



# Space Shuttle Mission 2007



Designed By: Michael Swannick

# Mission Checklist

## STS-98

### Crew Members

Commander - Kenneth D. Cockrell | Pilot - Mark L. Polansky

#### Mission Specialist

Robert L. Curbeam | Marsha S. Ivins | Thomas D. Jones

### Mission Highlights

Carried out by Atlantis on February 7, 2001. The mission's highlight was the delivery and installation of the USA Destiny Lab at the International Space Station. Mission Specialist Tom Jones and Robert Curbeam conducted three space walks during the mission totaling nearly 20 hours of Extra Vehicular Activity. The addition of the Destiny Lab module greatly increased the habitable volume of the International Space Station. The module is 8.5 meters (28 feet) long and 4.3 meters (14 feet) wide in diameter. It has space for 24 racks and a comfortable work area for scientists. Destiny is at the center of scientific exploration aboard the orbiting outpost, enabling experiments requiring a Microgravity environment which will be performed after Destiny's racks are delivered. Destiny also has a special optical glass window through which the crew can look outside and take high quality pictures of Earth.

### Payload

**U.S. Destiny Laboratory.** Destiny will be the centerpiece of research on this world-class scientific orbiting outpost.

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

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

### Flight Summary

**Launchpad:** Kennedy Space Center (KSC) 39A | **Orbit:** 173NM | **Inclination:** 51.6 | **Orbits:** 153

**Duration:** 12 Days, 21 Hours, 21 Minutes, 0 Seconds | **Landing:** Edwards Air Force Base



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



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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	NOTES
55	Mission Dep.	Right Aft Panel	R11L	* Set DUMP ISOL VLV To OPEN	
59	Mission Dep.	Right Aft Panel  Aft Right Panel Right Aft Panel	R11L R13L  AIU R11L	* Check MAJ FUNC To GNC * Enter SPEC 25 PRO (AFT Keypad) * Set KU ANTENNA To DEPLOY * Check KU ANTENNA Talkback For DEP * Set KU ANTENNA To GND * Set KU BAND POWER To STBY * Check MAJ FUNC To GNC * Enter SPEC 33 PRO (AFT Keypad) * Enter ITEM 2 EXEC (AFT Keypad)	Deploy KU Antenna Indicates Status For All THC/RHC (Joysticks). KU Antenna Deployment Takes 15 Seconds Indicates KU Antenna Is Deployed  Enable KU Antenna
60	Mission Dep.				Shuttle Is Configured & Ready For Mission

### Commence On-Orbit Mission



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## STS-98 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.	Right Aft 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.	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	NC-1 Burn      Wait Until Asked To Confirm OMS Burn
1116	Mission Dep.	Center Panel	C3	* Set OMS ENG (Left & Right) To OFF	First NC Burn Complete - Disable OMS Next Event
1120	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) - (If Required) * 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	NC-2 Burn      Wait Until Asked To Confirm OMS Burn
1121	Mission Dep.	Center Panel	C3	* Set OMS ENG (Left & Right) To OFF	Second NC Burn Complete - Disable OMS Next Event
1122	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) - (If Required) * 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	NPC Burn      Wait Until Asked To Confirm OMS Burn
1123	Mission Dep.	Center Panel	C3	* Set OMS ENG (Left & Right) To OFF	NPC Burn Complete - Disable OMS Next Event
1133	Mission Dep.	Aft Right Panel	A6L	* SYSTEM POWER (MN A & MN B) To ON * PSU POWER (MN A & MN B) To ON	Power Up The APDS
1134	Mission Dep.	Aft Right Panel	A7L	* Set CONTROL PANEL POWER (A - B - C) To ON * Set HEATERS DCU POWER (H1 - H2/DCU - H3/DCU) To ON * Set APDS POWER (ABS - BDS - CDS) To ON	Activate APDS Power Panel
1135	Mission Dep.	Aft Right Panel	A7L	* APDS Control Commands   Press POWER ON * APDS Control Commands   Press APDS CIRC PROT OFF * APDS Control Commands   Press RING OUT	Extend APDS Capture Ring
1136	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)
1137	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



