



		OMS ENGINE VLV (LEFT/RIGHT) to ON OMS ENGINE (LEFT/RIGHT) to ARM	
3	T-00:09:00	<b>Key in DPS</b> <b>Select 2 (OPS 2)</b> <b>Key in EXE</b>  Check CABIN PRESSURE gauge for possible depressurization (normal is 760 torr)	Advise: Go for Load OPS 2 and Execute  Advise: Go for Cabin Leak Check
4	T-00:08:00	He ISOLATION A (LEFT/CNTR/RIGHT) to OPEN  He ISOLATION B (LEFT/CNTR/RIGHT) to OPEN  PNEUMATIC He ISOL (LEFT/CNTR/RIGHT) to OPEN  MAIN ENGINE POWER (LEFT/CNTR/RIGHT) to ON	Advise: Go for Helium (He) Pressurization  Advise: Go for Main Propulsion System (MPS) initialization
5	T-00:07:00	APU FUEL TNK VLV (1/2/3) to CLOSE  APU TK VLV to CLOSED  APU SHTDWN to ENABLE  HYD MAIN PUMP PRESSURE (1/2/3) to LOW  APU SPEED SELECT (1/2/3) to NORMAL  HYD CIRC PUMP (1/2/3) to GPC  APU PWR to ON  APU CNTRL POWER (1/2/3) to ON	Announce: APU Pre-start Check Is Underway

			Announce: Confirm Crew Access Arm Retracted
6	T-00:06:00	<p>APU TK VLV to OPEN</p> <p>APU FUEL TNK VLV (1/2/3) to OPEN</p> <p>APU /HYDRAULICS (1/2/3) to START/RUN</p> <p>HYD MAIN PUMP PRESSURE (1/2/3) to NORMAL</p> <p>HYD CIRC PUMP (1/2/3) to OFF</p>	<p>Announce: Nominal APU Start</p> <p>Announce: Check Hydraulic (APU) Pressure (normal is 3000 psi)</p>
7	T-00:05:00	<p><b><u>Launch HOLD</u></b></p> <p>INTERNAL SHUTTLE SYSTEM PWR (BAT A/BAT B) to ENABLE</p> <p><i>Confirm central HUD is on and in <u>Orbit Earth Mode</u>:</i></p> <ul style="list-style-type: none"> <li>• <i>If needed <b>Select 0</b> (toggle until <u>Orbit Earth HUD</u> is visible)</i></li> </ul> <p>STAR TRKR to ON</p> <p><i>Request <b>Go/ No Go</b> for launch</i></p> <p><b>Initiate Launch Clock Restart when Go order received</b></p>	<p>Announce: Launch Hold</p> <p>Advise: Mission Control confirms all systems are nominal. You are <b><u>Go</u></b> for launch</p> <p><b><u>OR</u></b></p> <p>Mission Control confirms some systems are Off-Nominal. You are <b><u>No Go</u></b> for launch until these systems are corrected</p> <p>Announce: Stand by to Initiate radar at T-4:00</p>

			Advise: Confirm Shuttle Is On Internal Power (Occurs at T-00:04:55)
8	T-00:04:00	<i>Initiate Radar /Monitor System</i> <b>Key in – ON</b>  RATE GYRO ASSEMBLY (RG1/ RG2-3/RG4) to ON	Announce: External Tank Liquid Oxygen (LOX) Vents are closing  Announce: The External Tank is beginning to pressurize.  Announce: External Tank Cap Is Retracted
9	T-00:03:00	<b>Key in DPS</b> <b>Select 3 (OPS 3)</b>	Advise: Load OPS 3  Announce: External Tank Liquid Hydrogen vents are closed.
10	T-00:02:00	APU SHTDWN to INHIBIT	Announce: Confirm APU Power Shutdown is Inhibited
11	T-00:01:00	AC BUS SNSR to AUTO	
12	<b>T-00:00:04</b>	<b>Key in EXE</b>	Advise: Go for Execute OPS 3
13	<b>T-00:00:00</b>	Liftoff	<u><i>Initiate Mission Elapsed Time Clock</i></u> Announce: Shuttle liftoff, the clock is running

