



# **STS-131/ISS-19A MOD Flight Readiness Review**

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***JSC Mission Operations Directorate  
Flight Director Office***

***DA8/Ron Spencer***

***DA8/Richard Jones***

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***February 4, 2010***

***Agenda Item #3***

# Agenda



- **DA8 COFR Requirements/Endorsements**
  - COFR Requirements/Endorsements Summary
  - New Operations – A/E Topics, Shuttle, ISS, MCC
  - Safety Status Review
  - Flight Rules (Generic Volumes A, B, C, D; STS-131/19A Annex)
  - FDF/ODF/SODF
  - Mission Staffing: Training/Certification/Work Guidelines Compliance
  - Non-Critical Processors/Applications (backup)
  - Emergency Mission Control Center (EMCC)/Backup Control Center (BCC) (backup)
  - Command Procedures (backup)
  - Contingency Shuttle Crew Support/Rescue Flight: STS-131 (LON vehicle) (backup)
  - Flight Techniques & Joint Operations Panels (backup)
  - Level II Actions/Shuttle IFAs
- **Standard Open Work (backup)**
- **Non-Standard Open Work**
- **Exceptions**
- **Items of Interest**
- **Flight Readiness Statement**



# DA8 COFR Requirements/Endorsements



REQUIREMENT (SHUTTLE)	FD	PI	Safety	SPAN	SMG	Team 4
Non-Crit Processors/Applications	G				G	
EMCC	G				G	G
Certified Flight Controllers	G			G	G	G
Flight Rules	G					
FDF	G	G				
FTP - New Ops	G					
Flight Anomaly Resolution	G			G		
Anomaly - Procedure	G					
Exceptions/Action Items From Prior Readiness Reviews	G	G	G	G	G	G
CIL/Hazards	G		G			
No Constraints	G	G				
Level II (Program) Actions	G	G				
Mission Requirements	G					
Exception/Resolution	G	G				
Command Procedures	G					
Flt Prep Process Plan Requirements Met		G				
Contractor Process Insight		G				



Ready to Support Flight/Only Standard Open work



Non Standard Open work with expected resolution prior to flight.



Open work without expected resolution without assistance, prior to flight, or unavoidable constraint violation.



N/A



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Flight Director Office

# DA8 COFR Requirements/Endorsements



REQUIREMENT (STATION)	Flight Director	Program Integration	Ops Safety	SPAN	Team 4							
Non-Crit Processors/Applications	G						G	Ready to Support Flight/Only Standard Open work				
BCC	G				G							
Certified Flight Controllers	G			G	G							
Flight Rules	G											
ODF/SODF	G											
JOP - New Ops	Y						Y	Non Standard Open work with expected resolution prior to flight.				
Flight Anomaly Resolution	G			G								
Anomaly - Procedure	G											
Exceptions/Action Items From Prior Readiness Reviews	G	G	G	G	G							
CIL/Hazards	Y		G				R	Open work without expected resolution without assistance, prior to flight, or unavoidable constraint violation.				
No Constraints	G	G										
Level II (Program) Actions	G	G										
Flight/Increment Planning (Mission Requirements)	Y											
Exception/Resolution	G	G										
Command Procedures	G							N/A				
Contractor Process Insight		G										





# Ascent/Entry Topics



Preliminary Launch Window Times for STS-131/19A

KSC Day Window Open	KSC Date	RNDZ Day	ET Photo Umbilical	ET Photo Handheld	Open (EDT)	Open (GMT)	In-Plane (GMT)	FD3 Close (GMT)	FD4 Close (GMT)
Thursday	18-Mar	FD3/FD4	Light	Light	13:30:12	17:30:12	17:35:12	17:40:12	17:43:27
Friday	19-Mar	FD3	Light	Light	13:07:41	17:07:41	17:12:41	17:17:03	
Saturday	20-Mar	FD3/FD4	Light	Light	12:41:58	16:41:58	16:46:58	16:51:58	16:55:13
Sunday	21-Mar	FD3	Light	Light	12:19:27	16:19:27	16:24:27	16:29:27	
Monday	22-Mar	FD3/FD4	Light	Light	11:53:44	15:53:44	15:58:44	16:03:44	16:06:59
Tuesday	23-Mar	FD3	Light	Light	11:31:13	15:31:13	15:36:13	15:41:13	
Wednesday	24-Mar	FD3/FD4	Light	Light	11:05:30	15:05:30	15:10:30	15:15:30	15:18:45
Thursday	25-Mar	FD3	Light	Light	10:42:59	14:42:59	14:47:59	14:52:59	
Friday	26-Mar	FD3/FD4	Light	Light	10:17:17	14:17:17	14:22:17	14:27:17	14:30:31
Saturday	27-Mar	FD3	Light	Light	9:54:45	13:54:45	13:59:45	14:04:45	
Sunday	28-Mar	FD3/FD4	Light	Light	9:29:03	13:29:03	13:34:03	13:39:03	13:42:17

## NOTES:

- 1) Day launch from March 4 through April 2
- 2) Beta cutout (Beta > 60 deg) begins on April 14 for 13+1+2 day mission (past dual docked ops window)
- 3) FD3/FD4 are days where both a FD3 and a FD4 pane may be utilized to extend the launch window.
- 4) Optimal ET Umbilical lighting occurs on March 5 through April 8
- 5) Optimal ET Handheld lighting occurs on March 8 through April 11
- 6) March 19 FD3 window close constrained by phase angle



**Mission Operations Directorate**  
**Flight Director Office**

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# Ascent/Entry Topics



- **Boundary Layer Transition DTO, Flight 3**
  - Third flight of DTO will gather data during entry regarding the aerothermal effects caused by the boundary layer transitioning from laminar flow to turbulent flow at a high Mach number
  - Changes from STS-128
    - No change to protuberance height (0.35 inches)
    - Boundary layer trip at Mach ~18
    - Temperature-sensitive, catalytic coating applied to 1 downstream tile
    - Thermocouple relocations based on STS-128 postflight data



# Ascent/Entry Topics



- **Day of Launch ET Loading**

- Verification of ET cryo load when PLOAD information is not available will rely upon flight-specific ET information
  - PLOAD provides the actual ET load on day of launch and when that application is not available the Flight Rule provides the protocol necessary to use prelaunch data to verify an acceptable ET load.
  - Rule is being updated to provide consistency with new Main Propulsion System (MPS) inventory changes recently adopted by the Program and to utilize flight specific ET volume versus a generic value that is currently used.