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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	PANEL AREA & NOTES
1138	Mission Dep.	Right Aft Panel	R11L	* Press RESUME (Aft Keypad)	Star Trackers Are Configured Resume Closes Star Tracker Display Next Event
1140	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) - (If Required) * 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 Crew Will Now Perform The NC-3 Burn       Wait Until Asked To Confirm OMS Burn
1141	Mission Dep.	Center Panel	C3	* Set OMS ENG (Right) To OFF	NC-3 Burn Complete - Disable OMS Next Event
1142	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) - (If Required) * 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 Crew Will Perform The Final NC Burn       Wait Until Asked To Confirm OMS Burn
1148	Mission Dep.	Center Panel Front Left Panel	C3 F6	* Set OMS ENG (Right) To OFF * Rotate Shuttle To Proper Attitude (Pitch/Roll)   Joystick - RHC)	Final NC Burn Complete - Disable OMS <u>Maneuver Shuttle To Correct Attitude</u> Target Attitude: Roll=0, Pitch=0, Yaw=90
1149	Mission Dep.	Aft Right Panel	A2	* Use RCS Thrusters To Close On The ISS	The ISS 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, The Hubble Telescope Is Right In Front Of The Shuttle.  If You Are Impatient, Use Next Event
1150	Mission Dep.	Aft Left Panel  Aft Right Panel	A7U  A6U	* Set VIDEO INPUT To PL 11 * Set VIDEO OUTPUT To MON 1 * Set PAYLOAD BAY FLOOD   DOCKING To BRIGHT * Set FLT CNTLR POWER To ON * Set SENSE To -Z * Set MANUAL MODE   TRANSLATION To Y (LOW Z)	Carefully Translate The Shuttle Below The Destiny Lab And Dock With The PMA. Docking Will Be Fully Automatic Once The Shuttle's APDS Gets Close To Unity
1151	Mission Dep.				Contact, Active Damping Is Performed
1152	Mission Dep.				The Ring Aligned Command Is Issued & The Electromechanical Dampers Are Deactivated. An Automatic Ring In Command Activates The Fixers To Rigidize The System.
1153	Mission Dep.	Aft Left Panel	A7L	* APDS Control Commands   Press POWER OFF * Set CONTROL PANEL POWER (A - B - C) To OFF * Set HEATERS DCU POWER (H1 - H2/DCU - H3/DCU) To OFF * Set APDS POWER (ABS - BDS - CDS) To OFF	Docking Complete, Disable The APDS
1154	Mission Dep.				After ODS Preparation, The Hatches Are Opened & The ISS And Shuttle Crews Finally Meet. Next Event
1160	Mission Dep.	Aft Left Panel Aft Right Panel Aft Left Panel	A8L A6U A8U A8L	* Set RMS POWER To PRIMARY * Set FLT CNTLR PWR To ON * Set RMS BRAKES To OFF * Set END EFFECTOR   MODE To AUTO * Use The RMS To Grapple The PMA-2 Grapple Fixture	Gain Manual RMS RHC/THC Control You Have Full Manual Control Of The RMS Arm. Align The End Effector With Unity's Pressurized Mating Adaptor (PMA2) Port Grapple Fixture. When The RMS Is In Position Press Enter  <u>POSITION - P Y R</u> P: -090.0   Y: -020.0   R: 000.0 <u>POSITION - X Y Z</u> X: 0577   Y: -0038   Z: 0696 <u>JOINT ANGLE</u> YAW: -049.9 SHOULDER: 136.4 ELBOW: -107.7 WRIST PITCH: -103.1 WRIST YAW: -012.8 WRIST ROLL: 051.6





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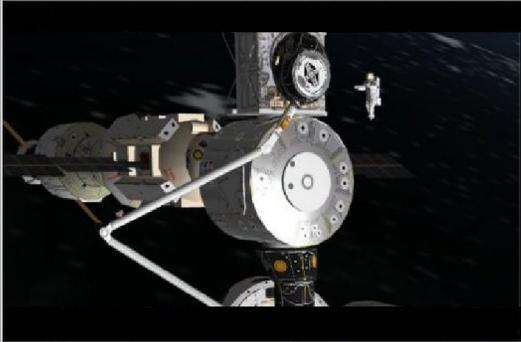
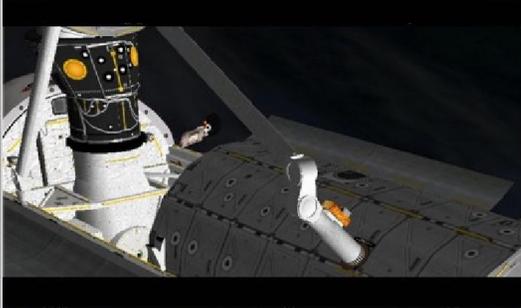
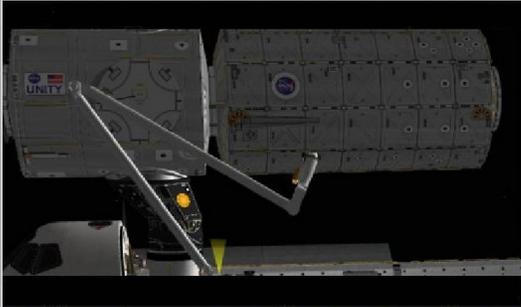