### *Ascent Checklist*

COM	MET	PROCEDURE	Mission Control Notes
14	T+00:00:20	Switch Left MFD back to Surface Mode <b>Key in 9</b>	
15	T+00:00:44		Announce: Automatic Main Engines Throttle Down to 65%
16	T+00:01:10		Announce: Automatic Main Engines Throttle Up to 104%
17	T+00:02:05	<i>SRB Separation</i>	Announce: OMS assist burn start
18	T+00:03:00	<i>Check that the (Freon) EVAP OUT TEMP data display shows below 60 degrees</i>	Advise: Check Flash Evaporator is Operational
19	T+00:04:20		Advise: Negative Return
20	T+00:08:00		Advise: Go for Engines Automatic Throttle Down In Preparation for Main Engine Cutoff (MECO)
21	T+00:08:55	<b><i>Main Engine Cutoff (MECO)</i></b>	Advise: Confirm Main Engine Shutdown and Engine Cutoff (MECO)

### *Orbit Insertion Checklist (Post MECO)*

COM	MET	Procedure	Mission Control Notes
22	T+00:09:00	FWD RCS He TANK ISOL (A/B) to OPEN  FWD RCS He MANIFOLD ISOL (1/2/3) to OPEN	Announce: External Tank Separation initiation
23	T+00:09:15	OMS ENGINE VLV (LEFT) to ON  OMS ENGINE VLV (RIGHT) to ON  OMS ENGINE (LEFT/RIGHT) to ARM	Announce: Standing by for Auto OMS1 Burn
24	T+00:09:30	FLT CNTLR PWR to INHIBIT  ENG DAP to AUTO	Announce: MPS Propellants Automatic Dump initiated.
25	T+00:09:45	MAIN ENGINE POWER (LEFT/CNTR/RIGHT) to OFF	Announce: Auto Propellant Dump Complete
26	T+00:10:00	He ISOLATION A (LEFT/CNTR/RIGHT) to GPC  He ISOLATION B (LEFT/CNTR/RIGHT) to GPC  PNEUMATIC He ISOL to GPC  H <sub>2</sub> SYSTEM LINE VENT to OPEN	Announce: Confirm External Tank Separation
27	T+00:10:30	HYD MAIN PUMP PRESSURE (1/2/3) to LOW	

27 Cont.		<p>APU / HYDRAULICS (1/2/3) to OFF</p> <p>APU FUEL TNK VLV (1/2/3) to CLOSE</p> <p>APU TK VLV to CLOSED</p> <p>APU CNTRL POWER (1/2/3) to OFF</p> <p>APU PWR to OFF</p> <p>BOILER CNTRL PWR (1/2/3) to OFF</p> <p>BOILER N<sub>2</sub> SUPPLY (1/2/3) to OFF</p> <p>HYD CIRC PUMP (1/2/3) to GPC</p> <p>H<sub>2</sub> SYSTEM LINE VENT to GPC</p>	<p>Announce: APU Shutdown complete</p>
28	T+00:11:00 approximate	<i>Advised Mission Control when OMS Burn Initiated</i>	Advise: Confirm OMS Burn Initiated
29	T+00:15:10 approximate	<p><i>Advised Mission Control when OMS Burn Complete</i></p> <p>OMS ENGINE (LEFT/RIGHT) to OFF</p> <p>AC BUS SNSR to MONITOR</p>	Advise: OMS Burn complete
30	Mission Dependent	<p>Confirm central HUD is on and switched to “Orbit Earth Mode”: If needed <b>Select 0</b> (toggle until <u>Orbit Earth</u> HUD is visible)</p> <p>H<sub>2</sub> SYSTEM OUTBRD VLV to GPC</p> <p>H<sub>2</sub> SYSTEM INBRD VLV to GPC</p> <p>ENG DAP to MANUAL</p> <p>FLT CNTRLR PWR to ENABLE</p> <p>RATE GYRO ASSEMBLY (RG1/ RG2-3</p>	Advise: Set Liquid H <sub>2</sub> Outboard Fill & Drain Valve to Computer Control

