

SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (6+1 UP/6+1 DN)	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM-ABORT EMERG	SRB RSRM AND ET	ORBIT		FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
		TITLE, NAMES & EVA'S	LANDING SITES, ABORT TIMES	LANDING TIMES FLT DURATION, WINDS	THROTTLE PROFILE ENG. S.N.		INC	HA/HP			

SPACE SHUTTLE MISSIONS SUMMARY

STS-116/ISS 12A.1 SEQ FLT# 117 KSC-117 PAD 39B-53 MLP-1 20TH SHUTTLE FLIGHT TO ISS	OV-103 (Flight 33) DISCOVER Y OMS PODS: LPO1-36 RPO3-34 FRC3-33 P717/R262/V185/M228 PLT: William A. Oefelein P718/R302/M262 MS1: Nicholas J. M. Patrick (Flt 2 - STS-105) P719/R303/V186/M263 MS2/EV1: Robert L. Curbeam, Jr. (Flt 3 - STS-85, STS-98) P720/R225/V167/M195 MS3/EV2: Christer Fuglesang P721/R304/M264 MS4: Joan E. Higginbotham P722/R305/F41 MS5 Up/EV3/EXP14: Sunita L. Williams P723/R306/F42 MS5 Down/EXP14: Thomas Reiter (M/S5 Up on STS-121) P724/R299/M260 SS EVA 98 DOCKED QUEST EVA 18 EMU/TETHERED EVA 91 SCHEDULED EVA 91 DURATION 6:36 SS EVA 99 DOCKED QUEST EVA 19 EMU/TETHERED EVA 92 SCHEDULED EVA 92 DURATION 5:00 SS EVA 100 DOCKED QUEST EVA 20 EMU/TETHERED EVA 93 SCHEDULED EVA 93 DURATION 7:31 SS EVA 101 DOCKED QUEST EVA	CDR: Mark L. Polansky (Flt 2 - STS-98) P717/R262/V185/M228 PLT: William A. Oefelein P718/R302/M262 MS1: Nicholas J. M. Patrick (Flt 2 - STS-105) P719/R303/V186/M263 MS2/EV1: Robert L. Curbeam, Jr. (Flt 3 - STS-85, STS-98) P720/R225/V167/M195 MS3/EV2: Christer Fuglesang P721/R304/M264 MS4: Joan E. Higginbotham P722/R305/F41 MS5 Up/EV3/EXP14: Sunita L. Williams P723/R306/F42 MS5 Down/EXP14: Thomas Reiter (M/S5 Up on STS-121) P724/R299/M260 SS EVA 98 DOCKED QUEST EVA 18 EMU/TETHERED EVA 91 SCHEDULED EVA 91 DURATION 6:36 SS EVA 99 DOCKED QUEST EVA 19 EMU/TETHERED EVA 92 SCHEDULED EVA 92 DURATION 5:00 SS EVA 100 DOCKED QUEST EVA 20 EMU/TETHERED EVA 93 SCHEDULED EVA 93 DURATION 7:31 SS EVA 101 DOCKED QUEST EVA	KSC 39B 344:01:47:35Z 8:47:35 PM EST (P) 8:47:35 PM EST (A) Saturday (6) 12/09/06 (8) LAUNCH WINDOW: 5 Minutes (PLT in-plane) EOM PLS: KSC TAL: ZZA TAL WX: MRN, FMI SELECTED: RTLS: KSC 33 N/N TAL: MRN 20 N/N AOA: NOR 17 N/N PLS: EDW 22 CI TDEL: 0:00 0.232 MAX Q NAV: 760 764 SRB STG: 2:04.162:04.64 PERF: NOMINAL 2 ENG TAL (MRN): 2:31 2:28 NEG RETURN: 3:55 3:52 PTA (U/S 160): 4:55 4:56 SE TAL (FMI): 6:07 6:03 PTM (U/S 160): 6:07 6:02 SE PRESS 104: 6:54 6:56 MECO CMD: 8:22.5 8:23.8 VI: 25819.0 25819.0 OMS-2: 37:07.4 37:10 187.2 FPS 188.5 FPS	KSC 15 (KSC 64) 356:22:31:58Z 5:31:58 PM EST Friday 14 12/22/06(15) DEORBIT BURN: 356.21:30:53Z XRANGE: 813 NM ORBIT DIR: AR 13 AIM PT: CLOSE IN MLGTD: 1825 FT 356:22:31:58Z VEL: 196 KGS 208 KEAS HDOT: -2.9 FPS TD NORM 205: 2015 FT DRAG CHUTE DEPLOY: 191 KEAS 356:22:32:04Z NLGTD: 5594 FT 356:22:32:11Z VEL: 140 KGS 152 KEAS HDOT: -7.0 FPS BRK INIT: 79 KGS DRAG CHUTE JETTISON: 52 KGS 356:22:32:36Z BRK DECEL FPS: AVE 5.3 PK 6.1 WHEELSTOP: 356:22:32:51Z 9980 FT ROLLOUT: 8155 FT 53 SEC	104/104/109 % PREDICTED: 100/104.5/104.5/72 104.5 ACTUAL: 100/104.5/104.5/74 104.5 1 = 2050 (5) 2 = 2054 (6) 3 = 2058 (1) ALL THREE SSM E'S BLOCK II M 3 EOM: WEIGHT: 