SPACE SHUTTLE MISSIONS SUMMARY - BOOK 2

STS- 97 THROUGH STS-131

REVISION T PCN-5 JUNE 2010

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IN MEMORIAM

Bob Legler
April 4, 1927 - March 16, 2007

Bob Legler, the originator of this Space Shuttle Missions Summary Book, was born a natural Corn Husker and lived a full life. His true love was serving his country in the US Coast Guard, Merchant Marines, United Nations, US Army, and the NASA Space Programs as an aerospace engineer. As one of a handful of people to ever support the Mercury, Gemini, Apollo, Skylab, Space Shuttle, and International Space Station missions, Bob was an icon to his peers. He spent 44 years in this noble endeavor called manned space flight. In the memorial service for Bob, Milt Heflin provided the following insight:

> "Bob was about making things happen, no matter what his position or rank, in whatever the enterprise was at that time…it might have been dodging bullets and bombs while establishing communication systems for United Nations outposts in crazy places…it might have been while riding the Coastal Sentry Quebec Tracking ship in the Indian Ocean…watching over the Lunar Module electrical power system or the operation of the Apollo Telescope Mount…serving as a SPAN Manager in the MCC (where a lot of really good stories were told during crew sleep)…or even while serving as the Chairman of the Annual FOD Chili Cook-off or his beloved Chairmanship of the Apollo Flight Operations Association…in each case he gave of himself so that the "mission," no matter what it was, could be successful…Bob might not have been the most efficient chairman… story telling could get in the way from time to time…but he made up for it by being a catalyst, causing the team to rise to the occasion…
>
> And, we all know quite well his love of capturing the history of manned space flight…Apollo reunions and producing the Space Shuttle Missions Summary Book are two of his legacies…events and things with Bob's hands that were done for the enjoyment of all…he took great pride in keeping the "official" Flight Director Log, a listing of those that have served as a Flight Director in Mission Control…the Log today lists 69 Flight Directors beginning with Red Flight, Chris Kraft…even I had a hard time in convincing Bob that I would not abuse my electronic copy of this list, if he would just send it to me…this list also contains the names of only five individuals designated as an Honorary Flight Director…Bob is number 5, known as 'History Flight,' given that honor upon his retirement…"

From Randy Stone: "Bob mentored all of the new Flight Controller's with his wisdom, knowledge, but more importantly his passion for human space flight."

Others commented: "Bob was a walking encyclopedia of space knowledge and also had a great sense of humor." "Bob was a rarity in the annuals of human space flight – a joyful cheerleader [with] unabashed love of the space program." "I could always rely on Bob for hard to find info. His enthusiasm for his work was obvious." "Bob was good natured and enjoyed a good joke, even if it was on him. I love Bob and will miss him."

And, shortly before Bob died, he received the following note from Bob Cabana: "Bob, I look forward to your summary Shuttle book after the last [final] Shuttle mission. I think it's the only way I'm ever going to remember what missions I capcom'ed on and who was on console with me."

The detail, the accuracy, the completeness of this Space Shuttle Missions Summary Book are a testament to Bob Legler's "passion and knowledge" for human space flight. We will finish it for him with the same dedication.

Floyd Bennett

Friend & Colleague

SPACE SHUTTLE MISSION SUMMARY

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NOTE: Yellow denotes REV T, PCN -5 Files

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CHANGE SHEET
FOR
Space Shuttle Missions Summary
BOOK 2 REV T PCN-5
JUNE 2010

CHANGE INSTRUCTIONS

1. Remove the following listed pages and replace with the same numbered pages attached:
   - Cover Page
   - Table of Contents - Pages i - ii (Added: STS-130(20A) & STS-131/(19A)
   - Page 7 of Weight Summary (Added: STS-130 & STS-131)

2. Add the following pages:
   - Pages 222 -- 225 for STS-130(20A)
   - Pages 226 – 229 for STS-131/(19A)

NOTE: The complete Shuttle Missions Summary Book is available electronically at:
http://mod.jsc.nasa.gov/da8/rules/space_shuttle_mission_summary/Default.aspx

Prepared by: Floyd V. Bennett/DA8, 281-483-9018

SPACE SHUTTLE MISSION SUMMARY

INTRODUCTION

ABOUT THE DOCUMENT

THIS DOCUMENT HAS BEEN PRODUCED AND UPDATED OVER A 21-YEAR PERIOD. IT IS INTENDED TO BE A HANDY REFERENCE DOCUMENT, BASICALLY ONE PAGE PER FLIGHT, AND CARE HAS BEEN EXERCISED TO MAKE IT AS ERROR-FREE AS POSSIBLE FOR A DOCUMENT WITHOUT FORMAL REVIEW PROCESS.

THIS DOCUMENT IS BASICALLY "AS FLOWN" DATA AND HAS BEEN COMPILED FROM MANY SOURCES INCLUDING FLIGHT LOGS, FLIGHT RULES, FLIGHT ANOMALY LOGS, MOD FLIGHT DESCENT SUMMARY, POST FLIGHT ANALYSIS OF MPS PROPELLANTS, FDRD, FRD, SODB, AND THE MER SHUTTLE FLIGHT DATA AND INFLIGHT ANOMALY LIST. ORBIT DISTANCE TRAVELED IS TAKEN FROM THE PAO MISSION STATISTICS. ROBERT D. "BOB" LEGLER AUTHORED THIS BOOK THROUGH FLIGHT STS-115. COMMENTS MAY BE DIRECTED TO NASA JSC, DA8/F. V. BENNETT, TELEPHONE 281-483-9018.

SPECIAL ENTRIES (SEVERAL ENTRIES HAVE BEEN ASSIGNED SEQUENTIAL NUMBERS FOR REFERENCE PURPOSES)

FLIGHT NUMBERS - THE FLIGHT NUMBERS INCLUDE THE OFFICIAL FLIGHT DESIGNATOR, FOLLOWED BY ORIGINAL FLIGHT DESIGNATOR/KSC FLIGHT DESIGNATOR, THE SEQUENTIAL FLIGHT NUMBER, THE KSC LAUNCH SEQUENTIAL NUMBER, THE OFT FLIGHT NUMBER (AS APPLICABLE), THE ISS FLIGHT NUMBER,THE LAUNCH PAD SEQUENTIAL NUMBER, AND MLP USED.

CREWMEMBER FLIGHT DESIGNATORS - NUMBERS RELATED TO SPACE SHUTTLE (SS) FLIGHTS ONLY:
P = SEQUENTIAL NUMBER OF PERSON FLOWN ON SS; R = SS ROOKIE NUMBER; V = SS VETERAN NUMBER (SECOND FLIGHT ON SS); M = SS MALE NUMBER; F = SS FEMALE NUMBER. NO ATTEMPT IS MADE TO DETERMINE WHICH SEAT ARRIVES IN ORBIT ON THE SAME FLIGHT. EXAMPLE: P17/R2/V1/M2 - PERSON 17, ROOKIE 2, VETERAN 1, MALE 2. ONCE ASSIGNED A NUMBER, THE CREWMEMBER RETAINS THOSE R, V, M OR F NUMBERS. ONLY THE P NUMBER WOULD CHANGE ON SUBSEQUENT FLIGHTS.

EVA'S - RELATES TO ONLY SS EVA'S. INCLUDES TYPE OF EVA, DATES/TIMES PF EVA'S, EVA CREWMEMBER NAMES, AND SEQUENTIAL NUMBER OF SS EVA'S AND EVA TIMES.

FLIGHT DIRECTORS - THE FLIGHT DIRECTORS AND MISSION OPERATIONS DIRECTOR ARE LISTED FOR EACH FLIGHT.

LAUNCH/LIFTOFF/ASCENT DATA - INCLUDES PAD NUMBER, LIFTOFF TIMES (PLANNED AND ACTUAL IN EASTERN TIME ZONE AND GMTLO TIME), DATE OF LAUNCH FOLLOWED BY A NUMBER INDICATING HOW MANY SS FLIGHTS HAVE BEEN LAUNCHED ON THAT MONTH TO DATE, DAY-OF-WEEK LAUNCH FOLLOWED BY A NUMBER INDICATING HOW MANY SS FLIGHTS WERE LAUNCHED ON THE DAY OF THE WEEK, WINDOW DURATION AND CLOSURE RATIONALE, PLANNED LANDING SITES INCLUDING THOSE SELECTED ON DAY OF LAUNCH, ASCENT EVENTS, AND ABORT CALLS. IN THE LATER FLIGHTS, THERE ARE TWO COLUMNS FOR THE ASCENT EVENTS. THE LEFT COLUMN IS PLANNED MET'S AND VELOCITIES, AND THE RIGHT SIDE IS THE ACTUAL MET'S AND VELOCITIES FOR THE SPECIFIED EVENTS.

SPACE SHUTTLE MISSION SUMMARY

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ENTRY/LANDING DATA - INCLUDES LANDING SITE/RUNWAY FOLLOWED BY A SEQUENTIAL NUMBER INDICATING THE NUMBER OF CONCRETE/LAKEBED LANDINGS AT EDW OR A SEQUENTIAL NUMBER FOR LANDINGS AT NOR AND KSC. LANDING TIME IS IN LOCAL TIME FOR THE LANDING SITE. THE LANDING DAY OF WEEK IS FOLLOWED BY A NUMBER INDICATING HOW MANY LANDINGS HAVE BEEN MADE ON THAT DAY OF THE WEEK. THE NUMBER AFTER THE LANDING DATE IS THE SEQUENTIAL NUMBER OF LANDINGS DURING THAT MONTH, I.E., 4/2/92 (7), STS-45 IS THE SEVENTH LANDING IN APRIL. EACH ORBIT DIRECTION FOR LANDING IS FOLLOWED BY A SEQUENTIAL NUMBER. THE WINDS ARE DESIGNATED IN KNOTS OF HEAD, TAIL AND LEFT AND RIGHT CROSSWINDS. THE FIRST LISTING WAS OBTAINED FROM THE MOD DESCENT POSTFLIGHT SUMMARY AND IS BASICALLY THE WINDS OBSERVED ON A DISPLAY AT THE TOUCHDOWN TIME. THE SECOND LISTING IS THE "OFFICIAL" WINDS, WHICH ARE THE 2-MINUTE AVERAGE WINDS SPANNING THE MLG TOUCHDOWN TIME. THE FLIGHT DURATIONS ARE PROVIDED IN DAYS, HOURS, MINUTES, AND SECONDS AND HOURS, MINUTES, AND SECONDS FROM LIFTOFF TO MLG TOUCHDOWN.

S/T - SHUTTLE TOTAL FLIGHT TIME, I.E., ACCUMULATED TOTAL. THIS IS FOLLOWED BY AN ORBITER DESIGNATOR AND THE ACCUMULATED FLIGHT TIME FOR THAT ORBITER.

SSME - INCLUDES NOMINAL, ABORT, AND EMERGENCY THROTTLES, PREDICTED AND ACTUAL THROTTLE PROFILE, AND ENGINE SERIAL NUMBERS FOLLOWED BY THE NUMBER OF FLIGHTS ON THAT ENGINE. FOR A LACK OF SPACE ELSEWHERE, THE MACH 3 END-OF-MISSION WEIGHTS AND X CG AND LANDING WEIGHT AND X CG HAVE BEEN ADDED IN THIS COLUMN.

SRB/SRM/RSRM - INCLUDES THE "BUILD ITEM" NUMBER FOLLOWED BY SRM/RSRM TYPE OR NUMBER.

ET COLUMN - INCLUDES ET NUMBERS, ET RUPTURE AND BREAKUP ALTITUDES AND TIMES IN MET, AND TUMBLE VALVE USE. THESE TIMES AND ALTITUDES ARE NOT CURRENTLY AVAILABLE FOR FLIGHTS AFTER STS-46.

INCLINATION - THIS IS THE INCLINATION AFTER OMS-2 AND IS FOLLOWED BY A SEQUENTIAL NUMBER INDICATING HOW MANY FLIGHTS WERE FLOWN AT THAT INCLINATION. INCLINATIONS BETWEEN 28.45 AND 28.55 HAVE BEEN CONSIDERED THE SAME FOR THE PURPOSES OF ASSIGNING SEQUENTIAL NUMBERS.

ORBIT HA/HP - INSERTIONS WERE STANDARD INSERTIONS UNLESS SPECIFICALLY STATING "DIRECT INSERTION". GENERALLY, ALTITUDES FOR POST OMS-2 ARE GIVEN, AS WELL AS PAYLOAD DEPLOY ALTITUDES AND DEORBIT ALTITUDE.

FLIGHT SOFTWARE DESIGNATORS - OI NUMBERS ARE FOLLOWED BY A SEQUENTIAL FLIGHT NUMBER FOR THAT OI.

SPACE SHUTTLE MISSION SUMMARY

INTRODUCTION

PAYLOAD COLUMN - INCLUDES CARGO, CHARGEABLE, DEPLOYED, NON-DEPLOYED, AND MIDDECK WEIGHTS AS DOCUMENTED IN THE SODB. THE FOLLOWING SHUTTLE ACCUMULATED WEIGHTS ARE PROVIDED: (1) TOTAL PAYLOAD DEPLOYED WEIGHTS LEFT IN ORBIT, (2) TOTAL NON-DEPLOYED PAYLOAD WEIGHTS (DOES NOT INCLUDE ANCILLARY EQUIPMENT SUCH AS ASE, CABLING, ETC.), AND (3) TOTAL CARGO WEIGHTS WHICH INCLUDE ALL ANCILLARY EQUIPMENT. WEIGHTS FOR SEVEN DOD FLIGHTS ARE NOT INCLUDED. PERFORMANCE MARGINS: FOUR NUMBERS ARE PROVIDED - (1) FLIGHT PLANNING RESERVE (FPR); (2) FUEL BIAS; (3) FINAL TDDP IS MARGIN ABOVE FPR, AND FUEL BIAS USING MEAN WIND AND ATMOSPHERE FOR LAUNCH MONTH, NO UNPLANNED DRAINBACK AND FINAL SELECTED I-LOAD; AND (4) RECON IS MARGIN ABOVE MET WIND AND ATMOSPHERE, ANY UNPLANNED DRAINBACK, FINAL ESTIMATED MPS LOADS (A.K.A., "RECONSTRUCTED" SYSTEMS PERFORMANCE). IT SHOULD BE NOTED THAT STS-27 DELTA MARGIN WAS -295 LBS FOR DRAINBACK, -365 LBS FOR WIND/ATMOSPHERE. STS-31 DELTA MARGIN WAS -753 LBS FOR DRAINBACK, +461 LBS FOR WIND/ATMOSPHERE. STS-41 WAS -358 LBS FOR DRAINBACK, -488 LBS FOR WIND/ATMOSPHERE. PAYLOADS ARE IDENTIFIED AS BEING PRIMARY, PAYLOAD BAY (PLB), AND/OR MIDDECK PAYLOADS. PAYLOAD COLUMN ALSO CONTAINS THE NUMBER OF CRYO TANK SETS AND WHETHER AN RMS WAS FLOWN FOLLOWED BY A SEQUENTIAL NUMBER AND SERIAL NUMBER OF THE RMS.

MISSION HIGHLIGHTS/MISCELLANEOUS DATA COLUMN - INCLUDES THE NUMBER OF KSC WORKDAYS IN OPF, AT VAB, AT PAD, AND THE TOTAL WORKDAYS. LAUNCH POSTPONEMENTS MAY NOT CONTAIN EARLY POSTPONEMENTS. POSTPONEMENTS ARE DEFINED AS LAUNCH DELAYS WHICH OCCURRED PRIOR TO CALL-TO-STATIONS FOR OMI S0007 SHUTTLE COUNTDOWN. SCRUBS ARE LAUNCH DATE CHANGES AFTER THE START OF SHUTTLE COUNTDOWN (COUNTDOWN WAS TERMINATED OR RECYCLED TO A LATER LAUNCH DATE). LAUNCH DELAYS ARE DELAYS WHICH OCCUR ONLY ON THE DAY OF LAUNCH. OTHER DATA INCLUDED ARE TAL WEATHER DATA, NIGHT LAUNCH AND NIGHT LANDING SEQUENTIAL NUMBERS, FLIGHT DURATION CHANGES, LANDING SITE CHANGES, FIRSTS, EVENTS, AND SIGNIFICANT ANOMALIES AS JUDGED BY THE COMPILER (NOT ALL ANOMALIES ARE INCLUDED). USE OF ALTERNATE AND DOLILU I-LOADS ARE INCLUDED WITH A SEQUENTIAL NUMBER FOR UPLINKS. STS-27 WAS THE FIRST FLIGHT WITH THE CAPABILITY TO UPLINK ALTERNATE I-LOADS FOR USE AND STS-48 WAS THE FIRST FLIGHT WITH DOLILU CAPABILITY. RENDEZVOUS OPERATIONS ARE IDENTIFIED INCLUDING THE TARGET AND SEQUENTIAL NUMBER OF EACH SPACE SHUTTLE RENDEZVOUS.

SPACE SHUTTLE FLIGHT WEIGHT SUMMARY - THE DATA FOR FLIGHTS STS-1 THROUGH STS-57 WAS EXTRACTED FROM THE SODB, VOLUME II. EFFECTIVE WITH STS-51, THE SODB DATA IS NO LONGER UPDATED AS FLOWN. THEREFORE, THE DATA HAS BEEN OBTAINED FROM THE DAY-OF-LAUNCH TDDP, WITH MACH 3 EOM AND LANDING WEIGHTS/CG'S FROM THE POSTFLIGHT PROP 30 REPORTS. THE PERFORMANCE MARGIN DATA WAS EXTRACTED FROM THE RI POSTFLIGHT TRAJECTORY RECONSTRUCTION REPORTS.

STARTING WITH STS-75, THE PROGRAM AGREED TO A 900-LB APM GAIN FOR ALL MISSIONS. STS-75 AND STS-76 HAVE 900 LBS OF INERT WEIGHT ADJUSTMENT (-450 LBS INERT WEIGHT DISCREPANCY ADJUSTMENT AND -450 LBS PERFORMANCE DISCREPANCY ADJUSTMENT, WHICH WERE SUBTRACTED FROM THE STS OPERATOR CHARGEABLE CARGO). EFFECTIVE WITH STS-77, THE -450 LBS WAS SUBTRACTED FROM THE STS OPERATOR CHARGEABLE CARGO AND THE -450 LBS PERFORMANCE DISCREPANCY IS INCLUDED IN THE MPS PROP INVENTORY. EFFECTIVE WITH STS-79, THE PERFORMANCE ADJUSTMENT WAS CHANGED TO -200 LBS WHICH IS SUBTRACTED FROM THE STS OPERATIONS CHARGEABLE CARGO. THE P/L DEPLOYED WEIGHTS

INTRODUCTION

FOR MIR FLIGHTS REFLECT THE WEIGHTS OF HARDWARE TRANSFERRED TO THE MIR (DOES NOT INCLUDE CONSUMABLES TRANSFERRED TO MIR).

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ACRONYM/ABBREVIATION LIST

AIM PT	AIM POINT
AL	ASCENDING LEFT
AOA	ABORT ONCE AROUND
AR	ASCENDING RIGHT
ASC	ASCENT
ASC/ENT	ASCENT/ENTRY
AVE BRK DECEL	AVERAGE BRAKE DECELERATION
BEN	BEN GUERIR
BRK INIT	BRAKE INITIATION VELOCITY IN KGS
BR/UP	BREAK UP ALTITUDE OF ET IN THOUSANDS OF FEET
BYD	BANJUL
CI	CLOSEIN
CTOB	CREW TIME ON BACK
DENS ALT	DENSITY ALTITUDE
DL	DESCENDING LEFT
DOLILU	DAY OF LAUNCH I-LOAD UPDATE
DR	DESCENDING RIGHT
EDW	EDWARDS AFB
EMU	ENVIRONMENTAL MOBILITY UNIT
ET	EXTERNAL TANK
EVA	EXTRA VEHICULAR ACTIVITY
F	SS FEMALE NUMBER
FDRD	FLIGHT DEFINITION & REQUIREMENTS DOCUMENT
FPR	FLIGHT PLANNING RESERVE
FRD	FLIGHT REQUIREMENTS DOCUMENT
GMTLO	GREENWICH MEAN TIME OF LIFTOFF
HA/HP	APOGEE AND PERIGEE IN NAUTICAL MILES
HDOT	TOUCHDOWN ALTITUDE RATE
KEAS	KNOTS EQUIVALENT AIRSPEED
KGS	KNOTS GROUND SPEED
KSC W/D	KSC WORKDAY
LD/O1	LEAD/ORBIT 1 SHIFT
LDA	LAUNCH DANGER AREA
M	SS MALE NUMBER
M 3 EOM	MACH 3 END OF MISSION
MECO	MAIN ENGINE CUT OFF
MET	MISSION ELAPSED TIME
MLGTD	MAIN LANDING GEAR TOUCHDOWN
MLP	MOBILE LAUNCH PLATFORM
MMT	MISSION MANAGEMENT TEAM
MMU	MANNED MANEUVERING UNIT/
MOD	MISSION OPERATIONS DIRECTOR MISSION OPERATIONS DIRECTORATE
MPS	MAIN PROPULSION SYSTEM
MRN	MORON
M/S	MISSION SPECIALIST
MTR	MOTOR

ACRONYM/ABBREVIATION LIST

N	NOMINAL
NEG RET	NEGATIVE RETURN
NLGTD	NOSE LANDING GEAR TOUCHDOWN
O1, O2, O3	ORBIT 1, 2, OR 3 FLIGHT DIRECTOR SHIFTS
OFT	OFFICIAL FLIGHT DESIGNATOR
OI	OPERATIONAL INCREMENT
OMS	ORBITAL MANEUVERING SYSTEM
OPF	ORBITER PROCESSING FACILITY
ORB DIR	ORBIT DIRECTION
P	SEQUENTIAL NUMBER OF PERSON FLOWN ON SS
PERF	PERFORMANCE
PERF MARGINS	PERFORMANCE MARGINS
P/L	PAYLOAD
PLNG	PLANNING SHIFT
PLS	PLANNED LANDING SITE
P/S	PAYLOAD SPECIALIST
PTA	PRESS TO ABORT ONCE AROUND
PTM	PRESS TO MECO
R	SS ROOKIE NUMBER
RECON	RECONSTRUCTED
RMS	REMOTE MANIPULATOR SYSTEM
RPT	RUPTURE OF ET IN THOUSANDS OF FEET
RSRM	REDESIGNED SOLID ROCKET MOTOR
RTLS	RETURN TO LAUNCH SITE
SEQ	SEQUENTIAL
SLS	SECONDARY LANDING SITE
SODB	SHUTTLE OPERATIONAL DATA BOOK
SS	SPACE SHUTTLE OR SUN SHIELD
SSME	SPACE SHUTTLE MAIN ENGINE
S/T	SHUTTLE TOTAL FLIGHT TIME
TAL	TRANSOCEANIC ABORT LANDING
TD NORM 195	NORMALIZED TOUCHDOWN RANGE AT 195 KEAS
TDDP	TRAJECTORY DESIGN DATA PACKAGE
TDEL	DIFFERENCE IN REFERENCE TIME FOR SSME THROTTLE ADJUSTMENT
TK	TANK
T/V	TUMBLE VALVE
V	SS VETERAN NUMBER
VAB	VEHICLE ASSEMBLY BUILDING
VEL	VELOCITY
VI	INERTIAL VELOCITY
W/D	WORKDAY
WX	WEATHER
X CG	X CENTER OF GRAVITY
XRANGE	CROSSRANGE
ZZA	ZARAGOZA

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SPACE SHUTTLE MISSIONS SUMMARY
DATA SOURCES - APPENDIX A

REV T PCN-2

This appendix provides the data sources and Point(s) of Contact (POC's) used in preparing the portion of the Space Shuttle Mission Summary Book for missions STS-116 and all missions to follow. My thanks to all these contributors and many others who helped me find my way to the correct mission data.

Floyd V. Bennett
(JSC-DA8)[USA/GHG]

ITEM	DATA SOURCES
COLUMN 1: FLT NUMBER	
FLT NO.	FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm
SEQ FLT #	Calculated from previous missions
KSC- #	Calculated from previous missions at KSC
PAD #	FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm
PAD # (#)	Calculated from previous missions same pad
MLP-3	FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm
# SHUTTLE FLIGHT TO ISS	Calculated from previous missions to ISS
COLUMN 2: ORBITER	
ORBITER Vehicle Designation (Number of Flights) Vehicle Name	FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm
OMS PODS Left POD #, Right POD #, & FWD RCS POD #	MV/Orbiter Project Office, POC's: Dwyer, Kenneth J. (JSC-MV6) and Storm, Michael D. (KSC-USA)
# of Flights of each POD	# of flights calculated from previous flight of the POD's

SPACE SHUTTLE MISSIONS SUMMARY
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ITEM	DATA SOURCES
COLUMN 3: CREW SIZE: TITLE, NAMES, AND EVA'S	
FLIGHT CREW SIZE	FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm
FLIGHT CREW, FLIGHT DIRECTORS, & CAPCOMS TITLES & NAMES	DA8/Lead Flight Directors Memos & JSC PAO Mission Press Kit: http://www.shuttlepresskit.com
EVA's	
Type and Duration	JSC PAO Shuttle Status Reports: http://www.nasa.gov/centers/johnson/news/shuttle/index.html MMT Briefings
# of EVA's	Calculated from previous mission EVAs
COLUMN 4: LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	
LAUNCH SITE	
Launch Pad	FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm
Launch Date & Time	Ascent FDO Post Flight Report, POC's: Gonzalez, Edward P. (JSC-DM) and Sparks, Carson W. (JSC-DM) [USA]
Day of Week (#)	Refers to # of launches that day of week calculated from previous missions same day of week
Date (#)	Refers to # of launches that month calculated from previous missions same month
LAUNCH WINDOW	Real-time data, POC: Sparks, Carson W. (JSC-DM) [USA]
EOM PLS	Planned landing site: FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm
TAL	Ascent FDO Post Flight Report, POC's: Gonzalez, Edward P. (JSC-DM) and Sparks, Carson W. (JSC-DM) [USA]
TAX WX	Spacecraft Meteorology Group Post Mission Summary, POC: Oram, Timothy D. (JSC-WS8) [NOAA]
SELECTED: RTLS, TAL, AOA, PLS	LSO Post-Flight Summary, POC: Linde, Martin G. (JSC-DM) [USA] & Hensley,Doyle W. (JSC-DM461)
MAX Q NAV	STS-XXX GNC First Stage Reconstruction: https://sspweb.jsc.nasa.gov/webdata/sei/t_Post%20Flight%20Reports/ POC's: Cooper, Carling C. (Boeing), and Biskup, Bruce A., (Boeing)
SRB STG: [MET]	STS-XXX Ascent Performance Trajectory Reconstruction letter, POC: Stephen P. Brod/The Boeing Company (HM5-20)
ALL REMAINING DATA THIS COLUMN	Ascent FDO Post Flight Report, POC's: Gonzalez, Edward P. (JSC-DM) and Sparks, Carson W. (JSC-DM) [USA]

SPACE SHUTTLE MISSIONS SUMMARY
DATA SOURCES - APPENDIX A

ITEM	DATA SOURCES

COLUMN 5: LANDING SITE/RUNWAY, CROSSRANGE, LANDING TIMES, FLIGHT DURATION, WINDS

ALL ITEMS EXCEPT ENTRIES LISTED BELOW:	Descent Postflight Summary & Quicklook Reports: http://usa1.unitedspacealliance.com/usahou/orgs/48-20/dsct/pf/ POC: Schill, Barbara C. (USA)
LANDING EVENTS	
Time of Landing	Image Science & Analysis group: http://isal-web1.jsc.nasa.gov/Shuttle/ShowPage.pl?template=default.htm Ascent/Descent Flight Design, POC: Lessmann, Christopher F. (USA)
Site (#)	Site (#) refers to # of landings at a site, calculated from previous landing at that site
Surface (#)	Surface (#) refers to # of landings on surface from previous landings on same surface
Landing Day of Week (#)	(#) refers to # of landings on that particular weekday, calculated from landings on same weekday
Landing Date (#)	(#) refers to # of landings in a particular calendar month, calculated from landings in the same calendar month
DEORBIT BURN	GMT (e.g., 051:12:59:52.0Z)-DM Trajectory Server - Legler Report, POC's:Propst, Carolyn A. (USA) & Deboeck, Toni F (USA)
ORBIT DIR	(#) refers to # of landings from the same direction, calculated from # of last mission at same direction
TIME OF EVENTS DURING LANDING	LLIMS Events: http://isal-web1.jsc.nasa.gov/llims/ObservationPublic.aspx?Mode=screening&mission=STS-XXX
ROLLOUT	
Distance (ft)	Calculated: wheels stop position - X RWY position
Time (sec)	Calculated: wheels stop GMT - MLGTD GMT
WINDS: OFFICIAL and DENS ALT (ft)	Spaceflight Meteorology Post Flight Mission Summary, POC: Oram, Timothy D. (JSC-WS8) [NOAA]
FLT DURATION	
S/T	Shuttle total flight time, calculated: mission duration + sum of previous missions
OV-XXX:	Total flight time for specific orbiter vehicle, calculated: mission duration + sum of previous missions
DISTANCE	Statute miles traveled this mission: PAO Missions Stats Report, POC: Herring, Kyle J. (JSC-AP311)
TOTAL SHUTTLE DISTANCE	Calculated: distance traveled this mission + sum of previous missions PAO Missions Stats Report, POC: Herring, Kyle J. (JSC-AP311)

ITEM	DATA SOURCES
COLUMN 6: SSME-TL, NOM-ABORT, EMERG THROTTLE PROFILE	
SSME THROTTLE LEVELS PREDICTED ACTUAL	 FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm Ascent FDO Post Flight Report, POC's: Gonzalez, Edward P. (JSC-DM) and Sparks, Carson W. (JSC-DM) [USA]
ENG. S.N. (#)	FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm Refers to # of flights by engine serial number - calculated from previous flight by that SSME
M 3 EOM and LANDING WEIGHT and X CG	 IDP Cycle/Prop30 Aerosciences Report/Version 01, POC: Schill, Barbara C. (USA)
COLUMN 7: SRB, RSRM, AND ET	
SRB, RSRM, and ET	FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm
ET IMPACT: MET, LAT, LONG	STS-XXX Nominal ET Disposal Chart and ET Summary Table, POC: Dulski, Matthew B. (USA) & Strach, Daniel P (USA)
COLUMN 8: ORBIT INCLINATION	
INC	FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm
COLUMN 9: ORBIT HA/HP	
INSERTION (type)	FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm
POST OMS-2 (nm) and DEORBIT HA/HP	 DM Trajectory Server - Legler Report Request, POC's: Propst, Carolyn A. (USA) and Deboeck, Toni F (USA)
ENTRY VELOCITY (fps) and ENTRY RANGE (nm)	 Descent Post Flight Summary: http://usa1.unitedspacealliance.com/usahou/orgs/48-20/dsct/pf/, POC: Hill, Trudy D. (Debbie) (USA)
COLUMN 10: FLIGHT SOFTWARE (FSW)	
OI-XX (#)	Orbit Insertion Flight Software version # - FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm (#) refers to # of flights flown - calculated from last flight of that FSW version

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ITEM	DATA SOURCES

COLUMN 11: PAYLOAD WEIGHTS; PAYLOADS, EXPERIMENTS

PAYLOAD WEIGHTS TOTAL, MIDDECK, DEPLOYED, and NON-DEPLOYED	Day of Launch (DOL) Trajectory Design Data Package (TDDP), POC: Bhula, Jayantilal (Jay) (USA)
SHUTTLEACCUMULATED WEIGHTS DEPLOYED, NON-DEPLOYED, and CARGO TOTAL	Calculated (summed) from previous missions
PERFORMANCE MARGIN (LBS) FPR and FUEL BIAS, FINAL TDDP RECON	Day of Launch (DOL) Trajectory Design Data Package (TDDP), POC's: Bhula, Jayantilal (Jay) (USA) Provided by Mike . L. Scott/USA/FDD POC STS-XXX Ascent Performance Trajectory Reconstruction, POC:
ASSIGNMENTS PAYLOADS: PLB and MIDDECK # CRYO TANK SETS STS OPERATOR SELECTIONS	FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm
RMS (#)	-# of flights RMS flown - calculated from previous missions with RMS

ITEM	DATA SOURCES

COLUMN 12: MISSION HIGHLIGHTS

BRIEF MISSION SUMMARY	JSC PAO Mission Press Kit: http://www.shuttlepresskit.com/ MMT Minutes: https://sspweb.jsc.nasa.gov/mmt/
KSC W/D (Work Days)	KSC Milestone Interface Chart, POC: Overton, Thomas L. (KSC) [ASRC AEROSPACE]
LAUNCH POSTPONEMENTS	SSPO PRCB Directives: https://sspweb.jsc.nasa.gov/meeting/mtgdata.cfm
LAUNCH SCRUBS	MMT Minutes: https://sspweb.jsc.nasa.gov/mmt/
LAUNCH WINDOW	Real-time Data, POC: Sparks, Carson W. (JSC-DM) [USA]
LAUNCH DELAYS	MMT Minutes: https://sspweb.jsc.nasa.gov/mmt/
TAL WEATHER	Spaceflight Meteorology Group Post Mission Summary, POC: Oram, Timothy D. (JSC-WS8) [NOAA]
PERFORMANCE ENHANCEMENTS	Day of Launch (DOL) Trajectory Design Data Package (TDDP), POC: Bhula, Jayantilal (Jay) (USA)
FLIGHT DURATION CHANGES/LANDING	MMT Minutes: https://sspweb.jsc.nasa.gov/mmt/ Spaceflight Meteorology Group Post Mission Summary, POC: Oram, Timothy D. (JSC-WS8) [NOAA]
FIRSTS/LASTS	JSC PAO Mission Press Kit: http://www.shuttlepresskit.com/ Flight Readiness Reviews: https://sspweb.jsc.nasa.gov/webdata/launch/
NIGHT LAUNCH (#)	Number of night launches, calculated from previous night launch mission
NIGHT LANDING (Site, #)	Number of night landings at specified site, calculated from previous night landing mission at that site
RENDEZVOUS	Number of rendezvous missions, calculated from previous rendezvous mission

Continued…

SPACE SHUTTLE MISSIONS SUMMARY
DATA SOURCES - APPENDIX A

ITEM	DATA SOURCES
COLUMN 12 MISSION HIGHLIGHTS (Continued)	
EVENTS	
Time of on-orbit maneuver events (OMS 2, IT, etc.)	DM Trajectory Server - Legler Report, POC's: Propst, Carolyn A. (USA) and Deboeck, Toni F (USA)
Time of docking/undocking events	APDS sensor Data from the ODRC, POC: Dake, Janna J. (JSC-DS421)
Time of ISS hatch opening and crew welcome	JSC PAO Shuttle Status Reports: http://www.nasa.gov/centers/johnson/news/shuttle/index.html
EVA descriptions and durations	Post flight EVA notes (provided by DX POC) JSC PAO Shuttle Status Reports: http://www.nasa.gov/centers/johnson/news/shuttle/index.html
Transfers (hardware and consumables weights)	STS-XXX Final Customer Support Room (CSR) Report and STS-XXX Mission by the Numbers (provided by MO POC's)
SIGNIFICANT ANOMALIES	PCASS In-flight Anomalies: https://usa93.usa-spaceops.com:4443/adamvweb/ifa.ifa_search2.wp_execfind
ENTRY BLACKOUT	INCO Electronic Flight Log (Provided by DS POC Steve Sides)
WEIGHT SUMMARY	
All entries except entries below:	Day of Launch (DOL) Trajectory Design Data Package (TDDP): POC: Bhula, Jayantilal (Jay)/USA
Orbiter Tail No.	FDRD: https://sspweb.jsc.nasa.gov/webdata/pdcweb/07700.htm
Shuttle /PL Accumulated WTs	Calculated from previous missions
Weight at Orbit Insertion	Ascent Post Flight Data (provided by Gonzalez, Edward P./JSC-DM)
Performance Margin	
Final TDDP	(Provided by Mike . L. Scott/USA/FDD POC)
Reconstructed	STS-XXX Ascent Performance Trajectory Reconstruction (provided by Kristin Smaltz Boeing/GN&C)
Orbiter at Mach 3 EOM and at Landing	IDP Cycle/Prop30 Aerosciences Report (provided by Barbara C. Shill/USA/FDD/SDM)
PHOTOS	Identified by NASA Number, unless otherwise noted.

SPACE SHUTTLE FLIGHT WEIGHT SUMMARY

(SOURCES: SODB, VOL II Thru STS-57 & DOL TDDP for STS-51 and Beyond)

Revision T PCN-5
June 2010

FLIGHT	ORBITER							CARGO								ORBITER TOTALS			ET TOTAL @ SRB IGN	SRB TOTAL LEFT & RIGHT	SHUTTL TOTAL @ SRB IGN	PERF MARG FINAL TDDP & RECO	ORBITER AT MACH 3 EOM		ORBITER AT LANDING	
								FLIGHT PAYLOAD WEIGHTS					FLIGH	ACCUMULATED													
	TAI NO. OV-	W/O CONS.	NON PRO CON @ SRB IGN	OMS PROP	RCS PROP		ORB TOTAL @ SRB IGN	PRI DPLY/ NON-DPLY	DPL AND RET	RET ONL	ANCI OR * MID-DEC	CHAR ABLE PYLD/ STS	CARG TOTA	PYLD DPLY/ NON-DPLY	CARGO TOTAL	WT @ SRB IGN	WT @ ORBIT INSERT	ACCUM WT @ ORBIT INSERT					WT	X CG	WT	X CG
					FWD	AFT																				
STS-1	102 (1)	172425	5197	18408	2461	5371	208437	0 10823	0	0			10823	0 10823	10823	219260	208415	208415	1664455	1295940 1298160	4459280	NOT AVAILABLE	195943	1096.7	195473	1098.1
STS-2	102 (2)	175211	5922	18011	2469	5383	212161	0 18778	0	0			18778	0 29601	29601	230939	219844	428259	1647514	1296747 1296784	4471984	2049 275	204356	1096.6	204263	1098.1
STS-3	102 (3)	175374	6560	17919	2446	5384	212846	0 22710	0	0			22710	0 52311	52311	235556	222985	651244	1643507	1296696 1296915	4470555	5343 2278	207349	1095.4	207073	1096.9
STS-4	102 (4)	175581	6588	22155	2446	5344	217280	0 9800	0	0	1844	11644 12848	24492	0 63955	76803	241772	228442	879696	1644745	1298213 1299253	4483983	4038 1195	209141	1092.9	208947	1094.4
STS-5	102 (5)	176729	5507	19804	2448	5379	215033	14585 5167	0	0	1078	20830 12596	32080	14585 70200	108883	247113	231213	1110869	1644995	1298256 1298714	4489078	822 -1017	202643	2094.8	202480	1096.3
STS-6	099 (1)	172837	5364	19242	1964	5384	209957	37546 6853	0	0	2263	46662 1794	46971	52131 79316	155854	256928	241325	1352224	1644495	1295364 1296180	4488967	4755 2463	190627	1099.7	190330	1101.2
STS-7	099 (2)	172822	5415	21015	2449	5372	212239	14949 13002	3192	0	3942	31893 5448	37124	67080 96260	192978	249363	233619	1585843	1644631	1295695 1294346	4484035	2940 2021	204340	1089.8	204043	1091.2
STS-8	099 (3)	172879	5363	22011	2456	4962	212837	7445 13179	0	0	5166	25790 4440	30076	74525 114605	223054	242913	227365	1813208	1656386	1297016 1297508	4493822	14863 15735	204141	1090.4	203945	1091.9
STS-9	102 (6)	179369	6184	16000	2446	5384	214549	0 32261	0	0	MIDDECK 0 CRYO TK 870	33131 1708	33264	74525 147736	256318	247813	235793	2049001	1662238	1298367 1297983	4505505	841 -411	220288	1085.8	220027	1087.1
STS 41-B (STS-11)	099 (4)	173041	6210	24704	2446	4970	216537	15073 10198	0	0	2981	28252 5598	33868	89598 160915	290186	250405	234108	2283109	1662570	1295569 1296187	4500237	12062 6961	201529	1087.9	201239	1089.3
STS 41-C	099 (5)	173207	5285	25096	2449	5012	216215	21396 12394	0	0	41	33831 4446	38266	110994 173350	328452	254481	245167	2528276	1661790	1295828 1296378	4508234	995 -3322	197170	1100.0	196976	1101.6
STS-41-DR	103 (1)	173911	5748	23864	2446	4970	216105	30086 10122	0	0	1174	41382 6521	47516	141080 184646	375968	263621	246903	2775179	1662823	1296101 1298244	4518538	-1611 -1564	202317	1090.7	201675	1091.7
STS 41-G	099 (6)	175411	6236	25088	2465	4970	219326	4949 11986	0	0	657	17592 5772	23465	146029 197289	399433	242791	226344	3001523	1662451	1296571 1296300	4495592	2194 3375	202829	1083.7	202266	1084.8
STS 51-A	103 (2)	174036	6311	25107	2446	4970	218016	22764 15052	0	2381	187	38003 7717	45306	168793 212528	444739	263352	247014	3248537	1662369	1299428 1299700	4522111	281 1003	207983	1081.4	207506	1082.6
STS 51-C	103 (3)																					-- -1457		1091.8	197700	1096.8
STS 51-D	103 (4)	174756	6272	21464	2446	4970	214855	22576 5092	0	0	1079	28747 7265	35794	191369 218699	480513	250679	239298	3487835	1661830	1297460 1296665	4504439	1243 1957	198167	1092.7	198014	1094.3
STS 51-B	099 (7)	174968	5397	22900	2446	4970	215847	105 30341	0	0	302	30748 1727	31377	191474 249342	511910	247254	230944	3718779	1661509	1296246 1296969	4501978	2536 3609	213795	1084.1	213499	1085.4
STS 51-G	103 (5)	174862	6272	18600	2446	4970	212316	22832 14866	2217	0	560	38258 6299	44477	214306 264768	556387	256823	243779	3962558	1661726	1297968 1298704	4518845	160 -1664	204321	1082.1	204169	1083.7
STS-51-F	099 (8)	175260	5397	25064	2446	4970	218303	0 31257	0	0	1755	33012 1492	34400	214306 297780	590787	252733	237931	4200489	1661338	1300211 1300031	4514313	NOT AVAILABLE	216894	1079.8	216735	1081.3

SPACE SHUTTLE FLIGHT WEIGHT SUMMARY

(SOURCES: SODB, VOL II Thru STS-57 & DOL TDDP for STS-51 and Beyond)

Revision T PCN-5
June 2010

FLIGHT	ORBITER							CARGO								ORBITER TOTALS						PERF MARG FINAL TDDP & RECO	ORBITER AT MACH 3 EOM		ORBITER AT LANDING	
								FLIGHT PAYLOAD WEIGHTS						ACCUMULATED														
	TAI NO. OV-	W/O CONS.	NON PRO CON @ SRB IGN	OMS PROP	RCS PROP		ORB TOTAL @ SRB IGN	PRI DPLY/ NON-DPLY	DPL AND RET	RETR ONLY	MID-DEC	CHAR PYLD/ STS	FLIGH CARG TOTA	PYLD DPLY/ NON-DPLY	CARGO TOTAL	WT @ SRB IGN	WT @ ORBIT INSERT	ACCUM WT @ ORBIT INSERT	ET TOTAL @ SRB IGN	SRB TOTAL LEFT & RIGHT	SHUTTL TOTAL @ SRB IGN		WT	X CG	WT	X CG
					FWD	AFT																					
STS 51-I	103 (6)	174785	6272	24646	2446	4970	218285	30289 8221	0	0	374	38884 5223	43988	244595 306375	634775	262303	249479	4449968	1661662	1297697 1298536	4520198	176 -1145	196856	1092.4	196674	1094.2
STS 51-J	104 (1)																								190765	1101.2
STS 61-A	099 (9)	175531	5397	18300	2446	4970	211810	150 27330	0	0	2164	30519 1587	31911	244745 335869	666686	243751	227797	4677765	1665455	1298021 1297886	4505113	6222 6219	214325	1083.8	214171	1085.2
STS 61-B	104 (2)	175615	6272	20000	1882	4970	213905	27465 13986	0	0	1337	42788 5236	47509	272210 351192	714195	261444	250836	4928601	1661470	1296606 1296018	4515538	874 2332	205880	1084.4	205732	1085.9
STS 61-C	102 (7)	185529	5692	22700	2096	4970	223153	12351 15837	0	0	437	28625 5547	32733	284561 367466	746928	255916	238764	5167365	1665325	1295611 1295702	4512534	10754 11127	210325	1083.6	210161	1085.1
STS 51-L	099 (10)	175760	5397	21500	2446	4970	215239	37636 10167 PROJECTED	0	0	830	48633 4171	52655			267929			1665170	1297828 1297848	4528770	NOT AVAILABLE	199585 PROJECTED	1089.7 PROJECTED	199438 PROJECTED	1091.3 PROJECTED
STS-26	103 (7)	176680	5409	14000	1914	4970	208139	37514 5928	0	0	1159	44601 3073	46448	322075 374553	793376	254617	243158	5410523	1664857	1301509 1301424	4522407	1546 624	194347	1096.6	194184	1098.3
STS-27	104 (3)																					2905 -286			190956	1095.1
STS-29	103 (8)	177365	5409	13984	1914	4973	208811	37640 6727	0	0	949	45316 3303	47394	359715 382229	840770	256235	244949	5655472	1664872	1300254 1300916	4522277	3772 2995	194940	1093.7	194790	1095.3
STS-30	104 (4)	177163	5415	18916	1906	4977	213543	40118 5540	0	0	165	45823 3140	17783	399833 387934	888553	261356	245051	5900523	1664743	1300247 1300880	4527426	4709 2650	192558	1097.4	192460	1099.1
STS-28	102 (8)																					409 158			200214	1089.4
STS-34	104 (5)	177407	5479	14007	1926	4987	208972	38323 6696	0	0	886	45905 3871	48613	438156 395516	937166	257615	246268	6146791	1664981	1300812 1300165	4523573	2103 -132	196112	1093.1	195954	1094.7
STS-33	103 (9)																					1157 653			194282	1094.8
STS-32	102 (9)	184982	7165	25187	2224	4951	229575	15316 1962	0	21398	1039	18317 8141	26458	453472 398517	963624	256063	244557	6391348	1664843	1299175 1299406	4510498	1956 992	228523	1078.2	228335	1079.6
STS-36	104 (6)																					881 930			187200	1096.4
STS-31	103 (10)	177516	5556	25045	2219	4966	220468	23095 960	0	0	652	25517 3126	28643	476567 400129	992267	249141	231665	6623013	1665069	1300241 1300214	4514665	2861 1352	189309	1087.9	189118	1089.7
STS-41	103 (11)	177599	5406	14509	1861	4961	209502	38604 6732	0	0	837	46173 3796	49969	515171 407698	1042236	259501	248128	6871141	1664877	1301372 1301388	4527138	1270 -152	196982	1089.4	196869	1091.2
STS-38	104 (7)																					863 474			191091	1098.6

SPACE SHUTTLE FLIGHT WEIGHT SUMMARY

(SOURCES: SODB, VOL II Thru STS-57 & DOL TDDP for STS-51 and Beyond)

Revision T PCN-5
June 2010

FLIGHT	ORBITER							CARGO								ORBITER TOTALS			ET TOTAL @ SRB IGN	SRB TOTAL LEFT & RIGHT	SHUTTL TOTAL @ SRB IGN	PERF MARG FINAL TDDP & RECO	ORBITER AT MACH 3 EOM		ORBITER AT LANDING	
								FLIGHT PAYLOAD WEIGHTS					FLIGH	ACCUMULATED													
	TAI NO. OV-	W/O CONS.	NON PRO CON @ SRB IGN	OMS PROP	RCS PROP FWD	RCS PROP AFT	ORB TOTAL @ SRB IGN	PRI DPLY/ NON-DPLY	DPL AND RET	RET ONL	MID-DEC	CHAR ABLE PYLD/ STS	CARG TOTA	PYLD DPLY/ NON-DPLY	CARGO TOTAL	WT @ SRB IGN	WT @ ORBIT INSERT	ACCUM WT @ ORBIT INSERT					WT	X CG	WT	X CG
STS-35	102 (10)	184580	7156	19339	2232	4971	223444	0 25968	0	0	1792	27760 5277	33037	515171 435458	1075273	256511	243474	7114615	1664775	1300088 1300140	4521514	4131 3812	225531	1079.1	225329	1080.5
STS-37	104 (8)	177763	5379	20053	1835	4971	215167	34442 1615	0	0	743	36800 3761	40561	549613 437816	1115834	255758	240809	7355424	1664803	1300130 1299254	4519945	1116 525	190266	1087.4	190098	1089.2
STS-39	103 (12)	179611	6257	22553	2451	4974	221012	827 16046	4046 3955	0	494	21413 4881	26294	550440 454356	1142128	247336	236623	7592047	1664494	1299733 1301485	4513048	1054 2768	211673	1080.3	211512	1082.0
STS-40	102 (11)	185755	7111	13265	1919	4968	218184	0 26237	0	0	1877	28114 5593	33707	550440 482470	1175835	251921	241175	7833222	1664845	1301303 1301723	4519792	3137 4212	226737	1079.6	226535	1080.9
STS-43	104 (9)	177623	6245	14126	1860	4972	209992	37575 8146	0	0	991	46712 2613	49325	588015 491607	1225160	259347	247964	8081186	1664898	1299653 1299220	4523118	2656 2593	196353	1087.4	196088	1089.7
STS-48	103 (13)	178149	5466	22643	2061	4970	218455	14388 2066	0	0	690	17144 4425	21569	602403 494363	1246729	240054	224141	8305327	1665078	1298959 1298580	4502671	510 -562	192925	1096.0	192780	1097.8
STS-44	104 (10)	177916	6245	16390	1893	4976	212586	37588 5809	0	0	1240	44637 2598	47235	639991 501415	1293964	259851	247087	8552414	1664283	1298356 1300086	4522576	565 1025	195047	1090.8	194818	1092.5
STS-42	103 (14)	178203	6341	14469	1908	4974	211062	0 26453	0	0	2210	28663 3701	32364	639991 530075	1326328	243456	231497	8783911	1664527	1300167 1299324	4507474	2511 2716	218159	1080.6	218089	1082.2
STS-45	104 (11)	177732	6337	16894	2180	4970	213279	0 15538	0	0	2145	17683 2658	20341	639991 547758	1346669	233650	222086	9005997	1664861	1298457 1298957	4496035	11017 10427	205672	1085.4	205588	1087.2
STS-49	105 (1)	180161	6197	19916	2448	4971	218859	23346 8766	0	0	697	32809 4635	37444	663337 557221	1384113	256333	246008	9252005	1664838	1299195 1298788	4519154	3351 3206	201400	1084.4	201235	1086.2
STS-50	102 (12)	186622	9760	16830	1903	4967	225218	0 22126	0	0	2179	24305 8142	32447	663337 581526	1416560	257695	245902	9497907	1664945	1298413 1299050	4520103	2940 3276	225865	1077.7	225615	1079.1
STS-46	104 (12)	178089	6380	24887	2451	4968	221941	9901 16094	1486 1396	0	1104	28585 5475	34060	673238 598724	1450620	256031	241797	9739704	1664720	1297746 1298292	4516789	2825 1942	209851	1078.2	209532	1079.6
STS-47	105 (2)	179161	6286	14559	1917	4979	212058	0 26247	0	0	1845	28092 4388	32480	673238 626816	1483100	244568	232661	9972365	1664720	1298225 1299291	4506804	1348 2887	220325	1083.7	220195	1085.3
STS-52	102 (13)	186650	7127	17398	2163	4974	223478	5577 12475	0	0	2080	20132 6730	26862	678815 641371	1509962	250370	239178	10211543	1664613	1299187 1300395	4514565	10788 9801	216043	1082.6	215935	1084.3
STS-53	103 (15)	179035	5874	18600	1912	4964	215551	20789 4299	0	0	1030	26118 2198	28316	699604 646700	1538278	243897	230731	10442274	1664985	1299174 1298531	4506587	1368 2844	194028	1089.5	193851	1091.3
STS-54	105 (3)	178558	5895	14278	1925	4980	210802	37497 7991	0	0	1052	46540 2499	49039	737101 655743	1587317	259871	248338	10690612	1664458	1299819 1299151	4523299	2659 3421	197481	1091.6	197353	1093.4
STS-56	103 (16)	179811	6287	17526	2456	4967	216223	0 12568	2840 2798	0	1031	16439 4561	21003	737101 669342	1608317	237253	225597	10916209	1664388	1299765 1300514	4501920	9521 10714	208052	1084.6	207946	1086.3
STS-55	102 (14)	186929	7345	15687	1928	4967	222022	0 24599	0	0	2282	26881 6535	33416	737101 696223	1641733	255468	244156	11160365	1664456	1298515 1300561	4519000	6248 7559	227484	1078.4	227209	1079.7
STS-57	105 (4)	179410	6412	25147	2450	4969	223554	132 18244	0	9424	1254	19630 9489	29119	737233 715721	1670852	252703	239319	11399684	1664332	1300548 1300983	4518566	2030 2162	224752	1081.1	224468	1082.5

SPACE SHUTTLE FLIGHT WEIGHT SUMMARY

(SOURCES: SODB, VOL II Thru STS-57 & DOL TDDP for STS-51 and Beyond)

Revision T PCN-5
June 2010

FLIGHT	ORBITER							CARGO								ORBITER TOTALS			ET TOTAL @ SRB IGN	SRB TOTAL LEFT & RIGHT	SHUTTL TOTAL @ SRB IGN	PERF MARG FINAL TDDP & RECO	ORBITER AT MACH 3 EOM		ORBITER AT LANDING	
					RCS PROP			FLIGHT PAYLOAD WEIGHTS						ACCUMULATED													
	TAI NO. OV-	W/O CONS.	NON PRO CON @ SRB IGN	OMS PROP	FWD	AFT	ORB TOTAL @ SRB IGN	PRI DPLY/ NON-DPLY	DPL AND RET	RET ONL	MID- DEC	CHAR ABLE PYLD/ STS	CARG TOTA	PYLD DPLY/ NON-DPLY	CARGO TOTAL	WT @ SRB IGN	WT @ ORBIT INSERT	ACCUM WT @ ORBIT INSERT					WT	X CG	WT	X CG
STS-51	103 (17)	179422	6003	16743	2451	4978	214763	268897305	7321	0	1122	426374048	46685	764122 724148	1717537	261487	250023	11649708	1664649	1298328 1298670	4523125	1358 1273	207043	1084.8	206932	1086.5
STS-58	102 (15)	187669	9789	14520	1945	4975	224062	0 21754	0	0	1373	231278884	32011	764122 747275	1749548	256103	244860	11894568	1664337	1298196 1298502	4517138	767 1114	229481	1078.8	229369	1080.4
STS-61	105 (5)	181308	7000	24989	2451	4971	225885	2308 14428	0	2148	665	174016962	24363	766430 762368	1773911	250279	236670	12131238	1664521	1298559 1298436	4511794	927 554	212947	1078.9	212836	1080.6
STS-60	103 (18)	179635	6510	18045	2450	4972	216778	171 21015	0	0	1110	222966661	28957	766601 784493	1802868	245765	233290	12364528	1664515	1298776 1298783	4508839	110 306	216663	1079.6	216595	1081.3
STS-62	102 (16)	187779	9733	16797	2091	4968	226533	0 18512	* 0	0	1280	19792 10224	30016	766601 804285	1832884	256579	245457	12609985	1664370	1299668 1299184	4519801	871 1795	228360	1082.6	228250	1084.1
STS-59	105 (6)	180488	7220	13287	1924	4976	213061	0 26002	0	0	1445	274476311	33758	766601 831732	1866642	246849	237048	12847033	1664202	1300061 1300299	4511411	2856 1731	221981	1079.6	221865	1081.2
STS-65	102 (17)	188398	9567	16385	1898	4975	226389	0 22521	0	0	1761	24282 8598	32880	766601 856014	1899522	259296	247778	13094811	1664460	1299585 1300097	4523441	2169 3531	229368	1078.6	229261	1080.1
STS-64	103 (19)	180122	6286	16789	2451	4969	215783	0 16212	28422800	0	1363	204175204	25621	766601 873589	1925143	241439	230743	13325554	1664420	1298946 1299121	4503921	6409 9639	212294	1082.3	212180	1083.9
STS-68	105 (7)	180520	7225	13321	1913	4976	213121	0 25997	0	0	1643	276406612	34252	766601 901229	1959395	247404	237742	13563296	1664393	1299294 1299523	4510613	1721 2071	221784	1078.7	221673	1080.4
STS-66	104 (13)	180096	7163	20801	2448	4974	220648	0 9901	71547011	0	1080	181355426	23560	766601 912210	1982955	244238	232278	13795574	1664386	1299860 1300231	4508715	3284 3158	211562	1084.4	211411	1086.1
STS-63	103 (20)	179828	6285	23979	2454	4980	222692	23 15249	26512617	0	1128	190515852	24903	766624 928587	2007858	247630	235671	14031245	1664161	1299714 1300130	4511630	1830 3476	212775	1079.5	212693	1081.2
STS-67	105 (8)	180588	10610	24154	2447	4972	227937	0 18303	0	0	1764	200678461	28528	766624 948654	2036386	256495	243809	14275054	1664446	1299857 1299389	4520187	4099 6754	217646	1083.5	217437	1085.0
STS-71	104 (14)	180545	7390	21956	2452	4972	222481	0 17251	0	476	690	179418636	26577	766624 966595	2062963	249089	238682	14513736	1664561	1299083 1298854	4511586	1040 1398	216527	1079.7	216352	1081.3
STS-70	103 (21)	179039	5537	15110	1921	4982	211755	377745585	0	0	1086	444452354	46799	804398 973266	2109762	258584	247141	14760877	1664631	1299218 1299339	4521772	3789 5299	194267	1097.2	194190	1099.1
STS-69	105 (9)	180072	7149	24993	2452	4973	224805	0 16739	73067258	0	1301	253466203	31549	804398 991306	2141311	256385	243328	15004205	1664169	1299385 1299176	4519114	5409 7966	219395	1080.7	219298	1082.3
STS-73	102 (18)	188174	10734	12653	1883	4972	223592	0 23302	0	0	2008	253108395	33705	804398 1016616	2175016	257321	246718	15250923	1664190	1299554 1300510	4521581	1906 4902	230603	1080.7	230479	1082.3
STS-74	104 (15)	179624	7175	25155	2453	4976	224549	100153135	0	690	914	140649623	23687	814413 1020665	2198703	248266	237141	15488064	1664354	1299872 1299903	4512395	1823 3689	202767	1078.7	202718	1080.6
STS-72	105 (10)	181188	7149	25038	2452	4970	225963	0 10546	2643	10459	898	140876931	21018	814413 1032109	2219721	247011	238498	15726562	1664138	1302278 1301220	4514647	11447 13346	218496	1081.7	218345	1083.3
STS-75	102 (19)	188372	9386	19109	2452	4970	229455	1494 20490	0	0	1369	233538653	32006	815907 1053968	2251727	261491	250226	15976788	1663825	1300542 1300635	4526493	1594 638	226443	1079.4	226287	1080.9

* NOTE: DEPLOYED, NON-DEPLOYED, AND DEPLOYED/RETRIEVED REFLECT ACTUALS, E.G., WSF WAS NOT DEPLOYED AND RETRIEVED ON STS-60; TSS WAS LEFT IN SPACE ON STS-75.

SPACE SHUTTLE FLIGHT WEIGHT SUMMARY

(SOURCES: SODB, VOL II Thru STS-57 & DOL TDDP for STS-51 and Beyond)

Revision T PCN-5
June 2010

FLIGHT	ORBITER							CARGO								ORBITER TOTALS			ET TOTAL @ SRB IGN	SRB TOTAL LEFT & RIGHT	SHUTTL TOTAL @ SRB IGN	PERF MARG FINAL TDDP & RECO	ORBITER AT MACH 3 EOM		ORBITER AT LANDING	
					RCS PROP			FLIGHT PAYLOAD WEIGHTS						ACCUMULATED													
	TAI NO. OV-	W/O CONS.	NON-PROP CONS @ SRB IGN	OMS PROP	FWD	AFT	ORB TOTAL @ SRB IGN	PRI DPLY/ NON-DPLY	DPLY AND RETR	RET ONL	MID-DEC	CHARABLE PYLD/ STS	FLIGH CARG TOTA	PYLD DPLY/ NON-DPLY	CARGO TOTAL	WT @ SRB IGN	WT @ ORBIT INSERT	ACCUM WT @ ORBIT INSERT					WT	X CG	WT	X CG
STS-76	104 (16)	180112	7216	21664	2451	4976	221585	2814 10578	0	736	760	14152 10453	24605	818721 1065306	2276332	246222	238531	16215319	1664159	1299899 1299353	4509631	3140 3563	211913	1082.8	211805	1084.5
STS-77	105 (11)	180204	7235	19483	2453	4976	219518	1104 23586	1837 1820	0	866	27393 7812	35205	819825 1089758	2311537	254753	243818	16459137	1664470	1300764 1299175	4519162	5381 8528	222399	1080.5	222276	1082.0
STS-78	102 (20)	188422	10876	13227	1940	4979	224611	0 21598	0	0	2066	23666 8188	31854	819825 1113422	2343391	256495	245723	16704860	1664859	1297868 1298255	4517477	3683 4245	229134	1081.9	228986	1083.4
STS-79	104 (17)	180241	7286	21473	2450	4971	221598	3170 15151	0	2126	718	19039 8773	27812	822995 1129291	2371203	249440	241776	16946636	1664353	1297828 1298848	4510469	462 716	215990	1081.3	215904	1083.0
STS-80	102 (21)	187805	9760	20528	2451	4975	230676	0 7575	12524 12427	0	1109	21208 9903	31111	822995 1137975	2402314	261817	248721	17195357	1663927	1299137 1299854	4524735	487 1103	227815	1079.1	227670	1080.6
STS-81	104 (18)	180533	7284	21574	2452	4978	221988	4019 14492	0	2842	810	19321 8828	28149	827014 1153277	2430463	250167	242178	17437535	1663879	1298753 1298212	4511011	1286 2118	215403	1081.4	215337	1083.1
STS-82	103 (22)	182897	6572	25010	2448	4971	227065	6941 9921	0	6638	512	17374 7517	24891	833955 1163710	2455354	251986	239583	17677118	1663879	1299604 1298386	4513855	3503 4235	213949	1077.8	213869	1079.6
STS-83	102 (22)	187924	10876	15000	1912	4970	225849	0 23536	0	0	2020	25556 8817	34373	833955 1189266	2489727	259963	248526	17925644	1663889	1299392 1299392	4522925	4820 3741	235510	1078.5	235421	1080.0
STS-84	104 (19)	179665	7163	21674	2455	4973	221097	3902 14605	0	2576	1136	19643 8854	28497	837857 1205007	2518224	249624	241827	18167471	1663879	1298206 1298123	4509832	938 868	216169	1081.0	216021	1082.6
STS-94	102 (23)	187901	10876	15058	1918	4968	225890	0 23536	0	0	2032	25568 8791	34359	837857 1230575	2552583	260279	248956	18416427	1664630	1297078 1297346	4519333	2845 4193	230818	1078.4	230773	1080.1
STS-85	103 (23)	181354	7072	17089	2450	4978	218082	0 15666	7726 7587	0	1590	24982 6977	31959	837857 1247831	2584542	250101	238142	18654569	1664460	1298435 1299129	4512125	1446 3065	221335	1082.0	221264	1083.6
STS-86	104 (20)	180477	7283	21682	2451	4975	222037	6058 14379	0	2859	602	21039 8689	29728	843915 1262812	2614270	251795	241773	18896342	1664491	1297660 1298078	4512024	1756 81	215387	1081.3	215303	1083.0
STS-87	102 (24)	188297	10459	16179	2188	4978	227270	0 17496	2998 2998	0	1452	21946 12448	34394	843915 1281760	2648665	261664	250693	19147035	1664353	1297733 1298120	4521900	4384 6115	232930	1081.0	232849	1082.6
STS-89	105 (12)	182187	7059	20679	2450	4972	222513	4596 16699	0	3508	868	22163 5877	28040	848511 1299327	2676705	250583	239584	19386619	1664543	1298227 1298526	4511879	2309 3544	217475	1086.5	217422	1088.2
SYS-90	102 (25)	187562	10884	15763	1841	4972	226191	0 23865	0	0	2340	26205 9844	36049	848511 1325532	2712754	262270	247955	19634574	1663992	1298901 1298520	4523683	3162 1999	233031	1080.3	232979	1081.9
STS-91	103 (24)	182624	7273	21882	2450	4976	224374	2419 22315	0	2964	891	25625 9944	35549	850933 1348738	2748303	259973	249580	19884154	1658766	1298618 1297292	4514649	631 403	226968	1079.5	226872	1081.1
STS-95	103 (25)	182647	7085	25032	2294	4980	227207	125 24108	2973 2945	0	1314	28520 10098	38618	851055 1374160	2786921	265855	247947	20132101	1658996	1297332 1298008	4520191	1587 2740	228455	1076.8	228388	1079.5
STS-88	105 (13)	182065	6997	24612	2451	4971	226265	26791 3073	0	335	1122	30986 6745	37731	877846 1378355	2824652	264026	251336	20383437	1658691	1297827 1297945	4518489	2365 1043	201538	1084.3	201492	1086.2
STS-96	103 (26)	183197	7174	25007	2450	4977	227974	4228 17994	0	213	1034	22707 11101	33808	882074 1397383	2858460	261812	245256	20628693	1658803	1297048 1296568	4514231	4435 4306	222366	1080.2	222299	1081.8

* NOTE: STS-91 WAS FIRST FLIGHT OF SLWT, 59212 LBS. STS-95 WAS SECOND FLIGHT OF SLWT, 59942 LBS. STS-88 WAS THIRD FLIGHT OF SLWT, 59137 LBS. STS-89 ET WEIGHED 66353 LBS.

SPACE SHUTTLE FLIGHT WEIGHT SUMMARY

(SOURCES: SODB, VOL II Thru STS-57 & DOL TDDP for STS-51 and Beyond)

Revision T PCN-5
June 2010

FLIGHT	ORBITER							CARGO								ORBITER TOTALS			ET TOTAL @ SRB IGN	SRB TOTAL LEFT & RIGHT	SHUTTL TOTAL @ SRB IGN	PERF MARG FINAL TDDP & RECO	ORBITER AT MACH 3 EOM		ORBITER AT LANDING	
	TAI NO. OV-	W/O CONS.	NON-PROP CONS @ SRB IGN	OMS PROP	RCS PROP FWD	RCS PROP AFT	ORB TOTAL @ SRB IGN	FLIGHT PAYLOAD WEIGHTS PRI DPLY/ NON-DPLY	DPLY AND RETR	RET ONL	MID-DEC	CHARABLE PYLD/ STS	FLIGH CARG TOTA	ACCUMULATED PYLD DPLY/ NON-DPLY	CARGO TOTAL	WT @ SRB IGN	WT @ ORBIT INSERT	ACCUM WT @ ORBIT INSERT					WT	X CG	WT	X CG
STS-93	102 (26)	185743	4820	14814	2473	4976	217975	430805171	0	0	1538	497892593	52382	9251541404092	2910842	270387	258911	20887604	1658826	12977601297999	452972	2081 -3981	202872	1097.5	202796	1099.4
STS-103	103 (27)	183199	7065	24990	2451	4979	227853	54236451	0	5351	1334	132087068	20276	9305771411877	2931118	248159	236285	21123889	1658784	12997091299767	4506419	13576 13388	212288	1080.6	212217	1082.4
STS-99	105 (14)	182260	6989	19605	2308	4968	221299	260 26987	0	0	1822	290696341	35410	9308371440686	2966528	256739	242322	21366211	1664331	12997671299817	4520450	1085 395	225092	1078.5	225030	1080.2
STS-101	104 (21)	183166	7235	23891	2453	4980	226894	3371 20159	0	1391	1262	2473310871	35604	9342081462107	3002132	262528	252056	21618267	1658873	12992231298831	4519455	1480 988	226277	1081.2	226212	1082.9
STS-106	104 (22)	183426	7235	23786	2449	4978	227032	5399 17935	0	948	1172	2396711024	34991	9396071481214	3037123	262053	253389	21871656	1658741	12995611298823	4519178	1940 317	222835	1080.1	222774	1081.7
STS-92	103 (28)	183363	7235	24629	2447	4968	227808	219984678	0	293	1333	280097241	35250	9616051487225	3072373	263088	253459	22125115	1658781	12995311299149	4520549	1532 2330	205188	1080.0	205129	1081.8
STS-97	105 (15)	181992	6989	22156	2452	4971	223736	36376719	0	227	1021	374965308	42804	9979811488965	3115177	266570	253646	22378761	1658695	12992461300085	4524795	1920 2032	197829	1085.9	197781	1087.7
STS-98	104 (23)	182605	7055	22904	2227	4978	224935	32270583	0	872	987	332865876	39162	10302511490535	3154339	264127	251033	22629794	1658647	12982701298137	4519380	2138 1538	197909	1083.1	197854	1082.0
STS-102	103 (29)	182881	7055	24940	2452	4975	227469	96493517	0	1086	472	287398559	37328	10399001494524	3191667	264797	253436	22883230	1658484	12997741298555	4521809	2847 3031	218094	1083.2	218031	1084.9
STS-100	105 (16)	182943	7301	24075	2451	4972	226908	63464282	0	1608	781	294728858	38330	10462461499587	3229997	265268	253063	23136293	1658593	12989451299241	4522246	2670 2296	220623	1083.8	220556	1085.5
STS-104	104 (24)	182862	7301	25033	2452	4975	227787	197826060	0	626	582	264248711	35135	10660281506229	3265132	262952	254358	23390651	1658552	12988971299559	4520159	2884 2990	209142	1083.8	209097	1085.6
STS-105	103 (30)	182831	7055	23428	1886	4974	225340	96574654	0	3802	475	293057802	37107	10756851511358	3298239	262477	253897	23644548	1658085	12988521298417	4518170	705 631	222682	1081.0	222620	1085.6
STS-108	105 (17)	182106	7058	25057	2452	4972	226711	64548635	0	4156	690	313936784	38177	10821391520683	3336416	264918	252854	23897402	1657831	12982631298521	4519872	2381 1182	220623	1083.8	220556	1085.5
STS-109	102 (27)	188444	6969	25066	2451	4975	233071	8256 10672	0	6409	1216	201447420	27564	10903951532571	3363980	260665	250970	24148372	1658065	12982191298358	4515646	3309 4170	222447	1082.9	222366	1084.6
STS-110	104 (25)	184160	7060	25072	2451	4975	228854	306000	0	2607	757	283797470	35849	11209951533328	3399829	264763	253486	24401858	1658030	12989471298885	4520964	1256 2670	201513	1085.3	201463	1087.2
STS-111	105 (18)	183220	7060	25059	2454	4976	227935	9512906	0	6342	288	297126370	36082	11305071534522	3435911	264047	253522	24655380	1657969	12975611298161	4518077	2484 1870	220234	1083.6	220279	1085.3
STS-112	104 (26)	183924	7060	25043	2179	4869	228341	2954300	0	1839	381	295027939	37441	11600501534904	3473352	265812	254269	2490949	1658013	12980721299078	4521314	2744 3860	202688	1087.1	202621	1088.9
STS-113	105 (19)	183037	7060	25064	2254	4970	227551	2967246	0	2250	288	302178176	38393	11897221535238	3511745	265974	250282	25159931	1658011	12988061298119	4521249	1736 2486	200993	1087.6	200939	1089.5
STS-107	102 (28)	189487	10160	17619	2180	4976	229588	023515	0	0	801	2431611147	35463	11897221559554	3547208	265081	250270	25410201	1663352	12986481298614	4526034	1335 1348	234495 *	1078.5 *	234167 *	1077.9 *

* WT & CG ARE AT EI AND EI+15 MINUTES.

