

**SPACE SHUTTLE MISSIONS SUMMARY - BOOK 1**  
**FIRST 100 FLIGHTS (STS-1 THROUGH STS-92)**  
**REVISION S, PCN-1**                      **FEBRUARY 2007**



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## 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. COMMENTS MAY BE DIRECTED TO NASA JSC, DA8/R. D. LEGLER, TELEPHONE 281-483-5406.

#### 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

### INTRODUCTION

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

**SPACE SHUTTLE MISSION SUMMARY**

**INTRODUCTION**

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## SPACE SHUTTLE MISSIONS SUMMARY

### ACRONYM/ABBREVIATION LIST

AIM PT	AIM POINT	N	NOMINAL
AL	ASCENDING LEFT	NEG RET	NEGATIVE RETURN
AOA	ABORT ONCE AROUND	NLGTD	NOSE LANDING GEAR TOUCHDOWN
AR	ASCENDING RIGHT		
ASC	ASCENT	O1, O2, O3	ORBIT 1, 2, OR 3 FLIGHT DIRECTOR SHIFTS
ASC/ENT	ASCENT/ENTRY	OFT	OFFICIAL FLIGHT DESIGNATOR
AVE BRK DECEL	AVERAGE BRAKE DECELERATION	OI	OPERATIONAL INCREMENT
		OMS	ORBITAL MANEUVERING SYSTEM
BEN	BEN GUERIR	OPF	ORBITER PROCESSING FACILITY
BRK INIT	BRAKE INITIATION VELOCITY IN KGS	ORB DIR	ORBIT DIRECTION
BR/UP	BREAK UP ALTITUDE OF ET IN THOUSANDS OF FEET		
BYD	BANJUL	P	SEQUENTIAL NUMBER OF PERSON FLOWN ON SS
		PERF	PERFORMANCE
CI	CLOSEIN	PERF MARGINS	PERFORMANCE MARGINS
CTOB	CREW TIME ON BACK	P/L	PAYLOAD
		PLNG	PLANNING SHIFT
DENS ALT	DENSITY ALTITUDE	PLS	PLANNED LANDING SITE
DL	DESCENDING LEFT	P/S	PAYLOAD SPECIALIST
DOLILU	DAY OF LAUNCH I-LOAD UPDATE	PTA	PRESS TO ABORT ONCE AROUND
DR	DESCENDING RIGHT	PTM	PRESS TO MECO
		R	SS ROOKIE NUMBER
EDW	EDWARDS AFB	RECON	RECONSTRUCTED
EMU	ENVIRONMENTAL MOBILITY UNIT	RMS	REMOTE MANIPULATOR SYSTEM
ET	EXTERNAL TANK	RPT	RUPTURE OF ET IN THOUSANDS OF FEET
EVA	EXTRA VEHICULAR ACTIVITY	RSRM	REDESIGNED SOLID ROCKET MOTOR
		RTLS	RETURN TO LAUNCH SITE
F	SS FEMALE NUMBER	SEQ	SEQUENTIAL
FDRD	FLIGHT DEFINITION & REQUIREMENTS DOCUMENT	SLS	SECONDARY LANDING SITE
FPR	FLIGHT PLANNING RESERVE	SODB	SHUTTLE OPERATIONAL DATA BOOK
FRD	FLIGHT REQUIREMENTS DOCUMENT	SS	SPACE SHUTTLE OR SUN SHIELD
		SSME	SPACE SHUTTLE MAIN ENGINE
GMTLO	GREENWICH MEAN TIME OF LIFTOFF	S/T	SHUTTLE TOTAL FLIGHT TIME
		TAL	TRANSOCEANIC ABORT LANDING
HA/HP	APOGEE AND PERIGEE IN NAUTICAL MILES	TD NORM 195	NORMALIZED TOUCHDOWN RANGE AT 195 KEAS
HDOT	TOUCHDOWN ALTITUDE RATE	TDDP	TRAJECTORY DESIGN DATA PACKAGE
		TDEL	DIFFERENCE IN REFERENCE TIME FOR SSME THROTTLE ADJUSTMENT
KEAS	KNOTS EQUIVALENT AIRSPEED	TK	TANK
KGS	KNOTS GROUND SPEED	T/V	TUMBLE VALVE
KSC W/D	KSC WORKDAY		
		V	SS VETERAN NUMBER
LD/O1	LEAD/ORBIT 1 SHIFT	VAB	VEHICLE ASSEMBLY BUILDING
LDA	LAUNCH DANGER AREA	VEL	VELOCITY
		VI	INERTIAL VELOCITY
M	SS MALE NUMBER	W/D	WORKDAY
M 3 EOM	MACH 3 END OF MISSION	WX	WEATHER
MECO	MAIN ENGINE CUT OFF		
MET	MISSION ELAPSED TIME	X CG	X CENTER OF GRAVITY
MLGTD	MAIN LANDING GEAR TOUCHDOWN	XRANGE	CROSSRANGE
MLP	MOBILE LAUNCH PLATFORM		
MMT	MISSION MANAGEMENT TEAM	ZZA	ZARAGOZA
MMU	MANNED MANEUVERING UNIT/		
MOD	MISSION OPERATIONS DIRECTOR MISSION OPERATIONS DIRECTORATE		
MPS	MAIN PROPULSION SYSTEM		
MRN	MORON		
M/S	MISSION SPECIALIST		
MTR	MOTOR		



**SPACE SHUTTLE MISSIONS SUMMARY**

**ACRONYM/ABBREVIATION LIST**

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# SPACE SHUTTLE MISSIONS SUMMARY

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FLT NO.	ORBITER	CREW (2)	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM-ABORT EMERG	SRB RSRM	ORBIT		FSW	PAYLOAD WEIGHTS,	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
		TITLE, NAMES & EVA'S	LANDING SITES, ABORT TIMES	LANDING TIMES FLT DURATION, WINDS	THROTTLE PROFILE ENG. S.N.	AND ET	INC	HA/HP		PAYLOADS/ EXPERIMENTS	
STS-1 SEQ FLT #1  KSC 1  OFT-1  PAD 39A-1	OV-102 Flight 1 Columbia  OMS PODS LVO1 - 1 RVO1 - 1 FRC2 - 1	CDR: John W. Young P1/R1/M1  PLT: Robert L. Crippen P2/R2/M2	KSC 39A 102:12:00:03.9Z 7:00:00 AM EST (P) 7:00:04 AM EST (A) Sunday 1 4/12/81 (1)  <u>WINDOW DURATION:</u> 4.7 hours  PLS - EDW SLS - NOR NO TAL AOA - EDW NOR CLS - HICKAM KADENA ROTA  <u>MAX Q</u> = 617 M = 1.06  <u>SRB SEP:</u> 2:11.7 MET  <u>MECO:</u> 8:34 MET  <u>ET SEP:</u> 8:52.1 MET  <u>OMS-1:</u> 10:34 MET 86.1 Seconds  <u>OMS-2:</u> 44:02 MET 74.8 Seconds	EDW 23, LKBD (EDW 1, LKBD 1)  10:20:57 AM PST Tuesday 1 4/14/81 (1)  <u>XRANGE:</u> 315 NM  <u>ORB DIR:</u> DR (1)  <u>AIM PT:</u> NOMINAL  <u>MLGTD:</u> 6053 FT 104:18:20:57Z <u>VEL:</u> 192 KGS 183 KEAS <u>HDOT:</u> -1.5 FPS  <u>TD NORM 195:</u> 4973 FT  <u>NLGTD:</u> 9152 FT 104:18:21:07Z <u>VEL:</u> 156 KGS <u>HDOT:</u> -5.6 FPS  <u>BRK INIT:</u> 105 KGS  <u>AVE BRK DECEL:</u> 5.9 FPS/S  <u>WHEELS STOP:</u> 104:18:21:36Z 15046 FT  <u>ROLLOUT:</u> 8993 FT 60 SEC  <u>WIND:</u> 2T, 2R KNOTS OFFICIAL: 1H, 1R  <u>DENS ALT:</u> 2200 FT  <u>FLT DURATION:</u> 2:06:20:53 54:20:53  <u>DISTANCE:</u> 933,757 sm	100/100 (100)  65%  1 = 2007 (1) 2 = 2006 (1) 3 = 2005 (1)	A7/8 86-80E  <u>MTR:</u> STD  <u>CASE:</u> STD 168-80  SWT  ET-1  <u>ET BR/UP</u> 223K 47:42 MET  <u>ET IMPACT LAT:</u> 30.95°S <u>LONG:</u> 93.2°E	40.3° (1)  <u>START:</u> -25.6°  <u>END:</u> -19.9°  <u>MAX:</u>	STANDARD <u>INSERTION</u>  <u>INSERTION ALTITUDE:</u> 145 NM  152/152 172/172 SM	R16/T9	<u>CARGO:</u> 10823 lbs  <u>DFI:</u> 9290 lbs  <u>SHUTTLE ACCUMULATED WEIGHTS:</u>  <u>DEPLOYED:</u> 0 lbs  <u>NON-DEPLOYED:</u> 10823 lbs  <u>CARGO TOTAL:</u> 10823 lbs  PERFORMANCE MARGINS NOT AVAILABLE  <u>PAYLOADS:</u> IECM/REM DFI  NO RMS  2 CRYO TANK SETS	KSC W/D: OPF 531, VAB 33, PAD 104 =668  <u>LAUNCH POSTPONEMENTS:</u> Yes.  <u>LAUNCH SCRUBS:</u> - Scrubbed 4/10/81 launch at T-18 minutes because BFS did not track PASS timing. Rescheduled launch for 4/12/81. 2-day slip. - Installed S/W patch to correct problem.  <u>LAUNCH DELAYS:</u> 4 seconds.  <u>CONTINGENCY LANDING SITE (CLS) WX:</u> - Rota was go. There was no TAL site for STS-1.  <u>FLIGHT DURATION CHANGES:</u> None.  <u>FIRSTS:</u> - First orbital Shuttle flight.  <u>SIGNIFICANT ANOMALIES:</u> - SRB ignition overpressure (higher than expected) deformed FRCS oxidizer tank aft Z strut. - OMS POD tile LRSI tiles lost. - WMS problems (degraded air suction). - ET tumble system did not work. - PLBD closure overlap more than expected. - Cabin temperature controller did not maintain selected temperature. - OMS quantity gaging system was sticking during flight. - Both Radar Altimeters lost lock at 75 feet (no valid data after 75 feet). - Difficulty locking doors on two storage lockers due to misalignment.  <u>CONTINGENCY LANDING SITE:</u> - ROTA was a contingency landing site but not required for one SSME out.  <u>S-BAND TRACKING SITES:</u> - MIL, PDL, BDA, MAD, IOS, ORR, BUC, GDS, HAW, ACN, GWM, QUI, AGO, TUL (NOR), PTT, VDT.  <u>RADIATORS DEPLOY #1</u>  <u>NOTE:</u> ON STS-1 AND STS-2, THE NOMINAL OGS AIM POINT WAS 6500 FEET (5500 FEET WAS THE CLOSE-IN AIM POINT).



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (2)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-2</b>  SEQ FLT # 2  KSC 2  OFT-2  PAD 39A-2	OV-102 Flight 2 Columbia  OMS PODS LVO1 - 2 RVO1 - 2 FRC2 - 2	CDR: Joe H. Engle P3/R3/M3  PLT: Richard H. Truly P4/R4/M4	KSC 39A 316:15:09:59.8Z 7:20:00 AM EST (P) 10:10:00 AM EST (A) Thursday 1 11/12/81 (1)	EDW 23, LAKEBED (EDW 2, LKBD 2) 1:23:12 PM PST Saturday 1 11/14/81 (1)  X RANGE: 63 NM  ORB DIR: DR (2)  AIM PT: NOMINAL  MLGTD: 780 FT 318:21:23:12Z VEL: 186 KGS 197 KEAS HDOT: -1.0 FPS  TD NORM 195: 960 FT  NLGTD: 4429 FT 318:21:23:26Z VEL: 137 KGS HDOT: -5.1 FPS  BRK INIT: 109 KGS  AVE BRK DECEL: 6.1 FPS/S  WHEELS STOP: 318:21:24:03Z 8491 FT  ROLLOUT: 7711 FT 50 SEC  WIND: 20H, 3R KNOTS OFFICIAL: 17H, 6L  DENS ALT: 3500 FT  FLT DURATION: 2:06:13:12 54:13:12  S/T: 4:12:34:05  OV-102: 4:12:34:05  DISTANCE: 933,757 sm	100/100 (107)  68%  1 = 2007 (2) 2 = 2006 (2) 3 = 2005 (2)	A9/10  MTR: STD  CASE: STD 168-80  SWT  ET-2  ET RPT 256K 49:20 MET  ET BR/UP 219K 50:28 MET  ET IMPACT LAT: 31.67°S LONG: 95.7°E	38.0° (1) 63.25°  START: -53.5°  END: -56.2°  MAX:	STANDARD INSERTION  INSERTION ALTITUDE: 137 NM  120/120 137/137 NM	R18/T11	CARGO: 18778 lbs  CHARGEABLE:  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 0 lbs NON-DEPLOYED: 29601 lbs CARGO TOTAL: 29601 lbs  PERFORMANCE MARGINS (LBS): FPR: 7057 FUEL BIAS: 1050 FINAL TDDP: 2049 RECON: 275  PAYLOADS: IECM/REM OSTA-1/PALLET MAPS SMIRR SIR-A FILE OCE DFI  RMS 1 (S.N. 201) RMS CHECKOUT (UNLOADED OPS)  2 CRYO TANK SETS	KSC W/D: OPF 99, VAB 18, PAD 70 = 187  LAUNCH POSTPONEMENT: - 45-day postponement caused by FRCS N204 spill on tiles resulting in debonding of tiles.  LAUNCH SCRUB: - Scrubbed 11/4/81 launch at T-31 seconds because APU's 1 & 3 lube oil outlet pressure high at 100 to 112 PSIA. Flushed APU's 1 and 3 gear boxes and changed clogged filters. Rescheduled launch for 11/12/81. 53 days total slip.  LAUNCH DELAYS: - 2H40M delay MDM OF3 failure. Flew in replacement MDM which also failed. Replaced with OV-099 MDM. - 10-minute delay for KSC confidence review of systems status. - Total launch delay: 2H50M  TAL WX: Rota go.  FLIGHT DURATION CHANGE: - Shortened flight from 5D4H to 2D6H (priority flight after Fuel Cell 1 failed at 0/04:45 MET).  FIRSTS: - First flight of RMS.  SIGNIFICANT ANOMALIES: - Fuel Cell 1 failure at 0/04:45 MET resulting in priority mission. Shortened flight from planned 5D4H to 2D6H. - Icing in WSB 3 inhibited lube oil cooling, resulting in elevated APU gearbox outlet temp. - Excessive gas in drinking water. - TV camera B RMS elbow camera, PLB cameras A,B,C lenses had contamination. - CRT 1 failed due to HV power supply problem. - RH SRB lost one main chute. - RH SRM aft field joint gas leak to primary O-ring with erosion. - LH fwd windows degraded by salt spray.  RADIATORS DEPLOYED #2 (port stowed last 1/2 of flight)  NOTE: ON STS-1 AND STS-2, THE NOMINAL OGS AIM POINT WAS 6500 FEET (5500 FEET WAS THE CLOSE-IN AIM POINT).



MCC FCR-1 (2)  
  
 FLIGHT DIRECTORS:  
 ASC - N. B. Hutchinson  
 PLNG - T. W. Holloway  
 ORBIT - C. R. Lewis  
 ENT - D. R. Puddy  
 ORB - H. M. Draughon  
 MOD - E. F. Kranz

# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (2)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-3</b>  SEQ FLT # 3  KSC 3  OFT-3  PAD 39A-3	OV-102 Flight 3 Columbia  OMS PODS LVO1 - 3 RVO1 - 3 FRC2 - 3	CDR: Jack R. Lousma P5/R5/M5  PLT: C. Gordon Fullerton P6/R6/M6	KSC 39A 81:15:59:59.875Z 10:00:00 AM EST (P) 11:00:00 AM EST (A) Monday 1 3/22/82 (1)  <u>WINDOW DURATION:</u> 6.1 hours  PLS - EDW SLS - NOR TAL - ROTA (Selected)  MAX Q = 651 M = 1.04  SRB SEP: 2:07.9 MET  MECO: 8:33 MET  ET SEP: 8:51.5 MET  OMS-1: 10:34.4 MET 85.2 Seconds  OMS-2: 40:50.4 MET 88 Seconds	WSMR 1 NORTHROP STRIP 17 (LAKEBED) 9:04:45 AM MST Tuesday 2 3/30/82 (1)  X RANGE: 276 NM  ORB DIR: AR (1)  AIM PT: NOM  MLGTD: 1092 FT 89:16:04:44.8Z VEL: 233 KGS 220 KEAS HDOT: -5.7 FPS  TD NORM 195: 3342 FT  NLGTD: 6261 FT 89:16:04:59.7Z VEL: 176 KGS HDOT: -8.4 FPS  BRK INIT: 149 KGS  AVE BRK DECEL: 5 FPS/S  WHEELS STOP: 89:16:06.09Z 14824 FT  ROLLOUT: 13737 FT 84 SEC  WINDS: 14H, 2L KNOTS OFFICIAL: 13H, 1L  DENS ALT: 3700 FT  FLT DURATION: 8:00:04:45 192:04:45  S/T: 12:12:38:50  OV-102: 12:12:38:50  DISTANCE: 3,900,000 sm	100/100 (107)  68%  1 = 2007 (3) 2 = 2006 (3) 3 = 2005 (3)	A11/12  MTR: STD  CASE: STD 86-80E  SWT  ET-3  ET RPT 235K 49:18 MET  ET BR/UP 210K 49:58 MET  ET IMPACT LAT: 31.2°S LONG: 94.4°E	38.0° (2) 64.14°  START: -33.2°  END: -26.0°  MAX: -36.0°	STANDARD <u>INSERTION</u>  <u>INSERTION ALTITUDE:</u> 130 NM  130/130 NM	R18/T11	CARGO: 22710 lbs  <u>CHARGEABLE:</u>  RETURNED: 24492.8 lbs  <u>SHUTTLE ACCUMULATED WEIGHTS:</u> <u>DEPLOYED:</u> 0 lbs <u>NON-DEPLOYED:</u> 52311 lbs <u>CARGO TOTAL:</u> 52311 lbs  <u>PERFORMANCE MARGINS (LBS):</u> FPR: 7444 FUEL BIAS: 1050 FINAL TDDP: 5343 RECON: 2278  <u>PAYLOADS:</u> IECM/REM EEVT HBT-HEFLEX OSS-1 PDP/REM (PLASMA DIAGNOSTIC PACKAGE) DFI  RMS 2 (S.N. 201)  LOADED TESTS USING PDP  WAVE PDP OUTSIDE P/L BAY  3 CRYO TANK SETS	KSC W/D: OPF 55, VAB 12, PAD 30=97  <u>LAUNCH POSTPONEMENTS:</u> None.  <u>LAUNCH SCRUBS:</u> None.  <u>LAUNCH DELAYS:</u> - Launch delayed 1 hour. SSME GN2 purge heater temp sensor failed in GSE.  <u>TAL WX:</u> Rota go.  <u>LANDING SITE CHANGE:</u> - EDW lakebed to WSSH because EDW lakebed was wet.  <u>FLIGHT DURATION CHANGE:</u> - Flight extended from 7 to 8 days because of sand storm at WSSH.  <u>FIRSTS:</u> - First flight without white paint on ET. (800 lbs weight savings. STS-1 and STS-2 ET's were painted white.)  <u>SIGNIFICANT ANOMALIES:</u> - Early shutdown of APU 3 due to WSB3 freezeup causing high lube oil temp. - R ENG hydraulic lockup at 82% at To plus 8 min 12 sec due to early shutdown of APU. - RMS wrist TV camera failed causing IECM OPS to be canceled. - AFT bulkhead latch did not fully latch (top sun for 15 minutes and latches operated normally). - WMS (slinger stopped on day 5). - Missing tiles on FWD upper fuselage and upper body flap. - CCTV camera C failed, camera B zoom failed. - ARPCS GN2 usage excessive (cold soak induced leak). - S-Band xponder 1 failed in hi and low power modes (downlink). - S-Band xponder 2 failed in low power mode (downlink). (Contaminants in RF control relay.) - S-Band Power Amp reduced power output. - VTR tape broke. - Ammonia boiler controllers A&B failed. - Cracked rotor RH outboard MLG brake. - WSMR dust storm caused significant maintenance and cleanup of orbiter (gypsum contamination). - One RH SRB main chute failure 3 seconds after deployment.  RADIATORS DEPLOYED #3



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (2)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-4 SEQ FLT # 4 KSC 4 OFT-4 PAD 39A-4	OV-102 Flight 4 Columbia  OMS PODS LVO1 - 4 RVO1 - 4 FRC2 - 4	CDR: Thomas K. Mattingly P7/R7/M7  PLT: Henry W. Hartsfield P8/R8/M8	KSC 39A 178:14:59:59.8Z 11:00:00 AM EDT (P) 11:00:00 AM EDT(A) Sunday 2 6/27/82 (1)	EDW 22, CONC (EDW 3, CONC 1)  9:09:40 AM PDT Sunday 1 7/4/82 (1)  X RANGE: 581 NM  ORB DIR: DL (1)  AIM PT: NOM  PLS - EDW SLS - KSC CLS - NOR AOA - EDW AOA WX - NOR TAL - DAKAR TAL WX - ROTA (Selected)  MAX Q = 721 M = 1.74  SRB SEP: 2:10 MET  MECO: 8:32.7 MET  ET SEP: 8:50:4 MET  OMS-1: 10:32.6 MET 88 Seconds  MCC FCR-1 (4)  FLIGHT DIRECTORS: Asc - T. W. Holloway Ld/Orb - C. R. Lewis Plng - J. T. Cox Plng - J. H. Greene Orb/Ent - H. M. Draughon MOD - E. F. Kranz	100/100 (107)  100/65/ 100/65  1 = 2007 (4) 2 = 2006 (4) 3 = 2005 (4)  ET RPT 228K 47:19 MET  ET BR/UP 204K 47:56 MET  ET IMPACT LAT: 28.4°S LONG: 83.07°E  M 3 EOM  WEIGHT: 209141  X CG: 1092.9  LANDING  WEIGHT: 208947  X CG: 1094.4	A13/14  MTR: STD  CASE: STD 86-80E  SWT  ET-4  ET RPT 228K 47:19 MET  ET BR/UP 204K 47:56 MET  ET IMPACT LAT: 28.4°S LONG: 83.07°E	28.529° (1)  START: -1.2°  END: +20.5°	STANDARD INSERTION  INSERTION ALTITUDE:  POST OMS-2 139.2 X 131.05 NM  DEORBIT 175 X 160 NM  VELOCITY 25800 FPS  RANGE 3810 NM	R18/T11	CARGO: 24492 lbs  PAYLOAD CHARGEABLE: 11644 lbs  PRIMARY P/L: 9800 lbs  ANCILLARY: 1844 lbs  RETURNED: 24492.8 lbs  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 0 lbs NON-DEPLOYED: 63955 lbs CARGO TOTAL: 76803 lbs  PERFORMANCE MARGINS (LBS): FPR: 6210 FUEL BIAS: 1474 FINAL TDDP: 4038 RECON: 1195  PRIMARY: DOD 82-1 ICEM/REM  ANCILLARY: ACIP GAS (UTAH STATE) STUDENT EXP'S: (1) CHOLESTEROL (2) CHROMIUM LEVEL (Deficiency) MLR CFES (MID-DECK) TGE NOSL  3 CRYO TANK SETS  RMS 3 (S.N. 201)  WAVED IECM OUTSIDE P/L BAY	KSC W/D: OPF 41, VAB 7, PAD 29=77  LAUNCH POSTPONEMENTS: None.  LAUNCH SCRUBS: None.  LAUNCH DELAYS: None.  TAL WX: Dakar no go - crosswinds.  FLIGHT DURATION CHANGE: None.  FIRSTS: - First flight with student experiments.  SIGNIFICANT ANOMALIES: - Hail stones on tile at L-1 day (repaired tiles). - Water found in thrusters F2R & F4R - During prelaunch rain storms, approximately 500 lbs water absorbed by tiles requiring bottom-to-sun for many hours to dry-out water (to prevent ice damage to tile). - GAS activation problems - successful workaround. - VTR would not rewind. - AFT bulkhead actuator on port PLBD stalled during latch closure. - AFT STBD, FWD port, and FWD bulkhead floodlights failed. - Thermal conditioning required to close PLBD's. - WMS slinger slowed down. - Mid-deck TV camera operation erratic. - DFI PCM recorder data lost. - Both SRB's lost (impacted water at extremely high velocity). - Right and left inboard brakes damaged.  IFM - GAS EXPERIMENTS RECOVERY  RADIATORS DEPLOYED #4



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (4)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-5</b>	OV-102 Flight 5 Columbia	<p><u>CDR:</u> Vance D. Brand P9/R9/M9</p> <p><u>PLT:</u> Robert F. Overmyer P10/R10/M10</p> <p><u>M/S:</u> William B. Lenoir P11/R11/M11</p> <p><u>M/S:</u> Joseph P. Allen P12/R12/M12</p> <p>FIRST SPACE SHUTTLE EVA SCHEDULED, BUT NOT ACCOMPLISHED BECAUSE OF EMU PROBLEMS.</p> <p>EV-1 - Lenoir EV-2 - Allen</p>	<p>KSC 39A 315:12:18:59.997Z 7:19:00 AM EST (P) 7:19:00 AM EST (A) Thursday 2 11/11/82 (2)</p> <p><u>WINDOW DURATION:</u> 39 Minutes (SBS Day 2 Deploy Opportunity)</p> <p>PLS - EDW SLS - NOR TAL - DAKAR (Selected) TAL WX - None AOA - NOR AOA WX - KSC CLS - KSC CLS WX - ROTA</p> <p><u>MAX Q</u> = 738 M = 1.70</p> <p><u>SRB SEP:</u> 2:09.08 MET</p> <p><u>MECO:</u> 8:30.68 MET</p> <p><u>ET SEP:</u> 8:48.77 MET</p> <p><u>OMS-1:</u> 10:30.8 MET 137.8 Seconds</p> <p><u>OMS-2:</u> 44:40.8 MET 117.6 Seconds</p> <p>MCC FCR-2 (1)</p> <p><u>FLIGHT DIRECTORS:</u> Ld/Asc/Ent - T. W. Holloway Orbit - J. T. Cox Planning - G. E. Coen MOD - E. F. Kranz</p>	<p>EDW 22, CONC (EDW 4, CONC 2)</p> <p>6:33:26 AM PST Tuesday 3 11/16/82 (2)</p> <p><u>XRANGE:</u> 580 NM</p> <p><u>ORB DIR:</u> DL (2)</p> <p><u>AIM PT:</u> NOM</p> <p><u>MLGTD:</u> 1637 FT 320:14:33:26Z VEL: 201 KGS 198 KEAS HDOT:-1.0 FPS</p> <p><u>TD NORM 195:</u> 1907 FT</p> <p><u>NLGTD:</u>4675 FT 320:14:33:34Z VEL:176 KGS HDOT:-4.6 FPS</p> <p><u>BRK INIT:</u> 167 KGS</p> <p><u>AVE BRK DECEL:</u> 6.7 FPS/S</p> <p><u>WHEELS STOP:</u> 320:14:34:29Z 11190 FT</p> <p><u>ROLLOUT:</u> 9553 FT 63 SEC</p> <p><u>WIND:</u> 2 H, 0X KNOTS OFFICIAL: 2H, 0X</p> <p><u>DENS ALT:</u> 1750 FT</p> <p><u>FLT DURATION:</u> 5:02:14:26 122:14:26</p> <p><u>S/T:</u> 24:16:02:56</p> <p><u>OV-102:</u> 24:16:02:56</p> <p><u>DISTANCE:</u> 1,850,000 sm</p>	<p>100/100 (107)</p> <p>100/85/65</p> <p>1 = 2007 (5) 2 = 2006 (5) 3 = 2005 (5)</p> <p><u>M 3 EOM</u></p> <p>WEIGHT: 202643</p> <p>X CG: 1094.8</p> <p><u>LANDING</u></p> <p>WEIGHT: 202480</p> <p>X CG: 1096.3</p>	<p>A15/16</p> <p><u>MTR:</u> STD</p> <p><u>CASE:</u> STD 86-80</p> <p>SWT</p> <p>ET-5</p> <p>ET <u>RPT</u> 236K 46:30 MET</p> <p>ET <u>BR/UP</u> 205K 47:18 MET</p> <p>ET <u>IMPACT</u> LAT: 28.3°S LONG: 82.4°E</p>	<p>28.482° (2) 89.8°</p> <p><u>START:</u> -26.0°</p> <p><u>END:</u> -7.2°</p>	<p>STANDARD <u>INSERTION</u></p> <p><u>INSERTION ALTITUDE:</u></p> <p><u>POST OMS-2</u> 162.07 X 160.67 NM</p>	<p>R19/T12</p>	<p><u>CARGO:</u> 32080 lbs</p> <p><u>PAYLOAD CHARGEABLE:</u> 20830 lbs</p> <p><u>ANCILLARY P/L:</u> 1078 lbs</p> <p><u>NON-DEPLOYED:</u> 5167 lbs</p> <p><u>DEPLOYED:</u> 14585 lbs</p> <p><u>RETURNED:</u> 17495 lbs</p> <p><u>SHUTTLE ACCUMULATED WEIGHTS:</u> <u>DEPLOYED:</u> 14585 lbs <u>NON-DEPLOYED:</u> 70200 lbs <u>CARGO TOTAL:</u> 108883 lbs</p> <p><u>PERFORMANCE MARGINS (LBS):</u> FPR: 5312 FUEL BIAS:1479 FINAL TDDP:822 RECON:-1017</p> <p><u>PRIMARY:</u> SBS-C/PAM-D (DEPLOYED)</p> <p><u>TELESAT-E/PAM D (ANIK-D)</u> (DEPLOYED)</p> <p><u>ANCILLARY:</u> STUDENT EXPERIMENTS - POFERIA (SPONGE) GROWTH - SOLUTION XTAL GROWTH - CONVECTION IN ZERO-G GAS, TGE MATERIALS TEST ZERO-G DEMO</p> <p>3 CRYO TK SETS NO RMS</p>	<p>KSC W/D: OPF 48, VAB 9, PAD 45= 102</p> <p><u>LAUNCH POSTPONEMENTS:</u> None.</p> <p><u>LAUNCH SCRUBS:</u> None.</p> <p><u>LAUNCH DELAYS:</u> None.</p> <p>TAL WX: DAKAR GO</p> <p>CLS WX: Rota go.</p> <p><u>FLIGHT DURATIONS CHANGE:</u> None.</p> <p><u>FIRSTS:</u></p> <ul style="list-style-type: none"> <li>- First operational Shuttle flight.</li> <li>- First flight with more than 2 crewmen (4).</li> <li>- First flight to deploy PAM-D (SBS-C).</li> <li>- First OV-102 flight after Micro-Mod including disabling the two ejection seats.</li> <li>- First flight of OV-102 with ejection seats disabled.</li> <li>- First Space Shuttle IFM.</li> </ul> <p><u>IFM's:</u></p> <ul style="list-style-type: none"> <li>- Switched CRT-2 and CRT-4 cables on FD4 after CRT 2 failed.</li> <li>- Water hoses used for water dispenser failure.</li> </ul> <p><u>SIGNIFICANT ANOMALIES:</u></p> <ul style="list-style-type: none"> <li>- 46-hour STBD side-to-sun.</li> <li>- EVA canceled, EV-2 (Allen's) suit fan did not operate.</li> <li>- EV-1 (Lenoir's) suit regulator was regulating to 3.8 psia instead of 4.3 psia.</li> <li>- WCCU A &amp; B failed.</li> <li>- CRT-2 failed (pot in "y" deflection board).</li> <li>- Radar altimeter #1 failed.</li> <li>- FWD port &amp; STBD PLB lights failed.</li> <li>- High 02 flow during PCS switchover.</li> <li>- LHIB MLG brake locked during landing.</li> <li>- OMS nozzle cracks found postflight.</li> </ul> <p>RADIATORS DEPLOYED #5 (for SUN SIDE attitude only)</p>



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (4)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-6</b>	OV-099 Flight 1 Challenger	<b>CDR:</b> Paul J. Weitz P13/R13/M13  <b>PLT:</b> Karol J. Bobko P14/R14/M14  <b>M/S:</b> F. Story Musgrave P15/R15/M15  <b>M/S:</b> Donald H. Peterson P16/R16/M16  <b>EMU/TETHERED EVA:</b> EVA: 4/7/83 EV1-Musgrave EV2-Peterson EVA1=3:54/4:42 Space Shuttle EVA #1  <b>EVA HARDWARE CHECKOUT</b>	KSC 39A 94:18:30:00.016Z 1:30:00 PM EST (P) 1:30:00 PM EST (A) Monday 2 4/4/83 (2)  <b>WINDOW DURATION:</b> 17 Minutes (TAL Lighting)  TAL - DAKAR NO TAL WX AOA - EDW AOA WX - NOR EOM - EDW  <b>MAX Q = 688</b> M = 1.47  <b>SRB SEP:</b> 2:09.4 MET  <b>MECO:</b> 8:19.4 MET  <b>ET SEP:</b> 8:37.55 MET  <b>OMS-1:</b> 10:19.6 MET 139.6 Seconds  <b>OMS-2:</b> 43:37.6 MET 119.1 Seconds	EDW 22 CONC (EDW 5, CONC 3)  10:53:42 AM PST Saturday 2 4/9/83 (2)  <b>XRANGE:</b> 378 NM  <b>ORB DIR:</b> AL (1)  <b>AIM PT:</b> CLOSE IN  <b>MLGTD:</b> 2026 FT 99:18:53:42Z <b>VEL:</b> 180 KGS 190 KEAS <b>HDOT:</b> -1.5 FPS  <b>TD NORM 195:</b> 1576 FT  <b>NLGTD:</b> 4970 FT 99:18:53:54Z <b>VEL:</b> 146 KGS <b>HDOT:</b> -3.9 FPS  <b>BRK INIT:</b> 136 KGS  <b>AVE BRK DECEL:</b> 7.3 FPS/S  <b>WHEELS STOP:</b> 99:18:54:31Z 9270 FT  <b>ROLLOUT:</b> 7180FT 49 SEC  <b>WIND:</b> 21H, 5L KNOTS OFFICIAL: 12H, 3L  <b>DENS ALT:</b> 3177 FT  <b>FLT DURATION:</b> 5:00:23:42 120:23:42  <b>S/T:</b> 29:16:26:38  <b>OV-099:</b> 5:00:23:42  <b>DISTANCE:</b> 1,820,000 sm	104/104 (109)  100/104/81/10 4/65  1 = 2017 (1) 2 = 2015 (1) 3 = 2012 (1) CENTER WAS 2011  LWT-1  ET-8  <b>ET RPT</b> 237K 46:19 MET  <b>ET BR/UP</b> 223K 46:42 MET  <b>ET IMPACT LAT:</b> 28.3°S LONG: 83.0°E  <b>M 3 EOM</b>  <b>WEIGHT:</b> 190627  <b>X CG:</b> 1099.7  <b>LANDING WEIGHT:</b> 190330  <b>X CG:</b> 1101.2	28.48° (3) 89.7°  <b>START:</b> -21.6°  <b>END:</b> -18.8°  <b>MAX:</b> -21.9°  ET RPT 237K 46:19 MET  <b>ET IMPACT LAT:</b> 28.3°S LONG: 83.0°E	STANDARD INSERTION  INSERTION ALTITUDE:  POST OMS-2 155.45 X 154.48 NM  MAX: -21.9°	R19/T12  <b>CARGO:</b> 46971 lbs  <b>CHARGEABLE:</b> 46662 lbs  <b>DEPLOYED:</b> 37546 lbs  <b>NON-DEPLOYED:</b> 6853 lbs  <b>ANCILLARY P/L:</b> 2263 lbs  <b>RETURNED:</b> 9462 lbs  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 52131 lbs <b>NON-DEPLOYED:</b> 79316 lbs <b>CARGO TOTAL:</b> 155854 lbs  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 5720 FUEL BIAS: 1298 FINAL TDDP: 4755 RECON: 2463  <b>PRIMARY:</b> TDRS-A/IUS-2  <b>DEORBIT</b> 155 X 147 NM  <b>VELOCITY</b> 25756 FPS  <b>RANGE</b> 4056 NM	KSC W/D: OPF 123, VAB 6, PAD 115=244  <b>LAUNCH POSTPONEMENT:</b> - 1/20/83 launch postponed 74 days to 4/4/83 because of H2 leak in aft compart-ment from engine 2011 (SSME #1) during FRF 1. Post-FRF 2 found crack in MCC of 2011. 2015 and 2012 had cracked ASI fuel lines. Replaced ASI lines in all three engines. 74-day slip for engine analysis and fixes.  <b>LAUNCH SCRUBS:</b> None.  <b>LAUNCH DELAYS:</b> None.  <b>TAL WX:</b> Dakar no go - haze.  <b>FLIGHT DURATION CHANGE:</b> None.  <b>FIRSTS:</b> - First flight of OV-099. - First flight with HUD. - First EVA on Shuttle Program. - First use of SRB LWT case. - First use of LWT ET.  <b>SIGNIFICANT ANOMALIES:</b> - TDRS deploy at MET 10:00:01 (Rev 6). IUS problem resulted in TDRS being left in 22000 X 12000 NM orbit. TDRS was maneuvered into geosync orbit using 1 lb attitude thrusters. - IUS problem with TVC. - TPS damage AFRSI on OMS PODS, slump-ing tiles on nose cap and aero surfaces. - Humidity separator failed (6 wires shorted). - High flow on O2 and N2 systems. - WCCU A & B failed. - GPC 2 failed. - Teleprinter failed. - WMS slinger failed on day 5. - CRT-3 failed. - Gas path through putty on both SRM nozzle-to-case joints.  <b>IFM</b> - Removed and stowed CCTV monitors.		
SEQ FLT # 6											
KSC 6											
PAD 39A-6	OMS PODS LPO1 - 1 RPO1 - 1 FRC9 - 1										



# 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		FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
							INC	HA/HP			
<b>STS-7</b>  SEQ FLT # 7  KSC 7  PAD 39A-7	OV-099 Flight 2 Challenger  OMS PODS LPO1 - 3 RPO1 - 3 FRC9 - 3	<b>CDR:</b> Robert L. Crippen (Flt 2 - STS-1) P17/R2/V1/M2  <b>PLT:</b> Frederick H. Hauck P18/R17/M17  <b>M/S 1:</b> John M. Fabian (Rt. Rear Seat) P19/R18/M18  <b>M/S 2:</b> Sally K. Ride (Center Seat) P20/R19/F1  <b>M/S 3:</b> Norman E. Thagard (Middeck Seat) P21/R20/M19	KSC 39A 169:11:33:00.33Z 7:33:00 AM EDT (P) 7:33:00 AM EDT (A) Saturday 1 6/18/83 (2)  <b>WINDOW DURATION:</b>  PLS - KSC SLS - EDW TAL - DAKAR CLS - ROTA AOA - EDW AOA WX - KSC EOM - KSC  <b>MAX Q = 701</b> M = 1.56  <b>SRB SEP:</b> 2:06.2 MET  <b>MECO:</b> 8:20.1 MET  <b>ET SEP:</b> 8:38.2 MET  <b>OMS-1:</b> 10:20.2 MET 139.5 Seconds  <b>OMS-2:</b> 44:30.2 MET 120 Seconds  MCC FCR-2 (3)  <b>FLIGHT DIRECTORS:</b> Ascent - J. H. Greene Ld/O1 - T. W. Holloway Orbit 2 - J. T. Cox Plng - L. S. Bourgeois Entry - G. E. Coen MOD - E. F. Kranz	EDW 15, LAKEBED (EDW 6, LKBD 3)  6:56:59 AM PDT Friday 1 6/24/83 (1)  <b>XRANGE:</b> 738 NM  <b>ORB DIR:</b> DL (3)  <b>AIM PT:</b> NOM  <b>MLGTD:</b> 2726 FT 175:13:56:59Z <b>VEL:</b> 200 KGS 202 KEAS <b>HDOT:</b> -1.1 FPS  <b>TD NORM 195:</b> 3356 FT  <b>NLGTD:</b> 6843 FT 175:13:57:19Z <b>VEL:</b> 158 KGS <b>HDOT:</b> -5.1 FPS  <b>BRK INIT:</b> 125 KGS  <b>AVE BRK DECEL:</b> 3.6 FPS/S  <b>WHEELS STOP:</b> 175:13:58:14Z 13176 FT  <b>ROLLOUT:</b> 10450 FT 75 SEC  <b>WIND:</b> 9H, 8R KNOTS OFFICIAL: 10H, 3R  <b>DENS ALT:</b> 3000 FT  <b>FLT DURATION:</b> 6:02:23:59 146:23:59  <b>S/T:</b> 35:18:50:37  <b>OV-099:</b> 11:02:47:41  <b>DISTANCE:</b> 2,220,000 sm	104/104 (109)  100/104/75/10 4/65  1 = 2017 (2) 2 = 2015 (2) 3 = 2012 (2)  M 3 EOM  <b>WEIGHT:</b> 204340  X CG: 1089.8  <b>LANDING WEIGHT:</b> 204043  X CG: 1091.2	A51/52  <b>MTR:</b> STD  <b>CASE:</b> LWC  SWT  ET-6  <b>ET RPT</b> 233K 46:20 MET  <b>ET BR/UP</b> 188K 47:18 MET  TV OFF  <b>ET IMPACT LAT:</b> 28.35°S <b>LONG:</b> 83.7°E	28.484° (4)  <b>START:</b> +17.5°  <b>END:</b> +41.0°  <b>MAX:</b>	<b>STANDARD INSERTION</b>  <b>INSERTION ALTITUDE:</b>  <b>POST OMS-2</b> 161 X 159.96 NM  <b>TELESAT DEPLOY</b> 162.21 NM  <b>PALAPA DEPLOY</b> 162.61 NM  <b>DEORBIT</b> 159 X 154 NM  <b>VELOCITY</b> 25771 FPS  <b>RANGE</b> 4042 NM	R19/T12  <b>CARGO:</b> 37124 lbs  <b>CHARGEABLE:</b> 31893 lbs  <b>ANCILLARY P/L:</b> 3942 lbs  <b>DEPLOYED:</b> 14949 lbs  <b>NON-DEPLOYED:</b> 13002 lbs  <b>RETURNED:</b> 22175 lbs  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 67080 lbs <b>NON-DEPLOYED:</b> 96260 lbs <b>CARGO TOTAL:</b> 192978 lbs  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 5539 FUEL BIAS: 1603 FINAL TDDP: 2940 RECON: 2021  <b>PRIMARY:</b> TELESAT-F/ PAM-D (ANIK-C) DEPLOYED  PALAPA-B1/PAM-D DEPLOYED  SPAS-01 DEPLOYED AND RETRIEVED  CFES, MLR OSTA-2: (MPE, MEA, MAUS) GAS-G002, G305, G009, G033, G088, G012 AND G345  <b>ANCILLARY:</b> MLR CFES (MID-DECK) GAS (7) BAYS 2-5 STUDENT EXP.  3 CRYO TK SETS  RMS 4 (S.N. 201)  Deployed and retrieved SPAS-01	KSC W/D: OPF 34, VAB 5, PAD 21=60  <b>LAUNCH POSTPONEMENTS:</b> None.  <b>LAUNCH SCRUBS:</b> None.  <b>LAUNCH DELAYS:</b> None.  <b>TAL WX:</b> Dakar go.  <b>LANDING SITE CHANGE:</b> - KSC to EDW (Poor visibility at KSC).  <b>FLIGHT DURATION CHANGE:</b> - Extended 1 day from 5 to 6 days plus 2 revs to land at EDW.  <b>FIRSTS:</b> - First flight with 5 crewmembers. - First US flight with female astronaut. - First payload deployed and retrieved same flight (SPAS-01). - First PROX OPS and reberthing of payload (SPAS-01). - First flight with Ku-Band antenna (Ku-band not used). - First planned landing at KSC. - First PROX OPS (with SPAS-01).  <b>EVENTS:</b> - TELESAT-F deployed on rev 4. - PALAPA-B1 deployed on rev 15.  <b>SIGNIFICANT ANOMALIES:</b> - Reduced cabin pressure demonstration (10.2 PSIA). - Bus-tie demonstration post-landing fired one set of PYROS for MLG uplock release. - WCCU A, B and C failed. - WCCU C and E wall units failed. - Right braking system damaged. - APU 3 underspeed shutdown on-orbit. - Locker and cabin door misalignment problems. - Right inboard MLG brake damage. - Challenger window replaced after orbital debris impact.	





# 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		FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
							INC	HA/HP			
STS-8 SEQ FLT # 8 KSC 8 PAD 39A-8	OV-099 Flight 3 Challenger  OMS PODS LPO1 - 2 RPO1 - 2 FRC9 - 2	CDR: Richard H. Truly (FLT 2 - STS-2) P22/R4/V2/M4  PLT: Daniel C. Brandenstein P23/R21/M20  M/S 1: Guion S. Bluford, Jr. (Center Seat) P24/R22/M21  M/S 2: Dale A. Gardner (Rt Rear Seat) P25/R23/M22  M/S 3: William E. Thornton (Middeck) P26/R24/M23	KSC 39A 242:06:32:00.009Z 2:15:00 AM EDT (P) 2:32:00 AM EDT (A) Tuesday 1 8/30/83 (1)  LAUNCH WINDOW: 41 Minutes  (INSAT Dply Rev 18)  PLS - EDW SLS - KSC TAL - DAKAR NO TAL WX AOA - EDW AOA WX - NOR EOM - EDW  MAX Q = 701 M = 1.53  SRB SEP: 2:04.34 MET  MECO: 8:41.62 MET  ET SEP: 8:59.66 MET  OMS-1: 10:41.7 MET 138.8 Seconds  OMS-2: 44:51.7 MET 116.5 Seconds  MCC FCR-2 (4)  FLIGHT DIRECTORS: Asc/Plng - J. H. Greene Orbit 1 - B. R. Stone Ld/O2 - H. M. Draughon Entry - G. E. Coen MOD - E. F. Kranz	EDW 22, CONC (EDW 7, CONC 4) 248:07:40:43Z 12:40:43 AM PDT Monday 1 9/5/83 (1)  XRANGE: 519 NM ORB DIR: DL (4)  AIM PT: NOM  MLGTD: 2793 FT 248:07:40:43Z VEL: 196 KGS 195 KEAS HDOT: -1.2 FPS  TD NORM 195: 2793 FT  NLGTD: 5515 FT 248:07:40:50Z VEL: 177 KGS HDOT: -4.3 FPS  BRK INIT: 154 KGS  AVE BRK DECEL: 6.9 FPS/S  WHEELS STOP: 248:07:41:33Z 12164 FT  ROLLOUT: 9371 FT 50 SEC  WIND: 7H, 0X KNOTS OFFICIAL: 5H, 2L  DENS ALT: 3600 FT  FLT DURATION: 6:01:08:43 145:08:43  S/T: 41:19:59:20  OV-099: 17:03:56:24  DISTANCE: 2,220,000 sm	100/104 (104)  100/69/ 100/65  1 = 2017 (3) 2 = 2015 (3) 3 = 2012 (3)  M 3 EOM  WEIGHT: 204141  X CG: 1090.4  LANDING  WEIGHT: 203945  X CG: 1091.9	A53/54  MTR: HPM  CASE: STD  LWT-2  ET-9  ET RPT 241K 46:30 MET  ET BR/UP 223K 47:01 MET  ET IMPACT LAT: 28.4°S LONG: 81.5°E	28.488 (5)  START: -36.2°  END: +29.4°  MAX: +37.0°	STANDARD INSERTION  INSERTION ALTITUDE:  POST OMS-2 161.07 X 160.14 NM  INSAT DEPLOY 159.18 NM	R19/T12	CARGO: 30076 lbs  PAYLOAD CHARGEABLE: 25790 lbs  DEPLOYED: 7445 lbs  NON-DEPLOYED: 13179 lbs  ANCILLARY: 5166 lbs  RETURNED: 22631 lbs  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 74525 lbs NON-DEPLOYED: 114605 lbs CARGO TOTAL: 223054 lbs  PERFORMANCE MARGINS (LBS): FPR: 6756 FUEL BIAS: 780 FINAL TDDP: 14863 RECON: 15735  PRIMARY: INSAT-1B/PAM-D (DEPLOYED)  RMS/PDRS/PFTA DFI PALLET (HEAT PIPE EXPERI- MENT, 2 BOXES OF POSTAL COVERS) RME EXP, EOM  ANCILLARY: CFES (MIDDECK) GAS (3) BAYS 2-8 GAS (4) BAY 5 BIO-FEEDBACK ANIMAL ENCLOSURE POSTAL COVERS  3 CRYO TK SETS RMS 5 (S.N. 201)  USED FOR PFTA OPS	KSC W/D: OPF 26, VAB 4, PAD 25 = 55  LAUNCH POSTPONEMENTS: - 8/4/83 launch postponed 26 days to 8/30/83 due to removal of TDRS-B from flight (IUS not ready because of problem on STS-6) and time required to checkout TDRS-A on orbit. 26-day slip.  LAUNCH SCRUBS: None.  LAUNCH DELAYS: - 00H17M delay because of thunderstorms in launch area.  TAL WX: Dakar go.  FLIGHT DURATION CHANGE: None.  FIRSTS: - First Shuttle night launch. - First Shuttle night landing. - First flight to use TDRS for communications (test mode). - First flight to use Ku-band communications. - First flight using SRM HPM.  EVENTS: - Tile survey of Orbiter bottom made using RMS End Effector TV camera. - INSAT-1B deployed on rev 27.  SIGNIFICANT ANOMALIES: - Completed all 54 DTO's and DSO's planned for flight. - Hydraulic circulation pump 2 failed - GPC-1 failed to sync (recovered OK) - WCCW A wall unit failed, B&E noisy. - CCTV C command problems & out of focus. - CCTV D failed. - TAGS failed. - Rt outboard brake had 3 cracked washers and right inboard had one cracked washer. - Nose gear thruster piston found on runway. - LH and RH SRB nozzles experienced off-nominal erosion. - SRB nozzle erosion was found after recovery. - RH mid window (W5) pitted.  RADIATORS DEPLOYED #6 (for 2 days)



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (6)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-9</b> (STS 41-A) S/L1	OV-102 Flight 6 Columbia	CDR: John W. Young (FLT 2 - STS-1) P27/R1/V3/M1	KSC 39A 332:15:59:99Z 11:00:00 AM EST (P) 11:00:00 AM EST (A) Monday 3 11/28/83 (3)	EDW 17, LAKEBED (EDW 8, LKBD 4)  15:47:24 PM PST Thursday 1 12/8/83 (1)  XRRANGE: 69 NM  ORB DIR: DL (5)  AIM PT: NOM  MLGTD: 1649 FT 342:23:47:24Z VEL: 200 KGS 185 KEAS HDOT: -1.7 FPS  TD NORM 195: 749 FT  NLGTD: 5897 FT 342:23:47:37Z VEL: 146 KGS HDOT: -9.9 FPS  BRK INIT: 126 KGS  AVE BRK DECEL: 6.8 FPS/S  WHEELS STOP: 342:23:48:17Z 10105 FT  ROLLOUT: 8556 FT (10105 FROM THRESHOLD) 53 SEC  WINDS: 0 H/T, 0 X KNOTS OFFICIAL: 1T, 0X  DENS ALT: 1900 FT  FLT DURATION: 10:07:47:24 247:47:24  S/T: 52:03:46:44  OV-102: 34:23:50:20  DISTANCE: 3,330,000 sm	104/104 (107)  100/104/ 78/104/65  1 = 2011 (1) 2 = 2018 (1) 3 = 2019 (1)  LWT-4  ET BR/UP 199K 1:01:00 MET  ET IMPACT LAT: 59.96°S LONG: 149.9°E	A55/60  MTR: HPM  CASE: STD  LWT-4  ET-11  ET BR/UP 199K 1:01:00 MET  ET IMPACT LAT: 59.96°S LONG: 149.9°E	57.028° (1)  START: -58.0°  END: -79.0°  MAX: -79.9°	STANDARD INSERTION  INSERTION ALTITUDE:  POST OMS-2 136.75 X 132.79 NM	OI-2 (1)	CARGO: 33264 lbs  PAYLOAD CHARGEABLE: 33131 lbs  PAYLOAD WEIGHT: 33,131 lbs (includes 870 lbs cryo tank)  DEPLOYED: 0 lbs  NON-DEPLOYED: 32261 lbs  MIDDECK: 0 lbs  RETURNED: 32394 lbs  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 74525 lbs NON-DEPLOYED: 147736 lbs CARGO TOTAL: 256318 lbs  PERFORMANCE MARGINS (LBS): FPR: 5404 FUEL BIAS: 1084 FINAL TDDP: 841 RECON: -411  SPACELAB-1/LM  SPACELAB 1 WITH 73 EXP: - ASTRONOMY - SOLAR PHYSICS - SPACE PLASMA - ATMOSPHERIC PHYSICS - EARTH OBSERVATIONS - LIFE SCIENCES - MATERIAL SCIENCES  5 CRYO TANKS NO RMS	KSC W/D: OPF 82 (2), VAB 12 (3), PAD 34 (2) = 128 days  LAUNCH POSTPONEMENTS: -10/30/83 Launch postponed 29 days to 11/28/83. Rolled back from pad and changed SRB nozzles subsequent to STS-8 excessive nozzle erosion. 29-day slip.  LAUNCH SCRUBS: None.  LAUNCH DELAYS: None.  TAL WX: Zaragoza no go - winds, Koln-Bonn no go - clouds.  FLIGHT DURATION CHANGE: - Flight extended 1 day for additional science. - Landing delay 5 revs after GPC 1 and GPC 2 hard failures - Total extension - 1 day + 5 revs.  FIRSTS: - First flight with 6 crewmen. - First flight of Spacelab after Spacelab only modifications to OV-102. - First flight with non-astronauts (P/S) and first non-Americans. - First use of two shifts of 12 hours (red and blue shifts). - First flight with galley and sleep station. - First flight with 3 substack fuel cells.  SIGNIFICANT ANOMALIES: - GPC SV time tag to S/L incremented by 1 day. - Ku-band TWT failed to come on (low temp problem). - Spacelab RAU 21/cooling problem. - Excessive GH2 in water. - S-band power amp no. 2 failed. - Noises and oscillations reported by crew. - GPC 1 hard failure GPC 2 failure, re-IPL'ed, memory altered, failed again at NLG contact (delayed landing 7-3/4 hours). - IMU 1 failed (power supply failure). - GPC 1 hard failure GPC 2 failure, re-IPL'ed, memory altered, failed again at NLG contact (delayed landing 7-3/4 hours). - APU 1 and 2 hydrazine leak/fire shutdown after landing (APU 1 and 2 damaged). - Right outboard brakes damaged. - LH OMS pod TPS damage during entry. - Mission extended one day. 8 hours extension to analyze GPC and IMU failures. - LH OMS pod removed for repair after burn-through (missing tile).  RADIATORS DEPLOYED #7 (stowed for 34 hours)
SEQ FLT # 9	Spacelab 1 LM (1)	PLT: Brewster H. Shaw, Jr. P28/R25/M24	LAUNCH WINDOW: 14 Minutes (TAL Lighting)								
KSC 9	OMS PODS LVO1 - 6 RVO1 - 6	M/S 1: Owen K. Garriott P29/R26/M25	TAL - ZARAGOZA PLS - EDW SLS - NOR TAL - ZARAGOZA IN PLANE TAL - COLOGNE/BONN AOA - NOR AOA WX - NONE								
PAD 39A-9	FRC2 - 6	M/S 2: Robert A. R. Parker P30/R27/M26									
		P/S 1: Byron K. Lichtenberg P31/R28/M27	MAX Q = 676 M = 1.52								
		P/S 2: Ulf Merbold (Germany) P32/R29/M28	SRB SEP: 2:06.24 MET								
			MECO: 8:29.18 MET								
			ET SEP: 8:47.32 MET								
			OMS-1: 10:29.3 MET 68.5 Seconds								
			OMS-2: 40:37.4 MET 101.6 Seconds								
		MCC FCR-2 (5)									
		FLIGHT DIRECTORS: Ascent - J. H. Greene Ld/Orb 1 - C. R. Lewis Orb 2 - J. T. Cox Orb 3 - L. S. Bourgeois Team4/Ent - G. E. Coen									



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)	
		TITLE, NAMES & EVA'S					INC	HA/HP				
<b>STS-11</b> (STS 41-B)	OV-099 Flight 4 Challenger	CDR: Vance D. Brand (FLT 2 - STS -5) P33/R9/V4/M9	KSC 39A 34:12:59:59:998Z 8:00:00 AM EST (P) 8:00:00 AM EST (A) Friday 1 2/3/84 (1)	KSC 15 (KSC 1)  7:15:55 AM EST Saturday 3 2/11/84 (1)  XRANGE: 524 NM  ORB DIR: DL (6)  AIM PT: CLOSE IN	100/104 109  100/73/ 100/65  1 = 2109 (1) 2 = 2015 (4) 3 = 2012 (4)	A57/58  MTR: HPM  CASE: MWC  LWT-3  ET-10  ET RPT 231K 46:26 MET  ET BR/UP 214K 46:51 MET  ET IMPACT LAT: 28.3°S LONG: 80.6°E	28.486° (6)  START: -26.9°  END: +4.5°  MAX:	STANDARD INSERTION  INSERTION ALTITUDE:  POST OMS-2 165.88 X 164.61 NM  PALAPA DEPLOY 166.48 NM  WESTAR DEPLOY 153.52 NM	OI-2 (2)	CARGO: 33868 lbs  CHARGEABLE: 28252 LBS  DEPLOYED: 15073 LBS  NON-DEPLOYED: 10198 lbs  ANCILLARY: 2981 lbs  RETURNED: 18795 LBS  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 89598 lbs NON-DEPLOYED: 160915 lbs CARGO TOTAL: 290186 lbs  PERFORMANCE MARGINS (LBS): FPR: 5259 FUEL BIAS: 1038 FINAL TDDP: 12062 RECON: 6961  PRIMARY: WESTAR-IV/ PAM-D (DEPLOYED)  PALAPA-B2 / PAM-D (DEPLOYED)  SPAS 01A MFR PLATFORM MMU (2) MMU/EMU CINEMA 360 (BAY 5) CINEMA 360 (MID-DECK) ACES EXP. IEF EXP. RME EXP.  ANCILLARY: IRT (DEPLOYED) GAS (5) STUDENT EXP (A.E.M.) SESA+ BEAM (BAY 2) MLR EXP 4 CRYO TK SETS RMS 6 (S.N. 201) CANCELED SPAS DEPLOY (RMS PROBLEM)	KSC W/D: OPF 52, VAB 6, PAD 21=80  <u>LAUNCH POSTPONEMENTS:</u> - 1/24/84 launch was postponed 10 days to 2/3/84 because of ongoing analysis of APU failures on STS-9. 10-day slip.  <u>LAUNCH SCRUBS:</u> None.  <u>LAUNCH DELAYS:</u> None.  <u>TAL WX:</u> Dakar no go - visibility.  <u>FLIGHT DURATION CHANGE:</u> None.  <u>FIRSTS:</u> - First use of Manned Maneuvering Unit (MMU) on EVA. - First untethered EVA crewman on Shuttle flight (320 foot separation from Orbiter). - First use of 10.2 PSIA cabin for EVA prep. - First use of MFR on RMS. - First landing at KSC. - First flight with spare GPC in locker (STS-9 GPC failures reaction).  <u>EVENTS:</u> - Made Orbiter maneuver to recover foot restraint in PLB. - PALAPA-B deployed on rev 6. - WESTAR-IV deployed on rev 48. - Saw Challenger entry trail from Houston during landing at KSC.  <u>RENDEZVOUS:</u> - Canceled planned RNDZ when IRT failed.  <u>SIGNIFICANT ANOMALIES:</u> - RMS wrist joint failure (RMS/SPAS-01 operations canceled). RMS used for PALAPA PKM burn witness plate ops. - Left OMS POD damage from waste water dump nozzle ice (during entry) - IRT failed to inflate properly after deployment (rendezvous canceled). - Both SRB's lost one chute. - WESTAR-IV and PALAPA-B failed to achieve desired orbit due to PAM-D nozzle failure. (Both satellites were retrieved on STS 51-A). - LH SRM forward center field joint gas leak to primary O-ring with erosion. - RH SRM gas leak and erosion to primary O-ring of nozzle-to-case joint. - LH SRB main chute failed to inflate.	
SEQ FLT # 10		PLT: Robert L. Gibson P34/R30/M29										
KSC 10	OMS PODS LPO1 - 4 RPO1 - 4 FRC9 - 4	M/S 1: Bruce McCandless II P35/R31/M30	LAUNCH WINDOW: 13 Minutes (PALAPA SUN SHIELD FAIL OPEN)	MLGTD: 1930 FT 42:12:15:55Z VEL: 198 KGS 196 KEAS HDOT: -2.0 FPS  TD NORM 195: 2020 FT  NLGTD: 5789 FT 42:12:16:06Z VEL: 159 KGS HDOT: -2.8 FPS  BRK INIT: 136 KGS  AVE BRK DECEL: 5.1 FPS/S  WHEELS STOP: 42:12:17:02 12737 FT  ROLLOUT: 10,815 FEET 64 SEC  WINDS: 5H, 3L KNOTS OFFICIAL: 3T, 2L  DENS ALT: -200 FT  FLT DURATION: 7:23:15:55 191:15:55  S/T: 60:03:02:39  OV-099: 25:03:12:19  DISTANCE: 2,870,000 sm								
PAD 39A-10		M/S 2: Ronald E. McNair P36/R32/M31  M/S 3: Robert L. Stewart P37/R33/M32  <u>UNTETHERED EVA'S</u> MMU: EV1=McCandless EV2=Stewart  EVA1=5:35/6:05 2/7/84 SS EVA #2  EVA2=6:02/6:17 2/9/84 SS EVA #3  FIRST UNTETHERED EVA'S: FREE FLYER EVA's #1 & # 2  MMU CHECKOUT EVA'S	PLS - KSC SLS - EDW TAL - DAKAR NO TAL WX CLS - KSC CLS - EDW AOA - EDW AOA WX - NOR EOM - KSC  MAX Q = 676 M = 1.55  SRB SEP: 2:07.92 MET  MECO: 8:41.42 MET  ET SEP: 8:59.57 MET  OMS-1: 10:41.6 MET 150 Seconds  OMS-2: 45:24.6 MET 124.8 Seconds									
		MCC FCR-2 (6)  <u>FLIGHT DIRECTORS:</u> Asc/Ent - G. E. Coen Orbit 1 - B. R. Stone Ld/O2 - H. M. Draughon Plng - L. S. Bourgeois EVA - J. T. Cox MOD - E. F. Kranz										



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS 41-C</b> (STS-13)	OV-099 Flight 5 Challenger	<p>CDR: Robert L. Crippen (Flt 3) (STS-1 &amp; STS-7) P38/R2/V1/M2</p> <p>PLT: Francis R. Scobee P39/R34/M33</p> <p>M/S: Terry J. Hart P40/R35/M34</p> <p>M/S: James D. Van Hoften P41/R36/M35</p> <p>M/S: George D. Nelson P42/R37/M36</p> <p><u>UNTETHERED EVA'S (MMU):</u> EV1=Nelson EV2=Van Hoften</p> <p>EVA1=2:59/3:05 4/8/84 - SS EVA #4 SMM TPAD DOCK ATTEMPT</p> <p>EVA2=7:07/6:30 4/11/84- SS EVA #5 SMM REPAIR AND RELEASE</p> <p>FREE FLYER EVA'S #3 AND #4</p> <p>MCC FCR-2 (7)</p> <p><u>FLIGHT DIRECTORS</u> Asc/Ent - G. E. Coen Ld/O 1 - J. H. Greene Orbit 2 - J. T. Cox Planning - B. R. Stone MOD - E. F. Kranz</p>	<p>KSC 39A 097:13:57:59.999Z 8:58:00 AM EST (P) 8:58:00 AM EST (A) Friday 2 4/6/84 (3)</p> <p><u>LAUNCH WINDOW:</u> -3.5 MINUTES (PLANAR WINDOW/ET FOOTPRINT NEAR HAWAII)</p> <p>PLS - KSC SLS - EDW TAL - DAKAR TAL WX - ROTA AOA - EDW AOA WX - NOR</p> <p><u>MAX Q</u> = 635 M = 1.03</p> <p><u>SRB SEP:</u> 2:05.57 MET</p> <p><u>MECO:</u> 8:30.76 MET</p> <p><u>ET SEP:</u> 8:48.9 MET</p> <p><u>OMS-1:</u> NONE</p> <p><u>OMS-2:</u> 42:54 MET 95.1 Seconds</p>	<p>EDW 17, LAKEBED (EDW 9, LKBD 5)</p> <p>5:38:07 AM PST Friday 2 4/13/84 (3)</p> <p><u>XRANGE:</u> 381 NM</p> <p><u>ORB DIR:</u> DL 7</p> <p><u>AIM PT:</u> NOM</p> <p><u>MLGTD:</u> 1912 FT 104:13:38:07Z VEL: 218 KGS 213 KEAS HDOT: -1.5 FPS</p> <p><u>TD NORM 195:</u> 3505 FT</p> <p><u>NLGTD:</u> 7167 FT 104:13:38:23Z VEL: 144 KGS HDOT: -4.6 FPS</p> <p><u>BRK INIT:</u> 110 KGS</p> <p><u>AVE BRK DECEL:</u> 8.4 FPS/S</p> <p><u>WHEELS STOP:</u> 104:13:38:55Z 10628 FT</p> <p><u>ROLLOUT:</u> 8716 FT 48 SEC</p> <p><u>WINDS:</u> 2 H, 0 X KNOTS OFFICIAL: 0H, 0X</p> <p><u>DENS ALT:</u> 1000 FT</p> <p><u>FLT DURATION:</u> 6:23:40:07 167:40:07</p> <p><u>S/T:</u> 67:02:42:46</p> <p><u>OV-099:</u> 32:02:52:26</p> <p><u>DISTANCE:</u> 2,880,000 sm</p>	<p>104/104 (109)</p> <p>100/104/ 67/104/ 65</p> <p>1 = 2109 (2) 2 = 2020 (1) 3 = 2012 (5)</p> <p><u>MLGTD:</u> 1912 FT 104:13:38:07Z VEL: 218 KGS 213 KEAS HDOT: -1.5 FPS</p> <p><u>TD NORM 195:</u> 3505 FT</p> <p><u>NLGTD:</u> 7167 FT 104:13:38:23Z VEL: 144 KGS HDOT: -4.6 FPS</p> <p><u>BRK INIT:</u> 110 KGS</p> <p><u>AVE BRK DECEL:</u> 8.4 FPS/S</p> <p><u>WHEELS STOP:</u> 104:13:38:55Z 10628 FT</p> <p><u>ROLLOUT:</u> 8716 FT 48 SEC</p> <p><u>WINDS:</u> 2 H, 0 X KNOTS OFFICIAL: 0H, 0X</p> <p><u>DENS ALT:</u> 1000 FT</p> <p><u>FLT DURATION:</u> 6:23:40:07 167:40:07</p> <p><u>S/T:</u> 67:02:42:46</p> <p><u>OV-099:</u> 32:02:52:26</p> <p><u>DISTANCE:</u> 2,880,000 sm</p>	<p>BI-012</p> <p>MTR: HPM</p> <p>CASE: MWC</p> <p>ET-12</p> <p>LWT-5</p> <p>ET RPT 246K 1:22:15 MET</p> <p>ET BR/UP 228K 1:22:45 MET</p> <p>ET IMPACT LAT: 18.90°S LONG: 149.9°W</p> <p><u>M 3 EOM</u></p> <p>WEIGHT: 197170</p> <p>X CG: 1100.0</p> <p><u>LANDING</u></p> <p>WEIGHT: 196976</p> <p>X CG: 1101.6</p>	<p>28.45° (7)</p> <p><u>START:</u> -18.1°</p> <p><u>END:</u> +12.0°</p> <p><u>MAX:</u></p> <p>DIRECT INSERTION</p> <p>252 NM DIRECT INSERTION</p> <p>251.6 X 115.4 NM</p> <p>DEORBIT 268 X 265 NM</p> <p>VELOCITY 25998 FPS</p> <p>RANGE 4090 NM</p>	<p>OI-2 (3)</p> <p>CARGO: 38266 lbs</p> <p><u>CHARGEABLE:</u> 33831 lbs</p> <p><u>DEPLOYED:</u> 21396 lbs</p> <p><u>NON-DEPLOYED:</u> 12394 lbs</p> <p><u>MIDDECK:</u> 41 lbs</p> <p><u>RETURNED:</u> 16870 lbs</p> <p><u>SHUTTLE ACCUMULATED WEIGHTS:</u> <u>DEPLOYED:</u> 110994 lbs <u>NON-DEPLOYED:</u> 173350 lbs <u>CARGO TOTAL:</u> 328452 lbs</p> <p><u>PERFORMANCE MARGINS (LBS):</u> FPR: 5052 FUEL BIAS: 1038 FINAL TDDP: 995 RECON: -3322</p> <p><u>PRIMARY:</u> LONG DURATION EXPOSURE FACILITY (LDEF) (DEPLOYED)</p> <p>SMRM/FSS (RETRIEVED, REPAIRED &amp; RELEASED)</p> <p>MMU (2) MMU/EMU MFR PLATFORM BAY 10 CINEMA 360 I-MAX CAMERA RME EXPERIMENT</p> <p><u>ANCILLARY:</u> STUDENT EXPERIMENTS ACIP</p> <p>4 CRYO TANK SETS</p> <p>RMS 7 (S.N. 302) Used for LDEF de- ploy, SMRM capture, berth, and deploy and water nozzle and OMS pod survey</p>	<p>KSC W/D: OPF 31, VAB 4, PAD 18 = 53</p> <p><u>LAUNCH POSTPONEMENT:</u> - 4/4/84 launch postponed 2 days to 4/6/84 to upgrade OMS pod TPS (STS 41-B problem during entry). 2-day slip.</p> <p><u>LAUNCH SCRUBS:</u> None.</p> <p><u>LAUNCH DELAYS:</u> None.</p> <p><u>TAL WX:</u> Dakar no go - low clouds.</p> <p><u>FLIGHT DURATION &amp; LANDING SITE CHANGES:</u> - Extended flight 1 day to replan use of RMS to grapple SMM after TPAD docking failure. - Extended flight 1 rev to land at EDW because of unacceptable weather (overcast) at KSC. - Total extension: 1 day+ 1 rev.</p> <p><u>FIRSTS:</u> - First flight to use direct insertion. - First rendezvous/satellite repair flight. - First use of TPAD. Nelson used MMU to translate to SMM and attempted to dock using TPAD. TPAD failed to fire because a thermal insulation button prevented it from firing. - First grapple of satellite using RMS. - First direct insertion (no OMS-1 burn).</p> <p><u>RENDEZVOUS 1 &amp; 2:</u> - To capture, repair, and release SMM.</p> <p><u>EVENTS:</u> - Nelson held onto solar panel during MMU ops to attempt to slow SMM rotation. - Re-rendezvous with SMM on 5th day &amp; RMS grapple of SMM. Repair and redeploy of SMM on 6th day by Van Hoften &amp; Nelson. - RMS used to survey OMS pods and monitor water dumps to ensure no ice chunks on nozzles.</p> <p><u>ET TRACKING DTO 331/318 NEAR HAWAII</u> - ET Reentry (tumble)-KPTC RADAR poor coverage, MOTIF unusable, CAST GLANCE - LH2 rupture 264-254 Kft debris large DV, "violent rupture."</p> <p><u>SIGNIFICANT ANOMALIES:</u> - RH SRB main parachute failure. - WCS fan SEP 1 low air flow. - WCS fan SEP 2 failed. - Brake damage similar to STS- 7 on left &amp; right sides. - Ku-band Rndz Radar failed self test &amp; lost lock. - RH SRB one chute failed to inflate. - RH SRM gas leak and erosion to primary O-ring (blowby) nozzle-to-case joint.</p> <p>RADIATORS DEPLOYED #8 (for one sleep period)</p>		



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (6)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS 41-DR (STS-14)	OV-103 Flight 1 Discovery	<b>CDR:</b> Henry W. Hartsfield (Flt 2 - STS-4) P/43/R8/V5/M8  <b>PLT:</b> Michael L. Coats P44/R38/M37  <b>M/S:</b> Steven A. Hawley P45/R39/M38  <b>M/S:</b> Richard m. Mullane P46/R40/M39  <b>M/S:</b> Judith A. Resnik P47/R41/F2  <b>P/S:</b> Charles Walker (MDAC) P48/R42/M40	KSC 39A 243:12:41:50Z 8:35:00 AM EDT (P) 8:41:50 AM EDT (A) Thursday 3 8/30/84 (2)  <b>LAUNCH WINDOW:</b> 14 minutes thermal constraint SBS-D on 5A & TELSTAR 34A EHS cutout  PLS - EDW SLS - KSC TAL - DAKAR (Selected) TAL WX - MORON AOA - EDW AOA WX - NOR EOM - EDW  <b>MAX Q = 611</b> M = 1.26  <b>SRB SEP:</b> 2:04.12 MET  <b>MECO:</b> 8:35.19 MET  <b>ET SEP:</b> 8:53 MET  <b>OMS-1:</b> 10:36.9 MET 159.4 Seconds  <b>OMS-2:</b> 44:52.2 MET 126.3 Seconds	EDW 17, LAKEBED (EDW 10, LKBD 6)  6:37:54 AM PDT Wednesday 1 9/5/84 (2)  <b>XRANGE:</b> 474 NM  <b>ORB DIR:</b> DL 8  <b>AIM PT:</b> NOM  <b>MLGTD:</b> 2510 FT 249:13:37:54Z VEL: 221 KGS 200 KEAS HDOT: -1.8 FPS  <b>TD NORM 195:</b> 2960 FT  <b>NLGTD:</b> 6713 FT 249:13:38:08Z VEL: 170 KGS HDOT: -5.6 FPS  <b>BRK INIT:</b> 107 KGS  <b>AVE BRK DECEL:</b> 5.6 FPS/S  <b>WHEELS STOP:</b> 249:13:38:54Z 12785 FT  <b>ROLLOUT:</b> 10270 FT 60 SEC  <b>WINDS:</b> O H/T, O X KNOTS OFFICIAL: 2H, 2L  <b>DENS ALT:</b> 3400 FT  <b>FLT DURATION:</b> 6:00:56:04 144:56:04  <b>S/T:</b> 73:03:38:50  <b>OV-103:</b> 6:00:56:04  <b>DISTANCE:</b> 2,210,000 sm	104/104 109  100/104/ 84/65/ 104/65  1 = 2109 (3) 2 = 2018 (2) 3 = 2021 (1)	BI-011  <b>SRM:</b> HPM  <b>CASE:</b> LWC  LWT-6  ET-13  <b>ET RPT</b> 245K 45:45 MET  <b>ET BR /UP</b> 197K 46:57 MET  <b>ET IMPACT</b> <b>LAT:</b> 28.3°S <b>LONG:</b> 80.0°E	28.489° (8)	<b>STANDARD INSERTION</b>  <b>INSERTION ALTITUDE:</b> 160 NM  160.8 X 160.8 NM  <b>POST OMS-2</b> 161.63 X 160.95 NM  <b>SBS DEPLOY</b> 161.43 NM (REV 6)  <b>SYNCOM DEPLOY</b> 170.48 NM (REV 17)  <b>TELSTAR DEPLOY</b> 174.94 NM (REV 34)  <b>DEORBIT</b> 159 X 157 NM  <b>VELOCITY</b> 25776 FPS  <b>RANGE</b> 4112 NM	OI-4 (1)	<b>CARGO:</b> 47516 lbs  <b>CHARGEABLE:</b> 41382 lbs  <b>DEPLOYED:</b> 30086 lbs  <b>NON-DEPLOYED:</b> 10122 lbs  <b>MIDDECK:</b> 1174 lbs  <b>RETURNED:</b> 17436 lbs  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 141080 lbs <b>NON-DEPLOYED:</b> 184646 lbs <b>CARGO TOTAL:</b> 375968 lbs  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 4987 FUEL BIAS: 1341 FINAL TDDP:-1611 RECON: -1564  <b>PRIMARY:</b> SBS-D/PAM-D (DEPLOYED) TELESTAR 3-C/ PAM-D (DEPLOYED) SYNCOM-IV-2 (DEPLOYED)  <b>OAST-1/IMPRESS:</b> SOLAR ARRAY EXPERIMENT CFES (MIDDECK) IMAX 70MM CAMERA RME CLOUDS STUDENT EXP. SSIP-FSA EXP.  4 CRYO TANK SETS  RMS 8 (S.N. 301) Used for PKM burn viewing and water dump nozzle survey and ice removal	<b>KSC W/D:</b> OPF 123 (2), VAB 15 (3), PAD 72 (2) = 210  <b>LAUNCH POSTPONEMENT:</b> - 6/22/84 launch postponed 3 days to 6/25/84 because of debonded engine shield during FRF.  <b>LAUNCH SCRUBS/PAD ABORT #1:</b> - 6/25/84 launch scrubbed at T-20 minutes because GPC 5 (BFS) exhibited two parity errors at T-32 minutes. Rescheduled launch for 6/26/84. - 6/26/84 launch aborted at T-4 seconds when SSME #3 Main Fuel Valve failed the valve position check. (PAD abort #1.) - Rolled back to VAB and remanifested, combining STS 41-D and STS 41-F P/L's. SSME 2021 replaced 2017. Launch slip of 63 days. - 8/29/84 launch scrubbed because MEC would not process certain critical events commands. Implemented a software patch to assure all 3 SRB fire commands are issued in proper order. 69-day total slip.  <b>LAUNCH DELAYS:</b> - 6 M50 S delay at T-9 because of KSC GLS problems and two private planes in launch danger area.  <b>FLIGHT DURATION CHANGES:</b> None.  <b>TAL WX:</b> DAKAR & MORON go.  <b>FIRSTS:</b> - First flight to deploy 3 payloads. - First flight with commercial company P/S.  <b>SIGNIFICANT ANOMALIES:</b> - CRT-2 failed (IFM replaced DU-2 with DU-4) - Supply/waste water nozzle iced. (12 inches in diameter by 27 inches tapered to point). - Ice from supply water nozzle removed using RMS impact . Unable to dump waste water for remainder of flight. - O <sup>2</sup> leak (30 lbs/hr). - Fuel cell performance monitor failed. - Vehicle pulled to right after NLGTD. Schrader valve leaking GN2 caused compressed strut. - S-Band Quad antenna (ULF) (switch was R & R'ed postflight). - Five microswitch anomalies in RCS & OMS. - RH SRM forward field joint erosion. - LH SRM gas leak and erosion to primary O-ring of nozzle-to-case joint (blowby).