# Shuttle Item of Interest



- **Descending Landing Opportunities**
  - Team is weighing feasibility of making descending landing opportunities the nominal plan
    - Significantly improves available time for transfer
    - Favorable crew sleep shift
    - No concerns for noctilucent clouds (season: June – August)
    - Ascent performance margin and fwd/aft margins may offset additional propellant costs without changing pre-flight design (ascending)
    - Precludes Shuttle launch on March 23-25 due to sleep shift conflicts with Soyuz 22S docking if Soyuz launch remains April 2







# Shuttle Items of Interest



- **Cryo off-load set at 545 lbm to achieve 96 hours pad hold, assuming 13+2+2 mission duration**
  - Standard Group B Power Down for on-orbit free flight and post docking
  - 96 hours of padhold will allow 4 launch attempts over 5 days, with last launch attempt on Mar. 22 (2 days before Dual Docked Operations)
  - Launch team/MOD considering offload to yield 120 hours of padhold to increase launch attempt flexibility to avoid Dual Docked Operations
- **Go/No-Go Pause Points for Flight Day 1 SRMS Operations**
  - RMS Powerup & Checkout nominally timed for FD2
  - If crew space adaptation going well, no-later-than METs defined where portion of RMS Powerup/Checkout may be completed and still get SRMS to overnight precradle position in time for crew sleep
  - RMS Powerup must start no later than MET 00/04:25



# Shuttle Items of Interest



- **Shuttle LiOH Management**
  - Will modify flight rule 19A\_C2-83 for STS-131/19A to maintain  $PPCO_2 \leq 5.0$  mmHg in the shuttle, factoring in available ISS resources
  - Nominal plan: with 3 ISS crew for 13+2+3, expect to transfer 9 cans leaving stockpile  $\geq 29$  cans
  - Worst case planning: If Vozdukh failed, protecting 13+2+3, with 6 ISS crew, then STS-131/19A may require 8 LiOH cans from ISS stockpile (leaving it at 12)
- **Shuttle Waste Management**
  - Urine waste dumps not allowed during mated operations
  - 5<sup>th</sup> CWC and 2<sup>nd</sup> Waste water dump filter manifested in case ISS WHC use by shuttle crew is prohibited
  - Crew/Ground Plan: Shuttle waste tank tracking chart will be uplinked to crew on FD4
    - No more than 2 equivalent CWC fills for Urine expected (worst case w/ no failures)
    - Waste tank dump targeted for FD12 (undocking day) with CWC dump on FD13
- **Shuttle Water Management**
  - Highly confident CWC & PWR condensate fill/processing plan will allow deletion of FD8 mated dump for Dual Docked Operations if required



# New Operations: ISS



- **Cupola RWS**

- MPLM Install/Uninstall and EVA support planned from Cupola RWS in Cupola
- Cupola location of RWS not mandatory, but cupola windows provided enhanced situational awareness for robotics
- Requires drag through approvals of BPSMU, Seat restraint system and 2 extra monitor cables (ECD 2/16)
  - If drag throughs disapproved:
    - Seat: Alternative restraint methods to be evaluated by 20A/Increment crew
    - Monitor Cables: Still prefer cupola windows versus extra monitors at the lab RWS
    - BPSMU: due to docked audio unreliability, Lab RWS preferred
    - Lab RWS available



# New Operations: ISS



- **New rack Installations during 19A, activated during stage**
  - Crew Quarters 2 will be installed at NOD2O5
  - MARES will be installed at COL1F3
  - MELFI 3 will be installed at JPM1A1
  - WORF will be installed over the Lab window at LAB1D3
  - ER-7 will be installed at LAB1P2
    - ITCS hoses will be connected during 19A to prevent stagnant ITCS fluid



# New Operations: ISS Stage Ops



- **SM 8.04 Transition**

- scheduled for April 13, 2010.
- Major new functionality available in SM 8.04
  - Docking MRM1 to FGB nadir port using SSRMS.
  - Integration of MRM1 to ISS after docking.
  - Orlan Suit Telemetry available via USOS with Integration of MU 23 (Orlan Telemetry Unit).
  - Development of interfaces between ISS-RS and Soyuz with new generation SUDN.
  - Upgrade interfaces between ISS-RS and Progress with new generation SUDN.
  - Development of interfaces between SM TC and new up-link EKTS.
  - Update interfaces between ISS-RS and USOS in accordance with PIRNs to SSP 50097.
  - Update interfaces between ISS-RS and ATV-2
  - Development of modes ISS attitude control using thrusters “Progress” vehicle docked to MRM2
  - Development of interfaces between OCS and new RS payloads.
  - Development of modes “Soyuz” vehicles re docking



# New Operations: ISS Stage Ops



- **SPDM Operations (Ground only)**

- SPDM RPCM Swap SDTO:
  - RPCM Swap: Swap P11A\_A and P31A\_A
    - RPCM P11A\_A: Backup hrs
    - RPCM P11A\_B: Redundant Port TRRJ control (P1-1 MDM and TRRJ RJMC P1-1)
    - RPCM P31A\_A: Redundant Port SARJ control (P3-1 MDM and RJMC P3-1)
- OCR6 & RPCM Swap
  - Day 1: MSS Configuration
  - Day 2: OCR 6 and RPCM P11A\_A removal for swap
  - Day 3: RPCM P311A\_A removal and swap with RPCM P111A\_A
  - Day 4: MSS Cleanup
- SPDM Locations:
  - RPCM Swap: SPDM on SSRMS (SSRMS on MBS at WS6)
  - ULF4 or ULF 6 Preparation: SPDM will be moved back to US Lab PDGF.
- ISS Program would like EVA backup capability.
  - The readiness level has not yet been defined.
  - A 2-3 day EVA turnaround would require 25 to 30 hours of EVA prep.
  - The exact date has not been determined.
    - The ideal time period would be to schedule it prior to US Stage EVA 15, scheduled for July 7, 2010.



# New Operations: ISS Stage Ops



- **Sabatier**

- New regen ECLSS equipment to be installed in Node 3.
- Sabatier uses H<sub>2</sub> from OGS and CO<sub>2</sub> from CDRA to make H<sub>2</sub>O, which is collected and processed by WPA, and CH<sub>4</sub> which is vented overboard.
- NASA committed to launch and provide all operational interfaces required for checkout of the hardware on orbit by May 31, 2010.
- Current plan does not accommodate installation prior to May 31<sup>st</sup>.
  - Final OOS TIM in mid-February attempt to accommodate Sabatier installation during Increment 23. However, it will probably be scheduled in the ULF4 Stage, since it currently 29<sup>th</sup> on the priority list.
- Includes up to 40 hours of crew time for initial installation
- Checkout consists of a 5 hour operational run
  - Multiple CDRA half cycles and OGS day/night cycles



# ISS: Items of Interest



- **Longeron Shadowing**
  - Solar Array Wing 2A considered degraded since the December 2009 BGA latch failure/longeron shadowing event
  - 1/29 Ops Tagup decision to continue ISS ops with desats enabled
  - Updates to 19A attitude control and solar array plans will be reflected in the Final Flight Plan (ECD 2/16)
  - 19A constraints are in work for event specific contingency responses to longeron shadowing cautions (ECD L- 2 weeks)
- **ISS Program considering inhibiting auto handover to RS FDIR due to updated loads analysis (2/4 IMMT)**
  - Flight Rule update if necessary (ECD 2/8)





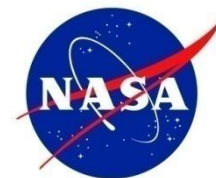


# ISS: Items of Interest



- **ATA R&R (EVAs 1-3)**
  - NH3 vent on FD1
    - ATA will be isolated from EATCS Loop A
    - Vent to be performed using momentum management
    - Vent recontact analysis in work (ECD 2/17)
      - No issues expected based on 17A port ATA vent analysis
  - N2 vent on FD4
    - Vent to be performed on momentum management with desats enabled
      - Desats expected—there were 5 desats on 17A
  - After R&R (EVA2), Stbd ATA tank 2 will be integrated but not Stbd ATA tank 1
    - Minimizes N2 to pressurize system and loss of NH3 if leak occurs
      - Loop B has been running single ATA tank ops since the port ATA R&R on 17A





# ISS: Items of Interest



- **ISS Stowage**
  - ~30 CTBE ISS stowage shortfall for 19A delivered content
    - Assumes maximum MPLM volumetric return
  - Resolution:
    - Get approval to use 1.5 empty JPM rack bays (ECD 2/12)
      - These rack bays are scheduled to be empty until HTV2 arrival
      - 30 CTBE available
    - Utilize additional Node 3 and Node 1 volume
      - ~ 15 CTBE available in Node 3
      - ~ 30 CTBE available in Node 1
      - Requires translation path and ventilation analysis (ECD 2/19)
  - ~40 CTBE of return candidates not yet approved
    - Need approval by 2/12 to support stage prepack