226476 LBS X CG: 1077.4 in LANDING: WEIGHT: 224041 LBS X CG: 1079.6 in	BI-128 51.60 (20) RSRM 95 ET-123 SLWT 25 ET IMPACT MET 1:14:00 LAT: 36.83S LONG: 159.1W	DIRECT INSERTION POST OMS-2: 134.7x122.7NM DEORBIT: HA 184.5 NM HP 168.1 NM ENTRY VELOCITY: 25837 FPS ENTRY RANGE: 4263 NM	OI-30 (4) CARGO: 35690 LBS PAYLOAD CHARGEABLE: 22502 LBS DEPLOYED: 5748 LBS NON-DEPLOYED: 16572 LBS MIDDECK: 182 LBS SHUTTLE ACCUMULATE D WEIGHTS: DEPLOYED: 1281231 LBS NON-DEPLOYED: 1585492 LBS CARGO TOTAL: 3701134 LBS PERFORMANCE MARGINS (LBS): FPR: 2886 FUEL BIAS: 921 FINAL TDDP: 3768 RECON: 4559 PAYLOADS: PLB: ISS 12A.1 - ITS SPACEHAB SM ICC (W/STP-H2 UTILIZATION PAYLOAD) MIDDECK: ISS 12A.1 RAMBO MAUAI	BRIEF MISSION SUMMARY: STS-116/12A.1 (19th ISS mission) continued ISS construction with the delivery and installation of Integrated Truss Segment P5 and began the process of reconfiguration and redistribution of the power generated by the pair of U.S. solar arrays. The P6 truss was relocated to its final assembly position after 6 years atop the Unity Module. KSC W/D: OPF 105, VAB 8, PAD 28 = 141 days total LAUNCH POSTPONEMENTS: - Baselined OV-104 launch date of 06/05/2003 on 05/05/2002 - Postponed launch date to 07/24/2003 on 10/08/2002; delays due to engine flowliner crack repairs - Postponed launch date to NET 12/18/2003 on 03/13/2003. Slip due to Columbia accident. - Postponed launch date to NET 03/01/2004 on 04/17/2003. Slip due to Columbia accident. - Postponed launch date to NET 05/13/2004 on 05/28/2003. Slip due to Columbia accident. - Postponed launch date to NET 09/13/2004 on 07/29/2003. Slip due to Columbia accident. - Postponed launch date to NET 04/14/2005 on 10/03/2003. Slip due to Columbia accident. - Delete flight from FDRD on 03/22/2004 - Re-baselined STS-116 launch date to NET 02/09/2006 on 12/09/2004 - Postponed launch date to NET 04/23/2006 on 05/23/2005. Slip reflected latest planning decisions. - Postponed launch date to NET 10/01/2006 on 10/31/2005. Slip reflected latest planning decisions. - Postponed launch date to NET 11/16/2006 on 03/16/2006. Slip reflected latest planning decisions. - Postponed launch date to NET 12/14/2006 on 04/04/2006. Slip reflected latest planning decisions. - Advanced launch date to NET 12/07/2006 on 09/28/2006. LAUNCH SCRUBS: - Scrubbed Thursday 12/7/06 EST launch (12/8/06 GMT day 242) while holding at T-5 minutes. The window opened at 342:02:30:48Z and closed at 342:02:40:48Z with a Preferred Launch Time of 342:02:35:48Z. TAL1 (ZZA) was forecast and observed GO at TAL landing time and was selected as Prime TAL site. TAL2 (MRN) was forecast NO-GO thunderstorms WI 20 NM and BKN30 and observed NO-GO BKN. TAL3 (FMI) was forecast and observed NO-GO BKN30/BKN35. Launch Director counted down and held at 5 minutes until window closed. Scrubbed launch due to Range Safety violation of clouds below 6000 feet, thicker than 500 feet (verified at 5500 feet). MMT opted for a 48-hour turnaround and top off cryos and weather forecast was NO-GO. Launch date set for 12/09/06 EST (12/10/06 GMT). Weather Scrub..
--	---	---	--	---	---	--	--	---	--



