



Space Shuttle Mission 2007



Designed By: Michael Swannick

Mission Checklist STS-88

Crew Members

Commander - Robert D. Cabana | Pilot - Frederick W. Sturckow

Mission Specialist

Nancy J. Currie | Jerry L. Ross | James H. Newman | Sergei K. Krikalev

Mission Highlights

Carried out by Endeavour on December 04, 1998, the STS-88 Unity mission is the first manned international Space Station (ISS) assembly flight. The primary mission objective is to rendezvous with the already orbiting Zarya control module and successfully attach it to the Unity connecting module, providing the foundation for future ISS components. Space Station Assembly Flight 2A (ISS-01-2A)

Payload

UNITY Connecting Module. The first US-Built component of the International Space Station, a six-sided connecting module will be the primary cargo of Space Shuttle mission STS-88, the first mission dedicated to assembly of the station.

MightySat 1. The MightySat 1 payload consists of a non-recoverable spacecraft and experiments integrated with a hitchhiker (HH) ejection system (HES), mounted in the Shuttle bay. MightySat 1 will be spring released at the end of the mission.

Satellite de Aplicaciones/Cientifico-A (SAC-A). The SAC-A payload consists of the SAC-A installed in a Hitchhiker (HH) canister equipped with an HH ejection system and an HH motorized door assembly (HMDA), mounted to the side wall of the Shuttle in the forward port location. The satellite payload includes a Differential Global Positioning System (DGPS), a charge coupled device (CCD) camera, Argentinean built silicon solar cells, and a magnetometer. It will be deployed at the end of the mission.

Space Experiment Module (SEM-07). The SEM-07 utilizes a standard 5 cubic-foot GAS canister that will be mounted on an SSP/JSC provided adaptor beam on the aft port side of the payload bay.

IMAX Cargo Bay Camera (ICBC). The primary objectives of ICBC on STS-88 are to film the Node 1 installation, rendezvous, docking, extravehicular activity (EV), separation burn, and fly-around.

External Airlock. The external airlock provides an airtight, internal tunnel between two spacecraft after docking.

Androgynous Peripheral Docking System (APDS). A docking mechanism consisting of a structural ring, a movable ring, alignment guides, latches, hooks, dampers and fixers. It mates with an exact copy mounted on the ISS. The APDS is mounted on top of the airlock.

Tunnel Adaptor. The Tunnel Adaptor provides the ability for EV while ISS is docked to the APDS and airlock.

SAFER Flight Demonstration. The purpose is to demonstrate through an on-orbit functional checkout that the USA Simplified Aid for EV Rescue (SAFER) performs as expected.

Flight Summary

Launchpad: Kennedy Space Center (KSC) 39A | **Orbit:** 173NM | **Inclination:** 51.6 | **Orbits:** 185

Duration: 11 Days, 19 Hours, 18 Minutes, 47 Seconds | **Landing:** Kennedy Space Center



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PRE-LAUNCH CHECKLIST

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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	PANEL AREA & NOTES
1	T-00:01:50:00				Astronauts Enter The Shuttle
2	T-00:01:40:00	Overhead Left Panel	O5	* Set Left Audio XMIT/ICOM MODE To VOX/VOX * Set Left Audio A/G (1 & 2) To T/R * Set Left Audio A/A To T/R * Set Left Audio ICOM (A & B) To T/R * Set Left Audio (AUD) Power Switch To AUD/TONE	Activates Commander Communications
3	T-00:01:35:00	Overhead Right Panel	O9	* Set Right Audio XMIT/ICOM MODE To VOX/VOX * Set Right Audio A/G (1 & 2) To T/R * Set Right Audio A/A To T/R * Set Right Audio ICOM (A & B) To T/R * Set Right Audio (AUD) Power Switch To AUD/TONE	Activates Pilot Communications
5	T-00:01:20:00	Front Left Panel	F6	* Check ABORT Light (DIM/BRIGHT/DIM) For 8 Seconds	Abort Advisory Check
6	T-00:01:10:00				Flight Control Confirms With Commander That The Side Hatch Is Closed & Locked
7	T-00:01:05:10	Left Panel	L2	* Set CABIN VENT ISOL To CLOSE	Cabin Leak Check
		Front Left Panel	F2	* Set CABIN VENT To CLOSE * Press MASTER ALARM	Cancel Master Alarm Sound
8	T-00:00:51:00				Pilot Confirms IMU Alignment
9	T-00:00:50:00	Right Panel	R2	* Check BOILER CNTLR/HTR (1/2/3) Are On - A	Confirm Boiler Power On
		Overhead Aft Panel	O14	* Set BOILER N2 Supply (1/2/3) To ON	
		Center Panel	O16	* Set L OMS ENG VLV Is ON	
			C3	* Set R OMS ENG VLV Is ON * Set OMS ENG (LEFT & RIGHT) Are Set To ARM/PRESS	
10	T-00:00:45:00	Left Panel	L2	* Set CABIN VENT/VENT To OPEN	Open Cabin Vent
11	T-00:00:42:00	Center Panel	C3	* Set BFC CRT DISPLAY To ON	Enable Backup Flight System (BFS) And
				* Confirm BFC CRT SELECT Is At (3+1)	Execute Computer Data Transfer To BFS
			C2	* Enter ITEM 25 EXEC (Use Left Keypad)	Copy Primary Avionics SW To BFS
12	T-00:00:36:40	Left Panel	L2	* Set CABIN VENT To CLOSE	Cabin Leak Check - Continued
		Overhead Low Panel	O1	* Set CABIN VENT ISOL To OPEN * Check CABIN dP/dT Gauge For Possible Depressurization	
13	T-00:00:33:20	Left Panel	L2	* Set CABIN VENT ISOL To Close * Check CABIN VENT Is CLOSED	Cabin Pressurization Check Complete
14	T-00:00:30:00	Center Panel	C2	* Enter OPS 101 PRO (Use Right Keypad) * Enter SPEC 99 PRO (Use Right Keypad) * Press RESUME (Use Right Keypad)	Load OPS 1 - Planned 10 Minute Hold Load First Stage SW Into Primary Avionics System
15	T-00:00:29:00	Center Panel	C2	* Enter OPS 101 PRO (Use Left Keypad)	Load OPS 1 Into The BFS
16	T-00:00:26:00	Right Panel	R2	* Set He ISOLATION A (LEFT/CRT/RIGHT) To Open * Set He ISOLATION B (LEFT/CRT/RIGHT) To Open * Set PNEUMATICS He ISOL To Open * Set 6 ENGINE POWER Switches (LEFT/CTR/RIGHT) To ON	Begin The Main Propulsion System (MPS) Helium (He) Pressurization
17	T-00:00:15:00	Front Left Panel	F6	* Check ABORT Light ON/OFF For 8 Seconds	Final Test Of The ABORT System
		Center Panel	C3	* Set CAUTION/WARNING MEMORY To CLEAR	Clear C/W Memory
18	T-00:00:09:00	Center Panel	C3	* Set Timer Thumbwheels To 0900 * Set TIMER Switch To SET * Check EVENT TIMER MODE Is DOWN	Enable Countdown From Nine (9) Minutes
605	T-00:00:09:00	Center Panel	C3	* Set EVENT TIMER CONTROL To START	Start The Nine (9) Minute Countdown
		Front Center Panel	F7	* Confirm EVENT TIMER Display Continues The Countdown	
19	T-00:00:08:00	Right Panel	R1 R2	* Set ESS BUS SOURCE (MN B/C, MN C/A, MN A/B) To ON * Check APU FUEL TK VLV (1/2/3) Are CLOSED * Check APU AUTO SHUT DOWN (1/2/3) Are Enable * Check HYD MAIN PUMP PRESS (1/2/3) Are LOW * Check APU SPEED SELECT (1/2/3) Are NORM * Set HYD CIRC PUMP (1/2/3) Set To GPC * Set APU CNTLR PWR (1/2/3) To ON	Enable Fuel Cells The Crew Access Arm Is Retracting APU Prestart Check Is Underway
20	T-00:00:05:10	Right Panel	R2	* Set APU FUEL TK VLV (1/2/3) To Open * Check APU/HYD READY TO START (1/2/3) Repeaters-(White)	APU Start
		Front Center Panel	F7	* Set APU OPERATE (1/2/3) To START/RUN	
		Right Panel	R2	* Check HYDRAULIC (APU) Pressure 900psi (Use MFD #2)	
		Front Center Panel	F7	* Set HYD MAIN PUMP PRESS (1/2/3) To NORM	
		Front Left Panel	F2	* Check HYDRAULIC (APU) Pressure 3000psi (Use MFD #2)	
		Right Panel	R2	* Press MASTER ALARM (If Required) * Set HYD CIRC PUMP (1/2/3) Set To OFF	The Master Alarm May Sound Until APU Pressure Reaches 3000 PSI. (Silence Alarm)
21	T-00:00:04:30	Left Panel	L2	* Set FLASH EVAP FEEDLINE HTR A & B SUPPLY To OFF	The Shuttle Is On Internal Power. Turn Off Flash Evaporator Feed Line & Heater Supply
	T-00:00:04:10				APU Check Complete
22	T-00:00:03:45				Start Hydraulic Check, Aero Surfaces Are Moved, A Gimbal Check Is Performed
	T-00:00:03:05				Hydraulic Check Complete
23	T-00:00:02:55				External Tank Liquid Oxygen (LOX) Vents Are Closing & The External Tank Begins To Pressurize. External Tank Cap Is Retracted.
24	T-00:00:02:00	Right Panel	R2	* Set APU AUTO SHUT DOWN (1/2/3) To INHIBIT	APU Power - Inhibit
		Center Panel	R1	* Set AC BUS SNSR (1/2/3) To MONITOR	
			C3	* Set CAUTION/WARNING MEMORY To CLEAR	



