | | | | | | | | | | |
| NOTES: | | <p> @H/O RED TO BLUE @ARMS EXT PARK @-ZLV, +XVV @DSO 321 FREQ INTERFERENCE MEAS @S.AFRICAN SCHOOL B/U </p> <p> @NC1 INU/ATMOS @ARMS EXT PARK @-ZLV, +XVV </p> <p> @-ZLV, +XVV @PASS 5 @STATION 1 - AIRLOCK @BELLINGHAM SCHOOL </p> <p> @DSO 476 INFLIGHT AEROBICS @OUTER DOOR CLOSE @ARMS EXT PARK @-ZLV, +XVV </p> <p> @PARKWAY SCHOOL </p> | | | | | | | | | | | | |




| GMT (D:H:M) | | MET (D:H:M) | | CST (D:H:M) | | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | |
|----------------------|------|--|-----|----------------------|--------|------------------|-----------------|------------|----------------|------------------|------------------|-----------|------------------|-------------------|
| 074:17:56/ 075:05:56 | | 004:12:00/ 005:00:00 | | 074:11:56/ 074:23:56 | | R6/074 CST | 30.1 | | MARCH 15, 1993 | STS-56 | FINAL, REV A | 02/24/93 | | |
| CST | :074 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 0 |
| RED FD | :006 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
| MET | :004 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
| | | | | | | | | | | BLU | FD 06 | | | MET:005 |
| BLUE | CDR | SLEEP (7.5) | | | | | | POST SLEEP | TAGUP | SPARTAN RETRIEVE | | | H/O | SPARTAN RETRIEVE |
| | PLT | PRE SLEEP/OPRE SLEEP | | SLEEP (6.75) | | | | | | POST SLEEP | SPARTAN RETRIEVE | H/O | SPARTAN RETRIEVE | |
| | MS3 | PRE SLEEP/OPRE SLEEP | | SLEEP (6.75) | | | | | | POST SLEEP | SPARTAN RETRIEVE | H/O | SPARTAN RETRIEVE | |
| RED | MS2 | POST SLEEP | H/O | HERCULES OBS | | DSO 476 EXERCISE | HERCULES OBS | | MEAL | TAGUP | SPARTAN RETRIEVE | | H/O | P/TV09 SETUP SPTR |
| | MS1 | POST SLEEP | H/O | ADP TAL ALG SY | P/TV09 | ACT MDDK | P/TV07 ACT MDDK | | MEAL | TAGUP | SPARTAN RETRIEVE | | H/O | SPARTAN RETRIEVE |
| DAY/NIGHT | | [Day/Night Cycle Diagram] | | | | | | | | | | | | |
| ORBIT | | [Orbit Diagram] | | | | | | | | | | | | |
| EARTH TRACE | | [Earth Trace Diagram] | | | | | | | | | | | | |
| TDRS | | [TDRS Diagram] | | | | | | | | | | | | |
| ATTITUDE | | [Attitude Diagram] | | | | | | | | | | | | |
| NOTES: | | @H/O BLUE TO RED @MDA 4 @-ZLV, +XVV @TIPS S-BD CONNECT @DTO 700-2 LASER CHECKOUT @DSO 476 INFLIGHT AEROBICS @H/O RED TO BLUE | | | | | | | | | | | | |

| GMT (D:H:M) | | MET (D:H:M) | | CST (D:H:M) | | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | | |
|----------------------|------|--|---------|--------------------------------------|--|--|-----------------------------|--|---|---|---------------------------------|--------------------------------------|----------------------------|----------------------------|----------------------------|
| 075:05:56/ 075:17:56 | | 005:00:00/ 005:12:00 | | 074:23:56/ 075:11:56 | | 86/074 CST | 32.3 | | MARCH 15, 1993 | STS-56 | FINAL, REV A | 02/24/93 | | | |
| CST | :074 | 0 | CST:075 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| BLU FD | :006 | 0 | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| MET | :005 | 0 | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| BLUE | CDR | SPARTAN RETRIEVE | | ZLV MNV R | PG RETR DOWN | PR V NEED | OR G M E A L | S A R E X E S E R V I C E | V O I C E P A R E O P S | V O I C E S A R E X E | K U C A B L E | P R E S L E E P | | | |
| | PLT | SPARTAN RETRIEVE | | S P A R T A N | R M S E X T P A R K | P R E R E T R I E V E | M E A L | H E R C U L E S O B S | | R O T O R | R O T O R | R O T O R | R O T O R | R O T O R | |
| | MS3 | SPARTAN RETRIEVE GRAPPLE | | S P A R T A N | R M S E X T P A R K | S P O S I T C O N T R O L A D D I T I N A L G Y | M E A L | D S O 4 7 6 E X E R C I S E | P S A E D M U L T I P L I C A T I O N | H I M U | S N U L L M | S N U L L M | S N U L L M | S N U L L M | S N U L L M |
| RED | MS2 | P/TV09 ACT SPARTAN | | P R E S L E E P | | | S L E E P | | | S L E E P | | | | | |
| | MS1 | SPARTAN RETRIEVE | | P R E S L E E P | | | S L E E P | | | S L E E P | | | | | |
| DAY/NIGHT | | | | | | | | | | | | | | | |
| ORBIT | | 80 81 82 83 84 85 86 87 88 | | | | | | | | | | | | | |
| EARTH TRACE | | | | | | | | | | | | | | | |
| TDRS | | | | | | | | | | | | | | | |
| ATTITUDE | | -Z TGT TRK INTL -ZLV, -XVV IMU -ZSI IROT -ZSI IROT -ZSI IROT -ZSI IROT | | | | | | | | | | | | | |
| NOTES: | | @ZLV, -XVV @PASS 1 B/U @TIPS S-BD DISCONNECT @BILLINGS WEST HS @LAUREL MIDDLE SCHOOL @MEMORY MODULE REPLACEMENT @ACR EXPLANATION | | | | | | | | | | | | | |

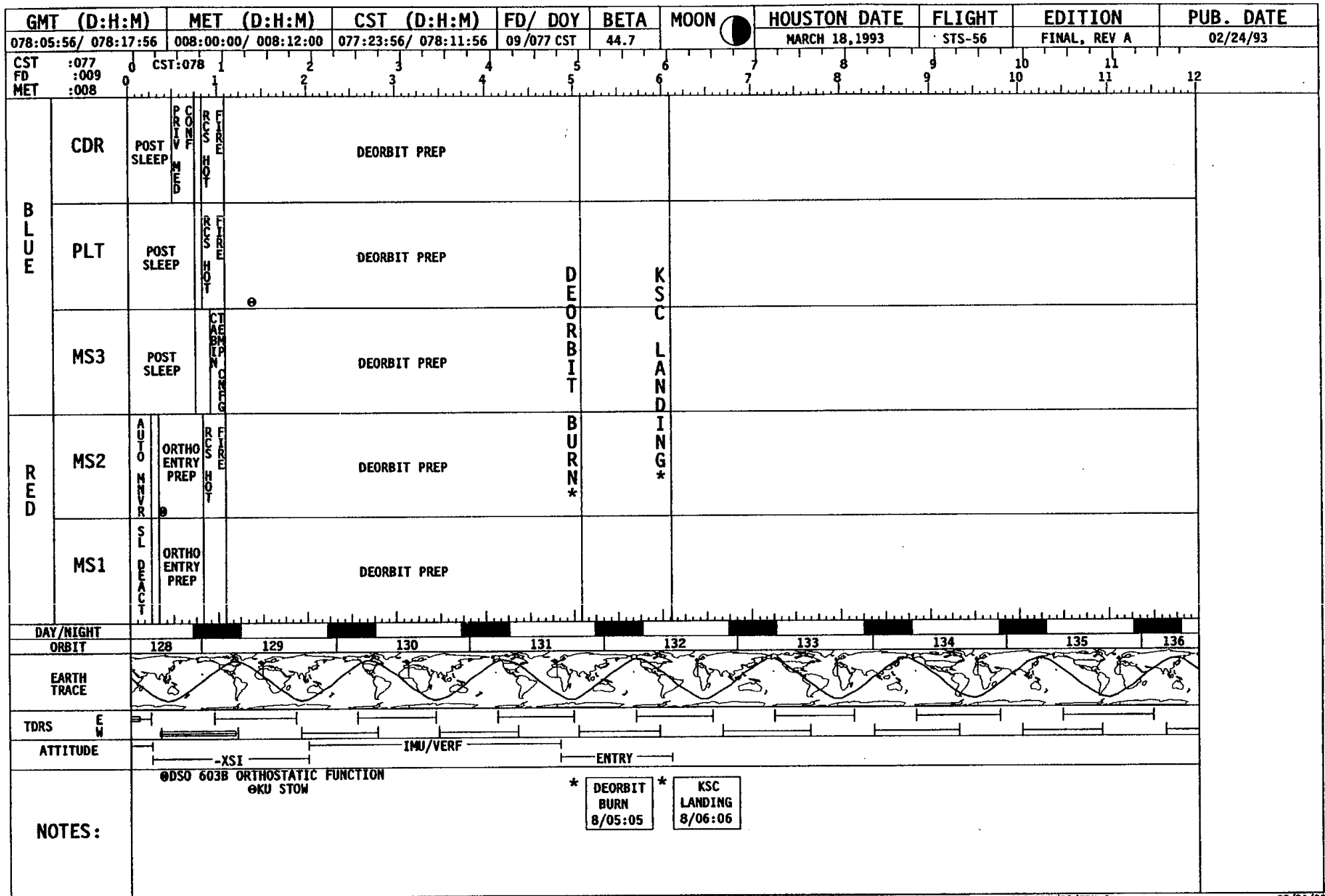
| GMT (D:H:M) | | MET (D:H:M) | | CST (D:H:M) | | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | | | | |
|----------------------|------|--|------------|----------------------|------------|--------------------|------|------|----------------|--------------|--------------|------------|-----------------|-----------------|-----------------|-------------|---------------|
| 075:17:56/ 076:05:56 | | 005:12:00/ 006:00:00 | | 075:11:56/ 075:23:56 | | B6/075 CST | 34.5 | | MARCH 16, 1993 | STS-56 | FINAL, REV A | 02/24/93 | | | | | |
| CST | :075 | RED | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | BLU | 0 | MET:006 | |
| BLU | FD | :006 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | FD | 07 | |
| MET | :005 | | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | | |
| BLUE | CDR | SLEEP | | | | | | | | | | POST SLEEP | FILTER CLEANING | S F A S T R E V | | | |
| | PLT | PRE SLEEP | H/O | PRE SLEEP | SLEEP | | | | | | | | | | POST SLEEP | | |
| | MS3 | PRE SLEEP | H/O | PRE SLEEP | SLEEP | | | | | | | | | | POST SLEEP | | |
| RED | MS2 | SLEEP | POST SLEEP | H/O | POST SLEEP | HERCULES OBS | | | | HERCULES OBS | | | | MEAL | HERC OBS | H I M A G E | H D I M A G E |
| | MS1 | SLEEP | POST SLEEP | H/O | POST SLEEP | ADP TAL LIN ALG SY | | | | F I M A C T | | | | MEAL | P/TV100 ACT MAS | | |
| DAY/NIGHT | | [Day/Night Cycle] | | | | | | | | | | | | | | | |
| ORBIT | | [Orbit Diagram] | | | | | | | | | | | | | | | |
| EARTH TRACE | | [Earth Trace Map] | | | | | | | | | | | | | | | |
| TDRS | | [TDRS Diagram] | | | | | | | | | | | | | | | |
| ATTITUDE | | [Attitude Diagram] | | | | | | | | | | | | | | | |
| NOTES: | | @-ZLV, -XVV @DSO 476 INFLIGHT AEROBICS @H/O BLUE TO RED | | | | | | | | | | | | | | | |
| | | @-ZLV, -XVV @DSO 321 FREQ INTERFERENCE MEAS @AUSTRALIA SCHOOL B/U | | | | | | | | | | | | | | | |
| | | @PASS 6 @DSO 488 FORMALDEHYDE - DEPLOY @DSO 476 INFLIGHT AEROBICS @PASS 2 B/U | | | | | | | | | | | | | | | |

| GMT (D:H:M) | | MET (D:H:M) | | CST (D:H:M) | | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | | |
|-------------------------------------|-----|--|--|-----------------------|--------------------------|---------------------|---|---|-------------------------|-----------------------|---|--------------------------------------|----------------------------------|---|-----------------------|
| 076:05:56 / 076:17:56 | | 006:00:00 / 006:12:00 | | 075:23:56 / 076:11:56 | | B7/075 CST | 36.6 | | MARCH 16, 1993 | STS-56 | FINAL, REV A | 02/24/93 | | | |
| CST :075 BLU FD :007 MET :006 | | 0 1 2 3 4 5 6 7 8 9 10 11 12 | | | | | | | | | | | | | |
| BLUE | CDR | | FCS C/O | | P/TV10P SETUP CONF | TV10 ACT CONF | NEAL | PC N I V M E D | P/TV04 SETUP EDUC | P/TV04 ACT EDUC | SV O R I E C E | PARE O P S | SV O R I E C E | PS M / E D I T O R O P 7 | P/TV07 ACT MDDK |
| | PLT | POST SLEEP H/O | FCS C/O | HERC OBS | | CREW CONF | HERCULES OBS | SF Y A S O R T I E V C X /E | P/TV04 ACT EDUC | MEAL | HERCULES OBS | | | | |
| | MS3 | POST SLEEP H/O | ADP TAL L I N G S Y | | | CREW CONF | PS F / E L T T V U D O P K 6 | P/TV06 ACT FLTDK | | MEAL | P S E T U P O P S | P A C T M A S S | K U C A B L E | DSO 476 EXERCISE | |
| RED | MS2 | DSO 476 EXERCISE H/O | FCS C/O | | CREW CONF | | PRE SLEEP | | | SLEEP | | | | | |
| | MS1 | | | | CREW CONF | | PRE SLEEP | | | SLEEP | | | | | |
| DAY/NIGHT | | [Day/Night Cycle Diagram] | | | | | | | | | | | | | |
| ORBIT | | 96 97 98 99 100 101 102 103 104 | | | | | | | | | | | | | |
| EARTH TRACE | | | | | | | | | | | | | | | |
| TDRS | | [TDRS Diagram] | | | | | | | | | | | | | |
| ATTITUDE | | -ZLV, -XVV IMU -ZLV, -XVV | | | | | | | | | | | | | |
| NOTES: | | <ul style="list-style-type: none"> o APU HTR ACT o DSO 321 FREQ INTERFERENCE MEAS o H/O RED TO BLUE o APU HTR RECONFIG o -ZLV, -XVV o PASS 3 B/U FRANKLIN INSTITUTE o LAUREL MIDDLE SCHOOL B/U TISHOMINGO SCHOOL B/U o BELLINGHAM SCHOOL B/U PARKWAY SCHOOL B/U o DSO 488 FORMALDEHYDE - RETRIEVE | | | | | | | | | | | | | |

| GMT (D:H:M) | | MET (D:H:M) | | CST (D:H:M) | | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | |
|----------------------|------|---|----------------------|----------------------|----------------|------------|-----------------------------|----------------------|----------------------|-------------|--|-------------------------------|------------------------------------|-----------------------|
| 076:17:56/ 077:05:56 | | 006:12:00/ 007:00:00 | | 076:11:56/ 076:23:56 | | B7/076 CST | 38.7 | | MARCH 17, 1993 | STS-56 | FINAL, REV A | 02/24/93 | | |
| CST | :076 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 0 |
| BLU FD | :007 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
| MET | :006 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | MET:007 |
| BLUE | CDR | PRE SLEEP | | | SLEEP | | | | | | POST SLEEP | | | |
| | PLT | HERCULES OBS | | | PRE SLEEP/H/O | PRE SLEEP | SLEEP | | | | | | | |
| | MS3 | PACT ACT ATMOS | PACT ACT ATMOS | PRE SLEEP/H/O | PRE SLEEP | SLEEP | | | | | | | | |
| RED | MS2 | SLEEP | | | POST SLEEP H/O | POST SLEEP | HERCULES OBS | | | HERCULES | HERCULES | MEAL | CDR MEMO XO T H/D S | |
| | MS1 | SLEEP | | | POST SLEEP H/O | POST SLEEP | AD TAL L ALG SY | PACT ACT ATMOS | PACT ACT ATMOS | CU CABLE | SAR EX | PSM ED T V O P | MEAL | P/TV07 ACT MDDK |
| DAY/NIGHT | | [Day/Night Cycle] | | | | | | | | | | | | |
| ORBIT | | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | | | | |
| EARTH TRACE | | | | | | | | | | | | | | |
| TDRS | | [TDRS Data] | | | | | | | | | | | | |
| ATTITUDE | | -ZLV, -XVV IMU -ZLV, -XVV | | | | | | | | | | | | |
| NOTES: | | @DSO 476 INFLIGHT AEROBICS @H/O BLUE TO RED @-ZLV, -XVV | | | | | | @PASS 4 B/U | | | @MDA 3 @DSO 488 FORMALDEHYDE - RETRIEVE | | | |

| GMT (D:H:M) | | MET (D:H:M) | | CST (D:H:M) | | FD/ DOY | BETA | MOON  | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | | | | |
|----------------------|-----|--|------------|----------------------|-----|------------|------|--|----------------|--------|--------------|-----------|----|----|----|----|--|
| 077:05:56/ 077:17:56 | | 007:00:00/ 007:12:00 | | 076:23:56/ 077:11:56 | | R8/076 CST | 40.8 | | MARCH 17, 1993 | STS-56 | FINAL, REV A | 02/24/93 | | | | | |
| CST :076 | 0 | CST:077 | 2 | | 3 | | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | |
| RED FD :008 | 0 | BLU | 1 | FD 08 | 2 | | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| MET :007 | 0 | | 1 | | 2 | | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| BLUE | CDR | | | | | | | | | | | | | | | | |
| | PLT | SLEEP | POST SLEEP | | | | | | | | | | | | | | |
| | MS3 | SLEEP | POST SLEEP | | | | | | | | | | | | | | |
| RED | MS2 | | | | | | | | | | | | | | | | |
| | MS1 | | | | | | | | | | | | | | | | |
| DAY/NIGHT | | | | | | | | | | | | | | | | | |
| ORBIT | | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | | | | | | | |
| EARTH TRACE | |  | | | | | | | | | | | | | | | |
| TDRS | |  | | | | | | | | | | | | | | | |
| ATTITUDE | | -ZLV, +YVV AMOS -ZLV, -XVV IMU -ZSI IROT -ZSI IROT -ZSI IROT -ZSI IROT | | | | | | | | | | | | | | | |
| NOTES: | | @-ZLV, +YVV @DSO 476 INFLIGHT AEROBICS @BIASED -ZLV, -XVV @MEMORY MODULE REPLACEMENT @-ZLV, -XVV @H/O RED TO BLUE @HUDSON SCHOOL @BILLINGS W. HS B/U ARMAND BAYOU SCHOOL B/U MCWHIRTER B/U @SUSIM EXPLANATION @PASS 5 B/U @SSBUV EXPLANATION | | | | | | | | | | | | | | | |

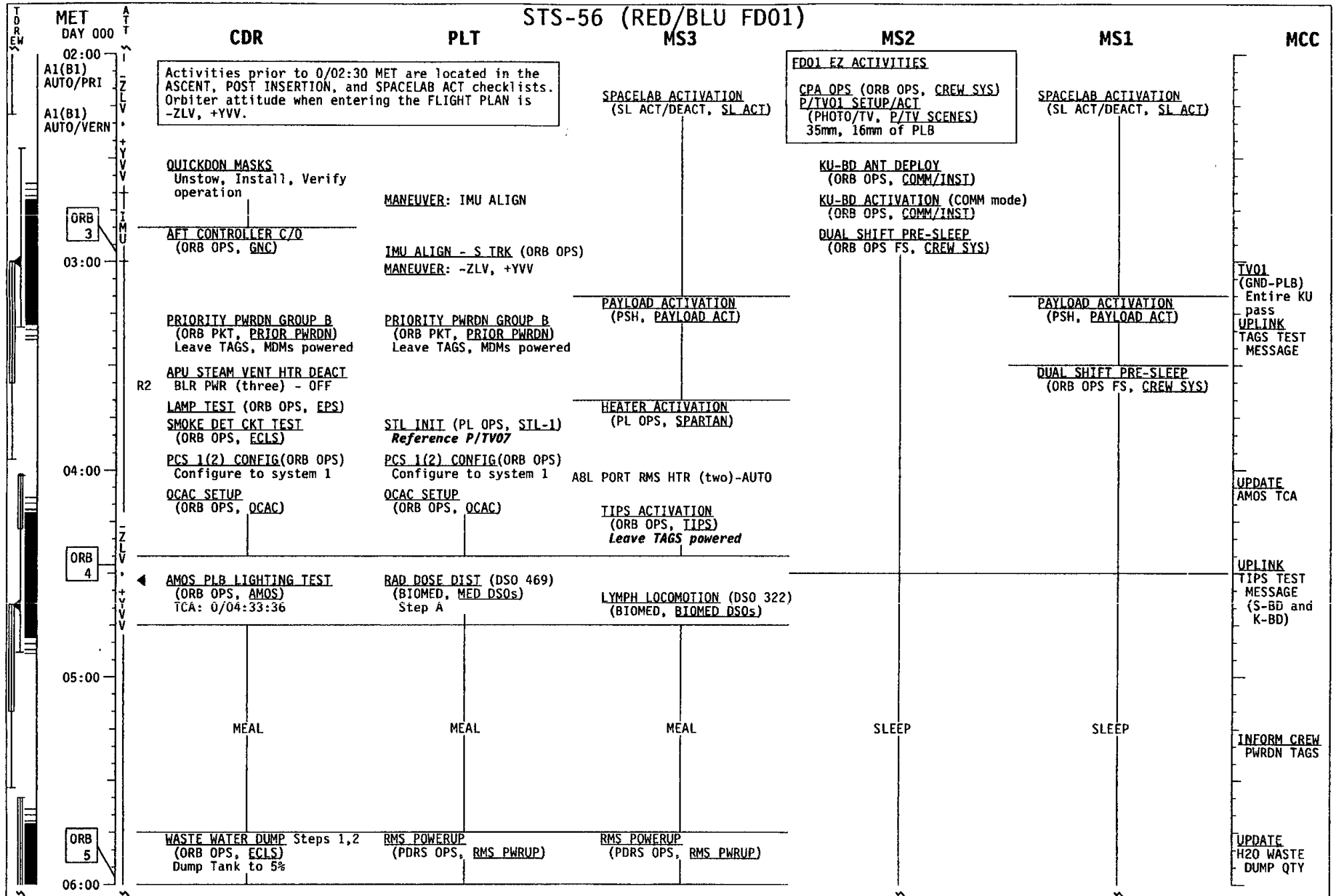
| GMT (D:H:M) | | MET (D:H:M) | | CST (D:H:M) | | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | | | | |
|----------------------|------|--|-------------------------|---------------------------|--|--|-----------------------|-------------------------------|--|---|--------------------------------------|--------------------------------------|------------------------------|--|---------------------------|-----------------------------|---------------------------|
| 077:17:56/ 078:05:56 | | 007:12:00/ 008:00:00 | | 077:11:56/ 077:23:56 | | B8/077 CST | 42.8 | | MARCH 18, 1993 | STS-56 | FINAL, REV A | 02/24/93 | | | | | |
| CST | :077 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 0 | | | |
| BLU FD | :008 | | | | | RED | | | | | | | | | | | |
| MET | :007 | | | | | FD 09 | | | | | | | | MET:008 | | | |
| BLUE | CDR | C R E A T I O N S T O W | ERG S T O W | PRE SLEEP | | | | SLEEP | | | | | POST SLEEP | | | | |
| | PLT | SUSIM ALIGN | ROTOR ROTOR | INSTR INSTR | AUTO AUTO | AUTO AUTO | IMU IMU | ZLV ZLV | PRE SLEEP | | | | H/O S L I D E | SLEEP (6.25) | POST SLEEP | | |
| | MS3 | SUSIM ALIGN | ERG S T O W | SAREX S T O W | PSF /E L T V D P R 6 | S U E | D E A C T | POST S L I D E | PRE SLEEP | | | | H/O S L I D E | SLEEP (6.25) | POST SLEEP | | |
| RED | MS2 | SLEEP | | | | POST S L I D E | H/O | POST SLEEP | PG WR RP UB P | P A D H S T O W | T I P S A C T | OCAC S T O W | CABIN S T O W | MEAL | CABIN S T O W | | |
| | MS1 | SLEEP | | | | POST S L I D E | H/O | POST SLEEP | P A S S E N G E R S C O M P A R T M E N T S | S R V I C E S C O M P A R T M E N T S | A P P C S T O W | T E P C S T O W | OCAC S T O W | CABIN S T O W | MEAL | PL D E A C T | CABIN S T O W |
| DAY/NIGHT | | | | | | | | | | | | | | | | | |
| ORBIT | | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | | | | | | | |
| EARTH TRACE | | | | | | | | | | | | | | | | | |
| TDRS | | | | | | | | | | | | | | | | | |
| ATTITUDE | | SUSIM - IROT - ZSI - ZLV, -XV | | | | | | | | | | | | | | | |
| NOTES: | | STL ENTRY PREP -ZLV, -XV | | | | DSO 476 INFLIGHT AEROBICS H/O BLUE TO RED | | | | ATLAS DAILY PLNG P/TV102 S/U SOLCON TIPS S-BD CONFIG DSO 469 RAD DOSE | | | | SSBUV DEACT DSO 476 INFLIGHT AEROBICS | | | |

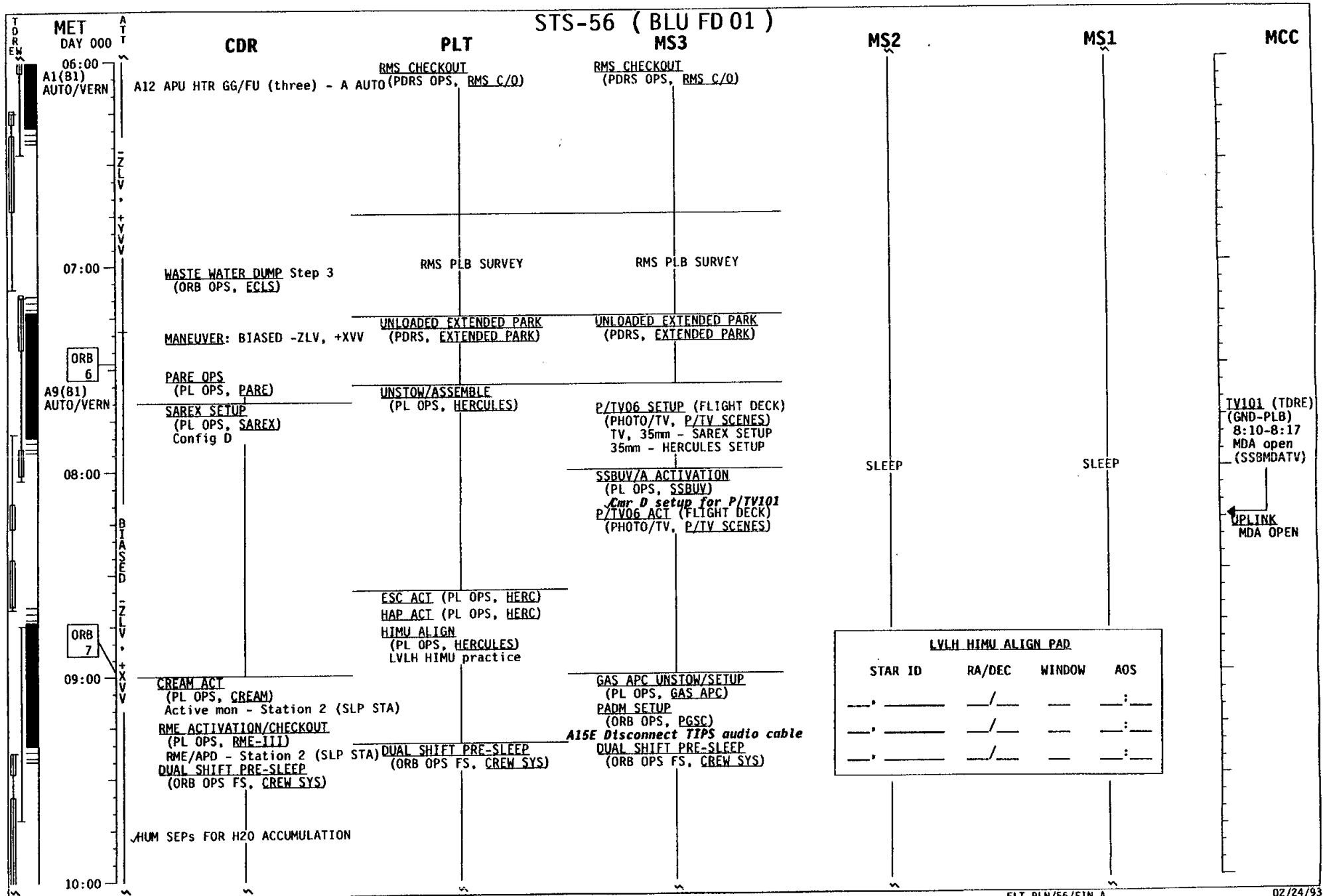


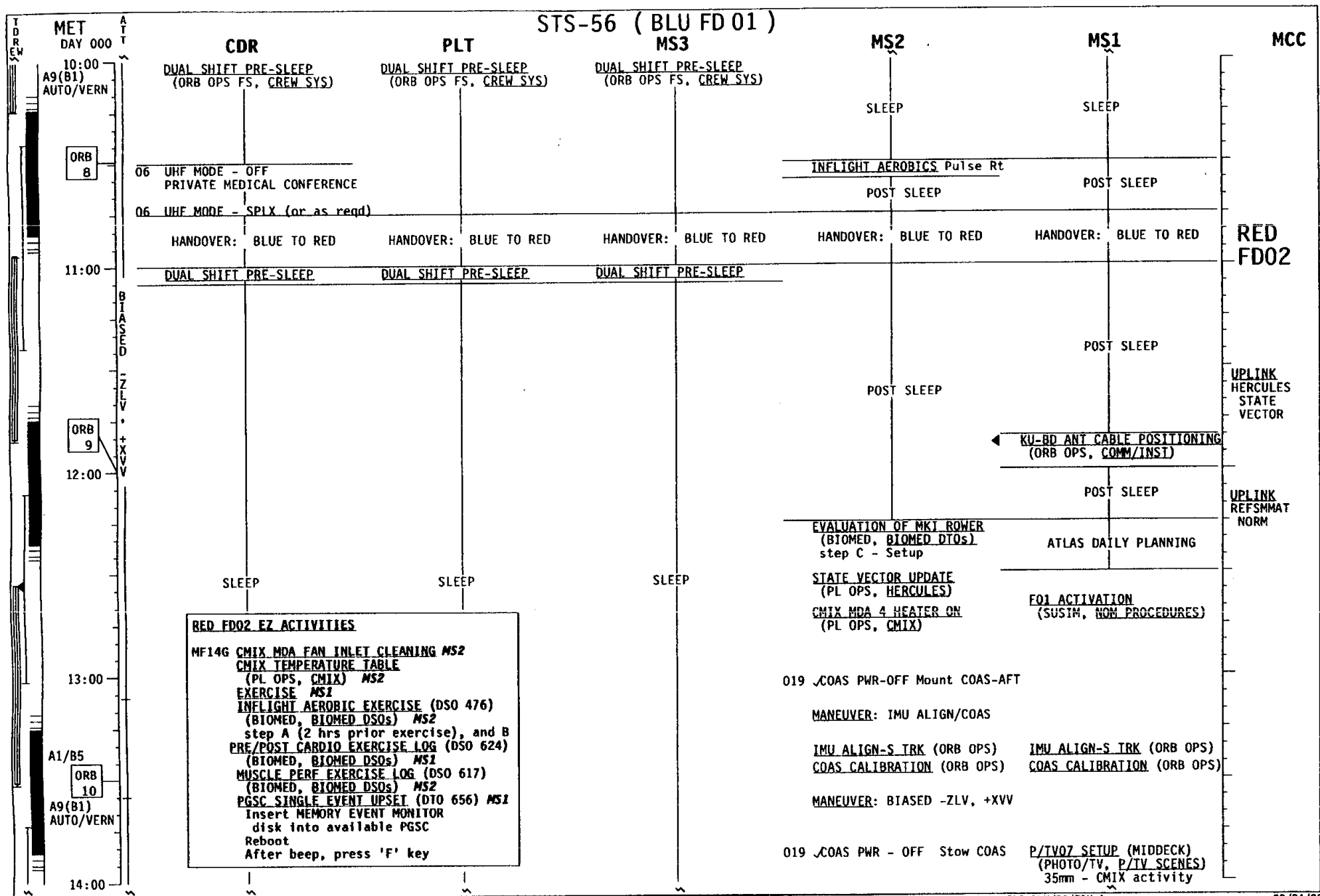
DETAILED TIMELINE

DETAILED
TIMELINE

DETAILED TIMELINE







STS-56 (RED FD 02)

MET DAY 000
 14:00
 A9(B1)
 AUTO/VERN

15:00
 ORB 11

16:00
 ORB 12

17:00

18:00

TDRW
 A T T
 BIASED
 ZLV
 +XVVV

CDR

PLT

| LVLH HIMU ALIGN PAD | | | |
|---------------------|--------|--------|---------|
| STAR ID | RA/DEC | WINDOW | AOS |
| _____ | / | _____ | : _____ |
| _____ | / | _____ | : _____ |
| _____ | / | _____ | : _____ |

SLEEP

SLEEP

MS3

SLEEP

MS2

| COAS CALIBRATION LOG |
|------------------------------------|
| STAR ID: -Z 21 , PROCYON |
| STAR AVAIL: 13:04 TO 13:51 |
| -Z Δ BIAS _____ |
| UPDATE TIME: ___ / ___ : ___ : ___ |

ESC ACT (PL OPS, HERC)
 HIMU ALIGN
 (PL OPS, HERCULES)
 LVLH HIMU Practice

BPM SETUP
 (PL OPS, CMIX)
 CMIX MDA ACTIVATION
 (PL OPS, CMIX)
 MDAs 1-4

CMIX MDA DEACTIVATION
 (PL OPS, CMIX)
 MDA 2

BPM ACT
 (PL OPS, CMIX)

BPM FIX
 (PL OPS, CMIX)
 Samples 6,8

MEAL

MS1

P/TV94 SETUP (MAS)
 (PHOTO/TV, P/TV SCENES)

P/TV94 ACT (MAS)
 (PHOTO/TV, P/TV SCENES)

