Space Shuttle Mission 2007

Designed By: Michael Swannick

Mission Checklist
STS-103

Crew Members

Commander - Curtis L. Brown | Pilot - Scott J. Kelly

Mission Specialist

Steven L. Smith | C. Michael Foale | John M. Grunsfeld | Claude Nicollier | Jean-Francois Clervoy

Mission Highlights

Carried out by Discovery on December 19, 1999. STS-103 is the third Hubble repair mission. In addition to replacing all six gyroscopes, the crew will replace a guidance sensor, the main computer and install a voltage/temperature kit for the batteries. A new transmitter, solid state recorder and thermal insulation blankets will also be installed. HST-SM 3A.

Payload

Orbital Replacement Unit Carrier (ORUC). The ORUC will carry various enclosures containing parts for the Hubble Space Telescope (HST).
Fine Guidance Sensor (FGS). A FGS is an optical sensor, consists of a large structure housing a collection of mirrors, lenses, servos, prisms, beam-splitters and photomultiplier tubes.
Rate Sensor Units (RSU). Three gyros must operate simultaneously to provide enough information to control Hubble. There are a total of six gyros on board, three serve as backups.
New Advanced Computer. The new advanced computer will be based on the Intel 80486 microchip. It will be twenty times faster, and have six times as much memory, as the current computer on Hubble.
New Outer Blanket Layer (NOBL). The crew also will carry a special fabric, called the Shell/Shield Replacement Fabric, or SSRF. During SM3A astronauts will install the SSRF on Hubble's forward shell and light shield if time is available.
S-Band Single Access Transmitter (SSAT). Astronauts will replace a faulty SSAT with a spare. The SSAT sends the data from Hubble Space Telescope to the ground by radio.
Solid State Recorder (SSR). The SSR is used by Hubble to record data when downlink is not available. Three 1970-style, reel-to-reel tape recorders will be replaced with new digital recorders capable of storing 12 gigabits of data.
Voltage/Temperature Improvement Kit (VIK). Astronauts will install a battery VIK on each of the Hubble's six Batteries. The VIK modifies the charge cutoff voltage to a lower level to prevent battery overcharging and associated overheating.
External Airlock

Flight Summary

Launchpad: Kennedy Space Center (KSC) 39B | Orbit: 317NM | Inclination: 28.45 | Orbits: 117

Duration: 7 Days, 23 Hours, 11 Minutes, 34 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 Front Left Panel	L2 F2	* Set CABIN VENT ISOL To CLOSE * Set CABIN VENT To CLOSE * Press MASTER ALARM	Cabin Leak Check 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 PWR (1/2/3) Are ON * Check BOILER CNTLR/HTR (1/2/3) Are On - A * Set BOILER N2 Supply (1/2/3) To ON	Confirm Boiler Power On
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 C2	C3 C2	* Set BFC CRT DISPLAY To ON * Confirm BFC CRT SELECT Is At (3+1) * Enter ITEM 25 EXEC (Use Left Keypad)	Enable Backup Flight System (BFS) And Execute Computer Data Transfer To BFS Copy Primary Avionics SW To BFS
12	T-00:00:36:40	Left Panel Overhead Low Panel	L2 O1	* Set CABIN VENT To CLOSE * Set CABIN VENT ISOL To OPEN * Check CABIN dP/dT Gauge For Possible Depressurization	Cabin Leak Check - Continued
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 Center Panel	F6 C3	* Check ABORT Light ON/OFF For 8 Seconds * Set CAUTION/WARNING MEMORY To CLEAR	Final Test Of The ABORT System 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 Front Center Panel	C3 F7	* Set EVENT TIMER CONTROL To START * Confirm EVENT TIMER Display Continues The Countdown	Start The Nine (9) Minute 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 * Check 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 Front Center Panel Right Panel Front Center Panel Front Left Panel Right Panel	R2 F7 R2 F7 F2 R2	* Set APU FUEL TK VLV (1/2/3) To Open * Check APU/HYD READY TO START (1/2/3) Repeaters-(White) * Set APU OPERATE (1/2/3) To START/RUN * Check HYDRAULIC (APU) Pressure 900psi (Use MFD #2) * Set HYD MAIN PUMP PRESS (1/2/3) To NORM * Check HYDRAULIC (APU) Pressure 3000psi (Use MFD #2) * Press MASTER ALARM (If Required) * Set HYD CIRC PUMP (1/2/3) Set To OFF	APU Start The Master Alarm May Sound Until APU Pressure Reaches 3000 PSI. (Silence Alarm)
21	T-00:00:04:30 T-00:00:04:10	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 APU Check Complete
22	T-00:00:03:45 T-00:00:03:05				Start Hydraulic Check, Aero Surfaces Are Moved, A Gimbal Check Is Performed 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 Center Panel	R2 R1 C3	* Set APU AUTO SHUT DOWN (1/2/3) To INHIBIT * Set AC BUS SNSR (1/2/3) To MONITOR * Set CAUTION/WARNING MEMORY To CLEAR	APU Power - Inhibit
25	T-00:00:01:40 T-00:00:01:20				Liquid Hydrogen External Tanks Close. Go For Launch Announcement.