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25	T-00:00:01:40 T-00:00:01:20 T-00:00:01:00 T-00:00:00:30				Liquid Hydrogen External Tanks Close. Go For Launch Announcement. One Minute Countdown Announcement. Thirty Seconds Countdown Announcement.
26	T-00:00:00:15				Begin Countdown To Liftoff The Shuttles Main Engines Will Ignite At T-00:00:00:05. A Staggered Start Of The Main Engines Will Commence In 120 millisecond Intervals. The Two SRB's Will Ignite At T-00:00:00:00, Followed By An Almost Instantaneous Liftoff.
26	T-00:00:00:00				Shuttle Liftoff Once The Shuttle Clears The Tower, It Will Complete A Roll Maneuver.

Commence Ascent Checklist



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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	NOTES
27	T+00:00:00:30 T+00:00:01:05				Main Engines Throttle Down To 65% Main Engines Throttle Up To 104%
28	T+00:00:02:00 T+00:00:02:05	Front Center Panel	F7	* Check Pressure Pc<50 (MFD / CRT 1)	Standby For SRB Separation SRB Separation
600	T+00:00:02:10				An OMS Assist Burn Is Now Performed To Add Additional Boost
602	T+00:00:03:00	Overhead Low Panel	O1	* Check FREON - EVAP OUT TEMP Gauge Shows Below 60 Degrees	Check Flash Evaporator Is Operational
29	T+00:00:04:20				Negative Return
601	T+00:00:05:18				The Shuttle Will Perform A Roll To Use Satellite Position Data
30	T+00:00:06:56				Single Engine Press To MECO
31	Mission Dep.	Front Center Panel	F7	* Check MAIN ENGINE STATUS Lights (Left/CTR/Right) Are Red	Engines Throttle Down In Preparation For Main Engine Cutoff (MECO) External Tank Separation
34	Mission Dep.	Left Panel Center Panel Right Panel Front Left Panel Front Right Panel Center Panel	L1 L2 C3 R1 F6 F8 C3	* Set FLASH EVAP CONTROLLER PRI A & PRI B To ON * Set FLASH EVAP FEEDLINE HTR A SUPPLY & B SUPPLY To 1 * Set BFC CRT DISPLAY To OFF * Set AC BUS SNSR (1/2/3) To AUTO TRIP * Set O2 TK 1 (B) & O2 TK 2 (B) HEATERS To AUTO * Set H2 TK 1 (B) & H2 TK 2 (B) HEATERS To AUTO * Check FLT CNTLR POWER Is OFF * Check FLT CNTLR POWER Is OFF * Check ORBIRAL DAP - CONTROL Is Set To AUTO	Remaining MPS Propellants Are Dumped Automatically. Main Engines Are Gimbaled Down During The Dump
35	Mission Dep.	Center Panel	C3	* Enter OPS 105 PRO (Use Left Keypad)	Prepare To Circularize Orbit
36	Mission Dep.	Center Panel Overhead Aft Panel Center Panel	C3 C2 O14 O16 C3	* Confirm DAP (Digital Auto Pilot) Switches Are Set To AUTO * Enter ITEM 22 EXEC (Use Right Keypad) * Enter ITEM 27 EXEC (Use Right Keypad) * Enter ITEM 23 EXEC (Use Right Keypad) * Confirm L OMS ENG VLV Is ON * Confirm R OMS ENG VLV Is ON * Confirm OMS ENG (LEFT & RIGHT) Are Set To ARM/PRESS	Circularize Orbit
37	Mission Dep.	Right Panel	R2 R4	* Set 6 ENGINE POWER Switches (LEFT/CTR/RIGHT) To OFF * Set He ISOL A (LEFT/CTR/RIGHT) To GPC * Set He ISOL B (LEFT/CTR/RIGHT) To GPC * Set PNEUMATICS He ISOL To GPC * Set H2 PRESS LINE VENT To OPEN	Propellant Dump Complete
38	Mission Dep.	Right Panel	R2 R4	* Set ET UMBILICAL DOOR - MODE GPC To GPC/MAN * Set CENTERLINE LATCH To STOW * Set LEFT & RIGHT Door To CLOSE * Check Talkback Shows CLOSE * Set LEFT & RIGHT LATCH To LATCH * Check Talkback Shows CLOSED & LATCHED * Set LEFT & RIGHT DOOR To OFF * Set LEFT & RIGHT LATCH To OFF * Set HYD MAIN PUMP PRESS (1/2/3) To LOW * Set APU OPERATE - START/RUN (1/2/3) To OFF * Set APU FUEL TK VLV (1/2/3) To CLOSE * Set APU CNTLR PWR (1/2/3) To OFF * Set BOILER PWR (1/2/3) To OFF * Set BOILER N2 SUPPLY (1/2/3) To OFF * Set HYD CIRC PUMP (1/2/3) To GPC * Set H2 PRESS LINE VENT To GND	Close & Latch The ET Umbilical Doors. APU Shutdown
39	Mission Dep.	Center Panel	C2	* Press EXEC - Confirms ready for OMS burn (Use Right Keypad)	Confirm OMS Burn
40	Mission Dep.	Right Panel Center Panel	R4 C3	* Set PROPELLANT FILL/DRAIN LH 2 OUTBD & INBD To OPEN * Set OMS ENG LEFT & RIGHT To OFF	Liquid He Manual Dump
41	Mission Dep.	Overhead Aft Panel Right Panel	O17 R4	* Set ATVC (1/2/3/4) To OFF * Set Engine Interface Units - EIU (L-C / C-R / R-L) To OFF * Set MEC (1 & 2) To OFF * Set MPS/TVC ISOL VLV - (SYS 1, SYS 2, SYS 3) To CLOSE	Turn Off Main Engine Controllers
42	Mission Dep.	Right Panel Center Panel Front Left Panel	R4 C3 F6	* Set PROPELLANT FILL/DRAIN - LH2 OUTBD To GND * Check PROPELLANT FILL/DRAIN - LH2 INBD To OPEN * ORBITAL DAP/MANUAL MODE - ROTATION YAW, VERN=ON * Set FLIGHT CNTLR POWER To ON * Rotate The Shuttle To Zero Attitude (Pitch/Roll) (Joystick - RHC)	Set Liquid H2 Outboard Fill & Drain Valve To Ground Control Set Attitude Manually Enable Vernier RCS Enable Manual Control Of The RCS Align All ADI Needles
43	Mission Dep.	Right Panel Aft Right Panel	R4 A12	* Set HYDRAULICS - BRAKE HEATERS (A/B/C) To AUTO * Set APU HEATER - GAS GEN/FUEL PUMPS (1/2/3) To A AUTO * Set APU HEATER - LUBE OIL LINES (1/2/3) To A AUTO * Set TANK/FUEL LINE/H2O (SYS 1A, SYS 2A, SYS 3A) To AUTO * Set HYDRAULIC HEATER - RUDDER SPD BRK To A AUTO * Set HYDRAULIC HEATER - BODY FLAP To A AUTO * Set HYDRAULIC HEATER - ELEVON To A AUTO * Set HYDRAULIC HEATER - AFT FUSELAGE To A AUTO	Thermal Condition The Shuttle
44	Mission Dep.	Aft Left Panel	A14	* Set RCS/OMS HEATERS - FWD RCS To A AUTO * Set RCS/OMS HEATERS - LEFT POD To A AUTO * Set RCS/OMS HEATERS - RIGHT POD To A AUTO	