# ISS & Shuttle: Dual Docked Operations (DDO)



- **Soyuz 22S**
  - Launch: April 2, 2010
  - Docking to MRM2: April 4, 2010
- **Dual Docked Operations Window**
  - Shuttle launch from March 24 through April 2
  - Shuttle launch on March 23 also applies if +1 day added to mission
- **Jan 25 JPRCB approved mission duration increase from 13+1 to 13+2 for DDO**
  - Mission content loss due to DDO can be mitigated by adding +1 day
- **Timeline Assessments**
  - Nominal mission sleep schedule supports Soyuz docking
  - Very long crew day if OBSS safing performed on the crew evening prior to DDO
  - Mated water dump may be deleted to meet visiting vehicle requirements (no dump < 3 days from docking)
  - Descending landing is a possibility due to mission duration/mission content concerns
    - Results in a Sleep shift left to support DDO followed by a sleep shift right to support deorbit
    - Eliminates FD11+ DDO opportunities



# ISS & Shuttle: Dual Docked Operations (cont.)



- **Unique SRMS/OBSS safing trajectory coordinated with Orbiter Project Office to protect OBSS sensors and SRMS cameras**
  - Procedure will be uplinked to crew if required
  - Orbiter payload bay cameras & star tracker doors also require safing measures
- **Attitude Control and Solar Array Plan**
  - Options to be worked for attitude mnvr to Soyuz docking attitude (ECD L-2 weeks)
    - Shuttle VRCS attitude mnvr + Russian thruster attitude hold
      - Shuttle propellant not specifically budgeted for this
      - May be very difficult to find a common solar array position that supports Shuttle VRCS, Russian attitude hold, plus KURS constraints
    - Russian attitude mnvr and attitude hold



# ISS & Shuttle: Dual Docked Operations (cont.)



- **Forward Work**

- Solar array plan and powerdown requirements once SACM is received (L- 2 weeks)
- Generic detailed DDO timeline including crew and ISS ground activities (ECD 3/1)
  - Specific detailed timeline will be worked after launch to the specific flight day DDO opportunity
- Flight rules targeted for PCN-1
  - Orbiter systems safing requirements
  - Docked loads constraint tables



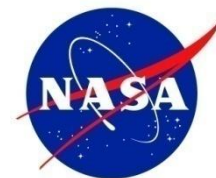
# ISS & Shuttle: Items of Interest



- **STORRM DTO #703 Docking Target Installation**

- Background:
  - Relative Navigation sensors for Orion vehicle require special 'reflectors' on the PMA-2 docking target
  - DTO #703 (post-undocking re-rendezvous) slated to fly on STS-134/ULF6
- STS-131/19A will fly and transfer STORRM DTO docking target reflectors to ISS
- ISS crew will install reflectors and STS-131 crew will take close-out photographs of docking target after hatch closure (prior to undock)
- STS-132/ULF4 team is aware of the docking target changes





# ISS & Shuttle: Items of Interest



- **MPLM Atmosphere Management**

- ‘Turn-OFF’ temperature setpoint for 28 volt MPLM shell heater thermostat has been lowered (colder by ~1.5 degF)
  - Mitigates likelihood of exceeding upper MPLM pressure limit of 14.95 psi
  - 28V heaters active after undocking
- Temperature/Pressure ‘control’ provided by 28V shell heaters known to be inefficient at high Beta magnitudes
  - Beta expected to be in -40 deg range for STS-131/19A (slightly better than STS-128/17A)
- Review of MPLM closeout control box (Temperature/Pressure) techniques in preparation for MPLM unberthing showed no changes are required



# Non-Standard Open Work: Safety



- Resolution of Drag-through NCRs (ECD 2/25/10)
- Update of Laser hazard reports given presence of Cupola (ECD 2/18/10)
- Resolution of Stowage NCRs (ECD 2/25/10)





# Non-Standard Open Work: Shuttle and ISS



## Shuttle

- **IFA STS-129-D-001 Unexpected Release of HPGT from ELC2**
  - High Pressure Gas Tank (HPGT) was released from ELC before EVA crewpersons were in place, ready to receive the ORU
    - Procedure incorrectly assumed “locked” configuration of 5<sup>th</sup> latch was sufficient; however this assumption was true only at the ISS Airlock (HPGT final destination) and not for the ELC
  - MOD has assessed the STS-131/19A EVA operations and there are no issues or hardware configurations similar to the STS-129/ULF3 HPGT/ELC interface issue. Procedures ensure all EVA ORUs and hardware are fully secured before being untethered.
  - STS-131/19A one-flight disposition completed 2/3

## ISS

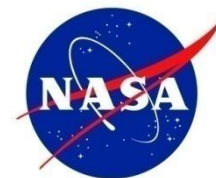
- NH3 vent recontact analysis (ECD 2/17)
- Longeron shadowing event response (ECD L- 2 weeks)
- ISS Stowage Approvals (ECD 2/12 JPM, 2/19 Node 1 and Node 3)

**Mission Operations Directorate**  
**Flight Director Office**

*Pre-decisional FOR INTERNAL USE ONLY*

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# Flight Rules



- **All required generic volume A, B, C, and D flight rules have been developed, reviewed, and approved by the appropriate Flight Techniques Panels, Joint Operations Panels, and the Flight Rules Control Board**
- **The following generic publications are applicable for STS-131/ISS-19A**
  - Volume A (STS), Final, PCN-10 dated 5/21/09
  - Volume B (ISS), Final, PCN-20 dated 1/26/10
  - Volume C (Joint), Final, PCN-5 dated 5/18/09
  - Volume D (Soyuz/Progress), Final, PCN-6, dated 5/4/09
- **STS-131/ISS-19A flight rules annex**
  - Final, approved at JPRCB on 1/25/10
  - PCN-1, planned for JPRCB review on 3/8/10
    - Expecting ~20 flight rule CRs (mission priorities, docked loads, exercise constraints, RPM/RCS management, dual docked operation orbiter safing)





# FDF/ODF/SODF



- **DA8 has participated in FDF/ODF/SODF processes and procedure reviews as required**
- **FDF/ODF will be ready to support STS-131/ISS-19A**
- **New procedures are primarily for:**
  - PDRS (intra-crew coordination callouts)
  - GNC (DAP table mods for Draper loads analysis)
  - RGPO (Ku-band mgmt for RPM, Loss of 1 FxD mods for RPM)
  - EVA and Robotics activities



# Flight Director Mission Staffing



- **STS-131/ISS-19A Flight Directors are certified per Flight Director Certification Guide (DA8-00010), Final, dated May 22, 2009**
  - Initial certification required as indicated by \*
- **Additional certified Flight Directors are available to support mission staffing, Team 4, EMCC, and STS-131/LON flight, as required**
- **MOD Work Guidelines are met**
- **Flight-specific certifications are expected to be complete by Mar 3, 2010**

Shuttle Flight Directors		ISS Flight Directors	
Richard Jones	Lead/Orbit 1	Courtenay McMillan	Orbit 1
Michael Sarafin	Orbit 2	Ron Spencer	Lead/Orbit 2
Ginger Kerrick *	Planning	Ed Van Cise *	Orbit 3
Paul Dye	Orbit 4	Brian Smith	Team 4
Bryan Lunney	Ascent/Entry		