HIMU ALIGN
 (PL OPS, HERCULES)
 LVLH HIMU Practice

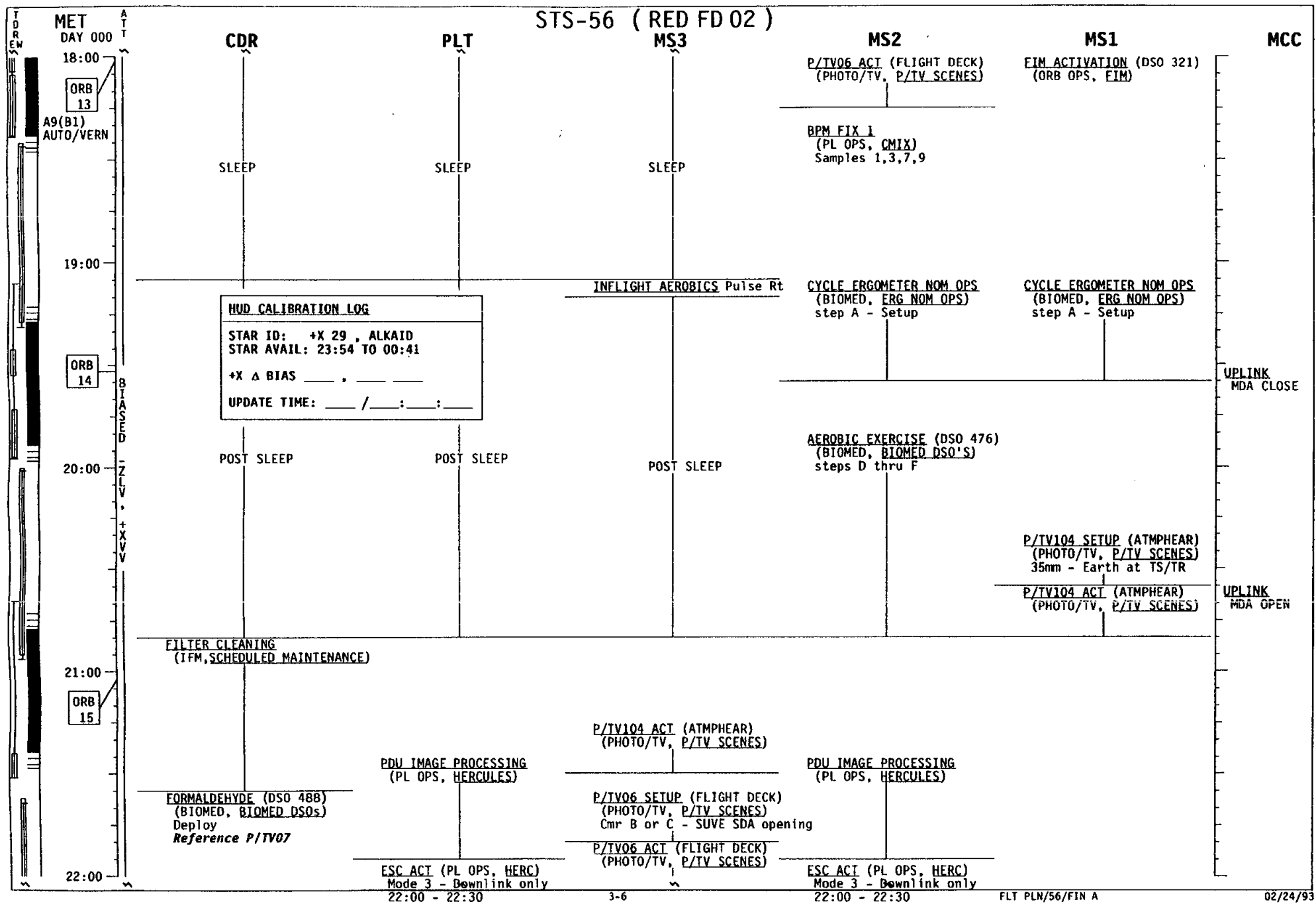
SPARTAN TEMP CHECK
 (PL OPS, SPARTAN)
 P/TV07 ACT (MIDDECK)
 (PHOTO/TV, P/TV SCENES)

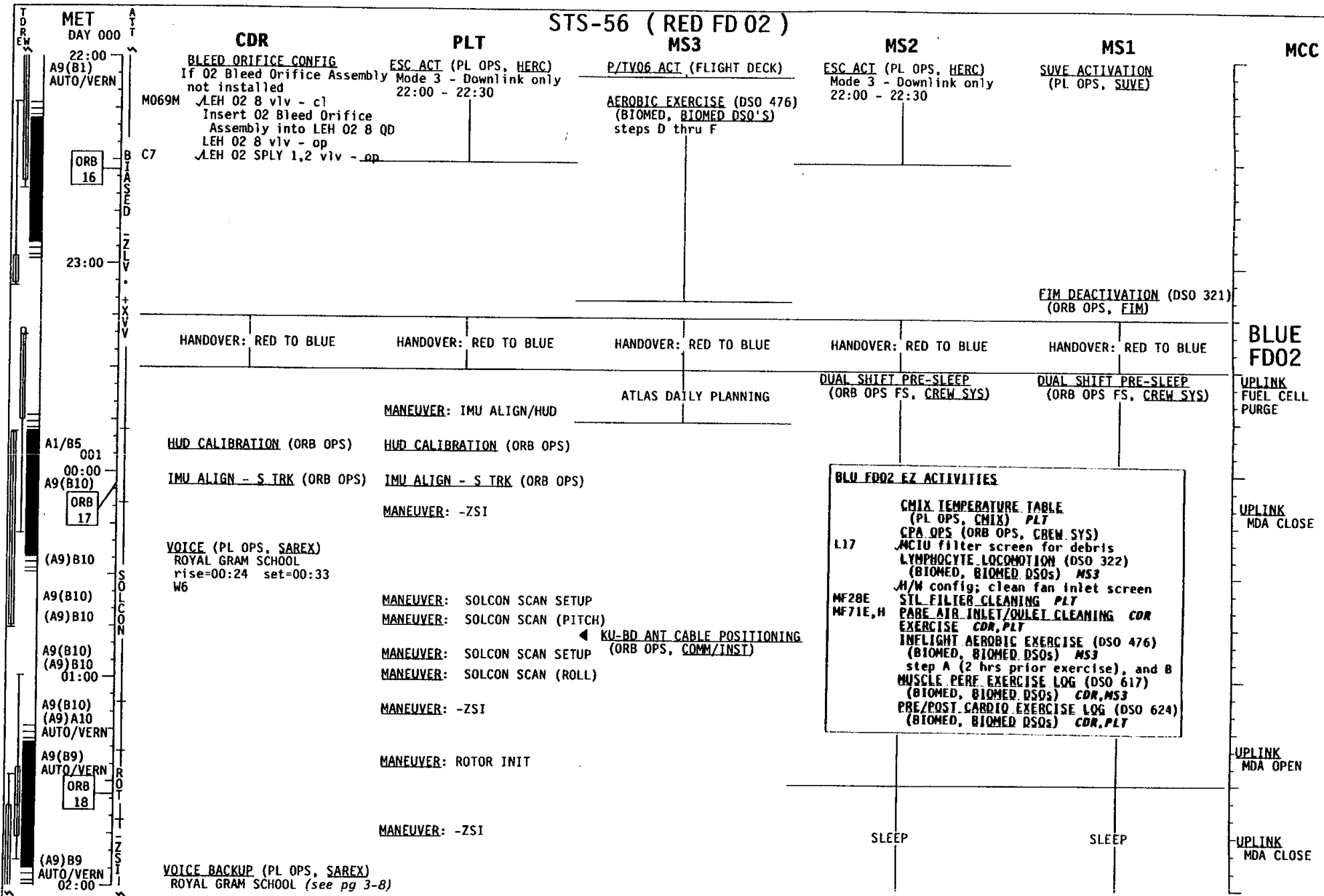
P/TV06 SETUP (FLIGHT DECK)
 (PHOTO/TV, P/TV SCENES)
 35mm - FIM installation