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44	Mission Dep.	Aft Left Panel Left Panel	A14 A8L L1	* Set RCS/OMS HEATERS - FWD RCS JET (1/2/3/4/5) To AUTO * Set RCS/OMS HEATERS - AFT RCS JET (1/2/3/4/5) To AUTO * Set RCS/OMS HEATERS - OMS CRSFD LINES To A AUTO * Set PORT RMS HEATER To AUTO A * Set TOPPING EVAP HEATER - NOZZLE (L & R) To A AUTO * Set TOPPING EVAP HEATER - DUCT Selector To A/B * Set HI LOAD EVAP - HI LOAD DUCT HTR Selector To A/B	
45	Mission Dep.	Left Panel Overhead Aft Panel	L2 L1 O14 O15 O16 O15	* Set O2 SYS 2 SUPPLY To CLOSE * Set N2 SYS 2 SUPPLY To CLOSE * Set N2 SYS 2 REG INLET To CLOSE * Set H2O LOOP 2 BYPASS - MODE To AUTO * Set H2O PUMP - LOOP 1 To OFF H2O PUMP - LOOP 2 To GPC * Set RGA 1 To OFF * Set RGA 2 & 4 To OFF * Set RGA 3 To OFF * Set ACCEL 3 To OFF * Set ACCEL 4 To OFF	
46	Mission Dep.	Overhead Left Panel Right Aft Panel Overhead Left Panel	O6 R11L O6	* Set GENERAL PURPOSE COMPUTER - MODE 5 To HALT * Check MAJ FUNC Set To GNC * Enter OPS 201 PRO (AFT Keypad) * Set MAJ FUNC To SM * Press GPC/CRT (AFT Keypad) * Enter 4 EXEC (AFT Keypad) * Enter OPS 201 PRO (AFT Keypad) * Set GENERAL PURPOSE COMPUTER - MODE 3 To HALT	Configure Computers For Orbit Switch To On-Orbit SW Mode Load GPC 1/2/3 With GNC SW GPC 3 Preserves Independent Source Data GPC 4 Contains System Management Data GPC 5 Retains The Backup Flight System
47	Mission Dep.	Left Panel	L1 L2	* Set RAD CONTROLLER - (LOOP 1 & LOOP 2) To AUTO A * Set RAD CONTROLLER - BYPASS MODE (1 & 2) To AUTO * Set FREON LOOP ISOLATION - MODE To AUTO	Activate Radiator Cooling
48	Mission Dep.	Right Aft Panel	R11L R13L	* Confirm MAJOR FUNC Is Set To SM * Enter OPS 202 PRO (AFT Keypad) * Enter ITEM 3 EXEC * Enter ITEM 1 EXEC * Set PL BAY DOOR (SYS 1 & SYS 2) To ENABLE * Set PL BAY DOOR To OPEN * Confirm PL BAY DOOR Talkbacks Show DEP	Open Payload Doors PL BAY DOOR SPEC Display Enable Auto Mode Enable AC Power Opening Both PL Doors Takes 3 Minutes Indicating Both PL Doors Are Open
49	Mission Dep.	Right Aft Panel	R13L	* Set PL BAY MECH PWR (SYS 1 & SYS 2) To ON * Set RADIATOR LATCH (SYS A & SYS B) To RELEASE * Check RADIATOR LATCH SYS Talkbacks Indicate REL * Set RADIATOR CONTROL (SYS A & SYS B) To DEPLOY * Check RADIATOR CONTROL SYS Talkbacks Indicate DEP	Deploy Radiators Indicating That The Radiators Are Ready For DEP. Deploying Both Radiators Takes 30 Seconds. Indicating Both Radiators Are Deployed.
50	Mission Dep.	Right Aft Panel	R13L R11L	* Set RADIATOR LATCH (SYS A & SYS B) To OFF * Set RADIATOR CONTROL (SYS A & SYS B) To OFF * Set PL BAY DOOR To STOP * Set PL BAY MECH PWR (SYS 1 & SYS 2) To OFF * Set PL BAY DOOR (SYS 1 & SYS 2) To DISABLE * Enter ITEM 2 EXEC (AFT Keypad)	Disable All Power To PL Doors And Radiators. Disable AC Power To The Doors
51	Mission Dep.	Right Aft Panel	R11U	* Set FUEL CELL - PURGE HEATER To GPC * Set H2O LINE HTR & H2O RELIEF HTR To A AUTO * Confirm PURGE VALVES (1/2/3) Are On GPC * Confirm STARTUP HEATER (1/2/3) Are Set To ENABLE * Set GPC PURGE SEQ To START - Press START For 3 Seconds * Confirm GPC PURGE SEQ START Talkback Is WHITE	Initiate Fuel Cell Purge
52	Mission Dep.	Right Aft Panel Left Panel	R11L L1	* Enter SPEC 69 PRO (AFT Keypad) * Enter SPEC 88 PRO (AFT Keypad) * Set FLASH EVAP CONTROLLER (PRI A & PRI B) To OFF * Set FLASH EVAP CONTROLLER - SEC To OFF * Set HILOAD EVAP To OFF	Check Purge Process On The SPEC Display Check Coolant Loops Secure The Flash Evaporator
53	Mission Dep.	Overhead Left Panel Right Aft Panel	O6 R11L	* Set STAR TRACKER POWER (-Y & -Z) To ON * Set DOOR CONTROL (SYS 1 & SYS 2) To OPEN * Check DOOR CONTROL (SYS 1 & SYS 2) Talkbacks Are OP * Set DOOR CONTROL (SYS 1 & SYS 2) To OFF * Set MAJ FUNC To GNC * Enter SPEC 22 PRO (AFT Keypad) * Enter ITEM 3 EXEC (AFT Keypad) * Enter ITEM 4 EXEC (AFT Keypad)	Deploy & Activate The Star Trackers Indicating The ST Doors Are Open
54	Mission Dep.	Right Aft Panel	R11L	* Check MAJ FUNC To GNC * Enter SPEC 21 PRO (AFT Keypad) * Enter ITEM 16 EXEC (AFT Keypad)	Initiate IMU Alignment
55	Mission Dep.	Overhead Center Panel	O7	* Set GPS 1 POWER To ON * Set GPS 1 PRE AMPL UPPER To ON * Set GPS 1 PRE AMPL LOWER To ON * Set GPS 2 POWER To ON * Set GPS 2 PRE AMPL UPPER To ON * Set GPS 2 PRE AMPL LOWER To ON * Set GPS 3 POWER To ON * Set GPS 3 PRE AMPL UPPER To ON	Activate Global Positioning System (GPS) Activate GPS 1 Activate GPS 2 Activate GPS 3



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55	Mission Dep.	Overhead Center Panel Right Aft Panel	O7 R11L	* Set GPS 3 PRE AMPL LOWER To ON * Set DUMP ISOL VLV To OPEN	
59	Mission Dep.	Right Aft Panel Aft Right Panel Right Aft Panel	R11L R13L A1U R11L	* Check MAJ FUNC To GNC * Enter SPEC 25 PRO (AFT Keypad) * Set KU ANTENNA To DEPLOY * Check KU ANTENNA Talkback For DEP * Set KU ANTENNA To GND * Set KU BAND POWER To STBY * Check MAJ FUNC To GNC * Enter SPEC 33 PRO (AFT Keypad) * Enter ITEM 2 EXEC (AFT Keypad)	Deploy KU Antenna Indicates Status For All THC/RHC (Joysticks). KU Antenna Deployment Takes 15 Seconds Indicates KU Antenna Is Deployed Enable KU Antenna
60	Mission Dep.				Shuttle Is Configured & Ready For Mission