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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	PANEL AREA & NOTES
25	T-00:00:01:00 T-00:00:00:30				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. Once The Shuttle Clears The Tower, It Will Complete A Roll Maneuver.
26	T-00:00:00:00				Shuttle Liftoff

Commence Ascent Checklist

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ASCENT CHECKLIST

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
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
30	T+00:00:06:56				Single Engine Press To MECO
31	Mission Dep.				Engines Throttle Down In Preparation For Main Engine Cutoff (MECO) MECO
32	Mission Dep.	Front Center Panel	F7	* Check MAIN ENGINE STATUS Lights (Left/CTR/Right) Are Red	Confirm Main Engine Shutdown 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	* Check ORBIRAL DAP - CONTROL Is Set To AUTO * Enter ITEM 22 EXEC (Use Right Keypad) * Enter ITEM 27 EXEC (Use Right Keypad) * Enter ITEM 23 EXEC (Use Right Keypad) * Set L OMS ENG VLV Is ON * Set R OMS ENG VLV Is ON * Set 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 And Drain Valve To Ground Control. Enable Manual Control Of The RCS Align All ADI Needles
43	Mission Dep.	Right Panel Aft Left Panel Right Panel Aft Left Panel	R4 A12 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 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	Thermal Condition The Shuttle
44	Mission Dep.	Aft Right Panel	A14	*Set RCS/OMS HEATERS - FWD RCS To A AUTO * Set RCS/OMS HEATERS - LEFT POD To A AUTO	