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS 41-G</b> (STS-17)	OV-099 Flight 6 Challenger	<p><u>CDR:</u> Robert L. Crippen (Flt 4 - STS-1, STS-7 &amp; STS 41-C) P49/R2/V1/M2</p> <p><u>PLT:</u> Jon A. McBride P50/R43/M41</p> <p><u>M/S:</u> Sally K. Ride (Flt 2 - STS-7) P51/R19/V6/F1</p> <p><u>M/S:</u> Kathryn D. Sullivan P52/R44/F3</p> <p><u>M/S:</u> David C. Leestma P53/R45/M42</p> <p><u>P/S:</u> Paul D. Scully-Power (Civilian - Navy) P54/R46/M43</p> <p><u>P/S:</u> Mark Garneau (Canadian) P55/R47/M44</p> <p><u>EMU/TETHERED EVA:</u> EV1=Leestma EV2=Sullivan</p> <p>EVA1=3:29/3:27 10/11/84 - SS EVA #6</p> <p>DEMO ON ORBIT REFUELING SYSTEM UNSCHEDULED KU-BAND ANTENNA STOW (IFM)</p> <p>MCC FCR-2 (8)</p> <p><u>FLIGHT DIRECTORS</u> Ascent - G. E. Coen O 1/Ent - T. C. Lacefield Ld/O 2 - J. T. Cox Plng - G. A. Pennington MOD - E. F. Kranz</p>	<p>KSC 39A 279:11:03:00Z 7:03:00 AM EDT (P) 7:03:00 AM EDT (A) Friday 3 10/5/84 (1)</p> <p><u>LAUNCH WINDOW:</u> 2 hours (EOM - LANDING KSC REV 7)</p> <p>PLS - KSC AOA - NOR AOA WX-NOR TAL-ZARAGOZA TAL WX-MORON (Selected) EMERGENCY COLOGNE-BONN AIRPORT</p> <p><u>MAX Q = 716</u> M = 1.42</p> <p><u>SRB SEP:</u> 2:04.5 MET</p> <p><u>MECO:</u> 8:50.34 MET</p> <p><u>ET SEP:</u> 9:08.41 MET</p> <p><u>OMS-1:</u> 10:50.4 MET 130.6 Seconds</p> <p><u>OMS-2:</u> 60:30.4 MET 144.6 Seconds</p>	<p>KSC 33 (KSC 2) 12:26:38 PM EDT</p> <p>Saturday 4 10/13/84 (1)</p> <p><u>XRANGE:</u> 614 NM</p> <p><u>ORB DIR:</u> DR 3</p> <p><u>AIM PT:</u> CLOSE IN</p> <p><u>MLGTD:</u> 962 FT 287:16:26:38Z <u>VEL:</u> 210 KGS 208 KEAS <u>HDOT:</u> -0.5 FPS</p> <p><u>TD NORM 195:</u> 2265 FT</p> <p><u>NLGTD:</u> 5505 FT 287:16:26:47Z <u>VEL:</u> 162 KGS <u>HDOT:</u> -3 FPS</p> <p><u>BRK INIT:</u> 113 KGS</p> <p><u>AVE BRK DECEL:</u> 6.8 FPS/S</p> <p><u>WHEELS STOP:</u> 287:16:27:32Z 11527 FT</p> <p><u>ROLLOUT:</u> 10527 FT 54 SEC</p> <p><u>WINDS:</u> 8 H, O X KNOTS</p> <p>OFFICIAL: 8H, 0X</p> <p><u>DENS ALT:</u> 1100 FT</p> <p><u>FLT DURATION:</u> 8:05:23:38 197:23:38</p> <p><u>S/T:</u> 81:09:02:28</p> <p><u>OV-099:</u> 40:08:16:04</p> <p><u>DISTANCE:</u> 3,400,000 sm</p>	<p>100/104 109</p> <p>100/92/ 65/100/65</p> <p>1 = 2023 (1) 2 = 2020 (2) 3 = 2021 (2)</p> <p><u>MLGTD:</u> 962 FT 287:16:26:38Z <u>VEL:</u> 210 KGS 208 KEAS <u>HDOT:</u> -0.5 FPS</p> <p><u>TD NORM 195:</u> 2265 FT</p> <p><u>NLGTD:</u> 5505 FT 287:16:26:47Z <u>VEL:</u> 162 KGS <u>HDOT:</u> -3 FPS</p> <p><u>BRK INIT:</u> 113 KGS</p> <p><u>AVE BRK DECEL:</u> 6.8 FPS/S</p> <p><u>WHEELS STOP:</u> 287:16:27:32Z 11527 FT</p> <p><u>ROLLOUT:</u> 10527 FT 54 SEC</p> <p><u>WINDS:</u> 8 H, O X KNOTS</p> <p>OFFICIAL: 8H, 0X</p> <p><u>DENS ALT:</u> 1100 FT</p> <p><u>FLT DURATION:</u> 8:05:23:38 197:23:38</p> <p><u>S/T:</u> 81:09:02:28</p> <p><u>OV-099:</u> 40:08:16:04</p> <p><u>DISTANCE:</u> 3,400,000 sm</p>	<p>A63/64 117-84 BI-013</p> <p>MTR: HPM</p> <p>CASE: LWC</p> <p>115 FT CHUTES ON SRB'S</p> <p>LWT-8</p> <p>ET-15</p> <p>ET BR/UP 216K 1:01:00 MET</p> <p>ET IMPACT LAT: 57.1°S LONG: 150.0°E</p>	<p>57.08° (2)</p> <p><u>STANDARD INSERTION</u></p> <p><u>INSERTION ALTITUDE:</u></p> <p><u>POST OMS-2</u> 191.74 X 189.06 NM</p> <p><u>ERBS DEPLOY</u> 190 NM</p> <p><u>DEORBIT</u> 121 X 118 NM</p> <p><u>VELOCITY</u> 25684 FPS</p> <p><u>RANGE</u> 4321 NM</p>	<p>OI-4 (2)</p> <p>CARGO: 23465 lbs</p> <p><u>CHARGEABLE:</u> 17592 lbs</p> <p><u>DEPLOYED:</u> 4949 lbs</p> <p><u>NON-DEPLOYED:</u> 11986 lbs</p> <p><u>MIDDECK:</u> 657 lbs</p> <p><u>RETURNED:</u> 18484.8 lbs</p> <p><u>SHUTTLE ACCUMULATED WEIGHTS:</u> <u>DEPLOYED:</u> 146029 lbs <u>NON-DEPLOYED:</u> 197289 lbs <u>CARGO TOTAL:</u> 399433 lbs</p> <p><u>PERFORMANCE MARGINS (LBS):</u> FPR: 4594 FUEL BIAS: 1152 FINAL TDDP: 2194 RECON: 3375</p> <p>EARTH RADIATION BUDGET SATELLITE (ERBS) DEPLOYED OSTA-3 (SIR-B) MAPS, FILE LFC-MPESS ORS IMAX, RME CANEX (Canadian) APE, TLD GAS (8) G038, G032, G518, G013, G007, G469, G074</p> <p>4 CRYO TANK SETS</p> <p>RMS 9 (S.N. 302) Used for ERBS deploy, TPS survey, water nozzle survey, SIR-B antenna latching assist</p>	<p>KSC W/D: OPF 53, VAB 5, PAD 22 = 80</p> <p><u>LAUNCH POSTPONEMENT:</u> - 10/1/84 launch postponed 4 days to 10/5/84 to replace SSME #2012 with #2021 from OV-103 in slot #3. Engine 2012 had non-flight HPOTP and HPFTP. 4-day slip.</p> <p><u>LAUNCH SCRUBS:</u> None.</p> <p><u>LAUNCH DELAYS:</u> None.</p> <p><u>FLIGHT DURATION CHANGES:</u> None.</p> <p><u>TAL WX:</u> ZZA no go - winds, Moron go.</p> <p><u>FIRSTS:</u> - First flight with seven crewmembers. - First EVA by a female astronaut. - First use of PSA. - First Flight with 360 degree saddle brakes. - First flight with wing moment ties. - First transfer of hydrazine in space.</p> <p><u>EVENTS:</u> - Used RMS to latch SIR-B antenna. - Solar heating used to free ERBS solar array when -Y solar array stuck during deploy attempt. MS2 tried deploy using SSP appendage arm and deploy switches, th's functioned nominally but array did not deploy. Could not shake array loose using RMS back-drive procedure. ERBS was positioned to direct sun on array deploy mechanism. Array deployed approximately 15 minutes later.</p> <p><u>SIGNIFICANT ANOMALIES:</u> - Found TPS screed problem postflight. Tile waterproofing caused screed deterioration requiring approx 4000 tiles to be replaced. Schedule impacted and OV-103 replaced OV-099 on STS 51-A. - FES shutdown by both controllers, probably icing in FES CORE. - DEU 2 Failed. - TPS damage on ROMS pod, approx 40-inch strip of FRSI peeled off. - Ku-Band antenna gimbal failure (beta angle motor short). EVA IFM to stow antenna. - R &amp; R brakes post-flight. - R &amp; R MLG tires (damaged by rough runway).</p>		



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS 51-A</b> (STS-19)  SEQ FLT # 14  KSC 14  PAD 39A-14	OV-103 Flight 2 Discovery  OMS PODS LPO3 - 3 RPO3 - 2 FRC3 - 2	CDR: Frederick H. Hauck (Flt 2 - STS-7) P56/R17/V7/M17  PLT: David M. Walker P57/R48/M45  M/S: Joseph P. Allen (Flt 2 - STS-5) P58/R12/V8/M12  M/S: Anna L. Fisher P59/R49/F4  M/S: Dale A. Gardner (Flt 2 - STS-8) P60/R23/V9/M22  UNTETHERED EVA'S (MMU): EV1=Allen EV2=Gardner  EVA1-6:13 11/12/84 - SS EVA #7 EVA2-6:01 11/14/84 - SS EVA #8  CAPTURE AND STOW OF PALAPA-B & WESTAR-IV  FREE FLYER EVA'S #5 & #6  MCC FCR-1 (6)  FLIGHT DIRECTORS Ascent - J. H. Greene Ld/O 1 - L. S. Bourgeois Orbit 2 - B. R. Stone Plng - W. D. Reeves Entry - T. C. Lacefield MOD - E. F. Kranz	KSC 39A 313:12:15:00Z 7:15:00 AM EST (P) 7:15:00 AM EST (A) Thursday 4 11/8/84 (4)  LAUNCH WINDOW: 18 Minutes PLANAR WINDOW (MAX YAW STEERING MPS LIMIT 1000 LBS FOR RENDEZVOUS)  PLS - KSC TAL - DAKAR (Selected) TAL WX - MORON AOA - EDW AOA WX-NOR,KSC  MAX Q = 651 M = 1.10  SRB SEP: 2:05.72 MET  MECO: 8:33.16 MET  ET SEP: 8:51.29 MET  OMS-1: 10:33.3 MET 150.7 Seconds  OMS-2: 44:43 MET 114.8 Seconds	KSC 15 (KSC 3)  6:59:56 AM EST Friday 3 11/16/84 (3)  XRANGE: 486 NM  ORB DIR: DL9  AIM PT: CLOSE IN  MLGTD: 2724 FT 321:11:59:56Z VEL: 190 KGS 192 KEAS HDOT: -1.0 FPS  TD NORM 195: 2454 FT  NLGTD: 6380 FT 321:12:00:09Z VEL: 160 KGS HDOT: -4.6 FPS  BRK INIT: 142 KGS  AVE BRK DECEL: 6.5 FPS/S  WHEELS STOP: 321:12:00:54Z 12178 FT  ROLLOUT: 9461FT 58 SEC  WINDS: 4 H, 0 X KNOTS OFFICIAL: 2T, 1R  DENS ALT: -100 FT  FLT DURATION: 7:23:44:56 191:44:56  S/T: 89:08:47:24  OV-103: 14:00:41:00  DISTANCE: 2,870,000 sm	104/104 109  100/89/ 67/104/ 65  1 = 2109 (4) 2 = 2018 (3) 3 = 2012 (6)  M 3 EOM  WEIGHT: 207983  X CG: 1081.4  LANDING  WEIGHT: 207506  X CG: 1082.6	BI-014 61-84  SRM: HPM LWC  136 FT Chutes  LWT-9  ET-16  ET RPT 226K 47:06 MET  ET IMPACT LAT: 27.7°S LONG: 82.0°E	28.487° (9)  STANDARD INSERTION  INSERTION ALTITUDE:  POST OMS-2 161.22 X 151.17 NM  TELESAT DEPLOY 163.48 NM  SYNCOM DEPLOY 168.14 NM  PALAPA RETRIEVE 194.44 NM  WESTAR RETRIEVE 189.55 NM  DEORBIT 191 X 188 NM  VELOCITY 25870 FPS  RANGE 4141 NM	OI-4 (3)	CARGO: 45306 lbs  PAYLOAD CHARGEABLE: 38003 lbs  DEPLOYED: 22764 lbs  NON-DEPLOYED: 15052 lbs  MIDDECK: 187 lbs  RETRIEVED: 2381 lbs  RETURNED: 24883 lbs  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 168793 lbs NON-DEPLOYED: 212528 lbs CARGO TOTAL: 444739 lbs  PERFORMANCE MARGINS (LBS): FPR: 4633 FUEL BIAS: 1566 FINAL TDDP: 281 RECON: 1003  SYNCOM IV-1 (DEPLOYED)  TELESAT-H/ ANIK-D2/PAM-D (DEPLOYED)  PALAPA-B2- (RETRIEVED & RETURNED)  WESTAR-IV - (RETRIEVED & RETURNED)  RME DMOS-3M EXP. MMU (2), EMU (3)  4 CRYO TK SETS  RMS 10 (S.N. 301) Used for PALAPA/ WESTAR capture and berth, waste water dump monitor, and SYNCOM and TELESAT PKM viewing	KSC W/D: OPF 34, VAB 5, PAD 17 = 56  VEHICLE CHANGE: - OV-103 replaced OV-099 (TPS screed deterioration caused by waterproofing).  LAUNCH POSTPONEMENT: None.  LAUNCH SCRUBS: - 11/7/84 launch scrubbed because winds aloft exceeded Orbiter structural limits (excessive wind shear) - 1-day slip.  LAUNCH DELAYS: None.  TAL WX: - Dakar GO, Moron NO GO - low clouds.  FLIGHT DURATION CHANGES: None.  FIRSTS: - First retrieval and return of satellites. PALAPA-B AND WESTAR-IV were deployed on STS 41-B but PAM Upper Stages failed. - EVA crewmen captured spacecrafts using MMU/Stinger and stowed in payload bay.  RENDEZVOUS 3 & 4: - To capture and return PALAPA & WESTAR.  SIGNIFICANT ANOMALIES: - APU 2 water spray valve system A failed. - CRT 4 failed. - RCS F4R fuel leak. - Both left side EMU helmet lights failed (Bad Batteries). - Arriflex 16 mm camera failed (IFM bypassed failed microswitch). - FWD RCS Manifold 3 fuel and oxidizer iso valves lost open indications. - LRCS Sys B Fuel tank Iso Valve for manifold 3/4/5 lost open indication. - PLB blankets and metal discolored. - Brake hydraulic pressure increased when Iso valves opened at 200k (Iso valve leak).  IFM's - Arriflex camera repaired, EVA helmet light repaired and DAP key changeout	



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS 51-C</b> (STS-20)  SEQ FLT # 15  KSC 15  PAD 39A-15	OV-103 Flight 3 Discovery  OMS PODS LPO3 - 4 RPO3 - 3 FRC3 - 3	<b>CDR:</b> Thomas. K. Mattingly (Flt 2 - STS-4) P61/R7/V10/M7  <b>PLT:</b> Loren J. Shriver P62/R50/M46  <b>M/S:</b> Elison S. Onizuka P63/R51/M47  <b>M/S:</b> James F. Buchli P64/R52/M48  <b>P/S:</b> Gary E. Payton P65/R53/M49   MCC FCR-2 (9)  <b>FLIGHT DIRECTORS</b> Ascent - J. H. Greene Ld/Orb - T.W. Holloway Plng - C. W. Shaw Orb/Ent - T. C. Lacefield MOD - E. F. Kranz	KSC 39A 24:19:50:00Z 2:50:00 PM EST Thursday 5 1/24/85 (1)  PLS - KSC SLS - EDW TAL - DAKAR TAL ALT: Zaragoza (Selected) TAL WX - MORON	KSC 15 (KSC 4)  4:23:23 PM EST Sunday 2 1/27/85 (1)  X <b>RANGE:</b> 380 NM  OR <b>B DIR:</b> DL 10  AIM <b>PT:</b> CLOSE IN  ML <b>GTD:</b> 2753 FT 27:21:23:23Z VEL: 177 KGS 185 KEAS HDOT: -1FPS  NL <b>GTD:</b> 5752 FT 27:21:23:35Z VEL: 146 KGS HDOT: -3.9 FPS  TD <b>NORM 195:</b> 1853 FT  BR <b>K INIT:</b> 117 KGS  A <b>VE BRK DECEL:</b> 8.9 FPS/S  W <b>HEELS STOP:</b> 27:21:24:13Z 10105 FT  R <b>OLLOUT:</b> 7370 FT 50 SEC  W <b>INDS:</b> 8H, 0 X KNOTS OFFICIAL: 8H, 1R  D <b>ENS ALT:</b> -100 FT  F <b>LT DURATION:</b> 3:01:33:23 73:33:23  S <b>T:</b> 92:10:20:47  O <b>V-103:</b> 17:02:14:23  D <b>ISTANCE:</b> 1,242,566 sm	100/92/ 65/104/ 65  1 = 2109 (5) 2 = 2018 (4) 3 = 2012 (7)	BI-015  M <b>T</b> R: HPM  C <b>A</b> S <b>E:</b> LWC  115 FT Chutes  L <b>W</b> T-7  E <b>T</b> -14  E <b>T</b> R <b>P</b> T 239K 46:11 M <b>E</b> T  E <b>T</b> B <b>R</b> /U <b>P</b> 227K 46:31 M <b>E</b> T  E <b>T</b> I <b>M</b> P <b>A</b> C <b>T</b> L <b>A</b> T: 28.1°S L <b>O</b> N <b>G</b> : 78.3°E	28.45° (10)	OI-4 (4)	DOD  P <b>E</b> R <b>F</b> O <b>R</b> M <b>A</b> N <b>C</b> E M <b>A</b> R <b>G</b> I <b>N</b> S (L <b>B</b> S): F <b>P</b> R: F <b>U</b> E <b>L</b> B <b>I</b> A <b>S</b> : F <b>I</b> N <b>A</b> L T <b>D</b> D <b>P</b> : -- R <b>E</b> C <b>O</b> N: -1457  A <b>R</b> C S <b>F</b> M <b>D</b> T <b>R</b> E  V <b>I</b> S <b>I</b> O <b>N</b> F <b>L</b> U <b>I</b> D S <b>H</b> I <b>F</b> T O <b>C</b> E <b>A</b> N <b>S</b> O <b>A</b> S <b>I</b> S-1 C <b>L</b> O <b>U</b> D <b>S</b> A <b>F</b> T-T I <b>O</b> C <b>M</b>  R <b>M</b> S 11 (S.N. 301) Used to monitor I <b>U</b> S/S <b>R</b> M burn	KSC W/D: OPF 31, VAB 5, PAD 20 = 50  L <b>A</b> U <b>N</b> C <b>H</b> P <b>O</b> S <b>T</b> O <b>N</b> E <b>M</b> E <b>N</b> T: None.  L <b>A</b> U <b>N</b> C <b>H</b> S <b>C</b> R <b>U</b> B <b>S</b> : - 1/23/85 launch was scrubbed prior to ET tanking due to cold weather with potential for acreage ice on ET. 1-day slip.  L <b>A</b> U <b>N</b> C <b>H</b> D <b>E</b> L <b>A</b> Y: Launch delay caused by right I/B elevon not in expected position.  T <b>A</b> L W <b>X</b> : - Dakar & Moron NO GO - haze. Zaragoza GO.  F <b>L</b> I <b>G</b> H <b>T</b> D <b>U</b> R <b>A</b> T <b>I</b> O <b>N</b> C <b>H</b> A <b>N</b> G <b>E</b> S: Yes.  S <b>I</b> G <b>N</b> I <b>F</b> I <b>C</b> A <b>N</b> T A <b>N</b> O <b>M</b> A <b>L</b> I <b>E</b> S: - Right inboard elevon CH4 secondary delta pressure force flight prelaunch (cleared when APU's to full pressure). - IMU 1 and 3 excessive bias. - GHE leak in T-O umbilical. - FWD RCS dilemma during deorbit. - BFS did not proceed to MM104 after ET sep. - BFS deorbit ignition time was 8 seconds late. - TACAN 3 did not lock up. - RA2 erratic at high altitude. - TPS had long gouge under left wing. - RH SRM primary O-ring gas leak and erosion at center field joint (blowby). - LH SRM forward field joint gas leak and erosion to primary O-ring (blowby).	





# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS 51-E</b> (STS-22)  SEQ FLT #  PAD	OV-099 Flight Challenger	<u>CDR:</u> Karol J. Bobko  <u>PLT:</u> Donald E. Williams  <u>M/S:</u> M. Rhea Seddon  <u>M/S:</u> S. David Griggs  <u>M/S:</u> Jeffrey A. Hoffman  <u>P/S:</u> Patrick Baudry (French)  <u>P/S:</u> Jake Garn (U.S. Senator from Utah)   <u>FLIGHT DIRECTORS:</u> Asc/Ent - T. C. Lacefield Orbit 1 - C. W. Shaw Ld/Orb 2 - B. R. Stone Planning - J. M. Heflin				<u>MTR:</u>  <u>CASE:</u> STD  ET-17			OI-5	<u>CARGO:</u>  <u>CHARGEABLE :</u>  TDRS-B/IUS-2 TELESAT-I/PAM-D FEE FPE PPE	KSC W/D: OPF 57, VAB 8 (2), PAD 17 (2) = 82 days total  <u>LAUNCH POSTPONEMENT:</u> - Launch rescheduled from 2/20/85 to 2/27/85 due to tile replacement caused by deteriorated screed on OV-099. - Launch rescheduled to 3/3/85 due to LH2 primary seal leak (17" ET/Orbiter) but decision was made that secondary seal would hold.  <u>LAUNCH SCRUBS:</u> - Flight canceled on 3/7/85 due to a TDRS-B problem and TELESAT-I was remanifested on OV-103 STS-51D. (Challenger was destacked.)  - ROLLED BACK TO VAB, CHANGED PAYLOAD TO SPACELAB 3 FOR STS 51-B.  - THESE DATA ARE INCLUDED BECAUSE THE FLIGHT WAS SCRUBBED AFTER GOING THROUGH ALL OF THE FLIGHT REVIEWS, ETC.  - 17-INCH LH2 PRIMARY SEAL REDESIGNED REDUCING WIDTH & DEPTH WITH STS 61-A AS FIRST FLIGHT.

# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS 51-D</b> (STS-23)	OV-103 Flight 4 Discovery	CDR: Karol J. Bobko (Flt 2 - STS-6) P66/R14/V11/M14  PLT: Donald E. Williams P67/R54/M50  M/S: M. Rhea Seddon P68/R55/F5  M/S: S. David Griggs P69/R56/M51  M/S: Jeffrey A. Hoffman P70/R57/M52  P/S: Jake Garn (U.S. Senator from Utah) P71/R58/M53  P/S: Charles Walker (MDAC) (Flt 2 - STS 41-DR) P72/R42/V12/M40  EVA CREWMEN: EV1= Hoffman EV2= Griggs  UNSCHEDULED EVA: 4/16/85 - 3:10/3:07 (ATTACHED "FLY SWATTER" TO RMS.) SS EVA #9 SS Unscheduled EVA#1	KSC 39A 102:13:59:05Z (Flt 2 - AM EST (P) 8:04:00 AM EST (A) 8:59:05 AM EST (A) Friday 4 4/12/85 (4)  LAUNCH WINDOW: 1 Hour, 11 Minutes (ANIK SS FAIL OPEN)  PLS - KSC SLS - EDW TAL - DAKAR TALWX - MORON (Selected) AOA - EDW AOA WX - NOR/KSC  MAX Q = 666 M = 1.25  SRB SEP: 2:06.84 MET  MECO: 8:51.96 MET  ET SEP: 9:10 MET  OMS-1: NONE  OMS-2: 43.15 MET 143 Seconds	KSC 33 (KSC 5)  8:54:28 AM EST Friday 4 4/19/85 (4)  X <b>R</b> ANGE: 518 NM  OR <b>B</b> DIR: DL 11  AIM PT: NOM  MLGTD: 1639 FT 109:13:54:28Z VEL: 210 KGS HDOT: -3.2 FPS  TD NORM 195: 2089 FT  NLGTD: 4303 FT 109:13:54:36Z VEL: 182 KGS HDOT: -5.9 FPS  BRK INIT: 156 KGS  AVE BRK DECEL: 8 FPS/S  WHEELS STOP: 109:12:55:31Z 11937 FT  ROLLOUT: 10,430 FT 63 SEC  WINDS: 3T,5R KNOTS OFFICIAL: 4T, 7R  DENS ALT: 1100 FT  FLT DURATION: 6:23:55:23 167:55:23  S/T: 99:10:16:10  OV-103: 24:02:09:46  DISTANCE: 2,500,000 sm	100/104 109  100/90/ 65/100/ 65  1 = 2109 (6) 2 = 2018 (5) 3 = 2012 (8)	BI-018  MTR: HPM  CASE: LWC  136 Ft Chutes  ET-18  LWT-11  ET RPT  ET BR/UP  ET IMPACT LAT: 20.24°N LONG: 149.37°W	28.511° (11)  START:  END:  MAX:  DEORBIT 249 X 180 NM  VELOCITY 25954 FPS  RANGE 4064 NM	DIRECT INSERTION  POST OMS-2 249.0 X 160.68 NM  TELESAT DEPLOY 221.09 NM (REV 5)  SYNCOM DEPLOY 213.16 NM (REV 15)	OI-5 (1)  CARGO: 35794 lbs  PAYLOAD CHARGEABLE: 28747 lbs  DEPLOYED: 22,576 lbs  NON-DEPLOYED: 5092 lbs  MIDDECK: 1079 lbs  RETURNED: 13248 lbs  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 191369 lbs NON-DEPLOYED: 218699 lbs CARGO TOTAL: 480533 lbs  PERFORMANCE MARGINS (LBS): FPR: 4732 FUEL BIAS: 883 FINAL TDDP: 1243 RECON: 1957  SYNCOM IV-3 (DEPLOYED)  TELESAT-I/ ANIK C-1/PAM-D (DEPLOYED)  GAS(2) CFES-III, APE, PPE SSIP(2)  2 - MINIATURE COPPER STATUES OF LIBERTY MADE FROM "SOL" FRAMEWORK  SKIN CLAMP (12 LBS)  4 CRYO TANK SETS  RMS 12 (S.N. 301) Used for flyswatter snag of SYNCOM arm switch, PKM monitor, ET door survey, and water dump survey	KSC W/D: OPF 53, VAB 5, PAD 15 = 73  LAUNCH POSTPONEMENTS: - 3/19/85 launch postponed 9 days to 3/28/85 to remanifest TELESAT-1 from STS 51-E. - 3/28/85 launch postponed to 4/12/85 when PLBD was damaged by OPF bucket (access platform dropped on PLBD). 24-day slip.  LAUNCH SCRUBS: None.  LAUNCH DELAYS: - 55M5S delay - Ship in SRB recovery area.  TAL WX: Dakar no go - haze, Moron go.  FLIGHT DURATION CHANGES: - Extended flight from 5 to 7 days for attempt to operate SYNCOM IV-3 arming switch using IFM "Fly Swatter" (SYNCOM failed to maneuver to altitude because of defective mechanical arming switch. Crew re-rendezvoused with SYNCOM and snagged switch but switch was a single point failure and did not operate. - Landing at KSC was extended 1 rev because of KSC weather. - Extension: 2 days + 1 rev.  RNDZ 5: To attempt to arm SYNCOM IV-3.  ET TRACKING DTO 331/318: - ET Reentry (tumble) KPTC RADAR events detected at 245K and 232K, benign rupture. AWAC RADAR and Doppler conflicting data. MOTIF unusable/cloud coverage. CAST GLANCE no coverage/engine failure.  SIGNIFICANT ANOMALIES: - Brake/tire problems resulted in programmatic decision to land at EDW lakebed until Nose Wheel Steering is used during landing at EDW. - Cryo 02 tank 1 htr ctr auto mode failed. - Right ET door latches A and B indicated off (Thermal barrier pinned between door and sill). - Ku-Band antenna motion erratic. - Hydraulic Sys 3 accum rapid pressure decay. - APU 3 shutdown load abnormal. - Right MLG inboard tire burst. - Right MLG brakes damaged (locked up). - Left OB elevon TPS damaged/skin burn. - Right RCS thruster R2U oxidizer leak.  IFM: Developed and used "flyswatter" to snag SYNCOM arm switch.	



## SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS 51-B</b> (STS-24)	OV-099 Flight 7 Challenger	<u>CDR:</u> Robert F. Overmyer (Flt 2 - STS-5) P73/R10/V13/M10	KSC 39A 119:16:02:18Z 12:00:00 PM EDT (P) 12:02:18 PM EDT (A) Monday 4 4/29/85 (5)	EDW 17.LAKEBED (EDW 11, LKBD 7)	104/104 109	BI-016	57.004° (3)	<u>STANDARD INSERTION</u>	OI-4 (5)	<u>CARGO:</u> 31377 lbs	KSC W/D: OPF 31, VAB 4, PAD 15 = 50
SEQ FLT # 17	Spacelab 3	<u>PLT:</u> Frederick D. Gregory P74/R59/M54	<u>LAUNCH WINDOW:</u> 3 Hours (CREW WORKDAY)	9:11:04 AM PDT Monday 2 5/6/85 (1)	100/94/ 65/104/ 103/72/ 65	MTR: HPM	<u>START:</u>	<u>INSERTION ALTITUDE:</u>		<u>CHARGEABLE:</u> 30748 lbs	AFTER STS 51-E (TDRS-B/TELESAT-1) WAS SCRUBBED, CHALLENGER WAS ROLLED BACK TO THE VAB AND PAYLOAD WAS CHANGED TO SPACELAB 3.
KSC 17	SECOND SPACELAB FLIGHT LM (2)	<u>M/S:</u> Don L. Lind P75/R60/M55	PLS-EDW SLS-KSC	<u>XRANGE:</u> 274 NM	1 = 2023 (2) 2 = 2020 (3) 3 = 2021 (3)	CASE: LWC	<u>END:</u>	<u>POST OMS-2</u> 191.74 X 189.37 NM		<u>DEPLOYED:</u> 105 lbs (NUSAT)	<u>LAUNCH POSTPONEMENT:</u> None.
PAD 39A-17	<u>OMS PODS</u> LPO1 - 6 RPO4 - 1 FRC9 - 7	<u>M/S:</u> Norman E. Thagard (Flt 2 - STS-7) P76/R20/V14/M19	TAL-ZARAGOZA (Selected) TAL WX-MORON MANUAL TAL-BONN	<u>ORB DIR:</u> AL 2		ET-17	<u>MAX:</u>			<u>NON-DEPLOYED:</u> 30341 lbs	<u>LAUNCH SCRUBS:</u> None.
		<u>M/S:</u> William E. Thornton (Flt 2 - STS-8) P77/R24/V15/M23	<u>MAX Q =</u> 700 M = 1.31	<u>AIM PT:</u> NOM		LWT-10				<u>MIDDECK:</u> 302 lbs	<u>LAUNCH DELAYS:</u> - 2M18S delay due to an LPS failure at T-4 minutes (lost GPC FEP).
		<u>P/S:</u> Taylor Wang P78/R61/M56	SRB SEP: 2:25.88 MET	<u>MLGTD:</u> 1576 FT 126:16:11:04Z VEL: 209 KGS 204 KEAS HDOT: -2 FPS		ET RPT 220K 1:01:12 MET				<u>RETURNED:</u> 30,427 lbs	<u>TAL WX:</u> Zaragoza and Moron go.
		<u>P/S:</u> Lodewijk Van den Berg P79/R62/M57	<u>MECO:</u> 8:34.96 MET	<u>TD NORM 195:</u> 2386 FT		ET BR/UP 195K 1:01:42 MET				<u>SHUTTLE ACCUMULATED WEIGHTS:</u> <u>DEPLOYED:</u> 191474 lbs <u>NON-DEPLOYED:</u> 249342 lbs <u>CARGO TOTAL:</u> 511910 lbs	<u>FLIGHT DURATION CHANGES:</u> None.
			<u>ET SEP:</u> 8:53.05 MET	<u>NLGTD:</u> 5528 FT 126:16:11:16Z VEL: 159 KGS HDOT: -7.1 FPS		ET IMPACT LAT: 57. 1°S LONG: 150.8°E				<u>PERFORMANCE MARGINS (LBS):</u> FPR: 4887 FUEL BIAS: 849 FINAL TDDP: 2536 RECON: 3609	<u>SIGNIFICANT ANOMALIES:</u> - WSB 3 controller A inoperative. - Right ET door motor B inoperative. - SM onboard display data exhibited erratic values. - Right OMS pod TPS protrusion (AFRSI). - Galley did not dispense water. - APU 3 seal cavity drain line heater 3A failed. - Smoke detector in avionics bay 2A failed self test. - Right RCS thruster R4D heater failed. - S-Band upper right antenna reflected power high and upper left antenna reflected power erratic. - APU 1 fuel by-pass line heater B failed on. - Mid MCA 2 OPS status 5 indicated zero.
		:C FCR-1 (7)	<u>OMS-1:</u> 10:35 MET 132 Seconds	<u>BRK INIT:</u> 106 KGS				<u>DEORBIT</u> 192 X 189 NM		<u>SPACELAB 3/LM:</u> MPESS VWFC AFT ATMOS BTS DEMS FES GFFC IONS MICG RAHF-VT (Monkeys & Rats) UMI VCGS GAS (Deployable): - NUSAT (deployed) - GLOMR (failed to deploy) UMS	<u>Right RCS thruster R4D heater failed.</u> <u>S-Band upper right antenna reflected power high and upper left antenna reflected power erratic.</u> <u>APU 1 fuel by-pass line heater B failed on.</u> <u>Mid MCA 2 OPS status 5 indicated zero.</u> <u>PLBD close sequence failed on port aft latches.</u> <u>MLG brakes damaged (LH inboard rotors destroyed).</u> <u>MLG dump valve leaked 3 days after landing (power left on 3 hydraulic valves which had to be replaced).</u> <u>Left OB elevon tile slumping and gap filler breach.</u> <u>GLOMR failed to deploy (150 lbs).</u> <u>Gas leaks and erosion in both SRM nozzle-to-case joints.</u> <u>Erosion to secondary O-ring on LH SRM (blowby).</u>
		<u>FLIGHT DIRECTORS:</u> Asc/Ent - T. C. Lacefield Ld/O 1 - G. E. Coen O 2 - W. D. Reeves O 3 - G. A. Pennington MOD - E. F. Kranz	<u>OMS-2:</u> 46.15 MET 147.5 Seconds	<u>AVE BRK DECEL:</u> 7.1 FPS/S	M 3 EOM	X CG: 1084.1		<u>VELOCITY</u> 25857 FPS		4 CRYO TANK SETS	<u>IFM's:</u> S/L drop dynamics godule experiment recovered. Spacelab ION experiment recovered.
			<u>ROLLOUT:</u> 8317 FT 59 SEC	<u>WHEELS STOP:</u> 126:16:12:03Z 9893 FT	WEIGHT: 213795	X CG: 1085.4		<u>RANGE</u> 4264 NM		NO RMS	
			<u>WIND:</u> 5H, 0 X KNOTS OFFICIAL: 5H, 2R	<u>WHEELS STOP:</u> 126:16:12:03Z 9893 FT							
			<u>DENS ALT:</u> 3400 FT	<u>ROLLOUT:</u> 8317 FT 59 SEC							
			<u>FLT DURATION:</u> 7:00:08:46 168:08:46	<u>S/T:</u> 106:10:24:56							
			<u>OV-099:</u> 47:08:24:50	<u>DISTANCE:</u> 2,900,000 sm							



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS 51-G</b> (STS-25)  SEQ FLT # 18  KSC 18  PAD 39A-18	OV-103 Flight 5 Discovery   OMS PODS LPO4 - 1 RPO3 - 5 FRC3 - 5	<b>CDR:</b> Daniel C. Brandenstein (Flt 2 - STS-8) P80/R21/V16/M20  <b>PLT:</b> John O. Creighton P81/R63/M58  <b>M/S:</b> John M. Fabian (Flt 2 - STS-7) R82/R18/V17/M18  <b>M/S:</b> Steven R. Nagel P83/R64/M59  <b>M/S:</b> Shannon W. Lucid P84/R65/F6  <b>P/S:</b> Patrick Baudry (France) P85/R66/M60  <b>P/S:</b> Sultan S. Al-Saud (Saudia Arabia) P86/R67/M61	KSC-39A 168:11:33:00Z 7:33:00 AM EDT (P) 7:33:00 AM EDT (A) Monday 5 6/17/85 (3)  <u>LAUNCH WINDOW:</u> 4 minutes (CLOSE ON MORELOS EARTH HORIZON SENSOR CUTOUT - 10 MINUTES WITH WAIVER OF CUTOUT)  NEOM - EDW EOM WX - KSC RTLS - KSC TAL - DAKAR (Selected) TAL WX - MORON AOA - EDW AOA WX - NOR/KSC  <u>MAX_Q = 648</u> M = 1.24  <u>SRB SEP:</u> 2:04.68 MET  <u>MECO:</u> 8:35.77 MET  <u>ET SEP:</u> 8:53.93 MET  <u>OMS-1:</u> NONE  <u>OMS-2:</u> 40:29 MET 179.4 Seconds  <b>FLIGHT DIRECTORS</b> Asc/Ent - T. C. Lacefield Ld/O 1 - L. S. Bourgeois O 2 - J. M. Heflin Plng - C. R. Knarr MOD - T. W. Holloway	EDW 23, LAKEBED (EDW 12, LKBD 8)  6:11:52 AM PDT Monday 3 6/24/85 (2)  <u>XRANGE:</u> 694 NM  <u>ORB DIR:</u> DL 12  <u>AIM PT:</u> CLOSE IN  <u>MLGTD:</u> 1117 FT 175:13:11:52.4Z VEL: 210 KGS 198 KEAS HDOT: -2 FPS  <u>TD NORM 195:</u> 1387 FT  <u>NLGTD:</u> 4990 FT 175:13:12:05Z VEL: 163 KGS HDOT: -8 FPS  <u>BRK INIT:</u> 154 KGS  <u>AVE BRK DECEL:</u> 8.8 FPS/S  <u>WHEELS STOP:</u> 775:13:12:33Z 8550 FT  <u>ROLLOUT:</u> 7433 FT 36 SEC  <u>WIND:</u> 2H, 11L KNOTS OFFICIAL: 2H, 11L  <u>DENS ALT:</u> 3727 FT  <u>FLT DURATION:</u> 7:01:38:52 169:38:52  <u>S/T:</u> 113:12:03:48  <u>OV-103:</u> 31:03:48:38  <u>DISTANCE:</u> 2,500,000 sm	104/104 109 %  100/104/ 83/65/ 104/65  1 = 2109 (7) 2 = 2018 (6) 3 = 2012 (9)  <u>TD NORM 195:</u> 1387 FT  <u>NLGTD:</u> 4990 FT 175:13:12:05Z VEL: 163 KGS HDOT: -8 FPS  <u>BRK INIT:</u> 154 KGS  <u>AVE BRK DECEL:</u> 8.8 FPS/S  <u>WHEELS STOP:</u> 775:13:12:33Z 8550 FT  <u>ROLLOUT:</u> 7433 FT 36 SEC  <u>WIND:</u> 2H, 11L KNOTS OFFICIAL: 2H, 11L  <u>DENS ALT:</u> 3727 FT  <u>FLT DURATION:</u> 7:01:38:52 169:38:52  <u>S/T:</u> 113:12:03:48  <u>OV-103:</u> 31:03:48:38  <u>DISTANCE:</u> 2,500,000 sm	BI-019  <b>MTR:</b> HPM  <b>CASE:</b> MWC  ET-20  LWT-13  ET RPT 233K 1:19:15 MET  ET BR/UP 219K 1:19:38 MET  ET IMPACT LAT: 14.89°N LONG: 159.5°W  M 3 EOM  WEIGHT: 204321  X CG: 1082.1  LANDING  WEIGHT: 204169  X CG: 1083.7	28.487° (12)  <b>START:</b>  <b>END:</b>  <b>MAX:</b>  DEORBIT 191 X 150 NM  <u>VELOCITY</u> 25850 FPS  <u>RANGE</u> 4050 NM	DIRECT INSERTION  POST OMS-2 192.37 X 190.37 NM  <u>MORELOS DEPLOY</u> 191.1 NM  <u>ARABSAT DEPLOY</u> 193.81 NM  <u>TELESTAR DEPLOY</u> 196.35 NM  <u>SPARTAN DEPLOY</u> 210.3 NM	OI-6 (1)  CARGO: 44477 lbs.  <u>CHARGEABLE:</u> 38258 lbs  <u>DEPLOYED:</u> 22832 lbs  <u>NON-DEPLOYED:</u> 14866 lbs  <u>MIDDECK:</u> 560 lbs  <u>RETURNED:</u> 21310 lbs  <u>SHUTTLE ACCUMULATED WEIGHTS:</u> <u>DEPLOYED:</u> 214306 lbs <u>NON-DEPLOYED:</u> 264768 lbs <u>CARGO TOTAL:</u> 556387 lbs  <u>PERFORMANCE MARGINS (LBS):</u> FPR: 5088 FUEL BIAS: 849 FINAL TDDP: 160 RECON: -1664  <u>PRIMARY:</u> TELESTAR-3D/ PAM-D DEPLOYED MORELOS-A/ PAM-D DEPLOYED ARABSAT-A/ PAM-D DEPLOYED SPARTAN-101DH (DEPLOYED & RETRIEVED) FEE, ADSF, FPE, HPTE, ASE  <u>GAS:</u> G027-OFVLR G028-OFVLR G471-GSFC OLLENDORF G025-ERNO G034-EL PASOYSLETA G314-USAF/NRL  4 CRYO TNK SETS  RMS 13 (S.N. 301) Used for SPARTAN deploy, retrieve, and berth, water dump survey, PKM monitoring, and ARABSAT solar array survey	KSC W/D: OPF 37, VAB 7, PAD 14 = 58  <u>LAUNCH POSTPONEMENTS:</u> - 6/12/85 launch postponed to 6/14/85 due to late OPF start. - 6/14/85 launch postponed to 6/17/85 because STS 51-D landed at EDW not KSC. - 2 day extension - 5-day total slip.  <u>LAUNCH SCRUBS:</u> None.  <u>LAUNCH DELAYS:</u> None.  <u>TAL WX:</u> Dakar & Moron go.  <u>FLIGHT DURATION CHANGES:</u> None.  <u>EVENTS:</u> - MORELOS deployed orbit 6D. - ARABSAT deployed orbit 18D. - TELESTAR deployed orbit 32D. - SPARTAN deployed orbit 51D. - Rendezvous with SPARTAN. - Wheels dug into lakebed » 6 inches at end of rollout.  <u>RENDEZVOUS 6:</u> - With SPARTAN for retrieval and return.  <u>SIGNIFICANT ANOMALIES:</u> - WCS Fan Separator 1 motor current high. - RCS microswitch problems. - Right RCS fuel x-feed valve 3/4/5. - Left RCS OX or Fuel Tank Iso Valve. - Right RCS OX Tank Iso Valve 3/4/5. - S-Band lower left antenna beam switch intermittent. - MDM FA3 failure (Intermittent output from secondary core power supply). - WOW dilemma (wheel off ground 800 ft). - RA2 late acquisition. - TPS debris hits. - Gas leaks and erosion on both SRM nozzle-to-case joints (blowby).	



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS 51-F (STS-26)	OV-099 Challenger (Flight 8)	CDR: C. Gordon Fullerton (Flt 2 - STS-3) P87/R6/V18/M6	KSC 39A 210:21:00:00Z 3:23:00 PM EDT (P) 5:00:00 PM EDT (A) Monday 6 7/29/85 (1)	EDW 23, LAKEBED (EDW 13, LKBD 9)  12:45:26 PM PDT Tuesday 4 8/6/85 (1)	104/104 109 %  100/104/ 97/65/ 104/91	BI-017  SRM: HPM  CASE: MWC	49.491° (1)	142.9 X 108.7 NM	O15-24 (2)	CARGO: 34400 lbs  CHARGEABLE: 33012 lbs  DEPLOYED: 0 lbs  NON-DEPLOYED: 31257 lbs  MIDDECK: 1755 lbs  RETURNED: 33555 lbs  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 214306 lbs NON-DEPLOYED: 297780 lbs CARGO TOTAL: 590787 lbs  PERFORMANCE MARGINS: NOT AVAILABLE  SPACELAB 2 WITH 13 INVESTIGATIONS IN 7 SCIENTIFIC DISCIPLINES: SOLAR, ATMOSPHERIC, PLASMA, HIGH-ENERGY ASTRO-PHYSICS, IR ASTRONOMY, TECHNOLOGY RESEARCH, AND LIFE SCIENCES PDP, VCAP, IRT, CRNE, XRT, SOUP CHASE, HRTS, SUSIM, PGU, SUPERFLUID HELIUM, PLASMA DEPLETION PDP PROX OPS SAREX, SLSTP, CBDE PROX OPS WITH FREE FLYING PDP  4 CRYO TANK SETS  RMS 14 (S.N. 302) Used for PDP deploy and retrieve, waste water dump monitor, and belly tile survey	KSC W/D: OPF 39, VAB 5, PAD 31 = 75  LAUNCH POSTPONEMENT: None.  LAUNCH SCRUBS/PAD ABORT #2: - 7/12/85 launch aborted at T-4.2 seconds when SSME #2 (2020) chamber coolant valve (CCV) failed to ramp to 70% open by "CMD A," resulting in an MCF, causing shutdown. (pad abort #2). Recycled engine 2020 at pad. - 17-day launch slip.  LAUNCH DELAYS: - 1H37M delay because of an error in a TMBU CMD to BFS. BFS was Re-IPL'ed and IMU's were realigned.  TAL WX: Zaragoza go, Moron no go.  FLIGHT DURATION CHANGES: - Extended flight 1 day (+ 1 rev) to provide additional Spacelab experiment time.  FIRSTS: - First flight of Spacelab pallet only. - First flight of IPS.  PROX OPS: With PDP.  SIGNIFICANT ANOMALIES: - ROMS primary pitch TVC failed to respond properly to cmds on 7/10/85. - EXP computer failed prelaunch, ECOS loaded in B/U computer. - SSME #1 auto shut down at 5:43 MET. (HPFTP discharge temp B Xducer failed at 3:31 MET & Xducer A failed at 5:43) resulting in an ATO call. OMS dump (burn) of 106 seconds (4134 lbs. Prop). - SSME #3 HPFTP temp B failed at 8:12 MET, inhibited limits and accomplished ATO. - Recycled SSME 2020 at pad. - RMS tile scan to check for ET SOFI damage to Orbiter bottom TPS (100 tiles scrapped) - GPC body rate data transfer incompatible with Spacelab. - Left SRB yaw axis rate Gyro assy 3 failed hardover prelaunch (GMEM patch). - BFS logged "Stored Protect" after TMBU uplinked. - SSME 2 GH2 Pressure Xducer failed. - No damage to brakes (runway inspection).  RADIATORS DEPLOYED #9 - (port side stowed 3 hours for tile survey).
	SEQ FLT # 19	Spacelab 2	PLT: Roy D. Bridges P88/R68/M62	LAUNCH WINDOW: 2 Hours, 25 Minutes CREW WORKDAY 3 Hours, 50 Minutes launch clearance and service window	XRANGE: 603 NM  ORB DIR: AL 3  AIM PT: NOM  MLGTD: 3713 FT 218:19:45:26Z VEL: 204 KGS 199 KEAS HDOT: -0.7 FPS  TD NORM 195: 4073 FT  NLGTD: 6412 FT 218:19:45:35Z VEL: 168 KGS HDOT: -7.1 FPS  BRK INIT: 126 KGS  AVE BRK DECEL: 8 FPS/S  WHEELS STOP: 218:19:46:21Z 12282 FT  ROLLOUT: 8569 FT 55 SEC	1 = 2023 (3) 2 = 2020 (4) 3 = 2021 (4)	ET-19  LWT-12  ET RPT 211K 1:03:35 MET  ET BR/UP 193K 1:03:58 MET  ET IMPACT LAT: 48.9°S LONG: 159.0°E				
KSC-19	(IGLOO + 3 PALLETS)	M/S: F. Story Musgrave (Flt 2 - STS-6) P89/R15/V19/M15									
PAD 39A-19	THIRD SPACELAB FLIGHT	M/S: Anthony W. England P90/R69/M63  M/S: Karl G. Henize P91/R70/M64  P/S: Loren W. Acton P92/R71/M65  P/S: John-David F. Bartoe P93/R72/M66									
	OMS PODS LPO1 - 7 RPO4 - 2 FRC9 - 8										
		MCC FCR-1 (8)									
		FLIGHT DIRECTORS Asc/Ent - T. C. Lacefield O 1 - G. A. Pennington Ld/O 2 - J. T. Cox O 3 - A. L. Briscoe MOD - E. F. Kranz									



# SPACE SHUTTLE MISSIONS SUMMARY

# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS 51-I</b> (STS-27)  SEQ FLT 20  KSC-20  PAD 39A-20	OV-103 Discovery (Flight 6)  OMS PODS LPO4 - 2 RPO3 - 6 FRC3 - 6	<b>CDR:</b> Joe H. Engle (Flt 2 - STS-2) P94/R3/V20/M3  <b>PLT:</b> Richard O. Covey P95/R73/M67  <b>M/S:</b> James D. Van Hoften (Flt 2-STS 41-C) P96/R36/V21/M35  <b>M/S:</b> John M. Lounge P97/R74/M68  <b>M/S:</b> William F. Fisher P98/R75/M69  <b>EMU/TETHERED EVA'S:</b> EV1 - Van Hoften EV2- Fisher  EVA1 = 8/31/85 7:20/7:07 SS EVA #10  EVA2 = 9/1/85 EV1 = 4:31/4:12 EV2 = 4:31/4:28 SS EVA #11  CAPTURE, REPAIR, AND RELEASE OF LEASAT/SYNCOM IV-4   MCC FCR-2 (12)  <b>FLIGHT DIRECTORS:</b> Asc/Ent - G. E. Coen _d/O 1 - J. H. Greene _C 2 - W. D. Reeves _Png - C. R. Knarr MOD - E. F. Kranz	KSC-39A 239:10:58:01Z 6:55:00 AM EDT (P) 6:58:01 AM EDT (A) Tuesday 2 8/27/85 (3)  <b>LAUNCH WINDOW:</b> 54 Minutes (PLANAR/ET IMPACT AREA)  PLS-EDW SLS-KSC ALS-NOR AOA-EDW AOA WX-NOR,KSC TAL-DAKAR TAL WX-MORON (SELECTED)  MAX Q = 735 PSF M = 1.61  <b>SRB SEP:</b> 2:01 MET  <b>MECO:</b> 8:27.59 MET  <b>ET SEP:</b> 8:45.77 MET  <b>OMS-1:</b> NONE  <b>OMS-2:</b> 40:28 MET 183.2 Seconds	EDW 23, LAKEBED (EDW 14, LKBD 10)  6:15:43 AM PDT Tuesday 5 9/3/85 (3)  <b>XRANGE:</b> 692 NM  <b>ORB DIR:</b> DL 13  <b>AIM PT:</b> NOM  <b>MLGTD:</b> 2101 FT 246:13:15:43Z VEL: 178 KGS 191 KEAS HDOT: -0.5 FPS  <b>TD NORM 195:</b> 1741 FT  <b>NLGTD:</b> 4384 FT 246:13:15:51Z VEL: 144 KGS HDOT: -5.6 FPS  <b>BRK INIT:</b> 114 KGS  <b>AVE BRK DECEL</b> 7.3 FPS/S  <b>WHEELS STOP:</b> 246:13:16:30Z 8201 FT  <b>ROLLOUT:</b> 6100 FT 47 SEC  <b>WINDS:</b> 19H, 0 X KNOTS OFFICIAL: 18H, 0X  <b>DENS ALT:</b> 2982 FT  <b>FLT DURATION:</b> 7:02:17:42 170:17:42  <b>S/T:</b> 128:13:06:56  <b>OV-103:</b> 38:06:06:20  <b>DISTANCE:</b> 2,500,000 sm	104/104 109%  100/104/ 70/67/ 104/103/ 73/67  1 = 2109 (8) 2 = 2018 (7) 3 = 2012 (10)  BI-STABLE HPOTP (1)  <b>M 3 EOM</b> WEIGHT: 196856  X CG: 1092.4  <b>LANDING</b> WEIGHT: 196674  X CG: 1094.2	BI-020  <b>MTR:</b> HPM  <b>CASE:</b> LWC  ET-21  LWT-14  <b>ET</b> <b>RPT</b> 232K 1:19:03 MET  <b>ET</b> <b>BR/UP</b> 216K 1:19:29 MET  <b>ET</b> <b>IMPACT</b> <b>LAT:</b> 11.5°N <b>LONG:</b> 157.6°W	28.541° (13)  <b>DIRECT</b> <b>INSERTION</b>  <b>POST OMS-2</b> 190.51 X 190.2 NM  <b>AUSSAT</b> <b>DEPLOY</b> 190.23 NM  <b>ASC DEPLOY</b> 191.6 NM  <b>SYNCOM-F4</b> <b>DEPLOY</b> 194.6 NM  <b>DEORBIT</b> 242 X 178 NM  <b>VELOCITY</b> 25829 FPS  <b>RANGE</b> 4004 NM	O16-27 (2)  <b>CARGO:</b> 43988 lbs  <b>CHARGEABLE:</b> 38884 lbs  <b>DEPLOYED:</b> 30289 lbs  <b>NON-DEPLOY:</b> 8221 lbs  <b>MIDDECK:</b> 374 lbs  <b>RETURNED:</b> 13478 lbs  <b>SHUTTLE</b> <b>ACCUMULATED</b> <b>WEIGHTS:</b> <b>DEPLOYED:</b> 244595 lbs <b>NON-DEPLOYED:</b> 306375 lbs <b>CARGO TOTAL:</b> 634775 lbs  <b>PERFORMANCE</b> <b>MARGINS (LBS):</b> FPR: 4983 FUEL BIAS: 839 FINAL TDDP: 176 RECON: -1145  <b>PRIMARY:</b> ASC-1/PAM-D DEPLOYED  AUSSAT-1/PAM-D DEPLOYED  SYNCOM IV-4 UNQ (LEASAT) DEPLOYED  <b>MIDDECK:</b> PVTOS PFR/APC MFR  4 CRYO TK SETS  RMS 15 (S.N. 301) Used for LEASAT capture, repair, and release, waste water dump monitor, and to open AUSSAT sunshield	KSC W/D: OPF 27, VAB 7, PAD 22 = 56  <b>LAUNCH POSTPONEMENTS:</b> None.  <b>LAUNCH SCRUBS:</b> - 8/24/85 launch scheduled for 8:38 AM EDT scrubbed because of thunderstorms in launch area and ship in LDA. - 8/25/85 launch scrubbed because of GPC-5 failure. Re-IPL's GPC-5 and fault repeated 11 minutes later. Replaced GPC-5. - 3-day total slip.  <b>LAUNCH DELAYS:</b> - 3M1S delay awaiting clearing in cloud cover and ship in SRB recovery area.  <b>TAL WX:</b> Dakar no go - clouds, Moron go.  <b>FLIGHT DURATION CHANGES:</b> - Shortened flight 1 day because AUSSAT was deployed early.  <b>EVENTS:</b> - Deployed AUSSAT-1 on orbit 5 instead of 17 because of sunshield damage by RMS camera. - Deployed ASC-1 on orbit 7 at 239:22:07:32Z. - Deployed SYNCOM IV-4 on orbit 32 at 241:10:47:55z. (Failed to operate after achieving operational altitude.) - Rendezvous and EVA repair of LEASAT salvage (SYNCOM IV-3) on days 5 and 6. (Deployed on STS 51-D.) - Bi-Stable Pump - HPOTP minimum throttle of 67 percent (first flight.)  <b>RENDEZVOUS 7:</b> To repair SYNCOM IV-3 .  <b>SIGNIFICANT ANOMALIES:</b> - Tank A water flow rate to galley low. - Hydraulic System 3 accumulator bootstrap pressure low. - RMS elbow joint failed to respond to computer commands in primary. - Potable water nozzle temp dropped to 58°F during supply water dump. - BFS OMS 2 out-of-plane velocity computation 12.5 FPS higher than PASS. - FES topping duct zone H heater B failed. - FRCS thruster FIF chamber pressure failure. - Rt OMS fuel tank isol vlv A barber pole. - Galley water flow did not shut off. - Right OMS pod AFRSI strip loose.  <b>RADIATORS DEPLOYED #10</b> (one sleep period for DTO)		



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS 51-J</b> (STS-28)  SEQ. FLT # 21  KSC-21  PAD 39A-21	OV-104 Atlantis (Flight 1)  OMS PODS LPO3 - 6 RPO1 - 7 FRC4 - 1	<p><u>CDR:</u> Karol J. Bobko (Flt 3 - STS-6 &amp; STS 51-D) P99/R14/V11/M14</p> <p><u>PLT:</u> Ronald J. Grabe P100/R76/M70</p> <p><u>M/S:</u> Robert L. Stewart (Flt 2 - STS 41-B) P101/R33/V22/M32</p> <p><u>M/S:</u> David C. Hilmers P102/R77/M71</p> <p><u>P/S:</u> William A. Pailles (USAF) P103/R78/M72</p>	KSC-39A 276:15:15:30Z  11:15:30 AM EDT Thursday 6 10/3/85 (2)  PLS - EDW SLS - KSC TAL - Dakar TAL WX - Moron (SELECTED) TAL WX - Zaragoza	EDW 23, LAKEBED (EDW 15, LKBD 11)  10:00:08 AM PDT Monday 4 10/7/85 (2)  <u>XRANGE:</u> 432 NM  <u>ORB DIR:</u> DL 14  <u>A/IM PT:</u> CLOSE IN  <u>MLGTD:</u> 2476 FT 280:17:00:08Z VEL: 187 KGS 192 KEAS HDOT: -2 FPS  <u>TD NORM 195:</u> 2206 FT  <u>NLGTD:</u> 4873 FT 280:17:00:15Z VEL: 155 KGS HDOT: -5.6 FPS  <u>BRK INIT:</u> 117 KGS  <u>AVE BRK DECEL:</u> 7.3FPS/S  <u>WHEELS STOP:</u> 280:17:01:13Z 10532 FT  <u>ROLLOUT:</u> 8056 FT 65 SEC  <u>WINDS:</u> 14H, 1R KNOTS OFFICIAL: 11H, 4R  <u>DENS ALT:</u> 3622 FT  <u>FLT DURATION:</u> 4:01:44:38 97:44:38  <u>S/T:</u> 132:14:51:34  OV-104: 4:01:44:38  DISTANCE: 1,682,641 sm	104/104 109  100/104/ 68/65/ 104/102/ 74/65  1 = 2011 (2) 2 = 2019 (2) 3 = 2017 (4)	BI-021  MTR: HPM  CASE: LWC  ET-25  LWT-18  ET RPT 230K 1:23:04 MET  ET BR/UP 215K 1:23:25 MET  ET IMPACT LAT: 20.6°N LONG: 148.26°W	28.5° (14)	OI6-28 (3)	DOD  NO RMS  OASIS-2 CLOUDS RME MARC-DN RTPA OCEANS VFT-1 VFT-2 CST AMOS WINCON	KSC W/D: OPF 84, VAB 14 PAD 34 = 132  LAUNCH POSTPONEMENTS: None.  LAUNCH SCRUBS: None.  FLIGHT DURATION CHANGES: None.  LAUNCH DELAY: - Launch delayed because of MPS PV# 6 RPCA erratic. (LH2 prevalve close indicator.)  SIGNIFICANT ANOMALIES: - Port MPM shoulder "A" pyro initiator circuit failed self test. - APU Exhaust Gas temp 2 failed. - WSB 2 regulator pressure decayed. - OPS Recorder 2 tracks 7,8, & 9 intermittent. - ROMS fuel total quantity reading offset. - TPS damage on left inboard elevon leading edge and in nose cap area. - Fuel Cell 3 Oxygen flow meter failed. - SSME 1 and 2 pitch and yaw actuator secondary delta pressures high. - PLB camera "B" difficult to focus and camera "C" Azimuth and elevation failed. - Airlock hatch "A" tapered pin did not latch in open position. - Side hatch "T" handle difficult for crew to operate.	