Commence On-Orbit Mission



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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	PANEL AREA & NOTES
1100	Mission Dep.				First Mission Event - RMS Activation Next Event
1101	Mission Dep.	Aft Left Panel	A8L	* Set RMS POWER To PRIMARY * Set RMS SELECT To PORT * Set The PORT RMS DEPLOY To DEPLOY	Power Up & Deploy The RMS
1102	Mission Dep.	Aft Left Panel	A8L	* Set The PORT RMS DEPLOY To OFF * Set The PORT RMS Latch To RELEASE * Set The PORT RMS Latch To OFF * Hold The RMS SHOULDER BRACE RELEASE Toward PORT	RMS Deployed Wait Until Talkback Indicates REL Press Until Talkback Indicator Turns White
1103	Mission Dep.	Right Aft Panel Aft Left Panel	R11L A8U	* Set MAJ FUNC To SM * Enter SPEC 94 PRO (Aft Keypad) * Set MODE Rotary Switch To SINGLE * Press ENTER Just Below The MODE Rotary Switch * Set BRAKES Switch To OFF	Continue RMS Preparation
1104	Mission Dep.	Aft Left Panel	A8U	* Set The PARAMETER Rotary Switch To JOINT ANGLE * Set The JOINT Rotary Switch To SHOULDER/PITCH * Press & Hold The SINGLE DIRECT DRIVE In The + Position * Set The JOINT Rotary Switch To ELBOW * Press & Hold The SINGLE DIRECT DRIVE In The - Position * Set The MODE Rotary Switch To MANUAL ORB UNL * Press ENTER Just Below The MODE Rotary Switch	Move RMS Out Of Reach Limit Confirm Digital Readout Indicates +3 Degrees Confirm Digital Readout Indicates -3 Degrees
1105	Mission Dep.	Aft Right Panel	A6U	* Set FLT CNTLR POWER To ON	Assign RHC/THC Control To The RMS
1106	Mission Dep.	Aft Left Panel Front Left Panel	A8L A8U F6	* Set RMS POWER To OFF * Set RMS BRAKES To ON * Set FLT CNTLR POWER To ON	Turn Off RMS Power For Later Use.
1110	Mission Dep.	Center Panel Overhead Aft Panel Center Panel	C2 C3 O14 O16 C2	* Set MAJOR FUNC To GNC For CRT #2 * Enter OPS 202 PRO (Right Keypad) * Enter ITEM 22 EXEC (Right Keypad) * Enter ITEM 27 EXEC (Right Keypad) * Enter ITEM 23 EXEC (Right Keypad) * Set OMS ENG (Left & Right) To ARM/PRESS * Confirm L OMS ENG VLV Is ON * Confirm R OMS ENG VLV Is ON * Press EXEC - (Right Keypad) Confirms ready for OMS burn	First In A Series Of Rendezvous Burns
1111	Mission Dep.	Center Panel	C3	* Set OMS ENG (Left & Right) To OFF	First NC Burn Complete - Disable OMS Next Event
1115	Mission Dep.	Center Panel	C2 C3 C2	* Enter ITEM 22 EXEC (Right Keypad) * Enter ITEM 27 EXEC (Right Keypad) * Enter ITEM 23 EXEC (Right Keypad) * Set OMS ENG (Left & Right) To ARM/PRESS * Press EXEC - (Right Keypad) Confirms ready for OMS burn	Second NC Burn
1116	Mission Dep.	Center Panel	C3	* Set OMS ENG (Left & Right) To OFF	Second NC Burn Complete - Disable OMS Next Event
1120	Mission Dep.	Aft Left Panel Aft Right Panel	A8L A6U	* Set RMS POWER To PRIMARY * Set RMS BRAKES To OFF * Set FLT CNTLR POWER To ON	
1121	Mission Dep.	Aft Left Panel	A8U A8L	* Set END EFFECTOR MODE To AUTO * Use The RMS To Grapple The Unity Module	You Have Full Control Of The RMS Arm. Grapple The Unity Module. When The RMS Is In Position Press Enter <u>POSITION - P Y R</u> P: -090.0 Y: 020.0 R: 000.0 <u>POSITION - X Y Z</u> X: 0760 Y: -0008 Z: 0470 <u>JOINT ANGLE</u> YAW: -027.6 SHOULDER: 081.9 ELBOW: -119.3 WRIST PITCH: -062.2 WRIST YAW: 017.6 WRIST ROLL: 029.1
1122	Mission Dep.	Center Panel Aft Right Panel	C3 A6U	* PAYLOAD SAFING Switches (1-2-3-4-5) To NORM * PAYLOAD RETENTION LOGIC POWER (SYS 1) To ON * PAYLOAD SELECT Rotary Switch To 2 * PAYLOAD RETENSION LATCHES (1-2-3-4-5) To RELEASE * PAYLOAD RETENSION LATCHES (1-2-3-4-5) To OFF	Release The Unity module From The Payload Bay.
1123	Mission Dep.	Aft Right Panel	A6U A6L	* PAYLOAD RETENTION LOGIC POWER (SYS 1) To OFF * Set Docking System Power (MN A - MN B) To ON * Set Docking system Power PSU POWER (MN A - MN B) To ON	Disable Payload Bay Latch Power And Power Up The (APDS).
1124	Mission Dep.	Aft Right Panel	A7L	* Set CONTROL PANEL POWER (A - B - C) To ON * Set HEATERS DCU POWER (H1 - H2/DCU - H3/DCU) To ON * Set APDS POWER (ABS - BDS - CDS) To ON	Activate APDS Power Panel
1125	Mission Dep.	Aft Right Panel	A7L	* APDS Control Commands Press POWER ON * APDS Control Commands Press APDS CIRC PROT OFF * APDS Control Commands Press RING OUT	Extend APDS Capture Ring



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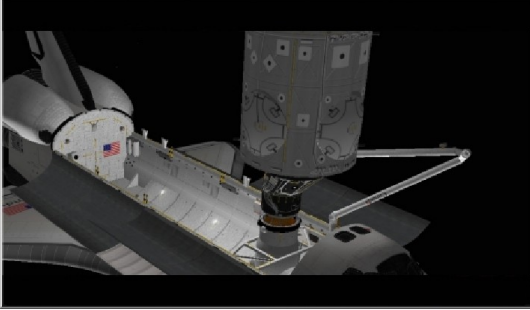
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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	PANEL AREA & NOTES
1126	Mission Dep.	Aft Left Panel	A8L	<p>* Use The RMS To Position The Unity Module</p> 	<p>Align The PMA Of The Unity Module With The APDS. When The RMS Is In Position Press Enter</p> <p><u>POSITION - P Y R</u> P: 173.3 Y: -049.2 R: -179.8</p> <p><u>POSITION - X Y Z</u> X: 590 Y: -034 Z: 567</p> <p><u>JOINT ANGLE</u> YAW: -19.0 SHOULDER: 141.5 ELBOW: -153.0 WRIST PITCH: 016.0 WRIST YAW: -111.6 WRIST ROLL: 002.1</p>
1127	Mission Dep.	Aft Left Panel	A8L	<p>* Release The Unity Module - Press Backspace * Stow The RMS</p>	Unity Module Released Stow The RMS
1128	Mission Dep.	Aft Left Panel	A7L	* APDS Control Commands Press RING IN	Return Docking Ring To The Docked Position
1129	Mission Dep.	Aft Left Panel	A7L	<p>* APDS Control Commands Press POWER OFF * Set CONTROL PANEL POWER (A - B - C) To OFF * Set HEATERS CDU POWER (H1 - H2/DCU - H3/DCU) To OFF * Set APDS POWER (ABS - BDS - CDS) To OFF</p>	Docking Complete
1130	Mission Dep.	Aft Left Panel Front Left Panel	A8U A8L F6	<p>* Set RMS BRAKES To ON * Set RMS POWER To OFF * Set FLT CNTLR POWER To ON</p>	Power Down & Secure The RMS
1131	Mission Dep.				Third NC Burn Is Up Next Next Event
1135	Mission Dep.	Center Panel	C2 C3 C2	<p>* Enter ITEM 22 EXEC (Right Keypad) * Enter ITEM 27 EXEC (Right Keypad) * Enter ITEM 23 EXEC (Right Keypad) * Set OMS ENG (Left & Right) To ARM/PRESS * Press EXEC - (Right Keypad) Confirms ready for OMS burn</p>	Third NC Burn
1136	Mission Dep.	Center Panel	C3	* Set OMS ENG (Left & Right) To OFF	Third NC Burn Complete - Disable OMS Next Event
1138	Mission Dep.	Center Panel	C2 C3 C2	<p>* Enter ITEM 22 EXEC (Right Keypad) * Enter ITEM 27 EXEC (Right Keypad) * Enter ITEM 23 EXEC (Right Keypad) * Set OMS ENG (Left & Right) To ARM/PRESS * Press EXEC - (Right Keypad) Confirms ready for OMS burn</p>	Final NC Burn
1139	Mission Dep.	Center Panel	C3	* Set OMS ENG (Left & Right) To OFF	Final NC Burn Complete - Disable OMS Next Event
1140	Mission Dep.	Right Aft Panel	R11L	<p>* Set MAJOR FUNC To GNC * Enter SPEC 22 PRO (Aft Keypad) * Enter ITEM 5 EXEC (Aft Keypad) * Enter ITEM 6 EXEC (Aft Keypad) * Enter ITEM 11+1 EXEC (Aft Keypad) * Enter ITEM 12+1 EXEC (Aft Keypad)</p>	Activate Star Trackers Target = Zarya Module
1141	Mission Dep.				Star Trackers Are Now Configured Next Event
1143	Mission Dep.	Aft Right Panel Right Aft Panel	A1U R11L	<p>* Set KU BAND POWER To ON * Set KU BAND Rotary Switch To AUTO TRACK * Enter SPEC 33 PRO (Aft Keypad) * Enter ITEM 1 EXEC (Aft Keypad)</p>	Activate KU Band Antenna REL NAV Display Mode Rendezvous Radar Data
1144	Mission Dep.	Aft Left Panel	A2	* Use RCS Thrusters To Close On The Zarya Module	<p>The Zarya Module Is Approximately 45,000 Feet Away. Use The RCS Thrusters To Translate The Shuttle Up/Down Until The Yellow Reticules Overlap The White Cross Hairs.</p> <p>Always Maintain The Following Attitude ROLL=0 PITCH=0 YAW=90 When The Reticules Are Centered, The Zarya Module Is Right In Front Of The Shuttle. If You Are Impatient, Use Next Event</p>
1150	Mission Dep.	Aft Left Panel Aft Left Panel Aft Right Panel	A2 A8L A8U A6U	<p>* Use RCS Thrusters To Translate Below The Zarya Module <u>Once The Zarya Module Is In Position</u></p> <p>* Set RMS POWER To PRIMARY * Set RMS BRAKES To OFF * Set FLT CNTLR POWER To ON</p> <p>Once The RMS Is Powered Up - Grapple The Zarya Module Grapple Image Provided On The Next Page</p>	Position The Shuttle So The Zarya Module Is Behind Unity, About 10 Feet Above The Cargo Bay.