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44	Mission Dep.	Aft Right Panel	A14	* Set RCS/OMS HEATERS - RIGHT POD To A AUTO * 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	
			A8L	* Set TOPPING EVAP HEATER - DUCT Selector To A/B	
		Left Panel	L1	* Set HI LOAD EVAP - HI LOAD DUCT HTR Selector To A/B	
45	Mission Dep.	Left Panel	L2	* Set O2 SYS 2 SUPPLY To CLOSE * Set N2 SYS 2 SUPPLY To CLOSE * Set N2 SYS 2 REG INLET To CLOSE	
			L1	* Set H2O LOOP 2 BYPASS - MODE To AUTO * Set H2O PUMP - LOOP 1 To OFF | H2O PUMP - LOOP 2 To GPC	
		Overhead Aft Panel	O14	* Set RGA 1 To OFF	
			O15	* Set RGA 2 & 4 To OFF	
			O16	* Set RGA 3 To OFF * Set ACCEL 3 To OFF	
			O15	* Set ACCEL 4 To OFF	
46	Mission Dep.	Overhead Left Panel	O6	* Set GENERAL PURPOSE COMPUTER - MODE 5 To HALT	Configure Computers For Orbit
		Right Aft Panel	R11L	* 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)	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
		Overhead Left Panel	O6	* Set GENERAL PURPOSE COMPUTER - MODE 3 To HALT	GPC 5 Retains The Backup Flight System
47	Mission Dep.	Left Panel	L1	* Set RAD CONTROLLER - (LOOP 1 & LOOP 2) To AUTO A * Set RAD CONTROLLER - BYPASS MODE (1 & 2) To AUTO	Activate Radiator Cooling
			L2	* Set FREON LOOP ISOLATION - MODE To AUTO	
48	Mission Dep.	Right Aft Panel	R11L	* Confirm MAJOR FUNC Is Set To SM * Enter OPS 202 PRO (AFT Keypad) * Enter ITEM 3 EXEC * Enter ITEM 1 EXEC	Open Payload Doors PL BAY DOOR SPEC Display Enable Auto Mode Enable AC Power
			R13L	* Set PL BAY DOOR (SYS 1 & SYS 2) To ENABLE * Set PL BAY DOOR To OPEN * Confirm PL BAY DOOR Talkbacks Show DEP	 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	* 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	 Disable All Power To PL Doors And Radiators. Disable AC Power To The Doors
			R11L	* Enter ITEM 2 EXEC (AFT Keypad)	
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	R11L	* Confirm MAJOR FUNC Is Set To SM * Enter SPEC 69 PRO (AFT Keypad) * Enter SPEC 88 PRO (AFT Keypad)	 Check Purge Process On The SPEC Display Check Coolant Loops
		Left Panel	L1	* Set FLASH EVAP CONTROLLER (PRI A & PRI B) To OFF * Set FLASH EVAP CONTROLLER - SEC To OFF * Set HILOAD EVAP To OFF	 Secure The Flash Evaporator
53	Mission Dep.	Overhead Left Panel	O6	* 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	Deploy & Activate The Star Trackers Indicating The ST Doors Are Open
		Right Aft Panel	R11L	* Set MAJ FUNC To GNC * Enter SPEC 22 PRO (AFT Keypad) * Enter ITEM 3 EXEC (AFT Keypad) * Enter ITEM 4 EXEC (AFT Keypad)	
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 1 PRE AMPL LOWER 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	O7	* Set GPS 3 POWER To ON	Activate Global Positioning System (GPS)
				* Set GPS 3 PRE AMPL UPPER To ON	
				* Set GPS 3 PRE AMPL LOWER To ON	
		Right Aft Panel	R11L	* Set DUMP ISOL VLV To OPEN	
59	Mission Dep.	Right Aft Panel	R11L	* Check MAJ FUNC To GNC	Deploy KU Antenna
				* Enter SPEC 25 PRO (AFT Keypad)	Indicates Status For All THC/RHC
			R13L	* Set KU ANTENNA To DEPLOY	(Joysticks).
				* Check KU ANTENNA Talkback For DEP	KU Antenna Deployment Takes 15 Seconds
				* Set KU ANTENNA To GND	Indicates KU Antenna Is Deployed
		Aft Right Panel	A1U	* Set KU BAND POWER To STBY	
		Right Aft Panel	R11L	* Check MAJ FUNC To GNC	
				* Enter SPEC 33 PRO (AFT Keypad)	
				* Enter ITEM 2 EXEC (AFT Keypad)	Enable KU Antenna
60	Mission Dep.				Shuttle Is Configured & Ready For Mission

Commence On-Orbit Mission

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STS-103 MISSION CHECKLIST

COMM	MET	PANEL SECTION	PANEL	PROCEDURE	PANEL AREA & NOTES
1100	Mission Dep.				RMS Needs To Be Powered Up. 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.
1107	Mission Dep.				This Ends The Activation And Checkout Of The RMS. Next Event
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
1112	Mission Dep.	Left Aft Panel	L12	* Standard Switch Panel | Set FSS POWER To ON * Standard Switch Panel | Set FSS DEPLOY Switch To DEPLOY	Power Up The FSS
1113	Mission Dep.				The FSS Preparation Is Complete Next Event
1115	Mission Dep.	Right Aft Panel	R11L	* 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)	Activate Star Trackers Target = Hubble Telescope
1116	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	Star Trackers Are Configured. Second Rendezvous NC Burn Is Performed.
1117	Mission Dep.	Center Panel	C3	* Set OMS ENG (Left & Right) To OFF	Second NC Burn Complete - Disable OMS
1120	Mission Dep.	Aft Right Panel Right Aft Panel	A1U R11L	* 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)	Activate KU Band Radar
1121	Mission Dep.	Aft Left Panel	A2	* Use RCS Thrusters To Close On The Hubble Telescope	The Hubble Telescope 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. Always Maintain The Following Attitude ROLL=0 PITCH=0 YAW=90 When The Reticules Are Centered, Hubble Telescope Is Right In Front Of The Shuttle. If You Are Impatient, Use Next Event
1125	Mission Dep.	Aft Left Panel	A2	* Use RCS Thrusters To Translate The Shuttle	The Hubble Telescope Is In Visual Range. Translate The Shuttle So The Hubble Is Within RMS Grapple Range.
1126	Mission Dep.	Aft Left Panel	A2	* Use RCS Thrusters To Translate The Shuttle	Now Bring The Closing Rate Between The Shuttle And The Hubble Telescope To Zero.

