Space Shuttle Mission 2007

Designed By: Michael Swannick

Mission Checklist
STS-125

Crew Members

Commander - Scott D. Altman | Pilot - Gregory G. Johnson

Mission Specialist

Michael T. Good | Megan McArthur | John M. Grunsfeld | Michael J. Massimino | Andrew J. Feustel

Mission Highlights

Carried out by Atlantis on May 11, 2009. Nineteen years since its launch in April 1990, Hubble's view of the universe again will be dramatically improved with the addition of two new scientific instruments, the repair of two others, and the replacement of additional hardware that will extend Hubble's life well into the next decade.
STS-125 or HST-SM4 (Hubble Space Telescope Servicing Mission 4), was the fifth and final Space Shuttle Servicing Mission to the Hubble Space Telescope (HST). Landing occurred on May 24th. At 11:39 am (EDT), with the mission lasting a total of just under 13 days. Landing was delayed by two days and moved from KSC to Edwards Air Force base. Space Shuttle Atlantis carried two new instruments to the Hubble Space Telescope, the Cosmic Origins Spectrograph and the Wide Field Camera 3. The mission also replaced a Fine Guidance Sensor, six new Gyroscopes and two Battery Unit Modules to allow the telescope to continue to function at least through 2014.

Payload

Orbital Replacement Unit Carrier (ORUC). The ORUC will carry various enclosures containing parts for the Hubble Space Telescope (HST).
Flight Support System (FSS). The Flight Support System (FSS) is a reusable equipment system that provides the Structural, mechanical, and electrical interfaces between a spacecraft and the orbiter for launch, retrieval, and in-orbit servicing missions.
Super Lightweight Interchangeable Carrier (SLIC). A new bread of equipment carrier that will allow the Space Shuttle to transport a full compliment of scientific instruments and other components to Hubble.

Multi-Use Lightweight Equipment (MULE) Carrier. The MULE Integrated NOBL Container (MINC). A replacement SI C/DH will ride to orbit on the MULE.
IMAX 3D Cargo Bay Camera
New Hubble parts including Battery Module Units (BMUs), Rate Sensor Units (RSUs), New Orbiter Blanket Layer (NOBL) material, Wide Field Camera 3 (WFC-3), Cosmic Origins Spectrograph (COS) and an upgraded Fine Guidance Sensor (FGS)

Flight Summary

Launchpad: Kennedy Space Center (KSC) 39A | Orbit: 304NM | Inclination: 28.5 | Orbits: 117

Duration: 12 Days, 21 Hours, 37 Minutes, 09 Seconds | Landing: Edwards Airforce Base

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PRE-LAUNCH CHECKLIST

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 Overhead Aft Panel Center Panel	R2 O14 O16 C3	* Check BOILER CNTLR/HTR (1/2/3) Are On - A * Set BOILER N2 Supply (1/2/3) To ON * Set L OMS ENG VLV Is ON * Set R OMS ENG VLV Is ON * Set OMS ENG (LEFT & RIGHT) Are Set To ARM/PRESS	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 	* 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 * 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 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

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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	PANEL AREA & NOTES
25	T-00:00:01:40				Liquid Hydrogen External Tanks Closed
25	T-00:00:01:20				Go For Launch Announcement
25	T-00:00:01:00				One Minute Countdown Announcement
25	T-00:00:00:30				Thirty Seconds Countdown Announcement
26	T-00:00:00:15				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
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+00:00:05:19				The Shuttle Performs A Roll-To-Heads-Up
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)
32	Mission Dep.			* Check MAIN ENGINE STATUS Lights (Left/CTR/Right) Are Red	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 * Set RCS/OMS HEATERS - FWD RCS JET (1/2/3/4/5) To AUTO	Activate Various Heater Systems