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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	PANEL AREA & NOTES
1161	Mission Dep.			* EV2	The Crew Releases The Bolts Holding The PMA-2 To The Station. EV2 Emerges From The Airlock, Move EV2 Down to The Right Aft Area Of The Payload Bay To Remove Umbilical's Between Atlantis And Discovery. Covers To Prevent Contamination During Launch Are Also Removed.
1162	Mission Dep.			* EV1 & EV2	EV-1 Emerges From The Airlock. Move EV1 Up To The Z1 Truss In Preparation For The Relocation Of PMA-2.
1163	Mission Dep.	Aft Left Panel	A8L	* Use The RMS To Release The PMA-2 	EV1 Will Assist And Manually Latch The PMA-2 To The Z1 Truss. Carefully Move The PMA-2 To The Z1 Truss. After Attachment The PMA-2 Attitude Must Be Rotated 135 Degrees Counter Clockwise.  When The PMA-2 Is In Position Press Backspace <a href="#">POSITION - P Y R</a> P: 090.0   Y: -040.0   R: +179.9 <a href="#">POSITION - X Y Z</a> X: 0537   Y: -0018   Z: 0769 <a href="#">JOINT ANGLE</a> YAW: -088.0 SHOULDER: 147.4 ELBOW: -123.2 WRIST PITCH: 025.7 WRIST YAW: -001.3 WRIST ROLL: 091.4
1164	Mission Dep.			* EV1 & EV2	EV1 Will Now Enable The Latches That will Temporarily Hold The PMA-2 To The Z1 Truss.
1165	Mission Dep.	Aft Left Panel	A8L	* Use The RMS To Grapple The Density Module 	Grapple The Density Module In The Payload Bay.  When The RMS Is In Position Press Enter <a href="#">POSITION - P Y R</a> P: -117.0   Y: -041.6   R: 018.8 <a href="#">POSITION - X Y Z</a> X: 0934   Y: -0070   Z: 0484 <a href="#">JOINT ANGLE</a> YAW: -000.1 SHOULDER: 046.5 ELBOW: -068.2 WRIST PITCH: -095.1 WRIST YAW: -041.7 WRIST ROLL: -018.7
1166	Mission Dep.			* EV1 & EV2	Move EV1 & EV2 Close To The Rear Coolant Radiator, Mounted On The NADIR Side Of The Vertical P5/P6 Truss.
1167	Mission Dep.	Center Panel Aft Right Panel	C3 A6U	* EV1 & EV2  * PAYLOAD SAFING Switches (1-2-3-4-5) To NORM * PAYLOAD RETENTION   LOGIC POWER (SYS 1) To ON * PAYLOAD SELECT Rotary Switch To 2 * PAYLOAD RETENSION LATCHES (1-2-3-4-5) To RELEASE	EV1 & EV2 Prepare The Coolant Panel for Deployment And release The Gimbal Locks On A Station Communication Antenna. Release The Destiny Module From The Cargo Bay.
1168	Mission Dep.	Aft Right Panel	A6U	* PAYLOAD RETENSION LATCHES (1-2-3-4-5) To OFF * PAYLOAD RETENTION   LOGIC POWER (SYS 1) To OFF	Deactivate & Power Down The Payload Latches.
1169	Mission Dep.	Aft Left Panel	A8L	* Use The RMS To Position The Destiny Module 	Carefully Move The Destiny Module Over To The Unity Module.  When The Destiny Module Is In Position Press Backspace <a href="#">POSITION - P Y R</a> P: 064.0   Y: -042.0   R: 018.0 <a href="#">POSITION - X Y Z</a> X: 0663   Y: -0070   Z: 0584 <a href="#">JOINT ANGLE</a> YAW: -000.1 SHOULDER: 123.9 ELBOW: -155.1 WRIST PITCH: 095.1 WRIST YAW: -041.9 WRIST ROLL: -018.2