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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	PANEL AREA & NOTES
1127	Mission Dep.	Aft Right Panel Aft Left Panel	A6U A8L A8U	* Set AFT FLT CNTLR POWER To ON * Set RMS POWER To PRIMARY * Set RMS BRAKES To OFF	Power Up The RMS.
1128	Mission Dep.	Aft Left Panel	A8U	* Set END EFFECTOR | MODE To AUTO	Grapple The Hubble Using The Closer Of The Two Grapple Points
1130	Mission Dep.	Aft Left Panel	A8L	* Use The RMS To Align Hubble With The FSS 	Place The Hubble On The FSS With The Door End Pointing Straight Up. These Coordinates Are For The Right RMS POSITION - P Y R P: 000.0 | Y: 000.0 | R: 000.0 POSITION - X Y Z X: 0920 | Y: -0041 | Z: 0701 JOINT ANGLE YAW: -011.4 SHOULDER: 080.4 ELBOW: -081.5 WRIST PITCH: 001.1 WRIST YAW: 011.5 WRIST ROLL: -000.1
1131	Mission Dep.	Left Aft Panel	L12	* Standard Switch Panel | Set FSS LATCHES To LAT * Standard Switch Panel | Confirm FSS POWER Is ON	Hubble Is In The Latch Position
1132	Mission Dep.				The Latches Will Take About Eight Seconds To Activate. After That Hubble's Solar Panels Are Rotated By Ground Crew.
1133	Mission Dep.	Aft Left Panel	A8L	* Release The Hubble Telescope - Press Backspace	Hubble Telescope Released
1134	Mission Dep.				Hubble Telescope Is Ready For Repair. Next Event
1140	Mission Dep.			* EV1	EV1 Emerges From The Airlock. Move EV1 To The Foot Restraints Attached To The Shuttle Bay Wall.
1141	Mission Dep.	Aft Left Panel Aft Right Panel Aft Left Panel	A8L A6U A8U	* EV1 & EV2 * Set RMS POWER To PRIMARY * Set AFT FLT CNTLR POWER To ON * Set RMS BRAKES To OFF	EV2 Emerges From The Airlock. Enable Stick Control. Power Up The RMS. Then Move The RMS End Effector Close To EV1 For Foot Restraint Attachment.
1142	Mission Dep.			* EV1 & EV2	EV1 Connects The Foot Restraint To The RMS. Move EV2 On Top Of The Orbital Replacement Unit Carrier (ORUC).
1143	Mission Dep.			* EV2	Move The RMS End Effector Over To EV2.
1144	Mission Dep.			* EV1 & EV2	EV2 Attaches Himself To The RMS Foot Restraint. First Task Is To Replace The Hubble Rate Sensor Unit (RSU) #2. Move EV1 & EV2 To The Contingency Orbital Replacement Unit Protective Enclosure. (COPE)
1145	Mission Dep.			* EV1 & EV2	The COPE Box Lid Is Unlatched And Opened. The RSU-2 Will Be Carried By EV2 In An ORU Transfer Bag. Move EV1 & EV2 Close To The Hubble Aft Shroud Doors, In The Lower Part Of Hubble.
1146	Mission Dep.			* EV1 & EV2	The Astronauts Will Now Replace The RSU-2. Bring EV2 Back To The COPE Box To Return The Old RSU-2 And Pick Up A New RSU-3.
1147	Mission Dep.			* EV1 & EV2	EV2 Exchanges The RSU Unit. Return To Hubble Aft Shroud Doors.
1151	Mission Dep.			* EV1 & EV2	EV2 Dismounts The RMS. The Next Task Will Be To Install Six Voltage/Temperature Improvement Kits (VIK) On The Hubble Batteries. The Six Batteries Supply Power To The Hubble While It Orbits On The Night Side. Move EV2 To The Airlock To Retrieve The VIK Caddy.
1152	Mission Dep.			* EV1 & EV2	While EV2 Gets The VIK Caddy, Move EV1 Onto The RMS Foot Restraint.
1153	Mission Dep.			* EV1 & EV2	Move EV1 & EV2 To The Upper Section Of The Lower Part Of Hubble.
1154	Mission Dep.			* EV1 & EV2	EV2 Transfers The VIK Caddy To The RMS End Effector. EV1 Installs The VIK's Inline With Each Battery. This Concludes The First Spacewalk. Move EV2 To The Airlock.
1155	Mission Dep.			* EV1 & EV2	EV1 Dismounts From The RMS. Move EV1 Into The Airlock.