Continued...

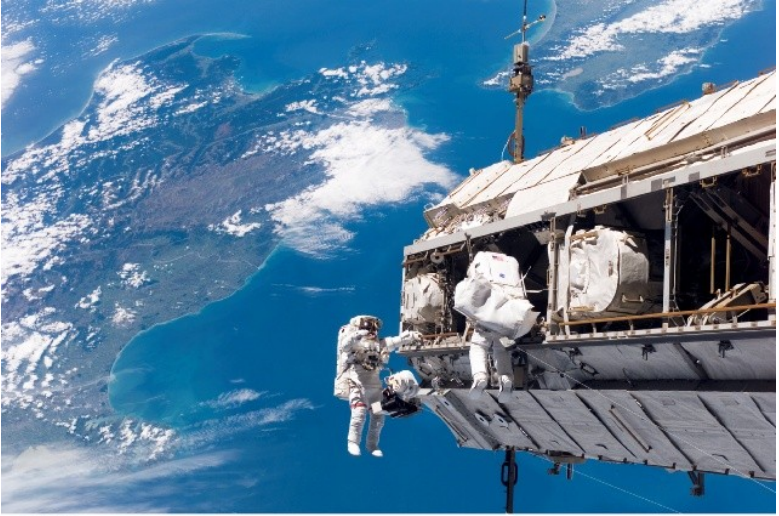
Continued...

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM-ABORT EMERG	SRB RSRM AND ET	ORBIT		FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
		TITLE, NAMES & EVA'S	LANDING SITES, ABORT TIMES	LANDING TIMES FLT DURATION, WINDS	THROTTLE PROFILE ENG. S.N.		INC	HA/HP			