SPACE SHUTTLE FLIGHT WEIGHT SUMMARY

(SOURCES: SODB, VOL II Thru STS-57 & DOL TDDP for STS-51 and Beyond)

Revision T PCN-5
June 2010

FLIGHT	ORBITER							CARGO								ORBITER TOTALS			ET TOTAL @ SRB IGN	SRB TOTAL LEFT & RIGHT	SHUTTL TOTAL @ SRB IGN	PERF MARG FINAL TDDP & RECO	ORBITER AT MACH 3 EOM		ORBITER AT LANDING	
								FLIGHT PAYLOAD WEIGHTS					FLIGH	ACCUMULATED													
	TAI NO. OV-	W/O CONS.	NON-PROP CONS @ SRB IGN	OMS PROP	RCS PROP		ORB TOTAL @ SRB IGN	PRI DPLY/ NON-DPLY	DPL AND RET	RETR ONLY	MID-DEC	CHAR ABLE PYLD/ STS	CARG TOTA	PYLD DPLY/ NON-DPLY	CARGO TOTAL	WT @ SRB IGN	WT @ ORBIT INSER	ACCUM WT @ ORBIT INSERT					WT	X CG	WT	X CG
					FWD	AFT																				
STS-114	103 (31)	184906	7076	24931	2174	4972	229219	264133231	0	6600	163	298078845	38652	12161351562948	3585860	267901	253950	25664151	1657242	12980741298565	4523083	21113792	225792	1086.6	225727	1088.2
STS-121	103 (32)	184902	7076	24922	2174	4968	229235	236965426	0	8456	158	292808456	37736	12398311568532	3623596	267001	253267	25917418	1657055	12992201299312	4523889	2290 N/A (Sensor Fail)	226063	1084.6	225972	1086.3
STS-115	104 (27)	184260	6986	24926	2449	4970	228734	3555220	0	993	206	357586090	41848	12753831568738	3665444	270612	252240	26169658	1657088	12989571298678	4526580	1749349	199711	1086.0	199642	1087.0
STS-116	103 (33)	185153	7189	24959	2134	4977	229555	57481652	0	806	182	2250213188	35690	12811311585492	3701134	265275	250980	26420638	1657123	12982001298501	4520334	37684559	224053	1077.5	223986	1079.2
STS-117	104 (28)	184487	7018	24298	1926	4974	227846	3639330	0	857	200	365936048	42641	13175241585692	3743775	270517	255388	26676026	1657157	12981381298472	4525519	13061431	199418	1084.6	199305	1086.8
STS-118	105 (20)	185133	7189	24899	2030	4975	229369	1183011740	0	316	329	2389913491	37390	13293541597761	3781165	266789	250805	2692831	1657180	12983331297781	4521318	19132435	221740	1078.1	221660	1079.8
STS-120	103 (34)	185405	7108	22763	1885	4971	227275	33474280	0	1577	59	338137059	40872	13628281598100	3822037	268177	251790	2944621	1657012	12989061298777	4524107	20911880	203069	1078.3	202989	1083.0
STS-122	104 (29)	184885	7042	20823	1914	4979	226743	306572162	0	2162	122	329417355	40296	13934851600384	3862333	267069	252667	3197288	1657253	12986751299004	4523236	24023435	207013	1078.2	207215	1080.4
STS-123	105 (21)	185393	7108	22763	1928	4981	227316	294421132	0	4891	188	307628153	38915	14229271601704	3901248	266261	253348	3450636	1657249	12981631298480	4521388	21095128	208916	1079.7	208762	1081.8
STS-124	103 (35)	185476	6868	22771	1923	4971	227152	338900	0	1608	79	339698028	41997	14568171601783	3943245	269179	251247	3701883	1656958	12991471298621	4525140	13082513	203605	1088.0	203755	1089.3
STS-126	105 (22)	185343	7108	22761	2187	4971	227513	304321760	0	19436	211	324037068	39471	14872491603754	3982716	267014	254431	3956314	1657112	12986111299270	4523242	16822329	221787	1087.2	221712	1089.0
STS-119	103 (36)	185710	6808	22762	2162	4973	227558	324890	0	1279	57	325466542	39088	15197381603811	4021804	266676	254546	4210860	1656990	12981971298799	4521897	17462016	201795	1082.8	201713	1084.7
STS-125	104 (30)	186902	7087	24984	2450	4982	231548	469417560	0	3893	0	2225410164	32418	15244321621371	4054222	231548	254376	4465236	1657233	12979361298774	4519550	16892499	225509	1078.3	225469	1080.1
STS-127	105 (23)	185510	7108	22762	2204	4973	227700	24266290	0	9756	126	2468211571	36253	15486981621787	4090475	263983	252658	4717894	1657094	12982731298296	4518787	25532734	215900	1089.8	215817	1091.7
STS-128	103 (37)	185683	6586	22762	1934	4970	227078	305722331	0	19130	153	330567549	40605	15792701624271	4131080	267713	254672	4972566	1657188	12985111298323	4522876	17072077	222200	1088.4	222148	1090.2
STS-129	104 (31)	185268	7042	22762	2205	4967	227387	276151404	0	1176	353	293729521	38893	16068851626028	4169973	266310	254734	5227300	1657082	12988931298843	4522269	22282041	206917	1083.8	207200	1084.6
STS-130	105 (24)	185488	6397	22763	1918	4974	226683	346480	0	1262	283	349316025	40956	16415331626311	4210929	267669	252838	5480138	1657227	12983851297738	4522160	11882828	201138	1082.8	201084	1084.8
STS-131	103 (38)	186007	6392	22762	1931	4976	227212	305121388	0	21764	231	321317385	39516	16720451627930	4250445	266758	251459	5731597	1657053	12982301298461	4521643	11331491	224257	1089.0	224206	1090.7

SPACE SHUTTLE FLIGHT WEIGHT SUMMARY

(SOURCES: SODB, VOL II Thru STS-57 & DOL TDDP for STS-51 and Beyond)

Revision T PCN-5
June 2010

FLIGHT	ORBITER							CARGO								ORBITER TOTALS			ET TOTAL @ SRB IGN	SRB TOTAL LEFT & RIGHT	SHUTTL TOTAL @ SRB IGN	PERF MARG FINAL TDDP & RECO	ORBITER AT MACH 3 EOM		ORBITER AT LANDING	
								FLIGHT PAYLOAD WEIGHTS						ACCUMULATED												
	TAI NO. OV-	W/O CONS.	NON PRO CON @ SRB IGN	OMS PROP	RCS PROP		ORB TOTAL @ SRB IGN	PRI DPLY/ NON-DPLY	DPL AND RET	RET ONL	MID- DEC	CHAR ABLE PYLD/ STS	FLIGH CARG TOTA	PYLD DPLY/ NON-DPLY	CARGO TOTAL	WT @ SRB IGN	WT @ ORBIT INSERT	ACCUM WT @ ORBIT INSERT					WT	X CG	WT	X CG
					FWD	AFT																				
STS-132	104 (32)	185064	7042	22762	2166	4974	227151	266190	0	7564	121	267409223	35963	16986641628051	4286408	263144	???	???	1657088	12994111299029	4519813	5074 ???	210434	1081.0	210370	1082.9
STS-134	105 (25)																									
STS-133	103 (39)																									

SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5) TITLE, NAMES & EVA'S	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT INC	ORBIT HA/HP	FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

SPACE SHUTTLE MISSIONS SUMMARY

STS-97/ ISS 4A

SEQ
FLT #101

KSC-101

PAD 39B-44

MLP- 1

SIXTH SHUTTLE FLIGHT TO ISS

OV-105 (Flight 15)

Endeavour

OMS PODS:
LPO4-22
RPO1-29
FRC5-15

CDR:
Brent W. Jett
(Flt 3 - STS-72, STS-81)

P598/R206/V132/M179

PLT:
Michael J. Bloomfield
(Flt 2 - STS-86

P599/R227/V165/M198

M/S 1/EV1:
Joseph R. Tanner
(Flt 3 - STS-66, STS-82)

P600/R185/V136/M162

M/S 2:
Marc Garneau
(Canada)
(Flt 3 - STS-41-G, STS-77)
P601/R47/V128/M44

M/S 3/EV2:
Carlos I. Noriega
(Flt 2 - STS-84)

P602/R221/V166/M193

SS EVA #55
EMU/TETHERED
EVA #48
SCHEDULED EVA #49
DURATION 7:33:23

SS EVA #56
EMU/TETHERED
#49
EDULED EVA #50
ATION 6:37:19

VA #57
/TETHERED
#50
EDULED EVA #51
ATION 5:09:49

Continued…

KSC 39B
336:03:06:01 Z
10:06:01 PM EST (P)
10:06:01 PM EST (A)
Thursday 30 11/30/00 (13)

LAUNCH WINDOW:
4M01S USING PLT (IN-PLANE TIME)

EOM PLS: KSC
TAL: ZZA
TAL WX: MRN, BEN

SELECTED:
RTLS: KSC 33 N/N
TAL: ZZA 30 SF/N
AOA: KSC 33 N/N
PLS: EDW 4 N/N

TDEL:
0.11 -0.048/-0.01

MAX Q NAV:
758 753

SRB STG:
2:03.5 2:03.0

PERF: NOMINAL

2 ENG TAL (ZZA):
2:43 2:40

NEG RETURN:
3:51 3:54

PTA (U/S 265):
4:54 4:54

PTM (U/S 265):
5:54 5:53

SE TAL (ZZA)
5:55 5:55

SE PTM
6:55 6:58

MECO CMD:
8:24.3 8:25.9

Continued…

KSC 15 (KSC 53)
346:23:03:23Z
6:03:23 PM EST

Monday 19 12/11/00 (12)

DEORBIT BURN:
346:21:57:31Z

XRANGE: 20 NM

ORBIT DIR: AR 8

AIM PT: CLOSE IN

MLGTD: 2360 FT
346:23:03:23Z
VEL: 196 KGS
199 KEAS
HDOT: -3.5 FPS

TD NORM 195:
2783 FT

NLGTD: 5839 FT
346:23:03:35Z
VEL: 138 KGS
144 KEAS
HDOT: -6.5 FPS

DRAG CHUTE DEPLOY: 189 KEAS
346:23:03:27Z

BRK INIT: 88 KGS

DRAG CHUTE JETTISON: 70 KGS
346:23:03:53Z

BRK DECEL FPS/S:
AVE 4.6 PK 6.7

WHEELS STOP:
346:23:04:20Z
10340 FT

ROLLOUT:
7980 FT
57 SEC

WINDS:
6H 2L
OFFICIAL:
1406P09
SS: 6H 1L
PK: 9H 2L

Continued…

104/104/109%

PREDICTED:
100/104.5/104.5/72/104.5

ACTUAL:
100/104.5/104.5/72/104.5

1 = 2054 (2)
2 = 2043 (5)
3 = 2049 (4)

ALL BLOCK IIA ENGINES

M 3 EOM:

WEIGHT:
197829

X CG:
1085.85

LANDING:

WEIGHT:
197781 LBS

X CG:
1087.73

BI-103

RSRM 72

ET-105

SLWT 10

ET IMPACT
1:26:32 MET

LAT:
1.54°S

LONG:
127.4° W

51.60 (6)

DIRECT INSERTION

POST OMS-2:
175.1 X 106.2 NM

TI BURN:
1:14:26:43 MET

ORBIT:
199.6 X 204 NM

MC-4:
1:15:50:55 Z

ORBIT:
205.5 X 201.3 NM

DEORBIT:
APOGEE
198 NM
PERIGEE
188.5 NM

ENTRY RANGE:
4338 NM

ENTRY VELOCITY:
25877

OI-27 (6)

CARGO:
42804 LBS

PAYLOAD CHARGEABLE:
37486 LBS

DEPLOYED:
36213 LBS

NON-DEPLOYED:
719 LBS

MIDDECK:
1021 LBS

SHUTTLE ACCUMULATED WEIGHTS:
DEPLOYED:
997818 LBS
NON-DEPLOYED:
1488965 LBS
CARGO TOTAL:
3115177 LBS

PERFORMANCE MARGINS (LBS):
FPR: 3274
FUEL BIAS: 818
FINAL TDDP: 1920
RECON: 2032

PAYLOADS:
PLB:
ISS-4A
PV module P6
ICBC3D
RMS, ODS

MIDDECK:
HEDS tech demo
EMU H/W, EVA Tools

5 CRYO TK SETS
5 GN2 Tanks
RMS 58

RMS USED FOR P6 TRUSS AND EVA SUPPORT

KSC W/D: OPF 203, VAB 5, PAD 26 = 234 days total.

LAUNCH POSTPONEMENTS:
- Baselined launch date of 4/8/99 on 11/6/97
- Postponed launch to 8/5/99, 2/3/00, 3/23/00, 7/20/00, 12/2/00, and then 11/30/00 EST (12/1/00 GMT date). The primary cause for postponements was Service Module late delivery to ISS.

LAUNCH SCRUBS: None

LAUNCH WINDOW:
- Total launch window was 7M45S. Window opened at 336:03:02:17Z and closed at 336:03:10:02Z. Selected Preferred Launch Time (PLT) of 336:03:06;01Z (In-plane time) resulting in a launch window of 4M01S.

LAUNCH DELAYS: None
- Launched on time at 336:03:06:01 GMT on December 1, 2000 (at 10:06:01 PM EST on Thursday, November 30, 2000).
- Note: During the count, a loose Firex line bracket/clamp was discovered on OAA, which was rolled back to allow access and removal using a 180 foot condor crane. No impact to launch.

TAL WX:
- Zaragoza (prime and selected) was forecast and observed GO, Moron was forecast and observed NO GO due to low ceiling, and Ben Guerir (2-engine TAL call) was forecast and observed GO.

PERFORMANCE ENHANCEMENTS:
- Standard Set plus: (1) PE Operational High Q WIN/DEC, (2) OMS assist is 4000 lbs, (3) 52 NM MECO, (4) No roll to heads up, and (5) Del Psi

FLIGHT DURATION CHANGES: None
- Landed at KSC runway 15 on orbit 170. MLGTD at 346:23:03:23Z (10:19:57:22 MET) on Monday, December 11, 2000.

SHUTTLE NIGHT LAUNCH #25

SHUTTLE NIGHT LANDING #16
- Landed on KSC runway 15 on orbit 170 at 346:23:03:23Z, 6:03:23 PM EST on Monday, December 11, 2000.

EVENTS:
- Ring capture at 337:19:59:35Z
- Docked with ISS PMA3 Node 1 Nadir Port at 337:20:11:47Z (1:17:03:59 MET)
- RMS grapple of P6 Truss from PLB at 337:22:16:57Z, 1:19:19:59 MET. P6 moved to overnight park position and grapple released at 338:20:17:25Z, 2:17:11 MET.
- Hatch between orbiter and PMA3 was opened at 338:00:22:01Z, 1:21:16 MET

Continued…

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5) TITLE, NAMES & EVA'S	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT INC	ORBIT HA/HP	FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
STS-97/ ISS 4A Continued...		Continued... MCC WHITE FCR (31) FLIGHT DIRECTORS: Asc - N. W. Hale Ent - L. E. Cain LD/O1 - W. D. Reeves O2 - P. L. Engelauf PLNG - K. B. Beck ISS LD/O2 - J. M. Hanley ISS O1 - J. M. Curry ISS PLNG - P. S. Hill MOD - J. W. Bantle	Continued... VI: 25930 25928 OMS-2: 43:10.643:14.6 121 FPS119 FPS	Continued... DENS ALT: 1068 FT FLT DURATION: 10:19:57:22 S/T: 881:06:18:29 OV-105: 155:05:44:02 DISTANCE: 4,476,164 sm							Continued... EVENTS: (Continued) - EVA 1 Start at 338:18:34:46Z, 2:15:29:45 MET and End at 2:23:02:06 MET, duration 7:33:23. 2B Solar Array wing deployed, but had tensioning problem. - RMS used to deploy P6 Truss to Z1 Truss. P6 Truss 4B SAW deployed. - EVA 2 Start at 340:17:20:52Z, 4:14:14:51 MET and End 4:20:52:10 MET, duration 6:37:19 - EVA 3 Start at 342:16:12:13Z, 6:13:06:12 MET and End 6:18:16:01 MET, duration 5:09:49. EVA crew successfully tensioned SAW 2B. - Undocked at 344:19:13:00Z (8:16:06:59 MET) - Total Transfers from orbiter to ISS 1457 lbs, includes 773 lbs hardware and 7 CWC's with 684 lbs H2O. Transfers from ISS to orbiter 227 lbs. - ISS Visitor time 6:23:01:13 (docking to undocking). - Delivered and mated P6 Truss to Z1. Deployed and activated 2B and 4B Solar Array wings. Deployed and activated PMV radiator, EETCS aft radiator. Relocated S-band Antenna Support assembly. ISS EPS reconfigured to power U.S. and Russian Segments. FPP assembled and tested. RENDEZVOUS #50: - Rendezvous and dock with ISS at PMA2 Node 1 Nadir Port. SIGNIFICANT ANOMALIES: - Waste water quantity sensor dropouts - Crew could not remove Cabin Temp Controller Actuator Pip Pin - APCU 1 converters shutdown and APCU 2 tripped off. - During EVA 1, EV2 reported equipment hook inadvertently opened. - EV1's WVS EMU TV not received - EV2 reported during helmet light battery charging, battery overheated (bad battery). - IPS workstation crashed, delaying execute package - CPS application on IPS crashed - Sequential Still Video processing anomaly - ICBC3D Camera stopped filming - Erratic RCS jet L5D oxidizer injector temp transducer - F5R Fuel Injector temp sensor failure - OCA/Audio malfunctions

SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5) / TITLE, NAMES & EVA'S	LAUNCH SITE, LIFTOFF TIME, / LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE / LANDING TIMES FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG / THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT INC	ORBIT HA/HP	FSW	PAYLOAD WEIGHTS, / PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, / TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

SPACE SHUTTLE MISSIONS SUMMARY

STS-98/ ISS 5A

SEQ
FLT # 102

KSC-102

PAD: 39A-58
MLP-2

SEVENTH SHUTTLE FLIGHT TO ISS

OV-104 (Flight 23)

Atlantis

OMS PODS:
LPO3-27
RPO4-23
FRC4-23

CDR:
Kenneth D. Cockrell (Flt 4 - STS 56, STS-69, STS-80)

P603/R159/V121/M140

PLT:
Mark L. Polansky P604/R262/M228

M/S 1/EV2:
Robert L. Curbeam (Flt 2 - STS-85)

P605/R225/V167/M195

M/S 2:
Marsha S. Ivins (Flt 5 - STS-32, STS-46, STS-62, STS-81)
P606/R108/V77/F12

M/S 3/EV1:
Thomas D. Jones (Flt 4 - STS-59, STS-68, STS-80)

P607/R177/V111/M155

SS EVA #58
EMU/TETHERED
EVA #51
SCHEDULED EVA #52
DURATION 7:33:58

SS EVA #59
EMU/TETHERED
EVA #52
SCHEDULED EVA #53
DURATION 6:50

VA #60
/TETHERED
#53
EDULED EVA #54
ATION 5:25

Continued…

KSC 39A
38:23:11:16Z
6:11:16 PM EST
6:13:02 PM EST
Wednesday 11
2/7/01 (8)

LAUNCH WINDOW:
4M42S USING PLT (IN-PLANE TIME)

EOM PLS: KSC
TAL: ZZA
TAL WX: MRN, BEN

SELECTED:
RTLS: KSC 33 N/N
TAL: ZZA 30
AOA: KSC 33 N/N
PLS: EDW 22 N/N

TDEL:
0.00 0.22/0.06

MAX Q NAV:
727 735

SRB STG:
2:05.6 2:06

PERF: NOMINAL

2 ENG TAL (BEN):
2:34 2:37

NEG RETURN:
3:53 3:55

PTA (U/S):
4:48 4:46

PTM:
5:50 5:46

SE ZZA:
6:02 5:58

SE PTM:
6:51 6:51

Continued…

EDW 22, CONC
EDW 47, CONC
28
51:20:33:06Z
12:33:06 PM PST

Tuesday 17
2/20/01 (6)

DEORBIT BURN:
51:19:27:20Z

XRANGE: 381 NM

ORBIT DIR: AL

AIM PT: CLOSE IN

MLGTD: 1994 FT
51:20:33:06Z
VEL: 199 KGS
209 KEAS
HDOT: -2.5 FPS

TD NORM 195:
3540 FT

NLGTD: 5635 FT
51:20:33:18Z
VEL: 133 KGS
144 KEAS
HDOT: -5.9 FPS

DRAG CHUTE DEPLOY: 206 KEAS
51:20:33:08Z

BRK INIT: 58 KGS

DRAG CHUTE JETTISON: 64 KGS
51:20:33:36Z

BRK DECEL FPS^2:
AVE 4.7 PK 6.7

WHEELS STOP:
51:20:34:02Z
9964 FT

ROLLOUT:
7970 FT
56 SEC

WINDS:
20H 1L

OFFICIAL:
23020P27
SS: 20H 2R
PK: 27H 3R

Continued…

104/104/
109%

PREDICTED:
100/104.5/
104.5/72/
104.5

ACTUAL:
100/104.5/
104.5/72/
104.5

1 = 2052 (3)
2 = 2044 (5)
3 = 2047 (5)

ALL 3 BLOCK IIA ENGINES

M 3 EOM:

WEIGHT:
197909 LBS

X CG:
1080.06

LANDING:

WEIGHT:
197854 LBS

X CG:
1081.98

BI-105

RSRM 77

ET-106

SLWT-11

ET IMPACT
1:26:23 MET

LAT:
1.73°S

LONG:
127.9° W

51.6
0 (7)

DIRECT INSERTION

POST OMS-2:
175.1 X
110.3 NM

DEORBIT:
APOGEE
210.8 NM
PERIGEE
196.2 NM

ENTRY VELOCITY:
25893

ENTRY RANGE:
4350 NM

OI-28
(1)

CARGO:
39162 LBS

PAYLOAD CHARGEABLE:
33286 LBS

DEPLOYED:
32270 LBS

NON-DEPLOYED:
583 LBS

MIDDECK:
983 LBS

SHUTTLE ACCUMULATED WEIGHTS:
DEPLOYED:
1030088 LBS
NON-DEPLOYED:
1490535 LBS
CARGO TOTAL:
3154339 LBS

PERFORMANCE MARGINS (LBS):
FPR: 3274
FUEL BIAS: 818
FINAL TDDP: 2138
RECON: 1538

PAYLOADS:
PLB:
ISS-5A (DESTINY)
U.S. LABORATORY
RMS, ODS, SPDU

MIDDECK:
SIMPLEX
BMRRM (LON)

5 CRYO TK SETS
6 GH2 TANKS
RMS 59

RMS USED FOR U.S. LAB TO NODE 1, PMA-2 TO LAB, AND EVA SUPPORT

KSC W/D: OPF 70, VAB 30 (2), PAD 28 (2) = 128 days total (Rollback to inspect SRB cables).

LAUNCH POSTPONEMENTS:
- Baseline launch date of 5/20/99 on 11/20/97
- Postponed to 10/28/99, 2/3/00, 3/2/00, 4/20/00, 8/29/00, and 1/18/01
- Postponed launch date to NET 2/6/01 when decision made to rolll back to VAB and inspect/x-ray SRB cables (Replaced damaged cables).
- Set 2/7/01 launch date at FRR.

LAUNCH SCRUBS: None

LAUNCH WINDOW:
- The total launch window was 9M02S, which opened at 38:23:06:56Z and closed at 38:23:15:58Z. The decision was made to use the Preferred Launch Time (PLT) of 38:23:11:16Z (In-plane time) with a 4M42S launch window.

LAUNCH DELAYS:
- During T-9 hold, a step function was seen on APU 1 Turbine Speed (OA1 card 6). This proved to be a ground-processing problem; however, coming out of T-9 minute hold was 1m46s late, resulting in a launch delay of 1m46s. Launch occurred at 38:23:13:02Z, 6:13:02 PM EST on Wednesday, February 7, 2001.

TAL WX:
- Zaragoza (prime and selected) and Ben Guerir (2-engine TAL call) were forecast and observed GO. Moron was forecast and observed NO GO for ceiling and showers within 20 nm.

PERFORMANCE ENHANCEMENTS:
- Standard Set Plus: (1) PE Operational High Q WIN/JAN, (2) OMS assist is 4000 lbs, (3) 52 NM MECO, (4) Del Psi

FLIGHT DURATION CHANGES:
- Total extension 2 days plus two orbits and changed landing site to EDW.
- EDW was not called up for NEOM. Closed PLBD's, but waved-off landing at KSC on NEOM orbits 170 (Tig-24 mins) and 171 (Tig-36 mins) due to observed and forecast crosswind violations. Activated EDW for EOM+1. Closed PLBD's for EOM+1 but waved-off landing at KSC on orbit 186 for crosswind violations and orbit 187 due to observed and forecast crosswind violations and precipitation. Waved-off landing at EDW on orbits 188 and 189 due to forecast ceiling, crosswind, and precipitation violations. EOM+2. Waved-off landing at KSC on orbits 201 and 202 due to forecast of low ceiling and precipitation. Landed at EDW runway 22 on orbit 203 at 12:33:06 PST on Tuesday, February 20, 2001.

EVENTS:
- OMS assist at 2:16 MET, duration 102.2 seconds
- MC-4 at 40:15:41:20Z, 1:16:28:18 MET.
- Docked with ISS PMA3 Node 1 Nadir Port at 40:16:50:49Z, 01:17:37:47 MET
- Collision avoidance maneuver for ISS at 41:11:48:02Z, 02:12:35:00 MET Delta V +2.5 ft/sec, 186.5 by 199.4 nm

Continued…

SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5) / TITLE, NAMES & EVA'S	LAUNCH SITE, LIFTOFF TIME, / LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE / LANDING TIMES FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG / THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT INC	ORBIT HA/HP	FSW	PAYLOAD WEIGHTS, / PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, / TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

SPACE SHUTTLE MISSIONS SUMMARY

STS-98/ ISS 5A Continued …		Continued… MCC WHITE FCR (32) FLIGHT DIRECTORS: A/E - L. E. Cain LD/O1 - R. E. Castle O2 - K. B. Beck PLNG/O3 - B. P. Austin ISS LD/O2 - A. F. Algate ISS O1 - M. A. Kirasich ISS O3 - M. J. Ferring MOD - J. W. Bantle	Continued… MECO CMD: 8:25.1 8:24.7 VI: 25928 25928 OMS-2: 43:46 43:45 127.1 FPS 127.1 FPS	Continued… DENS ALT: 2334 FT FLT DURATION: 12:21:20:04 S/T: 894:03:38:33 OV-102: 185:11:10:35 DISTANCE: 5,369,576 sm						Continued… EVENTS (Continued): - RMS grappled PMA2 on Node 1 at 41:14:12Z, 2:14:59 MET. PMA2 installed on Z1 Truss at 41:17:00Z, 2:17:47 MET. - U.S. Laboratory grappled in PLB at 41:17:22Z, 2:18:00 MET. U.S. Lab (Destiny) was attached to Node at 41:19:00Z, 2:19:47 MET. - EVA 1 Start at 41:15:51Z, 2:16:36 MET. EVA duration 7H33M56S. - First ISS Reboost maneuver Started at 42:17:13Z, 3:18:00 MET. - Second Reboost maneuver Started at 42:18:18Z, 3:19:05 MET. Altitude increase of 3.6 nm, orbit 203.0 by 188.9. - EVA 2 Start at 43:15:58Z, 4:16:45 MET, duration 6H50M. - Third Reboost maneuver Started at 44:15:53:02Z, 5:16:40:00 MET lasted 4 hours. - Fourth Reboost Started at 44:20:06:02Z, 5:20:53:00 MET. 5 nm altitude increase, orbit 206.5 by 193.7 nm - EVA 3 Start at 45:14:30Z, 6:15:16:58 MET, duration 5H25M. - Fifth Reboost at 45:23:08Z, 6:23:54:58 MET, 1.4 nm altitude increase, orbit 209 by 195 nm. - Sixth Reboost at 46:15:23Z, Delta V of 4.4 fps, orbit 209.4 by 195.5 nm. - Seventh Reboost at 46:16:56Z, duration 3h41m, Delta V 11.9 fps, orbit 212.5 by 199.2 nm. - Hatch closed at 47:13:22Z, 8:14:08:58 MET. - Undocked at 47:14:06Z, 8:14:53 MET. - Relocated PMA2 from Node 1 to fwd CBM. Delivered and installed U.S. Lab on Node 1 fwd CBM and connected umbilicals, activated U.S. Lab core systems. Activated and C/O CMG's, then handed over attitude control to U.S. GN&C system. - ISS Visitor Time is 6:21:15:11. TRANSFERS: - To ISS: Dry cargo IVA 3036 lbs, U.S. Lab 29866 lbs, external EVA 368 lbs = total 33270 lbs. (Included H2O transfer to ISS: 10 CWC's = 993 lbs) - Transfers from ISS to shuttle 872 lbs. RENDEZVOUS #51: - Rendezvous and dock with ISS at PMA3, Node 1 Nadir Port. SIGNIFICANT ANOMALIES: - CDR and PLT HUD runway misalignment. PLT saw about 600 foot offset to the right of the runway, CDR was about half of this offset. - PCA vent cover bolts did not fit 5/16 -n socket. PCA vent bolts were difficult to start with power tool. - EV2 EMU boot pressure point during EVA #1 and EVA #2. - Broken connector bail linkage, one of rivets on connector bail broke. - Sticky mini-workstations end effectors, occasionally stuck open. - SASA P4 connector O-ring loose. - Bad video for proshare video conferencing. - STS-98 Vent Command error for Reboost 5. - Ku-band radar Alpha gimbal angle error.

SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (10) 7 UP/7 DOWN TITLE, NAMES & EVA'S	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT		FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
							INC	HA/HP			

SPACE SHUTTLE MISSIONS SUMMARY

STS-102/ ISS 5A.1 SEQ FLT # 103 KSC-103 ISS-5A.1 PAD 39B-45 MLP-3 EIGHTH SHUTTLE FLIGHT TO ISS	OV-103 (Flight 29) Discovery OMS PODS: LPO1-32 RPO3-30 FRC3-29	CDR: James D. Wetherbee (Flt 5 - STS-32, STS-52, STS-63, STS-86) P608/R108/V80/M198 PLT: James M. Kelly P609/R263/M229 M/S 1 UP/EV3: Andrew S. W. Thomas (Flt 3 - STS-77, Up to Mir on STS-89, Down STS-91) P610/R213/V149/M186 M/S 2/EV4: Paul Richards P611/R264/M230 M/S 3 UP/EV1/EXP2 Flt Eng 1: James S. Voss (Flt 5 - STS-44, STS-53, STS-69, STS-101) P612/R136/V85/M121 M/S 4 UP/EV2/EXP2 Flt Eng 2: Susan Helms (Flt 5 - STS-54, STS-64, STS-78, STS-101) P613/R158/V108/F19 M/S 5 UP/EXP2 CDR: Yury Usachev (Russia) (Flt 2 - STS-101) P614/R256/V168/M223 M/S 3 DN/EXP1 Flt Eng: Sergei Krikalev (Russia) (Soyuz UP, STS-102 DN) (Flt 3 - STS-60, STS-88) P615/R177/V154/M154 M/S 4 DN/EXP1 CDR: William M. Shepard (Flt 4 - STS-27, STS-	KSC 39B 67:11:42:09Z 6:42:09 AM EST (P) 6:42:09 AM EST (A) Thursday 31 3/8/01 (7) LAUNCH WINDOW: 4:59 USING PLT (IN-PLANE TIME) EOM PLS: KSC TAL: ZZA TAL WX: MRN, BEN SELECTED: RTLS: KSC 33 CI/N TAL: BEN 36 AOA: KSC 33 CI/N PLS: EDW 22 N/N TDEL: 0.03 -0.118/-0.08 MAX Q NAV: 740 748 SRB STG: 2:05.6 2:04 PERF: NOMINAL 2 ENG TAL (BEN): 2:24 2:24 NEG RETURN: 3:51 3:55 PTA (U/S 152): 4:48 4:48 DROOP: 4:43 PTM (U/S 152): 6:02 6:01 MECO CMD: 8:21.9 8:23.1 VI: 25823 25824 Continued…	KSC 15 (KSC 54) 80:07:31:41Z 2:31:41 AM EST Wednesday 12 3/21/01 (7) DEORBIT BURN: 80:06:26:06Z XRANGE: 373 NM ORBIT DIR: AR 9 AIM PT: NOMINAL MLGTD: 2839 FT 80:07:31:41Z VEL: 199 KGS 203 KEAS HDOT: -1.0 FPS TD NORM 205: 2529 FT NLGTD: 6190 FT 80:07:31:52Z VEL: 165 KGS 159 KEAS HDOT: -6.3 FPS DRAG CHUTE DEPLOY: 153 KEAS 80:07:31:55Z BRK INIT: 98 KGS DRAG CHUTE JETTISON: 57 KGS 80:07:32:31Z BRK DECEL FPS^2: AVE 3.5 PK 5.4 WHEELS STOP: 80:07:33:06Z 14244 FT ROLLOUT: 11244 FT 85 SEC WINDS: 2H 9R OFFICIAL: 2309P16 KTS SS: 2H 9R PK: 4H 16R Continued…	104/104/109% PREDICTED: 100/104.5/104.5/72/104.5 ACTUAL: 100/104.5/104.5/72/104.5 1 = 2048 (3) 2 = 2053 (3) 3 = 2045 (4) ALL BLOCK IIA ENGINES M 3 EOM: WEIGHT: 218094 LBS X CG: 1083.19 LANDING: WEIGHT: 218031 LBS X CG: 1084.92	BI-106 RSRM 78 ET-107 SLWT-12 ET RPT: 283 K ET IMPACT 1:12:24 MET LAT: 36.5°S LONG: 158.1° W	51.60 (8)	DIRECT INSERTION POST OMS-2: 126/86.2 NM DEORBIT: APOGEE: 206.5 NM PERIGEE: 206 NM ENTRY VELOCITY: 25899 FPS ENTRY RANGE: 4391 NM	OI-28 (2)	CARGO: 37328 LBS PAYLOAD CHARGEABLE: 28739 LBS DEPLOYED: 9649 LBS NON-DEPLOYED: 3517 LBS MIDDECK: 472 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1039900 LBS NON-DEPLOYED: 1494524 LBS CARGO TOTAL: 3191667 LBS PERFORMANCE MARGINS (LBS): FPR: 3274 LBS FUEL BIAS: 818 LBS FINAL TDDP: 2847 RECON: 3031 PAYLOADS: PLB: ISS-5A.1 MPLM PMA3 Logistics GAS (2) WSVFM ICC RMS, ODS MIDDECK: NONE 5 CRYO TK SETS 6 GN2 TANKS RMS 68 RMS used for PMA3 install on lab, MPLM grapple, deploy, retrieve, and berth, and EVA Support	KSC W/D: OPF 84, VAB 8, PAD 24 = 113 days total. LAUNCH POSTPONEMENTS: - Baselined launch date of 3/16/00 on 1/28/99. - Postponed launch to 4/13/00, 6/29/00, 10/19/00, 2/15/01, then 3/8/01. (Postponements caused by replacement of 9 damaged RCS thrusters, STS-98 launch postponements, and SRB x-rays/inspections and replacement of damaged cables. LAUNCH SCRUBS: None LAUNCH WINDOW: - Launch window opened at 67:11:37:10Z and closed at 67:11:47:08Z for a total window of 9M58S. - Selected the Preferred Launch Time (In-plane time) of 67:11:42:09Z, 6:42:09 AM EST, giving a launch window of 4M59S. Note: Sunrise was 2 minutes before launch. This was a daylight launch. LAUNCH DELAYS: None - Launch occurred on time at 67:11:42:09Z, 6:42:09 AM EST on Thursday, March 8, 2001. TAL WX: - Zaragoza (prime) was forecast NO GO for crosswinds (observed GO at launch and TAL landing times), Moron was NO GO for ceiling and showers within 20 nm. Ben Guerir (2-engine TAL call) was GO and selected. PERFORMANCE ENHANCEMENTS: - Standard Set Plus: (1) PE OPS High Q WIN/MAR, (2) OMS assist is 3717 lbs, (3) 52 nm MECO, (4) Del Psi FLIGHT DURATION CHANGES: - Total flight duration extensions 1 day plus 1 orbit. - Extended 1 day for MPLM stowage exceeding planned time and 1 orbit for showers and low clouds at KSC. Plan was to land at KSC on orbit 201; however, KSC was forecast NO GO for the next 3 days. Waved-off the planned landing at KSC for orbit 201 due to weather forecast NO GO for showers and low clouds. Plan was to land at KSC on orbit 202; if not, then land at EDW on orbit 203. Minutes before Tig, the weather forecast was observed GO and forecast GO to land at KSC on orbit 202. (Observed crosswinds at landing time were 16 knots, a 4-knot violation.) Low ceiling at 4200 feet became scattered minutes before landing. SHUTTLE NIGHT LANDING #17: - Landed at KSC runway 15 on orbit 202 at 80:07:31:41Z, 2:31:41 AM EST Wednesday, March 21, 2001. Flight duration 12:19:49:32. Landed at KSC Orbit 101. Continued…

Continued…

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (10) 7 UP/7 DOWN TITLE, NAMES & EVA'S	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT INC	ORBIT HA/HP	FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

SPACE SHUTTLE MISSIONS SUMMARY

STS-102/ ISS 5A.1

Continued...

Continued...

M/S 5 DN/EXP1 Soyuz
PLT:
Yuri Gidzenko
(Russia)
(Soyuz Up, STS-102 DN)
P617/R265/M231

SS EVA #61
EMU/TETHERED
EVA #54
SCHEDULED EVA #55
DURATION 8:56

SS EVA #62
EMU/TETHERED
EVA #55
SCHEDULED EVA #56
DURATION 8:21

MCC WHITE FCR (33)

FLIGHT DIRECTORS:
A/E - N. W. Hale
LD/O1 - J. P. Shannon
O2 - P. S. Hill
PLNG/O3 - P. F. Dye
MOD - J. W. Bantle

STATION:
LD/O1 - R. E. LaBrode
O2 - S. P. Davis
PLNG/O3 - R. E. Castle

Continued...

OMS-2:
38:35 38:37
95.6 FPS 97.2 FPS
1:02

1:03.8

Continued...

DENS ALT:
264 FT

FLT DURATION:
12:19:49:32

S/T:
906:23:28:05

OV-103:
230:01:27:50

DISTANCE:
5,357,432 sm

Continued...

FIRSTS/LASTS:
- First shuttle flight transporting an Expedition crew - Expedition 2 up, Expedition 1 down. Expedition 1 Crew launched on Flight 2R, Russian Soyuz rocket from Baikonur Cosmodrome, Kazakhstan on October 31, 2000 at 2:53 AM EST (305:07:53Z). Soyuz docked with ISS on 11/2/2000 at 4:21 AM EST (307:09:21Z). Expedition 1 Crew: CDR - William Shepherd, Soyuz pilot - Yuri Gidzenko, Flight Engineer - Sergei Krikalev.
- Sheperd flight time 80:07:31:41

EVENTS:
- TI maneuver at 69:03:12:39Z, 1:15:30:30 MET, orbit 199.2 by 205.3. MC-4 at 69:04:33:21Z, 1:16:51:12 MET, orbit 199.1 by 206.1 nm.
- ISS capture at 69:06:38:26Z, 1:18:56:17 MET; Docked at PMA2 Lab Forward Port at 69:06:58:23Z; hatch opened at _____.
- EVA 1 Start at 2:17:29 MET and End at 3:02:25 MET, duration 8:56.
- PMA3 grappled, unberthed, and installed on Node 1 Port ACBM at 70:13:50Z.
- MPLM grapple at 71:03:36Z, 3:15:54 MET, and installed on Node 1 Nadir ACBM at 71:06:08Z, 3:18:46 MET.
- EVA 2 Start at 4:17:45 MET and End 5:00:06 MET, duration 6:21.
- Collision avoidance maneuver/ISS Reboost #1 at 73:12:12:09Z, 6:02:30:00 MET, duration 47M22S, orbit 200.1 by 210.8 nm, Delta V 11.8 fps.
- ISS Reboost #2 at 75:11:32:23Z, 7:23:50:14 MET, 7.2 fps, orbit 203 by 212 nm.
- ISS Reboost #3 at 76:09:17:45Z, 8:22:33:52 MET, 7.4 fps, orbit 204.5 by 213.7 nm.
- MPLM grappled at 9:20:22 MET, reberthed in orbiter, and ungrappled at 10:00:05 MET
- ODS hatch was closed at 78:02:48Z, 10:15:06 MET.
- Undocked at 78:04:31:53Z, 10:16:50 MET.
- Transfers: Shuttle to ISS: 9649 lbs cargo plus 980 lbs water in 10 CWC's. ISS to Shuttle: 1647 lbs cargo.
- Crew rotation (Expedition 1 to Expedition 2). Relocated PMA3 from Node 1 Nadir to Node 1 Port. Berthed MPLM to Node 1 Nadir. Transferred RSP's, RSR's, HRF, ISPR, etc. to ISS.
- Krikalev flew two long-duration missions to Mir.
- ISS Visitor Time is 8:21:33:30

RENDEZVOUS #52:
- Rendezvous and dock with ISS at PMA2 Lab Forward Port.

SIGNIFICANT ANOMALIES:
- Flash evaporator left topping Evaporator Duct Heater String A failure
- WCS Fan Sep Rotary Switch 2 position failure
- Freon® loop flow degradation
- EV1 burning sensation in eyes during Airlock depress
- PMA3 J603 loose O-ring EVA
- Unable to remove PMA3 P608 connector cap
- TCS failure during rendezvous termination operation
- OCAC fan failure (running slow at all speed settings)
- Right OMS Vapor Isolation Valve #2 anomaly
- C&W limits set volts pushbutton rotary switch

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-100/ ISS 6A SEQ FLT # 104 KSC-104 PAD: 39A-59 ISS-6A MLP-1 NINTH SHUTTLE FLIGHT TO ISS	OV-105 (Flight 16) Endeavor OMS PODS: LPO4-23 RPO1-30 FRC5-16	CDR: Kent V. Rominger (Flt 5 - STS-73, STS-80, STS-85, STS-96) P618/R200/V131/M174 PLT: Jeffrey S. Ashby (Flt 2 - STS-93) P619/R251/V169/M218 M/S 1/EV1: Chris A. Hadfield (Flt 2 - STS-74) P620/R202/V170/M178 M/S 2: John L. Phillips CSA/Canada P621/R266/M232 M/S 3/EV2: Scott E. Parazynski (Flt 4 - STS-66, STS-86, STS-95) P622/R187/V144/M165 M/S 4: Umberto Guidoni (Flt 2 - STS-75) (ESA-Italy) P623/R212/V171/M185 5: V. Lonchokov ssia) 4/R267/M233 Continued…	KSC PAD 39A 109:18:40:41:99Z 2:40:42 PM EDT (P) 2:40:42 PM EDT (A) Thursday 32 4/19/01 (14) LAUNCH WINDOW: 4M49S BASED ON IN-PLANE TIME (PLT) EOM PLS: KSC TAL: ZZA TAL WX: MRN, BEN SELECTED: RTLS: KSC 33/N/N TAL: MRN 20/N/N AOA: KSC 33/N/N PLS: KSC 15/N/N TDEL: 0.10-0.018/0.02 MAX Q NAV: 725 728 SRB STG: 2:03.7 2:04 PERF: NOMINAL 2 ENG TAL (MRN): 2:33 2:33 NEG RETURN: 3:54 3:55 PTA (U/S 243): 4:47 4:46 PTM (U/S 243): 5:56 5:50 SE TAL (ZZA): 6:04 6:03 SE PTM (U/S 701): 6:53 6:53 MECO CMD: 8:24.2 8:25.4 Continued…	EDW 22, CONC EDW 48, CONC 29 121:16:10:43Z 9:10:43 AM PDT Tuesday 18 5/1/01 (10) DEORBIT BURN: 121:15:02:47Z XRANGE: 527 NM ORBIT DIR: AL 28 AIM PT: NOMINAL MLGTD: 2159 FT 121:16:10:43Z VEL: 207 KGS 195 KEAS HDOT: -3.6 FPS TD NORM 195: 2148 FT NLGTD: 5410 FT 121:16:10:53Z VEL: 157 KGS 149 KEAS HDOT: -5.2 FPS DRAG CHUTE DEPLOY: 191 KEAS 121:16:10:45Z BRK INIT: 106 KGS DRAG CHUTE JETTISON: 53 KGS 121:16:11:16Z BRK DECEL FPS^2: AVE 6.5 PK 10.6 WHEELS STOP: 121:16:11:34Z 10123 FT ROLLOUT: 7964 FT 51 SEC WINDS: 2H 3R OFFICIAL: 28006P10 SS: 5H 4R PK: 8H 7R Continued…	104/104/109% PREDICTED: 100/104.5/104.5/72/104.5 ACTUAL: 100/104.5/104.5/72/104.5 1 = 2054 (3) 2 = 2043 (6) 3 = 2049 (5) ALL BLOCK IIA ENGINES M 3 EOM: WEIGHT: 220693 LBS X CG: 1083.79 LANDING: WEIGHT: 220556 LBS X CG: 1085.49	BI-107 RSRM 79 ET-108 SLWT-13 ET BRKUP: 283 K ET IMPACT 1:26:38 MET LAT: 1.23°S LONG: 127.14° W	51.60 (9)	DIRECT INSERTION POST OMS-2: 178.7 X 85.7 NM DEORBIT: APOGEE 219 NM PERIGEE 204 NM ENTRY VELOCITY: 25919 FPS ENTRY RANGE: 4387 NM	OI-28 (3)	CARGO: 38330 LBS PAYLOAD CHARGEABLE: 29472 LBS DEPLOYED: 6346 LBS NON-DEPLOYED: 4282 LBS MIDDECK: 781 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1046246 LBS NON-DEPLOYED: 1499587 LBS CARGO TOTAL: 3229997 LBS PERFORMANCE MARGINS (LBS): FPR: 3274 FUEL BIAS: 818 FINAL TDDP: 2670 RECON: 2296 PAYLOADS: PLB: ISS-6A ICBC3D MPLM SLP-06A RMS, ODS MIDDECK: DTO EMU H/W EVA Tools 5 CRYO TK SETS 7 GN2 TANKS RMS 61 RMS used to grapple, deploy, retrieve, and berth Spacelab Pallet and MPLM, and for EVA Support	KSC W/D: OPF 82, VAB 5, PAD 23 = 110 days total. LAUNCH POSTPONEMENTS: - Baselined launch date of 12/2/99 - Postponed launch to 4/20/00, then 7/13/00, 7/27/00, 11/30/00. - Postponed launch to 4/19/01 on 2/24/00. LAUNCH SCRUBS: None LAUNCH WINDOW: - Launch window opened at 109:18:36:12Z and closed at 109:45:31Z, giving a total window of 9M29S. The Preferred Launch Time (PLT) was 109:18:40:42 (In-plane time) 2:40:42 PM EDT, giving a launch window of 4M49S. LAUNCH DELAYS: None - Launch occurred on time at 109:18:40:42Z, 2:40:42 PM EDT on Thursday, April 19, 2001. TAL WX: - Zaragoza (prime) was NO GO for head wind violations until approximately L-3 minutes when head winds dropped to 25 knots. Moron (selected early) was GO and decision made to stay with a solid Moron. Ben Guerir was NO GO for forecast and observed showers/virga. PERFORMANCE ENHANCEMENTS: - Standard Set Plus: (1) PE Operational High Q TRN/APR, (2) OMS assist is 4000 lbs, (3) 52 nm MECO, (4) Del Psi FLIGHT DURATION CHANGES: - Total extensions 1 day plus 2 orbits. Planned landing had been on orbit 170. - Extended 1 docked day due to ISS C&C MDM (computer) problems resulting in a planned landing on orbit 185. Did not close PLBD's and waved-off landing at KSC on orbits 185 and 186 due to forecast of showers, crosswinds, and low ceiling weather violations. Similar weather violations were forecast for KSC for the next 2 days. EDW had been called up for EOM because KSC WX violations were forecast to continue through the majority of the week. Decision was made to land at EDW on orbit 187. KSC WX was observed NO GO on the two extension days. Weather observations forecast KSC was NO GO for all 3 days. EDW was GO on EOM+1. Landed on EDW runway 22 on orbit 187 at 121:16:10:43Z, 8:10:43 AM PST on May 1, 2001, 11:21:30:01 MET. Continued…

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-100/ ISS 6A Continued ...		Continued... SS EVA #63 EMU/TETHERED EVA #56 SCHEDULED EVA #57 DURATION 7:09:51 SS EVA #64 EMU/TETHERED EVA #57 SCHEDULED EVA #58 DURATION 7:39:23 MCC WHITE FCR (34) FLIGHT DIRECTORS: A/E - L. E. Cain LD/O 1 - P. L. Engelauf O 2 - K. B. Beck PLNG/O3 - B. P. Austin MOD - J. M. Heflin STATION: LD/O 1 - J. M. Curry O 2 - M. J. Ferring PLNG/O 3- R. E. Castle	Continued... VI: 25930 25920 OMS-2: 43:40 43:42	Continued... DENS ALT: 3925 FT FLT DURATION: 11:21:30:01 S/T: 918:20:58:06 OV-105: 167:03:14:03 DISTANCE: 4,910,188 sm							Continued... EVENTS: - MC-4 (RCS) at 1:18:00:36 MET, orbit 199.1 by 206.1 nm - Docked at ISS PMA2 Lab Forward Port at 111:14:10:42Z - EVA 1 Start at 2:17:04:41 MET, duration 7:09:51 - RMS grappled the Spacelab Pallet, unberthed from orbiter, and installed on Lab Cradle Assembly at 2:16:07:18 MET - ISS hatch opening and crew ingress into ISS at approximately 3:14:40 MET. - MPLM in PLB at 3:19:45 MET grappled and positioned over Node 1 Nadir CBM and installed at 3:21:04 MET. - First ISS Reboost maneuver Started at 4:01:09:54 MET, duration 59M36S, Delta V 7.41 fps, orbit 205.5 by 212.2, raised orbit 2.1 nm. - EVA 2 Start at 4:17:53:12 MET, duration 7h39M22S - Second ISS Reboost maneuver Started at 7:16:40:00 MET (RCS), ended at 1 hour, Delta V was 15.9 fps, orbit 210 by 206. - RMS berthed MPLM in PLB and powered down at 8:02:43 MET. SSRMS to RMS handoff of SLP berthed at 9:02:02 MET. - Delivered and installed SSRMS and connected cables to U.S. Lab. UHF antenna on U.S. Lab, removed starboard ECOMM antenna. Delivered and installed express racks with payloads. Replaced failed CMC MDM #1. - Undocked at 119:17:34:04Z (Extended flight 1 docked day due to ISS C&C MDM and Node MDM problems). - Transferred 6346 lbs cargo to ISS, and 1608 lbs from ISS to Shuttle. Transferred 1380 lbs water in 14 CWC's. - ISS Visitor time is 8:03:23:22. RENDEZVOUS #53: - Rendezvous and dock with ISS at PMA2 Lab Forward Port SIGNIFICANT ANOMALIES: - FES Feedline B Mid 2 Htr 1 failed off - RMS End Effector Capture Switch sticky - WSB 3 anomalous temperature response when operating on WSB 3B controller - Humidity Separator B water carryover - RCS Jet R5D low chamber pressure - EV1 eye irritation during EVA 1 and EVA 2 (Disposable in-suit drink bag leaked) - ISS Early Comm Antenna connector fell apart - Video Signal Converter failed to release from SLP during EVA 2 - SIGI data check bad status indications - SRB - Unburned propellant (3 percent) in RH Forward Booster Separation Motor (BSM). Conclusion is water intrusion. - LOMS POD inboard Y-web dithering/erratic System A Heater - In video of launch, the lower left hand OMS Pod TPS appeared to be flexing during SSME startup. Similar but smaller motion has been seen on the pods in the past.

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5) / TITLE, NAMES & EVA'S	LAUNCH SITE, LIFTOFF TIME, / LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE / LANDING TIMES FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG / THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT INC	ORBIT HA/HP	FSW	PAYLOAD WEIGHTS, / PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, / TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

SPACE SHUTTLE MISSIONS SUMMARY

STS-104/ ISS 7A

SEQ
FLT #105

KSC-105

PAD
39B-46

MLP-2

TENTH SHUTTLE FLIGHT TO ISS

OV-104 (Flight 24)
Atlantis

OMS PODS:
LPO3-28
RPO4-24
FRC4-24

CDR:
Steven W. Lindsey (Flt 3 - STS-87, STS-95)

P625/R229/V131/M200

PLT:
Charles O. Hobaugh P626/R268/M234

M/S 1/EV1:
Michael L. Gernhardt (Flt 4 - STS-69, STS 83, STS-94)

P627/R198/V138/M173

M/S 2:
Janet L. Kavandi (Flt 3 - STS-91, STS-99)

P628/R243/V158/F32

M/S 3/EV2:
James F. Reilly (Flt 2 - STS-89)

P629/R234/V172/M204

SS EVA #65
EMU/TETHERED
EVA #58
SCHEDULED EVA #59
DURATION 5:59

SS EVA #66
EMU/TETHERED
EVA #59
SCHEDULED EVA #60
DURATION 6:29:20

SS EVA #67
DOCKED EVA 1 FROM QUEST A/L #1
EMU/TETHERED
EVA #60
SCHEDULED EVA #61
DURATION 4:01:30

MCC WHITE FCR (35)

FLIGHT DIRECTORS:
A/E/O 2 - N. W. Hale
LD/O 1 - P. S.Hill
PLNG/O3 - J. P. Shannon

ISS LD/O 2 - M. A. Kirsich
ISS O 1 - S. P. Davis

KSC 39B
193:09:03:59Z
5:03:59 AM EDT (P)
5:03:59 AM EDT (A)
Thursday 33
7/12/01 (7)

LAUNCH WINDOW:
7M57S USING PLT (IN-PLANE TIME)

EOM PLS: KSC
TAL: ZZA
TAL WX: MRN

SELECTED:
RTLS: KSC 33 N/N
TAL: ZZA 30 N/SF
AOA: KSC 15 N/N
PLS: EDW 22 N/N

TDEL:
0.010.012/0.05

MAX Q NAV:
732 732

SRB STG:
2:02.1 2:02

PERF: NOMINAL

2 ENG TAL (MRN):
2:23 2:26

NEG RETURN:
3:54 3:57

PTA (U/S 159):
4:39 4:36

SE OPS 3:
5:20 NC

PTM (U/S 159):
6:02 6:02

SE TAL (ZZA):
6:03 6:06

SE PTM (U/S 755):
6:49 6:52

Continued...

KSC 15 (KSC 55)
206:03:38:55Z
11:38:55 PM EDT

Tuesday 19
7/24/01 (10)

DEORBIT BURN:
206:02:31:35Z

XRANGE: 391 NM

ORBIT DIR: AL 29

AIM PT:
NOMINAL

MLGTD: 2183 FT
206:03:38:55Z
VEL: 198 KGS
199 KEAS
HDOT: -1.4 FPS

TD NORM 195:
2499 FT

NLGTD: 5442 FT
206:03:39:06Z
VEL: 148 KGS
148 KEAS
HDOT: -5.7 FPS

DRAG CHUTE DEPLOY: 191 KEAS
206:03:38:58Z

BRK INIT: 56 KGS

DRAG CHUTE JETTISON:
57 KGS
206:03:39:39Z

BRK DECEL (FPS):
AVE 1.6 PK 5.1

WHEELS STOP:
206:03:40:06Z
13041 FT

ROLLOUT:
10858 FT
68 SEC

WINDS:
4H 1L
OFFICIAL:
13005P07
SS: 5H 2L
PK: 6H 3L

Continued...

104/104/109%

PREDICTED:
100/104.5/104.5/72/104.5

ACTUAL:
100/104.5/104.5/72/104.5

1 = 2056 (1)
2 = 2051 (2)
3 = 2047 (6)

ENG 1 & 3
BLOCK IIA

ENG 2
BLOCK II

M 3 EOM:

WEIGHT:
209142 LBS

X CG:
1083.81

LANDING:

WEIGHT:
209097 LBS

X CG:
1085.59

BI-108

RSRM 80

ET-109

SLWT 14

ET RPT:
283 K

ET IMPACT:
1:14:17 MET

LAT:
36.32 °S
LONG:
158.55 °W

51.60 (10)

DIRECT INSERTION

POST OMS-2:
127 X 85 NM

DEORBIT:
APOGEE:
211.0 NM
PERIGEE:
207.5 NM

VELOCITY:
25905 FPS

ENTRY RANGE:
4405 NM

OI-28 (4)

CARGO:
35135 LBS

PAYLOAD CHARGEABLE:
26424 LBS

DEPLOYED:
19792 LBS

NON-DEPLOYED:
6060 LBS

MIDDECK:
582 LBS

SHUTTLE ACCUMULATED WEIGHTS:
DEPLOYED:
1066028 LBS
NON-DEPLOYED:
1506229 LBS
CARGO TOTAL:
3265132 LBS

PERFORMANCE MARGINS (LBS):
FPR: 3274
FUEL BIAS: 818
FINAL TDDP: 2884
RECON: 2990

PAYLOADS:
PLB:
ISS-7A
ISS Airlock Spacehab Double Pallet
(O2 and N2 TKS)
ICBC3D
RMS, ODS

MIDDECK:
ICBC SPT EQUIP,
EMU H/W, EVA TOOLS

5 CRYO TK SETS
7 GH2 TKS
RMS 62

RMS used to view A/L Installation, OSVS, and EVA Support

KSC W/D: OPF 82, VAB 11, PAD 21 = 114 days total.

LAUNCH POSTPONEMENTS:
- Baselined launch date of 8/24/00 on 7/29/99
- Postponed launch date to 2/8/01 on 11/10/99
- Postponed launch date to 5/15/01 on 2/24/01
- Postponed launch date to 7/12/01

LAUNCH SCRUBS: NONE

LAUNCH WINDOW:
- Launch window opened at 193:08:59:00Z and closed at 193:09:11:56Z in two panes with a 10 second cutout between panes, resulting in a total window of 12M56S. The Preferred Launch Time was 193:09:03:59Z (Pane 1 In-Plane Time) resulting in a launch window of 7M57S.

LAUNCH DELAYS: NONE
- Launch occurred On-Time at 193:09:03:59Z (5:03:59 AM EDT) on Thursday, July 12, 2001.

TAL WX:
- Zaragoza (Prime and Selected) forecast and observed GO, Moron (2-Eng TAL Call) was forecast and observed GO. Ben Guerir was not available due to security concerns (BEN was forecast and observed GO).

PERFORMANCE ENHANCEMENTS:
- Standard Set Plus: PE Operational High Q SUM/JUL, 52 nm MECO, and Del Psi

SHUTTLE NIGHT LAUNCH #26

SHUTTLE NIGHT LANDING #18
- Landed on orbit 201 on KSC runway 15 at 206:03:38:55Z, 11:38:55 PM EDT on 7/24/2001.

FLIGHT DURATION CHANGES:
- Total extension 2 days. One day for ISS Ops and one day for weather at KSC.
- Extended Flight 1 day due to delays in completing ISS activities primarily caused by airlock leaks.
- Closed PLBD's and fluid loaded crew for planned landing on orbit 186 at KSC at 11:19:32:47 MET. At Tig -10 mins, waved-off when small cluster of showers formed SW of SLF with forecast to be within 30 nm at landing. At Tig -11 mins, waved-off landing on orbit 187 at KSC with observed precipitation and low ceiling within 30 nm and forecast precipitation within 30 nm at landing time.
- Second Extension Day. Called up EDW for EOM+1. Landed on first KSC opportunity on orbit 201 on runway KSC 15 at 206:03:38:55Z, 12:18:34:56 MET, 11:38:55 PM EDT (Tuesday, July 24, 2001 EDT).

FIRSTS/LASTS:
- First flight of SSME with alternate Pratt & Whitney HPFTP (S/N 2051) Block II engine
- First operational use of SSRMS since delivery on STS-100/6A. Used to grapple Airlock and install on Node 1 Starboard Port.

Continued...

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5) / TITLE, NAMES & EVA'S	LAUNCH SITE, LIFTOFF TIME, / LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE / LANDING TIMES FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG / THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT INC	ORBIT HA/HP	FSW	PAYLOAD WEIGHTS, / PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, / TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

SPACE SHUTTLE MISSIONS SUMMARY

STS-104/ ISS 7A Continued...			Continued... MECO CMD: 8:23.8 8:26 VI: 25824 25823 OMS-2: 38:29 38:33 96.7 FPS 96.6 FPS	Continued... DENS ALT: 1346 FT FLT DURATION: 12:18:34:56 S/T: 931:15:33:02 OV-104: 198:05:45:31 DISTANCE: 5,309,429 sm						Continued... FIRSTS/LASTS (Continued): - First use of exercise pre-breathe of pure oxygen to purge nitrogen from EVA crew for EVA 3 (12 minute pre-breathe). - First use of ISS Joint Airlock for EVA (by Shuttle Crew on EVA 3). EVENTS: - Docked at ISS PMA2 Lab Fwd Port. ISS contact at 1:18:04:02 MET, 195:03:08:01Z; Docking complete at 1:18:19:16 MET, 195:03:23:15Z. - ISS Hatch open (first) 1:20:24 MET, 195:05:28Z. - Airlock grapple. - EVA 1 started at 2:18:07 MET, 196:03:12Z; ended at 3:00:06 MET, 196:09:11Z, duration 5H59M. - ISS Reboost 1 maneuver started at 196:01:18:06Z, 3:16:14:07 MET, Delta V=6.8 ft/sec, altitude increase 2.3 nm, altitude 206 by 201 nm. - EVA 2 started at 199:03:05Z; ended at 199:09:34Z, duration 6H29M20S. - ISS Reboost 2 maneuver started at 199:09:59:12Z, 6:00:55:13 MET, delta V=6.9 ft/sec, altitude increase 2.0 nm, altitude 207.8 by 203.7 nm. - ISS Reboost 3 maneuver started at 200:07:35:04Z, 6:22:31:05 MET, delta V=14.9 ft/sec, altitude increase 4.3 nm, altitude 211.1 by 208.6 nm. - EVA 3 started by 202:08:35Z, and ended at 202:08:37Z, duration 4H01M30S. EVA from Joint Airlock. - Delivered and installed ISS Joint Airlock on Node 1 Stbd port using SSRMS. Delivered and installed four HPGT's (two O2 and two H2) on Airlock. End of ISS Phase 2. - ISS Hatch close (Final) at 9:17:51 MET, 203:02:55Z. - Undocked at 9:19:50:00 MET, 203:04:53:59 Z. - Transfers: Shuttle to ISS: 19782 lbs cargo (includes Airlock, 13299 lbs) plus 897 lbm water in 9 CWC's. ISS to Shuttle: 626 lbs. - ISS Visitor Time is 8:01:45:58. RENDEZVOUS #54: - Rendezvous and dock with PMA2 Lab Forward Port SIGNIFICANT ANOMALIES: - Water Loop 1 floodlight coldplate low temperature - FES Feedline A heater failure - EMU 3 battery electrolyte leakage - EV1 right foot discomfort - Airlock Handhold 0535 installation failure - Non-tending retractable tether - Proshare video conferencing anomaly - Failed hand held microphone. - Sequential Still Video (SSV) not operating - Ku-Band failed to detect and track Ku forward signal. - ODS C/L Camera misalignment - Left Vent doors 8 and 9 Open 2 sticky microswitch.

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-105/ ISS 7A.1

SEQ
FLT #106

KSC-106

PAD
39A-60

MLP-3

ELEVENTH SHUTTLE FLIGHT TO ISS

OV-103 (Flight 30

(Discovery)

OMS PODS:
LPO1-33
RPO3-31
FRC3-30

CDR:
Scott J. Horowitz
(Flt 4 - STS-75, STS-82, STS-101)

P630/R210/V135/M183

PLT:
Frederick W. Sturckow
(Flt 2 - STS-88)

P631/R247/V173/M215

M/S 1/EV2:
Patrick G. Forrester
P632/R269/M235

M/S 2/EV1:
Daniel T. Barry
(Flt 3 - STS-72, STS-96

P633/R209/V155/M182

M/S 3 UP/EXP 3 CDR:
Frank L. Culbertson, Jr.
(Flt 3 - STS-38, STS-51)

P634/R116/V95/M105

M/S 4 UP/EXP 3 SPLT:
Vladimir N. Dezhurov
(Russia)
(Flt 2 - STS-71)

P635/R195/V174/M170

UP/EXP 3 Flt

Tyurin
a)
R270/M236

ON/EXP 2 Flt

S. Voss
- STS-44, STS-53, STS-69, STS-101, STS-102 UP)
P637/R136/V85/M121

KSC 39A
222:21:10:14Z
5:10:14 PM EDT (P)
5:10:14 PM EDT (A)
Friday 23 8/10/01 (7)

LAUNCH WINDOW:
9M58S ISS WINDOW OPEN

EOM PLS: KSC
TAL: ZZA
TAL WX: MRN, BEN

SELECTED:
RTLS: KSC 15 N/N
TAL: MRN 20 N/N
AOA: KSC 15 N/N
PLS: EDW 22 N/N

TDEL:
0.05 -0.148/-0.11

MAX Q NAV:
723 715

SRB STG:
2:02.2 2:07

PERF: NOMINAL

2 ENG TAL (BEN):
2:27 2:21

NEG RETURN:
3:55 3:58

PTA (U/S 163):
4:35 4:36

SE OPS[3]:
5:25

PTM (U/S 163):
6:36 6:44

Continued...

KSC 15 (KSC 56)
234:18:22:59Z
2:22:59 PM EDT

Wednesday 13 8/22/01 (6)

DEORBIT BURN:
234:17:15:23Z

XRANGE: 793 NM

ORBIT DIR: AR 10

AIM PT: NOMINAL

MLGTD: 1508 FT
234:18:22:59Z
VEL: 210 KGS
202 KEAS
HDOT: -3.2 FPS

TD NORM 195:
2256 FT

NLGTD: 4971 FT
234:18:23:10Z
VEL: 157 KGS
149 KEAS
HDOT: -6.9 FPS

DRAG CHUTE DEPLOY: KEAS
234:18:23:01Z

BRK INIT: 78 KGS

DRAG CHUTE JETTISON:
56 KGS
234:18:23:43Z

BRK DECEL FPS[2]:
AVE 3.8 PK 4.9

WHEELS STOP:
234:18:24:05Z
11544 FT

ROLLOUT:
10036 FT
66 SEC

Continued...

104/104/109%

PREDICTED:
100/104.5/104.5/72/104.5

ACTUAL:
100/104.5/104.5/72/104.5

1 = 2052 (4)
2 = 2044 (6)
3 = 2045 (6)

ALL BLOCK IIA SSME'S

M 3 EOM:

WEIGHT:
220682 LBS

X CG:
1083.96

LANDING:

WEIGHT:
222620 LBS

X CG:
1085.62

BI-109

RSRM 81

ET-110

SLWT 15

ET RPT:
283K

ET IMPACT
1:14:21
MET

LAT:
36.7°S

LONG:
157.75° W

51.60 (11)

DIRECT INSERTION

POST OMS-2:
125.9 X 84.8 NM

DEORBIT:
APOGEE
218.8 NM
PERIGEE
199.2 NM

ENTRY VELOCITY:
25909 FPS

ENTRY RANGE:
4286 NM

OI-28 (5)

CARGO:
33107 LBS

PAYLOAD CHARGEABLE:
29305 LBS

DEPLOYED:
9657 LBS

NON-DEPLOYED:
4654 LBS

MIDDECK:
475 LBS

SHUTTLE ACCUMULATED WEIGHTS:
DEPLOYED:
1075685 LBS
NON-DEPLOYED:
1511356 LBS
CARGO TOTAL:
3298239 LBS

PERFORMANCE MARGINS (LBS):
FPR: 3065
FUEL BIAS: 937
FINAL TDDP: 705
RECON: 631

PAYLOADS:
PLB:
ISS-7A.1 (MPLM, ICC crew rotation)
Heat, GAS (2)
RMS, ODS

MIDDECK:
None

5 CRYO TK SETS
6 GN2 Tanks
RMS 63

RMS used to install MPLM on Node 1 and berth in PLB, to install EAS on P6 truss, and EVA Support

KSC W/D: OPF 79, VAB 8, PAD 31 = 118 days total.

LAUNCH POSTPONEMENTS:
- Baselined launch date of 6/21/01 on 6/22/00
- Postponed launch date to 7/12/01
- Postponed launch date to NET 8/5/01 on 6/7/01
- Postponed launch date to NET 8/9/01 on 7/11/01

LAUNCH SCRUBS:
- Scrubbed the 8/9/01 launch attempt. The launch window was in two planes; however, at the L-2 day MMT, it was decided not to use Plane 2 for the first launch attempt on Thursday, August 9, 2001. Window opened at 221:21:32:47Z and closed at 221:21:42:46Z or 9M59S total window. With a Preferred Launch Time (PLT) of 221:21:37:46Z, the launch window was 5M00S. Launch attempt was scrubbed at L-25 minutes due to thunderstorms within 20nm, lightening strikes at 12 nm, and detached anvils over the Pad and SLF. All three TAL sites were GO. Weather Scrub. Launch set for Friday, August 10.

LAUNCH WINDOW:
- Launch window opened at 222:21:10:14Z and closed at 222:21:20:12Z, giving a total launch window of 9M58S. The PLT (Preferred Launch Time) of 222:21:15:13Z (In Plane Time) was selected, which gave a planned window of 4M59S. During the late count, thunderstorms were moving toward the launch site from the Southwest and forecast to be within 30 nm of the Pad and SLF at launch time. At L-27 minutes, the Ops Manager made the decision to increase the probability of launching by moving the Launch Time to the opening of the launch window (222:21:10:14Z), giving the ultimate launch window of 9M58S. Weather was observed GO at RTLS landing time for PLT and Window Open Time.

LAUNCH DELAYS: NONE
- Launch occurred On-Time at 222:21:10:14Z, Friday, August 10, 2001 at 5:10:14 PM EDT.

TAL WX:
- All three TAL sites were forecast and observed GO (Zaragoza (prime), Moron, and Ben Guerir). Moron was selected because it had the best weather (ZZA had potential for winds and rain).

PERFORMANCE ENHANCEMENTS:
- Standard Set plus PE Operational High Q SUM/AUG, 52 nm MECO, and Del Psi.

FLIGHT DURATION CHANGES:
- Total changes-one orbit weather extension. NEOM was to land at KSC on orbit 186 at approximately 12:46 PM EDT. EDW was not called up. At Tig-25 minutes, waved-off landing due to observed and forecast thunderstorms and rain showers within 20 nm of SLF. STA reported there was not-a-cloud-in-the-sky over Florida except for the rain cell that persisted at 1 or 2 miles south of the SLF, which caused the wave-off. Landed at KSC 15 on orbit 187 at 234:18:22:59Z, 2:2:59 PM EDT, on Wednesday, August 22, 2001.