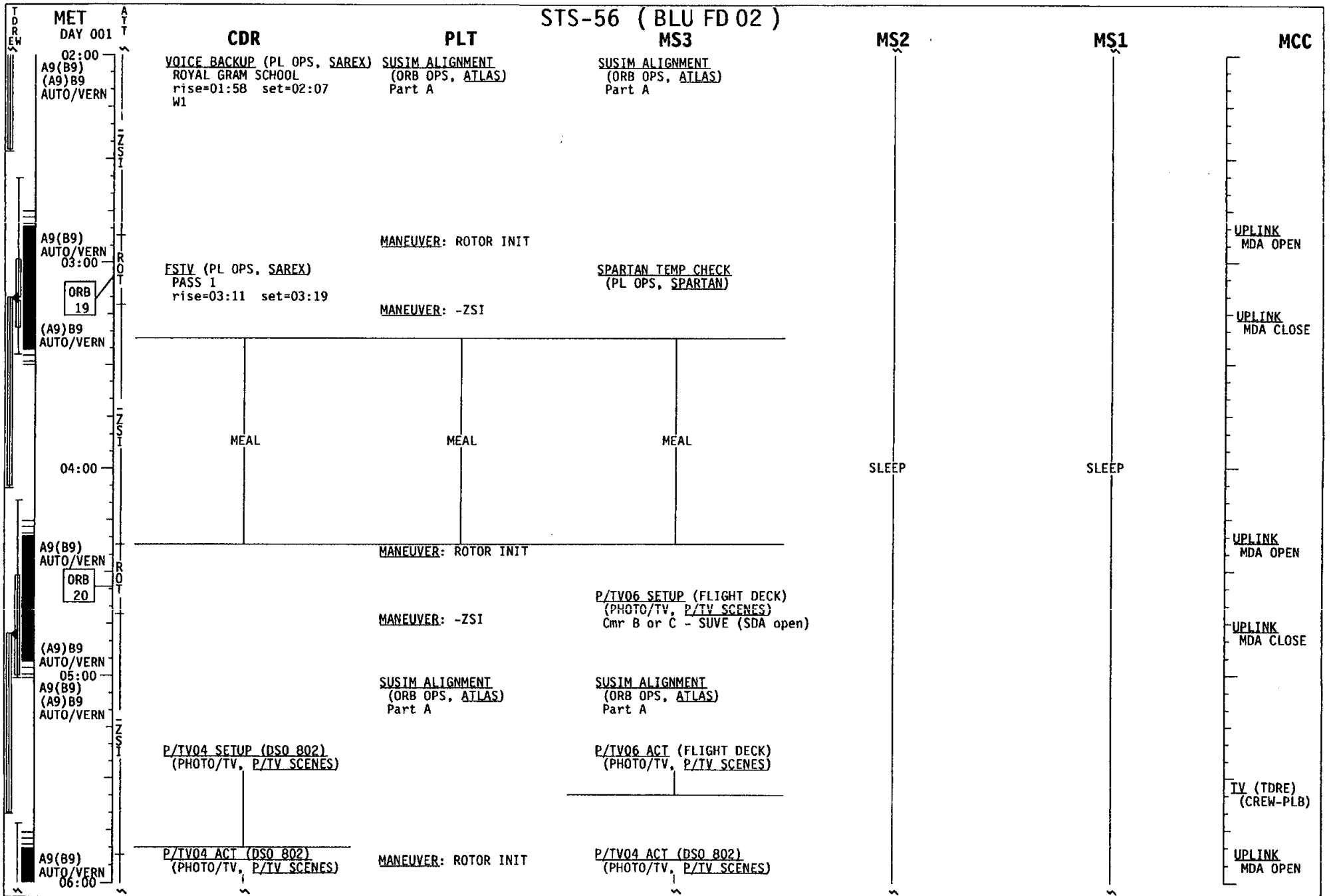
MEAL

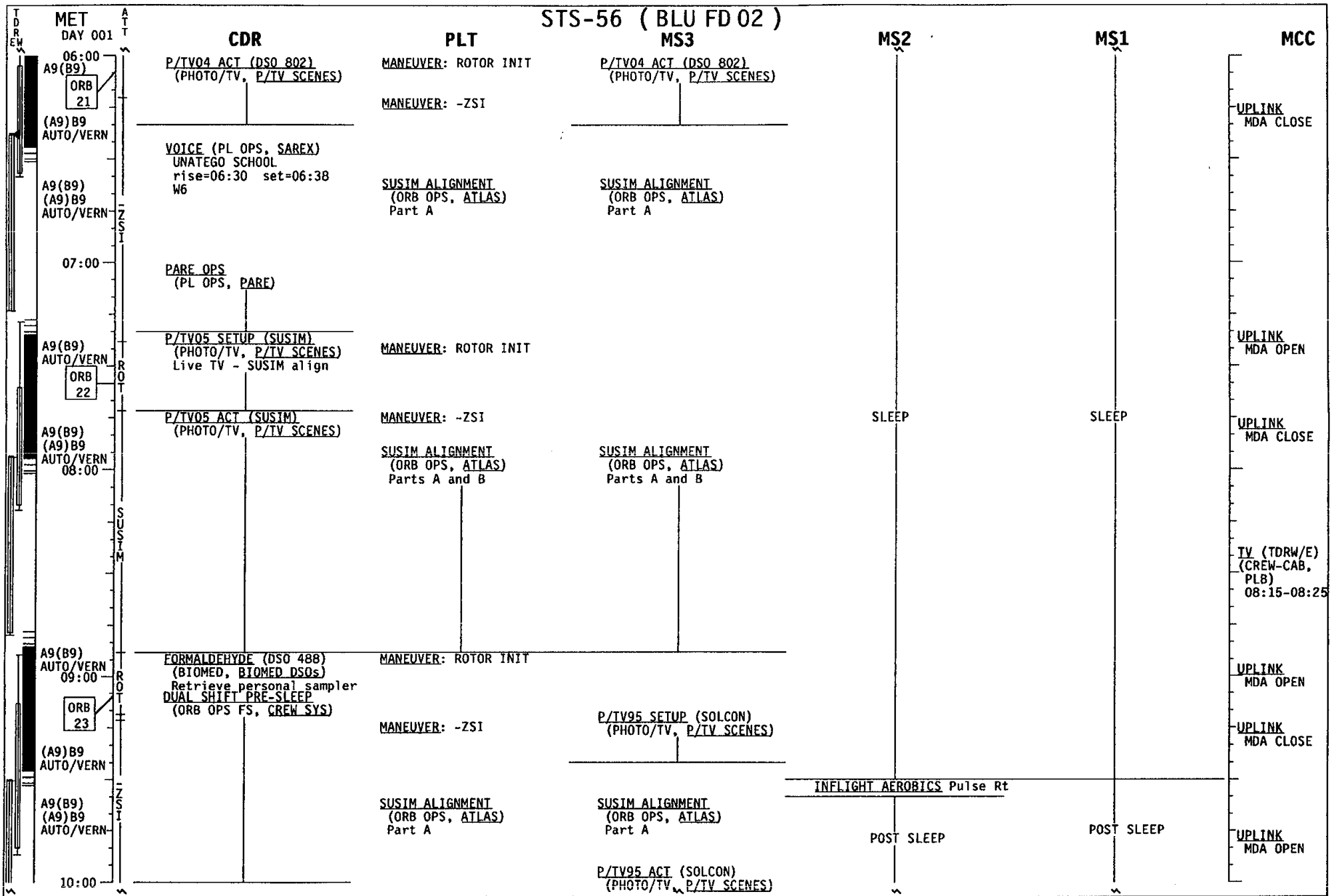
MCC

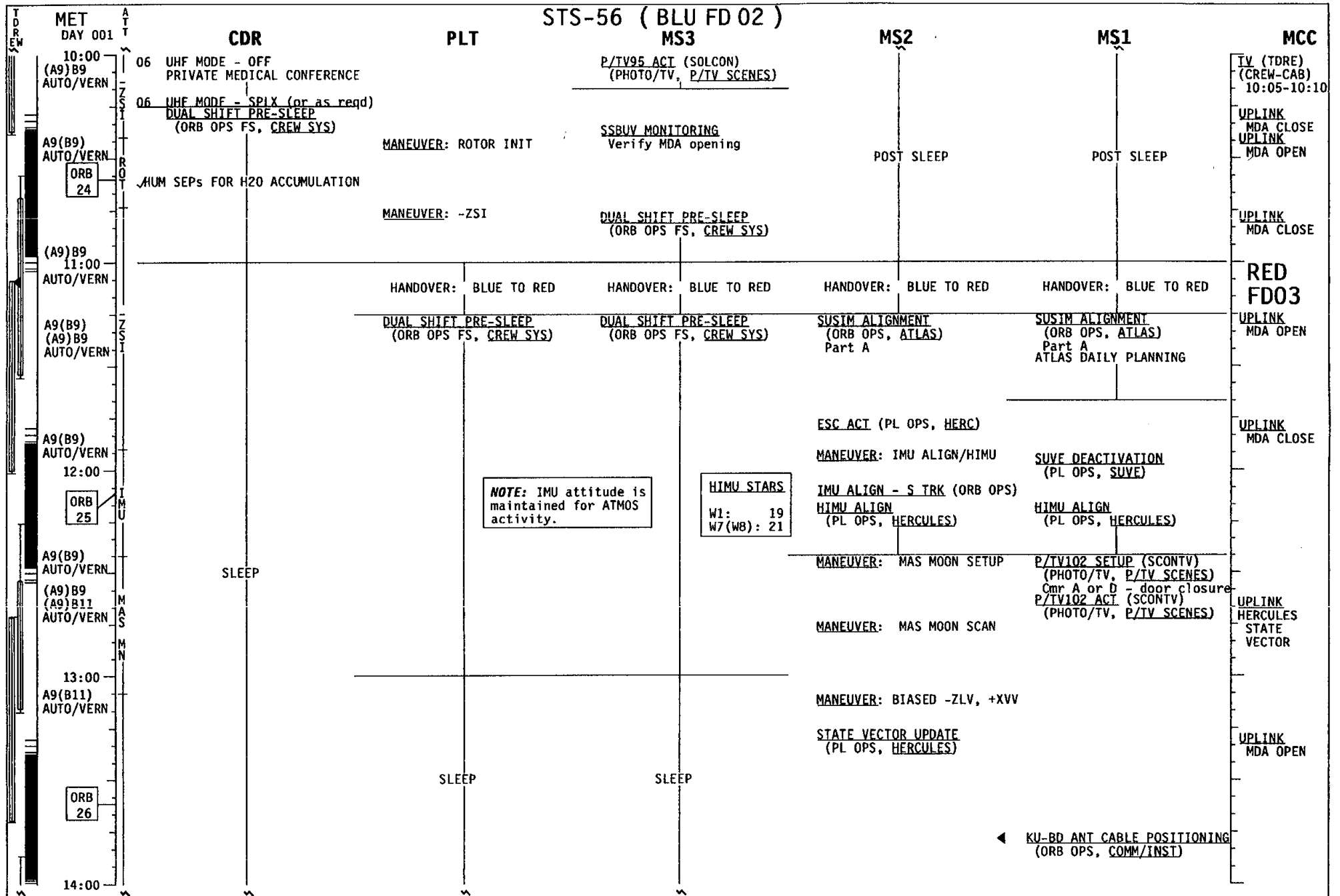
TV (TDRW)
 (CREW-CAB)
 14:30-14:35

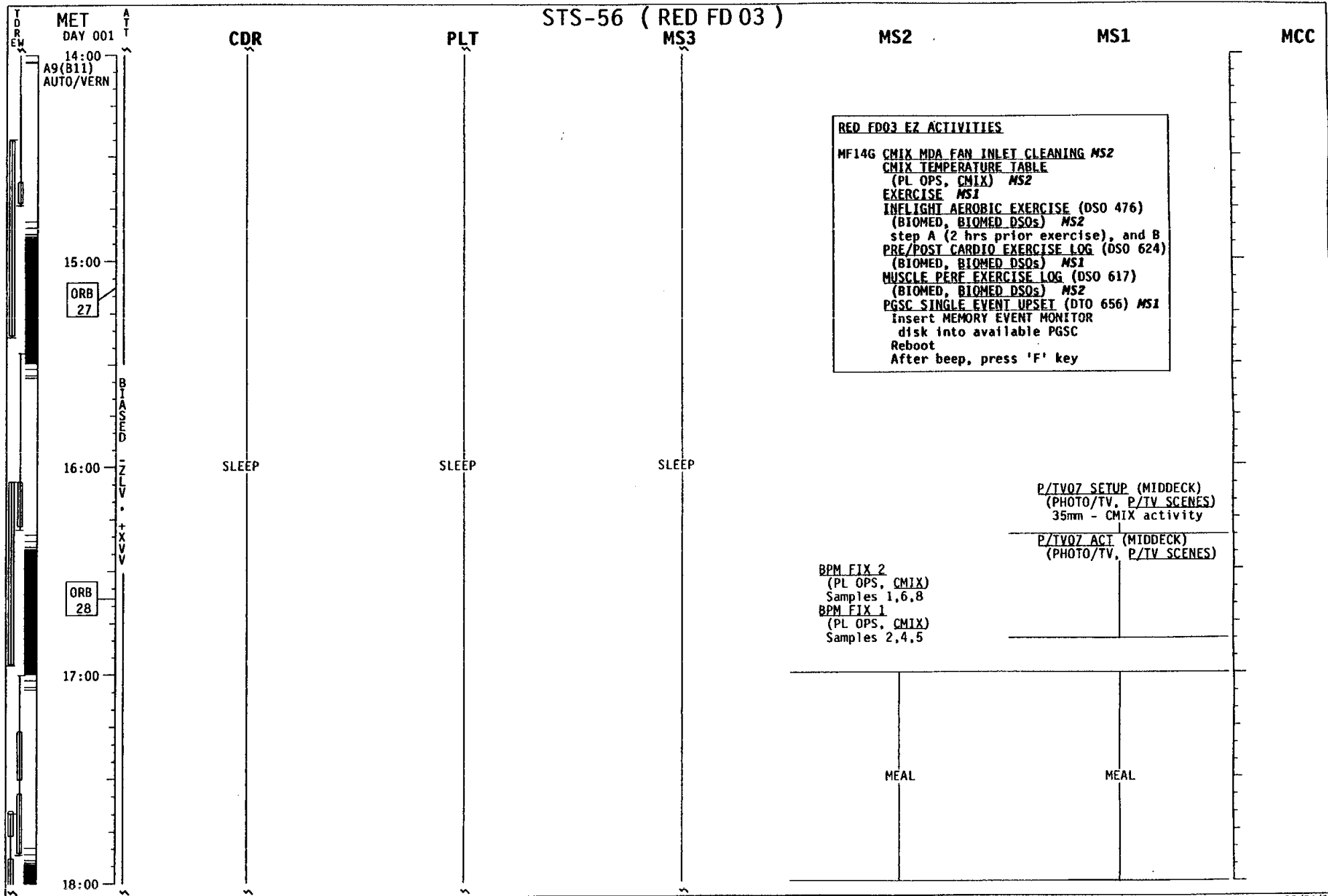


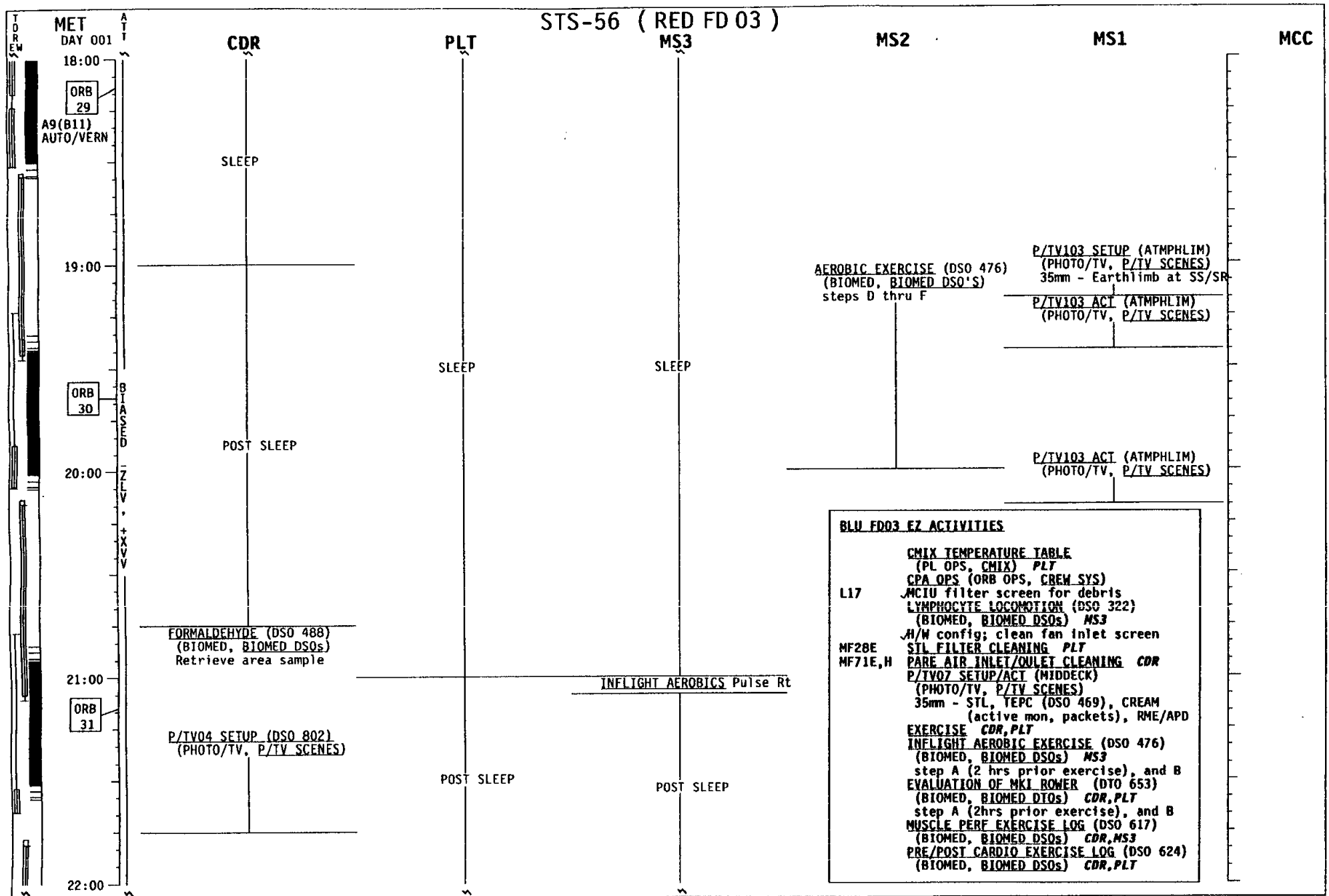


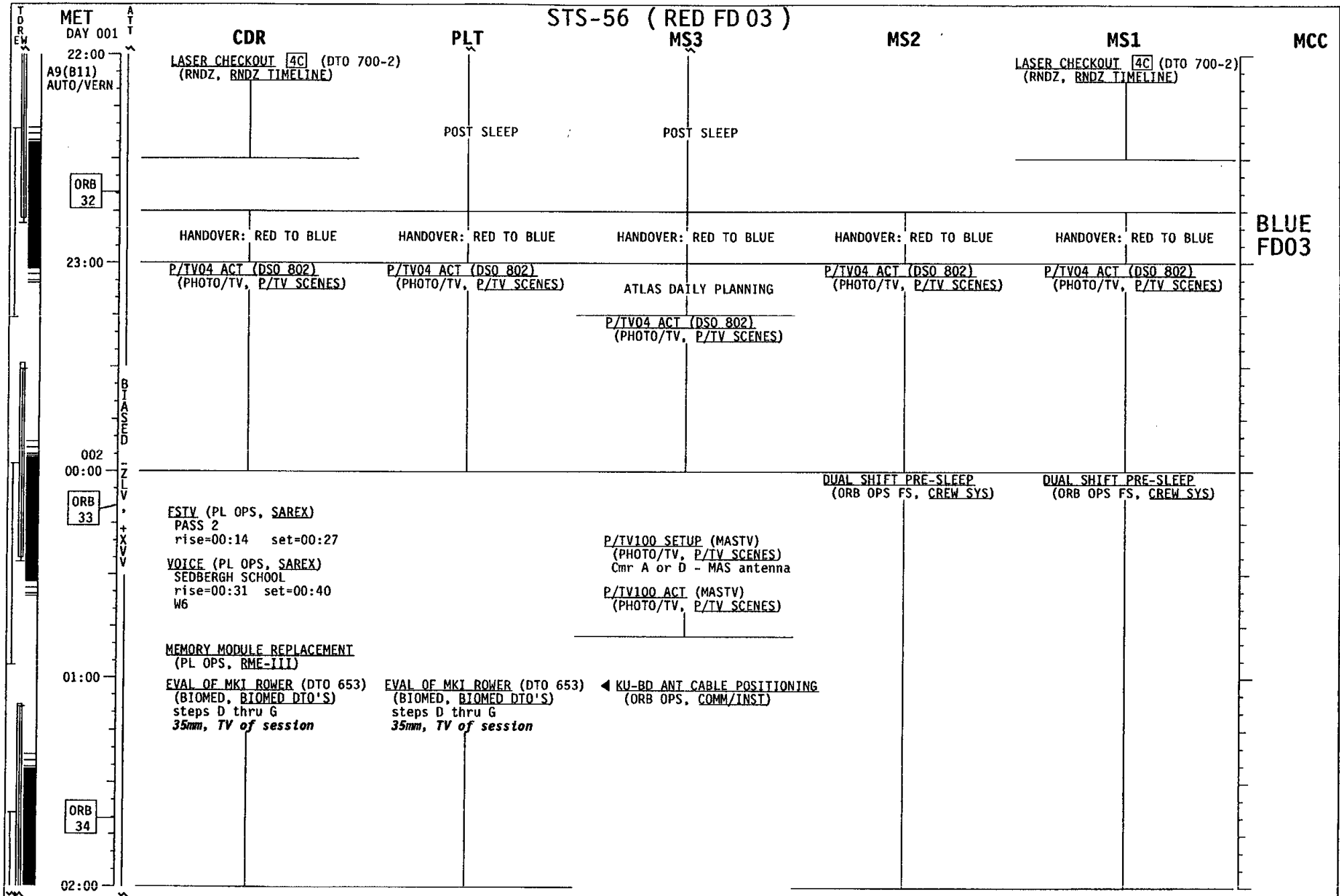


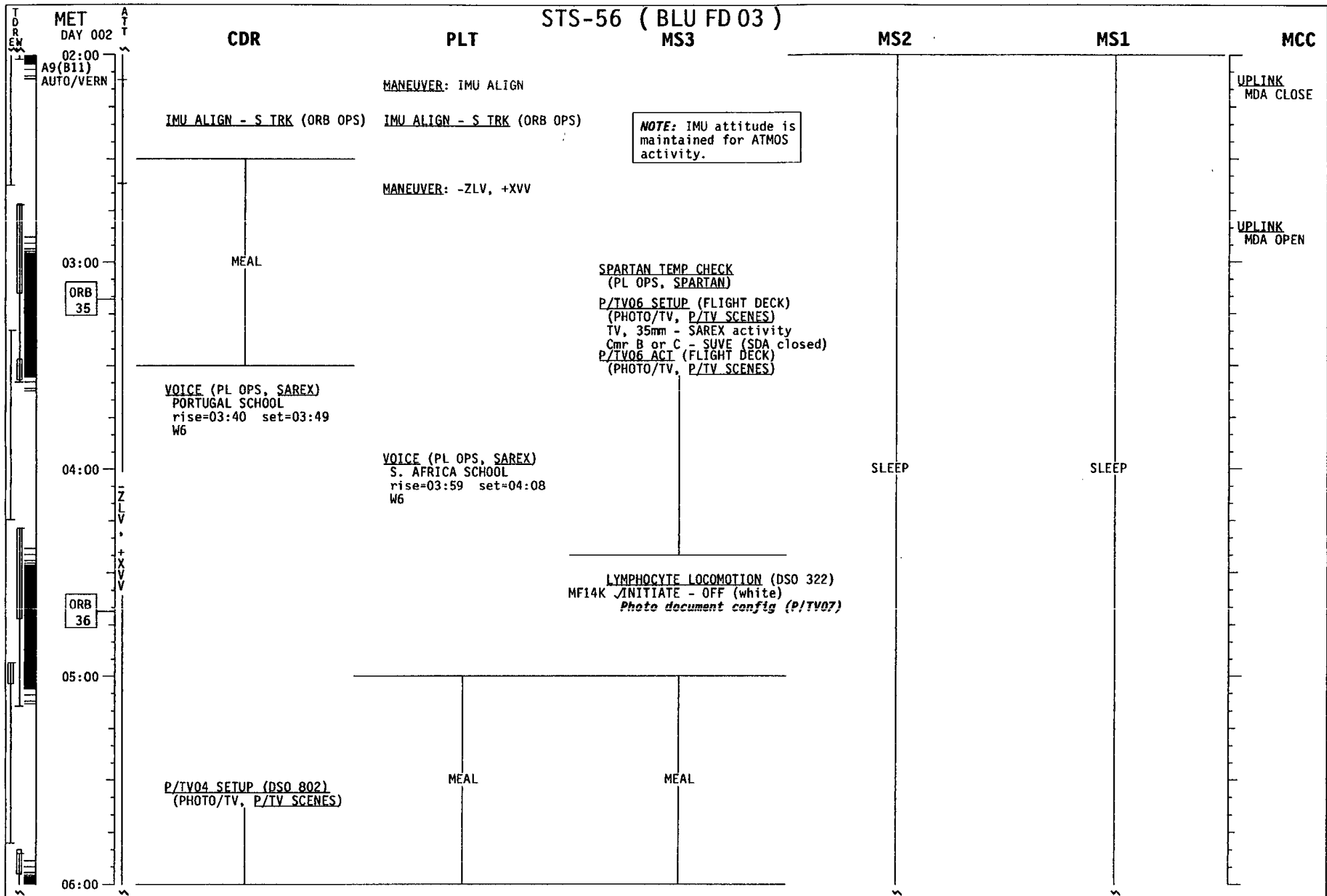


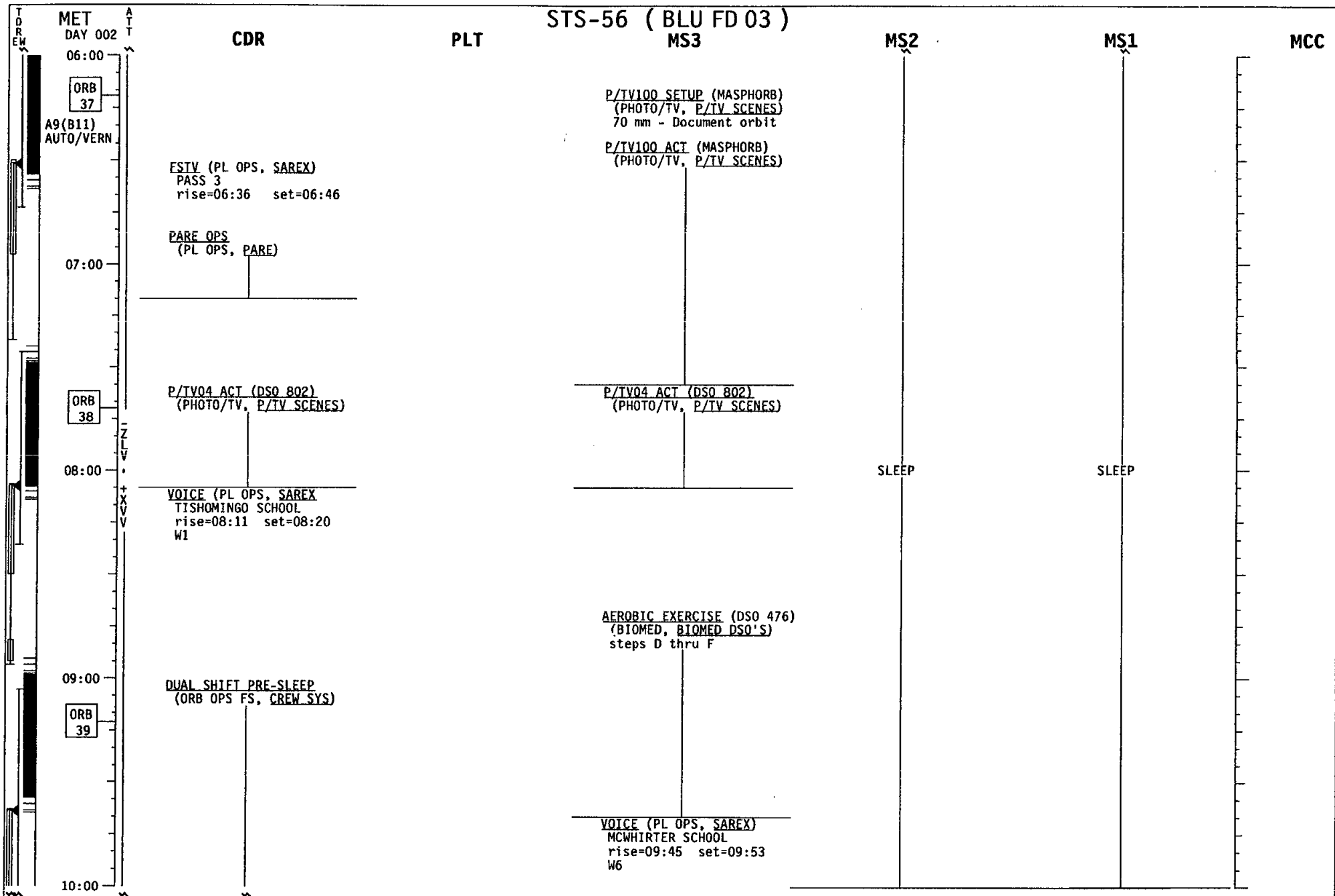


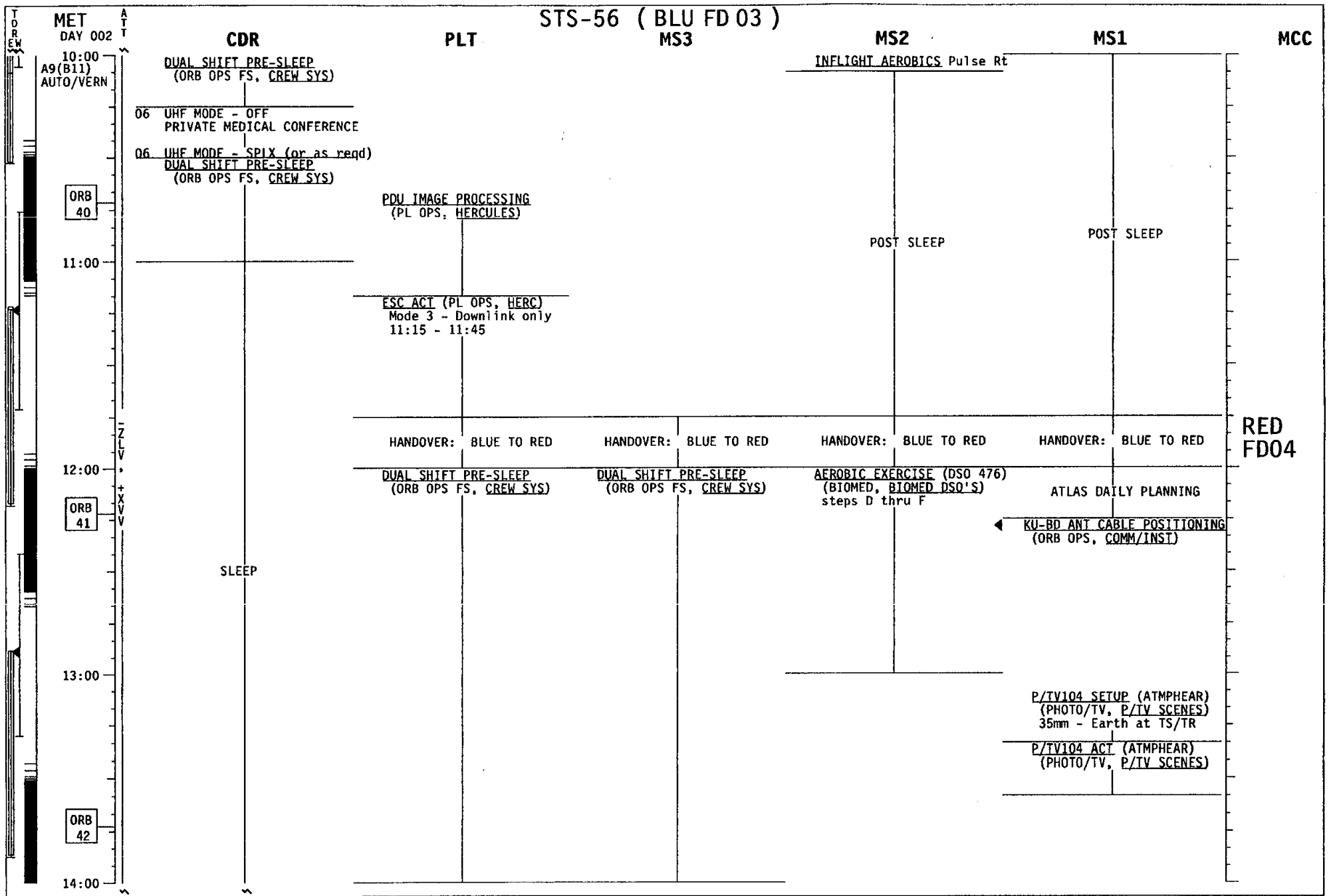


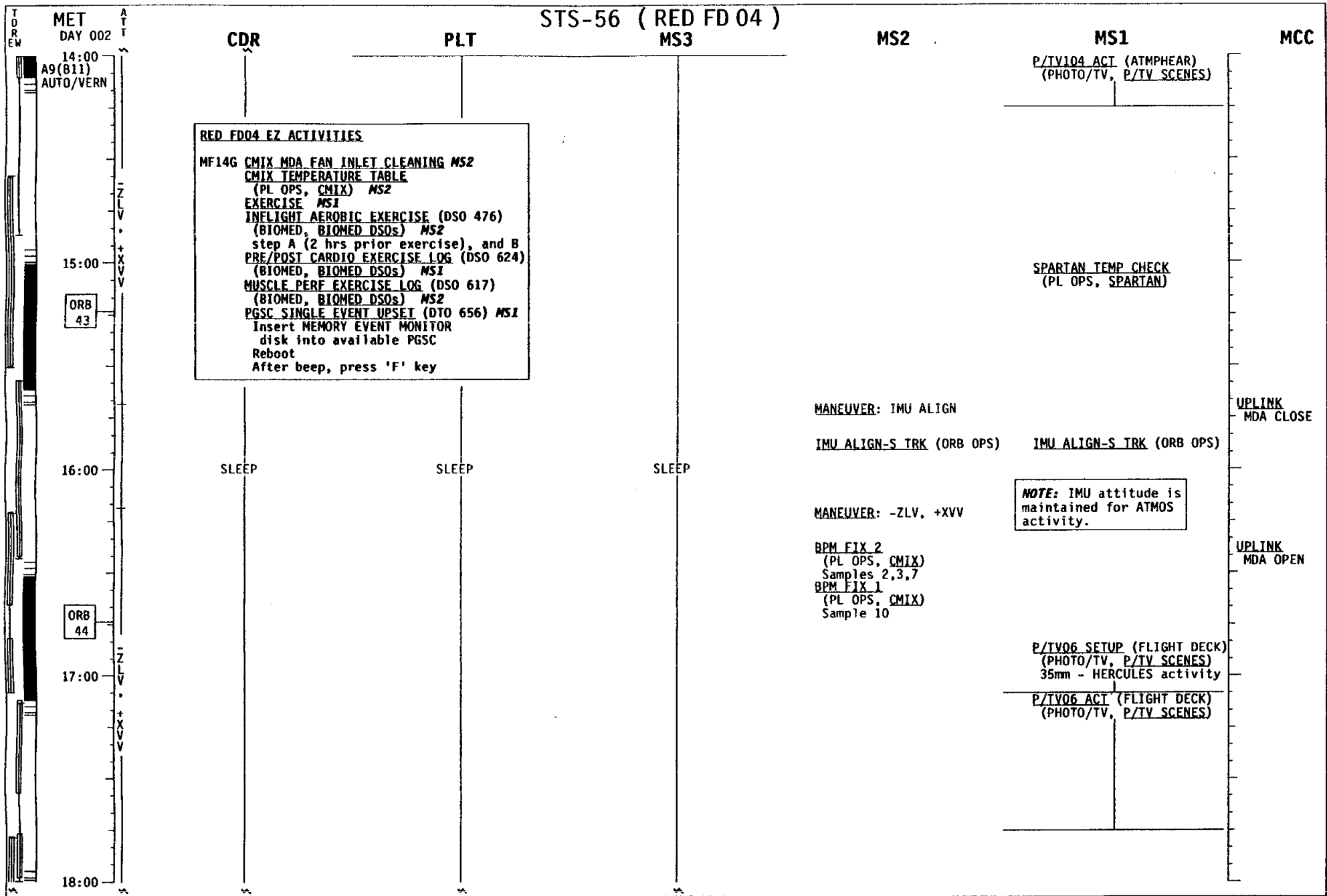




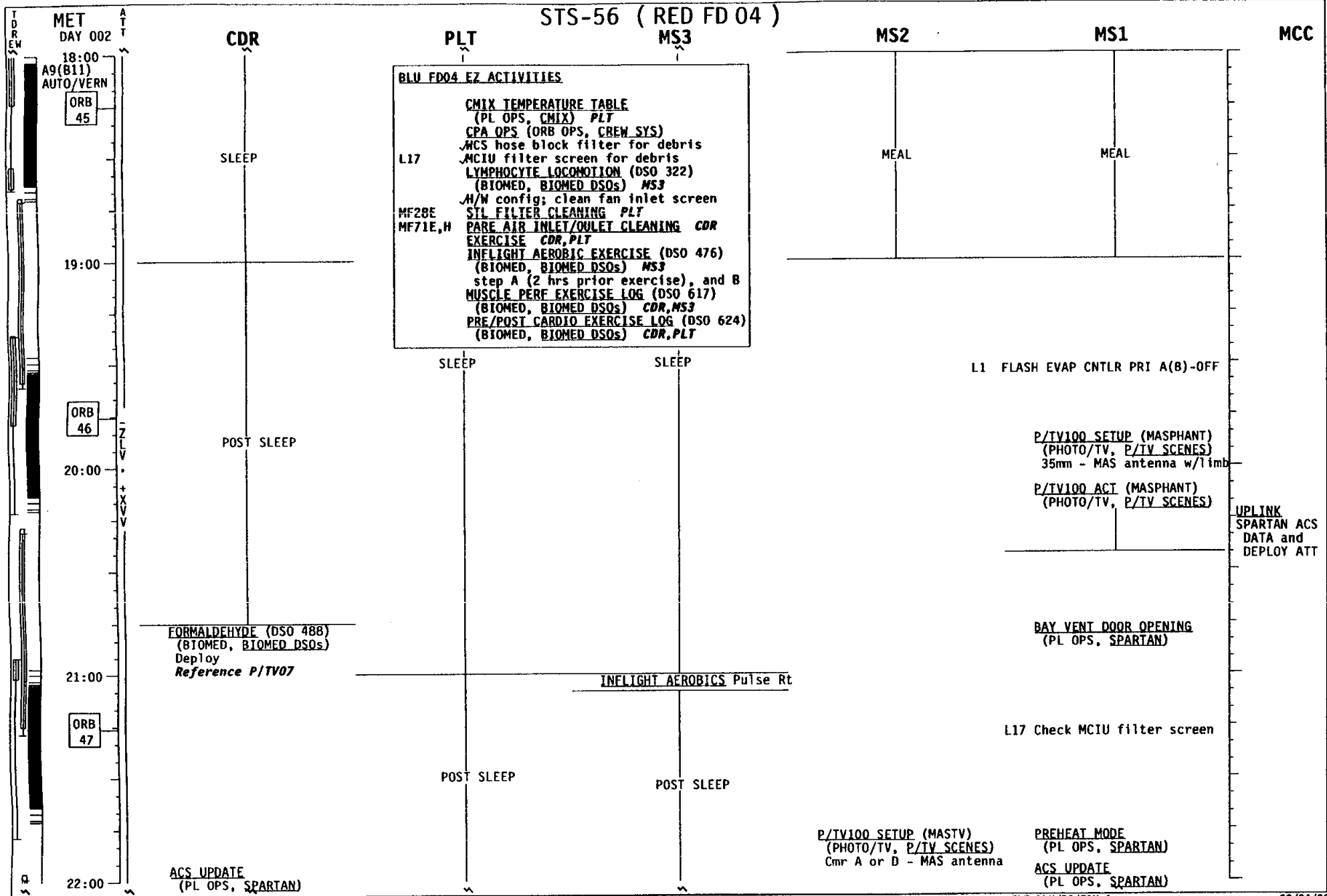


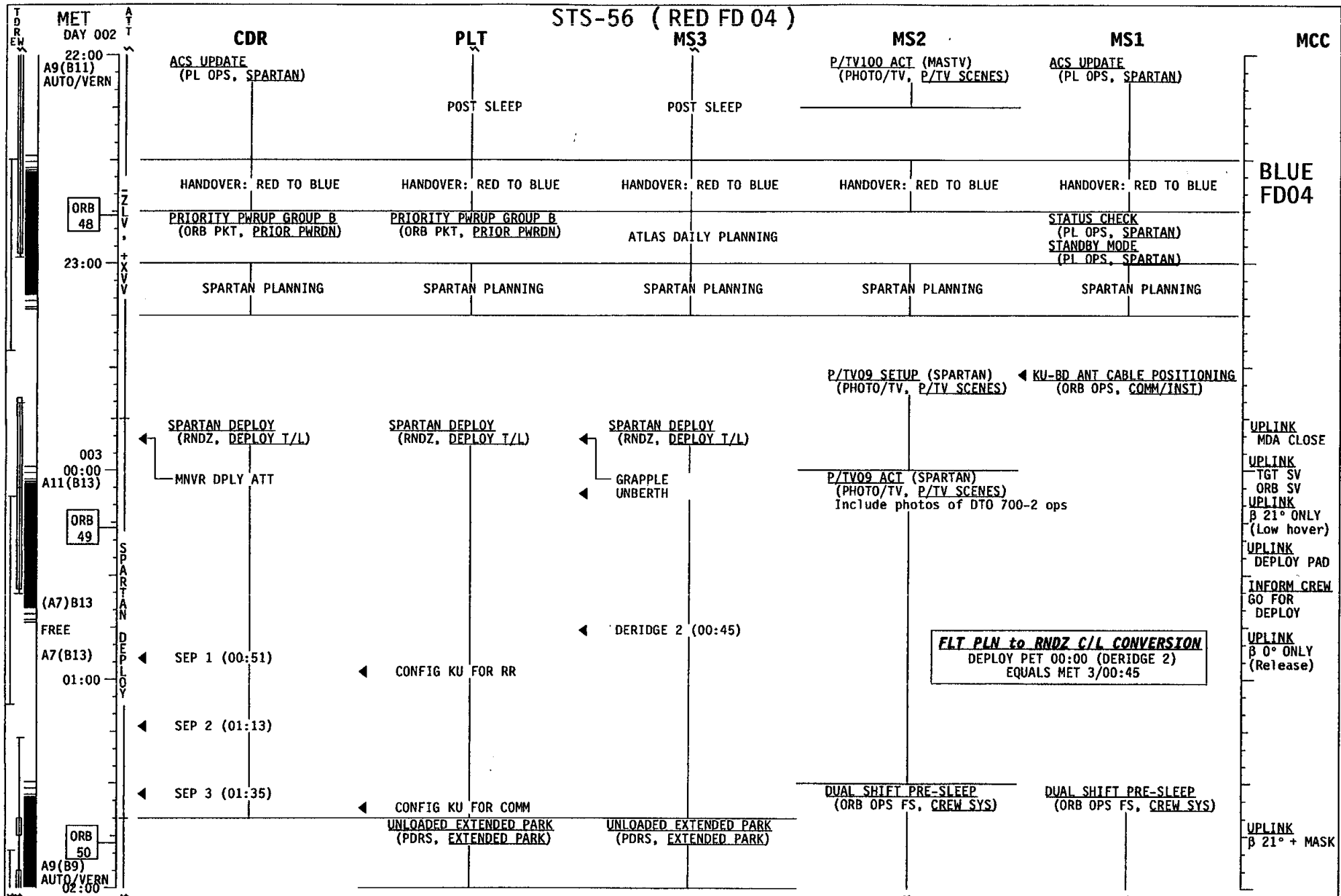


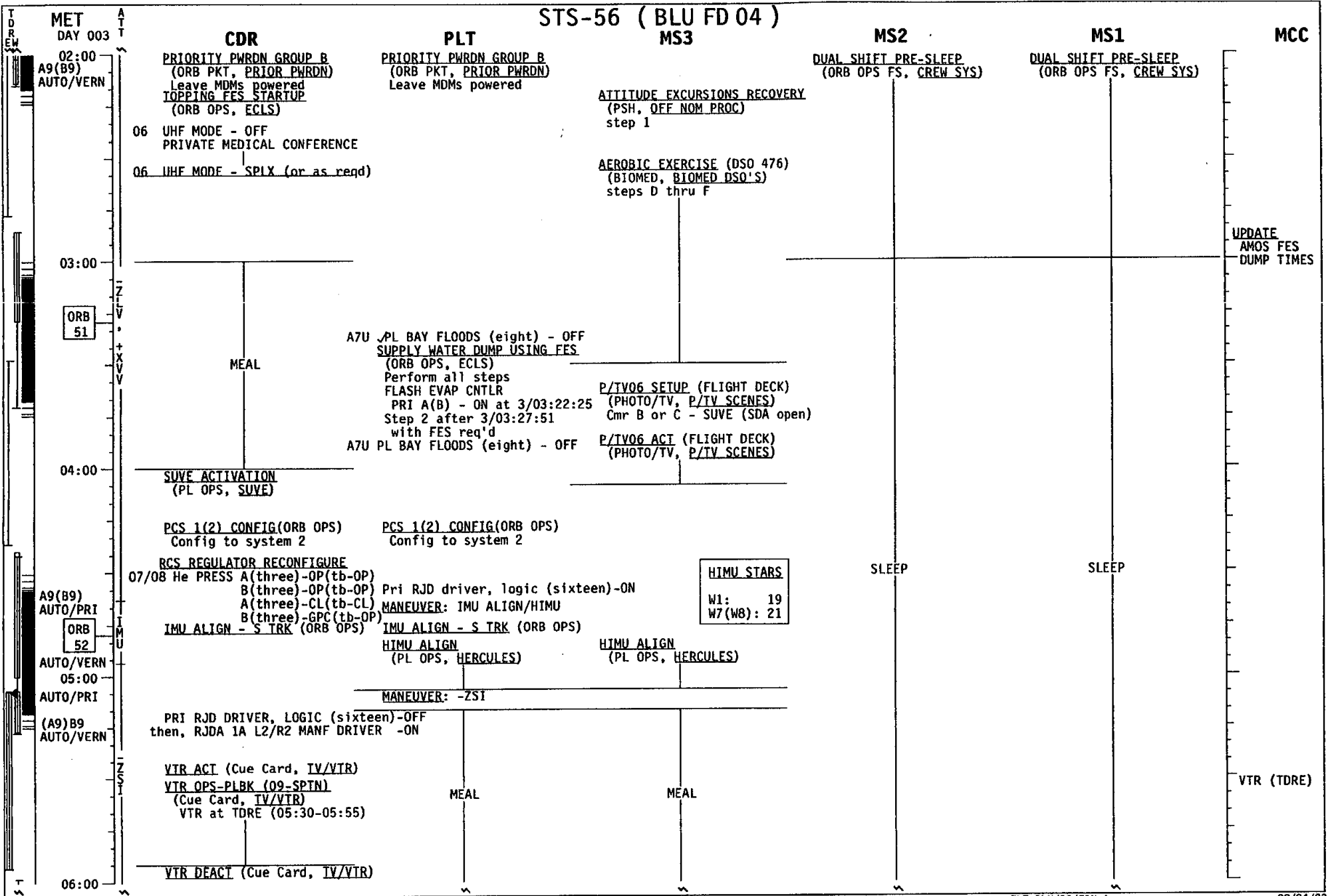


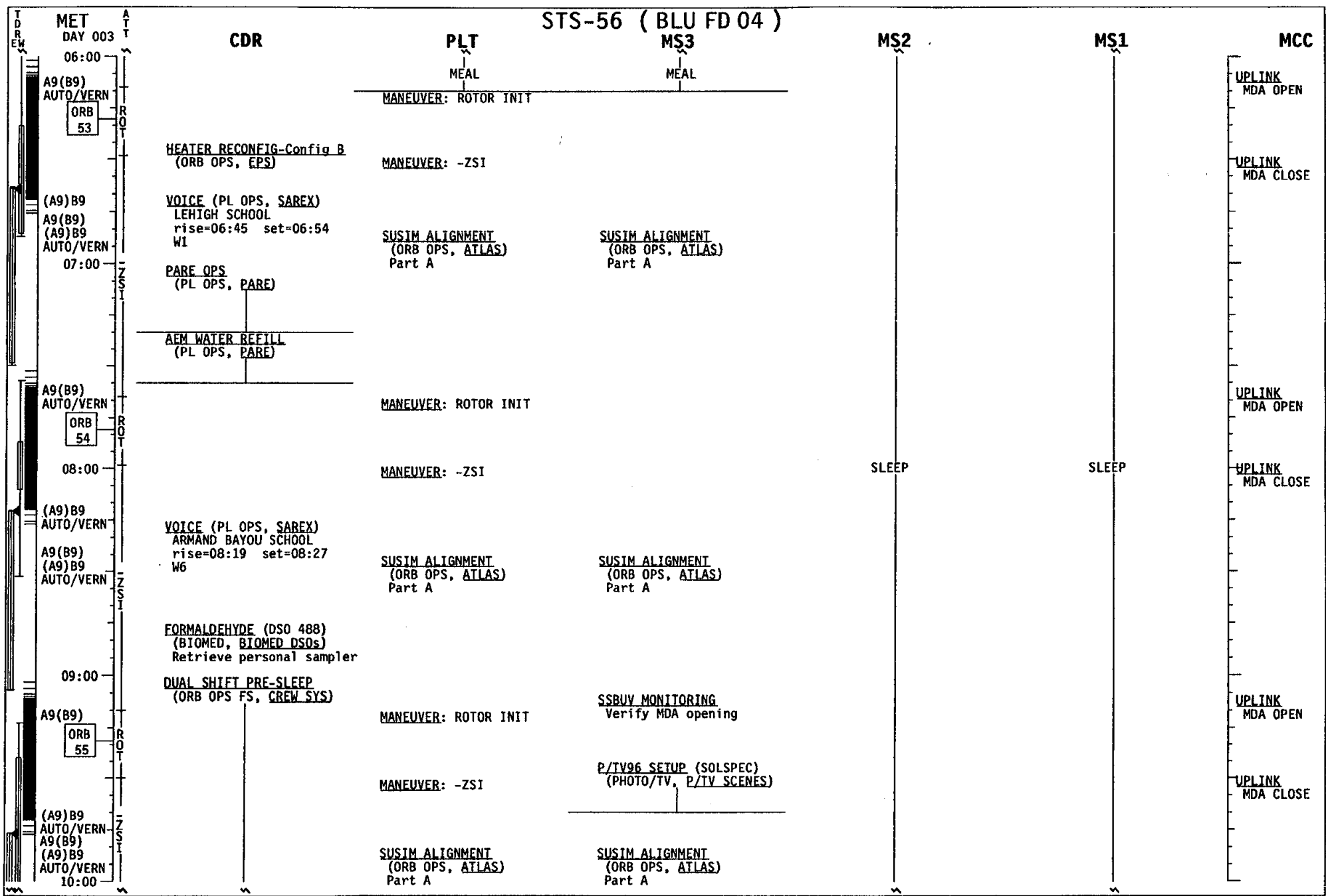


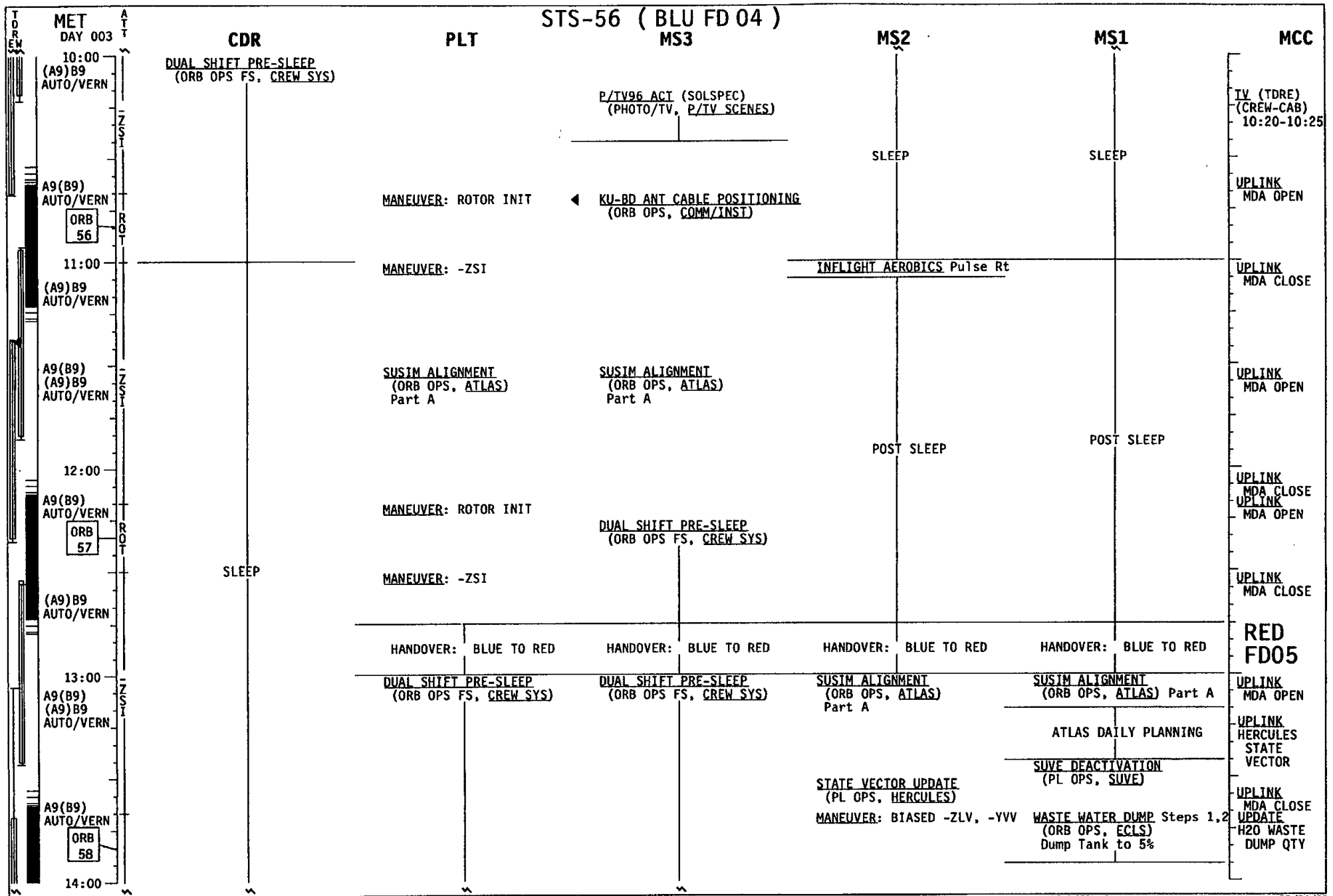
STS-56 (RED FD 04)