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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	NOTES
44	Mission Dep.	Aft Left Panel	A14	* Set RCS/OMS HEATERS - AFT RCS JET (1/2/3/4/5) To AUTO	Activate Various Heater Systems
				* Set RCS/OMS HEATERS - OMS CRSFD LINES To A AUTO	
			A8L	* Set PORT RMS HEATER To AUTO A	
		Left Panel	L1	* 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	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	Switch To On-Orbit SW Mode
				* Enter OPS 201 PRO (AFT Keypad)	Load GPC 1/2/3 With GNC SW
				* Set MAJ FUNC To SM	GPC 3 Preserves Independent Source Data
				* Press GPC/CRT (AFT Keypad)	GPC 4 Contains System Management Data
				* Enter 4 EXEC (AFT Keypad)	GPC 5 Retains The Backup Flight System
				* Enter OPS 201 PRO (AFT Keypad)	
		Overhead Left Panel	O6	* Set GENERAL PURPOSE COMPUTER - MODE 3 To HALT	
47	Mission Dep.	Left Panel	L1	* Set RAD CONTROLLER - (LOOP 1 & LOOP 2) To AUTO A	Activate Radiator Cooling
				* Set RAD CONTROLLER - BYPASS MODE (1 & 2) To AUTO	
			L2	* Set FREON LOOP ISOLATION - MODE To AUTO	
48	Mission Dep.	Right Aft Panel	R11L	* Confirm MAJOR FUNC Is Set To SM	Open Payload Doors
				* Enter OPS 202 PRO (AFT Keypad)	PL BAY DOOR SPEC Display
				* Enter ITEM 3 EXEC	Enable Auto Mode
				* Enter ITEM 1 EXEC	Enable AC Power
			R13L	* Set PL BAY DOOR (SYS 1 & SYS 2) To ENABLE	
				* Set PL BAY DOOR To OPEN	Opening Both PL Doors Takes 3 Minutes
				* Confirm PL BAY DOOR Talkbacks Show DEP	Indicating Both PL Doors Are Open
49	Mission Dep.	Right Aft Panel	R13L	* Set PL BAY MECH PWR (SYS 1 & SYS 2) To ON	Deploy Radiators
				* Set RADIATOR LATCH (SYS A & SYS B) To RELEASE	Indicating That The Radiators Are Ready
				* Check RADIATOR LATCH SYS Talkbacks Indicate REL	For DEP. Deploying Both Radiators Takes
				* Set RADIATOR CONTROL (SYS A & SYS B) To DEPLOY	30 Seconds.
				* Check RADIATOR CONTROL SYS Talkbacks Indicate DEP	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	Disable All Power To PL Doors And
				* Set PL BAY DOOR To STOP	Radiators.
				* Set PL BAY MECH PWR (SYS 1 & SYS 2) To OFF	
				* Set PL BAY DOOR (SYS 1 & SYS 2) To DISABLE	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	Initiate Fuel Cell Purge
				* 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	
52	Mission Dep.	Right Aft Panel	R11L	* Enter SPEC 69 PRO (AFT Keypad)	Check Purge Process On The SPEC Display
				* Enter SPEC 88 PRO (AFT Keypad)	Check Coolant Loops
		Left Panel	L1	* Set FLASH EVAP CONTROLLER (PRI A & PRI B) To OFF	
				* Set FLASH EVAP CONTROLLER - SEC To OFF	Secure The Flash Evaporator
				* Set HILOAD EVAP To OFF	
53	Mission Dep.	Overhead Left Panel	O6	* Set STAR TRACKER POWER (-Y & -Z) To ON	Deploy & Activate The Star Trackers
				* Set DOOR CONTROL (SYS 1 & SYS 2) To OPEN	
				* Check DOOR CONTROL (SYS 1 & SYS 2) Talkbacks Are OP	Indicating The ST Doors Are Open
				* Set DOOR CONTROL (SYS 1 & SYS 2) To OFF	
		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	Initiate IMU Alignment
				* Enter SPEC 21 PRO (AFT Keypad)	
				* Enter ITEM 16 EXEC (AFT Keypad)	
55	Mission Dep.	Overhead Center Panel	O7	* Set GPS 1 POWER To ON	Activate Global Positioning System (GPS)
				* Set GPS 1 PRE AMPL UPPER To ON	Activate GPS 1
				* Set GPS 1 PRE AMPL LOWER To ON	
				* Set GPS 2 POWER To ON	
				* Set GPS 2 PRE AMPL UPPER To ON	Activate GPS 2
				* Set GPS 2 PRE AMPL LOWER To ON	
				* Set GPS 3 POWER To ON	
				* Set GPS 3 PRE AMPL UPPER To ON	Activate GPS 3
				* Set GPS 3 PRE AMPL LOWER To ON	

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55	Mission Dep.	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 (Joysticks).
			R13L	* Set KU ANTENNA To DEPLOY	KU Antenna Deployment Takes 15 Seconds
				* Check KU ANTENNA Talkback For DEP	Indicates KU Antenna Is Deployed
				* Set KU ANTENNA To GND	
		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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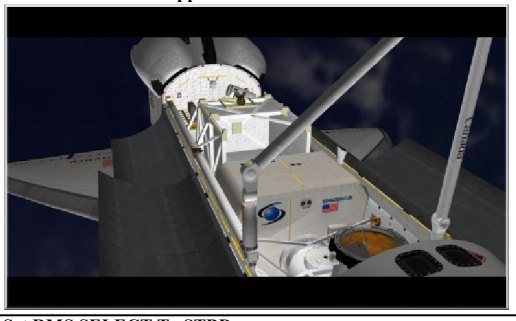
STS-125 MISSION CHECKLIST

COMM	MET	PANEL SECTION	PANEL	PROCEDURE	PANEL AREA & NOTES
1100	Mission Dep.				The RMS Is 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	Gain Manual RMS RHC/THC Control
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	The First In A Series Of Rendezvous Burns
1111	Mission Dep.	Center Panel	C3	* Set OMS ENG (Left & Right) To OFF	Burn Complete - Disable OMS
1112					Next Event
1114	Mission Dep.	Left Aft Panel	L12	* STANDARD SWITCH PANEL | Set FSS Power To ON * STANDARD SWITCH PANEL | Set FSS To DEPLOY	Power Up The Flight Support Structure (FSS)
1115	Mission Dep.	Center Panel	C2	* Check CRT 2 | MAJ FUNC Switch Set To GNC * Enter OPS 202 PRO (Right Keypad) - (If Necessary) * Enter ITEM 2 EXEC (Right Keypad) * Enter ITEM 22 EXEC (Right Keypad) * Enter ITEM 27 EXEC (Right Keypad) * Enter ITEM 23 EXEC (Right Keypad) * Set OMS ENG (Left) To ARM/PRESS * Confirm L OMS ENG VLV Is ON * Press EXEC - (Right Keypad) Confirms ready for OMS burn	Perform NC-2 Burn
1116	Mission Dep.	Center Panel	C3	* Set OMS ENG (Left) To OFF	Burn Complete - Disable OMS
1117	Mission Dep.	Front Left Panel	F6	* Use RCS Thrusters To Position The Shuttle	Use The ADI Error Needles For Reference
1118	Mission Dep.	Aft Left Panel Aft Right Panel Aft Left Panel	A8L A6U A8U	* Set RMS POWER To PRIMARY * Set RMS SELECT To STBD * Set The STARBOARD RMS DEPLOY To DEPLOY * Set The STARBOARD RMS DEPLOY To OFF * Set RMS To PORT * Set RMS BRAKES To OFF * Set FLT CNTLR POWER To ON * Set END EFFECTOR | MODE To AUTO	Begin Shuttle Inspection With The OBSS. Gain Manual Control Of The RMS.
1119	Mission Dep.	Aft Left Panel	A8L	* Use The RMS To Grapple The OBBS 	Grapple The OBSS POSITION - P Y R P: -090.0 | Y: 000.0 | R: 000.0 POSITION - X Y Z X: 0550 | Y: 0099 | Z: 0465 JOINT ANGLE YAW: -085.9 SHOULDER: 092.9 ELBOW: -131.1 WRIST PITCH: -051.4 WRIST YAW: 000.0 WRIST ROLL: 086.0
1120	Mission Dep.	Aft Left Panel	A8L	* Set RMS SELECT To STBD * Set The STARBOARD RMS Latch To RELEASE	Unlatch The OBSS