# Level II Actions and Exceptions



- **Level II Actions:**      **None**
- **Exceptions:**            **None**

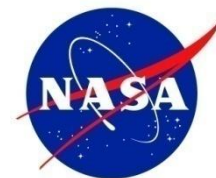


# Flight Readiness Statement



- **Pending completion of all standard and non-standard open work, the Flight Director Office and Space Flight Meteorology Group are ready to support the STS-131/ISS-19A mission and ISS-19A stage**
- **All standard/non-standard open work will be closed out or have a closure plan prior to SSP FRR (date under review) with no exceptions**
- **ISSP SORR will be conducted on 2/25/10; closeout for non-standard open work will be reported to ISSP prior to SOMD Level 1 FRR (date under review)**





# BACKUP



# Spaceflight Meteorology Group



- All forecasters required to support STS-131 meet requirements listed in SMG Training & Certification plan
- **GOES Satellite** eclipse period: March 2 – April 28
- **GOES-East Satellite** will be in eclipse 0430Z-0630Z.
  - Launch impacts do not begin until April 8
- **GOES-West Satellite** will be in eclipse 0815Z-1030Z.
  - Not an impact to launch or landing.
- System Changes:
  - **AWIPS/MIDDS**: None.

The undersigned certifies that the Spaceflight Meteorology Group is ready to support the STS-130 flight.

/s/ Frank C. Brody

Frank C. Brody

Chief, Spaceflight Meteorology Group

**Mission Operations Directorate**  
**Flight Director Office**

*Pre-decisional FOR INTERNAL USE ONLY*

DA8/Spencer/Jones/Lunney/Jason 131/19A MOD FRR 02/04/10







# EMCC/BCC



- **No changes to EMCC procedures since STS-129/ULF3**
  - Personnel are identified to support EMCC, if required
- **Backup Control Center (BCC)**
  - BCC-HOSC is prime for BCC/BAT.
  - Facilities and personnel are ready to support.
  - Checkout occurred and included all Partner Control Centers.
    - June 1, 2009 included HOSC, POIC, JAXA, ESA.
    - July 8, 2009 included MCC-M.
    - BCC updates now provide cmd/tlm connectivity to MCC-M, COL-CC and SSIPC.



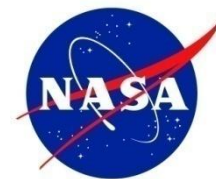
# Command Procedures



- **Personnel are prepared and ready to execute the command procedures as documented per MOD Command Policy/Flight Rules**



# Non-Critical Processors/Applications



- **No changes to Flight Director MCC software applications for STS-131/ ISS-19A**



# ISS Open Hazard Reports



- ISS-EPS-0207** Electrical Shock of an IVA Crewmember (ECD 2/11/10)
- ISS-EPS-0309** Electrical Shock of an EVA Crewmember (ECD 2/11/10)
- ISS-ECL-0404** Fire Event on-board ISS (ECD 2/18/10)
- ISS-EVA-0301** EVA Crewmember Collision (ECD 2/11/10)
- ISS-TCS-0001** Flammability of Ammonia in the Orbiter Payload Bay (ECD 2/11/10)
- ISS-TCS-0057** Rupture of External Active Thermal Control System (EATCS) components (ECD 2/11/10)
- ISS-TCS-0091** Leakage or Failure of the Internal Thermal Control System (ITCS). (ECD 2/11/10)
  
- ISS-TBD** Laser HR (ECD 2/18/10)



# ISS Open NCRs



<b>NCR-ISS-STO-N1N2N3-001</b>	Node 1, Node 2, and Node 3 Fireports, Flight 19A through 40P Undock. (ECD 2/18/10)
<b>NCR-P/TV-CUPRWS-01</b>	Standard Definition Video Drag-throughs from Lab to Cupola for Robotics Operations. (ECD 2/18/10)
<b>NCR-P/TV-DOCKVID-01</b>	Video Drag-throughs for Visiting Vehicle Docking to Russian Segment. (ECD 2/18/10)
<b>NCR-P/TV-HDCAM-01</b>	MPC Video Drag-throughs for Hi-Definition Video into Adjacent Modules. (ECD 2/18/10)
<b>NCR-P/TV-JEMRMS-01</b>	Standard Definition Video Drag-through from Lab to JEM for JEMRMS. (ECD 2/18/10)
<b>NCR-P/TV-SDCAM-02</b>	Standard Definition Camera Video Drag-throughs into Adjacent Modules. (ECD 2/18/10)
<b>NCR-P/TV-SDCAM-03</b>	Standard Definition Camera Video Drag-through from Node 1 into SM. (ECD 2/18/10)



# Payload Open Hazard Reports



- **STS**

- none

- **ISS**

- APEX-Cambium Series/Reflight Hardware Phase III, ECD: TBD
- HRF MARES, HR MARES-6 – Electrical Shock and HR MARES-12 – Rapid Safing, ECD: 01/29/10
- HRF MARES Rack, HR MRACK-2 – Electrical Shock, ECD: 01/29/10



# Open NASA OCADs



- **OSO (1)**
  - Sabatier thermal constraints for rack entry
- **EVA (3)**
  - PWR constraints
- **ROBO (2)**
  - ATA tight clearance (GCA)
  - MPLM removal trajectory constraints
- **PHALCON (2)**
  - Power removal prior to Sabatier maintenance





# CSCS Support/LON



- Contingency Shuttle Crew Support (CSCS) /Rescue Flight Resource Book is located at [http://mod.jsc.nasa.gov/da8/rules/CSCS\\_Rescue\\_Flight\\_Resource\\_Book/cover.htm](http://mod.jsc.nasa.gov/da8/rules/CSCS_Rescue_Flight_Resource_Book/cover.htm)
- STS-131 Ascent/Entry Team will support STS-131/LON mission
- Personnel are available to support Orbit Operations as required





# Remaining STS-131/19A Integrated Simulations



- **Ascent/Entry**

- 2/10: S0044 w/ KSC
- 2/11: FDO/BSE
- 2/24: TCDT w/ KSC
- 2/26: D/O Prep
- 3/2: Post Insertion
- 3/4: Ascent #3
- 3/10: Entry #3
- 3/12: Ascent #4

- **Orbit**

- None

- **ISS**

- None



# Ascent/Entry Topics



- **Edwards Temp Runway**
  - Permanent runway concrete work to began in mid January which will drive the need for the Temporary Runway for an EDW landing if required.
  - Flight Rules, procedures, and Crew/MCC training have been conducted with use of the Temp Runway.
  - Navigational aids are in place on the Temp Runway.
- **Launch Window Cutouts**
  - Air Force COLA cutout methodology may begin with STS-131.
    - Launch window screened against the entire debris catalog instead of only “mannable” satellites.
    - Impacts to launch window expected to be minimal and should not result in more than ~4 cutouts where launch would be prohibited.