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1170	Mission Dep.			* EV1 & EV2	Move EV1 & EV2 To The Shuttle Airlock.
1171	Mission Dep.				This Concludes The First EVA Next Event
1175	Mission Dep.			* EV1	EV1 Emerges From The Shuttle Airlock. Move EV1 To The Z1 Truss To Assist With The Unlatching Of The PMA.
1176	Mission Dep.			* EV1 & EV2	EV2 Emerges From The Shuttle Airlock. Move EV2 To The Far End Of Destiny to Remove Covers And Prepare The Berthing Mechanism For Attachment Of The PMA.
1177	Mission Dep.	<a href="#">Aft Left Panel</a>	A8L	* Use The RMS To Release The Destiny Module	Release Destiny Module. (Press Backspace)
1178	Mission Dep.	<a href="#">Aft Left Panel</a>	A8L	* Use The RMS To Grapple The PMA	Grapple The PMA That Is Stowed On The Z1 Truss.  Grapple The PMA When The PMA Is In Position Press Enter <a href="#">POSITION - P Y R</a> P: -087.2   Y: -073.0   R: 087.1 <a href="#">POSITION - X Y Z</a> X: 0532   Y: -0069   Z: 0812 <a href="#">JOINT ANGLE</a> YAW: -074.5 SHOULDER: 142.4 ELBOW: -089.2 WRIST PITCH: -070.6 WRIST YAW: -013.9 WRIST ROLL: -004.4
1179	Mission Dep.			* EV1 & EV2	EV1 Will Now Manually Release The Latches Holding The PMA. EV2 Finishes Preparation Of The Berthing Mechanism On Destiny. These Tasks Will Take Approximately 20 Minutes.
1180	Mission Dep.			* EV1 & EV2	Move EV1 & EV2 On Top Of The Destiny Module.
1181	Mission Dep.	<a href="#">Aft Left Panel</a>	A8L	* EV1 & EV2  * Use The RMS To Position The PMA	EV1 Installs Thermal Covers On Destiny's Four Trunnions And Attaches The Exterior Portion Of A Vent That Will Be Used By The ISS Life Support System. Meanwhile, EV2 Installs Several Foot Platform Mounts And Handrails. Use The RMS To Move The PMA Adaptor To Its Final Position At The End Of The Destiny Lab. The Correct Attitude Is With The Docking Port Down, Towards the Atlantis Payload Bay.  <a href="#">POSITION - P Y R</a> P: 090.0   Y: -045.0   R: -090.0 <a href="#">POSITION - X Y Z</a> X: 0928   Y: -0041   Z: 0606 <a href="#">JOINT ANGLE</a> YAW: -004.0 SHOULDER: 055.0 ELBOW: -080.1 WRIST PITCH: 111.0 WRIST YAW: -044.9 WRIST ROLL: 084.3
1182	Mission Dep.	<a href="#">Aft Left Panel</a>	A8L	* Use The RMS To Release The PMA	The PMA Is Now Attached To The ISS Using Passive/Active Berthing Mechanisms. Press Backspace To Release The PMA.
1183	Mission Dep.			* EV1 & EV2	Move EV1 To The Shuttle Payload Bay To Pick Up A Foot Restraint.
1184	Mission Dep.	<a href="#">Aft Left Panel</a>	A8L	* Use The RMS To Position The End Effector	Move The RMS To The Center Of The Shuttle Payload Bay.
1185	Mission Dep.			* EV1 & EV2	Move EV1 Close To The RMS End Effector To Mount The Foot Restraint.
1186	Mission Dep.			* EV1 & EV2	After Mounting The Foot Restraint, Move EV1 Back To Pick Up A Power & Grapple Fixture (PDGF).
1187	Mission Dep.			* EV1 & EV2	Move Back To The RMS End Effector Carrying The Power & Grapple Fixture (PDGF).
1188	Mission Dep.	<a href="#">Aft Left Panel</a>	A8L	* Use The RMS To Position The PDGF	Move The RMS Into Position So The PDGF Can Be Attached To The Destiny Module.