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1150	Mission Dep.			* EV1 & EV2	EV1 & EV2 Replace The Last RSU. After Replacing The Last RSU, The Crew Carries Out A Near Infrared Camera & Multi-Object Spectrometer Valve Reconfiguration. They Remove Two Coolant In And Coolant Out Bayonet Caps And Open The Valves. Move EV2 Back To The Cope Box To Return The Old RSU Unit.
1151	Mission Dep.				EV2 Dismounts The RMS. The Next Task Will Be To Install Six Voltage/Temperature Improvement Kits (VIK) On The Hubble Batteries. The Six Batteries Supply Power To The Hubble While It Orbits On The Night Side. Move EV2 To The Airlock To Retrieve The VIK Caddy.
1152	Mission Dep.				While EV2 Gets The VIK Caddy, Move EV1 Onto The RMS Foot Restraint.
1153	Mission Dep.				Move EV1 & EV2 To The Upper Section Of The Lower Part Of Hubble.
1154	Mission Dep.				EV2 Transfers The VIK Caddy To The RMS End Effector. EV1 Installs The VIK's Inline With Each Battery. This Concludes The First Spacewalk. Move EV2 To The Airlock.
1155	Mission Dep.				EV1 Dismounts From The RMS. Move EV1 Into The Airlock.
1156					The First Spacewalk Is Finished. For The Next EVA, The Old DF-224 Computer Will Be Replaced. The Fine Guidance Sensor (FGS-2) And A New Outer Blanket Layer (NOBL) Will Be Installed On The Hubble Equipment Bay 1. Next Event
1160	Mission Dep.	Aft Left Panel	A8L	* Move The RMS Away From The Hubble Telescope	Before The Spacewalk, Move The RMS Away From The Telescope So The Hubble Can Be Rotated To Its Left Side.
1161	Mission Dep.	Left Aft Panel	L12	* Standard Switch Panel | Set FSS ROTATE Switch To ROTATE	Rotate The Hubble So The Left Side Faces The Airlock.
1162	Mission Dep.				The Hubble Is Now Rotated 90 Degrees To Service Attitude.
1163	Mission Dep.			* EV1 & EV2 * Move The RMS To EV2	EV2 Exits The Airlock. Move EV2 On Top Of The OVUC Enclosures. Then Move The RMS Close To EV2.
1164	Mission Dep.			* EV1 & EV2	EV1 Exits The Airlock. First Task Is To Replace The Old DF-224 Computer. Move EV2 To The Cope Enclosure And Pick Up The Connector Converter Caddy.
1165	Mission Dep.			* EV1 & EV2	Move EV1 Over To The LOPE Where The New Computer Will Be Prepared For Installation.
1166	Mission Dep.			* EV1 & EV2	While EV1 Prepares The New Computer, Move EV2 To Hubble Service Bay 1.
1167	Mission Dep.			* EV1 & EV2	EV2 Opens The Service Bay Door And Begins To Disconnect The Old Computer. EV1 Will Assists EV2. Move EV1 Close To EV2
1168	Mission Dep.			* EV1 & EV2	The Old Computer Is Released. Move EV1 Back To The LOPE Enclosure To Store The Old And Get The New Computer.
1169	Mission Dep.			* EV1 & EV2	Move EV2 To The LOPE Enclosure.
1170	Mission Dep.			* EV1 & EV2	While EV1 Stores The Old Computer, Move EV2 Back To Service Bay 1.
1171	Mission Dep.			* EV1 & EV2	Move EV1 To Service Bay 1 To Assist EV2.
1172	Mission Dep.			* EV1 & EV2	After Replacing The Old Computers, A New Outer Layer Blanket (NOLB) Is Mounted On Service Bay 1 Door. Move EV1 To The NOLB Protective Enclosure (NPE).
1173	Mission Dep.			* EV1 & EV2	Move EV1 Back To Service Bay 1 For NOBL Installation.
1174	Mission Dep.			* EV1 & EV2	First Task Is Now Complete. Move EV1 And EV2 To The Center Of The Payload Bay.
1176	Mission Dep.	Left Aft Panel	L12	* Standard Switch Panel | Set FSS ROTATE Switch To ROTATE	Rotate The Hubble 90 Degrees So The Under Side Faces The Airlock.
1177	Mission Dep.				The Hubble Is Now Being Rotated 90 Degrees.
1179	Mission Dep.				Move The RMS With EV1 To The Central Part Of The Bottom Of Hubble.