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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	PANEL AREA & NOTES
1121	Mission Dep.	Aft Left Panel	A8L	* Set The STARBOARD RMS Latch To OFF * Set RMS SELECT To PORT	Disable Latches & Regain RMS Control.
1122	Mission Dep.	Aft Left Panel	A8L	* Use The RMS To Inspect The Shuttle's Tiles	The Far End On The OBSS Contains A Laser Dynamic Range Imager (LDRI), A Laser Camera system (LCS), And An Intensified Television Camera (ITVC). Move The OBSS End Below The Shuttle And Thoroughly Inspect The Underside For Damage To The heat Shield.
1123	Mission Dep.	Aft Left Panel	A8L	* Use The RMS To Return The OBSS To Its Latched Position.	The Tile Inspection Takes A Lot Of Time. To Keep Things Simple, We Consider The Tile Inspection Complete. Return The OBSS Back To Its Latched Position. Use The Same Coordinates As COMM 1119
1124	Mission Dep.	Aft Left Panel	A8L	* Set RMS SELECT To STBD * Set The STARBOARD RMS Latch To LATCH	The OBSS Is In The Latch Position, Latch The OBSS.
1125	Mission Dep.	Aft Left Panel	A8L	* Set The STARBOARD RMS Latch To OFF * Set RMS SELECT To PORT	Set The Starboard RMS Latch To Off.
1126	Mission Dep.	Aft Left Panel	A8L	* Release The OBSS - Press Backspace	Release The OBSS
1127	Mission Dep.	Aft Left Panel	A8L	* Stow The RMS	Return The RMS To Its Latched Position.
1128	Mission Dep.	Aft Left Panel Front Left Panel	A8L F6	* Set RMS POWER To OFF * Set RMS BRAKES To ON * Set FLT CNTLR POWER To ON	Heatshield Inspection Complete Next Event
1130	Mission Dep.				The Hubble Space Telescope Aperture Door Is Now Closing.
1131	Mission Dep.	Center Panel Overhead Aft Panel	C2 C3 O14 C2	* Enter ITEM 3 EXEC (Right Keypad) * Enter ITEM 22 EXEC (Right Keypad) * Enter ITEM 27 EXEC (Right Keypad) * Enter ITEM 23 EXEC (Right Keypad) * Set OMS ENG (Right) To ARM/PRESS * Confirm R OMS ENG VLV Is ON * Press EXEC - (Right Keypad) Confirms ready for OMS burn	Perform Third NC Burn
1132	Mission Dep.	Center Panel	C3	* Set OMS ENG (Right) To OFF	Burn Complete—Disable OMS
1133	Mission Dep.				Hubble Telescope Hi-Gain Antennas Are Now Retracted In Preparation For Rendezvous
1134	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 = International Space Station (ISS)
1135	Mission Dep.	Center Panel Overhead Aft Panel Center Panel	C2 C3 O16 C2	* Enter ITEM 2 EXEC (Right Keypad) * Enter ITEM 22 EXEC (Right Keypad) * Enter ITEM 27 EXEC (Right Keypad) * Enter ITEM 23 EXEC (Right Keypad) * Set OMS ENG (Left) To ARM/PRESS * Confirm L OMS ENG VLV Is ON * Press EXEC - (Right Keypad) Confirms ready for OMS burn	Final NC Burn
1136	Mission Dep.	Center Panel	C3	* Set OMS ENG (Left) To OFF	Burn Complete - Disable OMS
1137	Mission Dep.	Aft Right Panel Right Aft Panel Front Left Panel	A1U R11L F6	* 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) * Use RCS Thrusters To Position The Shuttle	Activate KU Band Radar Use The ADI Error Needles For Reference
1140	Mission Dep.	Aft Left Panel	A2	* Use RCS Thrusters To Close On The Hubble Telescope	The Hubble Space 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=0 When The Reticules Are Centered, The Hubble Telescope Is Right In Front Of The Shuttle. If You Are Impatient, Use Next Event
1141	Mission Dep.	Aft Left Panel	A2	* Use RCS Thrusters To Position The Shuttle	The Hubble Space Telescope Is Now In Visual Range. Position The Shuttle Within RMS Grapple Distance. Then Decrease The Shuttles Translation Motion Until Relative To That Of The Hubble Space Telescope (ZERO).