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1189	Mission Dep.			* EV1 & EV2	The PDGF Is Now Installed And Debris And Protection Shields Will Be Reinstalled Around The PDGF.
1190	Mission Dep.			* EV1 & EV2	This Concludes The Second EVA. Move EV1 & EV2 To The Shuttle's Airlock.
1191	Mission Dep.				STS-98 Continues With The Final EVA. Next Event
1200	Mission Dep.	Aft Left Panel	A8L	* Use The RMS To Position The End Effector	For The Third Spacewalk, EV2 Is Supposed To Work From The RMS. Move The RMS To The Center Of The Shuttle Payload Bay.
1201	Mission Dep.			* EV2	Move EV2 To The RMS End Effector.
1202	Mission Dep.			* EV1 & EV2	EV2 Mounts The RMS While EV1 Emerges From The Airlock. Move EV1 To Pick Up A Spare S-Band Antenna Support Assembly (SASA), Mounted On The Starboard Payload Bay Wall.
1203	Mission Dep.			* EV1 & EV2	Move EV1 To EV2 To Hand Over The S-Band Antenna Support Assembly.
1204	Mission Dep.			* EV1 & EV2	The SASA Will Be Stowed On The Z1 Truss. Move EV2 With The RMS Arm To The Z1 Truss.
1205	Mission Dep.			* EV1 & EV2	While EV2 Attaches The Antenna Assembly, Move EV1 Below The Destiny Window.
1206	Mission Dep.			* EV1 & EV2	Move EV2 With The RMS Below The Destiny Window. EV2 Will Assist EV1 With The Removal Of A Protective Cover.
1207	Mission Dep.			* EV1 & EV2	EV1 & EV2 Remove A Protective Cover And Install A Shutter With Its associated Gearbox.
1208	Mission Dep.			* EV1 & EV2	The Final Task For EV1 & EV2 Will Be To Connect The Electrical And Data Connections Between The New PMA-2 Shuttle Docking Port And The Destiny Module. Move EV1 & EV2 To The PMA-2 & Destiny Connection Port.
1209	Mission Dep.			* EV1 & EV2	EV1 & EV2 Will Work At This Location For Some Time.
1210	Mission Dep.			* EV1 & EV2	EV2 Dismounts The RMS. EV1 & EV2 Will Test The Simplified Aid For Extravehicular Activity Rescue (SAFER) Backpack. Move EV1 & EV2 Back To The Shuttle Airlock Using The SAFER Backpacks.
1211	Mission Dep.				This Completes All mission Objectives. STS-98 Is An Unprecedented Success. After Moving Some Additional Supplies To The ISS, Atlantis Will Undock From The ISS. Next Event
1260	Mission Dep.	Aft Right Panel	A6L A7L	* VESTIBULE DEPRESS VALVE   (SYS 1) VENT ISOL To OPEN * VESTIBULE DEPRESS VALVE   (SYS 2) VENT ISOL To OPEN * VESTIBULE DEPRESS VALVE   (SYS 1) VENT To OPEN * VESTIBULE DEPRESS VALVE   (SYS 2) VENT To OPEN * Set CONTROL PANEL POWER (A - B - C) To ON * Set HEATERS CDU POWER (H1 - H2/DCU - H3/DCU) To ON * Set APDS POWER (ABS - BDS - CDS) To ON * APDS Control Commands   Press POWER ON * APDS Control Commands   Press APDS CIRC PROT OFF	After Closure Of All Hatches, The Docking Vestibule Is Depressurized.
1261	Mission Dep.	Aft Right Panel	A7L	* APDS STATUS Press UNDOCK COMPLETE (Lower Left)	Initiate Undock Sequence
1262	Mission Dep.	Aft Left Panel Front Left Panel Aft Right Panel	A8L F6 A7L A6L	* Set RMS POWER To OFF * Set FLT CNTLR POWER To ON * APDS Control Commands   Press POWER OFF * Set CONTROL PANEL POWER (A - B - C) = OFF * Set HEATERS CDU POWER (H1 - H2/DCU - H3/DCU) = OFF * Set APDS POWER (ABS - BDS - CDS) = OFF * Docking System Power   System Power (MN A & MN B) = OFF * Docking System Power   PSU Power ( MN A & MN B) = OF	Disable RMS And Enable RCS Controls  Deactivate APDS
1263	Mission Dep.	Center Panel  Overhead Aft Panel Center Panel	C2  C3 O16 C2	* Enter OPS 202 PRO (Right Keypad) * 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 An OMS Separation Burn
1264	Mission Dep.	Center Panel	C3 C2	* Set OMS ENG (Right) To OFF * Check OPS 202 PRO (Right Keypad) * Enter ITEM 1 EXEC (Right Keypad)	Burn Complete - Disable OMS The Deorbit Burn Will Be Performed Using Both OMS Engines.



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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	PANEL AREA & NOTES
1269	Mission Dep.				STS-98 On Orbit Mission Objectives Are Complete. Next Event

**Commence Deorbit & Landing**



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## DEORBIT & LANDING CHECKLIST