FIRSTS/LASTS:
- First Shuttle round trip with Expedition rotation crews (Expedition 3 crew up, Expedition 2 crew down).

Continued...

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-105/ ISS 7A.1

Continued ...

Continued...

M/S 4 DN/EXP 2 Flt Eng 2:
Susan J. Helms
(Flt 5 - STS-54, STS-64, STS-78, STS-101, STS-102 UP)

P638/R158/V108/F19

M/S 5 DN/EXP 2 CDR:
Yuri V. Usachev
(Flt 2 - STS-101)
(Russia)
(STS-102 UP)

P639/R256/V168/M223

SS EVA #68
EMU/TETHERED
EVA #61
SCHEDULED EVA #62
DURATION 6:16

SS EVA #69
EMU/TETHERED
EVA #62
SCHEDULED EVA #63
DURATION 5:29

MCC WHITE FCR (36)

FLIGHT DIRECTORS:
A/E/ O1 - J. P. Shannon
LD/O1 - P. F. Dye
O 2 - K. B. Beck
PLNG/O3 - B. P. Austin

ISS LD/O1 - M. J. Ferring
ISS O2 - R. E. La Brode
ISS P/O3 - J. M. Curry
MOD - N. W. Hale

Continued...

SE TAL (ZZA):
6:04 5:59

MECO CMD:
8:24.4 8:27

OMS-2:
38:34 38:34
96.4 96.2

Continued...

WINDS:
3T 6L
OFFICIAL:
04007P11
SS: 6L 3T
PK: 10L 4T

DENS ALT:
1816 FT

FLT DURATION:
11:21:12:45

S/T:
943:12:45:47

OV-103:
241:22:40:35

DISTANCE:
4,912,390 sm

Continued...

EVENTS:
- ISS capture was at 1:21:31:27 MET, 224:18:41:41Z.
- ISS hard dock at PMA2 Lab Forward Port at 1:21:53:39Z, 224:19:03:53Z.
- First ISS hatch opening at 1:23:30 MET, 224:20:41:14Z.
- RMS grapple of the MPLM at 2:15:41:46 MET, 225:12:52:00Z.
- MPLM installed on Node 1 at 2:18:35:37 MET, 225:15:45:51Z.
- IELK time and Command Handover Time (ISS transfer from Exp 2 crew to Exp 3 crew and Cmd from Usachev to Culbertson) at 225:19:15Z.
- Exp 2 habitant time (Usachev=156:08:35, Voss=154:14:17, Helms=152:10:34). OV-105 crew ISS Visitor Time=7:19:47:44.
- EVA 1 Start time 228:13:58:14Z, 5:16:48:00, duration 6H16M.
- EAS installed on P6 Truss and Pip Pin in at 228:15:40:02Z, 5:18:29:47 MET.
- First Reboost maneuver started at 226:17:56:26Z, 3:20:48:12 MET, delta V 6.0 ft/sec, altitude increase 1.7 nm, orbit 218 by 208 nm.
- Second Reboost maneuver started at 229:12:12:27Z, 6:15:02:13 MET, delta V 6.4 ft/sec, altitude increase 1.8 nm, orbit 218.8 by 209.5 nm.
- EVA 2 started at 230:14:32Z, 7:16:32 MET, and ended at 230:20:01Z, duration 5M29S.
- SimpleSat deployed from Gas Can at 232:18:29:14Z, 9:21:19:00 MET.
- Total transferred to ISS 10651 lbs; 9657 lbs cargo (MPLM 6314, ICC 1549, MD 1794, H2O 10 CWC's with 993.8 lbs). Total transferred from ISS 3802 lbs (MPLM 2564, ICC 0, MD 1238). Net transfer from Shuttle to ISS=6849 lbs.
- Crew rotation, Exp 3 up and Exp 2 down. Delivered and installed EAS on P6 Truss and attached cables. Clamped MISSE to ISS Airlock handrails. Installed 11 handrails on U.S. Lab.
- Undocked at 232:14:51:37Z.
- ISS Visitor Time is 7:19:47:44. Exp 2 Crew ISS Flight Time 167:06:40:50 (New U.S. record). Exp 2 Crew ISS Habitant Times: Usachev 156:08:35:00 (ISS record), Voss 154:14:17:00, Helms 152:10:34:00 (Times based on Exp 2 to Exp 3 IELK transfer times).

RENDEZVOUS #55:
- Rendezvous and dock with ISS - PMA 2 Lab Forward Port

SIGNIFICANT ANOMALIES:
- Loss of AC2 phase A during MPM stow
- Zero-G connector loose O-rings
- Safety tether hook lock guard inadvertently released on EV2's safety tether
- GPS ADL-CC-15 anomaly (MAGR tracking difficulty)
- Ku-Band Power Output low
- OPS Recorder 1 degraded tracks
- Nose Wheel Steering switch anomaly
- Left OMS Crossfeed low point drain line heater failure
- TCS power supply undervoltage annunciations

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-108/ ISS UF-1 SEQ FLT #107 KSC-107 PAD: 39B-47 MLP-1 TWELFTH SHUTTLE FLIGHT TO ISS	OV-105 (Flight 17) Endeavor OMS PODS: LPO4-24 RPO1-31 FRC5-17	CDR: Dominic L. Gorie (Flt 3 - STS-91, STS-99) P640/R242/V157/M211 PLT: Mark E. Kelly P641/R271/M237 M/S 1: Linda M. Godwin (Flt 4 - STS-37, STS-59, STS-76) P642/R122/V105/F13 M/S 2: Daniel M. Tani P643/R272/M238 M/S 3 UP/EXP 4 Flt Eng: Carl E. Walz (Flt 4 - STS-51, STS-65, STS-79) P644/R170/V106/M148 M/S 4 UP/EXP 4 Flt Eng: Daniel W. Bursch (Flt 4 - STS-51, STS-68, STS-77) P645/R169/V109/M147 M/S 5 UP/EXP 4 CDR: Yuri I. Onufrienko (Russia) P646/R273/M239 M/S 3 DN/EXP 3 CDR: Frank L. Culbertson, Jr. (Flt 3 - STS-38, STS-51, STS-105 '/R116/V95/M105 4 DN/EXP 3 SPLT: dimir N. ıurov ssia) 2 - STS-71, STS-UP) P648/R195/V174/M170	KSC 39B 339:22:19:28Z 5:19:28 PM EST (P) 5:19:28 PM EST (A) Wednesday 12 12/5/01 (6) LAUNCH WINDOW: 7M34S USING PLT (IN-PLANE TIME) EOM PLS: KSC TAL: ZZA TAL WX: MRN, BEN SELECTED: RTLS: KSC 33/N/N TAL: ZZA 30/N/N AOA: NOR 17/N/SF PLS: EDW 22/N/N TDEL: 0.03 -0.1568 MAX Q NAV: 714 708 SRB STG: 2:05 2:04 PERF: NOMINAL 2 ENG TAL (MRN): 2:19 2:26 NEG RETURN: 3:48 3:53 PTA (U/S 154): 4:51 4:58 SE TAL (ZZA 104): 6:03 6:06 PTM (U/S 154): 6:20 6:20 SE PTM (U/S 736): 6:52 6:57 MECO CMD: 8:23.8 8:25.7 Continued…	KSC 15 (KSC 57) 351:17:55:12Z 12:55:12 AM EST Monday 20 12/17/01 (13) DEORBIT BURN: 351:16:48:13Z XRANGE: 26 NM ORBIT DIR: AR 11 AIM PT: NOMINAL MLGTD: 3024 FT 351:17:55:12Z VEL: 198 KGS 201 KEAS HDOT: -1.6 FPS TD NORM 205: 2734 FT NLGTD: 6901 FT 351:17:55:24Z VEL: 143 KGS 146 KEAS HDOT: -6.3 FPS DRAG CHUTE DEPLOY: 191 KEAS 351:17:55:16Z BRK INIT: 92 KGS DRAG CHUTE JETTISON: 57 KGS 351:17:56:18Z BRK DECEL FPS^2: AVE 4.2 PK 6.9 WHEELS STOP: 351:17:56:18Z 11965 FT ROLLOUT: 8941 FT 66 SEC WINDS: 6H, 2L OFFICIAL: 14006P13 SS: 6H, 2L PK: 13H, 2L Continued…	104/104/ 109% PREDICTED: 100/104.5/ 104.5/72/ 104.5 ACTUAL: 100/104.5/ 93/72/ 104.5 1 = 2049 (6) 2 = 2043 (7) 3 = 2050 (2) ENGINE 2050 IS BLOCK II ENGINE. OTHER TWO BLOCK IIA ENGINES. M 3 EOM: WEIGHT: 220623 LBS X CG: 1083.79 LANDING: WEIGHT: 220556 LBS X CG: 1085.49	BI-110 RSRM 82 ET-111 SLWT 16 ET IMPACT 1:14:20 MET LAT: 36.3°S LONG: 158.3 °W	51.60 (12)	DIRECT INSERTION POST OMS-2: 124.2 X 121.6 NM DEORBIT: 204 X 191 NM VELOCITY: 25888 FPS ENTRY RANGE: 4416 NM	OI-28 (6)	CARGO: 38177 LBS PAYLOAD CHARGEABLE: 31393 LBS DEPLOYED: 6454 LBS NON-DEPLOYED: 8635 LBS MIDDECK: 690 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1082139 LBS NON-DEPLOYED: 1520683 LBS CARGO TOTAL: 3336416 LBS PERFORMANCE MARGINS (LBS): FPR: 3065 FUEL BIAS: 937 FINAL TDDP: 2881 RECON: 1182 PAYLOADS: PLB: ISS UF-1 (MPLM, LMC) MACH-1, SEM (1), GAS (5), RMS, ODS, Crew Transfer MIDDECK: ADF CBTM SIMPLEX ISS UF-1 5 CRYO TK SETS 6 GN_2 TANKS RMS 64 RMS used for ISS MPLM deploy and retrieve and EVA support	KSC W/D: OPF 142, VAB 6, PAD 34 = 182 days total. LAUNCH POSTPONEMENTS: - Baselined launch date of 10/4/01 on 9/21/00 - Postponed launch date to NET 11/1/01 - Postponed launch date to 11/29/01 LAUNCH SCRUBS: - Scrubbed Thursday 11/29/01 EDT (11/30/01 GMT) Launch at ET Tanking MMT at L-9.5 Hours due to an ISS problem. Progress 6 had Soft Docked with SM Aft Port; however, did not achieve Hard Dock. Suspect debris within the docking interface. U.S. ISS Mgmt wanted to work problem and it was decided to go into a 24-hour scrub turnaround, then 48-hr scrub turnaround. Initially IP Russia was GO. U.S. ISS management wanted to scrub to work problem. Then IP Russia announced at ISS MMT on 11/30/01 that they planned an EVA on 12/3/01 to clear debris in docking mechanism. SSP MMT on 11/30/01 set launch for 12/4/01 to allow review of results of EVA. IP Russia EVA crew removed damaged seal from previous Progress enabling Progress 6 to Hard Dock. ISS Technical Scrub (new category of scrub). - Scrubbed Tuesday 12/4/01 launch due to RTLS and Range weather (light precipitation and low ceiling). Low clouds moved into launch area from the Northeast bringing dynamic weather conditions particularly in last hour before launch. RTLS runway selection alternated between 33 and 15. Light rain was reported only by the STA as it was not visible on radar or by SLF Observer. Counted down to T-5 minutes and held while evaluating the observed and forecast weather. Scrubbed at 338:22:44:43Z (Preferred Launch Time was 22:45:08Z) while holding at T-5 minutes based on STA observations of precipitation and cloud cover and a late update SMG forecast of broken clouds over SLF runway. RTLS and Range WX Scrub. Went into a 24 hour scrub turnaround. All three TAL sites were GO. LAUNCH WINDOW: - Window opened at 339:22:15:35Z and closed at 339:22:27:02Z giving a total window of 11:37 in two panes with a 19-second gap between panes. Preferred Launch Time (PLT) in-plane time for pane 1 was 339:22:19:28Z giving a window of 7M34S. LAUNCH DELAYS: None - Launch occurred On-Time at 339:22:19:27.951Z, 5:19:28 PM EST, on Wednesday, 12/5/01. TAL WX: - All three TAL sites (ZZA, MRN, and BEN) were GO. Zaragoza was prime but it was a low energy day there, so Moron was selected. - MRN was 2-Eng TAL Call PERFORMANCE ENHANCEMENTS: - Standard Set plus PE Operational High Q, OMS Assist is 4000 lbs, 52 nm MECO, and Del Psi. FLIGHT DURATION CHANGES: - Extended flight one docked day to allow time for additional ISS tasks. Initially planned (before extension) to land at KSC on orbit 170. After one day extension, planned landing at KSC on orbit 186. Endeavour landed at KSC on Runway 15 on orbit 186 at 351:17:55:11Z, 122:55:11 PM EST on Monday, December 17, 2002.

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-108/ ISS UF-1

Continued ...

Continued...

M/S 5 DN/EXP 3 Flt Eng:
Mikail Tyurin (Russia) (STS-105 UP)
P649/R270/M236

SS EVA #70
EMU/TETHERED
EVA #63
SCHEDULED EVA #64
DURATION 4:11

MCC WHITE FCR (37)

FLIGHT DIRECTORS:
A/E - L. E. Cain
Shuttle LD/O 1 - N. W. Hale
Shuttle O 2 - P. S. Hill
Shuttle Plng - C. A. Koerner

ISS LD/O 1 - S. P. Davis
ISS O 2 - R. E. Castle
ISS PLNG - J. A. [illegible]ough
[illegible]. M. Heflin

Continued...

VI:
25822 25823

OMS-2:
37:42 37:47
164 FPS 164 FPS
1:48 1:48

Continued...

DENS ALT:
1607 FT

FLT DURATION:
11:19:35:44

S/T:
955:08:21:31

OV-105
178:22:49:47

DISTANCE:
4,817,649 sm

Continued...

FLIGHT DURATION CHANGES:
- SMG Weather forecast for KSC on Tig orbit 185/Landing orbit 186 was forecast NO GO due to ceiling (3000 broken and 6500 broken). However, STA was reporting an observed GO and several positive factors provided the FD confidence to give a GO for landing on orbit 186. A Flight Rule waiver was approved post flight.

FIRSTS/LASTS:
- First flight of Block II SSME (S/N 2050) in position 3.

EVENTS:
- MC4 maneuver at 341:16:52Z, 01:18:32 MET, orbit 195.8 by 209.7 nm
- ODS captured ISS at 341:20:03:25Z, 1:21:43:58 MET
- MPLM grappled by RMS at 342:16:14Z, 2:17:54 MET, unberthed at 342:17:00Z, 2:18:40 MET and installed on NODE, RMS ungrappled MPLM at 342:18:09:20Z, 2:19:49 MET.
- Reboost #1 Start at 343:15:11:40Z, 3:16:52:12 MET, Delta V = 6.3 FPS, altitude increase 1.9 nm, resulting orbit 210.6 by 199.0 nm.
- EVA 1 Start at 344:19:34Z, 4:21:14 MET, duration of 4 hours 11 minutes. Installed MLI blankets on Beta Gimbal Assembly on solar arrays 4B and 2B. Removed SASA blanket and pre-positioned Circuit Interrupt Devices (CID's).
- Reboost #2 Start at 345:16:19:40Z, 5:18:00:12 MET, Delta V = 6.5 FPS, altitude increase 1.8 nm, resulting orbit 211.3 by 201.2 nm.
- Reboost #3 Start at 346:15:22:32Z, 6:17:03:04 MET, Delta V = 14.1 FPS, altitude increase of 4.0 nm, resulting orbit 213.4 by 206.9 nm.
- Reboost #4 was performed for collision avoidance. Started at 349:14:55:40Z, 9:16:36:13 MET, Delta V = 2.1 FPS, altitude increase of 0.6 nm, resulting orbit 213.8 by 206.3 nm.
- Undocking: 349:17:28:35Z, 9:19:08 MET
- ISS Separation burn at 349:17:28:35Z, 9:19:09:08 MET
- Total water transferred to ISS was 299 lbm (210.3 lbm in 3 CWC's plus 88.7 lbm in 4 PWR's).
- Total transfers from Shuttle to ISS was 6244 lbs (from MPLM 5249 lbs and Middeck 995 lbs), total transfer from ISS was 4156 lbs (in MPLM 3007 lbs and to Middeck 1149 lbs).
- Endeavour/ISS Visitor Time is 7:21:25:11.
- Expedition 4 Crew Up, Expedition 3 Crew Down.
- Expedition 3 Crew ISS Habitant Time - 117:02:57:00.
- Expedition 3 Crew Flight Time - 128:20:44:58
- Culbertson Total Flight Time - 143:14:50:31
- Official transfer time from Expedition 3 to Expedition 4 crew was 342:22:12:00Z.

RENDEZVOUS #56:
- Rendezvous and dock with ISS to PMA2 Lab Fwd Port. Expedition 4 Crew Up, Expedition 3 Crew Down.

SIGNIFICANT ANOMALIES:
- GSE Gaseous Hydrogen (GH_2) Vent Arm did not latch-back and the GUCP rebounded beyond FSS. GH_2 Vent Arm contacted side of support structure (Constraint to next flight)
- RCS Thruster R4U Failed-Off and was auto deselected
- RCS Thruster F3F Failed-Off and was auto deselected
- Loud white noise was heard on A/G 2 after SSOR 1 was tied to Orbiter Audio Bus
- IMU 2 Platform fail and redundant rate BITE

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-109 SEQ FLT # 108 KSC-108 PAD 39A-61 MLP-2 Fourth HST Service Flight	OV-102 (Flight 27) Columbia OMS PODS: LPO5-16 RPO5-15 FRC2-27	CDR: Scott D. Altman (Flt 3 - STS-90, STS-106) P650/R237/V161/M207 PLT: Duane Carey P651/R274/M240 M/S 1/EV1: John Grunsfeld (Flt 4 - STS-67, STS-81, STS-103) P652/R191/V133/M167 M/S 2: Nancy Currie (Flt 4 - STS-57, STS-81, STS-103) P653/R165/V120/F21 M/S 3/EV2: Richard Linnehan (Flt 3 - STS-78, STS-90 P654/R214/V150/M187 M/S 4/EV3: James Newman (Flt 4 - STS-51, STS-69, STS-88) P655/R168/V122/M146 M/S 5/EV4: Michael Massimino P656/R275/M241 SS EVA #71 EMU/TETHERED EVA #64 SCHEDULED EVA #65 DURATION 7:01 SS EVA #72 EMU/TETHERED EVA #65 SCHEDULED EVA #66 DURATION 7:16 Continued…	KSC 39A 60:11:22:01:99Z 6:22:02 AM EST (P) 6:22:02 AM EST (A) Friday 24 3/1/02 (8) LAUNCH WINDOW: HST Planar/Phase Window 61M51S EOM PLS: KSC TAL: BEN TAL WX: NONE SELECTED: RTLS: KSC 15/CI/N TAL: BEN 36/N/N AOA: EDW 22/N/N PLS: EDW 04/CI/N TDEL: -0.03 -0.26/-0.023 MAX Q NAV: 693 ??? 754 SRB STG: 2:06 2:07 PERF: NOMINAL 2 ENG TAL (BEN): 2:17 2:16 NEG RETURN: 3:55 3:59 PTA (U/S 530): 3:50 3:55 PTM (U/S 500): 5:06 5:08 SE TAL (BYD): 5:50 5:50 MECO CMD: 8:21.5 8:23.9 Continued…	KSC 33 (KSC 58) 71:09:31:53Z 4:31:53 AM EST Tuesday 20 3/12/02 (9) DEORBIT BURN: 71:08:22:39Z XRANGE: 268 NM ORBIT DIR: DL 48 AIM PT: NOMINAL MLGTD: 3433 FT 71:09:31:53Z VEL: 196 KGS 186 KEAS HDOT: -2.7 FPS TD NORM 195: 2993 FT NLGTD: 6286 FT 71:09:32:01Z VEL: 156 KGS 149 KEAS HDOT: -5.6 FPS DRAG CHUTE DEPLOY: 181 KEAS 71:09:31:55Z BRK INIT: 66 KGS DRAG CHUTE JETTISON: 63 KGS 71:09:32:37Z BRK DECEL (FPS^2): AVE 3.7 PK 7.2 WHEELS STOP: 71:09:33:05Z 13552 FT ROLLOUT: 10119 FT 72 SEC WINDS:T5, R2 OFFICIAL: 13005P08 SS: T5, R2 PK: T8, R3 Continued…	104/104/109% PREDICTED: 100/104.5/104.5/72/104.5 ACTUAL: 100/104.5/101/72/104.5 1 = 2056 (2) 2 = 2053 (4) 3 = 2047 (7) ALL SSME's BLOCK IIA M 3 EOM: WEIGHT: 222447 LBS X CG: 1082.87 LANDING: WEIGHT: 222366 LBS X CG: 1084.57	BI-111 RSRM 83 ET-112 SLWT-17 ET IMPACT 1:28:35 MET LAT: 16.3°N LONG: 143.6 °W	28.45 (50)	DIRECT INSERTION POST OMS-2: 310.5 x 105.0 NM DEORBIT: 312.6 x 259 NM VELOCITY: 26082 FPS ENTRY RANGE: 4274 NM	OI 28 (7)	CARGO: 27564 LBS PAYLOAD CHARGEABLE: 20144 LBS DEPLOYED: 8256 LBS NON-DEPLOYED: 10672 LBS MIDDECK: 1216 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1090395 LBS NON-DEPLOYED: 1532571 LBS CARGO TOTAL: 3363980 LBS PERFORMANCE MARGINS (LBS): FPR: 3065 FUEL BIAS: 937 FINAL TDDP: 3309 RECON: 4170 PAYLOADS: PLB: HST Service Mission 3B RMS MIDDECK: NONE 5 CRYO TK SETS 5 GN2 TANKS RMS 65 RMS USED FOR: HST GRAPPLE, BERTH, SERVICE, AND RELEASE.	KSC W/D: OPF 253, VAB 8, PAD 32 = 293 days total. LAUNCH POSTPONEMENTS: - Baselined launch date of 11/1/01 on 9/21/00 - Postponed launch date to NET 11/19/01 on 5/4/01 - Postponed launch date to 1/17/02 on 5/10/01 - Postponed launch date to 2/14/02 on 10/4/01 - On 12/21/01, postponed launch date to NET 2/21/02 to allow manifest of new RWA (new HST problem) and train EVA crew. - On 1/10/02, postponed launch date to 2/28/02, had to prepare and ship another RWA to KSC. First RWA was faulty. LAUNCH SCRUBS: - 2/28/02 Launch was scrubbed at approximately L-16 hours due to forecast of cold weather at pad at LCC limits. Forecast was for 38 deg, 73 percent humidity, winds 7 to 10 knots. This forecast is one degree above the minimum temperature, and MMT decided to scrub and reschedule launch for 3/1/02. ObservationS at launch time were 28 deg, RH 71 percent, winds 7 to 10 knots. Wx scrub #36. LAUNCH WINDOW: - Window was in 2 panes: Pane 1 opened at 60:11:22:02Z and closed at 60:11:27:23Z (5M21S window), pane 2 opened at 60:11:27:33Z and closed at 60:12:23:53Z (56M20S window), and combined panes 1 & 2 yielded a window of 61M51S with a cutout from 11:23:20 to 11:24:20. LAUNCH DELAYS: NONE - Launched On-Time at 60:11:22:02Z, 6:22:02 AM EST, on March 1, 2002. TAL WX: - Ben Guerir was the only TAL site available. Ben Guerir was forecast and observed GO. SHUTTLE NIGHT LAUNCH #27 RENDEZVOUS #57: Rendezvous and berth HST, performed service operations, and released HST. PERFORMANCE ENHANCEMENTS: - Standard Set Plus PE Operational High Q, WIN/FEB SHUTTLE NIGHT LANDING #19 KSC NIGHT LANDING #14 FLIGHT DURATION CHANGES: NONE - Planned landing at KSC on orbit 166. Landed at KSC Runway 33 on orbit 166, MLGTD at 71:09:31:53Z on Tuesday, March 12, 2002. Continued…

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-109 Continued...		Continued... SS EVA #73 EMU/TETHERED EVA #66 SCHEDULED EVA #67 DURATION 6:48 SS EVA #74 EMU/TETHERED EVA #67 SCHEDULED EVA #68 DURATION 7:30 SS EVA #75 EMU/TETHERED EVA #68 SCHEDULED EVA #69 DURATION 7:20 MCC WHITE FCR (38) FLIGHT DIRECTORS: LD/O 1 - B. P. Austin O 2 - A. J. Ceccacci PLNG - J. M. Hanley A/E - J. P. Shannon MOD - N. W. Hale	Continued... VI: 26114 26113 OMS-2: 44:00 43:57 134 FPS 134 FPS 1:27 1:27	Continued... DENS ALT: 326 FT FLT DURATION: 10:22:09:51 S/T: 966:06:31:22 OV-102: 284:19:19:08 DISTANCE: 3,941,705 sm							Continued... EVENTS: - OMS-2 Start at 60:16:43:49Z, 13.8 duration, Delta V 10.3 ft/sec, resultant orbit 105.0 by 310.5 nm. - NH maneuver (OMS-4) at 62:04:07:30Z, 207 seconds duration, Delta V 326.6 ft/sec, resultant orbit 302.2 by 309.2 nm. MC-4 at 62:08:23:29Z, resultant orbit 303.4 by 314.9 nm. - HST capture by RMS at 62:09:31:21Z, and HST berth on FSS in PLB at 62:10:31:Z. 1:22:09:19 MET. - EVA 1 Start at 63:06:37Z, 2:19:15 MET, End at 63:13:38Z, duration 7H01M. Replaced old SA with -V2 Solar Array 3 and diode box. - EVA 2 Start at 64:06:41Z, 3:19:19 MET, End at 64:13:57Z, duration 7H16M. Replaced old SA with +V2 Solar Array 3 and diode box. Preplaced Reaction Wheel Assembly. Installed NOBL in Bay 6 and two doorstop extensions (one on -V2 side and one on +V2 side.) - EVA 3 Start 2 hrs late at 65:08:28Z, 04:21:06 MET (EMU 1 got water in suit), hence had to resize EMU 3 for use by EV1. EVA duration 6H48M. Powered down HST and replaced PCU (Power Control Unit). - EVA 4 Start at 66:09:00Z, 5:21:38 MET, duration 7H30M. Replaced FOC (Faint Object Camera) with new ACS (Advanced Camera for Surveys), installed Electronics Support Module and PCU clean up tasks. - EVA 5 Start at 67:08:46Z, 6:21:24 MET. Installed NICMOS Camera and cryogenic cooler, duration 7:20. - HST Reboost started at 67:17:18:04Z, 7:05:56:02 MET, Delta V 11.8 fps, altitude increase 3.6 nm, orbit of 314.7 by 310.6 nm. - HST unberthed from Orbiter at 68:08:34Z, 7:21:12 MET and released at 68:10:04Z, 7:22:42 MET. - Orbit Adjust maneuver at 70:10:07:32Z, 48.3 seconds, Delta V 11.6 fps, orbit 259 by 312.5 nm. - Last flight of Block IIA Engines. SIGNIFICANT ANOMALIES: - Freon® Loop 1 Aft Coldplate Flow Blockage - Loss of EV1 Suit data during EVA - Starboard Slidewire Slider Anomaly - Inner Airlock “A” Hatch locking device difficult to actuate - APU 3 Drain Line Pressure Decay - MPS LH2 4-Inch Recirculation Disconnect Slow to Close - Forward THC -X Contact Lost During One Burn - FES Accumulator/Hi-Load Feedline B Heater System 2 Failure - Primary RCS Thruster R3R Failed Off - Water leaking from EMU 1 PLSS

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-110/ ISS 8A

SEQ
FLT #109

KSC-109

PAD
39B-48

MLP-3

THIRTEENTH SHUTTLE FLIGHT TO ISS

OV-104 (Flight 25)

Atlantis

OMS PODS:
LPO3-29
RPO4-24
FRC4-25

CDR:
Michael J. Bloomfield (Flt 3 - STS-86, STS-97)

P657/R227/V165/M198

PLT:
Stephen N. Frick
P658/R276/M242

MS1/EV2:
Rex J. Walheim
P659/R277/M243

M/S 2:
Ellen Ochoa (Flt 4 - STS-56, STS-66, STS-96)

P660/R180/V113/F20

M/S 3/EV4:
Lee M. E. Morin
P661/R278/M244

M/S 4/EV3:
Jerry L. Ross (Flt 7 - STS 61-B, STS-27, STS-37, STS-55, STS-74 STS-88)
P662/R89/V38/M80

MS5/EV1:
Steven L. Smith (Flt 4 - STS-68, STS-82, STS-103)

P663/R184/V137/M161

KSC 39B
98:20:44:19Z
4:39:31 PM EDT (P)
4:44:19 PM EDT (A)
Monday 12
4/8/02 (15)

LAUNCH WINDOW:
4M59S PLT (In-Plane Time) with ISS

EOM PLS: KSC
TAL: ZZA
TAL WX: MRN, BEN

SELECTED:
RTLS: KSC 15/Cl/N
TAL: ZZA 30/Cl/N
AOA: KSC 15/Cl/N
PLS: EDW 22/N/N

TDEL:
0.02 -0.58/-0.2

MAX Q NAV:
737 742

SRB STG:
1:59:58

PERF: NOMINAL

2 ENG TAL (BEN):
2:29 2:37

NEG RETURN:
3:53 4:02

PTA (U/S 160):
4:46 5:02

PTM (U/S 160):
6:02 6:20

SE TAL (ZZA) 104:
6:00 6:02

SE PTM (U/S 675):
6:51 6:53

Continued…

KSC 33 (KSC 59)
109:16:26:58Z
2:26:58 PM EDT

Friday 12
4/19/02 (11)

DEORBIT BURN:
109:15:18:59Z

XRANGE: 73 NM

ORBIT DIR: AL 30

AIM PT: NOMINAL

MLGTD: 3058 FT
109:16:26:58Z
VEL: 197 KGS
193 KEAS
HDOT: -2.2 FPS

TD NORM 195:
3070 FT

NLGTD: 6353 FT
109:16:27:08Z
VEL: 146 KGS
137 KEAS
HDOT: -5.9 FPS

DRAG CHUTE DEPLOY: 186 KEAS
109:16:27:00Z

BRK INIT: 75 KGS

DRAG CHUTE JETTISON:
54 KGS
109:16:27:42Z

BRK DECEL FPS^2:
AVE 4.4 PK 5.5

WHEELS STOP:
109:16:28:08Z
12677 FT

ROLLOUT:
9619 FT
70 SEC

WINDS: 0T, 8R
OFFICIAL:
08008P11
SS: 3T, 8R
PK: 4T, 10R

Continued…

104/104/109%

PREDICTED:
100/100/100/
67/104

ACTUAL:
100/100/100/
72/104

1 = 2048 (4)
2 = 2051 (3)
3 = 2045 (6)

ALL THREE SSME'S BLOCK II

M 3 EOM:

WEIGHT:
201513 LBS

X CG:
1085.32

LANDING:

WEIGHT:
201463 LBS

X CG:
1087.17

BI-112

RSRM 85

ET-114

SLWT-18

ET IMPACT
1:14:19
MET

LAT:
35.8°S
LONG:
158.8 °W

51.60 (13)

DIRECT INSERTION

POST OMS-2:
124.1 X 84.8 NM

ENTRY:
HA/HP
218.7 X 166 NM

ENTRY VELOCITY:
25917 FPS

ENTRY RANGE:
4354 NM

OI-29 (1)

CARGO:
35849 LBS

PAYLOAD CHARGEABLE:
28379 LBS

DEPLOYED:
30600 LBS

NON-DEPLOYED:
0 LBS

MIDDECK:
757 LBS

SHUTTLE ACCUMULATED WEIGHTS:
DEPLOYED:
1122264 LBS
NON-DEPLOYED:
1533328 LBS
CARGO TOTAL:
3399829 LBS

PERFORMANCE MARGINS (LBS):
FPR: 3065
FUEL BIAS: 937
FINAL TDDP: 1256
RECON: 2670

PAYLOADS:
PLB:
ISS 8A
S0 Truss and ITS
RMS, ODS

MIDDECK:
ISS 8A
Simplex
RAMBO

5 CRYO TK SETS
6 GN2 TANKS
RMS 66

RMS USED TO MATE S0 TRUSS AND EVA SUPPORT

KSC W/D: OPF 132, VAB 6, PAD 28 = 166 days total.

LAUNCH POSTPONEMENTS:
-Baselined launch date of 1/17/02 on 11/15/00.
-Posponed launch date to 2/28/02 on 5/4/01 and Postponed launch date to 3/21/02 on 10/4/01.
-Postponed launch date to 4/4/02 on 1/10/02 due to ground processing delays requiring OMS Pod removal.

LAUNCH SCRUBS:
- Scrubbed 4/4/02 Launch at approximately L-8 hours, during ET Fill operations, due to a Hydrogen leak in the MLP 3 Hydrogen Vent Line which is fed by Orbiter Hi-Point Bleed line. The leak was found to be from a 1/8 in wide crack in a weld location in the 16-inch double walled aluminum line. Weld is more than 20 years old. Decision was made to repair using a clam-shell technique. New launch date was set for Monday, 4/8/02. Line was repaired using a two-piece clam-shell that was welded to the 16-inch outer line.

LAUNCH WINDOW:
- The Launch Window opened at 98:20:34:32Z and closed at 98:20:44:30Z for a total window of 9M58S. Using a Preferred Launch Time (In-Plane Time) of 98:20:39:31Z, the Launch Window was 4M59S.

LAUNCH DELAYS:
- Day-of-Launch Delay was 4M48S. LPS system detected consecutive sync errors in all three Stand-by PCM FEP'S (OI, GPC, PLD). The count was held at T-5 Min for 4M48S to execute Front End Processor resynchronization procedure which was successfully completed. Came out of the T- 5 Min hold, and picked up the count at 98:20:39:19Z (4:39:19 PM EDT) with 5M11S remaining to Launch Window closure. Launch occurred at 98:20:44:19Z, 4:44:19 PM EDT, on Monday, April 8, 2002. Only 11 seconds remained in the Launch Window at Liftoff.

TAL WX:
- Zaragoza (Prime and Selected) was Forecast and Observed GO. Moron was Forecast and Observed NO GO for Showers within 20 nm. Ben Guerir was Forecast GO but Observed NO GO for precipitation within 20 nm.

PERFORMANCE ENHANCEMENTS:
- Standard Set plus: (1) PE Operational High Q TRN/APR, (2). OMS Assist, (3) 52 NM MECO, (4) Del Psi

RENDEZVOUS #58:
- Rendezvous and Dock with ISS to PMA 2 Lab Fwd Port.

FIRSTS:
- First flight with all three Block II SSME's.
- First flight of FSW OI-29.
- First operation availability of delayed TAL.

EVENTS:
- MC-4 Maneuver at 100:15:04:09, 1:18:19:50, Delta V 2 fps, resultant altitude 204.0 by 211.3 nm.
- ISS Capture at 01/19:20:09 MET, 100:16:04:28Z.
- ISS Hard Dock at 1/19:34:46 MET,

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-110/ ISS 8A

Continued...

SS EVA 76
DOCKED QUEST EVA 2
EMU/TETHERED EVA 69
DURATION 7:48

SS EVA 77
DOCKED QUEST EVA 3
EMU/TETHERED EVA 70
DURATION 7:30

SS EVA 78
DOCKED QUEST EVA 4
EMU/TETHERED EVA 71
DURATION 6:27

SS EVA 79
DOCKED QUEST EVA 5
EMU/TETHERED EVA 72
DURATION 6:37

MCC WHITE FCR (39)

FLIGHT DIRECTORS:
Flt & ISS Ld/O2 - R. E. Castle
ISS O 1 - A. F. Algate
ISS PLNG - N. D. Knight
STS LD/O 1 - J. M. Hanley
O 2 - P. F. Dye
O 3/PLNG - J. S. Stich
A/E - L. E. Cain
MOD - J. M. Heflin

Continued...

VI:
25821 25822

OMS-2:
96 FPS 96 FPS
38:38 38:45

Continued...

DENS ALT:
1260 FT

FLT DURATION:
10:19:42:39

S/T:
977:02:14:01

OV-104:
209:01:28:10

DISTANCE:
4,525,299 sm

Continued...

EVENTS (Continued):
- EVA 1 Start at 2:17:52 MET, 101:14:36Z, duration 7H48M. Installed Port & Stbd Fwd Struts to S0 truss and Port & Stbd avionics trays, deployed aft Umbilical tray, and installed TUS-1 cable.
- EVA 2 Start at 4:17:25 MET, 103:14:09Z, duration 7H30M. Installed Aft Port & Stbd Struts, installed TUS-2 cables, installed A/L handrail, Mated MT/MBS feed through cable.
- Reboost 1 at 5:01:59 MET, 103:22:44Z, Delta V 3.2 fps, alt. increase 0.95 nm, orbit 212 x 205 nm.
- EVA 3 Start at 5:17:04 MET, 104:13:48Z, duration 6H27M. Installed J300/400 panels, released capture claw, installed CID's 7 & 8, removed MT Launch restraints. Removed MT RPCM Thermal cover.
- Reboost 2 at 6:01:00 MET, 104:21:44Z, Delta V 3.4 fps, alt. increase 1.0 nm, orbit 212 x 206 nm.
- EVA 4 Start at 7:17:45:17 MET, 106:14:29:36Z, duration 6H37M. Installed Node & U.S. Lab EVA lights, released LCA guides, S0 handrails, MT energy absorbers, and deployed A/L spur & EV-CPDS.
- Reboost 3 at 8:14:35:01 MET, 107:11:19:20Z, Delta V 12.8 fps, alt. increase orbit to 213.8 by206.3 nm.
- Cargo transferred to ISS = 28944 lbs (S0 ITS 26716, middeck 2228); ISS to Atlantis middeck 2607 lbs.
- Transfers to ISS: O_2 146 lb, N_2 45 lb, and water 1465 lb (1397 lb in 14 CWC's +68 lbs in three PWR's)
- Total transfers to ISS = 30600 lbs, net transfer 27993 lbs (30600 minus 2607)
- Hatch close between ISS and Atlantis at 107:16:04Z, 11:04 AM CDT, Wednesday, 4/17/02
- Undocked at 107:18:31Z, 8:21:47 MET, 1:31 AM CDT, 4/17/02
- ISS Visitor Time is 7:02:12:30.
- Jerry Ross total EVA time is U.S. record of 58H18m.

FLIGHT DURATION CHANGES: NONE
- Planned Landing at KSC on orbit 171. MLGTD on orbit 171 at KSC runway 33 at 109:16:26:58Z, 4:26:58 PM EDT, 10:19:42:39 MET.

SIGNIFICANT ANOMALIES:
- Pre-Launch Scrub of 4/4/02 Launch due to Hydrogen Leak in MLP-3 16-inch Hydrogen Vent Line.
- Sync errors on LPS RF TLM FEP reload required at L-5M11S (Launched occurred with 11 seconds in window.)
- MED'S IDP-2 MSU BITE and FCW Buffer Overflow Error
- Primary RCS Thruster L1A Failed Off and was auto-deselected (Chamber P Max 20 psia)
- Low Chamber Pressure on Primary RCS Thruster F1D (Pc = 63-65 psia)
- Low Chamber Pressure on Primary RCS Thruster F3L (Pc = 63-65 psia)
- Lack of Digital Video from PD100 Camcoder to DTV MUX
- ICOM Problem with BPSMU
-ODS Upper Hatch Delta Pressure Gauge Bias
- Loss of Biomed Data during EVA 2

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-111/ ISS UF-2

SEQ
FLT #110

KSC-110

PAD
39A-62

MLP-1

14TH SHUTTLE FLIGHT TO ISS

OV-105 (Flight 18)

Endeavour

OMS PODS:
LPO4-25
RPO1-32
FRC5-18

CDR:
Kenneth D. Cockrell (Flt 5 - STS-56, STS-69, STS-80, STS-98)

P664/R159/V121/M140

PLT:
Paul S. Lockhart
P665/R279/M245

M/S 1/EV2:
Philippe Perrin (France - CNES)
P666/R280/M246

M/S 2/EV1:
Franklin R. Chang-Diaz (Flt 7 - STS 61-C, STS-34, STS-46, STS-60, STS-75, STS-91)
P667/R89/V46/M81

M/S 3 UP/EXP 5 Flt Eng:
Peggy A. Whitson
P668/R281/F35

M/S 4 UP/EXP 5 CDR:
Valery C. Korzun (Russia)
P669/R282/M247

M/S 5 UP/EXP 5 Flt Eng:
Sergei Y. Treschev (Russia)
P670/R283/M248

M/S 3 DN/EXP 4 Flt Eng
Carl Walz
(Flt 4 - STS-51, STS-65, STS-79, STS-108 Up)

/R170/V106/M1

4 DN/EXP 4 Flt

iel Bursch
4 - STS-51, STS-68, STS-77, STS-108 Up)

P672/R169/V109/M147

KSC 39A
156:21:22:49Z
5:22:49 PM EDT (P)
5:22:49 PM EDT (A)
Wednesday 13 6/5/02 (10)

LAUNCH WINDOW:
4M34S PLT (In-Plane Time) ISS Planar/Phase

EOM PLS: KSC
TAL: ZZA
TAL WX: MRN, BEN

SELECTED:
RTLS: KSC 33/N/SFD
TAL: MRN 20/N/N
AOA: KSC 15/CI/N
PLS: EDW 22/N/N

TDEL:
0.12-0.058/-0.20

MAX Q NAV:
748 722

SRB STG:
2:04 2:05

PERF: NOMINAL

2 ENG TAL (MRN):
2:24 2:29

NEG RETURN:
3:52 3:57

PTA (U/S 182):
4:49 4:45

DROOP (ZZA 109):
5:23 5:24

PTM (U/S 182):
6:11 6:06

SE TAL (ZZA 104):
6:03 6:06

VI:
25821 25815

Continued...

EDW 22, CONC
EDW 49, CONC 30
170:17:57:42Z
10:57:42 AM PDT
Wednesday 14 6/19/02 (6)

DEORBIT BURN:
170:16:50:26Z

XRANGE: 603 NM

ORBIT DIR: AL 31

AIM PT:
NOMINAL

MLGTD: 3058 FT
170:17:57:42Z
VEL: 197 KGS
193 KEAS
HDOT: -2.2 FPS

TD NORM 195:
3070 FT

NLGTD: 6353 FT
170:17:57:53Z
VEL: 146 KGS
137 KEAS
HDOT: -5.9 FPS

DRAG CHUTE DEPLOY: 186 KEAS
170:17:57:45Z

BRK INIT: 75 KGS

DRAG CHUTE JETTISON:
54 KGS
170:17:58:23Z

BRK DECEL FPS^2:
AVE 4.4 PK 5.5

WHEELS STOP:
170:17:58:46Z
12677 FT

ROLLOUT:
9619 FT
64 SEC

WINDS: 3T, 4R
OFFICIAL:
35005p08
SS: H3, R4
PK: H5, R6

DENS ALT:
1260 FT

Continued...

104/104/109%

PREDICTED:
100/104.5/104.5/72/104.5

ACTUAL:
100/104.5/98/72/104.5

1 = 2050 (3)
2 = 2044 (7)
3 = 2054 (4)

ALL BLOCK II SSME's

M 3 EOM:

WEIGHT:
220334 LBS

X CG:
1083.62

LANDING:

WEIGHT:
220279 LBS

X CG:
1085.30

BI-113

RSRM 84

ET-113

SLWT-19

ET IMPACT
1:13:47 MET

LAT:
37.3°S

LONG:
160.1° W

51.60 (14)

DIRECT INSERTION

POST OMS-2:
126.7 X 84.8 NM

DEORBIT:
HA 210.5
HP 187.1

ENTRY VELOCITY:
25902 FPS

ENTRY RANGE:
4360 NM

OI-29 (2)

CARGO:
36082 LBS

PAYLOAD CHARGEABLE:
29712 LBS

DEPLOYED:
9512 LBS

NON-DEPLOYED:
906 LBS

MIDDECK:
288 LBS

SHUTTLE ACCUMULATED WEIGHTS:
DEPLOYED:
1130507 LBS
NON-DEPLOYED:
1534522 LBS
CARGO TOTAL:
3435911 LBS

PERFORMANCE MARGINS (LBS):
FPR: 3065
FUEL BIAS: 937
FINAL TDDP: 2484
RECON: 1870

PAYLOADS:
PLB:
ISS UF-2 (MPLM, MBS, PDGF, SMOP, SSRMS, WRJ, RMS, ODS)

MIDDECK:
ISS UF-2 RAMBO

5 CRYO TK SETS
6 GN2 TANKS

RMS 67

RMS USED FOR ISS MPLM DEPLOY AND RETRIEVE AND EVA SUPPORT

KSC W/D: OPF 92, VAB 7, PAD 33 = 132 days total.

LAUNCH POSTPONEMENTS:
- Launch was scheduled for 5/2/02.
- Postponed launch to 5/31/02 to the end of a Beta Cutout and allow time to train EVA crew to R&R SSRMS failed Wrist Roll Joint.
- Advanced launch to 5/30/02 after analysis indicated adequate power generation using an ISS Pitch attitude bias.

LAUNCH SCRUBS:
- Scrubbed Thursday 5/30/02 Launch at L-24M53S due to opaque anvils within 30 nm circle while holding at T-9 minutes. PLT was 7:44:26 PM EDT with a window of 4M9S. Lightning was present throughout a wide area in Florida with occasional strike within 30 nm circle and thunderstorms were forecast. Weather forecast 70 percent chance NO GO for launch due to continuing anvil clouds, lightning, and thunderstorms through Monday, June 3. An upper Low is bringing in moist air from the tropics. Decision was made to hold a tanking MMT on Friday, May 31, where it was decided not to tank. Forecast included thunderstorms, anvil clouds, and chance of hail.. During the count, the L OME GN2 Regulator leaked and increased the accumulator pressure. Regulator locked up after a test. Went into a 24-hour Scrub turnaround. RTLS and Range Weather Scrub.
- A Tanking MMT was held on Friday, 5/31/02 and a decision was made not to tank due to inclement observed and forecast weather. There was a tanking weather violation with observed lightning within 5 nm. Launch forecast was for attached anvil clouds, thunderstorms, lightning, and precipitation. Tanking, RTLS, and Range Weather Scrub.
- A tentative decision was made to try for a Monday, 6/3 launch but keep an eye on the weather and hold a special MMT at 6:30 PM CDT (Later changed to 1:00 PM CDT) to decide whether to hold a tanking MMT on Saturday, 6/1.
- At the 1:00 PM CDT MMT, it was decided to top-off the cryos and reload the GN2 (and at the same time to run another GN2 regulator test) with a target of a Monday evening launch. This would allow three launch opportunities based on Range schedule on Monday, Tuesday, and Wednesday. Tentative plans were made for a tanking MMT on Monday. On Friday, the GN2 was reloaded and the regulator failed the leak test. At a Saturday morning management meeting, it was decided to replace the L OME GN2 Regulator, and with success oriented schedule, it would lead to a launch date of NET Tuesday 6/4/02. On Sunday morning, management decided to re-target the launch date to Wednesday, 6/5 due to delays in completing GSE work. Wednesday launch was confirmed later. Technical Scrub.

LAUNCH WINDOW:
- The June 4, 2002 launch window opened at 156:21:18:19Z and closed at 156:21:27:28Z giving a total window of 9M09S. Using a Preferred Launch Time of 156:21:22:49Z (5:22:49 PM EDT), the window was 4M39S.

LAUNCH DELAYS: NONE

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-111/ ISS UF-2

Continued ...

Continued...

M/S 5 DN/EXP 4 CDR:
Yury I. Onufrienko (Russia)
(Flt 1 - STS-108 Up)
P673/R273/R239

SS EVA 80
DOCKED QUEST EVA 6
EMU/TETHERED EVA 73
SCHEDULED EVA 74
DURATION 7:14

SS EVA 81
DOCKED QUEST EVA 7
EMU/TETHERED EVA 74
SCHEDULED EVA 75
DURATION 5:00

SS EVA 82
DOCKED QUEST EVA 8
EMU/TETHERED EVA 75
SCHEDULED EVA 76
DURATION 7:17

MCC WHITE FCR (40)

FLIGHT DIRECTORS:
ISS Ld/O1-R. E. LaBrode
ISS O 2 - J. M. Curry
ISS PLNG - B. C. Lunney
STS LD/O 1 - P. S. Hill
STS O 2 - A. J. Ceccacci
STS O 3/PLNG - K. B. Beck
A/E - J. P. Shannon
MOD - R. E. Castle

Continued...

OMS-2:

38:42	38:45
98 FPS	95 FPS

Continued...

FLT DURATION:
13:20:34:53

S/T:
990:22:48:54

OV-105:
192:19:24:40

DISTANCE:
5,781,115 sm

Continued...

TAL WX:
- Zaragoza (Prime) was forecast and observed NO GO for precipitation. Ben Guerir was forecast and observed NO GO for Head Winds of 27 Knots. Moron (Selected) was forecast and observed GO.

PERFORMANCE ENHANCEMENTS:
- Standard Set plus: (1) PE Operational High Q TRN/MAY, (2). OMS Assist, (3) 52 NM MECO, (4) Del Psi

FLIGHT DURATION CHANGES:
- Total Extensions: 2 Days Plus 2 Revs. Planned landing at KSC on Orbit 186 at 12:59 PM EDT on June 17, 2002. Did not call up EDW. Closed PLBD's but did not fluid load crew. Waved off Orbit 186 due to forecast ceiling, precipation, crosswinds, and thunderstorms and observed precipitation, thunderstorms within 20 nm, ceiling 2600 broken and visibility violations. Waved off landing at KSC on Orbit 187 with similar forecast and observed at landing time. Extended one day. Brought up EDW for EOM+1. Waved off landing at KSC on Orbit 201 due to forecast ceiling, precipitation, and thunderstorms. Observed ceiling, precipitation, thunderstorms, and visibility violations. Waved off Orbit 202 due to similar forecasts and observations. Extended the second day.
- EOM+2 was "pick the landing site" day. EOM-2 PLBD's were closed for Planned landing at KSC on Orbit 216 at 170:14:52Z. Crew not in suits and no fluid load. Waved off landing at KSC on Orbit 216 at approximately Tig -40 minutes due to forecast and observed thunderstorms, attached anvil clouds, and low ceiling within 30 nm. Waved off landing at KSC on Orbit 217 at approximately Tig -20 minutes due to thunderstorms, attached anvils, and low clouds. (Two orbits wave-off).
- Decision made to land at EDW 22 on Orbit 218. MLGTD at 170:17:57:42Z, 10:57:42 AM PDT (MET 13:20:34:57) on Wednesday, June 19, 2002.
- NLGTD at 170:17:57:53Z.
- Total Flight Duration Extensions: Two Days plus two orbits.

FIRSTS:
- First use of orbiter oxygen for EVA pre-breathe for astronauts in ISS Joint Airlock.

EVENTS:
- MC4 Maneuver Start at 158:15:16:16Z, 1:127:53:27 MET, 1.2 ft/sec, altitude 203.3 by 211.9 nm.
- ISS Capture at 158:16:24Z, 1:19:01 MET.
- ISS Hard-Docked at 158:17:26:32Z, 1:20:03:43 MET.
- Official Transfer Time (IELK time) from Expedition 4 Crew to Expedition 5 Crew = 158:22:55Z, 5:55 PM CDT, June 7, 2001.
- Expedition 4 ISS Habitant Time is 181:00:43.
- MPLM installed on Node 1 by RMS at 159:14:28Z, 2:17:05 MET
- EVA 1 Start at 160:15:26Z, 3:18:03 MET and End 160:22:40Z, 04:01:17 MET, duration 7:14.

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-111/ ISS UF-2 Continued ...											Continued... EVENTS (Continued): - Reboost Maneuver 1 Start at 161:20:53:24Z, 4:23:30:35 MET, Delta V 3.0 fps, 0.8 nm altitude increase, altitude 212 by 205 nm. - EVA 2 Start at 162:15:19Z, 5:17:58 MET and End 162:20:19Z, 5:22:58 MET, duration 5:00, final installation of MBS to MT (Connected video and data cables), attached bag with contingency extension cable to MBS. - Reboost Maneuver 2 Start at 163:12:08:02Z, 6:15:45:13 MET, Delta V 3.0 fps, altitude increase .81 nm, Orbit 212.8 by 206.2 nm - EVA 3 Start at 164:15:16Z, 7:17:53 MET, duration 7:17. R&R SSRMS Wrist Roll Joint (WRJ). - Reboost Maneuver 3 Start at 165:11:51:26Z, 6:14:28:37 MET, Delta V 12.5 fps, altitude increase 3.6 nm, orbit 214.4 by 211.1 nm. - Transfers from shuttle to ISS = 9512 lbs (from MPLM = 8062 lbs and from middeck = 1450 lbs). Transfers from ISS to Shuttle = 6342 lbs (to MPLM = 4668 lbs and to middeck = 1675 lbs). Consumables transfer: Total water = 884.9 lbm (8 CWC's with 798.9 and 4 PWR's with 86.0 lbm). Total shuttle O2 transferred = 34 lbm for the 3 EVA prebreathes in JAL, N2 tank transfer of 18.9 lbm. - Undocked at 166:14:31Z, 9:17:08 MET - STS-111/ISS Visitor Time is 7:31:04:28 (Docking to Undocking) - Expedition 4 ISS Habitant Time is 181:00:43:00 (IELK S/L Xfer to IELK S/L Xfer), Expedition 4 broke U.S. Flight Time record,;flight time is 195:19:38:14 (STS-108 L/O to STS-111 MLGTD). - Carl Walz record total flight time is 230:13:02:44. Dan Bursch Total Flight Time is 226:22:14:48. - Sep Burn 166:16:14:27Z, 6:18:51:38 MET. - Orbit Adjust Maneuver at 166:17:57:48Z, 9:20:34:59 MET, Delta V 45.6 fps, orbit was 186.1 by 211.9 nm. RENDEZVOUS # 59: Rendezvous and Dock with ISS (Dock to PMA2 Lab Fwd Port) SIGNIFICANT ANOMALIES: - Right Main Engine High Pressure Fuel Pump Speed Sensor Failure - Flash Evaporator Controller Primary B failure - WIF Adapter Hitch Pin Anomaly - EV2 Boot Fit Problems during EVA 1 - EVA Communications Anomaly on STS-111 EVA 3 - AVIU-Camcorder Failed - BPSMU XMIT/ICOM Dey causes Video to Flicker - LL QUAD Reflected Power Spikes - Loss of BIOMED Data on EVA 1

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-112/ ISS 9A

SEQ
FLT #111

KSC-111

PAD
39B-49

MLP-3

15TH SHUTTLE FLIGHT TO ISS

OV-104
(Flight 26)

Atlantis

OMS PODS:
LPO3-30
RPO4-26
FRC4-26

CDR:
Jeffrey S. Ashby
(Flt 3 - STS-93, STS-100)

P674/R251/V169/M218

PLT:
Pamela A. Melroy
(Flt 2 - STS-92)

P675/R261/V175/F34

M/S 1/EV1:
David A. Wolf
(Flt 3 - STS-58, Up to Mir
on STS-86, Dn on STS-89)

P676/R173/V147/M151

M/S 2:
Sandra H. Magnus
P677/R284/F36

M/S 3/EV2:
Piers J. Sellers
P678/R285/M249

M/S 4:
Fyodor N. Yurchikhin
(Russia)
P679/R286/M250

SS EVA 83
DOCKED QUEST EVA 9
EMU/TETHERED EVA 76
SCHEDULED EVA 77
DURATION 7:01

SS EVA 84
DOCKED QUEST EVA
THERED EVA
LED EVA 78
ON 6:04
35
QUEST EVA
THERED EVA 78
SCHEDULED EVA 79
DURATION 6:36

KSC 39B
280:19:45:51Z
3:45:51 PM EDT (P)
3:45:51 PM EDT (A)
Monday 13
10/7/02 (11)

LAUNCH WINDOW:
4M59S USING PLT
(ISS IN-PLANE TIME)

EOM PLS: KSC
TAL: ZZA
TAL WX: MRN

SELECTED:
RTLS: KSC 33/N/N
TAL: ZZA 30/N/SFD
AOA: KSC 33/N/N
PLS: EDW 04/N/N

TDEL:
-0.11 -0.368/-0.490

MAX Q NAV:
726 725

SRB STG:
2:04 2:02

PERF: NOMINAL

2 ENG TAL (MRN):
2:33 2:30

NEG RETURN:
3:54 3:54

PTA (U/S 182):
4:57 4:55

PTM (U/S 182):
6:14 6:10

SE TAL (ZZA):
6:04 6:08

MECO CMD:
8:21.5 8:24.5

VI:
25822 25815

OMS-2:
38:40 38:42
96.1 FPS 95.9 FPS

KSC 33 (KSC 60)
291:15:43:41Z
11:43:41 AM EDT

Friday 13
10/18/02 (9)

DEORBIT BURN:
291:14:36:14Z

XRANGE: 21 NM

ORBIT DIR: AR 12

AIM PT:
NOMINAL

MLGTD: 3072 FT
291:15:43:41Z
VEL: 186 KGS 187 KEAS
HDOT: -1.0 FPS

TD NORM 195:
2851 FT

NLGTD: 5475 FT
291:15:43:48Z
VEL: 161 KGS 160 KEAS
HDOT: -6.2 FPS

DRAG CHUTE DEPLOY: 157 KEAS
291:15:43:51Z

BRK INIT: 86 KGS

DRAG CHUTE JETTISON:
51 KGS
291:15:44:18Z

BRK DECEL FPS^2:
AVE 6.9 PK 9.1

WHEELS STOP:
291:15:44:33Z
11377 FT

ROLLOUT:
8305 FT
52 SEC

WINDS:
11H, 5R KTS
OFFICIAL:
01011P17
AVE: 8H 11R
PK: 13H 11R

DENS ALT:
1019 FT

FLT DURATION:
104/104/109%

PREDICTED:
100/104.5/104.5/72/104.5

ACTUAL:
100/104.5/97/72/104.5

1 = 2048 (5)
2 = 2051 (4)
3 = 2047 (8)

M 3 EOM:

WEIGHT:
202688 LBS

X CG:
1087.08

LANDING:

WEIGHT:
202621 LBS

X CG:
1088.94

BI-115
RSRM 87

ET-115

SLWT-20

ET IMPACT
1:14:01 MET

LAT:
36.97° S

LONG:
159.3° W

51.60 (15)

DIRECT INSERTION

POST OMS-2:
126.4 x 85.0 NM

DEORBIT:
HA 220.0 NM
HP 146.0 NM

VELOCITY:
25917 FPS

ENTRY RANGE:
4342 NM

OI-29 (3)

CARGO:
37441 LBS

PAYLOAD CHARGEABLE:
29502 LBS

DEPLOYED:
29543 LBS

NON-DEPLOYED:
0 LBS

MIDDECK:
382 LBS

SHUTTLE ACCUMULATED WEIGHTS:
DEPLOYED:
1160050 LBS
NON-DEPLOYED:
1534904 LBS
CARGO TOTAL:
3473352 LBS

PERFORMANCE MARGINS (LBS):
FPR: 3065
FUEL BIAS: 937
FINAL TDDP: 2744
RECON: 3860

PAYLOADS:
PLB:
ISS 9A
(ITS S1 TRUSS)
CETA CART A
RMS, ODS

MIDDECK:

ISS 9A
(SHIMMER, RAMBO)

5 CRYO TK SETS
6 GN2 TANKS
RMS 69

RMS USED FOR TV SUPPORT DURING S1 INSTALL (SSRMS INSTALL)

KSC W/D: OPF 106, VAB 6, PAD 25 = 139 days total.

LAUNCH POSTPONEMENTS:
- Launch was postponed from June after Post-STS-110 visual inspections of OV-104 Inconel 12” MPS LH2 Flowliners revealed three cracks to SSME 2. Subsequent inspections found cracks in other Orbiter LH2 Flowliners:
  - OV-103 - three cracks (SSME 1)
  - OV-105 - one crack (SSME 1) and one crack (SSME 2)
  - MPTA - one crack (SSME 1)
  - OV-102 three cracks (SSME 2). OV-102 flowliners are CRES.

After analyses, tests, etc., including consideration of other repair techniques, the decision was made to use weld-repair technique and polishing of Flowliner holes.
- Severe cracks were found in Mobile Launch Platform Crawler-Transporter (CT-2) jacking cylinder bearings. CT-2 was repaired using undamaged spare and new bearings. CT-2 bearings will be replaced incrementally.
- These postponements resulted in rescheduling STS-112 and STS-113 ahead of STS-107. STS-112 launch date was set to October 2, 2002.

LAUNCH SCRUBS:
- Scrubbed October 2 Launch at approximately L-27 hours at an MMT due to the threat to JSC/MCC posed by Hurricane Lili in the Gulf of Mexico. Launch delayed for at least 24 hours. At approximately L-21 hours, the Space Shuttle and ISS Programs decided there was less risk to the MCC by implementing an orderly powerdown of the MCC with a launch in the Sunday/Monday timeframe. Weather Scrub.
- Early Wednesday morning, October 2, MCC-H transitioned USOS operations support to BCC HSG Moscow.
- At the October 2, 6:45 AM CST MMT, the decision was made not to launch earlier than Monday, October 7. This presumes a GO to begin Restoration of the MCC late Wednesday or early Thursday.
- MCC powerup/restoration began early Thursday morning, October 3. ISS operations in MCC will be resumed Thursday night. Launch scheduled for Monday, October 7.

LAUNCH WINDOW:
- Launch window opened at 280:19:40:51Z and closed at 280:19:50:50Z for a total launch window of 9m59s. In-plane time was 280:19:45:51Z for a launch window of 4m59s.

LAUNCH DELAYS: NONE
- Launch occurred On-Time at 280:19:45:51Z, 3:45:51 PM EDT on Monday, October 7, 2002.

TAL WX:
- Zaragoza (prime and selected) and Moron (2-Eng TAL Call) were forecast and observed GO. Moron earlier forecast was NO GO for showers and anvils. Ben Guerir was not available.

Continued...

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-112/ ISS 9A

Continued ...

Continued...

MCC WHITE FCR (41)

FLIGHT DIRECTORS:
ISS Ld/O1 - A. F. Algate
ISS O 2 - M. A. Kirasich
ISS PLNG - A. P. Hasbrook
STS LD/O 1 - P. L. Engelauf
STS O 2 - C. A. Koerner
STS O 3/PLNG - J. M. Curry
A/E - J. P. Shannon
MOD - R. E. Castle

Continued...

S/T:
1001:18:46:44

OV-104:
219:21:26:00

DISTANCE:
4,513,015 sm

Continued...

PERFORMANCE ENHANCEMENTS:
- Standard Set plus: (1) PE Operational High Q TRN/OCT, (2) OMS Assist, (3) 52 NM MECO, (4) Del Psi

FLIGHT DURATION CHANGES: NONE
- Planned landing at KSC on Orbit 171. MLGTD at KSC Runway 33 on Orbit 171 at 291:15:43:41Z, 11:43:41 AM EDT, 10:19:57:50 MET. NLGTD at 291:15:43:48Z, 11:43:48 AM EDT. STS-112 was the 75th planned landing at KSC, but the 60th actual landing at KSC, and the 36th landing on Runway 33.

FIRSTS/LASTS:
- First use of ET Shuttle Observation Camera during ascent.

EVENTS:
- MC4 Start at 282:14:18:46Z, 3.2 fps, orbit 200.4 by 213.6 nm.
- ISS Capture at MET 1:19:30:19, 282:15:16:10Z.
- Harddock to PMA2 Lab Fwd Port complete at 1:19:44:06 MET, 282:15:29:57Z.
- PMA/APAS Hatch Open at 282:16:40Z, 1:20:55:09 MET. ODS Hatch open at 282:16:50Z, 1:21:05:09 MET.
- EVA 1 (JAL) Start at 283:15:21Z, 2:19:35 MET End at 283:22:22Z, 3:02:36 MET, duration 7h01m (Attached S1 to S0 Truss using SSRMS. Released CETA cart launch locks. Connected Zenith side power umbilicals and deployed S-Band Antenna. Installed S1 nadir ETVCG).
- First Reboost maneuver start at 285:10:52:48Z, 4:15:06:57 MET, delta V of 11.9 fps, altitude increase of 3.4 nm, orbit 216 by 204 nm.
- EVA 2 (JAL) Start at 285:14:30Z, 4:18:44 MET, End 285:20:34Z, 05:00:48 MET, duration 6h04m. (Installed Z1/P6, Z1/Lab and RBVM SPD's. Connected ATA Umbilicals. Installed Lab ETVCG. ZCG Activation).
- Second Reboost maneuver (c3) start at 287:11:20:50Z, 6:15:34:59Z MET, delta V = 6.9 fps, altitude increase 1.96 nm, orbit 219.4 by 203.3 nm.
- EVA 3 (JAL) Start at 287:14:11:25Z, 6:18:25:34 MET, End 287:20:47Z, 07:01:01 MET, EVA duration 6h36m. (IUA on MT R&R. S1 to S0 fluid (ammonia) jumper connections, removal of port and starboard keel pins, last of TRRJ SPD's, TRRJ bolts).
- Total cargo transfers from Orbiter to ISS = 29120 lbm (S1 Segment = 27676 lbm), Total cargo transfers from ISS to Orbiter = 1351 lbm Consumables Transfer: H2O Total = 1658.1 lbm (16 CWC's with 1603.7 lbm and 3 PWR's with 54.4 lbm). Total N2 (Tank) = 68.2 lbm.
- Total O2 = 60 lbm (Pre-Breathe: EVA 1 = 10 lbm, EVA 2 = 10 lbm, EVA 3 = 10 lbm, Tank Transfer= 28 lbm).
- Undocking at 289:13:13:25Z, 8:17:27:34 MET.
- Total ISS Visitor Time = 6:21:33:28.

Continued...

SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (6) / TITLE, NAMES & EVA'S	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT INC	ORBIT HA/HP	FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
STS-112/ ISS 9A Continued ...											Continued... EVENTS (Continued): - Post-undocking initial separation maneuver began at 289:13:13Z. ISS flyaround terminated at 289:14:30Z, 8:18:44 MET. - Final Separation at 289:15:00Z, 8:19:14 MET, delta V= 5.5 fps, resulting Orbit = 200.8 nm by 219.9 nm. - Orbit Adjust Maneuver at 290:20:26:51Z, 10:00:41:00 MET, delta V = 93.9 fps, Orbit 146.6 nm by 219.9 nm - Note: At 291:08:35Z, using Progress engines, raised the ISS 6.9 miles. RENDEZVOUS # 60: - Rendezvous and Dock with ISS (Dock to PMA2 Lab Fwd Port) SIGNIFICANT ANOMALIES: - Piece of debris impacted ETA ring near IEA box on LH SRB at 33 seconds. - Insulating foam was lost on ET-115 left bipod ramp (approx 4″ X 5″ X12″) exposing bipod housing SLA closeout. - Primary Thruster L4D failed off due to low chamber pressure (IFA STS-112-V-01). - Panel F7 SM Alert Light Brightness - Supply Water Crossover Valve Circuit Breaker did not indicate Open - System A Pyros for SRB Holddown Posts and ET Vent Arm Systems did not fire at T-0 (IFA STS-112-K-01). - EVA Glove Wrist Tether Point Torn - RPOP PGSC (STS-5) Network Problem - Emergency Egress Net Daisy Wheel Knob broke - PCS 1 O2 Supply Pressure Indication failed OSH - MADS recorder “stuck” at beginning of tape (tape came off reel) - Forward RCS Primary Thruster F3F Failed On Heater - ICOM A from Shuttle to Station not operating - Handheld Mic failed

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-113/ ISS 11A

SEQ FLT #112

KSC-112

PAD 39A-63

MLP-2

16TH SHUTTLE FLIGHT TO ISS

OV-105 (Flight 19)

Atlantis

OMS PODS: LPO4-26 RPO1-33 FRC5-19

CDR:
James D. Wetherbee
(Flt 6 - STS-32, STS-52,
STS-63, STS-86, STS-102)

P680/R108/V80/M198

PLT:
Paul S. Lockhart
(Flt 2 - STS-111)

P681/R279/V176/M245

M/S 1/EV1:
Michael E. Lopez-Alegria
(Flt 3 - STS-73, STS-92)

P682/R202/V163/M175

M/S 2/EV2:
John B. Herrington
P683/R287/M251

M/S 3 UP/EXP 6 CDR:
Kenneth D. Bowersox
(Flt 5 - STS-50, STS-61,
STS-73, STS-82)

P684/R146/V97/M130

M/S 4 UP/EXP 6 Flt Eng 1:
Nikolai Budarin (Russia)
P685/R288/M252

M/S 5 UP/EXP 6 Flt Eng 2:
Donald R. Pettit
P686/R289/M253

M/S 3 DN/EXP 5 Flt Eng 2:
Sergei Y. Treschev (Russia)
(STS-111 Up)
P687/R283/M248

M/S 4 DN/EXP 5 CDR:
Valery C. Korzun (Russia)
(STS-111 Up)
P688/R282/M247

M/S 5 DN/EXP 5 Flt Eng 1:
Peggy A. Whitson
(STS-111 Up)
P689/R281/F35

KSC 39A
328:00:49:47Z
7:49:47 PM EST (P)
7:49:47 PM EST (A)
Saturday 5
11/23/02 (EST)
(14)

LAUNCH WINDOW:
7M08S IN 2 PANES
ISS PLANAR/PHASE

EOM PLS: KSC
TAL: ZZA
TAL WX: MRN

SELECTED:
RTLS: KSC 33/N/N
TAL: ZZA 30/N/SF
AOA: KSC 33/N/N
PLS: EDW 22/N/N

TDEL:
0.04 -0.278/-0.24

MAX Q NAV:
763 765

SRB STG:
2:04.8 2:04

PERF: NOMINAL

2 ENG TAL (BEN):
2:33 2:35

NEG RETURN:
3:52 3:55

PTA (U/S 183):
5:01 5:01

PTM (U/S 183):
6:05 6:10

SE TAL (ZZA):
6:00 6:01

SE PTM (U/S 646):
6:53 6:59

MECO CMD:
8:22.4 8:22.9

VI:
25821 25823

KSC 33 (KSC 61)
341:19:37:13Z
2:37:13 PM EST

Saturday 21
12/7/02 (14)

DEORBIT BURN:
341:18:31:33Z

XRANGE: 2.1 NM

ORBIT DIR: AL 32

AIM PT: NOMINAL

MLGTD: 2846 FT
341:19:37:13Z
VEL: 194 KGS
197 KEAS
HDOT: -2.8 FPS

TD NORM 195:
3009 FT

NLGTD: 5814 FT
341:19:37:23Z
VEL: 163 KGS
159 KEAS
HDOT: -5.8 FPS

DRAG CHUTE DEPLOY: 155 KEAS
341:19:37:25Z

BRK INIT: 65 KGS

DRAG CHUTE JETTISON: 57 KGS
341:19:38:00Z

BRK DECEL FPS2:
AVE 3.9 PK 5.1

WHEELS STOP:
341:19:38:28Z
13420 FT

ROLLOUT:
10574 FT
75 SEC

WINDS:
H3 R7 KTS
OFFICIAL:
0308P13
H4 R7

DENS ALT: 580 FT

FLT DURATION:
13:18:47:26

104/104/109%

PREDICTED:
100/104.5/104.5/72/104.5

ACTUAL:
100/104.5/99/72/104.5

1 = 2050 (4)
2 = 2044 (8)
3 = 2045 (7)

M 3 EOM:

WEIGHT:
200993 LBS

X CG:
1087.63

LANDING:

WEIGHT:
200939 LBS

X CG:
1089.52

BI-114

RSRM 86

ET-116

SLWT-21

ET IMPACT

1:14:10 MET

LAT:
36.54°S

LONG:
158.67° W

51.60 (16)

DIRECT INSERTION

POST OMS-2:
169.9 x 125.7 NM

DEORBIT:
APOGEE:
214 NM
PERIGEE:
212 NM

VELOCITY:
25907 FPS

ENTRY RANGE:
4351 NM

OI-29 (4)

CARGO:
38393 LBS

PAYLOAD CHARGEABLE:
30217 LBS

DEPLOYED:
29672 LBS

NON-DEPLOYED:
46 LBS

MIDDECK:
288 LBS

SHUTTLE ACCUMULATED WEIGHTS:
DEPLOYED:
1189722 LBS
NON-DEPLOYED:
1559554 LBS
CARGO TOTAL:
3547208 LBS

PERFORMANCE MARGINS (LBS):
FPR: 3065
FUEL BIAS: 937
FINAL TDDP: 1736
RECON: 2486

PAYLOADS:
PLB:
ISS 11A
(ITS P1 TRUSS)
CETA CART B
SRMS, ODS

MIDDECK:
ISS 11A

5 CRYO TK SETS
6 GN2 TANKS
RMS 70

RMS USED TO UNBERTH P1 ITS AND HAND-OFF TO SSRMS FOR MATE TO S0 TRUSS.