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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	PANEL AREA & NOTES
1142	Mission Dep.	Aft Left Panel Aft Right Panel	A8L A6U	* Set RMS POWER To ON * Set RMS BRAKES To OFF * Set FLT CNTLR POWER To ON	Grapple The Hubble Telescope Since Grapple Coordinates Will Vary Depending Upon Position, I Am Unable To Provide Grapple Coordinates
1143	Mission Dep.	Aft Left Panel	A8L	* Use The RMS To Place The Hubble Telescope On The FSS 	Place The Hubble Telescope On The FSS 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
1144	Mission Dep.	Left Aft Panel	L12	* STANDARD SWITCH PANEL | Confirm FSS POWER Is ON * STANDARD SWITCH PANEL | Set FSS LATCHES To LAT	Secure The Solar Max To The FSS Table
1145	Mission Dep.				The Latches Will Take About 8 Seconds To Activate.
1146	Mission Dep.	Aft Left Panel	L8	* Use The RMS To Unlatch The Hubble Telescope	Ungrapple The Hubble Telescope
1147	Mission Dep.				Hubble Solar Panels Are Rotated 90 Degrees
1148	Mission Dep.				Hubble Is Latched And Ready for Servicing Next Event
1150	Mission Dep.			* EV1	EV1 Emerges From The Airlock. Move EV1 To The Manipulator Foot Restraint (MFR) Attached To The Shuttle Bay Wall.
1151	Mission Dep.	Aft Left Panel Aft Right Panel	A8L A6U	* EV1 & EV2 * Set RMS POWER To ON * Set FLT CNTLR POWER To ON	EV2 Emerges From The Airlock. Enable Stick Control. Move The RMS End Effector Close To EV1 For MFR Attachment.
1152	Mission Dep.			* EV1 & EV2	It Will Take Approximately 15 Minutes To Attach The MFR To The RMS.
1153	Mission Dep.			* EV1 & EV2	Move The Shuttle RMS Close To EV2 For Mounting.
1154	Mission Dep.			* EV1 & EV2	EV2 Attaches Himself To The Shuttles RMS Foot restraint. Additional Tools Carried By EV2 Are Attached To The Foot Restraint Tool box. First Maintenance Task Is To Replace The Wide Field Camera (WFC). Move EV1 To The Forward Fixture At The Orbital Replacement Unit Carrier.
1155	Mission Dep.			* EV1 & EV2	EV1 Removes The Handhold For The Old WFC. Move EV2 On The RMS Arm Close To EV1.
1156	Mission Dep.			* EV1 & EV2	After The Handhold Is Removed, EV1 & EV2 Move Close To The Old WFC On The Hubble Telescope.
1157	Mission Dep.			* EV1 & EV2	It Will Take EV1 & EV2 About An Hour To Mount The Handhold And Remove The Old WFC.
1158	Mission Dep.			* EV1 & EV2	Now Move EV1 To The Forward Enclosure (WSIPE), To Prepare The New WFC For Installation.
1159	Mission Dep.			* EV1 & EV2	Now Move EV2 To The Forward Enclosure (WSIPE), Carrying The Old WFC.
1160	Mission Dep.			* EV1 & EV2	EV1 & EV2 Will now Swap The Wide Field Cameras And Latch The Old Camera In The Enclosure. It Will Take About 20 Minutes To Complete The Swap.
1161	Mission Dep.			* EV1 & EV2	Move EV1 & EV2 To The Hubble Again To Mount The New WFC.
1162	Mission Dep.			* EV1 & EV2	It Will Take About 40 Minutes To Install The New WFC.
1163	Mission Dep.			* EV1 & EV2	Next Task Is To Swap The Science Instrument Command And Data Handling Unit (SCI/DH). Move EV1 To The Starboard Aft Side Of The Multi-Use Lightweight Equipment (MULE).
1164	Mission Dep.			* EV1 & EV2	While EV1 Removes The Transportation Covers And Releases the Bolts Holding The (SCI/DH). Move EV2 To Hubble Bay 10.