# Shuttle Item of Interest



- **Ku-band Management for RPM**

- For RPM, Ku Select switch will remain in GPC instead of Auto Track to prevent Ku radar from moding to Hi Power if loss of lock occurs (STS-128/17A scenario)
  - Ku Radar not allowed to radiate in High Power inside of 681 ft ( All Flights flight rule C11-4)
- During RPM, Ku Power taken to Standby at initiation, then On at completion
- Risk: Possible loss of TCS data due to loss of Ku-radar lock after RPM completion
- Same philosophy used since STS-129/ULF3

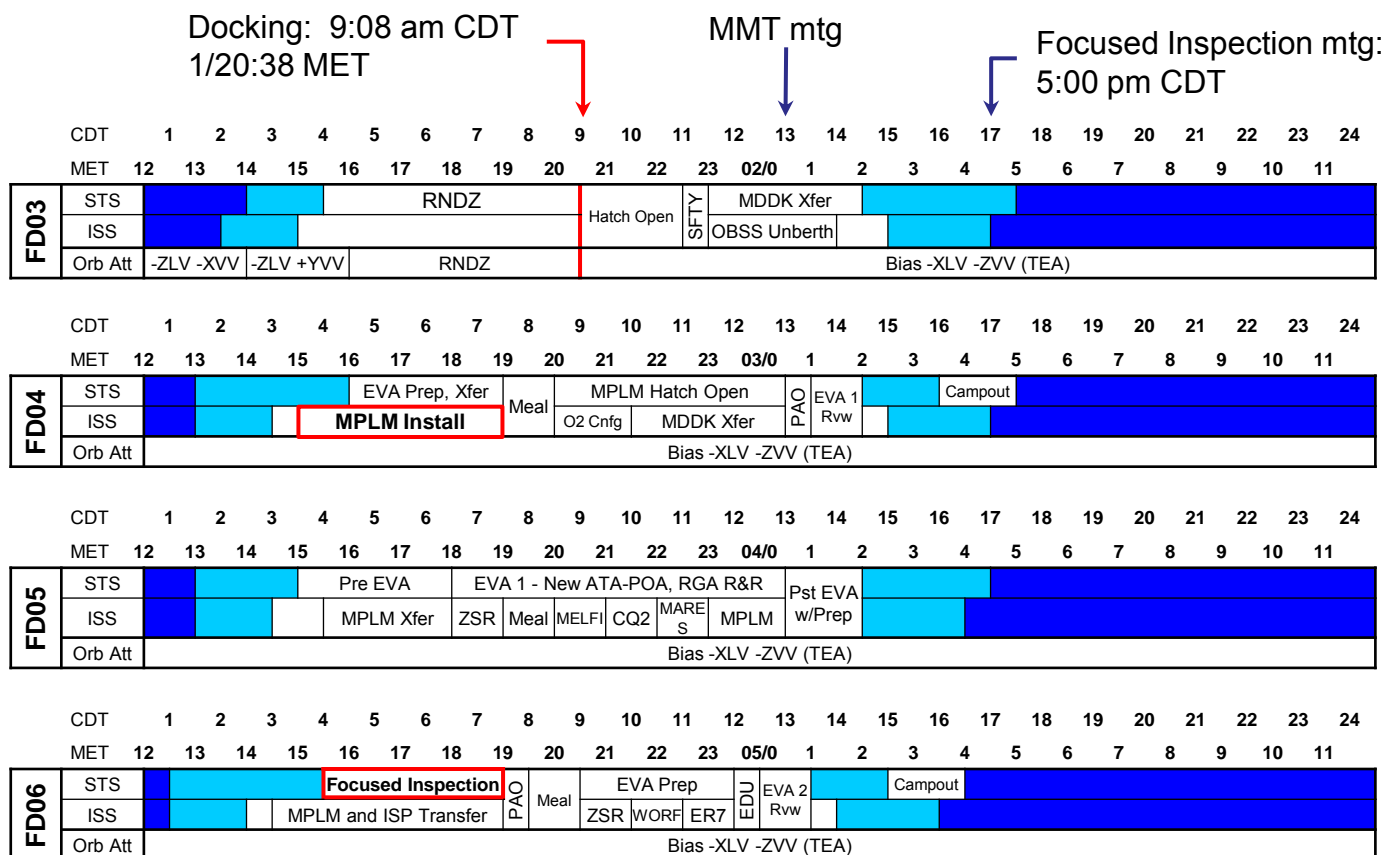




# Focused Inspection Timeline



- Assumption: Launch on Thurs, March 18, 2010, 077/17:35:12 GMT, 12:35 pm CDT



# Standard Open Work



- **STS-131/ISS-19A Flight Rules Annex**
  - Final: approved at JPRCB on 1/25/10
  - PCN-1: targeted for JPRCB on 3/8/10
- **FDF/SODF**
  - Final crew review 3/4/10
  - Final errata, L-2 days
- **Training**
  - Complete STS-131 Ascent/Entry simulations (L-6 days)
  - Complete Flight Director flight specific certifications (ECD 3/3/10)
- **INDEPENDENT SAFETY VERIFICATION REVIEW**
  - SHUTTLE ISVR REPORT (ECD: L-2 wk)
  - ISS ISVR REPORT (ECD: L-2 wk)



# Standard Open Work



- **Water transfer plan and Pressure profile**
  - Complete coordination with MCC-M (ECD L- 8 days)
- **Finalize solar array constraints and power profile plan for docked mission**
  - SACM (L-2 weeks)
  - Power Analysis (ECD L-2 weeks)
- **Complete “Road To” Items and Prepack**
  - ISS stowage reconfig of Node 2 hatchway and several rack bays
  - TESS disassembly and stowage removal
  - PMA3 CDC and CPA removal
    - Needed for stowage access for BMRMM and other items
  - SSRMS Walkoff from Lab PDGF to Node 2 PDGF
  - SPDM relocation from MBS to Lab PDGF
  - Regen ECLSS Relocation to Node 3



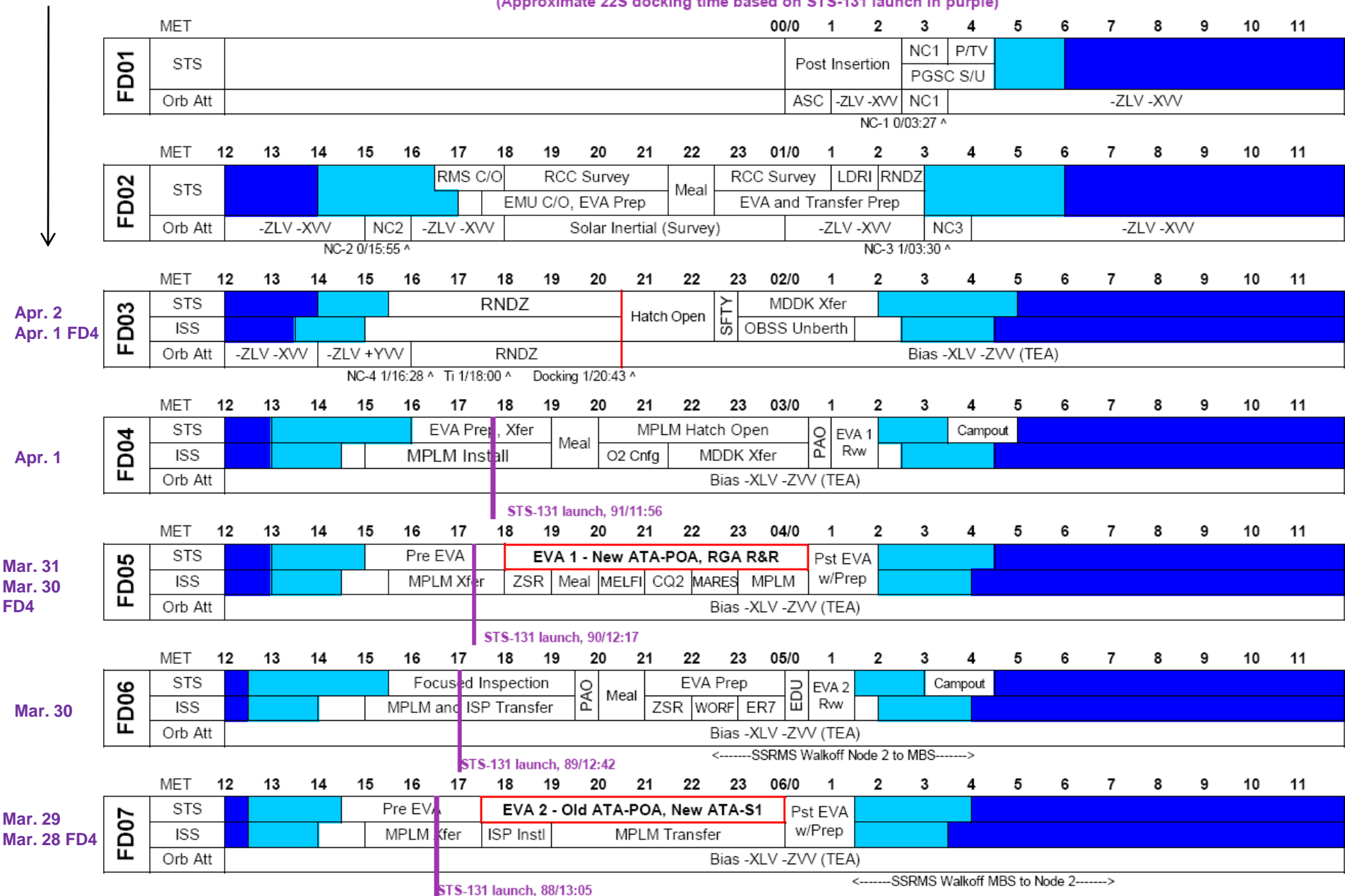
# STS-131/ISS 19A Dual Docked Operations