KSC W/D: OPF 79, VAB 9, PAD 35 = 123 days total.

LAUNCH POSTPONEMENTS:
- Launch was postponed from July after Post-STS-110 visual inspections of OV-104 Inconel 12" MPS LH2 Flowliners revealed three cracks to SSME 2. Subsequent inspections found cracks in other orbiter LH2 Flowliners:
  - OV-103 - three cracks (SSME 1)
  - OV-105 - one crack (SSME 1) and one crack (SSME 2)
  - MPTA - one crack (SSME 1)
  - OV-102 three cracks (SSME 2). OV-102 flowliners are CRES.

After analyses, tests, etc., including consideration of other repair techniques, the decision was made to use weld-repair technique and polishing of Flowliner holes.
- As a result, STS-113 and STS-112 moved ahead of STS-107. STS-113 launch date was set to November 6, 2002 EST.
- At FRR, STS-113 Launch was postponed 1 day to November 7, 2002 EST at 11:56 PM (311:04:56Z).

LAUNCH SCRUBS:
- Scrubbed Monday, November 7 Launch at approximately L-3 hours due to an O2 leak in PCS 2 between ECLSS Supply Valve and 576 Bulkhead. Leak was first noticed when Haz Gas Detection System indicated an O2 concentration of approximately 150 ppm in the Mid-Body. Troubleshooting procedures isolated the leak to PCS 2 outside the cabin between ECLSS O2 Supply valve and Crew Module 576 bulkhead. Launch date set to NET Monday, November 18. Inspection/troubleshooting found a blowing leak in PCS 2 O2 flex hose near the 576 bulkhead. Replaced PCS 2 O2 and N2 flex hoses. During preparation to get access to PCS 2 O2 line under PLB liner, an Access Platform came in contact with the RMS damaging the TPS, Kevlar honeycomb with minor delamination to composite boom. Tests and analyses proved it is OK to fly-as-is. On November 20, set launch date to 11/22/02. Technical Scrub.
- Scrubbed 11/22/02 launch planned for 8:15:30 PM EST at L-8 minutes due to unstable weather at ZZA and MRN. Early forecasts were showers within 20 nm at Zaragoza and occasional overcast 1500 feet and showers at MRN. At L-1 hour, Moron weather had improved and FD updated TAL to Moron. However, both TAL sites were forecast and observed NO GO at the L-8 minute scrub time and at TAL landing times. TAL Weather Scrub. Ben Guerir was not available as a TAL site; however, Ben Guerir was observed NO GO for ceiling and showers.

LAUNCH WINDOW:
- ISS first Planar window opened at 328:00:44:48Z and closed at 328:0054:46Z with PLT at 328:00:49:47Z (7:49:47 PM EST) for a 7M08S launch window. Second Planar window opened at 328:00:47:56Z and closed at 328:00:57:55Z.

LAUNCH DELAYS: NONE
- Launch occurred On-Time at 328:00:49:47Z, 7:49:47 PM EST on Saturday, November 23, 2002.

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-113/ ISS 11A

Continued …

Continued…

SS EVA 86
DOCKED QUEST EVA 12
EMU/TETHERED EVA 79
SCHEDULED EVA 80
DURATION 6:45

SS EVA 87
DOCKED QUEST EVA 13
EMU/TETHERED EVA 80
SCHEDULED EVA 81
DURATION 6:10

SS EVA 88
DOCKED QUEST EVA 14
EMU/TETHERED EVA 81
SCHEDULED EVA 82
DURATION 7:00

MCC WHITE FCR (42)

FLIGHT DIRECTORS:
ISS LD/O1 - A. F. Algate
ISS O 2 - M. A. Kirasich
ISS PLNG - A. P. Hasbrook
STS LD/O 1 - P. L. Engelauf
STS O 2 - C. A. Koerner
STS O 3/PLNG - J. M. Curry
A/E - J. P. Shannon
MOD - R. E. Castle

Continued…

OMS-2:
38.12 37:49.2
250 FPS256 FPS
2:42 5:31

Continued…

S/T:
1015:13:34:10

OV-105:
206:14:12:06

DISTANCE:
5,735,600 sm

Continued…

PERFORMANCE ENHANCEMENTS:
- Standard Set plus: (1) PE Operational High Q (WIN/DEC), (2) OMS Assist, (3) 52 NM MECO, (4) Del Psi

FIRSTS/LASTS:
- First flight with 3 Days Extension due to weather wave-offs.
- Record Minimum Crossrange of 2.1 nautical miles.

RENDEZVOUS #61:
- Rendezvous and Dock with ISS (PMA2 Lab Fwd Port).

FLIGHT DURATION CHANGES: Extended flight 3 days total.
- EOM - Planned landing at KSC on orbit 170 (Tig orbit 169) at 338:20:49Z, 3:49 PM EST on Wednesday, December 4, 2002. Waved-off landing on orbit 170 (Tig orbit 169) at Tig-21 minutes due to NO GO forecast for ceiling (broken 6000 feet). Weather reported that at landing time ceiling was 8000 feet and showers at 30 nm (GO Observation).
- Waved-off landing on orbit 171 (Tig orbit 170) at Tig –24 minutes due to NO GO Forecast of ceiling 6500 feet. (One day extension) waveoff 1 day. Landing observations verified NO GO (BKN 6500 feet).
- EOM+1 - Waved-off landing at KSC on orbit 185 (Tig orbit 184) at 339:19:54Z, 2:54 PM EST on Thursday, December 5, 2002 at approximately Tig-3H15M due to observed 18 knot crosswinds, moisture within 30 nm and broken 7000 feet.
-Waved-off landing at KSC on orbit 186 (Tig orbit 185) a few minutes later for crosswind, moisture, and ceiling violations.
(Second day Extension) waveoff 2 days.
- EOM+2 - Waved-off landing at KSC on orbit 200 at 340:18:57Z, 1:57 PM EST on Friday, December 6, 2002 at Tig-3H03M due to NO GO forecast and observed drizzle at SLF and overcast 900 ft.
- Decided to proceed with DeOrbit Prep for orbit 201 landing but not fluid load. Closed the PLBD's and gave GO for OPS 3 transition. Weather violations continued. Waved-off landing at Tig-1H12M due to continued NO GO observed and forecast drizzle/fog, visibility 3 miles and overcast 600 feet. (Third Day Extension) waveoff 3 days.
-EOM+3 - Landed at KSC Runway 33 on orbit 216 at 341:19:37:13Z, 2:37:13 PM EST, Saturday, December 7, 2002 (MET 13:18:47:26). Total extensions 3 Days (Record for three days extension due to weather, landed on EOM+4). STS-57 was extended 3 days; however, the first day extension was for science and the last 2 days were weather extensions. Record minimum crossrange of 2.1 miles.

SHUTTLE NIGHT LAUNCH #28:

EVENTS:
- NC1 maneuver at 328:03:42:05Z (02:52:28 MET) resultant altitude of 170.2 by 186.7 nm.
- MC4 maneuver at 329:20:27Z (01:19:37 MET) resultant altitude 203.3 by 215.5 nm.
- ISS Capture (PMA 2 Lab Fwd Port) at 329:21:20:27Z (01:21:08:53 MET)

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-113/ ISS 11A Continued …										Continued… - IELK S/L Transfer (Official transfer of ISS from Expedition 5 Crew to Expedition 6 Crew) at 330:02:28Z (02:01:39:13 MET) - SRMS unberth of P1 ITS at 330:15:19:51Z (02:14:30 MET) and positioned P1 over orbiter Port Wing for handoff to SSRMS. (Thereafter SRMS camera was used only for video support of EVA activities.) - SSRMS used to mate P1 ITS to S0 truss at 330:18:50:14Z (02:18:00:27 MET) - EVA 1 Start at 330:19:48Z (02:18:57 MET), EVA 1 End at 331:02:33Z (03:01:43 MET) on November 26, 2002, duration 6H45M. All three EVA's used Pre-Breathe Protocol while exercising on Shuttle Ergometer located in mid-deck. Crew had to use Shuttle Ergometer as the CEVAS had a problem. Made connections between P1 and S0 Trusses. Released launch restraints on CETA Cart, DLA, and TARJ Stinger, installed Node 1 WETA. - Reboost 1 at 331:17:10:47Z (03:16:21 MET) delta V + 2.4 fps, altitude increase 2.4 nm, altitude 216 by 207 nm - EVA 2 Start at 332:18:36Z (04:17:46 MET), EVA 2 End at 333:00:47Z (04:23:57 MET) on November 28, 2002, duration 6H10M. Installed fluid jumpers between P1 & S0. Removed P1 Port & Stbd keel pins. Installed WVS TX Assy on P1. Relocated CETA Cart from P1 to S1. Released P1/P3 line clamps. Removed & stowed Radiator beam launch locks. - Reboost 2 at 333:16:50:59Z (05:16:01:12 MET), delta V = 2.56 fps, altitude increase 0.7 nm, altitude 216 by 209 nm. - EVA 3 Start at 334:19:24Z (06:18:34 MET) and End at 335:02:24Z (07:01:34 MET) on November 30, 2002, duration 7H00M. Installed Z1/P6/Lab, Lab HX, and P1 RBVM SPD's. Reconfigured electrical harnesses, route power through Main Bus switching units. - Reboost 3 at 335:16:36:47Z (07:15:49 MET), delta V = 8.6 fps, altitude increase 2.4 nm, final orbit 216.6 by 211.4 nm. - Farewell 336:17:18Z (08:16:28 MET) - ODS Upper Hatch closed at 336:17:47:47Z (08:16:58 MET), Lab Fwd Hatch (all hatches closed) closed at 326:18:15:47Z (08:17:26 MET) - Undocking complete at 336:20:04:50Z (08:19:15:03 MET) - Transfers: Shuttle to ISS 2160 lbs plus P1 ITS of 27514 lbs, 690 lbs H2O (672 lbs in 7 CWC's and 18 lbs in one PWR), 32 lbs O2 used during prebreathe for 3 EVA's. Plus 6 LiOH cans. Transfer ISS to Shuttle 2250 lbs. - MEPSI deploy at approx. 336:22:25Z (08:21:36 MET) <u>SIGNIFICANT ANOMALIES</u>: - O2 concentration in Mid Body above expected baseline. Replaced secondary O2 line and secondary GN2 flex hoses (IFA STS-113-V-01). - Right OMS Engine Bi-Propellant Valve 2 position indicator indicated 96 percent Open at start of OMS Assist Burn and continued to indicate 96 percent Open after burn (IFA STS-113-V-02). - S-Band Power Amplifier 2 power output low (IFA STS-113-V-04). - Hardware C&W pushbutton failures - APU 2 GG Bed Heater Cycles Abnormal - Wireless Video System video problems

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-107

SEQ
FLT #113

KSC-113

PAD 39A-40

MLP-1

OV-102
(Flight 28)

Columbia

OMS PODS:
LPO5-17
RPO5-16
FRC2-28

EDO FLT
15
S/H RDM 1

CDR:
Rick D. Husband
(Flt 2 - STS-96)

P690/R248/V177/M216

PLT:
William C. McCool
P691/R290/M254

M/S 1:
David M. Brown
P692/R291/M255

M/S 2:
Kalpana Chawla
(Flt 2 - STS-87)

P693/R230/V178/F30

M/S 3 (PAYLOAD CDR):
Michael P. Anderson
(Flt 2 - STS-89)

P694/R235/V179/M205

M/S 4:
Laurel Blair Salton Clark
P695/R292/F37

amon
EL)
R293/M256

MCC WHITE FCR (43)

FLIGHT DIRECTORS:
LD/O 2 - K. B. Beck
O 1 - J. S. Stich
O 3 - B. P. Austin
O 4 - J. M. Hanley
A/E - L. E. Cain
MOD - P. L. Engelauf

KSC 39A
16:15:39:00Z
10:39:00 AM EST (P)
10:39:00 AM EST (A)
Thursday 34
1/16/03 (10)

LAUNCH WINDOW:
2H30M CTOB

EOM PLS: KSC
TAL: MRN
TAL WX: ZZA

SELECTED:
RTLS: KSC 15 CI/N
TAL: MRN 20 N/N
AOA: EDW 04 CI/N
PLS: EDW 04 N/N

TDEL:
0.11
0.032/0.070

MAX Q NAV:
756 749

SRB STG:
2:05.4 2:07

PERF: NOMINAL

2 ENG TAL (MRN):
2:39 2:50

NEG RETURN:
3:50 3:52

PTA (U/S 242):
5:15 5:14

SE OPS 3:
5:25

PTM (U/S 242):
5:54 6:05

SE TAL (ZZA):
5:56 6:05

SE PTM (U/S 459):
7:00 7:05

MECO CMD:
8:20.9 8:23

VI:
25863 25860

OMS-2:
41.18 41:24

DEORBIT BURN:
32:13:15:18Z
Sunday, February 1, 2003

PLANNED LANDING:
On KSC 33 at 9:15:50 AM EST

ORBIT DIRECTION:
DL 49

FLT DURATION:
15:22:20:32
Lost contact with Columbia at 8:59:32 AM EST

S/T:
1031:11:54:42

OV-102:
300:17:39:40

DISTANCE:
6,649,757 sm

104/104/
109%

PREDICTED:
100/104.5/72/
72/104.5

ACTUAL:
100/104.5/72/
72/104.5

1 = 2055 (1)
2 = 2053 (5)
3 = 2049 (7)

EI:

WEIGHT:
234495 LBS

X CG:
1078.53

EI + 15 MIN:

WEIGHT:
234167 LBS

X CG:
1077.87

BI-116

RSRM 88

ET-93

LWT-86

ET IMPACT

1:24:35 MET

LAT:
2.28°N

LONG:
139.42° W

39.
0
(8)

DIRECT INSERTION

POST OMS-2:
156 x 147 NM

DEORBIT:
Ha 151.6 NM
Hp 135.0 NM

VELOCITY:
25762 FPS

ENTRY RANGE:
4439 NM

OI-
29
(5)

CARGO:
35463 LBS

PAYLOAD CHARGEABLE:
24316 LBS

DEPLOYED:
0 LBS

NON-DEPLOYED:
23515 LBS

MIDDECK:
801 LBS

SHUTTLE ACCUMULATED WEIGHTS:
DEPLOYED:
1189722 LBS
NON-DEPLOYED:
1559554 LBS
CARGO TOTAL:
3547208 LBS

PERFORMANCE MARGINS (LBS):
FPR: 3047
FUEL BIAS: 1112
FINAL TDDP:
RECON:

PAYLOADS:
PLB:
SPACEHAB RDM
FREESTAR
OARE
(MORE THAN 80 EXPERIMENTS)

MIDDECK:
FREESTAR - MIDDECK H/W
RAMBO
S/H SUPPORT EQUIPMENT

9 CRYO TK SETS
(EDO PALLET)

5 GN2 TANKS

NO RMS

KSC W/D: OPF 79, VAB 9, PAD 35 = 123 days total.

LAUNCH POSTPONEMENTS:
- Baselined launch date of 1/11/01 on 11/10/99.
- Postponed launch date to 2/22/01 on 3/3/00.
- Postponed launch date to 4/15/01, then 6/14/01, others(?), then to 9/2/03, moved after STS-112 and STS-113 (Priority flights to HST and ISS flights that had been postponed due to flow-liner cracks.)
- Postponed launch date to 1/16/03.

LAUNCH SCRUBS: None

LAUNCH WINDOW:
- Launch Window was 2H30M (Crew Time On Back).

LAUNCH DELAYS: NONE
- KSC weather was excellent, perhaps the best launch weather experienced in Shuttle Program.
- Launch occurred On-Time at 16:15:39:00Z, 10:39:00 AM EST, on Thursday, January 16, 2003.

TAL WX:
- Moron was prime and selected. Both Moron and Zaragoza were forecast and observed GO. Ben Guerir was not available.

PERFORMANCE ENHANCEMENTS:
- Standard Set plus: PE Operational High Q (WIN/JAN) and OMS Assist.

FIRSTS/LASTS:
- First flight of Space Shuttle in CY 2003.
- First flight of Spacehab RDM (Research Double Module) with more than 80 Experiments. Science: Biological, Physiological & Countermeasures, Physical Sciences, Earth and Space Science, Space & Technology Development.
- First EDO Pallet Flight since STS-90 (April 17, 1998)
- First flight of Israeli Astronaut - Ilan Ramon

FLIGHT DURATION CHANGES:
- Planned landing at KSC on orbit 256 (TIG orbit 255) on Saturday, February 1, 2003. Deorbit maneuver was initiated at 32:13:15:18Z, 8:15:18 AM EST on Saturday, February 1, 2003 (TIG orbit 255, landing orbit 256). Planned landing time was 32:14:15:50Z, 9:15:50 AM EST.
- Orbiter weight and Xcg at entry interface was 234,495 lbm, Xcg was 1078.53.
- Orbiter weight and Xcg at entry interface plus 15 minutes 234,167 lbm, Xcg was 1077.87.
- Flight controllers reported increased temperatures on some sensors and some failed sensors in left wing area. Off-nominal indications started at approximately 32:13:52:17Z. Columbia contact loss (Loss-of-Signal) occurred at 32:13:59:32Z, 8:59:32 AM EST (15:22:20:32 MET), 16 minutes prior to planned landing time. Communications and tracking were lost at an altitude of approximately 203,000 feet while Columbia was traveling at approximately 12,500 miles per hour at Mach 18.
- Columbia and 7 astronauts were lost over Texas.

RED SHIFT: Rick Husband, Kalpana Chawla, Laurel Clark, Ilan Ramon.

BLUE SHIFT: William McCool, David Brown, Michael Anderson (PL CDR)

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-107 Continued...										Continued... STS-107 EVENTS: Orbital Altitude was 150 nm. STS-107 FLIGHT OBJECTIVES/EXPERIMENTS: - Flight was a dedicated and successful science/research mission. - Primary payload is SPACEHAB Research Double Module (SHRDM) with International, NASA and SPACEHAB commercial payloads including Life Sciences, Materials, and Microgravity Science Research Experiments. - Fast Reacting Experiments Enabling Science, Technology, Applications and Research (FREESTAR) is a complex Secondary Payload which is a cross bay carrier with following payloads: MEIDEX (Mediterranean Israeli Dust Experiment), Solar Constant-3 (SOLCON-3), Shuttle Ozone Limb Sounding Experiment-2 (SOLSE-2), Critical Viscosity of Xenon-2 (CVX-2), Low Power Transceiver (LPT), and Space Experiment Module-14 (SEM-14) - Ram Burn Observation (RAMBO) SIGNIFICANT ANOMALIES: - ET Foam loss during ascent at approximately 81 seconds (likely from Bi-pod area) (IFA). Re-design constraint to flight. - RSRM Nozzle Flex Boot Separation (IFA). Constraint to flight. - O2 Tank 7 Heater failed off in Manual Mode (IFA STS-107-V-02) - Suspected Fuel Cell Monitoring System Data Cable problem. FCMS is suspect after same problem with backup cable. - SM I/O Errors on IP Bus - DSR 20 Error Message 32 (Loss of tape recording and playback) - 70 mm Hasselblad Intermittent Motor Drive (Binds or jams) - 2nd 70 mm Hasselblad Motor Jam - STGT site outage - Payload No I-COM B Transmission in Spacehab (Not being heard in Spacehab) - Spacehab water loop Degradation (Flow rates decreasing) - Payload Ku Channel 2 Data Dropouts (Ku-Band and S-Band) - AC2 Phase B “Sluggish” Current Signature on Orbiter (IFA STS-107-V-01) - Forward DAP Auto A Contact Deselected by RM - Spacehab Rotary Separator flooding short - Loss of Columbia and crew during Entry - IFA STS-107-V-03 CAIB REPORT: Accident Analysis indicated that the physical cause of the loss of Columbia and its crew was a breach in the Thermal Protection System on the leading edge of the left wing. The breach was initiated by a piece of insulating foam that separated from the left bipod ramp area of the External Tank and struck the wing in the vicinity of the lower half of Reinforced Carbon-Carbon panel 8 at 81.9 seconds after launch. During re-entry, this breach in the Thermal Protection System allowed superheated air to penetrate the

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-114/ LF-1

SEQ
FLT #114

KSC-114

PAD 39B-50

MLP-3

17TH SHUTTLE FLIGHT TO ISS

ISS LOGISTICS FLIGHT 1

OV-103 (Flight 31)

Discovery

OMS PODS: LPO1-34 RPO3-32 FRC3-31

CDR:
Eileen Collins
(Flt 4 - STS-63, STS-84, STS-93)

P697/R188/V139/F24

PLT:
James M. Kelly
(Flt 2 - STS-102)

P698/R263/V180/M229

M/S 1/EV-1:
Soichi Noguchi
(Japan JAXA)
P699/R294/M257

M/S 2/EV-2:
Stephen K. Robinson
(Flt 3 - STS-85, STS-95)

P700/R222/V152/M196

M/S 3:
Andrew S.W. Thomas
(Flt 4 - STS-77, Up to Mir on STS-89, Down on STS-91, STS-102)

P701/R213/V149/M186

M/S 4:
Wendy B. Lawrence
(Flt 4 - STS-67, STS-86, STS-91)

P702/R192/V146/F25

M/S 5:
Charles Camarda
P703/R295/M258

SS EVA 89
DOCKED QUEST EVA 15
EMU/TETHERED EVA 82
SCHEDULED EVA 83 DURATION 6:50

SS EVA 90
DOCKED QUEST EVA 16
EMU/TETHERED EVA 83
SCHEDULED EVA 84 DURATION 7:14

SS EVA 91
DOCKED QUEST EVA 17
EMU/TETHERED EVA

KSC 39B
207:14:39:00Z
10:14:39 AM EDT (P)
10:39:00 AM EDT (A)
Tuesday 14
7/26/05 (8)

LAUNCH WINDOW:
4M15S (In-Plane Time) with ISS

EOM/PLS: KSC
TAL: ZZA
TAL WX: MRN, FMI

SELECTED:
RTLS: KSC 33/N/N
TAL: ZZA 30/N/SFD
AOA: KSC 33/N/N
PLS: EDW 22/N/SFD

TDEL:
0.02 -0.178

MAX Q NAV:
775 709

SRB STG:

PERF:
NOMINAL:

2 ENG TAL (ZZA):
2:43 2:44

NEG RETURN:
3:52 3:57

PTA (U/S 182):
5:10 5:14

SE TAL (ZZA 104):
6:09 6:14

PTM (U/S 614):
6:10 6:14

SE PRESS 104:
6:57 7:02

MECO CMD:
8:24.2 8:24.9

VI:
25819 25819.6

OMS-2:
37:40 38:00
100.7 FPS 99 FPS

EDW 22, CONC
EDW 50, CONC
31
221:12:11:23Z
5:11:23 AM PDT
Tuesday 21
8/9/05 (7)

DEORBIT BURN:
221:11:06:18Z

XRANGE: 46 NM

ORBIT DIR: AL 33

AIM PT: NOM

MLGTD: 1311 FT
221:12:11:23Z
VEL: 226 KGS 222 KEAS
HDOT: -5.5 FPS

TD NORM 205:
2761 FT

DRAG CHUTE DEPLOY:
192 KEAS
221:12:11:31.9Z

NLGTD: 6573 FT
221:12:11:38Z
VEL: 163 KGS 156 KEAS
HDOT: -6.4 FPS

BRK INIT: 90 KGS

DRAG CHUTE JETTISON:
53 KGS
221:12:12:08Z

BRK DECEL FPS^2:
AVE 5.1 PK 6.6

WHEELS STOP:
221:12:12:31Z
12657 FT

ROLLOUT:
11346 FT
68 SEC

NO BLACKOUT DURING ENTRY

Continued...

104/104/109 %

PREDICTED:
100/104.5/104.5/72/104.5

ACTUAL:
100/104.5/104.5/72/104.5

1 = 2057 (1)
2 = 2054 (5)
3 = 2056 (3)

ALL BLOCK II ENGINES

M 3 EOM:

WEIGHT:
225792 LBS

X CG:
1086.58

LANDING:

WEIGHT:
225727 LBS

X CG:
1088.21

BI-125 RSRM-92

ET-121

SLWT-22

ET IMPACT:
1:14:10 MET

LAT:
36.56ºS

LONG:
158.7ºE

51.60 (17)

DIRECT INSERTION

POST-OMS-2
123.6 NM
X 85.0 NM

DEORBIT:
Ha 191.0 NM
Hp 168.0 NM

ENTRY VELOCITY:
25858 FPS

ENTRY RANGE:
4416 NM

OI-30 (1)

CARGO:
38652 LBS

PAYLOAD CHARGEABLE:
29807 LBS

DEPLOYED:
26413 LBS

NON-DEPLOYED:
3231 LBS

MIDDECK:
163 LBS

SHUTTLE ACCUMULATED WEIGHTS:
DEPLOYED:
1216135 LBS

NON-DEPLOYED:
1562948 LBS

CARGO TOTAL:
3585860 LBS

PERFORMANCE MARGINS (LBS):
FPR: 3098
FUEL BIAS: 1269
FINAL TDDP:
RECON:

PAYLOADS:
PLB:
ISS LF-1
MPLM RAFFAELLO, ESP2, LMC, RMS, ODS, OBSS

MIDDECK:
ISS LF-1 RAMBO

5 CRYO TK SETS
6 GN2 TANKS

RMS 71

RMS USED FOR TPS SURVEYS AND TWO GAP FILLER REMOVALS

KSC/WD: OPF 994, VAB 25, PAD 85 = 1104 days total

LAUNCH POSTPONEMENTS:
-Baselined OV-104 Atlantis as ULF-1 Crew Rotation flight with launch date of 1/16/03 on 12/6/01
- Postponed launch date to NET 3/1/03 on 9/16/02. Postponement caused by Engine Flowliner cracks.
- Subsequent postponements after STS-107 Accident to NET 7/21/03, NET 10/1/03, NET 12/18/03, NET 3/11/04, NET 9/12/04.
- Postponed launch date to NET 3/6/05 on 3/22/04. Changed flight to ISS Logistics Flight LF-1, canceled crew rotation, and changed orbiters to Discovery OV-103.
-Tanking Test 1 on 4/24/05 experienced two intermittent LH2 ECO anomalies. (ECO sensors #3 & #4 failed WET). Replaced MPS Point Sensor Box (PSB) and all Sensor #3 & #4 wiring to LH2 monoball. Subsequent to completion of this work, the Tanking Test #2 LH2 Sensor performance was nominal.
- Postponed launch date to NET 5/12/05, 5/15/05, 5/22/05, 7/13/05.
- Rolled back from pad 39B to VAB on 5/26/05 to swap stacks with STS-121, due to a late all-flights requirement for a heater on the ET LOX Feedline upper bellows, to prevent formation of critical ascent ice debris in that area. Installation of the bellows heater was started on ET-121 (STS-114 was ET-120) in the VAB before the STS-114 stack was rolled-back. Removed and replaced an out-of-spec H2 diffuser.
- Replaced MPS PSB after a power card failure.
- Rolled out to Pad 39B on 06/15/05 and set launch date of 07/13/05 on 05/22/05.

LAUNCH SCRUBS:
- Scrubbed 07/13/05 launch attempt at 194:17:30Z (L-2:14:51 to Window Opening) when LH2 ECO Sensor #2 failed WET (failed to transition to DRY with Sim Commands). This violated OMRSD and LCC MPS-22 requirements for four functional LH2 sensors. Extensive tests were conducted that identified a degraded PSB ground and some evidence of EMI as potential causes of the false WET problem. At MMT on 07/20/05, decided to set launch for 07/26/05 (without a special tanking test), allowing sufficient time to clean up the ground and emi. Decision was made to perform ECO Sensor #2 and #4 pin swap that provides additional troubleshoot results. (Note: ECO sensors operated normally on 7/26/05; further analyses and tests have significantly reduced the concerns about PSB grounding and EMI as causes of the STS-114 anomalies, but this remains a UA as of February 2006).
- Weather: All three TAL sites were forecast and observed GO. RTLS and AOA1 landing site KSC was forecast NO GO for precipitation and thunderstorms within 20 NM and observed NO GO for thunderstorms within 20 NM (Anvil). 07/13/05 Launch Attempt was a combined Technical/Weather Scrub.

LAUNCH WINDOW:
Window opened at 207:14:34:33Z and closed at 207:14:43:52Z for a total window of 9M19S. The Preferred Launch Time (In-Plane Time) was 207:14:39:00Z resulting in a Launch Window of

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-114/ LF-1 Continued...		Continued... MCC WHITE FCR (44) FLIGHT DIRECTORS: SHUTTLE: A/E - LeRoy Cain LD/O 1 - Paul Hill O 2 - Anthony Ceccacci O 3/Plng - Catherine Koerner Team 4 - Kelly Beck WX - Steven Stich MOD - Phil Engelauf ISS: LD/O 2 - Mark Ferring O 1 - Bryan Lunney O3/Plng - Joel Montalbano Team 4 - Richard LaBrode		Continued... DENS ALT: 3799 FT FLT DURATION: 13:21:32:23 S/T: 1045:09:27:05 OV-103: 255:20:12:58 DISTANCE: 5,746,939 sm						Continued... TAL WX: Zaragoza (Primary and Selected) was forecast and observed GO. Moron was forecast and observed NO GO for Crosswind. FMI (Istres) was forecast GO but observed NO GO for Tailwind violation. PERFORMANCE ENHANCEMENTS: Standard Set plus: (1) PE Operational High Q SUM/JUL, (2) OMS Assist, (3) 52 NM MECO, (4) Del Psi FLIGHT DURATION CHANGES: - On Flight Day 4, decision made to extend flight 1 day to give more time to transfer activities to and from ISS. EOM Day: Deorbit Tig on Orbit 201 was at 220:07:43Z and landing time at KSC on Orbit 202 at 12/18:07 MET 220:08:46Z (4:46 AM EDT). EDW was not called up for support on EOM day. - Early weather forecast was GO except for a chance of showers. Gave crew a GO for PLBD closure at 220:05:15Z. Light rain was observed at SLF for a few minutes. At 220:06:15Z gave crew a GO for fluid loading. Last forecast changed to NO GO at 220:0643Z with observed broken low clouds at 1000 feet in SLF area. At 220:07:16Z, due to low clouds, decision was made to wave off first opportunity at KSC. KSC was observed GO at landing time. Flight extension 1 day plus one orbit. KSC opportunity 2 Deorbit Tig on Orbit 202 was at 220:09:19Z and landing time at KSC was 220:10:22Z (5:42 AM CDT). Last forecast at 220:08:46Z was GO. However, due to unstable conditions in low clouds, FD made decision to wave off landing at KSC on second opportunity. KSC was observed NO GO due to precipitation in SLF area. Flight extension now 2 days. - EOM + 1 Day: All three EOM landing sites KSC, EDW, and NOR were called up on pick-em day with Discovery landing at one of the three sites. First opportunity for a KSC landing was on Orbit 218 at 221:09:08Z with Tig at 220:08:05Z on Orbit 217. Gave a GO for PLBD closing at 221:05:05Z but did not give a GO for crew fluid loading. Weather was NO GO with showers, thunderstorms, and confirmed electrified cloud within 30 NM. Showers and thunderstorms were forecast within 30 NM at landing time. At 221:06:55Z, waved off landing at KSC on Orbit 218. Flight extensions 2 days + one orbit. - Changed Landing site to EDW. Targeted landing at KSC on Orbit 219 at 221:10:43Z. Gave crew a GO to fluid load at 221:08:40Z. At 221:08:43Z, weather forecaster reported two cells developing rapidly northeast of field moving NE with lightning in a northeast cell. At 221:08:57Z, Crew reported APU prestart complete. Current observations at SLF had showers within 30 NM with electrified cirrus (anvil) within 30 NM with forecast of thunderstorms within 30 NM moving NE. At 221:09:00, Flight Director advised crew to stop fluid loading. Waved off landing at KSC on Orbit 219, the last opportunity on FD 13. Decision made to change landing sites to EDW concrete runway 22 on Orbit 220. Flight extensions 2 days + two orbits.

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-114/ LF-1 Continued...											Continued... FIRSTS/LASTS: - First flight in Return-To-Flight after Columbia STS-107. - First launch in 922 days after STS-107 launch. - First flight with Istres, France as a TAL site. - First flight with ET bipod redesign to eliminate large insulating foam ramps as a debris source and replace them with electric heaters. - First use of the 50-foot-long robotic arm extension known as Orbiter Boom Sensor System (OBSS) equipped with Laser Imager and cameras to inspect Wing Leading Edges RCC and the Shuttle Bottom tiles for damage. - First use of upgraded Ground Camera Ascent Imagery System, two WB-57 aircraft based video, and ship and ground based radar. - First use of WLE instrumentation behind RCC panels to gather and downlink acceleration and temperature data during ascent phase. - First use of orbiter back-flip pirouette to allow ISS based photography of orbiter bottom TPS. - First EVA crew to make repairs on shuttle bottom. Removed gap fillers protruding approximately 1 inch from black tiles in two areas of orbiter bottom black tiles, each extended approximately 1 inch. Gap fillers were removed during EVA 3. - First flight with ET design change to use heater in bipod ramp area to prevent ice/frost buildup (in lieu of insulating foam in that area). - Mandated day-time launch for STS-114 and STS-121 to provide proper lighting for video and film cameras observation of ET debris shedding during ascent. - First flight with ET LOX Feedline upper bellows heater to prevent formation of critical ascent ice debris in that area. EVENTS: - ET Separation at 207:14:47:00Z, 8:46 GET - MC-1 maneuver at 01:17:37:53, delta V 0.44 ft/sec Orbit 199.7 by 213.1 NM - FD2 SRMS/OBSS survey of Wing Leading Edges and nose cap - FD2 SRMS survey of orbiter upper surfaces - ISS capture at 209:11:17:20Z (01:20:38:20 MET) - Hard Dock: 209:11:31:53Z (01:20:52:53 MET) - Open Lab Fwd Hatch at 209:11:51:00Z (01:21:12 MET) - Open APAS Hatch at 209:12:35:00Z (01:21:56:00 MET) - Open ODS Hatch at 209:12:14:00Z (01:22:14 MET) ISS ingress - FD4 OBSS survey of heat-protection tiles. MPLM docked to Node 1. MPLM and Middeck transfers begin. - EVA 1 start at 211:09:45:50Z, 3:19:06:50 MET, duration 6H50M, on 07/30/05. Crew members performed EWA & NOAX TPS sample repair DTO 848 in PLB. Crew used OBSS to scan predamaged RCC samples on DTO pallet. - EVA 2 start at 213:08:43:00, 5:18:04:00 MET, duration 7H14M, on 08/01/05. EVA crew removed, replaced, and performed checkout of ISS CMG 1. Crew started CMG 1. - EVA 3 start at 215:08:48:00Z, 7:18:09:00 MET, duration 6H01M, on 08/03/05. Installed External Stowage Platform (ESP-2) on ISS airlock. Removed gap filler material (two) protruding from orbiter bottom tiles.

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7) / TITLE, NAMES & EVA'S	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT INC	ORBIT HA/HP	FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
STS-114/ LF-1 Continued...											Continued... EVENTS (Continued): - Orbiter undocked from ISS at 218:07:23:45Z (10:16:44:45 MET) - Total Consumables transferred to ISS 1855.2 lbm (18 CWC's & 5 PWR's), N2 = 29 lbm tank-to-tank; Stack-to-stack O2 = 60.85 lbm (27.6 lbm atmo & 33.3 metabolic), N2 to ISS cabin transfer = -7.7 lbm. - Total MPLM transfers to ISS 3695 lbs (2095 Cargo and 1600 HRF). 6600 lbs transferred to MPLM/Discovery for return to earth - ISS Visitor Time was 8D19H51M52S (Hard dock to Undock) - Sep 1 Burn at 218:08:36:26Z Ha 193.5 Hp 189.3, Sep Burn 2 at 218:09:04:26Z Ha 194.1 Hp 168.1 NM - Orbit Adjust Burn at 221:11:06:18Z H RENDEZVOUS # 62: Rendezvous and dock with ISS. SPACE SHUTTLE NIGHT LANDING: # 20 total and sixth night landing at EDW. SIGNIFICANT ANOMALIES: - LH2 ECO sensor #2 stayed wet when commanded dry caused launch scrub. - ET TPS damages and TPS foam losses during ascent constraint to next flight: - LH2 PAL ramp, Ice/Frost ramp, Acreage, Intertank flange foam losses. - +Y thrust strut flange and -Y Bipod spindle closeout foam losses. - TPS Blanket damage near window 1 - TPS Gap Filler Protuberances (removed during EVA 3) - Nose Landing Gear TPS tile damage - APU 2 momentary loss of Press & Temp Indications - ODS Capture Latch manual release talkback showed “Open” prior to hooks drive - Airlock Aft “B” Hatch Closure difficulties - Airlock Depress Off-Nominal - TCS repeated loss of Track - VRCS thruster R5R Low Pc. Heater may have failed on. - MPS/SSME low pressure helium decay rate exceeded - WSB GN2 Regulator outlet pressure low - High O2 concentration in aft compartment during ascent - Loss of several Orbiter tile putty repairs during ascent - Late release of two FRCS Thruster TYVEK rain covers during ascent - Orbiter forward ET attach point NSI pyro bolt ejection after nominal NSI firing

SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7 up, 6 down) / TITLE, NAMES & EVA'S	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT INC	ORBIT HA/HP	FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

SPACE SHUTTLE MISSIONS SUMMARY

STS-121/ ULF1.1

SEQ FLT# 115

KSC 115

PAD 39B-51

MLP-1 18th Shuttle Flight to ISS

ISS Logistics Flight 2

OV-103 (Flight 32) Discovery

OMS PODS: LPO1-27 RPO3-34 FRC3-32

CDR:
Steven W. Lindsey (Flt 4 - STS-87, STS-95, STS-104)

P704/R229/V131/M200

PLT:
Mark E. Kelly (Flt 2 (STS-108))

P705/R271/V181/M237

EV2/M/S 1 (PAYLOAD CDR):
Michael E. Fossum
P706/R296/M259

M/S 2:
Lisa M. Nowak
P707/R297/F38

M/S 3:
Stephanie D. Wilson
P708/R298/F39

EV1/M/S 4:
Piers J. Sellers (Flt 2 (STS-112))

P709/R285/V182/M249

M/S 5 UP, stay as ISS EXP 14 FE:
Thomas Reiter
P710/R299/M260
(ESA - Germany)

SS EVA 92
DOCKED QUEST EVA 18
EMU/TETHERED EVA 85
SCHEDULED EVA 86
DURATION 7:31

SS EVA 93
DOCKED QUEST EVA 19
EMU/TETHERED EVA 86
SCHEDULED EVA 87
DURATION 6:47

SS EVA 94
DOCKED QUEST EVA 20
EMU/TETHERED EVA 87
UNSCHEDULED EVA 7
DURATION 7:11

KSC 39B
185:18:37:55 Z
2:37:55 PM EDT (P)
2:37:55 PM EDT (A)
Tuesday 15 7/4/06 (9)

LAUNCH WINDOW:
3M43S (In-plane time with ISS)

EOM PLS: KSC
TAL: MRN
TAL WX: ZZA, FMI

SELECTED:
RTLS: KSC 33/N/N
TAL: MRN 20/CI/N
AOA : KSC 15/N/N
PLS : EDW 22/N/N

TDEL:
0.09 .172

MAX Q NAV:
684 660

SRB STG:
2:03 2.02

PERF:
NOMINAL

2 ENG TAL:
2:49 2:52

NEG RETURN:
3:58 4.02

PTA (U/S 160):
5:48 5:42

SE TAL (FMI 104):
606 6:17

PTM (U/S 160):
6:34 6:45

SE PRESS 104:
7:04 7:12

MECO CMD:
8:29.8 8:30.1

KSC 15 (KSC 62)
198:13:14:42 Z
9:14:42 AM EDT
Monday 21 7/17/06 (11)

DEORBIT BURN:
198:12:06.55 Z

XRANGE: 258 NM

ORBIT DIR: AL 34

AIM PT:
NOMINAL

MLGTD: 3273 FT
198:13:14:42 Z
VEL: 198 KGS 199 KEAS
HDOT: -1.8 FPS

TD NORM 205:
2662 FT

DRAG CHUTE DEPLOY:
189 KEAS
198:13:14:45 Z

NLGTD: 6646 FT
198:13:14:53Z
VEL: 149 KGS 145 KEAS
HDOT: -5.8 FPS

BRK INIT: 100 KGS

DRAG CHUTE JETTISON:
54 KGS
198:13:15:18 Z

BRK DECEL FPS^2:
AVE 5.6 PK 6.7

WHEELSTOP:
198:13:15:56 Z
12238 FT

ROLLOUT:
8965 FT
74 SEC

104/104/109 %

PREDICTED:
100/104.5/ 104.5/67 104.5

ACTUAL:
100/104.5/ 104.5/67 104.5

1 = 2045 (8)
2 = 2051 (5)
3 = 2056 (4)

All Block II Engines

M 3 EOM:

WEIGHT:
226063 LBS

X CG:
1084.58

LANDING:

WEIGHT:
225972 LBS

X CG:
1086.32

BI-126

RSRM 93

ET-119

SLWT 23

ET IMPACT

MET 1:14:32

LAT:
35.845 S

LONG:
157.76 W

51.6 (18)

DIRECT INSERTION

POST OMS-2:
123.6 NM BY
85.0 NM

DEORBIT:
HA 190.7 NM
HP 176.7 NM

ENTRY VELOCITY:
25862 FPS

ENTRY RANGE:
4494 NM

OI-30 (2)

CARGO:
37736 LBS

PAYLOAD CHARGEABLE:
29280 LBS

DEPLOYED:
23696 LBS

NON-DEPLOYED:
5426 LBS

MIDDECK:
158 LBS

SHUTTLE ACCUMULATED WEIGHTS:

DEPLOYED:
1239831 LBS

NON-DEPLOYED:
1568532 LBS

CARGO TOTAL:
3623596 LBS

PERFORMANCE MARGINS (LBS):
FPR: 3519
FUEL BIAS: 825
FINAL TDDP:
RECON:

PAYLOADS:
PLB:
ISS ULF1.1
ICC
MPLM
LMC
RMS, ODS, OBSS

MIDDECK:
ISS ULF1.1, RAMBO, MAUI

5 CRYO TK SETS
6 GN2 TANKS
RMS 72

KSC W/D: OPF 264, VAB 7, PAD 41 = 312 days total.

LAUNCH POSTPONEMENTS:
- Baselined OV-103 launch date of 11/15/04 on 10/26/03
- Postponed launch date to NET 5/5/05 on 3/26/04. Slip due to Columbia accident
- Postponed launch date to NET 7/10/05 on 10/29/04. Slip due to Columbia accident
- Postponed launch date to NET 7/12/05 on 2/17/05 to provide on acceptable launch lighting conditions
- Postponed launch date to NET 9/9/05 on 5/23/05 to reflect latest planning decisions
- Postponed launch date to **TBD** on 11/15/05
- Postponed launch date to 5/10/06 on 3/16/06
- Postponed launch date to 7/1/06

LAUNCH SCRUBS:
- Scrubbed Saturday 7/1/2006 launch attempt at 182:19:46Z (at L- 0h2m41s) while holding count at L-9 min. The window opened at 182:19:43:41 and closed at 19:53:41Z. The Preferred Launch Time was 183:19:26:11Z. Last forecast for KSC RTLS was forecast and observed NO-GO for thunderstorm attached anvils within 20 NM. KSC AOA1 and NOR AOA2 were forecast and observed NO-GO for thunderstorms within 20 NM. KSC PLS3 was forecast GO but observed crosswind of 19 knots. Primary TAL Moron and alternates Zaragoza and Istres (France) were forecast and observed GO. Weather scrub for KSC RTLS, AOA1 and PLS3.
- Scrubbed Sunday 7/2/2006 launch attempt at 183: 17:14Z (at L-2h12m). The window opened at 183:19:21:09Z and closed at 183:19:31:09Z. The preferred launch time was 183:19:26:09Z. At the time of the scrub, there remained 7m41s to window closure. KSC RTLS was forecast NO-GO thunderstorm anvils within 20 NM and chance of broken 3000 ft and observed thunderstorms within 20 NM. KSC AOA1 was forecast NO-GO for thunderstorm anvils within 30 NM and chance of broken 3000 ft and observed thunderstorms. NOR AOA2 was forecast NO-GO for chance of thunderstorms within 30 NM and observed GO Primary TAL site Moron and alternate Istres (FMI) were forecast and observed GO. Zaragoza was forecast slight chance of thunderstorms within 20 NM but observed GO. All three TAL sites were observed GO. Weather Scrub - KSC RTLS, AOA. Management made the decision to go for a 48-hour turnaround so the fuel cell cryos could be topped off for a possible 1-day extension, power permitting. KSC RTLS/AOA/Launch weather scrub.

LAUNCH WINDOW:
- The July 4th launch window opened at 185:18:32:55Z and closed at 185:18:42:56Z giving a total window of 10 minutes plus 1 second. The Preferred Launch Time (In-Plane Time) was 185:18:37:55Z.
- Performance close time was 185:18:41:38Z,

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-121/ ULF1.1 Continued...		Continued... MCC WHITE FCR (45) FLIGHT DIRECTORS: A/E - Steve Stich LD/O 1 - Anthony Ceccacci O 2 - Norman Knight PLNG - Paul Dye MOD - Phil Engelauf ISS: LD/O 2 - R.E. LaBrode O 1 - A.P. Hasbrook O 3/PLNG - P. F. Dye ADO EVA's	Continued... VI: 25819 25821 HaHp: 123.6 x 31.1 OMS-2: 38:00 38:00 98.1 FPS 98.6 FPS	Continued... WINDS: 21008 P10 AVE: 5H, 7R PEAK: 6H, 8R DENS ALT: 1691 FT FLT DURATION: 12:18:36:47 OV-103: 263:14:49:45 S/T: 1058:04:03:42 DISTANCE: sm					Continued... RMS USED FOR OBSS/LDRI ACTIVITIES	Continued... LAUNCH DELAYS: - None. Launch occurred on time at 185:18:37:55Z (2:37:55 PM EDT) on Tuesday, July 4, 2006. SLF crosswinds were forecast at 16 knots but STA evaluation raised RTLS crosswind limit to 17 knots. All three TAL sites were forecast GO but Zaragoza was observed NO-GO for showers within 25 NM. TAL WEATHER: - MRN (Primary TAL), Istres, and Zaragoza were all three forecast GO. Zaragoza was observed NO-GO for showers within 25 nm. PERFORMANCE ENHANCEMENTS: - Standard Set plus (1) PE Low Q SUM/JUL, (2) OMS Assist, (3) 52 NM MECO, (4) Del Psi FLIGHT DURATION CHANGES/LANDING: - Total flight extension is 1 day. - On FD4 , MMT made decision to extend flight 1 day (from 12+1+2 to 13+2) to permit additional EVA to accomplish RCC/tile repair materials DTO's. The plan was to land at one of the two EOM opportunities at KSC: (1) Deorbit 202 with landing on orbit 2023 (2) Deorbit 203 with landing on orbit 204. EDW was not called up. If unable to land at KSC on EOM, EDW would be called up for a "pickem?" KSC or EDW. TD 6-hr weather forecast for Deorbit 202 chance of showers within 30 nm. The weather forecast update at 1155Z removed showers within 30 nm and detached anvils were removed from the forecast changing the forecast to GO for deorbit. (Deorbit 203 forecast showers within 30 nm) - Deorbit burn was at 198:12:06:55Z with KSC runway 33 as the preferred runway. At EI-15, an unexpected rain shower moved toward the SLF that was expected close to HAC for runway 33 by touchdown. Re-designated from runway 33 to runway 15 at M15 (185,000 feet) to avoid the weather buildup south of the SLF. MLG touchdown was at 198:13:14:42Z (9:14:42 AM EDT) on Monday July 17, 2006 for a flight duration of 12:18:36:47. NLG touchdown was at 198:13:14:53Z. There were no further flight duration changes. Total 1 day extension for operations. RENDEZVOUS # 63: Rendezvous and dock with ISS FIRSTS/LASTS/NEW: - First flight of an ET without the Protuberance Air Load ramps as a safety improvement to reduce potential for debris. - First test of 50-ft robotic arm boom extension as a work platform. - First flight with hardened tiles on NLG doors. - First use of SRMS/OBSS/Laser Dynamic Range Imager (LDRI) to scan Orbiter WLE and Nose Cap (RCC). - DTO 848 RCC crack repair tasks using caulk guns to dispense the NOAX (non-oxide adhesive experimental) material. - First flight of Orbiter MLG with four new larger, smoother tires that can withstand higher loads at landing.

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-121/ ULF1.1 Continued...										Continued... RMS USED FOR OBSS/LDRI ACTIVITIES	Continued... EVENTS: - ET Separation at 185:18:46:46Z, 000:00:08:51 MET. - OMS-2 ignition at 185:19:15:55Z, 98.7 fps, resultant orbit 124.4 by 85.1 nm. - TI ignition 187:12:04:46Z, 16.8 seconds, resulting orbit 190.1 by 177.9 nm. - SRMS/OBSS/Laser Dynamic Range Imager (LDRI) scanned both WLE and nose cap, no anomalous conditions identified. - ISS captured at 187:14:51:45Z (1:20:13:49 MET). - Hard dock at 187:15:10:28Z (1:20:32:33 MET). - ISS Hatch Open at 187:16:29Z (1:21:51 MET). Welcomed by Expedition 13 two-person crew (Vinogradov and Williams). - IELK Seat Liner transfer at 187:19:13Z (002:00:35:05 MET which is Reiter's Shuttle time). This is the official transfer of Thomas Reiter from Space Shuttle STS-121 crew to ISS Expedition 13 crew. ISS crew increased to three persons for first time since May 2003. - Leonardo MPLM grappled and installed on Unity Module. - EVA 1 Start at approximately 3/18:38 MET (189:13:15:55Z) July 8. Duration 7h 31m. Blade blocker inserted into Zenith IUA of MS, OBSS/SRMS Characterization. Rerouted TUS cable. EVA from ISS Quest A/L. - EVA 2 Start at approximately 5/17:36 met (191:12:13:55Z) July 10. Duration 6h 47m. Nadir IUA R&R, Pump Module (w/FGB) transferred from ICC to ESP-2, R&R TUS. Piers' SAFER became detached, Mike re-locked it. - EVA 3 start 193:11:20:30Z (7:16:42:35 MET), July 12. Duration 7h 11m. Completed 5 samples of NOAX DTO & IR imaging. Grapple Bar transferred to ISS. - STS-121 crew farewell to ISS crew (Commander Pavel Vinogradov, Flight Engineers Jeffrey Williams & Thomas Reiter). - APAS Hatch Close at 10/13:36 MET, ODS Hatch close 10/13:38 MET (196:08:15:55Z). - STS-121 Undock from ISS at 10/15:29 MET, 196:10:06:55Z. - Total consumables transferred from Orbiter to ISS: Water 1545.8 lbm (1454.9 lbm in 15 CWC's and 90.9 lbm in 4 PWR's); N2 74.2 lbm transferred to Joint Air Lock tanks. No oxygen transferred between tanks. - Cargo transferred from Orbiter to ISS total 10903.35 lbs (7423.99 from MPLM, 1862.93 from Middeck, 1616.43 from ICC). - Cargo transferred from ISS to Orbiter total 6450.92 lbs (4389.14 plus unplanned 241.52 lbs to MPLM and 1820.26 lbs to Middeck). - No communications blackout during entry. SIGNIFICANT ANOMALIES: - L5L thruster heater fail off (first launch attempt) - ET LH2 5% fill-point sensor failed wet when commanded to dry state (during loading attempts) - FES Full up PRI B Shutdown - Protruding Gap Fillers - Personal hygiene hose leak - TPS Blanket Damage - 85-ft safety tether #24 retraction issue - Scratch reported on crewlock external hatch sealing surface - SAFER 5000 (EV1) unlatched during EVA. Relocked by EV2 - APU 1 Fuel Tank Leak - APU 3 GG/FU Pump Heaters cycling in overtemp range

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-115/ ISS 12A

SEQ
FLT# 116

KSC 116

PAD 39B-52

MLP-2

19TH SHUTTLE FLIGHT TO ISS

OV-104 (Flight 27) Atlantis

OMS PODS: LPO4-RPO FRC4-27

CDR:
Brent W. Jett
(Flt 4 - STS-72, STS-81, STS-97)

P711/R206/V132/M179

PLT:
Christopher J. Ferguson
P712/R300/M261

MS1/EV1:
Joseph R. Tanner
(Flt 4 - STS-66, STS-82, STS-97)

P713/R185/V136/M162

MS2/EV2:
Daniel C. Burbank
(Flt 2 - STS-106)

P714/R258/V184/M225

MS3/EV3:
Heidimarie M. Stefanyshyn-Piper
P715/R301/F40

MS4/EV4:
Steven G. MacLean
(Flt 2 - STS-52)

P716/R156/V185/M138
(CSA-Canada)

SS EVA 95
DOCKED QUEST EVA 21
EMU/TETHERED EVA 88
SCHEDULED EVA 88
DURATION 6:26

SS EVA 96
DOCKED QUEST EVA 22
EMU/TETHERED EVA 89
SCHEDULED EVA 89
DURATION 7:11

SS EVA 97
DOCKED QUEST EVA 23
EMU/TETHERED EVA 90
SCHEDULED EVA 90
DURATION 6:42

Continued…

KSC 39B
252:15:14:55 Z
11:14:55 AM EDT (P)
11:14:55 AM EDT (A)
Saturday 11
9/9/06 (11)

LAUNCH WINDOW:
4M41S (PLT in-plane)

EOM PLS: KSC
TAL: MRN
TAL WX: ZZA, FMI

SELECTED:
RTLS: KSC 33/N/N
TAL: MRN 20/N/N
AOA : KSC 33/N/N
PLS : EDW 22/N/N

TDEL:
0.10 .062

MAX Q NAV:

SRB STG:
2:05 2.08

PERF:
NOMINAL

2 ENG TAL (MRN):
2:42 2:47

NEG RETURN:
3:52 4.00

PTA (U/S 155):
5:16 5:26

SE TAL (FMI 104):
6:09

PTM (U/S 575):
6:19 6:24

SE PRESS 104:
7:00 7:00

MECO CMD:
8:23.7 8:24.8

KSC 33 (KSC 63)
264:10:21:23 Z
6:21:23 AM EDT
Thursday 10
9/21/06 (11)

DEORBIT BURN:
264:09:14.23 Z

XRANGE: 225 NM

ORBIT DIR: AL 35

AIM PT:
NOMINAL

MLGTD: 3131 FT
264:10:21:23 Z
VEL: 191 KGS
189 KEAS
HDOT: -1.5 FPS

TD NORM 195:
2639 FT

DRAG CHUTE DEPLOY:
181 KEAS
264:10:21:26 Z

NLGTD: 5775 FT
264:13:21:32Z
VEL: 158 KGS
156 KEAS
HDOT: -6.4 FPS

BRK INIT: 107 KGS

DRAG CHUTE JETTISON:
63 KGS
264:10:21:53 Z

BRK DECEL FPS^2:
AVE 5.8 PK 8.5

WHEELSTOP:
264:10:22:15 Z
10670 FT

ROLLOUT:
7539 FT
52 SEC

104/104/109 %

PREDICTED:
100/104.5/104.5/72
104.5

ACTUAL:
100/104.5/104.5/72
104.5

1 = 2044 (9)
2 = 2048 (6)
3 = 2047 (9)

All 3 Block II Engines

M 3 EOM:

WEIGHT:
199711 LBS

X CG:
1084.99

LANDING:

WEIGHT:
199642 LBS

X CG:
1086.98

BI-127

RSRM 94

ET-118

SLWT 24

ET IMPACT

MET 1:13:36

LAT:
37.58S

LONG:
160.16 W

51.6
0
(19)

DIRECT INSERTION

POST OMS-2:
154.0 NM X 123.8 NM

DEORBIT:
HA 190 NM
HP 179 NM

ENTRY VELOCITY:
25867 FPS

ENTRY RANGE:
4378 NM

OI-30
(3)

CARGO:
41848 LBS

PAYLOAD CHARGEABLE:
35758 LBS

DEPLOYED:
36682 LBS

NON-DEPLOYED:
0 LBS

MIDDECK:
206 LBS

SHUTTLE ACCUMULATED WEIGHTS:

DEPLOYED:
1276513 LBS

NON-DEPLOYED:
1568738 LBS

CARGO TOTAL:
3665444 LBS

PERFORMANCE MARGINS (LBS):
FPR: 2886
FUEL BIAS: 921
FINAL TDDP: RECON:

PAYLOADS:
PLB:
ISS 12A (P3/P4) Segment

MIDDECK:
RAMBO, MAUI, RMS, ODS, OBSS

5 CRYO TK SETS
5 N2 TANKS
RMS 73

KSC W/D: OPF 264, VAB 7. PAD 41 = 312 days total.

LAUNCH POSTPONEMENTS:
- Baselined OV-104 launch date of 4/10/03 on 3/7/02
- Postponed launch date to 5/23/03 on 10/8/02; delays due to engine crack repairs
- Postponed launch date to NET 8/21/03 on 3/13/03
- Postponed launch date to NET 10/30/03 on 4/17/03
- Postponed launch date to NET 1/22/04 on 5/28/03
- Postponed launch date to NET 7/24/04 on 7/29/03
- Postponed launch date to NET 2/10/05 on 10/3/03
- Postponed launch date to NET 8/28/05 on 3/22/04
- Postponed launch date to NET 12/8/05 on 10/29/04
- Postponed launch date to NET 2/16/06 on 5/23/04
- Postponed launch date to NET 7/1/06 on 10/31/05
Changed launch date to **TBD** on 11/15/05
Changed launch date to NET 8/28/06 on 3/16/06
Advanced launch to 8/27/06 on 8/3/06 (actual launch date was 9/9/06)

LAUNCH SCRUBS:
- Scrubbed Sunday, 8/27/06 launch scheduled for 4:30 PM EDT at approximately L-26 hours to allow all Shuttle elements time to evaluate the lightning strike on Pad 39B on 8/26. Technical scrub. Launch rescheduled to NET 8/28/06 at 4:04 PM EDT. The Saturday, 10:00 PM EDT MMT decision was to spend another day analyzing the probability of damage to the SRB pics. The launch countdown was to continue for a NET Tuesday 8/29 launch.
- Scrubbed Tuesday, 8/29/06 launch at approximately L-37 hours based on a KSC forecast of 50 knots, gusts to 65 with a potential of reaching the Pad maximum of 70 knots due to Tropical Storm Ernesto. Decision made at 3:45 AM EDT on 8/29/06 morning to roll back to the VAB with option to stop and reverse the rollback if the forecast improved. Rollback to VAB started at 10:04 AM EDT. The 11 AM forecast was in fact improved. KSC would sustain winds of less than 45 knots with gusts to 60 knots that is within the pad limit of 70 knots mph. The STS-115 stack was midway between Pad B and the VAB at 2:45 PM EDT when the decision was made to stop the Rollback and return the stack to Pad B. The launch date is under assessment. Weather Scrub. Rescheduled launch to 11:29 AM EDT on 9/6/06.
- Scrubbed Wednesday, 9/6/06 launch at approximately L-8.5 hours due to a fuel cell 1 coolant pump phase A short. (Pump operated on two phases.) 24-hour scrub turnaround with MMT at 1 PM 9/6 to decide launch date. The MMT decision was to press for a launch attempt on Friday, 9/8. Plan was to keep Phase A cb open during ascent. Technical scrub.
- Scrubbed Friday, 9/8/06 launch attempt at

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-115/ ISS 12A

Continued...

Continued...

MCC WHITE FCR (46)

FLIGHT DIRECTORS:
SHUTTLE:
A/E - Steve Stich
LD/O 1 - Paul Dye
O 2 - Cathy Koerner
O 3/PLNG - Bryan Lunney
MOD -
ISS:
LD/O 2 - John McCullough
O 1 - Kelly Beck
O 3/PLNG - Kwatsi Alibaruho

Continued...

VI:
25819 25818

OMS-2:
37:21 37:20.7
FPS FPS

Continued...

WINDS: 2H, 3R

OFFICIAL: 2H, 3R
0303P04

DENS ALT:
696 FT

FLT DURATION:
11:19:06:28

S/T:
1069:23:10:20

OV-104:
231:16:32:28

S/T:
1058:04:03:42

DISTANCE:
sm

Continued...

RMS USED FOR OBSS/LDRI SURVEYS AND UNBERTH P3/P4

Continued...

LAUNCH WINDOW:
- The 9/9/06 launch window opened at 252:15:10:39Z and closed at 252:15:19:36Z for a total launch window of 9 minutes 0 seconds. The Preferred Launch Time (In-Plane time) was 252:15:14:55Z giving a launch window of 4m41s.

LAUNCH DELAYS:
- None. Launch occurred on time at 252:15:14:55Z (11:14:55 AM EDT) on Saturday, September 9, 2006.

TAL WEATHER:
- Zaragoza and Moron were forecast NO-GO for thunderstorms within 20. FMI was forecast with a 1-knot tailwind violation (average tailwind forecast to be 11 knots and peak tailwind forecast to be 16 knots). Zaragoza was observed NO-GO for thunderstorms and attached anvil. MRN and FMI were both observed GO at TAL landing time. Moron was selected as Prime TAL site.

PERFORMANCE ENHANCEMENTS:
- Standard set plus (1) PE Operational High Q SUM/AUG, (2) OMS Assist, (3) 52 NM MECO, (4) Del Psi, (5) Non-standard consumables reduction.

FLIGHT DURATION CHANGES/LANDING:
- EOM landing was planned for 263:13:04Z on 9/20/06 at KSC. However, during INCO survey of the orbiter after FCS checkout, an unidentified piece of debris was observed in Camera A. Tuesday 9/19/06 MMT decided to investigate the significance of the debris. The MMT extended the flight 1 day to allow time to perform RMS and OBSS surveys. The RMS and OBSS surveys of the PLB, both WLE and flight control surfaces using the RMS elbow camera, did not identify the debris. Atlantis was cleared for landing on EOM +1 day. Deorbit burn occurred at 264:09:14:23Z (11/17:59:28 MET) Orbit 185. Main Landing Gear touchdown on KSC Runway 33 was at 264:10:21:23Z (6:21:23 AM EDT) on Thursday, 9/20/06 for a flight duration of 11/19:06:28. Nose Landing Gear touchdown was at 264:10:21:32Z. Landing winds were forecast 03003P05 and observed 0303P04 (2H, 3R). Total flight duration extensions of 1 day (technical extension).

RENDEZVOUS # 64: Rendezvous and dock with ISS

SPACE SHUTTLE NIGHT LANDING: 21 (landed on runway KSC 33)

FIRSTS/LASTS/NEW:
- Used Airlock Campout Prebreathe Protocol for the first time. Crew spent sleep period isolated in the JAL (Quest Airlock) at reduced pressure of 10.2 psia.

Continued...

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-115/ ISS 12A Continued...										

Continued...

EVENTS:
- Max Q at 252:15:15:45Z (00m50s)
- OMS Assist ignition was 252:15:17:08Z with burn duration of 2m52s
- OMS-2 ignition was at 252:15:52:16Z (37:21 MET), burn duration 2m25s
- TI at 254:08:08:08Z
- SRMS/OBSS/LDRI survey of nosecap, port, and starboard wing RCC on FD2
- ISS Docking capture at 254:10:48:27Z, 1:19:33:32 MET
- Docking complete at 254:11:01:01Z, 1:19:46:06 MET
- ISS Hatch Open at 1d21h19m; ISS crew welcoming
- EVA 1 Crew began campout in ISS Airlock at 10.2 psia in prep for EVA 1.
- EVA 1 Start at 255:09:19Z (3/18:01 MET) on 9/12/06, conducted from the ISS JAL (Quest Airlock). The astronauts used a new prebreathe protocol first tested during the handover of Expedition 12. EV1/Joe Tanner and EV2/Heidimarie Piper spent the night isolated in the JAL (Quest Airlock) with a reduced pressure of 10.2 psi while the ISS remains at 14.7 psi. This prebreathe protocol is called Prebreathe Campout Protocol (PBCOP). The Integrated Truss Segment (ITS) P3/P4 was attached to the Port 1 (P1) segment using the SSRMS. EVA crew connected power cables, released SABB and BGA restraints to prepare SARJ for operations. During removal of launch lock cover, a bolt/spring and a washer were accidentally released and lost. The EVA duration was 6:26.
- EVA 2 Start at 256:09:18Z (4/17.51 MET) on 9/13/06,. EV3/Dan Burbank and EV4/Steven MacLean slept in the JAL for Spacewalk Prebreathe Campout Protocol. They completed preparations for the activation of SARJ for operations. EVA 2 duration was 7:11.
- EVA 3 Start at _____. EV1/Tanner and EV2/Piper used PBCOP protocol. They completed P3 and P4 tasks, R&R SASA on Z1 truss, and installed heat shield on Ku-band antenna group interface tube. The EVA duration was 6:42.
- Hatch closed at 7/19:27 MET after saying goodbyes to Expedition 13 crew.
- Atlantis undocking completed at 260:12:49:50Z, 7/19:27 MET
- Total cargo transferred from Atlantis to the ISS was 36678 lbs (included 35552 lbs for P4/P5, but excluding water)
- Total cargo transferred from ISS to Atlantis was 993 lbs
- Total consumables transferred from Atlantis to ISS was 1110.5 lbm of water (11 CWC's with 1043.8 lbm and four PWR's with 66.1 lbm). Total oxygen transferred to ISS was 103 lbm.

Continued...

SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7) / TITLE, NAMES & EVA'S	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT INC	ORBIT HA/HP	FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
STS-115/ ISS 12A Continued...											Continued... SIGNIFICANT ANOMALIES: - Fuel Cell 1 Coolant Pump AC1 Phase A short caused launch scrub. (See Launch Scrubs.) - ARD response to erroneous telemetry (ARD NO-GO) - Elevon Positioning Procedure callout errors - ASA 3 Speedbrake driver channel # erratic - Starboard PLBD aft (B) closed indication ON should be OFF - F4D Tyvek cover late release - TPS tile and blanket anomalies (cleared for Entry) - FES shutdown during Ascent - Water supply dump line heater A abnormal temperature cycling - Hydraulic System 3 TVC Pitch Actuator indication - Water supply dump valve leak - Sequential Stills Video failure - APU 2 X-axis accelerometer data erratic - S-band lower right antenna communication problems - FES topping left duct sensor erratic/OSL - MADS BITE indication on FDM 2 MUX D - Nosecap expansion seal RCC damage - Engine 2 LO2 inlet pressure transducer reading low - R4R heater failed on - Aft sample bottles L1 and R2 leaking - Starboard radiator MMOD strike

SPACE SHUTTLE MISSIONS SUMMARY

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

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) DISCOVERY OMS PODS: LPO1-36 RPO3-34 FRC3-33	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 FPS188.5 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^2: AVE 5.3 PK 6.1 WHEELSTOP: 356:22:32:51Z 9980 FT ROLLOUT: 8155 FT 53 SEC Continued…	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 SSME'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 RSRM 95 ET-123 SLWT 25 ET IMPACT MET 1:14:00 LAT: 36.83S LONG: 159.1W	51.60 (20)	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 ACCUMULATED 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 Continued…	***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. 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..

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-116/ ISS 12A.1
Continued ...

Continued...

MCC WHITE FCR (47)

FLIGHT DIRECTORS:
SHUTTLE:
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

CAPCOMS:
SHUTTLE:
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. Getzelman
Team 4 PLNG – N/A

Continued...

WINDS: 14H/2R Kts
OFFICIAL: 159/14 14/2R Kts

DENS ALT: 1229 FT

FLT DURATION: 12:20:44:23

S/T: 1082:19:54:33

OV-103: 276:11:34:05

DISTANCE: 5,330,398 sm

TOTAL SHUTTLE DISTANCE: 438,715,036 sm


S116E05983

S116-e-05983 - Curbeam (left) and Fuglesang conduct EVA1 tasks for installation of P5 Truss. New Zealand and

Continued...

5 CRYO TK SETS
6 N2 TANKS
RMS 74

RMS USED FOR RMS/OBSS SURVEYS AND GRAPPLE/ UNBERTH P5, HANDOFF TO SSRMS

Continued...

LAUNCH WINDOW:
- 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.

LAUNCH DELAYS:
- None. Launch occurred on time at 344:01:47:35Z, 8:47:35 PM EST on Saturday, 12/09/06.

TAL WEATHER:
- 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.

PERFORMANCE ENHANCEMENTS:
- Include the standard set plus: (1) PE Operational High Q WIN/DEC, (2) OMS Assist, (3) 52 nm MECO, and (4) Del Psi

FLIGHT DURATION CHANGES/LANDING:
- 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.

NIGHT LAUNCH #29:

RENDEZVOUS #65: Rendezvous and dock with ISS

FIRSTS/LASTS/NEW:
- 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

Continued...