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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	NOTES
1000	Mission Dep.	Left Panel	L1	<ul style="list-style-type: none"> <li>* Set RAD CONTROLLER - OUT TEMP To HIGH</li> <li>* Set RAD CONTROLLER (LOOP 1 &amp; LOOP 2) To OFF</li> <li>* Set RAD CONTROLLER - BYPASS MODE (1 &amp; 2) To MAN</li> <li>* Confirm RAD FLOW BYPASS VALVE Talkbacks Display (BYP)</li> <li>* Confirm The HI LOAD EVAP ENABLE Is Set To OFF</li> <li>* Set FLASH EVAP CONTROLLER (PRI A &amp; PRI B) To ON</li> <li>* Set FLASH EVAP CONTROLLER - SEC   GPC To ON</li> </ul>	<p>Trap Cold Freon In The Bay Radiators</p> <p>If The Rad Bypass Valve Talkbacks Do Not Display (BYP), Set The Manual Rad Flow Bypass Switches 1 &amp; 2 To Bypass.</p>
1001	Mission Dep.	Right Aft Panel  Aft Right Panel Right Aft Panel	R11L  A1U R13L  R11L	<ul style="list-style-type: none"> <li>* Set The MAJ FUNC Switch To GNC</li> <li>* Enter SPEC 33 PRO (AFT Keypad)</li> <li>* Enter ITEM 2 EXEC (AFT Keypad)</li> <li>* Enter ITEM 1 EXEC (AFT Keypad)</li> <li>* Set KU BAND POWER To OFF</li> <li>* Set KU Antenna To STOW</li> <li>* When KU Antenna Talkback Shows STO, Set KU Antenna To GND</li> <li>* Enter SPEC 22 PRO (Aft Keypad)</li> <li>* Enter ITEM 9 EXEC (Aft Keypad)</li> <li>* Enter ITEM 10 EXEC (Aft Keypad)</li> </ul>	<p>Deactivate &amp; Stow The KU Antenna</p> <p><b>NOTE:</b> Rendezvous Navigation Has Been Used It Must Be Disabled.</p> <p>Confirm On CRT 4 There Are No Asterisks Besides The Following Entries. RNDZ NAV ENA 1 KU ANT ENA 2</p>
1002	Mission Dep.	Right Aft Panel	R13L	<ul style="list-style-type: none"> <li>* Set PL BAY MECH PWR (SYS 1 &amp; SYS 2) To ON</li> <li>* Set RADIATOR CONTROL (SYS A &amp; SYS B) To STOW</li> <li>* Set LATCH CONTROL (SYS A &amp; SYS B) To LATCH</li> <li>* Set LATCH CONTROL (SYS A &amp; SYS B) To OFF</li> <li>* Set RADIATOR CONTROL (SYS A &amp; SYS B) To OFF</li> <li>* Set PL BAY MECH PWR (SYS 1 &amp; SYS 2) To OFF</li> </ul>	<p>Stow The Radiators</p> <p>Wait Until The RADIATOR CONTROL Talkbacks Show STO Before Setting The LATCH CONTROLS SYS 1 &amp; SYS 2 To LATCH. Wait Until Latch Control Talkbacks Show LAT Before Turning Off ALL Radiators.</p>
1003	Mission Dep.	Overhead Left Panel Center Panel  Right Panel	O6 C3  R2	<ul style="list-style-type: none"> <li>* Set GENERAL PURPOSE COMPUTER - MODE 5 To STBY</li> <li>* Set The BFC/CRT - Display To ON</li> <li>* Confirm The BFC/CRT SELECT Is Set To (3+1)</li> <li>* Confirm BOILER CNTLR/HTR Switches (1/2/3) Are ON</li> <li>* Set HYD CIRC PUMP Switches (1/2/3) To OFF</li> </ul>	<p>Activate Backup Flight System</p>
1004	Mission Dep.	Overhead Aft Panel   Right Aft Panel	O14 O15 O16  O15 R11L	<ul style="list-style-type: none"> <li>* Set RGA 1 To ON</li> <li>* Set RGA (2 &amp; 4) To ON</li> <li>* Set RGA 3 To ON</li> <li>* Set ACCEL 3 To ON</li> <li>* Set ACCEL 4 To ON</li> <li>* Set SUPPLY H2O - Crossover Valve To OPEN</li> </ul>	<p>Gyro Assemblies &amp; Accelerators</p>
1090	Mission Dep.	Aft Left Panel	A8L	<ul style="list-style-type: none"> <li>* Set RMS POWER To PRIMARY</li> <li>* Set RMS SELECT To STBD</li> <li>* Set STARBOARD RMS (DEPLOY/OFF/STOW) To STOW</li> <li>* Set STARBOARD RMS (DEPLOY/OFF/STOW) To OFF</li> </ul>	<p>Stow The OBSS Boom</p> <p>Wait Until Talkbacks Indicate (STO)</p>