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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	PANEL AREA & NOTES
1165	Mission Dep.			* EV1 & EV2	EV2 Will Now Disconnect The Old (SCI/DH) From Hubble. Both Astronauts Will Be Busy For A Few Minutes With Their Tasks.
1166	Mission Dep.			* EV1 & EV2	EV1 Has Removed The New (SCI/DH) Unit. Move EV1 On Top Of The Starboard Tower Of The MULE.
1167	Mission Dep.			* EV1 & EV2	Move EV2 To EV1 To Swap The (SCI/DH) Unit. Watch Out For The Hubble Solar Panel.
1168	Mission Dep.			* EV1 & EV2	The Swap Is Complete, Move EV2 Back To Hubble Bay 10 To Attach And Connect The New (SCI/DH) Unit.
1169	Mission Dep.			* EV1 & EV2	Move EV1 Back To The Starboard Aft Multi-Use Lightweight Equipment (MULE) To Stow The Old (SCI/DH) Unit.
1170	Mission Dep.			* EV1 & EV2	Both Astronauts Will Work Several Minutes On Their Tasks.
1171	Mission Dep.			* EV1 & EV2	EV1 Retrieves Batteries From The Lower Part Of The MULE. Move EV1 To The Front Starboard Side Of The FSS.
1172	Mission Dep.			* EV1 & EV2	EV1 Will Insert The EHIP Batteries, Test The SCM Power Level And Then Drive The Bolt Attaching The SCM To Hubble. Meanwhile, EV2 Finishes Installing The SCI/DH. Move EV2 To Hubble Bay 2.
1173	Mission Dep.			* EV1 & EV2	It Will Take The Astronauts About 10 Minutes To Complete Their Tasks.
1174	Mission Dep.			* EV1 & EV2	EV1 Removes The Batteries For The SCM. Move EV1 To The Aft Port Side Of The MULE.
1175	Mission Dep.			* EV1 & EV2	EV1 Retrieves Three Latch Over Center Kits (LOCK). Meanwhile Move EV2 To The Forward Port Area Of The MULE For Lock Handover. Watch Out For The Hubble's Port Solar Panel.
1176	Mission Dep.			* EV1 & EV2	Move EV1 To The Swap Position, On Top Of The Port Tower MULE
1177	Mission Dep.			* EV1 & EV2	Move EV1 & EV2 To Hubble's V2 Doors.
1178	Mission Dep.			* EV1 & EV2	EV1 & EV2 Now Assembly The LOCK Kits On Hubble's V2 Doors. Installation Will Take About 30 Minutes.
1179	Mission Dep.			* EV1 & EV2	Move EV1 To The Shuttle Airlock.
1180	Mission Dep.			* EV2	EV2 Will Now Unmount From The RMS Foot Restraint, Move EV2 To The Shuttle Airlock.
1181	Mission Dep.				First Spacewalk Is Complete
1185	Mission Dep.			* EV3	EV3 Emerges From The Airlock, Move EV3 Over To The Manipulator Foot Restraint Attached To The RMS.
1186	Mission Dep.			* EV3 & EV4	EV4 Emerges From The Airlock, Move EV4 Over To The Manipulator Foot Restraint Attached to The RMS For Mounting.
1187	Mission Dep.			* EV3 & EV4	It Will Take About 30 Minutes To Mount EV4 Onto The MFR.
1188	Mission Dep.			* EV3 & EV4	Move EV3 To The Small Orbital Replacement Unit Protective Enclosure (SOPE).
1189	Mission Dep.			* EV3 & EV4	EV3 Opens The SCOPE And Prepares Rate Sensor Unit 2, This Will Be Mounted On Hubble. Move EV4 With The RMS Down to The SCOPE To Retrieve The RSU-2.
1191	Mission Dep.			* EV3 & EV4	Move EV3 & EV4 To Hubble's V3 Doors
1192	Mission Dep.			* EV3 & EV4	EV3 Opens The V3 Doors. Both Astronauts Begin To Work On Switching The RSU2 Unit.
1193	Mission Dep.			* EV3 & EV4	Move EV3 & EV4 To The SCOPE To Stow The Old RSU And Unpack The New RSU3 Unit.
1194	Mission Dep.			* EV3 & EV4	It Will Take A Couple Of Minutes To Swap The RSU Units.
1195	Mission Dep.			* EV3 & EV4	The RSU Swap Is Complete. Move EV3 & EV4 Back To Hubble's V3 Doors.
1196	Mission Dep.			* EV3 & EV4	EV3 & EV4 Begin The Swap Of RSU3. It Will Take About An Hour To Complete This Task.
1197	Mission Dep.			* EV3 & EV4	Move EV3 & EV4 To The SCOPE To Stow The Old RSU And Unpack The New RSU1 Unit.