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1150	Mission Dep.	Aft Left Panel	A8L	<p>* Use The RMS To Grapple The Zarya Module</p>  <p>* Use The RMS To Align Zarya With Unity Module</p> 	<p>When The RMS Is In Position Press Enter</p> <p>Since Shuttle Position Will Vary During This Maneuver, No Coordinates Are Available.</p> <p>Align The Zarya Module With The Unity Module.</p> <p>When In Position Press Backspace</p> <p><u>POSITION - P Y R</u> P: -152.6 Y: -087.0 R: 150.9</p> <p><u>POSITION - X Y Z</u> X: 557 Y: -0055 Z: 0932</p> <p><u>JOINT ANGLE</u> YAW: 005.8 SHOULDER: 116.0 ELBOW: -051.0 WRIST PITCH: -056.0 WRIST YAW: -098.5 WRIST ROLL: 010.8</p>
1151	Mission Dep.	Aft Left Panel	A8L	<p>* Release The Zarya Module - Press Backspace</p> <p>* Use The RMS Commands</p>	<p>Zarya Module Released</p> <p>Stow The RMS</p>
1152	Mission Dep.	Aft Left Panel Front Left Panel	A8L F6	<p>* Set RMS POWER To OFF</p> <p>* Set FLT CNTLR POWER To ON</p> <p>* RCS Transition Burst (UP)</p>	<p>Disable RMS & Enable RCS Control</p> <p>Use Short Up Transition Bursts To Force The Zarya/Unity Docking Mechanisms Together.</p>
1153	Mission Dep.				<p>Docking Is Complete</p> <p>Next Event</p>
1155	Mission Dep.			* EV1	<p>EV1 - Connect 8 Umbilical's And Remove Thermal Protection From The MUX/DEMUX On PMA2.</p> <p>(The Mating Adapter That Connects Unity To The Shuttle.</p> <p>Move EV1 Up Beside PMA-2</p>
1156	Mission Dep.			* EV2	<p>EV2 - Move EV2 To PMA2 For Umbilical Connection.</p>
1157	Mission Dep.			* EV1 & EV2	<p>EV1 And EV2 Will Now Connect The Umbilical's Between Unity And The PMA2. A Side Wire Is Also Installed For Safety.</p> <p>Next Event</p>
1160	Mission Dep.			* EV1 & EV2	<p>EV1 & EV2 Have Finished With The PMA2. Both Astronauts Should Now Move To PMA1 To Close The Mating Adaptor That Connects Zarya To Unity.</p>
1161	Mission Dep.			* EV1 & EV2	<p>Work Is Under Way On PMA1. Umbilical's Identical To Those Connected On Unity And PMA2, Are Now Connected Between Unity And PMA1. Thermal Protection Is Also Removed From Various Parts Of PMA1.</p> <p>Next Event</p>
1165	Mission Dep.			* EV1 & EV2	<p>The First Space Walk Is Complete. Return Both Astronauts To The Shuttle Via The Air Lock.</p>
1166	Mission Dep.				<p>Command Checks Between Houston And Moscow Mission Control Will Be Conducted The Next Day While The Crew Pressurizes The Docking System Vestibule. The Crew Will Perform Leak Checks And Prepare The S-Band Communications Equipment For Installation On The Second Spacewalk.</p> <p>Next Event</p>



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1170	Mission Dep.	Aft Left Panel Aft Right Panel	A8L A8U A6U	* EV1 * Set RMS POWER To PRIMARY * Set RMS BRAKES To OFF * Set FLT CNTLR POWER To ON	Second Spacewalk - Move EV1 Toward The Middle Of The Cargo Bay. He Is Carrying A Portable Foot Restraint That Will Be Connected To The RMS.
1171	Mission Dep.			* EV1 & EV2 - Move The RMS Right Above EV1's Head, This Will Attach The Foot Restraint. Then Use The RMS To Move EV1	Move EV1 And EV2 Around The Center Of Unity's Capsule. Use The RMS For EV1
1172	Mission Dep.			* EV1 & EV2	EV1 And EV2 Mount Handrails And Other Interfaces. They Remove Hatch & Petal Launch Restraints. They Install Antennas And A Sunshade. Next Event or Time Skip
1175	Mission Dep.			* EV2	Second Spacewalk Is Complete For EV2. Move EV2 To The Airlock.
1176	Mission Dep.			* EV1	Move The RMS Toward The Center Of The Payload Bay. Then Lower It Until EV1 Get Out Of The Foot Restraint.
1177	Mission Dep.			* EV1	Second Spacewalk Is Complete For EV1. Move EV1 To The Airlock.
1179	Mission Dep.				The Crew Will Enter Unity And Zayra The Next Day, Prior To Their Last Spacewalk. Portable Lights, Fans, As Well As Additional Components Of The S Band Communication System Will Be Installed. They Will Also Transfer Spare Equipment From Endeavour. Next Event
1180	Mission Dep.			* EV1	Move EV1 To The RMS Foot Restraint.
1181	Mission Dep.			* EV2 * RMS With EV1	Move RMS+EV1 And EV2 Close To The PMA1. The PMA That Attaches Unity To Zarya.
1182	Mission Dep.			* RMS With EV1	EV1 And EV2 Will Disconnect A Wiring Harness And Stow Some Specialized Tools For Future Spacewalks. The Final Task Will Be To Mount A Handrail At The Far End Of Zarya. Bring The RMS With EV1 Back To The Center Of The Cargo Bay So EV1 Can Dismount The RMS
1183	Mission Dep.			* EV1 * EV2	Move EV1 Back To PMA1. Then Move EV1 And EV2 Close To The Far End Of Zarya.
1184	Mission Dep.			* EV1 And EV2	EV1 And EV2 Mount A Handrail On The Far End Of Zarya. Move EV2 To The Airlock.
1185	Mission Dep.			* EV1	EV1 Will Now Test The SAFER Backpack. Remember You Have A Limited Supply Of Propellant. One The Test Is Complete Head Toward The RMS End Effector And Remove The Foot Restraint.
1186	Mission Dep.			* EV1	EV1 Completes The SAFER Backpack Tests And Retrieves The Foot Restraint From The RMS. EV1 Now Heads To The Airlock.
1187	Mission Dep.	Aft Left Panel Front Left Panel	A8L F6	* Set RMS POWER To OFF * Set FLT CNTLR POWER To ON	Disable RMS And Enable RCS Controls
1188	Mission Dep.				This Concludes The First ISS Assembly Mission. Next Event
1200	Mission Dep.	Aft Right Panel Aft Left Panel	A6L A7L	*VESTIBULE DEPRESS VALVE (SYS 1) VENT ISOL To OPEN *VESTIBULE DEPRESS VALVE (SYS 2) VENT ISOL To OPEN *VESTIBULE DEPRESS VALVE (SYS 1) VENT To OPEN *VESTIBULE DEPRESS VALVE (SYS 2) VENT To OPEN * Set CONTROL PANEL POWER (A - B - C) To ON * Set HEATERS CDU POWER (H1 - H2/DCU - H3/DCU) To ON * Set APDS POWER (ABS - BDS - CDS) To ON * APDS Control Commands Press POWER ON * APDS Control Commands Press APDS CIRC PROT OFF	After Closure Of All Hatches, The Docking Vestibule Is Depressurized.
1201	Mission Dep.	Aft Left Panel	A7L	* APDS STATUS Press UNDOCK COMPLETE (Lower Left)	
1202	Mission Dep.	Aft Right Panel	A6U	* Set SENSE To -Z * Set MANUAL MODE TRANSLATION To Y (LOW Z)	Springs Between The Mating Surfaces Create A Force Resulting In A Small Separation Velocity Between The Shuttle And The ISS. When Endeavor Is At A Safe Distance, Apply A Small -Z Translation In Low Z Dap To Increase Velocity.
1203	Mission Dep.				This Completes The Assembly Of The ISS. Next Event
1205	Mission Dep.	Front Left Panel	F6	* Use Small RCS Bursts (Rotate The Shuttle)	Time To Deploy A Small SAC-A Satellite. Monitor The ADI For Correct Attitude Pitch=45.0 - Roll=0.0 - Yaw=90.0



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1206	Mission Dep.	Left Aft Panel	L12	* Standard Switch Panel Set GAS CTRL POWER (S3) To ON * Standard Switch Panel Set START (S2) To START	Release The SAC-A Satellite Standard Switch Panel (L12) Make Sure You Use The Switches On The Left Side.
1207	Mission Dep.				The Hitchhiker Motorized Door Will Now Open And A Switch On Top Of The SAC-A Will Apply Power To A Single Momentum Wheel That Will Spin The Satellite.
1208	Mission Dep.	Left Aft Panel	L12	* Standard Switch Panel Set GAS CTRL POWER (S3) To OFF	Disable The Gas Controller Power.
1209	Mission Dep.				The MightySat-1 Will Be Released Next. Next Event
1210	Mission Dep.	Front Left Panel	F6	* Use Small RCS Bursts	Time To Deploy The MightySat-1 Satellite. Monitor The ADI For Correct Attitude Pitch=180.0 - Roll=180.0 - Yaw=90.0
1211	Mission Dep.	Left Aft Panel	L12	* Standard Switch Panel Set GAS CTRL POWER (S6) To ON * Standard Switch Panel Set START (S5) To START	Release The MightySat-1 Satellite Standard Switch Panel (L12) Make Sure You Use The Switches On The Right Side.
1212	Mission Dep.	Left Aft Panel	L12	* Standard Switch Panel Set GAS CTRL POWER (S6) To OFF	Disable The Gas Controller Power.
1213	Mission Dep.				This Completes The On Orbit Mission Next Event