		<p>/RG4) to OFF</p> <p><b>**Rotate The Shuttle to Zero Attitude, kill rotation to stabilize. Attitude must be zero in both the horizontal and vertical planes.</b></p> <p><b>Key in 4</b> – to kill rotation</p>	<p>Announce: Go for Initiating Manual Zero Attitude Correction</p> <p>Announce: Confirm Shuttle in zero attitude (manual prograde)</p>
31	Mission Dependent	<p>THERMAL CONDITIONING SYSTEM HYD / FUEL to AUTO</p> <p>THERMAL CONDITIONING SYSTEM ENV to AUTO</p> <p>THERMAL CONDITIONING SYSTEM POD / JET to AUTO</p>	<p>Announce: Go for Configuring the Thermal Condition of the Shuttle</p>
32	Mission Dependent	<p>ENVIRONMENTAL SYSTEM O<sub>2</sub> SYS2 to CLOSE</p> <p>ENVIRONMENTAL SYSTEM N<sub>2</sub> SYS2 to CLOSE</p> <p>ENVIRONMENTAL SYSTEM H<sub>2</sub>O LOOP to OFF</p>	
33	Mission Dependent	<p>BAY DOOR LCK to RELEASE</p> <p>BAY DOOR to OPEN</p> <p><i>Initiate Payload Bay Door, KU Antenna and Radiator Open Program</i></p> <p><b>Key in PBD</b></p> <p><b>Key in OPEN</b></p> <p><i>Confirm payload bay door is open</i></p>	<p>Advise: Go for payload bay door open program</p> <p>Announce: Confirm KU Antenna deployment</p>

			Announce: Confirm Radiator deployment
34	Mission Dependent	<p>GLOBAL POSITIONING SYSTEM (GPS1/GPS2/GPS3) to ON</p> <p><i>De-select HUD</i> <b>Key in IO</b></p>	<p>Advise: Activate Global Positioning System (GPS)</p> <p>Announce: Confirm activation of GPS 1, GPS 2 and GPS 3</p>
35	Mission Dependent	<p><i>MFD CRT Display Left and Right to OFF</i> <b>Key in CRT</b> <b>Key in SPC</b> (sets pad to red) <b>Key in Red-CRT</b> <b>Key in SPC</b> (sets pad to blue)</p> <p><i>Shuttle is Configured &amp; Ready For Mission</i></p>	Advise: Go for MFD terminal shutdown

## *De-Orbit Checklist*

COM	MET	Procedure	Mission Control Notes
36	Mission Dependent	<p><i>Run <u>De-orbit system check</u></i></p> <p><b>Key in RSD</b></p> <p><i>MFD CRT Display Left and Right to ON</i></p> <p><b>Key in CRT</b></p> <p><b>Key in SPC</b> (sets pad to red)</p> <p><b>Key in Red-CRT</b></p> <p><b>Key in SPC</b> (sets pad to blue)</p> <p><i>Confirm Mission Commander MFD on and in SRFC mode</i></p> <p><i>Confirm Pilot MFD on and in Orbit Mode</i></p>	<p>Advise: Go for MFD terminal initialization</p>
37	Mission Dependent	<p>STAR TRKR to OFF</p> <p>BAY DOOR to CLOSE</p> <p><i>Initiate Payload Bay Door, KU Antenna and Radiator Close Program</i></p> <p><b>Key in PBD</b></p> <p><b>Key in CLOSE</b></p> <p><i>Confirm Bay door is closed</i></p> <p>BAY DOOR LCK to LATCH</p>	<p>Advise: Confirm Star Tracker Disabled</p> <p>Advise: Go for Payload Bay Door Close program.</p> <p>Announce: Confirm Radiator Retracted</p> <p>Announce: Confirm KU Antenna Retracted</p>
38	Mission Dependent	<p><i>Initiate HUD – place in surface mode</i></p> <p><b>Key in IO</b></p> <p><b>Select 0</b> (Toggle until surface HUD)</p> <p>BOILER CNTRL HTR (1/2/3) to ON</p> <p>HYD CIRC PUMP (1/2/3) to OFF</p>	