SPACE SHUTTLE MISSIONS SUMMARY

<p>STS-116/ISS 12A.1 Continued ...</p>		<p>Continued... MCC WHITE FCR (47) <u>FLIGHT DIRECTORS:</u> <u>SHUTTLE:</u> A - J. S. Stich E - N. D. Knight LD/O 1 - A. J. Ceccacci O 2 - M. R. Abbott O 3/PLNG - R. E. LaBrode Team 4 - R. S. Jones MOD - P. L. Engelauf ISS: LD/O 2 - J. M. Curry O 1 - J. D. Hassmann O 3 - J. R. Montalbano TEAM 4/PLNG - D. J. Weigel <u>CAPCOMS:</u> <u>SHUTTLE:</u> A/E - K. T. Ham - C. J. Ferguson (Wx) LD/O1 - K. A. Ford O2 - K. M. McArthur O3/PLNG - S. W. Lucid Team 4 PLNG - N/A ISS: LD/O2 - S. K. Robinson O1 - T. W. Virts O3/PLNG - H. D. Getzleman Team 4 PLNG - N/A</p>		<p>Continued... <u>WINDS:</u> 14H/2R Kts <u>OFFICIAL:</u> 159/14 14/2R Kts <u>DENS ALT:</u> 1229 FT <u>FLT DURATION:</u> 12:20:44:23 <u>S/T:</u> 1082:19:54:33 <u>OV-103:</u> 276:11:34:05 <u>DISTANCE:</u> 5,330,398 sm <u>TOTAL SHUTTLE DISTANCE:</u> 438,715,036 sm</p>	<p>S116-e-05983 - Curbeam (left) and Fuglesang conduct EVA1 tasks for installation of P5 Truss. New Zealand and Cook Islands are seen in the background.</p>	<p>Continued... 5 CRYO TK SETS 6 N2 TANKS RMS 74 RMS USED FOR RMS/OBSS SURVEYS AND GRAPPLE/UNBERTH P5, HANDOFF TO SSRMS</p>	<p>Continued... <u>LAUNCH WINDOW:</u> - Total launch window was 10 minutes with window open at 344:01:42:35Z and close at 344:01:52:35Z. Preferred Launch Time was 344:01:47:35Z (In-Plane Time) for a launch window of 5m00s. NOTE: In October, the self-imposed post-Columbia daylight launch constraint was relaxed, thus clearing STS-116 for a night launch. <u>LAUNCH DELAYS:</u> - None. Launch occurred on time at 344:01:47:35Z, 8:47:35 PM EST on Saturday, 12/09/06. <u>TAL WEATHER:</u> - All three TAL sites were forecast and observed GO. MRN was selected as Prime TAL site. MRN had best TD energy, ZZA had low TD energy, and FMI had balloon problems. <u>PERFORMANCE ENHANCEMENTS:</u> - Include the standard set plus: (1) PE Operational High Q WIN/DEC, (2) OMS Assist, (3) 52 nm MECO, and (4) Del Psi <u>FLIGHT DURATION CHANGES/LANDING:</u> - Early planning had STS-116 as an 11+1+2 flight that was changed a few weeks before the flight to 12+0+2 as consumables proved adequate. Pre-flight EOM TIG was 11/17:47 MET with landing at 11/18:49 MET. Difficulties with P5 retraction resulted in an FD8 MMT decision to add an unscheduled EVA 4 to inspect P5 for feasibility of retraction by EVA crew. This resulted in a loss of a weather wave-off day and a 13+1 flight. Undocking would be delayed 1 day and FD10 would be used for a late inspection. <u>NIGHT LAUNCH #29:</u> <u>RENDEZVOUS #65:</u> Rendezvous and dock with ISS <u>FIRSTS/LASTS/NEW:</u> - First flight of Advanced Health Monitoring System (AHMS). Flew on right engine in monitor mode. - First use of Quest for four EVA's and four Campout Prebreathes on a Shuttle flight - First flight with four EVA's by one astronaut - Curbeam - First on-orbit retraction of an ISS solar array - First ISS crew rotation through Shuttle since STS-113/11A in November 2002 - First entry of a Shuttle on the day of landing opportunity that was both the first and "pick em" days of opportunity for weather</p> <p>Continued...</p>
				 <p>S116E05983</p>			

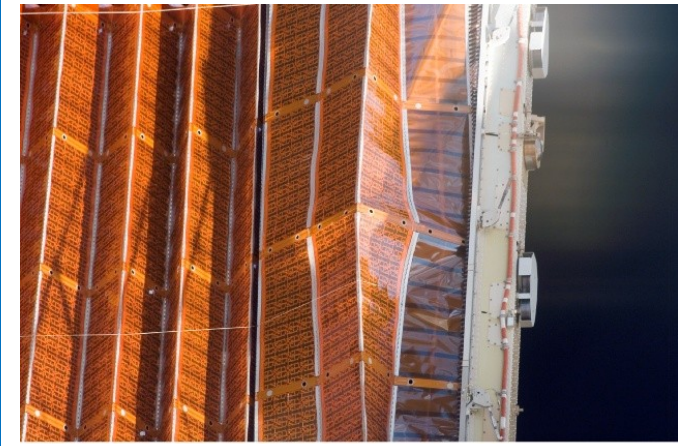
SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM-ABORT EMERG	SRB RSRM	ORBIT		FSW	PAYLOAD WEIGHTS,	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS,
		TITLE, NAMES & EVA'S	LANDING SITES, ABORT TIMES	LANDING TIMES FLT DURATION, WINDS	THROTTLE PROFILE ENG. S.N.	AND ET	INC	HA/HP		PAYLOADS/ EXPERIMENTS	TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