MCC FCR-2 (13)

FLIGHT DIRECTORS:  
Asc/Ent - G. E. Coen  
O 1 - C. W. Shaw  
Ld/O 2 - B. R. Stone  
PIng - J. M. Hefflin  
MOD - T. W. Holloway



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (8)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS 61-A</b> (STS-30)  SEQ FLT # 22  KSC-22  PAD 39A-22	OV-99 Challenger (Flight 9)  Spacelab D-1 Flight  4th Spacelab Flight  LM (3)  <u>OMS PODS</u> LPO1 - 8 RPO3 - 7 FRC9 - 9	<b>CDR:</b> Henry W. Hartsfield (Flt 3 - STS-4 & STS 41-D) P104/R8/V5/M8  <b>PLT:</b> Steven R. Nagel (Flt 2 - STS 51-G) P105/R64/V23/M59  <b>M/S:</b> James F. Buchli (Flt 2 - STS 51-C) P106/R52/V24/M48  <b>M/S:</b> Guion S. Bluford (Flt 2 - STS-8) P107/R22/V25/M21  <b>M/S:</b> Bonnie J. Dunbar P108/R79/F7  <b>P/S:</b> Reinhard Furrer (Germany) P109/R80/M73  <b>P/S:</b> Ernst Messerschmid (Germany) P110/R81/M74  <b>P/S:</b> Wubbo J. Ockels (Netherlands) P111/R82/M75    MCC FCR-1 (9)  <b>FLIGHT DIRECTORS:</b> Asc/Ent - G. E. Coen Ld/O 1 - L. S. Bourgeois O 2 - G. A. Pennington O 3 - C. R. Knarr MOD - D. R. Puddy	KSC 39A 303:17:00:00Z 12:00:00 PM EST (P) 12:00:00 PM EST (A) Wednesday 1 10/30/85 (3)  <u>LAUNCH WINDOW:</u> 180 Minutes (CREW WORKDAY)  PLS - EDW SLS - KSC ALS - NOR AOA - NOR AOA WX - NONE TAL - ZARAGOZA (SELECTED) TAL WX - MORON MANUAL TAL - KOLN/BONN  MAX Q = 665 PSF M = 1.25  <u>SRB SEP:</u> 2:05 MET  <u>MECO:</u> 8:34.96 MET  <u>ET SEP:</u> 8:53.05 MET  <u>OMS-1:</u> 10:35 MET 121.4 Seconds  <u>OMS-2:</u> 44.40 MET 132.7 Seconds	EDW 17, LAKEBED (EDW 16, LKBD 12)  9:44:51 AM PST Wednesday 2 11/06/85 (4)  <u>XRANGE:</u> 69 NM  <u>ORB DIR:</u> AR 2  <u>AIM PT:</u> NOM  <u>MLGTD:</u> 1829 FT 310:17:44:51Z VEL: 213 KGS 203 KEAS HDOT: -1.2 FPS  <u>TD NORM 195:</u> 2549 FT  <u>NLGTD:</u> 4767 FT 310:17:44:59Z VEL: 178 KGS HDOT: -7.8 FPS  <u>BRK INIT:</u> 111 KGS  <u>AVE BRK DECEL:</u> 7.5 FPS/S  <u>WHEELS STOP:</u> 310:17:45:40Z 10133 FT  <u>ROLLOUT:</u> 8304 FT 49 SEC  <u>WINDS:</u> OH, 1R KNOTS OFFICIAL: OH, 0X  <u>DENS ALT:</u> 2539 FT  <u>FLT DURATION:</u> 7:00:44:51 168:44:51  <u>S/T:</u> 139:15:36:25  <u>OV-099:</u> 62:07:55:07  <u>DISTANCE:</u> 2,501,290 sm	104/104 109%  100/89/ 65/104/ 102/73/ 67  1 = 2023 (4) 2 = 2020 (5) 3 = 2021 (5)  ET-24  LWT-17  <u>ET BR/UP</u> 188K 1:00:57 MET  <u>ET IMPACT</u> LAT: 59.97°S LONG: 147.96°E    <u>M 3 EOM</u> WEIGHT: 214325  X CG: 1083.8  <u>LANDING</u> WEIGHT: 214171  X CG: 1085.2	BI-022  MTR: HPM  CASE: LWC  ET-24  LWT-17  <u>ET BR/UP</u> 188K 1:00:57 MET  <u>ET IMPACT</u> LAT: 59.97°S LONG: 147.96°E    <u>M 3 EOM</u> WEIGHT: 214325  X CG: 1083.8  <u>LANDING</u> WEIGHT: 214171  X CG: 1085.2	56.998° (4)  STANDARD INSERTION  POST OMS-2 178.99 X 175.51 NM  <u>GLOMR DEPLOY</u> 179.62 NM    <u>DEORBIT</u> 180 X 174 NM  <u>VELOCITY</u> 25829 FPS  <u>RANGE</u> 4353 NM	O16-29 (4)  CARGO: 31911 lbs  <u>CHARGEABLE:</u> 30519 lbs  <u>DEPLOYABLE:</u> 150 lbs GLOMR GAS  <u>NON-DEPLOY:</u> 27330 lbs  <u>MIDDECK:</u> 2164 lbs  <u>RETURNED:</u> 30732 lbs  <u>SHUTTLE ACCUMULATED WEIGHTS:</u> <u>DEPLOYED:</u> 244745 lbs <u>NON-DEPLOYED:</u> 335869 lbs <u>CARGO TOTAL:</u> 666686 lbs  <u>PERFORMANCE MARGINS (LBS):</u> FPR: 4897 FUEL BIAS: 851 FINAL TDDP: 6222 RECON: 6219  <u>PAYLOAD:</u> Spacelab D-1/LM (Germany)  <u>EXPERIMENTS:</u> WL - 6 Material Science Exps PK - 3 optical diagnostic facilities (process chamber) MD - Media (material science), elliptical mirror heating facility, high precision thermostat facility BW - Life Sciences VS - Vestibular sled BR - Biorack NAVES - (Nav Exp) ME - Materials Exp GLOMR (DPLY)  4 CRYO TANK SETS  RMS 16 (S.N. 302) Used for waste water dump monitor	KSC W/D: OPF 35, VAB 4, PAD 14 = 53  <u>LAUNCH POSTPONEMENTS:</u> None.  <u>LAUNCH SCRUBS:</u> None.  <u>LAUNCH DELAYS:</u> None.  TAL WX: Zaragoza, Moron, and Ben Guerir go.  <u>FLIGHT DURATION CHANGES:</u> None.  <u>FIRSTS:</u> - First flight with redesigned MPS 17" disconnect primary seal. - First flight with full nosewheel steering. - First flight with 8 crewmembers. - First flight with POCC overseas (Munich). Spacelab D-1 flight with objective science and implications of microgravity.  <u>EVENTS:</u> - GLOMR deployed at 12:34:00 MET (rev 9). - Long duration gravity gradient attitude (9 - 12 hours per day).  <u>SIGNIFICANT ANOMALIES:</u> - Fuel cell 1 condenser exit temperature oscillated. - Cryo hydrogen tank 1 control pressure failed. - RRCS helium leg A operated on secondary. - RRCS helium leg B failed closed. - APU 1 gearbox GN2 P high. - Smoke detector B in avionics bay triggered false alarms. - S-Band antenna switched late. - Primary L RCS thruster L2L injector heater failed on. - RMS deploy micrositches for shoulder manipulator positioning pedestal went to zero. - Stream of particulate matter hit Orbiter. - WCS fan separator 1 fails. - LH SRM center and aft field joint gas leaks to primary O-rings (blowby).  RADIATORS DEPLOYED #11 (stowed for 23 hours in -ZLV +YVV)		



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS 61-B (STS-31) SEQ FLT #23 KSC-23 PAD 39A-23	OV-104 Atlantis (Flight 2)  OMS PODS LPO3 - 7 RPO1 - 8 FRC4 - 2	<p><b>CDR:</b> Brewster H. Shaw, Jr. (Flt 2 - STS-9) P112/R25/V26/M24</p> <p><b>PLT:</b> Bryan D. O'Connor P113/R83/M76</p> <p><b>M/S:</b> Sherwood C. Spring P114/R84/M77</p> <p><b>M/S:</b> Mary L. Cleave P115/R85/F8</p> <p><b>M/S:</b> Jerry L. Ross P116/R86/M78</p> <p><b>P/S:</b> Charles Walker (Flt 3 - STS 41-D &amp; STS 51-D) P117/R42/V12/M40</p> <p><b>P/S:</b> Rudolpho Neri Vela (Mexico) P118/R87/M79</p> <p><b>EMU/TETHERED EVA'S:</b> EV1 - Jerry Ross EV2 - Woody Spring</p> <p><b>EVA 1 - 11/29/85</b> 5:34 - SS EVA#12</p> <p><b>EVA 2 - 12/1/85</b> 6:46 - SS EVA #13</p> <p>DEMO SPACE STATION ASSEMBLY TECHNIQUES</p> <p>MCC FCR-2 (14)</p> <p><b>FLIGHT DIRECTORS:</b> Asc/Ent - G. E. Coen O 1 - W. D. Reeves Ld/O 2 - J. T. Cox Plng - C. W. Shaw MOD - D. R. Puddy</p>	<p>KSC 39A 331:00:29:00Z 7:29:00 PM EST (P) 7:29:00 PM EST (A) Tuesday 3 11/26/85 (5)</p> <p><b>LAUNCH WINDOW:</b> 9 Minutes KU-SAT B/U DPLY- AUSSAT SUN SHIELD FAIL</p> <p>PLS - EDW SLS - KSC ALS - NOR AOA - EDW AOA WX - NOR, KSC TAL - DAKAR (SELECTED) TAL WX - MORON</p> <p>MAX Q = 723 PSF M = 1.16</p> <p><b>SRB SEP:</b> 2:03.56 MET</p> <p><b>MECO:</b> 8:31.29 MET</p> <p><b>ET SEP:</b> 8:49.45 MET</p> <p><b>OMS-1:</b> NONE</p> <p><b>OMS-2:</b> 40:25 MET 180.4 Seconds</p>	<p>EDW 22, Concrete (EDW 17, CONC 5)</p> <p>1:33:49 PM PST Tuesday 6 12/03/85 (2)</p> <p><b>XRANGE:</b> 533 NM</p> <p><b>ORB DIR:</b>AL 4</p> <p><b>AIM PT:</b> NOM</p> <p><b>MLGTD:</b> 2386 FT 337:21:33:49Z VEL: 197 KGS 191 KEAS HDOT: -1.0 FPS</p> <p><b>TD NORM 195:</b> 2026 FT</p> <p><b>NLGTD:</b> 5909 FT 337:21:34:00Z VEL: 160 KGS HDOT: -3.6 FPS</p> <p><b>BRK INIT:</b> 126 KGS</p> <p><b>AVE BRK DECEL:</b> 7 FPS/S</p> <p><b>WHEELS STOP:</b> 337:21:35:07Z 13145 FT</p> <p><b>ROLLOUT:</b> 10759 FT 78 SEC</p> <p><b>WINDS:</b> 8T, 2R KNOTS OFFICIAL:4T, 4R</p> <p><b>DENS ALT:</b> 2551 FT</p> <p><b>FLT DURATION:</b> 6:21:04:49 165:04:49</p> <p><b>S/T:</b> 146:12:41:14</p> <p><b>OV-104:</b> 10:22:49:27</p> <p><b>DISTANCE:</b> 2,466,956 sm</p>	<p>104/104 109%</p> <p>100/104/ 65/104/ 103/74/ 65</p> <p>1 = 2011 (3) 2 = 2019 (3) 3 = 2017 (5)</p> <p><b>BRK INIT:</b> 126 KGS</p> <p><b>AVE BRK DECEL:</b> 7 FPS/S</p> <p><b>WHEELS STOP:</b> 337:21:35:07Z 13145 FT</p> <p><b>ROLLOUT:</b> 10759 FT 78 SEC</p> <p><b>WINDS:</b> 8T, 2R KNOTS OFFICIAL:4T, 4R</p> <p><b>DENS ALT:</b> 2551 FT</p> <p><b>FLT DURATION:</b> 6:21:04:49 165:04:49</p> <p><b>S/T:</b> 146:12:41:14</p> <p><b>OV-104:</b> 10:22:49:27</p> <p><b>DISTANCE:</b> 2,466,956 sm</p>	<p>BI-023</p> <p><b>MTR:</b> HPM</p> <p><b>CASE:</b> LWC</p> <p>ET-22</p> <p>LWT- 15</p> <p><b>ET RPT</b> 231 K 1:19:20 MET</p> <p><b>ET BR/UP</b> 207 K 1:19:56 MET</p> <p><b>ET IMPACT</b> LAT: 17.31°N LONG: 156.69°W</p>	<p>28.454° (15)</p> <p>DIRECT INSERTION</p> <p><b>POST OMS-2</b> 191.33 X 190.12 NM</p> <p><b>MORELOS DEPLOY</b> 192.71 NM</p> <p><b>AUSSAT DEPLOY</b> 196.43 NM</p> <p><b>SATCOM DEPLOY</b> 197.17 NM</p> <p><b>DEORBIT</b> 209 X 172 NM</p> <p><b>VELOCITY</b> 25882 FPS</p> <p><b>RANGE</b> 4099 NM</p>	<p>O16-30 (5)</p> <p><b>CARGO:</b> 47509 lbs</p> <p><b>CHARGEABLE:</b> 42788 lbs</p> <p><b>DEPLOYABLE:</b> 27465 lbs</p> <p><b>NON-DEPLOY:</b> 13986 lbs</p> <p><b>MIDDECK:</b> 1337 lbs</p> <p><b>RETURNED:</b> 20074 lbs</p> <p><b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 272210 lbs <b>NON-DEPLOYED:</b> 351192 lbs <b>CARGO TOTAL:</b> 714195 lbs</p> <p><b>PERFORMANCE MARGINS (LBS):</b> FPR: 5284 FUEL BIAS: 849 FINAL TDDP: 874 RECON: 2332</p> <p><b>PAYLOADS:</b> SATCOM KU-2/ PAM D-2 DEPLOYED</p> <p>MORELOS-B/ PAM-D DEPLOYED</p> <p>AUSSAT-2/PAM-D DEPLOYED</p> <p>SKT EASE/ACCESS/MP ESSIMAX CFES DMOS GAS(1) MPSE</p> <p>4 CRYO TANK SETS</p> <p>RMS 17 (S.N. 303) Used for EASE/ACCESS assembly, PKM monitors, waste water dump monitor</p>	<p><b>KSC W/D:</b> OPF 27, VAB 4, PAD 14 = 46</p> <p><b>LAUNCH POSTPONEMENTS:</b> None.</p> <p><b>LAUNCH SCRUBS:</b> None.</p> <p><b>LAUNCH DELAYS:</b> None.</p> <p><b>NIGHT LAUNCH:</b> Shuttle #2</p> <p><b>TAL WX:</b> Dakar go, Moron no-go - clouds.</p> <p><b>FLIGHT DURATION CHANGES:</b> - EDW lakebed wet, changed to EDW 22 and landed one rev early due to lighting conditions on EDW 22. - Shortened flight by one rev.</p> <p><b>EVENTS:</b> - OMS-1 not performed. - MORELOS deployed 331:07:46:50Z (rev 6). - AUSSAT deployed 332:01:21Z (rev 17). - SATCOM deployed 332:21:57:31Z (rev 31). - EVA 1 - Assembled/disassembled - ACCESS ten bays and six EASE assembly/disassembly cycles. - EVA 2 - Completed all tasks.</p> <p><b>SIGNIFICANT ANOMALIES:</b> - Excess helium in cryo 02 fans 1 and 2. - Fuel cell 2 performance degraded and CPM hung up. - OMS XFD OX Center Heater failed. - WSB #3 Reg. pressure decay. - Port PLS R-T-L CLOSE A failed. - Port PLBD aft. - NLG Strut 3" low. - Volume H locker had to be pried open. - GSE side hatch "T" handle broke. - Gas leaks and erosion to both nozzle-to-case joints (blowby on LH SRM). - Radiators deployed #12 (deployed for 10 hour DTO)</p>		



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS 61-C</b> (STS-32)  SEQ FLT #24  KSC-24  PAD 39A-24	OV-102 Columbia (Flight 7)  <u>OMS PODS</u> LPO4 - 3 RPO4 - 3 FRC2 - 7	CDR: Robert L. Gibson (Flt 2 - STS 41-B) P119/R30/V27/M29  PLT: Charles F. Bolden P120/R88/M80  M/S: George D. Nelson (Flt 2 - STS 41-C) P121/R37/V28/M36  M/S: Steven A. Hawley (Flt 2 STS 41-DR) P122/R39/V29/M38  M/S: Franklin Chang-Diaz P123/R89/M81  P/S: C. W. Nelson (Congressman) P124/R90/M82  P/S: R. J. Cenker (RCA) P125/R91/M83	KSC 39A 12:11:55:00Z 6:55:00 AM EST (P) 6:55:00 AM EST (A) Sunday 3 1/12/86 (2)  <u>LAUNCH WINDOW:</u> 49 mins SATCOM KU THERMAL CONSTR ORBIT 8A  PLS - KSC SLS - EDW ALS - NOR AOA - EDW AOA WX - NOR,KSC TAL - DAKAR TAL WX - MORON (SELECTED)  MAX Q = 696 PSF M = 1.13  SRB SEP: 2:07.23 MET  MECO: 8:21.29 MET  ET SEP: 8:39.77 MET  OMS-1: 10:51 MET 164.03 Seconds ΔV = 265.8 FPS  OMS-2: 46.05 MET 136.38 Seconds ΔV = 216.9 FPS	EDW 22, Concrete (EDW 18, CONC 6)  5:58:51 AM PST Saturday 5 1/18/86 (2)  X RANGE: 661 NM  ORB DIR: DL 15  AIM PT: NOM  MLGTD: 1530 FT 18:13:58:51Z VEL: 217 KGS 212 KEAS HDOT: -2 FPS  TD NORM 195: 2970 FT  NLGTD: 6300 FT 18:13:59:07Z VEL: 160 KGS HDOT: -3.1 FPS  BRK INIT: 138 KGS  AVE BRK DECEL: 7.2 FPS/S  WHEELS STOP: 18:13:59:50Z 11727 FT  ROLLOUT: 10202 FT 59 SEC  WINDS: 2T, 0X KNOTS OFFICIAL: 1H, 1R  DENS ALT: 1088 FT  FLT DURATION: 6:02:03:51 146:03:51  S/T: 152:14:45:05  OV-102: 41:01:54:11  DISTANCE: 2,197,305 sm	104/104 109%  100/104/ 85/69/ 104  1 = 2015 (5) 2 = 2018 (8) 3 = 2109 (9)  BI-STABLE HPOTP (2)  ET RPT 239K 46:25 MET  ET BR/UP 192K 47:41 MET  ET IMPACT LAT: 28.3°S LONG: 81.3°E	BI-024  MTR: HPM  CASE: LWC  ET-30  LWT- 23  ET RPT 239K 46:25 MET  ET BR/UP 192K 47:41 MET  ET IMPACT LAT: 28.3°S LONG: 81.3°E	28.448° (16)	<u>STANDARD INSERTION</u>  <u>POST OMS-2</u> 176.13 X 175.14 NM  <u>SAT COM DEPLOY</u> 182.63 NM	OI7-32 (1)	CARGO: 32733 lbs  PAYLOAD CHARGEABLE: 28625 lbs  DEPLOYABLE: 12351 lbs  NON-DEPLOY: 15837 lbs  MIDDECK: 437 lbs  RETURNED: 20111 lbs  <u>SHUTTLE ACCUMULATED WEIGHTS:</u> DEPLOYED: 284561 lbs NON-DEPLOYED: 367466 lbs CARGO TOTAL: 746928 lbs  <u>PERFORMANCE MARGINS (LBS):</u> FPR: 5407 FUEL BIAS: 840 FINAL TDDP: 10754 RECON: 11127  PAYLOADS : SATCOM KU- 1/ PAM D2 DEPLOYED  MSL-2 HITCHHIKER INFRARED - IMAGINING EXP 13 GAS CANS CHAMP IBSE HPCG STUDENT EXP (3) NORMS ACIP AADS  4 CRYO TK SETS  NO RMS	KSC W/D: OPF 101, VAB 8, PAD 34 = 143  LAUNCH POSTPONEMENTS: None.  <u>LAUNCH SCRUBS:</u> - 12/18/85 launch scrubbed to complete RCS crossfeed work in aft compartment (rescheduled before PRSD loading). 1-day slip. - 12/19/85 launch scrubbed after autohold at T-14 seconds due to RH SRB tilt HPU exceeding RPM redline (oversensitivity in control circuit). Launch rescheduled after holidays for 1/6/86. 18-day slip. - 1/6/86 launch scrubbed at T-31 seconds when GSE LO2 replenish valve failed to close. Wrong manual command sequence resulted in TSM vent and drain valves opening without closing Orbiter fill/drain valve causing off-loading of approximately 18,000 lbs LO2 via F/D valve. LO2 SSME temperature dropped below redline limit and count recycled to T-20 minutes. Did an IMU alignment; however, launch was scrubbed when SATCOM launch window expired. Detanked and found a broken GSE LOX temperature probe lodged in SSME #2 pre valve (would have precluded full pre valve closure). Launch rescheduled for 1/7/86. 1-day slip. - 1/7/86 launch was scrubbed at T-9 hold due to bad weather at TAL sites (Dakar & Moron) and marginal KSC weather. Forty-eight hour turnaround for ovality check on MPS low pressure fuel duct. Rescheduled launch for 1/9/86. 2-day slip. - 1/9/86 launch was scrubbed on 1/8/86 because of predicted bad weather at KSC. and temperature GSE probe found in SSME #2 pre valve. Rescheduled launch for 1/10/86. 1-day slip. - 1/10/86 launch scrubbed due to rain showers at KSC with 45 minutes remaining in window. Rescheduled launch for 1/12/86). 2-day slip. - 25-day total slip.  LAUNCH DELAYS: None.  TAL WX: Dakar no-go - dust, Moron go.  <u>FIRSTS</u> - First flight of OV-102 after major mod (included removal of ejection seats and modifying display panels).  Continued . . .



MCC FCR-1 (10)  
  
FLIGHT DIRECTORS:  
AscEnt - G. E. Coen  
Ld/O 1 - J. H. Greene  
O 2 - J. M. Heflin  
PIng - G. A. Pennington  
MOD - T. W. Holloway

# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS 61-C</b>  (Cont'd)											Continued . . .  <u>FLIGHT DURATION CHANGES:</u> - Management decision made to change flight duration to 4 days from 5 days. - Extended flight from 4 to 5 days due to bad weather at KSC (was 1/16/86). - Extended flight from 5 to 6 days due to bad weather at KSC (was 1/17/86). - Waved off KSC landing on 1/18/86 due to bad weather and landed at EDW (one rev extension). - Flight extensions, 2 days + 1 rev.  <u>LANDING SITE CHANGE:</u> - KSC to EDW.  <u>NIGHT LANDING:</u> - Second Shuttle night landing.  <u>EVENTS:</u> - SATCOM deployed at 9:32 MET (REV 7). - Bi-stable Pump - HPOTP required minimum throttle of 67 percent (second flight).  <u>SIGNIFICANT ANOMALIES:</u> - Fuel cell power source to essential bus 1 BC erratic. - APU 1 gearbox GN2 pressure high . - APU's 1 and 3 isolation valve temperatures low. - APU 3 fuel line system B heater failed . - Vernier RCS jets fired excessively . - S-Band U/L and L/R antenna performance erratic. - ECLSS pressure control system 2 oxygen flow transducer read low. - WSB 3 System "A" heater operation erratic. - Left RCS Helium Reg "B" leaked. - WSB 1 system "A" cooling water use high. - Gas leak in LH SRM nozzle-to-case joint (blowby). - Gas leak and erosion in RH SRM nozzle-to-case joint.

# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS 51-L</b> (STS-33)  SEQ FLT #25  KSC-25  PAD 39B-1	OV-099 (Flight 10) Challenger  <u>OMS PODS</u> LVO1 - 7 RVO1 - 7 FRC9 - 10	<u>CDR:</u> Francis R. Scobee (Flt 2 - STS 41-C) P126/R34/V30/M33  <u>PLT:</u> Michael J. Smith P127/R92/M84  <u>M/S:</u> Judith A. Resnik (Flt 2 - STS 41-D) P128/R41/V31/F2  <u>M/S:</u> Ronald E. McNair (Flt 2 - STS 41-B) P129/R32/V32/M31  <u>M/S:</u> Ellison S. Onizuka (Flt 2 STS 51-C) P130/R51/V33/M47  <u>P/S:</u> Gregory Jarvis (HAC) P/131/R93/M85  <u>P/S:</u> Christa McAuliffe (Civilian Teacher) P132/R94/F9  MCC FCR-2 (15)  <u>FLIGHT DIRECTORS:</u> Asc - J. H. Greene Ent - A. L. Briscoe Ld/O 1 - B. R. Stone O 2 - C. W. Shaw Plng - C. R. Knarr MOD - D. R. Puddy	KSC 39B 28:16:38:00.1Z 9:38:00 AM EST (P) 11:38:00 AM EST (A) Tuesday 4 1/28/86  <u>LAUNCH WINDOW:</u> 3 Hours TAL SUNSET (CASABLANCA)  PLS - KSC SLS - EDW TAL - CASABLANCA TAL WX - DAKAR  MAX Q = 720 PSF M = 1.35	104/104 109%  1 = 2023 (5) 2 = 2020 (6) 3 = 2021 (6)	BI-026  MTR: HPM  CASE: LWC  ET-26  LWT-19	28.45°	PLANNED STANDARD INSERTION  153.5 NM	OI7-26 (2)	<u>CARGO:</u> 52685 lbs  <u>CHARGEABLE:</u> 48633 lbs  <u>DEPLOYABLE:</u> 37636 lbs  <u>NON-DEPLOYED:</u> 10167 lbs  <u>MIDDECK:</u> 830 lbs  <u>PRIMARY:</u> TDRS-B/IUS-3 SPARTAN -HALLEY/MPRESS  <u>ANCILLARY:</u> CHAMP FDE RME TISP PPE SSIP (3) ACIP  3 CRYO TANK SETS  RMS 18 (S.N. 302)	KSC W/D: OPF 30, VAB 5, PAD 28 = 63  <u>LAUNCH POSTPONEMENTS:</u> - On 12/23/85, the 1/22/86 launch was postponed 1 day to 1/23/86 to accommodate an integrated simulation (STS 61-C launch delay impact). 1-day slip. - On 1/22/86, the 1/23/86 launch was postponed 2 days to 1/25/86 because of KSC work schedule being impacted by STS 61-C landing delays. 2-day slip.  <u>LAUNCH SCRUBS:</u> - 1/25/86 launch scrubbed early in count by MMT due to forecast of unacceptable weather at KSC throughout launch window. Launch rescheduled for 1/27/86. - 1/27/86 launch scrubbed. Countdown halted at T-9 minutes when a GSE hatch fixture could not be removed from exterior of side hatch, followed by a problem with a portable drill. Handling tool attach screw was drilled out. One hour and 20 minutes later, when the hatch problem was resolved, the winds at KSC RTLS runway had increased and exceeded the maximum allowable crosswind velocity. Launch rescheduled for 1/28/86. - During the night, the temperature at KSC dropped to the low twenties. Ice had accumulated in the pad area and ice inspections were made during night and morning of 1/28.  <u>LAUNCH DELAYS:</u> - 1H00M delay during T-3 hour hold due to late ET tanking start caused by a GSE H2 fire alarm detector problem in LH2 ground storage tank. - 1H00M additional delay after ice team inspection of ice formed by leaking H2O hoses. The decision was made to allow additional time for ice on pad to melt. - 2H00M launch delay total.  <u>LAUNCH:</u> - Launch occurred at 11:38:00.010 a.m. EST on January 28, 1986. - Explosive burn at MET of 74 seconds.  <u>FIRSTS:</u> - First Shuttle launch from pad 39B. - First flight to use Casablanca as TAL site. - First flight to use DIAL-A-TAL site.	



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-26 (STS-26R)  SEQ FLT #26  KSC-26  PAD 39B-2	OV-103 (Flight 7) Discovery	<p><u>CDR:</u> Frederick H. Hauck (Flt 3 - STS-7 &amp; STS 51-A) P133/R17/V7/M17</p> <p><u>PLT:</u> Richard O. Covey (Flt 2 - STS 51-I) P134/R73/V34/M67</p> <p><u>M/S 1:</u> John M. Lounge (Flt 2 - STS 51-I) P135/R74/V35/M68</p> <p><u>M/S 2:</u> George D. Nelson (Flt 3 - STS 41-C &amp; STS 61-C) P136/R37/V28/M36</p> <p><u>M/S 3:</u> David C. Hilmers (Flt 2 - STS 51-J) P137/R77/V36/M71</p>	<p>KSC 39B 273:15:37:00Z 9:59:00 AM EDT (P) 11:37:00 AM EDT (A) Thursday 7 9/29/88 (1)</p> <p><u>WINDOW DURATION:</u> 3 HOURS (CREW CONSTRAINT)</p> <p>PLS - EDW SLS - NOR AOA - EDW - NOR</p> <p>TAL - BEN GUERIR TAL WX - MORON (SELECTED) AUGMENTED CTG: BANJUL</p> <p>MAX Q = 707 M = 1.16</p> <p><u>SRB SEP:</u> 2:04.8 MET</p> <p><u>MECO:</u> 8:33.43 MET</p> <p><u>ET SEP:</u> 8:50.5 MET</p> <p><u>OMS-1:</u> NONE</p> <p><u>OMS-2:</u> 39.55 MET 141.6 Seconds 222 FPS</p> <p><u>FLIGHT DIRECTORS:</u> Asc/Ent - G. E. Coen O 1 - J. M. Hefflin O 2 - C. W. Shaw Ld/Plg - L.S.Bourgeois MOD - T. W. Holloway MDR - B. R. Stone MDR - R. M. Kelso</p>	<p>EDW 17L (EDW 19, LKBD 13) 9:37:11 AM PDT Monday 5 10/3/88 (3)</p> <p><u>DEORBIT BURN:</u> 277:15:34:44Z</p> <p><u>XRANGE:</u> 383 NM</p> <p><u>ORB DIR:</u> DL 16, REV 64</p> <p><u>AIM PT:</u> NOM</p> <p><u>MLGTD:</u> 2569 FT 277:16:37:11Z VEL: 196 KGS 187 KEAS HDOT: -0.5 FPS (SR + 11 MIN)</p> <p><u>TD NORM 195:</u> 1849 FT</p> <p><u>NLGTD:</u> 5671 FT 277:37:16:18Z VEL: 150 KGS HDOT: -5.8 FPS</p> <p><u>BRK INIT:</u> 127 KGS</p> <p><u>AVE BRK DECEL:</u> 7.2 FPS/S</p> <p><u>WHEELS STOP:</u> 277:16:37:57Z 10020 FT</p> <p><u>ROLLOUT:</u> 7451 FEET 50 SECONDS</p> <p><u>WINDS:</u> 3T, 0X KNOTS OFFICIAL: 5H, 1L</p> <p><u>DENS ALT:</u> 3182 FT</p> <p><u>FLT DURATION:</u> 4:01:00:11 97:00:11</p> <p><u>S/T:</u> 156:15:46:30</p> <p><u>QV-103:</u> 42:07:06:31</p> <p><u>DISTANCE:</u> 1,430,505 sm</p>	<p>104/104 109%</p> <p>104/102/ 65/104/ 65</p> <p>1 = 2019 (4) 2 = 2022 (1) 3 = 2028 (1)</p> <p><u>ORB DIR:</u> DL 16, REV 64</p> <p><u>MLGTD:</u> 2569 FT 277:16:37:11Z VEL: 196 KGS 187 KEAS HDOT: -0.5 FPS (SR + 11 MIN)</p> <p><u>TD NORM 195:</u> 1849 FT</p> <p><u>NLGTD:</u> 5671 FT 277:37:16:18Z VEL: 150 KGS HDOT: -5.8 FPS</p> <p><u>BRK INIT:</u> 127 KGS</p> <p><u>AVE BRK DECEL:</u> 7.2 FPS/S</p> <p><u>WHEELS STOP:</u> 277:16:37:57Z 10020 FT</p> <p><u>ROLLOUT:</u> 7451 FEET 50 SECONDS</p> <p><u>WINDS:</u> 3T, 0X KNOTS OFFICIAL: 5H, 1L</p> <p><u>DENS ALT:</u> 3182 FT</p> <p><u>FLT DURATION:</u> 4:01:00:11 97:00:11</p> <p><u>S/T:</u> 156:15:46:30</p> <p><u>QV-103:</u> 42:07:06:31</p> <p><u>DISTANCE:</u> 1,430,505 sm</p>	<p>BI-029</p> <p>RSRM 1 360L 001</p> <p>ET-28</p> <p>LWT-21</p> <p><u>ET RPT</u> 231K 1:17:18 MET</p> <p><u>ET BR/UP</u> 211K 1:17:51 MET</p> <p><u>ET IMPACT LAT:</u> 12.58°N <u>LONG:</u> 164.04°W</p>	<p>28.46° (17)</p> <p><u>DIRECT INSERTION</u></p> <p><u>POST OMS-2</u> 162.61 X 169.02 NM</p> <p><u>TDRS-C DEPLOY</u> 165.88 NM</p> <p><u>DEORBIT</u> 177 X 163 NM</p> <p><u>VELOCITY</u> 25790 FPS</p> <p><u>RANGE</u> 4117 NM</p>	<p>OI-8B (1)</p> <p><u>CARGO:</u> 46448 lbs</p> <p><u>PAYLOAD CHARGEABLE:</u> 44601 lbs</p> <p><u>DEPLOYABLE:</u> 37514 lbs</p> <p><u>NON-DEPLOYED:</u> 5928 lbs</p> <p><u>MIDDECK:</u> 1159 lbs</p> <p><u>RETURNED:</u> 8964 lbs</p> <p><u>SHUTTLE ACCUMULATED WEIGHTS:</u> <u>DEPLOYED:</u> 322075 lbs <u>NON-DEPLOYED:</u> 374553 lbs <u>CARGO TOTAL:</u> 793376 lbs</p> <p><u>PERFORMANCE MARGINS (LBS):</u> FPR: 5169 FUEL BIAS: 949 FINAL TDDP: 1546 RECON: 624</p> <p><u>PAYLOADS:</u> PLB: TDRS-C/IUS DEPLOYED</p> <p>OASIS-1</p> <p><u>MIDDECK:</u> PVTOS-2 ADSF, IRCFE PCG IEF PPE ARC MLE ELRAD SSIP(2) SE84-4 SE84-5</p> <p>3 CRYO TANK SETS</p> <p>NO RMS</p>	<p>KSC W/D: OPF 221, VAB 13, PAD 88 = 322</p> <p><u>LAUNCH POSTPONEMENTS:</u> - 9/26/88 launch postponed 3 days to 9/29/88 for Orbiter aft critical path. 3-day slip.</p> <p><u>LAUNCH SCRUBS:</u> None.</p> <p><u>LAUNCH DELAYS:</u> - 1H38M delay from 9:59 a.m. EDT due to: (1) winds aloft differed from planned autumn winds with exceedences of WLE-14R and WLE-14L, and (2) PLT and M/S 1 suit fan fuses blew (replaced with 10A fuses but intended 5 amp fuses).</p> <p><u>FLIGHT DURATION CHANGES:</u> None.</p> <p><u>TAL WX:</u> - Alternate TAL Moron selected due to rain showers and crosswind violations at Ben Guerir (Prime).</p> <p><u>FIRSTS:</u> - Return to flight after STS 51-L.</p> <p><u>EVENTS:</u> - TDRS-C deployed at 06:13:05 MET (rev 3). - Two engines OMS SEP burn at 06:28:03 MET (16.6 sec, 30.85 FPS). - Deorbit burn 168 secs, 324.86 FPS. - ET Reentry (tumble) - CAST GLANCE violent rupture.</p> <p><u>SIGNIFICANT ANOMALIES:</u> - Prelaunch H2 leak at 4"disc. - RCS dynatube repair early in flow using clamshell. - OMS gimbal standby enable 1 fail. - FES high load evap freezing during ascent. FES shutdown during entry after OMS deorbit burn (rust/contamination). - Ku-Band failed self test. Antenna would not follow pointing commands. (Had to use alternate stow procedure.) - GOX flow control valves 1 and 2 operated sluggish on first cycle. - WCS fan separator 1 flooded exhibiting stall currents for 80 secs. - STBD PLBD Forward R-T-L "A" Talkback failed to function. - APU#3 chamber pressure low. - Rt wing TPS damage. - 4" LH2 ET/Orbiter disconnect leak. - Radar altimeter failed at 50 feet. - Video cassette tapes jammed (4 tapes).</p>		



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-27</b> (STS-27R)  SEQ FLT #27  KSC-27  PAD 39B-3	OV-104 (Flight 3) Atlantis  OMS PODS LPO1 - 9 RPO1 - 9 FRC4 - 3	<b>CDR:</b> Robert L. Gibson (Flt 3 - STS 41-B & STS 61-C) P138/R30/V27/M29  <b>PLT:</b> Guy S. Gardner P139/R95/M86  <b>M/S 1:</b> Richard M. Mullane (Flt 2 - STS 41-DR) P140/R40/V37/M39  <b>M/S 2:</b> Jerry L. Ross (Flt 2 - STS 61-B) P141/R86/V38/M78  <b>M/S 3:</b> William M. Shephard P142/R96/M87	KSC 39B 337:14:30:34Z 9:30:34 AM EST Friday 5 12/2/88 (1)  PLS - EDW  AOA - NOR  AOA WX:  TAL - ZARAGOZA (SELECTED)  TAL WX - MORON BEN GUERIR	EDW 17L (EDW 20, LKBD 14)  3:36:11 PM PST Tuesday 7 12/6/88 (3)  <b>DEORBIT BURN:</b> 341:22:29:34Z  <b>CROSSRANGE:</b> 520 NM  <b>ORBIT DIR:</b> DR 4  <b>AIM PT:</b> NOM  <b>MLGTD:</b> 1469 FT 341:23:36:11Z <b>VEL:</b> 204 KGS 194 KEAS <b>HDOT:</b> -1.0 FPS  <b>TD NORM 195:</b> 1523 FT  <b>NLGTD:</b> 4423 FT 341:23:36:18Z <b>VEL:</b> 164 KGS <b>HDOT:</b> -4.9 FPS  <b>BRK INIT:</b> 132 KGS  <b>AVE BRK DECEL:</b> 9.8 FPS/S  <b>WHEELS STOP:</b> 341:23:36:52Z 8592 FEET  <b>ROLLOUT:</b> 7123 FEET 41 SECONDS  <b>WINDS:</b> 0H, 2L KNOTS OFFICIAL: 0H, 0X  <b>DENS ALT:</b> 3047 FT  <b>FLT DURATION:</b> 4:09:05:37 105:05:37  <b>S/T:</b> 161:00:52:05  <b>OV-104:</b> 15:07:55:04  <b>DISTANCE:</b> 1,812,075 sm	100/104/ 96/65/ 104/65  1 = 2027 (1) 2 = 2030 (1) 3 = 2029 (1)	BI-030  RSRM 2 360L 002  ET-23  LWT-16  ET RPT 236K 1:24:30 MET  ET BR/UP 216K 1:25:03 MET  ET IMPACT LAT: 2.86°S LONG: 123.48°W	57° (5)		OI-8B (2)	<b>DOD FLIGHT</b>  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 4698 FUEL BIAS: 968 FINAL TDDP: 2905 * RECON: -286  <b>SECONDARY PAYLOADS:</b> OASIS-II AMOS APE CLOUDS CRUX RME-III VFT-2  RMS 19 (S.N. 201) Used for belly tile damage survey	KSC W/D: OPF 196, VAB 10, PAD 30 = 236  <b>LAUNCH POSTPONEMENTS:</b> None.  <b>LAUNCH SCRUBS:</b> - 12/1/88 launch scrubbed due to winds aloft exceedences. Launch rescheduled for 12/2/88. 1-day slip.  <b>LAUNCH DELAYS:</b> - Countdown held at T-9 due to winds aloft and at T-31 seconds for TAL weather.  <b>TAL WX:</b> - Zaragoza (prime) selected, alternate sites were no go - low ceilings at Moron and Ben Guerir.  <b>ALTERNATE ASCENT I-LOADS:</b> - LSEAT selected nominal ascent I-loads, no uplink required.  <b>FIRSTS:</b> - First flight with alternate ascent I-loads capability. - First flight using East and West TDRS. - First flight with no communications blackout during entry (due to favorable comm look angle to West TDRS). - First flight of PDRS console position.  <b>SIGNIFICANT ANOMALIES:</b> - Left inboard tire leaking since OPF (over-inflation plug seal). - APU #2 GG heater system malfunction. - Humidity separator B flooded. - TAGS paper jam. - TPS damage worst to date (707 hits, 298 hits > 1", most on right side bottom of wing and fuselage). - Tile survey conducted using RMS end effector camera. - R RCS Oxidizer B He regulator slow response. - Cabin temp controller #2 non-responsive. - L OMS GN2 Isolation valve coil failure. - Engine #3 HPOTP #3 bearing inner race crack due to stress corrosion. Liquid stains, pitting, spalling - chlorine contaminant.



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-29</b> (STS-29R)  SEQ FLT #28  KSC-28  PAD 39B-4	OV-103 (Flight 8) Discovery   OMS PODS LPO4 - 5 RPO3 - 9 FRC3 - 8	<b>CDR:</b> Michael L. Coats (Flt 2 - STS 41-DR) P143/R38/V39/M37  <b>PLT:</b> John E. Blaha P144/R97/M88  <b>M/S:</b> James F. Buchli (Flt 3 - STS 51-C & STS 61-A) P145/R52/V24/M48  <b>M/S:</b> Robert C. Springer P146/R98/M89  <b>M/S:</b> James P. Bagian P147/R99/M90	KSC 39B 72:14:57:00Z 8:07:00 AM EST (P) 9:57:00 AM EST (A) Monday 7 3/13/89 (2)  PLS - EDW AOA - NOR TAL - BEN GUERIR (Selected) TAL WX - MORON CLS - BANJUL  <u>LAUNCH WINDOW:</u> 2.5 HOURS (CREW TIME ON BACK)  MAX Q =710 M = 1.44  SRB SEP: 2:04.5 MET  MECO: 8:30.8 MET  ET SEP: 8:50 MET  OMS-1: NONE  OMS-2: 39:58 MET 141.4 Seconds 221.8 FPS	EDW 22 (EDW 21, CONC 7)  6:35:50 AM PST Saturday 6 3/18/89 (2)  <u>DEORBIT BURN:</u> 77:13:35:15Z  <u>XRANGE:</u> 384 NM  ORB DIR: AL 5, ORBIT 79, REV 80  <u>AIM PT:</u> NOM  <u>MLGTD:</u> 1195 FT 77:14:35:50Z VEL: 204 KGS 205 KEAS HDOT: -3 FPS  <u>TD NORM 195:</u> 2085 FT  <u>NLGTD:</u> 5027 FT 77:14:36:01Z VEL:162 KGS HDOT: -1.9 FPS  <u>BRK INIT:</u> 129 KGS  <u>AVE BRK DECEL:</u> 8 FPS/S  <u>WHEELS STOP:</u> 77:14:36:41Z 10534 FT  <u>ROLLOUT:</u> 9339 FEET 51 SECONDS  <u>WINDS:</u> 4.4H,4.1L KNOTS OFFICIAL: 6H, 1L  <u>DENS ALT:</u> 1853 FT  <u>FLT DURATION:</u> 4:23:38:50 119:38:50  <u>S/T:</u> 166:00:30:57  <u>OV-103:</u> 47:06:45:21  <u>DISTANCE:</u> 1,800,000 sm	104/104 109%  100/104/ 66/104/ 65  1 = 2031 (1) 2 = 2022 (2) 3 = 2028 (2)  1 = 2031 (1) 2 = 2022 (2) 3 = 2028 (2)  TD NORM 195: 2085 FT  <u>NLGTD:</u> 5027 FT 77:14:36:01Z VEL:162 KGS HDOT: -1.9 FPS  <u>BRK INIT:</u> 129 KGS  <u>AVE BRK DECEL:</u> 8 FPS/S  <u>WHEELS STOP:</u> 77:14:36:41Z 10534 FT  <u>ROLLOUT:</u> 9339 FEET 51 SECONDS  <u>WINDS:</u> 4.4H,4.1L KNOTS OFFICIAL: 6H, 1L  <u>DENS ALT:</u> 1853 FT  <u>FLT DURATION:</u> 4:23:38:50 119:38:50  <u>S/T:</u> 166:00:30:57  <u>OV-103:</u> 47:06:45:21  <u>DISTANCE:</u> 1,800,000 sm	BI-031   RSRM 3 360L 003  ET-38  LWT- 29  ET RPT 240K 1:17:11 MET  ET BR/UP 217K 1:17:50 MET  ET IMPACT LAT: 13.20°N LONG: 162.65°W	28.45° (18)	<u>DIRECT INSERTION</u>  <u>POST OMS-2</u> 162.59 X 160.27 NM  <u>TDRS-D DEPLOY</u> 162.63 NM	OI-8B (3)	<b>CARGO:</b> 47394 lbs  <b>PAYLOAD CHARGEABLE:</b> 45316 lbs  <b>DEPLOYABLE:</b> 37640 lbs  <b>NON-DEPLOYED:</b> 6727 lbs  <b>MIDDECK:</b> 949 lbs  <b>RETURNED:</b> 9784 lbs  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 359715 lbs <b>NON-DEPLOYED:</b> 382229 lbs <b>CARGO TOTAL:</b> 840770 lbs  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 4698 FUEL BIAS: 968 FINAL TDDP: 3772 RECON: 2995  <b>PAYLOADS:</b> <b>PLB:</b> TDRS-D/IUS DEPLOYED  SHARE OASIS-1  <b>MIDDECK:</b> IMAX PCG AMOS CHROMEX SSIP (2): SE 82-08 GAS: SE 82-08 CHIX  3 CRYO TK SETS  NO RMS	KSC W/D: OPF 94, VAB 11, PAD 39 = 144  <u>LAUNCH POSTPONEMENTS:</u> - 3/11/89 launch postponed 1 day to 3/12/89 to replace MEC #2. - 3/12/89 launch postponed 1 day to 3/13/89 to replace FPOV actuator. 2-day total slip.  <u>LAUNCH SCRUBS:</u> None.  <u>LAUNCH DELAYS:</u> - 1H50M launch delay due to winds aloft and ground fog at KSC.  <u>TAL WX:</u> - Ben Guerir (prime) selected - weather good throughout.  <u>ALTERNATE ASCENT I-LOADS:</u> - LSEAT selected YAW negative which was uplinked (first uplink).  <u>FLIGHT DURATION CHANGES:</u> None.  <b>FIRSTS:</b> - First flight with corner alternate I-load capability. - First flight alternate ascent I-load uplinked.  <b>EVENTS:</b> - TDRS-D/IUS deployed at 06:12:48 MET (rev 5). - SEP burn at 06:27:48 MET, 16.48 seconds, 31.1 FPS - OASIS-1 performed nominally. - DTO 0517 NWS Runway Evaluation. - DTO 0518 Revised System Braking Test. - Deorbit burn 162 seconds, 313.2 FPS.  <u>ET ENTRY (TUMBLE) CAST GLANCE:</u> - Tumble rate 62 deg/sec prior to rupture, max DV - 552 FPS, number of pieces-30.  Continued . . .





# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-29											Continued . . .
Continued											<p><u>SIGNIFICANT ANOMALIES:</u></p> <ul style="list-style-type: none"> <li>- RCS jet R1U failed off at ET Sep.</li> <li>- Excessive vapor at H2 ET/Orbiter umbilical area prelaunch and tower clear.</li> <li>- TAGS developer overtemp; however, best TAGS performance with more than 660 pages processed.</li> <li>- Sluggish GOX FCV'S system 1 and 3.</li> <li>- LH2 disconnect slow to close.</li> <li>- FES shutdown during deorbit prep switch reconfiguration.</li> <li>- Unable to dump ops 2 track 4.</li> <li>- R OMS regulator "A" anomaly (OX &amp; FU tank pressures approx 245 psi).</li> <li>- SHARE operations had problems due to vapor bubbles in liquid channels.</li> <li>- IMAX camera drive mechanism problem (belt jumped off track).</li> <li>- CHROMEX not cooling properly.</li> <li>- PLBD PORT B CLOSED indicator failed.</li> <li>- TPS 132 debris hits, 23 greater than 1"</li> </ul>

# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-30</b> (STS-30R)  SEQ FLT #29  KSC-29  PAD 39B-5	OV-104 (Flight 4) Atlantis  <u>OMS PODS</u> LPO1 - 10 RPO1 - 10 FRC4 - 4	<u>CDR:</u> David M. Walker (Flt 2 - STS 51-A) P148/R48/V40/M45  <u>PLT:</u> Ronald J. Grabe (Flt 2 - STS 51-J) P149/R76/V41/M70  <u>M/S 1:</u> Mark C. Lee R150/R100/M91  <u>M/S 2:</u> Norman E. Thagard (Flt 3 - STS-7 & STS 51-B) P151/R20/V14/M19  <u>M/S 3:</u> Mary L. Cleave (Flt 2 - STS 61-B) P152/R85/V42/F8	KSC 39B 124:18:46:58.975Z 1:48:00 PM EDT (P) 2:46:59 PM EDT (A) Thursday 8 5/4/89 (1)  <u>WINDOW DURATION:</u> 64 Minutes (TAL LIGHTING)  PLS - EDW AOA - EDW TAL - BEN GUERIR (SELECTED) TAL WX - MORON CTG - BANJUL RTL5 15  MAX Q = 676 M = 1.07  <u>SRB SEP:</u> 2:05.26 MET  <u>MECO:</u> 8:29.37 MET  <u>ET SEP:</u> 8:46.67 MET  <u>OMS-1:</u> 10:29 MET 141.72 Seconds 226.29 FPS  <u>OMS-2:</u> 44:27 MET 125.32 Seconds 197.03 FPS	EDW 22, CONC (EDW 22, CONC 8) 12:43:26 PM PDT Monday 6 5/8/89 (2)  <u>DEORBIT BURN:</u> 128:18:40:49Z 165.7, DV 326  <u>XRANGE:</u> 350 NM  <u>ORB DIR:</u> AL6,  <u>AIM PT:</u> NOM  <u>MLGTD:</u> 1314 FT 128:19:43:26Z VEL: 204 KGS 196 KEAS HDOT: -1.5 FPS  <u>TD NORM 195:</u> 1354 FT  <u>NLGTD:</u> 5088 FT 128:19:43:38Z VEL:163 KGS HDOT: -1.7 FPS  <u>BRK INIT:</u> 128 KGS  <u>AVE BRK DECEL:</u> 6.2 FPS/S  <u>WHEELS STOP:</u> 128:19:44:30Z 11609 FEET  <u>ROLLOUT:</u> 10295 FEET 64 SECONDS  <u>WINDS:</u> VARIABLE 290/12G20 11 TO 19 KNOTS RIGHT XWIND OFFICIAL: 5H, 11R  <u>DENS ALT:</u> 4900 FT  <u>FLT DURATION:</u> 4:00:56:27 96:56:27  <u>S/T:</u> 170:01:27:24  <u>OV-104:</u> 19:08:51:31  <u>DISTANCE:</u> 1,477,500 sm	104/104 109%  100/104/ 102/65/ 104/65  1 = 2027 (2) 2 = 2030 (2) 3 = 2029 (2)  <u>M 3 EOM</u>  WEIGHT: 192558  X CG: 1097.4  <u>LANDING</u>  WEIGHT: 192460  X CG: 1099.1	BI-027  RSRM 4 360L 004  ET-39 LWT-22  ET RPT 243K 46:50 MET  ET BR/UP 212K 47:40 MET  T/V  ET IMPACT LAT: 28.85°S LONG: 86.89°E	28.871° (1)	STANDARD INSERTION  <u>POST</u> OMS-2 160.98 X 159.35 NM  <u>MAGELLAN</u> DEPLOY 161.84 NM	OI-8B (4)	<u>CARGO:</u> 47783 lbs  <u>CHARGEABLE:</u> 45823 lbs  <u>DEPLOYABLE:</u> 40118 lbs  <u>NON-DEPLOYED:</u> 5540 lbs  <u>MIDDECK:</u> 165 lbs  <u>RETURNED:</u> 7724 lbs  <u>SHUTTLE</u> <u>ACCUMULATED</u> <u>WEIGHTS:</u> 399833 lbs <u>NON-DEPLOYED:</u> 387934 lbs <u>CARGO TOTAL:</u> 888553 lbs  <u>PERFORMANCE</u> <u>MARGINS (LBS):</u> FPR: 4698 FUEL BIAS: 968 FINAL TDDP: 4709 RECON: 2650  <u>PAYLOADS:</u> PLB: MAGELLAN/IUS (VENUS PROBE) DEPLOYED  <u>MID-DECK:</u> AMOS FEA MLE  CRYO TK SETS - 3  NO RMS	KSC W/D: OPF 79, VAB 11, PAD 43 = 133  <u>LAUNCH POSTPONEMENTS:</u> None.  <u>LAUNCH SCRUBS:</u> 4/28/89 Launch scrubbed at T-31 seconds due to an SSME 1 LH2 recirc pump failure at T-55 seconds. Launch rescheduled for 5/4/89. 6-day total slip.  <u>LAUNCH DELAYS:</u> - 00H43M delay with hold at L-16 minutes due to RTLS ceiling violation. (1:48 PM EDT planned launch). Picked up at 2:15 PM EDT, counted down to T-5 minutes and held. Picked up count at 2:42 PM EDT when RTLS runway 15 was go (33 was no go due to broken ceiling and excessive tailwind). Total launch delay: 58M59S.  <u>TAL WX:</u> - Ben Guerir (prime) selected - Good weather at Ben Guerir and Moron.  <u>I-LOADS:</u> LSEAT selected nominal ascent I-loads - no uplink required.  <u>FLIGHT DURATION CHANGE:</u> None.  <u>FIRSTS:</u> - First interplanetary payload launch by Shuttle. First crosswind landing test.  <u>EVENTS:</u> - Uplinked launch targeting command load ly and del Psi (inertial plane and first stage yaw steering). - Uplinked OMS targeting command load for OMS-1 and OMS-2. - IUS/Magellan deployed at 6:14:33 MET (rev 5). - Sep burn at 6:27:22 MET, 16 secs, 31.6 FPS.  <u>ET REENTRY (NO TUMBLE)</u> - CAST GLANCE, poor quality, tumble rate not discernible.  <u>SIGNIFICANT ANOMALIES:</u> - SSME 1 LH2 Recirc pump failure. - GPC 4 quit (poll fail on SM CRT when GPC was taken to standby). IFM replaced GPC. - Cabin P Xducer test port left on during first launch attempt. - Excess water from galley H2O dispenser. - TAGS jam on 19th page. - Teleprinter character tops illegible. - Camera A spots on image. - ARRIFLEX 16MM camera operate lever failure (crew performed IFM). - Thruster R1U failed off at ET Sep. - R RCS OX Helium P A valve failed open. - FEA problems. - WONG dilemma.



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-28</b> (STS-28R)  SEQ FLT #30  KSC-30  PAD 39B-6	OV-102 (Flight 8) Columbia  OMS PODS LPO3 - 8 RPO4- 4 FRC2 - 8	<b>CDR:</b> Brewster H. Shaw, Jr. (Flt 3 - STS-9 & STS 61-B) P153/R25/V26/M24  <b>PLT:</b> Richard N. Richards P154/R101/M92  <b>M/S 1:</b> James C. Adamson P155/R102/M93  <b>M/S 2:</b> David C. Leestma (Flt 2 - STS 41-G) P156/R45/V43/M42  <b>M/S 3:</b> Mark N. Brown P157/R103/M94	KSC 39B 220:12:37:00Z 8:37:00 AM EDT Tuesday 5 8/8/89 (4)	EDW 17 LEFT (EDW 23, LKBD 15) 6:37:09 AM PDT Sunday 3 8/13/89 (2)	104/104 109%  100/104/ 97/65/ 104/65  1 = 2019 (5) 2 = 2022 (3) 3 = 2028 (3)	BI-028  RSRM 5 360L 005  ET-31 LWT-24  ET BR/UP 220K 1:11:44 MET  ET IMPACT LAT: 36.64°S LONG: 149.65°W	57° (6)	OI-8B (5)	<b>DOD</b>  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 4698 FUEL BIAS: 968 FINAL TDDP: 409 RECON: 158  3 CRYO TK SETS  AMOS HEIN-LO IOCM/APM CLOUDS CRUX RME-III LLL SAM VFT-2	KSC W/D: OPF 190, VAB 11, PAD 25 = 227  <b>LAUNCH POSTPONEMENTS:</b> - 8/7/89 launch postponed to 8/8/89 due to MPS He system. 1-day slip.  <b>LAUNCH SCRUBS:</b> None.  <b>LAUNCH DELAYS:</b> - Launch delay at T-9 due to an NSP frame sync error and MMU 1 read problem during G9 to OPS 101 transition. - Launch delay due to KSC ground fog.  <b>TAL WX:</b> - Zaragoza (prime) NO GO - thundershowers, Ben Guerir NO GO - crosswinds. - Moron (selected) - GO throughout.  <b>I-LOADS:</b> - LSEAT selected nominal ascent i-loads - no uplink required.  <b>EVENTS:</b> - No blackout during entry, comm via TDRS-W.  <b>SIGNIFICANT ANOMALIES:</b> - Prelaunch problem, one of nose gear WOW proximity sensors began indicating weight on nose gear. Indication went away after insertion but returned later in flight causing a WOW dilemma during landing. NWS was enabled by crew by depressing SRB SEP pushbutton. - MMU input/output error on OPS-1 transition. - Pilot's seat moved aft during ascent. - Vernier thruster F5R annunciated "fail leak." - NLG WOW indication failed off. - Forward RCS F5L thruster heater failed on. - S-Band PA2 power output degraded to 60 watts. - Potable water dump valve failed open. - Teleprinter cable shorted causing a 1.5 seconds short of 51A. - Freon coolant loop 2 flow degraded about 100 lbs/hr & FCL 1 about 50 lb/hr. - Radar altimeter 1 and 2 lost attitude reading at 26 feet. - Hydraulic system 2 unloader valve operation out-of-spec. - Body flap excessive deflection during ascent. - NSP frame sync errors prelaunch. - SSME 1 GH2 flow control valve sluggish.	



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-34</b> (STS-34R)  SEQ FLT #31  KSC-31  PAD 39B-7  MLP 1  (WAS STS 61-G)	OV-104 (Flight 5) Atlantis     OMS PODS LPO1 - 11 RPO3- 10 FRC4 - 5	<b>CDR:</b> Donald E. Williams (Flt 2 - STS 51-D) P158/R54/V44/M50  <b>PLT:</b> Michael J. McCulley P159/R104/M95  <b>M/S 1:</b> Shannon W. Lucid (Flt 2 - STS 51-G) P160/R65/V45/F6  <b>M/S 2:</b> Franklin Chang-Diaz (Flt 2 - STS 61-C) P161/R89/V46/M81  <b>M/S 3:</b> Ellen S. Baker P162/R105/F10	KSC 39B  291:16:53:40Z 12:50:00 PM EDT (P) 12:53:40 PM EDT (A) Wednesday 2 10/18/89 (4)  <b>LAUNCH WINDOW:</b> 27 Minutes (GALILEO RAAN)  <b>LANDING SITE PRIORITIES:</b> 1. EDW LAKEBED 2. EDW CONCRETE 3. NOR 4. KSC  <b>EOM RUNWAY:</b> Based on DTO priority: 1. Xwind DTO 2. NWS DTO  EDW Concrete & Lakebed acceptable xwind < 15 knots  RTLS: KSC 15 TAL: Ben Guerir TAL Wx: Zaragoza 30 (Selected) AOA: EDW 17  MAX Q = 687.9 M = 1.63  <b>SRB SEP:</b> 2:04.98 MET  <b>MECO:</b> 8:31.88 MET  <b>ET SEP:</b> 8:50 MET  <b>OMS-1:</b> NONE  <b>OMS-2:</b> 39:55 MET 140.64 Seconds 218.98 FPS	EDW 23L, LKBD (EDW 24, LKBD 16) 296:16:33:00Z  9:33:00 AM PDT Monday 7 10/23/89 (4)  <b>XRANGE:</b> 496 NM  <b>DEORBIT BURN:</b> 296:15:31:45Z 166.4 secs, 321.48 FPS  <b>ORB DIR:</b> AL8  <b>AIM PT:</b> CLOSEIN  <b>MLGTD:</b> 1871 FT 296:16:33:00Z VEL: 206 KGS 195 KEAS HDOT: -2 FPS  <b>TD NORM 195:</b> 1880 FT  <b>NLGTD:</b> 5355 FT 296:16:33:11Z VEL:158 KGS HDOT: -3.9 FPS  <b>BRK INIT:</b> 77 KGS  <b>AVE BRK DECEL:</b> 5.8 FPS/S  <b>WHEELS STOP:</b> 296:16:34:01Z 11548 FEET  <b>ROLLOUT:</b> 9677 FEET 61 SECONDS  <b>WINDS:</b> 190° @ 8 KTS 1H, 4L KTS OFFICIAL: 2H, 3L  <b>DENS ALT:</b> 2680 FT  <b>FLT DURATION:</b> 4:23:39:20 119:39:20  <b>S/T:</b> 180:02:06:53  <b>OV-104:</b> 24:08:30:51  <b>DISTANCE:</b> 1,800,000 sm	104/104 109%  100/104/ 100/65/ 104/65  1 =2027 (3) 2 =2030 (3) 3 =2029 (3)	BI-032  RSRM 6  ET-34 LWT-20  ET RPT 245K 1:19:00 MET  ET BR/UP 228K 1:19:37 MET  T/V OFF  ET IMPACT LAT: 3.4°N LONG: 147.6°W	34.327° (1)	DIRECT INSERTION  POST OMS-2 161.73 X 161.35 NM  GALILEO DEPLOY 163.61 NM	OI-8C (1)	<b>CARGO:</b> 48613 lbs  <b>PAYLOAD CHARGEABLE:</b> 45905 lbs  <b>DEPLOYABLE:</b> 38323 lbs  <b>NON-DEPLOYED:</b> 6696 lbs  <b>MIDDECK:</b> 886 lbs  <b>RETURNED:</b> 10320 lbs  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 438156 lbs <b>NON-DEPLOYED:</b> 395516 lbs <b>CARGO TOTAL:</b> 937166 lbs  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 4698 FUEL BIAS: 968 FINAL TDDP: 2103 RECON: -132  <b>PAYLOADS:</b> <b>PLB:</b> GALILEO/IUS (JUPITER PROBE) (DEPLOYED) SSBUV  <b>MID-DECK:</b> SSP (1) PM MLE GHCO STEX AMOS IMAX  3 CRYO TANKS  NO RMS	<b>KSC W/D:</b> OPF 95, VAB 8, PAD 50 = 153  <b>LAUNCH POSTPONEMENTS:</b> None.  <b>LAUNCH SCRUBS:</b> - 10/12/89 launch scrubbed during T-19 hold to replace SSME #2 controller. 5-day slip. - 10/17/89 launch scrubbed while holding at T-5 minutes due to bad RTLS weather when 27-minute window expired. Rescheduled launch for 10/18/89. 6-day total slip.  <b>LAUNCH DELAYS:</b> - 3M40S delay into 27-minute window after reconfiguration to Zaragoza for TAL at T-5 minutes (Ben Guerir had rain showers).  <b>TAL WX:</b> - Ben Guerir (prime) - NO GO - rain showers - Zaragoza 30 (alt) selected.  <b>I-LOADS:</b> LSEAT selected nominal ascent I-loads, no uplink required.  <b>FLIGHT DURATION CHANGE:</b> None.  <b>EVENTS:</b> - Galileo/IUS deployed on rev 5. - Sep burn 06:36:23, 16.64 secs, 31.31 FPS - No blackout during entry, comm via TDRS-W.  <b>ET TRACKING DTO (NO TUMBLE):</b> - CAST GLANCE, daylight entry, unsuccessful track.  <b>SIGNIFICANT ANOMALIES:</b> - SRB C-Band transponders first flight. - APU 1 fault to high speed during ascent. - APU Heater GG/Fuel Pump 2-A failure. - WSB #2 Steam Vent Heater A failure. - MDM FA1 Primary Port failure. - Cryo 02 manifold valve tank 2 failed to close. - Erratic waste water quantity transducer. - HSI primary miles erroneous indication. - TAGS overtemp indication. - S-Band beam control assy failed to select URF antenna. - S-Band antenna elect. 1 failed to select ULF antenna. - CCTV camera C image degraded. - R OME Cover B heater failure.



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-33</b> (STS-33R)  SEQ FLT #32  KSC-32  PAD 39B-8  MLP-2	OV-103 (Flight 9) Discovery    OMS PODS LPO4 - 6 RPO1- 11 FRC3 - 9	<b>CDR:</b> Frederick D. Gregory (Flt 2 - STS 51-B) P163/R59/V47/M54  <b>PLT:</b> John E. Blaha (Flt 2 - STS-29) P164/R97/V48/M88  <b>M/S 1:</b> Manley L. Carter, Jr. P165/R106/M96  <b>M/S 2:</b> F. Story Musgrave (Flt 3 - STS-6 & STS 51-F) P166/R15/V19/M15  <b>M/S 3:</b> Kathryn C. Thornton P167/R107/F11	KSC 39B  327:00:23:29.98Z 7:23:30 PM EST Wednesday 3 11/22/89 (6)  <b>LANDING SITE PRIORITIES:</b> 1. EDW LAKEBED 2. EDW CONCRETE 3. NOR 4. KSC  RTLS: KSC 15 TAL: Ben Guerir 36 (Selected) CTGY: Banjul AOA: EDW 22  MAX Q = 729.3 M = 1.5 1:02.1 MET  <b>SRB SEP:</b> 2:06.77 MET  <b>MECO:</b> 8:26.9 MET  <b>ET SEP:</b> 8:44 MET  <b>OMS-1:</b> 10:25 MET 66 Seconds  <b>OMS-2:</b> 35:16 MET 95.2 Seconds	EDW 04, CONC (EDW 25,CONC9) (04 - 1ST FLIGHT) 4:30:19 PM PST Monday 8 11/27/89 (5)  <b>DEORBIT BURN:</b> 331:23:10:51Z 181.9 Seconds  <b>XRANGE:</b> 226 NM  <b>ORB DIR:</b> AL 9  <b>AIM PT:</b> CLOSEIN  <b>MLGTD:</b> 740 FT 332:00:30:19Z VEL: 196 KGS 199 KEAS HDOT: -1 FPS  <b>TD NORM 195:</b> 1042 FT  <b>NLGTD:</b> 3982 FT 332:00:30:26Z VEL:161 KGS HDOT: -2.2 FPS  <b>BRK INIT:</b> 149 KGS  <b>AVE BRK DECEL:</b> 8.5 FPS/S  <b>WHEELS STOP:</b> 332:00:30:02Z 8504 FT  <b>ROLLOUT:</b> 7764 FEET 46 SECONDS  <b>WINDS:</b> 070° @ 8 KTS GUSTS TO 19 KTS 7.2H, 3.5R KTS OFFICIAL: 8H, 2R  <b>DENS ALT:</b> 2302 FT  <b>FLT DURATION:</b> 5:00:06:49 120:06:49  <b>S/T:</b> 185:02:13:42  <b>OV-103:</b> 52:06:52:10  <b>DISTANCE:</b> 2,045,056 sm	104/104 109%  100/104/ 97/65/ 104/65  1 = 2011 (4) 2 = 2031 (2) 3 = 2107	BI-034  RSRM 7  ET-38 LWT-31  ET RPT 237K 46:55 MET  T/V OFF  ET IMPACT LAT: 28.57°S LONG: 86.4°E	28.45° (19)	OI-8B (6)	<b>DOD</b>  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 4698 FUEL BIAS: 968 FINAL TDDP:1157 RECON: 653  3 CRYO TK SETS  AMOS VFT-1 APE-B RME-III CLOUDS-1A	KSC W/D: OPF 114, VAB 21, PAD 27 = 162  <b>LAUNCH POSTPONEMENTS:</b> - 11/21/89 launch postponed to 11/22/89 due to SRB IEA cable replacement. 1-day total slip.  <b>LAUNCH SCRUBS:</b> None.  <b>LAUNCH DELAYS:</b> - Launch held at T-5 because of a ground purge problem for GLS confirmation of Shuttle purge flow rate and completion of APU prestart.  <b>TAL WX:</b> - Ben Guerir 36 (prime selected - good weather after marginal ceiling earlier in day. - Banjul contingency site.  <b>I-LOADS:</b> - LSEAT selected nominal ascent I-loads, no uplink required.  <b>NIGHT LAUNCH:</b> Third Shuttle night launch.  <b>WAVEOFFS:</b> - Waved off landing on fourth day due to high winds at EDW and landed one day later.  <b>EVENTS:</b> - No entry blackout, comm via TDRS-W.  <b>SIGNIFICANT ANOMALIES:</b> - APU 1 lube oil outlet pressure high during ascent. - Cabin leak through WCS. - TAGS jam (did not work during flight). - Galley rehydration station failed to dispense hot or cold water. - FES primary B shut down (overtopped during deorbit prep). - +X COAS line of sight shift. - CDR AMI M/VEL error. - MSBLS BITE indication. - WCCS short battery life. - Ku-Band radar self test failure. - Hydraulic system 1 and 2 accumulator pressure locked up low. - Cryo oxygen tank 2 check valve stuck twice.  <b>IFM:</b> - Broken shear pin on WCS so crew used vice grips to drive valve linkage.	