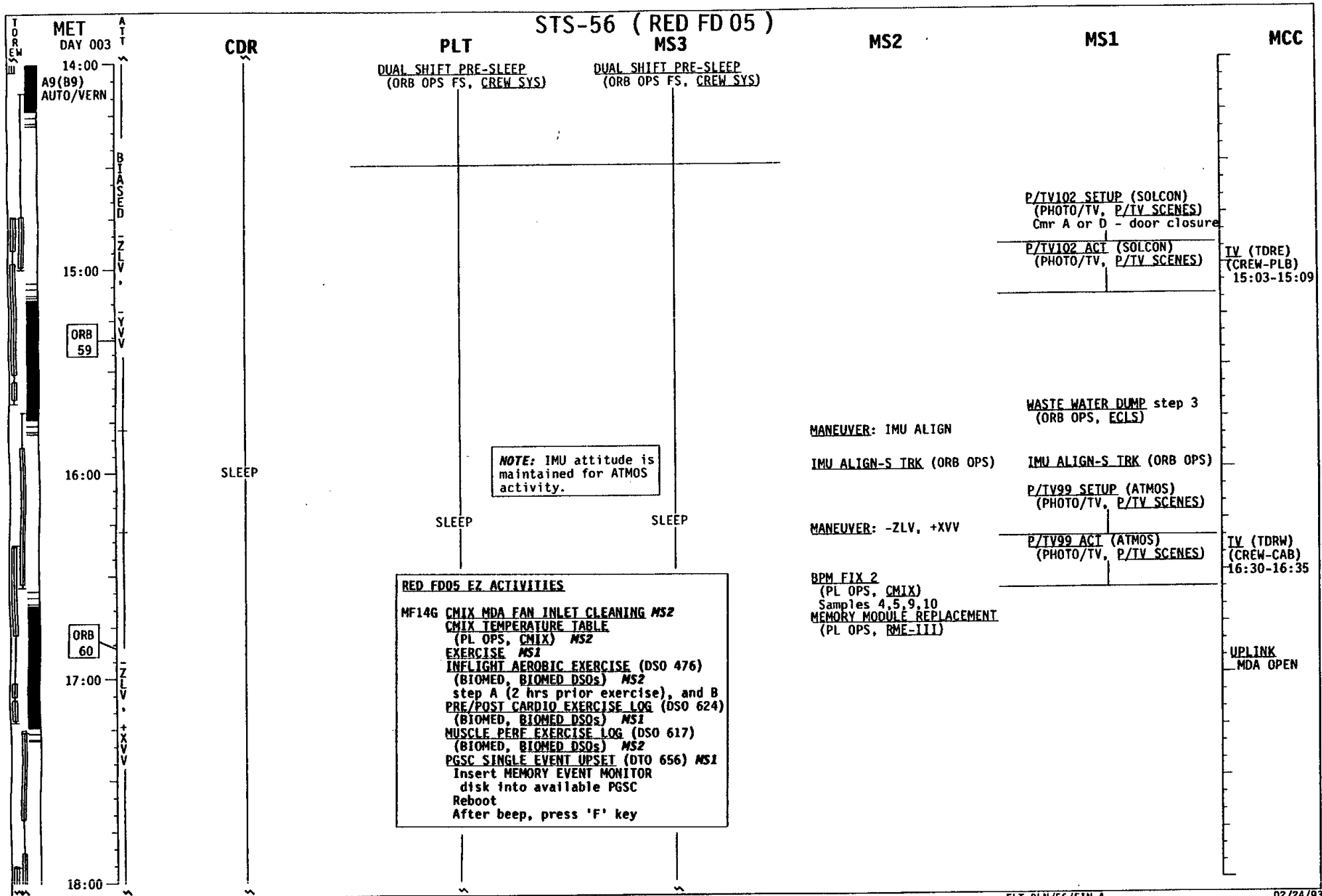


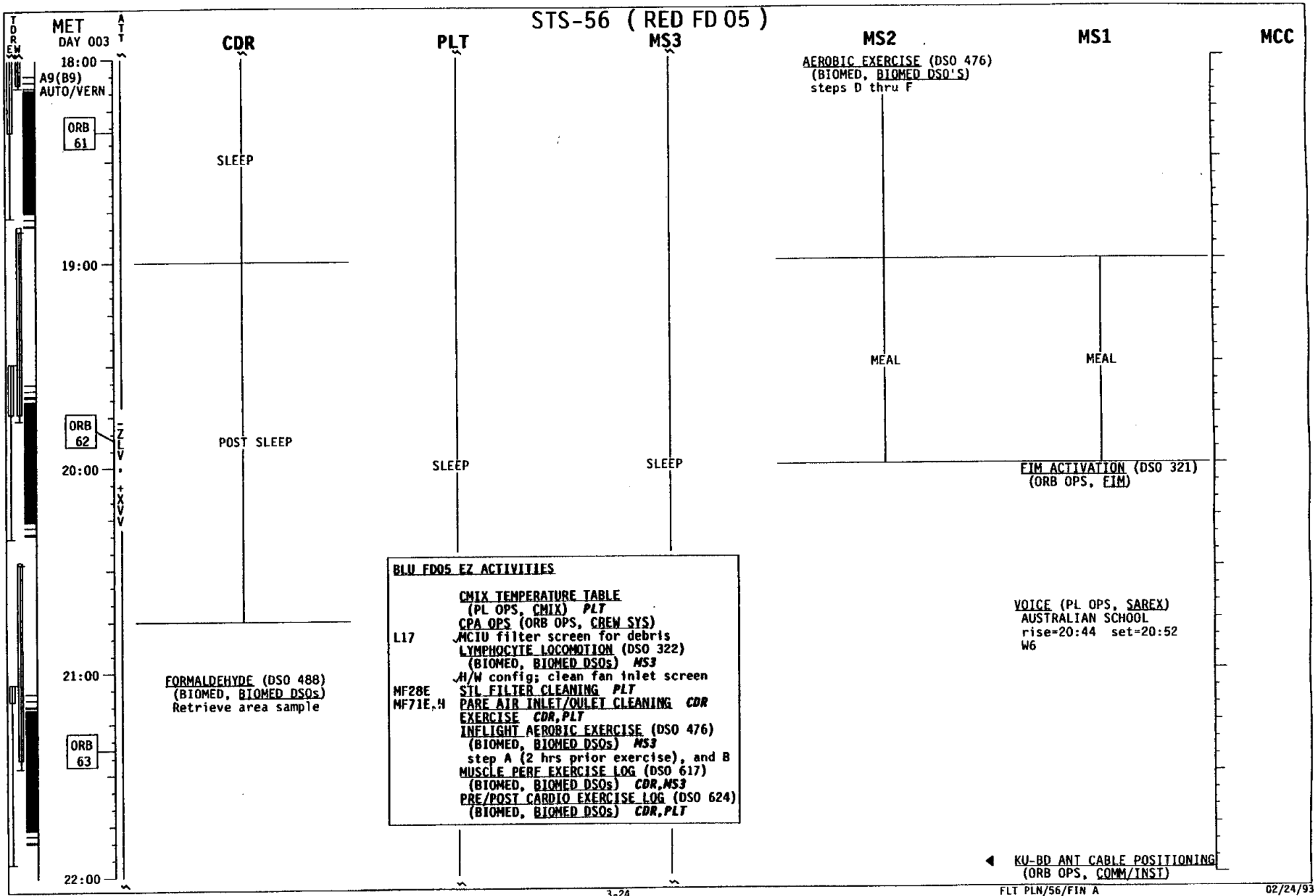


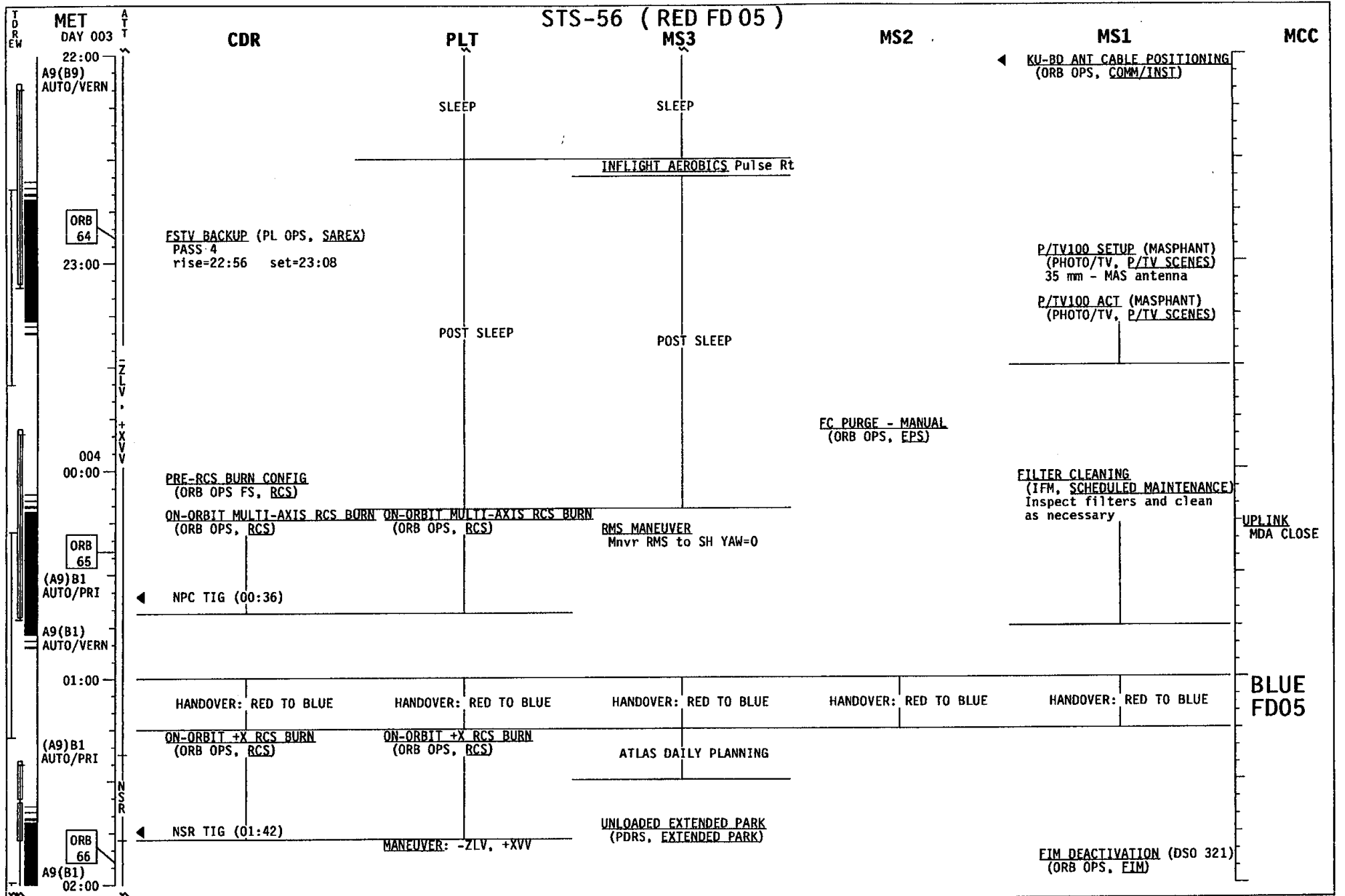


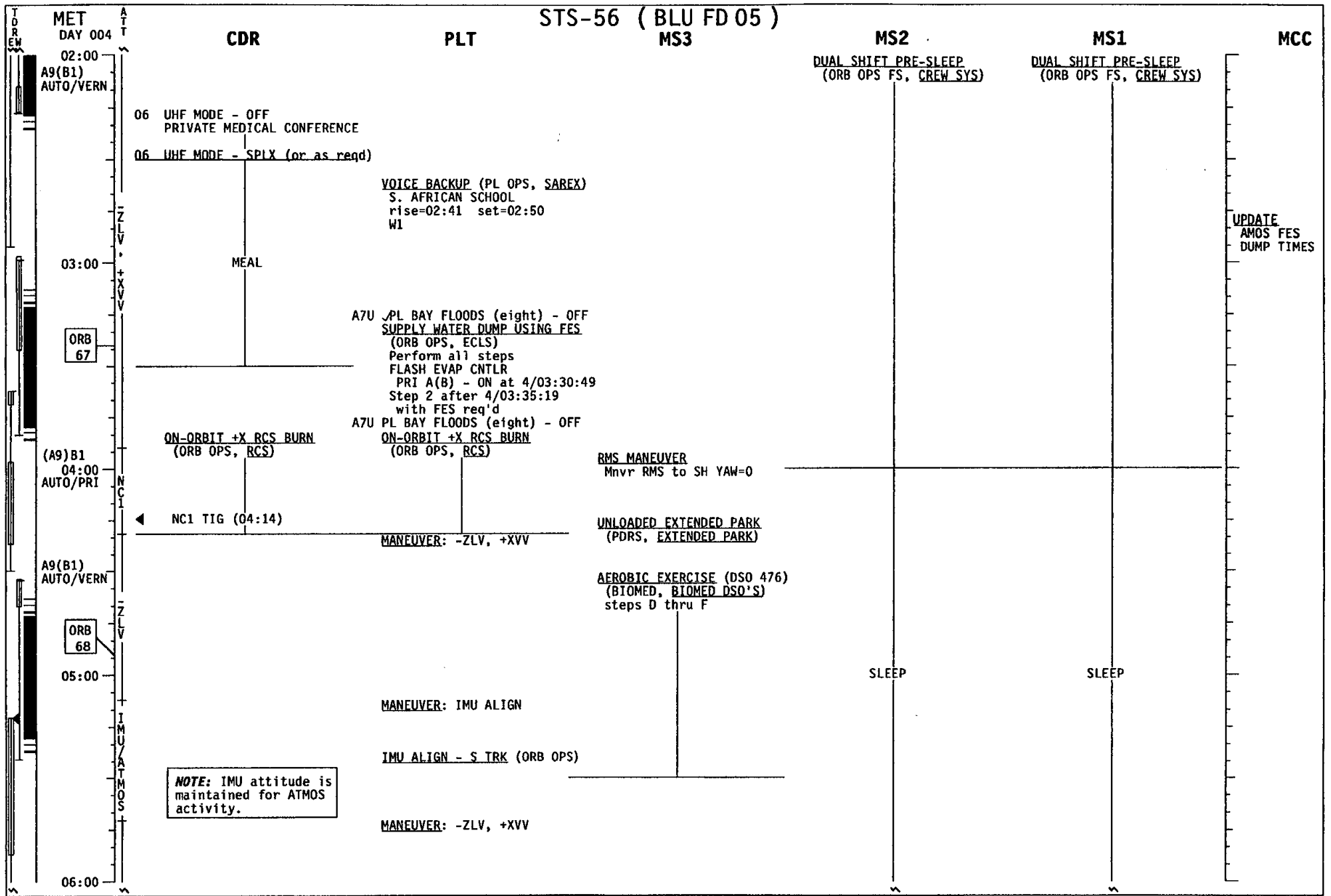


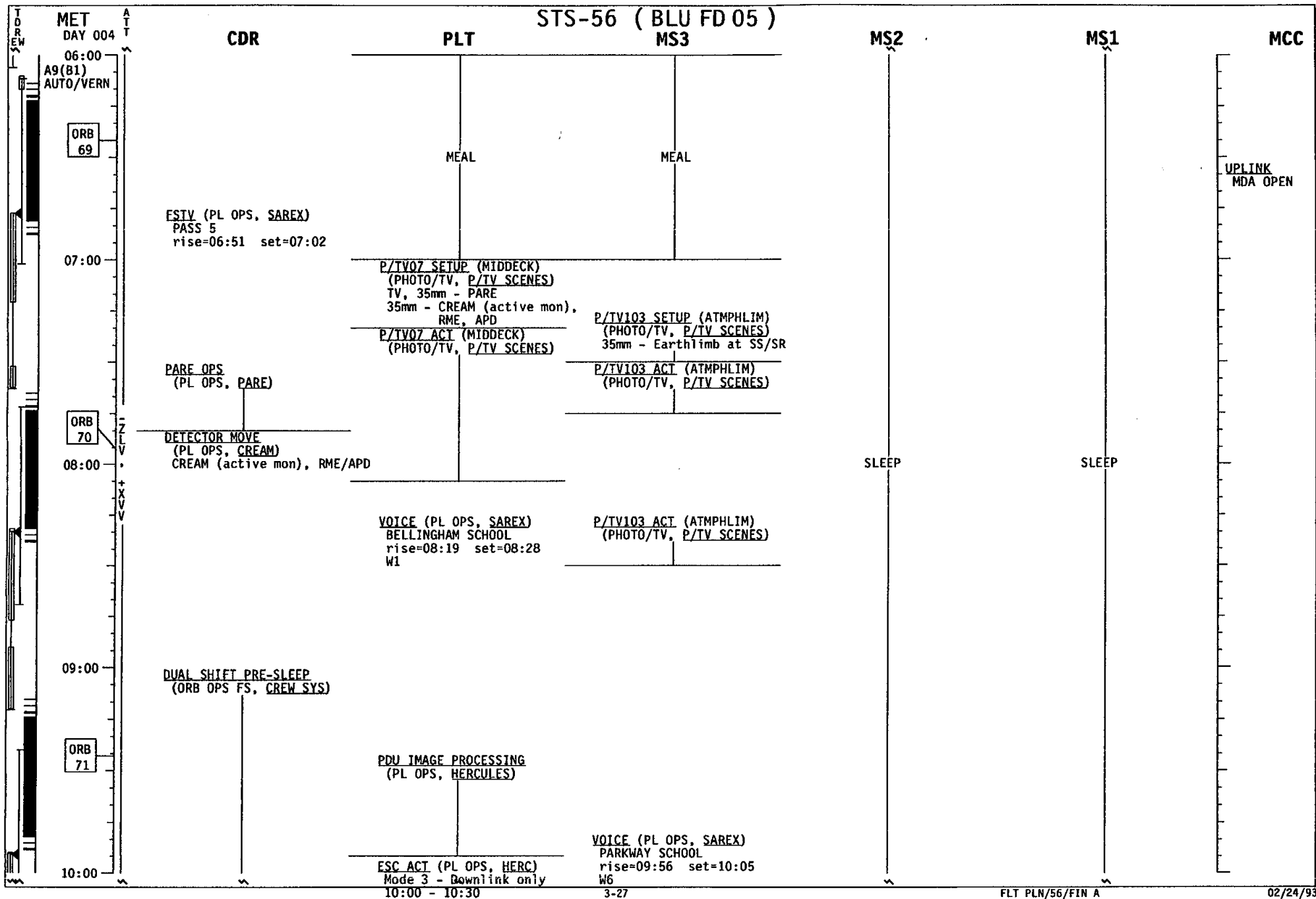


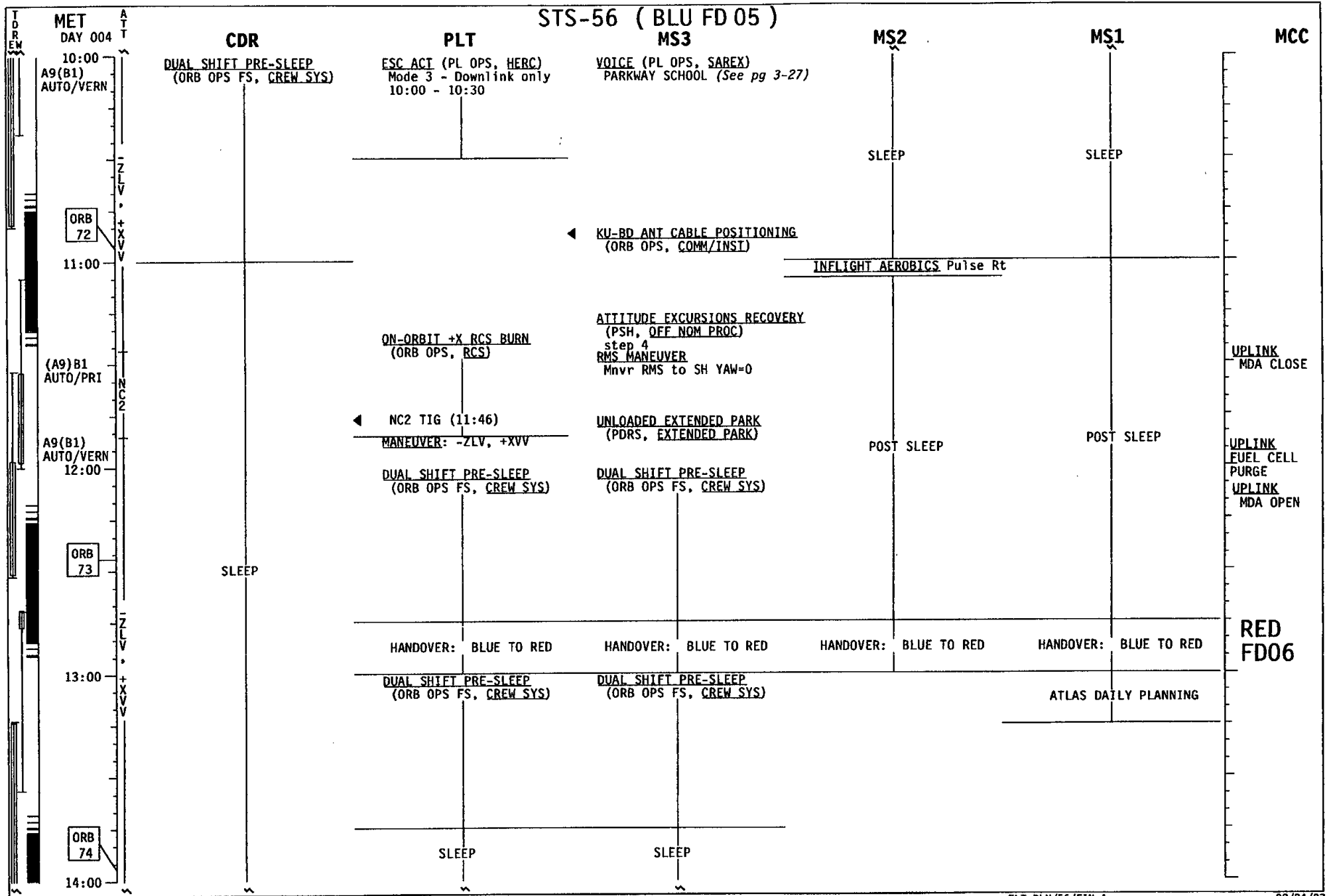


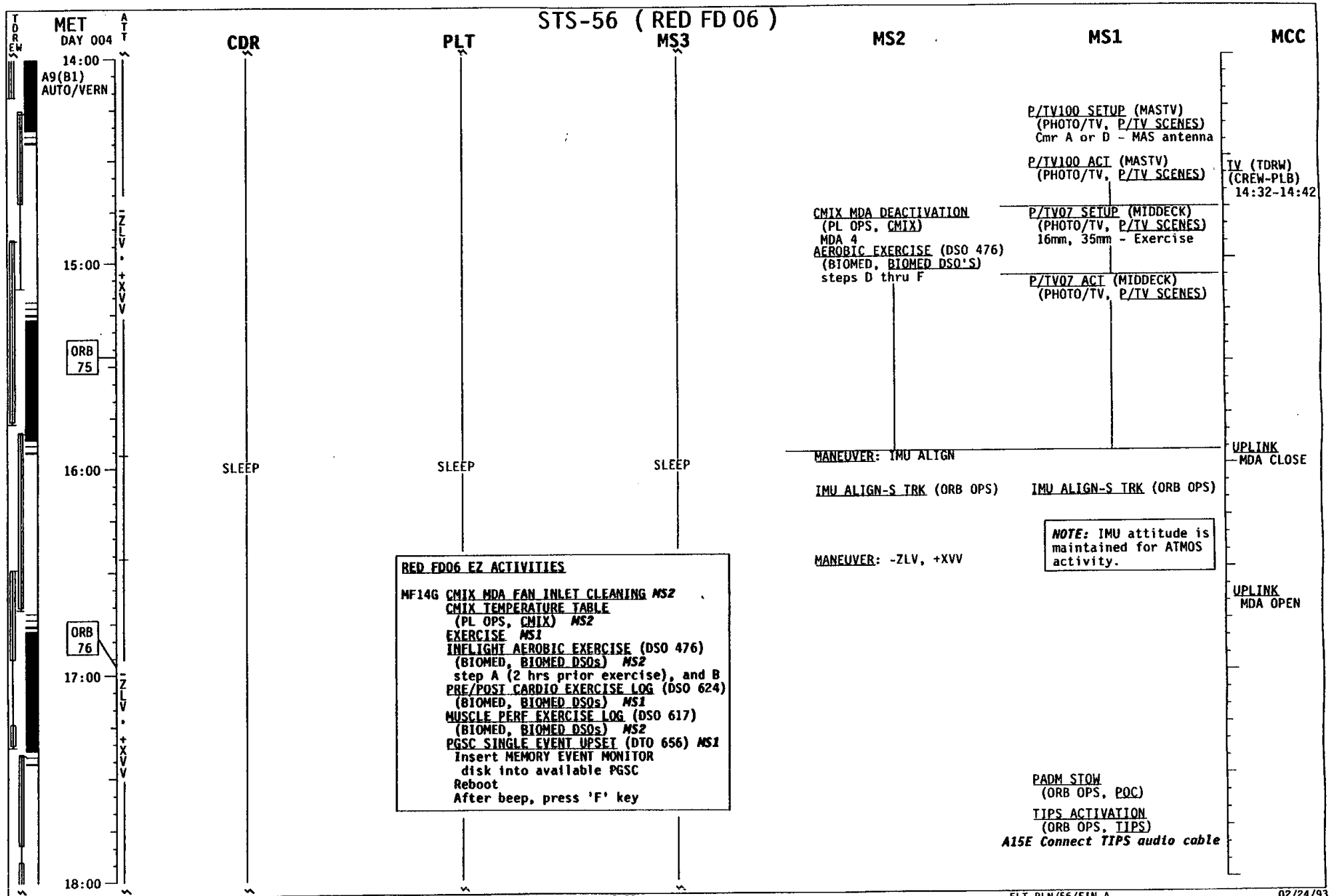


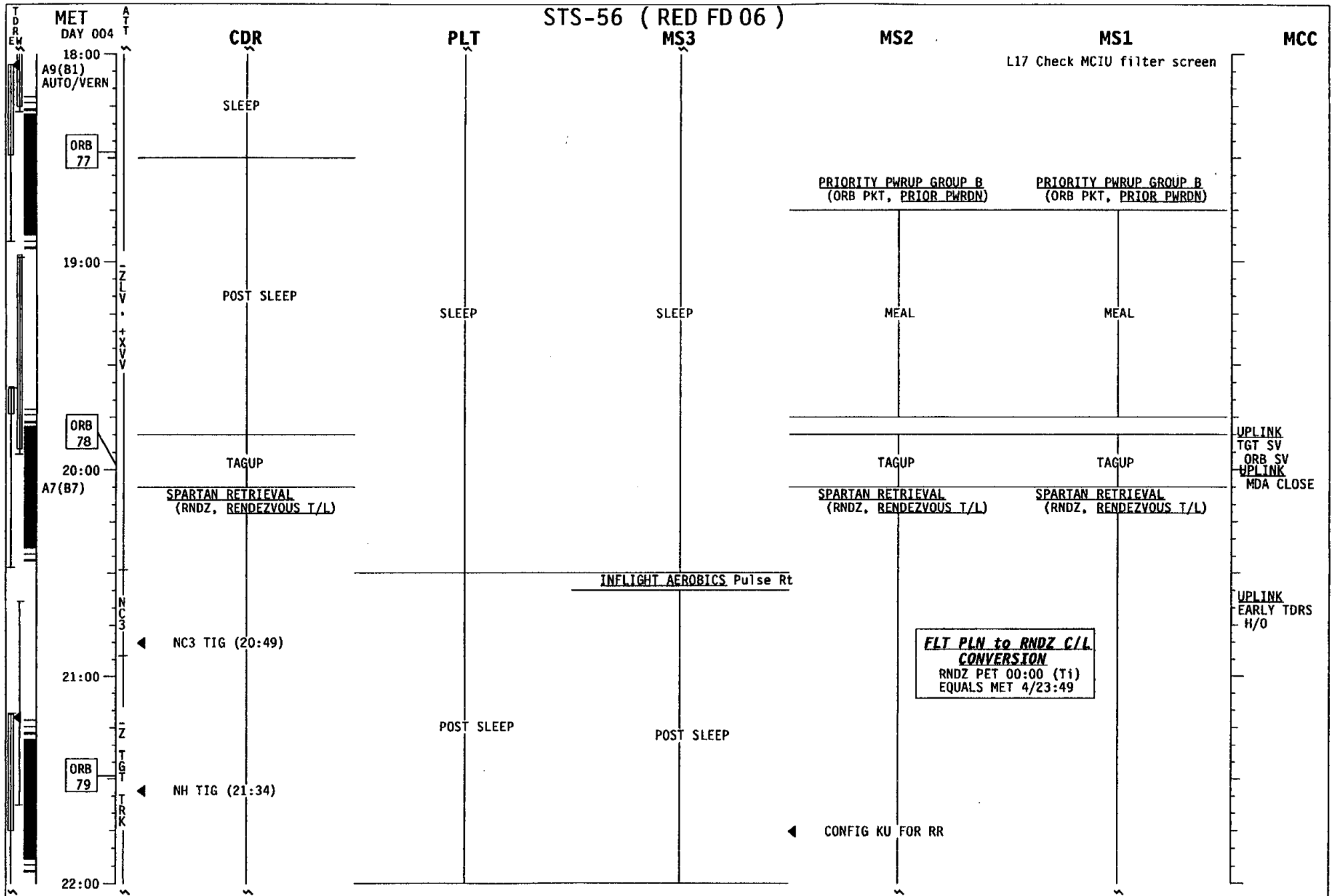


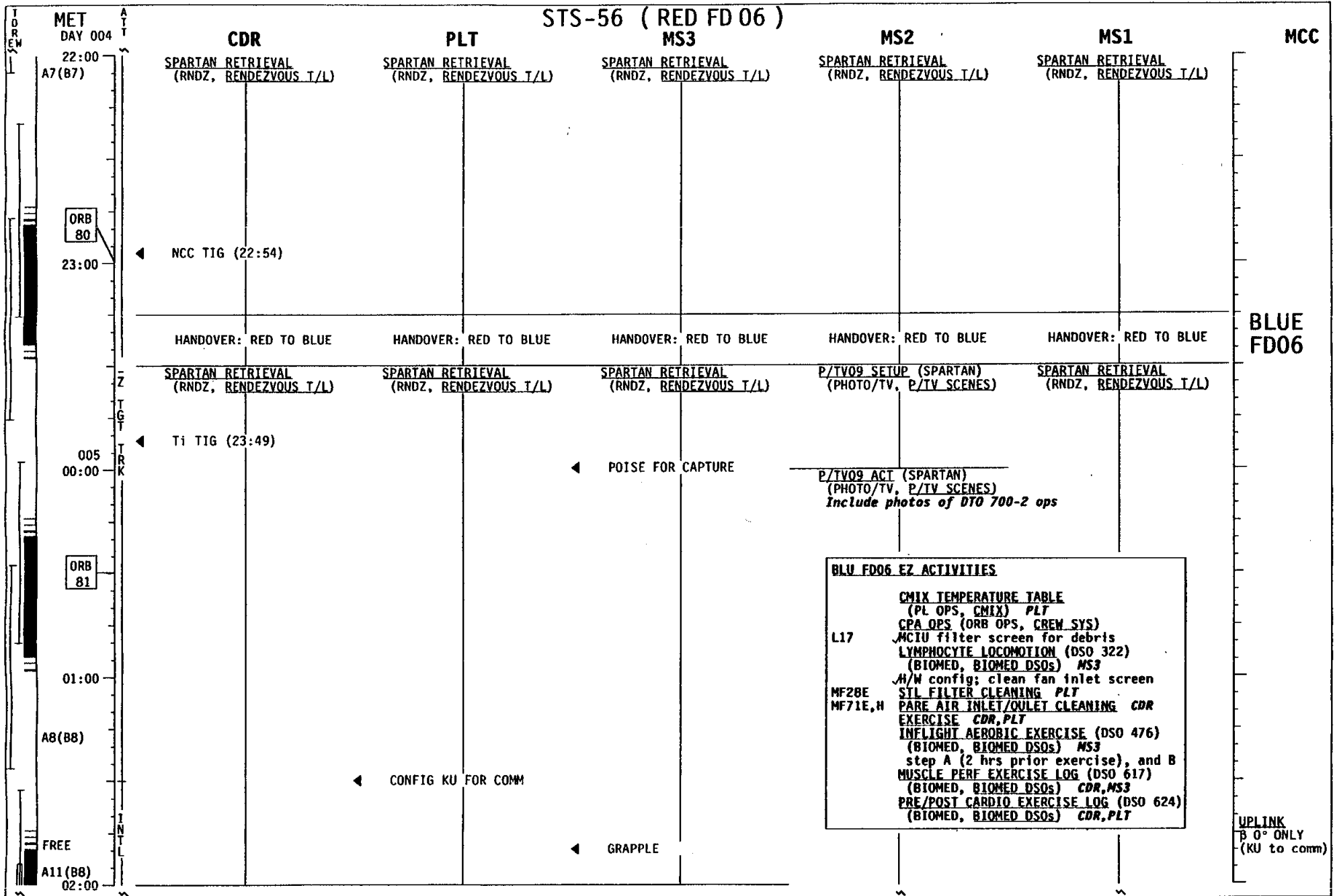






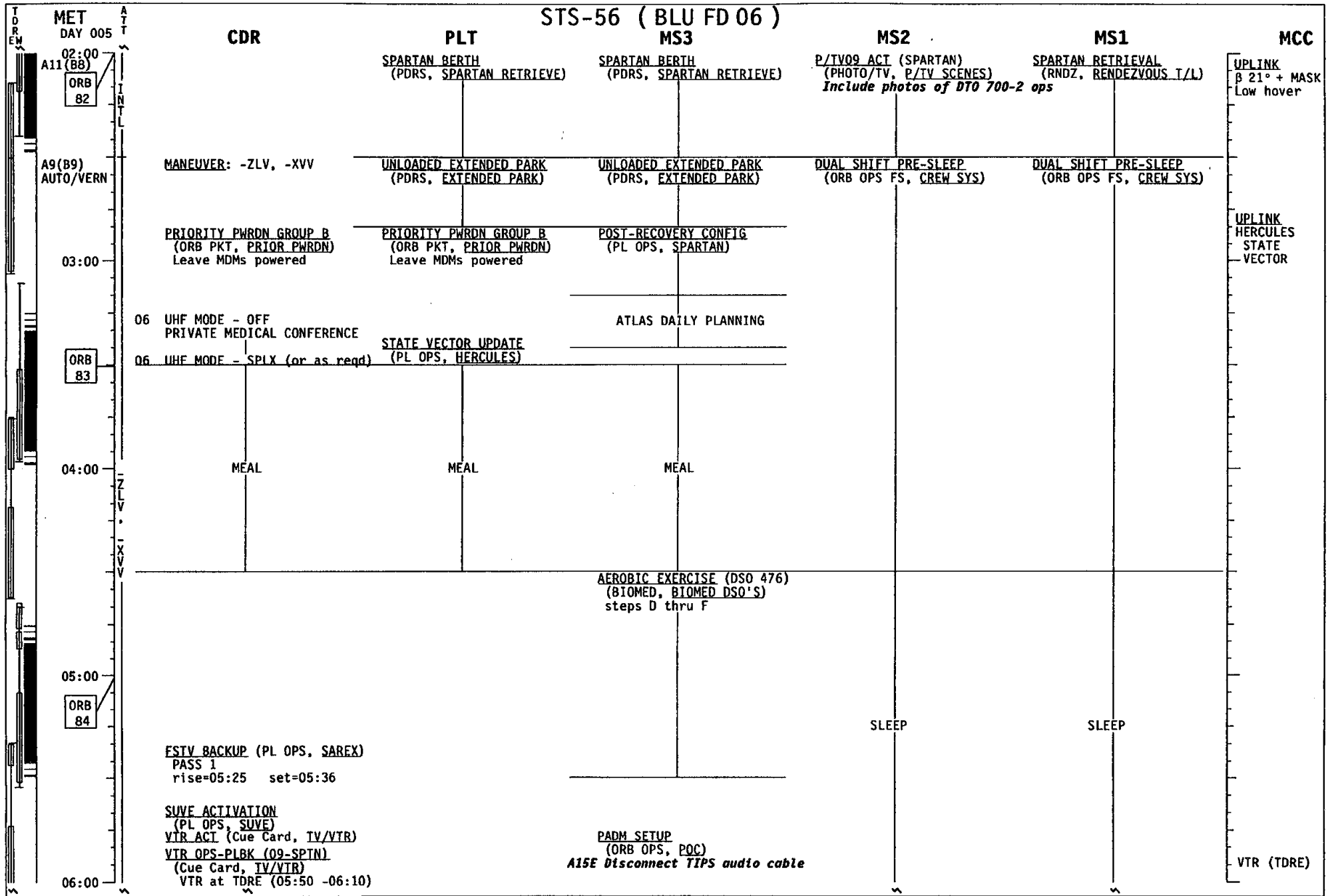


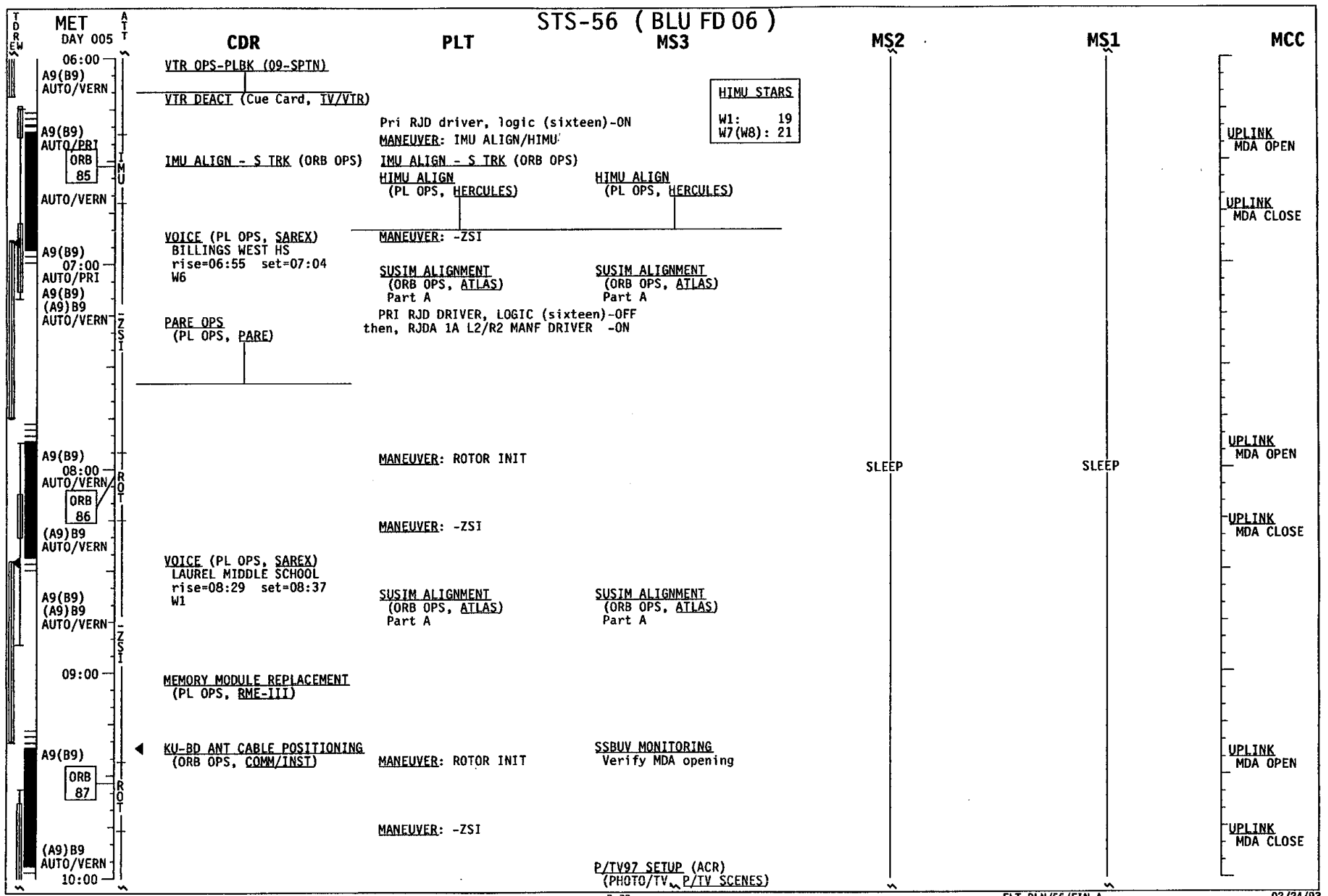




**BLUE
FD06**

UPLINK
B O° ONLY
(KU to comm)





STS-56 (BLU FD 06)

MET DAY 005
 06:00 A9(B9) AUTO/VERN
 07:00 A9(B9) AUTO/PRI (A9)B9 AUTO/VERN
 08:00 A9(B9) AUTO/VERN (A9)B9 AUTO/VERN
 09:00 A9(B9) (A9)B9 AUTO/VERN
 10:00 (A9)B9 AUTO/VERN

CDR
 VTR OPS-PLBK (09-SPTN)
 VTR DEACT (Cue Card, TV/VTR)
 IMU ALIGN - S TRK (ORB OPS)
 VOICE (PL OPS, SAREX)
 BILLINGS WEST HS
 rise=06:55 set=07:04 W6
 PARE OPS (PL OPS, PARE)
 MANEUVER: ROTOR INIT
 MANEUVER: -ZSI
 VOICE (PL OPS, SAREX)
 LAUREL MIDDLE SCHOOL
 rise=08:29 set=08:37 W1
 MEMORY MODULE REPLACEMENT (PL OPS, RME-III)
 KU-BD ANT CABLE POSITIONING (ORB OPS, COMM/INST)

PLT
 Pri RJD driver, logic (sixteen)-ON
 MANEUVER: IMU ALIGN/HIMU
 IMU ALIGN - S TRK (ORB OPS)
 HIMU ALIGN (PL OPS, HERCULES)
 MANEUVER: -ZSI
 SUSIM ALIGNMENT (ORB OPS, ATLAS) Part A
 PRI RJD DRIVER, LOGIC (sixteen)-OFF then, RJDA 1A L2/R2 MANF DRIVER -ON
 MANEUVER: ROTOR INIT
 MANEUVER: -ZSI
 SUSIM ALIGNMENT (ORB OPS, ATLAS) Part A
 MANEUVER: ROTOR INIT
 MANEUVER: -ZSI