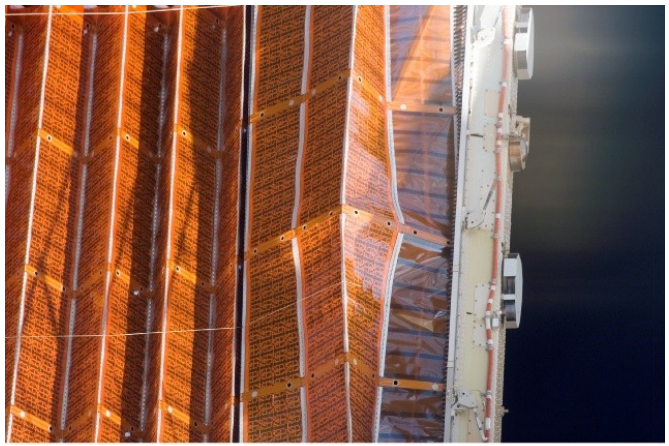
SPACE SHUTTLE MISSIONS SUMMARY

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

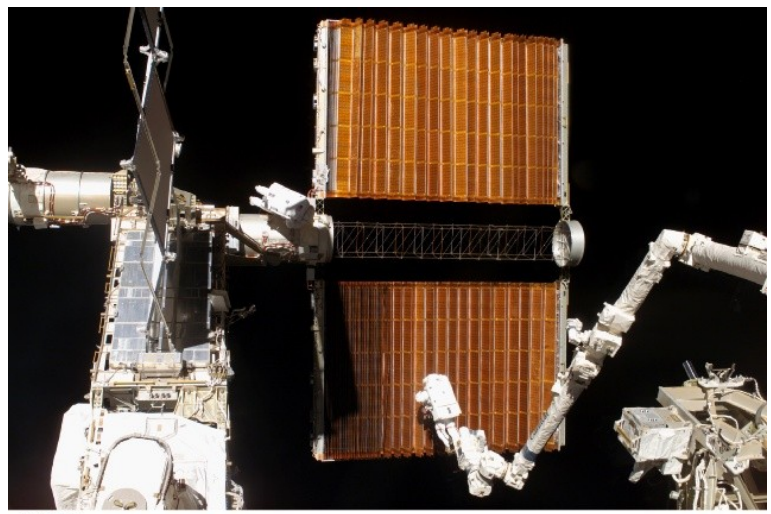
SPACE SHUTTLE MISSIONS SUMMARY

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 nosecap, 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

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

STS-116/ ISS 12A.1

Continued...

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

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-117/ ISS 13A

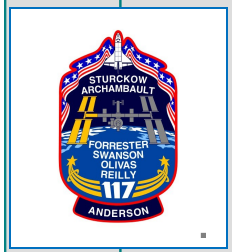
SEQ
FLT# 118

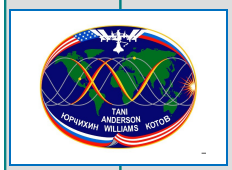
KSC-118

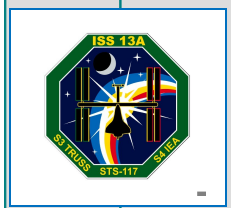
PAD 39A-41

MLP-2

21ST SHUTTLE FLIGHT TO ISS







OV-104 (Flight 28) ATLANTIS

OMS PODS:
LPO4-28
RPO1-35
FRC4-28

CDR:
Frederick W. Sturckow
(Flt 3 - STS-88, STS-105)

P725/R247/V173/M215

PLT/R2/M1:
Lee J. Archambault
P726/R307/M265

MS 1/EV 3/R1:
Patrick G. Forrester
(Flt 2 - STS-105)

P727/R269/V186/M235

MS 2/EV4/M2:
Steven R. Swanson
P728/R308/M266

MS 3/EV2/R1:
John D. Olivas
P729/R309/M267

MS 4/EV1:
James F. Reilly II
(Flt 3 - STS-89, STS-104)

P730/R234/V172/M204

MS 5 UP/EXP 15/16 FLT ENG:
Clayton C. Anderson
P731/R310/M268

MS 5 DN/EXP 14/15 FLT ENG:
UP ON STS-116, STAY ISS
Sunita L. Williams
P732/R306/F42

SS EVA 102
DOCKED QUEST EVA 25
EMU/TETHERED EVA 95
SCHEDULED EVA 95 DURATION 6:16

SS EVA 103
DOCKED QUEST EVA 26
EMU/TETHERED EVA 96
SCHEDULED EVA 96 DURATION 7:16

SS EVA 104
DOCKED QUEST EVA 27
EMU/TETHERED EVA 97
UNSCHEDULED EVA 8
DURATION 7:58

KSC 39A
159:23:38:04Z
7:38:04 PM EDT (P)
7:38:04 PM EDT (A)
Friday (25)
6/8/07 (11)

LAUNCH WINDOW:
3M 18S (PLT IN-PLANE)

EOM PLS: KSC
TAL: FMI
TAL WX: ZZA (MRN: N/A RWY REPAIRS)

SELECTED:
RTLS: KSC 15 CI/N
TAL: FMI 33 N/SFD
AOA: KSC 15 N/N
1ST DAY PLS: EDW 22 N/N

TDEL:
0:000(P) 0.112(A)

MAX Q NAV:
720.08(P) 719.70(A)

SRB STG:
2:03 (P)2:03 (A)

PERF:
NOMINAL

2 ENG TAL (ZZA):
2:48 (P)2:54 (A)

NEG RETURN:
3:47 3:55

PTA (U/S 162):
5:19 5:20

SE TAL (ZZA 104):
6:04 6:08

PTM (U/S 180):
6:19 6:23

SE PRESS 104
7:02 7:03

MECO CMD:
8:24.9 8:24.9

Continued…

EDW 22, CONC
EDW 51, CONC 32
173:19:49:37Z
12:49:37 PM PDT
Friday (14)
06/22/07 (7)

DEORBIT BURN:
173:18:43:47Z

XRANGE: 772 NM

ORBIT DIR: AL 36

AIM PT:
NOMINAL

MLGTD: 1443 FT
173:19:49:37Z
VEL: 219 KGS
205 KEAS
HDOT: -4.0 FPS

TD NORM 195:
2380 FT

DRAG CHUTE DEPLOY:
196 KEAS
173:19:49:40Z

NLGTD: 5379 FT
173:19:49:49Z
VEL: 158 KGS
140 KEAS
HDOT: -6.2 FPS

BRK INIT: 88 KGS

DRAG CHUTE JETTISON:
55 KGS
173:19:50:18Z

BRK DECEL FPS^2:
AVE 4.0 PK 6.0

WHEELS STOP:
173:19:50:51Z
11422 FT

ROLLOUT:
9979 FT
1:04 M:S

Continued…

104/104/109 %

PREDICTED:
100/104.5/104.5/72
104.5

ACTUAL:
100/104.5/104.5/72
104.5

1 = 2059 (1)
2 = 2052 (5)
3 = 2057 (2)

M 3 EOM:

WEIGHT:
199418 LBS

X CG:
1084.62 IN

LANDING:

WEIGHT:
199305 LBS

X CG:
1086.76 IN

BI-129

RSRM 96

ET-124

SLWT 26

ET IMPACT

MET 1:14:15

LAT:
36.38S

LONG:
158.48 W

51.6 (21)

DIRECT INSERTION

POST OMS-2:
123.7x84.7 NM

DEORBIT:
HA 192.8 NM
HP 178.8 NM

ENTRY VELOCITY:
25868 FPS

ENTRY RANGE:
4226 NM

OI-30 (5)

CARGO:
42641 LBS

PAYLOAD CHARGEABLE:
36593 LBS

DEPLOYED:
36393 LBS

NON-DEPLOYED:
0 LBS

MIDDECK:
200 LBS

SHUTTLE ACCUMULATED WEIGHTS:
DEPLOYED:
1317624 LBS

NON-DEPLOYED:
1585692 LBS

CARGO TOTAL:
3743775 LBS

PERFORMANCE MARGINS (LBS):
FPR: 2651
FUEL BIAS: 1063
FINAL TDDP: 1306
RECON: 1431

PAYLOADS:
PLB:
ISS 13A
MIDDECK:
ISS 13A
RAMBO
MAUAI

5 CRYO TK SETS
5 GN2 TANKS

RMS 75
ODS, OBSS
RMS USED FOR RMS/OBSS SURVEYS AND GRAPPLE/ UNBERTH S3/S4, HANDOFF TO SSRMS

BRIEF MISSION SUMMARY: STS-117/13A (21st ISS mission) continued the construction of the International Space Station with the delivery and installation of the second starboard truss segment (S3/S4), the deployment of the third set of solar arrays, and the retraction of the P6 starboard solar array wing, and one radiator. The truss also contained a Solar Alpha Rotary Joint (SARJ) which rotates 360 degrees for S4 & S6 solar arrays tracking of the sun. In addition, performed unscheduled EVA repair to Port OMS Pod thermal blanket for damage incurred during ascent.

KSC W/D: OPF 125, VAB 8, PAD 17, Rollback to VAB, then VAB 72, PAD 25 = 247 Total Work Days

LAUNCH POSTPONEMENTS:
- Baselined OV-104 launch date of 09/05/2003 on 07/18/2002.
- Postponed to 10/02/03 on 10/08/02 due to SSME flowliner crack repairs.
- Postponed to NET 01/22/04 on 03/13/03 due to Columbia accident.
- Postponed to NET 03/30/04 on 04/17/03 due to Columbia accident.
- Postponed to NET 07/29/04 on 05/28/03 due to Columbia accident.
- Postponed to NET 12/15/04 on 07/29/03 due to Columbia accident.
- Deleted flight from FDRD on 10/03/03.
- Re-baselined STS-117 to NET 05/18/06 on 03/17/05.
- Postponed to NET 07/13/06 on 05/28/05. Slip reflected latest manifest constraints.
- Postponed to NET 12/07/06 on 11/10/05. Slip reflected latest manifest constraints.
- Postponed to NET 02/22/07 on 04/04/06. Slip reflected latest manifest constraints.
- Postponed to NET 03/16/07 on 11/02/06. Slip due to ET delivery/processing schedule.
- Launch date "under review" due to ET hail damage during 02/26/07 storm at the PAD. (ET sustained over 4,000 dings.)
- Postponed to 06/08/07 on 04/16/07 due to rollback for ET repairs.

LAUNCH SCRUBS: None

LAUNCH WINDOW:
- Total launch window was 6 minutes 29 seconds with window open at 159:23:34:53Z and close at 159:23:41:22Z. Preferred Launch Time was 159:23:38:04Z (In-Plane Time) for a launch window of 3m18s.

LAUNCH DELAYS:
- None. Launch occurred on time at 159:23:38:04Z, 7:38:04 PM EDT on Friday, 06/08/07.

Continued…

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-117/ ISS 13A
Continued...

Continued...

SS EVA 105
DOCKED QUEST EVA 28
EMU/TETHERED EVA 98
SCHEDULED EVA 97
DURATION 6:29

MCC WHITE FCR (48)

FLIGHT DIRECTORS:
SHUTTLE:
A/E - N. D. Knight
LD/O1 - C. A. Koerner
O2 - B. C. Lunney
O3/PLNG - R. S. Jones
MOD - P. L. Engelauf
Team 4 - M. L. Sarafin

ISS:
LD/O2 - K. B. Beck
O1 - A. P. Hasbrook
O3/PLNG - H. E. Ridings
Team 4 - S. P. Davis

CAPCOMS:
SHUTTLE:
A/E - D. A. Antonelli
- T. W. Virts (Wx)
LD/O1 - T. W. Virts
O2 - K. A. Ford
O3/Plng - R. S. Kimbrough
Team 4 - N/A

ISS:
LD/O2 - K. M. McArthur
O1 - S. G. Bowen
O3/PLNG - R. M. Davis
Team 4 - N/A

Continued...

VI:
25819.0 25818.5

OMS-2:
37:46 38:30
98.7 FPS 96.8 FPS

Continued...

WINDS:
1.9T/0.5R KTS
OFFICIAL:
08002P06 KTS
5T/3L KTS

DENS ALT:
5169 FT

FLT DURATION:
13:20:11:33

S/T:
1096:16:06:06

OV-104:
245:12:44:01

DISTANCE:
5,809,363 sm

TOTAL SHUTTLE DISTANCE:
444,524,399 sm

iss015e11705 S3 S4 PL: The 17.8 ton S3/S4 truss to be added to the station is shown

Continued...

TAL WEATHER: Launch Day Synopsis: “Showers and thunderstorms will develop during the daylight hours on Friday across Spain and France but are expected to diminish rapidly after sunset. TAL landing times are well after sunset.” ZZA and FMI TAL Sites were forecast and observed GO. ZZA was selected as Prime TAL Site. MRN was not available.

PERFORMANCE ENHANCEMENTS:
- Include the standard set plus: (1) PE Operational High Q SUM/JUN, (2) OMS Assist, (3) 52 nm MECO, Del Psi, and (4) Non-standard Consumables Reduction.

FLIGHT DURATION CHANGES/LANDING:
STS-117 was planned as an 11+2+2 duration flight.
- FD4: The MMT concurred with the recommendation to repair the Port OMS Pod thermal blanket damage incurred during ascent. An additional 2 days, docked to the ISS, and a 4th EVA were added to conduct the repair.
- FD14: Two KSC landing attempts (12:55 pm & 2:30 pm CDT) were waved due to weather. After wave-off, an Orbit Adjust Maneuver was added to the timeline. This 11 FPS burn brought in an additional landing opportunity (total of 3) for Edwards AFB on Friday, FD15.
- FD15: KSC landing attempt at 1:18 pm CDT was waved due to weather. Landing site was switched to Edwards AFB for a successful landing on Orbit Rev 219 at 2:49 pm CDT (12:49 pm PDT). (PAO: “It's a good day to land in California...”)

FIRSTS/LASTS:
- First flight of 2007.
- First Launch from PAD 39A since final flight of Columbia.
- First flight of Advanced Health Monitoring System (AHMS) on all three Sesame’s. One flew in Active Mode. Two flew in Monitor Mode. In active mode, AHMS provides safe engine shutdown for excessive turbopump vibrations.
- Sunita Williams sets new female long duration spaceflight record of 195 Days 18 Hours 58 Min, breaking Shinned Lucid’s record of 188 Days 4 Hours. Williams surpassed Lucid’s record on Saturday, 06/16/07, at 12:47 a.m. CDT
- First EVA repair of Shuttle thermal blanket.
- Last flight for James Reilly. Reilly flew to two space stations and clocked more than 853 hours in space, with five space walks totaling over 31 hours. He left NASA in June 2008.

RENDEZVOUS #66: Rendezvous and dock with ISS

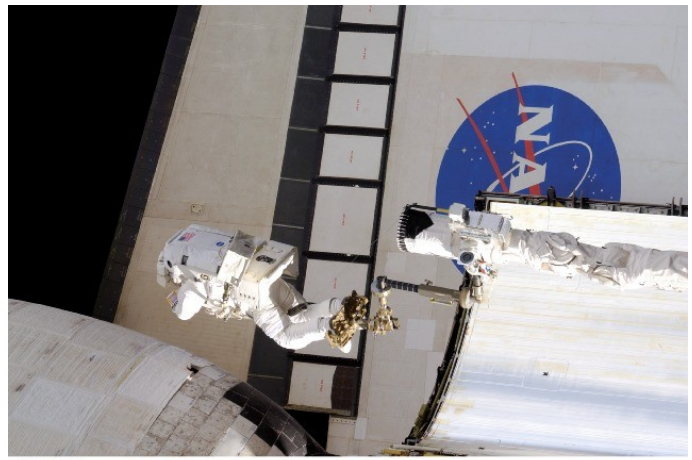
EVENTS:
- OMS 2 ignition at 160:00:16:34Z resulted in a 123.7 by 84.7 nm orbit.
- SRMS OBSS/LDRI survey of nosecap, port and starboard wing RCC (WLE’s) was completed.

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-117/ ISS 13A
Continued ...



iss015e12948 EVA Repair: Anchored to a foot restraint on the RMS robotic arm, astronaut John "Danny" Olivas moves toward port OMS pod thermal blanket damage during EVA 3. Skin

Continued...

EVENTS (continued):
- TI maneuver at 161:17:00:57Z: Resultant orbit was 181.2 by 179.4 nm orbit
- Rbar Pitch Maneuver was performed. Photos of Atlantis' tile surfaces and the damaged OMS POD thermal blanket were taken by ISS crew. The thermal blanket damage was later determined to be from ET foam/ice shedding from LO2 line bracket during ascent.
- Docking Capture occurred at 161:19:36:10Z
- Hard Docking occurred at 161:19:47:48Z.
- ISS Hatch open 161:21:20:00Z, 4:20 pm CDT, Sunday, June 10, 2007, ISS crew welcoming
- IELK Seat Liner transfer at 162:00:55Z (7:55 PM CDT, June 10, 2007). At that time, Sunita Williams became a member of STS-120 and Daniel Tani joined the ISS Expedition 16 as Flight Engineer.
- STS-117 delivered new set of solar arrays on 21st flight to ISS; P6 Starboard array was retracted for over 3 days.
- "Suni" Williams was replaced by Clay Anderson on Expedition 15 and returned home on STS-117 with long duration space record for a female (see Firsts above).
- FD4 - Station robotic arm used to install S3/S4 truss on S1 truss.
- FD4 EVA 1: Reilly/EV1 & Olivas/EV2 completed the following tasks for S3/S4 Power Generation work: connected 13 power & data umbilicals, unstowed & deployed 1A & 3A solar arrays, and uncinched/unwinched photovoltaic radiator (PVR) for deployment. SARJ work included: installing 4 alpha joint I/F structure (AJIS) struts, installing drive lock assembly (later, EVA 2 determined a problem, see below), removed 6 SARJ locks, and released all swing bolts along SARJ. EVA 1 duration: 6h16m.
- FD4 - MMT Management Decisions Summary: On 06/11/07, the MMT concurred: (1) that the Port OMS Pod TPS Blanket is considered [to be] suspect in case of a contingency deorbit, (2) with performing a repair of the OMS Pod Blanket, and (3) with adding 2 extension days and a 4th EVA.
- FD5: Activities completed nominally. Solar Array deployment - 8 bays retracted. Array behavior similar to 4B retraction on STS-116 (sticking grommets, asymmetric folding).
- FD6: Russian central and terminal computers failed during docked operations at GMT 164:15:15:00Z and were restored with jumper cables bypassing power monitoring devices.
- FD6 EVA 2: Forrester/EV3 & Swanson/EV4 conducted partial retraction of P6 2B Solar Array (including cut leader). Inspected P6 aft radiator starboard PIP pin (only one confirmed). SARJ work included: Installed 4 SARJ brace beams, installed DLA 1 (discovered DLA's were cross wired on the ground), removed 10 SARJ launch locks, and broke torque on 3 SARJ launch restraints. EVA 2 duration: 7h16m.

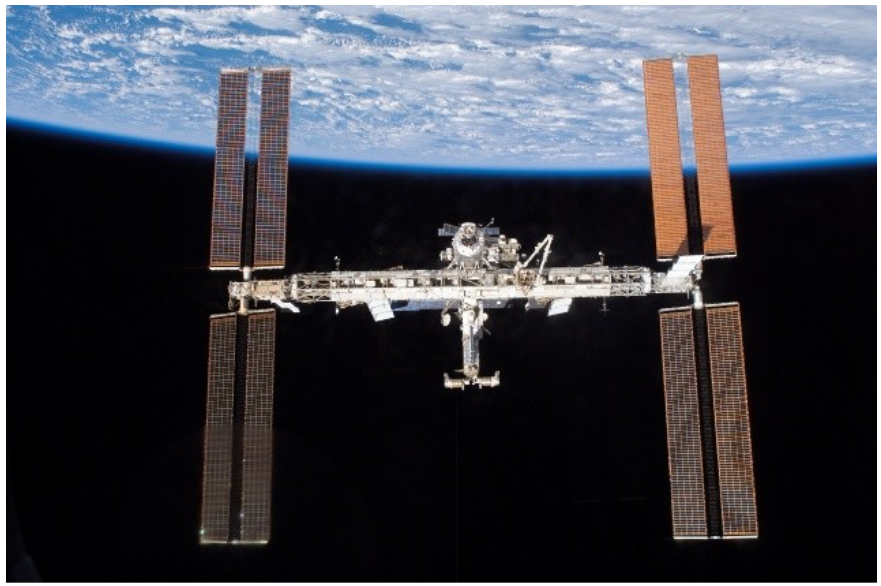
SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

STS-117/ ISS 13A

Continued...



s117e08006ISS-earth.jpg: Back-dropped by the blackness of space and Earth's horizon, the new ISS configuration is viewed

Continued...

EVENTS (Continued):
- FD8 EVA 3: Conducted by Reilly/EV1 & Olivas/EV2: Removed Lab H2O Vent & installed Lab H2 Vent, repaired OMS POD thermal blanket with skin stapler and pins, relocated 1 of 3 APFR's for 13A.1, and finished retraction of P6 2B Solar Array. This was unscheduled EVA added by MMT. EVA 3 duration: 7h58 m.
- FD10 EVA 4: Conducted by Forrester/EV3 & Swanson/EV4: Activated SARJ for rotation, cleared S3 Mobile Transporter path, relocated 2 of 3 APFR's for 13A.1, released torque on S4 MMOD Shield bolts, moved VSSA to Camera Port 1, cleared Node 1 Port for 10A Node 2 temporary stowage, and opened Lab H2 Vent. EVA duration: 6h29m.
- Transfers:
  - Mid-deck resupply cargo transfer to ISS from Atlantis was 1277 lbs.
  - Mid-deck return cargo transfer to Atlantis from ISS was 1528 lbs.
  - Supply Water total to ISS was 751 L (1,656 lbm)
  - Oxygen (net) to ISS was 89 lbm
  - Nitrogen to ISS: to A/L tanks 17.3 lbm; into stack for repress 16 lbm
  - Lithium Hydroxide (LiOH): STS [used] to ISS = 3, ISS (new) to STS = 3
- Undocked at 170:14:42:00Z followed by a fly-around (1/2 lap).
- Sep 1 & Sep 2 maneuvers resulted in orbit of 185.0 x 177.1 nm
- Micrometeoroid Orbital Debris late inspection was completed.
- No communications blackout during Entry.

SIGNIFICANT ANOMALIES:
Orbiter:
- MDM OA2 CARD 5 Failed - Invalid Data
- MADS Recorder Tape Speed Went To 120 IPS (Nom is 15) at Nose Wheel TD
- E3 LH2 Inlet Pressure Transducer Went OSH at T+ 3.5 Min

SRB: None.
RSRM:
- Gas Penetration Through Nozzle Joint 2 RTV, RSRM-96A&B

SSME: None.
ET:
- Post-Launch Camera & Film Rev. - Loss of LH2 Acreage Foam at Stations 1160, 1623 & 1871

MOD:
- GDR Data Dropouts During Ascent
- Ascent LOC Push Button Inoperative
- LCC Activation Turning Off WLES PGSC

Integration:
- Tile Piece Liberated From Aft Fuselage Body Flap I/F During Ascent
- FOD Found In Aft Compartment
- Port OMS Pod Blanket Damage During Ascent
- Rope-Like Material Noted Moving In Umbilical Well Imagery
- Propellant Use During FDS Extended Shuttle Attitude - Hold Approx 3 Times Higher Than Predicted

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-118/ ISS 13A.1

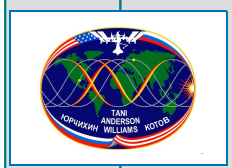
SEQ FLT# 119

KSC-119

PAD 39A-42

MLP-1

22ND SHUTTLE FLIGHT TO ISS



OV-105 (Flight 20) ENDEAVOUR

OMS PODS: LPO3-31 RPO4-27 FRC5-20

CDR: Scott J. Kelly (Flt 2 - STS-103)

P733/R253/V187/M220

PLT: Charles O. Hobaugh (Flt 2 - STS-104)

P734/R268/V188/M234

MS 1/R: Tracy E. Caldwell P735/R311/F43

MS 2/EV1: Richard A. Mastracchio (Flt 2 - STS-106)

P736/R257/V189/M224

MS 3/EV2: David R. Williams (Canada) P737/R312/M269

MS 4: Barbara R. Morgan P738/R313/F44

MS 5: B. Alvin Drew P739/R314/M270

SS EVA 106
DOCKED QUEST EVA 29
EMU/TETHERED EVA 99
SCHEDULED EVA 98
DURATION 6:17

SS EVA 107
DOCKED QUEST EVA 30
EMU/TETHERED EVA 100
SCHEDULED EVA 99
DURATION 6:28

SS EVA 108
DOCKED QUEST EVA 31
EMU/TETHERED EVA 101
SCHEDULED EVA 100
DURATION 5:28

SS EVA 109
DOCKED QUEST EVA 32
EMU/TETHERED EVA 102
SCHEDULED EVA 101
DURATION 5:02

KSC 39A
220:22:36:42Z
6:36:42 PM EDT (P)
6:36:42 PM EDT (A)
Wednesday (14)
8/8/07 (8)

LAUNCH WINDOW: 4M 14S (PLT IN-PLANE)

EOM PLS: KSC
TAL: ZZA
TAL WX: MRN, FMI

SELECTED:
RTLS: KSC 15
TAL: ZZA 30L
(FMI: NO-GO)
AOA: KSC 15
1ST DAY PLS: EDW 22

TDEL:
0:000(P) 0.312(A)

MAX Q NAV:
707.47(P) 699.34(A)

SRB STG:
2:02.56(P) 2:03.04(A)

PERF: NOMINAL

2 ENG TAL (MRN*):
2:34 (P) 2:40(A)
*ZZA prime TAL site;
Call made off MRN (GO site)

NEG RETURN:
3:53 3:56

PTA (U/S 167 FPS):
5:04 5:10

SE TAL (ZZA 104):
5:58 6:08

PTM (U/S 179 FPS):
6:16 6:23

SE PRESS 104
6:56 6:58

MECO CMD:
8:25.0 8:25.4

KSC 15 (KSC 65)
233:16:32:17Z
12:32:17 PM EDT
Tuesday (21)
08/21/07 (8)

DEORBIT BURN:
233:15:25:12Z

XRANGE: 697 NM

ORBIT DIR: A/L 37

AIM PT: NOMINAL

MLGTD: 1628 FT
233:16:32:17Z
VEL: 210 KGS 212 KEAS
HDOT: -3.1 FPS

TD NORM 205:
2302 FT

DRAG CHUTE DEPLOY:
163 KEAS
233:16:32:30Z

NLGTD: 5619 FT
233:16:32:29Z
VEL: 169 KGS 165 KEAS
HDOT: -6.3 FPS

BRK INIT: 123 KGS

DRAG CHUTE JETTISON:
54 KGS
233:16:32:59Z

BRK DECEL FPS^2:
AVE 6.1 PK 9.1

WHEELS STOP:
233:16:33:16Z
11862 FT

ROLLOUT:
10234 FT
46 SEC

Continued...

104/104/109 %

PREDICTED:
100/104.5/ 104.5/72/ 104.5

ACTUAL:
100/104.5/ 104.5/74/ 104.5

1 = 2047 (10)
2 = 2051 (6)
3 = 2045 (9)

M 3 EOM:

WEIGHT:
221740 LBS

X CG:
1078.1 IN

LANDING:

WEIGHT:
221660 LBS

X CG:
1079.8 IN

BI-130

RSRM 97

ET-117

SLWT 27

ET IMPACT

MET 1:14:03

LAT: 36.9S

LONG: 159.2W

51.6 (22)

DIRECT INSERTION

POST OMS-2:
172.2X124.2 NM

DEORBIT:
HA 187.2 NM
HP 22.8 NM

ENTRY VELOCITY:
25860 FPS

ENTRY RANGE:
4343 NM

OI-30 (6)

CARGO:
37390 LBS

PAYLOAD CHARGEABLE:
23899 LBS

DEPLOYED:
11830 LBS

NON-DEPLOYED:
11740 LBS

MIDDECK:
329 LBS

SHUTTLE ACCUMULATED WEIGHTS:
DEPLOYED:
1329454 LBS

NON-DEPLOYED:
1597761 LBS

CARGO TOTAL:
3781165 LBS

PERFORMANCE MARGINS (LBS):
FPR: 2651
FUEL BIAS: 1063
FINAL TDDP: 1913
RECON: 2435

PAYLOADS:
PLB:
ISS 13A.1-ITS S5 SPACEHAB SM, ESP-3

MIDDECK:
ISS 13A.1 RAMBO MAUI

5 CRYO TK SETS

RMS 76
ODS, OBSS

RMS USED FOR RMS/OBSS SURVEYS AND GRAPPLE/ UNBERTH S5, HANDOFF TO SSRMS

BRIEF MISSION SUMMARY: STS-118/13A (22nd ISS mission) continued the assembly and resupply of the International Space Station and fulfilled a long-standing teacher's legacy. The new assembly included the delivery of the S5 Truss segment, installation of a spare parts platform, and changeout of a failed gyroscope. This was the last shuttle resupply mission using the SPACEHAB module. In addition, Barbara R. Morgan, who had served as backup to Christa McAuliffe in the Teacher in Space Project 21 years earlier, flew as the first Educator Mission Specialist. McAuliffe was a member of the crew that lost their lives in the 1986 Challenger accident.

KSC W/D: OPF 1332+64+63+18 = 1477, VAB 9, PAD 25 = 1511 Total Work Days (OPF Processing occurred over a total time period of 1665 days.)

LAUNCH POSTPONEMENTS:
- Added STS-118 to FDRD - launch date of 10/09/03 on 08/01/02.
- Postponed to NET 11/13/03 on 10/08/02 due to engine flowliner crack repairs.
- Postponed to NET 05/06/04 on 03/13/03 due to Columbia accident.
- Postponed to NET 06/01/04 on 04/17/03 due to Columbia accident.
- Deleted flight from FDRD on 05/28/03.
- Re-baselined to NET 09/14/06 on 07/14/05.
- Revised to "TBD" on 11/10/05. Slip reflected latest manifest constraints.
- Postponed to NET 06/11/07 on 04/04/06. Slip reflected latest manifest constraints.
- Postponed to NET 06/28/07 on 11/02/06. Slip due to ET delivery/processing schedule.
- Postponed to NET 08/09/07 on 04/16/07. Slip due to STS-117 rollback.
- Advanced to 08/07/07 on 06/28/07. Provide an adequate number of launch opportunities before a range conflict.
- Launch delayed to 08/08/07 on 08/03/07 due to "cabin leak checks and other processing work."

LAUNCH SCRUBS: None

LAUNCH WINDOW:
- Total launch window was 8 minutes 11 seconds with window open at 220:22:32:45Z and close at 220:22:40:56Z. Preferred Launch Time was 220:22:36:42Z (In-Plane Time) for a launch window of 4m14s.

LAUNCH DELAYS:
- None. Launch occurred on time at 220:22:36:42Z, 6:36:42 PM EDT on Wednesday, 08/08/07.

TAL WEATHER:
Forecast: Pressure gradient between a surface high over northern Spain and low over northern Italy will keep NW winds at FMI and ZZA Wednesday through Friday. Peak winds at FMI are forecast to be above headwind limits all 3 days, but remain within limits at ZZA. MRN weather is forecast "GO" all 3 days.

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-118/ ISS 13A.1
Continued...

Continued...

MCC WHITE FCR (49)

FLIGHT DIRECTORS:
SHUTTLE:
A/E - J. S. Stich
LD/O1 - M. R. Abbott
O2 (FD1-FD6) - R. S. Jones
O2 (FD7-EOM) - M. L. Sarafin
O3/PLNG (FD1-Undock) - M. P. Moses
O3/PLNG/Prelaunch/Post-Undock - P. F. Dye
MOD - P. L. Engelauf
Team 4 - R. E. LaBrode

ISS:
LD/O2 - J. R. Montalbano
O1 - K. L. Alibaruho
O3/PLNG - G. Kerrick
Team 4 - J. D. Hassmann

CAPCOMS:
SHUTTLE:
A/E - C. J. Ferguson
- J. P. Dutton (Wx)
LD/O1 - S. K. Robinson
O2 - R. S. Kimbrough
O3/PLNG - S. W. Lucid
Team 4 - N/A

ISS:
LD/O2 - S. Walker
O1 - D. A. Antonelli
O3/PLNG - L. McCullough
Team 4 - N/A

Continued...

VI:
25819.0 25817.4

OMS-2:
37:00 37:00.7
253.9 FPS252.6 FPS

Continued...

WINDS:
6H 4L KTS
OFFICIAL:
11909P13 KTS
10H 8L KTS

DENS ALT:
1973 FT

FLT DURATION:
12:17:55:35

S/T:
1109:10:01:41

OV-105:
219:08:07:41

DISTANCE:
5,274,977 sm

TOTAL SHUTTLE DISTANCE:
449,799,376 sm

ISS015-E-21711 - Endeavour delivers a new S5 stbd truss segment, cargo inside the SPACEHAB module (in center of bay), and the external

Continued...

PERFORMANCE ENHANCEMENTS:
Include the standard set plus: 1) PE Operational High Q WIN/DEC, 2) OMS Assist, 3) a 52 nm MECO, and 4) Del Psi

FLIGHT DURATION CHANGES/LANDING:
On 8/12/07, FD5, the MMT concurred with extending the Mission to 14+2 days and adding EVA 4.

FIRSTS/LASTS:
- First flight of Endeavour in 5 years
- First flight test of new system to monitor ECO circuit voltage to fuel sensors. System allows Flight Controllers to recommend manual engine shutdown by the crew if sensor voltage has failed.
- First flight of Automated Meteorological Profiling System (AMPS) High Resolution (HR) as primary system for DOLILU wind measurements - replacement for Jimspheres.
- First flight that Station Shuttle Power Transfer System (SSPTS) available to provide extended duration capability to shuttle
- First flight that three-string Global Positioning System (GPS) was used to replace landing TACAN System - previously flown single string only.
- First flight of SRB Command Receiver/Decoder (CRD). Replaced Integrated Receiver/Decoder (IRD) and Range Safety Distributor (RSD) due to obsolescence concerns
- Last flight of SPACEHAB resupply module.
- First and last flight of Educator Mission Specialist Barbara R. Morgan. She left NASA and returned to Boise State University in 2008.

NIGHT LAUNCH - N/A

RENDEZVOUS #67: Rendezvous and dock with ISS

EVENTS:
- OMS 2 ignition at 220:22:47:15Z resulted in a 172.2 by 124.7 nm orbit.
- SRMS OBSS/LDRI survey of nosecap and port and starboard wing RCC (WLE's) was completed.
- TI maneuver at 222:15:15:19Z - resultant orbit was 186.5 by 180.4 nm
- During R-Bar Pitch Maneuver, a gouge in the heat shield below the right wing (site 3) was identified.
- Docking contact occurred at 222:18:01:54Z.
- Hard Dock occurred at 222:18:29:44Z.
- ISS Hatch open 222:20:04:00Z, 3:04 pm CDT, Friday, August 10, 2007, ISS crew welcoming
- FD4: MMT, per Flight Rule 13A.1_A2-6 concurred that TPS was considered to be damaged.

Continued...

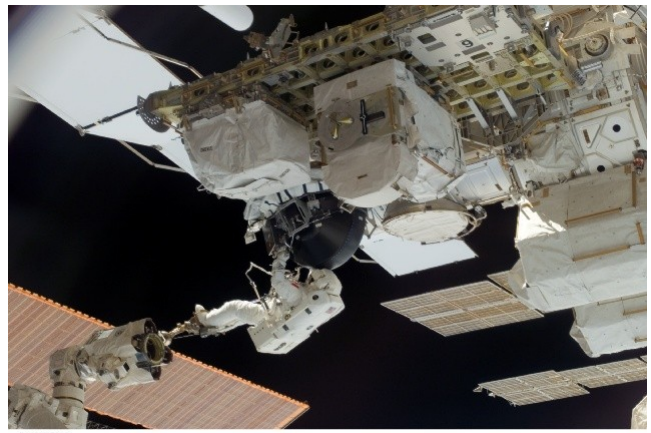
SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-118/ ISS 13A.1
Continued ...

S118e06114 - Barbara R. Morgan flew as first Educator Mission Specialist



S118-E-06998 - Anchored to the foot restraint on the Canadarm2, Williams, and Mastracchio (out of frame), R&R a faulty control moment

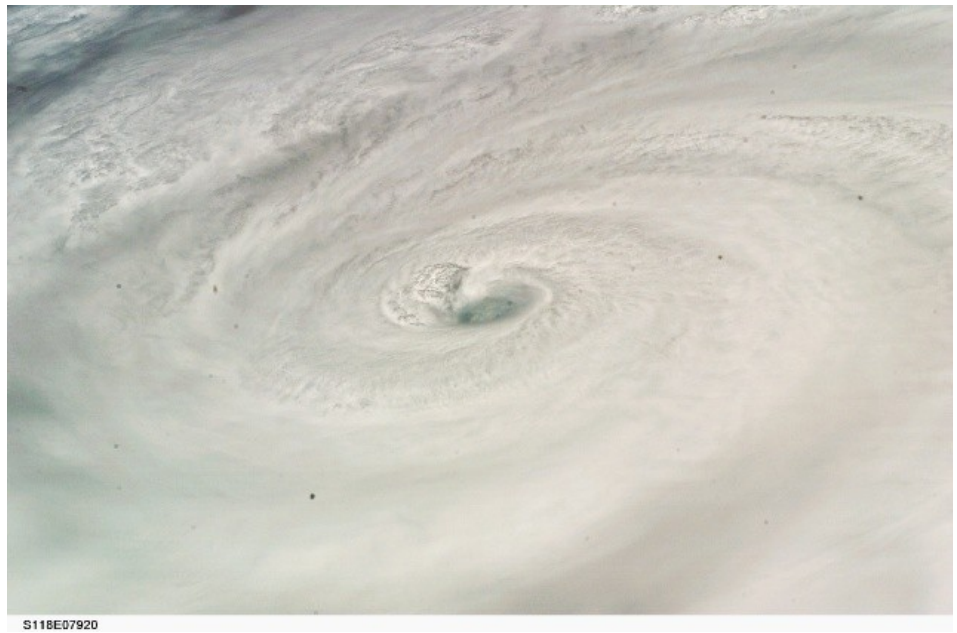
Continued...

EVENTS (Continued):
- FD4, EVA 1: EV1 and EV2 installed S5 on S4, relocated S5 PVRGF to S5 Keel (ground strap bolt would not seat again, like P5), retracted and cinched P6 Forward PVR, and retrieved EVA ratchet from STBD Z1 toolbox. EVA 1 duration 6h17m.
- FD5: MMT concurred that TPS was considered to be damaged and authorized focused TPS inspection. Mission was extended to 14+2 and EVA4 (preplanned) was added.
- FD6, EVA 2: EV1 and EV2 completed R&R of faulty CMG 3 into ISS Z1 truss, installed old CMG3/FSE/FRAM on nadir ESP-2 FRAM Site #5 with MLI cover (no straps), and retrieved EVA ratchet from PORT Z1 toolbox. The failed CMG will remain at its temporary stowage location until it is returned to Earth on a later shuttle mission. The new gyroscope is one of four CMG's used to control Station attitude on orbit. EVA 2 duration 6h28m.
- FD8, EVA 3: EV1 and EV3 (Exp 15/16) relocated P6 SASA to P1 zenith, installed P1 S-band BSP and Xpdr, moved CETA cart 1 to STBD of MT (connected to MT), moved CETA cart 2 to STBD of MT (connected to CETA 1), and removed P6 S-band Xpdr (dummy box plate installed). EV1 EVA terminated early to EMU glove damage at EVA Phase Elapsed Time (PET) 4:20. The damage did not cause leakage; the suit pressure was unaffected. Due to the early termination, the S-band Antenna Structural Assembly (SASA) Spare Gimbal Locks and Materials International Space Station Experiment (MISSE) 3 and 4 tasks were not completed. EVA 3 duration 5h28m.
- FD8: EVA 4 delayed from FD9 to FD11 by MMT for potential tile repair.
- FD9: MMT decided that the TPS repair issue required a Programmatic assumption of risk and that the MMT was willing to assume that risk. The preponderance of data (including ground analysis and arc jet testing) indicated acceptable margins to fly as is. MMT decided that no TPS repair would be performed on Endeavour and that the nominal planned EVA 4 would be executed on FD11.
- FD11, EVA 4: EV2 and EV3 (EXP 15/16) installed OBSS OSE (2) on S1 zenith trunnions, re-torqued Z1 SASA gimbal bolts, removed MISSE 3 and MISSE 4 from A/L and returned on Shuttle, Lab EWIS antenna handrails and cable installed (Lab fwd endcone nadir - got 3 of 3 DZU's installed), and retrieved tools from A/L toolboxes. Did not perform Lab or Node MMOD shield cleanup or S3 WETA installation. EVA 4 duration 5h2m.
- FD12: MOD contingency plans for Hurricane Dean Preparedness included decreasing the flight control support to two teams and evacuation on military aircraft if required. The plan was not required to be implemented.

Continued...

SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7) TITLE, NAMES & EVA'S	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT INC	ORBIT HA/HP	FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
STS-118/ ISS 13A.1 Continued...											



S118-E-07918 - Category 4 Hurricane Dean, viewed from Endeavour, was moving westerly in the Caribbean nearing Jamaica with sustained winds of 150 mph. MOD contingency evacuation plans

Continued...

EVENTS (Continued):
- Transfers:
  - Hardware transferred to ISS (outside and inside): 14,740 lbs
  - Hardware/supplies returned from ISS: 3,297 lbs
  - Water delivered to ISS: 918.6 lbm
  - Oxygen to ISS: 77 lbm
  - Nitrogen to ISS: 33.8 lbs
  - Lithium Hydroxide (LiOH) cans from ISS to STS: 12 cans (9 old, 3 used)
  - LiOH new cans from STS to ISS: 30 cans
  - Power transferred from ISS to orbiter using the SSPTS was 1186 kWh.
- Undocked at 170:14:42:00Z followed by a flyaround (1/2 lap)
- Sep 1 and Sep 2 maneuvers resulted in orbit 185.2 by 183.5 nm.
- Micrometeoroid Orbital Debris late inspection was completed. No issues.
- No communications blackout during Entry.

SIGNIFICANT ANOMALIES:
Orbiter:
- A Magenta Hue Appeared On Camera (GFE).
- STS-118 Drag Chute Reefing Line Cutter Failure to Cut (GFE).

SRB:
- None.

RSRM:
- Gas Penetrations through Nozzle Joint 2 RTV, RSRM-97A&B

SSME:
- 3 Com Card/Cable Failed (GFE).

ET:
- 2007 ET-117 Film Review Found TPS Loss at Sta. 1623 Outboard LO2
- Feedline Support Bracket and TPS Orb Impact
- XT 1973 Inboard LO2 Feedline Bracket Base Fitting TPS Crack on ET-117
- Post-Launch Camera and Film Review Showed Loss of LH2 Acreage Foam

MOD:
- B30M Power Failure B-C Power Feeds
- Margi Output Error
- ET Umbilical Door Closure Timing
- SSRMS Movement Prior To Shuttle Ku Mask
- OBSS Sensor Mode Change From 6 to 2 per MCC
- Procedure Error on PGSC Setup

Integration:
- Partial Tyvek Cover Release
- SSRMS Movement Prior to Shuttle Ku Mask
- BFS Loss of Class III Alert from Spacehab E

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-120/ ISS 10A

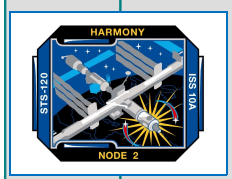
SEQ
FLT# 120

KSC-120

PAD 39A-43

MLP-2

23RD SHUTTLE FLIGHT TO ISS



OV-103 (Flight 34) DISCOVERY

OMS PODS:
LPO1-37
RPO3-35
FRC3-34

CDR:
Pamela A. Melroy (Flt 3 - STS-92, STS-112)

P740/R261/V175/F34

PLT:
George Zamka P741/R315/M271

MS 1/EV1:
Scott E. Parazynski (Flt 5 - STS-66, STS-86, STS-95, STS-100)

P742/R187/V144/M165

MS 2/R:
Stephanie D. Wilson (Flt 2 - STS-121)

P743/R298/V190/F39

MS 3/EV2:
Douglas H. Wheelock P744/R316/M272

MS 4/R:
Paolo A. Nespoli (ESA) P745/R317/M273

MS 5 UP/EXP 16 FLT ENG:
Daniel M. Tani (Flt 2 - STS-108)

P746/R272/V191/M238

MS 5 DN/EXP 15/16 FLT ENG:
Clayton C. Anderson (UP on STS-117, Stay on ISS) P747/R310/M268

SS EVA 110
DOCKED QUEST EVA 33
EMU/TETHERED EVA 103
SCHEDULED EVA 102
DURATION 6:14

Continued…

KSC 39A
296:15:38:19Z
11:38:19 PM EDT (P)
11:38:19 PM EDT (A)
Tuesday (16)
10/23/07 (12)

LAUNCH WINDOW:
7M 17S
(PLT IN-PLANE)

EOM PLS: KSC
TAL: MRN
TAL WX: FMI

SELECTED:
RTLS: KSC 15 N/N
TAL: MRN 20 N/N
(ZZA: NO-GO)
AOA: NOR 35 N/N
1ST DAY PLS: EDW 04 CI/N

TDEL:
0:000(P) 0.162(A)

MAX Q NAV:
719.02(P) 701.56(A)

SRB STG:
2:02.56(P) 2:03.20(A)

PERF:
NOMINAL

2 ENG TAL (MRN):
2:37 (P) 2:45(A)

NEG RETURN:
3:51 3:55

PTA (U/S 167 FPS):
5:16 5:26

SE TAL (ISTRES 104):
6:04 6:12

PTM (U/S 181 FPS):
6:16 6:27

Continued…

KSC 33 (KSC 66)
311:18:01:17Z
12:01:17 PDT
Wednesday (15)
11/07/07 (12)

DEORBIT BURN:
311:16:58:49Z

XRANGE: 196 NM

ORBIT DIR: D/R 21

AIM PT: CLOSE IN

MLGTD: 1247 FT
311:18:01:17Z
VEL: 204 KGS
220 KEAS
HDOT: -5.4 FPS

TD NORM 195:
3249 FT

DRAG CHUTE DEPLOY:
189 KEAS
311:18:01:26Z

Continued…

104/104/109 %

PREDICTED:
100/104.5/104.5/72/104.5

ACTUAL:
100/104.5/104.5/72/104.5

1 = 2050 (6)
2 = 2048 (7)
3 = 2058 (2)

M 3 EOM:

WEIGHT:
203067 LBS

X CG:
1081.0 IN

LANDING:
WEIGHT:
202989 LBS
X CG:
1083.0 IN

BI-131

RSRM 98

ET-120

SLWT 28

ET IMPACT

MET 1:14:06

LAT:
36.749 S

LONG:
158.98 3W

51.6 (23)

DIRECT INSERTION

POST OMS-2:
169.9X123.8 NM

DEORBIT:
HA 188.0 NM
HP 12.1 NM

ENTRY VELOCITY:
25850 FPS

ENTRY RANGE:
4436 NM

OI-32 (1)

female Women Commanders. Peggy Whitson (right), ISS EXP 16 CDR, greets Pam Melroy, STS-120 CDR.

CARGO:
40872 LBS

PAYLOAD CHARGEABLE:
33813 LBS

DEPLOYED:
33474 LBS

NON-DEPLOYED:
280 LBS

MIDDECK:
59 LBS

SHUTTLE ACCUMULATED WEIGHTS:
DEPLOYED:
1362928 LBS

NON-DEPLOYED:
1598100 LBS

CARGO TOTAL:
3822037 LBS

PERFORMANCE MARGINS (LBS):
FPR: 2651
FUEL BIAS: 1063
FINAL TDDP: 2091
RECON: 1880

PAYLOADS:
PLB:
ISS 10A (NODE 2), PDGF, MBSU, SASA

MIDDECK:
ISS 10A
RAMBO
MAUI

5 CRYO TK SETS

RMS 77
ODS, OBSS

BRIEF MISSION SUMMARY: STS-120/10A (23rd ISS mission) provided for expansion of the ISS with delivery of the Italian-built U.S. multi-port Node 2 connecting module named Harmony. Installation of Harmony allows for attachment of research labs from the European Space Agency (Columbus) and the Japan Aerospace Exploration Agency (Kibo) to be delivered on subsequent flights. The P6 truss segment and solar arrays were replaced from a temporary location (on Z1) to a permanent location on P5 truss. In this new location, the solar arrays were redeployed to maximize needed power generation for inclusion of the future research labs. Also on this mission, a 1-day extension was added to extend EVA 4 for starboard SARJ inspections, but the EVA was later reworked for a successful repair of P6 4B solar power array damaged during deploy.

KSC W/D: OPF 234, VAB 7, PAD 23 = 264 Total Work Days (OPF Processing occurred over a total time period of 273 days.)

LAUNCH POSTPONEMENTS:
- Added STS-120 to FDRD - launch date of 02/19/04 on 01/23/03.
- Postponed to NET 09/23/04 on 03/13/03 due to Columbia accident.
- Deleted flight from FDRD on 05/28/03.
- Rebaselined to NET 08/09/07 on 06/01/06.
- Postponed to NET 09/07/07 on 11/02/06. Slip due to ET delivery/processing schedule
- Advanced to 08/26/07 on 02/08/07 to avoide spacing problem with Soyuz and ATV.
- Postponed to 10/20/07 on 04/16/07. Slip due to STS-117 rollback.
- Postponed to 10/23/07 on 08/07/07. Slip to maintain standard minimum interval between Soyuz undocking (changed for landing opportunities) and orbiter docking to the ISS.

LAUNCH SCRUBS: None

LAUNCH WINDOW:
- Total launch window was 11 minutes 19 seconds with window open at 296:15:34:17Z and close at 296:15:45:36Z. Preferred Launch Time was 296:15:38:19Z (In-Plane Time) for a launch window of 7m17s.

LAUNCH DELAYS:
- None. Launch occurred on time at 296:15:38:19Z, 11:38:19 AM EDT on Tuesday, 10/23/07. (PAO: "It's a nice day in Florida…")

Continued…

SPACE SHUTTLE MISSIONS SUMMARY

FLT	ORBITER	CREW (6+1 UP/6+1 DN)	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM- ABORT EMERG	SRB RSRM	ORBIT		FSW	PAYLOAD WEIGHTS,	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS,
NO.		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-120/ ISS 10A
Continued...

Continued...

SS EVA 111
DOCKED QUEST EVA 34
EMU/TETHERED EVA 104
SCHEDULED EVA 103
DURATION 6:33

SS EVA 112
DOCKED QUEST EVA 35
EMU/TETHERED EVA 105
SCHEDULED EVA 104
DURATION 7:08

SS EVA 113
DOCKED QUEST EVA 36
EMU/TETHERED EVA 106
SCHEDULED EVA 105
DURATION 7:19

MCC WHITE FCR (50)

FLIGHT DIRECTORS:
SHUTTLE:
A/E - N. D. Knight
LD/O1 - R. E. LaBrode
O2 (FD2-FD13) - M. P. Moses
O2 (FD1, FD14 and Waveoff) - M. R. Abbott
O3/PLNG (FD1-FD13) -
M. L. Sarafin
PLNG (Prelaunch, FD1, FD14, and Waveoff - A. J. Ceccacci
ENT - B. C. Lunney
MOD - P. L. Engelauf
Team 4 - P. F. Dye

ISS:
LD/O2 - J. D. Hassmann
O1 - D. J. Weigel
O3/PLNG - H. L. Rarick
Team 4 - G. Kerrick

CAPCOMS:
SHUTTLE:
A/E - T. W. Virts
- L. J. Archambault (Wx)
LD/O1 - C. J. Ferguson
O2 - D. A. Antonelli
O3/Plng - S. W. Lucid
Team 4 - N/A

Continued...

Continued...

SE PRESS 104
7:06 6:57

MECO CMD:
8:25.6 8:25.8

VI:
25819 25817

OMS-2:
37:22 37:19.6
232.8 FPS230.9 FPS

Continued...

NLGTD: 5419 FT
311:18:01:30Z
VEL: 150 KGS
163 KEAS
HDOT: -5.9 FPS

BRK INIT: 109 KGS

DRAG CHUTE JETTISON:
52 KGS
311:18:01:53Z

BRK DECEL FPS^2:
AVE 6.3PK 10.5

WHEELS STOP:
311:18:02:11Z
9593 FT

ROLLOUT:
8346 FT
54 SEC

WINDS:
10.6H 2.8R KTS
OFFICIAL:
35013P22 KTS
21H 6R KTS

DENS ALT:
771 FT

FLT DURATION:
15:02:22:58

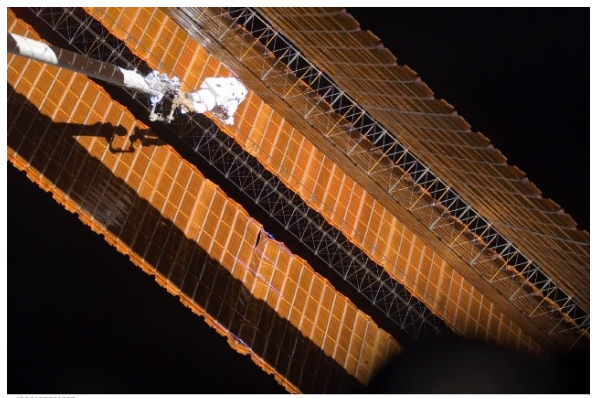
S/T:
1124:12:24:39

OV-103:
291:13:57:03

DISTANCE:
6,249,432 sm

TOTAL SHUTTLE DISTANCE:
456,048,808 sm

SS016-E-006834 (27 Oct. 2007 --- Interior view of Harmony node after it was attached to temporary



ISS016-E-009207 (3 Nov. 2007) --- While anchored to a foot restraint on the end of the OBSS, Parazynski/EV1 assesses his repair work as the solar array is fully

Continued...

TAL WEATHER:
The weather model data for Europe continued to show an area of low pressure near Italy, with high pressure over central France. Windy conditions at ZZA and FMI were expected to contribute to pockets of turbulence in the region. Weakening high pressure was forecast over southern Spain, with partly cloudy skies and soutwest winds at MRN Tuesday. All three TAL sites were forecast and observed GO. Moron was selected as Prime TAL Site.

PERFORMANCE ENHANCEMENTS:
Include the standard set plus: 1. PE Operational High Q TRN/OCT, 2. OMS Assist, 3. 52 nautical mile MECO, and 4. Del Psi.

FLIGHT DURATION CHANGES/LANDING:
On FD7, MMT concurred with adding a docked extension day to the mission to extend EVA 4 for starboard SARJ inspections for cause of vibrations and drag.

FIRSTS:
- Historical first meeting of two spacecrafts commanded by women: Peggy Whitson, the first woman to command the ISS, and Pamela A. Melroy, the second woman space shuttle commander.
- Successful first time operation of OV-103 Station-to-Shuttle Power Transfer System (SSPTS)
- First ET LO2 IFR bracket pockets filled with BX (replaces PDL in pockets) to minimize void formation.
- First flight of OI-32 Flight Software. Standard capability release included changes for enhanced crew safety and situational awareness, improved mated control of ISS, and other enhancements for ground and flight operations and safety.
- First High Definition TV coverage of Launch (by CNN)

NIGHT LAUNCH: (N/A)

RENDEZVOUS #68: Rendezvous and dock with ISS

EVENTS

- OMS 2 ignition at 296:15:48:44Z resulted in a 159.9 by 123.8 NM orbit.
- SRMS OBSS/LDRI survey of nosecap and port and starboard wing RCC (WLE's) was completed.
- TI maneuver at 298:09:55:25Z resulted in a 188.7 by 179.7 NM orbit.
- R-Bar Pitch Maneuver was performed. No significant issues
- Docking Capture occurred at 298:12:39:57Z.
- Hard Dock occurred at 298:12:52:50Z.

Continued...

SPACE SHUTTLE MISSIONS SUMMARY

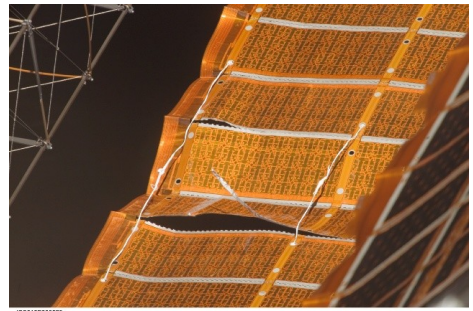
FLT NO.	ORBITER	CREW (6+1 UP/6+1 DN) TITLE, NAMES & EVA'S	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT INC	ORBIT HA/HP	FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS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

SPACE SHUTTLE MISSIONS SUMMARY

STS-120/ ISS 10A
Continued...

Continued...

ISS:
LD/O2 - K. A. Ford
O1 - H. Getzelman
O3/PLNG - Z. Jones
Team 4 - N/A



ISS016-E-008875 (3 Nov. 2007) --- Close-up view of the repaired

S120-E-008531 (5 Nov. 2007) --- Back-dropped by the blackness of space and Earth's horizon, the new ISS configuration is viewed from the departing STS-120

SIGNIFICANT ANOMALIES:
Orbiter:
- V070-396376-201, Blanket R&R
- PLB Floodlight #3 failed
- Protrusion on the Arrowhead Plate (H-0.38)
- Protruding Ames Gap Filler (H=0.21)
- Protruding Ames Gap Filler (H=0.29)
- Blanket is lifted off left (Port) OMS Pod
- Could not install the plug on the bent end of the GO2 Transfer Flex Hose Assy
- The MPS Engine #1 LO2 Inlet Temperature failed off scale high at 15:41:15GMT during STS-120 Ascent.
- On STS-120/OV-103, Measurement V62T0519A was erratic, diverged from approximately 184 degrees F
- Missing debris

SRB:
- Nonlinear separation on LH SRB of the Frustrum/Forward Skirt Ordnance Ring for STS-120/BI-131
- STS-120/ET-120 launched on 10/23/07: Post Launch camera and film review showed loss of foam at two locations.

RSRM:
- Gas penetrations through Nozzle Joint 2 RTV, RSRM-98A&B
- Gas penetration through RTV, Nozzle Joint 5, RSRM-98B

SSME: None
ET:
- Post Launch photograph and film review of STS-120/ET-120

MOD:
- Wall clocks hung state in both FCR's
- Missing step in PDRS STBD survey procedure
- Typo - IMU align in Orb Ops Checklist
- RMS Joint Angle Ground Display Error

INTEGRATION:
- LH2 Umbilical ice noted prelaunch
- GUCP ice bridged to ET Intertank Foam

Continued...

- ISS Hatch opened at 9:39 AM (CDT) on10/25/07 (298:14:39:00Z) - Shuttle Crew welcomed by ISS Crew - Historical first meeting of two spacecrafts commanded by women.
- IELK Seat Liner Transfer at 298:16:12Z (11:12 AM CDT, Oct. 25, 2007). At that time Clayton Anderson became a member of STS-120 and Daniel Tani joined the ISS Expedition 16 as Flight Engineer.
- FD4 EVA 1: (EV1 and EV2) Removed the failed SASA from Z1; installed SASA in PLB sidewall carrier; prepped Node 2 (Harmony) for removal from bay; demated P6/Z1 fluid QD's; used Station robot arm (PDGF) to install Node 2 to temporary location on Node 1 (Unity). [NOTE: Node 2 was moved to its permanent location at the front of the U.S. Lab using the ISS robotic arm after shuttle departure.] EVA1 duration 6h14m
- FD6 EVA 2: EV1 and EV3 conducted P6 truss demate from temporary location on Z1; EV3 performed inspection of suspected sharp edge on S1 CETA rail; Initial stbd SARJ inspection; Node 2 Outfitting (EV1 completed all of this solo); structurally installed the Node 2 PDGF; successfully deployed the two outboard S1 radiators between EVA 2 and EVA 3 (so all three are now deployed). EVA 2 duration 6h33m
- FD7: MMT concurred with adding a docked extension day to the mission to extend EVA 4 for starboard SARJ inspections for cause of vibrations and drag.
- FD8 EVA 3: EV1 and EV2 attached P6 truss to P5 (permanent location). The 2B solar array was 100% deployed. The 4B array was aborted at 25 bays, with a tear in the right blanket (guide wire snag). EVA 3 duration 7h8m
- FD11: MMT concurred with new plan for EVA4 to repair the Solar Array Wing (SAW) 4B repair. The Tile Ablator Dispenser DTO was postponed.
- FD12 EVA 4: (EV1 & EV2) EV1 repaired the P6 4B array using the OBSS on the SSRMS with a WIF-E. As reported by the Rocky Mountain News: "Parazynski…performed what NASA is calling on e of the greatest 'space saves' in the history of manned spaceflight. …[He] floated outside with wire cutters, pliers, and homemade tools to fix the torn wing" [restoring maximum power capability to the ISS.] EVA 4 duration 7h19m

- Transfers:
  - Hardware transferred ISS (outside and inside): 33,834 lbs
  - Hardware/supplies returned from ISS: 2,020 lbs
  - Water delivered to ISS: 939.1 lbm
  - Oxygen transferred to ISS: 30 lbm
  - Nitrogen transferred to ISS: 31.6 lbs
  - Power from ISS to Orbiter using SSPTS: 1186 kWh.
- FD14: Undocking from ISS: 309:10:32:03Z (4:32 am CST, 11/05/07)
- Sep 1 & Sep 2 maneuvers resulted in orbit 189.6 by 181.9 nm.
- Micrometeoroid Orbital Debris late inspection was completed. No issues.
- Anderson returned home after 152 days in

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-122/ ISS 1E

SEQ FLT# 121

KSC-121

PAD 39A-44

MLP-1

24TH SHUTTLE FLIGHT TO ISS

OV-104 (Flight 29) ATLANTIS

OMS PODS: LPO4-29 RPO1-36 FRC4-29

CDR:
Stephen N. Frick
(Flt 2 - STS-110)

P748/R276/V192/M242

PLT:
Alan G. Poindexter
P749/R318/M274

MS 1/R:
Leland D. Melvin
P750/R319/M275

MS 2/EV1:
Rex J. Walheim
(Flt 2 - STS-110)

P751/R277/V193/M243

MS 3/EV2:
Hans Schlegel
(Germany)
(Flt 2 - STS-55)

P752/R163/V194/M143

MS 4/EV3:
Stanley G. Love
P753/R320/M276

MS 5 UP/EXP 16 FLT ENG:
Leopold Eyharts
(ESA)
(also flew on MIR Feb 1998)
P754/R321/M277

MS 5 DN/EXP 16 FLT ENG:
Daniel M. Tani
(Flt 2 - STS-108, STS-120 up)

P755/R272/V191/M238

SS EVA 114
DOCKED QUEST EVA 37
EMU/TETHERED EVA 107
SCHEDULED EVA 106
DURATION 7:58

SS EVA 115
DOCKED QUEST EVA 38
EMU/TETHERED EVA 108
SCHEDULED EVA 107
DURATION 6:45

Continued...

KSC 39A
038:19:45:30Z
2:45:30 PM EST (P)
2:45:30 PM EST (A)
Tuesday (35)
2/07/08 (9)

LAUNCH WINDOW:
5M1S
(PLT IN-PLANE)

EOM PLS: KSC
TAL: ZZA
TAL WX: MRN, BEN

SELECTED:
RTLS: KSC 15 N/N
TAL: ZZA 30L N/N
AOA: NOR 23 N/N
1ST DAY PLS: EDW 04 N/N

TDEL:
0:000(P) 0.212(A)

MAX Q NAV:
756.21(P) 755.17(A)

SRB STG:
2:04.16(P) 2:04.16(A)

PERF:
NOMINAL

2 ENG TAL (MRN):
2:35(P) 2:38(A)

NEG RETURN:
3:51 3:54

PTA (U/S 161 FPS):
5:04 5:05

SE TAL (ZZA 104):
6:04 6:082

PTM (U/S 167 FPS):
5:58 6:02

Continued...

KSC 15 (KSC 67)
051:14:07:09Z
9:07 AM EST
Thursday (11)
02/21/08 (7)

DEORBIT BURN:
051:12:59:52.0Z

XRANGE: 408 NM

ORBIT DIR: A/L 38

AIM PT:
NOMINAL

MLGTD: 2344 FT
051:14:07:09Z
VEL: 197 KGS 194 KEAS
HDOT: -2.1 FPS

TD NORM 195:
2200 FT

DRAG CHUTE DEPLOY:
188 KEAS
051:14:07:10Z

NLGTD: 5175 FT
051:14:07:17Z
VEL: 157 KGS 155 KEAS
HDOT: -4.9 FPS

BRK INIT: 91 KGS

DRAG CHUTE JETTISON:
54 KGS
051:14:07:46Z

BRK DECEL FPS^2:
AVE 4.6 PK 6.9

WHEELS STOP:
051:14:08:07Z
10911 FT

ROLLOUT:
8567 FT
58 SEC

Continued...

104/104/109 %

PREDICTED:
100/104.5/104.5/72/104.5

ACTUAL:
100/104.5/104.5/74/104.5

1 = 2059 (2)
2 = 2052 (6)
3 = 2057 (3)

M 3 EOM:

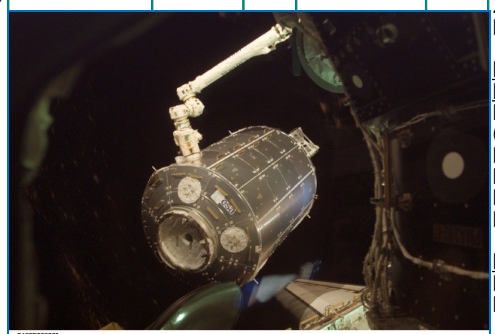
WEIGHT:
207295 LBS

X CG:
1078.2 IN

LANDING:

WEIGHT:
207215 LBS

X CG:
1080.4 IN



S122-E-007873 (11 Feb. 2008) --- Photographed from ISS, the station's robotic Canadarm2 moves the Columbus laboratory from Atlantis' payload bay to

BI-132

RSRM 99

ET-125

SLWT 29

ET IMPACT

MET 1:14:07

LAT:
36.619 S

LONG:
158.79 6W

51.6 (24)

DIRECT INSERTION

POST OMS-2:
124.0X118.8 NM

DEORBIT:
HA 187.6 NM
HP 23.1 NM

ENTRY VELOCITY:
25860 FPS

ENTRY RANGE:
4403 NM

OI-32 (2)

CARGO:
40296 LBS

PAYLOAD CHARGEABLE:
32941 LBS

DEPLOYED:
30657 LBS

NON-DEPLOYED:
2162 LBS

MIDDECK:
122 LBS

SHUTTLE ACCUMULATED WEIGHTS:
DEPLOYED:
1393585 LBS

NON-DEPLOYED:
1600348 LBS

CARGO TOTAL:
3862333 LBS

PERFORMANCE MARGINS (LBS):
FPR: 2651
FUEL BIAS: 1063
FINAL TDDP: 2402
RECON: 3435

PAYLOADS:
PLB:
ISS 1E (COLUMBUS MODULE)
ICC-LITE
ECSH
PDGF

MIDDECK:
ISS 1E
MAUI

5 CRYO TK SETS

RMS 78

ODS
OBSS
SSPTS

BRIEF MISSION SUMMARY: STS-122/1E (24th ISS mission) delivered the European Space Agency's Columbus research laboratory module to the ISS. Columbus, measuring 23 ft in length and 15 ft in diameter, is ESA's largest contribution to the expansion of the ISS. Also delivered were ESA experiments and two ESA astronauts with one of them to join the ISS crew for operation of Columbus research. This mission also saw the Columbus Control Center in Oberpfaffenhofen, near Munich, Germany, brought on-line for initial checkout and future operations of the laboratory.

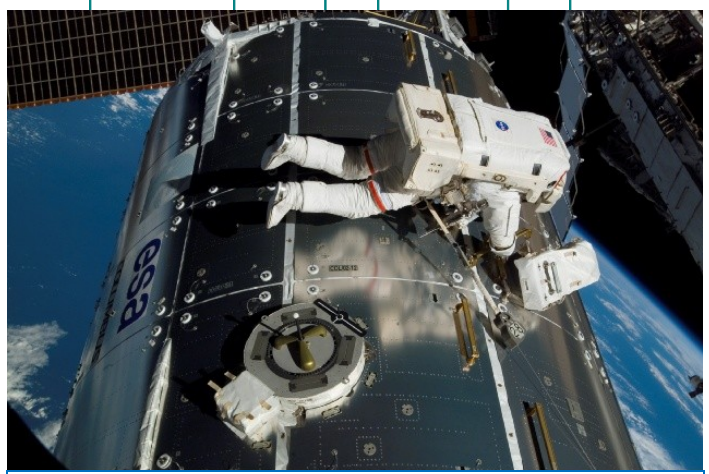
KSC W/D: OPF: 121, VAB HB-3: 7, PAD A: 76 = 204 Total Work Days (+1 holiday @ OPF Processing + 10 holidays + 4 contingency days @ PAD)

LAUNCH POSTPONEMENTS:
- Added STS-122 to FDRD - launch date of 10/17/07 on 10/05/06.
- Postponed to 12/06/07 on 04/16/07 due to STS-117 rollback.
- After 12/06/07 scrub, see LAUNCH SCRUBS below, launch was reset for 24-hr turnaround on Friday, 12/07/07.
- Later, on 12/06/07, during MMT Scrub Turnaround Meeting, it was decided to extend to a 48-hr turnaround for Saturday, 12/08/07 launch to allow additional time to address all concerns.
- At Friday, 12/07/07 MMT, it was determined that necessary discussion could not be finished in time for Saturday 12/08/07 launch attempt. The launch was moved to Sunday 12/09/07 with a new Launch Commit Criteria (for this launch only) requiring four of four valid ECO sensor readings (rather than three of four) prior to launch. In addition, the following two conditions were added: 1) Launch Window was limited to in-plane +1 minute (to provide additional ascent fuel margin), and 2) utilization of new in-flight ECO circuit voltage readings (successfully tested on STS-118 and STS-120 by ground flight controllers to recommend manual engine shutdown by the crew, if required.
- After second scrub on 12/09/07, see LAUNCH SCRUBS below, launch was rescheduled to NET 01/02/08 contingent on development and implementation of fuel ECO sensor system troubleshooting plan.
- Postponed to 01/10/08 on 12/13/07 dependent on resolution of the problem with the fuel sensor system. Slip was to allow "as many people as possible to have time with family and friends at the time of year when it means the most." Tanking test using add-on Time Domain Reflectivity (TDR) instrumentation on 12/18/07 isolated ECO Sensor System failures to open circuit in the three-part "pass-through connector." TPS removal on the tank was authorized at the pad to begin moving toward removal of the hardware, if required, to solve the problem. Launch date remained unchanged.
- Postponed to TBD on 01/03/08; however, PRCB

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (6+1 UP/6+1 DN) TITLE, NAMES, & EVA'S	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT INC	ORBIT HA/HP	FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
STS-122/ ISS 1E Continued...		Continued... SS EVA 116 DOCKED QUEST EVA 39 EMU/TETHERED EVA 109 SCHEDULED EVA 108 DURATION 7:25 MCC WHITE FCR (51) FLIGHT DIRECTORS: SHUTTLE: ASC - N. D. Knight LD/O1 - M. L. Sarafin O2 - A. J. Ceccacci PLNG - P. F. Dye ENT - B. C. Lunney MOD - P. L. Engelauf Team 4 - M. R. Abbott ISS: LD/O2 - S. P. Davis O1 - R. C. Dempsey O3 - J. R. Spencer Team 4 - K. L. Alibaruho IP FD - A. P. Hasbrook (I/F w/Columbus CC, Oberpfaffenhofen, Germany) CAPCOMS: SHUTTLE: A/E - J. P. Dutton - T. W. Virts (Wx) LD/O1 - K. A. Ford O2 - S. K. Robinson PLNG - S. W. Lucid Team 4 - N/A ISS: O1 - H. Getzelman LD/O2 - C. J. Cassidy O3/PLNG - C. E. Zajac Team 4 - N/A	Continued... SE PRESS 104 6:55 6:55 MECO CMD: 8:22.9 8:22.8 VI: 25819 25818 OMS-2: 37:46 37:40 159.6 FPS158.1 FPS	Continued... WINDS: 1.9T 0.6R KTS OFFICIAL: 31003P05 KTS 5H 2L KTS DENS ALT: 77 FT FLT DURATION: 12:18:21:39 S/T: 1137:06:46:18 OV-104: 258:07:05:40 DISTANCE: 5,296,842 sm TOTAL SHUTTLE DISTANCE: 461,345,650 sm							Continued... - New “work to” launch date of NET 02/07/08 established on 01/14/08. Testing of removed ECO connector confirmed problem in the connector. - Officially postponed launch to 02/07/08 on 01/28/08. Slip was due to ECO sensor problems experienced during December launch attempt and implementation of ECO sensor connector soldered mod. (Also, LCC went back to the standard three of four valid ECO sensor readings.) LAUNCH SCRUBS: - Thursday, 12/06/07 launch attempt was terminated 2 hours into tanking when two of four engine cutoff (ECO) low-level LH2 fuel sensors failed wet/dry test. (The 5% sensor also failed wet during drain-back.) The ECO sensors are required for backup engine shutdown command to avoid catastrophic failure in the event of early fuel depletion. Launch was scrubbed at 8:56 am CST. Technical Scrub. - Sunday, 12/09/07 launch attempt was terminated when one of previously failed sensors failed again during tanking, a couple of minutes into fast-fill. Engineers stated that the ET feedthrough and connector assembly was the most likely source of the problems. The 12/06/07 and 12/09/07 launch attempts produced previously unavailable time trending data that showed sensor faults occurring shortly before and after the feedthrough and connector were immersed in the super-cold propellants. Technical Scrub. LAUNCH WINDOW: - Total launch window was 10m1s with window open at 038:19:40:29Z and close at 038:19:50:30Z. Preferred Launch Time was 038:19:45:30Z (In-Plane Time) for a launch window of 5m1s. LAUNCH DELAYS: - None. Launch occurred on time at 038:19:45:30Z, 1:45:30 PM CST on Thursday 02/07/08. TAL WEATHER: Weather for the Transoceanic Abort Landing (TAL) sites during launch was benign. High pressure at the surface and aloft produced clear skies and light winds for Moron, Spain (MRN), Zaragoza, Spain (ZZA), and Istres, France (ISTRES). All three TAL sites were forecast GO throughout the launch count. Continued...