## Overview Timeline 13+1+2

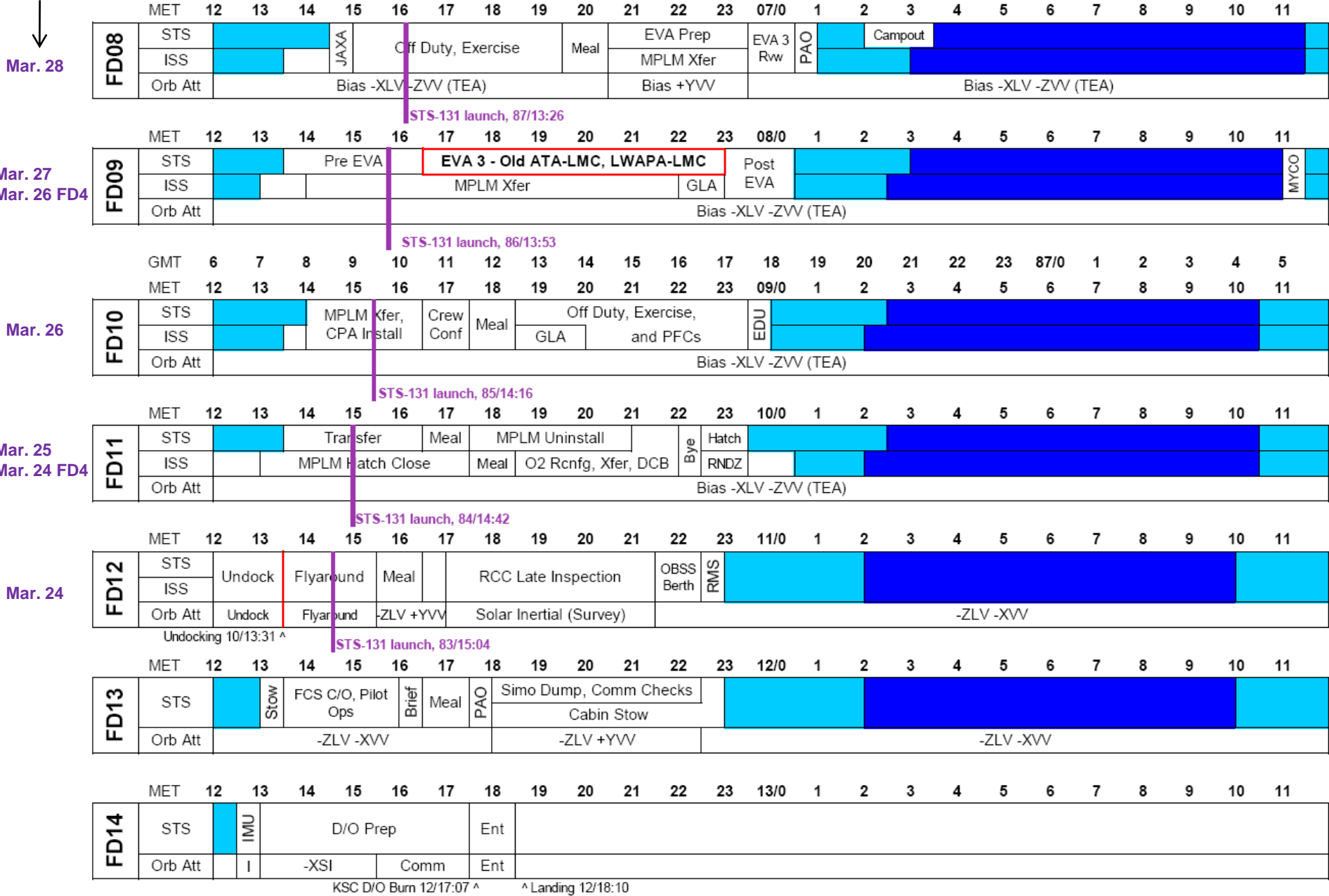
GMT L/O: 077/18:08

(Approximate 22S docking time based on STS-131 launch in purple)

Corresponding STS-131 Launch date for DDO on a given Flight Day



Corresponding STS-131 Launch date for DDO on a given Flight Day





# Generic Soyuz Docking Timeline



PET	-3:30	-3:00	-2:00	-1:00	0:00	1:00	2:00	3:00	4:00					
ISS CDR (Kotev)	POSTSLEEP	DPC	MPEG2 C/O	POSTSLEEP	HAM & WIND	PW	CTTC CFG	ISS-TK-RNDZ-MON (Soyuz Appr. Monitoring)	CTTC DCFG	PAO S/U	PAO	SAFETY BRIEF	MEAL	
FE-5 (Noguchi)	POSTSLEEP	DPC		POSTSLEEP		PW		EXERCISE		EXERCISE	PAO	PAO	SAFETY BRIEF	MEAL
FE-6 (Creamer)	POSTSLEEP	DPC		POSTSLEEP		PW	P/TV CNFG	BPTK-TBC-D/L (Docking video D/L)	BPTK-TE	P/TV RMV	PAO S/U	PAO	SAFETY BRIEF	MEAL
FE-1 (Skvortsov)	TK-22-БД-OPER (Soyuz Operations)						Soyuz Leak Check				PAO	CLIMP INSTL	SAFETY BRIEF	MEAL
FE-2 (Caldwell)	TK-22-БД-OPER (Soyuz Operations)						Soyuz Leak Check				PAO		SAFETY BRIEF	MEAL
FE-3 (Kornienko)	TK-22-БД-OPER (Soyuz Operations)						Soyuz Leak Check				PAO		SAFETY BRIEF	MEAL
STS CREW (ALL)					SHUTTLE SAFING						SHUTTLE RECONFIG	PAO	SAFETY BRIEF	MEAL