1091	Mission Dep.	Aft Left Panel Aft Right Panel Aft Left Panel	A8L A6U A8L A8U	<ul style="list-style-type: none"> <li>* Set RMS POWER To PRIMARY</li> <li>* Set FLT CNTLR POWER To ON</li> <li>* Set RMS SELECT To PORT</li> <li>* Set The MODE Rotary Selector To SINGLE</li> <li>* Press ENTER Just Below The MODE Rotary Selector</li> <li>* Set The PARAMETER Rotary Selector To JOINT ANGLE</li> <li>* Set The JOINT Rotary Selector As Required</li> <li>* Depress The SINGLE/DIRECT DRIVE (+-) Spring Switch</li> </ul>	<p>Stow The RMS</p> <p>Return All Joint Angles To Their Stowed Position.</p> <p>By Returning All Joint Angles To Zero, You Will Eventually Reach The RMS Latch Position.</p>
1092	Mission Dep.	Aft Left Panel   Front Left Panel	A8L   F6	<ul style="list-style-type: none"> <li>* Port RMS   Retention Latches   Ready For Latch Talkbacks (White)</li> <li>* Set PORT RMS (RELEASE/OFF/LATCH) To LATCH</li> <li>* Set PORT RMS (RELEASE/OFF/LATCH) To OFF</li> <li>* Set PORT RMS (DEPLOY/OFF/STOW) To STOW</li> <li>* Set PORT RMS (DEPLOY/OFF/STOW) To OFF</li> <li>* Set RMS POWER To OFF</li> <li>* Set FLT CNTLR POWER To ON</li> </ul>	<p>Latch The RMS</p> <p>Wait Until Talkbacks Indicate (LAT)</p> <p>Wait Until Talkbacks Indicate (STO)</p>
1093	Mission Dep.	Aft Left Panel	A7U	<ul style="list-style-type: none"> <li>* Set All PAYLOAD BAY FLOOD Lights To OFF</li> </ul>	<p>Turn Off All Payload Bay Flood Lights</p>
1006	Mission Dep.	Right Aft Panel	R11L  R13L  R11L	<ul style="list-style-type: none"> <li>* Set MAJ FUNC Switch To SM</li> <li>* If Required, Enter OPS 202 PRO (AFT Keypad)</li> <li>* Enter ITEM 1 EXEC (AFT Keypad)</li> <li>* If Not Already Enabled, Enter ITEM 3 EXEC (AFT Keypad)</li> <li>* Set PL BAY DOOR (SYS 1 &amp; SYS 2) To ENABLE</li> <li>* Set PL BAY DOOR To CLOSE</li> <li>* Set PL BAY DOOR To STOP</li> <li>* Set PL BAY DOOR (SYS 1 &amp; SYS 2) To DISABLE</li> <li>* Enter ITEM 2 EXEC (AFT Keypad)</li> </ul>	<p>Close Payload Bay Doors</p> <p>Wait Until The PL BAY DOOR Talkback Shows CL.</p>
1008	Mission Dep.	Right Aft Panel   Overhead Left Panel Right Aft Panel	R11L  O6 R11L	<ul style="list-style-type: none"> <li>* Set MAJ FUNC To GNC</li> <li>* Press GPC/CRT (AFT Keypad)</li> <li>* Enter 4 EXEC (AFT Keypad)</li> <li>* Enter OPS 201 PRO (AFT Keypad)</li> <li>* Set GENERAL PURPOSE COMPUTER - MODE 3 To RUN</li> <li>* Enter OPS 301 PRO (AFT Keypad)</li> </ul>	<p>Reconfigure GNC's For Deorbit</p>
1009	Mission Dep.	Overhead Left Panel	O6	<ul style="list-style-type: none"> <li>* STAR TRACKER DOOR CONTROL (SYS 1 &amp; SYS 2) To CLOSE</li> <li>* STAR TRACKER DOOR CONTROL (SYS 1 &amp; SYS 2) To OFF</li> <li>* Set The STAR TRACKER POWER Switches (-Y &amp; -Z) To OFF</li> </ul>	<p>Close Star Tracker Doors</p> <p>Wait Until STAR TRACKER DOOR POSITION Talkback Shows CL.</p>
1010	Mission Dep.	Right Panel Overhead Aft Panel	R4 O15	<ul style="list-style-type: none"> <li>* Check HYDRAULICS BRAKE HEATER (A/B/C) Set To AUTO</li> <li>* Set BRAKES MN B To ON</li> </ul>	<p>Final Switch Configuration Check</p>