S122-E-008923 (15 Feb. 2008) --- Mission Specialist, Rex Walheim, performs work on the outside of the Columbus laboratory. Mission Specialist, Stanley Love (out of frame), shared this EVA with Walheim

SPACE SHUTTLE MISSIONS SUMMARY

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SPACE SHUTTLE MISSIONS SUMMARY

STS-122/ ISS 1E
Continued...

S122-E-008911 (15 Feb. 2008) --- ESA astronaut Hans Schlegel continues work aimed toward readying the new Columbus laboratory for duty.

Continued...

PERFORMANCE ENHANCEMENTS:
Include the standard set plus: 1) PE Operational High Q WIN/FEB, 2) OMS Assist, 3) a 52 nm MECO, and 4) Del Psi.

FLIGHT DURATION CHANGES/LANDING:
On FD4, MMT concurred with formally changing mission duration from 11+1+2 to 12+0+2 to honor ISSP request for extra docked day for commissioning Columbus. (Activity did not fit 11-day mission.)

On FD7, MMT concurred with extending the mission duration to 13+0+2 to provide additional time needed to complete the activation of the Columbus module. Landing day was moved to 02/20/08.

FIRSTS/LASTS:
- First flight ECO sensor connector soldered mod
- First flight of new RSRM Nozzle-to-Case J-leg Joint insulation configuration
- New Annex Flight Rule in place to outline operational use of ECO sensor voltage measurements
- Addition of the Modified Adjustable Protective Mitten Assemblies (APMA's) or Overgloves
- First operational support from the Columbus Control Center in Oberpfaffenhofen, Germany
- First reboost of ISS since December 2002
- Last Shuttle Mission for Shuttle Program Manager N. Wayne Hale, Jr., a 30-year veteran of NASA who helped lead the space agency's recovery from the 2003 Columbia Disaster.

MEMENTOS:
- Mementos carried aboard STS-122 included three green starter flags celebrating the 50th anniversary of NASA and the 50th running of the Daytona 500 NASCAR Race, a dried red rose to be woven into a NASA-themed 50th anniversary float for the Tournament of Roses Parade, and 20 ESA flags whose use will be to commemorate the addition of Columbus to the ISS.

NIGHT LAUNCH: N/A

RENDEZVOUS #69: Rendezvous and dock with ISS

EVENTS:
- OMS 2 ignition at 038:20:23:09.9Z resulted in a 124.4 by 118.7 nm orbit.
- SRMS OBSS/LDRI survey of nosecap and port and starboard wing RCC (WLE's) was completed.
- TI maneuver at 040:14:37:28Z resulted in a 184.0 by 176.0 nm orbit.
- R-Bar Pitch Maneuver was performed. No significant issues
- Docking Capture occurred at 040:17:17:20Z.
- Hard Dock occurred at 040:17:30:22Z (above the South Australian coast - Columbus reached its permanent home).
- ISS Hatch Open 12:40 PM CST, Saturday, 02/09/08 - welcomed by ISS Crew.

Continued...

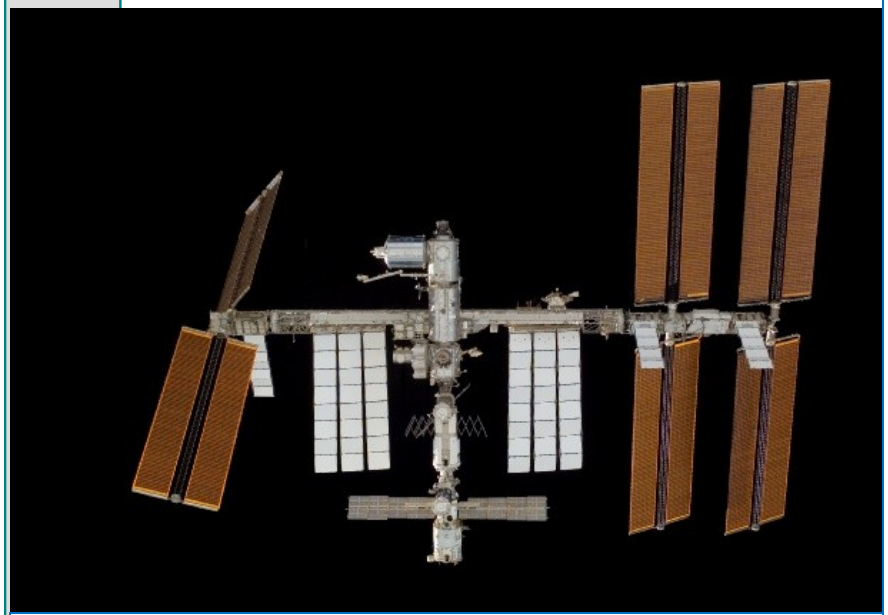
SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-122/ ISS 1E
Continued...



S122-E-011027 (18 Feb. 2008) --- The new ISS configuration is seen from Atlantis during separation.

NOTES:
- Landing occurred at KSC on Wednesday 02/20/08 at 9:07 AM EST, 46 years to the day after the first American, John Glenn, orbited the Earth.
- Daniel Tani returned home after 120 days.

SIGNIFICANT ANOMALIES:
Orbiter:
- Overexposed video due to suspect AVIU
- Fuel Cell 3 O2 flowmeter is erratic.
- During flight, Port AFT MPM Pedestal Stow indications came on approximately 11 hours after actual stow.
- SSOR #1 intermittent comm dropouts
- Suspect indication of possible IML crack on noted tile
- CCTV black and white video shows intermittent color.
- Mid Port Payload Bay Floodlight not illuminating

SRB:
- One of the three main parachutes on BI-132 LH showed significant damage in the canopy.

RSRM:
- Missing piece of forward factory joint weather seal, RSRM-99B

SSME: None

ET:
- ET-124 - Post Launch camera and film review showed LH2 acreage foam loss at Sta. 1160 during Launch.
- A crack in the +Y SRB Pal Ramp was observed prior to the ET-125 tanking test on 12/18/07.
- A crack in the +Y Longeron Closeout was observed during the post-drain walkdown after the ET-125 tanking test on 12/18/07.
- During the first launch attempt of ET-125 on 12/06/07, ECO/S #3 and #4 failed wet.
- STS-122/ET-125 launched on 02/07/08. Post Launch camera and film review showed LH2 acreage foam loss at Sta. 1145 during Launch.
- STS-122/ET-125 - Post Launch camera and film review showed TPS losses at the intertank to Lh2 flange closeout at two locations.

MOD:
- High-speed data dropouts during Launch
- Trajectory Server GPS time misconfiguration

Integration:
- Stinger tile observed falling after SSME startup
- Ku-Band radiated in Hi Power
- Unexpected debris/expected debris exceeding mass allowable prior to pad clearance (liftoff debris)

Continued...

- IELK Seat Liner Transfer at 040:23:20Z (5:20 PM CST, Feb. 9, 2008). At that time Daniel Tani became a member of STS-122 and Leopold Eyharts/ESA joined the ISS Expedition 16 as Flight Engineer.
- Due to crew health issue, EVA1 postponed from FD4 to FD5
- FD5 EVA 1: EV1 and EV3 (sub for EV2, health issue) performed Columbus prep activities: connected data, power, and communications lines; removed LTA cable and CBM seal cover; installed PDGF; performed NTA prep activities; and stowed OTSD. Columbus second stage bolting completed at 3:44 PM CST Monday, 02/11/08. EVA1 duration 7h58m
- FD7 EVA 2: EV1 and EV2 completed primary task to R&R a spent Nitrogen Transfer Assembly, outfit Columbus with trunnion covers, and repair Lab MMOD shield. EVA 2 duration 6hr45m
- The OMS Pod stinger tile was cleared for entry.
- FD9 EVA 3: EV1 and EV3 transferred SOLAR to Columbus, installed Columbus keel pin cover and handrail, transferred CMG to PLB, transferred EuTEF, and performed Airlock handrail damage swatch test. EVA 3 duration 7h25m
- EVA NOTE: One EMU glove from STS-122, S/N 6197, had a 3/16-inch hole in the Vectran of left thumb that wasn't seen until postflight inspections on the ground. S/N 6197 was Rex Walheim's left glove worn on all three EVA's (per STS-123 03/11/08 MMT notes).
- European Flight Controllers told the crew they had successfully completed initial activation of Columbus with the module's computer systems. German Chancellor Angela Merkel called to congratulate the crew.
- FD9: To clear the path to shoot down a crippled spy satellite, NASA agreed to open its California landing strip on Wednesday, 02/20/08 so Atlantis could land that day, even if weather was bad at KSC. "The reason is to give the military the biggest possible window and maximum flexibility to ensure the success of the satellite intercept" per Lead Shuttle Flight Director Sally Davis.
- Transfers:
  - Hardware transferred to ISS (outside and inside): 30404 lbs
  - Columbus - ESA Laboratory: 26627 lbs
  - Hardware/supplies transferred from ISS: 3585 lbs
  - H2O transferred to ISS: 1386 lbs
  - O2 transferred to ISS: 95 lbs
  - N2 transferred to ISS: 27 lbs
- FD10: Reboost at 047:12:17:00.0Z resulted in 187.8 by 177.6 nm orbit (first reboost since December 2002). ISSP estimated prop savings to get 400 lbs of logistics gains.
- Undocked at 049:09:24:40Z followed by a flyaround (1/2 lap)
- Separation Burn 1 at 049:10:34:02.0Z resulted in 188.1 by 175.8 nm orbit
- Separation Burn 2 at 049:11:01:30.0Z resulted in 187.9 by 175.5 nm orbit
- No communications blackout during Entry.

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-123/ ISS 1JA

SEQ FLT #122

KSC-122

PAD 39A-45

MLP-3

25TH SHUTTLE FLIGHT TO ISS

0V-105 (Flight 21) ENDEAVOUR

OMS PODS: LPO3-32 RPO4-28 FRC5-21

CDR:
Dominic L. Gorie (Flt 4 - STS-91, STS-99, STS-108)

P756/R242/V157/M211

PLT:
Gregory H. Johnson P757/R322/M278

MS 1/EV2:
Robert L. Behnken P758/R323/M279

MS 2/EV3:
Michael J. Foreman P759/R324/M280

MS 3:
Takao Doi, JAXA (Flt 2 - STS-87)

P760/R231/V195/M201

MS 4/EV1:
Richard M. Linnehan (Flt 4 - STS-78, STS-90, STS-109)

P760/R214/V150/M187

MS 5 UP/EV4/EXP 16/17 FLT ENG:
Garrett E. Reisman P761/R325/M281

MS 5 DN/EXP 16 FLT ENG:
Leopold Eyharts, ESA (UP on STS-122, Stay on ISS. Also flew on MIR Feb 1998.) P762/R321/M277

SS EVA 117
DOCKED QUEST EVA 40
EMU/TETHERED EVA 110
SCHEDULED EVA 108
DURATION 7:01

SSA EVA 118
DOCKED QUEST EVA 41
EMU/TETHERED EVA 111
SCHEDULED EVA 109
DURATION 7:09

Continued...

KSC 39A
071:06:28:14Z
2:28:14 AM EDT (P)
2:28:14 AM EDT (A)
Tuesday (17)
3/11/08 (9)

LAUNCH WINDOW:
4M54S
(PLT IN-PLANE)

EOM PLS: KSC
TAL: ZZA
TAL WX: BEN

SELECTED:
RTLS: KSC 15 N/N
TAL: ZZA 30L N/N
(MRN: NO-GO)
AOA: NOR 23 N/N
1ST DAY PLS: EDW 04 N/N

TDEL:
0.000 (P) -0.288 (A)

MAX Q NAV:
754.38 (P)
758.53 (A)

SRB STG:
2:05.44 (P)
2:04.64 (A)

PERF: NOMINAL

2 ENG TAL (ZZA):
2:39 (P)2:41 (A)

NEG RETURN:
3:54 3:55

PTA (U/S 158 FPS):
5:046 5:016

SE TAL (ZZA 104):
5:57 6:04

PTM (U/S 181 FPS):
6:05 6:03

SE PRESS 104:
6:56 6:57

Continued...

KSC 15 (KSC 68)
087:00:39:06Z
8:39:06 PM EDT
Wednesday (16)
03/26/08 (9)

DEORBIT BURN:
086:23:33:13.9Z

XRANGE:187.7 NM

ORBIT DIR: A/R (14)

AIM PT:
NOMINAL

MLGTD: 2174 FT
087:00:39:06Z
VEL: 202 KGS
200 KEAS
HDOT: -1.8 FPS

TD NORM 195:
2707 FT

DRAG CHUTE:
DEPLOY: 192 KEAS
087:00:39:10Z
NLGTD: 5351 FT
087:00:39:16Z
VEL: 161 KGS
158 KEAS
HDOT: -4.6 FPS

BRK INIT: 57 KGS

DRAG CHUTE JETTISON: 58 KGS
087:00:39:55Z

BRK DECEL FPS^2:
AVE 2.7 PK 4.1

WHEELS STOP:
087:00:40:36Z
13629 FT

ROLLOUT:
11455 FT
1:30 M:S

Continued...

104/104/109%

PREDICTED:
100/104.5/104.5/72/104.5

ACTUAL:
100/104.5/99/
72/104.5

1 = 2047 (11)
2 = 2044 (10)
3 = 2054 (7)

M 3 EOM:
WEIGHT:
208629.5 LBS
X CG:
1080.57 IN

LANDING:
WEIGHT:
208762 LB
X CG:
1081.8 IN

BI-133

RSRM 101

ET-126

SLWT 30

ET IMPACT:

MET 1:14:05

LAT:
36.723 S

LONG:
158.957W

51.6 (25)

DIRECT INSERTION

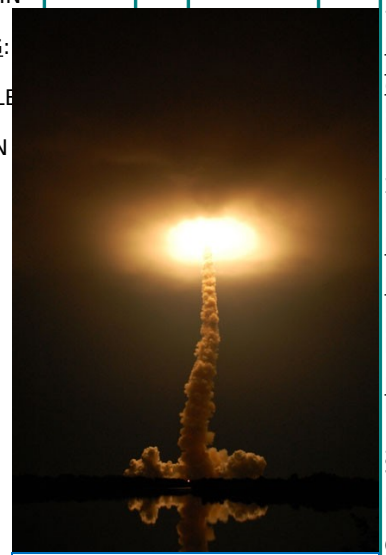
POST OMS-2:
124.9X84.8 NM

DEORBIT:
HA 190.0 NM
HP 22.5 NM

ENTRY VELOCITY:
25859 FPS

ENTRY RANGE:
4402 NM

OI-32 (3)



STS123-S-009 (11 March 2008) --- Overcast clouds at 6500 ft provided a spectacular night image as the clouds

CARGO:
38915 LBS

PAYLOAD CHARGEABLE:
30762 LBS

DEPLOYED:
29442 LBS

NON-DEPLOYED:
1132 LBS

MIDDECK:
188 LBS

SHUTTLE ACCUMULATED WEIGHTS:

DEPLOYED:
1423027 LBS

NON-DEPLOYED:
1601668 LBS

CARGO TOTAL:
3901248 LBS

PERFORMANCE MARGINS (LBS):
FPR: 2651
FUEL BIAS: 1063
FINAL TDDP: 2109
RECON: 5128

PAYLOADS:

PLB:
ISS-1JA (JAXA LOGISTICS MODULE)

MIDDECK:
ISS-1JA

5 CRYO TANK SETS

RMS (79)

ODS
OBSS
SSPTS

BRIEF MISSION SUMMARY: STS-123/1JA (25th ISS mission) delivered the first pressurized component of the Japanese Kibo Laboratory to ISS, delivered a Canadian robotic device called Dextre, and provided five spacewalks. Endeavour's 16-day flight was the longest shuttle mission to the ISS. The Japanese Experiment Logistics Module Pressurized Section (ELMPS or JLP), the smaller of two pressurized modules of Kibo, was attached temporarily to a docking port on the space-facing side of Harmony. Kibo, which means "hope," is the major Japanese (JAXA) contribution to the Station, and will increase its research capability in a variety of disciplines. The robot Dextre is designed somewhat like the human form with a torso, a head area (camera), and arm appendages. It rides on the SSRMS as a "dexterous tool for ORU changeout without requiring a space walk." This mission included representation of all five Station partner interests - the U.S., Japan, Canada, Russia, and the European Space Agency (ESA).

KSC W/D: OPF: 159, VAB HB-1: 7, PAD A: 23 = 189 Total Work Days (+ 14 holidays @ OPF)

LAUNCH POSTPONEMENTS:
- Added STS-123 to FDRD - launch date of NET 12/08/07 on 11/14/06
- Postponed to 02/14/08 on 04/16/07. Slip due to STS-117 rollback
- Postponed to 03/11/08 on 01/28/08. Slip due to ECO sensor problems experienced during December launch attempt of STS-122

LAUNCH SCRUBS: None

LAUNCH WINDOW:
Total launch window was 9 minutes 44 seconds with window open at 071:06:23:20Z and close at 071:06:33:04Z. Preferred Launch Time was 071:06:28:14Z (In-Plane Time) for a launch window of 4m54s.

Chief Astronaut Steve Lindsey flying the Shuttle Training Aircraft said, "It's a really nice night out here." PAO: "Florida's east coast is about to get an early sunrise!"

LAUNCH DELAYS: None. Launch occurred on time at 2:28 a.m. EDT, Tuesday, March 11, 2008. An eclipse of the GOES-East weather satellite prevented using any satellite imagery in the hour prior to launch. Fortunately, the low clouds remained well behaved as skies were cloudy but above the range safety and Return to Launch Site (RTLS) cloud ceiling limits.

Continued...

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-123/ ISS 1JA
Continued…

Continued…

SS EVA 119
DOCKED QUEST EVA 42
EMU/TETHERED EVA 112
SCHEDULED EVA 110
DURATION 6:47

SS EVA 120
DOCKED QUEST EVA 43
EMU/TETHERED EVA 113
SCHEDULED EVA 111
DURATION 6:24

SS EVA 121
DOCKED QUEST EVA 44
EMU/TETHERED EVA 114
SCHEDULED EVA 112
DURATION 6:02

MCC WHITE FCR (52)

FLIGHT DIRECTORS:
SHUTTLE:
ASC - B. C. Lunney
LD/O1 - M. P. Moses
O2 - R. E. LaBrode
PLNG - M. R. Abbott
ENT - R. S. Jones
MOD - P. L. Engelauf
Team 4 - R. S. Jones/ A. J. Ceccacci

ISS:
LD/O2 - D. J. Weigel
O1 - K. L. Alibaruho
O 3 - G. Kerrick
Team 4 - H. L. Rarick
IP FD - E. J. Nelson (I/F w/CSA & JAXA)

CAPCOMS:
SHUTTLE:
A/E - J. P. Dutton
K. A. Ford (Wx)
LD/O1 - T. W. Virts
O2 - N. J. Patrick
PLNG - B. A. Drew
Team 4 - N/A

Continued…

Continued…

MECO CMD:
8:23.6 8:22.6

VI:
25819 25817.6

OMS-2:
38:15 38:30
97.4 FPS 96.1 FPS

Continued…

WINDS:
1.5T 1.3L KTS
OFFICIAL:
01002P03 KTS
2H 2R KTS

DENS ALT:-336 FT

FLT DURATION:
15:18:10:52

S/T:
1153:00:57:10

OV-105:
235:02:18:33

DISTANCE:
6,577,857 sm

TOTAL SHUTTLE DISTANCE:

ISS016-E-032598 (12 March 2008) --- The Canadian-built Dextre robotic system and the Japanese Kibo laboratory (JLP) are visible in Endeavour's cargo bay on approach to ISS.

Continued…

TAL WEATHER:
Weather at the TAL sites was tricky as showers were monitored near Zaragoza, Spain and Istres, France during the launch countdown. Post cold front low level wind flow from the northwest brought showers to the windward sides of the Pyrenees and central French mountains. These showers dissipated as they crossed the high terrain. TAL weather was GO.

PERFORMANCE ENHANCEMENTS:
Include the standard set plus: 1) PE Operational High Q WIN/MAR, 2) OMS Assist, 3) A 52 nm MECO, and 4) Del Psi

FLIGHT DURATION CHANGES/LANDING:
Deorbit burn was planned for 086:21:58:14Z. Due to low clouds moving in at KSC, the deorbit burn was delayed to second opportunity at 086:23:33:13.9Z. Landing occurred at 087:00:39:06Z, Wednesday, 03/26/08, at 8:39:06 PM EDT.

FIRSTS/LASTS:
- First 16-day Space Station Assembly Mission, 12 days docked. (Longest mission is STS-67 - Spacelab, 16D 21H 47M 35S.)
- Tied the current mission record of five spacewalks held by the HST Servicing Missions (STS-61, STS-82, and STS-109). Most EVA's docked to ISS.
- A redesign to RSRM Nozzle Joints 2 and 5, the latter with an additional bolt enhancement, follows up the new Nozzle-to-Case J-leg Joint insulation configuration that debuted on STS-122's motors.
- First flight of a lighting system derived from an off-the-shelf flash (Nikon SB800) was added to a digital camera (in orbiter umbilical well) to capture photos of ET after separation for about 130 ft away.
- This is the last modified tank (before Columbia) and the next will be a tank built with all mods done in line.
- First on-orbit test of orbiter tile repair technique.
- First time the OBSS was left on the Station so that the next flight can deliver the large JAXA Kibo module.
- This mission marks a significant milestone with the inauguration of the JAXA IP support to real-time operations, adding them to the fold with ESA, CSA, and Russia. "We have reached a new pinnacle in the 'international' part of the Space Station operations."
- Spacelab Logistics Pallet (SLP) used by Dextre made its fourth and final flight to space, "concluding a long history that can be traced back before the first shuttle left the launch pad." - PAO.
- First flight with John Shannon as Shuttle Program Manager.

NOTE: The unmanned cargo ship Jules Verne, the ESA's first Automated Transfer Vehicle (ATV), launched toward ISS on March 7. It was parked well away from ISS at a safe distance

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

STS-123/ ISS 1JA
Continued...

Continued...

ISS:
O1 - Z. Jones
LD/O2 - S. K. Robinson
O3 - M. T. Vande Hei
Team 4 - R. C. Dempsey

S123-E-007088 (18 March 2008) --- Canada's two armed robot, Dextre, is shown in the grasp of the station's robotic Canadarm2.

Continued...

NIGHT LAUNCH #30: Shannon: "We are launching in the dark."

NIGHT LANDING KSC #16: (#22 in Shuttle history)

RENDEZVOUS #70: Rendezvous and dock with ISS

EVENTS:
- OMS2 ignition at 071:07:06:44.0Z resulted in a 124.9 by 84.8 nm orbit.
- SRMS OBSS/LDRI survey of nosecap and port and starboard wing RCC (WLE's) was completed.
- TI maneuver at 073:00:42:21.9Z resulted in a 186.3 by 180.6 nm orbit.
- R-Bar Pitch Maneuver was performed. No issues
- Docking contact occurred at 073:03:46:54Z.
- Hard Dock occurred at 073:04:02:11Z
- ISS Hatch opened at 073:05:36:00Z, 12:36 AM CDT, Thursday, March 13, 2008, ISS crew welcoming
- IELK Seat Liner Transfer at 073:07:50Z (2:50 AM CDT, March 13, 2008). At that time Leopold Eyharts/ESA became a member of STS-123 and Garrett Reisman joined the ISS Expedition 16/17 as Flight Engineer.
- The first transfer item after hatch opening was swapping Garrett Reisman/MS for Leopold Eyharts (ESA)/Expedition 16 FE. The transfer was official when the form-fitting Soyuz seatliners were swapped. Eyharts spent 33 days as a member of ISS Expedition 16. With the on-time landing of March 26, Eyharts spent a total of 48 days in space.
- FD4/5: EVA 1: EV1 & EV4: JLP prepped for unberthing, shuttle robot arm grappled JLP, Orbital Replacement Unit (ORU) and Tool Changeout Mechanism installed on the Canadian Special Purpose Dexterous Manipulator (SPDM or Dextre) arm 2 and arm 1, shuttle arm unberthed JLP, and shuttle arm installed JLP onto Harmony zenith port (temporary location until Kibo delivery on STS-124). Unable to provide keep-alive power to SPDM (later determined to be flawed cable in pallet). EVA 1 duration 7:01
- FD6: While Expedition 16 and STS-123 crewmembers brought the Kibo logistics module to life, Dextre's power supply unit was brought to life via the SSRMS.
- FD6: EVA 2: EV1 & EV3: EVA ran long due to problems with the SPDM Arm Expandable Diameter Fasteners (EDF's) not releasing per procedure. Crew ended up using a pry bar. Time didn't permit removing some of the SPDM blankets. EV3 experienced RTV delamination. Per Rule {1JA_C2-105}, EMU OVERGLOVE EXCEPTIONS, crew continued the SPDM assembly task without donning overgloves due to the thermal constraints on SPDM. EV3 donned overgloves once the thermal critical tasks were complete. ISS multimeter was repaired and would later be swapped with shuttle multimeter prior to hatch closure. Installed the Node 2/JLP vestibule barrier assembly. EVA 2 duration 7:09

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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SPACE SHUTTLE MISSIONS SUMMARY

STS-123/ ISS 1JA
Continued...

S123-E-009262 (24 March 2008) --- The ISS latest configuration is viewed from Endeavour post-separation.

SIGNIFICANT ANOMALIES:
Orbiter:
-Sensor Unit S/N 1150 on the port wing had excessive triggers (quantity 4452) during the first hour of MMOD monitoring for Late Inspection.
-Integrated Sensor Inspection System Sensor Pack 1 Pan Tilt Unit 10 degrees offset
-DCS OI1 card 1 failure
-FES shutdown on Primary A Controller
-GG Chamber pressure indicated a shift upward
-APU 1 fuel tank pressure decay
-LH OMS Pod mid surface temperature
-Sensor Unit 1150 (Ref Des: 65V08A01) on the port wing
-APU 3 seal cavity drain line pressures indicate slow decay.
-Body Flap tile damage
-Aft arrowhead damage
-STBD FWD RAD Retract Flexhose did not fully retract into RRSC (ref SPC# 205181853).
-APU 1 Gas Generator Chamber Pressure Transducer shift
-Cabin Temp Controller 1 noisy
-MPS E-3 LOX Inlet pressure showed a shift of 30 psi at Liftoff.
-MADS PCM MSRMNT gradually and abruptly moved to OSH throughout the MADS and MMU1/SSR1 recording phase.
-Lost OMS POD (RH OMS024) putty repair
-Damage to the V070-391044-174 (BRI-18) tile
-Damage to the V070-191101-043 (BRI-18) tile
SRB:
-Loss of data from SRB RH ET Observation Camera during Ascent
RSRM: None
SSME: None
ET: None
MOD:
-White-VTS-Servers hung
Integration:

Continued...

- FD8: RTV Loss in EVA Gloves: EV3's gloves were NO-GO for subsequent EVA's. First spare set used on EVA 4.
- FD8: EVA3: EV1 & EV2: Finished assembly of Dextre, including installation of tool holder assembly and a Camera Light Pan Tilt Assembly (CLPA) which serves as Dextre's eyes. Also, the Spacelab Logistics Pallet used for assembly was prepared for return to shuttle cargo bay. Attempted to install MISSE-6 experiment (unsuccessful - moved to EVA5). EVA 3 duration 6:53
- FD10: Japanese Prime Minister called to congratulate the crew.
- FD10: During press interview, asked to describe the fast-growing Space Station, Reisman said the crew was struck by the view during final approach and similarities with the famous Space Station scene in the movie "2001: A Space Odyssey" by Stanley Kubrick and Arthur C. Clarke. Clarke died during this mission on 3/19/08 at the age of 90. Clarke in "First on the Moon" stated, "The inspirational value of the space program is probably of far greater importance to education than any input of dollars...a whole generation is growing up which has been attracted to the hard disciplines of science and engineering by the romance of space."
- FD11: EVA4: EV2 & EV3: Tasks were Remote Power Control Module removal and replacement, and the Tile Repair Ablator Dispenser (T-RAD) detailed test objective worksite setup and demonstration. The demonstration was considered a "huge" success, but needs results from post-landing detailed analysis. EVA 4 duration 6:24
- FD13: EVA 5: EV2 & EV3: Primary tasks completed were positioning of OBSS to temporary home on ISS truss, installation of MISSE-6 experiment, and inspection of SARJ. EVA 5 duration 6:02
- FD14: Conducted Rigidizable Inflatable Gas Experiment (RIGEX) funded by the Air Force. RIGEX was designed to test how well ground models and computer simulations predict what happens to the inflated structures in weightlessness. Once rigid, the sample tubes aboard Endeavour were blasted with vibrations to test their structural integrity. The experiment was returned to Earth aboard the shuttle for further scientific analysis.
- Transfers:
  - Hardware transferred to Station (outside and inside): 25839 lbs
  - Hardware transferred to Station (outside): 23776 lbs
  - Hardware transferred to Station (inside): 1432 lbs
  - Japanese pressurized logistics module: 18377 lbs
  - Dextre - Special Purpose Dexterous Manipulator: 3431 lbs
  - Middeck items returned from ISS aboard Endeavour: 1565 lbs
  - Water transferred to Station: 608 lbs
  - Oxygen transferred to Station: N/A
  - Nitrogen transferred to Station: 23 lbs
- Undocked at 085:00:25:00Z followed by a

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-124/ ISS 1J

SEQ
FLT# 123

KSC-123

PAD 39A-46

MLP-3

26TH SHUTTLE FLIGHT TO ISS

OV-103 (Flight 35) DISCOVERY

OMS PODS:
LPO1-38
RPO3-36
FRC3-35

CDR:
Mark E. Kelly (Flt 3 - STS-108, STS-121)

P763/R271/V181/M237

PLT:
Kenneth T. Ham
P764/R326/M282

MS 1/Robotics:
Karen L. Nyberg
P765/R327/F45

MS 2/EV2:
Ronald J. Garan
P766/R328/M283

MS 3/EV1:
Michael E. Fossum (Flt 2 - STS-121)

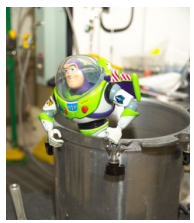
P767/R296/V196/M259

MS 4/Robotics:
Akihiko Hoshide (Japan)
P768/R329/M284

MS 5 UP/Stay as EXP 17/18 FLT ENG:
Gregory E. Chamitoff
P769/R330/M285

MS 5 DN/EXP 16/17 FLT ENG:
Garrett E. Reisman (Up on STS-123, stay ISS)
P770/R325/M281

SPECIAL EDUCATOR
"Buzz" Lightyear (UP/EXP 18)
See "Firsts"



Continued...

KSC 39A
152:21:02:12Z
5:02:12 PM EDT (P)
5:02:12 PM EDT (A)
Saturday (7)
05/31/08 (7)

LAUNCH WINDOW:
6M 47S (PLT IN-PLANE)

EOM PLS: KSC
TAL: MRN
TAL WX: FMI

SELECTED:
RTLS: KSC 15 N/N
TAL: MRN 20 N/N
(ZZA NO-GO)
AOA: KSC 15 N/N
1ST DAY PLS:
EDT 22 N/N

TDEL:
0:000(P) - 0.508(A)

MAX Q NAV:
715.16(P) 701.98(A)

SRB STG:
2:03:36(P) 2:02.56(A)

PERF:
NOMINAL

2 ENG TAL (ZZA):
2:48(P) 2:47(A)

NEG RETURN:
3:48 3:55

PTA (U/S 159 FPS):
5:19 5:23

SE TAL (FMI 104):
6:08 6:13

PTM (U/S 180 FPS):
6:18 6:29

SE PRESS 104
7:01 7:07

MECO CMD:
8:24 8:26.3

Continued...

KSC 15 (KSC 69)
166:15:15:18Z
11:15:18 AM EDT
Saturday (22)
06/14/08 (8)

DEORBIT BURN:
166:14:10:12Z

XRANGE:270.2 NM

ORBIT DIR: A/L 39

AIM PT:
NOMINAL

MLGTD: 2100 FT
166:15:15:17Z
VEL: 209 KGS 208 KEAS
HDOT: -2.1 FPS

TD NORM 195:
3172 FT

DRAG CHUTE DEPLOY:
194 KEAS
166:15:15:20Z

NLGTD: 5601 FT
166:15:15:28Z
VEL: 155 KGS 148 KEAS
HDOT: -7.0 FPS

BRK INIT: 77 KGS

DRAG CHUTE JETTISON:
54 KGS
166:15:15:59Z

BRK DECEL FPS^2:
AVE 4.8 PK 6.3

WHEELS STOP:
166:15:16:19Z
11421 FT

ROLLOUT:
9321 FT
1:02 M:S

Continued...

104/104/109%

PREDICTED:
100/104.5/104.5/72
104.5

ACTUAL:
100/104.5/104.5/72
104.5

1 = 2051 (7)
2 = 2048 (8)
3 = 2058 (2)

M 3 EOM:

WEIGHT:
203604.5 LBS

X CG:
1088.03 IN

LANDING:

WEIGHT:
203558.5 LBS

X CG:
1090.00 IN

"Shuttle launch exhaust thrust damaged flame trench and blasted bricks and other debris beyond a perimeter fence some 1,800 feet from

BI-134

RSRM 102

ET-128

SLWT 31

ET IMPACT

MET 1:14:18

LAT:
36.362 S

LONG:
158.449W

51.6 (26)

DIRECT INSERTION

POST OMS-2:
170.3x125.0 NM

DEORBIT:
HA 190.6 NM
HP 23.3 NM

ENTRY VELOCITY:
25866 FPS

ENTRY RANGE:
4396 NM

OI-32 (4)

CARGO:
41997 LBS

PAYLOAD CHARGEABLE:
33969 LBS

DEPLOYED:
33890 LBS

NON-DEPLOYED:
0 LBS

MIDDECK:
79 LBS

SHUTTLE ACCUMULATED WEIGHTS:
DEPLOYED:
1456917 LBS

NON-DEPLOYED:
1601747 LBS

CARGO TOTAL:
3943245 LBS

PERFORMANCE MARGINS (LBS):
FPR: 2651
FUEL BIAS: 1063
FINAL TDDP: 1308
RECON: 2513

PAYLOADS:
PLB:
ISS 1J

MIDDECK:
ISS 1J
MAUAI

5 CRYO TK SETS

SRMS (80)
ODS, OBSS (Return Only)
SSPTS

BRIEF MISSION SUMMARY: STS-124/1J (26th ISS mission) delivered the second and main segment of the Japanese (JAXA) Station Kibo (Hope) Laboratory. This segment known as the Japanese Pressurized Module (JPM) is the ISS's largest laboratory measuring 14.4 feet in diameter and 36.7 feet long. The Kibo complex also includes: An airlock and two robotic arms also delivered on this flight; the Japanese Experiment Logistics Module Pressurized Section (JLP) launched on STS-123; and an exterior platform for experiments exposed to space, scheduled for delivery on STS-127. The STS-124 mission is the first in which the JAXA Flight Control Team activated and controlled a module from Kibo Mission Control in Tsukuba, Japan. Also, as the STS-124 launch countdown got underway, a special Russian pump was added to Discovery's manifest to fix "a balky toilet" on the ISS.

KSC W/D: OPF: 157, VAB HB-1: 7, PAD A: 29 = 193 Total Work Days (+ 13 Holidays @ OPF)

LAUNCH POSTPONEMENTS:
- Added STS-124 to FDRD - launch date of 02/28/08 on 02/20/07.
- Ppd. to 04/24/08 on 04/16/07. Slip due to STS-117 rollback.
- Ppd. to 05/25/08 on 03/07/08. Slip due to ET delivery delay and Beta Angle restriction.
- Ppd. to 05/31/08 on 04/03/08. Slip due to adverse weather conditions affected on dock delivery date of ET-128.

LAUNCH SCRUBS: None

LAUNCH WINDOW:
Total launch window was 7 minutes 45 seconds with window open at 152:21:01:14Z and close at 152:21:08:59Z. Preferred Launch Time was 152:21:02:12Z (In-Plane Time) for a launch window of 6m47s.

LAUNCH DELAYS: None.
Launch occurred on time at 152:21:02:12Z, 5:02:12 p.m. EDT, Saturday, May 31, 2008. On launch day, the seabreeze pushed across KSC with showers just west of the launch pad several hours before launch time. However, the seabreeze had pushed west of KSC by early afternoon with near ideal conditions for launch. Thunderstorms were occurring over central Florida but were well outside the 20 nautical mile thunderstorm flight rule limit. "Nice day to send 'Hope' to the ISS" – PAO. Cain**:** "If you watched today, you saw a flawless countdown."

Continued...

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

FLT	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,
NO.		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-124/ ISS 1J
Continued...

Continued...

SS EVA 122
DOCKED QUEST EVA 45
EMU/TETHERED EVA 115
SCHEDULED EVA 113
DURATION 6:48

SS EVA 123
DOCKED QUEST EVA 46
EMU/TETHERED EVA 116
SCHEDULED EVA 114
DURATION 7:11

SS EVA 124
DOCKED QUEST EVA 47
EMU/TETHERED EVA 117
SCHEDULED EVA 115
DURATION 6:33

MCC WHITE FCR (53)

FLIGHT DIRECTORS:
SHUTTLE:
ASC - N. D. Knight
LD/O1 - M. R. Abbott
O2 - M. L. Sarafin
PLNG - P. F. Dye/ A. J. Ceccacci
ENT - R. S. Jones
MOD - J. A. McCullough
Team 4 - R. E. LaBrode

ISS:
LD/O2 - A. P. Hasbrook
O1 - R. C. Dempsey
O3 - E. J. Nelson
Team 4 - B. T. Smith
IP FD - H. E. Ridings (I/F w/JAXA)

Continued...

Continued...

VI:
25819 25820

OMS-2:
37:20 37:21
250.7 FPS 249.1 FPS

Continued...

WINDS:
0 KT 5 L KTS
OFFICIAL:
07007P12 KTS
1H 12L KTS

DENS ALT:
1748 FT

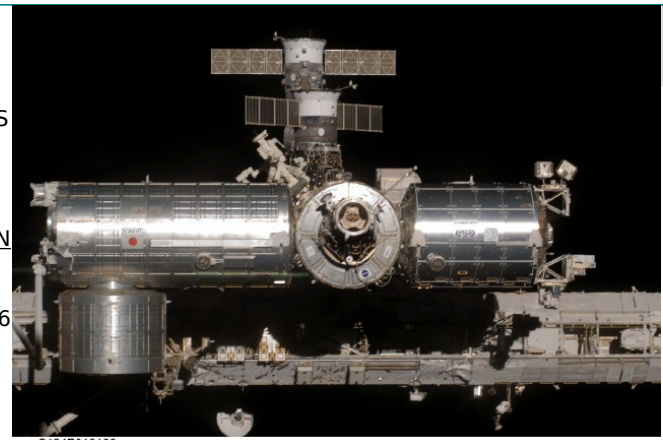
FLT DURATION:
13:18:13:06

S/T:
1166:19:10:16

OV-103:
305:08:10:09

DISTANCE:
5,735,643 sm

TOTAL SHUTTLE DISTANCE:
473,659,150 sm


S124E010186

S124-E-010186 (11 June 2008) --- The Kibo laboratory (center left) is shown attached to the port side of the Harmony Node with: Kibo logistics module at bottom left, Columbus lab at center right, and at top center is

S124-E-006279 (4 June 2008) --- JAXA astronaut Akihiko Hoshide works in the newly installed Kibo IPM.

Continued...

TAL WEATHER:
The TAL weather conditions were rather challenging. An upper low had been spinning over Spain for several days, drifting slowly to the northwest. Timing differences in the models made forecasting where precipitation would develop difficult. Initially on L-2 day, NO-GO forecasts were issued for Moron and Zaragoza, Spain with a GO forecast for Istres, France. Shuttle launches require only one of the three TAL sites have GO weather. As the upper low began to finally move to the northwest, forecasts were updated to GO for Moron, but a NO-GO for Istres. On launch day, Moron weather remained favorable and conditions at Istres improved and were GO. Zaragoza was observed NO-GO at TAL landing time.

PERFORMANCE ENHANCEMENTS:
Include the standard set plus: 1) PE Operational High Q TRN/JUN, 2) OMS Assist, 3) A 52 nautical mile MECO, and 4) Del Psi.

FLIGHT DURATION CHANGES/LANDING: None

FIRSTS/LASTS:
- First flight of an ET built from scratch with all of the safety modifications stemming from the 2003 Columbia accident. "This essentially is the completed return-to-flight tank," Shannon.
- First docking of Shuttle while ATV also docked to ISS.
- First OBSS transfer from ISS to Orbiter.
- First Post-Undock Inspection (Orbiter heat shield) will be the full “FD2 Inspection” done on previous missions.
- First flight of Modified EMU gloves: includes addition of Turtleskin™ patches to thumb and index finger – to provide increased protection against cuts.
- A first: NASA and Disney joined forces for education. “Buzz Lightyear,” a 12-inch tall action doll, based on the cartoon character from the Pixar Studios Toy Store animated movies was delivered to the ISS for a 6-month stay. While on ISS, Lightyear will demonstrate zero gravity to elementary school children.

NIGHT LAUNCH: N/A

RENDEZVOUS: #71 - Rendezvous and dock with ISS

Continued...

SPACE SHUTTLE MISSIONS SUMMARY

FLT	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,
NO.		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-124/ ISS 1J
Continued...

Continued...

CAPCOMS:
SHUTTLE:
A/E - T. W. Virts
- K. A. Ford (Wx)
LD/O1 - N. J. Patrick
O2 - B. A. Drew
PLNG - S. W. Lucid
Team 4 - N/A

ISS:
O1 - M. T. Vande Hei
LD/O2 - C. J. Cassidy
O3/PLNG - M. C. Jensen
Team 4 - N/A


S124E009982

S124-E-009982 (11 June 2008) --- View of ISS configuration post Shuttle sep shows Kibo attached to Harmony at bottom center with first ESA ATV Docked at top center.

Continued...

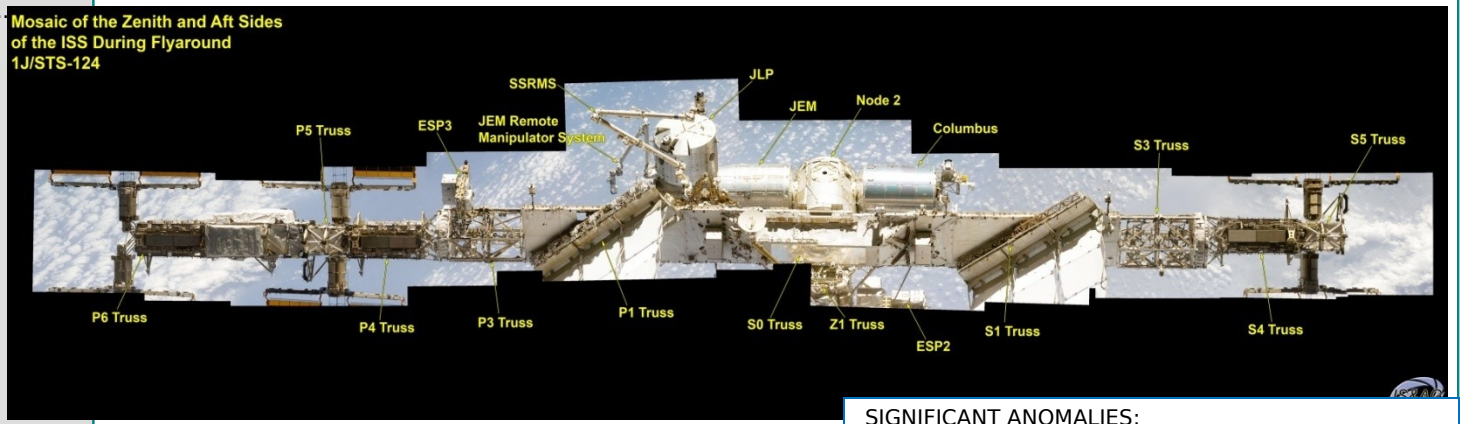
EVENTS:
- Shuttle launch sent asbestos 1,800 feet from pad. The 6 million pounds of thrust from Discovery's engines, channeled by the flame trench, blasted bricks, concrete rubble, and asbestos beyond a perimeter fence some 1,800 feet away. Bricks and some asbestos landed in a retention pond behind the fence. No damage to Shuttle.
- OMS2 ignition at 152:21:39:32.5Z resulted in a 170.3 by 125.0 NM orbit.
- NOTE: SRMS OBSS/LDRI survey of nosecap and port and starboard wing RCC (WLE's) was not performed until post undocking (no OBSS on Shuttle).
- FD2: TI Maneuver at 154:15:16:26.0Z resulted in a 183.9 by 182.2 NM orbit.
- R-Bar Pitch Maneuver was performed. No issues
- FD3: Docking Contact occurred at 154:18:03:20Z
- Hard Dock occurred at 154:18:16:30Z.
- ISS Hatch opened at 154:19:30:00Z, 2:30 PM CDT, Monday, June 02, 2008; welcomed by ISS crew.
- IELK Seat Liner Transfer at 154:22:35Z (5:35 PM CDT, June 2, 2008). At that time Garrett Reisman became a member of STS-124 and Greg Chamitoff joined the ISS Expedition 17 as Flight Engineer.
- FD4: EVA 1: EV1 & EV2: EVA 1 egress was delayed by about 1 hour to reconnect EV1's comm cap - lost comm during pre-breathe. EV1 & EV2, Fossum and Garan, prepared the Kibo (JPM) for its removal from the Shuttle payload bay, disconnecting cables and removing covers. JAXA MS/Hoshide and MS/Nyberg robotically removed Kibo from the Shuttle P/L bay and latched it to Harmony, Node 2. Hoshide noted: "We have a new 'Hope' on the ISS." EV1 & EV2 assisted in the transfer of the OBSS from its ISS stored position (since STS-123) back to the Shuttle. The OBSS would be used with the shuttle robotic arm on FD12 to inspect the Orbiter heat shield. EV1& EV2 also demonstrated a technique that could be used to clean the starboard SARJ, which has had limited capability for several months. EV2 installed a new bearing and EV1 verified by inspection that a spot on earlier EVA's was a divot. This will feed into further analysis of the origin of the damage. EVA 1 duration 6:48.
- FD4: Based on review of launch imagery, the MMT decided that the focused inspection of the Orbiter heat shield was not required.
- FD6: EVA 2 - Garan and Fossum outfitted the outside of the JPM, installing covers and external television equipment and removing thermal covers and insulation on the JAXA RMS and top hatch. They also loosened bolts holding two Nitrogen Tank Assemblies in place on the Station's truss. Those tanks will be swapped during EVA 3. They also retrieved a failed external television camera from the port truss. In addition, Fossum inspected the left SARG, which had been performing perfectly. No shavings or debris were found, but photos were taken to be sent to the ground for review. EVA 2 duration 7:11.

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-124/ ISS 1J
Continued...



SIGNIFICANT ANOMALIES:
Orbiter:
- TCS Dropouts during Rendezvous
- Engine # 2 Dome Heat C/P Tile Damage
- Imagery Showed F3D (V070-421558-024) and F44 (V070-421558-025) Tyvek Rain Covers Released Late
- IMU 1 Z Gyro excessive drift
- The Left Hand ET Door BRI-18 Tile V070-395055-255
- Rudder Speed Brake Thermal Tab found dislodged and floating
- A buildup of ceramic adhesive identified under the Thermal Barrier
- Closed 2 Indication failed to Transfer On when door was closed
- Crew reported difficulty latching the External Airlock Upper Hatch prior to Undocking

KSC:
- STS-124 Pad debris items

SRB:
- STS-124/BI-134rh Data Acquisition System failed to record video and obtained erroneous Accelerometer data

RSRM: None. SSME: None. MOD: None
ET:
- STS-124/ET-128 Post-Launch Camera Film Review showed two foam losses (80971008428-510) on Xt 1129 LO2 Feedline Support Fitting Closeout

Integration:

Continued...

- FD9: EVA 3: Garan and Fossum began the EVA 30 minutes ahead of schedule. The EVA was highlighted by Garan's dramatic robot ride some 80 feet over the top of the ISS to replace a 550 lb nitrogen tank on the starboard truss. The ride was dubbed the "windshield wiper maneuver" or as Mark Carreau (Houston Chronicle) headlined it: "Wild robot-arm ride caps workday at Space Station." Fossum returned to the port SARJ (inspected on EVA 2) taking particulate matter from inside the joint, using a strip of tape that was returned to Earth for analysis. He also removed thermal insulation from the Kibo robotic arm's wrist and elbow cameras and launch locks from one of the Kibo windows and deployed debris shields on Kibo. Other tasks by the pair included: The repaired video camera retrieved on EVA 2 was re-installed and several extra tasks (installation of thermal cover on Harmony, relocation of foot restraint aid, and removal of SARJ launch lock) were conducted. EVA 3 duration 6:33.
- Transfers:
  - Hardware transferred to ISS (outside & inside): 34,353 lbs
  - Hardware transferred to ISS (inside): 1,787 lbs
  - Hardware transferred to shuttle (outside – OBSS): 536 lbs
  - Hardware/supplies transferred from ISS (inside): 1,807 lbs
  - H2O delivered to ISS: 569 lbs
  - O2 used for the 3 EVA's: 92 lbs
  - O2 used for "stack maintenance:" 29 lbs
  - N2 transferred to ISS: 15 lbs
- FD12: Undocked at 163:11:41:54Z followed by a fly-around (1/2 lap).
- Conducted the late inspection of the Shuttle's heat shield using the OBSS. No issues.
- FD14: Rudder/Speedbrake thermal spring tab was seen floating away from the vehicle during the FCS checkout. The function of the tab is to prevent a flow path for ascent heating and is not required for entry. The TPS was cleared for entry.
- [Post-flight, this issue was presented to 08/07/08 PRCB; decision was made to continue to fly as is. PRCB directed a new ascent thermal environmental assessment to consider flying without the tabs.]
- No communications blackout during Entry

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

	PCN-3 Change ORBITER	CREW (6+1 UP/6+1 DN)	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM-ABORT EMERG	SRB RSRM			FSW	PAYLOAD WEIGHTS,	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS,
NO.	This Column Only	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-126/ ISS-ULF2 SEQ FLT # 124 KSC-124 PAD 39A (47) MLP- 3 27th SHUTTLE FLIGHT TO ISS	OV-105 (Flight 22) ENDEAVOUR <u>OMS PODS:</u> LPO3-33 RPO4-29 FRC5-22	<u>CDR:</u> Chris Ferguson Flt 2 (STS-115) P771/R300/V197/M179 <u>PLT</u> Eric Boe P772/R331/M286 <u>MS1</u> Donald Pettit Flt 2 (STS-113 Up – Soyuz TMA-1 Dn) P773/R289/V198/M253 <u>MS2</u> Steve Bowen P774/R332/M287 <u>MS3</u> Heidemarie Stefanyshyn-Piper Flt 2 (STS-115) P775/R301/V199/F40 <u>MS4</u> Shane Kimbrough P776/R333/M288 <u>MS5 UP Stay ISS EXP 18/FLT ENG</u> Sandra Magnus Flt 2 (STS-112) P777/R284/V200/F36 <u>MS5 DN EXP 17/Flt ENG</u> Greg Chamitoff (UP ON STS-124, stay ISS) P778/R330/M285 SS EVA 125 DOCKED QUEST EVA 48 EMU/TETHERED EVA 118 SCHEDULED EVA 116 DURATION 6:52 Continued…	KSC 39A 320:00:55:39Z 7:55:39 PM EST (P) 7:55:39 PM EST (A) Friday (26) 11/14/08 (15) <u>LAUNCH WINDOW</u>: 4M 39S (PLT in-plane) <u>EOM PLS</u>: KSC <u>TAL</u>: ZZA <u>TAL WX</u>: FMI <u>SELECTED</u>: <u>RTLS</u>: KSC15 CI/NOM <u>TAL</u>: ZZA30L N/N <u>AOA</u>: KSC15 CI/N <u>1ST DAY PLS</u>: EDT22 N/SFD Continued…	EDT04 CONC EDW 52 CONC 33 335:21:25:09Z 1:25:09 PM PST Sunday (15) 11/30/08 (13) <u>DEORBIT BURN</u>: 335:20:19:29Z <u>XRANGE</u>: 169.6 NM <u>ORBIT DIR</u>: A/L (40) <u>AIM PT</u>: Close-In <u>MLGTD</u>: 2040 FT 335:21:25:09Z VEL: 219 KGS 211 KEAS	104/104/109% <u>PREDICTED</u>: 100/104.5/104.5/ 72/104.5 <u>ACTUAL</u>: 100/104.5/104.5/ 72/104.5 1 = 2047 (12) 2 = 2052 (7) 3 = 2054 (8) <u>M 3 EOM</u>: WEIGHT: 221787 LBS X CG: 1087.2 IN <u>LANDING</u>: WEIGHT: 221712 LBS X CG:	BI-136 RSRM 104 ET-129 SLWT 32 <u>ET IMPACT</u> MET 1:14:18 <u>LAT</u>: 36.202 S <u>LONG</u>: 158.215W	51.6 (27)	DIRECT INSERTION POST OMS-2: 125.7x 84.6NM <u>DEORBIT</u>: HA 193.1 NM HP 21.9 NM <u>ENTRY VELOCITY</u>: 25863 FPS <u>ENTRY RANGE</u>: 4400NM	OI-33 (1) OMS-2: 125.7 x 84.6 NM	<u>CARGO</u>: 39471 LBS <u>PAYLOAD CHARGEABLE</u>: 32403 LBS <u>DEPLOYED</u>: 30432 LBS <u>NON-DEPLOYED</u>: 1760 LBS <u>MIDDECK</u>: 211 LBS <u>SHUTTLE ACCUMULATED WEIGHTS:</u> <u>DEPLOYED</u>: 1487349 LBS <u>NON-DEPLOYED</u>: 1603708 LBS <u>CARGO TOTAL</u>: 3982716 LBS <u>PERFORMANCE MARGINS (LBS)</u>: FPR: 2651 FUEL BIAS: 1063 FINAL TDDP: 1682 RECON: 2329 <u>PAYLOADS:</u> <u>PLB</u>: ISS-ULF2 (MPLM, LMC),SSPL/PSSC <u>MIDDECK</u>: ISS-ULF2, MAUI SEITE 5 CRYO TANK SETS RMS (81) SRMS, ODS, OBSS, SSPTS	***Brief Mission Summary:*** ***"Extreme Home Improvements" STS-126/ULF2 (27th ISS mission) outfitted the ISS to increase accommodations from a crew of three to six. Life support and habitability additions included: an advanced resistive exercise device, a second toilet, a galley, two sleep stations and an integrated water recycling system. The mission also included EVA's for lubricating the sluggish Solar Alpha Rotary Joints (SARJ) and installation of other external systems.*** *Endeavour was originally rolled to Launch Pad 39B as the Launch on Need (LON) vehicle in support of STS-125 HST servicing mission. Last minute complications with HST caused an indefinite delay for STS-125. Endeavour was rolled to Launch Complex 39A and prepared for the STS-126 November launch date. (Shuttles have only moved from one spaceport launch pad to another twice before in the program's history, in 1990 and 1993.)* **KSC W/D** The Orbiter prep days are 162 workdays (W/D) + 3 holidays + 3 weather days in the OPF. VAB ops = 7 W/D + 1 weather day Pad B ops = 19 W/D + 15 contingency days Pad A ops = 18 W/D + 5 contingency days Total W/D = 206 **<u>LAUNCH POSTPONEMENTS</u>** - Added STS-126 to FDRD - launch date of 09/18/08 on 08/15/07. - Ppd. to 10/16/08 on 02/14/08. Slip due to ECO sensor problems experienced during December launch attempt of STS-122. - Ppd. to 11/10/08 on 05/27/08. Slip due to delays in delivery of ET-127 & ET-129 for STS-125 & STS-400, respectively. - Ppd. to 11/12/08 on 09/08/08. Slip due to Hurricane Faye impacts to HST payload readiness. - Ppd. to 11/16/08 on 09/24/08. Slip due to STS-125 slip to from 10/10/08 to 10/14/08 caused by Hurricane Ike. - Launch moved forward to 11/14/08 on 10/19/08. Move due to critical path adjustment. STS-126/ULF2 now "prime crew" as STS-125 postponed to NET Mid-Feb 2009 on 10/02/08. **<u>LAUNCH SCRUBS</u>**: None. Continued…

STS-125 (HST Service) & LON Vehicle on Pads 39A & 39B. LON Vehicle became STS-126 when STS-125 was ppd to 2009. Picture courtesy of Rod Ostoski/KSC-USA.

SPACE SHUTTLE MISSIONS SUMMARY

FLT	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,
NO.		TITLE, NAMES & EVA'S	LANDING SITES, ABORT TIMES	LANDING TIMES FLT DURATION, WINDS	THROTTLE PROFILE ENG. S.N.	AND ET	INC	HA/HP		PAYLOADS/ EXP	TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

SPACE SHUTTLE MISSIONS SUMMARY

STS-126/ ISS-ULF2
Continued ...

Continued...

SS EVA 126
DOCKED QUEST EVA 49
EMU/TETHERED EVA 119
SCHEDULED EVA 117
DURATION 6:45

SS EVA 127
DOCKED QUEST EVA 50
EMU/TETHERED EVA 120
SCHEDULED EVA 118
DURATION 6:57

SS EVA 128
DOCKED QUEST EVA 51
EMU/TETHERED EVA 121
SCHEDULED EVA 119
DURATION 6:07

MCC WHITE FLIGHT FCR (54)

FLIGHT DIRECTORS:
SHUTTLE:
ASC- Bryan Lunney
LD/O1- Mike Sarafin
O2- Tony Ceccacci
FD 1-12
- Paul Dye FD 13-EOM
Planning- Paul Dye FD 1-3
- Kwatsi Alibarufo FD 4-EOM
ENT- Bryan Lunney
MOD – John McCullough
Team 4- Richard Jones

ISS
O1 – Holly Ridings
LD/O2- Ginger Kerrick
O3 – Brian Smith
Team 4- Courtenary

Continued...

TDEL:
0.000 (P)
0.192 (A)

MAX Q NAV:
757.6 (P)
750.2 (A)

SRB STG:
2:04.32(P)
2:06.24(A)

PERF: NOMINAL

2 ENG TAL (MRN):
2:38 (P) 2:39 (A)

NEG RETURN:
3:52 3:54

PTA (U/S 157 FPS):
5:08 5:14

SE TAL (ZZA 104):
6:01 6:04

PTM (U/S 168 FPS):
6:07 6:18

SE PRESS 104
6:54 6:59

MECO CMD:
8:22.1
8:23.0

VI:
25819.0
25818.8

OMS-2:
38:20
38:19.3
97.4 FPS 95.9 FPS

Continued...

DRAG CHUTE DEPLOY:
193 KEAS
335:21:25:12Z

NLGTD: 6761 FT
335:21:25:20Z
VEL: 154 KGS 146 KEAS
HDOT: -6.2 FPS

BRK INIT: 124 KGS

DRAG CHUTE JETTISON:
53 KGS
335:21:25:42Z

BRK DECEL FPS^{2}:
AVE 6.2 PK 9.3

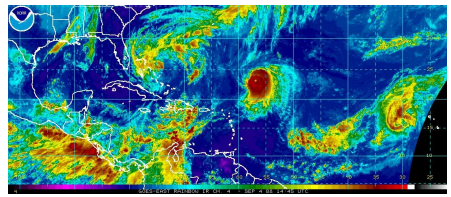
WHEELS STOP:
335:21:26:02Z
11180 FT

ROLLOUT:
9140 FT
0:53 M:S

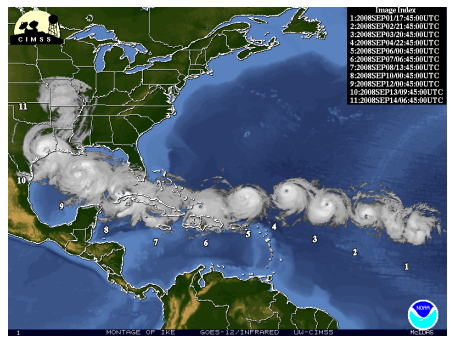
WINDS:
4H KT 0 KTS
OFFICIAL:
04004P06 KTS
6H 0CROSS KTS

DENS ALT: 3234 FT

FLT DURATION:
15:20:29:30
S/T:
1183:15:39:46
OV-105:
250:22:48:03
DISTANCE:
6,615,109 sm
TOTAL SHUTTLE DISTANCE:
480,274,259 sm



Parade of storms during STS-125 & STS-126 launch preps as seen on Sep. 04, 2008: Gustav (inland remnants, upper left)



IKE08-notrack.gif: Hurricane IKE tracking. Category 2 landfall at 2:10 a.m. CDT near Galveston Sep. 13, 2008. (From: JSC Roundup Nov. 2008) Damage from hurricanes cost NASA

Continued...

LAUNCH WINDOW:
Total launch window was 9 minutes 26 seconds with window open at 320:00:50:52Z and close at 320:01:00:18Z. Preferred Launch Time was 320:00:55:39 (In-Plane Time) for a launch window of 4m39s.

LAUNCH DELAYS: None. Launch occurred on time at 320:00:55:39Z, 7:55:39 p.m. EST, Friday, November 14, 2008. Weather on launch day was acceptable. Isolated afternoon showers were observed at 60 miles south of KSC along the sea breeze late in the day. The showers diminished by sunset - not a threat for the evening launch time or RTLS.

TAL WEATHER
Weather at the TAL sites was forecast/observed GO.

PERFORMANCE ENHANCEMENTS:
Include the standard set plus: 1) PE Operational High Q TRN/NOV, 2) OMS Assist, 3) a 52 nautical mile MECO, and 4) Del Psi

FLIGHT DURATION CHANGES/LANDING:
- FD 11 MMT decision made for a one-day extension for additional on-orbit time for the Urine Processing Assembly (UPA) troubleshooting & processing or possible Distillate Assembly (DA) return.
- Weather for landing was quite complex. Both KSC and EAFB were activated on Sunday, November 30, 2008, as possible landing sites. A large upper level low pressure system over the eastern US with a cold front moving across FL were concerns for landing at KSC on Sunday (EOM) & Monday (EOM+1). Spaceflight Meteorology Group (SMG) weather forecasts were "NO GO" for KSC with crosswind, ceiling, precipitation, and thunderstorm flight rule violations. Also, two Tornado Watches were issued for central FL and a third Watch included KSC. A squall line moving east at 20 kts combined with an unstable air mass across south and central FL generated numerous thunderstorms and isolated tornadoes by mid day. The weather continued to deteriorate across central FL, prompting the MMT to assess the possibility of staying on orbit and attempting EOM+1 landing at KSC. The SMG forecasts for that day indicated marginal conditions for a safe return to KSC.
After waving off the first opportunity to KSC and with weather conditions deteriorating through the day at KSC, the decision was made to land at EAFB. Weather conditions at EAFB were nearly ideal with light northeast surface winds and mostly clear skies. Endeavour touched down at 335:21:25:09Z (3:25 PM CST, November 30, 2008) on temporary runway 04. This runway was built due to construction and resurfacing of the primary runway.

Continued...

SPACE SHUTTLE MISSIONS SUMMARY

FLT	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,
NO.		TITLE, NAMES & EVA'S	LANDING SITES, ABORT TIMES	LANDING TIMES FLT DURATION, WINDS	THROTTLE PROFILE ENG. S.N.	AND ET	INC	HA/HP		PAYLOADS/ EXP	TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

SPACE SHUTTLE MISSIONS SUMMARY

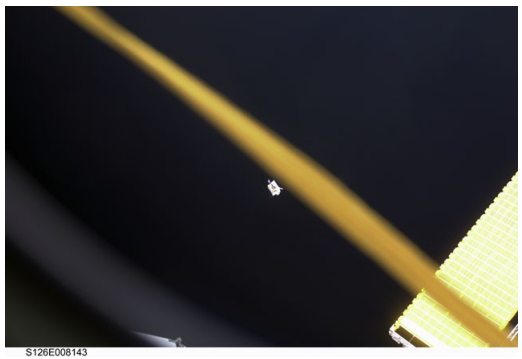
STS-126/ ISS-ULF2
Continued...

Continued...

CAPCOMS:

SHUTTLE
A/E – Alan Poindexter
- Greg (Box)
Johnson (Wx)
LD/01 – Steve Robinson
O2 – Jim Dutton
Planning – Shannon Lucid
Team 4 - N/A

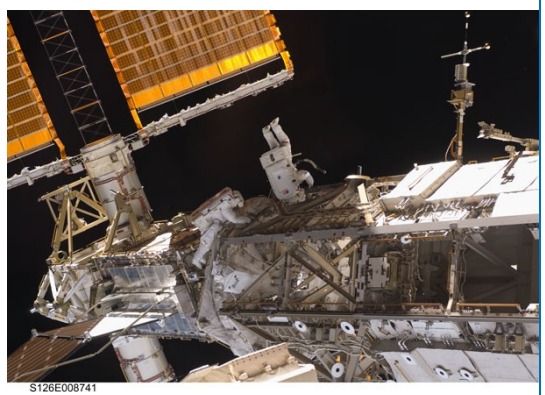
ISS
O1- Terry Virts
LD/O2- Mark Vande Hei
O3 – Robert Hanley
Team 4 – N/A


S126E008143

S126-E-008143 (18 Nov. 2008) --- Tool bag drifts away from ISS during EVA1 SARJ lubrication. It would later burn up during re-entery into the earth's atmosphere in Aug. 2009


S126E008178

S126-E-008178 (18 Nov. 2008) --- Pettit installs the Water Recovery System (WRS) rack in Destiny lab.


S126E008741

S126-E-008741 (20 Nov. 2008) --- Stefanyshyn-Piper (left) and Kimbrough during EVA2 continue removing debris and applying lubrication around starboard SARJ.

Continued...

FIRSTS/SECONDS:
- First water regeneration system to recycle urine into drinking water delivered and installed on ISS.
- First flight OI-33 Flight Software. Several minor changes made to improve Post MECO attitude control and reduce the risk of recontact with the ET.
- First flight of new SSME controller S/W to downlink Advanced Health Management System (AHMS) data on-orbit - provides backup to MADS data.
- First flight of redesigned EVA Prime Flight Glove TMG, a Turtleskin® reinforcement layer sandwiched between molded palm and RTV on thumb and index finger and new RTV-3145.
- First flight of ET redesigned LO2-to-Intertank Flange closeout per RTF B/L Plan
- First flight of ATK BSMs in both forward and aft positions.
- First Flight of BSM Forward Segment Grain Redesign - eliminated waiver.
- First flight of SRB Installed Enhanced Data Acquisition System (EDAS) Units and Instrumentation.
- First flight of SRB Redesigned Frangible Nut with Pyrotechnic Crossover Assembly to help prevent stud hang-up.
- A Second: "World Toilet Organization (WTO) is a global non-profit organization committed to improving toilet and sanitation conditions worldwide. World Toilet Day November 19th - During this mission the crew did their bit for WTD with installation of a new second toilet facility on ISS."

NIGHT LAUNCH: # 31 NASA Test Director Charlene Blackwell-Thompson, "Endeavour is ready to go. And we're really excited to share our version of a sunrise with you ..."

RENDEZVOUS: #71 Rendezvous and dock with ISS.

EVENTS:
- FD1: OMS2 ignition at 320:01:33:58.3Z resulted in a 125.7 by 84.6 NM orbit.
- FD2: RCC inspection found no areas of concern - focused inspection cancelled on FD4.
- T1 maneuver at 321:19:26:48.0Z resulted in a 192.4 by 184.3 NM orbit
- FD3: R-Bar Pitch Maneuver was performed. No issues.
- Docking Contact occurred at 321:22:01:17Z
- Hard Dock occurred at 321:22:44:35Z
- ISS Hatch opened at 321:24:16:00Z (6:16PM CST, Nov 16, 2008) welcomed by ISS crew.
- IELK Seat Liner Transfer at 322:02:50:00Z (8:50 PM CST, Nov 16, 2008). At that time Greg Chamitoff became a member of STS-126 and Sandra Magnus joined the ISS Expedition 18 as Flight Engineer.

Continued...

SPACE SHUTTLE MISSIONS SUMMARY

FLT	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,
NO.		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-126/ ISS-ULF2
Continued ...

Pawel-Warchal-EndISS281108_1227890243.jpg: Impressive photo taken by Polish

296595main_ED08-0306-131c_946-710.jpg: STS-126 Ferry Flight in route to KSC

SIGNIFICANT ANOMALIES:

Orbiter:
-The Fuel Cell 1 S/N P760106 Hydrogen Flowmeter Measurement Began Drifting High And Erratic At 320/12:36 GMT.
- MER-02, LV57 E2 GH2 FCV, After Engine Throttle up E2 GH2 Line Shows a Drop of 200 Psi
- MPS Helium Bottle Lost 140 Psi During Ascent, OMRSD Allows 60 Psi Max. (MER-10)
- GNC Bypass of Ku-Band Radar Data
- Tile Damage on Edge .65l X .23w X .05d

KSC:
- RDUnassigned - Column parity errors on all ME FEPs.
- IRAMS Failed at GMT Rollover.

SRB:
- STS126/Bi136 Squawk 126-001: HDP 3 Blast Container Debris Containment Failure

RSRM, SSME, & ET: None.