39	Mission Dependent	<i>Position The Shuttle to The Correct Attitude - Retrograde</i> <b>Key in 6 – Retrograde</b>	Announce: Confirm Shuttle in retrograde attitude
40	Mission Dependent	THERMAL CONDITIONING SYSTEM HYD / FUEL to AUTO  ENG DAP to MANUAL  ENVIRONMENTAL SYSTEM O <sub>2</sub> SYS2 SUPPLY to OPEN  ENVIRONMENTAL SYSTEM N <sub>2</sub> SYS2 SUPPLY to OPEN	Announce: Final Switch Configuration check in progress
41	Mission Dependent	He ISOLATION A (LEFT/CNTR/RIGHT) to OPEN  He ISOLATION B (LEFT/CNTR/RIGHT) to OPEN  PNEUMATIC He ISOL (LEFT/CNTR/RIGHT) to OPEN	Announce: Main Propulsion System Helium Release confirmation
42	Mission Dependent	BOILER N <sub>2</sub> SUPPLY (1/2/3) to ON BOILER CNTRL PWR (1/2/3) to ON APU TK VLV to OPEN APU FUEL TNK VLV (1/2/3) to OPEN APU PWR to ON APU CNTRL POWER (1/2/3) to ON APU SHTDWN to INHIBIT HYD MAIN PUMP PRESSURE (1/2/3) to LOW	

		<p>APU SPEED SELECT (1/2/3) to NORMAL</p> <p>APU / HYDRAULICS (1/2/3) to START/RUN</p> <p>DUMP ISOL VLV to OPEN</p>	
43	Mission Dependent	<p><i>Confirm</i> OMS ENGINE VLV (LEFT) is ON</p> <p><i>Confirm</i> OMS ENGINE VLV (RIGHT) is ON</p> <p>OMS ENGINE (LEFT/RIGHT) to ARM</p> <p><b>Engine Throttle to Maximum</b></p>	Advise: Go for Perform De-orbit Burn
44	Mission Dependent	<p><b>Engine Throttle to OFF</b></p> <p>OMS ENGINE (LEFT/RIGHT) to OFF</p> <p>OMS ENGINE VLV (LEFT) to OFF</p> <p>OMS ENGINE VLV (RIGHT) to OFF</p>	Advise: Confirm De-orbit Burn Complete
45	Mission Dependent	<p><i>Position The Shuttle to The Correct Attitude – Prograde</i></p> <p><b>Key in 7 – Prograde</b></p>	Announce: Confirm Shuttle in prograde attitude
46	Mission Dependent	<p>HYD MAIN PUMP PRESSURE (1/2/3) to NORMAL</p>	Announce: Confirmation of Auto Dump RCS Propellant
47	Mission Dependent	<p>FWD RCS He TANK ISOL (A/B) to CLOSE</p> <p>FWD RCS He MANIFOLD ISOL (1/2/3) to CLOSE</p> <p>DUMP ISOL VLV to CLOSED</p>	

			Announce: Pressure cycle complete
48	Mission Dependent		<i>Advise: De-Orbit Procedure is Complete</i>

## *Landing Checklist*

COM	Altitude	Procedure	Mission Control Notes
49	35 k	<i>Disengage RCS mode</i> <b>Key in SPC</b> (sets pad to red) <b>Key in Red-9</b>  <i>Run Landing System Check</i> <b>Key in LSD</b>  <i>Initiate Landing System Radar</i> <b>Key in LSR</b> <b>Key in ON</b>	
50	28 k	<i>(Lift takes affect)</i>	Announce: Current altitude and speed
51	25 k	THERMAL CONDITIONING SYSTEM HYD / FUEL to AUTO	Advise: Hydraulics / Brake Heater activated  Announce: Current altitude and speed
52	3 k	<i>Power Up Landing Gear</i> GEAR to ARM	Announce: Current altitude and speed
53	2.5 k	GEAR to DOWN	Announce: Gear deployed
54	0.5 k (500 m)	SPEED BRAKE to DEPLOY	
55	Touchdown	CHUTE to DEPLOY	Announce: Touchdown
56		<b><i>End of Mission</i></b>	