Commence Deorbit & Landing



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1000	Mission Dep.	Left Panel	L1	* Set RAD CONTROLLER - OUT TEMP To HIGH * Set RAD CONTROLLER (LOOP 1 & LOOP 2) To OFF * Set RAD CONTROLLER - BYPASS MODE (1 & 2) To MAN * Confirm RAD FLOW BYPASS VALVE Talkbacks Display (BYP) * Confirm The HI LOAD EVAP ENABLE Is Set To OFF * Set FLASH EVAP CONTROLLER (PRI A & PRI B) To ON * Set FLASH EVAP CONTROLLER - SEC GPC To ON	Trap Cold Freon In The Bay Radiators If The Rad Bypass Valve Talkbacks Do Not Display (BYP), Set The Manual Rad Flow Bypass Switches 1 & 2 To Bypass.
1001	Mission Dep.	Right Aft Panel Aft Right Panel Right Aft Panel	R11L A1U R13L R11L	* Set The MAJ FUNC Switch To GNC * Enter SPEC 33 PRO (AFT Keypad) * Enter ITEM 2 EXEC (AFT Keypad) * Enter ITEM 1 EXEC (AFT Keypad) * Set KU BAND POWER To OFF * Set KU Antenna To STOW * When KU Antenna Talkback Shows STO, Set KU Antenna To GND * Enter SPEC 22 PRO (Aft Keypad) * Enter ITEM 9 EXEC (Aft Keypad) * Enter ITEM 10 EXEC (Aft Keypad)	Deactivate & Stow The KU Antenna NOTE: Rendezvous Navigation Has Been Used It Must Be Disabled. Confirm On CRT 4 There Are No Asterisks Besides The Following Entries. RNDZ NAV ENA 1 KU ANT ENA 2 MEAS ENA 3
1002	Mission Dep.	Right Aft Panel	R13L	* Set PL BAY MECH PWR (SYS 1 & SYS 2) To ON * Set RADIATOR CONTROL (SYS A & SYS B) To STOW * Set LATCH CONTROL (SYS A & SYS B) To LATCH * Set LATCH CONTROL (SYS A & SYS B) To OFF * Set RADIATOR CONTROL (SYS A & SYS B) To OFF * Set PL BAY MECH PWR (SYS 1 & SYS 2) To OFF	Stow The Radiators Wait Until The RADIATOR CONTROL Talkbacks Show STO Before Setting The LATCH CONTROLS SYS 1 & SYS 2 To LATCH. Wait Until Latch Control Talkbacks Show LAT Before Turning Off ALL Radiators.
1003	Mission Dep.	Overhead Left Panel Center Panel Right Panel	O6 C3 R2	* Set GENERAL PURPOSE COMPUTER - MODE 5 To STBY * Set The BFC/CRT - Display To ON * Confirm The BFC/CRT SELECT Is Set To (3+1) * Confirm BOILER CNTLR/HTR Switches (1/2/3) Are ON * Set HYD CIRC PUMP Switches (1/2/3) To OFF	Activate Backup Flight System
1004	Mission Dep.	Overhead Aft Panel Right Aft Panel	O14 O15 O16 O15 R11L	* Set RGA 1 To ON * Set RGA (2 & 4) To ON * Set RGA 3 To ON * Set ACCEL 3 To ON * Set ACCEL 4 To ON * Set SUPPLY H2O - Crossover Valve To OPEN	Gyro Assemblies & Accelerators
1090	Mission Dep.	Aft Left Panel	A8L	* Set RMS POWER To PRIMARY * Set RMS SELECT To STBD * Set STARBOARD RMS (DEPLOY/OFF/STOW) To STOW * Set STARBOARD RMS (DEPLOY/OFF/STOW) To OFF	Stow The OBSS Boom Wait Until Talkbacks Indicate (STO)
1091	Mission Dep.	Aft Left Panel Aft Right Panel Aft Left Panel	A8L A6U A8U	* Set RMS POWER To PRIMARY * Set RMS SELECT To PORT * Set FLT CNTLR POWER To ON * Set RMS BRAKES To OFF * Set The MODE Rotary Selector To SINGLE * Press ENTER Just Below The MODE Rotary Selector * Set The PARAMETER Rotary Selector To JOINT ANGLE * Set The JOINT Rotary Selector As Required * Depress The SINGLE/DIRECT DRIVE (+/-) Spring Switch	Stow The RMS Return All Joint Angles To Their Stowed Position. By Returning All Joint Angles To Zero, You Will Eventually Reach The RMS Latch Position.
1092	Mission Dep.	Aft Left Panel Front Left Panel	A8L F6	* Port RMS Retention Latches Ready For Latch Talkbacks (White) * Set PORT RMS (RELEASE/OFF/LATCH) To LATCH * Set PORT RMS (RELEASE/OFF/LATCH) To OFF * Set PORT RMS (DEPLOY/OFF/STOW) To STOW * Set PORT RMS (DEPLOY/OFF/STOW) To OFF * Set RMS POWER To OFF * Set FLT CNTLR POWER To ON	Latch The RMS Wait Until Talkbacks Indicate (LAT) Wait Until Talkbacks Indicate (STO)
1093	Mission Dep.	Aft Left Panel	A7U	* Check/Set All PAYLOAD BAY FLOOD Lights To OFF	Turn Off All Payload Bay Flood Lights
1006	Mission Dep.	Right Aft Panel	R11L R13L R11L	* Set MAJ FUNC Switch To SM * If Required, Enter OPS 202 PRO (AFT Keypad) * Enter ITEM 1 EXEC (AFT Keypad) * If Not Already Enabled, Enter ITEM 3 EXEC (AFT Keypad) * Set PL BAY DOOR (SYS 1 & SYS 2) To ENABLE * Set PL BAY DOOR To CLOSE * Set PL BAY DOOR To STOP * Set PL BAY DOOR (SYS 1 & SYS 2) To DISABLE * Enter ITEM 2 EXEC (AFT Keypad)	Close Payload Bay Doors Wait Until The PL BAY DOOR Talkback Shows CL.
1008	Mission Dep.	Right Aft Panel Overhead Left Panel Right Aft Panel	R11L O6 R11L	* Set MAJ FUNC To GNC * Press GPC/CRT (AFT Keypad) * Enter 4 EXEC (AFT Keypad) * Enter OPS 201 PRO (AFT Keypad) * Set GENERAL PURPOSE COMPUTER - MODE 3 To RUN * Enter OPS 301 PRO (AFT Keypad)	Reconfigure GNC's For Deorbit
1009	Mission Dep.	Overhead Left Panel	O6	* STAR TRACKER DOOR CONTROL (SYS 1 & SYS 2) To CLOSE * STAR TRACKER DOOR CONTROL (SYS 1 & SYS 2) To OFF * Set The STAR TRACKER POWER Switches (-Y & -Z) To OFF	Close Star Tracker Doors Wait Until STAR TRACKER DOOR POSITION Talkback Shows CL.