MOD:
- Updating Minimum EPS Consumables
- Loss of Crewlock Bag during Eva #1
- Over Torque of Trundle Bearing Assembly Mount
- Middeck Return Item Weights Missing
- Debris Released Near the LH2 T-0 Plate

Integration:

EVENTS: Continued...

- FD5: Based on review of launch imagery, the MMT decided that the focused inspection of the Orbiter heat shield was not required.
-FD5: EVA 1: Piper & Bowen transferred the Nitrogen Tank Assembly (NTA) from the External Stowage Platform (ESP)-3 to Lightweight MPESS Carrier (LMC), followed by the Flex Hose Rotary Coupler (FHRC) transfer from LMC to ESP-3. JEM EFBM Multi-Layered Insulation (MLI) Cover was removed in prep for c/o of EFBM (to be installed on 2JA later in 2009). Stbd SARJ trundle bearing assembly (TBA) #10 and #6 were replaced, and the stbd race ring was partially cleaned and lubed. A crew equipment bag was inadvertently released during the EVA, but there was sufficient redundant cleaning and lube equipment to finish scheduled tasks. EVA 1 duration 6:52.
- FD6: Home improvements continued aboard ISS with installation of two new bedrooms and preparations to activate the water recycling facility.
- FD7: EVA2: Piper & Kimbrough relocated the CETA carts in prep for 15A install of S6 solar array upcoming in Feb. 2009; SSRMS Latching End Effector (LEE) A snares were lubricated; all stbd SARJ cleaning and lube objectives were completed except for cleaning under covers 11 and 12; & 4 more trundle bearing assemblies were replaced. EVA was terminated slightly early due to high CO2 readings in Kimbrough's' suit. EVA2 duration 6:45. **[During this EVA the ISS marked the 10th Anniversary of launching its first element - the Russian-built Zarya control module. "It's hard to believe it's been 10 years," said Kirk Shireman, NASA's Deputy Manager for ISS, who remembers it being a cold day on the steppes of Kazakhstan.]**
- FD9: UPA anomalous shutdown due to centrifuge speed below limits & high motor current.
- FD9: EVA3: Piper & Bowen continued cleaning of ISS stbd SARJ; R&R'ed the remaining TBA; and cleaned area around SARJ's drive lock assemblies. EVA3 duration 6:57.
- FD11:EVA4: Bowen & Kimbrough completed stbd and port SARJ lube tasks; P1 lower inboard camera installed in camera port 7; external facility berthing mechanism latch bolt retracted via EVA override and cover reinstalled; JEM GPS A installed and heaters checked out ok, JEM GPS B deferred to stage or next flight; and, no get-ahead radiator imagery was taken. EVA4 duration 6:07.
- SARJ put back in autotrack at 330/00:35 GMT (post-EVA).
- FD12: UPA processing was completed for the docked mission.

Transfers:

- 16,390 lbs of hardware transferred to ISS (Leonardo & middeck)
- 3,642 lbs of hardware returned from ISS to Endeavour (inside)
- 25 lbs O2 transferred to ISS

- FD15: Undocked at 333:14:47:26Z followed by Sep-1, Sep-2 and Sep-3; OBSS surveys on starboard, nose cap and port; and LDRI downlink.
- Communications blackout during Entry: "There [were] a few drop outs but nothing big around GMT 335:21:09 d:h:m."

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

FLT	ORBITER	CREW (6+1 UP/6+1 DN)	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM- ABORT EMERG	SRB RSRM	ORBIT		FSW	PAYLOAD WEIGHTS,	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS,
NO.		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-119/ ISS- 15A SEQ FLT # 125 KSC-125 PAD 39A (48) MLP-1 28th SHUTTLE FLIGHT TO ISS	OV-103 (Flight 36) DISCOVERY OMS PODS LPO1-39 RPO3-37 FRC3-36	CDR: Lee Archambault Flt 2 (STS-117) P779/R307/V201/M265 PLT Tony Antonelli P780/R334/M289 MS1 Joseph Acaba P781/R335//M290 MS2 Steve Swanson Flt 2 (STS-117) P782/R308/V202/M266 MS3 Richard Arnold P783/R336/M291 MS4 John Phillips Flt 2 (STS-100) P784/R266/V203/M232 MS5 UP Stay ISS EXP 18FLT ENG Koichi Wakata Flt 3 (STS-72, STS-92) P785/R208/V164/M181 MS5 DN EXP 18/Flt ENG Sandra Magnus FLT 2 (STS-112) (UP ON STS-126, stay ISS) P786/R284/V200/F36 SS EVA 129 DOCKED QUEST EVA 52 EMU/TETHERED EVA 122 SCHEDULED EVA 120 DURATION 6:07 SS EVA 130 DOCKED QUEST EVA 53	KSC 39A 074:23:43:44Z 7:43:44 PM EDT (P) 7:43:44 PM EDT (A) Sunday (12) 03/15/09 (10) LAUNCH WINDOW: 4M 14S (PLT in-plane) EOM PLS: KSC TAL: ZZA TAL WX: MRN SELECTED: RTLS: KSC15 CI/NOM TAL: ZZA30L N/N AOA: KSC15 CI/N 1ST DAY PLS: EDW22 N/N TDEL: 0.000 (P) -0.008 (A) MAX Q NAV: 739.4 (P) 722.9 (A) SRB STG: 2:04.00 (P) 2:05.12 (A) PERF: NOMINAL 2 ENG TAL (MRN): 2:35 (P) 2:37 (A) NEG RETURN: 3:54 3:55 PTA (U/S 166 FPS): 5:12 5:15 SE TAL (ZZA 104): 6:00 6:00 PTM (U/S 181	KSC 15 (KSC 70) 087:19:13:26Z 2:13:26PM CDT Saturday (23) 03/28/09 (10) DEORBIT BURN: 087:18:08:14Z XRANGE: 222.2 NM ORBIT DIR: A/R (14) AIM PT: Close-In MLGTD: 2705 FT 087:19:13:26Z VEL: 188 KGS 203 KEAS HDOT: -2.7 FPS TD NORM 195: 3473 FT DRAG CHUTE DEPLOY: 194 KEAS 087:19:13:29Z NLGTD: 5369 FT 087:19:13:34Z VEL: 152 KGS 167 KEAS HDOT: -6.7 FPS BRK INIT: 40 KGS DRAG CHUTE JETTISON: 60 KGS 087:19:13:59Z BRK DECEL FPS2:	104/104/ 109% PREDICTED: 100/104.5/ 104.5/72/104.5 ACTUAL: 100/104.5/ 104.5/72/104.5 1 = 2048 (9) 2 = 2051 (8) 3 = 2058 (3) M 3 EOM: WEIGHT: 201795 LBS X CG: 1082.8 IN LANDING: WEIGHT: 201713 LBS X CG: 1084.7 IN	BI-135 RSRM 103 ET-127 SLWT-33 LAT: 35.725 S LONG: 157.56 W	51.6 (28)	DIRECT INSERTION POST OMS-2: 126.0x84.9 NM DEORBIT: HA 184.8 NM HP 21.6 NM ENTRY VELOCITY: 25849 FPS ENTRY RANGE: 4377 NM	OI-33 (2) POST OMS-2: [illegible] NM	CARGO: 39088 LBS PAYLOAD CHARGEABLE: 32546 LBS DEPLOYED: 32489 LBS NON-DEPLOYED: 0 LBS MIDDECK: 57 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1517781 LBS NON-DEPLOYED: 1603765 LBS CARGO TOTAL: 4021804 LBS PERFORMANCE MARGINS (LBS): FPR: 2651 FUEL BIAS: 1063 FINAL TDDP: 1746 RECON:2016 PAYLOADS: PLB: ISS 15A (S6) MIDDECK: ISS 15A, MAUI SEITE, SIMPLEX 5 CRYO TANK SETS RMS (82) SRMS, ODS, OBSS, SSPTS	***Brief Mission Summary: ISS United States Operational Segment (USOS) assembly was completed with installation of S6 truss with final set of power generating Solar Arrays on Shuttle's 28th ISS Mission. This additional power prepares the ISS with the capability of housing six member crews in the near future.*** **KSC W/D**: OPF = 191+13H+3Wx, VAB = 6 + 0C, PAD = 47 + 14C: Total Work Days = 244 (OPF Processing occurred over a total time period of 207 days.) **LAUNCH POSTPONEMENTS** - Added STS-119 to FDRD - launch date of 01/15/04 on 01/23/03 - Ppd. to NET 06/10/04 on 03/13/03 due to Columbia accident. - Ppd. to NET 06/30/04 on 04/17/03 due to Columbia accident. - Deleted from FDRD on 05/28/03 pending Columbia accident investigation outcome. - Re-Baselined in FDRD - Launch date of 11/06/08 on 10/04/07 - Ppd to 12/04/08 on 02/14/08. Slip due to ECO Sensor problems during STS-122 launch attempt. - Ppd to 02/12/09 on 07/03/08. Slip due to ET delivery schedule. - Ppd. to NET 02/19/09 on 02/04/09. Slip due to additional testing & analysis required to resolve MPS flow control valve issue - Ppd. to NET 02/22/09 on 02/09/09. Slip due to additional testing & analysis required to resolve MPS flow control valve issue - Ppd. to 02/27/09 on 02/14/09. Slip due to additional testing & analysis required to resolve MPS flow control valve issue - Ppd. to TBD at STS-119 "Continuation" FRR on 02/20/09. Managers could not reach a consensus. - Ppd. to tentative date of 03/12/09 on 02/25/09. MPS flow control valve U/R. - Launch date set for NET 03/11/09 on 03/04/09. MPS flow control valve U/R. - Launch date set for 03/11/09 at Delta FRR on 03/06/09. - Officially ppd. launch to 03/15/09 on 03/12/09 after Scrub on 03/11/09. Scrub was due to gaseous hydrogen leak in vent line. **LAUNCH SCRUB**: **Mar.11, 2009**, Wednesday, with less than 20 minutes left in tanking process launch was scrubbed due to a gaseous hydrogen vent line leak. This line connects the Ground Umbilical Carrier Plate (GUCP), attached to ET, to the "flare stack" for burn-off of vented gaseous

STS-119 - Waiting for GO!
Moon - Waiting for Constellation!
(It will be a long wait - President directed cancellation of Constellation in 2010.)
317861main_image_1301946-710STS119Moon.jpg :

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-119/ ISS- 15A
Continued ...

ABOVE: STS-119 launch panorama into twilit sky. Photo by Ryan R. Smith (KSC-BOE-K2)
http://www.ryansmithphotography.com/

BELOW: S119-E-007747 --- STS-119 & Exp18 crews in ISS Harmony. From left (bottom row): PLT Antonelli, CDR Archambault, & Acaba/MS. From left (middle row): Magnus/MS, Exp 18 CDR Michael Fincke, Yury Lonchakov/Exp18FE(RSA), & Koichi Wakata/Exp18FE (JAXA). From left (top row) Swanson/MS, Arnold/MS, & Phillips/MS.

S119E007747

Continued...

SS EVA 131
DOCKED QUEST EVA 54
EMU/TETHERED EVA 124
SCHEDULED EVA 122
DURATION 6:27

MCC WHITE FCR (55)

FLIGHT DIRECTORS:
SHUTTLE:
ASC/ENT- Richard Jones
LD/O1- Paul Dye
O2- Mike Sarafin (FD1- FD12)
O2-Tony Ceccacci (FD13-EOM)
O3- Richard LaBrode (Prelaunch – FD1)
O3- Norman Knight (FD2-FD8
O3- Bryan Lunney (FD9-EOM)
Planning- Norm Knight - Bryan Lunney
MOD – John Mccullough
Team 4 - Tony Ceccacci

Continued...

Continued...

MECO CMD:
8:23.6 8:23.8

VI:
25819.0
25819.6

OMS-2:
38:00
38:30.0
97.7 FPS 96.1 FPS

Continued...

WINDS:
15H KT
0.3L KTS
OFFICIAL:
15017P2
3 KTS
X1P1H17P23
KTS

DENS ALT:
1718 FT

FLT DURATION:
12:19:29:42
S/T:
1196:11:09:28

OV-103:
318:03:39:51

DISTANCE:
5,304,106 sm

TOTAL SHUTTLE DISTANCE:
485,578,259 sm

Continued...

LAUNCH DELAYS: None. Launch occurred on time at 074:23:43:44Z, 7:43:44 p.m. EST, Sunday, March 15, 2009. Launch weather was relatively benign at KSC. A sea breeze developed at KSC and moved west of the Banana River about 3-hours prior to launch. The movement of the sea breeze inland produced favorable weather conditions with widely scattered clouds.

TAL WEATHER
TAL sites at both Zaragoza and Moron, Spain were acceptable for launch due to a high pressure system. Winds at Istres were out of limits following the passage of a cold front the day prior to launch, but launch proceeded with two acceptable TAL sites.

PERFORMANCE ENHANCEMENTS:
Include the standard set plus: 1) PE Operational High Q WIN/MAR, 2) OMS Assist, 3) 52 nautical mile MECO, & 4) Del Psi

FLIGHT DURATION CHANGES/LANDING:
- When STS-119 launch was slipped to March 15, 2009, (due to earlier scrub) the mission duration was reduced from 14 to 13 days to accommodate a Russian Soyuz mission to ISS later in the month. This also reduced number of EVA's from 4 to 3.
- For first KSC landing opportunity weather was no go with cloud decks building in at lower than anticipated broken (5/8) at 3000. Weather improved as did the wind direction. Discovery was given "Go" to land on second KSC opportunity. Landing occurred at 087:19:13:26Z (2:13:26 PM CDT Saturday, 03/28/09).

FIRSTS/SECONDS/LASTS:
- SSME ECP 1514 – LPOTP Bearing Ball Process Change
- SRB Hold Down Post Debris Containment mod
- S&MA: Orbiter LH2 T-0 Umbilical Ice: Update to IDBR-01 and NSTS-60559 to reflect new expected debris source.
- Last to be installed on ISS, the 45-foot S6 aluminum girder weighing more than 31,000 pounds was the first truss segment built (stored at KSC for six years).
- Second time a bat attempted to fly into space on Space Shuttle ET; coincidentally Koichi Wakata was on both flights.
- Discovery served as a hypersonic test bed during entry for new heat shield tiles in development for NASA's next-generation spacecraft.

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-119/ ISS- 15A
Continued ...

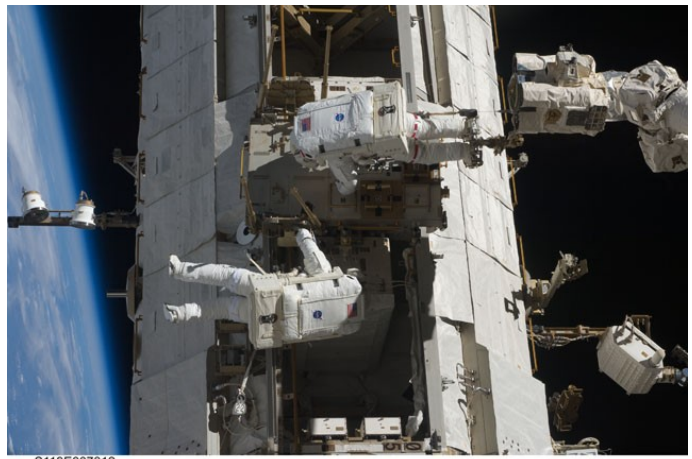
Continued...

ISS
LD/O1 - Kwatsi Alibaruho
O2 - Heather Ranick
O3 - David Korth
Team 4 - Robert dempsey

CAPCOMS:

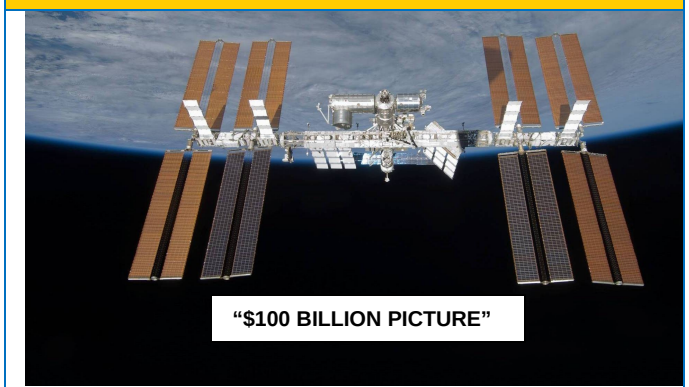
SHUTTLE
A/E – George Zamka
Asc (Wx)- C. Hobaugh
Ent (Wx)- Al Poindexter
LD/01 – George Zamka
O2 – Greg (Box) Johnson
Planning – Shannon Lucid
Team 4 - N/A

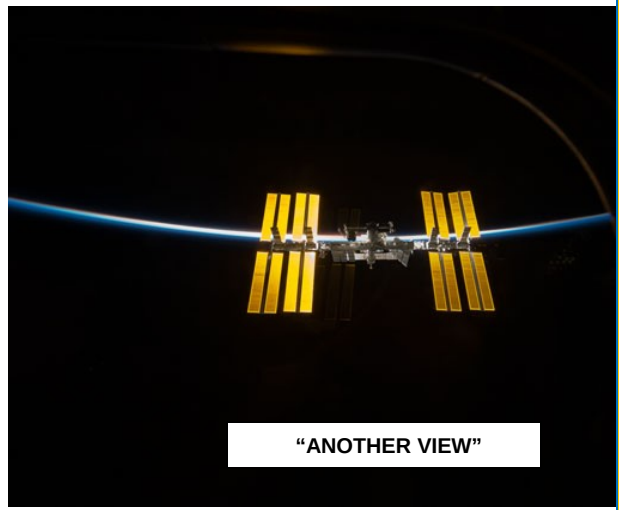
ISS



S119-E-006673 --- Swanson (center) and Arnold (partially obscured above Swanson) during EVA 1 connected bolts to attach S6 truss to S5, plugged in power and data connectors, prepared a radiator for cooling, and readied new solar arrays.

S119-E-009765 (25 March 2009) --- ISS USOS assembly complete as seen during Shuttle fly-around [labeled the "$100 Billion Picture" by ISS Lead Flight Director Kwatsi Alibaruho]. The ISS truss backbone measures 361 feet - longer than a football field.





S119-E-010506 Backdropped by the blackness of space and the thin line of Earth's atmosphere, ISS is seen from Discovery post sep. Thin orange arc is outline of Discovery window.
.

Continued... **FIRSTS/SECONDS/LASTS:**

- March 27, 2009: In a rare example of overlapping space missions, a U.S. space shuttle [STS-119] is set to return to Earth on Saturday just a few hours after a Russian Soyuz arrives at the ISS. Together the crews of the three craft total 13 people, tying the record for humans in space, first set 14 years ago this month. [Robert Pearlman - collectSPACE.com]

MCC ROSES:
This was the 100th flight since the Challenger accident that a beautiful bouquet of roses was delivered to the Houston MOCR to celebrate each mission since the landing of STS-26 in 1988. In 1989 it was determined that the roses were sent by the Shelby family (Mark, Terry & MacKenzie) of Bedford, TX. On March 27, 2009, the Shelbys personally delivered their 100th bouquet in recognition of STS-119. They received a warm welcome in the MOCR, led by James "Milt" Heflin, JSC Associate Director (Technical). They also received several JSC mementos for their kindness and dedication to the Space Program.

NIGHT LAUNCH: # 32 (Into twilit sky)

RENDEZVOUS: #72 Rendezvous and dock with ISS.

EVENTS:
- FD1: OMS2 ignition at 075:00:22:14Z resulted in a 126.0 by 84.9 NM orbit.
- FD2: RCC inspection found no areas of concern
- T1 maneuver at 076:18:35:39.0Z resulted in a 196.8 by 183.3 NM orbit
- FD3: R-Bar Pitch Maneuver was performed. No issues.
- Docking Contact occurred at 076:21:19:49Z, **St. Patrick's Day**
- Hard Dock, hooks closed, occurred at 076:21:33:59Z
- ISS Hatch opened at 076:23:22:59Z (6:09 PM CDT, March17, 2009) welcomed by ISS crew.
- IELK Seat Liner Transfer at 077:02:00Z (9:00 PM CDT) March 17, 2009). At that time Sandra Magnus became a member of STS-119 and Koichi Wakata joined the ISS Expedition 18 as Flight Engineer**.**
- FD5: Based on review of launch imagery, MMT cancelled FD6 focused inspection of Orbiter heat shield.
- FD5: EVA 1: Steve Swanson & Ricky Arnold: Activities included: S6 Connected to ISS, SABB Unstow, PCDF-PU Transfer, PVR Deploy, and 1B & 3B solar arrays deployed EVA1 duration 6:07.

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-119/ ISS- 15A
Continued ...

JSC2009-E-060959 (20 March 2009) --- Group portrait of STS-119/15A ISS Orbit 1 Flight Control Team in JSC MOCR. FD Kwatsi Alibaruho (right) is visible on the front row.

Participated

In

ISS USOS

Complete

JSC2009-E-060960 (20 March 2009) --- Group portrait of Shuttle STS-119 Orbit 1 Flight Control Team in JSC MCC. FD Paul Dye (left) is visible on the front row.

Continued... **SIGNIFICANT ANOMALIES:**

- Ground Imagery Showed That When Thruster F4D's Tyvek Rain Cover Released at 5:28 Sec Met (~93fps Or 63 Mph), A ~21 Inches X ~7.4 Inches Piece Remained Attached to the Thruster Lip as Shown In Figures 1 and 2.

KSC:
- STS-119 Post Launch Debris

SRB: RSRM: SSME: None.

ET:
-During Initial Launch Attempt of STS-117/Et-127, a GH2 Leak was Detected at Approximately One Minute After Start of LH2 Topping

MOD:
-Inadvertent Abort Light Command Sent from FDO

Integration:
-Unexpected Debris/Expected Debris Exceeding Mass Allowable Prior to Pad

Continued... **EVENTS:**

Downlinked, P3 UCCAS Deploy unsuccessful, temporary tethers installed, S3 PAS Deploy deferred to EVA3, and Z1 Patch Panel Reconfig unsuccessful. EVA2 duration 6:30.
- FD8: CDR Lee Archambault maneuvered the Shuttle-ISS "stack" to avoid a 9-year-old piece of Chinese space junk (4" fragment) that could have been a close encounter during upcoming EVA3. (A 4' fragment from a Russian satellite had previously passed at a safe distance prior to Shuttle/ISS docking.)
- FD9: EVA3: Joe Acaba & Ricky Arnold: Activities included: UCCAS troubleshooting; tethered in place, CETA cart relocation and SSRMS LEE B lube completed. Numerous get aheads accomplished: CETA coupler, S1/S3 SSAS panel BBC reconfig, S1 FHRC outboard p-clamps released 2 of 6 (#5, #6), and retrieved bungee caddy from Nadir STBD A/L toolbox. EVA3 duration 6:27.
- Transfers:
  - 32,962 lbs of hardware transferred to ISS (S6 Truss & Middeck)
  - 1963 lbs of hardware returned from ISS to Discovery (middeck)
  - 1142 lbs of water transferred to ISS
- FD11: Undocked at 084:19:53:26Z
- Fly-around initiated 084: 20:19Z
- Communications blackout during Entry occurred at GMT 87:18:47 to 87:18:52 d:h:m due to plasma effect.

SIGNIFICANT ANOMALIES:

Orbiter:
- Galley Water Leakage.
- WLES Group 2 Sensor S/N# 1033 Time Slip
- During MM/OD Monitoring With Group 2 Sensors, Sensor S/N 1024 On The Port Wing Unexpectedly Dropped Out Of On-Orbit Mode After 5-6 Hrs Of Monitoring.
- AVIU S/N 1031 Failure
- Failed Camera Shutter Actuation.
- Incorrect SORG Needle Installed
- V07P9379A Dropped To Lower Limit (Unit Step) During STS-119 Ascent
- Aft Stub Tile on the Upper Body Flap Was Suspect to be Damaged During FD3 On-Orbit Inspection. During Post-Flight Inspection the V070-395018-144 Tile Was Verified As Damaged.

Continued at left...

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-125 SEQ FLT # 126 KSC-126 PAD 39A (49) MLP-2 5TH & Final HST Service Flight	OV-104 (Flight 30) ATLANTIS OMS PODS LPO4-30 RPO1-37 FRC4-30	CDR: Scott Altman (Flt 4 - STS-90,STS-106, STS-109) P787/R237/V161/M207 PLT Gregory C. Johnson P788/R337/M292 MS1 Michael Good P789/R338//M293 MS2 Megan McAuthur P790/R339/F46 MS3 John Grunsfeld (Flt 5-STS-67, STS-81, STS-103, STS-109) P791/R191/V133/M167 MS4 Mike Massimino (Flt 2 - STS-109) P792/R275/V204/M241 MS5 Andrew Feustel P793/R340/M294 SS EVA 132 EMU/TETHERED EVA 125 SCHEDULED EVA 123 DURATION 7:20 SS EVA 133 EMU/TETHERED EVA 126 SCHEDULED EVA 124 DURATION 7:56 Continued...	KSC 39A 131:18:01:56Z 2:01:56 PM EDT (P) 2:01:56 PM EDT (A) Monday (14) 05/11/09 (8) LAUNCH WINDOW: 59M 45S (Total) 41M 50S (Preferred) EOM PLS: KSC TAL: MRN TAL WX: None. SELECTED: RTLS: KSC15 N/N TAL: MRN20 CI/N AOA: KSC15 N/N 1ST DAY PLS: NOR17 N/N Continued...	EDW22 CONC EDW 53 CONC 34 144:15:39:04Z 10:39:04 AM CDT SUNDAY (16) 05/24/09 (11) DEORBIT BURN: 144:14:24:41.0Z XRANGE: 405.6 NM ORBIT DIR: D/L (50) AIM PT: Nominal MLGTD: 3863 FT 144:15:39:04Z VEL: 192 KGS 200 KEAS HDOT: -2.5 FPS Continued...	104/104/109% PREDICTED: 100/104.5/104.5/ 72/104.5 ACTUAL: 100/104.5/94/ 72/104.5 1 = 2059 (3) 2 = 2044 (11) 3 = 2057 (4) M 3 EOM: WEIGHT: 225509.5 LBS X CG: 1078.3 IN LANDING: WEIGHT: 225898 LBS X CG: 1080.9	BI-137 RSRM 105 ET-130 SLWT 34 ET IMPACT 1:18:57 MET LAT: 16.699 N LONG: 147.375 W	28.45 (51)	DIRECT INSERTION POST OMS2: 298.1 NM X 106.8 NM DEORBIT: HA 294.3 NM HP 26.4 NM ENTRY VELOCITY: 26046 FPS ENTRY RANGE: 4267 NM	OI-32 (5)	CARGO: 32418 LBS PAYLOAD CHARGEABLE: 22254 LBS DEPLOYED: 4694 LBS NON-DEPLOYED: 17560 LBS MIDDECK: 0 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1524432 LBS NON-DEPLOYED: 1621371 LBS CARGO TOTAL: 4054222 LBS PERFORMANCE MARGINS (LBS): FPR: 2651 FUEL BIAS: 1063 FINAL TDDP: 1689 RECON:2499 PAYLOADS: PLB: HST SM4, ICBC 3D MIDDECK: HST SM4 5 CRYO TANK SETS RMS (83) SRMS, OBSS	***Brief Mission Summary:*** ***STS-125 was the 5th and final service mission (SM) visit to the 19 year old Hubble Space Telescope (HST) deployed on STS-31 in 1990. This was the 4th planned SM for HST . (The 3rd SM was conducted in two parts, 3A on STS-103 & 3B on STS-109 .) HST improvements included a new camera, a new spectrograph , repair of two other instruments, and replacement of six batteries and six gyroscopes. These improvements resulted in a higher definiton view of the universe and HST life extension into the next decade. A launch- on-need (LON) vehicle, STS-400, was readied on Pad B for potential crew rescue since there was no ISS safe haven on this misssion. STS-400 release from rescue duty occurred on May 21st , 2009, as the STS-125 crew prepared for the first deorbit/landing opportunity.*** **KSC W/D:** OPF Run 1: 178+2H+3Wx OPF Run 2: 120+11H VAB Run 1: 12+0C VAB Run 2: 8+0C PAD Run 1: 40+2C PAD Run 2: 38+4C Total Work Days = 396 (OPF Processing occurred over a total time period of 314 days.) **POSTPONEMENTS:** - Added STS-125 to FDRD - launch date of 08/07/08 on 06/29/07. - Ppd. to 08/28/08 on 02/14/08. Slip due to ECO sensor problems experienced during December launch attempt of STS-122. - Ppd. to 10/08/08 on 05/27/08. Slip due to delays in delivery of ET 127 & ET-129 (STS-400). - Ppd. to 10/10/08 on 09/08/08. Slip due to Hurricane Faye impacts to HST payload readiness. - Ppd. to 10/14/08 on 09/24/08. Slip due primarily to training time lost in the aftermath of Hurricane Ike. - Ppd. to NET Mid-Feb 2009 on 10/02/08. Slip due to HST on-orbit failure of A-side of Control Unit Science Data Formatter. - Ppd. to NET Mid-May 2009 on 10/30/08. Slip due to checkout problems with HST spare control unit. - Selected May 12, 2009 launch date on 12/04/08. - Advanced from 05/12/09 to 05/11/09 on 05/01/09. Advancing one day provided a 3rd launch opportunity before range conflicts. **LAUNCH SCRUBS**: None. Continued...

JSC2006-E-47144 (31 Oct. 2006): Last Shuttle Service Crew to HST selected: From left to right are McArthur, Good, Johnson (pilot), Altman (CDR), Grunsfeld, Massimino & Feustel.

SPACE SHUTTLE MISSIONS SUMMARY

FLT	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,
NO.		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-125
Continued ...

Ontinued...

SS EVA 134
EMU/TETHERED EVA 127
SCHEDULED EVA 125
DURATION 6:36

SS EVA 135
EMU/TETHERED EVA 128
SCHEDULED EVA 126
DURATION 8:02

SS EVA 136
EMU/TETHERED EVA 129
SCHEDULED EVA 127
DURATION 7:02

MCC WHITE FLIGHT
FCR (56)

FLIGHT DIRECTORS:
ASC/ENT- Norm Knight
LD/O1- Tony Ceccacci
O2- Rick LaBrode
Planning- Paul Dye
MOD – John McCullough
Team 4- Bryan lunneyi

CAPCOMS:
A/E - Greg (Box) Johnson
- Eric Boe (Wx)
LD/01 – Dan Burbank
O2 – Alan poindexter
Planning – Janice Voss
Team 4 - N/A

Continued...

SE TAL (BYD 104):
5:39 (P)
5:46 (A)

PTM (U/S 500 FPS):
5:09 (P)
5:12 (A)

SE PRESS 109
6:22 (P)
6:29 (A)

MECO CMD:
8:23.4 (P)
8:24.3 (A)

VI:
26088.0 (P)
26086.0 (A)

OMS-2:
43:46 (P)
43:45.0 (A)
142.5 (P) 139.7 (A) FPS

TDEL:
0.000 (P)
-0.448 (A)

MAX Q NAV:
740.95 (P)
734.75 (A)

SRB STG:
2:04.16 (P)
2:04.32 (A)

PERF: NOMINAL

2 ENG TAL (MRN):
2:48 (P) 2:55 (A)

NEG MRN (2@ 104):
3:53 (P)
3:56 (A)

PTA (U/S 483 FPS):
4:11 (P)
4:12 (A)

Continued...

TD NORM 205:
320
1 FT

DRAG CHUTE DEPLOY:
189 KEAS
144:15:39:06Z

NLGTD:
7134 FT
144:15:39:15Z
VEL: 137 KGS
141 KEAS
HDOT: -6.3 FPS

BRK INIT: 96 KGS

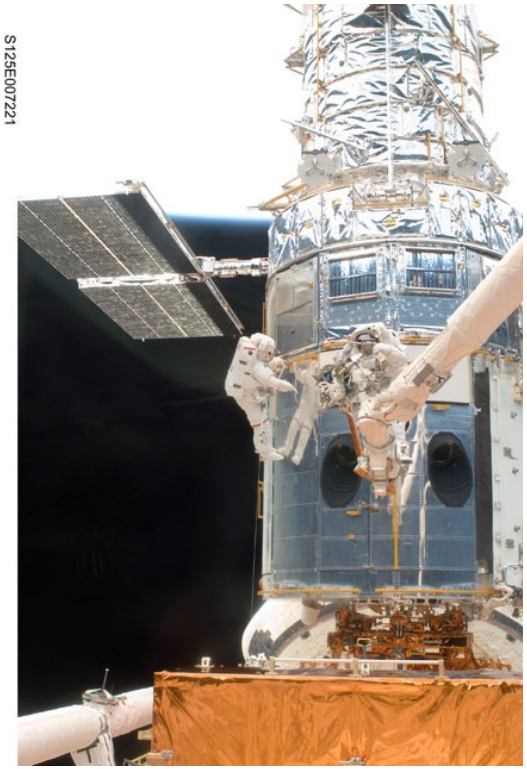
DRAG CHUTE JETTISON:
55 KGS
144:15:39:40Z

BRK DECEL FPS^2:
AVE 2.8 PK 7.4

WHEELS STOP:
144:15:40:13 Z
1236 7 FT

ROLLOUT:
8504 FT
1:09 M:S

WINDS:
16H KT 0 KTS
OFFICIAL:
23016P20 (X 2 PK 2 HD 16 PK 20)



S125-E-007221 (14 May 2009)-- Grunsfeld & Feustel and mirrored reflection during first HST EVA. Activities included installation of a new WFC3 and SI C&DH unit.

Continued...

LAUNCH WINDOW:
Total launch window was 59M 45S with window open at 131:17:44:01Z and close at 131:18:43:46Z. Preferred Launch Time was 131:18:01:56Z (In-Plane Time) for a launch window of 41M 50S.

LAUNCH DELAYS: None. Launch occurred on time at 131:18:01:56Z, 2:01:56 p.m. EDT,Monday, May 11, 2009. The Spaceflight Meteorology Group (SMG) forecast no flight rule violations for launch or RTLS. The SMG also tracked a large wildfire 18nm northwest of KSC that stayed north of the orbiter track for an RTLS if needed.

TAL WEATHER
At Moron, the only TAL site for the HST low inclination orbit, a trough of low pressure initially resulted in a "NO GO" with a slight chance of showers wihtin 20nm. Balloon data showed the atmosphere was too dry for showers and the forecast was updated to "GO" at 1636Z. Peak crosswinds of 15.5 kts surpassed the 15kt limit for a brief time at TAL landing, however, the FD had previouly stated a peak crosswind of 17kts was acceptable.

PERFORMANCE ENHANCEMENTS:
Include the standard set plus: PE Operational High Q TRN/MAY

FLIGHT DURATION CHANGES/LANDING:
- For both KSC landing opportunities on Friday, May 22nd the unstable weather was no go with low ceilings and thunderstorms expected. Landing was postponed to Saturday (EOM + 1).
- KSC weather was no go for EOM+1 with broken low ceilings and thunderstorms. Little change was expected for Sunday (EOM+2) and Monday (EOM+3) as moisture remained abundant over KSC.
- KSC landing for Sunday (EOM+2) waived off due to weather. Next opportunity to EDW's was selected on EOM +2 with typical summer weather and mostly clear skies. Landing occurred at 144:15:39:04Z (10:39:04 AM CDT Sunday, 05/24/09).

FIRSTS/LASTS:
- First mission post-STS-107 incident without ISS safe haven. LON STS-400 mission was on standby on PAD 39B. "First time since 2001 that two such birds have simultaneously perched on NASA's twin shuttle launch pads" - Todd Halvorson, Florida Today.
- 116 new EVA tools (GSFC) were developed to meet unique demands of this HST SM.
- First flight of food bars and Metamucil wafers
- First ET build with elimination of "Hand Pack Ablator (SLA)"

Continued...

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-125
Continued ...

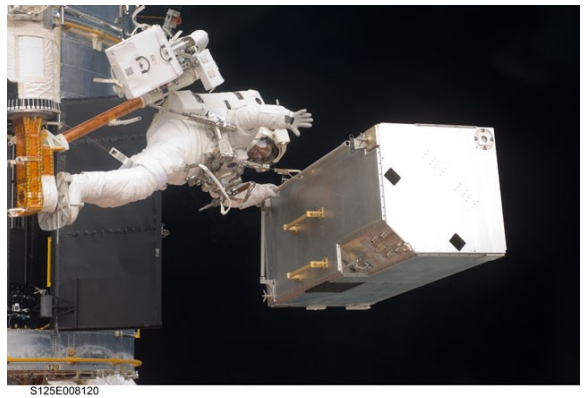
Continued...

FLT DURATION:
12:21:37:18
S/T:
1196:08:46:46

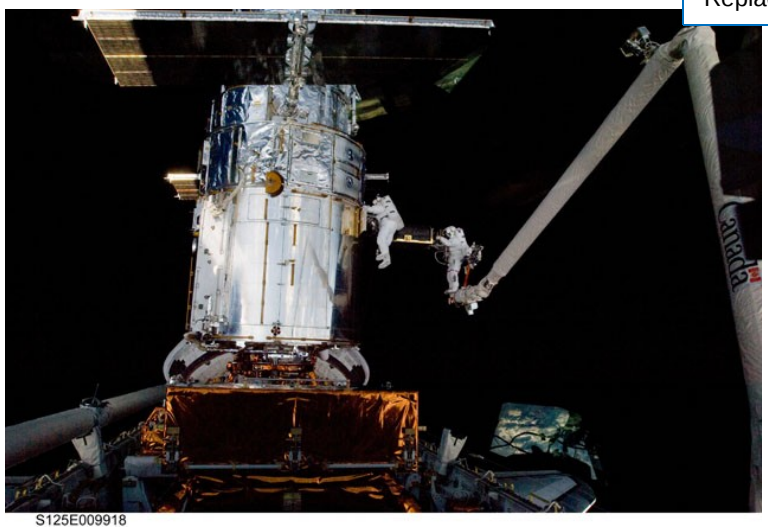
OV-105:
247:23:55:51

DISTANCE:
5,276,106 sm

TOTAL SHUTTLE DISTANCE:
490,854,365 sm


S125E008120

S125-E-008120 (16 May 2009)-- Andrew Feustel moves Corrective Optics Space Telescope Axial Replacement (COSTAR) in 3rd EVA to upgrade HST.


S125E009918

- Grunsfeld, on end of RMS, and Feustel, conduct mission's fifth and final HST service EVA: Replaced batteries, a Fine Guidance Sensor, and three thermal blankets (NOBL).

Continued... **FIRSTS/LASTS:**

- First flight of ATK BSM's in both forward and aft positions
- SRB Frangible nut redesigned with pyrotechnic crossover assembly
- Mike Massimino first to 'Tweet' from space, through email to JSC to his Twitter.
- First job offer in space: John Grunsfeld,whilel flying high in space, was named an adjoint professor at the University of Colorado at Boulder
- Fifth & last HST Service mission.

NIGHT LAUNCH: N/A

RENDEZVOUS: #73 Rendezvous with HST.

EVENTS:

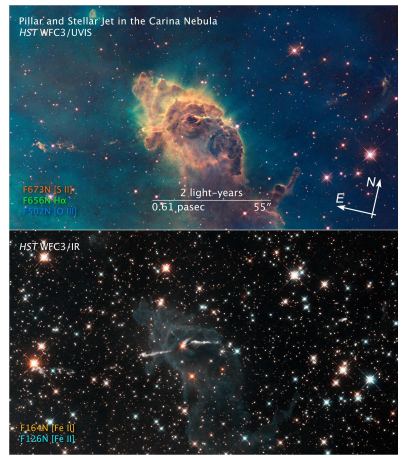
- FD1: OMS2 ignition at 131:18:45:40.9Z resulted in a 298.1 by 106.6 NM orbit.
- T1 maneuver at 133:14:41:56.0Z resulted in a 303.2 by302.9 NM orbit
- FD2: RCC inspection found no areas of concern - no requirement for Focused Inspection.
- FD3: HST Grapple by McArthur occurred at 133:17:14Z. Timeline was about 20 min. behind schedule due to a comm. problem with HST that delayed HST prep for capture.
- FD4: EVA 1: Grunsfeld & Feustel: Activities included installing and completing good aliveness tests for new WFC3 and SI C&DH unit. The HST can now see farther into space and across a wider spectrum of colors. EVA ran 50 min longer than planned as the crew encountered difficult (aging) latches and bolts. EVA1 duration 7:20.
- FD5: EVA 2: Massimino & Good: Activities included Rate Sensor Unit changeouts & Bay 2 Battery checkout. EVA ran long due to the challenges for seating and bolting of RSU's. EVA2 duration 7:56.
- FD6: EVA 3: Grundsfeld & Feusel: Activities included replacement of the COSTAR instrument with the Cosmic Orgins Spectrograph and repair of the Advanced Camera for Surveys. EVA3 duration 6:36.
- FD7: EVA 4: Massimino & Good: Activities included refurbishment of Space Telescope Imaging Spectrograph and replacement of 6 Gyros. EVA 4 duration 8:02 (6th longest in program history).
- FD8: EVA 5:Grundsfeld & Feustel: Activities included Bay 3 battery changeout and FGS 2 changeout . On way back to A/L crew found debris liberated from carrier and head under HST. On retrieving the debris, PLSS contact damaged the TPS cover on the Low Gain Aantenna (LGA). The LGA cover was reinstalled. The HST was in a good configuration for long term exposure to space. EVA5 duration 7:02.
- On departing the telescope, astronaut Grunsfeld called the week a "tour de force of tools and human ingenuity." He also added: "'Hubble Isn't Just a Satellite, It Is About Mankind's Quest for Knowledge".
- FD9: HST was released at 139:12:57:00Z. This was followed shortly by OBSS late inspection of Atlantis TPS.
- During Entry comm blackout occurred at GMT 144/1513 - 1517 due to plasma effect.

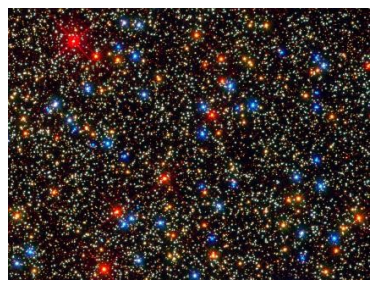
SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

STS-125
Continued ...





HST Program released the above photos on 09/10/09 taken by the “Refurbished Hubble” (using WFC3). At upper right is: Stars Bursting to Life in Chaotic Carina Nebula - These two images of a huge pillar of star birth demonstrate how observations taken in visible and in infrared light by HST reveal dramatically different and complementary views of an object. At left is cauldrons of gas at 36K Deg F tearing across space at 600K mph resembling a “butterfly”. In center is NGC 6302 Stephan’s Quintet Galactic Wreckage - a clash among members of the quintet revealing stars from young blue stars to aging red stars. At right is a panoramic view of a colorful assortment of 100K stars residing in the core of a giant star cluster.
See: http://www.nasa.gov/hubble Credit: NASA, ESA, and the Hubble SM4 ERO Team

SIGNIFICANT ANOMALIES:

Orbiter:
- FWD STBD PLB FLOODLIGHT (#2) FAILED DURING STS-125
- DURING SSME IGNITION, AN ELECTRICAL ANOMALY OCCURRED THAT CAUSED ASA 1 TO BE LOST.
- AFTER CARRIER PANEL REMOVAL AN IN-PLANE CRACK WAS DETECTED AT THE DENSIFICATION LAYER INTERFACE WITH BASE MATERIAL ON TILES V070-395018-143 (SERIAL S83057) AND V070-395018-151 (SERIAL 7HB1DR)
- THE CREW DISCOVERED CARRYOVER OR UNPROCESSED CONDENSATE IN THE IMMEDIATE AREA OF THE HUMIDITY SEPARATORS IN THE LOWER EQUIPMENT BAY.
- THE IMU FAN DELTA PRESSURE (V61P2869A) WAS OBSERVED TO SLOWLY INCREASE ON FD 12, WITH THE FIRST INCIDENCE OF TOGGLING ABOVE THE FLIGHT RULE LIMIT OF 4.71 PSI OCCURRING AT GMT 142/18:22:37.
- DURING SSME IGNITION AN ELECTRICAL SHORT OCCURRED ON THE 26VAC EXCITATION CIRCUIT BETWEEN AEROSURFACE SERVOAMPLIFIER 1 (ASA-1) AND THE RIGHT HAND INBOARD ELEVON ACTUATOR PRIMARY DELTA PRESSURE TRANSDUCER.
- MDU CRT 4 REPORTED 'MSG COM 1553B ERROR', 'MESSAGE 1553B FAIL' AND 'MEDS I/O ERROR' IN DOWNLIST AT NOSE GEAR TOUCHDOWN.

KSC:
- Fondu-Fyre Liberated from SRB Main Flame Deflector, STS-125, Pad A
- Brick Liberated from East Flame Trench Wall, SSME Side, STS-125, Pad A

SRB: None.

RSRM:
- MISSING STIFFENER RING FOAM WITH DISCOLORATION, STIFFENER RINGS, RSRM-105B

SSME: None.

ET: None.

MOD: None.

Integration:
- Aerosurface Servo Amplifier-1 (ASA-1) Power Supply Failed
- Unexpected Debris/Expected Debris Exceeding Mass Allowable Prior to Pad Clearance (Liftoff Debris)
- Ice Internal and External to the LH2 T-0 Umbilical
- Gap Filler Releases From Port OMS Pod

SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (6+1 UP/6+1 DN) **(PCN4 Change Col 3)** TITLE, NAMES & EVA'S	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT INC	ORBIT HA/HP	FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)

SPACE SHUTTLE MISSIONS SUMMARY

STS-127/ ISS-2JA

SEQ FLT # 127

KSC-127

PAD 39A (50)

MLP-3

29th SHUTTLE FLIGHT TO ISS

OV-105 (Flight 23) ENDEAVOUR

OMS PODS
LPO3 -33
RPO4 29
FRC5-22

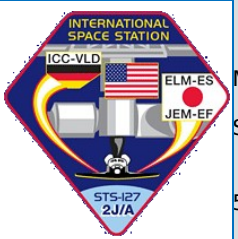
CDR:
Mark Polansky
(Flt 3 - STS-98,STS-116)
P794/R262/V185/M228

PLT
Doug Hurley
P795/R341/M295

MS 1
Christopher Cassidy
P796/R342/M296

MS 2
Julie Payette
(Canada)
(Flt 2-STS-96)
P797/R249/V205/F33

MS 3
Tom Marshburn
P798/R343/M297



MS 4
Dave Wolf
(Flt 4 - STS-58, Up to Mir
on STS-86, Dn on STS-89,
STS-112)
P799/R173/V147/M151

MS 5 UP Stay ISS EXP20/FLT ENG
T1m Kopra
P800/R344/M298

Continued...

KSC 39A
196:22:03:09Z
6:03:10 PM EDT (P)
6:03:10 PM EDT (A)
Wednesday (15)
07/15/09 (10)

LAUNCH WINDOW:
10M 0S (Total)
5M 0S (Preferred)

EOM PLS: KSC

TAL: MRN
TAL WX: ZZA.

SELECTED:
RTLS: KSC15 N/N
TAL: MRN20 N/N
AOA: NOR 17 N/SFD S B
1ST DAY PLS: EDW 22L N/N

TDEL:
0.000 (P)
-0.308 (A)

MAX Q NAV:
722.7 (P)
705.3 (A)

SRB STG:
2:04.2 (P)
2:03.8 (A)

PERF: NOMINAL

2 ENG TAL (MRN):
2:29 (P) 2:35 (A)

NEG MRN (2@ 104):
3:53 (P)
3:58(A)

PTA (U/S 158 FPS):
5:02(P)
5:10(A)

KSC 15 (KSC 71)
212:14:48:07Z
09:48:07 AM CDT
FRIDAY (15)
07/31/09 (12)

DEORBIT BURN:
212:13:41:09.9Z
XRANGE:
672.5 NM

ORBIT DIR: A/L (41)

AIM PT:
Nominal

MLGTD: 1797 FT
212:14:48:07Z
VEL: 208 KGS
209 KEAS
HDOT: -2.8 FPS

TD NORM 195:
2865 FT

DRAG CHUTE DEPLOY: 186 KEAS
212:14:48:13Z

NLGTD: 5842 FT
212:14:48:19Z
VEL: 152 KGS
150 KEAS
HDOT: -5.0 FPS

BRK INIT: 71 KGS

DRAG CHUTE JETTISON:
56

104/104/109%

PREDICTED:
100/104.5/104.5/72/104.5

ACTUAL:
100/104.5/100//72/104.5

1 = 2045 (10)
2 = 2060 (1)
3 = 2054 (9)

M 3 EOM:
WEIGHT:
215899.5 LBS
X CG:
1089.8 IN

LANDING:
WEIGHT:
215816.5 LBS
X CG:
1091.7 IN

BI-138

RSRM 106

ET-131

SLWT 35

ET IMPACT
1:14:27 MET

LAT:
35.889 S

LONG:
157.79 W

51.6 (29)

DIRECT INSERTION

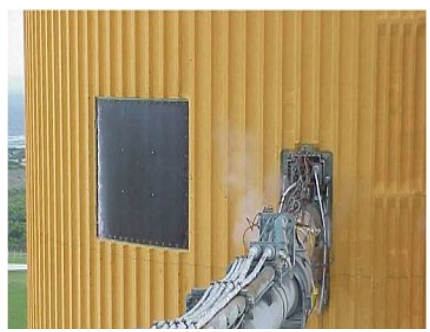
POST OMS-2:
123.8x32.3 NM

DEORBIT:
HA 184.5 NM
HP 22.2 NM

ENTRY VELOCITY:
25855 FPS

ENTRY RANGE:
4334 NM

OI-33 (3)



Gaseous hydrogen vent line leak caused STS-119 scrub in March 2009, also caused two scrubs on STS-127. This line connects the Ground Umbilical Carrier Plate (GUCP), attached to ET, to "flare stack" for burn-off of vented gaseous hydrogen.

CARGO:
36253LBS

PAYLOAD CHARGEABLE:
24682 LBS

DEPLOYED:
24266 LBS

NON-DEPLOYED:
290 LBS

MIDDECK:
126 LBS

SHUTTLE ACCUMULATED WEIGHTS:
DEPLOYED:
1548698 LBS

NON-DEPLOYED:
1621661 LBS

CARGO TOTAL:
4090475 LBS

PERFORMANCE MARGINS (LBS):
FPR: 2651
FUEL BIAS: 1059
FINAL TDDP: 2553
RECON:2734

PAYLOADS:
PLB:
ISS-2J/A, ANDRE-2, DRAGONSAT

MIDDECK:
ISS-2A,MAUI, SEITE,SIMPLEX

5 CRYO TANK SETS
ODS, SRMS (84), OBSS,SSPTS, ECSHS(2),ROEU, PPSUS(2)

Brief Mission Summary: STS-127 (29th mission to ISS) was a "16 day marathon construction mission". The final pieces of the Japanese Kibo Complex including an Experiment Exposed Facility "Porch" and the unpressurized Experiment Logistics Module were delivered along with spare equipment intended to keep ISS operational long after Shuttle is retired. Five EVA's and operations of three robotic arms were conducted for completion of all objectives.

KSC W/D:
OPF: 109 + 9H
VAB: 7 + 0C
PAD B: 32 + 10C + 1 SD (STS-125 launch) + 1 CR (Crew Rest Day)
PAD A: 42 + 3C + 1H
Total Work Days = 190 (OPF processing occurred over a total time period of 118 days.)

POSTPONEMENTS:
- Added STS-127 to FDRD - launch date of 04/23/09 on 04/24/08.
- Ppd. to 05/15/09 on 07/03/08. Slip due to ET deliveries.
- Ppd. to 06/13/09 on 03/10/09. Slip due to interim changes while Cx and SSP schedules were assessed and prioritized.

LAUNCH SCRUBS:
- Launch scrubbed officially on Saturday, 06/13/09 at 12:26 a.m. EDT due to gaseous Hydrogen leak at the GUCP – the same type of leak that scrubbed STS-119 in March. Launch rescheduled for 06/17/09. Technical Scrub.
- Launch scrubbed officially on Wednesday 06/17/09 at 1:55 EDT with the reoccurrence of the same type of GUCP leak as previous scrub. Launch rescheduled for 07/11/09. Technical Scrub.
- Launch officially scrubbed during L-11 Hour Hold at MMT meeting on Saturday morning, 07/11/09, due to unstable weather and lightning strikes overnight in KSC area. Seven strikes hit the lightning protection system, but none hit the vehicle. Launch rescheduled for 07/12/09. Weather Scrub.
- Launch scrubbed during a final hold at T-9 minute mark on Sunday 07/12/09 due to predicted thunderstorms within 20 nm limit of SLF. Launch rescheduled for 07/13/09. Weather Scrub.
- Launch scrubbed at 6:39 PM EDT on Monday 07/13/09 due to weather violations in KSC area. Launch rescheduled for 07/15/09. Weather Scrub.

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

FLT	ORBITER	CREW (6+1 UP/6+1 DN)	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM-ABORT EMERG	SRB RSRM	ORBIT		FSW	PAYLOAD WEIGHTS,	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS,
NO.		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-127/ ISS-2JA
Continued ...

Continued...

MS 5 DN EXP 18/19/20
FLT ENG (Japan) Koichi Wakata
(Flt 3 - STS-72,STS-92,
Up on STS-119 stay ISS)
P801/R208/V164/M181

SS EVA 137
DOCKED QUEST EVA 55
EMU/TETHERED EVA 130
SCHEDULED EVA 128
DURATION 5:32

SS EVA 138
DOCKED QUEST EVA 56
EMU/TETHERED EVA 1
HEDULED EVA 129
RATION 6:53

SS EVA 139
DOCKED QUEST EVA 57
EMU/TETHERED EVA 132
SCHEDULED EVA 130
DURATIO N 5:59

Continued...

Continued...

SE TAL (ZZA 104):
6:03(P)
6:08(A)

PTM (U/S 181 FPS):
6:01(P)
6:14(A)

SE PRESS 104
6:52(P)
7:01(A)

MECO CMD:
8:22.4(P)
8:24.9(A)

VI:
25819(P)
25820(A)

OMS-2:
35:45 (P)
38:30(A)
98.7(P)
96.9(A) FPS

Continued...

WHEELS STOP:
212:14:49:13Z

11856 FT

ROLLOUT:

10059 FT

1:06 M:S
WINDS:
7H KT 6R KTS
OFFICIAL:
19008P13KT
(X5P7 H7P11)

DENS ALT:
1916 FT

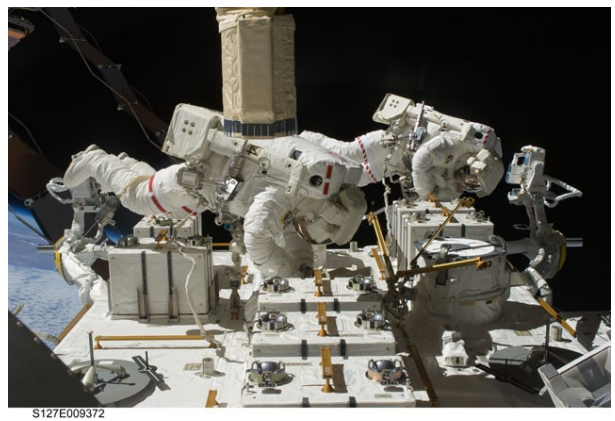
FLT DURATION:
15:16:44:58
S/T:
1212:01:31:44

OV-105:
266:15:33:01

DISTANCE:
6,547,853 sm

TOTAL SHUTTLE DISTANCE:
497,402,218 sm

ISS020-E-022626 (20 July 2009) --- Endeavour's crew cabin, along with the ISS's Kibo laboratory and Harmony node are shown during 2nd EVA.



S127-E-009372 (27 July 2009) Marshburn (left) & Cassidy, STS-127 MS's, participate in fifth and final EVA as construction and maintenance continue on the ISS.

Continued...

LAUNCH WINDOW: Total launch window was 10M 5S with window open at 196:21:58:10Z and close at 196:22:08:10Z. Preferred Launch Time was 196:22:03:10Z (In-Plane Time) for a launch window of 5M 0S.

LAUNCH DELAYS:
- None. Launch occurred on time at 196:22:03:10Z, 6:03:10 p.m. EDT,Wednesday, July 15, 2009. The Spaceflight Meteorology Group (SMG) forecast was challenged by thunderstorms along the east coast breeze throughout the day. However, the weather improved at the SLF and within the 20nm limit prior to launch for a "Go".

TAL WEATHER: TAL weather also cooperated for a Go for launch. A high pressure system produced dry and stable conditions across southern Spain. The two Spanish TAL sites were forecast for clear skies and winds within flight rule limits. Istres was forecasting a slight chance of a ceiling below flight rule limits for launch day.

PERFORMANCE ENHANCEMENTS:
Include the standard set plus: 1) PE Operational High Q SUM/JUL, 2) OMS Assist, 3) a 52 nautical mile MECO, and 4) Del Psi

FLIGHT DURATION CHANGES: NONE
- Planned landing at KSC on orbit 248. Landed at KSC Runway 15 on orbit 248 at 212:14:48:07Z on Friday, July 31, 2009.

FIRSTS/SECONDS/LASTS:
- Five launch scrubs is second highest number: STS-73 in 1995 & STS-61C in 1986 had six.
- Koichi Wakata, first Japanese astronaut to have engaged in long-duration on-orbit, returned to Earth after 4 1/2 months.
- First flight of SSME controller constant updates, an updated MPS propellant inventory, and an updated CMR.
- Record-size space crew of thirteen (ISS & Shuttle).

NIGHT LAUNCH: N/A

RENDEZVOUS: #74 Rendezvous and dock with ISS.

Continued...

SPACE SHUTTLE MISSIONS SUMMARY

FLT	ORBITER	CREW (6+1 UP/6+1 DN)	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM-ABORT EMERG	SRB RSRM	ORBIT		FSW	PAYLOAD WEIGHTS,	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS,
NO.		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-127/ ISS-2JA
Continued ...

Continued...

SS EVA 140
DOCKED QUEST EVA 58
EMU/TETHERED EVA 133
SCHEDULED EVA 131
DURATIO N 7:12

SS EVA 141
DOCKED QUEST EVA 59
EMU/TETHERED EVA 134
SCHEDULED EVA 132
DURATION 4:54

MCC WHITE FLIGHT FCR (57)

FLIGHT DIRECTORS:
SHUTTLE:
A/E- Bryan Lunney
LD/O1- Paul Dye
O2- Kwatsi Alibaruho
Planning- Gary Horlacher
- Mike Sarafin
MOD – John Mccullough
Team 4- Richard Jones

ISS
O1 - Brian Smith
LD/O2 – Holly Ridings
O3 – Derek Hassmann
Team 4 - Ron Spencer

Continued...

S127E009733

S127-E-009733 (28 July 2009) --- **Record Size Space Crew:** The STS-127 and Expedition 20 crew members pose for a group portrait in ISS Harmony Node. From left (front row) are NASA astronauts Michael Barratt, Exp 20 FE; Mark Polansky, STS-127 CDR; cosmonaut Gennady Padalka, Exp 20 CDR; and NASA astronaut Dave Wolf, STS-127 MS. From left (middle row) are JAXA astronaut Koichi Wakata, STS-127 MS; Canadian astronauts Julie Payette, STS-127 MS and Robert Thirsk, Exp 20 FE; and NASA astronaut Tom Marshburn, STS-127 MS. From left (back row) are cosmonaut Roman Romanenko, Exp 20 FE; NASA astronauts Christopher Cassidy, STS-127 MS; Doug Hurley, STS-127 Pilot; Tim Kopra, Exp 20 FE; and ESA astronaut Frank De Winne, Exp 20 FE.

Continued...

EVENTS:

- During liftoff several pieces of foam insulation came off the ET. Shuttle was hit two or three times, said Bill Gerstenmaier. Some scuff marks were spotted on the belly, but that probably is coating loss and considered minor, he said. That was later determined to be the case.
- FD1: OMS2 ignition at 196:22:41:40.0.9Z resulted in a 125.4 by 85.1 NM orbit.
- FD2: RCC inspection found no areas of concern
- T1 maneuver at 198:15:17:25.9Z resulted in a 188.7 by184.0 NM orbit
- FD3: R-Bar Pitch Maneuver was performed. No issues.

- Hard Dock, hooks closed, occurred at 198:15:47:10Z (12:47 CDT, July 17, 2009)
- ISS Hatch opened at 198:17:48:10Z (2:48 PM CDT, July 17, 2009) welcomed by ISS crew.
- IELK Seat Liner Transfer at 198:19:22:10Z (9:00 PM CDT March 17, 2009). At that time Koichi Wakata became a member of STS-127 and Tim Kopra joined the ISS Expedition 20 as Flight Engineer.
- Reboost - ~2.5 fps posigrade delta V. Increased altitude approx 4700 ft . Cleared vehicles of conjunction with Object 84180.
- FD4: Based on review of launch imagery, MMT cancelled FD5 focused inspection of Orbiter heat shield.
- FD4: EVA 1: David Wolf & Tim Kopra: Activities included: JPM berthing mechanism prep and install, CETA cart mods, and the P3 Nadir UCCAS deploy. EVA was shortened due to suit consumables. The PAS deploy was ppd. EVA1 duration 5:32.
- Using the SSRMS and SRMS the JEM Exposed Facility (JEF) was successfully unberthed from the Shuttle P/B and captured on the Japanese Experiment Module (JEM).
- FD6: EVA2: Dave Wolf & Tom Marshburn: Activities included: Transfer of ORU's (Space-to-Ground Antenna, Linear drive Unit & Pump Module) from the Intgrated Cargo Carrier (ICC) to the External Stowage Platform. Iinstallation of the JEF forward Vision Equipment [VE] was deferred.
EVA2 duration 6:53.
- FD8: EVA3: Dave Wolf & Chris Cassidy: Activities included: Node 2 WIF 14 removal and installation to COL WIF 2, JLE payload prep, completion of 2 Lab FPP grounding sleeves, changeput of 2 of 6 batteries on P6 (batts A & B from the ICC-VLD) and positioning of ICC-VLD in overnight parking configuration. EV2's LiOH performance caused early termination. EVA3 duration 5:59.
- FD10: EVA4: Chris Cassidy & Tom Marshburn: Activities included: successful R&R of all batteries and successful latching of the ICC-VLD back into the Shuttle P/L bay for return. EVA4 duration 7:12.

Continued...

SPACE SHUTTLE MISSIONS SUMMARY

FLT	ORBITER	CREW (6+1 UP/6+1 DN)	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM-ABORT EMERG	SRB RSRM	ORBIT		FSW	PAYLOAD WEIGHTS,	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS,
NO.		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

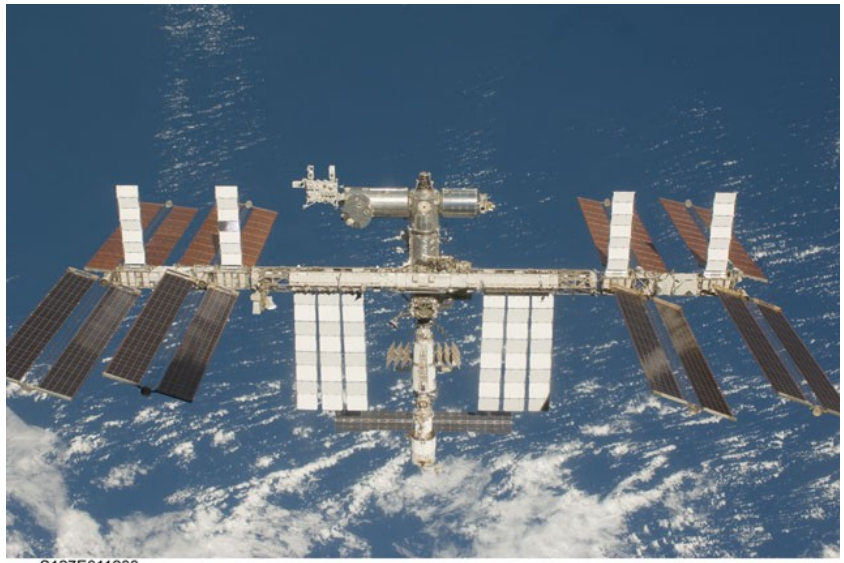
STS-127/ ISS-2JA
Continued ...

Continued...

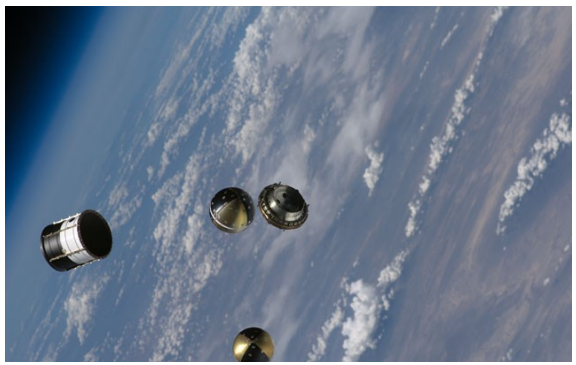
CAPCOMS:

SHUTTLE
A/E – Alan Poindexter
- Eric Boe (Wx)
LD/O1 – Greg (Box) Johnson
O2 - Janice Voss
Planning - Stan Love
- Shannon Lucid
Team 4 - N/A

ISS
O1 – Hal Getzelman
LD/O2-Akihiko Hoshide
O3 – Jason hutt
Team 4 – N/A


S127E011200

S127-E-011200 (28 July 2009) --- The ISS is seen from Space Shuttle Endeavour as the two spacecraft begin their relative separation.



S127-E-012919 (30 July 2009) --- The DOD-Satellite ANDE-2 shown after release from Endeavour's P/L Bay. The satellite data will be used to better predict

SIGNIFICANT ANOMALIES: Continued...

ET:
- POST-LAUNCH CAMERA AND FILM REVIEW SHOWED LOSS OF FOAM AT SEVERAL LOCATIONS ON THE INTERTANK.
- POST-LAUNCH CAMERA & FILM REVIEW SHOWED LOSS OF FOAM IN THE AFT INBOARD CORNER OF THE LO2 ICE FROST RAMP AT STATION 718
- ET TPS Loss Outboard Section of the -Y Bipod Closeout

MOD: None.

Integration:
- Unexpected Debris/Expected Debis Exceeding Mass Allowable Prior to Pad Clearance (Liftoff Debris)
- LH2 Leak at ET Ground Umbilical Carrier Plate (GUCP)

EVENTS: Continued...

- FD13: EVA5: Chris Cassidy & Tom Marshburn: Activities included: completion of Z1 patch panel reconfig, SPDM covers, JEF Vision Equipment installation and several get-aheads (JEM handrail and WIF installation, Lab cable tiedowns, Node 2 Gap Spanner installation, and relocating two APFR's for STS-128). The S3 Zenith Outboard PAS task was not performed due to lack of time based on predicted METOX capability. EVA5 duration 4:54.
-Transfers:
24,638 Pounds of hardware transferred to ISS (inside & out)
10,479 Pounds of hardware returned aboard Endeavour
2,175 Pounds of middeck items delivered to ISS aboard Endeavour
1,980 Pounds of middeck items returned from ISS to Endeavour
1,225 Pounds of water transferred to ISS
45 Pounds of Oxygen used for "stack maintenance"
12 Pounds of Nitrogen transferred to ISS
- ISS Mass in space 685,986 mass - pounds
- FD14: Undocked at 209:17:26:00Z (12:26 PM CDT, July 28, 2009)
- After undocking, Hurley initiated Endeavour fly-around at a distance of 400 feet from ISS and completed Sep-maneuver at 209:19:09:00Z (2:09 PM CDT, July 28, 2009)
- During Entry comm blackout occurred at 212:14:34:05Z - 212:14:36:24Z due to plasma effect.

SIGNIFICANT ANOMALIES:

Orbiter:
- MICROBIAL REMOVAL ASSEMBLY LEAKAGE
- FUEL CELL 3 SN 121 SUSTAINING HEATER TURNED ON WHEN THE FC STACK OUT TEMPERATURE REACHED A VALUE OF 185 DEG F
- DURING THE RCS HOTFIRE TEST, FORWARD RCS THRUSTER F2F
EXHIBITED LOW PC (V42P1542A) OF APPROXIMATELY 16 PSI. F2F
WAS DECLARED FAILED OFF AND AUTO DESELECTED BY RCS RM AT MET 14/10:45:40 (GMT 211/08:48:50).

KSC:
- The Istres Backup Azimuth system is in a Hard Overscan Alarm
- STS-127 Post Launch Debris

SRB:
- TOP LAYERS OF MSFC CONVERGENT COATING (MCC-1) MISSING ON AFT SKIRT TPS ACREAGE (BOTH LEFT & RIGHT HAND)POST FLIGHT OF STS-127/BI-138
- LEFT HAND SOLID ROCKET BOOSTER ENHANCED DATA ACQUISITION
SYSTEM (EDAS) ASSEMBLY CHANNEL 4 DID NOT RECORD NOMINAL
STRAIN RESPONSE.

RSRM: None.

SSME: None.

Continued at left...

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-128 (17A) SEQ FLT # 128 KSC-128 PAD 39A (51) MLP-2 30th SHUTTLE FLIGHT TO ISS	OV-103 (Flight 37) DISCOVERY OMS PODS LPO1 -40 RPO3-38 FRC3-37	CDR: Rick Sturckow (Flt 4 - STS-88,STS-105 STS-117) P802/R247/V173/M215 PLT Kevin Ford P803/R345/M259 MS 1 Patrick Forrester (Flt 3 - STS-105, STS-117) P804/R269/V186/M235 MS 2 Jose Hernandez P805/R346/M300 MS 3 Danny Olivas (Flt 2-STS-117) P806/R309/V207/M267 MS 4 Christer Fuglesang (Flt 2 - STS-116) P807/R304/V208/M264 MS 5 UP Stay ISS EXP20/FLT ENG Nicole Stott P808/R347/F47 MS 5 DN EXP 20 FLT ENG Tim Kopra Up on STS-127 stay ISS) P809/R344/M298 Continued…	KSC 39A 241:03:59:37Z 11:59:37 PM EDT (P) 11:59:37 PM EDT (A) Friday (27) 08/28/09 (9) LAUNCH WINDOW: 9M 36S (Total) 4M 48S (Preferred) EOM PLS: KSC TAL: MRN TAL WX: FMI.(NO GO) ZZA (NO GO) SELECTED: RTLS: KSC33 N/N TAL: MRN20 N/N AOA: NOR 17 N/SFD S B 1ST DAY PLS: EDW 22L N/SFD TDEL: 0.000 (P) -0.078 (A) MAX Q NAV: 752.76 (P) 738.70 (A) SRB STG: 2:02.2 (P) 2:02.6 (A) PERF: NOMINAL 2 ENG TAL (MRN): 2:38 (P) 2:41 (A) NEG MRN (2@ 104): 3:52 (P) 3:53(A) PTA (U/S 157 FPS):	EDW22 CONC EDW 54 CONC 35 255:00:53:20Z 7:53:20 PM CDT FRIDAY (16) 09/11/09 (12) DEORBIT BURN: 254:23:47:37Z XRANGE: 374.6NM ORBIT DIR: A/L (42) AIM PT: Nominal MLGTD: 1515 FT 255:00:53:20Z VEL: 220 KGS 199 KEAS HDOT: -4.3 FPS TD NORM 195: 1753 FT DRAG CHUTE DEPLOY: 155 KEAS 255:00:53:32Z NLGTD: 4854 FT 255:00:53:29Z VEL: 185 KGS 161 KEAS HDOT: -6.3 FPS BRK INIT: 113 KGS DRAG CHUTE JETTISON: 54 KGS 255:00:54:0	104/104/ 109% PREDICTED: 100/104.5/104.5/ 72/104.5 ACTUAL: 100/104.5/100// 72/104.5 1 = 2052 (8) 2 = 2051 (9) 3 = 2047 (13) M 3 EOM: WEIGHT: 222200 LBS X CG: 1088.4 IN LANDING: WEIGHT: 222271 LBS X CG: 1090 IN	BI-139 RSRM 107 ET-132 SLWT 36 ET IMPACT 1:14:26 MET LAT: 35.875 S LONG: 157.761 W	51.6 (30)	DIRECT INSERTION POST OMS-2 127.5x84.4 NM DEORBIT: HA 192.1 NM HP 22.5 NM ENTRY VELOCITY: 25863 FPS ENTRY RANGE: 4399.1 NM	OI-34 (1)	CARGO: 40605LBS PAYLOAD CHARGEABLE: 33056 LBS DEPLOYED: 30572 LBS NON-DEPLOYED: 2331 LBS MIDDECK: 153 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1579270 LBS NON-DEPLOYED: 1623992 LBS CARGO TOTAL: 4131080 LBS PERFORMANCE MARGINS (LBS): FPR: 2908 FUEL BIAS: 1059 FINAL TDDP: 1707 RECON: 2077 PAYLOADS: PLB: ISS-17A (MPLM,LMC), MISSE 6, TRIDAR AR&D SENSOR,DTO-701A Continued…

STS128-S-011 (28 Aug. 2009) ---Viewed from the Banana River Viewing Site, Space Shuttle heads toward Earth orbit and rendezvous with ISS. Night launch

Brief Mission Summary: The STS-128 (30th mission to ISS) main objective was to deliver science and environmental racks to dramatically enhance the scientific capability of the ISS. These racks were carried in the Leonardo MPLM. Included in the cargo was the highly publicized Combined Operational Load Bearing External Resistance Treadmill (COLBERT) named after TV comedian Stephen Colbert. Three EVA's were conducted and included replacement of the massive amonia tank used by the ISS Thermal Control System.