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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	PANEL AREA & NOTES
1198	Mission Dep.			* EV3 & EV4	It Will Take A Couple Of Minutes To Swap The RSU Units.
1199	Mission Dep.			* EV3 & EV4	Move EV3 & EV4 To Hubble's V3 Doors To Replace The Final RSU Unit.
1200	Mission Dep.			* EV3 & EV4	EV3 & EV4 Will Swap The RSU1 Unit. It Will Take About An Hour.
1201	Mission Dep.			* EV3 & EV4	Move EV3 & EV4 To The SCOPE To Stow The Old RSU.
1202	Mission Dep.			* EV3 & EV4	It Will Take A Couple Of Minutes To Stow The RSU Unit.
1203	Mission Dep.			* EV3 & EV4	EV3 & EV4 Will Replace A Battery Mounted At Hubble Bay 2. Move EV3 To The Super Lightweight Interchangeable Carrier (SLIC) Battery Two.
1204	Mission Dep.			* EV3 & EV4	While EV3 Prepares The Battery, Move EV4 To Hubble Bay 2.
1205	Mission Dep.			* EV3 & EV4	EV4 Is Opening Hubble Bay 2 Doors And Removing The Battery, While EV3 Finishes Preparing The New Battery For Installation. It Will Take About 40 Minutes To Complete These Tasks.
1206	Mission Dep.			* EV3 & EV4	Move EV4 To The SLIC Where The Batteries Will Be Exchanged.
1207	Mission Dep.			* EV3 & EV4	EV3 Stows The Old Battery On The SLIC. Move EV4 Back To Hubble Bay 2 To Mount The New Battery.
1208	Mission Dep.			* EV3 & EV4	It Will Take About 45 Minutes For EV3 And EV4 To Complete Their Tasks.
1209	Mission Dep.			* EV3 & EV4	Move EV4 Back To SLIC For UnMounting
1210	Mission Dep.			* EV3 & EV4	Move EV3 To The Shuttle Airlock.
1211	Mission Dep.			* EV4	Move EV4 To The Shuttle Airlock.
1212	Mission Dep.				This Concludes The Second Spacewalk Next Event
1215	Mission Dep.				Before The Third Spacewalk Begins, Hubble Is Rotated On The FSS By 90 Degrees.
1216	Mission Dep.			* EV1	EV1 Emerges From The Airlock, Move EV1 To The RMS/MFR.
1217	Mission Dep.			* EV1 & EV2	EV2 Emerges From The Airlock, Move EV2 To The RMS/MFR For Mounting.
1218	Mission Dep.			* EV1 & EV2	It Will Take About 30 Minutes For EV2 To Mount The RMS/MFR.
1219	Mission Dep.			* EV1 & EV2	Move EV1 To The Axial Scientific Instrument Protective Enclosure (ASIPE).
1220	Mission Dep.			* EV1 & EV2	EV1 Will Start Unstowing A New Scientific Instrument, The Cosmic Origins Spectrograph (COS). Move EV2 To The V2 Shroud Doors On Hubble.
1221	Mission Dep.			* EV1 & EV2	Move EV1 To The V2 Shroud Doors On The Hubble Telescope To Assist EV2 With The Removal Of COSTAR.
1222	Mission Dep.			* EV1 & EV2	The COSTAR Removal Procedure Will Take About An Hour.
1223	Mission Dep.			* EV1 & EV2	Move EV1 & EV2 To ASIPE
1224	Mission Dep.			* EV1 & EV2	COSTAR Is Temporarily Stowed At The Aft Fixture & COS Is Retrieved From The ASIPE Enclosure. This will Take About 20 Minutes.
1225	Mission Dep.			* EV1 & EV2	Move EV1 & EV2 To The V2 Shroud Doors On The Hubble Telescope To Install The COS.
1226	Mission Dep.			* EV1 & EV2	The COS Installation Will Take About An Hour.
1227	Mission Dep.			* EV1 & EV2	Move EV1 & EV2 To ASIPE To Stow The COSTAR.
1228	Mission Dep.			* EV1 & EV2	It Will Take About 20 Minutes To Stow The COSTAR In The ASIPE Enclosure.
1229	Mission Dep.			* EV1 & EV2	The Next Task Will Be The Restoration Of The Power Supply For The ACS. EV2 Has Unmounted The RMS/MFR. Move EV2 Back To The V2 Aft Shroud Doors.
1230	Mission Dep.			* EV1 & EV2	EV2 Will Now Work Almost Inside Hubble To Remove The ACS Power Supply. Meanwhile Move EV1 To The Fastener Capture Plate Directly Aft Of The SCOPE.
1231	Mission Dep.			* EV1 & EV2	It Will Take About 30 Minutes For EV1 To Pick Up All Spare Parts & Tools Needed.

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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	PANEL AREA & NOTES
1232	Mission Dep.			* EV1 & EV2	Move EV1 To The V2 Shroud Doors.
1233	Mission Dep.			* EV1 & EV2	EV1 & EV2 Work To Restore The Backup Power System For The ACS, This Takes Almost Two Hours.
1234	Mission Dep.			* EV1 & EV2	Move EV1 To The Shuttle Airlock.
1235	Mission Dep.			* EV2	Move EV2 To The Shuttle Airlock.
1236	Mission Dep.				This Concludes The Third Spacewalk. Next Event
1240	Mission Dep.				Before The Fourth Spacewalk, The Hubble Telescope Is Rotated On The FSS 180 Degrees.
1241	Mission Dep.			* EV3	EV3 Emerges From The Airlock, Move EV3 Over To The RMS/MFR.
1242	Mission Dep.			* EV3 & EV4	EV4 Emerges From The Airlock, Move EV4 Over To The RMS/MFR For Mounting.
1243	Mission Dep.			* EV3 & EV4	It Will Take About 20 Minutes For EV4 To Mount The RMS/MFR.
1244	Mission Dep.			* EV3 & EV4	The Main Task For EVA 4 Is To Repair The Space Telescope Imaging Spectrograph (STIS) Power Supply System. The Astronauts Will Replace A Low Voltage Power Supply Board. Move EV3 To The ORUC. The New Power Supply Board Is Stored In An Enclosure On The Top Of ASIPE.
1245	Mission Dep.			* EV3 & EV4	While EV3 Picks Up A New Board And Tools, Move EV4 To The V2 Shroud Doors.
1246	Mission Dep.			* EV3 & EV4	It Will Take About 20 Minutes For EV3 And EV4 To Complete Their Tasks.
1247	Mission Dep.			* EV3 & EV4	Move EV3 To The V2 Shroud Doors.
1248	Mission Dep.			* EV3 & EV4	Replacement Of The Circuit Board Will Take Almost 4 Hours.
1249	Mission Dep.			* EV3 & EV4	A New Outer Blanket Layer (NOBL) Will Be Mounted On Hubble Bay 8. While EV4 Closes And Locks The V2 Shroud Doors, Move EV3 To the MULE Integrated NOBL Container (MINC), Mounted On The Starboard Front Of The Multi-Use Lightweight Equipment.
1250	Mission Dep.			* EV3 & EV4	EV3 Will Now Open The MINC And Pick Up A NOBL For Hubble Bay 8, Meanwhile Move EV4 To Hubble Bay 8.
1251	Mission Dep.			* EV3 & EV4	Move EV3 To Hubble Bay 8.
1252	Mission Dep.			* EV3 & EV4	Replacement Of The Blanket Will Take About 30 Minute.
1253	Mission Dep.			* EV3 & EV4	While EV4 Unmounts From The RMS/MFR, Move EV3 To The Shuttle Airlock.
1254	Mission Dep.			* EV4	Move EV4 To The Shuttle Airlock.
1255	Mission Dep.				This Concludes The Fourth Spacewalk
1260	Mission Dep.			* EV1	EV1 Emerges From The Airlock, Move EV1 To The RMS/MFR.
1261	Mission Dep.			* EV1 & EV2	EV2 Emerges From The Airlock, Move EV2 To The RMS/MFR For Mounting.
1262	Mission Dep.			* EV1 & EV2	It Will Take About 20 Minutes For EV2 To Mount The RMS/MFR.
1263	Mission Dep.			* EV1 & EV2	The First Task For EVA 5 Will Be To Replace A Battery Mounted At Hubble Bay 3. While EV2 Mounts The RMS/MFR, Move EV1 To The Super Lightweight Interchangeable Carrier (SLIC) Battery 3.
1264	Mission Dep.			* EV1 & EV2	While EV1 Prepares The Battery, Move EV2 To Hubble Bay 3.
1265	Mission Dep.			* EV1 & EV2	EV2 Opens Hubble Bay 3 Doors And Removes The Battery, While EV1 Prepares The New Battery. It Will Take About 40 Minutes To Complete These Tasks.
1266	Mission Dep.			* EV1 & EV2	Move EV2 To The SLIC To Swap Batteries.
1267	Mission Dep.			* EV1 & EV2	EV1 Stows The Old Battery On The SLIC. Move EV2 Back To Hubble Bay 3 To Install The New Battery.
1268	Mission Dep.			* EV1 & EV2	It Will Take About 45 Minutes For EV1 And EV2 To Complete The Installation.
1269	Mission Dep.			* EV1 & EV2	Move EV1 & EV2 To Hubble's V3 Doors, Where A Fire Guidance Sensor (FGS) Will Be Replaced