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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	PANEL AREA & NOTES
1180	Mission Dep.			* EV1 & EV2	While EV1 Disconnects The Old FGA, Move EV2 To The Forward Fixture On The ORUC To Pickup An Outboard FGS Handhold.
1181	Mission Dep.			* EV1 & EV2	Move EV2 Close To EV1 For Handhold Installation And Removal Of The Old FGS.
1182	Mission Dep.			* EV1 & EV2	After The Removal Of The Old FGA, Move EV1 Carrying The Old FGA To The Aft Fixture Of The ORUC For Temporary Stowing.
1183	Mission Dep.			* EV1 & EV2	Move EV2 To The Fine Guidance Censor Scientific Instrument Protective Enclosure At The Forward End Of ORUC Box.
1184	Mission Dep.			* EV1 & EV2	While EV2 Prepares The New FGA, Move EV1 To The Forward Fixture To Pick Up Another Handhold.
1185	Mission Dep.			* EV1 & EV2	Move EV1 To The FSIPE For The Handhold Installation.
1186	Mission Dep.			* EV1 & EV2	After The Handhold Installation, EV1 Gets A Replacement FGA. Move EV1 & The RMS To The FGA Bay On Hubble To Install The New FGA.
1187	Mission Dep.			* EV1 & EV2	Move EV2 To The FGA Bay to Assist With The Installation.
1188	Mission Dep.			* EV1 & EV2	After Removal Of The Mirror Cover, EV1 & EV2 Install The FGA And Power It Up. Move EV1 & EV2 To The ORUC Aft Fixture.
1189	Mission Dep.			* EV1 & EV2	Move EV1 To The FSIPE With The Old FGA While EV1 Stows The Aft Fixture.
1190	Mission Dep.			* EV1 & EV2	Move EV2 To The FSIPE To Assist EV1 With The Old FGA.
1191	Mission Dep.			* EV1 & EV2	EV1 Dismounts From The RMS. Move EV1 To The Forward Fixture For Stowing.
1192	Mission Dep.			* EV1 & EV2	After Stowing The Forward Fixture, Move EV1 To The Airlock And Enter The Shuttle.
1193	Mission Dep.			* EV1 & EV2	Move EV2 To The Airlock And Enter The Shuttle.
1194	Mission Dep.				This concludes The Second Spacewalk. Next Event
1200	Mission Dep.			* EV1 & EV2	EV2 Emerges From The Airlock, Move EV2 Over The RMS End Effector For Mounting.
1201	Mission Dep.			* EV1 & EV2	EV1 Emerges From The Airlock, Move Both Astronauts Close To The Hubble Bay 5 Doors.
1202	Mission Dep.			* EV1 & EV2	Astronauts (EV1 & EV2) Complete Additional Connections To The New FGA. EV2 Prepares The Old S-Band Single Access Transmitter For Replacement. EV2 Then Transfers The SSAT To EV1. Bring EV1 To The COPE Enclosure.
1203	Mission Dep.			* EV1 & EV2	Move EV1 Close To EV2, Assist EV2 With The Installation Of The SSAT.
1204	Mission Dep.			* EV1 & EV2	Uninstall The Old Solid State Recorder (SSR). Move The Astronauts (EV1 & EV2) To The COPE Enclosure To Stow The Old SSR And Grab The Replacement.
1205	Mission Dep.			* EV1 & EV2	Move EV2 Back To The Hubble To Install The New SSR. Meanwhile EV1 Finishes Stowing The Old SSR.
1206	Mission Dep.			* EV1 & EV2	Move EV1 Close To EV2 To Assist With The Installation Of The New SSR.
1207	Mission Dep.			* EV1 & EV2	The Astronauts Close The Hubble Bay After Installing The SSR. EV2 Dismounts The RMS. Move EV1 To The RMS Foot Restraint.
1208	Mission Dep.			* EV1 & EV2	The Astronauts Will Now Install The New Outer Blankets To Hubble Bays 5 - 10. Move EV2 To The New Outer Blanket Layer Protection Enclosure (NPE).
1209	Mission Dep.			* EV1 & EV2	EV2 Takes The Blankets For 5 & 6. Move EV1 To EV2. EV1 Takes The Blankets From EV2.
1210	Mission Dep.			* EV1 & EV2	While EV1 Installs Blankets 5 & 6, Return To The NPE & Get The Blankets For Bays 7 & 8.
1211	Mission Dep.			* EV1 & EV2	EV2 Takes The Blankets For 7 & 8. Move EV1 To EV2. EV1 Takes The Blankets From EV2.
1212	Mission Dep.			* EV1 & EV2	While EV1 Installs Blankets 7 & 8, Return To The NPE And Get The Blankets 9 & 10.