# 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		FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
							INC	HA/HP			
<b>STS-32</b> (STS-32R)  SEQ FLT #33  KSC-33  PAD 39A-25  MLP-3	OV-102 (Flight 9) Columbia  OMS PODS LPO3 - 9 RPO4- 5 FRC2 - 9	CDR: Daniel C. Brandenstein (Flt 3 - STS-8 & STS 51-G) P168/R21/V16/M20  PLT: James D. Wetherbee P169/R108/M97  M/S 1: Bonnie J. Dunbar (Flt 2 - STS 61-A) P170/R79/V49/F7  M/S 2: Marsha S. Ivins P171/R109/F12  M/S 3: G. David Low P172/R110/M98	KSC 39A  09:12:35:00Z 7:35:00 AM EST (P) 7:35:00 AM EST (A) Tuesday 6 1/9/90 (4)  <u>LAUNCH WINDOW:</u> 62 Minutes (PLANAR/PHASE/ ET IMPACT AREA)  <u>RUNWAY PRIORITIES:</u> EDW (PLS)  HEAVY WEIGHT/ FWD CG (LDEF RETURN)  <u>EOM:</u> EDW 22/CONC NOR KSC EDW LAKEBED  RTLS: KSC 33 TAL: Ben Guerir 36 AOA: EDW 22  X-WIND LIMIT > 9 DAYS, 12 KNOTS  MAX Q = 641.1 M = 1.05 00:52 MET  SRB SEP: 2:05 MET  MECO: 8:33 MET  ET SEP: 8:50 MET  OMS-1: NONE  OMS-2: 40:25.6 MET 140 Seconds 218 FPS	EDW 22, CONC (EDW 26, CONC 10) 20:09:35:36.2Z  1:35:36 AM PST Saturday 7 1/20/90 (3)  <u>DEORBIT BURN:</u> 20:08:30:22Z 299.5 Seconds DV 489.7 FPS  <u>XRANGE:</u> 372 NM  ORB DIR: AL10  AIM PT: NOM  MLGTD: 2399 FT 20:09:35:36.2Z VEL: 209 KGS 207 KEAS HDOT: -1 FPS  TD NORM 195: 3100 FT  NLGTD: 6606 FT 20:09:35:51.5Z VEL: 160 KGS HDOT: -2.7 FPS  BRK INIT: 141 KGS  <u>AVE BRK DECEL:</u> 6.3 FPS/S  <u>WHEELS STOP:</u> 20:09:35:39.3Z 12495 FEET  <u>ROLLOUT:</u> 10731 FEET 64 SECONDS  <u>WINDS:</u> 1.9H, 3.5R KTS OFFICIAL: 1H, 4R  <u>DENS. ALT:</u> 923 FT  <u>FLT DURATION:</u> 10:21:00:36 261:00:36  <u>S/T:</u> 195:23:14:18  OV-102: 56:23:54:56  <u>DISTANCE:</u> 4,509,972 sm	104/104 109%  100/104/ 102/65/ 104/65  1 = 2024 (1) 2 = 2022 (4) 3 = 2028 (4)  ET RPT 228K 1:18:32 MET  ET BR/UP 189K 1:19:35 MET  T/V OFF  ET IMPACT LAT: 10.44°N LONG: 157.2°W	BI-035  RSRM 8  ET-32 LWT-25  ET 1:18:32 MET  ET BR/UP 189K 1:19:35 MET  T/V OFF  ET IMPACT LAT: 10.44°N LONG: 157.2°W	28.5° (20)	<u>DIRECT INSERTION</u>  <u>POST OMS-2</u> 193.48 X 155.76 NM  <u>SYNCOM DEPLOY</u> 169.09 NM  <u>LDEF RETRIEVE</u> 178.3NM	OI-8C (2)	CARGO: 26458 lbs  PAYLOAD CHARGEABLE: 18317 lbs  <u>DEPLOYABLE:</u> 15316 lbs  <u>NON-DEPLOYED:</u> 1962 lbs  <u>MIDDECK:</u> 1039 lbs  <u>RETRIEVED (LDEF)</u> 21393 lbs  <u>RETURNED:</u> 32565 lbs  <u>SHUTTLE ACCUMULATED WEIGHTS:</u> <u>DEPLOYED:</u> 453472 lbs <u>NON-DEPLOYED:</u> 398517 lbs <u>CARGO TOTAL:</u> 963624 lbs  <u>PERFORMANCE MARGINS (LBS):</u> FPR: 4698 FUEL BIAS: 968 FINAL TDDP: 1956 RECON: 992  <u>PAYLOADS:</u> PLB: LONG DURATION EXPOSURE FACILITY (LDEF) RETRIEVAL AND RETURN  SYNCOM IV-5 (DEPLOYED)  <u>MIDDECK</u> IOCM IMAX CNCR, PCG (2) FEA, AFE, MLE L3 (LLL) AMOS ACIP AADS  5 CRYO TK SETS  RMS 20 (S.N. 201) Used for LDEF capture and berth, and PKM burn monitor	KSC W/D: OPF 86, VAB 10, PAD 33 = 129  <u>LAUNCH POSTPONEMENTS:</u> - 12/18/89 launch postponed 21 days to 1/8/90 due to delays in readiness of pad 39A after pad modification, holidays, and Orbiter aft PCA R&R.  <u>LAUNCH SCRUBS:</u> - 1/8/90 launch scrubbed after holding at T-9 minutes, then counting down to T-5 minutes and holding until launch window expired when RTLS weather did not improve (low ceiling/fog). Rescheduled launch for 1/9/90. - 22-day total slip.  <u>LAUNCH DELAYS:</u> None.  <u>TAL WX:</u> - Ben Guerir 36 (prime) - selected - good weather.  <u>I-LOADS:</u> - LSEAT selected yaw positive I-Load - alternate I-Load uplink 2.  <u>LAUNCH TARGETING COMMAND LOAD:</u> - Uplinked load for inertial plane of LDEF.  <u>FLIGHT DURATION CHANGE:</u> - Extended 1 day due to fog at PLS (EDW) and unacceptable weather at NOR and KSC. - Plus One rev to reload BFS into extended GPC2.  <u>NIGHT LANDING:</u> Third Shuttle night landing.  <u>FIRSTS:</u> - First flight from pad 39A since STS 61-A.  <u>EVENTS:</u> - SYNCOM-IV-F5 deployed at 1:00:43:39 MET (rev 17). - Rendezvous with Long Duration Exposure Facility (LDEF) as planned, with grapple at 3:02:41:05 MET (rev 50). LDEF was deployed on STS 41-C. - No blackout during entry, comm via TDRS-W. - Deorbit burn O-O-P component of 51° with longest OMS burn time of 299.5 seconds.  <u>RENDEZVOUS 8:</u> With LDEF for capture and return.  Continued . . .



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-32											Continued . . .
Continued											<p><u>SIGNIFICANT ANOMALIES:</u></p> <ul style="list-style-type: none"> <li>- GPC 5 (BFS) registered illegal engage input/output term B during final entry checks. BFS was loaded into GPC2. GPC set restrung and GPC5 powered off. (Landing was delayed one revolution.)</li> <li>- FM transmitter failed.</li> <li>- APU 3 lubrication oil outlet pressure high (90 psi)</li> <li>- TAGS paper jammed.</li> <li>- GOX FCV 2 open cycle sluggish.</li> <li>- Humidity separator water bypass anomalies (free water from SEP B and SEP A).</li> <li>- Waste water dump line blockage at 18:13:29:00Z, no dumps performed subsequently.</li> <li>- FES topping duct B string heater failure.</li> <li>- IMU 1 RM failed (transient 4-axis accel-bias.</li> <li>- Hydraulic systems 1 and 2 circ pump unloader valves excessive leakage.</li> <li>- BFS GPC errors.</li> <li>- At 17:23:46:51Z during sleep period, a bad state vector was uplinked just prior to LOS, Orbiter rotated 3°/sec.</li> <li>- WSB sys 2 and 3 excessive regulator pressure decay.</li> <li>- RMS was used to conduct external survey (TPS).</li> <li>- Multiple S-Band dropouts.</li> <li>- Smoke detector 3A transient alarm.</li> <li>- WBS 3 controller A over controlling.</li> <li>- Ku-Band antenna feed heater erratic.</li> <li>- MPS LH2 F&amp;D (outboard) relief valve leak.</li> <li>- Pilot seat would not drive down.</li> <li>- CCTV camera problems.</li> <li>- Heaviest landing at 228,335 lbs.</li> </ul>

# 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		FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
							INC	HA/HP			
<b>STS-36</b> (STS-36R)  SEQ FLT #34  KSC-34  PAD 39A-26  MLP-1	OV-104 (Flight 6) Atlantis  OMS PODS LPO1 - 12 RPO3- 11 FRC4 - 6	CDR: John O. Creighton (Flt 2 - STS 51-G) P173/R63/V50/M58  PLT: John H. Casper P174/R111/M99  M/S 1: David C. Hilmers (Flt 3 - STS 51-J & STS-26) P175/R77/V36/M71  M/S 2: Richard M. Mullane (Flt 3 - STS 41-DR & STS-27) P176/R40/V37/M39  M/S 3: Pierre J. Thuot P177/R112/M100	KSC 39A  59:07:50:22Z 2:50:22 AM EST Wednesday 4 2/28/90 (2)  LANDING SITE PRIORITIES: 1. EDW LAKEBED 2. EDW CONCRETE 3. NOR 4. KSC  1. X-WIND FIRST PRIORITY 2. NWS SECOND PRIORITY  RTLS: KSC 15 TAL: Zaragoza 30 (Selected) TAL WX: Moron AOA: NOR 17  MAX Q = 743.9 M = 1.49 00:53 MET  SRB SEP: 2:05.8 MET  MECO: 8:30 MET  ET SEP: 8:48 MET  OMS-1: NONE  OMS-2: 32:58.1 MET 105.4 Seconds  MCC FCR-2 (19)  FLIGHT DIRECTORS: A/E - R. D. Dittmore Ld/O 1 - L. S. Bourgeois O 2 - R. M. Kelso Ping - C. R. Knarr MOD - T. W. Holloway	EDW 23L, LKBD (EDW 27, LKBD 17) 63:18:08:44Z 10:08:44 AM PST  Sunday 4 3/4/90 (3)  DEORBIT BURN: 63:17:11:17.24Z 125.48 Seconds 256.4 FPS  XRANGE: 255 NM  ORB DIR: DR 5  AIM PT: CLOSEIN  MLGTD: 1622 FT 63:18:08:44Z VEL: 193 KGS 199 KEAS HDOT: -1 FPS  TD NORM 195: 1959 FT  NLGTD: 4862 FT 63:18:09:37.32Z VEL:145 KGS HDOT: -4.4 FPS  BRK INIT: 99 KGS  AVE BRK DECEL: 5.5 FPS/S  WHEELS STOP: 63:18:09:37.3Z 9522 FEET  ROLLOUT: 7900 FEET 53 SECONDS  WINDS: 15.9H, 1.6R KTS OFFICIAL: 16H, 3R  DENS ALT: 3017 FT  FLT DURATION: 4:10:18:22 106:18:22  S/T: 200:09:32:40  OV-104: 28:18:49:13  DISTANCE: 1,837,962 sm	104/104 109%  100/104/ 98/75/ 104/65  1 =2019 (6) 2 =2030 (4) 3 =2027 (4)  1=2019 (6) 2 =2030 (4) 3 =2027 (4)  ET RPT 228K 1:00:35 MET  ET BR/UP 217K 1:00:53 MET  T/V ACTIVE LAST FLIGHT  ET IMPACT LAT: 61.40°S LONG: 145.1°E	BI-036  RSRM 9  ET-36 LWT-26  ET RPT 228K 1:00:35 MET  T/V ACTIVE LAST FLIGHT  ET IMPACT LAT: 61.40°S LONG: 145.1°E	62° (1)	HA/HP	OI-8C (3)	DOD  PERFORMANCE MARGINS (LBS): FPR: 4652 FUEL BIAS: 999 FINAL TDDP: 881 RECON: 930  MIDDECK RME-III VFT-I VFT-II	KSC W/D: OPF 69, VAB 6, PAD 35 = 110  LAUNCH POSTPONEMENTS: None.  LAUNCH SCRUBS: - 2/22/90 launch was scrubbed while counting from T-11 hours to T-6 hours for CDR's health (48-hour slip). - 2/24/90 launch scrubbed because of predicted bad weather at KSC. - 2/25/90 launch scrubbed due to a Range Safety backup computer problem. Count held at T-31 seconds, and during hold, the LO2 inlet temps on all 3 engines exceeded LCC lower limit. Rescheduled launch for 2/26/90. - 2/26/90 launch scrubbed at T-9 minutes due to bad RTLS weather (cloudy). Rescheduled launch for 2/28/90. 48-hour delay to allow launch team rest. 6 days total slip.  LAUNCH DELAYS: - Delay at T-9 minutes due to predicted rain in RTLS area. Resumed count to T-5 minutes, held for launch pad, RTLS, and TAL weather.  TAL WX: - Zaragoza 30 (prime) - Some delay waiting for STA go (until STA could see landing strip). - Moron - NO GO - ceiling.  I-LOADS: - LSEAT selected yaw positive, alternate I-load uplink 3.  NIGHT LAUNCH: Fourth Shuttle night launch.  EVENTS: - No entry blackout - comm via TDRS-W. - Last flight with ET tumble valve active.  SIGNIFICANT ANOMALIES: - AC2 Phase 2 Inverter failure. - RCS valve position indications intermittent. - WSB 2 Vent System A heater failed. - CRT 4 screen went blank. - SSME post powerdown hard failure ID. - O2 leak into cabin. - FES overtemp shutdown. - Humidity separator A degraded operation (found 1 quart of water below middeck floor). - Supply H2O tank A-B check valve failure. - PLB floodlight failure (2). - SPOC H/W and S/W problems. - Volume H latch jammed. - TAGS paper folding. - WSB 2 vent temp heater A failure. - Hyd system leak into aft compartment. - R3D fail-off at ET SEP. - R4R jet fail-off during RCS hot fire.





# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-31 (STS-31R) SEQ FLT #35 KSC-35 PAD 39B-9 MLP-2 (WAS STS 61-J)	OV-103 (Flight 10) Discovery  OMS PODS LPO4 - 7 RPO1- 12 FRC3 - 10	<p><u>CDR:</u> Loren J. Shriver (Flt 2 - STS 51-C) P178/R50/V51/M46</p> <p><u>PLT:</u> Charles F. Bolden (Flt 2 - STS 61-C) P179/R88/V52/M80</p> <p><u>M/S 1:</u> Steven A. Hawley (Flt 3 - STS 41-DR &amp; STS 61-C) P180/R39/V29/M38</p> <p><u>M/S 2:</u> Kathryn D. Sullivan (Flt 2 - STS 41-G) P181/R44/V53/F3</p> <p><u>M/S 3:</u> Bruce McCandless II (Flt 2 - STS 41-B) P182/R31/V54/M30</p>	<p>KSC 39B</p> <p>114:12:33:51Z 8:31:00 AM EDT (P) 8:33:51 AM EDT (A) Tuesday 7 4/24/90 (6)</p> <p><u>LAUNCH WINDOW:</u> 2H30M (CREW TIME ON BACK)</p> <p><u>LANDING SITE PRIORITIES:</u> NOEM: EDW LKBD - Prime</p> <p><u>RTLS:</u> KSC 15</p> <p><u>TAL:</u> Banjul (PRI) (Planned)</p> <p><u>ALT TAL:</u> Ben Guerir 36 (Selected)</p> <p><u>AOA or P/L Return:</u> 1. EDW 22/04 2. EDW LKBD 3. NOR 4. KSC</p> <p><u>AOA:</u> NOR 23</p> <p>MAX Q = 656.3 M = 1.08 00:52 MET</p> <p><u>SRB SEP:</u> 2:05.75 MET</p> <p><u>MECO:</u> 8:30 MET</p> <p><u>ET SEP:</u> 8:48 MET</p> <p><u>OMS-1:</u> NONE</p> <p><u>OMS-2:</u> 42.36 MET 305 Seconds</p>	<p>EDW 22. CONC (EDW 28. CONC 11) 119:13:49:57Z</p> <p>6:49:57 AM PDT Sunday 5 4/29/90 (5)</p> <p><u>DEORBIT BURN:</u> 119:12:37:36Z</p> <p><u>XRANGE:</u> 420 NM</p> <p><u>ORB DIR:</u> DL 17</p> <p><u>AIM PT:</u> NOM</p> <p><u>MLGTD:</u> 1176 FT 119:13:49:57Z VEL: 180 KGS 177 KEAS HDOT: -4 FPS</p> <p><u>ID NORM 195:</u> - 130 FT</p> <p><u>NLGTD:</u> 4560 FT 119:13:50:09Z VEL:143 KGS HDOT: -3.3 FPS</p> <p><u>BRK INIT:</u> 120 KGS</p> <p><u>AVE BRK DECEL:</u> 5.9 FPS/S</p> <p><u>WHEELS STOP:</u> 119:13:50:58Z 10065 FEET</p> <p><u>ROLLOUT:</u> 8874 FEET 61 SECONDS</p> <p><u>WINDS:</u> 180° @ 7 KTS GUSTS TO 10 KTS 4.1H, 5.7L KTS</p> <p><u>OFFICIAL:</u> 7H, 5L</p> <p><u>DENS. ALT:</u>2993 FT</p> <p><u>FLT DURATION:</u> 5:01:16:06 121:16:06</p> <p><u>S/T:</u> 205:10:48:46</p> <p><u>OV-103:</u> 57:08:08:16</p> <p><u>DISTANCE:</u> 2,068,213 sm</p>	<p>104/104 109%</p> <p>100/104/97/ 67/104/65</p> <p>1 = 2011 (5) 2 = 2031 (3) 3 = 2107 (2)</p> <p>119:13:49:57Z</p> <p>119:13:50:09Z</p> <p>119:13:50:58Z</p> <p>8874 FEET</p> <p>180° @ 7 KTS GUSTS TO 10 KTS 4.1H, 5.7L KTS</p> <p>5:01:16:06 121:16:06</p> <p>205:10:48:46</p> <p>57:08:08:16</p> <p>2,068,213 sm</p>	<p>BI-037  RSRM 10  ET-34 LWT-27  ET RPT 251K 1:24:18 MET  ET BR/UP 215K 1:25:14 MET  TV OFF ON ALL SUBS FLTS  ET IMPACT LAT: 19.95°N LONG: 150.0°W</p>	<p>28.453° (21)</p> <p>DIRECT INSERTION</p> <p>POST OMS-2 330.63 X 310.80 NM</p> <p>HST DEPLOY 333.06 NM</p>	<p>OI-8C (4)</p> <p>CARGO: 28643 lbs</p> <p>PAYLOAD CHARGEABLE: 25517 lbs</p> <p>DEPLOYABLE: 23095 lbs</p> <p>NON-DEPLOYED: 960 lbs</p> <p>MIDDECK: 652 lbs</p> <p>RETURNED: 4768 lbs</p> <p>SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 476567 lbs NON-DEPLOYED: 400129 lbs CARGO TOTAL: 992267 lbs</p> <p>PERFORMANCE MARGINS (LBS): FPR: 4652 FUEL BIAS: 994 FINAL TDDP: 2861 * RECON: 1352</p> <p>PAYLOADS: PLB: HUBBLE SPACE TELESCOPE (HST) (DEPLOYED)</p> <p>ICBC (IMAX) APM</p> <p>VELOCITY 26120 FPS</p> <p>RANGE 4121 NM</p>	<p>KSC W/D: OPF 78, VAB 9, PAD 39 = 126</p> <p><u>LAUNCH POSTPONEMENTS:</u> None.</p> <p><u>LAUNCH SCRUBS:</u> - 4/10/90 launch scrubbed during hold at T-4 minutes due to APU anomalies. Rescheduled launch for 4/24/90 (APU 1 R&amp;R). 14 days total slip.</p> <p><u>LAUNCH DELAYS:</u> - 2M51S delay during hold at T-31 seconds to manually close F&amp;D valve after failure to close by GLS (procedural enhancement problem).</p> <p><u>TAL WX:</u> - Banjul (prime) - NO GO because redundant TACAN's down, WX marginal but acceptable. - Ben Guerir 36 (alternate ) selected - marginal but GO.</p> <p><u>I-LOADS:</u> - LSEAT selected nominal I-loads, no uplink required.</p> <p><u>FLIGHT DURATION CHANGE:</u> None.</p> <p><u>FIRSTS/RECORDS:</u> - First planned use of Banjul at primary TAL. - First flight with carbon brakes. - Highest Shuttle altitude to date - 333 NM. - Longest OMS burn - 305 seconds.</p> <p><u>EVENTS:</u> - HST deployed on rev 20 (1 rev later than planned). - No entry blackout.</p> <p><u>ET REENTRY (NO TUMBLE):</u> - ARGUS - Rupture altitude 246K feet. - AMOS/MOTIF - Tumble rate 7 deg/second. - KPTC RADAR - Max. DV 670 FPS. - VHF RADAR: - Number of pieces &gt; 3 feet - 68. - Debris scatter: 200 NM (UR/DR) 40 NM CR.</p> <p><u>SIGNIFICANT ANOMALIES:</u> - Cabin depressed to 10.2 PSIA for approximately 72 hours. - Supply water tank C bellows stuck. - Fuel cell 2 purge anomaly. - SPOC failures. - ADTA 3 CB contamination. - TAGS problems. - WSB 2 steam vent heater A failure. - 70 mm camera jam. - L3A jet failed off, L3A fail leak. - Erratic ROMS fuel engine inlet pressure. - HST solar array deploy problem.</p> <p>3 CRYO TK SETS</p> <p>RMS 21 (S.N. 301) USED FOR HST DEPLOY</p>		



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-41</b>  SEQ FLT #36  KSC-36  PAD 39B-10  MLP-2  (Was STS 61-F)	OV-103 (Flight 11) Discovery  OMS PODS LPO4 - 8 RPO1- 13 FRC3 - 11  M/S 1: Bruce E. Melnick P185/R114/R102  M/S 2: Thomas D. Akers P186/R115/M103  M/S 3: William M. Shepherd (Flt 2 STS-27) P187/R96/V56/M87	CDR: Richard N. Richards (Flt 2 - STS-28) P183/R101/V55/M92  PLT: Robert D. Cabana P184/R113/M101  M/S 1: Bruce E. Melnick P185/R114/R102  M/S 2: Thomas D. Akers P186/R115/M103  M/S 3: William M. Shepherd (Flt 2 STS-27) P187/R96/V56/M87  MCC FCR-1 (17)  FLIGHT DIRECTORS: A/E/O1 - R. D. Dittmore Ld/O 2 - J. M. Hefflin Plng - G. E. Coen MOD - T. W. Holloway MDR - R. M. Kelso	KSC 39B  279:11:47:14.98Z 7:35:00 AM EDT (P) 7:47:15 AM EDT (A) Saturday 2 10/6/90 (5)  LAUNCH WINDOW: 2H17M (ULYSSES UPPER STAGE PERFORMANCE)  LANDING SITE PRIORITIES: NOEM: EDW Lakebed - Prime  RTLS: KSC 33  TAL: Banjul  TAL WX: Ben Guerir 36 (Selected)  AOA: NOR 17  MAX Q = 665 M = 00:49 MET  SRB SEP: 2:06 MET  MECO: 8:28 MET  ET SEP: 8:46 MET  OMS-1: None  OMS-2: 39:53.3 MET 144 Seconds (223.3 FPS)	EDW 22, CONC (EDW 29, CONC 12) 283:13:57:19Z  6:57:19 AM PDT Wednesday 3 Saturday 5 10/10/90 (5)  DEORBIT BURN: 283:13:00:05Z (150 Seconds DV 286.6)  XRANGE: 492 NM  ORB DIR: DL 18  AIM PT: NOM  MLGTD: 2295 FT 283:13:57:19Z VEL: 193 KGS 192 KEAS HDOT: -1 FPS  TD NORM 195: 2315 FT  NLGTD: 6359 FT 283:13:57:31Z VEL: 154 KGS HDOT: -2.7FPS  BRK INIT: 135 KGS  AVE BRK DECEL: 9 FPS/S  WHEELS STOP: 283:13:58:08Z 10827 FEET  ROLLOUT: 8478 FEET 49 SECONDS  WINDS: Light & Variable Peak 3 Kts 2.3H, 2 R KNOTS OFFICIAL: 2H, 2R  DENS. ALT: 1308 FT  FLT DURATION: 4:02:10:04 98:10:04  S/T: 209:12:58:50  OV-103: 61:10:18:20  DISTANCE: 1,707,445 sm	100/100/109%  ACTUAL: 100/104/101/67/104/65  1 = 2011 (6) 2 = 2031 (4) 3 = 2107 (3)  M 3 EOM  WEIGHT: 196892  X CG: 1089.4  LANDING  WEIGHT: 196869  X CG: 1091.2	BI-040  RSRM 13  ET-39  ET RPT 239K 1:16:20 MET  ET BR/UP 177K 1:17:50 MET  ET IMPACT LAT: 12.52°N LONG: 164.1°W	28.45° (22)  DIRECT INSERTION  POST OMS-2 160.2 X 159.5 NM  ULYSSES DEPLOY 160 X 159 NM  POST SEP BURN 177.9 X 160 NM	OI-8D (1)  DEORBIT 162.4 X 151.4 NM  VELOCITY 25762 FPS  RANGE 4147 NM	CARGO: 49969 LBS  PAYLOAD CHARGEABLE: 46173 LBS  DEPLOYABLE: 38604 LBS  NON-DEPLOYED: 6732 LBS  MIDDECK: 837 LBS  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 515171 LBS NON-DEPLOYED: 407698 LBS CARGO TOTAL: 1042236 LBS  PERFORMANCE MARGINS (LBS): FPR: 4652 FUEL BIAS: 994 FINAL TDDP: 1270 RECON: -152  PAYLOADS: PLB: ULYSSES/IUS/PAM-S (SOLAR ORBIT) DEPLOYED  SSBUV ISAC  MID-DECK: CHROMEX VCS SSCE IPMP PSE RME-III AMOS  3 CRYO TK SETS  RMS 22 (S.N. 301) Used for INTELSAT solar array coupon (witness plate) exposure	KSC W/D: OPF 109, VAB 8, PAD 32 = 149  LAUNCH POSTPONEMENTS: Launch postponed from 10/5/90 to 10/6/90 in late September.  LAUNCH SCRUBS: None.  LAUNCH DELAYS: - 10M43S delay at T-9 minutes due to rain showers 14 miles north of RTLS runway. - Countdown held at T-5 minutes for 10 seconds to mask GLS WSB 2 indication. - 1M22S delay at T-31 seconds due to P/L- Orbiter I/F and duct pressures out of limits. - 12M15S total delay.  TAL WX: - Banjul (prime) - Marginal WX, recent rain. - Ben Guerir (alt) selected - solid GO WX.  I-LOADS: LSEAT selected nominal I-loads, no uplink required.  FIRSTS: - First flight with all 3 Orbiters in vertical; OV-103/STS-41 on pad B, OV-102/STS-35 on pad A, OV-104/STS-38 in VAB. - First flight after MPS LH2 leaks found in STS-35 and STS-38. - First flight using fixed (shimmed) GOX FCV's (step 1). - First flight with SRB using redesigned field joint protection system.  EVENTS: - RMS parked at 1:03:35 MET with INTELSAT solar array coupon in velocity vector to witness potential solar array damage. - ULYSSES deployed at 06:01:06 MET. - No entry blackout. - Conducted RCS Hot Fire using extended firing durations (640 msecs) to attempt nitrate removal.  SIGNIFICANT ANOMALIES: - MC4 (SM2) NBAT had GPC 2 assigned to FC string 3. - IMU 1 RM fail (experiencing transient 2 axis accelerometer shifts). - APU 1 GG/fuel pump heater B failed on. - Ammonia boiler PRI A controlled low, 31.6° evap out temp. - Hydraulic Sys #2 priority valve sluggish at startup. - Debris plunger (EO-2) fail to seat/ ordnance pieces found on runway. - Crescent shaped debris (22") in video camera views during Ulysses deploy. - Haz gas grab bottles indicated max 37,000 SCIM's during ascent (upward trend).	



# 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		FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
							INC	HA/HP			
<b>STS-38</b>  SEQ FLT #37  KSC-37  PAD 39A-27  MLP-1	OV-104 (Flight 7) Atlantis  OMS PODS LPO1 - 13 RPO3 - 12 FRC4 - 7	<p><b>CDR:</b> Richard O. Covey (Flt 3 - STS 51-I &amp; STS-26) P188/R73/V34/M67</p> <p><b>PLT:</b> Frank L. Culbertson P189/R116/M104</p> <p><b>M/S 1:</b> Carle J. Meade P190/R114/M105</p> <p><b>M/S 2:</b> Robert C. Springer (Flt 2 - STS-29) P191/R98/V57/M89</p> <p><b>M/S 3:</b> Charles D. Gemar P192/R118/M106</p> <p>MCC FCR-2 (20)</p> <p><b>FLIGHT DIRECTORS:</b> Asc/Ent - A. L. Briscoe O 1 - R. M. Kelso Ld/O 2 - C. R. Knarr Plng - C. W. Shaw MOD - B. R. Stone</p>	KSC 39A  319:23:48:15Z 6:48:15 PM EST Thursday 9 11/15/90 (7)  PLS: EDW  RTLS: KSC  TAL: Banjul (Selected)  TAL WX: Ben Guerir  SELECTED: RTLS: KSC 15 TAL: BYD 32 AOA: EDW 22  MAX Q: 00:49 MET  SRB SEP: 2:03 MET  MECO: 8:29 MET  ET SEP: 8:47 MET  OMS-1: 10:30 MET  OMS-2: 47:43 MET	KSC 33 (KSC 6)  324:21:42:42Z 4:42:42 PM EST Tuesday 8 11/20/90 (6)  DEORBIT BURN: 324:20:46:15Z  X RANGE: 3 NM  ORB DIR: DL 19  AIM PT: CLOSE IN  MLGTD: 1414 FT 324:21:42:42Z VEL: 195 KGS 199 KEAS HDOT: -1 FPS  TD NORM 195: 1850 FT  NLGTD: 4600 FT 324:21:42:52Z VEL: 162 KGS HDOT: -3.1 FPS  BRK INIT: 127 KGS  AVE BRK DECEL: 7 FPS/S  WHEELS STOP: 324:21:43:39Z 10417 FEET  ROLLOUT: 9003 Feet 57 Seconds  WINDS: 4H, 4.4R KTS OFFICIAL: 4H, 4R  DENS. ALT: 387 FT  FLT DURATION: 4:21:54:27 117:54:27  S/T: 214:10:53:17  OV-104: 33:16:43:40  DISTANCE: 2,045,056 sm	104/104/ 109%  ACTUAL: 100/104/ 104/72/ 104/65  1 = 2019 (7) 2 = 2022 (5) 3 = 2027 (5)  M 3 EOM  WEIGHT:  X CG:  LANDING  WEIGHT: 191091  X CG: 1098.6	BI-039  RSRM 12  ET-40 LWT-33  ET RPT 222K 47:10 MET  ET BR/UP 181K 47:56 MET  ET IMPACT LAT: 28.52°S LONG: 84.9°W	28.45° (23)  STANDARD INSERTION  DEORBIT BURN 114.9 SECS 228.5 FPS  DEORBIT 142 X 115 NM  VELOCITY 25729 FPS  ENTRY RANGE 4146 NM  OMS BURN 114.9 SECS 228.5 FPS	OI-8D (2)  DOD  PERFORMANCE MARGINS (LBS): FPR: 4652 FUEL BIAS: 994 FINAL TDDP: 863 RECON: 474  SECONDARY PAYLOADS: APE VFT-1 RME-III AMOS APM  S-BAND XPONDERS ON SRB'S	<p>KSC W/D: OPF 134 (2), VAB 26 (3), PAD 85 (2) = 245</p> <p><b>LAUNCH POSTPONEMENTS:</b>                      - As of Jan 1990, launch date was 7/9/90. On 5/29/90, OV-102/STS-35 launch was scrubbed because of excessive H2 leak in aft compartment. Special H2 tanking tests were performed on OV-104/STS-38.                      - 6/18/90 - STS-38 rolled out to Pad A. Scheduled launch 7/9.                      - 6/29/90 - LH2 Tanking Test #1 - Excessive H2 leak detected in umbilical area.                      - 7/13/90 - LH2 Tanking Test #2 - Excessive H2 leak detected in umbilical and plate gap areas.                      - 7/25/90 - LH2 Tanking Test #3 - Excessive H2 leak ET 17" disconnect flange area. Decision made to roll back and fix leak.                      - 8/9/90 - Rolled stack back to VAB.                      - 8/15/90 - OV-104 to OPF. Umbilical removed from ET-37 and sent to MSFC and RI-D for tests. Subsequently, found follower arm seal and shaft seal leaks in tests. Decision to use ET-40 after replacing LH2 umbilical.                      - 10/13/90 - Rolled out to Pad A.                      - 10/24/90 - LH2 Tanking Test #4 successful.                      - Launch scheduled for 11/15/90. 129-day slip.</p> <p><b>LAUNCH SCRUBS:</b> None during second time at pad.</p> <p><b>LAUNCH DELAY:</b>                      Launch delayed because Range Bermuda command link out of service.</p> <p><b>TAL WX:</b>                      - Banjul - GO (weather good).                      - Ben Guerir - GO (weather good).</p> <p><b>I-LOADS:</b>                      - Due to seasonal slip in launch, pitch negative became pitch nominal, which LSEAT selected, and was uplinked (Uplink 4).</p> <p><b>NIGHT LAUNCH:</b> Fifth Shuttle night launch.</p> <p><b>WAVEOFFS:</b>                      - Waved off on fourth day because of excessive head and crosswinds on all three landing opportunities at EDW.                      - Extended one rev to land at KSC because of high winds predicted at EDW.</p> <p>Continued . . .</p>		





# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-35 (STS 61-E)	OV-102 (Flight 10) Columbia	<p>CDR: Vance D. Brand (Flt 3 - STS-5 &amp; STS 41B) P193/R9/V4/M9</p> <p>PLT: Guy S. Gardner (Flt 2 - STS-27) P194/R95/V58/M86</p> <p>M/S 1: John M. Lounge (Flt 3 - STS 51-I &amp; STS-26) P195/R74/V35/M68</p> <p>M/S 2: Jeffrey A. Hoffman (Flt 2 - STS 51-D) P196/R57/V59/M52</p> <p>M/S 3: Robert A. R. Parker (Flt 2 - STS-9) P197/R27/V60/M26</p> <p>P/S 1: Ronald A. Parise (CSC) P198/R119/M107</p> <p>P/S 2: Samuel T. Durrance John Hopkins University P199/R120/M108</p>	<p>KSC 39AB</p> <p>336:06:49:01Z 1:28:00 AM EST (P) 1:49:01 AM EST (A) Sunday 4 12/02/90 (2)</p> <p>LAUNCH WINDOW 2H30M (CTOB)</p> <p>RTLS: KSC-15</p> <p>TAL: Banjul 32</p> <p>TAL WX: Ben Guerir Moron</p> <p>SELECTED: TAL: BYD 32 RTLS: KSC 15 AOA: EDW 22 PLS: EDW22</p> <p>AOA: EDW 22</p> <p>MAX Q: 696 PSF 00:50 MET</p> <p>SRB SEP: 2:06 MET</p> <p>MECO: 8:32 MET</p> <p>ET SEP:</p> <p>OMS-1: NONE</p> <p>OMS-2: 40:24.7 MET 180.3 SECS 179.1 FPS</p> <p>MCC FCR-1 (18)</p> <p>FLIGHT DIRECTORS: Asc/Ent - N. W. Hale Ld/O 1 - G. E. Coen O 2 - G. A. Pennington O 3 - R. E. Castle MOD - T. W. Holloway</p>	<p>EDW 22 CONC (EDW 30, CONC 13) 345:05:54:09Z</p> <p>9:54:09 PM PST Monday 9 12/10/90 (4)</p> <p>DEORBIT BURN: 345:04:48:31Z 230.5 SECS,383 FPS</p> <p>XRANGE: 426 NM</p> <p>ORB DIR: DL 20</p> <p>AIM PT: CLOSEIN</p> <p>MLGTD: 1535 FT 345:05:54:09Z VEL: 208 KGS 201 KEAS HDOT: -1 FPS</p> <p>TD NORM 195: 2247 FT</p> <p>NLGTD: 5559 FT 345:05:54:20Z VEL:168 KGS HDOT: -3.9 FPS</p> <p>BRK INIT: 136 KGS</p> <p>AVE BRK DECEL: 7.2 FPS/S</p> <p>WHEELS STOP: 345:05:55:06Z 12101 FEET</p> <p>ROLLOUT: 10450 Feet 58 Seconds</p> <p>WINDS: 0.7 T, 0.7 R KTS OFFICIAL: 1T, 1R</p> <p>DENS ALT: 1143 FT</p> <p>FLT DURATION: 8:23:05:08 215:05:08</p> <p>S/T: 223:09:58:25</p> <p>OV-102: 65:23:00:04</p> <p>DISTANCE: 3,728,636 sm</p>	<p>104/104/ 109%</p> <p>100/104/ 71/104/65</p> <p>1 = 2024 (2) 2 = 2012 (11) 3 = 2028 (5)</p> <p>XRANGE: 426 NM</p> <p>AIM PT: CLOSEIN</p> <p>MLGTD: 1535 FT 345:05:54:09Z VEL: 208 KGS 201 KEAS HDOT: -1 FPS</p> <p>TD NORM 195: 2247 FT</p> <p>NLGTD: 5559 FT 345:05:54:20Z VEL:168 KGS HDOT: -3.9 FPS</p> <p>BRK INIT: 136 KGS</p> <p>AVE BRK DECEL: 7.2 FPS/S</p> <p>WHEELS STOP: 345:05:55:06Z 12101 FEET</p> <p>ROLLOUT: 10450 Feet 58 Seconds</p> <p>WINDS: 0.7 T, 0.7 R KTS OFFICIAL: 1T, 1R</p> <p>DENS ALT: 1143 FT</p> <p>FLT DURATION: 8:23:05:08 215:05:08</p> <p>S/T: 223:09:58:25</p> <p>OV-102: 65:23:00:04</p> <p>DISTANCE: 3,728,636 sm</p>	<p>BI-038</p> <p>RSRM 11</p> <p>ET-35 LWT-27</p> <p>ET RPT 233K 1:18:39 MET</p> <p>ET BR/UP 203K 1:19:27 MET</p> <p>ET IMPACT LAT: 15.09°N LONG: 159.0°W</p>	<p>28.457° (24)</p> <p>DIRECT INSERTION</p> <p>INSERTION ALTITUDE: 190.4 X 188.2 NM</p>	<p>OI-8D (3)</p> <p>CARGO: 33037 LBS</p> <p>CHARGEABLE: 27760 LBS</p> <p>DEPLOYED: 0 LBS</p> <p>NON-DEPLOYED: 25968 LBS</p> <p>MIDDECK: 1792 LBS</p> <p>RETURNED:</p> <p>SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 515171 LBS NON-DEPLOYED: 435458 LBS CARGO TOTAL: 1075273 LBS</p> <p>PERFORMANCE MARGINS (LBS): FPR: 4652 FUEL BIAS: 994 FINAL TDDP: 4131 RECON: 3812</p> <p>PAYLOADS: PLB: ASTRO-1: IPS, HUT, WUPPE, UIT, BBXRT (ASTRONOMY)</p> <p>MIDDECK: AMOS SAREX-II UVPI</p> <p>5 CRYO TK SETS</p> <p>NO RMS</p>	<p>KSC W/D: OPF 126 (2), VAB 16 (3), PAD 153 (3) = 295</p> <p>LAUNCH POSTPONEMENT: - As of 1/90, launch date was 5/9/90. Post-poned to 5/30/90 due to P/L argon servicing, LOX system leak, and FCL coolant valve contamination (low flow). 21-day slip.</p> <p>LAUNCH SCRUBS: - Scrubbed 5/29/90 launch during tanking due to excessive H2 leak in aft compartment. - Failed 6/6/90 special LH2 tanking test, excessive H2 leak in aft compartment. - 6/13/90 - Rolled back from Pad A to VAB. - 6/15/90 - OV-102 to OPF. Both OV-102 and ET-35 LH2 umbilicals sent to RI-D for special LH2 leak tests. R&amp;R'ed ET-35 and OV-102 umbilicals (used OV-105 umbilical). - 8/2/90 - Rolled out to VAB for restacking. - 8/9/90 - Rolled to Pad A. - Scheduled launch for 9/1/90. - Scrubbed 9/1/90 launch before tanking because of BBXRT TLM problem. Rescheduled launch for 9/6/90. - Scrubbed 9/6/90 launch during tanking due to H2 leak in aft compartment. (Estimated 30,000 SCIM's/6000 PPM.) Replaced crushed PV6 detent cover seal on SSME 3 and recirc pump package before 9/17/90 scheduled launch. - Scrubbed 9/17/90 launch during tanking at L-7 hrs due to H2 leak in aft compartment (4300 PPM). - Rescheduled launch for 10/2/90. - 10/8/90 - Rolled to Pad B after STS-41 launch (did not hard down). - 10/8-9/90 - Rolled back to VAB because of Tropical Storm Klaus threat. Replaced crushed PV5 detent seal in SSME 2. - 10/14/90 - Rolled to Pad B. MPS troubleshooting found several small H2 leaks exceeding specs. - 10/30/90 - Instrumented LH2 Tanking Test, successful with only 150 PPM concentration in aft compartment. - 12/2/90 - Launch successful on fifth launch attempt. 170-day launch slip. - 207-day total slip.</p> <p>Continued...</p>		





# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-37 SEQ FLT #39 KSC-39 PAD 39B-12 MLP-1	OV-104 (Flight 8) Atlantis  OMS PODS LPO1 - 14 RPO1 - 14 FRC4 - 8	<b>CDR:</b> Steven R. Nagel (Flt 3 - STS 51-G & STS 61-A) P200/R64/V23/M59  <b>PLT:</b> Kenneth D. Cameron P201/R121/M109  <b>M/S 1:</b> Linda M. Godwin P202/R122/F13  <b>M/S 2:</b> Jerry L. Ross (Flt 3 - STS 61-B & STS-27) P203/R86/V38/M78  <b>M/S 3:</b> Jay Apt P204/R123/M110  <b>EMU/TETHERED EVA:*</b> EV1 - Jerry Ross EV2 - Jay Apt  EVA 1 - 4/7/91 SS EVA #14 3:40/4:32 SS UNSCHED EVA #2 RELEASE STUCK GRO HI GAIN ANTENNA  EVA 2 - 4/8/91 SS EVA #15 5:47/5:57 DEMO SPACE STATION /CREW & EQUIPMENT (TRANSLATION AID)  MCC FCR-1 (19)  <b>FLIGHT DIRECTORS:</b> Asc/Ent - N. W. Hale Ld/O 1 - C. W. Shaw O 2 - J. M. Heflin Plng - P. L. Engelauf MOD - G. E. Coen	KSC 39B 95:14:22:44.98Z 9:18:00 AM EST (P) 9:22:45 AM EST (A) Friday 6 4/5/91 (7)  <b>LAUNCH WINDOW:</b> 2H30M (CTOB)  <b>PLS:</b> EDW LKBD <b>TAL:</b> BANJUL <b>TAL ALT:</b> BEN  <b>SELECTED:</b> <b>RTLS:</b> KSC 33 <b>TAL:</b> BEN 36 <b>AOA:</b> EDW 22  <b>TDEL:</b> -0.16                      -0.118  <b>MAX Q:</b> 676                              681  <b>SRB STG:</b> 2:04.8  <b>PERE:</b> NOM  <b>2 ENG TAL (BEN)</b> 2:59                              2:58  <b>NEG RETURN:</b> 4:04                              4:07  <b>PTA:</b> 4:46                              4:42  <b>PTM:</b> 5:51                              5:45  <b>MECO CMD:</b> 8:34                              8:33.3  <b>VI:</b> 26010                              26005  <b>OMS-2:</b> Tig = DV=369 FPS	EDW 33, LAKEBED (EDW 31, LKBD 18)  5:55:29 AM PST Thursday 2 4/11/91 (6)  <b>XRANGE:</b> 375 NM  <b>ORB DIR:</b> AL 11  <b>AIM PT:</b> CLOSEIN  <b>MLGTD:</b> -623 FT 101:13:55:29Z <b>VEL:</b> 156 KGS 168 KEAS <b>HDOT:</b> -2 FPS  <b>TD NORM 195:</b> -2384 FT  <b>NLGTD:</b> 1200 FT 101:13:55:35Z <b>VEL:</b> 130 KGS <b>HDOT:</b> -8.4 FPS  <b>BRK INIT:</b> 93 KGS  <b>AVE BRK DECEL:</b> 4.8 FPS/S  <b>WHEELS STOP:</b> 101:13:56:25Z 5741 FT  <b>ROLLOUT:</b> 6364 FEET 56 SECS  <b>WINDS:</b> 14.1H, 9.6 R KTS <b>OFFICIAL:</b> 15H, 8R  <b>DENS. ALT:</b> 1732 FT  <b>FLT DURATION:</b> 5:23:32:44 143:32:44  <b>S/T:</b> 229:09:31:09  <b>OV-104:</b> 39:16:16:24  <b>DISTANCE:</b> 2,487,075 sm	104/104/ 109%  <b>ACTUAL:</b> 100/104/ 87/67/ 104/65  1 = 2019 (8) 2 = 2031 (5) 3 = 2107 (4)  <b>ET</b> <b>RPT</b> 237K 1:22:20 MET  <b>ET</b> <b>BR/UP</b> 195K 1:23:25 MET  <b>ET</b> <b>IMPACT</b> <b>LAT:</b> 20.23°N <b>LONG:</b> 149.3°W	BI-042  RSRM 14  ET-37 LWT-30  ET RPT 237K 1:22:20 MET  ET BR/UP 195K 1:23:25 MET  ET IMPACT LAT: 20.23°N LONG: 149.3°W	28.453° (25)  DIRECT INSERTION  INSERTION <b>ALTITUDE:</b> 244.2 X 241.2 NM  GRO DEPLOY HO = 246.6 NM  DEORBIT 248 X 239 NM  VELOCITY 24612 FPS  ENTRY RANGE 4175 NM	OI-8F (1)  <b>CARGO:</b> 40561 LBS  <b>PAYLOAD CHARGEABLE:</b> 36800 LBS  <b>NON-DEPLOYED:</b> 1615 LBS  <b>DEPLOYABLE:</b> 34442 LBS  <b>MIDDECK:</b> 743 LBS  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 549613 LBS <b>NON-DEPLOYED:</b> 437816 LBS <b>CARGO TOTAL:</b> 1115834 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 4652 FUEL BIAS: 994 FINAL TDDP:1116 RECON: 525  <b>PAYLOADS:</b> <b>PLB:</b> GAMMA RAY OBSERVATORY (GRO) DEPLOYED APM CETA  <b>MIDDECK:</b> PCG, BLOCK II RME-III SAREX AMOS BIMDA  3 CRYO TK SETS  RMS 23 (S.N. 303 USED FOR GRO DEPLOY)	KSC W/D: OPF 97, VAB 6, PAD 22 = 125 days  <b>LAUNCH POSTPONEMENT:</b> - On 8/2/90, launch date was 3/27/91. - 4-day postponement prior to 10/90 (launch 4/1/91). - 7-day postponement in 11/90, STS-38 launch delay, launch date 4/8/91 (under review). - On 2/28/91, decision made to rollback STS-39 from pad to repair ET door hinge cracks. OV-104 ET doors repaired before OPF rollout. OV-103 rollback caused STS-39 to be launched after STS-37. - At LSRF, launch date 4/4/91 (under review). - Postponed 1 day to 4/5/91 (tile and FRT). - 9-day total slip from 8/90.  <b>LAUNCH SCRUBS:</b> None.  <b>LAUNCH DELAYS:</b> - 4M45S delay due to violation of RSO 8000-foot ceiling requirement at T-9 and range "B LAST" prediction (Counted to T-5 and held for waiver.)  <b>TAL WX:</b> - Banjul no go because of tail winds (brake energy). - Ben Guerir 36 go (selected).  <b>RTLS:</b> - Forecast NO GO RW & ceiling, observed NO GO at T-22 mins. Selected KSC NOM 33.  <b>I-LOADS:</b> - LSEAT select nominal I-loads, no uplink required.  <b>FLIGHT DURATION CHANGES:</b> - EDW 15 was first priority. Waved off one rev then extended flight 1 day due to winds/turbulence. - Extended one rev due to winds at EDW. Extension total, 1 day + 1 rev.  <b>GRO DEPLOY:</b> 2:08:14:02 MET Unscheduled EVA to release GRO antenna.  <b>FIRSTS:</b> - First flight of new GPC's (AP-101S). - First flight of OI-8F. - First EVA since STS 61-A.  Continued ...		



\* TWO EVA TIMES ARE PROVIDED: (1) OLD DEFINITION - STARTED WHEN EMU WENT TO BAT POWER AND ENDED WHEN SWITCHED TO ORBITER POWER  
(2) NEW DEFINITION - STARTS WHEN EMU GOES TO BAT POWER AND ENDS WHEN AIRLOCK REPRESS STARTS





# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-39</b>  SEQ FLT #40  KSC-39  PAD 39A-28 MLP-2	OV-103 Discovery (Flight 12)  OMS PODS LPO4 - 9 RPO3 - 13 FRC3 - 12	<b>CDR:</b> Michael L. Coats (Flt 3 - STS 41-DR & STS-29) P205/R38/V39/M37  <b>PLT:</b> L. Blaine Hammond P206/R124/M111  <b>M/S 1:</b> Gregory J. Harbaugh P207/R125/M112  <b>M/S 2:</b> Donald McMonagle P208/R126/M113  <b>M/S 3:</b> Guion S. Bluford (Flt 3 - STS-8 & STS 61-A) P209/R22/V25/M21  <b>M/S 4:</b> Charles Lacy Veach P210/R127/M114  <b>M/S 5:</b> Richard J. Hieb P211/R128/M115	KSC 39A 118:11:33:14Z 7:01:00 AM EDT (P) 7:33:14 AM EDT (A) Sunday 5 4/28/91 (8)	KSC 15 (KSC-7) 126:18:55:35Z  2:55:35 PM EDT Monday 10 5/6/91 (3)	104/104/ 109%  <b>ACTUAL:</b> 100/100/ 94/70/ 104/67  1 = 2026 (1) 2 = 2030 (5) 3 = 2029 (4)	BI-043  RSRM 15K  ET-46 LWT-39  ET RPT 249K 1:09:34 MET  ET BR/UP 215K 1:10:34 MET  ET IMPACT LAT: 43.82°S LONG: 156.3°W	57.007° (7)	DIRECT INSERTION  INSERTION ALTITUDE: 140.02 X 138.22 NM  SPAS DEPLOY: 137.37 X 136.55 NM  CRO-C DEPLOY: 136.4 X 134.7 NM  CRO-B DEPLOY: 136.7 X 132.7 NM  SPAS RNDZ: 135.5 X 132.8 NM  CRO-A DEPLOY: 140.96 X 138.6 NM  MPEC DEPLOY: 141.55 X 139.46 NM	OI-8F (2)	<b>CARGO:</b> 26294 LBS  <b>PYLD CHARGABLE:</b> 21413 LBS  <b>DEPLOYABLE:</b> 827 LBS  <b>NON-DEPLOYED:</b> 16046 LBS  <b>RETURNED:</b>  <b>MIDDECK:</b> 494 LBS  <b>SHUTTLE ACCUM WEIGHTS:</b> <b>DEPLOYED:</b> 550440 LBS  <b>NON-DEPLOYED:</b> 454356 LBS  <b>CARGO TOTAL:</b> 1142128 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 4653 FUEL BIAS: 994 FINAL TDDP:1054 RECON: 2768  <b>PAYLOADS:</b> <b>PLB:</b> Infrared Background Signature Survey (IBSS) (SPAS-II (IV + 3 GAS DEPLOY CRO-A, CRO-B, CRO-C, CIV)  AF-675 (CIRRIS, FAR-UV, URA, HUP, QINMS)  STP-1 (ALFE, APM, SKIRT, UVIM, DSE)  MPEC - GAS DPLY  <b>MIDDECK:</b> CLOUDS-1A RME-III UVPI  4 CRYO TK SETS  RMS 24 (S.N. 301) USED FOR SPAS/IBSS DPLY, CAPTURE, AND BERTH	KSC W/D: OPF 116 (2), VAB 17 (3), PAD 47 (2) = 180  <b>LAUNCH POSTPONEMENTS:</b> - As of 8/21/90, launch date is 2/26/91. - 2/26/91 launch postponed to 3/9/91 due to OMS pod work. (Swapped RP-03 from OV-104 for RP-01.) - On 2/15/91, cracks found in OV-103 ET door hinge brackets. On 2/28/91, decision made to roll back and repair ET doors resulting in STS-39 launch being scheduled after STS-37. Launch rescheduled for 4/23/91. - 56 days total slip based on 8/21/90 schedule.  <b>LAUNCH SCRUBS:</b> - 4/23/91 launch scrubbed at L-6 hours due to SSME #3 HPOTP secondary seal pressure xducer problem and P/L servicing. Rescheduled launch for 4/28/91. - 5-day slip. (Total slip - 61 days.)  <b>LAUNCH DELAYS:</b> - 32M14S delay caused by review of OPS 2 recorder uncommanded switching of tracks and going to run at approximate time of BFS 101 PRO.  <b>TAL WX:</b> - Zaragoza and Moron no go - ceilings (broken < 8000 feet).  <b>I-LOADS:</b> - LSEAT selected nominal, no uplink.  <b>FLIGHT DURATION/LANDING SITE CHANGES:</b> - Landed at KSC on same rev as planned for EDW because unfavorable winds predicted at EDW.  <b>EVENTS:</b> - SPAS deploy - rev 46, SPAS RNDZ - rev 72, MPEC deploy - rev 127. - 16 OMS burns.  <b>RENDEZVOUS 9:</b> With Infrared Background Signature Survey (IBSS) (SPAS-II) for retrieval and return.  <b>FIRSTS:</b> - First flight with 67% as standard 3g throttling.  <b>SIGNIFICANT ANOMALIES:</b> - ROB tire outboard shoulder damaged during landing (3 cords). - OPS 2 recorder uncommanded switching of tracks and tape speed prelaunch. - FES feedline A system 2 heater failure. - APU 2 fuel pump/GGVM coolant sys A valve did not operate. - GFE tread mill excessive resistance.



MCC FCR-1 (20)  
  
**FLIGHT DIRECTORS:**  
 Asc/Ent - A. L. Briscoe  
 Ld/O2 - R. D. Dittmore  
 O 1 - R. E. Castle  
 O 3 - R. M. Kelso  
 MOD - T. W. Holloway

M 3 EOM

WEIGHT:  
211673

X CG: 1080.3

LANDING

WEIGHT:  
211512

X CG: 1082.0

DEORBIT  
140 X  
138 NM

VELOCITY  
25765 FPS

ENTRY  
RANGE  
4502 NM

# SPACE SHUTTLE MISSIONS SUMMARY

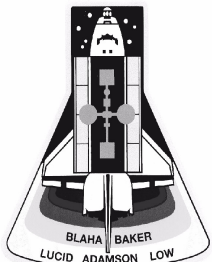
FLT NO.	ORBITER	CREW (7)	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT		FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-40</b> SEQ FLT #41 KSC-41 PAD 39B-13 MLP-3	OV-102 Columbia (Flight 11)  Sixth Spacelab Flight  LM (4)  First Life Sciences Flight  OMS PODS LPO3 - 11 RPO4 - 7 FRC2 - 11	<b>CDR:</b> Bryan D. O'Connor (Flt 2 - STS 61-B) P212/R83/V61/M76  <b>PLT:</b> Sidney M. Gutierrez P213/R129/M116  <b>M/S 1:</b> James P. Bagian (Flt 2 - STS-29) P214/R99/V62/M90  <b>M/S 2:</b> Tamara E. Jernigan P215/R130/F14  <b>M/S 3:</b> Rhea Seddon (Flt 2 - STS 51-D) P216/R55/V63/F5  <b>P/S 1:</b> F. Drew Gaffney P217/R131/M117  <b>P/S 2:</b> Millie Hughes-Fulford U of Cal/VA Center P218/R132/F15  <b>MCC FCR-1 (21)</b>  <b>FLIGHT DIRECTORS:</b> Asc/Ent - N. W. Hale Ld/O2 - G. A. Pennington O 1 - R. E. Castle Plng - J. W. Bantle MOD - B. R. Stone	KSC 39B  156:13:24:51Z 8:00:00 AM EDT (P) 9:24:51 AM EDT (A) Wednesday 5 6/5/91 (4)  <b>LAUNCH WINDOW:</b> 2H00M (MAND SLS-1 SCIENCE)  <b>PLS:</b> EDW LKBD <b>TAL:</b> BEN GUERIR <b>TAL ALT:</b> MORON ZARAGOZA  <b>SELECTED:</b> <b>RTLS:</b> KSC 33/CI/N <b>TAL:</b> BEN 36/N/N <b>AOA:</b> EDW 22 <b>PLS:</b> EDW 22  <b>TDEL:</b> -0.32                      +0.402  <b>MAX QNAV:</b> 681                              689  <b>SRB STG:</b> 2:04.2  <b>PERF:</b> NOMINAL  <b>2 ENG TAL:</b> 2:57                              3:01  <b>NEG RETURN:</b> 4:02                              4:03  <b>PTA:</b> 5:15                              5:18  <b>PTM:</b> 5:45                              5:49  <b>MECO CMD:</b> 8:31.2                              8:30.4  <b>VI:</b> 25850                              25868  <b>OMS-2:</b> Tig = 2:05 DV= 199 FPS	EDW 22, CONC (EDW 32, CONC 14) 165:15:39:11Z  8:39:11 AM PDT Friday 5 6/14/91 (3)  <b>XRANGE:</b> 211 NM  <b>ORB DIR:</b> DR 6  <b>AIM PT:</b> NOMINAL  <b>MLGTD:</b> 1485 FT 165:15:39:11Z <b>VEL:</b> 199 KGS 203 KEAS <b>HDOT:</b> -2 FPS  <b>TD NORM 195:</b> 2202 FT  <b>NLGTD:</b> 5914 FT 165:15:39:25Z <b>VEL:</b> 153 KGS <b>HDOT:</b> -4 FPS  <b>BRK INIT:</b> 134 KGS  <b>AVE BRK DECEL:</b> 6.8 FPS/S  <b>WHEELS STOP:</b> 165:15:40:06Z 10923 FT  <b>ROLLOUT:</b> 9438 FT 55 SECONDS  <b>WINDS:</b> 10.4H, 6 L KTS <b>OFFICIAL:</b> 12H, 3L  <b>DENS ALT:</b> 3739 FT  <b>FLT DURATION:</b> 9:02:14:20 218:14:20  <b>S/T:</b> 246:19:07:50  <b>OV-102:</b> 75:01:14:24  <b>DISTANCE:</b> 3,290,226 sm	104/104/ 109%  <b>PREDICTED:</b> 100/100/ 92/67/ 104/67  <b>ACTUAL:</b> 100/100/ 98/71/ 104/67  1 = 2015 (6) 2 = 2022 (6) 3 = 2027 (6)  ET <b>BR/UP</b> 197K 1:20:52 MET  ET <b>IMPACT</b> <b>LAT:</b> 1.05°N <b>LONG:</b> 146.06°W	BI-044  RSRM 16W  ET-41 LWT-34  ET <b>RPT</b> 244K 1:19:40 MET  ET <b>BR/UP</b> 197K 1:20:52 MET  ET <b>IMPACT</b> <b>LAT:</b> 1.05°N <b>LONG:</b> 146.06°W	39.0156° (1)  DIRECT INSERTION  <b>POST OMS-2:</b> 161.16 X 149.84 NM  DEORBIT 157 X 146 NM  VELOCITY 25772 FPS  ENTRY RANGE 4339 NM	OI-8D (4)  CARGO: 33707 LBS  <b>PAYLOAD CHARGEABLE:</b> 28114 LBS  <b>DEPLOYED:</b> 0 LBS  <b>NON-DEPLOYED:</b> 26237 LBS  <b>RETURNED:</b>  <b>MIDDECK:</b> 1877 LBS  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 550440 LBS <b>NON-DEPLOYED:</b> 482470 LBS <b>CARGO TOTAL:</b> 1175835 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 4671 FUEL BIAS: 983 FINAL TDDP: 3037 RECON: 4212  <b>PAYLOADS:</b> <b>PLB:</b> Spacelab Life Sciences-1 (SLS-1)/LM Cardiovascular, Cardiopulmonary Metabolic, Musculoskeletal, and Neurovestibular Systems Experiments  <b>GBA</b> With 12 GAS  <b>MIDDECK:</b> MODE-0  5 CRYO TK SETS  NO RMS	KSC W/D: OPF 74, VAB 6, PAD 34 = 114 days  <b>LAUNCH POSTPONEMENT:</b> - 1/9/91 launch date as of 8/21/90. Launch order was STS-35, STS-41, STS-38, STS-40, STS-39, and STS-37. Launch postponed due to STS-35 and STS-38 H2 leaks. Program manifest in March set tentative schedule of 5/22/91 with STS-37 and STS-39 moved ahead of STS-40. - 129-day slip.  <b>LAUNCH SCRUBS:</b> - 5/22/91 launch scrubbed at approximately L-1 day (during T-11 hr hold) due to (1) MDM FA2 problem, (2) GPC4 failure, and (3) SSME cryo temp probes analysis received stating probes could break and enter HP turbopumps. Changed LO2 and LH2 temperature transducers. Launch rescheduled for 6/1/91. 10-day turnaround. - 6/1/91 launch scrubbed at T-20 minute hold due to IMU 2 failing calibration. 96-hour turnaround.  <b>LAUNCH DELAYS:</b> - 1H24M51S delay at T-9 minute hold due to RSO no-go for ceiling at 12K. (Moisture in middle clouds and greater than 4500 feet thick.)  <b>TAL WX:</b> - Ben Guerir (P) go throughout (selected). - Moron go throughout - Zaragoza go.  <b>RTLS:</b> - KSC 15/33 ceiling 12K with middle clouds thicker than 4500 ft caused delay.  <b>I-LOADS:</b> - LSEAT selected nominal, no uplink required.  <b>SIGNIFICANT ANOMALIES:</b> - Two ECOS failures. - Hum sep A speed sensor wire break. - PRSD H2 tank 3 heater failure. - MECO velocity error (explained condition). - KSC wind tower data false wind gusts. - S-band degraded performance on lower antennas. - TAGS hardcopier jam. - PLBD seal section missing and 1307 bulkhead blankets unfastened. - LIOH door stuck closed (IFM freed door). - Camcorder adapter cable failure. - APU 1 fuel line heater failure. - Vernier jet L5L fail off. - S/L audio problem. - Orbiter freezer and L9I ref/freezer Freon freezepup.		



# SPACE SHUTTLE MISSIONS SUMMARY

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FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-43</b>  SEQ FLT #42  KSC-42  PAD 39A-29 MLP-1	OV-104 (Flight 9) Atlantis  OMS PODS LPO1 - 15 RPO1 - 15 FRC4 - 9	<b>CDR:</b> John E. Blaha (Flt 3 - STS-29 & STS-33) P219/R97/V48/M88  <b>PLT:</b> Michael A. Baker P220/R133/M118  <b>M/S 1:</b> Shannon W. Lucid (Flt 3 - STS 51-G & STS-34) P221/R65/V45/F6  <b>M/S 2:</b> G. David Low (Flt 2 - STS-32) P222/R110/V64/M98  <b>M/S 3:</b> James C. Adamson (Flt 2 - STS-28) P223/R102/V615M93	KSC 39 214:15:02:00Z 11:02:00 AM EDT (P) 11:02:00 AM EDT(A) Friday 7 08/02/91 (5)  <b>LAUNCH WINDOW:</b> 2H30M (CTOB)  PLS: KSC TAL: BANJUL (P) TAL WX: BEN GUERIR MORON  <b>SELECTED:</b> RTLS: KSC 15/CI/N TAL: BEN 36/N/N AOA: EDW 22/N/N PLS: EDW 22/N/N  <b>TDEL:</b> 0.00                      0.562  <b>MAX QNAV:</b> 714 PSF                      718PSF  <b>SRB STG:</b> 2:04.3                      2:02.9  PERE: NOM  <b>2 ENG TAL BEN:</b> 3:13                      3:12  <b>NEG RETURN:</b> 3:53                      3:54  <b>PTA (U/S 245):</b> 5:13                      5:09  <b>PTM (U/S 245):</b> 5:50                      5:49  <b>MECO CMD:</b> 8:27.7                      8:27.6  <b>VI:</b> 25875                      25873  <b>OMS-2 TIG:</b> 39:50.09                      222.2 FPS	KSC-15 (KSC-8) 223:12:23:25Z  6:23:25 AM EDT Sunday 6 08/11/91 (3)  <b>XRANGE:</b> 180NM  <b>ORBIT DIR:</b> DL 22  <b>AIM PT:</b> CLOSE IN  <b>MLGTD:</b> 1986 FT <b>VEL:</b> 202 KGS 197 KEAS <b>HDOT:</b> -1 FPS  <b>TD NORM 195:</b> 2152 FT  <b>NLGTD:</b> 5517 FT 223:12:23:36Z <b>VEL:</b> 165 KGS <b>HDOT:</b> -2.7 FPS  <b>BRK INIT:</b> 132 KGS  <b>AVE BRK DECEL:</b> 6.1 FPS/S  <b>WHEELS STOP:</b> 223:12:24:24Z 11876 FT  <b>ROLLOUT:</b> 9890 FT 59 SEC  <b>WINDS:</b> 0.5T, 4R KTS OFFICIAL: 0T, 3R  <b>DENS ALT:</b> 1602 FT  <b>FLT DURATION:</b> 8:21:21:25 213:21:25  <b>S/T:</b> 255:16:29:15  <b>OV-104:</b> 48:13:37:49  <b>DISTANCE:</b> 3,700,400 sm	104/104/ 109%  <b>PREDICTED:</b> 100/104/ 80/67/104  <b>ACTUAL:</b> 100/104/ 84/67/104  1 = 2024 (3) 2 = 2012(12) 3 = 2028 (6)  <b>M 3 EOM</b>  <b>WEIGHT:</b> 196353  <b>X CG:</b> 1087.4  <b>LANDING:</b>  <b>WEIGHT:</b> 196088  <b>X CG:</b> 1089.7	BI-045  RSRM 17W  ET-47 LWT-40  ET <b>RPT</b> 234K 1:17:35 MET  ET <b>BR/UP</b> 186K 1:18:15 MET  ET <b>IMPACT</b> LAT: 13.47°N LONG: 162.2°W	28.46° (26)  DIRECT INSERTION  158/35  <b>POST OMS-2:</b> 161.3 X 160.3 NM  <b>TDRS</b> <b>DEPLOY:</b> 161.2 X 159.8 NM  <b>OMS SEP</b> <b>MAN:</b> 177.9 X 161.2 NM	OI-20 (1)  CARGO: 49325 LBS  <b>PAYLOAD</b> <b>CHARGABLE:</b> 46712 LBS  <b>DEPLOYED:</b> 37575 LBS  <b>NON-DEPLOYED:</b> 8146 LBS  <b>MIDDECK:</b> 991 LBS  <b>SHUTTLE</b> <b>ACCUMULATED</b> <b>WEIGHTS:</b> <b>DEPLOYED:</b> 588015 LBS <b>NON-DEPLOYED:</b> 491607 LBS <b>CARGO TOTAL:</b> 1225160LBS  <b>PERFORMANCE</b> <b>MARGINS (LBS):</b> FPR: 4653 FUEL BIAS: 994 FINAL TDDP: 2656 RECON: 2593  <b>PAYLOADS:</b> PLB: TDRS-E/IUS SSBUV SHARE-II OCTW TCPE  <b>MIDDECK:</b> SSCE SAMS BIMDA IPMP PLG-III UVPI AMOS APE-B  4 CRYO TK SETS  NO RMS	KSC W/D: OPF 60, VAB 6, PAD 35 = 101 days  <b>LAUNCH POSTPONEMENT:</b> - 7/23/91 launch postponed on 7/19/91 to 7/24/91 due to SRB sep motor PIC wire replacement.  <b>LAUNCH SCRUBS:</b> - 7/24/91 launch scrubbed at approximately L-6 hours (during tanking) due to SSME 3 MEC DCU "A" parity error, MCF was set. Launch rescheduled for 8/1/91. - 8/1/91 launch scrubbed at L+1H24M while holding at T-9 min. Did not get cabin vent close indication but counted down to T-20 and ran cabin pressurization test (valve was closed) but by the time cabin was vented and cabin closed out, WX at KSC was bad. Scrubbed because T-showers within 20 nm, Xwinds > 15 kts @ SLF & convection present. Rescheduled launch for 8/2/91. 10 days total slip.  <b>LAUNCH DELAYS:</b> None.  <b>TAL WX:</b> Ben Guerir and Moron go, Banjul late go after T-showers and ceiling no go. Selected BEN 36.  <b>I-LOADS:</b> LSEAT selected nominal, no uplink required (uplink 6).  <b>FIRSTS:</b> First flight of OI-20.  <b>SIGNIFICANT ANOMALIES:</b> - Cabin vent valve failed to indicate "closed." - No cooling on WSB2 during ascent. - PDI decom problems with SHARE data. - PRSD H2 tank 1 heater failed off. - APU 1 FP/GGVM overcooling. - S-band power amp 2 degradation. - PPO2 sensor "C" failed. - APU 1 S/N 305 anomalous chamber pressure during entry. - PLB floodlight problems, mid-STBD RPC trip. - BIMDA cell syringe problems. - PRSD tank H2 manifold valve failed to close.  <b>DISCUSSION ITEM:</b> - LIB MLG tire rib 2 tire wear (scuffing of two cords).		