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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	PANEL AREA & NOTES
1270	Mission Dep.			* EV1 & EV2	It Will Take About An Hour For EV1 & EV2 To Remove The Old FGS.
1271	Mission Dep.			* EV1 & EV2	You Need To Move EV1 To The Radial Scientific Instrument Protective Enclosure (FSIPE), Where The New FGS Is Stored.
1272	Mission Dep.			* EV1 & EV2	Move EV2 To The Aft Fixture Of The ORUC.
1273	Mission Dep.			* EV1 & EV2	EV2 Will Now Temporarily Stow The Old FGS At The Aft Fixture. After Releasing The New FGS, EV1 Will Hand It Over To EV2. This Will Take About 15 Minutes.
1274	Mission Dep.			* EV1 & EV2	Move EV1 And Ev2 To Hubble's V3 Doors, Where The New FGS Will Be Mounted.
1275	Mission Dep.			* EV1 & EV2	It Will Take About An Hour To Install The New FGS.
1276	Mission Dep.			* EV1 & EV2	Installation Is Complete, Move EV1 Back To The FSIPE.
1277	Mission Dep.			* EV1 & EV2	After Closure Of Hubble's V3 Doors, Move EV2 To The Aft Fixture Of The ORUC.
1278	Mission Dep.			* EV1 & EV2	EV1 & EV2 Will Work Together To Stow The Old FGS In The FSIPE. This Will Take About 15 Minutes.
1279	Mission Dep.			* EV1 & EV2	A New Outer Blanket Layer (NOBL) Will Be Mounted On Hubble Bay 5. Move EV1 To the MULE Integrated NOBL Container (MINC), Mounted On The Starboard Front Of The Multi-Use Lightweight Equipment.
1280	Mission Dep.			* EV1 & EV2	EV1 Will Now Open The MINC And Pick Up A NOBL For Hubble Bay 5, Meanwhile Move EV2 To Hubble Bay 5.
1281	Mission Dep.			* EV1 & EV2	Move EV3 To Hubble Bay 5.
1282	Mission Dep.			* EV1 & EV2	Replacement Of The Blanket Will Take About 30 Minute.
1283	Mission Dep.			* EV1 & EV2	That Was The Final Task For This Mission. Move EV1 Back to The Shuttle Bay Wall To Remove The RMS/FMR.
1284	Mission Dep.			* EV1 & EV2	EV2 Dismounts From The RMS/FMR. Move The RMS End Effector Close To EV1.
1285	Mission Dep.			* EV1 & EV2	Move EV1 Close To EV2 To Assist With The Removing Of The RMS/FMR.
1286	Mission Dep.			* EV1 & EV2	It Will Take About 20 Minutes To Remove The FMR And Latch It In The Shuttle Bay.
1287	Mission Dep.			* EV1 & EV2	Move EV1 To The Shuttle Airlock
1288	Mission Dep.			* EV1 & EV2	Move EV2 To The Shuttle Airlock
1289	Mission Dep.	Aft Left Panel	A8L	* Stow The RMS	Gain Control Of The RMS And Move It Into The Stow Position.
1290	Mission Dep.				The Servicing Mission Is Complete, The Crew And Ground Crew Will Perform A Final Checkout Of The Hubble's Systems. Next Event
1295	Mission Dep.				Hubble Is Rotated 180 Degrees On The FSS.
1296	Mission Dep.				High Gain Antennas Deployed
1297	Mission Dep.				Hubble Is Now Rotated To Grapple Attitude On The FSS.
1298	Mission Dep.				The Hubble's Solar Panels Are Rotated To Release Position. The Antennas Are Rotated to Checkout Attitude.
1299	Mission Dep.				All Hubble Systems Are Checked. Next Event
1300	Mission Dep.	Aft Left Panel	A8L	* Use The RMS To Grapple The Hubble Telescope 	Grapple The Hubble Telescope 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