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1010	Mission Dep.	Right Panel Overhead Aft Panel Center Panel Left Panel Aft Right Panel	R4 O15 O14 O16 C3 L2 L1 L2 A12	* Check HYDRAULICS BRAKE HEATER (A/B/C) Set To AUTO * Set BRAKES MN B To ON * Set BRAKES MN A To ON * Set BRAKES MN C To ON * ORBITAL DAP / MANUAL MODE / ROTATION - ROLL To PRI * Check ORBITAL DAP / CONTROL To AUTO * Confirm ANTI SKID - Set To ON * Confirm NOSE WHEEL STEERING - Set To 1 * Confirm ENTRY MODE - Set To AUTO * Set FLASH EVAP CONTROLLER (PRI A & PRI B) To GPC * Set FLASH EVAP CONTROLLER SEC To GPC * FREON LOOP ISOLATION - MODE To OFF * Set O2 SYS 2 SUPPLY To OPEN * Set N2 SYS 2 SUPPLY To OPEN * Set N2 SYS 2 REG INLET To OPEN * Set O2/N2 CNTLR VLV SYS 1 To OPEN * Set APU HEATER - GAS GEN/FUEL PUMP (1/2/3) To OFF * Set APU HEATER - LUBE OIL LINE (1/2/3) To OFF * Set All TANK/FUEL LINE/H2O SYS Switches To OFF * HYDRAULIC HEATER - RUDDER SPD BRK (A & B) To OFF * HYDRAULIC HEATER - BODY FLAP (A & B) To OFF * HYDRAULIC HEATER - ELEVON (A & B) To OFF * HYDRAULIC HEATER - AFT FUSELAGE (A & B) To OFF	Final Switch Configuration Check
1012	Mission Dep.	Right Panel	R2	* Set He ISOLATION A LEFT/CENTER/RIGHT To OPEN * Set He ISOLATION B LEFT/CENTER/RIGHT To OPEN * Set PNEUMATICS L ENG He XOVR To OPEN * Set PNEUMATICS He ISOL To OPEN * Set LEFT He INTERCONNECT To - IN OPEN * Set CENTER & RIGHT INTERCONNECT To - OUT OPEN	Main Propulsion System / Helium Release
1013	Mission Dep.	Right Aft Panel	R11L	* Confirm MAJ FUNC Set To GNC * Enter SPEC 21 PRO (AFT Keypad) * Enter ITEM 16 EXEC	Final IMU Alignment
1014	Mission Dep.	Center Panel Right Panel Center Panel	C2 R2 C2	* Enter ITEM 34 EXEC (Right Keypad) * Set BOILER N2 SUPPLY (1/2/3) To ON * Set BOILER PWR (1/2/3) To ON * Set APU FUEL TK VLV (1/2/3) To OPEN * Set APU CNTLR PWR (1/2/3) To ON * Set APU AUTO SHUT DOWN (1/2/3) Set To INHIBIT * Confirm HYD MAIN PUMP PRESS (1/2/3) Set To LOW * Confirm APU SPEED SELECT Set To NORM * Confirm APU/HYD Ready To Start Talkbacks Are WHITE * Confirm GIMBAL CK 34 On CRT 2 Is Complete (No Asterisk) * Enter OPS 302 PRO (Right Keypad)	Perform OMS Gimbal If there's an asterisk next to GMBL CK 34 It means the gimbal check is incomplete. You must wait for the asterisk to Disappear.
1015	Mission Dep.	Center Panel	C2	* Confirm (CRT 1, CRT 3, CRT 2) Are Set To MAJ FUNC GNC * Enter SPEC 50 PRO (Left Keypad) * Enter SPEC 51 PRO (Right Keypad) * Enter ITEM 44 EXEC (Right Keypad)	Horizontal Situation & Override Displays
1016	Mission Dep.	Center Panel Right Panel	C2 R2	* Press RESUME (Right Keypad) * Set APU OPERATE - START/RUN For APU 1	
1017	Mission Dep.	Center Panel Overhead Aft Center Panel	F7 C2 O14 O16 C3 C2	* Check CRT 1 Confirm Display Of OPS MODE 3021 * ITEM 22 EXEC (Right Keypad) * ITEM 27 EXEC (Right Keypad) * ITEM 23 EXEC (Right Keypad) * Confirm L OMS ENG VLV Is ON * Confirm R OMS ENG VLV Is ON * Set OMS ENG (LEFT & RIGHT) To ARM/PRESS * Press EXEC - (Right Keypad) Confirms ready for OMS burn	Perform Deorbit Burn
1018	Mission Dep.	Center Panel Overhead Aft Panel	C3 O14 O16	* Set OMS ENG (LEFT & RIGHT) To OFF * Set L OMS ENG VLV To OFF * Set R OMS ENG VLV To OFF	Deorbit Burn Complete
1020	Mission Dep.	Center Panel Front Left Panel	C2 F6	* Enter OPS 303 PRO (Right Keypad) * Position The Shuttle To The Correct Attitude	Correct Attitude Hint Align All ADI Needles
1022	Mission Dep.	Center Panel Right Panel Overhead Aft Panel Right Panel Center Panel	C2 R2 O17 R1 C2	* Enter ITEM 36 EXEC (Right Keypad) * Enter ITEM 37 EXEC (Right Keypad) * Set APU OPERATE - START/RUN For APU (2 & 3) * Set HYD MAIN PUMP PRESS (1/2/3) To NORM * Set ATVC - (1/2/3/4) To ON * Set AC BUS SNSR (1/2/3) To MONITOR * Enter ITEM 39 EXEC (Right Keypad)	Dump RCS Propellant Pressure Should Rise To 3000 psi
1023	Mission Dep.	Center Panel Overhead Right Panel	C2 O8	* Enter ITEM 38 EXEC (Right Keypad) * Enter ITEM 40 EXEC (Right Keypad) * Set FWD RCS - He PRESS (A & B) To CLOSE * Set TANK ISOLATION (1/2 & 3/4/5) To CLOSE * Set MANIFOLD ISOLATION (1/2/3/4/5) To CLOSE	Wait Until The Cycle Completes



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1023	Mission Dep.	Center Panel	C2	* Enter OPS 304 PRO (Right Keypad)	
1024	Mission Dep.	Front Left Panel Front Right Panel	F6 F8	* Set Commander ATTITUDE INRTL To LVLH * Set Pilot ATTITUDE INRTL To LVLH	
1025	Mission Dep.	Front Right Panel	F4	* Check PITCH & ROLL/YAW Set To AUTO	
1026	Mission Dep.				The Shuttle Will Perform Roll Reversals
1027	Mission Dep.	Left Panel	L1	* Set RAD CONTROLLER - OUT TEMP To NORM * Set RAD CONTROLLER (LOOP 1 & LOOP 2) To AUTO A * Set RAD CONTROLLER - BYPASS MODE (1 & 2) To AUTO	
1080	Mission Dep.	Right Panel Left Panel	R4 L1	* Set MPS/TVC/ISOL/VLV (SYS1, SYS2, SYS3) To OPEN * Set NH3 BOILER - NH3 CONTROLLER (A & B) To PRI/GPC	Hydraulics / Brake Heater
1028	Mission Dep.	Center Panel Front Left Panel Front Right Panel Overhead Right Panel	C3 F6 F8 O8	* Set AIR DATA PROBE (Left & Right) To DEPLOY HEAT * Set AIR DATA To LEFT * Set AIR DATA To RIGHT * Set RADAR ALTIMETERS (1 & 2) To ON	Deploy Air Data Probes
1029	Mission Dep.	Front Left Panel Front Right Panel Front Left Panel	F3 F3 F2	* Set HUD POWER To ON (Commander) * Set HUD POWER To ON (Pilot) * Set PITCH & ROLL/YAW To CSS (Commander)	Commander & Pilot HUD Power
1031	Mission Dep.	Overhead Right Panel	O8	* Set MLS (1/2/3) Switches To ON * Set MLS Thumbwheel To (111)	Auto Software Transition To OPS 305 Microwave Scan Beam Landing System
1033	Mission Dep.	HUD Display Window		* Press LANDING GEAR ARM (Twice)	Arm The Landing Gear
1034	Mission Dep.	HUD Display Window		* Press LANDING GEAR DOWN (Twice)	Deploy Landing Gear
1035	Mission Dep.	HUD Display Window		* Press SHUTE ARM (Twice) * Press DEPLOY SHUTE (Twice) * Press CHUTE JETT (Twice)	Touchdown: Gently Push The Nose Down Until The Nose Wheel Touches The Runway. Use The Rudder To Steer. Apply Wheel Brakes.
1036	Mission Dep.	HUD Display Window		* Press CHUTE JETT (Twice)	Release Brake Shute
1037	Mission Dep.				End Of Mission