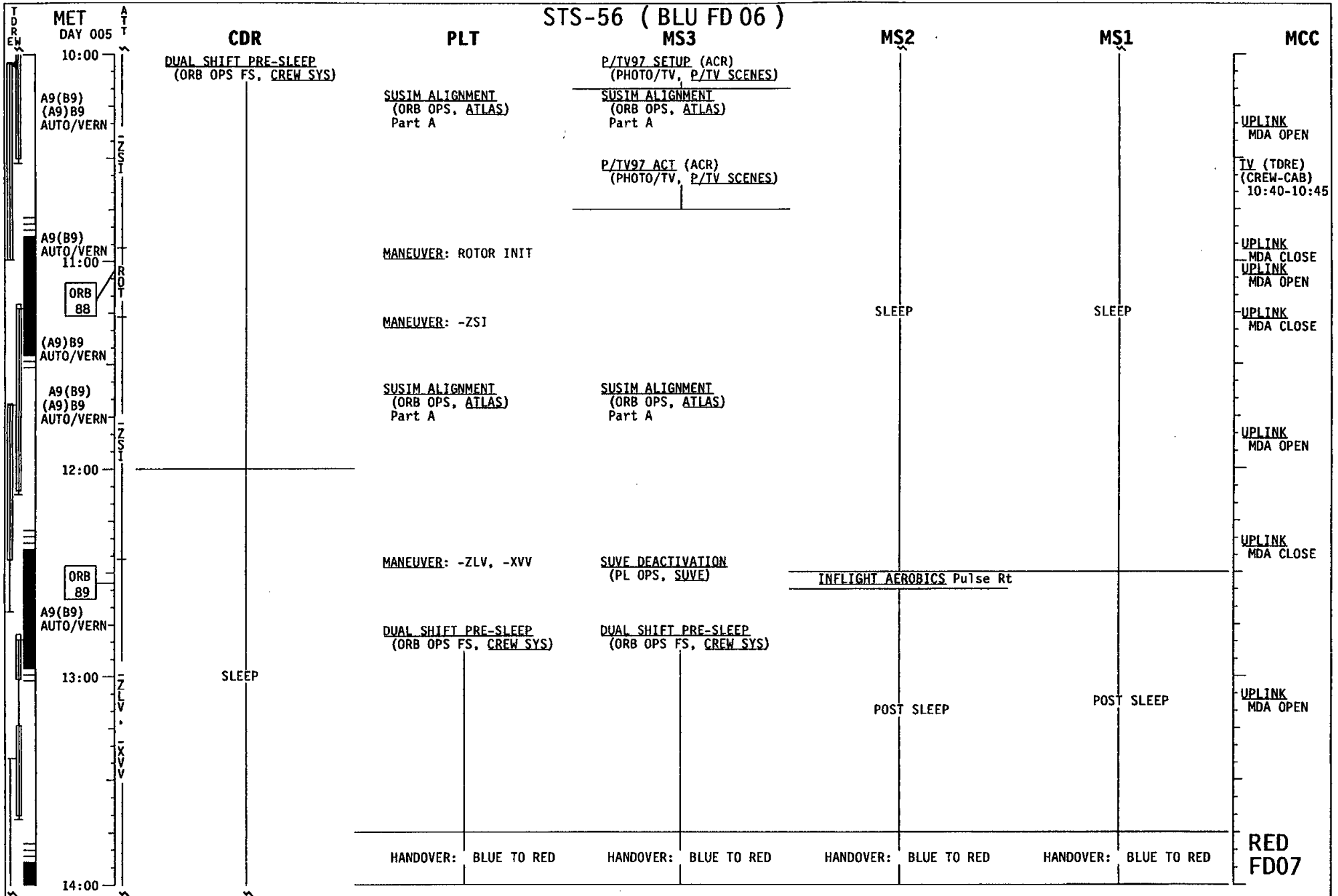
HIMU STARS
 W1: 19
 W7(W8): 21

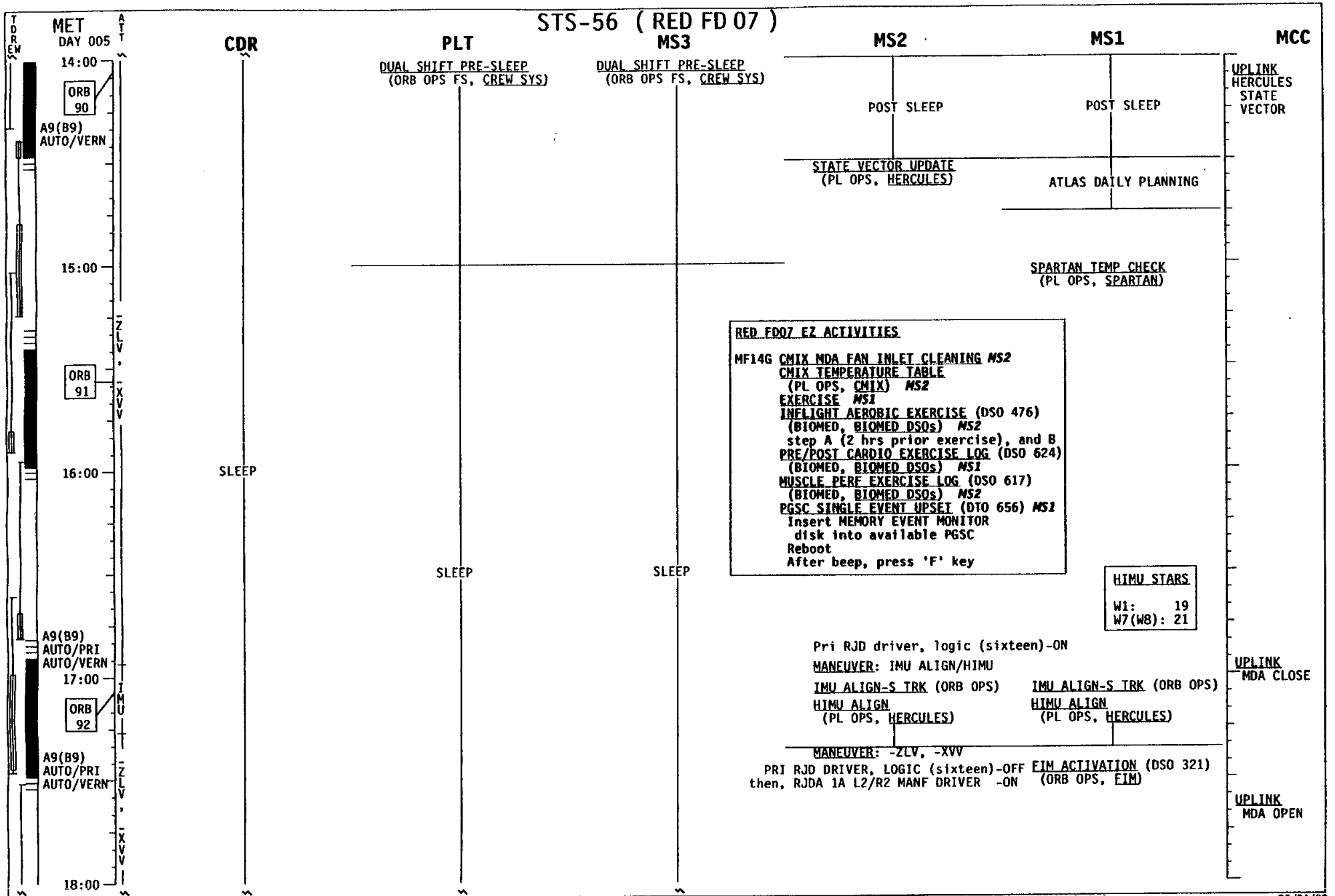
P/TV97 SETUP (ACR)
 (PHOTO/TV P/TV SCENES)

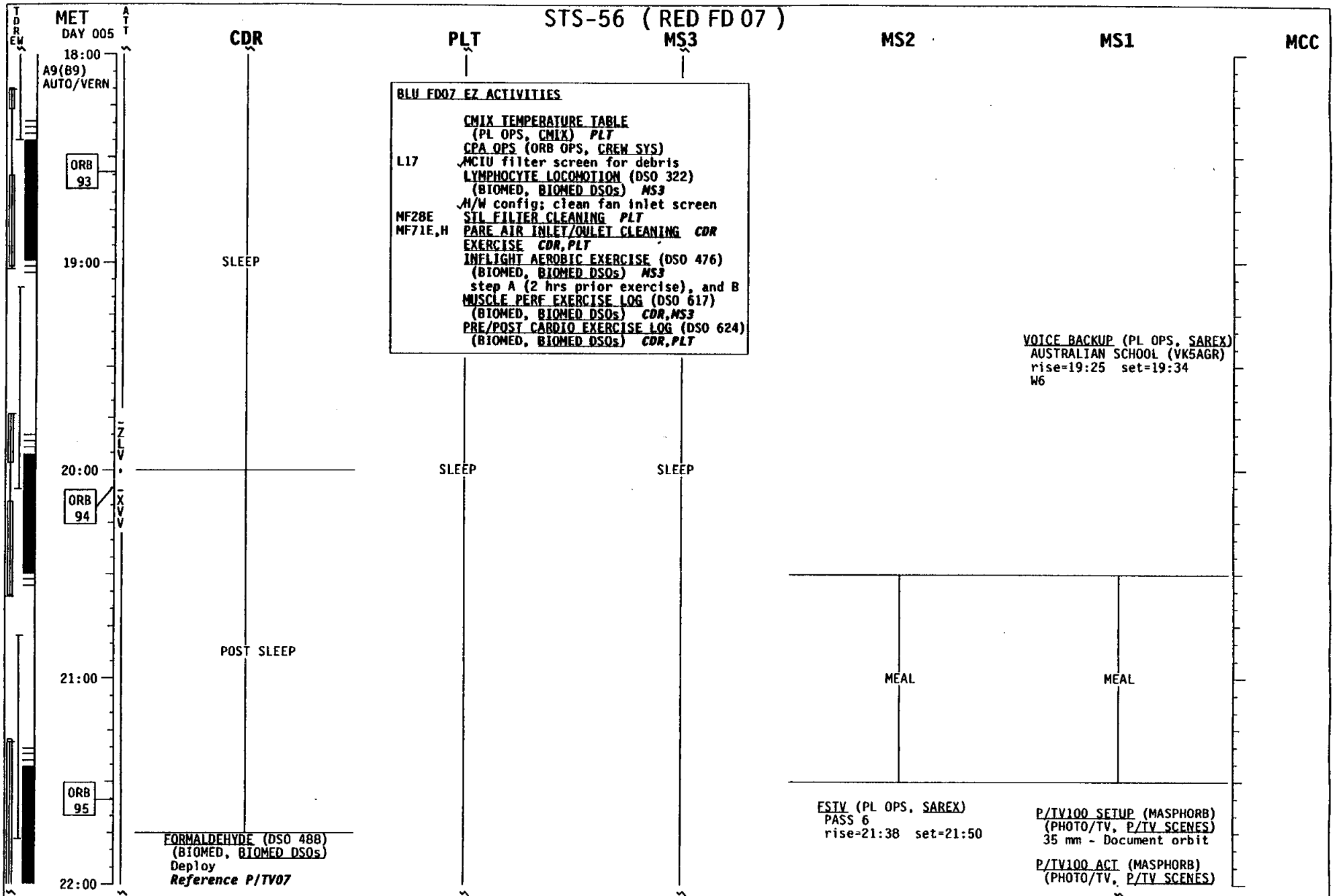
MS2
 SLEEP

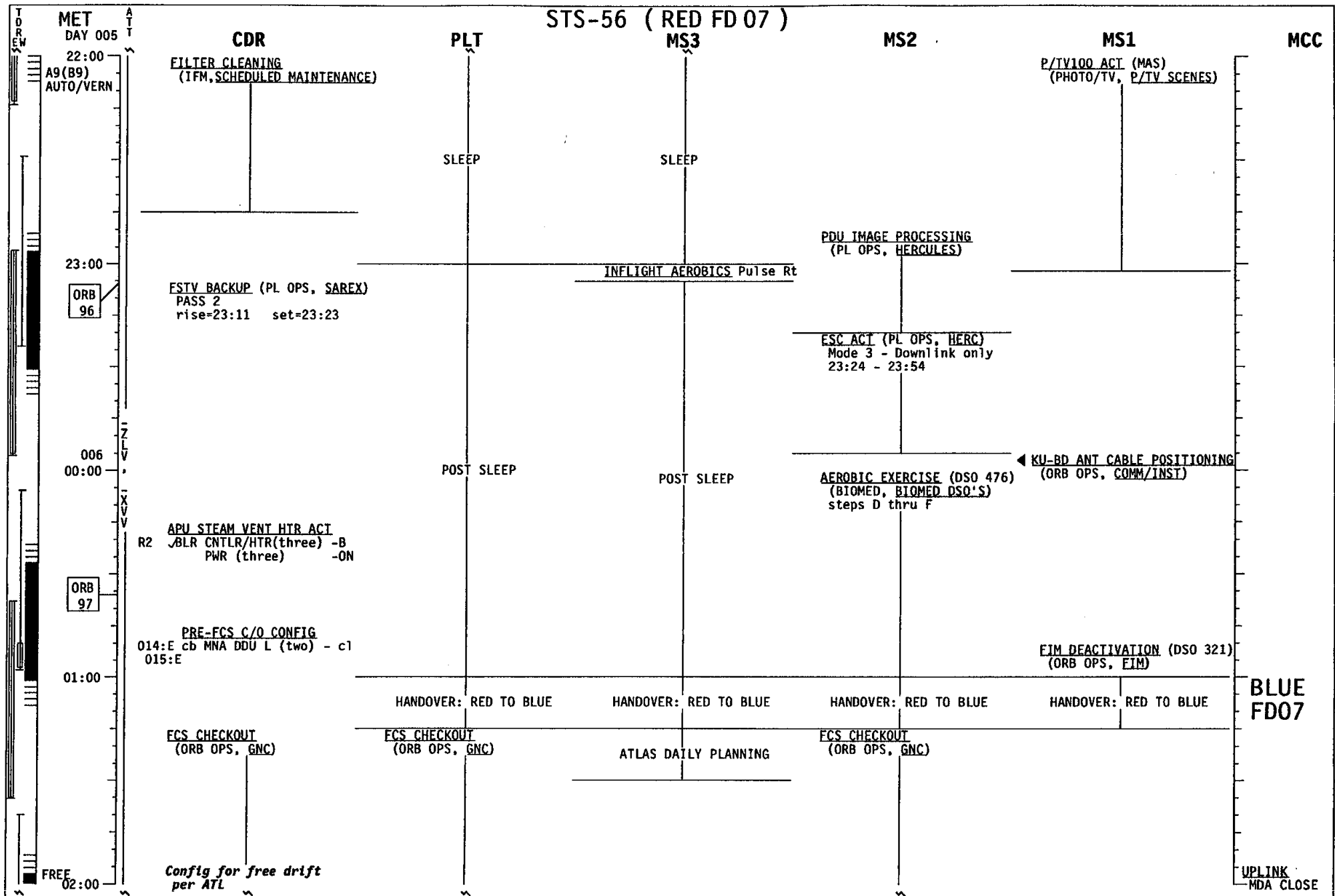
MS1
 SLEEP

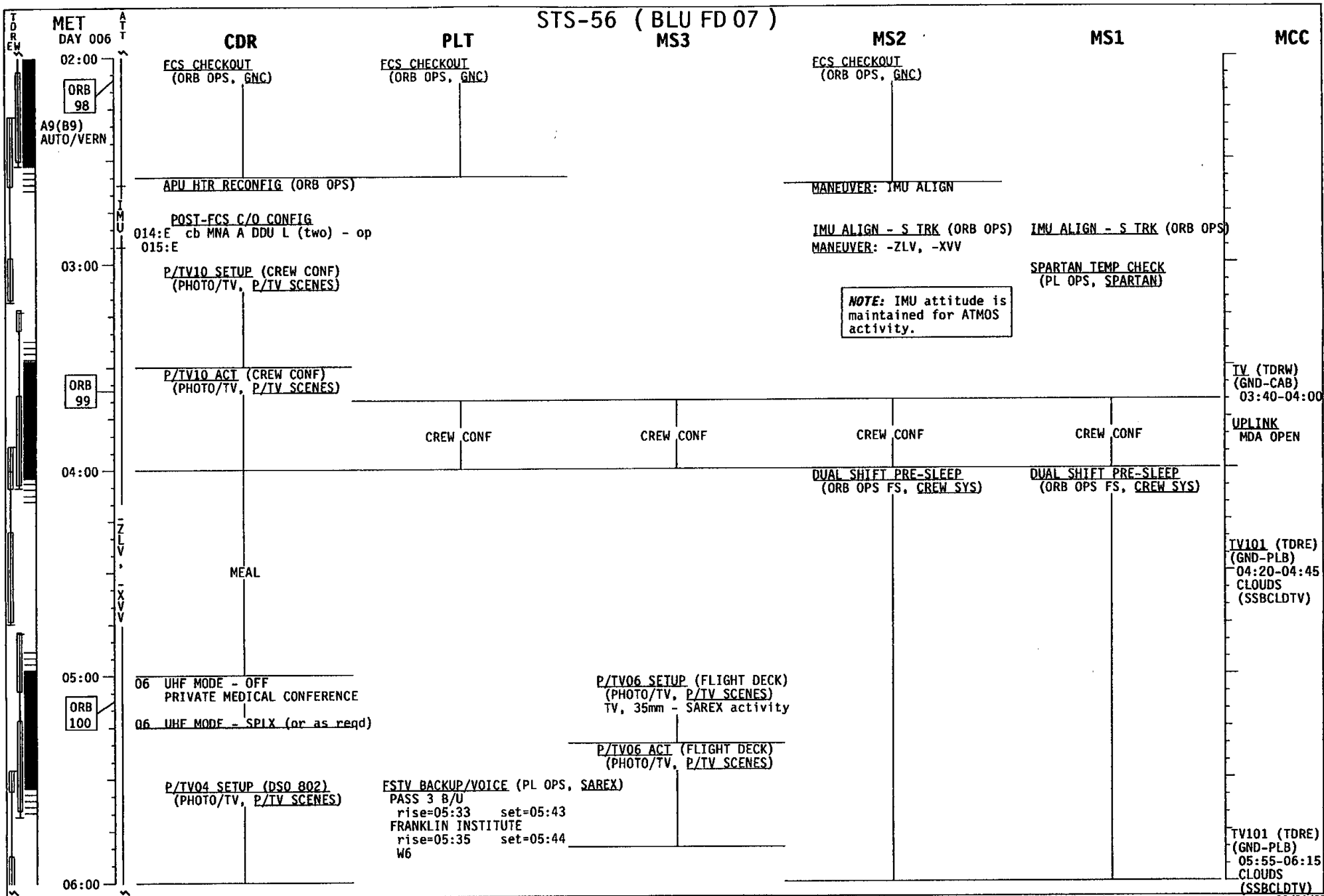
MCC
 UPLINK MDA OPEN
 UPLINK MDA CLOSE
 UPLINK MDA OPEN
 UPLINK MDA CLOSE
 UPLINK MDA OPEN
 UPLINK MDA CLOSE