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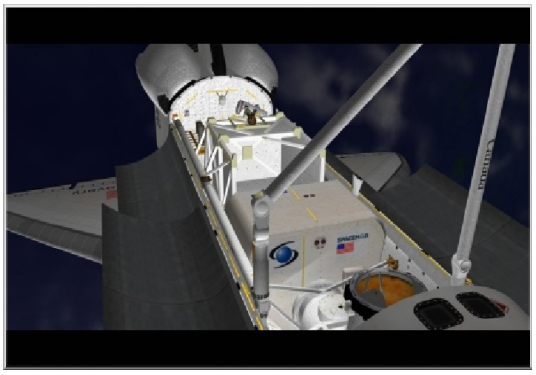
COMM	MET	PANEL SECTION	PANEL	PROCEDURE	PANEL AREA & NOTES
1301	Mission Dep.	Left Aft Panel	L12	* Standard Switch Panel | Set FSS LATCHES To RELEASE	Unlatch The Hubble Telescope From The FSS
1302	Mission Dep.				The Latches Will Take About 8 Seconds To Release Hubble.
1303	Mission Dep.	Aft Left Panel	A8L	* Use The RMS To Remove Hubble From The Cargo Bay	Remove Hubble From The FSS Table To A High Hover Above The Cargo Bay.
1304	Mission Dep.				Hubble's Power Is Reconfigured And The Aperture Door Latch Is Released. HST Is Now Fully Functional. Ground Crew Performs A Series Of Tests. Hubble Will Be Released In About 2 Hours. Next Event
1306	Mission Dep.	Aft Left Panel	A8L	* Use The RMS To Release The Hubble Telescope	Release Hubble, Once Released, Move The RMS Away From Hubble.
1307	Mission Dep.	Left Aft Panel	L12	* Standard Switch Panel | Set FSS DEPLOY / STOW To STOW	Rotate The FSS Back To Its Stow Position
1308	Mission Dep.	Left Aft Panel Aft Left Panel Front Left Panel	L12 A8L F6	* STANDARD SWITCH PANEL | Set FSS POWER To OFF * Set RMS POWER To OFF * Set FLT CNTLR POWER To ON	Power Down The Flight Service Station (FSS), Then Enable RHC/THC RCS Control
1309	Mission Dep.	Front Left Panel	F6	* Use RCS Bursts To Move Away From The Hubble Telescope	Move The Shuttle Away From The Hubble Telescope By Translating Down Using Short Downward Bursts.
1310	Mission Dep.				The Shuttle Continues To Move Away From The Hubble Space Telescope. Next Event
1315	Mission Dep.	Aft Left Panel Aft Right Panel Aft Left Panel	A8L A8U A6U A8U	* Set RMS POWER To ON * Set RMS BRAKES To OFF * Set FLT CNTLR POWER To ON * Set END EFFECTOR | MODE To AUTO	Power Up The RMS.
1316	Mission Dep.	Aft Left Panel	A8L	* Use The RMS To Grapple The OBBS 	You Have Full Manual Control Of The RMS Arm. Align The End Effector With The OBSS Forward End Grapple Fixture. Grapple The OBSS When The RMS Is In Position Press Enter POSITION - P Y R P: -090.0 | Y: 000.0 | R: 000.0 POSITION - X Y Z X: 0550 | Y: 0099 | Z: 0465 JOINT ANGLE YAW: -085.9 SHOULDER: 092.9 ELBOW: -131.1 WRIST PITCH: -051.4 WRIST YAW: 000.0 WRIST ROLL: 086.0
1317	Mission Dep.	Aft Left Panel	A8L	* Set RMS SELECT To STBD * Set The STARBOARD RMS Latch To RELEASE	Unlatch The OBSS
1318	Mission Dep.	Aft Left Panel	A8L	* Set The STARBOARD RMS Latch To OFF * Set RMS SELECT To PORT	Disable Latches & Regain RMS Control.
1319	Mission Dep.	Aft Left Panel	A8L	* Use The RMS To Inspect The Shuttle's Tiles	The Far End On The OBSS Contains A Laser Dynamic Range Imager (LDRI), A Laser Camera system (LCS), And An Intensified Television Camera (ITVC). Move The OBSS End Below The Shuttle And Thoroughly Inspect The Underside For Damage To The heat Shield.
1320	Mission Dep.	Aft Left Panel	A8L	* Use The RMS To Return The OBSS To Its Latched Position.	The Tile Inspection Takes A Lot Of Time. To Keep Things Simple, We Consider The Tile Inspection Complete. Return The OBSS Back To Its Latched Position. Use The Same Coordinates As COMM 1316
1321	Mission Dep.	Aft Left Panel	A8L	* Set RMS SELECT To STBD * Set The STARBOARD RMS Latch To LATCH	The OBSS Is In The Latch Position, Latch The OBSS.
1322	Mission Dep.	Aft Left Panel	A8L	* Set The STARBOARD RMS Latch To OFF * Set RMS SELECT To PORT	Set The Starboard RMS Latch To Off.
1323	Mission Dep.	Aft Left Panel	A8L	* Release The OBSS	Release The OBSS
1324	Mission Dep.	Aft Left Panel	A8L	* Stow The RMS	Stow The RMS
1325	Mission Dep.	Aft Left Panel Front Left Panel	A8L F6	* Set RMS POWER To OFF * Set RMS BRAKES To ON * Set FLT CNTLR POWER To ON	Heatshield Inspection Complete 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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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	NOTES
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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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

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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)	

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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