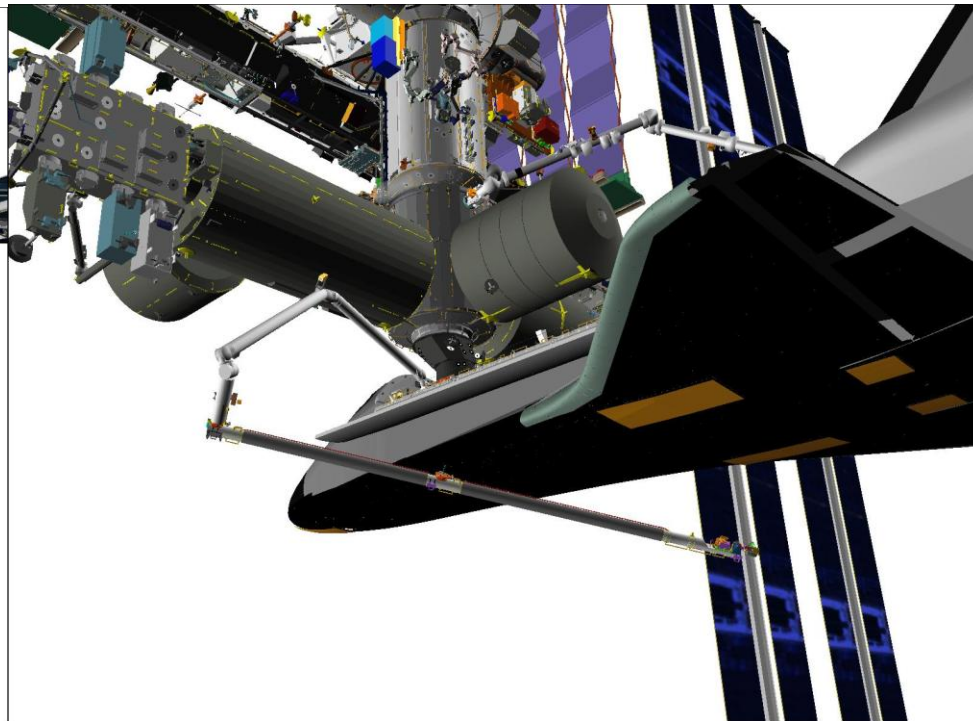
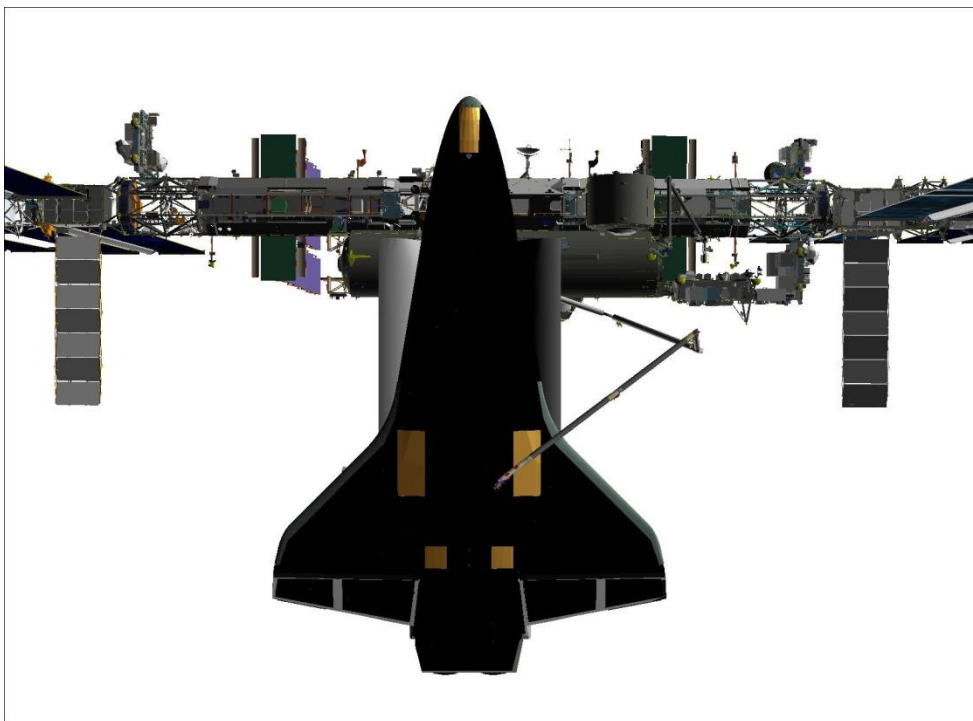
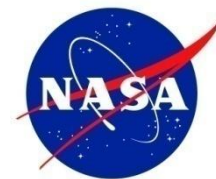
DOCK  
(typically ~3.5 to 4 hours after crew wake)

HATCH OPEN

5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	
SAFETY HANDOVER	EXERCISE, ROUTINE MAINTENANCE, POST DOCK CLOSEOUT, ETC			PREP WORK	DPC	PRESLEEP		SLEEP...	
SAFETY HANDOVER	EXERCISE			PREP WORK	DPC	PRESLEEP		SLEEP...	
SAFETY HANDOVER	SODF BOOK U/D	EXERCISE			PREP WORK	DPC	PRESLEEP		SLEEP...
SAFETY HANDOVER	SOYUZ POST-DOCK, CRITICAL PAYLOAD TRANSFER, ETC			PREP WORK	DPC	PRESLEEP		SLEEP...	
SAFETY HANDOVER				PREP WORK	DPC	PRESLEEP		SLEEP...	
SAFETY HANDOVER	SOYUZ POST-DOCK, SUIT DRYING, CRITICAL PAYLOAD TRANSFER, ETC			PREP WORK	DPC	PRESLEEP		SLEEP...	