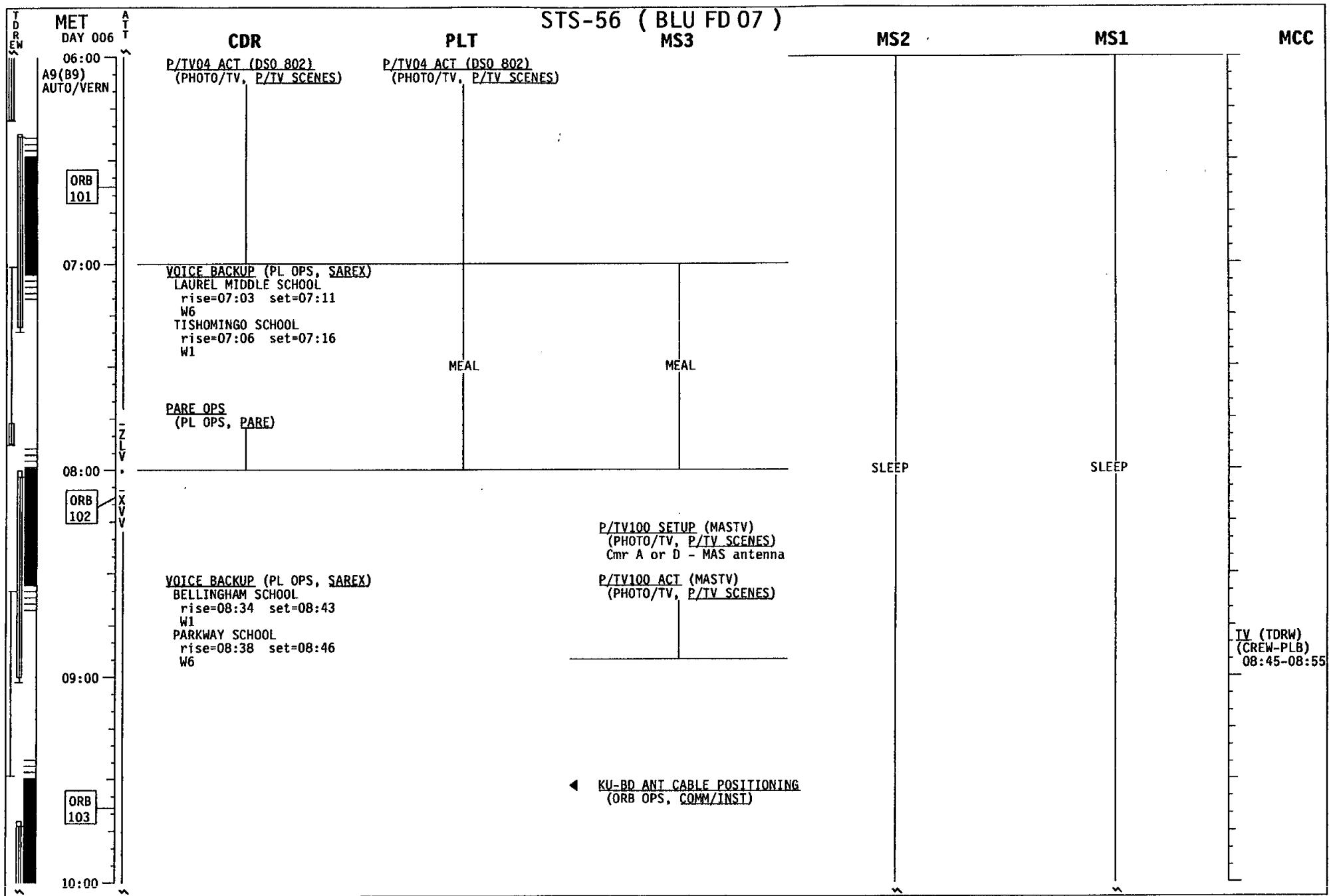


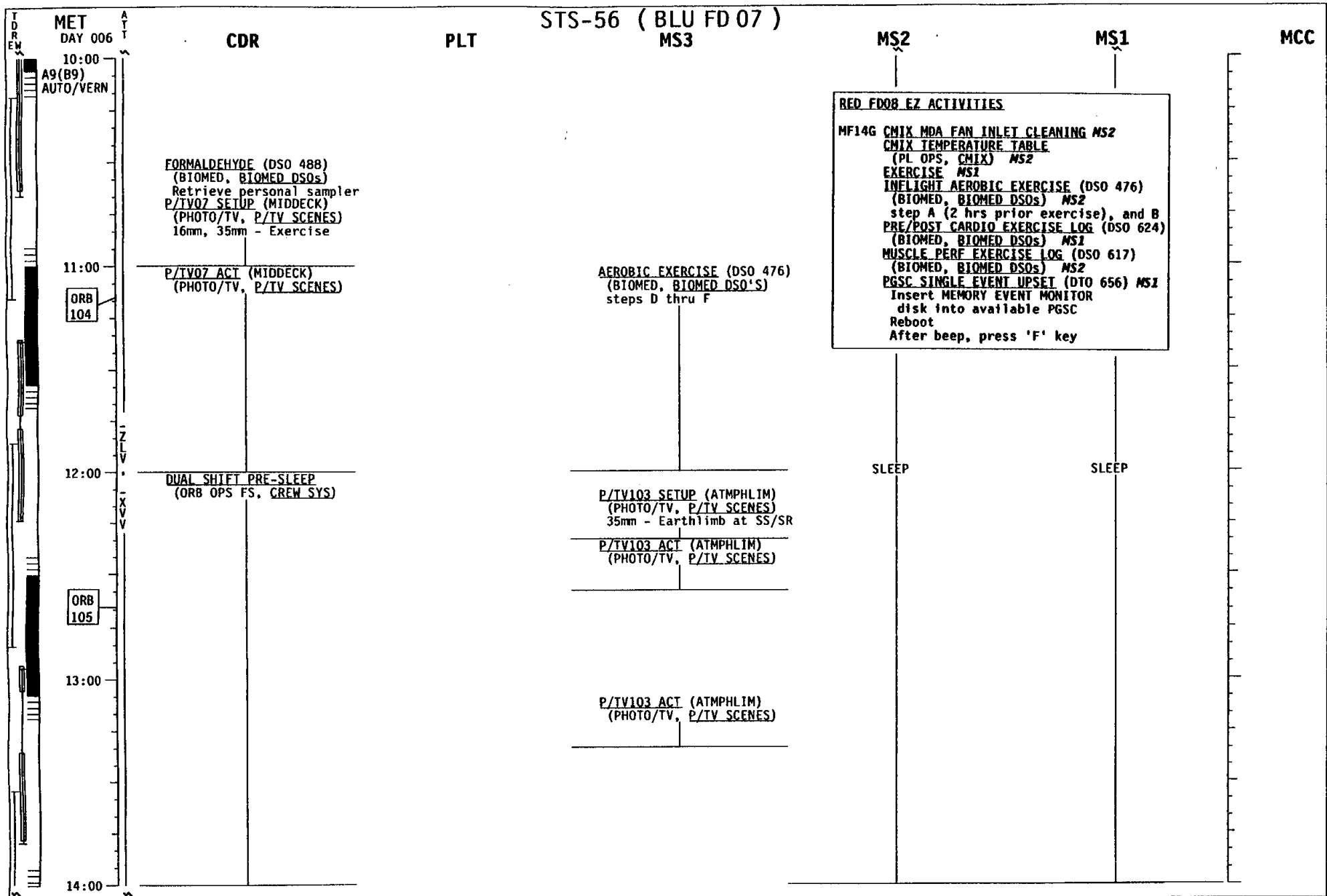


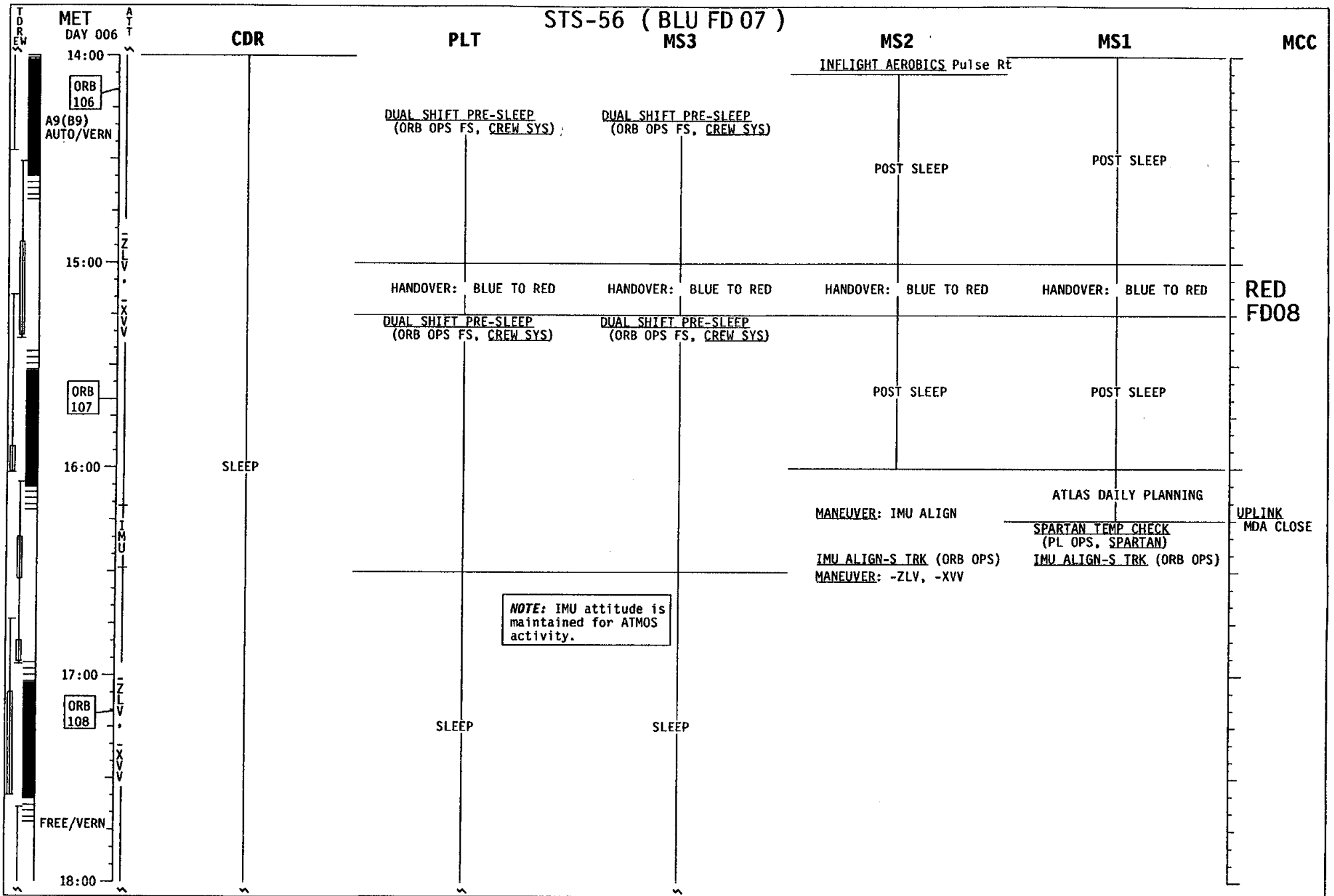


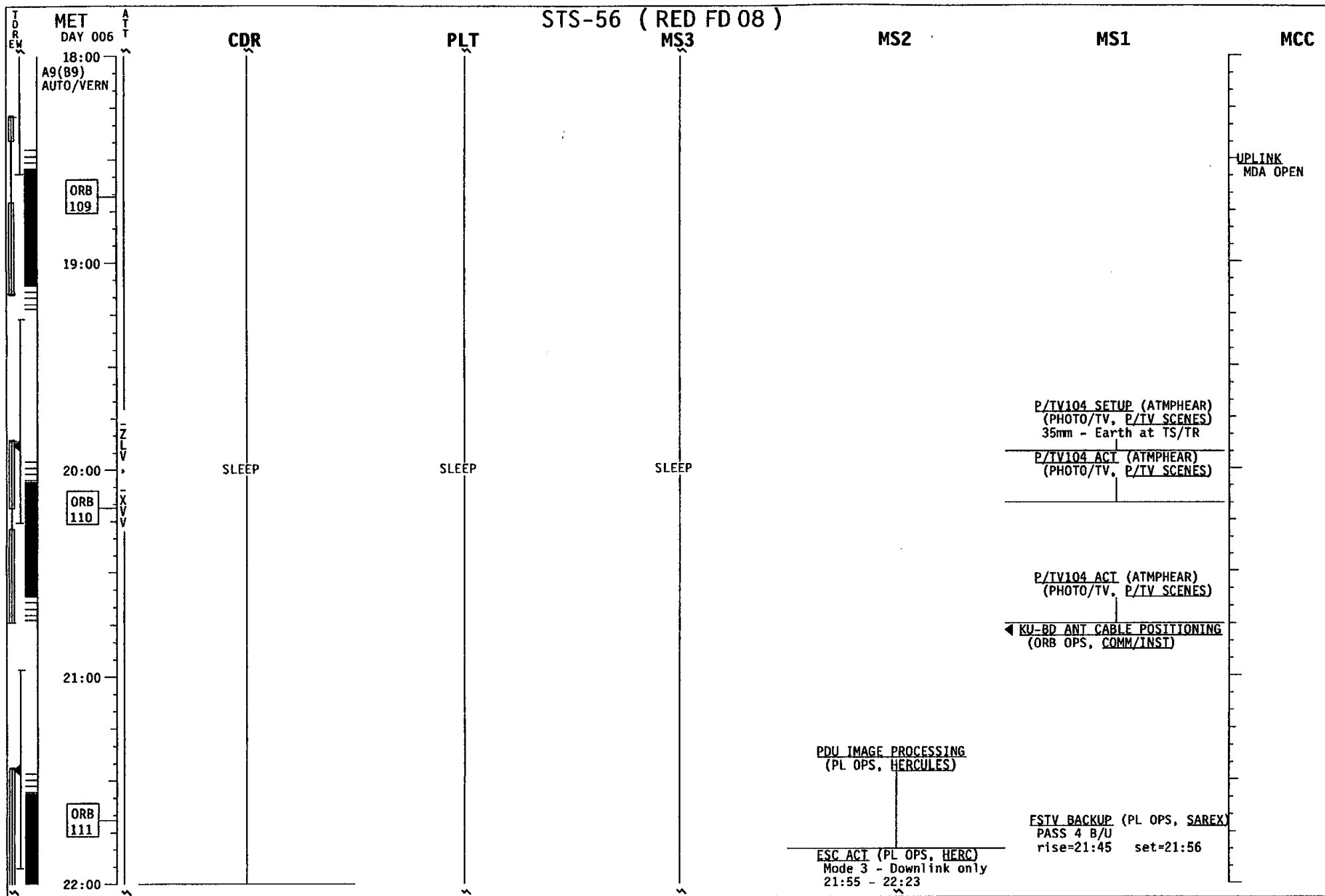


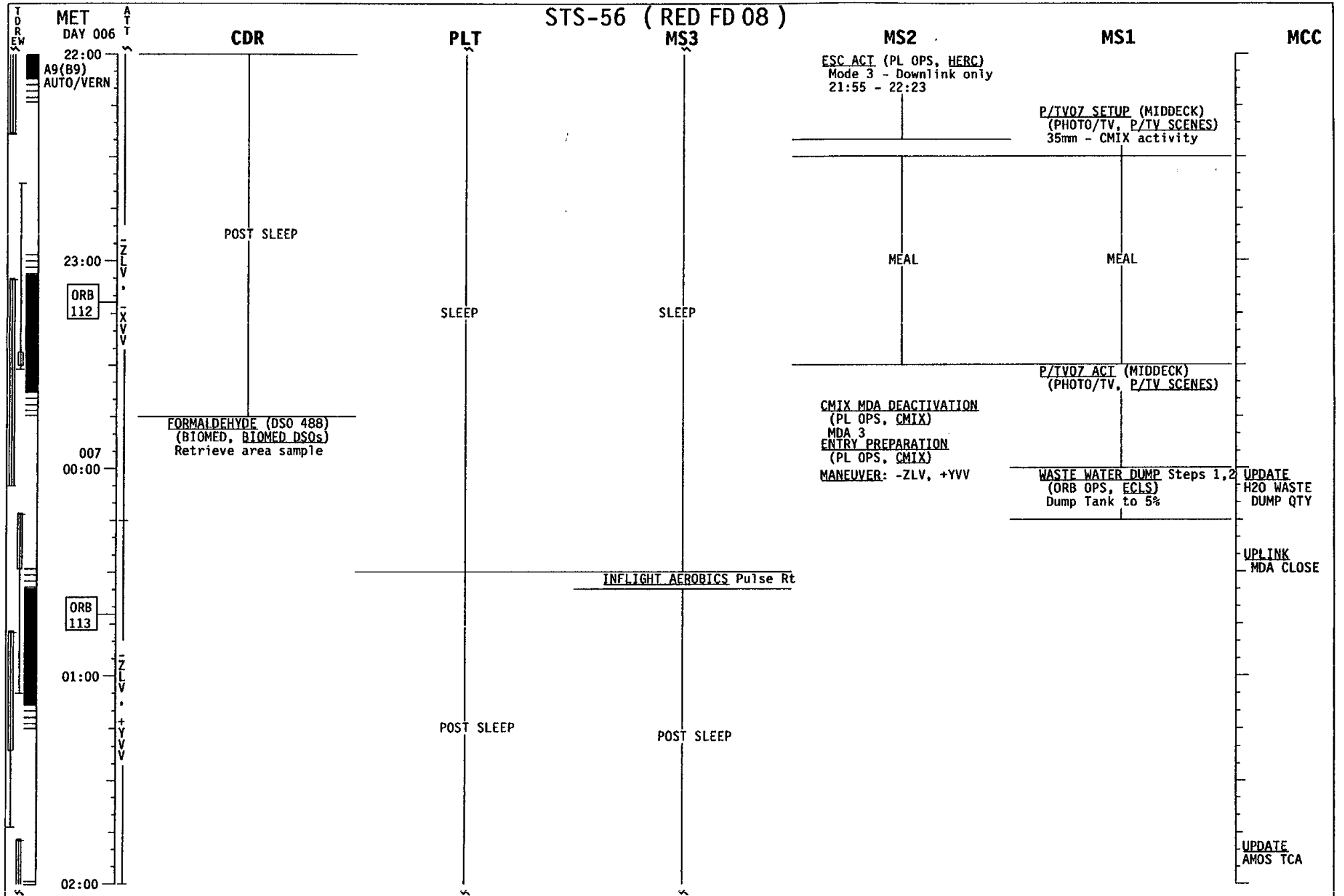


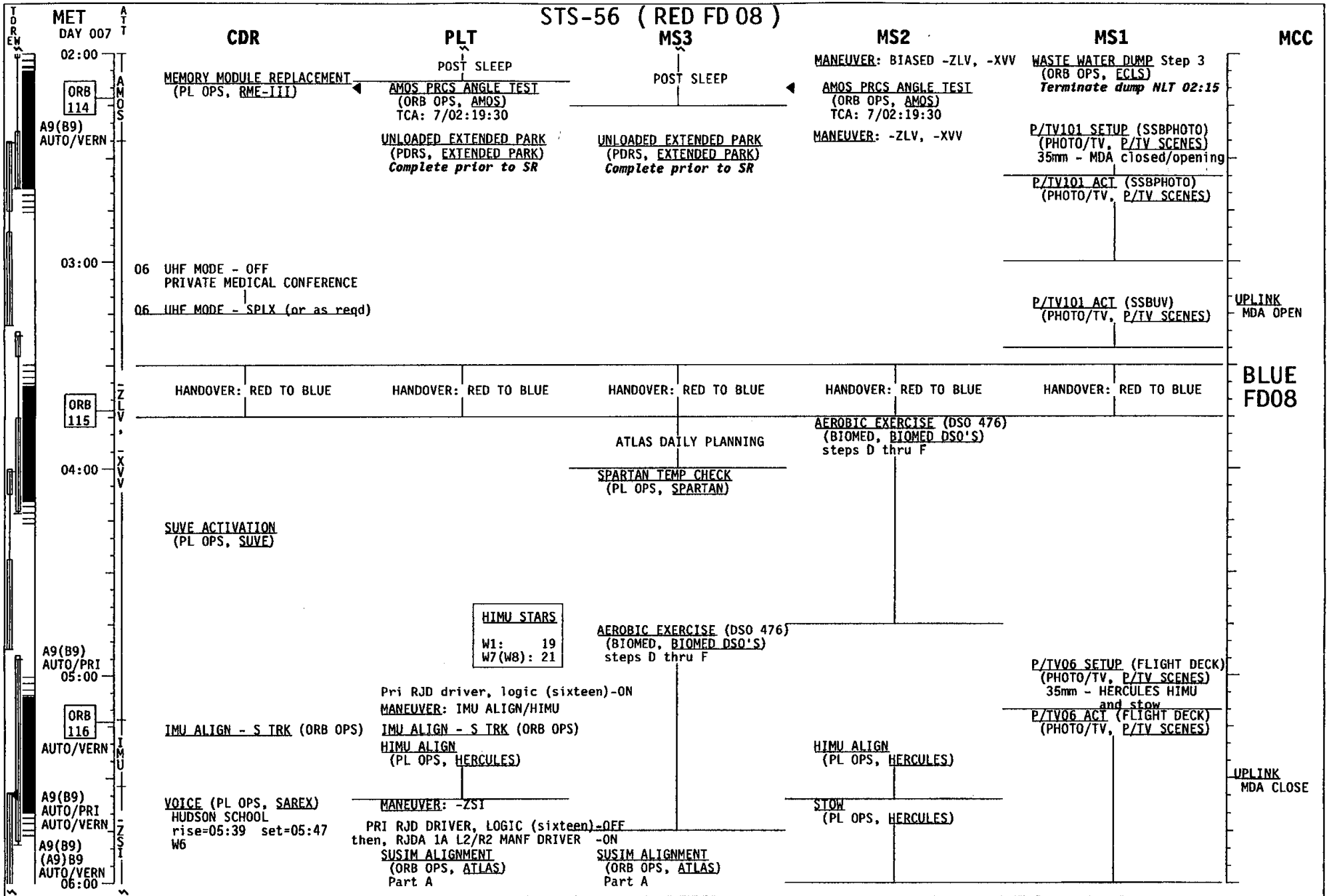


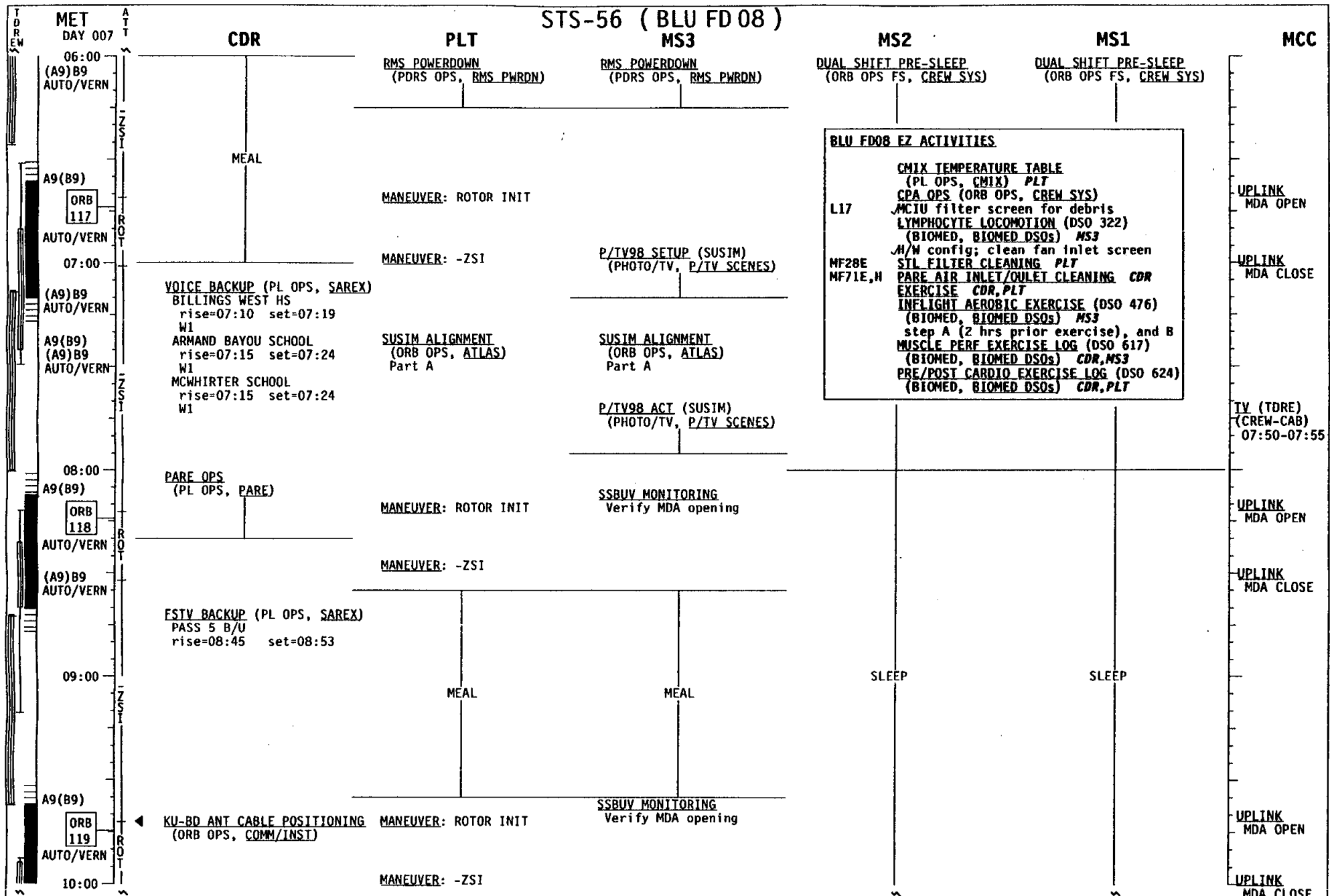


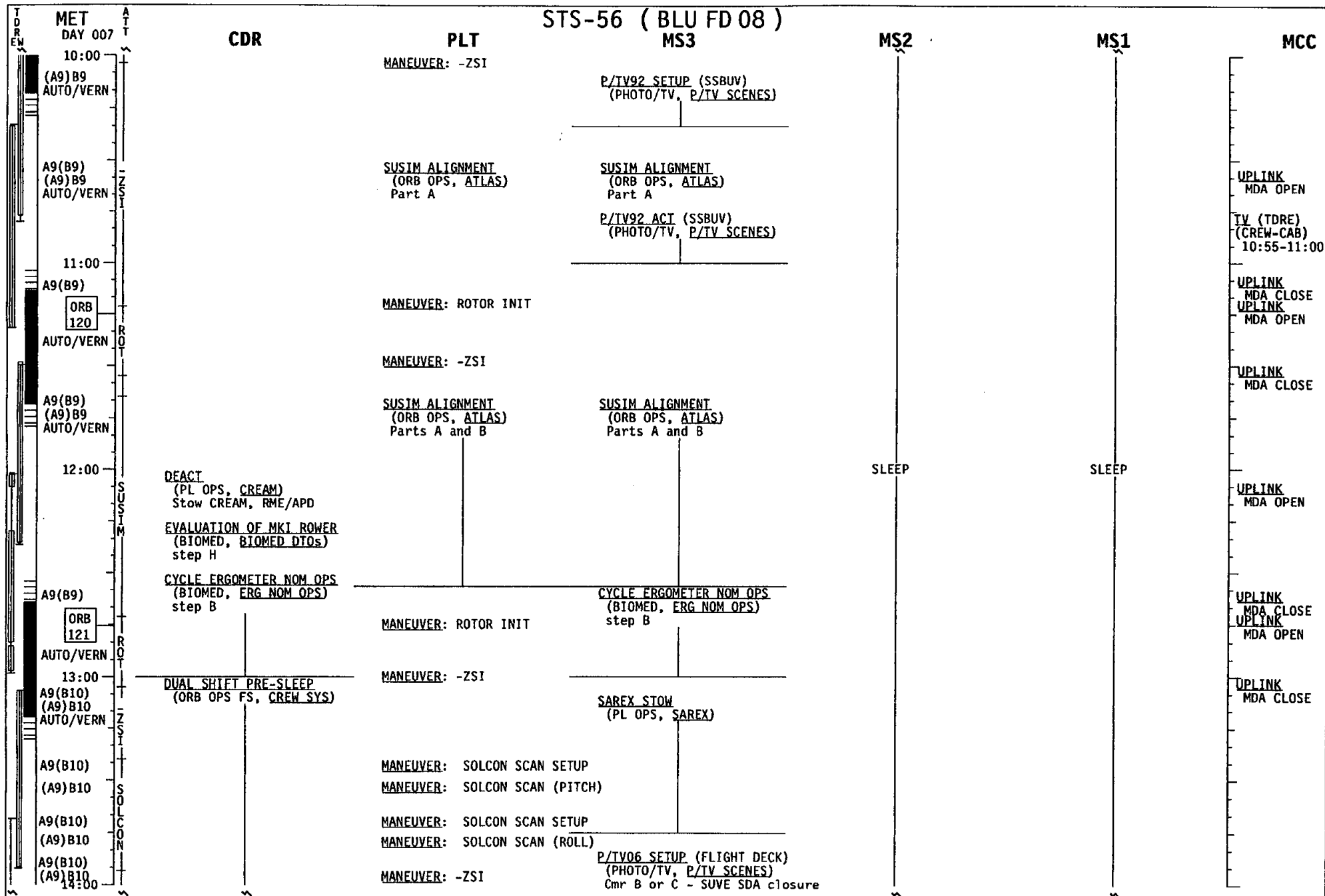


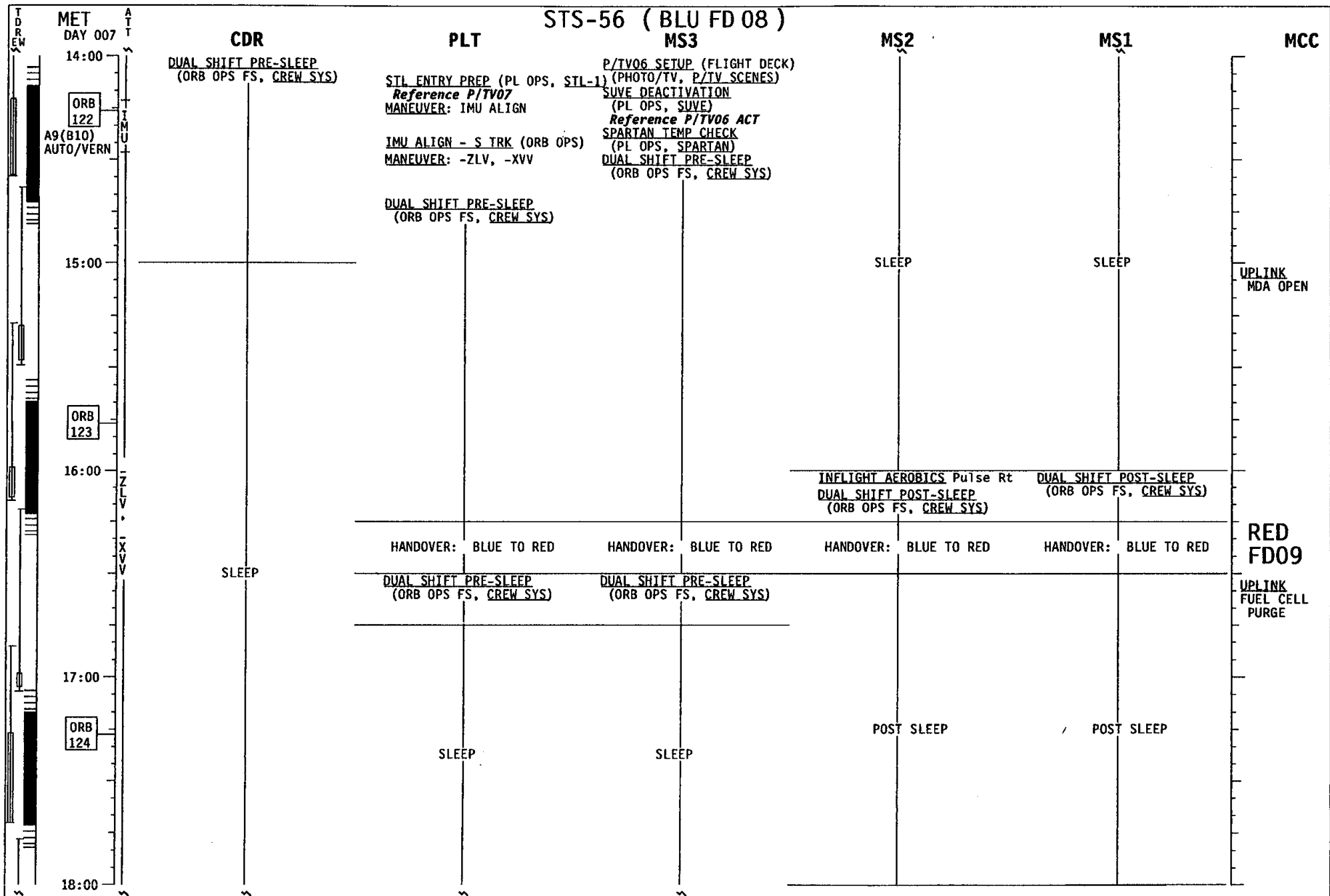


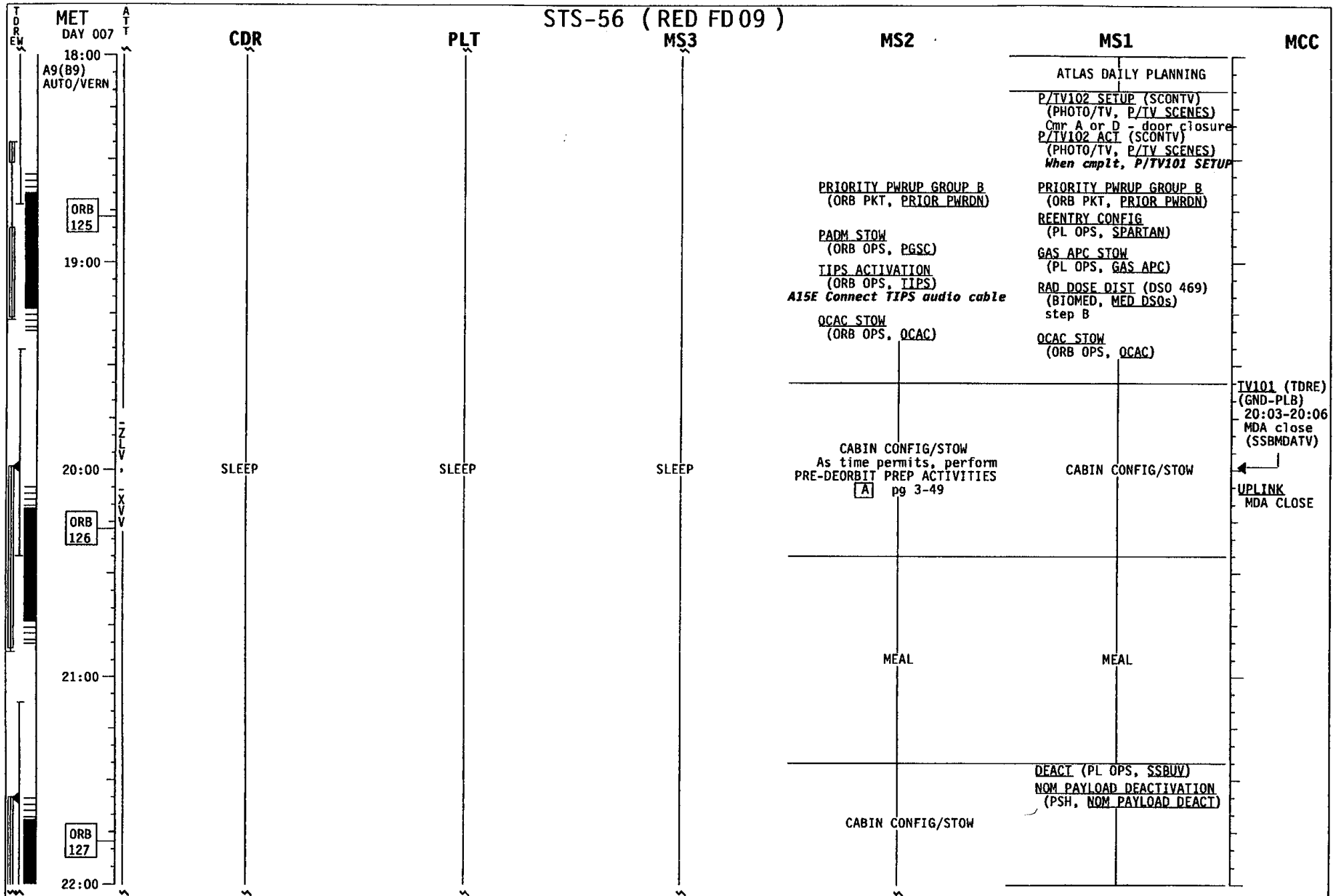


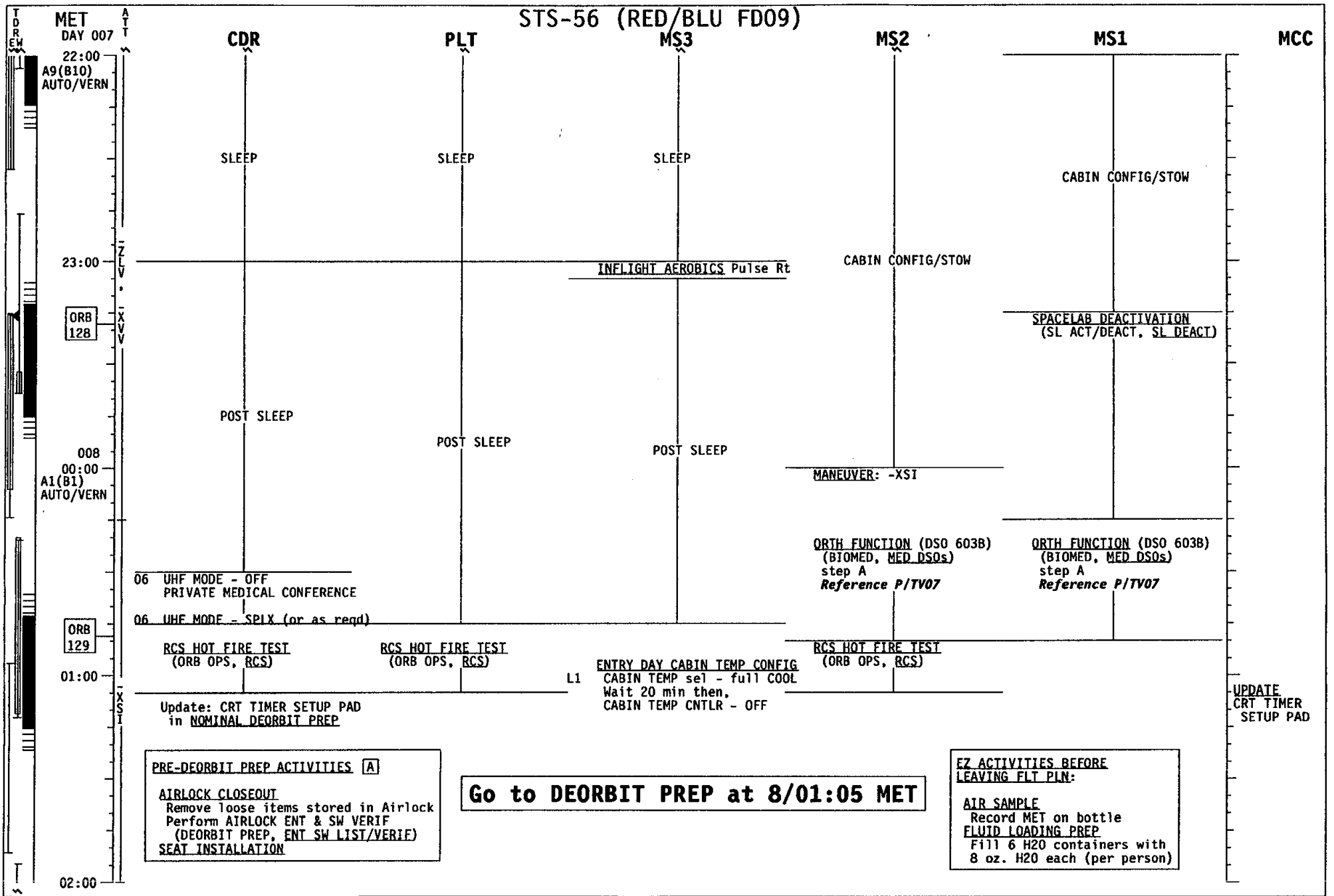












PRE-DEORBIT PREP ACTIVITIES [A]

AIRLOCK CLOSEOUT
Remove loose items stored in Airlock
Perform AIRLOCK ENT & SW VERIF
(DEORBIT PREP, ENT SW LIST/VERIF)

SEAT INSTALLATION

Go to DEORBIT PREP at 8/01:05 MET

EZ ACTIVITIES BEFORE LEAVING FLT PLN:

AIR SAMPLE
Record MET on bottle

FLUID LOADING PREP
Fill 6 H2O containers with
8 oz. H2O each (per person)

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ATTITUDE TIMELINE

ATTITUDE
TIMELINE

Attitude Timeline

| MET | MNVR OPTION | DAP | E/S | REF ATT/REMARKS | EVENT | |
|---|--|---------------------|---------------------------------------|---------------------|--|--|
| 1 000/01:12:00 MET 23:12 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM=270.00 Reference Only | A1 AUTO PRI | DSC 0.200 DB AT 5.00 DB RT 0.20 | EARTH R 360 P 90 | LVLH R= 0.00 P=180.00 Y= 90.00 | Post Insertion Note: Not Req for PLBD Opening |
| 2 000/02:40:00 MET 54:57 070/08:36:00 50:57 | INRTL R=202.00 MNVR P=256.00 Y= 0.00 | A1 AUTO VERN | DSC 0.200 DB AT 1.00 DB RT 0.02 | SUN R 149 P 108 | Star PR A1 -Y: 21 -Z: 19 | IMU Align |
| 3 000/03:00:00 MET 11:46 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM=270.00 | A1 AUTO VERN | DSC 0.200 DB AT 1.00 DB RT 0.02 | EARTH R 360 P 90 | LVLH R= 0.00 P=180.00 Y= 90.00 | -ZLV Nose South Water Dump |
| 4 000/07:19:00 MET 30:10 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM=136.00 | A1 AUTO VERN | DSC 0.200 DB AT 1.00 DB RT 0.02 | EARTH R 0 P 90 | LVLH R=180.00 P= 0.00 Y=316.00 | Biased -ZLV 44 Deg Yaw Nth From Nose fwd |
| 5 000/07:30:00 MET | Change DAP A to A9 ALT to ALT2 | A9 AUTO VERN | | | | |
| 6 000/13:06:00 MET 14:41 | INRTL R= 68.00 MNVR P= 92.00 Y= 7.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | SUN R 121 P 89 | Star PR A2 -Y: 19 -Z: 21 | IMU Align -2 COAS CAL Star ID: 21 |
| 7 | After CAL: Change DAP A to A9 B to B5 | A9 AUTO VERN | | | | |
| 8 000/13:35:00 MET 49:38 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM=136.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | EARTH R 0 P 90 | LVLH R=180.00 P= 0.00 Y=316.00 | Bias -ZLV Low Beta ATLAS Att |
| 9 000/23:40:00 MET 48:26 | INRTL R=222.00 MNVR P=228.00 Y=341.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | SUN R 110 P 128 | Star PR Special -Y: 55 -Z: 78 | IMU Align HUD CAL Star ID: 29 |
| 10 | After CAL: Change DAP A to A9 B to B10 | A9 AUTO VERN | | | | |
| 11 001/00:08:00 MET 19:59 | TGT=5 RA= 351.830 BV=3 DEC= -3.525S P= 90.00 Y= 0.00 OM=348.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | SUN R 0 P 90 | INRTL R=188.89 P= 90.01 Y= 23.39 | SOLCON Scan Starting Pos -Z to Sun |
| 12 | When in ATT: Select DAP B10 | B10 AUTO VERN | | | | |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

ATTITUDE
TIMELINE

Attitude Timeline

| MET | MNVR OPTION | DAP | E/S | REF ATT/REMARKS | EVENT | |
|------------------------------------|---|---------------------|---------------------------------------|----------------------|--|---|
| 13 001/00:35:00 MET 20 | TGT=5 RA= 351.830 BV=5 DEC= -3.525S P= 86.00 Y= 0.00 OM=348.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | SUN R 0 P 86 | INRTL R=190.57 P= 85.71 Y= 22.76 | Set Up for Pitch Scan |
| PET = 00:00 | | | | | | |
| 14 | When in ATT: Select DAP B10 | B10 AUTO VERN | | | | |
| 15 001/00:41:00 MET 50:31 | TGT=5 RA= 351.830 BV=5 DEC= -3.525S P= 94.00 Y= 0.00 OM=348.00 | B10 AUTO VERN | DSC 0.014 DB AT 0.10 DB RT 0.01 | SUN R 0 P 94 | INRTL R=187.15 P= 94.33 Y= 23.98 | Sun Scan Pitch thru -2 to Sun 4 deg aft |
| PET + 06:00 | | | | | | |
| 16 001/00:51:00 MET 28 | TGT=5 RA= 351.830 BV=5 DEC= -3.525S P= 90.00 Y=356.00 OM=348.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | SUN R 356 P 90 | INRTL R=192.89 P= 90.00 Y= 23.41 | Set Up for Roll Scan |
| PET + 16:00 | | | | | | |
| 17 | When in ATT: Select DAP B10 | B10 AUTO VERN | | | | |
| 18 001/00:57:00 MET 01:06:31 | TGT=5 RA= 351.830 BV=5 DEC= -3.525S P= 90.00 Y= 4.00 OM=348.00 | B10 AUTO VERN | DSC 0.014 DB AT 0.10 DB RT 0.01 | SUN R 4 P 90 | INRTL R=184.89 P= 90.00 Y= 23.43 | Sun Scan Roll thru -2 to Sun 4 deg starboard |
| PET + 22:00 | | | | | | |
| 19 001/01:07:00 MET 22 | TGT=5 RA= 351.830 BV=3 DEC= -3.525S P= 90.00 Y= 0.00 OM=350.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | SUN R 360 P 90 | INRTL R=189.04 P= 89.65 Y= 25.43 | SOLCON Scan End -2 to Sun |
| PET + 32:00 | | | | | | |
| 20 | When in ATT: Select DAP B10 Change to B9 | B9 AUTO VERN | | | | |
| 21 001/01:10:00 MET | Change DAP A9 VERN DISC RATE to 0.207 | B9 AUTO VERN | | | Unique DISC RATE to Support Night Rolls | |
| 22 001/01:21:00 MET | INRTL BV=2 ROTR P=180.00 Y= 0.00 | A9* AUTO VERN | DSC 0.207 DB AT 2.00 DB RT 0.02 | | INRTL R=189.04 P= 89.65 Y= 25.44 | Night Roll to cool SSBUV |
| 23 001/01:41:00 MET 50:00 | INRTL R=188.83 MNVR P= 90.00 Y= 23.44 | A9* AUTO VERN | DSC 0.207 DB AT 2.00 DB RT 0.02 | SUN R 0 P 90 | | -2 to Sun |
| 24 | When in ATT: Select DAP B9 | B9 AUTO VERN | | | | |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

| MET | MNVR OPTION | DAP | E/S | REF ATT/REMARKS | EVENT | |
|---------------------------------|---|---------------------|---------------------------------------|-----------------|--|-----------------------------|
| 25 001/02:52:00 MET | INRTL BV=2 ROTR P=180.00 Y= 0.00 | A9* AUTO VERN | DSC 0.207 DB AT 2.00 DB RT 0.02 | | INRTL R=188.83 P= 90.00 Y= 23.44 | Night Roll to cool SSBUV |
| 26 001/03:12:00 MET 20:59 | INRTL R=188.76 MNVR P= 90.00 Y= 23.44 | A9* AUTO VERN | DSC 0.207 DB AT 2.00 DB RT 0.02 | SUN R 0 P 90 | | -Z to Sun |
| 27 | When in ATT: Select DAP B9 | B9 AUTO VERN | | | | |
| 28 001/04:22:00 MET | INRTL BV=2 ROTR P=180.00 Y= 0.00 | A9* AUTO VERN | DSC 0.207 DB AT 2.00 DB RT 0.02 | | INRTL R=188.76 P= 90.00 Y= 23.44 | Night Roll to cool SSBUV |
| 29 001/04:42:00 MET 50:59 | INRTL R=188.70 MNVR P= 90.00 Y= 23.44 | A9* AUTO VERN | DSC 0.207 DB AT 2.00 DB RT 0.02 | SUN R 0 P 90 | | -Z to Sun |
| 30 | When in ATT: Select DAP B9 | B9 AUTO VERN | | | | |
| 31 001/05:52:00 MET | INRTL BV=2 ROTR P=180.00 Y= 0.00 | A9* AUTO VERN | DSC 0.207 DB AT 2.00 DB RT 0.02 | | INRTL R=188.70 P= 90.00 Y= 23.44 | Night Roll to cool SSBUV |
| 32 001/06:12:00 MET 20:59 | INRTL R=188.64 MNVR P= 90.00 Y= 23.44 | A9* AUTO VERN | DSC 0.207 DB AT 2.00 DB RT 0.02 | SUN R 0 P 90 | | -Z to Sun |
| 33 | When in ATT: Select DAP B9 | B9 AUTO VERN | | | | |
| 34 001/07:23:00 MET | INRTL BV=2 ROTR P=180.00 Y= 0.00 | A9* AUTO VERN | DSC 0.207 DB AT 2.00 DB RT 0.02 | | INRTL R=188.64 P= 90.00 Y= 23.44 | Night Roll to cool SSBUV |
| 35 001/07:43:00 MET 52:00 | INRTL R=188.56 MNVR P= 90.00 Y= 23.44 | A9* AUTO VERN | DSC 0.207 DB AT 2.00 DB RT 0.02 | SUN R 0 P 90 | | SUSIM Align -Z to Sun |
| 36 | When in ATT: Select DAP B9 | B9 AUTO VERN | | | | |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

| MET | MNVR OPTION | DAP | E/S | REF ATT/REMARKS | EVENT |
|------------------------------------|---|---------------------|---------------------------------------|--|---|
| 37 001/08:53:00 MET | INRTL BV=2 ROTR P=180.00 Y= 0.00 | A9* AUTO VERN | DSC 0.207 DB AT 2.00 DB RT 0.02 | | INRTL R=188.56 P= 90.00 Y= 23.44 Night Roll to cool SSBUV |
| 38 001/09:13:00 MET 21:59 | INRTL R=188.51 MNVR P= 90.00 Y= 23.44 | A9* AUTO VERN | DSC 0.207 DB AT 2.00 DB RT 0.02 | SUN R 0 P 90 | -Z to Sun |
| 39 | When in ATT: Select DAP B9 | B9 AUTO VERN | | | |
| 40 001/10:24:00 MET | INRTL BV=2 ROTR P=180.00 Y= 0.00 | A9* AUTO VERN | DSC 0.207 DB AT 2.00 DB RT 0.02 | | INRTL R=188.51 P= 90.00 Y= 23.44 Night Roll to cool SSBUV |
| 41 001/10:44:00 MET 52:59 | INRTL R=188.45 MNVR P= 90.00 Y= 23.44 | A9* AUTO VERN | DSC 0.207 DB AT 2.00 DB RT 0.02 | SUN R 0 P 90 | -Z to Sun |
| 42 | When in ATT: Select DAP B9 | B9 AUTO VERN | | | |
| 43 001/11:00:00 MET | Change DAP A9 VERN DISC RATE to 0.200 | B9 AUTO VERN | | | |
| 44 001/11:54:00 MET 12:04:03 | INRTL R= 68.00 MNVR P= 92.00 Y= 7.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | SUN R 120 P 90 Star PR A2 -Y: 19 -Z: 21 | IMU Align HIMU Align |
| 45 001/12:25:00 MET 38:28 | INRTL R=308.94 MNVR P=275.69 Y=333.77 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | SUN R 45 P 85 | MAS Moon Start |
| 46 | When in ATT: Select DAP B9 | B9 AUTO VERN | | | |
| 47 | When Rate Damp: Change DAP B to B11 | B11 AUTO VERN | | | |
| 48 001/12:44:00 MET 13:04:01 | INRTL R=306.40 MNVR P=270.31 Y=330.09 | B11 AUTO VERN | DSC 0.005 DB AT 0.10 DB RT 0.01 | SUN R 45 P 89 | MAS Moon Scan Mnvr sweeps Moon thru MAS |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