SPACE SHUTTLE MISSIONS SUMMARY

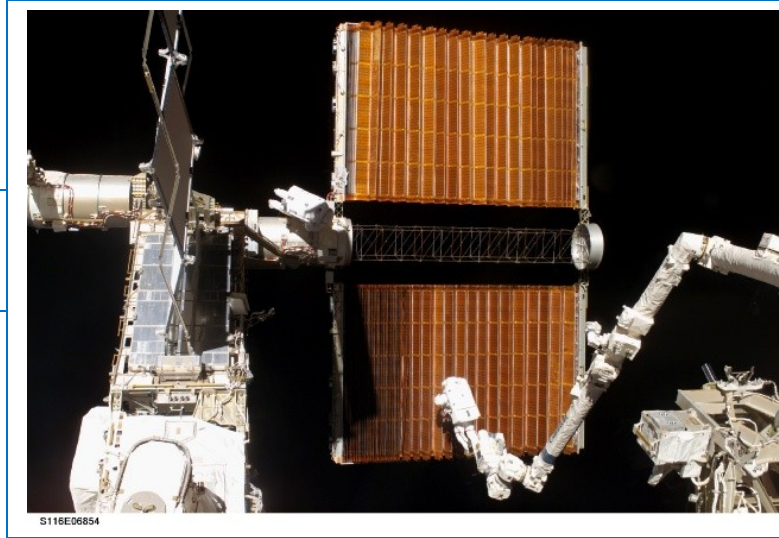
STS-116/ISS 12A.1

Continued
...



S116-E-05789 - A kink occurred in the port-side P6 solar array during the first attempt to retract

S116-E-06854 - FD10: EVA 4 Crew uses specially-prepared, tape insulated tools to guide the P6



Continued...

EVENTS:

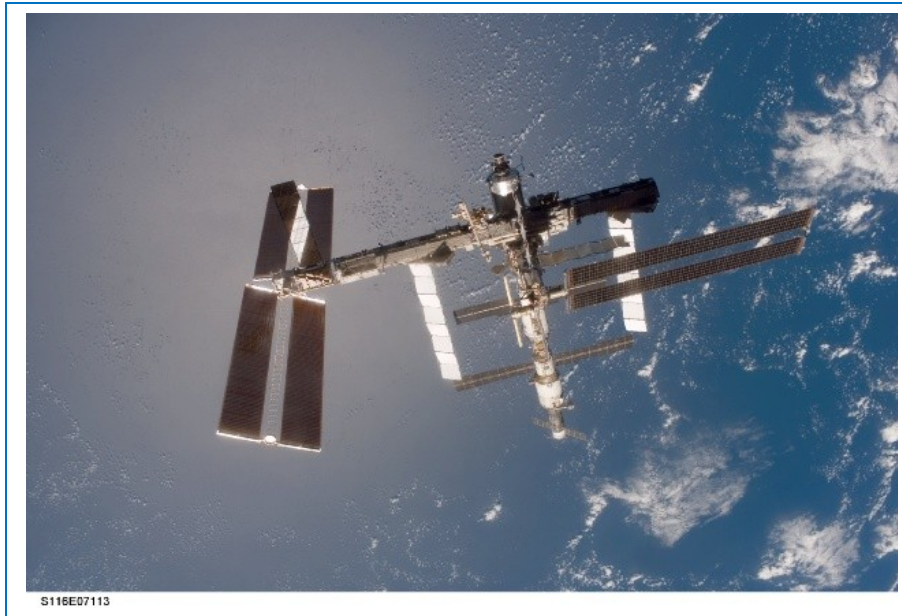
- OMS Assist ignition at 344:01:49:50Z (duration 1m38s)
- SRMS OBSS/LDRI survey of nose cap, port and starboard wing RCC (WLE's) completed
- TI maneuver at 345:19:28:22Z (1:17:40:47 MET). Resultant altitude 176.7 by 192.4 nm
- R-Bar pitch maneuver started at 345:21:04:46Z and was completed 7m33s later. Photos of Discovery's tile surfaces by ISS crew
- Docking capture occurred at 345:22:11:05Z (1:20:23:30 MET).
- Hard dock occurred at 345:22:26:33Z (1:20:38:58 MET).
- ISS hatch open 345:23:54Z (1:22:06 MET), ISS Crew Welcoming
- IELK seat liner transfer at 346:01:00:00Z (1:23:12 MET). At that time, Thomas Reiter became a member (MS5) of STS-116 and Sunita Williams joined the ISS Expedition 14 as Flight Engineer 2.
- EVA 1: EV1 and EV2 completed nominal tasks including P5 truss installed to P4 truss and mated P4-P4 umbilicals. 5/8-in socket lost from Pistol Grip Tool. EVA 1 duration 6h36m
- FD5: P6 4B SAW retraction required a series of partial deploy/retract sessions into 19 bays out for P4 SARJ to be free to rotate. P6 4B SAW now 16.5 bays out
- Solar flares raised radiation level. Crew slept in areas with better shielding.
- EVA 2: EV1 and EV2 Ch 2/3 reconfig and transfer to permanent power. CETA cart relocate. EVA 2 duration 5h00m
- FD7: Several IVA tests "wiggling" SAW, then extension/retraction were unsuccessful, 17.5 bays out
- EVA 3: EV1 and EV3 Ch 1/4 reconfig and transfer to permanent power. T/S P6 SAW. In an attempt to free the wires and grommets, oscillations and retractions were attempted. An additional 6 bays retracted, leaving additional 11 bays out. During EVA, a digital camera floated away. EVA 3 duration 7h31m.
- FD8: ISS and Space Shuttle Programs reached a joint decision to extend STS-116/12A.1 to 13+1 days to perform an unscheduled EVA to troubleshoot and complete P6 SAW retraction. Undocking now on FD11
- EVA 4: Curbeam and Fuglesang, unscheduled EVA 4 start at 352:19:00:00Z (8:17:12:25 MET). EVA crew successfully retracted P6 the last 36 feet by repeated actions of pulling on guide wires, shaking, and retract commands. Array was successfully retracted and folded into box. EVA duration 6h38m
- Total cargo transferred to ISS from Discovery was 4877 lbs (middeck 1305 lbs and logistics single module 3572 lbs).