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM-ABORT EMERG	SRB RSRM	ORBIT		FSW	PAYLOAD WEIGHTS,	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
		TITLE, NAMES & EVA'S	LANDING SITES, ABORT TIMES	LANDING TIMES FLT DURATION, WINDS	THROTTLE PROFILE ENG. S.N.	AND ET	INC	HA/HP		PAYLOADS/ EXPERIMENTS	
STS-48 SEQ FLT #43 KSC-43 PAD 39A-30 MLP-3	OV-103 (Flight 13) Discovery  OMS PODS LPO4 - 10 RPO3 - 14 FRC3 - 13	<b>CDR:</b> John O. Creighton (Flt 3 - STS 51-G, & STS-36) P224/R63/V50/M58  <b>PLT:</b> Kenneth S. Reightler P225/R134/M119  <b>M/S 1:</b> James F. Buchli (Flt 4 - STS 51-C, STS 61-A, & STS-29) P226/R52/V24/M48  <b>M/S 2:</b> Mark N. Brown (Flt 2 - STS-28) P227/R103/V66/M94  <b>M/S 3:</b> Charles D. (Sam) Gemar (Flt 2 - STS-38) P228/R118/V67/M106	KSC 39A 255:23:11:04Z 6:57:00 PM EDT (P) 7:11:04 PM EDT (A) Thursday 10 9/12/91 (2)  <b>LAUNCH WINDOW:</b> 2H57M (UARS RAAN & CTOB)  <b>PLS:</b> KSC <b>TAL:</b> ZARAGOZA <b>TAL ALT:</b> MOR, BEN  <b>SELECTED:</b> <b>RTLS:</b> KSC33/NOM NOM 2400 FT  <b>TAL:</b> ZZA30/CI NOM 2900 FT  <b>AOA:</b> NOR 17/NOM/ NOM 2900 FT  <b>PLS:</b> EDW22/NOM/ NOM 2700 FT  <b>TDEL:</b> -0.16      0.162/0.2  <b>MAX Q NAV:</b> 670      708  <b>SRB STG:</b> 2:04      2:05:23  <b>PERF:</b> NOMINAL  <b>2 ENG TAL ZZA:</b> 2:19      2:22  <b>NEG RETURN:</b> 4:09      4:14  <b>PTA (U/S 518):</b> 4:23      4:23  <b>PTM (U/S 1124):</b> 6:44      6:50  <b>MECO CMD:</b> 8:36      8:36  <b>VI:</b> 26087      26083  <b>OMS-2 TIG:</b> 43:39      43:40 448 FPS      450 FPS	EDW 22 NOM (EDW 33, CONC 15) 261:07:38:42Z 00:38:42 AM PDT Wednesday 4 09/18/91 (4)  <b>XRANGE:</b> 690 NM  <b>ORBIT DIR:</b> DR 7  <b>AIM PT:</b> NOMINAL  <b>MLGTD:</b> 1235 FT 261:07:38:42Z <b>VEL:</b> 213 KGS 203 KEAS <b>HDOT:</b> -1 FPS  <b>TD NORM 195:</b> 2015 FT  <b>NLGTD:</b> 4882 FT 261:07:38:53Z <b>VEL:</b> 160 KGS <b>HDOT:</b> -2.1 FPS  <b>BRK INIT:</b> 145 KGS  <b>AVE BRK DECEL:</b> 8.2 FPS/S  <b>WHEELS STOP:</b> 10619 FT  <b>ROLLOUT:</b> 9384 FT 49 SECS  <b>WINDS:</b> 2.9H, 0.8 L KTS <b>OFFICIAL:</b> 4H, 4L  <b>DENS ALT:</b> 3503 FT  <b>FLT DURATION:</b> 5:08:27:38 128:27:38  <b>S/T:</b> 261:00:56:53  <b>OV-103:</b> 75:02:08:19  <b>DISTANCE:</b> 2,193,670 sm	104/104/ 109%  <b>PREDICTED:</b> 100/100/ 89/67/ 104/67  <b>ACTUAL:</b> 100/100/ 89/67/ 104/67  1 = 2019 (9) 2 = 2031 (6) 3 = 2107 (5)  <b>M 3 EOM</b>  <b>WEIGHT:</b> 192925  <b>LANDING:</b>  <b>WEIGHT:</b> 192780  <b>X CG:</b> 1097.8	BI-046  RSRM 18W  ET-42 LWT-35  ET RPT 229K 1:25:46 MET  ET BR/UP 194K 1:26:47 MET  ET <b>IMPACT</b> <b>LAT:</b> 0.26°N <b>LONG:</b> 121.9°W	57.00° (8)  DIRECT INSERTION  288 X 36 NM  <b>POST OMS-2:</b> 291.5 X 289.9 NM  <b>RCS-1:</b> 306.9 X 290.9 NM  <b>RCS-2:</b> 308.1 X 207.9 NM  <b>UARS</b> <b>DEPLOY:</b> 308.9 X 305.3 NM	01:20 (2)  <b>CARGO:</b> 21564 LBS  <b>PAYLOAD</b> <b>CHARGABLE:</b> 17144 LBS  <b>DEPLOYED:</b> 14388 LBS  <b>NON-DEPLOYED:</b> 2066 LBS  <b>MIDDECK:</b> 690 LBS  <b>SHUTTLE</b> <b>ACCUMULATED</b> <b>WEIGHTS:</b> <b>DEPLOYED:</b> 602403 LBS <b>NON-DEPLOYED:</b> 494363 LBS <b>CARGO TOTAL:</b> 1246729 LBS  <b>PERFORMANCE</b> <b>MARGINS (LBS):</b> FPR: 4671 <b>FUEL BIAS:</b> 983 <b>FINAL TDDP:</b> 510 <b>RECON:</b> - 562  <b>PAYLOADS:</b> <b>PLB:</b> Upper Atmosphere Research Satellite (UARS) with 10 experiments deployed: SUSIM, SOLSTICE, PEM, CLAES, ISAMS, MLS, HALOE, HRDI, WIND II, ,ACRIM-II, APM  <b>MIDDECK:</b> PCG-II-2 RME-III MODE IPMP AMOS PARE SAM CREAM  4 CYRO TK SETS  RMS 25 (S.N. 301) used for UARS deploy	KSC W/D: OPF 78, VAB 8, PAD 27 = 101 days  <b>LAUNCH ADVANCEMENT:</b> - Launch advanced 9 days from 9/21/91 to 9/12/91, which was the earliest date to complete crew training  <b>LAUNCH SCRUBS:</b> None.  <b>LAUNCH DELAYS:</b> - 14M4S because of motor boating noise on A/G voice caused by glitch on RF to MILA resulting in Delta Modulation System (DMS) false frame lock. Counted to T-5 mins, held and cleared by CDR keying A/G voice.  <b>TAL WX:</b> Zaragoza, Moron, and Ben Guerir - all go.  <b>DOLILU/ALT I-LOADS:</b> - First availability of DOLILU which was uplinked and used (uplink 7).  <b>DUSK LAUNCH:</b> - Launch was planned during daylight but 14 minute delay slipped to dusk launch, RTLS would have been night.  <b>FLIGHT DURATION CHANGES:</b> - Waved off planned rev at KSC because STA observed clouds developing south of SLF. - Flight extended one rev when STA spotted clouds forming south of SLF. Clouds were not observed on radar.  <b>FIRSTS:</b> - First flight of enhanced MDM (OA1 only).  <b>LANDING SITE CHANGE:</b> - Changed from KSC to EDW because of the dynamic conditions with clouds and convection observed by STA. - One rev extension.  <b>EVENTS:</b> UARS deployed at MET 2:05:12:09. SEP 1 burn at 2:05:12:40.  <b>NIGHT LANDING:</b> Space Shuttle #5  <b>SIGNIFICANT ANOMALIES:</b> - ET door centerline latch 1 motor 2 phase B failure. - Fuel cell 1 O2 reactant valve closed indication. - Supply water dump valve leaking. - Hydraulic system 2 unloader valve leakage. - Supply water nozzle temperature temporary decrease. - APU 1 seal cavity drain pressure delay. - LINHOF camera failed.		



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (6)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-44 SEQ FLT #44 KSC-44 PAD 39A-31 MLP-1	OV-104 (Flight 10) Atlantis  OMS PODS LPO1-16 RPO1-16 FRC4-10	<p>CDR: Frederick D. Gregory (Flt 3 - STS 51-B &amp; STS-33) P229/R59/V47/M54</p> <p>PLT: Terence (Tom) Henricks P23/OR135/M120</p> <p>M/S 1: James S. Voss P231/R136/M121</p> <p>M/S 2: F. Story Musgrave (Flt 4 - STS-6, STS 51-F &amp; STS-33) P232/R15/V19/M15</p> <p>M/S 3: Mario Runco, Jr P233/R137/M122</p> <p>P/S: Thomas J. Hennen CWO-3, U.S. Army P234/R138/M123</p> <p>MCC FCR-1 (24)</p> <p>FLIGHT DIRECTORS: Asc/Ent - R. D. Dittmore Ld/O 2 - J. M. Heflin O 1 - P. L. Engelauf Plng - C. W. Shaw MOD - T. W. Holloway</p>	<p>KSC 39, PAD A 328:23:44:00Z 6:31:00 PM EST (P) 6:44:00 PM EST (A) Sunday 6 11/24/91 (8)</p> <p>LAUNCH WINDOW 1H59M (DSP RAAAN)</p> <p>EOM PLS: KSC TAL: BYD 32 TAL WX: BEN , MRN</p> <p>SELECTED: RTLS: KSC 33/CI/N TAL: BYD 32/N/SF AOA &amp; PLS: EDW 22/N/N</p> <p>TDEL: -0.16      0.442/0.48</p> <p>MAX QN: 719 PSF      728 PSF</p> <p>SRB STG: 2+05      2+05</p> <p>PERE: NOM</p> <p>2 ENG TAL BYD: 2+41      2+40</p> <p>NEG RETURN: 3+57      4+00</p> <p>PTA (U/S 315): 5+06      5+09</p> <p>PTM (U/S 315): 5+57      6+00</p> <p>MECO CMD: 8+28.5      8+30</p> <p>VI: 25934      25928</p> <p>OMS-2 TIG: 4+49      4+48</p>	<p>EDW 05 (EDW 34, LKBD 19) 335:22:34:43Z 2:34:43 PM PST Sunday 7 12/1/91 (5)</p> <p>XRANGE: 379 NM ORBIT DIR: AL 12 AIM PT: CLOSEIN MLGTD: 2607 FT 335:22:34:43Z VEL: 182 KGS 189 KEAS HDOT: -1 FPS</p> <p>TD NORM 195: 2127 FT</p> <p>NLGTD: 5077 FT 335:22:34:51Z VEL: 145 KGS HDOT: -5.2 FPS</p> <p>BRK INIT: 15 KGS</p> <p>AVE BRK DECEL: 1.8 FPS/S</p> <p>WHEELS STOP: 335:22:36:29Z 13798 FT</p> <p>ROLLOUT: 11191 FT 106 SEC</p> <p>WINDS: H12.8 KTS R2.2 KTS OFFICIAL: 13H, 0L</p> <p>DENS ALT: 2284 FT</p> <p>FLT DURATION: 6:22:50:43 166:50:43 S/T: 267:23:47:36</p> <p>OV-103: 55:12:28:32</p> <p>DISTANCE: 2,890,067 sm</p>	<p>104/104/ 109%</p> <p>PREDICTED 100/104/ 104/70/ 104/67</p> <p>ACTUAL 100/104/ 104/73/ 104/67</p> <p>1 = 2015 (7) 2 = 2030 (6) 3 = 2029 (5)</p>	<p>BI-047  RSRM 19W  ET-53 LWT-46  ET RPT 235K 1:19:55 MET  ET BR/UP 207K 1:20:38 MET  ET IMPACT LAT: 17.01°N LONG: 154.05°W</p>	<p>28.45° (27)</p> <p>DIRECT INSERTION</p> <p>POST OMS-2 195.0 X 194.3 NM</p> <p>DEPLOY: 195.5 X 194.9 NM</p> <p>SEP BURN: 212.4 X 195.4 NM</p> <p>RCS-2 195.9 X 195.3 NM</p> <p>COLLISION AVOIDANCE 195.9 X 195.0 NM</p> <p>DEORBIT 197 X 194 NM</p> <p>VELOCITY 25868 FPS</p> <p>ENTRY RANGE 4195 NM</p>	<p>OI-20 (3)</p> <p>CARGO: 47235 LBS</p> <p>PAYLOAD CHARGEABLE: 44637 LBS</p> <p>DEPLOYED: 37588 LBS</p> <p>NON-DEPLOYED: 5809 LBS</p> <p>MIDDECK: 1240 LBS</p> <p>SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 639991 LBS NON-DEPLOYED: 501412 LBS CARGO TOTAL: 1293964 LBS</p> <p>PERFORMANCE MARGINS (LBS): FPR: 4356 FUEL BIAS: 1337 FINAL TDDP: 565 RECON: 1025</p> <p>PAYLOADS: PLB: DEFENSE SUPPORT PROGRAM (DPS)/IUS (DEPLOYED) IOCM</p> <p>MIDDECK: MSS-1 AMOS CREAM SAM RME-III VFT-1 TERRA-SCOUT UVPI</p> <p>4 CRYO TK SETS</p> <p>NO RMS</p>	<p>KSC W/D: OPF 67, VAB 5, PAD 31 = 103 days</p> <p>LAUNCH POSTPONEMENTS: - As of 8/21/90, launch date was 7/5/91. - Postponed launch date to 11/15/91 caused by STS-38 and STS-35 H2 leaks. Postponed to 11/19/91 due to STS-43 delays impacted MLP availability and WLE tee splice replacement.</p> <p>LAUNCH SCRUB: - Scrubbed 11/19/91 launch at T-9 hours because one IMU in IUS RIMU experienced BITE indications. Rescheduled launch for 11/24/91 to replace IUS RIMU. 5-day slip. 142 days total slip.</p> <p>LAUNCH DELAYS: - 11/24/91 launch was delayed 13M0S at T-9 minutes to torque down packing in a leaking LOX replenish valve and to avoid a COLA at 6:38 pm EST.</p> <p>TAL WX: Banjul (prime) and Ben Guerir were go. Moron predicted no go (ceiling) but was observed go.</p> <p>ALT I-LOADS: - Second flight with DOLILU capability. Nominal selected. No uplink required.</p> <p>NIGHT LAUNCH: Shuttle night launch #7.</p> <p>LANDING SITE CHANGE: Loss of one IMU caused MDF and lakebed landing, hence changed to EDW from KSC.</p> <p>FLIGHT DURATION CHANGES: - Extended one rev at EDW because of predicted high winds. - Flight shortened nearly 3 days because of IMU 2 failure,</p> <p>FIRSTS: - First flight of HAINS ALT IMU (IMU-1 only). - First flight of color CCTV monitors.</p> <p>SIGNIFICANT ANOMALIES: - Left SSME MCC P Xducer B BIAS approx 30 PSIA high. - Supply water dump valve leaking after water dump. - HUMIDITY SEP B leaking water. - IMU 2 FAIL (Z AXIS ACCEL) - caused MDF and lakebed landing. - Left AIR DATA PROBE single motor deploy. - VCR tape door problem. - TREADMILL failed. - 16 mm ARRIFLEX malfunctioned. - APU 2 FUEL PUMP seal cavity drain line valve failure.</p>		



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-42 SEQ FLT #45 KSC-45 PAD 39A-32 MLP-3	OV-103 (Flight 14) Discovery  Seventh Spacelab Long Module (5)  OMS PODS LPO4-11 RPO3-15 FRC3-14	CDR: Ronald J. Grabe (Flt 3 - STS 51-J & STS-30) P235/R76/V41/M70  PLT: Steven S. Oswald P236/R139/M124  M/S 1 (P/L CDR): Norman E. Thagard (Flt 4 - STS-7, STS 51-B, STS-30) P237/R20/V14/M19  M/S 2: William F. Readdy P238/R140/M125  M/S 3: David C. Hilmers (Flt 4 - STS 51-J, STS-26, STS-36) P239/R77/V36/M71  P/S 1: Roberta L. Bondar (Canada) P240/R141/F16  P/S 2: Ulf D. Merbold (Germany) (Flt 2 - STS-9) P241/R29/V68/M28	KSC 39, PAD A 22:14:52:33Z 8:53:00 AM EST (P) 9:52:33 AM EST (A) Wednesday 6 01/22/92 (5)  LAUNCH WINDOW 2H49M (EOM/ TAL LIGHTING)  PLS: EDW TAL: ZZA (P) TAL WX: MRN, BEN  SELECTED: RTLS: KSC 33/N/N TAL: ZZA 30/Ci/N AOA: N/A PLS: EDW 22/N/N (REV 3) EDW 04/Ci/N (REV 7)  TDEL: 0.00      0.562/0.6  MAX QN: 692 PSF      708 PSF  SRB STG: 2+06.6      2+08  PERF: NOMINAL  2 ENG TAL ZZA: 2+51      2+48  NEG RETURN: 4+05      4+05  PTA (U/S 290): 5+20      5+10  PTM (U/S 290): 5+52      5+42  MECO CMD:  VI: 25934      25928  OMS-2 TIG: 36+12.8      36+08	EDW 22 (EDW 35, CONC 16) 30:16:07:17Z 8:07:17 AM PST Thursday 3 01/30/92 (4)  XRRANGE: 536 NM  ORBIT DIR: AR 3  AIM PT: NOMINAL  MLGTD: 2835 FT 30:16:07:17Z VEL: 198 KGS 196 KEAS HDOT: -1.5 FPS  TD NORM 195: 2868 FT  NLGTD: 5901 FT 30:16:07:27Z VEL: 168 KGS HDOT: -4.3 FPS  BRK INIT: 133 KGS  AVE BRK DECEL: 6.3 FPS/S  WHEELS STOP: 30:16:08:16Z 12676 FT  ROLLOUT: 9841 FT 59 SEC  WINDS: H 0.4 KTS R 2.0 KTS OFFICIAL: 1H, 2R  DENS ALT: 670 FT  FLT DURATION: 8:01:14:44 193:14:44  S/T: 276:01:02:20  OV-103: 83:03:23:03  DISTANCE: 3,349,830 sm	104/104/ 109%  PREDICTED 100/100/ 100/70/ 104/67  ACTUAL 100/100/ 100/75/ 104/67  1 = 2026 (2) 2 = 2022 (7) 3 = 2027 (7)  M 3 EOM  WEIGHT: 218159  X CG: 1080.6  LANDING  WEIGHT: 218089  X CG: 1082.2	BI-048  RSRM 20W  ET-52 LWT-45  ET RPT 243K 1:09:33 MET  ET BR/UP 222K 1:10:08 MET  ET IMPACT LAT: 44.7°S LONG: 157.9°W	57° (9)	DIRECT INSERTION  POST OMS-2 162 NM X 160 NM	OI-20 (4)	CARGO: 32364 LBS  PAYLOAD CHARGEABLE: 28663 LBS  DEPLOYED: 0 LBS  NON-DEPLOYED: 26453 LBS  MIDDECK: 2210 LBS  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 639991 LBS NON-DEPLOYED: 530075 LBS CARGO TOTAL: 1326328 LBS  PERFORMANCE MARGINS (LBS): FPR: 4339 FUEL BIAS: 1394 FINAL TDDP:2511 RECON: 2716  PAYLOADS: PLB: INTERNATIONAL MICROGRAVITY LABORATORY MATERIALS SCIENCE AND LIFE SCIENCES EXPERIMENTS (IML-1/LM) GBA (12 GAS)  MIDDECK: GOSAMR-1 SE 83-02 SE 81-9 IPMP RME-111 UVPI  4 CRYO TK SETS  NO RMS	KSC W/D: OPF 75, VAB 6, PAD 24 = 105 days  LAUNCH POSTPONEMENTS: - As of 12/19/90, launch date was 11/15/91. - Postponed to 1/13/92 as of 3/15/91. 26-day slip. - Postponed to 1/22/92 as of 8/21/91. 9-day slip. - 35 days total launch slip.  LAUNCH SCRUB: None.  LAUNCH DELAYS: - 1/22/92 launch was delayed 59M33S at T-9 minutes caused by: (1) Paper closure of FC2 H2 Pump/AC2 Bus anomaly, (2) KSC field mills read >1 KVOLT/meter (determined to be caused by salt fog), (3) Excessive O2 in mid-body, (4)"BLAST" program violation, and (5) KSC field mills read >1 KVOLT/meter (STA confirmed moisture in cloud passing over field mills).  TAL WX: Zaragozaza (prime), Moron, and Ben Guerir forecast and observed GO.  LAKEBEDS: EDW and NOR lakebeds NO GO (WET for L&L).  ALT I-LOADS: - Nominal selected. No uplink required.  FLIGHT DURATION CHANGE: - Flight extended 1 day from 7 to 8 days to get additional Spacelab science data.  LANDING SITE CHANGE: None.  SIGNIFICANT ANOMALIES: - MIDS computer not transferring all winds data to FDCF. - FC2 H2 motor status/AC glitch prelaunch. - MVI CB trip during pitch operations. - Waste water dump rate degraded. - White Sands central computer failure. - WCS commode control valve linkage failure. (IFM to use vice grips to open/close.) - TAGS jam/imaging failure. - GAS can G-609 motorized door did not open. - WCCS failures and battery shortened life - RCS jet L3A fail leak (oxidizer). - Crew reported plume from right pod, powered up MDM FA4 and confirmed R4U oxidizer leak. - SRB - Gas path in RH & LH nozzle-to-case joint polysulfide with eroded wiper o-ring. - ET - two large TPS divots on the ET intertank.  Radiators Deployed #13



# 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		FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
							INC	HA/HP			
STS-45 SEQ FLT #46 KSC-46 PAD 39A-33 MLP-1	OV-104 (Flight 11) Atlantis Eighth Spacelab Flight (2 Pallets) IGLOO (3) OMS PODS LPO1-17 RPO1-17 FRC4-11	CDR: Charles F. Bolden, Jr. (Flt 3 - STS 61-C & STS-31) P242/R88/V52/M80 PLT: Brian Duffy P243/R142/M126 M/S 1: Kathryn D. Sullivan (Flt 3 - STS 41-G & STS-31) P244/R44/V53/F3 M/S 2: David C. Leestma (Flt 3 - STS 41-G & STS-28) P245/R45/V43/M42 M/S 3: C. Michael Foale P246/R143/M127 P/S 1: Dirk Frimout (Belgium) P247/R144/M128 P/S 2: Bryon Lichtenberg (Flt 2 - STS-9) P248/R28/V69/M27	KSC 39, PAD A 84:13:13:39.96Z 8:00:00 AM EST (P) 8:13:40 AM EST (A) Tuesday 8 3/24/92 (3)  LAUNCH WINDOW 2H30M (CTOB)  EOM PLS: KSC TAL: ZZA (P) TAL WX: MRN, BEN  SELECTED: RTLS: KSC 33/CI/N TAL: ZZA 30/ CI/N AOA: NOR 17/N/N PLS: EDW 22/N/N  TDEL: 0.64 0.882/0.92  MAX Q NAV: 671 PSF 678 PSF  SRB STG: 2:07.7 2:07.9  PERE: NOMINAL  2 ENG TAL ZZA: 2:23 2:22  NEG RETURN: 4:11 4:13  PTA (U/S 285): 4:16 4:13  PTM (U/S 285): 4:48 4:51  MECO CMD: 8:30.9 8:31  VI: 25830 25823  OMS-2: 37:08 36:20 253.5 252.8	KSC 33 (KSC-9) 93:11:23:06Z  6:23:06 AM EST Thursday 4 4/2/92 (7)  XRANGE: 679 NM ORBIT DIR: AR 4  AIM PT: CLOSE IN  MLGTD: 1765 FT 93:11:23:06Z VEL: 186 KGS 192 KEAS HDOT: -1.9 FPS  TD NORM 195: 1481 FT  NLGTD: 4393 FT 93:11:23:14Z VEL: 161 KGS HDOT: -4.1 FPS  BRK INIT: 134 KGS  WHEELS STOP: 10992 FT 93:11:24:04Z  ROLLOUT: 9227 FT 56 SECS  WINDS: H 5.1 KTS L 3.2 KTS OFFICIAL: 5H, 3L  DENS ALT: 224 FT  FLT DURATION: 8:22:09:26 214:09:26  S/T: 284:23:11:46  OV-104: 64:10:37:58  DISTANCE: 3,274,946 sm	104/104/ 109%  PREDICTED 100/100/ 89/74/ 104/67  ACTUAL: 100/100/ 89/74/ 104/67  1 = 2024 (4) 2 = 2012(13) 3 = 2028 (7)  M 3 EOM  WEIGHT: 205672 LBS  X CG: 1085.4  LANDING  WEIGHT: 205588 LBS  X CG: 1087.2	BI-049  RSRM 21W  ET-44 LWT-37  ET RPT 249K 1:10:00 MET  ET BR/UP 219K 1:10:50 MET  ET IMPACT LAT: 42.7° LONG: 155.0°W	57.02° (10)	DIRECT INSERTION  POST OMS-2 159.8 X 153.0 NM  OMS-3: (CIRC BURN) 12.5 FPS @ 2:50:13 MET 160.5 X 159.3 NM	OI-20 (5)	CARGO: 20341 LBS  PAYLOAD CHARGABLE: 17683 LBS  DEPLOYED: 0 LBS  NON-DEPLOYED: 15538 LBS  MIDDECK: 2145 LBS  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 639991LBS NON-DEPLOYED: 547758 LBS CARGO TOTAL: 1346669 LBS  PERFORMANCE MARGINS (LBS): FPR: 4671 FUEL BIAS: 983 FINAL TDDP:11017 RECON: 10427  PAYLOADS: PLB: ATLAS-1: ATMOSPHERE SCIENCE: ALAE, MAS, ISO, ATMOS, GRILLE, SSBUV/A  SOLAR SCIENCE: ACR, SOLCON, SOLSPEC, SUSIM  SPACE PLASMA SCIENCE: AEP1, SEPAC, ENAP  ASTRONOMY: FAUST GAS G-229  MIDDECK: STL-01, RME-III, VPT-2, CLOUDS-1A, SAREX-2, IPMP, UVPI  4 CRYO TK SETS  NO RMS	KSC W/D: OPF 55, VAB 6, PAD 27 = 88 days  LAUNCH POSTPONEMENTS: - Launch date was 3/10/92 as of 3/15/91. Postponed to 3/14/92 on 8/21/91. 4 days slip. - Postponed to 3/23/92 on 1/23/92. 9 days slip with decision made to launch during a full moon.  LAUNCH SCRUB: - 3/23/92 launch was scrubbed at L-5.5 hours (fast fill + 3.5 minutes) because of H2 and O2 concentrations in aft compartment exceeding LCC limits (LH2=750 PPM & LO2=850 PPM). Could not repeat leaks during troubleshooting but scrubbed launch because could not make launch window.  LAUNCH DELAYS: - 13M40S delay at T-9 minutes because of RTLS ceiling violations (cloud deck at approximately 6K feet). BLAST violations occurred during hold period.  TAL WX: Zaragoza and Moron weather was GO, Moron was NO GO for runway margins, and Ben Guerir NO GO for weather (ceiling).  ALT I-LOADS: - LSEAT selected YAW NEG, which was uplinked (uplink 8). DOLILU was NO GO because of greenline exceedance.  FLIGHT DURATION CHANGE: - 3/29/92 MMT made decision that consumables supported an extension from 8+2 days to 9+2 days to get more science.  FIRSTS: - First flight of an improved APU (APU 2 only). - First flight with a female flight director (Linda J. Ham).  SIGNIFICANT ANOMALIES: - Fuel Cell 3 cell performance monitor D volts remained at self test value. - Ku-Bd power output TLM intermittent fail. - Ku-Bd auto track problem, similar to STS-37. - CCTV cameras A & C degraded. - TAGS OHC jam, cleared by crew. - APU 1 GG bed heater B intermittent. - Arriflex camera operate lever intermittent. - SEPAC electron beam accelerator operations were terminated on day 2 because 30 amp fuse between SEPAC battery and charger blew. - Lost all power to FAUST.



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-49</b> SEQ FLT #47 KSC-47 PAD 39B-14 MLP-2	OV-105 (Flight 1) Endeavour  OMS PODS LPO3-12 RPO4-8 FRC5-1	<b>CDR:</b> Daniel C. Brandenstein (Flt 4 - STS-8, STS 51-G & STS-32) P249/R21/V16/M20  <b>PLT:</b> Kevin P. Chilton P250/R145/M129  <b>M/S 1, EV2:</b> Richard J. Hieb (Flt 2 - STS-39) P251/R128/V70/M115  <b>M/S 2:</b> Bruce E. Melnick (Flt 2 - STS-41) P252/R114/V71/M102  <b>M/S 3, EV1:</b> Pierre J. Thuot (Flt 2 - STS-36) P253/R112/V72/M100  <b>M/S 4, EV3:</b> Kathryn C. Thornton (Flt 2 - STS-33) P254/R107/V73/F11  <b>M/S 5, EV4:</b> Thomas D. Akers (Flt 2 - STS-41) P255/R115/V74/M103	KSC 39, PAD B 128:23:39:59.98Z 7:06:00 PM EDT (P) 7:40:00 PM EDT (A) Thursday 11 5/7/92 (2)  <b>LAUNCH WINDOW</b> 47 Minutes (in 2 panes)  <b>EOM PLS:</b> EDW TAL: BYD TAL WX: BEN  <b>SELECTED:</b> RTLS: KSC 33/C/I/N TAL: BEN 36/C/I/N AOA: EDW 22/N/N PLS: EDW 22/N/N  <b>TDEL:</b> 0.64    0.782/0.800  <b>MAX Q NAV:</b> 716 PSF    712 PSF  <b>SRB STG:</b> 2:00.64    2:08  <b>PERF:</b> NOMINAL  <b>2 ENG TAL BEN:</b> 2:52    2:52  <b>NEG RETURN:</b> 4:00    4:03  <b>PTA (U/S 285):</b> 4:39    4:40  <b>PTM (U/S 285):</b> 5:53    5:43  <b>MECO CMD:</b> 8:28.5    8:29.8  <b>VI:</b> 25906    25900  <b>FLIGHT DIRECTORS:</b> Asc/Ent - N. W. Hale Ld/O 1 - G. A. Pennington O 2 - P. L. Engelauf Plng - J. M. Heflin MOD - B. R. Stone	EDW 22 CONC (EDW 36, CONC 17) 137:20:57:39Z 1:57:39 PM PDT Saturday 8 5/7/92 (4)  <b>DEORBIT BURN:</b> 137:19:55:15Z  <b>XRANGE:</b> 411 NM  <b>ORBIT DIR:</b> AL 14  <b>AIM PT:</b> NOMINAL  <b>MLGTD:</b> 2156 FT 137:20:57:39Z VEL: 209 KGS 194 KEAS HDOT: -1.0 FPS  <b>TD NORM 195:</b> 2329 FT  <b>NLGTD:</b> 5770 FT 137:20:57:48Z VEL: 173 KGS HDOT: -3.5 FPS  <b>DRAG CHUTE</b> DEPLOY: 165 KEAS 137:20:57:49Z  <b>BRK INIT:</b> 94 KGS  <b>DRAG CHUTE</b> JETTISON: 48 KGS 137:20:58:17Z  <b>AVE BRK DECEL:</b> 8.0 FPS/S  <b>WHEELS STOP:</b> 137:20:58:34Z 11646 FT  <b>ROLLOUT:</b> 9490 FT 55 SECS  <b>WINDS:</b> H2.0 KTS, X0.0 KTS OFFICIAL: 4H, 0L  Continued. . .	104/104/ 1099%  <b>PREDICTED</b> 100/104/ 89/72/ 104/67  <b>ACTUAL</b> 100/104/ 89/73/ 104/67  1 = 2030 (7) 2 = 2015 (8) 3 = 2017 (6)  <b>ET BR/UP</b> 206K 1:17:45 MET  <b>ET IMPACT</b> LAT: 12.17°S LONG: 163.6°W	BI-050  RSRM 22K  ET-43 LWT-36  ET RPT 238K 1:16:47 MET  ET BR/UP 206K 1:17:45 MET  ET IMPACT LAT: 12.17°S LONG: 163.6°W	28.32° (1)	DIRECT INSERTION  <b>POST OMS-2</b> 182.5 X 139.8 NM  INTELSAT RNDZ: 198 X 194 NM  <b>ORBITS:</b> 46, 62, & 95	OI-21 (1)	<b>CARGO:</b> 37444 LBS  <b>PAYLOAD CHARGEABLE:</b> 32809 LBS  <b>DEPLOYED:</b> 23346 LBS  <b>NON-DEPLOYED:</b> 8766 LBS  <b>MIDDECK:</b> 697 LBS  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 636337 LBS <b>NON-DEPLOYED:</b> 557221 LBS <b>CARGO TOTAL:</b> 1384113 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 4671 FUEL BIAS: 983 FINAL TDDP: 3351 RECON: 3206  <b>PAYLOADS:</b> <b>PLB:</b> INTELSAT REBOOST (CRADLE & PERIGEE STAGE)  PERIGEE STAGE ATTACHED TO INTELSAT WHICH WAS REDEPLOYED  <b>DEORBIT</b> 195 X 184 NM  <b>VELOCITY</b> 25841 FPS  <b>ENTRY RANGE</b> 4162 NM	KSC W/D: OPF 217, VAB 6, PAD 49=272 days  <b>LAUNCH POSTPONEMENTS:</b> - Launch date was 4/16/92 as of 3/21/91. - Postponed launch to 4/30/92, then 5/4/92 on 4/23/92 at FRR because of sheer volume of work including aft ET attach point liner repair. - Postponed launch to 5/7/92 to allow a daylight launch. - 21-day total slip.  <b>LAUNCH SCRUB:</b> None.  <b>LAUNCH DELAYS:</b> - Launch delayed because of RTLS ceiling violations (5K-7K bkn), then TAL WX (BYD NO GO visibility/haze, BEN NO GO occasional 4K bkn and rain). MEC BITE indication and an aircraft in launch area. Counted to T-9 minutes then T-5 minutes. Switched to second pane of launch window and uplinked new launch and OMS target loads. - 34-minute total delay.  <b>TAL WX:</b> - Banjul was NO GO - visibility, Ben Guerin late GO after occasional ceiling violation and rain.  <b>ASCENT I-LOADS:</b> - Nominal I-loads were NO GO and DOLILU was uplinked (second DOLILU uplink and 9th total uplink). Launch and OMS targets loads uplinked for both window panes.  <b>FLIGHT DURATION CHANGE:</b> - Flight was extended 2 days to allow the third EVA for the hand grab of INTELSAT after capture bar failed on two EVA's.  <b>RENDEZVOUS 10, 11, AND 12:</b> - With INTELSAT for capture, berthing, AKM mounting, and deploy.  <b>FIRSTS:</b> - First flight with drag chute. - First flight with Improved Nose Wheel Steering. - First flight of Collins TACAN, SS STAR-TRACKER, redesigned MPS 750 PSIG He Reg, MPS 850 PSIG He relief valve redesign, IAPU iso valve, redundant WOW det, brake press iso valve, improved RA antennas, deletion of vent doors 4 & 7, fourth EMU stowage, and improved PPO2 sensor and 3 IAPU's. - First flight with 4 EVA's and first flight with 3 crewmen on same EVA. First flight with 4 different EVA crewmen. - First hand capture of satellite by EVA crewmen (Hieb, Thuot, and Akers), then RMS grapple of INTELSAT on capture bar. - First flight of OI-21. - First flight of Block II SSME Controller.  Continued. . .





# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-49 Continued		<p>Continued. . .</p> <p><u>EMU/TETHERED EVA'S:</u></p> <p><u>EVA 1 - 5/10/92</u> SS EVA #16 BY EV1 &amp; EV2 INTELSAT CAPTURE BAR - NO GO 3H43M</p> <p><u>EVA 2 - 5/11/92</u> SS EVA #17 UNSCHEDULED EVA #3 BY EV1 &amp; EV2 INTELSAT CAPTURE BAR - NO GO 5H30M</p> <p><u>EVA3 - 5/13/92</u> SS EVA #18 UNSCHEDULED EVA #4 BY EV1, EV2 &amp; EV4 INTELSAT HAND CAPTURE, REPLACED UPPER STAGE AND RELEASED 8H29M</p> <p><u>EVA4 - 5/14/92</u> SS EVA #19 BY EV3 AND EV4 ASEM - 7H45M</p>		<p>Continued. . .</p> <p><u>DENS ALT:</u> 4664 FT</p> <p><u>FLIGHT DURATION:</u> 8:21:17:39 213:17:39</p> <p><u>S/T:</u> 293:20:29:35</p> <p><u>OV-105 TOTAL:</u> 8:21:17:39</p> <p><u>DISTANCE:</u> 3,969,019 sm</p>							<p>Continued. . .</p> <p><u>RECORDS:</u></p> <ul style="list-style-type: none"> <li>- Longest ever EVA (8H29M), second longest EVA (7H45M).</li> <li>- Longest EVA by female astronaut (7H45M).</li> <li>- Four EVA's on one flight.</li> </ul> <p><u>SIGNIFICANT ANOMALIES:</u></p> <ul style="list-style-type: none"> <li>- Av Bay 3 high delta pressure.</li> <li>- O2 manifold valve 1 failed open (failed to close)</li> <li>- TDRSS state vector propagation errors in MCC.</li> <li>- Orbit Target Terminal Initiation Computation failure on third rendezvous (used D/L state vectors in Ground Computations).</li> <li>- WCS fan sep 1 failure.</li> <li>- Four floodlights failed.</li> <li>- RCS jet L4L fail leak.</li> <li>- Ku-band beta gimbal failure - IFM EVA stow of antenna similar to STS 41-G.</li> <li>- PLBD port aft bulkhead latch failed to reach latch position.</li> <li>- SSME 2 HPFT TD temp sensor failed offscale high.</li> <li>- GPC AP101S microcode error.</li> </ul>

# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-50</b> SEQ FLT #48 KSC-48  PAD 39A-34 MLP-3	OV-102 (Flight 12) Columbia  9th Spacelab Flight Long Module (6)  EDO 1  OMS PODS LP05-1 RP05-1 FRC2-12	<b>CDR:</b> Richard N. Richards (Flt 3 - STS-28 & STS-41) P256/R101/V55/M92  <b>PLT:</b> Kenneth D. Bowersox P257/R146/M130  <b>M/S 1 (PYLD CDR):</b> Bonnie J. Dunbar (Flt 3 - STS 61-A & STS-32) P258/R79/V49/F7  <b>M/S 2:</b> Ellen S. Baker (Flt 2 - STS-34) P259/R105/V75/F10  <b>M/S 3:</b> Carl J. Meade (Flt 2 - STS-38) P260/R117/V76/M105  <b>P/S 1:</b> Larry DeLucas P261/R147/M131 (U OF ALA, BIRM)  <b>P/S 2:</b> Gene Trinh P262/R148/M132 (JPL)   MCC FCR-1 (28)  <b>FLIGHT DIRECTORS:</b> Asc/Ent - J. W. Bantle Ld/O 2 - R. E. Castle O 1 - R. D. Jackson O 3 - G. E. Coen Team 4 - R. M. Kelso MOD - A. L. Briscoe	KSC 39, PAD A 177:16:12:23Z 12:07:00 PM EDT (P) 12:12:23 PM EDT (A) Thursday 12 6/25/92 (5)  <b>LAUNCH WINDOW</b> 2H 30M CTOB  <b>EOM PLS:</b> EDW <b>TAL:</b> BYD <b>TAL WX:</b> BEN, ROTA  <b>SELECTED:</b> <b>RTLS:</b> KSC 15/C1/N <b>TAL:</b> BEN 36/N/N <b>AOA:</b> EDW 22/N/N <b>PLS:</b> EDW 22/N/N  <b>TDEL:</b> 0.48      0.682/0.72  <b>MAX Q NAV:</b> 688 PSF    690 PSF  <b>SRB STG:</b> 2:05.9      2:05.9  <b>PERF:</b> NOMINAL  <b>2 ENG TAL (BEN):</b> 3:01                  3:00  <b>NEG RETURN:</b> 3:57                  4:00  <b>PTA (U/S 235):</b> 4:57                  4:54  <b>PTM (U/S 235):</b> 5:58                  5:40  <b>MECO CMD:</b> 8:26.9              8:27.6  <b>VI:</b> 25875                  25870  <b>OMS-2:</b> 39:56                  39:51 222.3 FPS222.6 FPS	KSC 33 (KSC 10) 191:11:42:27Z 7:42:27 AM EDT Thursday 5 7/9/92 (1)  <b>DEORBIT BURN:</b> 191:10:41:38Z  <b>XRANGE:</b> 389 NM  <b>ORBIT DIR:</b> DL 23  <b>AIM PT:</b> NOMINAL  <b>MLGTD:</b> 2321 FT 191:11:42:27Z <b>VEL:</b> 208 KGS 203 KEAS <b>HDOT:</b> -2 FPS  <b>TD NORM 205:</b> 2122 FT  <b>NLGTD:</b> 7832 FT 191:11:42:45Z <b>VEL:</b> 149 KGS <b>HDOT:</b> -5.1 FPS  <b>DRAG CHUTE DEPLOY:</b> 136 KEAS 191:11:42:47Z  <b>BRK INIT:</b> 111 KGS  <b>DRAG CHUTE JETTISON:</b> 55 KGS 191:11:43:11Z  <b>Ave BRK DECEL:</b> 6.6 FPS/S  <b>WHEELS STOP:</b> 191:11:43:25Z 12996 FT  <b>ROLLOUT:</b> 10675 FT 58 SECS  <b>WINDS:</b> H 1.6 KTS L 4.8 KTS OFFICIAL 1H, 5L  Continued. . .	104/104/ 109%  <b>PREDICTED:</b> 100/104/ 104/72/104  <b>ACTUAL:</b> 100/104/ 104/74/104  1 = 2019 (10) 2 = 2031 (7) 3 = 2011 (7)  <b>M 3 EOM</b>  <b>WEIGHT:</b> 225865 LBS  <b>X CG:</b> 1077.7  <b>LANDING</b>  <b>WEIGHT:</b> 225615 LBS  <b>X CG:</b> 1079.1	BI-051  RSRM 24W  ET-50 LWT-43  ET RPT 247K 1:17:12 MET  ET BR/UP 216K 1:18:03 MET  ET <b>IMPACT</b> LAT: 13.28°N LONG: 162.64°W	28.46° (28)  DIRECT INSERTION  <b>POST OMS-2</b> 163.5 X 159.7 NM  <b>ORBIT ADJ 1:</b> 159.9 X 159.2 NM 04/00:23:18  <b>ORBIT ADJ 2:</b> 163.0 X 129.1 NM	OI-21 (2)  <b>CARGO:</b> 32447 LBS  <b>PAYLOAD CHARGEABLE:</b> 24305 LBS  <b>DEPLOYED:</b> 0 LBS  <b>NON-DEPLOYED:</b> 22126 LBS  <b>MIDDECK:</b> 2179 LBS  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 663337 LBS <b>NON-DEPLOYED:</b> 581526 LBS <b>CARGO TOTAL:</b> 1416560 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 4671 FUEL BIAS: 983 FINAL TDDP:2940 RECON: 3276  <b>PAYLOADS:</b> <b>PLB:</b> UNITED STATES MICROGRAVITY LABORATORY (USML-1/LM) MATERIALS SCIENCE, FLUID PHYSICS, COMBUSTION SCIENCE, BIO- TECHNOLOGY  <b>MIDDECK:</b> IPMP UVPI SAREX-II  4 + 4 EDO CRYO TK SETS  NO RMS	KSC W/D: OPF 108, VAB 5, PAD 23=136 days  <b>LAUNCH POSTPONEMENTS:</b> - Launch date was 5/11/92 as of 7/10/91. - Launch postponed to 6/3/92. Weather delayed OV-102 delivery to KSC after major mod period at Palmdale. - Launch postponed to 6/25/92 because of Ku-Band comm work, RSB corrosion repair, and LiOH canister locker interference.  <b>LAUNCH SCRUB:</b> None.  <b>LAUNCH DELAYS:</b> - 5M 23S delay during T-9 hold due to a concern about a cirrus layer at 28K-33K with a detached anvil (potential lightning in launch area). WX STA PLT reported it was not a problem because he could see through it.  <b>TAL WX:</b> - Banjul forecast and observed NO GO - ceiling. Ben Guerir forecast and observed GO (selected). Rota forecast NO GO - Vis (Haze), observed GO.  <b>ASCENT I-LOADS:</b> - Nominal selected, no uplink required.  <b>FLIGHT DURATION/LANDING SITE CHANGE:</b> - Extended 1 day because of forecasted rain at EDW. - Changed landing site to KSC and landed one rev early because EDW had forecast of rain in clouds.  <b>FIRSTS:</b> - First flight of OV-102 after OMDP (Major Mods at Palmdale). - First EDO flight and EDO pallet. - First flight of RCRS (Regenerable CO2 Removal System). - First flight of OV-102 with drag chute, INWS, etc. (Second flight of drag chute - deployed after NLGTD). - First flight to exceed GEMINI VII flight duration (by 54:33). Only 3 SKYLAB flights exceed STS-50 duration.  <b>DRAG CHUTE STRATEGY:</b> Second drag chute deploy with NLG on ground.  Continued. . .		



# SPACE SHUTTLE MISSIONS SUMMARY

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FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-50 Continued				Continued . . . <u>DENS ALT:</u> 1423 FT  <u>FLT DURATION:</u> 13:19:30:04 331:30:04  <u>S/T:</u> 307:15:59:29  <u>OV-102:</u> 88:20:44:28  <u>DISTANCE:</u> 5,758,332 sm							Continued . . .  <u>SIGNIFICANT ANOMALIES:</u> - RCRS shutdown due to a short in the controller, hence LiOH canisters used until IFM required use at 5 days MET. - SL/Orbiter air not mixing properly. Found a removable inline redundant seal was not removed from tunnel air ducting as should be for on-orbit operations. - Waste water dump line blockage causing reduction in dump rate. - Cryo O <sub>2</sub> tank 2 had a 1 lb/hr leak. - Cryo O <sub>2</sub> tank 2 heater A2 experienced intermittent power dropouts. - Fuel cell 3 O <sub>2</sub> purge valve did not close completely. Manually closed, did not purge again for remainder of flight. - Cryo O <sub>2</sub> tank 7 check valve failed in open position. - SS inverter overvoltage shut down when SL H <sub>2</sub> O loop was turned on. - FWD starboard floodlight did not come on. - R OMS yaw TVC excessive movement during ascent. - Aileron trim deflected to 2.2° at M=10.1, preflight predicted was maximum of 0.80 deflection. - TAGS jam on day 2, used teleprinter. - Flight deck Canon A1, Mark II camcorder failure. - ROB brake pressure low. - APU 1 gearbox N2 pressure decay/ transducer erratic. - L1U jet heater fail on. - F2F jet fail off.

# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-46</b>  SEQ FLT #49  KSC-49  PAD 39B-15 MLP-1	OV-104 (Flight 12) Atlantis  OMS PODS LPO1-18 RPO1-18 FRC4-12	<b>CDR:</b> Loren J. Shriver (Flt 3 - STS 51-C & STS-31) P263/R50/V51/M46  <b>PLT:</b> Andrew M. Allen P264/R149/M133  <b>M/S 1:</b> Claude Nicollier (Switzerland) P265/R150/M134  <b>M/S 2:</b> Marsha S. Ivins (Flt 2 - STS-32) P266/R109/V77/F12  <b>PYLD CDR, M/S 3:</b> Jeffrey A. Hoffman (Flt 3 - STS 51-D & STS-35)) P267/R57/V59/M52  <b>M/S 4:</b> Franklin R. Chang-Diaz (Flt 3 - STS 61-C & STS-34) P268/R89/V46/M81  <b>P/S 1:</b> Franco Malerba (Italy) P269/R151/M135	KSC 39, PAD B 213:13:56:48Z 9:56:00 AM EDT (P) 9:56:48 AM EDT (A) Friday 8 7/31/92 (2)  <b>LAUNCH WINDOW</b> 2H 30M CTOB  <b>EOM PLS:</b> KSC <b>TAL:</b> BYD <b>TAL WX:</b> BEN, ROTA  <b>SELECTED:</b> <b>RTLS:</b> KSC 15/C1/N <b>TAL:</b> BEN 36/N/N <b>AOA:</b> EDW 22/C1/N <b>PLS:</b> EDW 22/C1/N  <b>TDEL:</b> 0.0      0.332/0.36  <b>MAX Q NAV:</b> 709 PSF    718 PSF  <b>SRB STG:</b> 2:04.2      2:06  <b>PERE:</b> NOMINAL  <b>2 ENG TAL (BEN):</b> 2:51      2:54  <b>NEG RETURN:</b> 3:59      4:02  <b>PTA (U/S 285):</b> 4:23      4:22  <b>PTM (U/S 285):</b> 5:29      5:29  <b>MECO CMD:</b> 8:29      8:29.8  <b>VI:</b> 25987      25985  <b>OMS-2:</b> 41:23.6      41:23.6 351.2 FPS    351.4 FPS	KSC 33 (KSC 11) 221:13:11:50Z 9:11:50 AM EDT Saturday 9 8/8/92 (4)  <b>DEORBIT BURN:</b> 221:12:17:10Z  <b>XRANGE:</b> 499 NM  <b>ORBIT DIR:</b> DL 24  <b>AIM PT:</b> NOMINAL  <b>MLGTD:</b> 1866 FT 221:13:11:50Z <b>VEL:</b> 202 KGS 195 KEAS <b>HDOT:</b> -1 FPS  <b>ID NORM 195:</b> 1891 FT  <b>NLGTD:</b> 6501 FT 221:13:12:05Z <b>VEL:</b> 154 KGS <b>HDOT:</b> -4.3 FPS  <b>BRK INIT:</b> 131 KGS  <b>AVE BRK DECEL:</b> 5.9 FPS/S  <b>WHEELS STOP:</b> 221:13:12:55Z 12725 FT  <b>ROLLOUT:</b> 10840 FT 55 SECS  <b>WINDS:</b> T 0.4, L 0.9 KTS OFFICIAL 3H, 1R  <b>DENS ALT:</b> 1834 FT  <b>FLT DURATION:</b> 7:23:15:02 191:15:02  <b>S/T:</b> 315:15:14:31  <b>OV-104:</b> 72:09:53:00  <b>DISTANCE:</b> 3,321,007 sm	104/104/109%  <b>PREDICTED:</b> 100/104/80/67/104  <b>ACTUAL:</b> 100/104/82/67/104  1 = 2032 (1) 2 = 2033 (1) 3 = 2027 (8)  <b>ET IMPACT LAT:</b> 17.86°N <b>LONG:</b> 153.0°W  <b>M 3 EOM</b>  <b>WEIGHT:</b> 209851 LBS  <b>X CG:</b> 1078.2  <b>LANDING</b>  <b>WEIGHT:</b> 209532 LBS  <b>X CG:</b> 1179.6	BI-052  RSRM 25W  ET-48 LWT-41  ET RPT 239K 1:21:02 MET  ET BR/UP 217 K 1:21:39 MET  ET IMPACT LAT: 17.86°N <b>LONG:</b> 153.0°W	28.46° (29)  DIRECT INSERTION  <b>POST OMS-2</b> 230.4 X 228.3 NM  <b>EURECA DEPLOY:</b> 231.3 X 227.8 NM  <b>TSS DEPLOY:</b> 161.0 X 158.5 NM  <b>TSS DOCK:</b> 161.0 X 157.8 NM	OI-21 (3)  CARGO: 34060 LBS  <b>PAYLOAD CHARGEABLE:</b> 28585 LBS  <b>DEPLOYED:</b> 9901 LBS  <b>NON-DEPLOYED:</b> 16094 LBS  <b>MIDDECK:</b> 1104 LBS  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 673238 LBS <b>NON-DEPLOYED:</b> 598724 LBS <b>CARGO TOTAL:</b> 1450620 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 4671 FUEL BIAS: 983 FINAL TDDP: 2825 RECON: 1942  <b>PAYLOADS:</b> <b>PLB:</b> European Retrievable Carrier (EURECA) (Deployed)  Tethered Satellite System (TSS-1) (Deployed and Retrieved)  EOIM-III TEMP 2A-3 ICBC, CONCAP-II CONCAP-III LDCE  <b>MIDDECK:</b> PHCF UVPI  4 CRYO TK SETS  RMS 27 (S.N. 201) USED FOR EURECA DEPLOY	KSC W/D: OPF 61, VAB 5, PAD 45=111 days  <b>LAUNCH POSTPONEMENTS:</b> - Launch date 6/26/92 as of 6/5/91. - Launch postponed to 7/2/92 because of STS-45 launch and landing delays. - Launch postponed to 7/21/92 because of MOD STS-50 landing to launch 8-day constraint and range interference. - Launch postponed to 7/31/92 to allow additional flightcrew and flight controller training.  <b>LAUNCH SCRUB:</b> None.  <b>LAUNCH DELAYS:</b> - OM 48S delay at APU startup (approximately L-5 minutes). Crew did not open APU #3 fuel isolation valve within GLS window. KSC cleared hold and count continued.  <b>TAL WX:</b> - Banjul (prime) NO GO - ceiling, Ben Guerir GO (selected), Rota (2nd flight as substitute for Moron) NO GO - visibility (haze).  <b>ASCENT I-LOADS:</b> - DOLILU I-Load uplinked to increase margin for green squatcheloid at M=1.53. Third DOLILU uplink, total uplink #10.  <b>FLIGHT DURATION/LANDING SITE CHANGE:</b> - Extended 1 day because of TSS deploy problems. - Waved off first landing opportunity at KSC because of scattered showers within 30 miles. Total extension, 1 day plus 1 rev.  <b>FIRSTS:</b> - First flight of a deployment and retrieval of a tethered satellite.  NOTE: TSS deployed weight of 1040 lbs plus 90 lbs prop is not included in 9901 lbs deployed.  <b>LASTS:</b> - Last flight of fleet without drag chute, INWS, and other improvements first used on STS-49. These modifications will be made before the next flight of OV-104.  <b>EVENTS:</b> - EURECA deploy at 1/17:10 MET. - TSS deploy at 4/08:57:22 MET. - TSS dock at 5/08:56:12 MET.  Continued. . .		



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-46 Continued											Continued. . .  <u>SIGNIFICANT ANOMALIES:</u> - MPS GH2 FCV erratic pressure. - Fan Sep 1 flooded, indicated stall currents and CB opened. Fan Sep 2 temporarily flooded. - P/L EURECA RF data handling problem (PSP lost lock due to excessive zeros in payload bit stream). - Flight deck speaker failed. - TSS U2 umbilical retractions failed when commanded by crew. - TSS deployer reel stalling at 179 and 251 meters. - TSS upper tether control mechanism jam at 224 meters. - Postflight investigation found the TSS level wind mechanism was jammed by a structural reinforcement bolt which was added based on late loads analysis.

# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-47 SEQ FLT #50 KSC-50 PAD 39B-16 MLP-2	OV-105 (Flight 2) Endeavour Spacelab-J (Japan) Tenth Spacelab Flight Long Module (7) OMS PODS: LPO3 - 13 RPO4 - 9 FRC5 - 2	CDR: Robert L. Gibson (Flt 4 - STS 41B, STS 61-C, STS-27) P270/R30/V27/M29 PLT: Curtis L. Brown P271/R152/M136 M/S 1: Mark C. Lee Payload CDR (Flt 2 - STS-30) P272/R100/V78/M91 M/S 2: Jay Apt (Flt 2 - STS-37) P273/R123/V79/M110 M/S 3: N. Jan Davis P274/R153/F17 M/S 4: Mae C. Jemison P275/R154/F18 P/S 1: Mamoru Mohri (Japan) P276/R155/M137	KSC 39, PAD B 256:14:23:00Z 10:23:00 AM EDT (P) 10:23:00 AM EDT (A) Saturday 3 9/12/92 (3)  LAUNCH WINDOW: 2H 30M CTOB  EOM PLS: KSC TAL: ZZA TAL WX: ROTA, BEN  SELECTED: RTLS: KSC 33/CI/N TAL: ZZA 30/N/SF AOA: NOR 17/N/N PLS: EDW 22/CI/N  TDEL: -0.16 -0.118/-0.08  MAX Q NAV: 679 PSF -682 PSF  SRB STG: 2:04  PERE: NOMINAL  2 ENG TAL (ZZA): 3:05 3:07  NEG RETURN: 4:04 4:04  PTA (U/S 285): 5:22 5:22  PTM (N/A): SE PTM (U/S 476) 7:07 7:08  MECO CMD: 8:31 8:34  MECO VI: 25830 25827  OMS-2: 36:11 36:12 262 FPS 262 FPS  MCC FCR-1 (30)  FLIGHT DIRECTORS: Asc/Ent - N. W. Hale Ld/O 2 - J. M. Hefflin O 1 - G. A. Pennington O 3 - L. J. Ham MOD - G. E. Coen	KSC 33 (KSC 12) 264:12:53:22Z 8:53:22 AM EDT Sunday 8 9/20/92 (5)  DEORBIT BURN: 264:11:52:20Z XRANGE: 669 NM  ORBIT DIR: AR 5 AIM PT: CLOSEIN MLGTD: 2458 FT 264:12:53:22Z VEL: 209 KGS 202 KEAS HDOT: 0 FPS TD NORM 205: 2367 FT  DRAG CHUTE DEPLOY: 176 KEAS 264:12:53:30.9Z  NLGTD: 7651 FT 264:12:53:39Z VEL: 135 KGS HDOT: -2.2 FPS  BRK INIT: 114 KGS  AVE BRK DECEL: 6.9 FPS/S  CHUTE JETTISON: 264:12:53:57Z 55 KGS  WHEELS STOP: 264:12:54:11Z 11025 FT  ROLLOUT: 8567 FT 49 SECS  WINDS: H 0.9, L 1.8 KTS OFFICIAL: H2, L3 DENS ALT: 1805 FT  FLT DURATION: 7:22:30:22 190:30:22 S/T: 323:13:44:53 OV-105: 16:19:48:01 DISTANCE: 3,310,922 sm	104/104/109%  PREDICTED: 100/100/100/67/104  ACTUAL: 100/100/100/67/104  1 = 2026 (3) 2 = 2022 (8) 3 = 2029 (6)  M 3 EOM  WEIGHT: 220325 LBS  X CG: 1083.7  LANDING  WEIGHT: 220195 LBS  X CG: 1085.3	BI-053 RSRM 26W ET-45 LWT-38 ET RPT ET BR/UP ET IMPACT LAT: 43.99°S LONG: 158.8°W	57.02° (11)	DIRECT INSERTION  POST OMS-2 163.1 X 162.7 NM	OI-21 (4)	CARGO: 32480 LBS  PAYLOAD CHARGEABLE: 28092 LBS  DEPLOYED: 0 LBS  NON-DEPLOYED: 26247 LBS  MIDDECK: 1845 LBS  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 673238 LBS NON-DEPLOYED: 626816 LBS CARGO TOTAL: 1483100LBS  PERFORMANCE MARGINS (LBS): FPR: 4671 FUEL BIAS: 983 FINAL TDDP: 1348 RECON: 2887  PAYLOADS: PLB: SPACELAB-JAPAN MATERIALS SCIENCE AND LIFE SCIENCES EXPERIMENTS (SL-J/LM) GBA-12 GAS  MIDDECK: ISAAH SSCE SAREX-II  4 CRYO TK SETS  RMS 28 (S.N. 303) (NOT USED PER PLAN))	KSC W/D: OPF 77, VAB 5, PAD 17=99 days  LAUNCH POSTPONEMENTS: - Launch date 8/12/92 as of 8/21/91. - Launch postponed to 9/1/92 due to STS-49, STS-50, and STS-46 delays. - Launch postponed to 9/11/92 because of DFRF work and ferry to KSC being delayed.  LAUNCH SCRUB: None.  LAUNCH DELAYS: None.  TAL WX: - Zaragoza (prime) - GO (selected), Rota - GO. Ben Guerir - GO.  DOLILU/NOMINAL I-LOADS: - Nominal I-loads selected, no uplink required.  FLIGHT DURATION CHANGE: - Extended one day for science gain/enhancement. - Extended one rev because rain forecast within 30 nm at KSC.  FIRSTS: - First flight with married couple as crew members (M/S 1 and M/S 3). - First flight to deploy drag chute with nose in air. Deploy was at 185 KGS at 8 seconds after MLGTD. Chute pulled right 8°± 2° causing nose to move left 27 feet.  SIGNIFICANT ANOMALIES: - RCS JET L3A failed off. - L5D low chamber pressure. - DDS 1 H/W transient, screen blank and display overwrites. - Condensation on H2O loop lines. - Transient WCS fan separator stall currents. - Cryo O2 tank 4 controller problem. - H2O relief line temperature problem. - Ku-band range rate /Azimuth display failure. - APU 1 and 3 drain line temps cycling low. - RMLG line temperature high. - Loss of MCC power buses B1 and B2.



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (6)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-52</b> SEQ FLT #51 KSC-51 PAD 39B-17 MLP-3	OV-102 (Flight 13) Columbia  OMS PODS LPO5 - 2 RPO5 - 2 FRC2 - 13	<p>CDR: James D. Wetherbee (Flt 2 - STS-32) P277/R108/V80/M97</p> <p>PLT: Michael A. Baker (Flt 2 - STS-43) P278/R133/V81/M118</p> <p>M/S 1: Charles (Lacy) Veach (Flt 2 - STS-39) P279/R127/V82/M114</p> <p>M/S 2: William M. Shepherd (Flt 3 - STS-27, STS-41) P280/R96/V56/M87</p> <p>M/S 3: Tamara E. Jernigan (Flt 2 - STS-40) P281/R130/V83/F14</p> <p>P/S 1: Steven MacLean (Canada) P282/R156/M138</p>	<p>KSC 39, PAD B 296:17:09:38.97Z 11:16:00 AM EDT (P) 01:09:39 PM EDT (A) Thursday 13 10/22/92 (6)</p> <p>LAUNCH WINDOW 2H 30M CTOB</p> <p>EOM PLS: KSC TAL: BYD TAL WX: MOR, BEN</p> <p>SELECTED: RTLS: KSC 15/N/N TAL: BYD 32/N/SF AOA: EDW 22/N/N PLS: EDW 04/C/I/N</p> <p>TDEL: - 0.16 - 0.438/0.4</p> <p>MAX Q NAV: 717 PSF 708 PSF</p> <p>SRB STG: 2:03.8 2:05</p> <p>PERE: NOMINAL</p> <p>2 ENG TAL (BYD): 2:23 2:26</p> <p>NEG RETURN: 4:05 4:09</p> <p>PTA (U/S 235): 4:22 4:25</p> <p>PTM (U/S 235): 5:08 5:09</p> <p>MECO CMD: 8:29.82 8:32</p> <p>VI: 25875 25874</p> <p>OMS-2: 39:56 39:56 215 FPS</p>	<p>KSC 33 (KSC 13) 306:14:05:53Z 9:05:53 AM EST Sunday 9 11/1/92 (7)</p> <p>DEORBIT BURN: 306:13:11:59Z</p> <p>XRANGE: 223 NM</p> <p>ORBIT DIR: DL 25</p> <p>AIM PT: NOMINAL</p> <p>MLGTD: 1080 FT 306:14:05:53Z VEL: 219 KGS 211 KEAS HDOT: -0.3 FPS</p> <p>TD NORM 195: 2819 FT</p> <p>DRAG CHUTE DEPLOY: 169 KEAS 306:14:06:06Z</p> <p>NLGTD: 6949 FT 306:14:06:11Z VEL: 151 KGS HDOT: - 3.5 FPS</p> <p>BRK INIT: 101 KGS</p> <p>DRAG CHUTE JETTISON: 51 KGS 306:14:06:36Z</p> <p>AVE BRK DECEL: 5.7 FPS/S</p> <p>WHEELS STOP: 306:14:06:55Z 11788 FT</p> <p>ROLLOUT: 10708 FT 63 SECS</p> <p>WINDS: T-4, R 5 KTS OFFICIAL: H3, L8</p> <p>DENS ALT: 1643 FT</p> <p>FLT DURATION: 9:20:56:13 236:56:13</p> <p>S/T: 333:10:41:06</p> <p>OV-102: 98:17:40:41</p> <p>DISTANCE: 4,129,028 sm</p>	<p>104/104/109%</p> <p>PREDICTED 100/100/100/67/104</p> <p>ACTUAL 100/100/95/67/104</p> <p>1 = 2030 (8) 2 = 2015 (9) 3 = 2034 (1)</p>	<p>BI-055</p> <p>RSRM 27K</p> <p>ET-55 LWT-48</p> <p>ET RPT</p> <p>ET BR/UP</p> <p>ET IMPACT LAT: 12.9°S LONG: 163.4°W</p>	<p>28.46° (30)</p> <p>DIRECT INSERTION</p> <p>POST OMS-2 162.7 X 160.2 NM</p> <p>LAGEOS DEPLOY: 169.5 X 161.1 NM 0/20:47:45</p> <p>OMS-6: 154.2 X 114 NM 7/19:59:55</p> <p>OMS-7: 114.1 X 113.9 NM 7/20:46:26</p>	<p>OI-21 (5)</p>	<p>CARGO: 26862 LBS</p> <p>PAYLOAD CHARGEABLE: 20132 LBS</p> <p>DEPLOYED: 5577 LBS</p> <p>NON-DEPLOYED: 12475 LBS</p> <p>MIDDECK: 2080 LBS</p> <p>SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 678815 LBS NON-DEPLOYED: 641371 LBS CARGO TOTAL: 1509962 LBS</p> <p>PERFORMANCE MARGINS (LBS): FPR: 4671 FUEL BIAS: 983 FINAL TDDP:11107 RECON: 9801</p> <p>PAYLOADS: PLB: LASER GEODYNAMICS SATELLITE (LAGEOS-II) (DEPLOYED)</p> <p>CTA DEPLOYED (CANADIAN TARGET ASSY)</p> <p>CANEX-2/TPCE, USMP-01 ASP</p> <p>MIDDECK: PSE HPP CPCB BLOCK II SPIE CMIX CVTE CANEX</p> <p>5 CRYO TK SETS</p> <p>RMS 29 (S.N. 301) USED FOR CTA DEPLOY</p>	<p>KSC W/D: OPF 72, VAB 5, PAD 27=104 days</p> <p>LAUNCH POSTPONEMENTS: - Launch date was 9/24/92 on 8/21/91. - Launch postponed to 10/15/92 on 6/10/92. - Launch postponed to 10/22/92 on 10/10/92 due to engine 3 steerhorn weld anomaly.</p> <p>LAUNCH SCRUB: None.</p> <p>LAUNCH DELAYS: - Delayed for 1H53M39S because of RTLS crosswind exceedance (15-knot limit). A range safety warning (BLAST) existed for part of launch hold. MMT waived crosswind exceedance (0613G21 on center tower).</p> <p>TAL WX: - Prime TAL Banjul had reduced short range visibility but was forecast and observed GO and selected. Moron was forecast and observed NO GO because of low ceiling. Ben Guerir was NO GO during most of prelaunch period because of ceilings and threat of rain, but was observed GO when rain moved away from runway.</p> <p>DOLILU/I-LOADS: - Both nominal and DOLILU (Q-Alpha-4000) for aero DTO. Alternate (Q-Alpha-3250) to bailout DTO. Selected DOLILU, DOLILU uplink #4, total uplink #11).</p> <p>FLIGHT DURATION CHANGE: None.</p> <p>LANDING SITE CHANGE: None.</p> <p>DRAG CHUTE STRATEGY: - Deploy nose in air at 175 kgs/derotation if crosswinds ≤ 5 kts steady state and nose within ± 10 of center line. Dis-reef would occur at touchdown. Drag chute was deployed at 170 KGS (chute deploy #4), chute pulled left and nose went to right.</p> <p>SIGNIFICANT ANOMALIES: - WCS fan separator 1 failed to operate FD 10. - Fuel cell 1 cell performance monitor hangup. - F3L failed off (oxidizer leak). - PRSD O2 tank 2 heater A2 erratic. - TAGS hard jam, no developer motor motion. - Intermittent surface position indicator (SPI) power. - S-band PM low frequency forward link loss of lock. - S-band FM transmitter RF power output erratic. - Window 3 internal "void" or "bruise" (R&amp;R).</p>	



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-53</b>  SEQ FLT #52  KSC-52  PAD 39A-35 MLP-1	OV-103 (Flight 15) Discovery  OMS PODS LPO4-12 RPO3-16 FRC3-15	<b>CDR:</b> David M. Walker (Flt 3 - STS 51-A & STS-30) P283/R48/V40/M45  <b>PLT:</b> Robert D. Cabana (Flt 2 - STS-41) P284/R113/V84/M101  <b>M/S 1:</b> Guion S. Bluford (Flt 4 - STS-8, STS 61-A & STS-39) P285/R22/V25/M21  <b>M/S 2:</b> James S. Voss (Flt 2 - STS-44) P286/R136/V85/M121  <b>M/S 3:</b> Michael R. Clifford P287/R157/M139	KSC 39, PAD A 337:13:24:00Z 6:59:00 AM EST (P) 8:24:00 AM EST (A) Wednesday 7 12/2/92 (3)  <b>LAUNCH WINDOW</b> 2H 30M CTOB  <b>EOM PLS:</b> KSC <b>TAL:</b> ZZA <b>TAL WX:</b> MRN, BEN  <b>SELECTED:</b> <b>RTLS:</b> KSC 33/CI/N <b>TAL:</b> BEN 36/N/N <b>AOA:</b> NOR 17/N/N <b>PLS:</b> NOR 17/CI/N  <b>TDEL:</b> 0.32 0.722/0.766  <b>MAX Q NAV:</b> 692 PSF 705 PSF  <b>SRB STG:</b> 2:05.6 2:06  <b>PERE:</b> NOMINAL  <b>2 ENG TAL (MRN):</b> 2:32 2:33  <b>NEG RETURN:</b> 4:04 4:06  <b>PTA (U/S 350):</b> 4:56 4:52  <b>PTM (U/S 350):</b> 5:48 5:41  <b>MECO CMD:</b> 8:33.48 8:34  <b>VI:</b> 25885 25885  <b>FLIGHT DIRECTORS:</b> Asc/Ent - N. W. Hale Ld/O 2 - R. M. Kelso O 1 - J. M. Heflin Planning - L. J. Ham MOD - B. R. Stone	EDW 22, CONC (EDW 37, CONC 18) 344:20:43:47Z 12:43:47 PM PST Wednesday 5 12/9/92 (6)  <b>DEORBIT BURN:</b> 344:19:43:20Z  <b>XRANGE:</b> 791 NM  <b>ORBIT DIR:</b> DR 8  <b>AIM PT:</b> CLOSE IN  <b>MLGTD:</b> 1108 FT 344:20:43:47Z <b>VEL:</b> 209 KGS 212 KEAS <b>HDOT:</b> -2.5 FPS  <b>TD NORM 195:</b> 2682 FT  <b>DRAG CHUTE DEPLOY:</b> 167 KEAS 344:20:44:00Z  <b>NLGTD:</b> 6329 FT 344:20:44:03.6Z <b>VEL:</b> 145 KGS <b>HDOT:</b> -2.2 FPS  <b>BRK INIT:</b> 106 KGS  <b>DRAG CHUTE JETTISON:</b> 60 KGS 344:20:44:25Z  <b>AVE BRK DECEL:</b> 3.5 FPS/S  <b>WHEELS STOP:</b> 344:20:44:59Z 11273 FT  <b>ROLLOUT:</b> 10165 FT 82 SECS  <b>WINDS:</b> H9, R11 2614P19 <b>OFFICIAL:</b> H15, R8  <b>DENS ALT:</b> 2961 FT  <b>FLT DURATION:</b> 7:07:19:47 175:19:47  <b>S/T:</b> 340:18:00:53  <b>OV-103:</b> 90:10:42:50  <b>DISTANCE:</b> 3,034,680 sm	104/104/109%  <b>PREDICTED:</b> 100/100/100/70/104/67  <b>ACTUAL:</b> 100/100/100/73/104/67  1 = 2024 (5) 2 = 2012 (14) 3 = 2017 (7)	BI-055  RSRM 28W  ET-49 LWT-42  ET RPT  ET BR/UP  ET IMPACT LAT: 40.95°S LONG: 152.6°W	57° (12)  DIRECT INSERTION  <b>POST OMS-2</b> 200 X 199 NM  <b>DOD-1 DEPLOY:</b> 00/05:54 MET 200 X 199 NM  <b>SEP BURN:</b> 00/06:14MET 204 X 200 NM  <b>OMS-3:</b> 01/06:19:12 202 X 175 NM  <b>OMS-4:</b> 01/07:02:03 176 X 175 NM (ODERACS DEPLOY ALT)  <b>OMS-5:</b> 05/05:51 174.9 X 170.3 NM (2ND KSC LANDING EOM +1)	OI-21 (6)  <b>CARGO:</b> 28316 LBS  <b>PAYLOAD CHARGEABLE:</b> 26118 LBS  <b>DEPLOYED:</b> 20789 LBS (NO ODERACS DEPLOY)  <b>NON-DEPLOYED:</b> 4299 LBS (INCLUDES ODERACS)  <b>MIDDECK:</b> 1030 LBS  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 699604 LBS <b>NON-DEPLOYED:</b> 646700 LBS <b>CARGO TOTAL:</b> 1538278 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 3934 FUEL BIAS: 1055 FINAL TDDP:1368 RECON: 2844  <b>PAYLOADS:</b> PLB: DOD-1 (DPLY) GCP ODERACS (FAILED TO DEPLOY)  <b>MIDDECK:</b> HERCULES, STL, BLAST, RME III, CLOUDS-1A, CREAM, FARE  4 CRYO TK SETS  NO RMS	KSC W/D: OPF 247, VAB 5, PAD 24 = 276 days  <b>LAUNCH POSTPONEMENTS:</b> - Launch date was 10/9/92 on 3/15/91. - Launch postponed to 11/5/92 on 6/10/92 when decision made to fly STS-52 before STS-53. - Postponed launch to 12/2/92 due to LP04 replacing LP01, engine steerhorn Xrays, and NWS anomaly.  <b>LAUNCH SCRUB:</b> None.  <b>LAUNCH DELAYS:</b> - Delayed 1H25M at T-9 minutes because of acreage ice on ET which ice team confirmed melted approx. 35 minutes after sunrise. Additional delay caused by wing LA16 exceedance of 102% based on L-70 minutes and DOLILU I-loads.  <b>TAL WX:</b> - Zaragoza was prime but forecast intermittent GO (ceiling and rain) but observed GO. Moron forecast NO GO - ceiling, observed marginal GO. Ben Guerir forecast and observed GO (selected).  <b>DOLILU/I-LOADS:</b> - Nominal and DOLILU I-loads were GO on L-4.25 balloon. DOLILU was selected and uplinked. DOLILU uplink #5, total 12.  <b>FLIGHT DURATION CHANGES:</b> - Planned extension of flight from 6 to 7 days, if launch was delayed, to provide night passes for GLO experiment. - Extended one rev because forecast 3.5K broken on first KSC landing opportunity.  <b>LANDING SITE CHANGES:</b> - Changed landing site to EDW after waving off first opportunity at KSC and forecast NO GO (ceiling on second landing opportunity at KSC).  <b>FIRSTS/LASTS:</b> - First flight of OV-103 after OMDP-1 with drag chute, INWS, etc. - Last flight from FCR-2.  <b>SIGNIFICANT ANOMALIES:</b> - HPOT secondary seal transducer failure. - Humidity separator B water deposits. - Supply water dump valve water leaks. - Couldn't deploy ODERACS space spheres because logic battery was discharged (160 lbs). - Speedbrake FCS channel 3 position feedback anomaly. - F1L jet fail leak post FRCS dump (ox leak). - PPO2 C transducer shift. - Water spray boiler 1 steam vent heater anomalous cycles.  <b>EVENTS:</b> - DOD-1 deployed at 00/05:54 MET. - Lowered orbit to 176 nm for ODERACS deploy.		





# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-54</b>  SEQ FLT #53  KSC-53  PAD 39B-18 MLP-2	OV-105 (Flight 3) Endeavour  OMS PODS LPO3-14 RPO4-10 FRC5-3	<b>CDR:</b> John H. Casper (Flt 2 - STS-36) P288/R111/V86/M99  <b>PLT:</b> Donald McMonagle (Flt 2 - STS-39) P289/R126/V87/M113  <b>M/S 1:</b> Gregory J. Harbaugh (Flt 2 - STS-39) P290/R125/V88/M112  <b>M/S 2:</b> Mario Runco (Flt 2 - STS-44) P291/R137/V89/M122  <b>M/S 3:</b> Susan J. Helms P292/R158/F19  <b>EMU/TETHERED EVA:</b> EV1 - Greg Harbaugh EV2 - Mario Runco  1/17/93 4:27:50 Duration  SS EVA #20 REFINE TRAINING METHODS FOR SPACE STATION EVA'S	KSC 39, PAD B 13:13:59:29.95Z 8:52:00 AM EST (P) 8:59:30 AM EST (A) Wednesday 8 1/13/93 (6)  <b>LAUNCH WINDOW</b> 2H30M, CTOB  <b>EOM PLS:</b> KSC <b>TAL:</b> BEN <b>TAL ALT:</b> BYD, MRN  <b>SELECTED:</b> <b>RTLS:</b> KSC 33/N/N <b>TAL:</b> BEN 36/N/N <b>AOA:</b> NOR 17/N/N <b>PLS:</b> NOR 17/N/N  <b>TDEL:</b> -0.32 0.322/0.36  <b>MAX Q NAV:</b> 709 PSF 715 PSF  <b>SRB STG:</b> 2:05.1 2:06  <b>PERE:</b> NOMINAL  <b>2 ENG TAL (BEN):</b> 3:00 3:06  <b>NEG RETURN:</b> 3:57 4:00  <b>PTA (U/S 235):</b> 5:12 5:14  <b>PTM (U/S 235):</b> 5:54 5:56  <b>MECO CMD:</b> 8:28.66 8:30.6  <b>VI:</b> 25876 25872  <b>OMS-2:</b> 39:53 39:53	KSC 33 (KSC-14) 19:13:37:47Z 8:37:47 AM EST Tuesday 9 1/19/93 (5)  <b>DEORBIT BURN:</b> 19:12:38:10Z  <b>XRANGE:</b> 320 NM  <b>ORBIT DIR:</b> DL 26 <b>AIM PT:</b> CLOSE IN  <b>MLGTD:</b> 1536 FT 19:13:37:47Z <b>VEL:</b> 205 KGS 212 KEAS <b>HDOT:</b> -1 FPS  <b>TD NORM 195:</b> 2710 FT  <b>DRAG CHUTE DEPLOY:</b> 166 KEAS 19:13:38:00Z  <b>NLGTD:</b> 6247 FT 19:13:38:02Z <b>VEL:</b> 150 KGS <b>HDOT:</b> -3.1 FPS  <b>BRK INIT:</b> 107 KGS  <b>DRAG CHUTE JETTISON:</b> 52 KGS 19:13:38:23Z  <b>AVE BRK DECEL:</b> 7.3 FPS/S  <b>WHEELS STOP:</b> 19:13:38:36Z 10259 FT  <b>ROLLOUT:</b> 8723 FT 49 SECS  <b>WINDS:</b> 4H, R2 <b>OFFICIAL:</b> H3, R2  <b>DENS ALT:</b> -151 FT  <b>FLT DURATION:</b> 5:23:38:17 143:38:17  <b>S/T:</b> 346:17:39:10  OV-105: 22:19:26:18  <b>DISTANCE:</b> 2,501,277 sm	104/104/109%  <b>PREDICTED:</b> 100/104/99/70/104/67  <b>ACTUAL:</b> 100/104/104/72/104/67  1 = 2019(11) 2 = 2033(2) 3 = 2018(9)  (2018 WAS REBUILT)	BI-056  RSRM 29W  ET-51 LWT-44  ET RPT  ET BR/UP  ET IMPACT LAT: 12.92°N LONG 163.3°W	28.45° (31)  DIRECT INSERTION  <b>POST OMS-2</b> 164 X 160 NM  <b>SEP BURN:</b> OMS-3: 173 X 160 NM  OMS-4: 14:16:08:42Z 164 X 163 NM  MET 1:02:08:42	OI-21 (7)  CARGO: 49039 LBS  <b>PAYLOAD CHARGEABLE:</b> 46540 LBS  <b>DEPLOYED:</b> 37497 LBS  <b>NON-DEPLOYED:</b> 7991 LBS  <b>MIDDECK:</b> 1052 LBS  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 737101 LBS <b>NON-DEPLOYED:</b> 655743 LBS <b>CARGO TOTAL:</b> 1587317 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 3934 FUEL BIAS: 1055 FINAL TDDP: 2659 RECON: 3421  <b>PAYLOADS:</b> <b>PLB:</b> TDRS-F/IUS (DEPLOYED) DXS  <b>MIDDECK:</b> CHROMEX CGBA PARE SSCE  4 CRYO TK SETS  NO RMS  <b>VELOCITY</b> 25780 FPS  <b>ENTRY RANGE</b> 4213 NM	KSC W/D: OPF 55, VAB 6, PAD 27 = 88 days  <b>LAUNCH POSTPONEMENTS:</b> - Baselined launch date of 11/19/92 on 4/4/91. - Postponed launch date to 12/15/92 on 5/8/92. - Postponed launch date to 1/13/93, after holi-days, to allow the required OPF processing time.  <b>LAUNCH SCRUB:</b> None.  <b>LAUNCH DELAYS:</b> - Delayed 7M30S while holding at T-9 minutes while discussing load indicator A16 Q-plane exceedance (101%) at M=1.55. Approved a waiver.  <b>TAL WX:</b> - Ben Guerir and Moron forecast and observed GO. Banjul forecast and observe NO GO - VIS (haze).  <b>DOLILU/I-LOADS:</b> - DOLILU selected and uplinked. DOLILU #6, total uplink #13.  <b>FLIGHT DURATION CHANGES:</b> None.  <b>FIRSTS:</b> - First flight with a planned fuel cell shut-down/restart. FC2 shut down for 10 hours per DTO 412 at 04/20:00 - First flight of EDO Waste Collection System (WCS).  <b>SIGNIFICANT ANOMALIES:</b> - EDO WCS commode, urinal, and compactor microswitch problem. - PLB floodlights problems: Both mids and fwd starboard. - R1R jet failed off during RCS hot fire. - Rudder speedbrake secondary hydraulic switching valve indication. - Hydraulic sys 3 residual pressure post APU shutdown. - APU 3 overheat during ascent (WSB 3 not cooling). - DOLILU GPC dump display format error. - EVA - No hitch pin in PFR pip-pin. - R RSRM had 18 psi chamber pressure spike at 67 seconds.  <b>EVENTS:</b> - TDRS-F deployed at 06:12:57 MET. - OMS4 to bring in additional ldg opportunities. - EVA started at 03:20:50:25 MET. - Deorbit burn on rev 95, landing rev 96.  NOTE: SSME 2018 was rebuilt to new engine status.		



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, LANDING 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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-56</b>  SEQ FLT #54  KSC-54  PAD 39B-19 MLP-1	OV-103 (Flight 16) Discovery  Eleventh Spacelab Flight Igloo (4)  OMS PODS LPO1-19 RPO3-17 FRC3-16	<b>CDR:</b> Kenneth D. Cameron (Flt 2 - STS-37) P293/R121/V90/M109  <b>PLT:</b> Stephen S. Oswald (Flt 2 - STS-42) P294/R139/V91/M124  <b>M/S 1:</b> C. Michael Foale (Flt 2 - STS-45) P295/R143/V92/M127  <b>M/S 2:</b> Kenneth D. Cockrell P296/R159/M140  <b>M/S 3:</b> Ellen Ochoa P297/R160/F20	KSC 39, PAD B 98:05:28:59.95Z 1:29:00 AM EDT (P) 1:29:00 AM EDT (A) Thursday 14 4/8/93 (9)  <b>LAUNCH WINDOW</b> Closes on ATMOS Tangent Ray Constraint - 2H28M  <b>EOM PLS:</b> KSC TAL: ZZA TAL ALT: MRN, BEN  <b>SELECTED:</b> RTLS: KSC 33/N/N TAL: ZZA 30/C/I/N AOA: NOR 17/N/N PLS: EDW 22/N/N (ORBIT 7) EDW 04/C/I/N (ORBIT 3)  <b>TDEL:</b> 0.00 0.24  <b>MAX Q NAV:</b> 675 PSF 676 PSF  <b>SRB STG:</b> 2:05.3 2:06  <b>PERF:</b> NOMINAL  <b>2 ENG TAL (MRN):</b> 2:24 2:26  <b>NEG RETURN:</b> 4:10 4:13  <b>PTA (U/S 280):</b> 4:22 4:23  <b>PTM (U/S 280):</b> 5:09 5:12  <b>MCC FCR-1 (33)</b>  <b>FLIGHT DIRECTORS:</b> Ascent - J. W. Bantle Entry - R. D. Jackson Ld/O1 - C. W. Shaw O 2 - J. W. Muratore O 3 - R. E. Castle MOD - A. L. Briscoe	KSC 33 (KSC-15) 107:11:37:19Z 7:37:19 AM EST  Saturday 10 4/17/93 (8)  <b>DEORBIT BURN:</b> 107:10:34:25Z  <b>XRANGE:</b> 6 NM  <b>ORBIT DIR:</b> DL 27  <b>AIM PT:</b> CLOSE IN  <b>MLGTD:</b> 1074 FT 107:11:37:19Z VEL: 196 KGS 206 KEAS HDOT: -2.5 FPS  <b>TD NORM 195:</b> 1948 FT  <b>DRAG CHUTE DEPLOY:</b> 169 KEAS 107:11:37:30Z  <b>NLGTD:</b> 5587 FT 107:11:37:34Z VEL: 144 KGS HDOT: -3.4 FPS  <b>BRK INIT:</b> 92 KGS  <b>DRAG CHUTE JETTISON:</b> 55 KGS 107:11:37:59Z  <b>AVE BRK DECEL:</b> 4.9 FPS/S  <b>WHEELS STOP:</b> 107:11:38:22Z 10603 FT  <b>ROLLOUT:</b> 9529 FT 63 SECS  <b>WINDS:</b> H6, 1L <b>OFFICIAL:</b> H6, 1L  <b>DENS ALT:</b> -74 FT  <b>FLT DURATION:</b> 9:06:08:19 222:08:19  <b>S/T:</b> 355:23:47:29  <b>OV-103:</b> 99:16:51:09  <b>DISTANCE:</b> 3,853,997 sm	104/104/109%  <b>PREDICTED:</b> 100/100/89/67/104  <b>ACTUAL:</b> 100/100/89/69/104  1 = 2024 (6) 2 = 2033 (3) 3 = 2018 (10)	BI-058  RSRM 31KM  ET-54 LWT-47  ET RPT  ET BR/UP  ET IMPACT LAT: 42.4°N LONG: 154.36°W	57° (13)  DIRECT INSERTION  <b>POST OMS-2</b> 159.8 X 159.1 NM  <b>DEPLOY:</b> 161.1 X 158.2 NM  <b>RNDZ:</b> 160.5 X 156.9 NM	OI-21 (8)	<b>CARGO:</b> 21000 LBS  <b>PAYLOAD CHARGEABLE:</b> 16439 LBS  <b>DEPLOYED:</b> 0 LBS  <b>NON-DEPLOYED:</b> 12568 LBS  <b>MIDDECK:</b> 1031 LBS  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 737101 LBS <b>NON-DEPLOYED:</b> 669342 LBS <b>CARGO TOTAL:</b> 1608317 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 3934 FUEL BIAS: 1055 FINAL TDDP: 9521 RECON: 10718  <b>PAYLOADS:</b> PLB: ATMOSPHERE LABORATORY FOR APPLICATIONS AND SCIENCE (ATLAS-2) SSBUIA SPARTAN 201 (DEPLOYED & RETRIEVED) GBP SUVE  <b>MIDDECK:</b> CMIX STL PARE SAREX-II HERCULES RME-III AMOS CREAM  4 CRYO TK SETS  RMS 30 (S.N. 301) USED FOR SPARTAN DEPLOY, CAPTURE & BERTH	<b>KSC W/D:</b> OPF 63, VAB 10, PAD 22 = 95 days  <b>LAUNCH POSTPONEMENTS:</b> - Launch date of 3/23/93 was postponed to 4/6/93 because of STS-55 launch delays which were caused by SSME HPOTP tip seal retainer problems, hydraulic flex hoses, and range conflicts with Delta and Atlas launches.  <b>LAUNCH SCRUB:</b> - Launch on 4/6/93 was scrubbed after an RSLs breakout at T-11 seconds caused by failure to get "close" indication when LH2 high point bleed valve closed.  <b>LAUNCH DELAYS:</b> None.  <b>TAL WX:</b> All three TAL sites (ZZA, MOR, and BEN) were forecast and observed GO. ZZA selected.  <b>DOLILU/I-LOADS:</b> - Nominal I-loads were selected (were uplinked because DOLILU I-loads had been uplinked for 4/6/93 launch attempt).  <b>NIGHT LAUNCH:</b> Shuttle night launch #8.  <b>FLIGHT DURATION CHANGES:</b> - Waved off two landing opportunities at KSC because of forecast low ceiling at KSC. - Extended 1 day because WX forecast NO GO at KSC.  <b>FIRSTS:</b> - First flight with 90% reefed drag chute (same deploy strategy). 90% more stable than baseline. - First TV uplink to American Spacecraft via SAREX-II (UHF fast scan TV).  <b>SIGNIFICANT ANOMALIES:</b> - RSRM 7 to 8 psi pressure spike at 74 seconds. - Loose thermal blanket on aft (1307) bulkhead. - FC1 O2 reactant valve falsely indicated closed. - FC1 substack 3 delta voltage increased during purges. - ATVC Channel 4 power failure. - Ku-band singed processor problem - Spacelab data exceeding 2 MPS were degraded. - S-band low frequency interference problem. - TAGS jam. - TIPS on first flight worked OK on S-band, bad on Ku-band (TAGS master switch was turned off). - LSD injector temps high indicated htr failed on.  <b>RNDZ:</b> Rendezvous #13 with SPARTAN for retrieval and return.  <b>EVENTS:</b> - SAREX contact with Russian Space Station, MIR, at 2:17:55 MET. - SPARTAN was deployed at 3:00:42 MET on orbit 49, grapple was at 05:01:51 MET, and berthed at 05:02:32 MET.	



# SPACE SHUTTLE MISSIONS SUMMARY

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FLT NO.	ORBITER	CREW (7)		LAUNCH SITE, LIFTOFF TIME, LAUNCH SITES, LANDING 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.)
		TITLE, NAMES & EVA'S						INC	HA/HP			
STS-55	OV-102 (Flight 14) Columbia  Twelfth Spacelab Flight  Long Module (8)	CDR: Steven R. Nagel (Flt 4 - STS 51-G, STS 61-A, & STS-37) P298/R64/V23/M59  PLT: Terence T. Henricks (Flt 2 - STS-44) P299/R135/V93/M120  OMS PODS LPO5-3 RPO5-3 FRC2-14  M/S 1 (PYLD CDR): Jerry L. Ross (Flt 4 - STS 61-B, STS-27, & STS-37) P300/R86/V38/M78  M/S 2: Charles J. Precourt P301/R161/M141  M/S 3: Bernard A. Harris, Jr. P302/R162/M142  P/S 1: Ulrich Walter (Germany) P303/R163/M143  P/S 2: Hans W. Schlegel (Germany) P304/R164/M144	KSC 39, PAD A 116:14:49:59.98Z 10:50:00 AM EDT (P) 10:50:00 AM EDT (A) Monday 8 4/26/93 (10)  LAUNCH WINDOW 2H30M - CTOB  EOM PLS: KSC TAL: BYD TAL ALT: BEN, MRN  SELECTED: RTL: KSC 15/N/N TAL: BYD 32/N/SF AOA: EDW 22/C/N PLS: EDW 22/C/N  TDEL: -0.16    0.322/0.36  MAX Q NAV: 714 PSF    715 PSF  SRB STG: 2:04.6                      2:06  PERE: NOMINAL  2 ENG TAL (BYD): 2:30                      2:31  NEG RETURN: 3:58                      4:03  PTA (U/S 235): 4:52                      4:56  PTM (U/S 235): 5:28                      5:33  MECO CMD: 8:28.18                      8:30.9  VI: 25877                      25870  OMS-2: 39:54                      39:54	EDW 22 CONC (EDW 38, CONC 19) 126:14:29:59Z 7:29:59 AM PDT Thursday 6 5/6/93 (5)  DEORBIT BURN: 126:13:29:20Z  XRANGE: 640 NM  ORBIT DIR: DL 28  AIM PT: CLOSE IN  MLGTD: 1819 FT 126:14:29:59Z VEL: 210 KGS 217 KEAS HDOT: -1.5 FPS  TD NORM 205: 2589 FT  DRAG CHUTE DEPLOY: 165 KEAS 126:14:30:15Z  NLGTD: 7283 FT 126:30:17Z VEL: 149 KGS HDOT: -4.6 FPS  BRK INIT: 131 KGS  DRAG CHUTE JETTISON: 54 KGS 126:30:41Z  AVE BRK DECEL: 4.8 FPS/S  WHEELS STOP: 126:14:31:00Z 11944 FT  ROLLOUT: 10125 FT 61 SECS  WINDS: H13, L5 OFFICIAL: H15, L12  DENS ALT: 3166 FT  FLT DURATION: 9:23:39:59 239:39:59  S/T: 365:23:27:28  OV-102: 108:17:20:40  DISTANCE: 4,164,183 sm	104/104/ 109%	BI-057  RSRM 30W  ET-56 LWT-49  ET RPT  ET BR/UP  ET IMPACT LAT: 12.75°N LONG: 163.68°W	28.45° (32)	DIRECT INSERTION  POST OMS-2 162 X 160 NM  TRIM BURN #1: 0:10:33:00 MET 160.9 X 160.7 NM  TRIM BURN #1: 2:21:34 :30 MET 162 X 158 NM	OI-21 (9)	CARGO: 33416 LBS  PAYLOAD CHARGEABLE: 26881 LBS  DEPLOYED: 0 LBS  NON-DEPLOYED: 24599 LBS  MIDDECK: 2282 LBS  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 737101 LBS NON-DEPLOYED: 696223 LBS CARGO TOTAL: 1641733 LBS  PERFORMANCE MARGINS (LBS): FPR: 3934 FUEL BIAS: 1055 FINAL TDDP: 6248 RECON: 7559  PAYLOADS: PLB: SPACELAB SL-D2/LM (Germany) + USS + GAS GAS  MIDDECK: SAREX-II  5 CRYO TK SETS  NO RMS	KSC W/D: OPF 77, VAB 5, PAD 73 = 155 days  LAUNCH POSTPONEMENTS: - 2/25/93 launch date was postponed to 3/21/93 because of SSME HPOT tip seal retainer pro-blem, SSME 3 LH2 umbilical hydraulic supply flex hose break and range conflicts with Delta and Atlas launches.  LAUNCH SCRUBS AND PAD ABORT #3: - 3/21/93 launch date was scrubbed on 3/18/93 shortly after countdown started because of Delta launch scrub due to high winds. - 3/22/93 launch was scrubbed with a pad abort at T-3 seconds when SSME 3 (S.N. 2011) oxidizer preburner shutdown purge pressure exceeded 50 psi limit. Oxidizer preburner ASI purge checkvalve (N9) failed to close due to contamination. Decision was made to replace all three SSME's and moved STS-56 ahead of STS-55 (PAD abort #3). - Replaced all 3 engines at pad. - 4/24/93 launch scrubbed after tanking at L-6.5 hours due to an IMU-2 failed BITE test.  LAUNCH DELAYS: None.  DOLILU/I-LOADS: - Both nominal and DOLILU were go. DOLILU selected because of increased Q-plane margin at Mach 1.55. DOLILU uplink #7, total I-load uplink #14.  FLIGHT DURATION CHANGES: - Extended 1 day for additional science. - Extended one rev because of forecast variable broken ceiling and changed landing site to EDW concrete.  LANDING SITE CHANGE: KSC to EDW.  FIRSTS: First flight of operational TIPS.  DRAG CHUTE: - Baseline chute used with strategy to deploy at derotation similar to STS-56.  SIGNIFICANT ANOMALIES: - RSRM 6 PSI pressure spike at 69 seconds MET. - LSRM 10-12 PSI pressure spike at 71 seconds. - S/L DDS 1 and 2 problems. - MMU 1 SM checkpoint fail transient. - CRT-4 I/O error (lost aft CRT), CRT-1 dim. - Waste water tank outer shell punctured. Used CWC for waste water. - FES primary A shut down (ice in core). - ARD Sys parameter incorrect during first launch attempt. - TV camera and WCCU anomalies. - L4D RCS jet heater fail on. - Right OMS GN2 accumulator leak. - Prime OR/F (refrigerator/freezer) failed to operate. - Enhanced OR/F had thermal problems. - 48 total payload anomalies written.  RADIATOR DEPLOYED #14	



# SPACE SHUTTLE MISSIONS SUMMARY

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FLT NO.	ORBITER	CREW (6)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-57 SEQ FLT #56 KSC-56 PAD 39B-20 MLP-2	OV-105 (Flight 4) Endeavour  Spacehab 1  OMS PODS LPO3-15 RPO4-11 FRC5-4	<b>CDR:</b> Ronald J. Grabe (Flt 4 - STS 51-J, STS-30 & STS-42) P305/R76/V41/M70  <b>PLT:</b> Brian Duffy (Flt 2 - STS-45) P306/R142/V94/M126  <b>M/S 1 (PAYLOAD CDR):</b> G. David Low (Flt 3 - STS-32 & STS-43) P307/R110/V64/M98  <b>M/S 2:</b> Nancy J. Sherlock P308/R165/F21  <b>M/S 3:</b> Peter J. K. (Jeff) Wisoff P309/R166/M145  <b>M/S 4:</b> Janice E. Voss P310/R167/F22  <b>EMU/TETHERED EVA:</b> EV 1: G. David Low EV 2: Jeff Wisoff  EVA 1 - 6/25/93 5:50 Duration	KSC 39B 172:13:07:21.95Z 9:07:00 AM EDT (P) 9:07:22 AM EDT (A) Monday 9 6/21/93 (6)  <b>LAUNCH WINDOW:</b> 71M48S PLANAR/ PHASE WINDOW  <b>EOM PLS:</b> KSC <b>TAL:</b> BYD <b>TAL WX:</b> BEN, MRN  <b>SELECTED:</b> <b>RTL:</b> KSC15/CI/N <b>TAL:</b> BEN36/N/N <b>AOA:</b> EDW22/CI/N <b>PLS:</b> EDW22/CI/N  <b>TDEL:</b> 0.00    0.722/0.76  <b>MAX Q NAV:</b> 695 PSF    722 PSF  <b>SRB STG:</b> 2:04                      2:06  <b>PERF:</b> NOMINAL  <b>2 ENG TAL (BEN):</b> 2:33                      2:37  <b>NEG RETURN:</b> 3:45                      4:07  <b>PTA (U/S 395):</b> 4:10                      4:12  <b>PTM (U/S 427):</b> 5:32                      5:31  <b>MECO CMD:</b> 8:32.47                      8:33  <b>VI:</b> 26028                      26025  <b>OMS-2:</b> 42:11.7                      42:13 318 FPS                      316 FPS	KSC 33 (KSC 16) 182:12:52:16Z 8:52:16 AM EDT  Thursday 7 7/1/93 (6)  <b>DEORBIT BURN:</b> 182:11:41:42Z  <b>XRANGE:</b> 587 NM  <b>ORBIT DIR:</b> DL 29  <b>AIM PT:</b> CLOSE IN  <b>MLGTD:</b> 2296 FT 182:12:52:16Z <b>VEL:</b> 202 KGS 207 KEAS <b>HDOT:</b> -1.0 FPS  <b>TD NORM 205:</b> 2461 FT  <b>DRAG CHUTE</b> <b>DEPLOY:</b> 175 KEAS 182:12:52:25Z  <b>NLGTD:</b> 7498 FT 182:12:52:34Z <b>VEL:</b> 135 KGS <b>HDOT:</b> -3.4 FPS  <b>BRK INIT:</b> 101 KGS  <b>DRAG CHUTE</b> <b>JETTISON:</b> 56 KGS 182:12:52:57Z  <b>AVE BRK DECEL:</b> 4.4 FPS/S  <b>WHEELS STOP:</b> 182:12:53:21Z 12251 FT  <b>ROLLOUT:</b> 9955 FT 65 SEC  Continued. . .	104/104/ 109%  <b>PREDICTED:</b> 100/100/100/ 67/104  <b>ACTUAL:</b> 100/100/100/ 72/104  1 = 2019 (12) 2 = 2034 (2) 3 = 2017 (8)  <b>M 3 EOM:</b>  <b>WEIGHT:</b> 224752 LBS  <b>X CG:</b> 1081.1  <b>LANDING:</b>  <b>WEIGHT:</b> 224468 LBS  <b>X CG:</b> 1082.5	BI-059  RSRM 32 KM  ET-58  LWT 51  ET RPT  ET BR/UP  ET IMPACT LAT: 16.09°N LONG: 142.90°W	28.45° (33)  DIRECT INSERTION  POST OMS-2: 252 X 212 NM  <b>NC3 BURN:</b> 56 FPS 2:04:00:35 MET 257/251 NM  <b>TI BURN:</b> 258 X 255 NM  <b>ORB ADJ 3:</b> 3:19:01 MET 256 X 209 NM	OI-22 (1)	<b>CARGO:</b> 29119 LBS  <b>PAYLOAD</b> <b>CHARGEABLE:</b> 19630 LBS  <b>DEPLOYED:</b> 132 LBS  <b>NON-DEPLOYED:</b> 18244 LBS  <b>MIDDECK:</b> 1254 LBS  <b>SHUTTLE</b> <b>ACCUMULATED</b> <b>WEIGHTS:</b> <b>DEPLOYED:</b> 737233 LBS <b>NON-DEPLOYED:</b> 715721 LBS <b>CARGO TOTAL:</b> 1670852 LBS  <b>PERFORMANCE</b> <b>MARGINS (LBS):</b> FPR: 3934 FUEL BIAS: 1055 FINAL TDDP: 2030 RECON: 2162  <b>PAYLOADS:</b> <b>PLB:</b> SPACEHAB-1 EURECA CAPTURE AND RETURN SHOOT, GBA, CONCAP-IV  <b>MIDDECK:</b> FARE AMOS SAREX-II  4 CRYO TK SETS  RMS 31 (S.N. 303) RMS used to grapple and berth EURECA and EVA DTO	KSC W/D: OPF 52, VAB 16, PAD 51 = 119 days total.  <b>LAUNCH POSTPONEMENTS:</b> - Launch date was 5/10/93 then postponed to 5/18/93. - Launch date was postponed from 5/18/93 to 6/3/93 because of STS-55 and STS-56 launch delays. - Launch date was postponed from 6/3/93 to 6/20/93 because SSME 3 HPOTP required changeout (QA electrochemical etch marking found in a high stress area of HPOTP turbine bearing preload spring).  <b>LAUNCH SCRUBS:</b> - 6/20/93 launch was scrubbed during hold at T-5 minutes when 71 minute 48 second launch window expired. All three TAL sites were NO-GO (Banjul for thunderstorms and Ben Guerir and Moron for crosswind exceedences.)  <b>LAUNCH DELAYS:</b> - Launch delayed 22 seconds because of an intruder aircraft. Countdown was at T-5 minutes awaiting a GO for RTLS weather when the aircraft entered KSC airspace (Launch danger area).  <b>TAL WX:</b> - Banjul was forecast and observed NO GO for ceiling and rain. Ben Guerir (selected) was forecast and observed GO. Moron was forecast NO GO for ceiling, rain, and crosswinds but was observed GO.  <b>DOLILU/I-LOADS:</b> - Nominal I-loads were GO and selected because of better Q-plane than DOLILU. No uplink required.  <b>FLIGHT DURATION CHANGES:</b> 3 days extension - Extended 1 day for additional science. - Extended 1 day because of forecast low ceiling on rev 124 and convective development and potential thunderstorms on rev 125. - Extended 1 day because of forecast thunderstorms on revs 139 and 140.  <b>FIRSTS/LASTS:</b> - Last flight of TAGS, next to last flight of teleprinter. - First flight of the improved APU controller (APU #2). - Last flight of drag chute without ribbons removed. (Was second flight with 90 percent reefed).  <b>EVENTS:</b> - Started EVA at 3:23:59:51 MET (planned 4 hours). David Low pushed on EURECA antenna and ESOC commanded latches. David had to move antennas in "z" to get them latched. Both antennas confirmed latched at EVA time of 2:25, when they started the scheduled EVA DTO 1210. (EURECA deployed on STS-46  Continued. . .	



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# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (6)	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE	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.)
		TITLE, NAMES & EVA'S		LANDING TIMES FLT DURATION, WINDS			INC	HA/HP			
STS-57 Continued		Continued . . .  SPACE SHUTTLE EVA #21 SCHEDULED EVA #17 REFINE EVA TRAINING CONCEPTS AND DEMONSTRATE EVA TECHNIQUES FOR FUTURE EVA'S.  ADDED UNSCHEDULED MANUAL LATCHING OF EURECA ANTENNAS  MCC FCR-1 (35)  FLIGHT DIRECTORS: A/E - J. W. Bantle LD/O 1 - G. W. Pennington O 2 - P. L. Engelauf PLNG - R. M. Kelso MOD - G. E. Coen		Continued . . .  WINDS: H6, L2 KTS OFFICIAL: H10, L2  DENS ALT: 1571 FT  FLT DURATION: 9:23:44:54 239:44:54  S/T: 375:23:12:22  OV-105: 32:19:11:12  DISTANCE: 4,118,037 sm						Continued . . .  RENDEZVOUS #14: - Rendezvous with EURECA for capture, retrieval, and return.  SIGNIFICANT ANOMALIES: - O2 manifold valve tank 1 failed to close. - Fuel cell 3 H2 reactant valve failed to close. - PPO2 sensor B is biased low. - MCA logic MCA power AC3 3-phase mid 4 CB anomaly. - AC3 phase-to-phase short/Spacehab PDU fuses blown and replaced (command error). - Mid starboard and aft port floodlights failure. - EVA waist tether small tether hook failure. - Leaking EMU 1200-series battery. - RMS grapple fixture/EURECA thermal control unit switch problem (installed reversed). - Jet R5D heater failed on. - EURECA antennas failed to latch (crew manually latched them during planned EVA). - S-band intermittent forward and return links on lower left quad antenna. - Ammonia boilers failed to cool post landing.	

# 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		FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
							INC	HA/HP			
STS-51 SEQ FLT #57  KSC-57  PAD 39B-21 MLP-3	OV-103 (Flight 17) Discovery  OMS PODS LPO1-20 RPO3-18 FRC3-17	CDR: Frank L. Culbertson (Flt 2 - STS-38) P311/R116/V95/M104  PLT: William F. Readdy (Flt 2 - STS-42) P312/R140/V96/M125  M/S 1: James H. Newman P313/R168/M146  M/S 2: Daniel W. Bursch P314/R169/M147  M/S 3: Carl E. Walz P315/R170/M148  SPACE SHUTTLE EVA #22 SCHEDULED EVA #18 DTO 1210 EVA OPERATIONS/ PROCEDURES/TRAINING FOR FUTURE EVA'S  EMU/TETHERED EVA: EV 1: Carl Walz EV 2: Jim Newman  9/16/93 7:05:28 Duration  MCC FCR-1 (36)  FLIGHT DIRECTORS: A/E - R. D. Jackson LD/O 1 - R. E. Castle O 2 - R. M. Kelso PLNG - N. W. Hale MOD - B. R. Stone	KSC 39B 255:11:44:59.97Z 7:45:00 AM EDT (P) 7:45:00 AM EDT (A) Sunday 7 9/12/93 (4)  LAUNCH WINDOW: 1H55M ACTS/TOS RAAN ORBIT 23A  EOM PLS: KSC TAL: BYD TAL WX: BEN  SELECTED: RTL: KSC15/CI/N TAL: BEN36/N/N AOA: EDW22/CI/N PLS: EDW22/CI/N  TDEL: 0.16            0.322  MAX Q NAV: 700 PSF    707 PSF  SRB STG: 2:04.6            2:05.0  PERF: NOMINAL  2 ENG TAL (BEN): 3:15            3:12  NEG RETURN: 3:56            3:59  PTA (U/S 245): 5:15            5:07  PTM (U/S 245): 6:12            6:06  MECO CMD: 8:28.15            8:29.8  VI: 25873            25874  OMS-2: 39:53.7            39:53.7 222 FPS            222 FPS	KSC 15 (KSC 17) 265:07:56:06Z 3:56:06 AM EDT  Wednesday 6 9/22/93 (6)  DEORBIT BURN: 265:06:55:30Z  XRRANGE: 89 NM  ORBIT DIR: DL 30 AIM PT: CLOSE IN  MLGTD: 2099 FT 265:07:56:06Z VEL: 198 KGS 194 KEAS HDOT: -1.0 FPS  TD NORM 195: 2080 FT  DRAG CHUTE DEPLOY: 165 KEAS 265:07:56:16Z  NLGTD: 6539 FT 265:07:56:21Z VEL: 144 KGS HDOT: -3.9 FPS  BRK INIT: 113 KGS  DRAG CHUTE JETTISON: 47 KGS 265:07:56:43Z  WHEELS STOP: 265:07:56:56Z 10370 FT  ROLLOUT: 8271 FT 50 SEC  WINDS: T2, L1 KTS OFFICIAL: H2, L1  DENS ALT: 1049 FT  FLT DURATION: 9:20:11:06 236:11:06  S/T: 385:19:23:28  OV-105: 109:13:02:15  DISTANCE: 4,106,411 sm	104/104/ 109%  PREDICTED: 100/104/104/ 67/104  ACTUAL: 100/104/104/ 69/104  1 = 2030 (9) 2 = 2033 (4) 3 = 2032 (2)  M 3 EOM:  WEIGHT: 207043 LBS  X CG: 1084.8  LANDING:  WEIGHT: 206932 LBS  X CG: 1086.5	BI-060  RSRM 33  ET-59  LWT 52  ET RPT  ET BR/UP  ET IMPACT LAT: 12.89°N LONG: 163.4°W	28.45° (34)	DIRECT INSERTION  POST OMS-2: 161.1 X 160.3 NM  ACTS/TOS DEPLOY: 0/7:58:09 MET (P) 0/9:28:28 MET (A) 173.5 X 160.9 NM  ORFEUS- SPAS DEPLOY: 1/03:21:00 MET 164.6 X 147.2 NM  ORFEUS-SPAS GRAPPLE: 7/00:05 MET	OI-22 (2)	CARGO: 46685 LBS  PAYLOAD CHARGEABLE: 42637 LBS  DEPLOYED: 26889 LBS  NON-DEPLOYED: 7305 LBS  MIDDECK: 1122 LBS  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 764122 LBS NON-DEPLOYED: 724148 LBS CARGO TOTAL: 1717537 LBS  PERFORMANCE MARGINS (LBS): FPR: 3934 FUEL BIAS: 1055 FINAL TDDP: 1358 RECON: 1273  PAYLOADS: PLB: ACTS/TOS (DEPLOYED) ORFEUS-SPAS (DEPLOYED AND RETRIEVED) LDCE (2 CANS)  MIDDECK: IMAX CPCG - BLOCK-II CHROMEX, HRSGS-A, APE-B, IPMP, RME-III, AMOS  4 CRYO TK SETS  RMS 32 (S.N. 201)  RMS USED FOR SPAS DEPLOY, GRAPPLE AND REBERTH	KSC W/D: OPF 57, VAB 8, PAD 69 = 134 days total.  LAUNCH POSTPONEMENTS: - Launch date was 2/22/93 as of 6/28/91 but was postponed to 6/30/93 on 7/32/92 to reflect changes in manifest. - 6/30/93 launch was postponed to 7/13/93 on 3/31/93 based on STS-55, STS-56, and STS-57 launch delays. - 7/13/93 launch was postponed to 7/17/93 because of STS-57 launch delays. (See 7/17/93 and 7/24/93 scrubs below.) - 8/4/93 launch date was postponed on 7/30/93 to avoid Perseid Meteoroid (Comet Swift-Tuttle) event on 8/11/93. Launch rescheduled for 8/12/93. (See 8/12/93 scrub below.) - 9/10/93 launch postponed to 9/12/93 on 9/3/93 to allow ACTS/TOS to complete a review/analysis of transister alert (suspected as potential cause of NOAA-I and MARS Observer failures).  LAUNCH SCRUBS/PAD ABORT #4: - 7/17/93 launch was scrubbed at L-31 minutes. At approximately L-2 hours, nine "B" systems PIC's indicated they were charged (four on each SRB holddown post and one on ET vent arm). - 7/24/93 launch was scrubbed at T-19 seconds with an RSLs breakout caused by right SRB tilt HPU underspeed. - 8/12/93 launch aborted at T-3 seconds when SSME #2 (S.N. 2033) fuel flow sensor A2 miscompared with sensor A1. (Pad abort #4.) Launch reset to 9/10/93. Replaced all 3 engines at pad.  TAL WX: Banjul (prime) was forecast and observed NO-GO - ceiling. Ben Guerir (selected) was forecast and observed GO.  DOLILU/I-LOADS: Both nominal and DOLILU I-loads were GO but DOLILU was selected and uplinked to provide a slight increase in performance and drainback time. DOLILU uplink #8, I-load uplink #15.  FLIGHT DURATION CHANGES: - Waved off rev 142 landing at KSC because of rain within 30 nm. Extended flight 1 day minus 1 rev. (Total extension 15 revs.)  FIRSTS: - First flight of drag chute with five ribbons removed. - First flight with night landing at KSC. - First flight with wake up music (used Heartbreak Hotel by Carl Walz) sung by a crewmember. - First flight with two U.S. and two Russian EVA's at same time.  EVENTS: Fuel cell 1 shut down for 24 hours for DTO 412.  RENDEZVOUS #15: - Rendezvous with ORFEUS-SPAS for grapple, berth, and return.  NIGHT LANDING: Space Shuttle #6, first night landing at KSC.  SIGNIFICANT ANOMALIES: - Right SRB tilt HPU underspeed problem. (Scrub #2.) - SSME #2 fuel flow sensor A2 failed low. (Scrub #3.) - FA2 MDM BITE. - EECOM-01 - Loose thermal blanket on aft bulkhead. - PSA slider door stuck open. - Thruster L3L failed off. - Thruster R1R chamber pressure transducer failure (post-flight found fuel/oxidizer reaction products (FORP) in tube.) - TOS SuperZip damage, both detonation cords fired simultaneously damaging 1307 bulkhead and PLB blankets. - Humidity separator B water carryover.



# SPACE SHUTTLE MISSIONS SUMMARY

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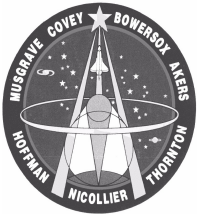
FLT NO.	ORBITER	CREW (7)	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE, LANDING TIMES, FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT		FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-58</b> SEQ FLT #58 KSC-58 PAD 39B-22 MLP-1	OV-102 (Flight 15) Columbia  SLS-2/LM  13th Spacelab Flight  Long Module 9  EDO 2  OMS PODS LPO5-4 RPO5-4 FRC2-15	<b>CDR:</b> John E. Blaha (Flt 4 - STS-29, STS-33 & STS-43) P316/R97/V48/M88  <b>PLT:</b> Richard A. Searfoss P317/R171/M149  <b>M/S 1 (PAYLOAD CDR):</b> M. Rhea Seddon (Flt 3 - STS 51-D & STS-40) P318/R55/V63/F5  <b>M/S 2:</b> William S. McArthur P319/R172/M150  <b>M/S 3:</b> David A. Wolf P320/R173/M151  <b>M/S 4:</b> Shannon W. Lucid (Flt 4 - STS 51-G, STS-34 & STS-43) P321/R65/V45/F6  <b>P/S 1:</b> Martin J. Fettman P322/R174/M152 Colorado State University	KSC 39, PAD B 291:14:53:09.97Z 10:53:00 AM EDT (P) 10:53:10 AM EDT (A) Monday 10 10/18/93 (7)  <b>LAUNCH WINDOW:</b> 2H30M, CTOB  <b>EOM PLS:</b> EDW TAL: BEN TAL WX: MRN, ZZA  <b>SELECTED:</b> RTLS: KSC33/N/N TAL: BEN36/N/N AOA: EDW22/N/N PLS: EDW22/N/N  <b>TDEL:</b> 0.00      0.82/0.12  <b>MAX Q NAV:</b> 687 PSF    684 PSF  <b>SRB STG:</b> 1:58.9      1:59  <b>PERE:</b> NOMINAL  <b>2 ENG TAL (BEN):</b> 2:50      2:53  <b>NEG RETURN:</b> 4:02      4:06  <b>PTA (U/S 218):</b> 5:30      5:30  <b>PTM (U/S 218):</b> 6:19      6:18  <b>MECO CMD:</b> 8:33.5      8:36  <b>VI:</b> 25867      25862  <b>OMS-2:</b> 41:41      41:55 200 FPS    198 FPS	EDW 22 CONC (EDW 39, CONC 20) 305:15:05:42Z 7:05:42 AM PST Monday 11 11/1/93 (8)  <b>DEORBIT BURN:</b> 305:14:05:30Z  <b>XRANGE:</b> 144 NM  <b>ORBIT DIR:</b> DR 9  <b>AIM PT:</b> NOMINAL  <b>MLGTD:</b> 3380 FT 305:15:05:42Z <b>VEL:</b> 205 KGS 198 KEAS <b>HDOT:</b> -2.2 FPS  <b>TD NORM 205:</b> 2800 FT  <b>DRAG CHUTE DEPLOY:</b> 173 KEAS 305:15:05:51Z  <b>NLGTD:</b> 6948 FT 305:15:05:53Z <b>VEL:</b> 167 KGS <b>HDOT:</b> -3.7 FPS  <b>BRK INIT:</b> 138 KGS  <b>DRAG CHUTE JETTISON:</b> 47 KGS 305:15:06:25Z  <b>AVE BRK DECEL:</b> 5.5 FPS/S  <b>WHEELS STOP:</b> 305:15:06:44Z 13020 FT  <b>ROLLOUT:</b> 9640 FT 62 SEC  <b>WINDS:</b> T2, R1 KTS <b>OFFICIAL:</b> T2, R2  <b>DENS ALT:</b> 1827 FT  <b>FLT DURATION:</b> 14:00:12:32 336:12:32  <b>S/T:</b> 399:19:36:00  OV-102: 122:17:33:12  <b>DISTANCE:</b> 5,840,450 sm	104/104/ 109%  <b>PREDICTED:</b> 100/100/100/ 67/104  <b>ACTUAL:</b> 100/100/100/ 69/104  1 = 2024 (7) 2 = 2109 (11) 3 = 2018 (11)  BI-061  RSRM 34  ET-57  LWT 50  ET PRED RPT LH2 TK RPT AT 285.2K  LO2 TK RPT AT 283K  ET IMPACT 1:25:22 MET LAT: 3.9°N LONG: 173.8°W	39.0° (2)  DIRECT INSERTION  POST OMS-2: 155 X 154 NM	OI-22 (3)  <b>CARGO:</b> 32011 LBS  <b>PAYLOAD CHARGEABLE:</b> 23127 LBS  <b>DEPLOYED:</b> 0 LBS  <b>NON-DEPLOYED:</b> 23127 LBS  <b>MIDDECK:</b> 1373 LBS  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 764122 LBS <b>NON-DEPLOYED:</b> 747275 LBS <b>CARGO TOTAL:</b> 1749548 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 3934 FUEL BIAS: 1055 FINAL TDDP: 767 RECON: 1114  <b>PAYLOADS:</b> PLB: SPACELAB LIFE SCIENCES (SLS-2/LM) Cardiovascular/ Cardiopulmonary, Neurovascular, and Regulatory Physiology Experiments  <b>MIDDECK:</b> SAREX-II  4 CRYO TK SETS + 4 EDO SETS  NO RMS  <b>DEORBIT:</b> 151 X 136 NM  <b>VELOCITY:</b> 25755 FPS  <b>ENTRY RANGE:</b> 4378 NM	KSC W/D: OPF 82, VAB 17, PAD 28 = 127 days total.  <b>LAUNCH POSTPONEMENTS:</b> - Launch date was 8/25/93 as of 7/31/92. - Postponed launch to 9/10/93, then 10/7/93 because of STS-55, STS-56, STS-57, and STS-51 launch delays. - Postponed launch to 10/14/93 to replace two APU's.  <b>LAUNCH SCRUBS:</b> - Scrubbed 10/14/93 launch at 16:57:20Z while holding at T-31 seconds when drainback time expired with 25M40S left in launch window. Scrub caused by range safety command system problem, and KSC weather caused lengthy hold. - Scrubbed 10/15/93 launch caused by S-Band PM transponder 2 problem. Rescheduled launch for 10/18/93 to change out transponder.  <b>LAUNCH DELAYS:</b> - 10/18/93 launch delayed 10 seconds at T-5 minutes because of intruder aircraft in launch area.  <b>TAL WX:</b> - Ben Guerir - prime and selected, Moron forecast and observed GO, Zaragoza forecast and observed NO-GO - rain.  <b>DOLILU/I-LOADS:</b> - Nominal I-loads were selected.  <b>FLIGHT DURATION CHANGES:</b> None.  <b>EVENTS:</b> Special attitude flown for OARE data on FD 12.  <b>RECORDS:</b> - Longest Shuttle flight - 14:00:12:32 - exceeds STS-50 by 4H42M28S (only exceeded by SKYLAB flights). - Shannon Lucid set Shuttle flight time record - 34:22:52:09.			





# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-61</b> SEQ FLT #59 KSC-59 PAD 39B-23 MLP-2	OV-105 (Flight 5) Endeavour  OMS PODS LPO3-16 RPO4-12 FRC5-5	<b>CDR:</b> Richard O. Covey (Flt 4 - STS 51-L, STS-26 & STS-38) P323/R73/V30/M67  <b>PLT:</b> Kenneth D. Bowersox (Flt 2 - STS-50) P324/R146/V97/M130  <b>M/S 1 AND EV3:</b> Kathryn C. Thornton (Flt 3 - STS-33 & STS-49) P325/R107/V73/F11  <b>M/S 2:</b> Claude Nicollier (Flt 2 - STS-46) P326/R150/V98/M134 Switzerland  <b>M/S 3 AND EV 1:</b> Jeffrey A Hoffman (Flt 4 - STS 51-D, STS-35 & STS-46) P327/R57/V59/M52  <b>M/S 4, P/L CDR &amp; EV 2:</b> F. Story Musgrave (Flt 5 - STS-6, STS 51-F, STS-33 & STS-44) (P328/R15/V19/M15)  <b>M/S 5 AND EV 4:</b> Thomas D. Akers (Flt 3 - STS-41 & STS-49) P329/R115/V74/M103  <b>MUSGRAVE COVEY BOWERSOX AKERS HOFFMAN NICOLLIER THORNTON</b>	KSC 39, PAD B 336:09:26:59.95Z 4:27:00 AM EST (P) 4:27:00 AM EST (A) Thursday 15 12/2/93 (4)  <b>LAUNCH WINDOW:</b> 67 MINUTES, PLANAR WINDOW  <b>EOM PLS:</b> KSC TAL: BYD TAL WX: BEN,MRN  <b>SELECTED:</b> RTLS: KSC15/N/N TAL: BEN32/N/SF AOA: EDW04/N/N PLS: EDW04/N/N  <b>TDDEL:</b> 0.32      0.402/44  <b>MAX Q NAV:</b> 701 PSF    705 PSF  <b>SRB STG:</b> 2:05.6      2:07  <b>PERF:</b> NOMINAL  <b>2 ENG TAL (BYD):</b> 2:08      2:07  <b>NEG RETURN:</b> 4:04      4:07  <b>PTA (U/S 500):</b> 4:02      4:07  <b>PTM (U/S 500):</b> 5:24      5:18  <b>MECO CMD:</b> 8:32.8    8:31.9  <b>VI:</b> 26123      26115  <b>FLIGHT DIRECTORS:</b> A/E - R. D. Jackson LD/O 2-EVA - J. M. Heflin O 2-SYS - J. W. Bantle O 1 - R. E. Castle PLNG - J. F. Muratore MOD - B. R. Stone  Continued . . .	KSC 33 (KSC 18) 347:05:25:33Z 00:25:33 AM EST  Monday 12 12/13/93 (7)  <b>DEORBIT BURN:</b> 347:04:14:45Z  <b>XRANGE:</b> 3 NM  <b>ORBIT DIR:</b> AR 6  <b>AIM PT:</b> NOMINAL  <b>MLGTD:</b> 2903 FT 347:05:25:33Z <b>VEL:</b> 192 KGS 201 KEAS <b>HDOT:</b> -1.7 FPS  <b>TD NORM 195:</b> 3415 FT  <b>DRAG CHUTE</b> <b>DEPLOY:</b> 170 KEAS 347:05:25:41Z  <b>NLGTD:</b> 6635 FT 347:05:25:45Z <b>VEL:</b> 148 KGS <b>HDOT:</b> -3.5 FPS  <b>BRK INIT:</b> 118 KGS  <b>DRAG CHUTE</b> <b>JETTISON:</b> 49 KTS 347:05:26:08Z  <b>AVE BRK DECEL:</b> 6.6 FPS/S  <b>WHEELS STOP:</b> 347:05:26:26Z 10825 FT  <b>ROLLOUT:</b> 7922 FT 53 SEC  <b>WINDS:</b> 6H, 0X KTS <b>OFFICIAL:</b> H7, L1  Continued . . .	104/104/ 109%  <b>PREDICTED:</b> 100/100/100/ 74/104  <b>ACTUAL:</b> 100/100/100/ 73/104  1 = 2019 (13) 2 = 2033 (5) 3 = 2017 (9)  <b>M 3 EOM:</b>  <b>WEIGHT:</b> 212947 LBS  <b>X CG:</b> 1078.9  <b>LANDING:</b>  <b>WEIGHT:</b> 212836 LBS  <b>X CG:</b> 1080.6	BI-063  RSRM 23  ET-60  LWT 53  ET PRED 285 K  ET BR/UP 214 K  ET IMPACT 1:29:01 MET LAT: 16.4°N LONG: 142.1°W	28.45° (35)  DIRECT INSERTION  POST OMS-2: 308.4 X 214.4 NM  <b>RNDZ</b> <b>BRAKING:</b> 1:22:34:49 MET 319.6 X 313.4 NM  <b>ARRAY</b> <b>JETTISON:</b> 3:19:26:00 MET 320.5 X 313.2 NM  <b>HST</b> <b>REBOOST:</b> 6:16:59:23 MET 321.7 X 320.8 NM  <b>DEORBIT:</b> 320.4 X 319.3 NM  <b>VELOCITY:</b> 26096 FPS  <b>ENTRY</b> <b>RANGE:</b> 4220 NM	OI-22 (4)  <b>CARGO:</b> 24363 LBS  <b>PAYLOAD</b> <b>CHARGEABLE:</b> 17401 LBS  <b>DEPLOYED:</b> 2308 LBS  <b>NON-DEPLOYED:</b> 14428 LBS  <b>MIDDECK:</b> 665 LBS  <b>SHUTTLE</b> <b>ACCUMULATED</b> <b>WEIGHTS:</b> <b>DEPLOYED:</b> 766430 LBS <b>NON-DEPLOYED:</b> 762368 LBS <b>CARGO TOTAL:</b> 1773911 LBS  <b>PERFORMANCE</b> <b>MARGINS (LBS):</b> FPR: 3981 FUEL BIAS: 987 FINAL TDDP: 927 RECON: 554  <b>PAYLOADS:</b> <b>PLB:</b> HUBBLE SPACE TELESCOPE (HST) SERVICING MISSION (SM-1) (REPLACEMENT HARDWARE) ICBC  <b>MIDDECK:</b> IMAX AMOS  5 CRYO TK SETS  RMS 33 (S.N. 303)  RMS USED FOR HST GRAPPLE, SERVICE, AND DEPLOY, AND EVA WORK PLATFORM	<b>KSC W/D:</b> OPF 103, VAB 6, PAD 33 = 142 days total.  <b>LAUNCH POSTPONEMENTS:</b> - Launch date was 12/2/93 as of 7/17/92. - Launch date was changed to 12/7/93, then 12/2/94, then 12/1/93 on 10/25/93. - Moved from Pad A to Pad B to protect payload from contamination caused by Pad A sandblasting.  <b>LAUNCH SCRUBS:</b> - 12/1/93 launch was scrubbed while holding at T-5 minutes when 67-minute window expired. Primary causes of delay were RTLS crosswind exceedance and rain within 20 nm. Other factors were BLAST, COLA, ceiling violation (6.5K broken), and intruder ship in SRB recovery area.  <b>LAUNCH DELAYS:</b> None.  <b>TAL WX:</b> - Banjul, Ben Guerir, and Moron all forecast and observed GO.  <b>DOLILU/I-LOADS:</b> - DOLILU uplink #9, I-load uplink #15.  <b>NIGHT LAUNCH:</b> Shuttle night launch #9.  <b>FLIGHT DURATION CHANGES:</b> - Shortened flight one rev because cloud cover forecast to move in at nominal landing time.  <b>FIRSTS:</b> - First flight with four EVA crewmembers. - First flight with five EVA'S (alternating crew on alternating days). - Minimum shuttle crossrange (3 nm).  <b>RENDEZVOUS #16:</b> - Rendezvous with HST for grapple, berth, repair, and deploy.  <b>NIGHT LANDING:</b> Space Shuttle #7, second night landing at KSC.  <b>SIGNIFICANT ANOMALIES:</b> - Aft mission timer circuit breaker popped. - In-suit drink bags leaked. - Large in-suit drink bags not stowed. - EMU 3 intermittent loss of 298.6 receive and all hardline comm. - HST power tool S.N. 1001 failed. - EMU 2 failed 0.5 psi leak check. - -Y star tracker temporary loss. - APU 2 gas generator/fuel pump heater failure. - Right OMS helium tank pressure transducer P2 bias - Jet L2U failed off. - Loss of biomed data on EMU 2 during EVA #5. - +V2 solar array outer bi-stem bowed, hence jettisoned old array. - Missing TPS on forward edge of RSRM RH forward center segment.		



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-61</b>		Continued . . .		Continued . . .							
Continued		<p>EMU/TETHERED EVA'S: EVA #1 - 12/4/93 SPACE SHUTTLE EVA #23 SCHEDULED EVA #19 BY EV 1 &amp; EV 2 REPLACED RSU'S 2 &amp; 3, ESU'S 1 &amp; 3 AND RELATED GYRO FUSE PLUGS. 7H53M57S</p> <p>EVA #2 - 12/5/93 SPACE SHUTTLE EVA #24 SCHEDULED EVA #20 BY EV 3 &amp; EV 4 REPLACED BOTH SOLAR ARRAYS, OLD +V2 ARRAY JETTISONED 6H35M3S</p> <p>EVA #3 - 12/6/93 SPACE SHUTTLE EVA #25 BY EV 1 &amp; EV 2 SCHEDULED EVA #21 REPLACED WIDE FIELD/PLANETARY CAMERA AND INSTALLED TWO MSS'S 6H47M28S</p> <p>EVA #4 - 12/7/93 SPACE SHUTTLE EVA #26 BY EV 3 &amp; EV 4 SCHEDULED EVA #22 REPLACED HIGH SPEED PHOTOMETER WITH COSTAR AND INSTALLED NEW COPROCESSOR 6H50M55S</p> <p>EVA #5 - 12/8/93 SPACE SHUTTLE EVA #27 BY EV 1 &amp; EV 2 SCHEDULED EVA #23 REPLACED SOLAR ARRAY DRIVE ELECTRONICS, GHR'S REDUNDANCY KIT, MLI CONTAMINATION KITS FOR MSS'S, AND MANUALLY OPERATED BOTH SOLAR ARRAY PRIMARY DEPLOYMENT MECHANISMS 7H20M4S</p>		<p>DENS ALT: -1039 FT</p> <p>FLT DURATION: 10:19:58:33 259:58:33</p> <p>S/T: 410:15:34:33</p> <p>OV-105: 43:15:09:45</p> <p>DISTANCE: 4,433,772 sm</p>							

# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (6)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-60</b> SEQ FLT #60 KSC-60 PAD 39A-37 MLP-3	OV-103 (Flight 18) Discovery  Spacehab 2  OMS PODS LPO1-21 RPO3-19 FRC3-18	<b>CDR:</b> Charles F. Bolden (Flt 4 - STS 61-C STS-31 & STS-45)) P330/R88/V52/M80  <b>PLT:</b> Kenneth S. Reightler (Flt 2 - STS-48) P331/R134/V99/M119  <b>M/S 1:</b> N. Jan Davis (Flt 2- STS-47) P332/R153/V100/F17  <b>M/S 2:</b> Ronald M. Sega P333/R175/M153  <b>M/S 3:</b> Franklin R. Chang-Diaz (Flt 4 - STS 61-C, STS-34 & STS-46) P334/R89/V46/M81  <b>M/S 4:</b> Sergei Krikalev (Flt 3 SOYUZ TM-7, MIR SOYUZ TM-12/MIR) Russian Cosmonaut (P335/R176/M154)	KSC 39, PAD B 34:12:09:59.965Z 7:10:00 AM EST (P) 7:10:00 AM EST (A) Thursday 16 2/3/94 (3)	KSC 15 (KSC 19) 42:19:19:22Z 2:19:22 PM EST  Friday 6 2/11/94 (2)	104/104/ 109%  PREDICTED: 100/104/104/ 70/104  ACTUAL: 100/104/104/ 70/104  1 = 2012 (15) 2 = 2034 (4) 3 = 2032 (2)	BI-062  RSRM 35  ET-61  LWT 54  ET PRED RPT 285 K  ET BR/UP 214 K  ET IMPACT 1:27:21 MET LAT: 2.69°N LONG: 123.2°W	57° (14)	DIRECT INSERTION  POST OMS-2: 191 X 189 NM  ODERACS DEPLOY: 6:02:43:24 MET  BREMSAT DEPLOY: 06:07:13:40 MET	OI-22 (5)	<b>CARGO:</b> 28957 LBS  <b>PAYLOAD CHARGEABLE:</b> 22296 LBS  <b>DEPLOYED:</b> 171 LBS  <b>NON-DEPLOYED:</b> 21015 LBS  <b>MIDDECK:</b> 1110 LBS  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 766601 LBS <b>NON-DEPLOYED:</b> 784493 LBS <b>CARGO TOTAL:</b> 1802868 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 3981 FUEL BIAS: 987 FINAL TDDP: 110 RECON: 306  <b>PAYLOADS:</b> PLB: WSF-1 SPACEHAB-2 CAPL-1 ODERACS/ BREMSAT GBA (WITH 4 GAS CANS)  <b>MIDDECK:</b> SAREX-II APE-B  4 CRYO TK SETS  RMS 34 (S. N. 201)  RMS used for WSF deberth but did not deploy because of WSF problems	KSC W/D: OPF 81 VAB 5, PAD 22 = 108 days total.  <b>LAUNCH POSTPONEMENTS:</b> - 10/31/93 launch date baselined on 7/31/92, later changed to 10/21/93 and 11/10/93. - Postponed STS-60 to 1/20/94 and moved STS-61 ahead on 9/2/93 (KSC work flows would not allow two flights before holidays).  <b>LAUNCH SCRUBS:</b> None.  <b>LAUNCH DELAYS:</b> None.  <b>TAL WX:</b> - Zaragoza was prime but forecast NO GO for visibility (rain/fog) and 4K ceiling; hence, Ben Guerir was selected. ZZA was observed GO. - Moron forecast NO GO (headwinds and ceiling), observed NO GO (headwinds).  <b>DOLILU/I-LOADS:</b> - Both DOLILU and Nominal I-loads were GO. DOLILU was selected because they provided approx. 300 lbs performance and 1.1-minute additional hold time. DOLILU uplink #10, total I-load uplink #16.  <b>FLIGHT DURATION CHANGES:</b> - Extended flight one orbit because KSC was forecast NO GO for ceiling and crosswinds  <b>FIRSTS:</b> - First flight of Russian Cosmonaut on U.S. spacecraft (Krikalev's previous flights were Soyuz TM-7 and Soyuz TM-12 with more than 1 year 3 months aboard Mir.)  <b>SIGNIFICANT ANOMALIES:</b> - Supply H2O dump valve leak (several burps after water dumps). - Unable to place diffuser cap into tunnel adapter. - O2 tank 2 quantity transducer erratic. - ARD nominal margin showed major thrust/mass difference with on-board data. - Pilot HIU failed. - Both MCC DVIS CPU's (A and B) went down). - Tunnel adapter stowage net, not stowed. - Hassleblad shutter failed. - Payload retention latch SW 2 position indicated release instead of off. - Air/ground crosstalk from ICOM to A/G loop. - Wakeshield horizon sensor signals bad, hence, did not deploy WSF resulting in limited scientific data. - WOW WONG anomaly.