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1213	Mission Dep.			* EV1 & EV2	EV2 Takes The Blankets For 9 & 10 From EV1.
1214	Mission Dep.			* EV1 & EV2	Move EV2 To The Airlock.
1215	Mission Dep.			* EV1 & EV2	EV1 Dismounts The RMS And Removes The Foot Restraint. Move EV1 To The Foot Restraint Latch Position Located In The Rear Of Shuttle Payload Bay.
1216	Mission Dep.			* EV1 & EV2	Move EV1 To The Airlock.
1217	Mission Dep.				All Spacewalk Goals Are Achieved. Next Event
1220	Mission Dep.	Left Aft Panel	L12	* Standard Switch Panel | Set FSS ROTATE Switch To ROTATE	Rotate The Hubble So The Grapple Fixtures Face The Airlock.
1221	Mission Dep.				The Hubble Is Now Rotating To Its Final Position.
1222	Mission Dep.	Aft Left Panel	A8L	* Use The RMS To Grapple The Hubble	Use COMM 1130 Coordinates.
1223	Mission Dep.	Left Aft Panel	L12	* Standard Switch Panel | Set FSS LATCHES To LAT	Release Hubble Latches
1224	Mission Dep.				Latches Will Take Approximately Eight Seconds To Release. After That, Hubble's Solar Panels Are Rotated By Ground Crew.
1225	Mission Dep.	Aft Left Panel	A8L	* Use The RMS To Deploy The Hubble Telescope	Very Carefully, Move The Hubble Out Of The Shuttle Payload Bay And Position It High Above The Space Shuttle. Important: The High Gain Antenna Will Be Deployed While Attached To The RMS, So Hubble Must Be Positioned In Such A Way That during Deployment, The Antennas Do Not Collide With The RMS.
1226	Mission Dep.				HST Power Is Reconfigured & The Aperture Door Latch Is released. HST High Gain Antennas Are Deployed By Ground Crew.
1227	Mission Dep.				The HST Is Now Fully Functional & Extended Test Of The New Equipment Is Performed By Ground Crew. Hubble Will Be Released In About Two Hours. Next Event
1230	Mission Dep.	Aft Left Panel	A8L	* Release The Hubble Telescope - Press Backspace * Stow The RMS	Release The Hubble Telescope. When The End Effector Talkbacks Show Derigid And Extend, Stow The RMS.
1231	Mission Dep.	Left Aft Panel	L12	* Standard Switch Panel | Set FSS DEPLOT To STOW	Rotate The FSS Back Into The Stow Position.
1232	Mission Dep.	Left Aft Panel Aft Left Panel Front Left Panel	L12 A8L F6	* Standard Switch Panel | Set FSS POWER Is OFF * Set RMS POWER To OFF * Set FLT CNTLR POWER To ON	Power Down The Flight Support Structure. Gain Manual RCS Control Of The Shuttle
1233	Mission Dep.	Front Left Panel	F6	* Use Small RCS Bursts	Move The Shuttle Away From The HST By Translating Backwards Using Short RCS Bursts.
1234	Mission Dep.				The Shuttle Continues To Move Away From Hubble. This Completes STS 103. Next Event

Commence Deorbit & Landing

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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	NOTES
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
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	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	* Set All PAYLOAD BAY FLOOD Lights To OFF	Turn Off All Payload Bay Flood Lights
1006	Mission Dep.	Right Aft Panel R11L	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.
1010	Mission Dep.	Right Panel	R4	* Check HYDRAULICS BRAKE HEATER (A/B/C) Set To AUTO	Final Switch Configuration Check