Commence Shutdown



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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	NOTES
	Mission Dep.	Left Panel Right Panel Front Left Panel Front Right Panel Front Left Panel Front Right Panel	L2 R2 R1 F6 F8 F3 F3	* SPD BK - MAN (Full FWD) * NWS - OFF * APU Auto Shutdown (1/2/3) - ENABLE * APU Speed Select (1/2/3) - NORM * AC BUS SNSR (1/2/3) - AUTO TRIP * Commander FLT CNTLR POWER - OFF * Pilot FLT CNTLR POWER - OFF * Commander HUD POWER - OFF * Pilot HUD POWER - OFF	
	Mission Dep.	Center Panel	C3	(PERFORMED IF ELS) * MSTR MADS - OFF (DoD ELS, MCC call DoD OSC on NCC)	Note: MCC Will Report Go/No-Go To DOFF Suits. (Post Safety Assessment)
	Mission Dep.	Center Panel Overhead Aft Panel	C3 O14 O15 O16 O14 O15 O16 O14 O16	* OMS ENG (Left & Right) - OFF * RJDA 1A DRIVER (L2/R2 MANF) - OFF * RJDA 2A DRIVER (L4/R4 MANF) - OFF * RJDF 1B DRIVER (F1 MANF) - OFF * RJDA 1B DRIVER (L1/R1 MANF) - OFF * RJDF 1A DRIVER (F2 MANF) - OFF * RJDA 2B DRIVER (L1/R1 MANF) - OFF * RJDF 2A DRIVER (F1 MANF) - OFF * RJDF 2B DRIVER (F1 MANF) - OFF * RJDA 1A LOGIC (L2/R2 MANF) - OFF * RJDA 2A LOGIC (L4/R4 MANF) - OFF * RJDF 1B LOGIC (F1 MANF) - OFF * RJDA 1B LOGIC (L1/R1 MANF) - OFF * RJDF 1A LOGIC (F2 MANF) - OFF * RJDA 2B LOGIC (L1/R1 MANF) - OFF * RJDF 2A LOGIC (F1 MANF) - OFF * RJDF 2B LOGIC (F1 MANF) - OFF * L OMS ENG VLV - OFF * R OMS ENG VLV - OFF	RMS OMS Safing (RDJs)
	Mission Dep.	Overhead Aft Panel	O15 O16 F2 F3 F4	(NOT PERFORMED IF ELS) * MNB - DRAG CHUTE SYS 2 - op * MNC - DRAG CHUTE SYS 1 - op * DRAG SHUTE - LT OFF * DRAG SHUTE - LT OFF * DRAG SHUTE - LT OFF	Drag Chute Safing
	Mission Dep.	Center Panel	C3	* AIR DATA PROBE (Left & Right) - DEPLOY	Deactivate Air Data Probe HTRS
	Mission Dep.	Right Aft Panel Aft Right Panel Front Left Panel Front Right Panel Aft Right Panel Right Aft Panel	R14 A12 F6 F8 A12 R14	(NOT PERFORMED IF ELS) * ESS 1BC LDG GEAR / ARM/DN - RESET CL * LG ARM/DN RESET - Set Switch To The RESET Position * LDG GEAR - LT OFF * LDG GEAR - LT OFF * LG ARM/DN RESET - Set Switch To The Down Position * ESS 1BC LDG GEAR / ARM/DN - RESET OP	Landing Gear Safing
	Mission Dep.	Right Panel	R2	* ET UMBILICAT DOOR / MODE - GCP/MAN * ET UMBILICAT DOOR / RIGHT LATCH - RELEASE * ET UMBILICAT DOOR / RIGHT LATCH - OFF * ET UMBILICAT DOOR / LEFT LATCH - RELEASE * ET UMBILICAT DOOR / LEFT LATCH - OFF * ET UMBILICAT DOOR / MODE - GCP	ET Umbilical Door Opening
	Mission Dep.	Front Right Panel Front Left Panel Right Panel Center Panel	F4 F8 R2 C3 R2	* BODY FLAP - MAN * FLT CNTLR PWR - ON * HYD MAIN PUMP PRESS #1 - LO * Run Full Load Test * HYD MAIN PUMP PRESS #1 - NORM * HYD MAIN PUMP PRESS #3 - LO * Repeat Load Test * HYD MAIN PUMP PRESS #3 - NORM	Hydraulic Load Test A Minimum Of Two Operating Hydraulic Systems Are Required For This Test
	Mission Dep.	Center Panel Front Right Panel Center Panel Right Panel Center Panel Right Panel Center Panel	C3 C2 F4 C3 R4 C2 R4 C2	* BFC CRT DISPLAY - ON * Enter Item OPS 000 PRO (Right Keypad) * Enter Item OPS 901 PRO (Right Keypad) * BODY FLAP - MAN * BODY FLAP - DOWN * HYDRAULICS - MPS/TVC ISOL VLV (SYS 1, SYS 2, SYS 3) OPEN * Enter ITEM 8 EXEC (Right Keypad) * Enter ITEM 1 +0 2 EXEC (Right Keypad) * Enter ITEM 5 EXEC (Right Keypad) * HYDRAULICS - MPS/TVC ISOL VLV (SYS 1, SYS 2, SYS 3) CLOSE * Enter ITEM 23 EXEC (Right Keypad) * Enter ITEM 1 EXEC (Right Keypad) * Enter ITEM 29+1 EXEC (Right Keypad) * Enter ITEM 30+8 EXEC (Right Keypad) * Enter ITEM 31 EXEC (Right Keypad) * Enter ITEM 32 EXEC (Right Keypad)	DPS Transition GNC 9 (If Pass)



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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	PANEL AREA & NOTES
	Mission Dep.	Overhead Left Panel Left Panel	O1 L1	* Confirm FREON EVAP OUT TEMP >40 degrees * RADIATORS / RAD CONTROLLER - OUT TEMP - HI * H2O PUMP LOOP 1 - ON	Radiator Reconfiguration
	Mission Dep.	Right Panel	R4 R2	* HYDRAULICS - MPS/TVC ISOL VLV (SYS 1, SYS 2, SYS 3) - CLOSE * BOILER PWR (1/2/3) - OFF * BOILER N2 SUPPLY (1/2/3) - OFF * APU OPERATE (1/2/3) - OFF * APU FUEL TK VLV (1/2/3) - CLOSE * APU CNTLR PWR (1/2/3) - OFF	APU/HYD Shutdown
	Mission Dep.	Right Panel	R2	* He ISOLATION (A & B) - CLOSE * PNEUMATICS / L ENG He XOVR - CLOSE	Post Landing MPS Reconfiguration
	Mission Dep.	Left Panel	L2	* Set O2 SYS SUPPLY 1 - CLOSE * Set O2 SYS SUPPLY 2 - CLOSE * Confirm O2 EMER Talkback Indicates CL	PCS Deactivation
	Mission Dep.	Aft Left Panel Overhead Center Panel	A13 O7	* GPS POWER (1 & 2) - OFF * GPS PRE AMPL UN - OFF * GPS PRE AMPL LC - OFF * GPS POWER (GPS 1, GPS 2, GPS 3) - OFF * GPS PRE AMPL UPPER (GPS 1, GPS 2, GPS 3) - OFF * GPS PRE AMPL LOWER (GPS 1, GPS 2, GPS 3) - OFF	GPS Power Down
	Mission Dep.	Center Panel	O2	* Enter ITEM 8 EXEC (Right Keypad) * Enter ITEM 1+03 EXEC (Right Keypad) * Enter ITEM 2 EXEC (Right Keypad) * Enter ITEM 5 EXEC (Right Keypad)	Vent Door Purge Positioning (PASS)
	Mission Dep.	Overhead Center Panel	O7 O8 O7	* MASTER RCS CROSSFEED - OFF * LEFT OMS / He PRESS/VAPOR ISOL (A & B) - GPC * RIGHT OMS / He PRESS/VAPOR ISOL (A & B) - GPC * LEFT OMS CROSSFEED (A & B) - OPEN/CLOSE * RIGHT OMS CROSSFEED (A & B) - OPEN/CLOSE * LEFT OMS TANK ISOLATION (A & B) - CLOSE/OPEN/GPC * RIGHT OMS TANK ISOLATION (A & B) - CLOSE/OPEN/GPC * LEFT OMS CROSSFEED (A & B) - OPEN/GPC * FWD RCS / He PRESS (A & B) - CLOSE/GPC * FWD RCS TANK ISOLATION (1/2 & 3/4/5) - CLOSE * FWD RCS MANIFOLD ISOLATION (1/2/3/4/5) - CLOSE * FWD RCS MANIFOLD ISOLATION (1/2/3/4/5) - OPEN/GPC * LEFT OMS / He PRESS/VAPOR ISOL (A & B) - CLOSE/GPC * RIGHT OMS / He PRESS/VAPOR ISOL (A & B) - CLOSE/GPC * LEFT MANIFOLD ISOLATION (1/2/3/4/5) - CLOSE * RIGHT MANIFOLD ISOLATION (1/2/3/4/5) - CLOSE * LEFT MANIFOLD ISOLATION (1/2/3/4/5) - OPEN/GPC * RIGHT MANIFOLD ISOLATION (1/2/3/4/5) - OPEN/GPC * LEFT RCS TANK ISOLATION (1/2 & A 3/4/5 B) - CLOSE * RIGHT RCS TANK ISOLATION (1/2 & A 3/4/5 B) - CLOSE * LEFT & RIGHT RCS CROSSFEED - OPEN/CLOSE/GPC	RCS, OMS Valve Test Open, Then Close Open, Then Close Close, Then Open, Then GPC Close, Then Open, Then GPC Open, Then GPC Close, Then GPC Open, Then GPC Close, Then GPC Close, Then GPC Open, Then GPC Open, Then GPC Open, Then Close, Then GPC
	Mission Dep.	Overhead Center Panel	O7	* LEFT RCS TANK ISOLATION (1/2 & A 3/4/5 B) - OPEN/GPC * RIGHT RCS TANK ISOLATION (1/2 & A 3/4/5 B) - OPEN/GPC	Open, Then GPC Open, Then GPC
	Mission Dep.	Overhead Left Panel	O6	* GPC MODE (1/2/3/4/5) - STBY/HALT	STBY, Then Halt
	Mission Dep.			IF LANDING AT (KSC, EDW, NOR) <u>HATCH OPENING PROCEDURE</u> * Pull G SUIT Controller Clip - (If Inflated) * Lap Belt & Chute - Release * Egress Seat - (Helmet Required If ELS) * Unstow - 'Return To Houston' Bags - (Except ELS)	Hatch Opening
	Mission Dep.			IF YOU ARE NOT LANDING AT (KSC, EDW, NOR) <u>HATCH OPENING PROCEDURE</u> * Tabs/Visor - CLOSE * Green Apple - PULL * Open Hatch/Deploy Slide Per Decal	Hatch Opening
	Mission Dep.			<u>ORBITER UNAIDED EGRESS</u> * Egress Orbiter * Hand Carry Landing Site Data Book * If ELS - (Reference ELS POST LANDING Procedures)	Orbiter Egress