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COMM	MET	PANEL SECTION	PANEL	PROCEDURE	NOTES
1010	Mission Dep.	Overhead Aft Panel  Center Panel  Left Panel       Aft Right Panel	O14 O16 C3  L2  L1  L2   A12	* Set BRAKES MN A To ON * Set BRAKES MN C To ON * ORBITAL DAP / MANUAL MODE / ROTATION - ROLL To PRI * Check ORBITAL DAP / CONTROL To AUTO * Confirm ANTI SKID - Set To ON * Confirm NOSE WHEEL STEERING - Set To 1 * Confirm ENTRY MODE - Set To AUTO * Set FLASH EVAP CONTROLLER (PRI A & PRI B) To GPC * Set FLASH EVAP CONTROLLER SEC To GPC * FREON LOOP ISOLATION - MODE To OFF * Set O2 SYS 2 SUPPLY To OPEN * Set N2 SYS 2 SUPPLY To OPEN * Set N2 SYS 2 REG INLET To OPEN * Set O2/N2 CNTLR VLV SYS 1 To OPEN * Set APU HEATER - GAS GEN/FUEL PUMP (1/2/3) To OFF * Set APU HEATER - LUBE OIL LINE (1/2/3) To OFF * Set All TANK/FUEL LINE/H2O SYS Switches To OFF * HYDRAULIC HEATER - RUDDER SPD BRK (A & B) To OFF * HYDRAULIC HEATER - BODY FLAP (A & B) To OFF * HYDRAULIC HEATER - ELEVON (A & B) To OFF * HYDRAULIC HEATER - AFT FUSELAGE (A & B) To OFF	Final Switch Configuration Check
1012	Mission Dep.	Right Panel	R2	* Set He ISOLATION A LEFT/CENTER/RIGHT To OPEN * Set He ISOLATION B LEFT/CENTER/RIGHT To OPEN * Set PNEUMATICS L ENG He XOVV To OPEN * Set PNEUMATICS He ISOL To OPEN * Set LEFT He INTERCONNECT To - IN OPEN * Set CENTER & RIGHT INTERCONNECT To - OUT OPEN	Main Propulsion System / Helium Release
1013	Mission Dep.	Right Aft Panel	R11L	* Confirm MAJ FUNC Set To GNC * Enter SPEC 21 PRO (AFT Keypad) * Enter ITEM 16 EXEC	Final IMU Alignment
1014	Mission Dep.	Center Panel Right Panel       Center Panel	C2 R2      C2	* Enter ITEM 34 EXEC (Right Keypad) * Set BOILER N2 SUPPLY (1/2/3) To ON * Set BOILER PWR (1/2/3) To ON * Set APU FUEL TK VLV (1/2/3) To OPEN * Set APU CNTLR PWR (1/2/3) To ON * Set APU AUTO SHUT DOWN (1/2/3) Set To INHIBIT * Confirm HYD MAIN PUMP PRESS (1/2/3) Set To LOW * Confirm APU SPEED SELECT Set To NORM * Confirm APU/HYD Ready To Start Talkbacks Are WHITE * Confirm GIMBAL CK 34 On CRT 2 Is Complete (No Asterisk) * Enter OPS 302 PRO (Right Keypad)	Perform OMS Gimbal       If there's an asterisk next to GMBL CK 34 It means the gimbal check is incomplete. You must wait for the asterisk to Disappear.
1015	Mission Dep.	Center Panel	C2	* Confirm (CRT 1, CRT 3, CRT 2) Are Set To MAJ FUNC GNC * Enter SPEC 50 PRO (Left Keypad) * Enter SPEC 51 PRO (Right Keypad) * Enter ITEM 44 EXEC (Right Keypad)	Horizontal Situation & Override Displays
1016	Mission Dep.	Center Panel Right Panel	C2 R2	* Press RESUME (Right Keypad) * Set APU OPERATE - START/RUN For APU 1	
1017	Mission Dep.	Center Panel    Overhead Aft  Center Panel	F7 C2  O14 O16 C3 C2	* Check CRT 1 Confirm Display Of OPS MODE 3021 * ITEM 22 EXEC (Right Keypad) * ITEM 27 EXEC (Right Keypad) * ITEM 23 EXEC (Right Keypad) * Confirm L OMS ENG VLV Is ON * Confirm R OMS ENG VLV Is ON * Set OMS ENG (LEFT & RIGHT) To ARM/PRESS * Press EXEC - (Right Keypad) Confirms ready for OMS burn	Perform Deorbit Burn
1018	Mission Dep.	Center Panel Overhead Aft Panel	C3 O14 O16	* Set OMS ENG (LEFT & RIGHT) To OFF * Set L OMS ENG VLV To OFF * Set R OMS ENG VLV To OFF	Deorbit Burn Complete
1020	Mission Dep.	Center Panel Front Left Panel	C2 F6	* Enter OPS 303 PRO (Right Keypad) * Position The Shuttle To The Correct Attitude	<u>Correct Attitude Hint</u> Align All ADI Needles
1022	Mission Dep.	Center Panel  Right Panel  Overhead Aft Panel Right Panel Center Panel	C2  R2  O17 R1 C2	* Enter ITEM 36 EXEC (Right Keypad) * Enter ITEM 37 EXEC (Right Keypad) * Set APU OPERATE - START/RUN For APU (2 & 3) * Set HYD MAIN PUMP PRESS (1/2/3) To NORM * Set ATVC - (1/2/3/4) To ON * Set AC BUS SNSR (1/2/3) To MONITOR * Enter ITEM 39 EXEC (Right Keypad)	Dump RCS Propellant   Pressure Should Rise To 3000 psi
1023	Mission Dep.	Center Panel  Overhead Right Panel   Center Panel	C2  O8  C2	* Enter ITEM 38 EXEC (Right Keypad) * Enter ITEM 40 EXEC (Right Keypad) * Set FWD RCS - He PRESS (A & B) To CLOSE * Set TANK ISOLATION (1/2 & 3/4/5) To CLOSE * Set MANIFOLD ISOLATION (1/2/3/4/5) To CLOSE * Enter OPS 304 PRO (Right Keypad)	Wait Until The Cycle Completes



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## DEORBIT & LANDING CHECKLIST

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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

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