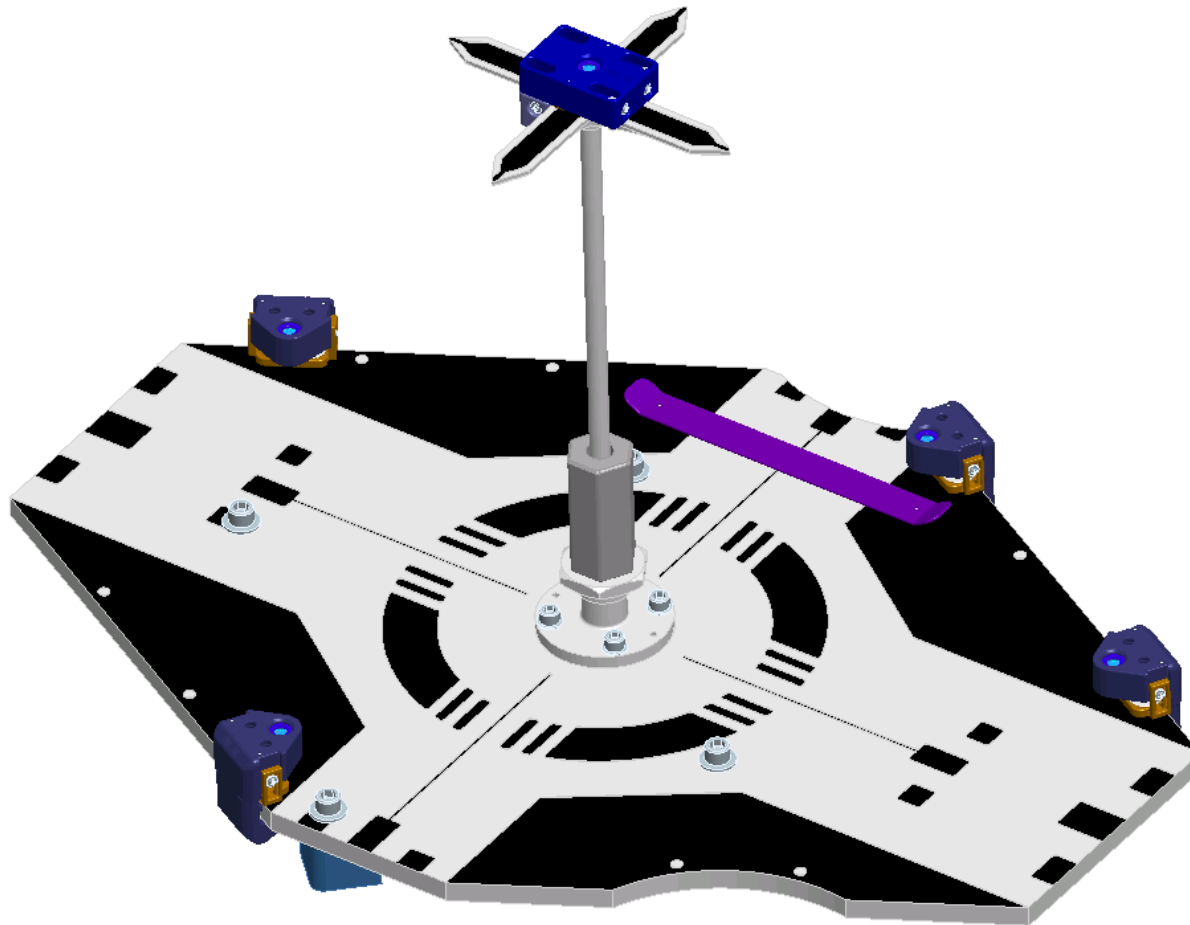


# SRMS/OBSS Safing for Dual Docked Operations



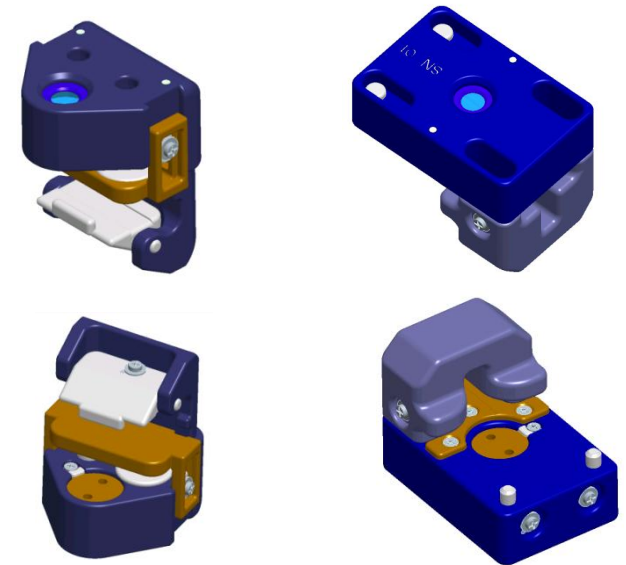
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# STORRM DTO #703 Docking Target Augmentation



## Reflector Elements:

- ◆ 5 edge clamps (4 plus 1 spare)
- ◆ 2 cross clamps (1 plus 1 spare)
- ◆ Scale

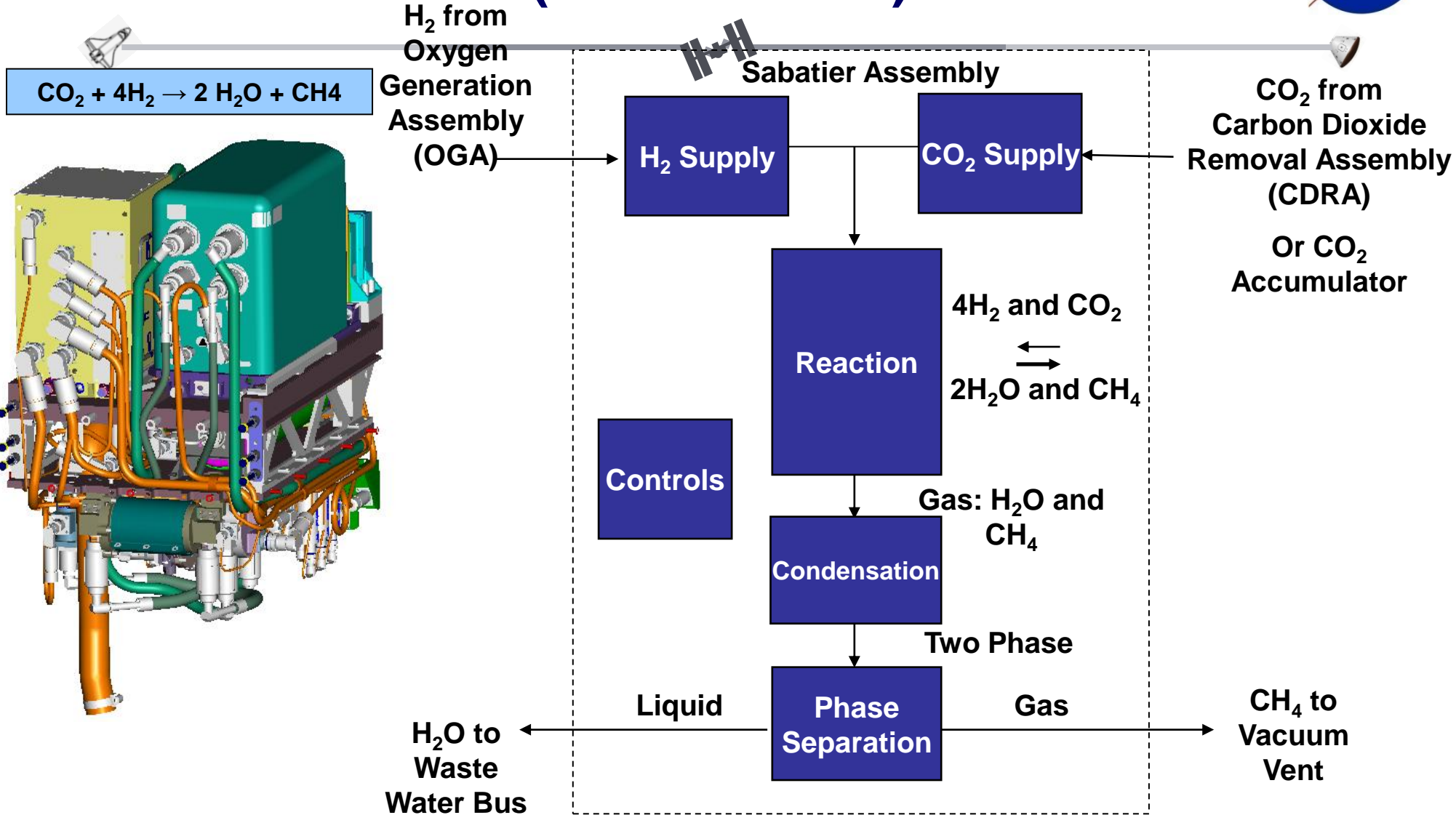
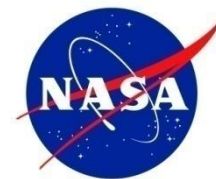


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Flight Director Office**

*Pre-decisional FOR INTERNAL USE ONLY*

DA8/Spencer/Jones/Lunney/Jason 131/19A MOD FRR 02/04/10

# Water Production Service Contract (aka Sabatier)



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