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1010	Mission Dep.	Overhead Aft Panel	O15	* Set BRAKES MN B To ON	Final Switch Configuration Check
			O14	* Set BRAKES MN A To ON	
			O16	* Set BRAKES MN C To ON	
		Center Panel	C3	* ORBITAL DAP / MANUAL MODE / ROTATION - ROLL To PRI	
				* Check ORBITAL DAP / CONTROL To AUTO	
		Left Panel	L2	* Confirm ANTI SKID - Set To ON	
				* Confirm NOSE WHEEL STEERING - Set To 1	
				* Confirm ENTRY MODE - Set To AUTO	
			L1	* Set FLASH EVAP CONTROLLER (PRI A & PRI B) To GPC	
				* Set FLASH EVAP CONTROLLER SEC To GPC	
			L2	* 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	
		Aft Right Panel	A12	* 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	
1012	Mission Dep.	Right Panel	R2	* Set He ISOLATION A LEFT/CENTER/RIGHT To OPEN	Main Propulsion System / Helium Release
				* 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	
1013	Mission Dep.	Right Aft Panel	R11L	* Confirm MAJ FUNC Set To GNC	Final IMU Alignment
				* Enter SPEC 21 PRO (AFT Keypad)	
				* Enter ITEM 16 EXEC	
1014	Mission Dep.	Center Panel	C2	* Enter ITEM 34 EXEC (Right Keypad)	Perform OMS Gimbal
		Right Panel	R2	* 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	
		Center Panel	C2	* Confirm GIMBAL CK 34 On CRT 2 Is Complete (No Asterisk)	If there's an asterisk next to GMBL CK 34
				* Enter OPS 302 PRO (Right Keypad)	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	Horizontal Situation & Override Displays
				* Enter SPEC 50 PRO (Left Keypad)	
				* Enter SPEC 51 PRO (Right Keypad)	
				* Enter ITEM 44 EXEC (Right Keypad)	
1016	Mission Dep.	Center Panel	C2	* Press RESUME (Right Keypad)	
		Right Panel	R2	* Set APU OPERATE - START/RUN For APU 1	
1017	Mission Dep.	Center Panel	F7	* Check CRT 1 Confirm Display Of OPS MODE 3021	Perform Deorbit Burn
			C2	* ITEM 22 EXEC (Right Keypad)	
				* ITEM 27 EXEC (Right Keypad)	
				* ITEM 23 EXEC (Right Keypad)	
		Overhead Aft	O14	* Confirm L OMS ENG VLV Is ON	
			O16	* Confirm R OMS ENG VLV Is ON	
		Center Panel	C3	* Set OMS ENG (LEFT & RIGHT) To ARM/PRESS	
			C2	* Press EXEC - (Right Keypad) Confirms ready for OMS burn	
1018	Mission Dep.	Center Panel	C3	* Set OMS ENG (LEFT & RIGHT) To OFF	Deorbit Burn Complete
		Overhead Aft Panel	O14	* Set L OMS ENG VLV To OFF	
			O16	* Set R OMS ENG VLV To OFF	
1020	Mission Dep.	Center Panel	C2	* Enter OPS 303 PRO (Right Keypad)	Correct Attitude Hint
		Front Left Panel	F6	* Position The Shuttle To The Correct Attitude	Align All ADI Needles
1022	Mission Dep.	Center Panel	C2	* Enter ITEM 36 EXEC (Right Keypad)	Dump RCS Propellant
				* Enter ITEM 37 EXEC (Right Keypad)	
		Right Panel	R2	* Set APU OPERATE - START/RUN For APU (2 & 3)	
				* Set HYD MAIN PUMP PRESS (1/2/3) To NORM	Pressure Should Rise To 3000 psi
		Overhead Aft Panel	O17	* Set ATVC - (1/2/3/4) To ON	
		Right Panel	R1	* Set AC BUS SNSR (1/2/3) To MONITOR	
		Center Panel	C2	* Enter ITEM 39 EXEC (Right Keypad)	
1023	Mission Dep.	Center Panel	C2	* Enter ITEM 38 EXEC (Right Keypad)	
				* Enter ITEM 40 EXEC (Right Keypad)	Wait Until The Cycle Completes
		Overhead Right Panel	O8	* 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	
		Center Panel	C2	* Enter OPS 304 PRO (Right Keypad)	

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DEORBIT & LANDING CHECKLIST

COMM	MET	PANEL SECTION	PANEL	PROCEDURE	NOTES
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

Space Shuttle Mission 2007

Designed By: Michael Swannick

SHUTDOWN CHECKLIST

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

Space Shuttle Mission 2007

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SHUTDOWN CHECKLIST

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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) HATCH OPENING PROCEDURE * 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) HATCH OPENING PROCEDURE * Tabs/Visor - CLOSE * Green Apple - PULL * Open Hatch/Deploy Slide Per Decal	Hatch Opening
	Mission Dep.			ORBITER UNAIDED EGRESS * Egress Orbiter * Hand Carry Landing Site Data Book * If ELS - (Reference ELS POST LANDING Procedures)	Orbiter Egress