KSC W/D
OPF: 117+ 2H
VAB: 9 + 0C
PAD A: 25 + 0C
Total Work Days = 151 (OPF processing occurred over a total time period of 119 days.)

POSTPONEMENTS:
- Added STS-128 to FDRD - launch date of 07/30/09 on 06/23/08.
- Ppd. to 08/06/09 on 12/10/08. Interim manifest while HST final placement is considered.
- Ppd to 08/07/09 on 06/08/09. Slip due to MA direction.
- Ppd. to 08/18/09 on 06/30/09. Slip due to STS-127 GUCP delays.
- Ppd. to 08/25/09 on 08/20/09. Sliped to support KSC processing.

LAUNCH SCRUBS:
- 08/25/09 weather did not cooperate, systems looked good. Setting up for the next opportunity, window open at 12:05am CDT tomorrow with the in-plane time at 12:10am. Weather Scrub.
- 08/25/09 the 2nd launch attempt was scrubbed officially at 4:52 p.m. CDT (5:52 Eastern) by Launch Director Pete Nickolenko due to stuck "fill & drain valve during ET loading. Based on the results of a technical review of the MPS Hydrogen Fill & Drain Valve data, a 48 hour scrub turnaround was initiated. Technical scrub.
- 08/27/09 Official no go for launch today. Launch postponed to allow engineers additional time to develop flight rationale based on testing of F&D valve. Moses, "Will try tomorrow night if we get there." Next opportunity is Friday at 10:59 pm CDT (11:59 Eastern).
-08/28/09 MMT Summary at 12:55 PM: Reviewed LH2 valve (PV12) and agreed to plan for tonight's launch attempt. MMT is go to proceed for launch.

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-128 (17A)

Continued…

At FRR News Conf: News 13 Flordia: "Buzz Lightyear doing okay?" Suffredini: "There are big plans for him. He's been stowed, so I didn't talk to him."

Continued…

SPECIAL EDUCATOR
"Buzz" Lightyear (DN/EXP 20, see below)

EVA 142
DOCKED QUEST EVA 60
EMU/TETHERED EVA 135
SCHEDULED EVA 133
DURATION 6:35

SS EVA 143
DOCKED QUEST EVA 61
EMU/TETHERED EVA 136
SCHEDULED EVA 134
DURATION 6:39

SS EVA 144
DOCKED QUEST EVA 62
EMU/TETHERED EVA 137
SCHEDULED EVA 135
DURATIO N 7:01

Continued…

Continued…

SE TAL (FMI 104):
6:05(P)
6:08(A)

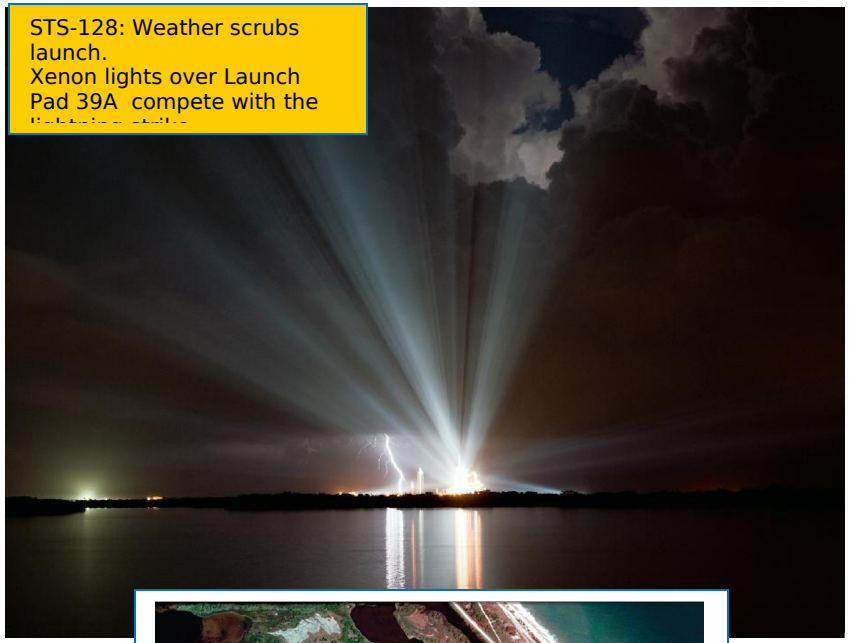
PTM (U/S 181 FPS):
6:09(P)
6:16(A)

SE PRESS 104
6:57(P)
6:58 (A)

MECO CMD:
8:24.0(P)
8:24.7 (A)
VI:
25819(P)
25820(A)

Continued…

STS-128: Weather scrubs launch.
Xenon lights over Launch Pad 39A compete with the lightning strike.



Google Earth Plots of StrikeNet and CGLSS Coordinates.
From: Aug 15, 2009 Daily PRCB, John

Continued…

MIDDECK:
ISS-17A,MAUI, SEITE,SIMPLEX

5 CRYO TANK SETS
ODS, SRMS (85),
OBSS,SSPTS

Continued…

LAUNCH WINDOW: Total launch window was 9M 36S with window open at 241:03:54:49Z and close at 241:04:04:25Z. Preferred Launch Time was 241:03:59:37Z (In-Plane Time) for a launch window of 4M 48S**.**

LAUNCH DELAYS:
- None. Launch occurred on time at 241:03:59:37Z, 11:59:37 PM EDT, Friday, August 28, 2009. The Spaceflight Meteorology Group (SMG) gave a "Go" for weather.

TAL WEATHER: SMG Forecast: A frontal system is approaching Istres and a upper level shortwave is dropping into northern Spain and southern France. Result in very windy conditions at Istres and breezy conditions at Zaragozal. Istres winds will be violating flight rule limits while Zaragoza will be very near the headwind limit. Moron weather is looking very favorable with clear skies and relatively light winds.

PERFORMANCE ENHANCEMENTS:
Include the standard set plus: 1) PE Operational High Q - SUM/AUG, 2) OMS Assist, 3) a 52 nautical mile MECO, and 4) Del Psi

FLIGHT DURATION CHANGES:
- Thursday, Sep 10, 2009, first deorbit opportunity waved off for violations of showers within 30nm & crosswind violations at 17 kts. Second opportunity also waved off; showers, instability, broken cloud deck and crosswind violation. Flight extended for EOM +1 day to Friday, 4 opportunities available. First & second opportunities at KSC were again waved off due to weather. EDW had no violations and low winds, first opportunity shows winds 230 8p12 kts. GO for EDW given. Landed on EDW Runway 22 at 255:00:53:20Z, Friday, Sep 11, 2009.

FIRSTS:
RSRM Improved Resiliency O-rings, Nozzle-to-Case Joint. Fly with higher margins.
RSRM Inactive Stiffener Stub Removal - Eliminated four debris liberation/debris impact causes

NIGHT LAUNCH: **#33**

Continued…

SPACE SHUTTLE MISSIONS SUMMARY

FLT	ORBITER	CREW (6+1 UP/6+1 DN)	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM-ABORT EMERG	SRB RSRM	ORBIT		FSW	PAYLOAD WEIGHTS,	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS,
NO.		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-128 (17A)

Continued...

Continued...

MCC WHITE FLIGHT
FCR (58)

FLIGHT DIRECTORS:
SHUTTLE:
A/E- Richard Jones
LD/O1- Tony Ceccacci
O2- Kwatsi Alibaruho
Planning- Gary Horlacher
MOD – John Mccullough
Team 4- Mike Sarafin

ISS
O1 - Ron Spencer
LD/O2 – Heather Rarick
O3 – Royce Renfro
Team 4 - Derek Hassmann

CAPCOMS:
SHUTTLE
A/E – Eric Boe
- Chris Ferguson (Wx)
LD/O1 - Chris Ferguson
- Tony Antonelli
O2 - Stan Love
Planning - Shannon Lucid
Team 4 - N/A

ISS
O1 - Chris Zajac
LD/O2- Robert Hanley
O3 – Mike Jensen
Team 4 – N/A

Continued...

OMS-2:
39:00 (P)
39:00(A)
95.1(P)
94.5(A) FPS

Continued...

ROLLOUT:
11594 FT
1:13 M:S
WINDS:
-6.5T KT
-2.5L KTS
OFFICIAL:
09007P08KT
(X4P4 T6P7)

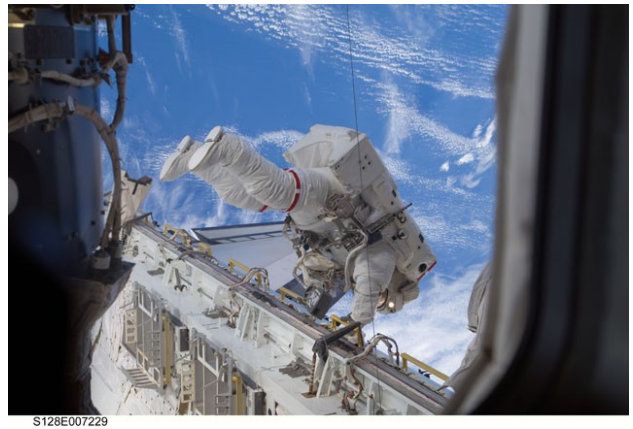
DENS ALT:
5489 FT

FLT DURATION:
13:20:53:43
S/T:
1225:22:25:27

OV-103:
332:00:33:34:

DISTANCE:
5,702,716 sm

TOTAL SHUTTLE DISTANCE:
503,104,934 sm

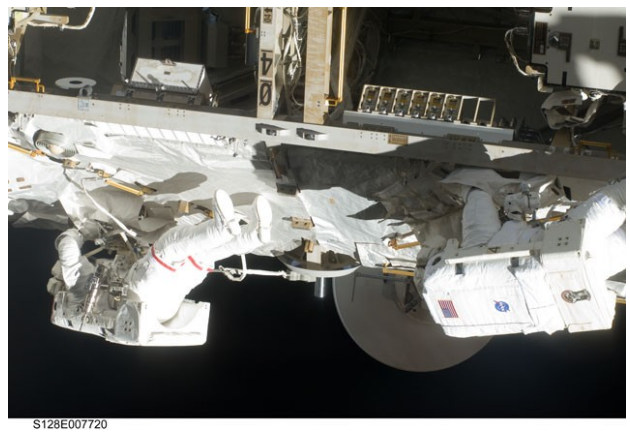


S128E007229

Construction and maintenance continued on the ISS.

ABOVE: S128-E-007229 (1 Sept. 2009) --- Nicole Stott/EXP 20 FE, during EVA 1with Danny Olivas/MS3 (out of frame). Activities included removal of an empty ammonia tank from ISS truss .

BELOW: S128-E-007720 (5 Sept. 2009) --- Olivas/MS3 (left) & Christer Fuglesang//ESA/MS4, participate in EVA3 activites.



S128E007720

Continued...

RENDEZVOUS: #75 Rendezvous and dock with ISS.

EVENTS:
- FD1: OMS2 ignition at 241:04:38:36.9Z resulted in a 127.5 by 84.4 NM orbit.
- FD2: RCC inspection found no areas of concern
- T1 maneuver at 242:22:26:17Z resulted in a 193.2 by181.6 NM orbit
- FD3: R-Bar Pitch Maneuver was performed. No issues.
- Docking Contact occurred at 243:00:53:56Z
- Hard Dock, hooks closed, occurred at 243:01::07:23Z
- ISS Hatch opened at (9:32 PM CDT, Aug 30, 2009) welcomed by ISS crew.
- IELK Seat Liner Transfer at (10:50 PM CDT, Aug 30). At that time Tim Kopra became a member of STS-128 and Nicole Stott joined ISS EXP 20.
- MMT FD3 reported VRCS jet F5R experienced a jet fail leak at 00/4:37 MET. ISS to perform all attitude control & maneuvers during the docked mission.
- MMT FD5 concured that no Focused Inspection of Orbiter was required.
- FD5: “Leonardo” MPLM transfered to ISS, Zero-G stowage rack transfered to “Harmony” node & COLBI treadmill transferred.
- EVA 1: Olivas & Stott successfully completed: Prep of P1 truss Ammonia Tank Assembly (ATA) for removal, EuTEF & MISSE experiment removal from Columbus module. EVA1 duration 6:35.
- FD7: EVA2: Olivas & Fuglesang: EVA was about 51 min late due to Olivas’ comm. cap chin strap came undone while in pre-breathe. The ATA task was completed early & 3 get ahead tasks were completed: CLA cover installation, APFR 4 tool stanchion relocation, & CLPA cover installation. EVA2 duration 6:39.
- FD9: EVA3: Olivas & Fuglesang: Activities included: Deploy S3 Truss Payload Attach System, Rate Gyro Assembly 2 R&R, S0 Truss Remote Power Control Unit R&R, Global Positioning System 4 installation, “Tranquility” Node 3 avionics cable routing (full), & Oxygen Generator Assembly water filter R&R. A lense became mechanically detached from Fuglesang’s helmet at the end of the EVA. Without intact helmet lights he headed to the A/L before sunset . His PET was 6:22. Olivas performed cleanup. EVA3 duration (PET) 7:01.

Continued...

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-128 (17A)

Continued...

ISS020E038322

ISS020-E-038322 --- STS-128 & Exp 20 crew in-flight portrait on ISS. STS-128 red-clad crewmembers are: front row, from left, Sturckow, Hernandez, & Forrester; middle row in red, Ford, Olivas, & Fuglesang (ESA). EXP 20 crew (in blue) are: bottom left, Kopra, who joined ISS crew in July, now scheduled to return to Earth with STS-128. Clockwise fashion from him are: Stott, Robert Thirsk/CSA, Roman Romanenko/RSA, Frank De Winne/ESA, Gennady Padalka/RSA, and Michael Barratt.

S128-E-009998 (8 Sept. 2009) --- Backdropped by Earth's horizon and the blackness of space, ISS as seen from Discovery as the two spacecraft begin


S128E009988

STS128-S-047 (11 Sept. 2009) --- Shuttle Discovery's main landing gear touchdown at EAFB. Landing was diverted from KSC due to marginal

Continued...

-Transfers:
18,548 Lbs of hardware transferred to ISS
1,705 Lbs"New" ATA (with 600 lbs of ammonia) to ISS
1,295 "Old" ATA to Discovery
5,223 Lbs hardware returned to Discovery
1,705 Lbs of middeck items transferred to ISS
861 Lbs of middeck items returned from ISS to Discovery
1,243 Lbs of water transferred to ISS
710,966 Mass in space of the ISS (lbs)
84 Percentage complete of ISS assembly
- FD12: Undocked at 251:19:26:22Z - During Entry comm blackout occurred at 255:00:38:39Z - 255:00:39:02Z due to plasma effect.
- FD15: Deorbit burn on orbit 219 for EDW landing.

SIGNIFICANT ANOMALIES:

Orbiter:
- EV2 UNACCEPTABLE COMM DURING EVA 2.
- Vernier Thruster F5R Indicates Leak In Flight
- APU 3 EGT 2 R&R
- Vernier Thruster F5R Indicates Leak In Flight

KSC:
- HANDLES ON BULK HEAD PLATES ARE LIBERATING
- STS-128 Post Launch Debris

SRB:
- DEBRIS OBSERVED NEAR HOLD DOWN POST (HDP-4) DURING ASCENT.
- RH MAIN CHUTE CANOPY DAMAGED WITH A VERTICAL TEAR EXTENDING FROM THE TOP VENT BAND TO THE CANOPY BOTTOM SKIRT BAND DURING STS-128 ON BI-139

RSRM: None.

SSME: None.

ET:
- STS-128/ET-132 REVIEW SHOWED FOAM LOSS BETWEEN +Y JACKPAD/-Y BIPOD CLOSEOUTS AT LH2/IT FLANGE

MOD: None.

Integration:
- LH2 PV-12 Inboard Fill and Drain valve did not indicate closed when commanded
- Debris Observed Near RH SRB Aft Skirt HDP #4 Foot
- LH2 PV-12 Inboard Fill and Drain valve did not indicate closed when commanded

SPACE SHUTTLE MISSIONS SUMMARY

FLT	ORBITER	CREW (6 UP/6+1 DN)	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM-ABORT EMERG	SRB RSRM	ORBIT		FSW	PAYLOAD WEIGHTS,	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS,
NO.		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-129/ ULF3

SEQ
FLT # 129

KSC-129

PAD 39A (52)

MLP-3

31th SHUTTLE FLIGHT TO ISS

OV-104 (Flight 31) ATLANTIS

OMS PODS
LPO4-30
RPO1-38
FRC4-31

CDR:
Charles O. Hobaugh (Flt 3 - STS-104, STS-118)
P810/R268/V188/M234

PLT
Barry E. Wilmore
P811/R348/M301

MS 1
Leland Melvin
(Flt-2 - STS-122)
P812/R319/V209/M275

MS 2
Randy Bresnik
P813/R349/M302

MS 3
Mike Foreman
(Flt 2 -STS-123)
P814/R324/V210/M280

MS 4, EV2
Robert Satcher, Jr.
P815/R350/M303

MS 5 DN
EXP20/21 FLT ENG
Nicole Stott
P816/R347/F47

SS EVA 145
DOCKED QUEST EVA 63
EMU/TETHERED EVA 138
SCHEDULED EVA 136
DURATION 6:37

SS EVA 146
DOCKED QUEST EVA 64
EMU/TETHERED EVA 139
SCHEDULED EVA 137
DURATION 6:08

Continued...

KSC 39A
320:19:28:10Z
1:28:01 PM CST (P)
2:28:01 PM EST (A)
Monday (15)
11/16/09 (15)

LAUNCH WINDOW:
9M 01S (Total)
4M 28S (Preferred)

EOM PLS: KSC
TAL: ZZA
TAL WX: MRN, FMI (Cloud Ceiling)

SELECTED:
RTLS: KSC33N/N
TAL: ZZA 30L N/SFD
AOA: KSC 33 N/N
1ST DAY PLS: EDW 22L N/N

TDEL:
0.000 (P)
-0.072 (A)

MAX Q NAV:
760.9 (P)
733.8 (A)

SRB STG:
2:03.0 (P)
2:04.0 (A)

PERF: NOMINAL

2 ENG TAL (ZZA):
2:36 (P) 2:43 (A)

NEG ZZA (2@ 104):
3:52 (P)
3:57(A)

PTA (U/S 157 FPS):
5:08(P)
5:09(A)

KSC 33 KSC (72)
331 / 14:44:21Z
8:44:21 AM CST
Saturday (24)
11/7/09 (14)

DEORBIT BURN:
331:13:37:09Z

XRANGE:
344.1NM

ORBIT DIR: A/L (43)
AIM PT: (Close-In)

MLGTD: 2971 FT
331:14:44:20Z
VEL: 184 KGS 197 KEAS
HDOT: -2.1 FPS

TD NORM 195: 298
9 FT

DRAG CHUTE DEPLOY: 189 KEAS
331:14:4

104/104/ 109%

PREDICTED:
100/104.5/104.5/ 72/104.5

ACTUAL:
100/104.5/100/ 72/104.5

1 = 2048 (10)
2 = 2044 (12)
3 = 2058 (4)

M 3 EOM:
WEIGHT: 206917 LBS
X CG: 1083.8 IN

LANDING:
WEIGHT: 207200 LBS
X CG: 1084.6 IN

BI-140

RSRM 108

ET-133
SLWT 37

ET IMPACT
1:14:13 MET

LAT:
36.434 S

LONG:
158.53 1 W

51.6 (31)

DIRECT INSERTION

POST OMS-2
125.0x84.8 NM

DEORBIT
HA 191.9 NM
HP 23.3 NM

ENTRY VELOCITY:
25867 FPS

ENTRY RANGE:
4390.31 NM

OI-34 (2)

CARGO:
38893LBS

PAYLOAD CHARGEABLE:
29372 LBS

DEPLOYED:
27615 LBS

NON-DEPLOYED:
1404 LBS

MIDDECK:
353 LBS

SHUTTLE ACCUMULATED WEIGHTS:
DEPLOYED:
1606885 LBS

NON-DEPLOYED:
1625396 LBS

CARGO TOTAL:
4131080 LBS

PERFORMANCE MARGINS (LBS):
FPR: 2908
FUEL BIAS: 1059
FINAL TDDP: 2228
RECON: 2041

PAYLOADS:
PLB:
ISS-ULF3 (ELC 1, ELC 2, SASA, MISSE 7A, MISSE 7B)

Continued...

KSC-2009-5945 (28 Oct. 2009) --- NASA's new Ares I-X test rocket launches from PAD 39B as STS-129 readies for

http://www.nasa.gov/images/content/389937main_2009-5728.jpg *Ares 1-X Rocket (1st Test Flight) and STS-129 Shuttle*

Brief Mission Summary: ***The STS-129 (31th mission to ISS) main objective was to deliver nearly 14 tons of ISS systems spares. The most critical spares being transferred were two 600 lb. control moment gyros. "They've done a tremendous job of really outfitting station with all the spares that are going to be needed, essentially through its lifetime," Bill Gerstenmaier, NASA Associate Administrato for Space Operations.***

KSC W/D
OPF: 113 days + 10 non-workdays + 1 holiday
VAB: 7 days + 1 contingency day
PAD A: 32 days + 2 contingency days
Total Work Days = 152 (OPF processing occurred over a total time period of 124 days.)

POSTPONEMENTS:
- Baselined STS-129 to FDRD - launch date of 10/15/09 on 10/06/08.
- Ppd. to 11/12/09 on 12/04/08. Interim manifest while HST final placement is considered.
- Ppd. to 11/16/09 at10/29/09 FRR. Slip due to latest SSP planning.

LAUNCH SCRUBS: None.

LAUNCH WINDOW: Total launch window was 9M 01S with window open at 320:19:23:37Z and close at 320:19:32:38Z. Preferred Launch Time was 320:19:28:10Z (In-Plane Time) for a launch window of 4M 28S.

LAUNCH DELAYS:
- None. Launch occurred on time at 320/19:28:10Z, 2:28:10 PM EST, Monday, November 16, 2009. A cloud ceiling below 5000 feet developed early in the morning, violating flight rule limits. The ceiling lifted to above flight rule limits about 5 hours prior to launch, but continued to violate US Air Force Range Safety cloud criteria. Astronaut Steve Lindsey, flying weather reconnaissance, provided measurements of the cloud thickness for the 45th Space Wing's Launch Weather Officer and found the thickness to be acceptable about 3 hours prior to launch.. (Courtesy NWS SMG Post-Mission Summary.)

Continued...

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-129/ ULF3
Continued...

Continued...

SS EVA 147
DOCKED QUEST EVA 65
EMU/TETHERED EVA 140
SCHEDULED EVA 138
DURATION 5:42

MCC WHITE FLIGHT
FCR (59)

FLIGHT DIRECTORS:
SHUTTLE:
A/E- Bryan Lunney
LD/O1- Mike Sarafin
O2- Gary Horlacher
Planning- PaulDye
MOD – John Mccullough
Team 4- Kwatsi Alibaruho
ISS
O1 - Emily Nelson
LD/O2 – Brian Smith
O3 – Jerry Jason
Team 4 - Heather Rarick

Continued...

Continued...

PTM (U/S 181 FPS):
6:11(P)
6:13(A)

SE PRESS 104
6:56(P)
6:56 (A)

MECO CMD:
8:24.2(P)
8:24.3 (A)

VI:
25819(P)
25819(A)

OMS-2:
37:55 (P)
38:15(A)
98.8(P)
96.7(A) FPS

Continued...

BRK DECEL FPS^2:
AVE 6.4 PK 7.9

WHEELS STOP:
331:14:45:04Z
955
7 FT
ROLLOUT:
658
6 FT
0:44
M:S
WINDS:
11H KTS -1L KTS
OFFICIAL:
33011P17KTS
X1P2H11P17)

DENS ALT: -473 FT

FLT DURATION:
10:19:16:14
S/T:
1235:41:41:41

OV-104:
281:23:59:12

DISTANCE:
4,490,138 sm
TOTAL SHUTTLE DISTANCE:
507,595,072 sm

STS129-S-027 (16 Nov. 2009) --- NASA mission managers monitor Atlantis launch from KSC FR 4. Bill Gerstenmaier, NASA Associate Administrato for Space Operations is at

ISS021-E-029824 (18 Nov. 2009) --- Atlantis loaded with spares is photographed on approach to ISS by an Expedition 21 crew member . The Russian Progress 35P

Continued...

PAYLOADS:
MIDDECK:
ISS-ULF3,
MAUI,
SEITE,
SIMPLEX,
RAMBO-2

5 CRYO TANK SETS
ODS, SRMS (86),
OBSS

Continued...

TAL WEATHER: Weather on launch day caused a couple minor issues at back-up site, Istres. Weather conditions at Zaragoza, the prime TAL site, and Moron were observed and forecast acceptable throughout the countdown. However, a cloud ceiling developed at Istres 2 hours prior to launch limiting the use of that landing site. (Courtesy NWS SMG Post-Mission Summary.) Istres became GO close to launch update.

PERFORMANCE ENHANCEMENTS:
Include the standard set plus: 1) PE Operational High Q - TRN/NOV, 2) OMS Assist, 3) a 52 nautical mile MECO, and 4) Del Psi

FLIGHT DURATION CHANGES:
None. Landed on KSC Runway 33 at 331:14:44:21Z, Friday, November 27, 2009, at8:24:21 CST.

FIRSTS/SECONDS/LASTS:
Second child born while astronaunt dad in space. Randy Bresnik's wife, Rebecca, gave birth to Abigail Mae Bresnik, 6 lbs 13 oz, at 11:04 p.m. Saturday, Nov. 21st, in Houston.
First “dad while in space” was Mike Fincke in 2004 on ISS during a 6 mo tour- a girl.
First Orthopedic Surgeon in space: Dr. Robert Satcher,Jjr.
First flight of new variable Alt DAP
First flight ET replaced LH2 ice Frost Ramp (IFR) base TPS with NCFI at 14 locations
First Flight SSME Nozzle Corrosion Inhibitor Application Change
First Monarch Butterflies delivered to ISS. Butterflies took flight on 12/09/09 as monitored by thousands of students back on Earth.
Super Bowl XLIV opening-toss coin flown to ISS & returned.

NIGHT LAUNCH: N/A

RENDEZVOUS: #76 Rendezvous and dock with ISS.

EVENTS:
- FD1: OMS2 ignition at 320:20:06:25Z resulted in a 125.0 by 84.8 NM orbit.
- FD2: RCC inspection found no areas of concern
- T1 maneuver at 322:14:05:57Z resulted in a 185.6 by179.5 NM orbit
- FD3: R-Bar Pitch Maneuver was performed. No issues.
- Docking Contact occurred at 322:16:51:16Z

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-129/ ULF3
Continued...

Continued...

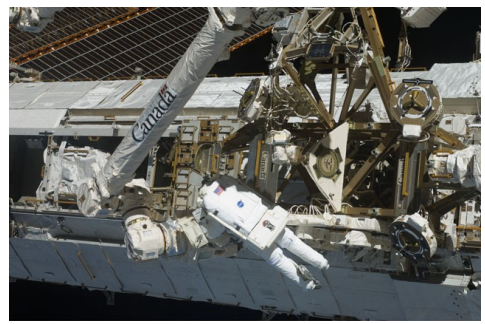
CAPCOMS:
SHUTTLE
A/E - Chris Ferguson
- Steve Frick (Wx)
LD/O1 - Stan Love
O2 - Megan McArthur
Planning - Aki Hoshide
Team 4 - N/A
ISS
O1 - Drew Feustel
LD/O2- Steve Swanson
O3 – Ryan Lien
Team 4 – N/A


ISS021E032724

ISS021-E-032724--- (24 Nov. 2009) Portrait Time: Twelve internationally-represented astronauts and cosmonauts spend time together in space. The group includes the seven STS-129 astronauts Charles O. Hobaugh, commander; Barry E. Wilmore, pilot; and Nicole Stott, Mike Foreman, Leland Melvin, Robert L. Satcher Jr. and Randy Bresnik, all mission specialists, plus the five ISS crewmembers, Jeffrey Williams, Frank De Winne/ESA, Robert Thirsk/CSA and Russia's FSA cosmonauts Roman Romanenko and Maxim Suraev.


ISS021-E-030165 (19 Nov. 2009) Foreman installing a spare S-band antenna structural assembly to the Z1 segment of the station's truss. EVA 1.


S129-E-007762 (21 Nov. 2009) New Dad In Space, Bresnik, installing a Grappling Adaptor to On-Orbit Railing Assembly (GATOR) on Columbus Lab. EVA 2.



S129-E-008103 (23 Nov. 2009) Satcher moves debris shields from Quest airlock to the External Stowage Platform #2. EVA 3.

Continued...

EVENTS: Continued...
- Hard Dock, hooks closed, occurred at 322:17:03:49
- ISS Hatch opened at (12:28 PM CST, Nov. 18, 2009) welcomed by ISS crew. At that time Stott ended her stay as EXP 21 FE and became an STS-129 MS.
- FD4: EVA 1: Foreman & Satcher successfully completed all ISS maintenance and spares transfer tasks ahead of schedule. A get-ahead task was the most difficult. In releasing a cargo platform, a spring loaded device jammed and had to be manhandled to achive relaese. EVA1 duration 6:37.
- MMT concured that no Focused Inspection of Orbiter was required.
- FD6: EVA2: Russian false depress event overnight, but EVA2 was conducted on time. Foreman & Bresnik completed all nominal tasks plus the following get-aheads: S3 Nadir/Inboard PAS Deploy, SGANT Y-cable check (CHIT 8025) , Tool stanchion relocation to P1 WIF 3, & APFR 5 retrieve. EVA2 duration 6:08.
- FD8: EVA3: Satcher & Bresnik: EVA-3 started one hour late due to EV2's drink bag valve coming loose. All tasks successfully completed included: transfer of HPGT & MISSE & from ExPRESS Logistics Carrier 2 to Quest airlock. Towards the end of the EVA two [unknown] items were lost overboard at 327:17:37Z. All tools were accounted for. EVA3 duration (PET) 5:42.
- Hard Dock, hooks closed, occurred at 322:17:03:49
- ISS Hatch opened at (12:28 PM CST, Nov. 18, 2009) welcomed by ISS crew. At that time Stott ended her stay as EXP 21 FE and became an STS-129 MS.

-Transfers:
31,789 Pounds of hardware transferred to station (inside & out)
40 Pounds of Oxygen "transferred" (pumped) into ISS cabin
11 Pounds of Nitrogen transferred into ISS tanks
2,211 Pounds of middeck items delivered to ISS
2,110 Pounds of middeck items returned from ISS
~1,400 Pounds of water transferred to ISS

- Mass in space of the ISS 759,222 pounds
- ISS assembly: 86 Percentage complete
- FD10: Undocked at 329:09:53:02Z
- During Entry there was no RF blackout. It was

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (6 Up/6+1 DN) TITLE, NAMES & EVA'S	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT INC	ORBIT HA/HP	FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
STS-129/ ULF3 Continued...											Continued...

S129-E-009497 (24 Nov. 2009) --- Nicole Stott/MS takes one of her final "strolls" through the modules and hatchways of the ISS on the eve of her departure from the orbital outpost.

JSC2009-E-243548 (24 Nov. 2009) --- The members of the STS-129 Ascent Flight Control Team pose for a group portrait in the Space Shuttle Flight Control Room in the Mission Control Center at JSC. Flight director Bryan Lunney and flight controller Christi Worstell hold the STS-129 logo.

S129-E-009228 (25 Nov. 2009) --- ISS, post Shuttle sep, is shown against the background of Earth's

SIGNIFICANT ANOMALIES:

Orbiter:

- WASTE DUMP STOPPED PREMATURELY. THE WASTE WATER DUMP INITIATED POST-UNDOCK AT APPROX. 329/12:07:38 GMT, EXHIBITED A NOMINAL WASTE DUMP RATE (APPROX. 2.0 %//MIN) UNTIL APPROX. 329/12:19:36 GMT WHEN THE WASTE DUMP RATE DEGRADED TO 0.3 /%/MIN. WASTE DUMP WAS TERMINATED BY CLOSING THE DUMP VALVE AND NOZZLE WAS REHEATED TO APPROX. 258 DEG F. DUMP VALVE WAS THEN OPENED AT 329/12:35:34 GMT FOR CONTINUATION OF THE DUMPING OPERATION. THE OBSERVED DUMP RATE CONTINUED OFF-NOMINALLY AT NEAR 0 %/MIN AND THE WASTE DUMP WAS TERMINATED AFTER 19 MINUTES. This IFA is considered a constraint to STS-132/ULF4 (next flight of OV-104), but is expected to be resolved with a dump line filter change.
- APU water tank heater A (50V46HR01A) did not operate at expected temp. APU water tank temp
- LRCS BFS FUEL AND OXIDEZER QUANTITIES INCREASED OFF NOMINAL

KSC: None.

SRB:

RH SOLID ROCKET BOOSTER AFT SKIRT FOAM ON THE OUTBOARD SIDE OF HOLDDOWN POST M2 NEAR THE GN2 PURGE LINE IS OBSERVED TO CRACK DURING LIFTOFF

RSRM: None.

SSME: None.

ET: None.

MOD: None.

Integration:

- Unexpected Debris/Expected Debris Exceeding Mass Allowable Prior to Pad Clearance (Liftoff Debris)
- Single Transient SRB I/O Error at Liftoff

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-130/ 20A

SEQ
FLT # 130

KSC-130

PAD 39A (53)

MLP-2

32nd SHUTTLE FLIGHT TO ISS

OV-105 (Flight 24) ENDEAVOUR

OMS PODS
LPO3 -34
RPO4 30
FRC5-23

CDR:
George D. Zamka
(Flt 2 - STS-120)
P817/R315/V211/M271

PLT
Terry W. Virts, Jr.
P818/R351/M304

MS 1
Kathyrn P. Hire
(Flt 2 - STS-90)
P819/R238/V212/F31

MS 2
Stephen K. Robinson
(Flt 4 - STS-85, STS-95, STS-114)
P820/R222/V152/M196

MS 3
Nicholas J. M. Patrick
(Flt 3 - STS-105, STS-116)
P821/R303/V186/M263

MS 4
Robert L. Behnken
(Flt 2 - STS-123)
P822/R323/V213/M279

SS EVA 148
DOCKED QUEST EVA 66
EMU/TETHERED EVA 141
SCHEDULED EVA 139
DURATION 6:32

SS EVA 149
DOCKED QUEST EVA 67
EMU/TETHERED EVA 142
SCHEDULED EVA 140
DURATION 5:53

SS EVA 150
DOCKED QUEST EVA 68
EMU/TETHERED EVA 143
SCHEDULED EVA 141
DURATION 5:48

Continued...

KSC 39A
39:09:14:07Z
4:14:07 AM EST (P)
4:14:07 AM EST (A)
Monday (16)
02/08/10 (10)

LAUNCH WINDOW:
11M 57S (Total)
7M 32S (Preferred)

EOM PLS: KSC
TAL: ZZA
TAL WX:
MRN (NO GO), FMI (NO GO)

SELECTED:
RTLS: KSC15 N/N
TAL: ZZA 30L N/N
AOA: KSC 15 N/N
1ST DAY PLS: EDW 22R N/N

TDEL:
0.000 (P)
0.232 (A)

MAX Q NAV:
757.6 (P)
756.6 (A)

SRB STG:
2:05.9 (P)
2:07.2 (A)

PERF: NOMINAL

2 ENG TAL (ZZA):
2:42 (P) 2:43 (A)

NEG ZZA (2@ 104):
3:52 (P)
3:54(A)

PTA (U/S 160 FPS):
5:08(P)
5:06(A)

KSC15 KSC (73)
053:03:20:29Z
9:20:29 PM CST
Sunday (17)
02/21/10 (8)

DEORBIT BURN:
053:02:14:47Z

XRANGE:
336.9NM

ORBIT DIR: A/L (44)
AIM PT: (Close-In)

MLGTD: 2760 FT
053:03:20:29Z
VEL: 188 KGS 190 KEAS
HDOT: -1.9 FPS

TD NORM 195: 240
5 FT

DRAG CHUTE DEPLOY: 185 KEAS
053:03:20:31Z

NLGTD: 5219 FT

104/104/ 109%

PREDICTED:
100/104.5/104.5/
72/104.5

ACTUAL:
100/104.5/100/
74/104.5

1 = 2059 (4)
2 = 2061 (1)
3 = 2057 (5)

M 3 EOM:
WEIGHT:
201138 LBS
X CG:
1082.8 IN

LANDING:
WEIGHT:
201084 LBS
X CG:
1084.8 IN

BI-141

RSRM 109

ET-134 SLWT 38

ET IMPACT
1:13:54 MET

LAT:
37.192 S

LONG:
159.603 W

51.6 (32)

DIRECT INSERTION

POST OMS-2
124.0x110.08 NM

DEORBIT
HA 190.3 NM
HP 23.3 NM

ENTRY VELOCITY:
25866 FPS

ENTRY RANGE:
4367.5 NM

OI-34 (3)

CARGO:
40956 LBS

PAYLOAD CHARGEABLE:
34931 LBS

DEPLOYED:
34648 LBS

NON-DEPLOYED:
0 LBS

MIDDECK:
283 LBS

SHUTTLE ACCUMULATED WEIGHTS:
DEPLOYED:
1641533 LBS

NON-DEPLOYED:
1626311 LBS

CARGO TOTAL:
4210929 LBS

PERFORMANCE MARGINS (LBS):
FPR: 2908
FUEL BIAS: 1059
FINAL TDDP: 1188
RECON: 2828

PAYLOADS:
PLB:
ISS-20A (NODE 3 W/CUPOLA)

MIDDECK:
ISS-20A, MAUI, SEITE, SIMPLEX, RAMBO-2

5 CRYO TANK SETS
ODS, SRMS (87),

***Brief Mission Summary:* The STS-130 (32nd mission to ISS) main objectives were to deliver and assemble the final U.S. module (Tranquility) and the Italian built Cupola Node plus delivery of ISS equipment, supplies, and experiments. Tranquility provides additionall room for the ISS crew and life support systems. The Cupola is a robotic control station and provides a panoramic view of earth through 7 windows, "A Room With a View" - PAO. The mission included 3 EVA's.**

KSC W/D
OPF-2: 130 days + 3 holidays
VAB-1: 9 days + 5 contingency days +11 holidays
PAD A: 31 days + 3 contingency days
Total Work Days = 170 (OPF processing occurred over a total time period of 133 days.)

POSTPONEMENTS:
- Baselined STS-130 to FDRD - launch date of 12/10/09 on 11/17/08.
- Ppd. to 02/04/10 on 03/10/09. Interim change while Cx and SSP schedules were assessed and prioritized.
- Ppd. to 02/07/10 on 12/17/09. Launch date change supports efficient use of KSC ground operation resources.

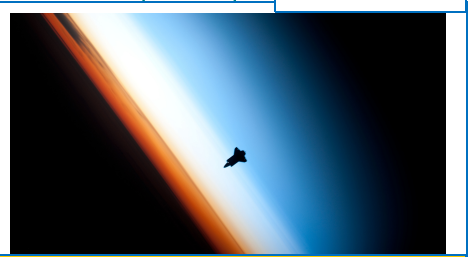
LAUNCH SCRUBS: Sunday, 02/07/10 launch attempt was terminated about an hour before scheduled launch of 4:40 AM EST. Launch scrub was was due to a massive area of low cloud ceilings that blanked the northern half of Flordia.. launch was reset for 02/08/10. WEATHER SCRUB.

LAUNCH WINDOW: Total launch window was 11M 57S with window open at 39:09:09:42Z and close at 39:09:21:39Z. Preferred Launch Time was 39:09:14:07Z (In-Plane Time) for a launch window of 7M32S.

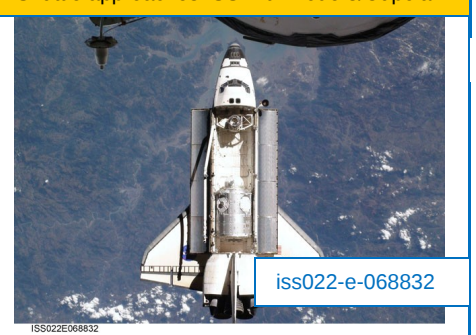
LAUNCH DELAYS: None. Launch occurred on time at 39:09:14:07Z on Monday 02/08/10.

TAL WEATHER: Spaceflight Meteorology Group (SMG) reported "quite challenging" weather for TAL sites: low clouds & showers at Moron & showers in 20 circle at ZZA. Recon aircraft at ZZA reported moisture (not rain droplets) so TAL "rainshower rule " was invoked for "GO". Istres changed form "GO" to "NO GO" (Low cloud ceiling) late in launch count.

PERFORMANCE ENHANCEMENTS:
Include the standard set plus: 1) PE Operational High Q - WIN/FEB, 2) OMS Assist, 3) a 52 nautical mile MECO, and 4) Del Psi


iss022e062672

Shuttle approaches ISS with Node 3/Cupola.


iss022-e-068832

http://www.nasa.gov/images/content/389937main_2009-5728.jpg *Ares 1-X Rocket (1st Test Flight) and STS-129 Shuttle*

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SPACE SHUTTLE MISSIONS SUMMARY

STS-130/ 20A
Continued...

Continued...

MCC WHITE FLIGHT
FCR (60)

FLIGHT DIRECTORS:
SHUTTLE:
A/E- Norm knight
LD/O1- Kwatsi Alibaruho
O2- Gary Horlacher
Planning- Chris Edelen
MOD – John Mccullough
Team 4- Paul Dye

ISS
O1 - Royce Renfrew
LD/O2 - Bob Dempsey
O3 - Mike Lammers
Team 4 - Dana Weigel

CAPCOMS:
SHUTTLE
A/E - Rick Sturckow
- Steve Frick (Wx)
LD/O1 - Danny Olivas
- Rick Sturckow
(Flt Days 3 & 12)
O2 - Mike Massimino
Planning - Shannon Lucid
Team 4 - N/A
ISS
O1 - Robert Hanley
LD/O2- Hal Getzelman
O3 – Kathy Bolt
Team 4 – N/A

Continued...

PTM (U/S 181 FPS):
6:10(P)
6:12(A)

SE PRESS 104
6:57(P)
6:56 (A)

MECO CMD:
8:22.5 (P)
8:21.4 (A)

VI:
25819(P)
25817(A)

OMS-2:
37:44 (P)
37:42(A)
143.4(P)
142.1(A) FPS

Endeavour launch as seen in time lapse photo from top of the Intracoastal Waterway Bridge in Ponte Vedra, FL, 115 Miles from the launch site, Monday, February 8, 2010 @ 4:14 am EST. Photo by: James Vernacotola, copyright 2010: www.jamesvernacotola.com

Continued...

FLIGHT DURATION CHANGES:
On FD6 *MMT agreed to add +1 day to nominal flight plan to facilitate complete transfer of the regen ECLSS racks to Node 3 as well as assist with accomplishing other flight objectives.*
Landed on KSC Runway 15 at 053:03:20:29Z, Sunday,
February 21, 2010 at 9:20:29 CST.

FIRSTS/LASTS:
- Shuttle's last night launch.
- Shuttle's lst night landing.
- Last U.S. on-orbit Segment (Node 3) installed on ISS.
- Orbiter: First flight of Main Engine Ignition Overpressure Acoustic Instrumentation.
- First lunar rock returned to space. The sample was colleceted on Apollo 11 by Neil Armstrong in 1969 and carried by Scott Parazynski (Shuttle astronaut) in 2009 on his climb of Mt. Everest. Now on ISS, it orbits Earth once again.

NIGHT LAUNCH: # 34

RENDEZVOUS: #77 Rendezvous and dock with ISS.

EVENTS:
- FD1: OMS2 ignition at 039:09:51:49Z resulted in a 124.0 by 110.0 NM orbit.
- FD2: During RCC surveys the crew downlinked some views of pulled up portion of port wing upper surface flapper door seal area. Area was cleared.
- T1 maneuver at 041:02:28:25Z resulted in a 187.4 by180.7 NM orbit
- FD3: R-Bar Pitch Maneuver was performed. No issues. MMT concurred no focus inspection required.
- Docking Contact occurred at 041:05:05:56Z
- Hard Dock, hooks closed, occurred at 041/05:54:12Z
- ISS Hatch opened at 1:16 AM CST Wednesday, Feb. 10, 2010, welcomed by ISS crew.
- FD4: EVA 1: Behnken & Patrick successfully completed preparations for unberthing Tranquility (Node 3). ISS arm unberthed Node 3 & installed it on Node 1 port side followed by crew activation. EVA1 duration 6:32.
- FD7: EVA2: Behnken & Patrick All planned activities were completed including installation of the ammonia jumpers, integrating Node 3 to EATCS Loop A, and installing the Node 3 port center disc cover (CDC). Cupola was

SPACE SHUTTLE MISSIONS SUMMARY

SPACE SHUTTLE MISSIONS SUMMARY

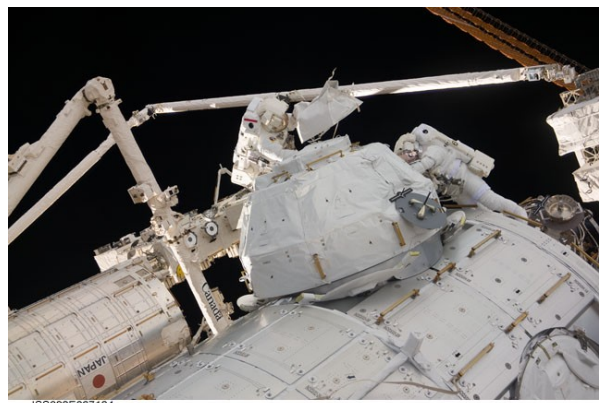
FLT NO.	ORBITER	CREW (6) TITLE, NAMES & EVA'S	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT INC	ORBIT HA/HP	FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
STS-130/ 20A Continued ...				Continued... ROLLOUT: 102 06 FT 1:3 1 M:S WINDS: 5H KTS 0.3R KTS OFFICIAL: 16007P10KT (X1P1 H7P10) DENS ALT: 410 FT FLT DURATION: 13:18:06:22 S/T: 1250:11:48:03 OV-105: 280:09:39:23 DISTANCE: 5,738,991 sm TOTAL SHUTTLE DISTANCE: 513,386,662 sm						Continued... **EVENTS: Continued...** - FD8: Cupola unberthed and moved from forward end to nadir port of Tranquility. - FD10: EVA3: Behnken & Patrick All planned and a number of get ahead tasks were completed including Loop B QD opening (integration of EATCS Loop B with Node 3 heat exchanger), PMA-3 cable installation, Cupola MLI removal, and VSC video cable routing. EVA3 duration (PET) 5:48. -Transfers: 36,130 Pounds of hardware transferred to ISS (inside & out) 29,788 Tranquility Node 3 weight in pounds (as installed) 3,594 Cupola 757 Integrated Stowage Platform cargo 24 Pounds of Oxygen transferred into ISS Airlock tanks 0 Pounds of Nitrogen transferred (N2 was used to repress the stack) 1,991 Pounds of middeck items delivered to ISS aboard Endeavour 1,803 Pounds of middeck items returned from ISS to Endeavour ~1,095 Pounds of water transferred to ISS 799,045 Mass in space of the International Space Station (in pounds) - FD13: Undocked at 051:00:53:52Z - During entry a manual handover to TDRS-46 early avoided rolling on to a lower antenna and prevented a comm blackout period. Continued...

ISS022E062844

ISS construction and maintenance continue.
Above: ISS022-E-062844 -- Patrick during EVA1.
Below: ISS022-E-065750 -- Behnken during EVA 2


ISS022E065750

ISS022-E-067727 --- Crews for STS-130 (red) & Exp22 (blue) in Harmony node. Front row (lt to rt): Exp22 CDR Jeffrey Williams, Patrick/MS, CDR Zamka, & Behnken/MS. Middle row: Exp22 Soichi Noguchi/FE (JAXA), Hire/MS, & Exp22 T.J. Creamer/FE. Back row: Maxim Suraev & Oleg Kotov, both Exp22/FE (RSA); along with Robinson/MS & PLT Virts.



ISS022E067184

ISS022-E-067184 --- Behnken (left) & Patrick conduct 3rd EVA, here removing insulation blankets & launch restraint bolts from each of Cupola's seven windows.

SPACE SHUTTLE MISSIONS SUMMARY

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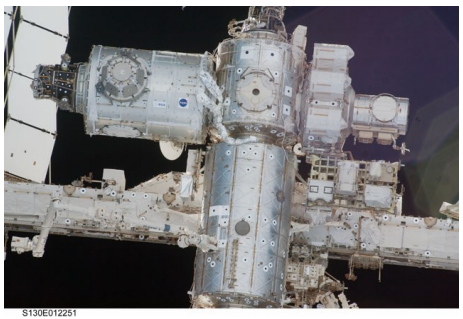
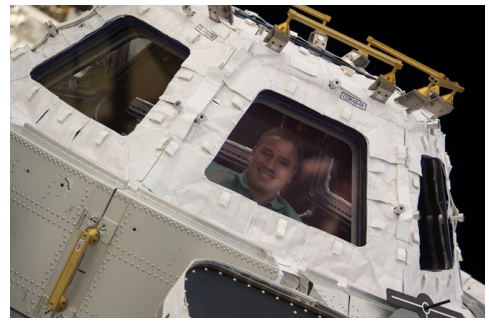
STS-130/ 20A Continued...											

Quoting Oscar Wilde's "Life imitates art far more than art imitates life" , Dave Zani - CinemaBlend.com, sees the Cupola window as the inside window of a Star Wars TIE Fighter.



S130-E-012251 --- A close-up view of ISS during post-undocking showing newly installed Tranquility node & Cupola at top

S130-E-010380--- Soichi Noguchi/JAXA/FE ISS Exp 22, takes earth photo from a window in Cupola.



ISS022-E-068724 -- CDR Zamka tries out view from Cupola.

Continued...

SIGNIFICANT ANOMALIES:

Orbiter:
- During STS-130 Ascent monitorng, WLE Sensor Unit S/N 1155 experienced two (2) off-scale high data spikes.
- MUX bypass switch will not switch to Bypass front for OCA 48Mbps downlinks.
- Audio drop-out during EVA 1.
- Trajectory Control Sensor (TCS) had trouble transistioning to CW mode. CW data became ratty and unusable.

KSC:
12 IFA's entritled "STS-130 Post Launch Debris"

SRB: None.

RSRM: None.

SSME: None.

ET:
- POST-FLIGHT REV. IDENT. 2 FOAM LOSSES +Z SIDE INTERTANK NCFI 24-124 ACREAGE, 19 FOAM LOSSES ?Z SIDE OF THE INTERTANK NCFI 24-12 ACREAGE

MOD:

JSC2010-E- 017955 --- Flight Directors in JSC MCC: From left: Chris Edelen, Norm Knight, Kwatsi Alibaruho and Gary Horlacher.

S130-E-012188 --- ISS as seen by Endeavour post-undocking and separation. Tranquility & Cupola are located just left of center.

STS130-S-128 --- Shuttle's last night landing. Drag chute is deployed at MLGTD on KSC Runway 15 at 10:20:29 PM EST on Feb. 21, 2010. It was the 23rd night landing in Shuttle history and the 17th at KSC.

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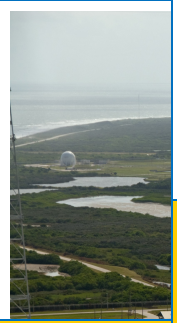
FLT NO.	ORBITER	CREW (7) TITLE, NAMES & EVA'S	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT INC	ORBIT HA/HP	FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION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

SPACE SHUTTLE MISSIONS SUMMARY

STS-131/19A	OV-103 (Flight 38) DISCOVERY OMS PODS LPO1 -41 RPO3-39 FRC3-38	CDR: Alan G. Poindexter (Flt 2- STS-122) P823/R318/V214/M274 PLT James P. Dutton, Jr. P824/R352/M305 MS 1 Rick Mastracchio (Flt 3 - STS-106, STS-118) P825/R257/V189/M224 MS 2 Dorthy Metcalf-Lindenburger P826/R353/F48 MS 3 Stephanie Wilson (Flt 3 - STS-121, STS-120) P827/R298/V190/F39 MS 4 Naoko Yamazaki P828/R354/F49 MS5 Clayton Anderson (Flt 2-UP ON STS-117STAY ISS, DN ON STS-120) P829/R310/V215/M268 SS EVA 151 DOCKED QUEST EVA 69 EMU/TETHERED EVA 144 SCHEDULED EVA 142 DURATION 6:27 SS EVA 152 DOCKED QUEST EVA 70 EMU/TETHERED EVA 145 SCHEDULED EVA 143 DURATION 7:26 SS EVA 153 DOCKED QUEST EVA 71 EMU/TETHERED EVA 146 SCHEDULED EVA 144 DURATION 6:24 Continued...	KSC 39A 95:10:21:25Z 6:21:25 AM EDT (P) 6:21:25 AM EDT (A) Monday (17) 04/05/10 (16) LAUNCH WINDOW: Dual pane day with window open at 95:10:18:40Z and close at 95:10:27:17Z 5M 52S (Preferred) EOM PLS: KSC TAL: ZZA TAL WX: MRN FMI (NO GO) SELECTED: RTLS: KSC33 N/N TAL: MRN20 N/N AOA: KSC33 N/N 1ST DAY PLS KSC15 N/N TDEL: 0.000 (P) 0.142 (A MAX Q NAV: 708.0 (P) 700.5 (A) SRB STG: 2:04.8 (P) 2:05.8 (A) PERF: NOMINAL 2 ENG TAL (MRN): 2:36 (P) 2:41 (A) NEG MRN (2@ 104): 3:47 (P) 3:54(A)	KSC33 KSC (74) 110:13:08:34Z 8:08:34 AM CDT Tuesday (18) 04/20/10 (12) DEORBIT BURN: 110:12:02:59Z XRANGE: 20.4 NM ORBIT DIR: D/L (50) AIM PT: NOMINAL MLGTD: 3559 FT 110:13:08:34Z VEL: 198 KGS 198 KEAS HDOT: -1.6 FPS TD NORM 195: 295 5 FT DRAG CHUTE DEPLOY: 191 KEAS 110:13:08:36Z NLGTD: 6398 FT	104/104/109% PREDICTED: 100/104.5/104.5/ 72/104.5 ACTUAL: 100/104.5/100/ 72/104.5 1 = 2045 (11) 2 = 2060 (2) 3 = 2054 10) M 3 EOM: WEIGHT: 224257 LBS X CG: 1089.0 IN LANDING: WEIGHT: 224206 LBS X CG: 1090.7 IN	BI-142 RSRM 110 ET-135 SLWT 39 ET IMPACT 1:13:55 MET LAT: 37.233 S LONG: 159.667 W	51.6 (33)	DIRECT INSERTION POST OMS-2 140.0x123.8 NM DEORBIT HA 190.6 NM HP 14.2 NM ENTRY VELOCITY: 25862 FPS ENTRY RANGE: 4480 NM	OI-34 (4)	CARGO: 39516 LBS PAYLOAD CHARGEABLE: 32131 LBS DEPLOYED: 30512 LBS NON-DEPLOYED: 1388 LBS MIDDECK: 231 LBS SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1672045 LBS NON-DEPLOYED: 1627930 LBS CARGO TOTAL: 4250445 LBS PERFORMANCE MARGINS (LBS): FPR: 2908 FUEL BIAS: 1059 FINAL TDDP: 1133 RECON: 1491 PAYLOADS: PLB: ISS-19A (MPLM,LMC), TRIDAR AR&D SENSOR DTO-701A MIDDECK: ISS-19A, MAUI, SEITE, SIMPLEX, RAMBO-2 5 CRYO TANK SETS ODS, SRMS	***Brief Mission Summary: The STS-131 (33rd mission to ISS), dubbed "Experiment Express" by PAO, main objectives were to bring some 8 tons of supplies and scientific equipment to ISS, remove & replace a depleted Ammonia tank,and return a large load of experiments and no longer useful gear back to earth.*** **KSC W/D** OPF: 142 days + 11 holidays VAB: 9 days + 0 contingency days PAD A: 32 days + 2 contingency days Total Work Days = 183 (OPF processing occurred over a total time period of 153 days **POSTPONEMENTS:** - Baselined STS-131 to FDRD - launch date of 03/18/10 on 02/05/09. - Ppd. to 04/05/10 on 03/09/10. Due to cold weather conditions, Orbiter rollover from the OPF to VAB was delayed such that the March 18, 2010 launch date could not be met. **LAUNCH SCRUBS:** None **LAUNCH WINDOW:** Dual pane day with window open at 95:10:18:40Z and close at 95:10:27:17Z. Preferred Launch Time was 95:10:21:25Z (In-Plane Time) for a launch window of 5M52S. **LAUNCH DELAYS:** None. Launch occurred on time at 95:10:21:25Z on Monday 04/05/10. **TAL WEATHER:** Spaceflight Meteorology Group (SMG) reported a pressure gradient between a high & a departing low contributed to winds at Istres above headwind limits. Only high cirrus clouds prevailed at both Zaragoza & Moron with winds well within flight rule limits. Weather was "GO". **PERFORMANCE ENHANCEMENTS:** Include the standard set plus: 1) PE Operational High Q - TRN/APR, 2) OMS Assist, 3) a 52 nautical mile MECO, and 4) Del Psi **FLIGHT DURATION CHANGES**: - FD 4: MMT approved plan for conducting a docked late inspection using +1 day - extended mission from 12 to 13 days. - Landing postponed 1 day due to unstable weather. Weather was still unstisfactory next day with fog and area showers for firat opportuniy. Weather cleared for "Go" on 2nd opportunity at KSC. Landing occurred at 110:13:08:34Z, Tuesday, April 20, 2010, at



ISS023-E-020718 --- ISS robotic Canadarm2 relocates Leonardo (MPLM) from Discovery's PLB to port on Harmony node.

http://www.nasa.gov/images/content/389937main_2009-5728.jpg *Ares 1-X Rocket (1st Test Flight) and STS-129 Shuttle*

SPACE SHUTTLE MISSIONS SUMMARY

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

SPACE SHUTTLE MISSIONS SUMMARY

STS-131/19A
Continued...

Continued...

MCC WHITE FLIGHT
FCR (61)

FLIGHT DIRECTORS:
SHUTTLE:
A/E- Bryan lunney
LD/O1- Richard Jones
O2- Mike Sarafin
Planning- Ginger Kerrick
MOD – John Mccullough
Team 4- Gary Horlacher

ISS
O1 - Courtenay McMillan
LD/O2 - Roy Spencer
O3 - Ed Van Cise
Team 4 - Brian Smith

CAPCOMS:
SHUTTLE
A/E - Rick Sturckow
- George Zamka (Wx)
LD/O1 - Rick Sturckow
O2 - Aki Hoshide
Planning - Megan McArthur/
Chris Cassidy
Team 4 - N/A

ISS
O1 - Mike Jensen
LD/O2 - Stan Love
O3 – Marcus Reagant
Team 4 – N/A

Continued...

PTM (U/S 180 FPS):
6:20(P)
6:29(A)

SE PRESS 104
6:58(P)
7:01 (A)

MECO CMD:
8:22.5 (P)
8:23.5 (A)

VI:
25819(P)
25816(A)

OMS-2:
37:16 (P)
37:14(A)
197.2(P)
196.5(A) FPS

Continued...

WINDS:
2.1H KTS 2.2R KTS
OFFICIAL:
02003P05KT
(X0P0 H5P6)

DENS ALT: 908 FT

FLT DURATION:
15:02:47:09

S/T:
1265:14:35:12

OV-103:
347:03:20:09

DISTANCE:
6,232,235 sm
TOTAL SHUTTLE DISTANCE:
519,613,765 sm

STS131-S-050 --- NASA Commentator Mike Curie and astronaut Kathryn (Kay) Hire discuss launch in LCC Firing Room 4 at KSC.

S131-E-010002 --- STS-131 & EXP 23 crews gather in ISS Kibo Lab STS-131 crew members pictured (light blue shirts) are CDR Poindexter, PLT Dutton; Anderson/MS, Mastracchio/MS, Metcalf-Lindenburger/MS, Wilson/MS, & Yamazaki/MS (JAXA). EXP 23 crew members are CDR Oleg Kotov (RSA), Mikhail Kornienko/FE (RSA), Alexander Skvortsov/FE (RSA); Soichi Noguchi/FE (JAXA), T.J. Creamer/FE (USA), & Tracy Caldwell Dyson/FE (USA).

Continued...

FIRSTS/LASTS:
- Last return trip for MPLM Leonardo. After STS-133 it will remain on ISS as a permanent fixture.
- First time for four women living in space.
- First time for two Japanese astronauts in space together.
- First special cookies from the Italian Café in Seabrook, TX, requested originally by Col. Timothy Creamer after a 6-month ISS tour, were delivered to ISS. The sand tarts passed NASA tests with the request to go light on the powdered sugar.

NIGHT LAUNCH: N/A

RENDEZVOUS: #78 Rendezvous and dock with ISS.

EVENTS:
- FD1: OMS2 ignition at 095:10:58:39Z resulted in a 140.0 by 123.8 NM orbit.
- FD2: During RCC surveys showed no areas of concern.
- T1 maneuver at 097:05:06:44Z resulted in a 189.3 by181.7 NM orbit
- Ku Band failed.
- FD3: R-Bar Pitch Maneuver was performed. Four areas of interest were identified: 1) RSB Trailing Edge Tile, 2) FWD Gap Filler, 3) Port ET Door Tile Chip, 4) three closely grouped OMS POD tile damage sites. The Damage Assessment Team later cleared these areas for entry and MMT concurred no focus inspection required.
- Crew executed the radar fail procedures for rendezvous after the system failed to respond to a last attempt early in the rendezvous.
- Docking Contact occurred at 097:07:44:09Z
- Hard Dock, hooks closed, occurred at 097:07:58:52Z
- ISS Hatch opened at 4:11 AM CDT April 7, 2010, welcomed by ISS crew.
- FD4: MPLM was grappled, unberthed, and installed on the Node 2 Nadir without issue.
- FD5: EVA 1:Mastracchio & Anderson remove old ATA and handover new ATA to SSRMS, retrieve JEM SEED, & R&R RGA. EVA1 duration 6:27.

Continued...

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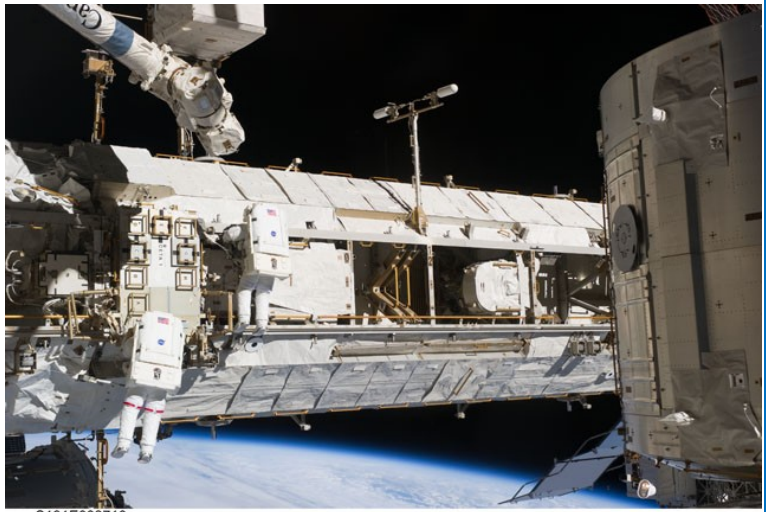
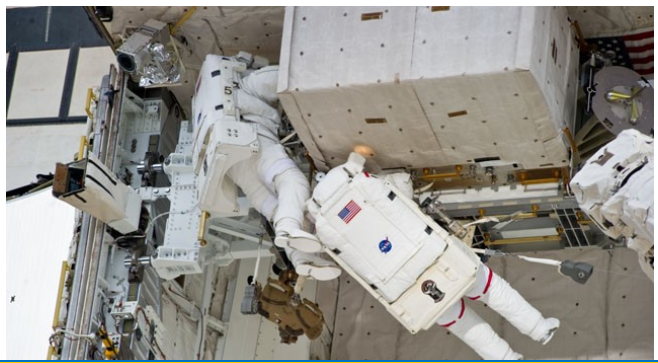
SPACE SHUTTLE MISSIONS SUMMARY

STS-131/19A
Continued...


S131E008710

AT LEFT: S131-E-008710 -- Mastracchio (left) & Anderson conduct 2nd EVA during which they unhooked and removed depleted ammonia tank and installed a 1,700-pound ammonia tank on ISS Starboard 1 truss. Crew had problems with bolting down the new ATA tank on S1. They eventually got all 4 bolts secured, however, the time required to do this resulted in several tasks dropping off this EVA.



S131-E-009456 --- Mastracchio (right) & Anderson conduct 3rd & session EVA. Activities included fluid lines hookup of new 1,700-pound ammonia tank and prepared cables on the Zenith 1 truss for a spare Space to Ground Ku-Band antenna.

S131-E-007954 --- First time four women in space shown in the Zvezda Service Module: clockwise from lower left: are Tracy Caldwell Dyson/FE EXP 23, Metcalf-Lindenburger/MS, Yamazaki/MS(JAXA), & Wilson/MS.

Continued...

EVENTS: Continued

- FD6&7: EVA2: Mastracchio & Anderson had difficulty installing new ATA onto S1 truss due to sticky plungers on bolt 4. Numerous workarounds were employed and eventually the bolt did cooperate. Alignment of the bolts and soft dock mechanisms are orientation sensitive and the task took much more time than booked. Several tasks were not completed & were rescheduled to EVA 3. EVA2 duration 7:26.
- FD9: EVA3: Mastracchio & Anderson completed: S1 ATA Fluid connectors (from EVA 2), Retrieve A/L MMOD shields (from EVA 2), Old ATA transfer to the LMC in Shuttle payload bay (all 4 bolts were engaged, though the last bolt required extra time due to some alignment challenges), & S1 ATA FGB install. EVA3 duration (PET) 6:24.

- FD9; Monday, April 12th celebrated the 49th Anniversary of the Sovet's cosmonaut, Yuri Gagarin, first human to orbit the earth in 1961 and the 29th Anniversary of the first U.S. Space Shuttle launch in 1981.

- Transfers:
  -15,222 Lbs of hardware transferred to ISS (inside & out)
  -12,060 Lbs of MPLM supplies & logistics transferred to ISS
  - 4,109 Lbs of MPLM supplies & logistics returned from ISS
  - 1,702 Lb Ammonia Tank Assembly (ATA) delivered to ISS
  - 1,295 Lb ATA (old) returned from ISS
  - 94.5 Lbs of Oxygen used to repress the stack
  - 1,460 Lbs middeck items delivered to ISS
  - 1,235 Lbs of middeck items returned from ISS to Discovery
  - 6,639 Lbs of total hardware returned aboard Discovery
  - 975 Lbs of water transferred to ISS

  - 806,282 Mass (Lbs) of ISS now in space
  - 98 Percentage complete of ISS assembly (pressurized volume)

- FD13: Undocked at 107:12:52:10Z

- During entry comm blackout times were approx 110/12:49:15 to 12:54:34 (~ 5.5 min). Early H/O to TDRS 46 was not an option as TDRS 46 stayed on a lower antenna. INCO prediction of LOS was in error due to DOL PAD error, noted in Significant Anomalies below.

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STS-131/19A Continued...											

ABOVE: JSC2010-E-045167 --- Flight Directors for the STS-131/19A: From the left are Tony Ceccacci, Bryan Lunney, Paul Dye, Richard Jones, Ginger Kerrick and Mike Sarafin.
BELOW: JSC2010-E-051978 -- STS-131 Orbit 2 Flight Control Team pose in JSC MCC. FD Mike Sarafin holds

Discovery's approach and landing track across the continental U.S. Photo courtesy PAO.

SHUTTLE051109 049(KSC)--- Discovery on approach to KSC Runway 33 on April 20, 2010, after weather waveoffs on April 19th and again on first opportunity of April 20th.

Continued...

SIGNIFICANT ANOMALIES:

Orbiter:
- CCTV Camera C zoom not functioning
- DURING STS-131, KU-BAND FAILED FROM POWER UP FOR BOTH COMM AND RADAR OPERATIONS.
- NIRD 131-005, D-131-RPM-410-001: DEBRIS EVENT DURING ACCENT AT 42SEC MET FROM PORT UPPER RSB TRAILING EDGE. TILE HAS BROKEN AWAY, APPEARS TO BE PARTIAL LIBERATION. VISIBLE CHARRING ALONG THE AFT EDGE.
- LRCS fuel helium ISO B valve slow to close during post wave off system reconfigure.
- FRCS fuel helium ISO A valve slow to close during post entry valve test.

KSC:
- STS-131 Post Launch Debris

SRB:
- UPLOADED ACCELEROMETER DATA FROM THE S/N 2000003 DAS SHOWED 446 SECONDS OF PREFLIGHT TESTING FOLLOWED BY THE FIRST 94 SECONDS OF FLIGHT DATA

RSRM: None.

SSME:
- ME-2 HPFTP 21 DEGREE ACCEL DISQUALIFIED @ T+7:19

ET: None.

MOD:
- INCORRECT COMM PREDICTS DUE TO PADS ERROR

Integration:
- Base Heat Shield TPS Liberation
- Windows 5, 6 Missing/Protruding Ceramic Plugs
- Rudder Speedbrake TPS Liberation