| MET | MNVR OPTION | DAP | E/S | REF ATT/REMARKS | EVENT | |
|---------------------------------|--|--------------------|---------------------------------------|------------------------|--|------------------------------------|
| 49 001/13:05:00 MET 16:03 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM=136.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | EARTH R 360 P 90 | LVLH R=180.00 P= 0.00 Y=316.00 | Bias -ZLV Low Beta ATLAS Att |
| 50 002/02:07:00 MET 16:48 | INRTL R=345.00 MNVR P=232.00 Y=318.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | SUN R 340 P 114 | Star PR C2 -Y: 36 -Z: 59 | IMU Align |
| 51 002/02:37:00 MET 47:47 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM=180.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | EARTH R 0 P 90 | LVLH R=180.00 P= 0.00 Y= 0.00 | -ZLV Nose Fwd |
| 52 002/15:41:00 MET 50:51 | INRTL R=345.00 MNVR P=232.00 Y=318.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | SUN R 340 P 114 | Star PR C2 -Y: 36 -Z: 59 | IMU Align |
| 53 002/16:11:00 MET 21:53 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM=180.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | EARTH R 0 P 90 | LVLH R=180.00 P= 0.00 Y= 0.00 | -ZLV Nose Fwd |
| 54 002/23:45:00 MET | EXIT FLT PLN Config DAP per Rndz C/L and PDRS C/L | A9 AUTO VERN | | | | |
| 55 002/23:48:00 MET 59:41 | TGT=4 BV=5 P= 0.00 Y=320.00 OM=153.40 Reference Only | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | SUN R 270 P 40 | INRTL R= 13.53 P=354.07 Y= 32.77 | SPARTAN Deploy |
| 56 003/00:57:00 MET | TGT=1 BV=3 P= 90.00 Y= 0.00 OM=(blank) Reference Only | A7 AUTO VERN | DSC 0.200 DB AT 1.00 DB RT 0.02 | | RNDZ NAV must be enabled | SPARTAN Track SEP 2 |
| 57 003/01:20:00 MET 31:26 | INRTL R=318.00 MNVR P=223.00 Y=354.00 Reference Only | A7 AUTO VERN | DSC 0.200 DB AT 1.00 DB RT 0.02 | SUN R 26 P 138 | | SEP 3 +X RCS TIG: 3/01:35 |
| 58 003/01:42:00 MET 43:09 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM=180.00 Reference Only | A7 AUTO VERN | DSC 0.200 DB AT 1.00 DB RT 0.02 | EARTH R 0 P 90 | LVLH R=180.00 P= 0.00 Y= 0.00 | -ZLV Nose Fwd |
| 59 003/01:45:00 MET | ENTER FLT PLN Change DAP A to A9 B to B9 ALT to ALT2 Jet Opt 3 | A9 AUTO VERN | | | | |
| 60 003/04:38:00 MET 42:52 | INRTL R= 68.00 MNVR P= 92.00 Y= 7.00 Verif PRI RJDs | A9 AUTO PRI | DSC 0.500 DB AT 3.00 DB RT 0.20 | SUN R 118 P 90 | Star PR A2 -Y: 19 -Z: 21 | IMU Align HIMU Align |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

| MET | MNVR OPTION | DAP | E/S | REF ATT/REMARKS | EVENT |
|------------------------------------|---|---------------------|---------------------------------------|--|--|
| 61 | When in ATT: A9/AUTO/VERN | A9 AUTO VERN | | | |
| 62 003/05:00:00 MET 03:58 | INRTL R=186.70 MNVR P= 90.00 Y= 23.44 Verif PRI RJDs | A9 AUTO PRI | DSC 0.500 DB AT 3.00 DB RT 0.20 | SUN R 0 P 90 | -Z to Sun |
| 63 | When in ATT: A9/AUTO/VERN | A9 AUTO VERN | | | |
| 64 | When Rate Damp: Select DAP B9 | B9 AUTO VERN | | | |
| 65 003/06:00:00 MET | Change DAP A9 VERN DISC RATE to 0.215 | B9 AUTO VERN | | | Unique DISC Rate to Support Night Rolls |
| 66 003/06:09:00 MET | INRTL BV=2 ROTR P=180.00 Y= 0.00 | A9* AUTO VERN | DSC 0.215 DB AT 2.00 DB RT 0.02 | INRTL R=186.70 P= 90.00 Y= 23.44 | Night Roll to cool SSBUV |
| 67 003/06:29:00 MET 36:55 | INRTL R=186.63 MNVR P= 90.00 Y= 23.44 | A9* AUTO VERN | DSC 0.215 DB AT 2.00 DB RT 0.02 | SUN R 0 P 90 | -Z to Sun |
| 68 | When in ATT: Select DAP B9 | B9 AUTO VERN | | | |
| 69 003/07:39:00 MET | INRTL BV=2 ROTR P=180.00 Y= 0.00 | A9* AUTO VERN | DSC 0.215 DB AT 2.00 DB RT 0.02 | INRTL R=186.63 P= 90.00 Y= 23.44 | Night Roll to cool SSBUV |
| 70 003/07:59:00 MET 08:06:55 | INRTL R=186.58 MNVR P= 90.00 Y= 23.44 | A9* AUTO VERN | DSC 0.215 DB AT 2.00 DB RT 0.02 | SUN R 0 P 90 | -Z to Sun |
| 71 | When in ATT: Select DAP B9 | B9 AUTO VERN | | | |
| 72 003/09:10:00 MET | INRTL BV=2 ROTR P=180.00 Y= 0.00 | A9* AUTO VERN | DSC 0.215 DB AT 2.00 DB RT 0.02 | INRTL R=186.58 P= 90.00 Y= 23.44 | Night Roll to cool SSBUV |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

| MET | MNVR OPTION | DAP | E/S | REF ATT/REMARKS | EVENT | |
|---------------------------------|---|---------------------|---------------------------------------|------------------------|--|---|
| 73 003/09:30:00 MET 37:55 | INRTL R=186.51 MNVR P= 90.00 Y= 23.44 | A9* AUTO VERN | DSC 0.215 DB AT 2.00 DB RT 0.02 | SUN R 0 P 90 | | -Z to Sun |
| 74 | When in ATT: Select DAP B9 | B9 AUTO VERN | | | | |
| 75 003/10:40:00 MET | INRTL BV=2 ROTR P=180.00 Y= 0.00 | A9* AUTO VERN | DSC 0.215 DB AT 2.00 DB RT 0.02 | | INRTL R=186.51 P= 90.00 Y= 23.44 | Night Roll to cool SSBUV |
| 76 003/11:00:00 MET 07:55 | INRTL R=186.44 MNVR P= 90.00 Y= 23.44 | A9* AUTO VERN | DSC 0.215 DB AT 2.00 DB RT 0.02 | SUN R 0 P 90 | | -Z to Sun |
| 77 | When in ATT: Select DAP B9 | B9 AUTO VERN | | | | |
| 78 003/12:10:00 MET | INRTL BV=2 ROTR P=180.00 Y= 0.00 | A9* AUTO VERN | DSC 0.215 DB AT 2.00 DB RT 0.02 | | INRTL R=186.44 P= 90.00 Y= 23.44 | Night Roll to cool SSBUV |
| 79 003/12:30:00 MET 37:55 | INRTL R=186.38 MNVR P= 90.00 Y= 23.44 | A9* AUTO VERN | DSC 0.215 DB AT 2.00 DB RT 0.02 | SUN R 0 P 90 | | -Z to Sun |
| 80 | When in ATT: Select DAP B9 | B9 AUTO VERN | | | | |
| 81 003/12:41:00 MET | Change DAP A9 VERN DISC RATE to 0.200 | B9 AUTO VERN | | | | |
| 82 003/13:40:00 MET 50:10 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM=110.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | EARTH R 360 P 90 | LVLH R=180.00 P= 0.00 Y=290.00 | -ZLV Nose North Deployed S/C H2O Dump Att |
| 83 003/15:47:00 MET 56:41 | INRTL R=345.00 MNVR P=232.00 Y=318.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | SUN R 341 P 114 | Star PR C2 -Y: 36 -Z: 59 | IMU Align |
| 84 003/16:17:00 MET 28:22 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM=180.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | EARTH R 0 P 90 | LVLH R=180.00 P= 0.00 Y= 0.00 | -ZLV Nose Fwd |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

| MET | MNVR OPTION | DAP | E/S | REF ATT/REMARKS | EVENT |
|------------------------------------|---|--------------------|---------------------------------------|-----------------------|--|
| 85 004/00:00:00 MET | Change DAP B to B1 | A9 AUTO VERN | | | |
| 86 004/01:22:00 MET 36:58 | INRTL R=158.00 MNVR P=165.00 Y= 47.00 Reference Only | B1 AUTO VERN | DSC 0.200 DB AT 1.00 DB RT 0.02 | SUN R 317 P 136 | NSR Burn +X RCS TIG: 4/01:42 |
| 87 004/01:47:00 MET 02:01:59 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM=180.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | EARTH R 0 P 90 | LVLH R=180.00 P= 0.00 Y= 0.00 -ZLV Nose Fwd |
| 88 004/03:54:00 MET 04:07:40 | INRTL R=136.00 MNVR P=232.00 Y=331.00 Reference Only | B1 AUTO VERN | DSC 0.200 DB AT 1.00 DB RT 0.02 | SUN R 197 P 121 | NC1 Burn +X RCS TIG: 4/04:14 |
| 89 004/04:19:00 MET 33:14 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM=180.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | EARTH R 0 P 90 | LVLH R=180.00 P= 0.00 Y= 0.00 -ZLV Nose Fwd |
| 90 004/05:22:00 MET 31:46 | INRTL R=345.00 MNVR P=232.00 Y=318.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | SUN R 342 P 115 | Star PR C2 -Y: 36 -Z: 59 IMU Align |
| 91 004/05:42:00 MET 56:10 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM=180.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | EARTH R 0 P 90 | LVLH R=180.00 P= 0.00 Y= 0.00 -ZLV Nose Fwd |
| 92 004/11:26:00 MET 40:59 | INRTL R=133.00 MNVR P=248.00 Y=335.00 Reference Only | B1 AUTO VERN | DSC 0.200 DB AT 1.00 DB RT 0.02 | SUN R 212 P 109 | NC2 Burn +X RCS TIG: 4/11:46 |
| 93 004/11:51:00 MET 12:05:59 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM=180.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | EARTH R 0 P 90 | LVLH R=180.00 P= 0.00 Y= 0.00 -ZLV Nose Fwd |
| 94 004/15:56:00 MET 16:06:02 | INRTL R=345.00 MNVR P=232.00 Y=318.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | SUN R 342 P 115 | Star PR C2 -Y: 36 -Z: 59 IMU Align |
| 95 004/16:26:00 MET 36:55 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM=180.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | EARTH R 0 P 90 | LVLH R=180.00 P= 0.00 Y= 0.00 -ZLV Nose Fwd |
| 96 004/20:05:00 MET | EXIT FLT PLN Config DAP per Rndz C/L | A9 AUTO VERN | | | |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

| MET | MNVR OPTION | DAP | E/S | REF ATT/REMARKS | EVENT | |
|----------------------------------|--|---------------------|---------------------------------------|-------------------------|--|--|
| 97 004/20:29:00 MET 43:57 | INRTL R=132.00 MNVR P=249.00 Y=333.00 Reference Only | A7 AUTO VERN | DSC 0.200 DB AT 1.00 DB RT 0.02 | SUN R 213 P 108 | | NC3 Burn +X RCS TIG: 4/20:49 |
| 98 004/20:51:00 MET 52:42 | TGT=1 BV=3 P= 90.00 Y= 0.00 OM= 0.00 Reference Only | B7 AUTO PRI | DSC 0.500 DB AT 2.00 DB RT 0.20 | | RNDZ NAV must be enabled | -Z SPARTAN Trk NH NCC TI Burns TI TIG: 4/23:49 |
| 99 005/01:20:00 MET 25:00 | TGT=2 BV=2 P=180.00 Y= 0.00 OM= 0.00 Reference Only | B8 AUTO VERN | DSC 0.200 DB AT 1.00 DB RT 0.02 | EARTH R 331 P 180 | LVLH R= 0.00 P= 90.00 Y= 0.00 | V bar Approach |
| 100 | ENTER FLT PLN After SPARTAN Berth: Change DAP A to A9 B to B9 ALT to ALT2 Jet Opt 3 | A9 AUTO VERN | | | | |
| 101 005/02:30:00 MET 37:30 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | EARTH R 0 P 90 | LVLH R= 0.00 P=180.00 Y= 0.00 | -ZLV Tail Fwd |
| 102 005/06:23:00 MET 28:34 | INRTL R= 68.00 MNVR P= 92.00 Y= 7.00 Verif PRI RJDs | A9 AUTO PRI | DSC 0.500 DB AT 3.00 DB RT 0.20 | SUN R 116 P 91 | Star PR A2 -Y: 19 -Z: 21 | IMU Align HIMU Align |
| 103 | When in ATT: A9/AUTO/VERN | A9 AUTO VERN | | | | |
| 104 005/06:45:00 MET 48:54 | INRTL R=184.63 MNVR P= 90.00 Y= 23.44 Verif PRI RJDs | A9 AUTO PRI | DSC 0.500 DB AT 3.00 DB RT 0.20 | SUN R 0 P 90 | | -Z to Sun |
| 105 | When in ATT: A9/AUTO/VERN | A9 AUTO VERN | | | | |
| 106 | When Rate Damp: Select DAP B9 | B9 AUTO VERN | | | | |
| 107 005/07:40:00 MET | Change DAP A9 VERN DISC RATE to 0.222 | B9 AUTO VERN | | | | |
| 108 005/07:54:00 MET | INRTL BV=2 ROTR P=180.00 Y= 0.00 | A9* AUTO VERN | DSC 0.222 DB AT 2.00 DB RT 0.02 | | INRTL R=184.63 P= 90.00 Y= 23.44 | Night Roll to cool SSBV |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

| MET | MNVR OPTION | DAP | E/S | REF ATT/REMARKS | EVENT | |
|-------------------------------------|---|---------------------|---------------------------------------|----------------------|--|-----------------------------|
| 109 005/08:14:00 MET 21:02 | INRTL R=184.57 MNVR P= 90.00 Y= 23.44 | A9* AUTO VERN | DSC 0.222 DB AT 2.00 DB RT 0.02 | SUN R 0 P 90 | | -Z to Sun |
| 110 | When in ATT: Select DAP B9 | B9 AUTO VERN | | | | |
| 111 005/09:24:00 MET | INRTL BV=2 ROTR P=180.00 Y= 0.00 | A9* AUTO VERN | DSC 0.222 DB AT 2.00 DB RT 0.02 | | INRTL R=184.57 P= 90.00 Y= 23.44 | Night Roll to cool SSBUV |
| 112 005/09:44:00 MET 51:02 | INRTL R=184.50 MNVR P= 90.00 Y= 23.44 | A9* AUTO VERN | DSC 0.222 DB AT 2.00 DB RT 0.02 | SUN R 0 P 90 | | -Z to Sun |
| 113 | When in ATT: Select DAP B9 | B9 AUTO VERN | | | | |
| 114 005/10:55:00 MET | INRTL BV=2 ROTR P=180.00 Y= 0.00 | A9* AUTO VERN | DSC 0.222 DB AT 2.00 DB RT 0.02 | | INRTL R=184.50 P= 90.00 Y= 23.44 | Night Roll to cool SSBUV |
| 115 005/11:15:00 MET 22:02 | INRTL R=184.44 MNVR P= 90.00 Y= 23.44 | A9* AUTO VERN | DSC 0.222 DB AT 2.00 DB RT 0.02 | SUN R 0 P 90 | | -Z to Sun |
| 116 | When in ATT: Select DAP B9 | B9 AUTO VERN | | | | |
| 117 005/11:40:00 MET | Change DAP A9 VERN DISC RATE to 0.200 | B9 AUTO VERN | | | | |
| 118 005/12:25:00 MET 30:30 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | EARTH R 0 P 90 | LVLH R= 0.00 P=180.00 Y= 0.00 | -ZLV Tail Fwd |
| 119 005/16:55:00 MET 17:00:40 | INRTL R= 68.00 MNVR P= 92.00 Y= 7.00 Verify PRI RJDs | A9 AUTO PRI | DSC 0.500 DB AT 3.00 DB RT 0.20 | SUN R 116 P 91 | Star PR A2 -Y: 19 -Z: 21 | IMU Align HIMU Align |
| 120 | When in ATT: A9/AUTO/VERN | A9 AUTO VERN | | | | |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

| MET | MNVR OPTION | DAP | E/S | REF ATT/REMARKS | EVENT | |
|-------------------------------------|---|---------------------|---------------------------------------|------------------------|--------------------------------------|---|
| 121 005/17:21:00 MET 25:52 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00 Verify PRI RJDs | A9 AUTO PRI | DSC 0.500 DB AT 3.00 DB RT 0.20 | EARTH R 360 P 90 | LVLH R= 0.00 P=180.00 Y= 0.00 | -ZLV Tail Fwd |
| 122 | When in ATT: A9/AUTO/VERN | A9 AUTO VERN | | | | |
| 123 006/01:55:00 MET | FCS C/O Pt 2: CONFIG FOR FREE DRIFT NET: 6/01:55 | A1 INRTL VERN | | | | |
| 124 | After FCS C/O: Change DAP A to A9 B to B9 | A9 AUTO VERN | | | | |
| 125 006/02:37:00 MET 49:41 | INRTL R=345.00 MNVR P=232.00 Y=318.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | SUN R 344 P 116 | Star PR C2 -Y: 36 -Z: 59 | IMU Align |
| 126 006/02:55:00 MET 03:05:59 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | EARTH R 0 P 90 | LVLH R= 0.00 P=180.00 Y= 0.00 | -ZLV Tail Fwd |
| 127 006/16:11:00 MET 23:32 | INRTL R=345.00 MNVR P=232.00 Y=318.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | SUN R 344 P 116 | Star PR C2 -Y: 36 -Z: 59 | IMU Align |
| 128 006/16:29:00 MET 39:48 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | EARTH R 360 P 90 | LVLH R= 0.00 P=180.00 Y= 0.00 | -ZLV Tail Fwd |
| 129 007/00:00:00 MET 07:30 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM=270.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | EARTH R 0 P 90 | LVLH R= 0.00 P=180.00 Y= 90.00 | -ZLV Nose South H2O Dump |
| 130 007/02:00:00 MET 08:05 | TGT=2 BV=5 P= 90.00 Y= 41.00 OM= 0.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | EARTH R 41 P 90 | LVLH R=319.00 P=180.00 Y= 0.00 | AMOS PRCS Test AMOS TCA: 7/02:19:30 |
| 131 ASAP After Test | TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | EARTH R 360 P 90 | LVLH R= 0.00 P=180.00 Y= 0.00 | -ZLV Tail Fwd |
| 132 007/05:07:00 MET 12:47 | INRTL R= 68.00 MNVR P= 92.00 Y= 7.00 Verify PRI RJDs | A9 AUTO PRI | DSC 0.500 DB AT 3.00 DB RT 0.20 | SUN R 114 P 91 | Star PR A2 -Y: 19 -Z: 21 | IMU Align HIMU Align |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

| MET | MNVR OPTION | DAP | E/S | REF ATT/REMARKS | EVENT |
|-------------------------------------|--|---------------------|---------------------------------------|--|--|
| 133 | When in ATT: A9/AUTO/VERN | A9 AUTO VERN | | | |
| 134 007/05:29:00 MET 32:50 | INRTL R=182.69 MNVR P= 90.00 Y= 23.44 Verify PRI RJDs | A9 AUTO PRI | DSC 0.500 DB AT 3.00 DB RT 0.20 | SUN R 0 P 90 | -2 to Sun |
| 135 | When in ATT: A9/AUTO/VERN | A9 AUTO VERN | | | |
| 136 | When Rate Damp: Select DAP B9 | B9 AUTO VERN | | | |
| 137 007/05:40:00 MET | Change DAP A9 VERN DISC RATE to 0.231 | B9 AUTO VERN | | | Unique DISC RATE to Support Night Rolls |
| 138 007/06:39:00 MET | INRTL BV=2 ROTR P=180.00 Y= 0.00 | A9* AUTO VERN | DSC 0.231 DB AT 2.00 DB RT 0.02 | INRTL R=182.69 P= 90.00 Y= 23.44 | Night Roll to cool SSBUV |
| 139 007/06:57:00 MET 07:04:59 | INRTL R=182.63 MNVR P= 90.00 Y= 23.44 | A9* AUTO VERN | DSC 0.231 DB AT 2.00 DB RT 0.02 | SUN R 0 P 90 | -2 to Sun |
| 140 | When in ATT: Select DAP B9 | B9 AUTO VERN | | | |
| 141 007/08:09:00 MET | INRTL BV=2 ROTR P=180.00 Y= 0.00 | A9* AUTO VERN | DSC 0.231 DB AT 2.00 DB RT 0.02 | INRTL R=182.63 P= 90.00 Y= 23.44 | Night Roll to cool SSBUV |
| 142 007/08:26:00 MET 34:59 | INRTL R=182.57 MNVR P= 90.00 Y= 23.44 | A9* AUTO VERN | DSC 0.231 DB AT 2.00 DB RT 0.02 | SUN R 0 P 90 | -2 to Sun |
| 143 | When in ATT: Select DAP B9 | B9 AUTO VERN | | | |
| 144 007/09:40:00 MET | INRTL BV=2 ROTR P=180.00 Y= 0.00 | A9* AUTO VERN | DSC 0.231 DB AT 2.00 DB RT 0.02 | INRTL R=182.57 P= 90.00 Y= 23.44 | Night Roll to cool SSBUV |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

| MET | MNVR OPTION | DAP | E/S | REF ATT/REMARKS | EVENT | |
|--|--|---------------------|---------------------------------------|--------------------|--|--|
| 145 007/09:57:00 MET 10:05:59 | INRTL R=182.50 MNVR P= 90.00 Y= 23.44 | A9* AUTO VERN | DSC 0.231 DB AT 2.00 DB RT 0.02 | SUN R 0 P 90 | | -Z to Sun |
| 146 | When in ATT: Select DAP B9 | B9 AUTO VERN | | | | |
| 147 007/11:10:00 MET | INRTL BV=2 ROTR P=180.00 Y= 0.00 | A9* AUTO VERN | DSC 0.231 DB AT 2.00 DB RT 0.02 | | INRTL R=182.50 P= 90.00 Y= 23.44 | Night Roll to cool SSBUV |
| 148 007/11:27:00 MET 35:59 | INRTL R=182.44 MNVR P= 90.00 Y= 23.44 | A9* AUTO VERN | DSC 0.231 DB AT 2.00 DB RT 0.02 | SUN R 0 P 90 | | SUSIM Align -Z to Sun |
| 149 | When in ATT: Select DAP B9 | B9 AUTO VERN | | | | |
| 150 007/12:41:00 MET | INRTL BV=2 ROTR P=180.00 Y= 0.00 | A9* AUTO VERN | DSC 0.231 DB AT 2.00 DB RT 0.02 | | INRTL R=182.44 P= 90.00 Y= 23.44 | Night Roll to cool SSBUV |
| 151 007/12:43:00 MET | Change DAP B to B10 | B10 AUTO VERN | | | | |
| 152 007/12:57:00 MET 13:06:59 | TGT=5 RA= 357.811 BV=3 DEC= -0.947S P= 90.00 Y= 0.00 OM=334.00 | A9* AUTO VERN | DSC 0.231 DB AT 2.00 DB RT 0.02 | SUN R 0 P 90 | INRTL R=182.38 P= 90.01 Y= 23.09 | SOLCON Scan Starting Pos -Z to Sun |
| 153 | When in ATT: Select DAP B10 | B10 AUTO VERN | | | | |
| 154 007/13:15:00 MET | Change DAP A9 VERN DISC RATE to 0.200 | B10 AUTO VERN | | | | |
| 155 007/13:24:00 MET 20 PET = 00:00 | TGT=5 RA= 357.811 BV=5 DEC= -0.947S P= 86.00 Y= 0.00 OM=334.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | SUN R 0 P 86 | INRTL R=184.08 P= 85.67 Y= 22.94 | Set Up for Pitch Scan |
| 156 | When in ATT: Select DAP B10 | B10 AUTO VERN | | | | |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

| MET | MNVR OPTION | DAP | E/S | REF ATT/REMARKS | EVENT | |
|---|---|---------------------|---------------------------------------|-----------------------|--|---|
| 157 007/13:30:00 MET 39:31 PET +06:00 | TGT=5 RA= 357.811 BV=5 DEC= -0.947S P= 94.00 Y= 0.00 OM=334.00 | B10 AUTO VERN | DSC 0.014 DB AT 0.10 DB RT 0.01 | SUN R 0 P 94 | INRTL R=180.66 P= 94.36 Y= 23.27 | Sun Scan Pitch thru -Z to Sun 4 deg aft |
| 158 007/13:40:00 MET 28 PET +16:00 | TGT=5 RA= 357.811 BV=5 DEC= -0.947S P= 90.00 Y=356.00 OM=334.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | SUN R 356 P 90 | INRTL R=186.38 P= 90.01 Y= 23.18 | Set Up for Roll Scan |
| 159 | When in ATT: Select DAP B10 | B10 AUTO VERN | | | | |
| 160 007/13:46:00 MET 55:31 PET + 22:00 | TGT=5 RA= 357.811 BV=5 DEC= -0.947S P= 90.00 Y= 4.00 OM=334.00 | B10 AUTO VERN | DSC 0.014 DB AT 0.10 DB RT 0.01 | SUN R 4 P 90 | INRTL R=178.38 P= 90.01 Y= 23.22 | Sun Scan Roll thru -Z to Sun 4 deg starboard |
| 161 007/13:56:00 MET 20 PET + 32:00 | TGT=5 RA= 357.811 BV=3 DEC= -0.947S P= 90.00 Y= 0.00 OM=334.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | SUN R 360 P 90 | INRTL R=182.38 P= 90.01 Y= 23.27 | SOLCON Scan End -Z to Sun |
| 162 | When in ATT: Select DAP B10 | B10 AUTO VERN | | | | |
| 163 007/14:11:00 MET 20:33 | INRTL R= 68.00 MNVR P= 92.00 Y= 7.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | SUN R 114 P 91 | Star PR A2 -Y: 19 -Z: 21 | IMU Align |
| 164 007/14:26:00 MET 39:10 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00 | A9 AUTO VERN | DSC 0.200 DB AT 2.00 DB RT 0.02 | EARTH R 0 P 90 | LVLH R= 0.00 P=180.00 Y= 0.00 | -ZLV Tail Fwd |
| 165 007/23:45:00 MET | Change DAP A to A1 B to B1 | A1 AUTO VERN | | | | |
| 166 008/00:00:00 MET 07:34 | TGT=4 RA= 358.203 BV=5 DEC= -0.777S P=184.00 Y= 0.00 OM= 90.00 | A1 AUTO VERN | DSC 0.200 DB AT 1.00 DB RT 0.02 | SUN R 180 P 176 | INRTL R= 39.15 P=177.67 Y=359.27 | Radiator Coldsdk Tail Sun |
| 167 | After Hot Fire: A1/AUTO/VERN | A1 AUTO VERN | | | | |
| 168 008/02:07:00 MET 13:05 TIG-2:58:00 | INRTL R= 82.00 MNVR P=117.00 Y= 49.00 Reference Only | A1 AUTO PRI | DSC 0.200 DB AT 5.00 DB RT 0.20 | SUN R 79 P 108 | Star PR -Y: 41 -Z: 18 | D-0 IMU Align |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

| MET | MNVR OPTION | DAP | E/S | REF ATT/REMARKS | EVENT | |
|---|---|--------------------|---------------------------------------|-----------------------|-----------------------------|---------------------------------|
| 169 008/02:22:00 MET 24:17 | INRTL R=350.00 MNVR P=178.00 Y= 31.00 Reference Only | B1 AUTO PRI | DSC 0.500 DB AT 3.00 DB RT 0.20 | SUN R 106 P 151 | Star PR -Y: 48 -Z: 49 | D-O IMU Verif |
| 170 008/02:33:00 MET 37:44 | INRTL R=200.00 MNVR P=320.00 Y= 0.00 Reference Only | B1 AUTO PRI | DSC 0.500 DB AT 3.00 DB RT 0.20 | SUN R 157 P 41 | | D-O Comm |
| 171 008/04:44:00 MET 45:47 TIG-0:15:00 | INRTL R=224.00 MNVR P= 9.00 Y=357.00 Reference Only | TRN AUTO PRI | DSC 0.500 DB AT 3.50 DB RT 0.20 | SUN R 307 P 8 | | D-O Burn TIG: 8/05:04:33 |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

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

STS-56 DAP BOOK

DAP A CONFIGURATIONS

| | ITEM # | A1* | A2 | A3 | A4 | A5 | A6 | A7 | A8 | A9 | A10 | A11 |
|--------------------|--------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|
| <u>TRANSLATION</u> | | | | | | | | | | | | |
| PULSE ft/sec | 1 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.05 | 0.10 | 0.10 | 0.05 |
| <u>ROTATION</u> | | | | | | | | | | | | |
| DSC RT NORM °/sec | 2 | 0.200 | 0.400 | 0.200 | 0.500 | 0.200 | 0.200 | 0.200 | 0.200 | 0.500 | 0.200 | 0.100 |
| VERN °/sec | 3 | 0.200 | 0.400 | 0.008 | 0.200 | 0.200 | 0.200 | 0.200 | 0.200 | 0.200 | 0.200 | 0.200 |
| PULSE NORM °/sec | 4 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 |
| VERN °/sec | 5 | 0.010 | 0.010 | 0.010 | 0.010 | 0.050 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 |
| COMP NORM °/sec | 6 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| VERN °/sec | 7 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| <u>DEADBAND</u> | | | | | | | | | | | | |
| ATT NORM (deg) | 8 | 5.00 | 1.00 | 1.00 | 3.00 | 5.00 | 5.00 | 2.00 | 2.00 | 3.00 | 3.00 | 3.00 |
| VERN (deg) | 9 | 1.000 | 1.000 | 0.070 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 2.000 | 2.000 | 3.000 |
| RATE NORM °/sec | 10 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| VERN °/sec | 11 | .020 | .020 | .010 | .020 | .020 | .020 | .020 | .020 | .020 | .020 | .200 |
| <u>JET OPT</u> | | | | | | | | | | | | |
| P | 12 | 1 | 1 | 1 | 1 | 1 | 3 | 1 or 3 | 1 | 3 | 3 | 1 |
| Y | 13 | 1 | 1 | 3 | 1 | 1 | 3 | 1 or 3 | 1 | 3 | 3 | 1 |
| CNTL ACCEL | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0,1,2 |

*I-LOADED OPS-2 DAP Configuration

DAP B CONFIGURATIONS

| | ITEM # | B1* | B2 | B3 | B4 | B5 | B6 | B7 | B8 | B9 | B10 | B11 | B12 | B13 |
|--------------------|--------|-------|-------|-------|-------|-------|----|--------|-------|-------|-------|-------|-------|-------|
| <u>TRANSLATION</u> | | | | | | | | | | | | | | |
| PULSE ft/sec | 15 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | | 0.05 | 0.01 | 0.02 | 0.02 | 0.02 | 0.02 | 0.01 |
| <u>ROTATION</u> | | | | | | | | | | | | | | |
| DSC RT NORM °/sec | 16 | 0.500 | 0.200 | 0.200 | 0.200 | 0.200 | | 0.500 | 0.200 | 0.050 | 0.050 | 0.050 | 0.100 | 0.050 |
| VERN °/sec | 17 | 0.200 | 0.200 | 0.200 | 0.008 | 0.016 | | 0.200 | 0.200 | 0.016 | 0.014 | 0.005 | 0.150 | 0.200 |
| PULSE NORM °/sec | 18 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| VERN °/sec | 19 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 |
| COMP NORM °/sec | 20 | .00 | .00 | .00 | .00 | .00 | | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| VERN °/sec | 21 | .000 | .000 | .000 | .000 | .000 | | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| <u>DEADBAND</u> | | | | | | | | | | | | | | |
| ATT NORM (deg) | 22 | 3.00 | 3.00 | 3.00 | 0.30 | 3.00 | | 2.00 | 2.00 | 1.00 | 0.30 | 0.30 | 2.00 | 1.00 |
| VERN (deg) | 23 | 1.000 | 1.000 | 1.000 | 0.100 | 0.033 | | 1.000 | 1.000 | 0.100 | 0.100 | 0.100 | 1.000 | 1.000 |
| RATE NORM °/sec | 24 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| VERN °/sec | 25 | .020 | .020 | .020 | .010 | .020 | | .020 | .020 | .020 | .010 | .010 | .020 | .020 |
| <u>JET OPT</u> | | | | | | | | | | | | | | |
| P | 26 | 1 | 3 | 1 | 3 | 3 | | 1 or 3 | 1 | 3 | 3 | 3 | 3 | 1 |
| Y | 27 | 1 | 3 | 1 | 3 | 3 | | 1 or 3 | 1 | 3 | 3 | 3 | 3 | 1 |
| CNTL ACCEL | 28 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 2 | 0,1 |

*I-LOADED OPS-2 DAP Configuration

ALT DAP CONFIGURATIONS

| | ITEM # | ALT1* | ALT2 | ALT3 |
|----------------|--------|-------|--------|--------|
| RATE DEADBAND | 32 | 0.200 | 0.070 | 0.100 |
| JET OPTION | 33 | 1 | 1 or 3 | 1 or 3 |
| NUMBER OF JETS | 34 | 2 | 1 | 2 |
| ON TIME | 35 | 0.08 | 0.08 | 0.08 |
| DELAY | 36 | 0.00 | 0.00 | 5.40 |

*I-LOADED OPS-2 DAP Configuration

| <u>DAP</u> | <u>PURPOSE</u> | <u>DAP</u> | <u>PURPOSE</u> |
|------------|---------------------------------|------------|--|
| A1 | - LOSS OF VERN (NOSE & TAIL) | B1 | - PRCS IMU ALIGN OMS & RCS BURNS |
| A2 | - PTC | B2 | - LOSS OF VERN (TAIL ONLY) |
| A3 | - GG | B3 | - LOSS OF VERN (NOSE & TAIL) GG MNVR |
| A4 | - PRE/POST DEPLOY | B4 | - SSUS DEPLOY |
| A5 | - IMU ROTATION | B5 | - COAS CAL |
| A6 | - LOSS OF VERN (TAIL ONLY) | B6 | - (Blank) |
| A7 | - RENDEZVOUS | B7 | - RENDEZVOUS |
| A8 | - PROX OPS | B8 | - PROX OPS |
| A9 | - ATLAS 2 MNVRS AND -ZLV | B9 | - ATLAS 2 SOLAR OPS |
| A10 | - ATLAS 2 LOSS OF VERN | B10 | - SOLCON SUN SCAN |
| A11 | - SPARTAN RMS MNVRING | B11 | - MAS LUNAR SCAN |
| | | B12 | - SPARTAN EXTENDED PARK |
| | | B13 | - SPARTAN RELEASE |

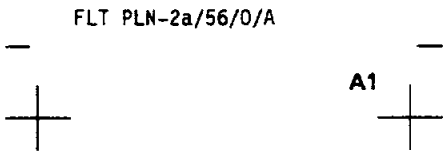
FLT PLN-1a/56/O/C

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FLT PLN-1b/56/O/A



DAP A



FLT PLN-2a/56/0/A

A1



DAP A1

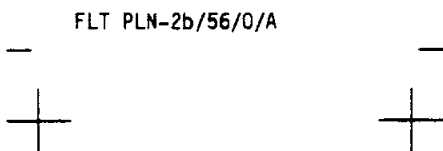
PURPOSE:

LOSS OF VERN
(NOSE & TAIL)