Continued...

SPACE SHUTTLE MISSIONS SUMMARY

STS-
116/
ISS
12A.1

Continue
d...



S116e07113 - ISS Configuration, FD11 view from departing Shuttle

Continued...

EVENTS (Continued):

- Total cargo transferred to Discovery from ISS was 4911 lbs (to middeck 1345 lbs and to logistics module 3566 lbs).
- Total consumables transferred to ISS: Oxygen tank transfer 69 lbm and total nitrogen tank transfer 47.2 lbm; total water transferred to ISS was 261.6 lbm (201.9 lbm in two CWC's and 59.7 lbm in three PWR's).
- Undocked at 353:22:09:35Z
- A fly-around (1/2 lap) was initiated at 353:22:35:13Z.
- Sep 1 and Sep 2 maneuvers resulted in orbit 171.1 by 192.5 nm
- Micrometeoroid Orbital Debris late inspection was completed.
- MEPSI payload was deployed at 355:00:19:35Z (10:22:32:00 MET).
- RAFT payload was deployed at 355:01:56:46Z (11:00:09:11 MET).
- ANDE was deployed at 355:18:23Z (11:16:35 MET).
- No communications blackout during Entry.

SIGNIFICANT ANOMALIES:

Orbiter:

- Loss of RMS End Effector Auto Release Capability
 - Fuel Cell O2 Flowmeter Failed
 - FES Primary B Failed To Come Out Of Standby
 - Port Mid Payload Bay Floodlight Failed
 - A6U Aft Event Thumbwheel Failure
 - TPS Tile And Blanket Anomalies
 - ML94B Bogen Bracket Shoe Debonded
 - Kodak DCS 760 Digital Camera Lost During EVA 3
 - Waste Water Dump Degraded Flow
 - -Z Star Tracker Pressure BITE Fail Indication
 - GPS Receiver Failed To Change Satellites
 - MADS Signal Dropout
 - WLE IDS Sensor Unit Inadvertent Shutdown
- ### SRB:
- SRB Separation Debris Impact On Orbiter Not A Safety Issue
 - T-0 Umbilical 1/4-Inch Frangible Bolt Missing
 - Delaminated/Missing BTA on Aft BSM Housing
- ### RSRM:
- No IFA's
- ### SSME:
- No IFA's
- ### ET:
- No IFA's

MOD:

- Erroneous Procedure Callout on OBSS LCS Cue Card
- MCC Automation System (MAS) File Server Failure

Integration:

- Ice Balls Noted Hanging From The North GOX Vent Arm Duct Exit Flange
- Debris Release from SRB LH BSM Area Traveled Fwd And Impacted Orbiter
- Delaminated/missing BTA on Aft BSM Housing with Sooting