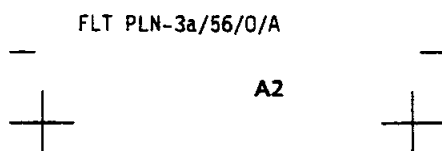


A1

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



FLT PLN-2b/56/0/A



FLT PLN-3a/56/0/A

A2



A1



DAP A2

PURPOSE:
PTC

A2

| | | | |
|---------|----|-------------|------|
| 0.1 0 | 1 | TRANSLATION | |
| | | PULSE | |
| | | ROTATION | |
| 0.4 0 0 | 2 | DSC RT | NORM |
| 0.4 0 0 | 3 | VERN | VERN |
| 0.1 0 | 4 | PULSE | NORM |
| 0.0 1 0 | 5 | VERN | VERN |
| .0 0 0 | 6 | COMP | NORM |
| .0 0 0 | 7 | VERN | VERN |
| | | DEADBAND | |
| 1.0 0 | 8 | ATT | NORM |
| 1.0 0 0 | 9 | | VERN |
| 0.2 0 | 10 | RATE | NORM |
| .0 2 0 | 11 | | VERN |
| 1 | 12 | JET OPT | P |
| 1 | 13 | | Y |
| 0 | 14 | CNTL ACCEL | |

FLT PLN-3b/56/0/A

FLT PLN-4a/56/0/A



A3



A2



DAP A3

PURPOSE:
GG

A3

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

FLT PLN-4b/56/0/A

FLT PLN-5a/56/0/A



A4





A3



DAP A4

PURPOSE:
PRE/POST DEPLOY

FLT PLN-5b/56/0/A



A4

| | | | |
|----------|----|-------------|------|
| 0.1 0 | 1 | TRANSLATION | |
| | | PULSE | |
| ROTATION | | | |
| 0.5 0 0 | 2 | DSC RT | NORM |
| 0.2 0 0 | 3 | | VERN |
| 0.1 0 0 | 4 | PULSE | NORM |
| 0.0 1 0 | 5 | | VERN |
| .0 0 0 | 6 | COMP | NORM |
| .0 0 0 | 7 | | VERN |
| DEADBAND | | | |
| 3.0 0 | 8 | ATT | NORM |
| 1.0 0 0 | 9 | | VERN |
| 0.2 0 | 10 | RATE | NORM |
| .0 2 0 | 11 | | VERN |
| 1 | 12 | JET OPT | P |
| 1 | 13 | | Y |
| 0 | 14 | CNTL ACCEL | |

FLT PLN-6a/56/0/A



A5



A4



DAP A5

PURPOSE:
IMU ROTATION

FLT PLN-6b/56/0/A



A5

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

FLT PLN-7a/56/0/A



A6



A5



DAP A6

PURPOSE:

LOSS OF VERN
(TAIL ONLY)

A6

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

FLT PLN-7b/56/0/A

FLT PLN-8a/56/0/A



A7



A6



DAP A7

PURPOSE:

RENDEZVOUS

A7

| | | | |
|---------|----|-------------|------|
| 0.1 0 | 1 | TRANSLATION | |
| | | PULSE | |
| | | ROTATION | |
| 0.2 0 0 | 2 | DSC RT | NORM |
| 0.2 0 0 | 3 | VERN | |
| 0.1 0 0 | 4 | PULSE | NORM |
| 0.0 1 0 | 5 | VERN | |
| .0 0 0 | 6 | COMP | NORM |
| .0 0 0 | 7 | VERN | |
| | | DEADBAND | |
| 2.0 0 | 8 | ATT | NORM |
| 1.0 0 0 | 9 | | VERN |
| | | RATE | |
| 0.2 0 | 10 | | NORM |
| .0 2 0 | 11 | | VERN |
| | | JET OPT | P |
| 1 or 3 | 12 | | |
| 1 or 3 | 13 | | Y |
| | | CNTL ACCEL | |
| 0 | 14 | | |

FLT PLN-8b/56/0/A

FLT PLN-9a/56/0/C

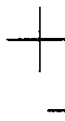


A8





A7



DAP A8

PURPOSE:
PROX OPS

FLT PLN-9b/56/0/A



A8



DAP A9

PURPOSE:
ATLAS 2 MNVRS AND -ZLV
NOTE: FOR NIGHT ROLLS
LOAD SPECIAL
VERN DISC RATE

FLT PLN-10b/56/0/A



A8

| | | | | |
|-----|---|---|---------------|------|
| 0.0 | 5 | 1 | TRANSLATION | |
| | | | PULSE | |
| | | | ROTATION | |
| 0.2 | 0 | 0 | 2 DSC RT | NORM |
| 0.2 | 0 | 0 | 3 VERN | VERN |
| 0.1 | 0 | 0 | 4 PULSE | NORM |
| 0.0 | 1 | 0 | 5 VERN | VERN |
| 0.0 | 0 | 0 | 6 COMP | NORM |
| .0 | 0 | 0 | 7 VERN | VERN |
| | | | DEADBAND | |
| 2.0 | 0 | 0 | 8 ATT | NORM |
| 1.0 | 0 | 0 | 9 VERN | VERN |
| | | | RATE | |
| 0.2 | 0 | 0 | 10 | NORM |
| 0.2 | 0 | 0 | 11 | VERN |
| | | | JET OPT | P |
| 1 | | | 12 | |
| 1 | | | 13 | Y |
| | | | 14 CNTL ACCEL | |

FLT PLN-10a/56/0/A



A9



A9

| | | | | |
|-----|---|---|---------------|------|
| 0.1 | 0 | 1 | TRANSLATION | |
| | | | PULSE | |
| | | | ROTATION | |
| 0.5 | 0 | 0 | 2 DSC RT | NORM |
| 0.2 | 0 | 0 | 3 VERN | VERN |
| 0.1 | 0 | 0 | 4 PULSE | NORM |
| 0.0 | 1 | 0 | 5 VERN | VERN |
| 0.0 | 0 | 0 | 6 COMP | NORM |
| .0 | 0 | 0 | 7 VERN | VERN |
| | | | DEADBAND | |
| 3.0 | 0 | 0 | 8 ATT | NORM |
| 2.0 | 0 | 0 | 9 VERN | VERN |
| | | | RATE | |
| 0.2 | 0 | 0 | 10 | NORM |
| 0.2 | 0 | 0 | 11 | VERN |
| | | | JET OPT | P |
| 3 | | | 12 | |
| 3 | | | 13 | Y |
| | | | 14 CNTL ACCEL | |

FLT PLN-11a/56/0/C



A10





A9

DAP A10

PURPOSE:

ATLAS 2 LOSS OF VERN

NOTE: FOR NIGHT ROLLS
LOAD SPECIAL
NORM DISC RATE



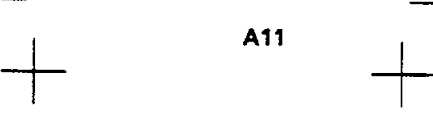
A10

| | | |
|---------|----|-------------|
| 0.1 0 | 1 | TRANSLATION |
| | | PULSE |
| 0.2 0 0 | 2 | ROTATION |
| 0.2 0 0 | 3 | DSC RT NORM |
| 0.1 0 0 | 4 | VERN |
| 0.0 1 0 | 5 | PULSE NORM |
| .0 0 0 | 6 | VERN |
| .0 0 0 | 7 | COMP NORM |
| | | VERN |
| 3.0 0 | 8 | DEADBAND |
| 2.0 0 0 | 9 | ATT NORM |
| | | VERN |
| 0.2 0 | 10 | RATE NORM |
| .0 2 0 | 11 | VERN |
| 3 | 12 | JET OPT P |
| 3 | 13 | Y |
| 0 | 14 | CNTL ACCEL |

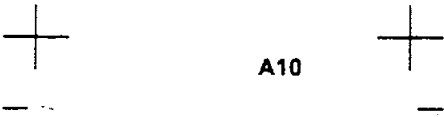
FLT PLN-11b/56/0/A



FLT PLN-12a/56/0/C



A11



A10

DAP A11

PURPOSE:

SPARTAN RMS MNVRING



A11

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

FLT PLN-12b/56/0/B



FLT PLN-29a/56/0/A





A11



DAP B

FLT PLN-29b/56/0/A



FLT PLN-13a/56/0/A

B1



DAP B1

B1

PURPOSE:

PRCS IMU ALIGN
OMS & RCS BURNS

| | | |
|----|-----|-------|
| 15 | 0.0 | 2 |
| 16 | 0.5 | 0 0 |
| 17 | 0.2 | 0 0 0 |
| 18 | 0.0 | 0 4 |
| 19 | 0.0 | 0 2 |
| 20 | .0 | 0 0 |
| 21 | .0 | 0 0 |

| | | |
|----|-----|-----|
| 22 | 3.0 | 0 |
| 23 | 1.0 | 0 0 |

| | | |
|----|-----|-----|
| 24 | 0.2 | 0 |
| 25 | .0 | 2 0 |

| | | |
|----|--|---|
| 26 | | 1 |
| 27 | | 1 |

| | | |
|----|--|---|
| 28 | | 0 |
|----|--|---|

FLT PLN-13b/56/0/A

FLT PLN-14a/56/0/A



B2





B1

DAP B2

PURPOSE:

LOSS OF VERN
(TAIL ONLY)

FLT PLN-14b/56/0/A



B2

DAP B3

PURPOSE:

LOSS OF VERN
(NOSE & TAIL)
GG MNVR

FLT PLN-15b/56/0/A



B2

15 0.0 2

16 0.2 0 0

17 0.2 0 0 0

18 0.0 0 4

19 0.0 0 2

20 .0 0 0

21 .0 0 0

22 3.0 0

23 -1.0 0 0

24 0.2 0

25 .0 2 0

26 3

27 1/3

28 0

FLT PLN-15a/56/0/A



B3



B3

15 0.0 2

16 0.2 0 0

17 0.2 0 0 0

18 0.0 0 4

19 0.0 0 2

20 .0 0 0

21 .0 0 0

22 3.0 0

23 -1.0 0 0

24 0.2 0

25 .0 2 0

26 1

27 1

28 0

FLT PLN-16a/56/0/A



B4

+ +
B3

DAP B4

PURPOSE:
SSUS DEPLOY

+ +

B4

| | | |
|----|-----|-----|
| 15 | 0.0 | 2 |
| 16 | 0.2 | 0 0 |
| 17 | 0.0 | 0 8 |
| 18 | 0.0 | 0 4 |
| 19 | 0.0 | 0 2 |
| 20 | 0.0 | 0 0 |
| 21 | .0 | 0 0 |
| 22 | 0.3 | 0 |
| 23 | 0.1 | 0 0 |
| 24 | 0.2 | 0 |
| 25 | 0.1 | 0 |
| 26 | | 3 |
| 27 | | 3 |
| 28 | | 0 |

FLT PLN-16b/56/0/B

FLT PLN-17a/56/0/A

+ +

+ +
B5

+ +
B4

DAP B5

PURPOSE:
COAS CAL

+ +

B5

| | | |
|----|-----|-----|
| 15 | 0.0 | 2 |
| 16 | 0.2 | 0 0 |
| 17 | 0.0 | 1 6 |
| 18 | 0.0 | 0 4 |
| 19 | 0.0 | 0 2 |
| 20 | 0.0 | 0 0 |
| 21 | .0 | 0 0 |
| 22 | 3.0 | 0 |
| 23 | 0.0 | 3 3 |
| 24 | 0.2 | 0 |
| 25 | 0.2 | 0 |
| 26 | | 3 |
| 27 | | 3 |
| 28 | | 0 |

FLT PLN-17b/56/0/A

FLT PLN-18a/56/0/A

+ +

+ +
B6



B5

DAP B6

PURPOSE:
(Blank)

FLT PLN-18b/56/0/A



B6

DAP B7

PURPOSE:
RENDEZVOUS

FLT PLN-19b/56/0/A



(reduced copy)



B6

| | |
|----|-----|
| 15 | --- |
| 16 | --- |
| 17 | --- |
| 18 | --- |
| 19 | --- |
| 20 | --- |
| 21 | --- |
| 22 | --- |
| 23 | --- |
| 24 | --- |
| 25 | --- |
| 26 | --- |
| 27 | --- |
| 28 | --- |

FLT PLN-19a/56/0/A



B7



B7

| | |
|----|------------|
| 15 | 0.0 5 |
| 16 | 0.5 0 0 |
| 17 | 0.2 0 0 |
| 18 | 0.0 0 4 |
| 19 | 0.0 0 2 |
| 20 | .0 0 0 |
| 21 | .0 0 0 |
| 22 | 2.0 0 0 |
| 23 | 1.0 0 0 |
| 24 | 0.2 0 0 |
| 25 | .0 2 0 |
| 26 | 1/1 or 3/3 |
| 27 | 1/1 or 3/3 |
| 28 | 0 |

FLT PLN-20a/56/0/A



B8



DAP B8

PURPOSE:
PROX OPS

FLT PLN-20b/56/0/A



DAP B9

PURPOSE:
ALTAS 2 SOLAR
OPS

FLT PLN-21b/56/0/B



B8

| | |
|----|-----------|
| 15 | 0.0 1 |
| 16 | 0.2 0 0 |
| 17 | 0.2 0 0 |
| 18 | 0.0 0 4 |
| 19 | 0.0 0 2 |
| 20 | .0 0 0 |
| 21 | .0 0 0 |
| 22 | 2.0 0 |
| 23 | - 1.0 0 0 |
| 24 | 0.2 0 |
| 25 | .0 2 0 |
| 26 | 1 |
| 27 | 1 |
| 28 | 0 |

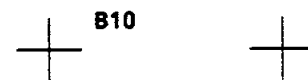
FLT PLN-21a/56/0/C



B9

| | |
|----|-----------|
| 15 | 0.0 2 |
| 16 | 0.0 5 0 |
| 17 | 0.0 1 6 |
| 18 | 0.0 0 4 |
| 19 | 0.0 0 2 |
| 20 | .0 0 0 |
| 21 | .0 0 0 |
| 22 | 1.0 0 |
| 23 | - 0.1 0 0 |
| 24 | 0.2 0 |
| 25 | .0 2 0 |
| 26 | 3 |
| 27 | 3 |
| 28 | 0 |

FLT PLN-22a/56/0/C



+ +
B9

DAP B10

PURPOSE:
SOLCON SUN SCAN

FLT PLN-22b/56/0/B

+ +

+ +
B10

DAP B11

PURPOSE:
MAS LUNAR SCAN

FLT PLN-23b/56/0/B

+ +

+ +

B10

15 0.0 2
16 0.0 5 0
17 0.0 1 4
18 0.0 0 4
19 0.0 0 2
20 .0 0 0
21 .0 0 0
22 0.3 0
23 - 0.1 0 0
24 0.2 0
25 .0 1 0
26 3
27 3
28 0

FLT PLN-23a/56/0/B

+ +
B11

+ +

B11

15 0.0 2
16 0.0 5 0
17 0.0 0 5
18 0.0 0 4
19 0.0 0 2
20 .0 0 0
21 .0 0 0
22 0.3 0
23 - 0.1 0 0
24 0.2 0
25 .0 1 0
26 3
27 3
28 0

FLT PLN-24a/56/0/B

+ +
B12

+ +
B11

DAP B12

PURPOSE:
 SPARTAN EXTENDED
 PARK

FLT PLN-24b/56/0/C

+ +

+ +
B12

DAP B13

PURPOSE:
 SPARTAN RELEASE

FLT PLN-30b/56/0/A

+ +

+ +

B12

| | |
|----|-----------|
| 15 | 0.0 2 |
| 16 | 0.1 0 0 |
| 17 | 0.1 5 0 |
| 18 | 0.0 4 |
| 19 | 0.0 0 2 |
| 20 | .0 0 0 |
| 21 | .0 0 0 |
| 22 | 2.0 0 |
| 23 | - 1.0 0 0 |
| 24 | 0.2 0 |
| 25 | .0 2 0 |
| 26 | 3 |
| 27 | 3 |
| 28 | 2 |

FLT PLN-30a/56/0/A

+ +
B13

+ +

B13

| | |
|----|-----------|
| 15 | 0.0 1 |
| 16 | 0.0 5 0 |
| 17 | 0.2 0 0 |
| 18 | 0.0 4 |
| 19 | 0.0 0 2 |
| 20 | .0 0 0 |
| 21 | .0 0 0 |
| 22 | 1.0 0 |
| 23 | - 1.0 0 0 |
| 24 | 0.2 0 |
| 25 | .0 2 0 |
| 26 | 1 |
| 27 | 1 |
| 28 | 0. 1 |

FLT PLN-31a/56/0/A

+ +

+ B13 +

| | | |
|-------|-----------|---|
| + DAP | PURPOSE | + |
| ALT1 | - NOMINAL | |
| | I-LOAD | |
| ALT2 | - LOSS OF | |
| | VERNS | |
| ALT3 | - SPARTAN | |
| | RMS | |

FLT PLN-25a/56/0/C

+ ALT1 +

FLT PLN-31b/56/0/A

+ +

+ DAP ALT1 +

PURPOSE:
NOMINAL
I-LOAD

+ ALT1 +

| | |
|---------|---------|
| RATE DB | |
| 32 | 0.2 0 0 |
| JET OPT | |
| 33 | 1 |
| # JETS | |
| 34 | 2 |
| ON TIME | |
| 35 | 0.0 8 |
| DELAY | |
| 36 | 0.0 0 |

FLT PLN-25b/56/0/B

FLT PLN-26a/56/0/B

+ ALT2 +

| | | | | | |
|---|--------------------|---|---|--------------------|------------------------------|
| + | DAP ALT2 | + | + | ALT2 | + |
| | PURPOSE: | | | RATE DB | |
| | LOSS OF VERNs | | | 32 | <u>0.0</u> <u>7</u> <u>0</u> |
| | | | | JET OPT | |
| | | | | 33 | <u>1</u> or <u>3</u> |
| | | | | # JETS | |
| | | | | 34 | <u>1</u> |
| | | | | ON TIME | |
| | | | | 35 | - <u>0.0</u> <u>8</u> |
| | | | | DELAY | |
| | | | | 36 | - <u>0.0</u> <u>0</u> |
| | FLT PLN-26b/56/0/B | | | FLT PLN-27a/56/0/B | |

| | | | | | |
|---|-------------|---|---|-------------|---|
| + | ALT1 | + | + | ALT3 | + |
|---|-------------|---|---|-------------|---|

| | | | | | |
|---|--------------------|---|---|--------------------|------------------------------|
| + | DAP ALT3 | + | + | ALT3 | + |
| | PURPOSE: | | | RATE DB | |
| | SPARTAN RMS | | | 32 | <u>0.1</u> <u>0</u> <u>0</u> |
| | | | | JET OPT | |
| | | | | 33 | <u>1</u> or <u>3</u> |
| | | | | # JETS | |
| | | | | 34 | <u>2</u> |
| | | | | ON TIME | |
| | | | | 35 | - <u>0.0</u> <u>8</u> |
| | | | | DELAY | |
| | | | | 36 | - <u>5.4</u> <u>0</u> |
| | FLT PLN-27b/56/0/C | | | FLT PLN-32a/56/0/A | |

| | | | | | |
|---|-------------|---|---|---|---|
| + | ALT2 | + | + | + | + |
|---|-------------|---|---|---|---|



FLT PLN-32b/56/0/A



| UNIV PTG | |
|-------------|---|
| TGT ID | = 1 Orbiting Vehicle = 2 Earth ctr = 3 Earth tgt Input LAT (± 90) LON (± 180 , + = East) ALT (-3444.0 to 20000.0 nm) |
| | = 4 Sun ctr = 5 Celestial tgt Input RA (0-359.99) DEC (± 90) = 11-110 Nav Stars |
| BODY VECT | = 1 +X* = 2 -X* = 3 -Z* = 4 -Y Star Tracker* = 5 Optional Input P (0-359.99) Y (270-359.99,0-90) *input OM \rightarrow OM (0-359.99) |
| MON AXIS | = 1 +X = 2 -X |
| CNTL ACCEL | = 0 Orbiter Alone = 1 SPARTAN Low Hover, Release, Capture = 2 SPARTAN Extended Park = 3 thru 5 not used |
| PRI JET OPT | = 1 Normal = 2 Nose only = 3 Tail only |
| ALT JET OPT | = 1 Normal = 2 Illegal entry = 3 Tail only |

FLT PLN-28a/56/0/B

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FLT PLN-28b/56/0/B

STS-56
FLIGHT PLAN NOTES

FLIGHT PLAN NOTES

A. FLIGHT DESCRIPTION

All data in this Flight Plan reflects a launch on March 11, 1993 (modified Flight Cycle) into a 159 x 162 nm orbit at an inclination of 57.0 degrees. The modification to Flight Cycle data consists of shifting SPARTAN retrieve activities, beginning with NC2, one orbit earlier. The mission duration is 8 days. Nominal landing occurs at KSC.

Landing opportunities are:

| | | <u>Landing Orbit No.</u> | <u>Site</u> | <u>Local Time</u> |
|-------------|---------|------------------------------|-------------|-------------------|
| Nominal | Primary | 132 | KSC | 07:02 EST |
| | Backup | 133 | NOR | 06:31 MST |
| | Backup | 134 | EDW | 07:03 PST |
| 1 Day Late | Primary | 148 | KSC | 07:09 EST |
| | Backup | 149 | NOR | 06:39 MST |
| | Backup | 150 | EDW | 07:10 PST |
| 2 Days Late | Primary | 164 | KSC | 07:16 EST |
| | Backup | 165 | EDW | 05:44 PST |
| | Backup | 165 | NOR | 06:45 MST |

Major Events:

| <u>Activity</u> | <u>MET</u> |
|-----------------|---------------------------------|
| LAUNCH (KSC) | 00/00:00 (05:56 GMT/23:56 CST) |
| OMS-2 | 00/00:40 |
| SPARTAN DEPLOY | 03/00:45 (06:41 GMT/00:41 CST) |
| RCS SEP-1 | 03/00:51 |
| RCS SEP-2 | 03/01:13 |
| RCS SEP-3 | 03/01:35 |
| NPC | 04/00:36 |
| NSR | 04/01:42 |
| NC1 | 04/04:14 |
| NC2 | 04/11:46 |
| NC3 | 04/20:49 |
| NH | 04/21:34 |
| NCC | 04/22:54 |
| Ti | 04/23:49 |
| SPARTAN GRAPPLE | ~05/01:49 (07:45 GMT/01:45 CST) |

| <u>Activity</u> | <u>MET</u> |
|-----------------|-------------------------------|
| DEORBIT BURN | 8/05:08 |
| LANDING (KSC) | 8/06:06 (12:02 GMT/06:02 CST) |

B. CREW

1. There will be five crewmembers onboard divided into teams as follows:

RED team - MS2, MS1
 BLUE team - CDR, PLT, MS3

The CDR's duty time is adjusted to allow time with both teams, but closely follows the Blue team. Each team works approximately 12 hours followed by 12 hours off duty. This allows continuous 24 hour/day payload operations.

2. The crewmembers will be assigned to the following tasks:

CDR - Kenneth D. Cameron
 PLT - Stephen S. Oswald
 MS1 - Michael C. Foale
 MS2 - Kenneth D. Cockrell
 MS3 - Ellen Ochoa

3. The crewmembers responsible for performing an EVA, should one become necessary, are: MS1(EV1), MS2(EV2), PLT(IV1).

C. ORBITER SYSTEMS

1. Communications and Instrumentation

- a. The Operational Instrumentation (OI) system will nominally be managed from the ground through uplink real-time commands (RTCs) coordinated with the crew.
- b. TDRS coverage is assumed to be supported by TDRS-E (41 degrees W) and TDRS-Spare (174 degrees W) and is the prime mode of communication coverage.
- c. GSTDN sites are available on an on-orbit contingency support basis (2- to 4-hour call-up): MIL, BDA, DKR, GDX, VAN, and DFR. Note: MAD and CAN are available on an emergency support basis only.
- d. RTS sites are available for contingency support (2-hour lead time required): DGS, HTS, GTS, VTS, IOS, NHS, CTS, and OTS.
- e. TDRS Ku-band is the prime mode of real-time TV; however, there are also three GSTDN sites available as backup (2 to 4-hour lead time required): GDX, MIL, and VAN.
- f. TDRS-E and TDRS-W are assumed available to support Ku-band uplink (e.g., TAGS or TIPS).
- g. HDR uplink (e.g., Teleprinter or TIPS) is available through TDRS-E and TDRS-W.

2. Guidance and Navigation

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

3. Environmental Control and Life Support Subsystems (ECLSS)

- a. Two CO₂ absorbers are installed prior to launch. On orbit, the canisters are alternately replaced as required per the cue card.
- b. There are four supply water tanks and one waste water tank which are loaded for launch with volumes sufficient to meet a launch day deorbit opportunity with payload bay doors (PLBDs) failed closed. Management of supply water will be accomplished through the use of the topping flash evaporator system (FES). Waste tank dumps will be performed as scheduled in the timeline.

D. TEXT UPLINK SYSTEM

1. The Text and Graphics System (TAGS) is a high-resolution facsimile system that scans text or graphics material and converts the analog SCAN data into serial digital data. This data is transmitted via a telemetry link to the cathode-ray tube hardcopier. Transmission time for an 8-1/2 by 11-inch page can vary from just over 1 minute to just over 16 minutes depending on the hardcopy resolution desired. The TAGS can only uplink images using Ku-band. This Flight Plan assumes Ku-band forward link is available for both TDRS-E and TDRS-W, and TAGS is the primary mode of text uplink. Instrumentation has the capability to uplink onboard hardcopier control commands via S-band or Ku-band for power on, advance, ready, standby, and off.
2. The teleprinter (TPR) will provide a backup on-orbit capability to receive and reproduce text-only data from MCC. The TPR uses S-band and is not dependent on TDRS Ku-band. TPR requires 1 to 2.5 minutes per message, depending on the number of lines (up to 66). The teleprinter will not be activated during Post Insertion. The TPR will remain unpowered to allow simultaneous HERCULES and DSO 321 (FIM) operations.
3. A Thermal Impulse Printer System (TIPS) will also be flown on STS-56. It is manifested as a DTO on STS-55. After evaluating the success of the DTO on STS-55, the operational priorities will be determined with respect to TAGS and TPR. The TIPS can operate with either the Ku-band or S-band system. Using the KU-band signal, the input cable for TAGS will be rerouted to TIPS if it is needed. Using S-band (A/G2) the audio cable will connect the TIPS to the PS's Comm panel on A15E in the same manner as the TPR. The TIPS will be stored in a middeck locker and can be accessed from the front of the locker. Paper rolls hold 160 feet and can also be changed from the front of the middeck locker.

E. TELEVISION/PHOTOGRAPHY

1. The CCTV system includes one color, wide-angle camera for in-cabin coverage. There will also be four PLB TV cameras. There are three different lens assemblies for the PLB cameras (color lens assembly, monochrome lens assembly, and wide-angle lens assembly). The type of lens assembly for each PLB camera is documented in the Flight Requirements Document. An RMS elbow and end effector camera will also be flown.
2. There is one video tape recorder.
3. Three camera systems are available: 35mm, 16mm, and 70mm.

F. PAYLOADS

1. Atmospheric Laboratory for Applications and Science - 2 (ATLAS-2)

The ATLAS-2 payload is the second of a series of NASA Shuttle-borne Spacelab (SL) missions designed to measure the variations in the solar output and its effects on the Earth's atmosphere over the course of an 11-year solar cycle. ATLAS is also intended to supplement measurements made by the Upper Atmosphere Research Satellite (UARS). The payload consists of an Igloo Spacelab pallet system and includes six instruments which are controlled via ground commanding:

a. Atmospheric Physics

- (1) Atmospheric Trace Molecule Spectroscopy (ATMOS) will map trace molecules in the middle atmosphere by measuring the infrared radiations absorbed. During Orbital sunrises and sunsets, the sunlight that passes through the Earth's atmosphere will be recorded. The wavelengths of light will identify molecules and their locations.
- (2) Millimeter Wave Atmospheric Sounder (MAS) will perform simultaneous measurements of day/night concentrations of ozone, middle atmosphere temperature, and trace molecules involved in the creation/destruction of ozone.

b. Solar Physics

- (1) Active Cavity Radiometer (ACR) and Solar Constant (SOLCON) experiments will use precise instruments to measure ultraviolet light through infrared radiation. With slightly different techniques, each experiment will determine a value for the solar constant and the values will be compared. Instrument accuracy and solar variations will be determined.
- (2) Solar Spectrum (SOLSPEC) will measure ultraviolet through infrared solar radiation to determine how the amount of these energies change over time and where they are absorbed in the atmosphere.

- (3) Solar Ultraviolet Spectral Irradiance Monitor (SUSIM) will determine both long-term and short-term variations of the total ultraviolet flux emitted by the Sun.
2. Shuttle Solar Backscatter Ultraviolet (SSBUV/A)

The SSBUV program is designed to provide more accurate and reliable readings of global ozone to aid in the calibration of backscatter ultraviolet (UV) instruments flown concurrently on free-flying satellites. The payload configuration consists of two Get-Away Special (GAS) canisters, one of which contains the SSBUV spectrometer. Payload operations are controlled via ground commands.
3. SPARTAN - 201

SPARTAN will be deployed and retrieved via the remote manipulator system (RMS). The two instruments which comprise SPARTAN, the Ultraviolet Coronal Spectrometer (UVCS) and the White Light Coronagraph (WLC), will investigate the physical conditions of the solar corona. All housekeeping and science data will be recorded onboard the deployed hardware.
4. Solar Ultraviolet Experiment (SUVE)

SUVE will measure extreme ultraviolet (EUV) and far ultraviolet (FUV) solar irradiance with two spectrometers contained in a Get-Away Special (GAS) canister.
5. Commercial Materials Dispersion Apparatus Instrumentation Technology Associates Experiment (CMIX)

CMIX will collect data on scientific methods and commercial potential of biomedical and fluid science applications in microgravity. Specifically, CMIX shall study protein crystal growth, collagen polymerization, fibrin clot formation, liquid-solid diffusion, and the formation of thin film membranes.
6. Physiological and Anatomical Rodent Experiment (PARE)

The PARE is a series of experiments designed to determine whether exposure to microgravity results in physiological or anatomical changes in rodents. The rodents will be contained in two Animal Enclosure Modules (AEM) which are designed such that the flight crew will not come into direct contact with the animals.
7. Space Tissue Loss (STL)

The objective of STL is to validate models of muscle, bone, and endothelial biochemical and functional loss induced by microgravity stress. STL will evaluate cytoskeleton, metabolism, membrane integrity and protease activity in target cells in addition to testing tissue loss pharmaceuticals for efficacy.
8. Shuttle Amateur Radio Experiment - II (SAREX-II)

SAREX-II is a middeck payload capable of two-way communication with amateur radio stations in the line-of-sight (LOS) of the Orbiter. An antenna is mounted in either window 1 or 6. Configuration D is planned for this mission and can operate in

one of four modes: voice, slow-scan television (SSTV), data, or fast-scan television (FSTV, uplink only). The voice mode is an attended mode, while SSTV, data, or FSTV can be operated in either an attended or unattended mode.

9. Handheld, Earth-Oriented, Real-Time, Cooperative, User-Friendly, Location Targeting, and Environmental System (HERCULES)

HERCULES provides an on-orbit capability to geolocate a ground target to 1 nm. The crew will have the ability to view electronic images onboard and downlink images via the Ku-band system.

10. Air Force Maui Optical Site (AMOS)

AMOS uses the Orbiter during cooperative overflights of Maui and Arecibo to obtain imagery and/or signature data to support the calibration of the ground-based sensors and the observe plume phenomenology. No unique onboard hardware is associated with the AMOS test; however, crew and Orbiter participation may be required to establish the controlled conditions for cooperative overflights. Only tests over Maui are planned.

11. Cosmic Ray Effects and Activation Monitor (CREAM)

CREAM will collect data on cosmic ray energy loss spectra, neutron fluxes, and induced radioactivity. Data will be collected with one active monitor and passive monitors placed at various locations within the crew compartment.

12. Radiation Monitoring Experiment - III RME-III

The RME-III configuration consists of a handheld instrument with replaceable memory modules and takes measurements of the radiation environment at a specified sample rate.

G. ON-ORBIT DTOs

1. Evaluation of the MK I Rowing Machine (DTO 653)

This DTO will evaluate the MK I rowing machine as an alternative to the shuttle treadmill. Noise and vibration associated with the MK I are anticipated to be significantly less than in the case of the treadmill. Additionally, inflight simulated rowing is anticipated to provide total body exercise including aerobic and anaerobic conditioning.

2. PGSC Single Event Upset Monitoring (DTO 656)

This DTO will evaluate Payload and General Support Computer (PGSC) random access memory susceptibility to single event upset caused by cosmic radiation. This information could lead to improved procedures, hardware, or software to reduce radiation effects.

3. Laser Range and Range Rate Device (DTO 700-2)

The Laser Range and Range Rate DTO will demonstrate the capability to provide the Orbiter flight crew with range and range rate data for rendezvous, proximity operations, and deploy

operations. The DTO will assess the usefulness of the data in assisting the pilot in achieving the desired trajectory conditions.

H. ON-ORBIT DSOs

1. Frequency Interface Measurement (DSO 321)

The Department of Defense has requested that NASA abandon the use of the present Extravehicular Activity (EVA) and Wireless Crew Communications System (WCCS) frequency bands. A spectrum analyzer will be used to collect data in the recommended 400 to 470 MHz frequency band. Data collection over European airspace is desired.

2. Human Lymphocyte Locomotion in Microgravity (DSO 322)

The data collected with DTO 322 will be used in the study of long-term weightlessness on the immune system. Specifically, DSO 322 will collect data on the locomotion and migration of human lymphocytes through intercellular matrix. The DSO will additionally test the Rotating Wall Vessel (RWV) and the Specimen Temperature Controller.

3. Inflight Radiation Dose-Distribution (TEPC) (DSO 469)

This DSO will provide data to establish, evaluate, and verify analytical and measurement methods for assessing and managing health risks from exposure to space radiation.

4. Inflight Aerobic Exercise (DSO 476)

The objectives of this DSO are to document the effects of daily aerobic exercise on 1) protection of left ventricular dimensions, 2) postflight orthostatic function, and 3) the rate at which these factors return to their preflight baseline values during the postflight period. In addition, the effects of regular aerobic exercise on the maintenance of aerobic power and economy will be determined.

5. Inter-MARS TEPC (DSO 485)

DSO 485 consists of a spectrometer, radiation detector, and support electronics mounted in the PLB. Although intended for the MARS '94 mission, it is onboard the Orbiter to test exposure to the radiation environment of spaceflight. The equipment is activated by a barometric pressure switch and requires no crew involvement.

6. Measurement of Formaldehyde Using Passive Dosimetry (DSO 488)

DSO 488 consists of personal and area samples which will be used to measure formaldehyde levels onboard the Shuttle.

7. Orthostatic Function During Entry, Landing, and Egress (DSO 603B)

DSO 603B will measure the changes in orthostatic function of crewmembers during the actual stresses of entry, landing, and egress from the Orbiter. Crewmembers will don equipment prior to

donning the LES during deorbit preparation. The crewmembers wear the equipment and record verbal comments throughout entry.

8. Evaluation of Functional Skeletal Muscle Performance Following Space Flight (DSO 617)

DSO 617 will study the physiological effects of long duration space flight on skeletal muscle strength, endurance, and power. It will provide knowledge necessary to support the development of future countermeasure prescriptions essential for nominal muscle performance.

9. Pre- and Postflight Measurement of Cardiorespiratory Responses to Submaximal Exercise (DSO 624)

A smaller decline between pre- and postflight aerobic capacity has been detected in individuals who perform regular inflight aerobic activity. To assist in the development of optimal exercise prescriptions, assigned crewmembers will maintain a log of exercise activities.

10. Educational Video (DSO 802)

DSO 802 will collect on-orbit video for postflight production of an educational video.

11. Documentary Television (DSO 901)

DSO 901 provides guidelines for scheduling live television or VTR dumps of on-orbit activities.

12. Documentary Motion Picture Photography (DSO 902)

DSO 902 provides guidelines for scheduling documentary and public affairs motion picture photography of on-orbit activities.

13. Documentary Still Photography (DSO 903)

DSO 903 provides guidelines for scheduling still photography of on-orbit activities.

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