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-62</b> SEQ FLT #61 KSC-61 PAD 39B-24 MLP-1	OV-102 (Flight 16) Columbia  EDO 3  OMS PODS: LPO5-5 RPO5-5 FRC2-16	<b>CDR:</b> John H. Casper (Flt 3 - STS-36 & STS-54) P336/R111/V86/M99  <b>PLT:</b> Andrew M. Allen (Flt 2 - STS-46) P337/R149/V101/M133  <b>M/S 1 (PAYLOAD CDR):</b> Pierre J. Thuot (Flt 3 - STS-36 & STS-49) P338/R112/V72/M100  <b>M/S 2:</b> Charles D. (Sam) Gemar (Flt 3 - STS-38 & STS-48) P339/R118/V67/M106  <b>M/S 3:</b> Marsha S. Ivins (Flt 3 - STS-32 & STS-46) P340/R109/V77/F12	KSC 39, PAD B 63:13:52-59.97Z 8:53:00 AM EDT (P) 8:53:00 AM EDT (A) Friday 9 3/4/94 (4)  <b>LAUNCH WINDOW:</b> 2H30M, CTOB  <b>EOM PLS:</b> KSC TAL: BEN TAL WX: MRN, ZZA  <b>SELECTED:</b> RTLS: KSC33/CI/N TAL: BEN36/N/N AOA: KSC33/CI/N PLS: EDW04/N/N  <b>TDEL:</b> 0:00 0.162/0.20  <b>MAX Q NAV:</b> 709 -708  <b>SRB STG:</b> 2:05.4 2:05  <b>PERF:</b> NOMINAL  <b>2 ENG TAL (BEN):</b> 2:41 2:44  <b>NEG RETURN:</b> 4:00 4:02  <b>PTA (U/S 250):</b> 5:09 5:07  <b>PTM (U/S 250):</b> 6:03 6:02  <b>MECO CMD:</b> 8:30.3 8:30.8  <b>VI:</b> 25886 25877  <b>FLIGHT DIRECTORS:</b> A/E/T 1 - N. W. Hale LD/T 2 - P. L. Engelauf T 3 - C. W. Shaw T 4 - J. M. Hefflin MOD - A. L. Briscoe	KSC 33 (KSC 20) 77:13:09:41Z 08:09:41 AM EST  Friday 7 3/18/94 (4)  <b>DEORBIT BURN:</b> 77:12:16:50Z  <b>XRANGE:</b> 116 NM <b>ORBIT DIR:</b> DR 10 <b>AIM PT:</b> NOMINAL  <b>MLGTD:</b> 2905 FT 77:13:09:41Z <b>VEL:</b> 210 KGS 207 KEAS <b>HDOT:</b> -3.4 FPS  <b>TD NORM 205:</b> 2974 FT  <b>DRAG CHUTE DEPLOY:</b> 166 KEAS 77:13:09:55Z  <b>NLGTD:</b> 8764 FT 77:13:10:00Z <b>VEL:</b> 148 KGS <b>HDOT:</b> -3.7 FPS  <b>BRK INIT:</b> 123 KGS  <b>DRAG CHUTE JETTISON:</b> 57 KGS 77:13:10:22Z  <b>AVE BRK DECEL:</b> 7 FPS/S  <b>WHEELS STOP:</b> 77:13:10:35Z 13071 FT  <b>ROLLOUT:</b> 10166 FT 54 SEC  <b>WINDS:</b> T4, L3 KTS <b>OFFICIAL:</b> 1905P08 T4, L3  <b>DENS ALT:</b> 333 FT  <b>FLT DURATION:</b> 13:23:16:41 335:16:41  <b>S/T:</b> 432:22:00:36  <b>OV-102:</b> 136:16:49:53  <b>DISTANCE:</b> 5,820,146 sm	104/104/ 109%  <b>PREDICTED:</b> 100/104/104/ 67/104  <b>ACTUAL:</b> 100/104/104/ 67/104  1 = 2031 (9) 2 = 2109 (12) 3 = 2029 (8)  ET PRE RPT 271K  ET BKUP 214K  ET IMPACT 1:27:04 MET LAT: 8.1°N LONG: 132.9°W	BI-064  RSRM 36 KM  ET-62  LWT 55  ET PRE RPT 271K  ET BKUP 214K  ET IMPACT 1:27:04 MET LAT: 8.1°N LONG: 132.9°W	39° (3)  DIRECT INSERTION  POST OMS-2: 163 X 161 NM  OMS-3: 9:17:09:39 MET 33.4 FPS 161 X 180 NM  OMS-4: 9:17:50:30 MET 37.6 FPS 140 X 140 NM  OMS-5: 11:18:15:34 MET 37.6 FPS 140 X 105 NM	OI-22 (6)  <b>CARGO:</b> 30016 LBS  <b>PAYLOAD CHARGEABLE:</b> 19792 LBS  <b>DEPLOYED:</b> 0 LBS  <b>NON-DEPLOYED:</b> 18512 LBS  <b>MIDDECK:</b> 1280 LBS  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 766601 LBS <b>NON-DEPLOYED:</b> 804285 LBS <b>CARGO TOTAL:</b> 1832884 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 3981 FUEL BIAS: 987 FINAL TDDP: 871 RECON: 1795  <b>PAYLOADS:</b> <b>PLB:</b> U. S. Microgravity Payload (USMP-2) Solidification of metals and semiconductors dendritic growth OAST-2 Technology experiments DEE SSBUV/A LDCE  <b>MIDDECK:</b> APCG, PSE, CPCG, CGBA, MODE, AMOS, APE-B  4 CRYO TK SETS + 4 EDO  RMS 35 (S.N. 301) RMS used for DEE tests	KSC W/D: OPF 62, VAB 5, PAD 19 = 86 days total.  <b>LAUNCH POSTPONEMENTS:</b> - 2/8/94 launch date baselined on 10/2/92. - Postponed launch to 2/24/94 on 9/2/93. - Postponed launch to 3/3/94 on 10/20/93.  <b>LAUNCH SCRUBS:</b> - Scrubbed 3/3/94 launch at L-16 hours because excessive RTLS winds were forecast.  <b>LAUNCH DELAYS:</b> None.  <b>TAL WX:</b> - Ben Guerir, Moron, and Zaragoza were forecast and observed GO, Ben Guerir was prime and selected.  <b>NOMINAL/DOLILU/I-LOADS:</b> - Nominal I-loads were NO-GO with PLB torque box indicator at 102 percent. DOLILU was selected and uplinked. DOLILU #11, total I-load uplink #17.  <b>FLIGHT DURATION CHANGES:</b> None.  <b>FIRSTS:</b> - First flight of D. C. vacuum cleaner. - First flight of Ku-Band Comm Adapter (KCA) uplink video.  <b>SIGNIFICANT ANOMALIES:</b> - Galley overdispensed hot water. - Excessive gas bubbles in food containers. - WCS Fan Sep 1 stalled and popped all three circuit breakers. - Water Coolant Loop 1 accumulator quantity transducer drift. - Supply Water Tank B transducer dropout. - Cryo H2 Tank A heater failure. - Mid-port and Mid-starboard PLB floodlight failures. - O2 Tank 7 quantity measurement failure. - TV Cameras A, D, and end effector problems. - Ops Recorder poor quality data on several tracks. - APU 3 high fuel pump inlet pressure (line froze). - LBNP fuse blew when vacuum cleaner operated., caused by a 20-volt peak-to-peak ripple - PDIP power failure. - KCA comm link anomaly.  RADIATOR DEPLOYED #15 (PORT RADIATOR ONLY).		



# 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		FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
							INC	HA/HP			
STS-59 SEQ FLT #62  KSC-62  PAD 39A-38 MLP-2	OV-105 (Flight 6) Endeavour  OMS PODS: LPO4-5 RPO1-19 FRC5-6	<p><b>CDR:</b> Sidney M. Gutierrez (Flt 2 - STS-40) P341/R129/V102/M116</p> <p><b>PLT:</b> Kevin P. Chilton (Flt 2 - STS-49) P342/R145/V103/M129</p> <p><b>M/S 1:</b> Jerome (Jay) Apt (Flt 3 - STS-37 &amp; STS-47) P343/R123/V79/M110</p> <p><b>M/S 2:</b> Michael R. Clifford (Flt 2 - STS-53) P344/R157/V104/M139</p> <p><b>M/S 3 (PAYLOAD CDR):</b> Linda M. Godwin (Flt 2 - STS-37) P345/R122/V105/F13</p> <p><b>M/S 4:</b> Thomas D. Jones P346/R177/M155</p> <p>MCC FCR-1 (41)</p> <p><b>FLIGHT DIRECTORS:</b> A/E/O 1 - R. D. Jackson LD/O 2 - G. A. Pennington O 3 - R. E. Castle MOD - B. R. Stone</p>	<p>KSC 39, PAD A 99:11:04:59.99Z 7:05:00 AM EDT (P) 7:05:00 AM EDT (A) Friday 10 4/9/94 (11)</p> <p><b>LAUNCH WINDOW:</b> 2H30M (CTOB)</p> <p><b>EOM PLS:</b> KSC TAL: ZZA TAL WX: BEN, MRN</p> <p><b>SELECTED:</b> RTLS: KSC15/CI/N TAL: ZZA30/CI/N AOA: NOR23/N/N PLS: NOR23/N/N</p> <p><b>TDEL:</b> .16 .042/.08</p> <p><b>MAX Q NAV:</b> 701 &gt;694</p> <p><b>SRB STG:</b> 2:04 2:05</p> <p><b>PERE:</b> NOMINAL</p> <p><b>2 ENG TAL (MRN):</b> 2:57 2:56</p> <p><b>NEG RETURN:</b> 4:04 4:04</p> <p><b>PTA (U/S 190):</b> 5:47 5:38</p> <p><b>DROOP (ZZA)</b> 5:28 5:42</p> <p><b>PTM (U/S 190):</b> 6:08 5:56</p> <p><b>MECO CMD:</b> 8:34:3 8:33</p> <p><b>VI:</b> 25778 25774</p> <p><b>OMS-2:</b> 35:09.2 35:10.3 163.5 FPS 163.7 FPS</p>	<p>EDW 22, CONC EDW 40, CONC 21 110:16:54:30Z 9:54:30 AM PDT Wednesday 7 4/20/94 (9)</p> <p><b>DEORBIT BURN:</b> 110:16:00:35Z</p> <p><b>XRANGE:</b> 721 NM</p> <p><b>ORBIT DIR:</b> DR 11 <b>AIM PT:</b> NOMINAL</p> <p><b>MLGTD:</b> 1619 FT 110:16:54:30Z VEL: 228 KGS 215 KEAS HDOT: -3.7 FPS</p> <p><b>TD NORM 205:</b> 2636 FT</p> <p><b>DRAG CHUTE DEPLOY:</b> 180 KEAS 110:16:54:41Z</p> <p><b>NLGTD:</b> 7115 FT 110:16:54:45Z VEL: 171 KGS HDOT: -4.4 FPS</p> <p><b>BRK INIT:</b> 118 KGS</p> <p><b>DRAG CHUTE JETTISON:</b> 49 KGS 110:16:55:12Z</p> <p><b>AVE BRK DECEL:</b> 7.6 FPS/S</p> <p><b>WHEELS STOP:</b> 110:16:55:23Z 12255 FT</p> <p><b>ROLLOUT:</b> 10636 FT 53 SEC</p> <p><b>WINDS:</b> T1, R2 KTS OFFICIAL: 0204 T4, R2</p> <p><b>DENS ALT:</b> 3764 FT</p> <p><b>FLT DURATION:</b> 11:05:49:30 269:49:30</p> <p><b>S/T:</b> 444:03:50:06</p> <p><b>OV-105:</b> 54:20:59:15</p> <p><b>DISTANCE:</b> 4,704,835 sm</p>	<p>104/104/ 109%</p> <p><b>PREDICTED:</b> 100/100/100/ 67/104</p> <p><b>ACTUAL:</b> 100/100/100/ 67/104</p> <p>1 = 2028 (8) 2 = 2033 (6) 3 = 2018 (12)</p> <p>118 KGS</p> <p><b>M 3 EOM:</b></p> <p><b>WEIGHT:</b> 221981 LBS</p> <p>X CG: 1079.4</p> <p><b>LANDING:</b></p> <p><b>WEIGHT:</b> 221865 LBS</p> <p>X CG: 1081.2</p>	<p>BI-065  RSRM 37  ET-63  LWT- 56  ET PRED RPT 271.3K  ET BKUP 214K  ET IMPACT 1:13:00 MET 45.0°N 158.06°E</p>	<p>57° (15)</p> <p>DIRECT INSERTION</p> <p>POST OMS-2: 121 X 121 NM</p>	<p>OI-22 (7)</p> <p>CARGO: 33758 LBS</p> <p>PAYLOAD CHARGEABLE: 27447 LBS</p> <p>DEPLOYED: 0 LBS</p> <p>NON-DEPLOYED: 27447 LBS</p> <p>MIDDECK: 1445 LBS</p> <p><b>SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED:</b> 766601 LBS <b>NON-DEPLOYED:</b> 831732 LBS <b>CARGO TOTAL:</b> 1866642 LBS</p> <p><b>PERFORMANCE MARGINS (LBS):</b> FPR: 3981 FUEL BIAS: 987 FINAL TDDP: 2856 RECON: 1731</p> <p><b>PAYLOADS:</b> PLB: SPACE RADAR LABORATORY (SRL-1) SIR-C/X-SAR IMAGING OF EARTH'S SURFACE CONCAP IV GAS (4)</p> <p><b>MIDDECK:</b> STL (2) VFT-4 SAREX ii</p> <p>5 CRYO TK SETS6 RMS 36 (S.N. 303)</p> <p>RMS NOT USED PER PLAN</p>	<p>KSC W/D: OPF 67, VAB 5, PAD 21 = 93 days total.</p> <p><b>LAUNCH POSTPONEMENTS:</b> - Baselined 9/30/93 launch date on 3/11/92. - Postponed launch date to 4/14/94 on 12/21/92. - Advanced launch date to 3/31/94 on 4/2/93. - Postponed launch date to 4/7/94 on 11/5/93.</p> <p><b>LAUNCH SCRUBS:</b> - Scrubbed 4/7/94 launch approximately 6 hours into count on 4/4/94 to borescope HPOTP preburner volute diffuser vane fillet for undersized radii. - Scrubbed 4/8/94 launch while holding at t-5 minutes. RTLS crosswinds exceeded limits. Decision made to count down to launch 1 hour earlier than nominal launch time on 4/9/94 to improve launch probability (11:05Z vs 12:05Z).</p> <p><b>LAUNCH DELAYS:</b> None. - Launched 1 hour early as planned.</p> <p><b>TAL WX:</b> - Zaragoza, Ben Guerir, and Moron forecast and observed GO.</p> <p><b>DOLILU/I-LOADS:</b> - DOLILU selected because WINGAR18 10 percent more margin than nominal. DOLILU uplink #12, I-load uplink #18.</p> <p><b>FLIGHT DURATION CHANGES:</b> - Changed from 9 to 10 days to acquire more science. - Waved off landing at KSC on orbits 166 and 167 for fore- cast and observed ceiling violations and rain within 30 nm. Extended flight a second day. - Waved off landing on orbit 182 due to observed ceiling violations and forecast rain within 30 nm. Waved off landing at KSC due to observed and forecast rain. Landed at EDW on orbit 183. - Flight extended 2 days plus one orbit.</p> <p><b>SIGNIFICANT ANOMALIES:</b> - Right SSME HPOTP turbine discharge temp A biased low (200 degree delta to CH B). - Bubbles in water from SORG ((caused by venturi effect). - Defective (split) LiOH can casing, no LiOH spilled. - FES Feedline A Heater 1 thermostat failure. - H2 Tank 5 check valve failed to seat. - Sticky cryo H2 Tank 2 check valve. - GPS DTO status bit static. - MADS recorder tape broke. - Ku-Band Channel 3 interferes with Channel 2. - Ku-Band range/elevation unit digit inoperative. - Side hatch window impact crew reported. - GOX vent arm on pad damaged, caused by shuttle plume effect.</p>		



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-65</b> SEQ FLT #63  KSC-63  PAD 39A-39  MLP-3	OV-102 (Flight 17) Columbia  14th Spacelab Flight  Long Module 10  EDO 4  OMS PODS: LPO5-6 RPO5-6 FRC2-17	<b>CDR:</b> Robert D. Cabana (Flt 3 - STS-41, STS-53) P347/R113/V84/M101  <b>PLT:</b> James D. Halsell, Jr. P348/R178/M156  <b>M/S 1 (PAYLOAD CDR):</b> Richard J. Hieb (Flt 3 - STS-39, STS-49) P349/R128/V70/M115  <b>M/S 2:</b> Carl E. Walz (Flt 2 - STS-51) P350/R170/V106/M148  <b>M/S 3:</b> Leroy Chiao P351/R179/M157  <b>M/S 4:</b> Donald A. Thomas P352/R180/M158  <b>P/S 1:</b> Chiaki Naito/Mukai P353/R181/F23 (Japan - NASDA)	KSC 39, PAD A 189:16:42:59.977Z 12:43:00 AM EDT (P) 12:43:00 AM EDT (A) Friday 10 7/8/94 (3)  <b>LAUNCH WINDOW:</b> 2H30M CTOB  <b>EOM PLS:</b> KSC TAL: BYD TAL WX: BEN  <b>SELECTED:</b> RTLS: KSC 15/N/N TAL: BYD 32/N/SF AOA: EDW 22/N/N PLS: EDW 22/N/N  <b>TDDEL:</b> 0.19 -0.048/-0.01  <b>MAX Q NAV:</b> 673 677  <b>SRB STG:</b> 2:03.8 2:05  <b>PERE:</b> NOMINAL  <b>2 ENG TAL (BYD):</b> 2:47 2:43  <b>NEG RETURN:</b> 4:00 4:01  <b>PTA (U/S 244):</b> 5:12 5:01  <b>DROOP (BYD):</b> 5:31 5:27  <b>PTM:</b> 6:03 5:50  <b>MECO CMD:</b> 8:32 8:31  <b>FLIGHT DIRECTORS:</b> A/E/O1 - J. W. Bantle LD/O 2 - J. M. Heflin O 3 - R. E. Castle O4 - P. L. Engelauf MOD - A. L. Briscoe	KSC 33 (KSC 21) 204:10:38:00Z 6:38:00 AM EDT  Saturday 11 7/23/94 (4)  <b>DEORBIT BURN:</b> 204:09:40:38Z  <b>XRANGE:</b> 180 NM  <b>ORBIT DIR:</b> DL 32  <b>AIM PT:</b> NOMINAL  <b>MLGTD:</b> 2996 FT 204:10:38:00Z <b>VEL:</b> 207 KGS 199 KEAS <b>HDOT:</b> -2.5 FPS  <b>TD NORM 205:</b> 2501 FT  <b>DRAG CHUTE DEPLOY:</b> 174 KEAS 204:10:38:09Z  <b>NLGTD:</b> 8313 FT 204:10:38:18Z <b>VEL:</b> 138 KGS <b>HDOT:</b> -5.7 FPS  <b>BRK INIT:</b> 115 KGS  <b>DRAG CHUTE JETTISON:</b> 52 KGS 204:10:38:43Z  <b>AVE BRK DECEL:</b> 5.7 FPS/S  <b>WHEELS STOP:</b> 204:10:39:08Z 13207 FT  <b>ROLLOUT:</b> 10211 FT 68 SEC  <b>WINDS:</b> T3,0X KTS <b>OFFICIAL:</b> 1503P04 T3,0X KTS  <b>DENS ALT:</b> 840 FT  <b>FLT DURATION:</b> 14:17:55:00 353:55:00 <b>S/T:</b> 458:21:45:06 <b>OV-102:</b> 151:10:44:53  <b>DISTANCE:</b> 6,143,846 sm	104/104/ 109%  <b>PREDICTED:</b> 100/104/104/ 67/104  <b>ACTUAL:</b> 100/104/104/ 67/104  <b>SSME S/N:</b> 1 = 2019 (14) 2 = 2030 (9) 3 = 2017 (10)	BI-066  RSRM 39 KM  ET-64  LWT 57  ET <b>PRED RPT</b>  ET <b>BKUP</b>  ET <b>IMPACT</b> 1:21:08 <b>MET</b> <b>LAT:</b> 13.6°S <b>LONG:</b> 163.3°W	28.45° (36)  DIRECT INSERTION  POST OMS-2: 163 X 160 NM	OI-23 (1)	<b>CARGO:</b> 32880 LBS  <b>PAYLOAD CHARGEABLE:</b> 24282 LBS  <b>DEPLOYED:</b> 0 LBS  <b>NON-DEPLOYED:</b> 22521 LBS  <b>MIDDECK:</b> 1761 LBS  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 766601 LBS <b>NON-DEPLOYED:</b> 856014 LBS <b>CARGO TOTAL:</b> 1899522 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 3981 FUEL BIAS: 987 FINAL TDDP: 2169 RECON: 3531  <b>PAYLOADS:</b> <b>PLB:</b> INTERNATIONAL MICROGRAVITY LABORATORY LIFE SCIENCES AND MATERIAL SCIENCES EXPERIMENTS (IML-2/LM) OARE  <b>MIDDECK:</b> CPCG MAST AMOS SAREX-II  4 + 4 EDO CRYO TANK SETS  NO RMS	KSC W/D: OPF 62, VAB 5, PAD 20 = 87 days total.  <b>LAUNCH POSTPONEMENTS:</b> - Baselined launch date of 6/23/94 on 4/2/93. - Postponed launch date to 7/8/94 on 4/15/93.  <b>LAUNCH SCRUBS:</b> None  <b>LAUNCH DELAYS:</b> None  <b>TAL WX:</b> - Banjul (prime & selected) forecast and observed GO. - Ben Guerir forecast NO GO (rain) but observed GO.  <b>DOLILU/I-LOADS:</b> - Both DOLILU and NOMINAL I-loads were GO, NOMINAL I-loads were selected, no uplink required.  <b>FLIGHT DURATION CHANGES:</b> - Waved off landing at KSC on orbits 220 and 221 due to forecast and observed rain and potential lightening. Extended flight 1 day.  <b>SIGNIFICANT ANOMALIES:</b> - Supply water dump nozzle icing occurred on third dump on FD3. FES was used to dump water for the rest of flight. - WCS problems included commode fault during compaction, commode filter fit and odor problems, and fan sep 1 stall and liquid backflow. - IMU redundant rate BITE messages. - RCS vernier thruster R5D failed off, then nominal ops. - Low waste water dump flow. Second dump in three cycles. Third dump required seven cycles. - Ops recorder 2 track 2 poor dump quality. - Galley rehydration station did not dispense cold water. - Arriflex magazine jams, Hasselblad jam and lens stuck.	



# 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		FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRTS, SIGNIFICANT ANOMALIES, ETC.)
							INC	HA/HP			
STS-64 SEQ FLT #64 KSC-64 PAD 39B-25 MLP-2	OV-103 (Flight 19) Discovery  OMS PODS: LPO1-22 RPO3-20 FRC3-19	CDR: Richard N. Richards (Flt 4 - STS-28, STS-41, STS-50) P354/R101/V55/M92  PLT: L. Blaine Hammond (Flt 2 - STS-39) P355/R124/V107/M111  M/S 1: Jerry M. Linenger P356/R182/M159  M/S 2: Susan J. Helms (Flt 2 - STS-54) P357/R158/V108/F19  M/S 3/EV2: Carl J. Meade (Flt 3 - STS-38, STS-50) P358/R117/V76/M105  M/S 4/EV1: Mark C. Lee (Flt 3 - STS-30, STS-47) P359/R100/V78/M91  SS EVA #28 SAFER FF #1 SCHEDULED EVA #24 9/16/94 EV1 - MARK LEE EV2 - CARL MEADE 6H51M35S DURATION EVALUATED SAFER PERFORMANCE	KSC 39, PAD 39B 252:22:22:54.947Z 4:30:00 PM EDT (P) 6:22:05 PM EDT (A) Friday 11 9/9/94 (5)  LAUNCH WINDOW: 2H30M CTOB  EOM PLS: KSC TAL: ZZA TAL WX: MRN, BEN  SELECTED: RTLS: KSC 15/CI/N TAL: ZZA AQA: NOR 17/N/N PLS: EDW 22/N/N  TDEL: 0.19 -0.088/-0.05  MAX Q NAV: 688 691  SRB STG: 2:04.3 2:03  PERE: NOMINAL  2 ENG TAL (MRN): 2:38 2:37  NEG RETURN: 4:08 4:10  PTA (U/S 250): 4:45 4:43  DROOP (ZZA): 5:28 5:31  PTM: 5:31 5:28  MECO CMD: 8:34.4 8:35.3  VI: 25805 25800  OCC FCR-1 (43)  FLIGHT DIRECTORS: A/E/O1 - N. W. Hale LD/O 2 - G. A. Pennington PLNG - W. D. Reeves MOD - B. R. Stone	EDW 04 CONC (EDW 41, CONC 22) 263:21:12:52Z 2:12:52 PM PDT Tuesday 10 9/20/94 (7)  DEORBIT BURN: 263:20:17:00Z  XRANGE: 110 NM  ORBIT DIR: AL 15  AIM PT: NOMINAL  MLGTD: 2386 FT 263:21:12:52Z VEL: 208 KGS 198 KEAS HDOT: -1 FPS  TD NORM 195: 2627 FT  DRAG CHUTE DEPLOY: 184 KEAS 263:21:12:59Z  NLGTD: 6192 FT 263:21:13:03Z VEL: 163 KGS HDOT: -6.7 FPS  BRK INIT: 133 KGS  DRAG CHUTE JETTISON: 56 KGS 263:21:13:31Z  AVE BRK DECEL: 4.6 FPS/S  WHEELS STOP: 263:21:13:53Z 12042 FT  ROLLOUT: 12045 FT 61 SEC  WINDS: 10H, 3L KTS OFFICIAL: 0204P09 H4, L2 KTS  DENS ALT: 4927 FT  FLT DURATION: 10:22:49:57 262:49:57  S/T: 469:20:35:03  OV-103: 128:19:01:34  DISTANCE: 4,576,174 sm	104/104/109%  PREDICTED: 100/100/100/67/104  ACTUAL: 100/100/100/67/104  1 = 2031 (11) 2 = 2109 (13) 3 = 2029 (10)  M 3 EOM:  WEIGHT: 212294 LBS  X CG: 1082.3  LANDING:  WEIGHT: 212180 LBS  X CG: 1083.9	BI-068  RSRM 41  ET-66  LWT 59  ET PRED RPT 271K  ET BKUP 214K  ET IMPACT 1:13:57 MET LAT: 43.3°S LONG: 155.5°W	57° (16)  DIRECT INSERTION  POST OMS-2: 141 X 140 NM  DEORBIT: 132.4 X 127.8 NM  VELOCITY: 25727 FPS  ENTRY RANGE: 4433 NM	OI-23 (2)  CARGO: 25621 LBS  PAYLOAD CHARGEABLE: 20417 LBS  DEPLOYED: 0 LBS  NON-DEPLOYED: 16212 LBS  MIDDECK: 1363 LBS  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 766601 LBS NON-DEPLOYED: 873589 LBS CARGO TOTAL: 1925143 LBS  PERFORMANCE MARGINS (LBS): FPR: 3981 FUEL BIAS: 987 FINAL TDDP: 6409 RECON: 9639  PAYLOADS: PLB: LIDAR In-Space Technology Experiment Atmospheric Research using Laser (LITE) SPARTAN-201 Astronomy (Deploy & retrieve) GBA ROMPS  MIDDECK: SSCE, BRIC, RME-III, MAST, SAREX-II, AMOS  4 CRYO TK SETS  RMS 37 (S.N. 201) RMS used for SPARTAN deploy, retrieve, and berth, and for SPIFEX and SAFER ops	KSC W/D: OPF 125, VAB 8, PAD 20 = 153 days total.  LAUNCH POSTPONEMENTS: - Launch date was 6/16/94 on 2/19/93. - Launch date postponed to 9/15/94 on 4/2/93. - Launch date advanced to 9/9/94 on 11/19/93.  LAUNCH SCRUBS: None  LAUNCH DELAYS: - Launch delayed 1H52M55S. Held at T-9 minutes for 1H34M18S because of detached opaque thunderstorm anvil and thunderstorms within 20 nm. Picked up count and held at T-5 minutes for 13M37S until KSC weather was GO.  TAL WX: - Zaragosa (prime and selected) Moron and Ben Guerir were all three forecast and observed GO.  DOLILU/I-LOADS: - Both NOMINAL and DOLILU were GO. NOMINAL I-loads were selected, no uplink required.  FLIGHT DURATION/LANDING SITE CHANGES: - Flight was 9+1+1 and was extended 1 day for science. - Waved off landing at KSC on orbits 159 and 160 due to forecast of lightening and thunderstorms with 30 nm and ceiling violations. Extended another day for weather. - Waved off landing at KSC on orbits 175 and 176 due to ceiling and rain within 30 nm. Decision made to change landing site to EDW.  FLIGHT EXTENSION: 2 days plus 2 orbits.  LANDING SITE CHANGE: KSC to EDW due to KSC weather.  RENDEZVOUS #17: To retrieve, berth, and return SPARTAN-201, which was deployed earlier in flight.  SIGNIFICANT ANOMALIES: - FES feedline A accumulator temperature decreased below thermostat spec. - Torn AFRSI blanket on left OMS pod. - Supply H2O dump valve leakage (burp). - FES outlet temperature oscillations during radiator bypass. - AFT MCA 1 OP STAT 4 indication. - Articulating portable foot restraint simulator fit interference. - Electronic cuff checklist #1 touch screen operation degraded during EVA. - PGSC PL3 hard disk error message and unexplained lockups on flight deck PGSC. - TACAN RM fails. - PROX OPS camera ALC logic lockup. - Side hatch locking device obstruction. - RCS jet L1A fail off.		



# SPACE SHUTTLE MISSIONS SUMMARY

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FLT NO.	ORBITER	CREW (6)	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE, LANDING TIMES, FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG THROTTLE 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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-68</b> SEQ FLT #65 KSC-65 PAD 39A-40 MLP-1	OV-105 (Flight 7) Endeavour  OMS PODS: LPO4-14 RPO1-20 FRC5-7	<b>CDR:</b> Michael A. Baker (Flt 3 - STS-43 & STS-52) P360/R133/V81/M118  <b>PLT:</b> Terrence W. Wilcutt P361/R183/M160  <b>M/S 1:</b> Steven V. Smith P362/R184/M161  <b>M/S 2:</b> Daniel W. Bursch (Flt 2 - STS-51) P363/R169/V109/M147  <b>M/S 3:</b> Peter J. K. (Jeff) Wisoff (Flt 2 - STS-57) P364/R166/V110/M145  <b>M/S 4 (PAYLOAD CDR):</b> Thomas D. Jones (Flt 2 - STS-59) P365/R177/V111/M155  MCC FCR-1 (44)  <b>FLIGHT DIRECTORS:</b> A/E/O1 - R. D. Jackson LD/O 2 - C. W. Shaw O 3 - R. E. Castle MOD - A. L. Briscoe	KSC 39 PAD A 273.11.15:59.98Z 7:16:00 AM EDT (P) 7:16:00 AM EDT (A) Friday 12 9/30/94 (6)  <b>LAUNCH WINDOW:</b> 2H30M CTOB  <b>EOM PLS:</b> KSC TAL: ZZA TAL WX: MRN, BEN  <b>SELECTED:</b> RTLS: KSC33/N/N TAL: MRN20/N/N AOA: NOR17/N/N PLS: EDW22/N/N  <b>TDDEL:</b> -0.16    -0.038/0.0  <b>MAX Q NAV:</b> 688                  690  <b>SRB STG:</b> 2:03.8              2:03  <b>PERE:</b> NOMINAL  <b>2 ENG TAL (MRN):</b> 2:58                  2:59  <b>NEG RETURN:</b> 4:03                  4:04  <b>PTA (U/S 180):</b> 5:56                  5:49  <b>PTM:</b> 6:18                  6:05  <b>MECO CMD:</b> 8:34.8              8:33.9  <b>VI:</b> 25780                25775  <b>OMS-2:</b>  35:09.7 159 FPS	EDW 22, CONC (EDW 42, CONC 23) 284:17:02:08Z 10:02:89 AM PDT Tuesday 11 10/11/94 (6)  <b>DEORBIT BURN:</b> 284:16:07:19Z  <b>XRANGE:</b> 746 NM  <b>ORBIT DIR:</b> DR 12  <b>AIM PT:</b> NOMINAL  <b>MLGTD:</b> 3522 FT 284:17:02:08Z <b>VEL:</b> 196 KGS 193 KEAS <b>HDOT:</b> -2.3 FPS  <b>TD NORM 205:</b> 2589 FT  <b>DRAG CHUTE DEPLOY:</b> 188 KEAS 284:17:02:11Z  <b>NLGTD:</b> 7299 FT 284:17:02:21Z <b>VEL:</b> 133 KGS <b>HDOT:</b> -5.1 FPS  <b>BRK INIT:</b> 82 KGS  <b>DRAG CHUTE JETTISON:</b> 55 KGS 284:17:02:45Z  <b>AVE BRK DECEL:</b> 4.0 FPS/S  <b>WHEELS STOP:</b> 284:17:03:10Z 12017 FT  <b>ROLLOUT:</b> 8495 FT 62 SEC  <b>WINDS:</b> H7, L3 KTS <b>OFFICIAL:</b> 2208P10 H8, L1 KTS  <b>DENS ALT:</b> 3912 FT  <b>FLT DURATION:</b> 11:05:46:08 273:46:08  <b>S/T:</b> 481:02:21:11  <b>OV-105:</b> 66:02:45:23  <b>DISTANCE:</b> 4,703,000 sm	104/104/ 109%  <b>PREDICTED:</b> 100/100/100/ 67/104  <b>ACTUAL:</b> 100/100/100/ 67/104  1 = 2028 (9) 2 = 2033 (6) 3 = 2026 (4)  <b>ET BKUP:</b> 214K  <b>ET IMPACT</b> 1:13:26 <b>MET LAT:</b> 43.9°S <b>LONG:</b> 156.3°W  <b>M 3 EOM:</b>  <b>WEIGHT:</b> 221784 LBS  <b>X CG:</b> 1078.7  <b>LANDING:</b>  <b>WEIGHT:</b> 221673 LBS  <b>X CG:</b> 1080.4	BI-067  RSRM 40  ET-65  LWT 58  ET PRED RPT: 271K  ET BKUP: 214K  ET IMPACT 1:13:26 MET LAT: 43.9°S LONG: 156.3°W	57° (17)  DIRECT INSERTION  POST OMS-2: 120 X 119 NM  DEORBIT: 111 X 110 NM  VELOCITY: 25658 FPS  ENTRY RANGE: 4480 NM	OI-22 (8)  CARGO: 34252 LBS  PAYLOAD CHARGEABLE: 27640 LBS  DEPLOYED: 0 LBS  NON-DEPLOYED: 25997 LBS  MIDDECK: 1643 LBS  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> DEPLOYED: 766601 LBS NON-DEPLOYED: 901229 LBS <b>CARGO TOTAL:</b> 1959395 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 3981 FUEL BIAS: 987 FINAL TDDP: 1721 RECON: 2071  <b>PAYLOADS:</b> PLB: SPACE RADAR LABORATORY (SRL-2) SIR-C/X-SAR MAPS GAS (5)  MIDDECK: CPCG CHROMEX BRIC CREAM MAST  5 CRYO TK SETS  RMS 38 (S.N. 303)  RMS NOT USED PER PLAN	KSC W/D: OPF 59, VAB 20 (2), PAD 41 (2) = 120 days total.  <b>LAUNCH POSTPONEMENTS:</b> - Launch date baselined as 10/27/94 on 7/9/93. - Launch date advanced to 8/18/94 on 9/2/93. - Launch date postponed to 10/2/94 after pad abort #5 on 8/18/94, moving STS-68 after STS-64. - Rolled back on 8/24/94 to VAB to replace all three engines. Returned to pad on 9/13/94. - Advanced launch date to 9/30/94 when range became available.  <b>LAUNCH SCRUBS/PAD ABORT #5:</b> - 8/18/94 launch scrubbed with pad abort #5 at -1.86 seconds when HPOTP turbine discharge temp A exceeded 1560 degrees R start redline limit. Rolled back to VAB and replaced all three engines. Rescheduled launch to 10/2/94 and moved STS-64 ahead of STS-68.  <b>LAUNCH DELAYS:</b> None  <b>TAL WX:</b> - Zaragoza was prime but was forecast and observed NO GO for ceilings. - Moron (selected) and Ben Guerir were forecast and observed GO.  <b>DOLILU/I-LOADS:</b> - NOMINAL and DOLILU I-loads were GO, selected NOMINAL, no uplink required.  <b>FLIGHT DURATION CHANGES:</b> - Flight extended from 10 to 11 days for additional science. - Waved off landing at KSC on orbit 182 due to late convection activity and forecast (and observed) 3000 ft ceiling variable broken. Waved off landing at KSC on orbit 183 due to continuing convective activity and forecast ceiling violations and chance of rain within 30 nm. Total flight extensions - 1 day plus one orbit.  <b>LANDING SITE CHANGE:</b> - Changed landing site to EDW due to forecast of worsening weather at KSC on Wednesday; hence, landed at EDW on orbit 183.  <b>SIGNIFICANT ANOMALIES:</b> - MTU accumulator 3 lost. - FES feedline A hi load line temp read off-scale-high. - Rudder channel 3 slow to bypass during FCS checkout. - Simulation termination during DOLILU I-load verification. - Ku-Band CH3 (PL MAX) interference on channels 2 and 1. - CCTV cameras B, C, and D problems. - Linhof, Hasselblad, and Nikon camera problems. - Degraded tracks on payload recorder. - WSB 2 reg pressure increase. - WSB 1 and WSB 3 pressure decay. - RCS jet L3D fail off, low chamber pressure indication. - RCS jet L5D oxidizer injector temp sensor erratic, implemented GMEM and vernier control.		





# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (6)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-66</b> SEQ FLT #66 KSC-66 PAD 39B-26 MLP-3	OV-104 (Flight 13) Atlantis 15th Spacelab Flight OMS PODS: LPO3-17 RPO4-13 FRC4-13	<b>CDR:</b> Donald R. McMonagle (Flt 3 - STS-39, STS-54) P366/R126/V87/M113  <b>PLT:</b> Curtis L. Brown (Flt 2 - STS-47) P367/R152/V112/M136  <b>M/S 1 (PAYLOAD CDR):</b> Ellen Ochoa (Flt 2 - STS-56) P368/R160/V113/F20  <b>M/S 2:</b> Joseph R. Tanner P369/R185/M162  <b>M/S 3:</b> Jean-Francois Clervoy P370/R186/M163 (ESA - France)  <b>M/S 4:</b> Scott E. Parazynski P371/R187/M164	KSC 39 PAD B 307:16:59:42.97Z 11:56:00 AM EST (P) 11:59:43 AM EST (A) Thursday 17 11/3/94 (9)  <b>LAUNCH WINDOW:</b> 1H02M, Crista-SPAS Beta Req ≥ 20 deg  <b>EOM PLS:</b> KSC TAL: ZZA TAL WX: MRN, BEN  <b>SELECTED:</b> RTLS: KSC 33/N/N TAL: BEN 36/N/N AOA: NONE PLS: EDW 04/N/N  <b>TDDEL:</b> 0.19 0.552/0.59  <b>MAX Q NAV:</b> 688 691  <b>SRB STG:</b> 2:04 2:05  <b>PERF:</b> NOMINAL  <b>2 ENG TAL (BEN):</b> 2:44 2:44  <b>NEG RETURN:</b> 4:07 4:09  <b>PTA (U/S 300):</b> 4:48 4:41  <b>PTM (U/S 215):</b> 5:30 5:32  <b>MECO CMD:</b> 8:35.9 8:34.4  <b>VI:</b> 25832 25826  <b>OMS-2:</b> 36:12 36:13 265 FPS 262 FPS	EDW 22, CONC (EDW 43, CONC 24) 318:15:33:45Z 7:33:45 AM PST Monday 13 11/14/94 (9)  <b>DEORBIT BURN:</b> 318:14:31:05Z  <b>XRANGE:</b> 745 NM  <b>ORBIT DIR:</b> AL 16  <b>AIM PT:</b> NOMINAL  <b>MLGTD:</b> 3219 FT 318:15:33:45Z <b>VEL:</b> 195 KGS 193 KEAS <b>HDOT:</b> -1.3 FPS  <b>TD NORM 195:</b> 3032 FT  <b>DRAG CHUTE DEPLOY:</b> 183 KEAS 318:15:33:49Z  <b>NLGTD:</b> 6390 FT 318:15:33:56Z <b>VEL:</b> 150 KGS <b>HDOT:</b> -4.4 FPS  <b>BRK INIT:</b> 108 KGS  <b>DRAG CHUTE JETTISON:</b> 62 KGS 318:15:34:16Z  <b>Ave BRK DECEL:</b> 6.0 FPS/S  <b>WHEELS STOP:</b> 318:15:34:35Z 10866 FT  <b>ROLLOUT:</b> 7647 FT 50 SEC  <b>WINDS:</b> T3, R3 KTS <b>OFFICIAL:</b> 3064 T3, R3 KTS  <b>DENS ALT:</b> 645 FT  <b>FLT DURATION:</b> 10:22:34:02 262:34:02  <b>S/T:</b> 492:00:55:13  <b>OV-105:</b> 83:08:27:02  <b>DISTANCE:</b> 4,554,791 sm	104/104/ 109%  <b>PREDICTED:</b> 100/100/100/ 67/104  <b>ACTUAL:</b> 100/100/100/ 68/104  1 = 2030 (10) 2 = 2034 (5) 3 = 2017 (11)  <b>M 3 EOM:</b>  <b>WEIGHT:</b> 211562 LBS  <b>X CG:</b> 1084.4  <b>LANDING:</b>  <b>WEIGHT:</b> 211411 LBS  <b>X CG:</b> 1086.1	BI-069  RSRM 38  ET-67  LWT 60  ET RPT 271K  ET BR/UP 214K  ET IMPACT 1:14:01 MET <b>LAT:</b> 42.2°S <b>LONG:</b> 156.9°W	57° (18)  DIRECT INSERTION  POST OMS-2: 164.8 X 164.2 NM  <b>DEPLOY (SPAS):</b> 00:19:50:06 MET 164 X 163 NM  <b>SPAS GRAPPLE:</b> 08/20:05:35 MET 160 x 157 NM  <b>SPAS BERTH:</b> 08/23:50:19 MET	OI-23 (3)  <b>CARGO:</b> 23560 LBS  <b>PAYLOAD CHARGEABLE:</b> 18135 LBS  <b>DEPLOYED:</b> 0 LBS  <b>NON-DEPLOYED:</b> 9901 LBS  <b>MIDDECK:</b> 1080 LBS  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 766601 LBS <b>NON-DEPLOYED:</b> 912210 LBS <b>CARGO TOTAL:</b> 1982955 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 3775 <b>FUEL BIAS:</b> 1136 <b>FINAL TDDP:</b> 3284 <b>RECON:</b> 3158  <b>PAYLOADS:</b> PLB: CRISTA/SPAS (Deploy & retrieve) Atmospheric Science Experiments ATLAS-3 SSBUV-A ESCAPE-II  <b>MIDDECK:</b> PARE/NIH-R PCG-TES PCG-STES SAMS, HPP STL/NIH-C  5 CRYO TK SETS  RMS 39 (S.N. 202) RMS used for CRISTA/SPAS deploy, grapple and berth, and monitor supply and waste water dump (saw icicle form)	KSC W/D: OPF 110, VAB 6, PAD 24 = 140 days total.  <b>LAUNCH POSTPONEMENTS:</b> - Launch baselined as 8/18/94 on 4/22/93. - Postponed launch to 10/27/94 on 9/2/93. - Postponed launch to 11/3/94 on 9/30/94 after STS-68 pad abort.  <b>LAUNCH SCRUBS:</b> None.  <b>LAUNCH DELAYS:</b> - Launch delayed for 3M43S while holding at T-5 min to discuss TAL weather. ZZA and MRN were NO GO due to forecast ceiling and rain. BEN was forecast NO GO for crosswinds. Decision made to select BEN for launch because observed crosswind trend was downward (last observed at 15 knots). Waiver to flight rule 4-64 was written.)  <b>TAL WX:</b> - ZZA (prime) was forecast NO GO for ceiling, tailwind, and light rain within 5 nm. MRN was forecast NO GO for ceiling and light rain with 5 nm. BEN (selected) was forecast NO GO for crosswinds but downward trend.  <b>DOLILU/I-LOADS:</b> - Both DOLILU and NOMINAL I-loads were GO, NOMINAL was selected with maximum load indicator at 88 percent. No uplink required.  <b>FLIGHT DURATION CHANGES:</b> - Decision made to not try landing at KSC on orbits 174 and 175 due to forecast of gale winds, rain, and ceiling violations caused by Tropical Storm Gordon. Landed at EDW on orbit 176. Extended flight two orbits.  <b>LANDING SITE CHANGE:</b> KSC to EDW  <b>FIRSTS:</b> - First use of "R-BAR" approach for rendezvous which is required to protect Mir solar arrays on Mir rendezvous flights.  <b>RENDEZVOUS #18:</b> To retrieve and return CHRISTA-SPAS, which was deployed earlier in flight.  <b>SIGNIFICANT ANOMALIES:</b> - Spacelab ERAU 20 skipped triplet. - GPS 4 MMU1 BCE 18 failure. - Damaged tile at overhead window (W8). - FES oscillations at low heat loads. - FES outlet temp sensor lag. - Av Bay 2 Smoke Detector A concentration transients. - Ice formation on PLBD during simultaneous supply and waste water dump on FD8 (1.5" D X 5-6" long). Canceled icicle removal with RMS when RMS wrist camera failed. At landing, ice (approx 3"x5"x3") was seen on PLBD. - FES B undertemp shutdown. - Fuel Cell 2 H2O through alternate path. - Spacelab subsystem inverter shutdown. - NSP 2 to Ku-Band Channel 1 interface failure. - WSB 3 regulator pressure decay.		



# 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		FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
							INC	HA/HP			
STS-63 SEQ FLT #67 KSC-67 PAD 39B-27 MLP-2	OV-103 (Flight 20) Discovery Spacehab-3 OMS PODS: LPO1-23 RPO3-21 FRC3-20	<p>CDR: James D. Wetherbee (Flt 3 - STS-32, STS-52) P372/R108/V80/M97</p> <p>PLT: Eileen M. Collins P373/R188/F24</p> <p>M/S 1/EV2 (PAYLOAD CDR): Bernard A. Harris (Flt 2 - STS-55) P374/R162/V114/M142</p> <p>M/S 2/EV1: C. Michael Foale (Flt 3 - STS-45, STS-56) P375/R143/V92/M127</p> <p>M/S 3: Janice E. Voss (Flt 2 - STS-57) P376/R167/V115/F22</p> <p>M/S 4: Vladimir Titov (SS Flt #1) (Flt 4 - SOYUZ T-8, SOYUZ T-10, MIR SOYUZ TM-4) P377/R189/M165 RUSSIAN COSMONAUT</p> <p>EVA #29 J/TETHERED EVA SCHEDULED EVA #25 \ DEVELOPMENT 3HT TEST (EDFT) #1 TO MONSTRATE EVA OCEDURES AND LITY TO MOVE LARGE JECTS. COLD /IRONMENT TESTS. 95 4H38M10S DURATION</p> <p>Continued. . .</p>	<p>KSC 39 PAD B 34:05:22:03.96Z 00:22:04 AM EST (P) Saturday 12 Friday 13 2/3/95 (4)</p> <p>LAUNCH WINDOW: 5 min Planar/Phase Window for Mir Rendezvous</p> <p>EOM PLS: KSC TAL: ZZA TAL WX: MRN, BEN</p> <p>SELECTED: RTL: KSC33/CI/N TAL: ZZA30/N/N AOA: KSC33/CI/N PLS: EDW04/N/N</p> <p>TDEL: -0.32 -0.478/0.28</p> <p>MAX Q NAV: 716 723</p> <p>SRB STG: 2:05.6 2:05</p> <p>PERE: NOMINAL</p> <p>2 ENG TAL (BEN): 2:25 2:22</p> <p>NEG RETURN: 4:04 4:06</p> <p>PTA (U/S 293): 4:28 4:24</p> <p>PTM (U/S 295): 5:54 5:44</p> <p>SE TAL (ZZA): 5:53 5:59</p> <p>SE PTM (U/S 810): 6:57 6:57</p> <p>MECO CMD: 8:30.6 8:31.9</p> <p>VI: 25885 25892</p> <p>OMS-2: 42:10.3 252.6 FPS</p>	<p>KSC 15 (KSC 22) 42:11:50:19Z 6:50:19 AM EST Saturday 12 2/11/95 (3)</p> <p>DEORBIT BURN: 42:10:44:04 Z</p> <p>XRANGE: 469 NM</p> <p>ORBIT DIR: DR 13</p> <p>AIM PT: CLOSE IN</p> <p>MLGTD: 1261 FT 42:11:50:19Z</p> <p>VEL: 206 KGS 212 KEAS HDOT: -2.8 FPS</p> <p>TD NORM 195: 2583 FT</p> <p>DRAG CHUTE DEPLOY: 185 KEAS 42:11:50:27Z</p> <p>NLGTD: 5460 FT 42:11:50:33Z</p> <p>VEL: 148 KGS HDOT: -4.8 FPS</p> <p>BRK INIT: 57 KGS</p> <p>DRAG CHUTE JETTISON: 58 KGS 42:11:51:05Z</p> <p>AVE BRK DECEL: 4.6 FPS/S</p> <p>WHEELS STOP: 42:11:51:40Z 12269 FT</p> <p>ROLLOUT: 11008 FT 70 SEC</p> <p>WINDS: H5, R2 KTS OFFICIAL: 1705P07 H5, R1 KTS</p> <p>DENS ALT: -443 FT</p> <p>FLT DURATION: 8:06:28:15 202:28:15</p> <p>S/I: 500:07:23:28</p> <p>OV-103: 137:01:29:49</p> <p>DISTANCE: 2,922,000 sm</p>	<p>104/104/ 109%</p> <p>PREDICTED: 100/104/97/ 69/104</p> <p>ACTUAL: 100/104/94/ 69/104</p> <p>1 = 2035 (1) 2 = 2109 (14) 3 = 2029 (11)</p> <p>TD NORM 195: 2583 FT</p> <p>DRAG CHUTE DEPLOY: 185 KEAS 42:11:50:27Z</p> <p>NLGTD: 5460 FT 42:11:50:33Z</p> <p>VEL: 148 KGS HDOT: -4.8 FPS</p> <p>BRK INIT: 57 KGS</p> <p>DRAG CHUTE JETTISON: 58 KGS 42:11:51:05Z</p> <p>AVE BRK DECEL: 4.6 FPS/S</p> <p>WHEELS STOP: 42:11:51:40Z 12269 FT</p> <p>ROLLOUT: 11008 FT 70 SEC</p> <p>WINDS: H5, R2 KTS OFFICIAL: 1705P07 H5, R1 KTS</p> <p>DENS ALT: -443 FT</p> <p>FLT DURATION: 8:06:28:15 202:28:15</p> <p>S/I: 500:07:23:28</p> <p>OV-103: 137:01:29:49</p> <p>DISTANCE: 2,922,000 sm</p>	<p>BI-070</p> <p>RSRM 42</p> <p>ET-68</p> <p>LWT 61</p> <p>ET RPT 271K</p> <p>ET BR/UP 214K</p> <p>ET IMPACT 1:27:07 MET</p> <p>LAT: 0.036°S LONG: 125.6°W</p> <p>M 3 EOM:</p> <p>WEIGHT: 212775 LBS</p> <p>X CG: 1079.5</p> <p>LANDING:</p> <p>WEIGHT: 212693 LBS</p> <p>X CG: 1081.2</p>	<p>51.66° (1)</p> <p>DIRECT INSERTION</p> <p>POST OMS-2: 183.9 X 168.9 NM</p> <p>MIR RNDZ: Mir CPA of 37 feet at 3/13:58 MET 37/19:20Z 213.5 X 206 NM</p> <p>Backaway: 3/14:10 MET</p> <p>Flyaround Initiated: 3/14:53 MET</p> <p>Sep Burn: 3/15:50 MET</p> <p>DEORBIT: 212 X 204 NM</p> <p>VELOCITY: 26903 FPS</p> <p>ENTRY RANGE: 4329 NM</p>	<p>OI-23 (4)</p> <p>CARGO: 24903 LBS</p> <p>PAYLOAD CHARGEABLE: 19051 LBS</p> <p>DEPLOYED: 23 LBS</p> <p>NON-DEPLOYED: 15249 LBS</p> <p>MIDDECK: 1128 LBS</p> <p>SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 766624 LBS NON-DEPLOYED: 928587 LBS CARGO TOTAL: 2007858 LBS</p> <p>PERFORMANCE MARGINS (LBS): FPR: 3775 FUEL BIAS: 1136 FINAL TDDP: 1830 RECON: 3476</p> <p>PAYLOADS: PLB: SPACEHAB-3 CGP/ODERACS-2 (deployed) SPARTAN-204 (deployed and retrieved)</p> <p>MIDDECK: SSCE AMOS</p> <p>4 CRYO TK SETS</p> <p>RMS 40 (S.N. 201) RMS used for SPARTAN deploy, retrieve, and berth and TCS maneu- vers, water dumps and EVA objectives</p>	<p>KSC W/D: OPF 71, VAB 5, PAD 25 = 101 days total.</p> <p>LAUNCH POSTPONEMENTS: - Launch date baselined as 5/19/94 on 1/19/93. - Launch date postponed to 1/26/95 on 11/18/93. - Launch date postponed to 2/2/95 on 3/25/94.</p> <p>LAUNCH SCRUBS: - 2/2/95 launch scrubbed at L-9 hours caused by IMU2 (HAINS) platform fail BITE during transition from STBY to OPERATE. Replaced IMU and rescheduled launch for 2/3/95.</p> <p>LAUNCH DELAYS: None</p> <p>TAL WX: - ZZA (prime and selected) and BEN were forecast and observed GO. MRN was forecast and observed NO GO for visibility (fog).</p> <p>DOLILU/NOMINAL I-LOADS: - Both DOLILU and NOMINAL I-loads were NO GO for Q-plane exceedance with boundary violation for engine knockdown. NOMINAL I-loads were selected because exceedance point on alpha beta envelope was bounded by a wing strut indicator which had adequate margin of safety. Waiver was written.</p> <p>NIGHT LAUNCH: Space Shuttle Night Launch #10.</p> <p>FLIGHT DURATION CHANGES: None</p> <p>FIRSTS: - First flight with a female pilot.</p> <p>RENDEZVOUS #19: - Rendezvous with Mir, prox ops and flyaround with closest approach of 37 feet.</p> <p>RENDEZVOUS #20: - Rendezvous with SPARTAN, retrieve and berth. SPARTAN was deployed earlier in flight.</p> <p>EVENTS: - ODERACS deployed at 00/23:35 MET. - SPARTAN deployed at 4/07:05:33 MET, grapple at 6/06:11:16 MET, and berth at 6/06:48:23 MET</p> <p>RADIATOR DEPLOY #16: - Port radiator deployed for approx 7 hours on FD2 for SPARTAN ops (FES INHIBIT period). - Bistable HPOTP on engine 2035 limited throttle bucket to 69 percent.</p> <p>Continued. . .</p>		



# SPACE SHUTTLE MISSIONS SUMMARY

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FLT NO.	ORBITER	CREW (6)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-63 Continued		Continued. . .  MCC FCR-1 (46)  FLIGHT DIRECTORS: A/E - N. W. Hale LD/O 2 - P. L. Engelauf O 1 - R. M. Kelso PLNG - P. F. Dye MOD - B. R. Stone									Continued. . .  <b>SIGNIFICANT ANOMALIES:</b> - Cabin pressure transducer shifted low by 0.23 PSI. - Fuel Cell 2 H2 motor status increased between 0.6 volts and 0.83 volts. - EV2 crewman experienced burning sensation in his eyes during repressurization at 5 PSI. Funny odor inside suit was reported. - During EVA, both EV1 and EV2 electronic cuffs were partially unresponsive. - THC hotstick event when aft flight controller power was turned on (ref. STS-66), several thrusters fixed. - TCZ Z-axis system failure during Mir backaway at 322 feet. - Erratic TCS data sporadically throughout TCS ops on SPARTAN rendezvous day. - Port radiator latch 1-6 "A" latched indication intermittent. - Spacehab module pressure decay (air leak into airlock). - RCS jet R1U failed off (oxidizer temp dropped below RM limit of 30 degree F), oxidizer leak. - RCS jet L2D failed off. Jet had good driver output with low (< 13 PSI) chamber pressure. - RCS jet F1F fail leak, indicated oxidizer leak.

# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-67</b> SEQ FLT #68 KSC-68 PAD 39A-41 MLP-1	OV-105 (Flight 8) Endeavour Spacelab Pallet 16th Spacelab Flight EDO 5 OMS PODS: LPO4-15 RPO1-21 FRC5-8	<p>CDR: Stephen S. Oswald (Flt 3 - STS-42, STS-56) P378/R139/V91/M124</p> <p>PLT: William G. Gregory P379/R190/M166</p> <p>M/S 1: John M. Grunsfeld P380/R191/M167</p> <p>M/S 2: Wendy B. Lawrence P381/R192/F25</p> <p>M/S 3 (PAYLOAD CDR): Tamara E. Jernigan (Flt 3 - STS-40, STS-52) P382/R130/V83/F14</p> <p>P/S 1: Samuel T. Durrance (Flt 2 - STS-35) P383/R120/V116/M108</p> <p>P/S 2: Ronald A. Parise (Flt 2 - STS-35) P384/R119/V117/M107</p> <p>MCC FCR-1 (47)</p> <p>FLIGHT DIRECTORS: A/E - R. E. Jackson O 1 - B. P. Austin O 2 - A. L. Pennington O 3 - J. P. Shannon L/O 4 - C. W. Shaw MOD - A. L. Briscoe MOD - J. W. Bantle</p>	<p>KSC 39A 61:06:38:12.95Z 01:37:00 AM EST (P) 01:38:13 AM EST (A) Thursday 18 3/2/95 (5)</p> <p>LAUNCH WINDOW: 2H30M CT0B</p> <p>EOM PLS: KSC TAL: BEN TAL WX: MRN</p> <p>SELECTED: RTL: KSC 33/C1/N TAL: BEN 36/C1/N AOA: EDW 22/C1/N PLS: EDW 22/C1/N</p> <p>TDEL: 0.48 0.202/0.24</p> <p>MAX Q NAV: 728 PSF 739 PSF</p> <p>SRB STG: 2:06.9 2:05</p> <p>PERF: NOMINAL</p> <p>2 ENG TAL: 2:38 2:35</p> <p>NEG RETURN: 3:59 4:01</p> <p>PTA (U/S 297): 4:22 4:15</p> <p>PTM (U/S 427): 5:30 5:17</p> <p>SE T/M (BYD): 5:49 5:49</p> <p>SE PTM (U/S-897): 6:33 6:33</p> <p>MECO CMD: 8:27.65 8:27.3</p> <p>MECO VI: 25922 25914</p> <p>OMS-2: 40:19.8 40:19.8 279 FPS 279 FPS</p>	<p>EDW 22, CONC (EDW 44, CONC 25) 77:21:47:14Z 1:47:14 PM PST Saturday 13 3/18/95 (5)</p> <p>DEORBIT BURN: 77:20:39:13Z</p> <p>XRANGE: 268 NM</p> <p>ORBIT DIR: AL17</p> <p>AIM PT: NOMINAL</p> <p>MLGTD: 1672 FT 77:21:47:01Z VEL: 201 KGS 209 KEAS HDOT: -1.4 FPS</p> <p>TD NORM 195: 2980 FT</p> <p>NLGTD: 6240 FT 77:21:47:14Z VEL: 151 KGS HDOT: -6.3 FPS</p> <p>DRAG CHUTE DEPLOY: 147 KEAS 77:21:47:16Z</p> <p>BRK INIT: 142 KGS</p> <p>DRAG CHUTE JETTISON: 54 KGS 77:21:47:43Z</p> <p>AVE BRK DECEL: 5.5 FPS/S</p> <p>WHEELS STOP: 77:21:48Z 11647 FT</p> <p>ROLLOUT: 9935 FT 47 SEC</p> <p>WINDS: H14, R5 KTS OFFICIAL: 2515P22 H14, R4 KTS</p> <p>DENS ALT: 3481 FT</p> <p>FLT DURATION: 16:15:08:48</p> <p>S/T: 516:22:32:16</p> <p>Continued. . .</p>	<p>104/104/ 109%</p> <p>PREDICTED: 100/104/104/ 70/104</p> <p>ACTUAL: 100/104/104/ 67/104</p> <p>SSME S/N: 1 = 2012 (16) 2 = 2033 (7) 3 = 2031 (12)</p> <p>M 3 EOM:</p> <p>WEIGHT: 217646 LBS</p> <p>X CG: 1083.5</p> <p>LANDING: WEIGHT: 217437 LBS</p> <p>X CG: 1085.0</p>	<p>BI-071 RSRM 43 ET-69 LWT 62 ET RPT 271K ET BR/UP 214K ET IMPACT 1:22:37 LAT: 15.5°S LONG: 159.45°W</p>	<p>28.45° (37)</p> <p>DIRECT INSERTION</p> <p>POST OMS-2: 190.4 X 187.3 NM</p>	<p>OI-23 (5)</p> <p>CARGO: 28528 LBS</p> <p>PAYLOAD CHARGEABLE: 20067 LBS</p> <p>DEPLOYED: 0 LBS</p> <p>NON-DEPLOYED: 18303 LBS</p> <p>MIDDECK: 1764 LBS</p> <p>SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 766624 LBS NON-DEPLOYED: 948654 LBS CARGO TOTAL: 2036386 LBS</p> <p>PERFORMANCE MARGINS (LBS): FPR: 3775 FUEL BIAS: 1136 FINAL TDDP: 4099 RECON: 6754</p> <p>PAYLOADS: PLB: ASTRO-2 GAS-2</p> <p>MIDDECK: CMIX, PGS-TCS PGS-STES SAREX-2, MACE</p> <p>5 + 4 EDO CRYO TK SETS EDO PALLET</p> <p>RMS 41 (S.N. 303)</p> <p>RMS NOT USED</p>	<p>KSC W/D: OPF 81, VAB 5, PAD 19 = 105 days total.</p> <p>LAUNCH POSTPONEMENTS: - Launch date baselined as 11/3/94 on 6/24/93 - Postponed launch to 12/1/94 on 11/5/93 - Postponed launch to 1/12/95 on 3/25/94 - Postponed launch to 2/23/95 on 9/26/94 - Postponed launch to 3/2/95 on 11/30/94</p> <p>LAUNCH SCRUBS: None</p> <p>LAUNCH DELAYS: - Delayed coming out of T-9 min hold awaiting confirmation that FES feedline B heater 1 was operating after switching from heater 2 at T-18 mins. Launch delay of 1M13S.</p> <p>TAL WX: - Ben Guerir (prime &amp; selected) and Moron were forecast and observed GO. Banjul was not available because of local instability.</p> <p>DOLILU/NOMINAL I-LOADS: - Both DOLILU and nominal were NO GO for ET load indicator ES-73 using L-1 data base. Using M data base, both were GO, DOLILU was selected because we had a better data base at MACH 1.4. An LSEAT waiver was written.</p> <p>NIGHT LAUNCH: Space Shuttle night launch #11.</p> <p>FLIGHT DURATION CHANGES/LANDING SITE CHANGE: - Waved off landing at KSC on orbits 246, 247, and 248 because of forecast ceiling violations and thunderstorms within 30 nm. Extended flight 1 day. - Waved off landing at KSC on orbits 262 and 263. Forecast of low ceiling and 0.2 cloud cover under 12K. Decision made to change landing site to EDW. - Total flight duration extension 1 day plus 1 orbit.</p> <p>LANDING SITE CHANGE: KSC to EDW</p> <p>EVENTS: - Most persons in orbit at one time, total eleven (11). Mir 18 was launched at 9:11 a.m. Moscow time (12:11 a.m. CST) on March 14 from Baikonur cosmodrome with Norm Thagard, Vladimir Dezhurov and Gennady Strekalov on board (planned return on Atlantis on STS-71). Three Russians went on Mir plus 7 Americans on Endeavor).</p> <p>Continued. . .</p>		



## SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-67 Continued				Continued . . .  OV-105: 82:17:54:11  DISTANCE: 6,892,836 sm							Continued . . .  <u>SIGNIFICANT ANOMALIES:</u> - Spacelab SCOS cache addressing error. - FES primary A failed to come out of standby. - Noisy supply water tank D quantity transducer. - High N2 flow on PCS system 2, 14.7 cabin regulator. - Middeck audio terminal unit failure (main bus current spike). - CCPI failure to power portable light or camcorder. - Handheld mike was inoperative on both middeck and airlock ATU's. Possible short. - TEAC 8 mm VCR anomaly (degraded picture quality). - Unexplained external IPS disturbances. Pointing performance degraded. - Water spray boiler 2 excessive water usage (most of water was accidentally off-loaded prelaunch.) - L5D oxidizer injector temperature erratic (GMEM uplinked). - R4R jet fail leak, jet stopped leaking at 21:53 MET.

# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (10) 7 UP, 8 DOWN	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.)		
		TITLE, NAMES & EVA'S					INC	HA/HP					
<b>STS-71</b>  SEQ FLT #69  KSC-69  PAD 39A-42  MLP-3	OV-104 (Flight 14) Atlantis  Spacelab-Mir LM-11  17th Spacelab Flight  OMS PODS: LPO3-18 RPO4-14 FRC4-14	CDR: Robert L. (Hoot) Gibson (Flt 5 - STS-41-B, STS 61-C, STS-27, STS-47) P385/R30/V27/M29	KSC 39A 178:19:32:18.95Z 3:32:19 PM EDT (P) 3:32:19 PM EDT (A) Tuesday 9 6/27/95 (7)	KSC 15 (KSC 23) 188:14:54:35Z 10:54:35 AM EDT  Friday 8 7/7/95 (6)	104/104/ 109%  PREDICTED: 100/104/104/ 68/104  ACTUAL: 100/104/104/ 68/104  SSME S/N: 1 = 2028 (10) 2 = 2034 (6) 3 = 2032 (3)	BI-072  RSRM 45  ET-70  LWT 63  ET RPT 271.3K  ET BR/UP 214K  ET IMPACT 1:26:57 MET LAT: 0.08°S LONG: 125.4°W	51.63° (2)	DIRECT INSERTION  POST OMS-2: 159.5 x 85.2 NM  DOCKING CAPTURE: 1/17:27:57 MET  HARD MATE: 1/17:35:54 MET  SHUTTLE HATCH OPEN: 1/19:28:56 MET  HAND SHAKE: 1/19:28:56 MET  SOYOZ UNDOCKING: 6/15:32:34 MET	OI-24 (1)	CARGO: 26577 LBS  PAYLOAD CHARGEABLE: 17941 LBS  DEPLOYED: 0 LBS  NON-DEPLOYED: 17251 LBS  MIDDECK: 690 LBS  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 766624 LBS NON-DEPLOYED: 966595 LBS CARGO TOTAL: 2062963 LBS  PERFORMANCE MARGINS (LBS): FPR: 3775 FUEL BIAS: 1136 FINAL TDDP: 1040 RECON: 1398  PAYLOADS: PLB: SHUTTLE-MIR MISSION 1 SL-M/LM ODS  MIDDECK: IMAX, SAREX-II  5 CRYO TK SETS  NO RMS	KSC W/D: OPF 115, VAB 6, PAD 44 = 165 days total.  LAUNCH POSTPONEMENTS: - Baselined 5/30/95 as launch date on 10/21/93. - Changed launch date to 5/24/95 on 9/1/94. - Postponed launch date to NET 6/19/95 due to delays in SPECKTR launch. STS-70 was moved ahead of STS-71. - Postponed launch date to NET 6/22/95 due to Mir EVA's to allow time to configure Mir docking ports and solar arrays. - Postponed launch date to NET 6/23/95 (docking on FD4 would be same date as 6/24/95 launch with docking on FD3).  LAUNCH SCRUBS: - Scrubbed 6/23/95 launch at T-6.25 hours when tanking window ran out. Tanking violation of lightning within 5 miles. - Scrubbed 6/24/95 launch at L-44 mins while holding at T-9 minutes due to ceiling violations, rain, and thunderstorms in KSC area.  LAUNCH DELAYS: None  TAL WX: - ZZA (prime) was forecast NO GO for ceiling and thunderstorms within 20 nm. MRN (selected) and BEN were both forecast and observed GO.  DOLILU/I-LOADS: - Selected and uplinked, DOLILU uplink #14, I-load uplink #20, last use of DOLILU I-load.  FLIGHT DURATION CHANGES: None  FIRSTS/SPECIAL EVENTS: - Lowest perigee of all space shuttle flights of 85 nm (phasing maneuver) achieved during initial orbit. - Smallest OMS Delta V of all space shuttle OMS-2 burns of 75.5 FPS. - First permanent transfer of Russian/American crews (Mir-19 up and Mir-18 crew down on Atlantis - 7 up, 8 down. - Carried up orbiter docking system and attached to Mir.  EVENTS: - Thagard lifted off from Baikonur Cosmodrome in Kazakhstan on March 14, 1995, at 9:11:00 AM local time (73:06:11:00Z). - Total Soyuz/Mir time for Thagard 107:09:57:18, total flight time 115:08:43:35. - Mir/Shuttle capture at 180:13:00:14Z, docking complete at 180:13:08:18Z. - Crews transfer time at 180:16:08:18Z (Mir 19 from Atlantis to Mir, and Mir 18 to Atlantis, when seat liners transferred to Atlantis). - Transferred equipment, experiments, 1067 lbm H <sub>2</sub> O, 48 lbm O <sub>2</sub> , and 87 lbm N <sub>2</sub> to Mir. - Undocking completed at 185:11:09:42Z.		
		Continued . . .		Continued . . .		M 3 EOM:  WEIGHT: 216527 LBS  X CG: 1079.7  LANDING:  WEIGHT: 216352 LBS  X CG: 1081.3							

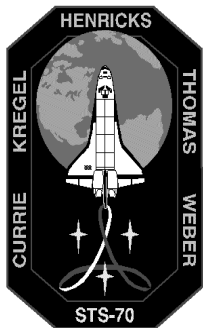


# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (10) 7 UP - 8 DOWN)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-71 Continued		<p>Continued . . .</p> <p><u>MIR-18 FLIGHT ENGINEER:</u> Gennady Strekalov P393/R196/M171</p> <p><u>MIR-18 COSMONAUT RESEARCHER:</u> Norman E. Thagard (Flt 5 - STS-7, STS 51-B, STS-30, STS-42) P394/R20/V14/M19</p> <p>MCC FCR-1 (48)</p> <p><u>FLIGHT DIRECTORS:</u> A/E - N. W. Hale LD/O 1 - R. E. Castle O 2 - P. L. Engelauf PLNG - P. F. Dye FD Moscow - W. D. Reeves MOD - A. L. Briscoe</p>	<p>Continued . . .</p> <p><u>MECO CMD:</u> 8:30.72    8:31.1</p> <p><u>VI:</u> 25876.5    25871</p> <p><u>OMS-2:</u> 42:57.2    42:57.2 Delta V    75.5 FPS TGO        =    00:47</p>	<p>Continued . . .</p> <p><u>OV-104:</u> 93:03:49:17</p> <p><u>DISTANCE:</u> 4,100,000 sm</p>							<p>Continued . . .</p> <p><u>RENDEZVOUS #21:</u> - Rendezvous and dock with Russian Mir Space Station (first docking).</p> <p><u>SIGNIFICANT ANOMALIES:</u> - Postflight disassembly of RSRM nozzle joint 3 revealed RTV gas paths with slight heat effect and erosion to primary O-rings of STS-71 LH RSRM and STS-70 RH RSRM. Technique developed to remove RTV from joint and do a vacuum backfill for STS-69 and STS-73 RSRM's. - GPC 4 annunciated GPC BITE fault message followed by GPC 4 fail. Determined to be single event upset, GPC 4 was assigned string 4 and used successfully during entry. - Slow docking module vestibule depress rate. - H2 manifold valve tank 1 failed open. - Cryo O2 tank 1 leak through flight cap of fill/drain line QD. - H2 manifold valve 1 microswitch failure. - Erratic O2 tank 5 heater temperature. - VHF system transmit failure. - PDIP power fail. - S-band comm string 2 uplink problem. - RCS jett R2U fail off (low chamber pressure).</p>

# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-70 SEQ FLT #70 KSC-70 PAD 39B-28 MLP-2	OV-103 (Flight 21) Discovery  OMS PODS: LPO1-24 RPO3-22 FRC3-21	<p><b>CDR:</b> Terence T. (Tom) Henricks (Flt 3 - STS-44, STS-55) P395/R135/V93/M120</p> <p><b>PLT:</b> Kevin R. Kregel P396/R197/ M172</p> <p><b>M/S 1:</b> Donald A. Thomas (Flt 2 - STS-65) P397/R180/V119/M158</p> <p><b>M/S 2:</b> Nancy J. (Sherlock) Currie (Flt 2 - STS-57) P398/R165/V120/F21</p> <p><b>M/S 3:</b> Mary Ellen Weber P399/R198/F26</p>	<p>KSC PAD 39B 194:13:41:55Z 9:41:00 AM EDT (P) 9:41:55 AM EDT (A) Thursday 19 7/13/95 (4)</p> <p><b>LAUNCH WINDOW:</b> 2H30M CTOB</p> <p><b>EOM PLS:</b> KSC TAL: BEN TAL WX: MRN</p> <p><b>SELECTED:</b> RTLS: KSC 15/N/N TAL: BEN 36/N/N AOA: EDW 22/N/N PLS: EDW 22/N/N</p> <p><b>TDEL:</b> 0.0      0.12/0.5</p> <p><b>MAX Q NAV:</b> 692      686</p> <p><b>SRB STG:</b> 2:02.7      2:05</p> <p><b>PERE:</b> NOMINAL</p> <p><b>2 ENG TAL (BEN):</b></p> <p><b>NEG RETURN:</b> 3:59      4:03</p> <p><b>PTA (U/S 244):</b> 5:03      5:01</p> <p><b>DROOP (BYD):</b> 5:00      5:31</p> <p><b>PTM (U/S):</b> 5:46      5:47</p> <p><b>SE TAL (BYD):</b> 5:59      6:06</p> <p><b>SE PTM (U/S 537):</b> 7:01      7:01</p> <p><b>MECO CMD:</b> 8:30.75      8:30.7</p> <p><b>VI:</b> 25876      25874</p> <p><b>OMS-2:</b> 39:54.9      39:55 DELTA V      222 FPS</p>	<p>KSC 33 (KSC 24) 203:12:02:00Z 8:02:00 AM EDT</p> <p>Saturday 14 7/22/95 (6)</p> <p><b>DEORBIT BURN:</b> 203:11:00:13Z</p> <p><b>XRANGE:</b> 430 NM</p> <p><b>ORBIT DIR:</b> DL 33</p> <p><b>AIM PT:</b> NOMINAL</p> <p><b>MLGTD:</b> 2601 FT 203:12:02:00Z VEL: 198 KGS 194 KEAS HDOT: -1.4 FPS</p> <p><b>TD NORM 195:</b> 2400 FT</p> <p><b>DRAG CHUTE</b> DEPLOY: 189 KEAS 203:12:02:03Z</p> <p><b>NLGTD:</b> 5460 FT 203:12:02:09Z VEL: 164 KGS HDOT: -6.1 FPS</p> <p><b>BRK INIT:</b> 89 KGS</p> <p><b>DRAG CHUTE</b> JETTISON: 59 KGS 203:12:02:35Z</p> <p><b>AVE BRK DECEL:</b> 4.6 FPS/S</p> <p><b>WHEELS STOP:</b> 203:12:02:58Z 11066 FT</p> <p><b>ROLLOUT:</b> 8465 FT 58 SEC</p> <p><b>WINDS:</b> T2, L2 KTS OFFICIAL: 2005 P8 T3, L4 KTS</p> <p><b>DENS ALT:</b> 1117 FT</p> <p><b>FLT DURATION:</b> 8:22:20:05 214:20:05 S/T: 535:16:14:36</p> <p><b>OV-103:</b> 145:23:49:54</p> <p><b>DISTANCE:</b> 3,700,000 sm</p>	<p>104/104/ 109%</p> <p><b>PREDICTED:</b> 100/104/104/ 67/104</p> <p><b>ACTUAL:</b> 100/104/104/ 67/104</p> <p><b>SSME S/N:</b> 1 = 2036 (1) 2 = 2019 (15) 3 = 2017 (12)</p> <p><b>M 3 EOM:</b></p> <p><b>WEIGHT:</b> 194267 LBS</p> <p><b>X CG:</b> 1097.2</p> <p><b>LANDING:</b></p> <p><b>WEIGHT:</b> 194190 LBS</p> <p><b>X CG:</b> 1099.1</p>	<p>BI-073</p> <p>RSRM 44</p> <p>ET-71</p> <p>LWT 64</p> <p>ET RPT 271K</p> <p>ET BR/UP 214K</p> <p>ET IMPACT 1:20:13 MET LAT: 13.75°S LONG: 163°W</p>	<p>28.45° (38)</p> <p>DIRECT INSERTION</p> <p>POST OMS-2: 160.9 X 160.7 NM</p>	<p>OI-24 (2)</p>	<p><b>CARGO:</b> 46799 LBS</p> <p><b>PAYLOAD CHARGEABLE:</b> 44445 LBS</p> <p><b>DEPLOYED:</b> 37714 LBS</p> <p><b>NON-DEPLOYED:</b> 5585 LBS</p> <p><b>MIDDECK:</b> 1086 LBS</p> <p><b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 804398 LBS <b>NON-DEPLOYED:</b> 973266 LBS <b>CARGO TOTAL:</b> 2109762 LBS</p> <p><b>PERFORMANCE MARGINS (LBS):</b> FPR: 3775 FUEL BIAS: 1136 FINAL TDDP: 3789 RECON: 5299</p> <p><b>PAYLOADS:</b> PLB: TDRS-G/IUS (DEPLOYED)</p> <p><b>MIDDECK:</b> PARE/NIH-R, BDS, CPCG, STL/NIH-C, BRIC(2), SAREX-II, VFT-4, HERCULES, MIS-B, MSX, MAST, WINDEX, RME-III</p> <p>4 CRYO TK SETS</p> <p>NO RMS</p>	<p>KSC W/D: OPF 63, VAB 14 (2) PAD 43 (2) = 120 days total.</p> <p><b>LAUNCH POSTPONEMENTS:</b> - Baselined launch date 6/29/95 on 3/18/94. - Advanced launch date to 6/22/95 on 9/26/94. - Advanced launch date to 6/8/95 on 5/2/95, moving STS-70 ahead of STS-71. Delays on SPEKTR launch &amp; docking with Mir caused STS-71 launch to be postponed. - Postponed 6/8/95 launch to 7/13/95 on 6/2/95 based on decision to rollback to VAB and repair holes (&gt;200) in ET caused by a pair of woodpeckers (Northern Flickers). Moved STS-70 after STS-71.</p> <p><b>LAUNCH SCRUBS:</b> None</p> <p><b>LAUNCH DELAYS:</b> - Launch delayed 55 seconds while holding at T-31 seconds due to Range Safety ET destruct package receiver fluctuating AGC (possible multipath).</p> <p><b>TAL WX:</b> - BEN was prime and selected. MRN was forecast and observed NO GO due to crosswinds. Banjul in plane site was down for runway repair.</p> <p><b>DOLILU/NOMINAL I-LOADS:</b> - First planned use of DOLILU II i-loads. DOLILU II was selected and uplinked. DOLILU II uplink #1, I-load uplink #21.</p> <p><b>FLIGHT DURATION CHANGES:</b> - Waved off landing at KSC on orbits 127 and 128 because of forecast and observed low ceiling and ground fog. - Waved off landing at KSC on orbit 142. Weather was observed GO but marginal with potential for ground fog but observed GO at landing time. - Total flight extensions 1 day plus 1 orbit.</p> <p><b>FIRSTS:</b> - First flight to be controlled by White FCR in new MCC (Bldg 30S) for most of orbit operations. Ascent and entry plus early and late orbit ops being controlled from old MCC FCR-1. - First flight with Block I SSME (2036).</p> <p><b>SIGNIFICANT ANOMALIES:</b> - Postflight disassembly of RSRM nozzle joint 3 revealed gas paths with slight heat effect and corrosion to primary o-ring of STS-70 RH RSRM. - Erratic supply water tank C transducer. - Ops recorder 2 track 3 degradation. - Vacuum cleaner power cable pinched (IFM fixed). - Crew reported W6 impact crater. - Lost MOC capability when MOC went to 100% CPU.</p>	





# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-69</b>  SEQ FLT #71  KSC-71  PAD 39A-43  MLP-1	OV-105 (Flight 9) Endeavour  OMS PODS: LPO4 - 16 RPO5 - 7 FRC5 - 9	<p><b>CDR:</b> David M. Walker (Flt 4 - STS 51-A, STS-30, STS-53) P400/R48/V40/M45</p> <p><b>PLT:</b> Kenneth D. Cockrell (Flt 2 - STS-56) P401/R159/V121/M140</p> <p><b>M/S 1 (PAYLOAD CDR):</b> James S. Voss (Flt 3 - STS-44, STS-53) P402/R136/V85/M121</p> <p><b>M/S 2/EV-1:</b> James H. Newman (Flt 2 - STS-51) P403/R168/V122/M146</p> <p><b>M/S 3/EV-2:</b> Michael L. Gernhardt P404/R199/M173</p> <p><b>SS EVA #30</b> EMU/Tethered EVA Scheduled EVA #26 EVA development flight test (EDFT) #2 to evaluate space suit mods to protect space walkers from extreme cold space environment, including heated gloves &amp; LCVG leg bypass) 9/16/95 6H46M11S duration</p> <p><b>MCC FCR-1 (50) (ASCENT/ENTRY)</b></p> <p><b>WHITE FCR (2) (ORBIT OPS)</b></p> <p><b>FLIGHT DIRECTORS:</b> A/E - N. W. Hale LD/O 1 - J. W. Bantle O 2 - P. F. Dye PLNG - G. A. Pennington MOD - A. L. Briscoe</p>	<p>KSC 39A 250:15:08:59.96Z 11:09:00 AM EDT (P) 11:09:00 AM EDT (A) Thursday 20 9/7/95 (7)</p> <p><b>LAUNCH WINDOW:</b> 2H30M CTOB</p> <p><b>EOM PLS:</b> KSC <b>TAL:</b> BEN <b>TAL WX:</b> MRN</p> <p><b>SELECTED:</b> <b>RTL:</b> KSC 15/C1/N <b>TAL:</b> BEN 36/N/N <b>AOA:</b> EDW 22/N/N <b>PLS:</b> EDW 22/N/N</p> <p><b>TDDEL:</b> 0.0 0.032/-0.09</p> <p><b>MAX Q NAV:</b> 705 PSF 715 PSF</p> <p><b>SRB SEP:</b> 2:03.7 1:59.1</p> <p><b>PERE:</b> NOMINAL</p> <p><b>2 ENG TAL (BEN):</b> 2:40 2:49</p> <p><b>NEG RETURN:</b> 4:01 4:02</p> <p><b>PTA (U/S 328):</b> 4:18 4:14</p> <p><b>DROOP (BYD):</b> 5:28 5:30</p> <p><b>PTM (U/S 328):</b> 5:24 5:24</p> <p><b>SE TAL (BYD):</b> 5:51 5:52</p> <p><b>LAST TAL (BEN):</b> 6:28</p> <p><b>MECO CMD:</b> 8:30.2 8:30.2</p> <p><b>MECO VI:</b> 25946 25940</p> <p><b>OMS-2:</b> 41:43 41:43 293.4 FPS 293.4 FPS</p>	<p>KSC 33 (KSC 25) 261:11:37:55Z 7:37:55 AM EDT</p> <p>Monday 14 9/18/95 (8)</p> <p><b>DEORBIT BURN:</b> 261:10:35:13Z</p> <p><b>XRANGE:</b> 202 NM</p> <p><b>ORBIT DIR:</b> DL 34</p> <p><b>AIM PT:</b> CLOSE IN</p> <p><b>MLGTD:</b> 1912 FT 261:11:37:55Z <b>VEL:</b> 218 KGS 212 KEAS <b>HDOT:</b> -4 FPS</p> <p><b>TD NORM 205:</b> 2468 FT</p> <p><b>DRAG CHUTE DEPLOY:</b> 187 KEAS 261:11:38:03Z</p> <p><b>NLGTD:</b> 6325 FT 261:11:38:08Z <b>VEL:</b> 167 KGS <b>HDOT:</b> -6.5 FPS</p> <p><b>BRK INIT:</b> 97 KGS</p> <p><b>DRAG CHUTE JETTISON:</b> 62 KGS 261:11:38:36Z</p> <p><b>AVE BRK DECEL:</b> 5.6 FPS/S</p> <p><b>WHEELS STOP:</b> 261:11:38:55Z 12142 FT</p> <p><b>ROLLOUT:</b> 10230 FT 60 SEC</p> <p><b>WINDS:</b> T2, L4 KTS <b>OFFICIAL:</b> 2205P06, T2, L5 KTS</p> <p><b>DENS ALT:</b> 1315 FT</p> <p><b>FLT DURATION:</b> 10:20:28:55</p> <p><b>S/T:</b> 546:12:43:31</p> <p><b>OV-105:</b> 93:14:23:06</p> <p><b>DISTANCE:</b> 4,500,000 sm</p>	<p>104/104/ 109%</p> <p><b>PREDICTED:</b> 100/104/104/ 67/104</p> <p><b>ACTUAL:</b> 100/104/104/ 67/104</p> <p>1 = 2035 (2) 2 = 2109 (16) 3 = 2029 (12)</p> <p><b>ET IMPACT</b> 1:24:54 <b>MET</b> <b>LAT:</b> 18.8°S <b>LONG:</b> 151.9°W</p> <p><b>M 3 EOM:</b></p> <p><b>WEIGHT:</b> 219395 LBS</p> <p><b>X CG:</b> 1080.7</p> <p><b>LANDING:</b></p> <p><b>WEIGHT:</b> 219298 LBS</p> <p><b>X CG:</b> 1082.3</p>	<p>BI-074</p> <p>RSRM 48 KM</p> <p>ET-72</p> <p>LWT 65</p> <p>ET RPT 271K</p> <p>ET BR/UP 214K</p> <p>ET IMPACT 1:24:54 <b>MET</b> <b>LAT:</b> 18.8°S <b>LONG:</b> 151.9°W</p>	<p>28.45° (39)</p> <p>DIRECT INSERTION</p> <p>POST OMS-2: 201 x 199 NM</p>	<p>OI-24 (3)</p>	<p><b>CARGO:</b> 31549 LBS</p> <p><b>PAYLOAD CHARGEABLE:</b> 25346 LBS</p> <p><b>DEPLOYED:</b> 0 LBS</p> <p><b>NON-DEPLOYED:</b> 16739 LBS</p> <p><b>MIDDECK:</b> 1301 LBS</p> <p><b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 804398 LBS <b>NON-DEPLOYED:</b> 991306 LBS <b>CARGO TOTAL:</b> 2141311 LBS</p> <p><b>PERFORMANCE MARGINS (LBS):</b> FPR: 3775 FUEL BIAS: 1136 FINAL TDDP: 5409 RECON: 7966</p> <p><b>PAYLOADS:</b> <b>PLB:</b> WSF (Wakeshield Facility), IEH, Spartan-201-03 CAPL-III/GBA</p> <p><b>MIDDECK:</b> STL/NIH-C CGBA, BRIC, EPICS CMIX</p> <p>5 CRYO TK SETS</p> <p><b>RMS 42 (S.N. 303)</b></p> <p><b>RMS USED TO DEPLOY AND RETRIEVE SPARTAN AND WSF. SUPPORT FOR EVA AND CLAWS.</b></p>	<p><b>KSC W/D:</b> OPF 81, VAB 7 PAD 47 (2) = 135 days total.</p> <p><b>LAUNCH POSTPONEMENTS:</b> - Baselined launch date of 3/16/95 on 11/18/93. - Postponed launch date to 5/4/95 on 3/24/94. - Postponed launch date to 7/20/95 on 10/6/94. - Postponed launch date to 8/5/95 caused by delays in STS-71 and STS-70. - Postponed launch date to 8/31/95 while program analyzed RTV gas paths in nozzle joint #3 on STS-71 and STS-70, then developed a fix for STS-69. - Rolled back to VAB on 8/1/95 under threat of Hurricane Erin. - Returned to pad on 8/8/95.</p> <p><b>LAUNCH SCRUBS:</b> - Scrubbed 8/31/95 launch at approx. L-7.5 hours when fuel cell 2 condenser exit temperature exceeded LCC limit of 160 deg F. - Rescheduled launch for 9/7/95.</p> <p><b>LAUNCH DELAYS:</b> None</p> <p><b>TAL WX:</b> - BEN (prime and selected), MRN forecast NO GO for ceiling and rain but observed GO 10 mins prior to landing time.</p> <p><b>DOLILU II/NOMINAL I-LOADS:</b> - Nominal I-loads were not certified for September. DOLILU-II I-loads uplinked. DOLILU-II uplink #2, total DOLILU uplink #16 I-load uplink #22.</p> <p><b>FLIGHT DURATION CHANGES:</b> None</p> <p><b>EVENTS:</b> - SPARTAN released 1:00:38:59, grapple 2:23:53, latched 3:00:03 MET. - WSF released 3:20:16:15, grapple 6:22:50:11 MET.</p> <p><b>RENDEZVOUS #22:</b> - Rendezvous, grapple &amp; berth WSF.</p> <p><b>RENDEZVOUS #23:</b> - Rendezvous, grapple &amp; berth SPARTAN 201-03.</p> <p><b>SIGNIFICANT ANOMALIES:</b> - CRT 1 dim display. - Fuel cell 2 condenser exit temp high (scrubbed launch attempt). - Waste dumpline blockage. IFM to bypass dump filter was unsuccessful, so off loaded waste tank into CWC. - EVA power tool failed. - Portable foot restraint fit problem. - S-band preamp 2 degraded causing intermittent forward link. - Middeck speaker ATU failure. - Camcorder tape eject failure. - Camera D downlink lost. - Loss of KU-band forward link. - Random ops recorder commands issued when panel brightness control adjusted in new MCC. - Hydraulics pump 3 stuck in norm press (cycled switch twice to get response then started APU - WSB 3 lub oil overcooling during entry.</p>	



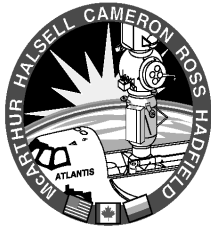
# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-73</b>  SEQ FLT #72  KSC-72  PAD - 39B - 29  MLP-3	OV-102 (Flight 18) Columbia  18th Spacelab Flight  LM-12  EDO 6  OMS PODS: LPO5-7 RPO1-22 FRC2-18	<b>CDR:</b> Kenneth D. Bowersox (Flt 3 - STS-50, STS-61) P405/R146/V97/M130  <b>PLT:</b> Kent V. Rominger P406/R200/M174  <b>M/S 1:</b> Catherine G. Coleman P407/R201/F27  <b>M/S 2:</b> Michael E. Lopez-Alegria P408/R202/M175  <b>M/S 3/Payload CDR:</b> Kathryn C. Thornton (Flt 4 - STS-33, STS-49, STS-61) P409/R107/V73/F11  <b>P/S 1:</b> Fred Leslie P410/R203/M176  <b>P/S 2:</b> Al Sacco, Jr. P411/R204/M177	KSC 39 PAD B 293:13:52:59.98Z 9:53:00 AM EDT (P) 9:53:00 AM EDT (A) Friday 14 10/20/95 (8)  <b>LAUNCH WINDOW:</b> 2H30M CTOB Extended to 3H45M (BEN Darkness) <b>EOM PLS:</b> KSC <b>TAL:</b> BEN <b>TAL WX:</b> MRN, ZZA  <b>SELECTED:</b> <b>RTLS:</b> KSC 33/N/N <b>TAL:</b> BEN 36/N/N <b>AOA:</b> EDW 22/N/N <b>PLS:</b> EDW 04/N/N  <b>TDEL:</b> 0:00 -0.078/-0.04  <b>MAX Q NAV:</b> 708 713  <b>SRB STG:</b> 2:04.5 2:04  <b>PERE:</b> NOMINAL  <b>2 ENG TAL (BEN):</b> 2:48 2:47  <b>NEG RETURN:</b> 3:59 4:02  <b>PTA (U/S):</b> 5:29 5:19  <b>DROOP (109):</b> 5:28 5:19  <b>PTM (U/S-220):</b> 6:00 5:48  <b>SE TAL (BEN):</b> 6:02 6:08  <b>MECO CMD:</b> 8:29.5 8:29.7  <b>VI:</b> 25866 25860  <b>OMS-2:</b> 41:29 41:29 186.1 FPS 186.0 FPS	KSC 33, (KSC 26) 309:11:45:21Z 7:45:21 AM EDT  Sunday 10 11/5/95 (10)  <b>DEORBIT BURN:</b> 309:10:46:40Z  <b>XRANGE:</b> 231 NM  <b>ORBIT DIR:</b> DR 14  <b>AIM PT:</b> CLOSE IN  <b>MLGTD:</b> 2500 FT 309:11:45:21Z <b>VEL:</b> 214 KGS 212 KEAS <b>HDOT:</b> -1.7 FPS  <b>TD NORM 205:</b> 3079 FT  <b>DRAG CHUTE DEPLOY:</b> 187 KEAS 309:11:45:29Z  <b>NLGTD:</b> 7098 FT 309:11:45:29Z <b>VEL:</b> 157 KGS <b>HDOT:</b> -5.7 FPS  <b>BRK INIT:</b> 125 KGS  <b>DRAG CHUTE JETTISON:</b> 50 KGS 309:11:45:58Z  <b>AVE BRK DECEL:</b> 6.0 FPS/S  <b>WHEELS STOP:</b> 309:11:106:17Z 11532 FT  <b>ROLLOUT:</b> 9032 FT 71 SEC  <b>WINDS:</b> H3, R4 KTS <b>OFFICIAL:</b> 0305P07, H2,R4 KTS  <b>DENS ALT:</b> 206 FT  <b>FLT DURATION:</b> 15:21:52:21 381:52:21 <b>S/T:</b> 562:10:35:52  OV-102: 167:08:37:14  <b>DISTANCE:</b> 6,600,000 sm	104/104/ 109%  <b>PREDICTED:</b> 100/104/104/ 67/104  <b>ACTUAL:</b> 100/104/104/ 67/104  <b>SSM3 S/N:</b> 1 = 2037 (1) 2 = 2031 (3) 3 = 2038 (1)	BI-075  RSRM 50  ET-73  LWT 67  ET RPT 271K  ET BR/UP 214K  ET IMPACT 1:24:50 MET LAT: 2.8°S LONG: 138.97°W	39.0° (4)  DIRECT INSERTION  POST OMS-2: 151 X 147 NM	OI-24  DEORBIT: 140 x 136 NM  VELOCITY: 25744 FPS  ENTRY RANGE: 4519 NM	CARGO: 33705 LBS  PAYLOAD CHARGEABLE: 25310 LBS  DEPLOYED: 0 LBS  NON-DEPLOYED: 23302 LBS  MIDDECK: 2008 LBS  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> DEPLOYED: 804398 LBS NON-DEPLOYED: 1016616 LBS <b>CARGO TOTAL:</b> 2175016 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 3775 FUEL BIAS: 1136 FINAL TDDP: 1906 RECON: 4902  PAYLOADS: PLB: U.S. MICROGRAVITY LABORATORY (USML-2) FLUIDS PHYSICS, MATERIALS SCIENCE, BIOTECHNOLOGY, AND COMBUSTION SCIENCE OARE  MIDDECK:  5 + 4 EDO CRYO TANK SETS EDO PALLET  NO RMS	KSC W/D: OPF 100, VAB 7, PAD 48 = 155 days total.  <b>LAUNCH POSTPONEMENTS:</b> - Baselined 9/24/95 as launch date on 6/30/94. - Postponed launch to 9/28/95 on 9/8/95 caused by delay to STS-69 launch (RSRM nozzle joint #3 repairs).  <b>LAUNCH SCRUBS:</b> - Scrubbed 9/28/95 launch at L-5:40 hrs when engine #1 main fuel valve leaked hydrogen. Rescheduled launch for 10/5/95. - Scrubbed 10/5/95 launch prior to L-1 day MMT due to forecast of high winds and rain under influence of Hurricane Opal, rescheduled launch for 10/6/95. - Scrubbed 10/6/95 launch at L-6:35 hrs while holding up tanking due to failure to service hydraulic sys 1 NLG section when MFV was replaced. Rescheduled launch for 10/7/95. - Scrubbed 10/7/95 launch while holding at T-20 minutes due to MEC 1, CORE B failure. Rescheduled launch for 10/14/95. - Scrubbed 10/14/95 launch at L-1 day MMT to measure high pressure oxidizer duct weld after test stand duct failure caused an oxidizer leak. Rescheduled launch for 10/15/95. - Scrubbed 10/15/95 launch while holding at T-5 mins. due to forecast and observed range and RTLS NO GO for ceiling (launch window extended to 3H49M (BEN dark).  <b>LAUNCH DELAYS:</b> - Launch delayed 3MOS while holding at T-5 mins. due to R/S command problem.  <b>TAL WX:</b> - BEN (prime & selected) with MRN and ZZA forecast and observed GO.  <b>DOLILU-II/NOMINAL I-LOADS:</b> Both GO - DOLILU-II selected and uplinked. DOLILU-II uplink #3, DOLILU uplink #17, total uplink #23.  <b>FLIGHT DURATION CHANGES:</b> None  <b>FIRSTS:</b> - First flight with 2 block I SSME's (S/N 2037 & 2038).  <b>SIGNIFICANT ANOMALIES:</b> - CRT-2 display flickered (IFM to replace with ORT-4). - FES feedline A mid 2 thermostat/heater failure. - FCL 1 P/L head exchanger flow degraded. - FC 3 cell performance monitor failed. - H2 manifold valve tank 1 failed open. - S-band lower right quad antenna degraded. - Spacelab high rate dump data bad. - APU 1 fuel pump inlet pressure decrease. - F1F jet failed off, chamber pressure decreased. - R5D and R5R transient fail off. - TDRSS STGT failure.	



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE, LANDING TIMES, 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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-74</b> SEQ FLT #73 KSC-73 PAD- 39A-44 MLP-2	OV-104 (Flight 15) Atlantis  OMS PODS: LPO3-19 RPO4-15 FRC4-15	<b>CDR:</b> Kenneth D. Cameron (Flt 3 - STS-37, STS-56) P412/R121/V90/M109  <b>PLT:</b> James D. Halsell (Flt 2 - STS-65) P413/R178/V123/M156  <b>M/S 1:</b> Chris Hadfield (Canada) P414/R205/M178  <b>M/S 2:</b> Jerry L. Ross (Flt 5 - STS 61-B, STS-27, STS-37, STS-55) P415/R89/V38/M80  <b>M/S 3:</b> William McArthur (Flt 2 - STS-58) P416/R172/V124/M150	KSC 39A 316:12:30:42.98Z 7:30:43 AM EST (P) 7:30:43 AM EST (A) Sunday 8 11/12/95 (10)  <b>LAUNCH WINDOW:</b> 7 minutes MIR PLANAR/ PHASE WINDOW EOM PLS: KSC TAL: ZZA TAL WX: MRN, BEN  <b>SELECTED:</b> RTLS: KSC 33/CI/N TAL: ZZA 30/N/N AOA: KSC 33/CI/N PLS: EDW 22/N/N  <b>TDEL:</b> 0.04 0.122/0.16  <b>MAX Q NAV:</b> 711 PSF 711 PSF  <b>SRB STG:</b>  PERE: NOMINAL  <b>2 ENG TAL (MRN):</b> 2:22 2:22  <b>NEG RETURN:</b> 4:06 4:08  <b>PTA (U/S 255):</b> 4:27 4:22  <b>DROOP (ZZA):</b> 5:24 5:26  <b>PTM (U/S 255):</b> 6:04 6:03  <b>SE TAG (ZZA):</b> 5:56 5:56  <b>SE PTM (U/S 842):</b> 7:00 6:54  <b>MECO CMD:</b> 8:33.7 8:33.2  <b>VI:</b> 25878 25870  <b>O/S:</b> 41:50 41:51.9 212 FPS 212 FPS	KSC 33 (KSC 27) 324:17:01:27Z 12:01:29 PM EST  Monday 15 11/20/95 (11)  <b>DEORBIT BURN:</b> 324:15:53:49Z  <b>XRANGE:</b> 612 NM  <b>ORBIT DIR:</b> DR 15  <b>AIM PT:</b> NOMINAL  <b>MLGTD:</b> 2471 FT 324:17:01:27Z <b>VEL:</b> 196 KGS 201 KEAS HDOT: -1.4 FPS  <b>TD NORM 195:</b> 2955 FT  <b>DRAG CHUTE</b> DEPLOY: 180 KEAS 324:17:01:33Z  <b>NLGTD:</b> 5565 FT 324:17:01:37Z <b>VEL:</b> 156 KGS HDOT: -6.7 FPS  <b>BRK INIT:</b> 72 KGS 324:17:02:00Z  <b>DRAG CHUTE</b> JETTISON: 55 KGS 324:17:02:07Z  <b>AVE BRK DECEL:</b> 5.0 FPS/S  <b>WHEELS STOP:</b> 324:17:02:25Z 11078 FT  <b>ROLLOUT:</b> 8607 FT 58 SEC  <b>WINDS:</b> H6, R4 KTS OFFICIAL: 0107P10 H5, R4  <b>DENS ALT:</b> 670 FT  <b>FLT DURATION:</b> 8:04:30:44 196:30:44  <b>S/T:</b> 570:15:06:36  <b>OV-104 TOTAL:</b> 101:08:20:01  <b>DISTANCE:</b> 3,400,000 sm	104/104/109%  <b>PREDICTED:</b> 100/104/104/ 67/104  <b>ACTUAL:</b> 100/104/104/ 67/104  <b>SSME S/N:</b> 1 = 2012 (17) 2 = 2026 (5) 3 = 2032 (4)	BI-076  RSRM 51  ET-74  LWT-67  ET RPT 273.1K  ET BR/UP 214K  ET IMPACT 1:26:05 MET LAT: 0.31°S LONG: 125.6°W	51.65° (3)	DIRECT INSERTION  POST OMS-2: 162 X 162 NM	OI-24 (4)	<b>CARGO:</b> 23687 LBS  <b>PAYLOAD CHARGEABLE:</b> 14064 LBS  <b>DEPLOYED:</b> 10015 LBS  <b>NON-DEPLOYED:</b> 3135 LBS  <b>MIDDECK:</b> 914 LBS  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> DEPLOYED: 814413 LBS NON-DEPLOYED: 1020665 LBS CARGO TOTAL: 2198703 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 3775 FUEL BIAS: 1136 FINAL TDDP: 1823 RECON: 3689  <b>PAYLOADS:</b> PLB: SHUTTLE/MIR MISSION 2 ICBC, GPP ORBITER DOCKING SYSTEM DOCKING MODULE  <b>MIDDECK:</b> SAREX-II  5 CRYO TK SETS  RMS 43 (S.N. 301)  RMS used for docking module installation on Mir and monitor plume impingement.	KSC W/D: OPF 76, VAB 8 PAD 23 = 107 days total.  <b>LAUNCH POSTPONEMENTS:</b> - Baselined launch date of 10/26/95 on 5/5/94. - Postponed launch date to 11/2/95 on 9/8/95, caused by SRB nozzle joints #3 and #4 repairs to STS-69, STS-73, and STS-74. - Advanced launch date to 11/1/95 on 10/4/95. - Postponed date to 11/16/95 on 10/27/95 caused by STS-73 launch scrubs.  <b>LAUNCH SCRUBS:</b> - Scrubbed 11/11/95 launch at T-4 minutes while holding at T-5 mins, when all 3 TAL sites (BEN, MRN, ZZA) were forecast and observed NO GO for weather.  <b>LAUNCH DELAYS:</b> None  <b>TAL WX:</b> - ZZA (prime & selected) was forecast GO but observed NO GO for 7000' broken ceiling. MRN forecast and observed TO. BEN forecast observed NO GO for ceilings and crosswinds.  <b>DOLILU-II I-LOADS:</b> - Selected and uplinked DOLILU-II I-loads, DOLILU-II uplink #4, DOLILU uplink #18, I-load uplink #23. (Last flight with nominal I-load availability.)  <b>FLIGHT DURATION CHANGES:</b> None  <b>RENDEZVOUS #24:</b> - Rendezvous and dock with Russian Mir space station (second docking).  <b>EVENTS:</b> - Docking module unberth 1/18:01, capture 1/18:46:12, hardmate 1/18:53:41. - Docking module APDS-1 to Mir docking at 2/17:56:57 MET, hardmate at 2/18/05:05 MET. - Transferred 993 lbm H <sub>2</sub> O, 59 lbm O <sub>2</sub> , and 44 lbm N <sub>2</sub> to Mir. - Undocking from Mir at 5/19:45:01 MET.  <b>RADIATOR DEPLOY #17:</b> - Deployed radiator to make water available for transfer to Mir. - Port RAD deployed to make water 83:23:14 GMT.  <b>SIGNIFICANT ANOMALIES:</b> - Fuel cell 3 cell performance monitor delta volt measurements for all 3 substacks shifted approximately 5 millivolts. - Cryo O <sub>2</sub> manifold tank 1 valve failed open. - PLB aft port and aft starboard lights failed. - H <sub>2</sub> manifold valve 1 microswitch failure. - TCS 1 lost calibration, TCS 2 self-test failures. - ODS stowage bag adapter plate jammed. - OPS-1 recorder track 8 data degradation. - Mir camcorder battery low capacity. - WSB 2 regulator pressure erratic postlanding.



# 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		FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
							INC	HA/HP			
<b>STS-72</b> SEQ FLT #74 KSC-74 PAD-39B-30 MLP-1	OV-105 (Flight 10) Endeavor  OMS PODS: LPO4 - 17 RPO5 - 8 FRC5 - 10	<p><b>CDR:</b> Brian Duffy (Flt 3 - STS-45, STS-57) P417/R142/V94/M126</p> <p><b>PLT:</b> Brent W. Jett, Jr. P418/R206/M179</p> <p><b>M/S 1/EV 1:</b> Leroy Chiao (Flt 2 - STS-65) P419/R179/V125/M157</p> <p><b>M/S 2/EV 3:</b> Winston E. Scott P420/R207/M180</p> <p><b>M/S 3:</b> Koichi Wakata (Japan) P421/R208/M181</p> <p><b>M/S 4/EV 2:</b> Daniel T. Barry P422/R209/M182</p> <p><b>SS EVA #31:</b> EMU/Tethered EVA EVA1 - 1/14/96 to 1/15/96 Scheduled EVA #27 by EV 1 and EV 2 6H09M19S Duration</p> <p><b>SS EVA #32:</b> EVA 2 - 1/16/96 to 1/7/96 Scheduled EVA #28 EMU/Tethered EVA by EV 1 and EV 3 6H53M41S Duration. To test and evaluate EVA hardware for Space Station use.</p> <p>MCC FCR-1 (53) ASCENT/ENTRY</p> <p>WHITE FCR (4) FOR ORBIT OPS</p> <p><b>FLIGHT DIRECTORS:</b> A/E - J. W. Bantle LD/O 1 - B. P. Austin O 2 - R. M. Kelso PLNG - J. P. Shannon MOD - J. W. Bantle &amp; A. L. Briscoe</p>	<p>KSC 39B 11:09:40:59:98Z 4:18:00 AM EST (P) 4:41:00 AM EST (A) Thursday 21 1/11/96 (7)</p> <p><b>LAUNCH WINDOW:</b> 49M33S SFU PLANAR/ PHASE WINDOW</p> <p><b>EOM PLS:</b> KSC <b>TAL:</b> BEN <b>TAL WX:</b> NONE</p> <p><b>SELECTED:</b> RTLS: KSC 15/N/N <b>TAL:</b> BEN 36/N/N <b>AOA:</b> EDW 04/CI/N <b>PLS:</b> EDW 04/CI/N</p> <p><b>TDEL:</b> 0.00 0.002/0.10</p> <p><b>MAX Q NAV:</b> 710 PSF 713 PSF</p> <p><b>SRB STG:</b> 2:05.1 2:05</p> <p><b>PERE:</b> NOMINAL</p> <p><b>2 ENG TAL (BEN):</b> 2:05 NO CALL</p> <p><b>NEG RETURN:</b> 4:03 4:07</p> <p><b>PTA (U/S 411):</b> 3:34 3:33</p> <p><b>DROOP:</b> 5:23 5:24</p> <p><b>PTM (U/S 411):</b> 4:42 4:34</p> <p><b>SE PTM (U/S:1073):</b> 6:23 6:20</p> <p><b>MECO CMD:</b> 8:27.3 8:27.1</p> <p><b>VI:</b> 26025.7 26025</p> <p><b>OMS-2:</b> 43:30 43:30 115.7FPS 115.7 FPS</p>	<p>KSC 15 (KSC 28) 20:07:41:40Z 2:41:40 AM EST</p> <p>Saturday 15 1/20/96 (6)</p> <p><b>DEORBIT BURN:</b> 20:06:41:23Z</p> <p><b>XRANGE:</b> 220 NM</p> <p><b>ORBIT DIR:</b> DL 35</p> <p><b>AIM PT:</b> NOMINAL</p> <p><b>MLGTD:</b> 3386 FT 20:07:41:40Z <b>VEL:</b> 193 KGS 185 KEAS <b>HDOT:</b> -1.7 FPS</p> <p><b>TD NORM 195:</b> 2768 FT</p> <p><b>DRAG CHUTE</b> <b>DEPLOY:</b> 179 KEAS 20:07:41:43Z</p> <p><b>NLGTD:</b> 6574 FT 20:07:41:51Z <b>VEL:</b> 146 KGS <b>HDOT:</b> -6.7 FPS</p> <p><b>BRK INIT:</b> 86 KGS</p> <p><b>DRAG CHUTE</b> <b>JETTISON:</b> 58 KGS 20:07:42:17Z</p> <p><b>AVE BRK DECEL:</b> 4.7 FPS/S</p> <p><b>WHEELS STOP:</b> 20:07:42:46Z 12155 FT</p> <p><b>ROLLOUT:</b> 8767 FT 66 SEC</p> <p><b>WINDS:</b> T6, R2 KTS <b>OFFICIAL:</b> 3206P08 T6, R1</p> <p><b>DENS ALT:</b> -1007 FT</p> <p><b>FLT DURATION:</b> 8:22:00:40</p> <p><b>S/T:</b> 579:13:07:16</p> <p>OV-105: 102:12:23:46</p> <p><b>DISTANCE:</b> 3,700,00 sm</p>	<p>104/104/ 109%</p> <p><b>PREDICTED:</b> 100/104/104/ 67/104</p> <p><b>ACTUAL:</b> 100/104/104/ 67/104</p> <p>1 = 2028 (11) 2 = 2039 (1) 3 = 2036 (2)</p> <p><b>M 3 EOM:</b></p> <p><b>WEIGHT:</b> 218496 LBS</p> <p><b>X CG:</b> 1081.7</p> <p><b>LANDING:</b></p> <p><b>WEIGHT:</b> 218345 LBS</p> <p><b>X CG:</b> 1083.3</p>	<p>BI-077</p> <p>RSRM 52</p> <p>ET-75</p> <p>LWT-68</p> <p>ET RPT 271.3K</p> <p>ET BR/UP 214K</p> <p>ET IMPACT 1:27:10 MET LAT: 18.4°S LONG: 145.5°W</p>	<p>28.45° (40)</p> <p>DIRECT INSERTION</p> <p>POST OMS-2: 248 x 94.9 NM</p> <p>SFU GRAPPLE 2:01:16:19 MET 256.8 x 251 NM</p> <p>ORBIT ADJ: 2:04:56:13 MET 254.7 x 164.9 NM</p> <p>CIRC MNVR: 2:05:43:29 MET 165.2 X 164.7 NM</p> <p>OAST REL: 3:01:51:53 MET 166 X 164 NM</p>	<p>OI-24 (5)</p> <p>CARGO: 21018 LBS</p> <p>PAYLOAD CHARGEABLE: 14087 LBS</p> <p>DEPLOYED: 0 LBS</p> <p>NON-DEPLOYED: 10546 LBS</p> <p>MIDDECK: 898 LBS</p> <p>SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 814413 LBS NON-DEPLOYED: 1032109 LBS CARGO TOTAL: 2219721 LBS</p> <p>PERFORMANCE MARGINS (LBS): FPR: 3775 FUEL BIAS: 1136 FINAL TDDP: 11447 RECON: 13346</p> <p>PAYLOADS: PLB: SPACE FLYER UNIT (SFU) RETRIEVED (JAPAN) OAST FLYER (DEPLOYED/ RETRIEVED) SSBUVIA SLA-01/GAS (5)</p> <p>MIDDECK: PARE/NIH-R STL/NIH-C PCG-STES CPCG</p> <p>5 CRYO TK SETS</p> <p>RMS 44 (S.N. 303)</p> <p>RMS used for SFU grapple &amp; berth, OAST deploy &amp; retrieve &amp; EVA support</p>	<p>KSC W/D: OPF 64, VAB 5, PAD 21 = 90 days total.</p> <p><b>LAUNCH POSTPONEMENTS:</b> - Baselined launch date of 8/24/95 on 6/6/94. - Postponed launch date to 11/30/95 on 10/6/94. - Postponed launch date to 1/11/96 on 9/8/95.</p> <p><b>LAUNCH SCRUBS:</b> None</p> <p><b>LAUNCH DELAYS:</b> - 23 minute launch delay while holding at T-5 minutes due to MCC old front end processor and associated problems. 100% CPU caused by not loading a necessary S/W patch.</p> <p><b>TAL WX:</b> - No TAL site available but no TAL site required (29 seconds overlap between RTLS and AOA). BEN was manned but NO GO for ceiling.</p> <p><b>NIGHT LAUNCH:</b> #12</p> <p><b>NIGHT LANDING:</b> #8</p> <p><b>DOLILU-II I-LOADS:</b> - First flight with only DOLILU-II I-Loads. DOLILU-II uplink #5. Total I-load uplink #24.</p> <p><b>FLIGHT DURATION CHANGES:</b> None</p> <p><b>EVENTS:</b> - Japanese SFU grapple at 2:01:16:19 MET, latch at 2:01:58:30 MET. Launched from Tanagashima, Japan. - OAST release 3/01:51:33 MET, grapple 5:00:06:15 MET, latch 5:00:31:40 MET. - EVA 1 started at 3:19:52:51 MET. - EVA 2 started at 5:19:59:06 MET.</p> <p><b>RENDEZVOUS #25:</b> - Rendezvous, grapple, berth, and return of SFU.</p> <p><b>RENDEZVOUS #26:</b> - Deploy, rendezvous, grapple, and return of OAST Flyer.</p> <p><b>SIGNIFICANT ANOMALIES:</b> - FCS shutdowns and topping FES case icing. - EMU helmet light damage. - EMU glove cut damage. - Loss of reception in left ear piece of EV 1. - Several EDFT-03 anomalies. - OAST-FLYER unexpected trajectory dispersions. - MCC front end processors operating at 100%. - RCS jet L1A fail off with maximum chamber pressure of 16 PSI. - RCS jet R2U fail leak. Jet had oxidizer leak. - Failure of SFU solar array panels to retract for capture and berthing, jettisoned solar arrays. - SFU AHU thermal discrepancies. Flight SFU not wired same as training SFU. - RMS wrist roll joint rate degradation. - LO2 ET umbilical frangible nut detonator did not fire (pyro wiring problem).</p>		



# 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		FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
							INC	HA/HP			
<b>STS-75</b> SEQ FLT #75 KSC-75 PAD 39B-31 MLP-3	OV-102 (Flight 19) Columbia  OMS PODS: LPO5-8 RPO1-23 FRC2-19	<p><b>CDR:</b> Andrew M. Allen (Flt 3 - STS-46, STS-62) P423/R149/V101/M133</p> <p><b>PLT:</b> Scott J. Horowitz P424/R210/M183</p> <p><b>M/S 1:</b> Jeffrey A. Hoffman (Flt 5 - STS 51-D, STS-35, STS-46, STS-61) P425/R57/V59/M52</p> <p><b>M/S 2:</b> Maurizio Cheli (Italy-ESA) P426/R211/M184</p> <p><b>M/S 3:</b> Claude Nicollier (Switzerland - ESA) (Flt 3 - STS-46, STS-61) P427/R150/V98/M134</p> <p><b>M/S 4/PAYLOAD CDR:</b> Franklin R. Chang-Diaz (Flt 5 - STS 61-C, STS-34, STS-46, STS-60) P428/R89/V46/M81</p> <p><b>P/S1:</b> Humberto Guidoni (Italy) P429/R212/M185</p> <p><b>MCC FCR-1 (54) ASCENT/ENTRY</b></p> <p><b>WHITE FCR (5) FOR ORBIT OPS</b></p> <p><b>FLIGHT DIRECTORS:</b> A/E - R. D. Jackson LD/O 2 - C. W. Shaw O 1 - G. A. Pennington O 3 - R. E. Castle O 4 - J. P. Shannon MOD - A. L. Briscoe</p>	<p>KSC 39B 53:20:17:59:97Z 3:18:00 PM EST (P) 3:18:00 PM EST (A) Thursday 22 2/22/96 (5)</p> <p><b>LAUNCH WINDOW:</b> 2H30M CTOB</p> <p><b>EOM PLS:</b> KSC <b>TAL:</b> BEN <b>TAL WX:</b> MRN</p> <p><b>SELECTED:</b> <b>RTL:</b> KSC 15/N/N <b>TAL:</b> BEN 36/N/N <b>AOA:</b> KSC 15/N/N <b>PLS:</b> KSC 15/N/N</p> <p><b>TDEL:</b> 0.0 0.182/0.22</p> <p><b>MAX Q NAV:</b> 690 697</p> <p><b>SRB STG:</b> 2:06.9 2:09</p> <p><b>PERF:</b> NOMINAL</p> <p><b>2 ENG TAL (BEN):</b> 3:06 3:07</p> <p><b>NEG RETURN:</b> 3:57 3:59</p> <p><b>PTA (U/S 242):</b> 4:59 5:00</p> <p><b>DROOP:</b></p> <p><b>PTM:</b> 6:02 5:58</p> <p><b>MECO CMD:</b> 8:27.4 8:28.3</p> <p><b>VI:</b> 25877 25869</p> <p><b>OMS-2:</b> 39:56 39:52 223 FPS 222 FPS</p>	<p>KSC 33 (KSC-29) 69:13:58:20Z 8:58:20 AM EST</p> <p>Saturday 16 3/9/96 (6)</p> <p><b>DEORBIT BURN:</b> 69:12:55:43Z</p> <p><b>XRANGE:</b> 234 NM</p> <p><b>ORBIT DIR:</b> DL 36</p> <p><b>AIM PT:</b> CLOSE IN</p> <p><b>MLGTD:</b> 2175 FT 69:13:58:20Z <b>VEL:</b> 189 KGS 211 KEAS <b>HDOT:</b> -1.0 FPS</p> <p><b>TD NORM 205:</b> 2706 FT</p> <p><b>DRAG CHUTE DEPLOY:</b> 193 KEAS 69:13:58:28Z</p> <p><b>NLGTD:</b> 6451 FT 69:13:58:36Z <b>VEL:</b> 130 KGS <b>HDOT:</b> -5.2 FPS</p> <p><b>BRK INIT:</b> 100 KGS</p> <p><b>DRAG CHUTE JETTISON:</b> 62 KGS 69:13:58:52Z</p> <p><b>AVE BRK DECEL:</b> 3.8 FPS/S</p> <p><b>WHEELS STOP:</b> 69:13:59:25Z 10635 FT</p> <p><b>ROLLOUT:</b> 8460 FT 65 SEC</p> <p><b>WINDS:</b> H13. 0X KTS <b>OFFICIAL:</b> 3312P20 H12, L2</p> <p><b>DENS ALT:</b> -1645 FT</p> <p><b>FLT DURATION:</b> 15:17:40:21</p> <p><b>S/T:</b> 595:06:47:37</p> <p><b>OV-102:</b> 183:02:17:35</p> <p><b>DISTANCE:</b> 6,500,000 sm</p>	<p>104/104/ 109%</p> <p><b>PREDICTED:</b> 100/104/104/ 67/104</p> <p><b>ACTUAL:</b> 100/104/104/ 67/104</p> <p>1 = 2029 (13) 2 = 2034 (7) 3 = 2017 (13)</p> <p><b>M 3 EOM:</b></p> <p><b>WEIGHT:</b> 226443 LBS</p> <p><b>X CG:</b> 1079.40</p> <p><b>LANDING:</b></p> <p><b>WEIGHT:</b> 226287 LBS</p> <p><b>X CG:</b> 1080.94</p>	<p>BI-078</p> <p>RSRM 53</p> <p>ET-76</p> <p>LWT-69</p> <p>ET RPT 271K</p> <p>ET BR/UP 214K</p> <p>ET IMPACT 1:20:58 MET LAT: 13.6°S LONG: 163.3°W</p>	<p>28.46° (41)</p> <p>DIRECT INSERTION</p> <p>POST OMS-2: 161.9 x 160.2 NM</p> <p>USMP PRCS 1 5/21:45:00 160.1 x 153.5</p> <p>MEPHESTO: 10:12:25:00 MET 158.4 X 149.4 NM</p> <p>DEORBIT: 173 x 146 NM</p> <p>VELOCITY: 25816 FPS</p> <p>ENTRY RANGE: 4375 NM</p>	<p>OI-24 (6)</p> <p><b>CARGO:</b> 32006 LBS</p> <p><b>PAYLOAD CHARGEABLE:</b> 23353 LBS</p> <p><b>DEPLOYED:</b> 1494 LBS</p> <p><b>NON-DEPLOYED:</b> 20490 LBS</p> <p><b>MIDDECK:</b> 1369 LBS</p> <p><b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 815907 LBS <b>NON-DEPLOYED:</b> 1053968 LBS <b>CARGO TOTAL:</b> 2251727 LBS</p> <p><b>PERFORMANCE MARGINS (LBS):</b> FPR: 3775 FUEL BIAS: 1136 FINAL TDDP: 1594 RECON: 638</p> <p><b>PAYLOADS:</b> <b>PLB:</b> TETHERED SATELLITE SYSTEM REFLIGHT (TSS-1R) U.S. MICROGRAVITY PAYLOAD SEMICONDUCTER EXPERIMENTS (USMP-3) OARE</p> <p><b>MIDDECK:</b> TSS SUPPORT EQUIPMENT MGBX CPCG</p> <p>5 CRYO TK SETS PLUS 4 EDO EDO PALLET</p> <p>NO RMS</p>	<p>KSC W/D: OPF 64, VAB 5, PAD 25 = 94 days total.</p> <p><b>LAUNCH POSTPONEMENTS:</b> - Baselined launch date of 2/15/96 on 10/13/94. - Postponed launch date to 2/22/96 on 12/1/95.</p> <p><b>LAUNCH SCRUBS:</b> NONE</p> <p><b>LAUNCH DELAYS:</b> NONE</p> <p><b>TAL WX:</b> - Both BEN (prime &amp; selected) and MRN were forecast and observed GO. BYD was not available as an intact abort site due to local situation.</p> <p><b>DOLILU-II I-LOADS:</b> - DOLILU II uplink #6, I-load uplink #25.</p> <p><b>FLIGHT DURATION CHANGES:</b> - Extended flight 1 day for additional USMP science. - Decision to not try to land on orbit 235 due to forecast of low ceiling. Waved off landing on orbits 236 and 237 due to forecast of low ceiling. Extended flight second day for weather. - Waved off landing at KSC on orbit 251 due to forecast of low ceiling. - Total flight duration extension of 2 days plus one orbit.</p> <p><b>FIRSTS/LASTS:</b> - First flight with thermocouple transducers on all 3 engines.</p> <p><b>EVENTS:</b> - TSS deployed at 03:00:27:00 MET, tether broke at 03:05:11:35, tether length of 19,695 meters, and TSS separated rapidly from orbiter. Tether was rewound starting at 03:21:49:00 MET and boon retraction completed at 03:02:41 MET.</p> <p><b>SIGNIFICANT ANOMALIES:</b> - Left main engine chamber pressure read 40% in lieu of 104%. - FA1 MDM card 0 failure during FCS C/O, aerosurfaces not receiving commands from FA1 (waiver written to F/R 2-30A.2a, MDF or next PLS). - Topping FES core icing used, ice flush procedure. - Fuel cell 3 CPM not doing self-test. - H2 tank 4 heater A failure. - AC 1 phase B short caused loss of utility outlets J31 and J7. - IMU 3 X and Y axis drift, compensations up to 8 sigma. Powered off to preserve lifetime. Used for entry but continued high drift rates. - MLS 2 did not lock on in range. - S-band transponder 2 failed to acquire TDRS (forward link). - MOC processing problems. - APU 1 fuel pump inlet pressure decay. - TSS was lost when tether parted when being deployed (at 19.7 kilometers). - Uncommanded SFMDM warm starts. - LH aft structure attach (to ET) blade valve not fully closed (debris catcher).</p>		



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (6)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-76</b>  SEQ FLT #76  KSC-76  PAD 39B-32  MLP-2	OV-104 (Flight 16) Atlantis  Spacehab 4  OMS PODS: LPO3-20 RPO4-16 FRC4-16	<b>CDR:</b> Kevin P. Chilton (Flt 3 - STS-49, STS-59) P430/R145/V103/M129  <b>PLT:</b> Richard A. Searfoss (Flt 2 - STS-58) P431/R171/V126/M149  <b>M/S 1 (PAYLOAD CDR):</b> Ronald M. Sega (Flt 2 - STS-60) P432/R175/V127M153  <b>M/S 2/EV 2:</b> M. Richard Clifford (Flt 3 - STS-53, STS-59) P433/R157/V104/M139  <b>M/S 3/EV 1:</b> Linda M. Godwin (Flt 3 - STS-37, STS-59) P434/R122/V105/F13  <b>M/S 4:</b> Shannon W. Lucid (Flt 5 - STS 51-G, STS-34, STS-43, STS-58, to return on STS-79) P435/R65/V45/F6  SS EVA #33 Tethered with SAFER CTGY EV 1 - Linda Godwin EV 2 - Rich Clifford Scheduled EVA #29 To install MEEP on Mir DM, evaluate EVA H/W, aids & tools. 3/27/96 - 6:02:28 Duration	KSC PAD 39B 82:08:13:03.9Z 3:13:04 AM EST (P) 3:13:04 AM EST (A) FRIDAY 15 3/22/96 (6)  <b>LAUNCH WINDOW:</b> 6M59S MIR PLANAR/ PHASE WINDOW  <b>EOM PLS:</b> KSC <b>TAL:</b> ZZA <b>TAL WX:</b> MRN, BEN  <b>SELECTED:</b> RTLS: KSC 33/CI/N TAL: ZZA 30/N/N AQA: KSC 33/CI/N PLS: EDW 22/N/N  <b>TDEL:</b> 0.09 0.492/0.49  <b>MAX Q NAV:</b> 720 PSF 724 PSF 52 SECS MET  <b>SRB STG:</b> 2:05.5 2:09  <b>PERF:</b> NOMINAL  <b>2 ENG TAL (BEN):</b> 2:25 2:28  <b>NEG RETURN:</b> 4:06 4:09  <b>PTA (U/S 242):</b> 4:23 4:24  <b>DROOP (ZZA):</b> 5:24 5:23  <b>PTM:</b> 5:54 5:58  <b>SE TAL (ZZA):</b> 5:54 6:09  <b>MECO CMD:</b> 8:32.6 8:33.2	EDW 22, CONC (EDW 45, CONC 26) 91:13:28:57Z 5:28:57 AM PST SUNDAY 11 3/31/96 (7)  <b>DEORBIT BURN:</b> 91:12:23:08Z  <b>XRANGE:</b> 763 NM  <b>ORBIT DIR:</b> DR 16  <b>AIM PT:</b> NOMINAL  <b>MLGTD:</b> 2185 FT 91:13:28:57Z VEL: 204 KGS 198 KEAS HDOT: -1.6 FPS  <b>TD NORM 195:</b> 2433 FT  <b>DRAG CHUTE</b> <b>DEPLOY:</b> 188 KEAS 91:13:29:00Z  <b>NLGTD:</b> 5747 FT 91:13:29:08Z VEL: 154 KGS HDOT: -5.0 FPS  <b>BRK INIT:</b> 116 KGS  <b>DRAG CHUTE</b> <b>JETTISON:</b> 54 KGS 91:13:29:31Z  <b>AVE BRK DECEL:</b> 5.4FPS/S  <b>WHEELS STOP:</b> 91:13:29:52Z 10579 FT  <b>ROLLOUT:</b> 8394 FT 55 SEC  <b>WINDS:</b> H0, L1 KTS OFFICIAL: 1301P04 T0, L1	104/104/ 109%  <b>PREDICTED:</b> 100/104/104/ 67/104  <b>ACTUAL:</b> 100/104/104/ 69/104  1 = 2035 (3) 2 = 2109 (16) 3 = 2019 (16)  <b>M 3 EOM:</b>  <b>WEIGHT:</b> 211913 LBS  <b>X CG:</b> 1082.76  <b>LANDING:</b>  <b>WEIGHT:</b> 211805 LBS  <b>X CG:</b> 1084.46	BI-079  RSRM 46  ET-77  LWT-70  ET RPT 271K  ET BR/UP 269K  ET IMPACT 1:25:49 MET LAT: 0.1°N LONG: 125.4°W	51.65° (4)  DIRECT INSERTION  POST OMS-2: 158.5 x 85.1 NM  MIR-RNDZ MNVR AT 1/01:11 MET 210 x 127 NM  TI: 1:15:28:01 MET 215.8 x 206.3 NM	OI-24 (7)	<b>CARGO:</b> 24605 LBS  <b>PAYLOAD CHARGEABLE:</b> 14152 LBS  <b>DEPLOYED:</b> 2814 LBS  <b>NON-DEPLOYED:</b> 10578 LBS  <b>MIDDECK:</b> 760 LBS  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 818721 LBS <b>NON-DEPLOYED:</b> 1065306 LBS <b>CARGO TOTAL:</b> 2276332 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 3775 FUEL BIAS: 1136 FINAL TDDP: 3140 RECON: 3563  <b>PAYLOADS:</b> PLB: SHUTTLE/MIR MISSION 3 SPACEHAB 4 ORBITER DOCKING SYSTEM (ODS)  <b>MIDDECK:</b> KIDSAT SAREX-II  5 CRYO TK SETS  NO RMS	KSC W/D: OPF 68, VAB 6, PAD 22 = 96 days total.  <b>LAUNCH POSTPONEMENTS:</b> - Baselined launch date of 3/21/96 on 12/14/94.  <b>LAUNCH SCRUBS:</b> - Scrubbed 3/21/96 launch at ET tanking MMT on 3/20/96 at approx. L-8 hours due to weather forecast of excessive RTLS crosswinds, chance of 5000' broken ceiling at KSC, and high seas in SRB recovery area.  <b>LAUNCH DELAYS:</b> None  <b>TAL WX:</b> - ZZA (prime and selected) and MRN were forecast and observed GO. BEN forecast and observed NO GO for ceiling and visibility.  <b>DOLILU-II I-LOADS:</b> - DOLILU-II I-Loads uplinked (#8), I-Load uplink #27.  <b>SPACE SHUTTLE NIGHT LAUNCH: #13</b>  <b>FLIGHT DURATION CHANGES/LANDING SITE CHANGE:</b> - MMT decision on 3/28/96 to land 1 day early on 3/30 (forecast of low ceiling & fog). - Loss of APU 3 imposed weather placards, flight rule 10-4A. - Waved off landing at KSC on orbit 129 due to overcast ceiling. - Waved off landing at KSC on orbit 130. Extended flight 1 day to original duration. - Waved off landing at KSC on orbit 144 due to ground fog. Changed landing site to EDW. - Total flight duration extension: one orbit.  <b>FIRSTS/LASTS:</b> - Mir docking at 01:18:39:26, hatch opening at 01:20:18:00 MET. - Shannon Lucid transferred to Mir 21 crew at 02:04:29:00 MET (84:12:42:04Z) and will return on STS-79. - Fifteen CWC's, total of 1506 lbm water, 42 lbm N <sub>2</sub> , 62 lbm O <sub>2</sub> , 614 lbm food transferred to Mir. - First EVA during orbiter/Mir docked operations at 04:22:23 MET. - Mir undocking at 06:16:54:59 MET. - Last flight from old MCC (FCR-1). First flight controlled from old MCC was Gemini 4.  <b>RADIATOR DEPLOY #18:</b> - Port radiator deployed for 47 hours to conserve water for transfer to Mir.  <b>RENDEZVOUS #27:</b> - Rendezvous and third docking with Mir Space Station (third docking flight).  Continued . . .	



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (6)	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, SIGNIFIC:T ANOMALIES, ETC.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-76 Continued			Continued . . . VI: 25878      25871 OMS-2: 42:18.5    42:21.9 77.1 FPS   76.8 FPS	Continued . . . DENS ALT: 1536 FT FLT DURATION: 9:05:15:53 S/T: 604:12:03:30 OV-105: 110:13:35:54 DISTANCE: 3,800,000 sm							Continued . . .  SIGNIFICANT ANOMALIES: - Hydraulic System 3 leak during ascent (approximately 20% fluid lost), kept in low pressure for entry, F/R waiver S063689CU. - WSB 3A failed to cool during ascent. - WSB 2 overcooked post-MECO. - Loss of PLBD centerline 9-12 release microswitch inclinations postlanding wave-off. - WSB 3B steam vent heater transient failure. - R4R fail off (low chamber pressure). - L2L fail leak (oxidizer leak). - L2U fail off (low chamber pressure). - EVA camera bracket not onboard. - EV 2 biomed (ECG) signal conditioner failed. - EMU 2 battery power discrete fail on. - MCC loss of forward link during countdown. - Loss of KCA forward link. - Water transfer mineral syringe failed to inject.

# SPACE SHUTTLE MISSIONS SUMMARY

NO.	ORBITER	CREW (6)	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	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.)
		TITLE, NAMES & EVA'S	LANDING SITES, ABORT TIMES	LANDING TIMES FLT DURATION, WINDS	SRB RSRM AND ET	INC	HA/HP	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS			
<b>STS-77</b>  SEQ FLT #77  KSC-77  PAD 39B-33  MLP-1	OV-105 (Flight 11) Endeavour  OMS PODS: LPO4-18 RPO5-9 FRC5-11	<b>CDR:</b> John H. Casper (Flt 4 - STS-36, STS-54, STS-62) P436/R111/V86/M99  <b>PLT:</b> Curtis L. Brown (Flt 3 - STS-47, STS-66) P437/R152/V112/M136  <b>M/S 1:</b> Andrew S. W. Thomas P438/R213/M186  <b>M/S 2:</b> Daniel W. Bursch (Flt 3 - STS-51, STS-68) P439/R169/V109/M147  <b>M/S 3:</b> Mario Runco, Jr. (Flt 3 - STS-44, STS-54) P440/R137/V89/M122  <b>M/S 4:</b> Marc Garneau (Canada) (Flt 2 - STS 41-G) P441/R47/V128/M44	KSC PAD 39B 140:10:29:59.973Z 6:30:00 AM EDT (P) 6:30:00 AM EDT (A) Sunday 9 5/19/96 (3)	KSC 33 (KSC 30) 150:11:09:20Z 7:09:20 AM EDT  Wednesday 8 5/29/96 (6)  <b>DEORBIT BURN:</b> 150:10:09:30Z  <b>XRANGE:</b> 314 NM  <b>ORBIT DIR:</b> DR 17  <b>AIM PT:</b> CLOSE IN  <b>MLGTD:</b> 1687 FT 150:11:09:20Z <b>VEL:</b> 216 KGS 216 KEAS <b>HDOT:</b> -4.6 FPS  <b>TD NORM 205:</b> 2536 FT  <b>DRAG CHUTE DEPLOY:</b> 191 KEAS 150:11:09:27Z  <b>NLGTD:</b> 6612 FT 150:11:09:35Z <b>VEL:</b> 150 KGS HDOT: -4.8 FPS  <b>BRK INIT:</b> 99 KGS  <b>DRAG CHUTE JETTISON:</b> 59 KGS 150:11:09:56Z  <b>Ave BRK DECEL:</b> 6.8 FPS/S  <b>WHEELS STOP:</b> 150:11:10:11Z 10978 FT  <b>ROLLOUT:</b> 9291 FT 51 SEC  <b>WINDS:</b> H0, L6 KTS <b>OFFICIAL:</b> 2607P9 H2, L7  <b>DENS ALT:</b> 1012 FT  <b>FLT DURATION:</b> 10:00:39:20  <b>S/T:</b> 614:12:42:50  OV-105: 112:13:03:06  <b>DISTANCE:</b> 4,100,000 sm	104/104/ 109%  <b>PREDICTED:</b> 100/104/104/ 67/104  <b>ACTUAL:</b> 100/104/104/ 67/104  1 = 2037 (2) 2 = 2040 (1) 3 = 2038 (3)	BI-080  RSRM 47  ET-78  LWT 71  ET RPT 271K  ET BR/UP 214K  ET IMPACT 1:24:57 MET <b>LAT:</b> 2.97°N <b>LONG:</b> 138.89°W	39.03° (5)	DIRECT INSERTION  <b>POST OMS-2:</b> 152.9 x 152.8 NM  <b>SPARTAN DEPLOY:</b> 153.6 x 150.4 NM  <b>SPARTAN GRAPPLE:</b> 153.1 x 152.0 NM  <b>PAMS/STU DEPLOY:</b> 152.6 x 152.0 NM	OI-24 (8)	<b>CARGO:</b> 35205 LBS  <b>PAYLOAD CHARGEABLE:</b> 27393 LBS  <b>DEPLOYED:</b> 1104 LBS  <b>NON-DEPLOYED:</b> 23586 LBS  <b>MIDDECK:</b> 866 LBS  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 819825 LBS <b>NON-DEPLOYED:</b> 1089758 LBS <b>CARGO TOTAL:</b> 2311537 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 3080 FUEL BIAS: 900 FINAL TDDP: 5381 RECON: 8528  <b>PAYLOADS:</b> <b>PLB:</b> SPACEHAB-4 SPARTAN 207/IAE TEAMS (GANE, LMTE, VTRE, PAMS/STU (deployed)) GBA (12) BETSCE  <b>MIDDECK:</b> ARF-01 BRIC-07  5 CRYO TK SETS  RMS 45 (S.N. 301)  RMS used for SPARTAN 207 deploy, retrieve, and berth (IAE deployed from SPARTAN).	KSC W/D: OPF 69, VAB 5, PAD 27 = 101 days total.  <b>LAUNCH POSTPONEMENTS:</b> - Baselined launch date of 4/25/96 on 6/19/95. - Postponed launch date to 5/16/96 on 9/11/95. - Postponed launch date to 5/19/96 on 5/14/96 (Atlas launch had range priority).  <b>LAUNCH SCRUBS:</b> None.  <b>LAUNCH DELAYS:</b> None.  <b>TAL WX:</b> - BEN (prime) was forecast NO-GO for broken ceiling but observed GO at TAL landing time. MRN was forecast GO, selected, and observed GO. ZZA was forecast GO but observed NO-GO for broken ceiling at TAL landing time.  <b>DOLILU-II I-LOADS:</b> - DOLILU-II uplink #8, I-load uplink #27.  <b>FLIGHT DURATION CHANGES:</b> None. Flight was planned to be 10 days assuming 5/19/96 liftoff; hence, this does not count as a flight duration change.  <b>FIRSTS/LASTS:</b> - First flight with all 3 Block I engines. - First flight to be controlled completely from the new MCC (White FCR).  <b>EVENTS:</b> - SPARTAN deployed at 1:01:59:12 MET. - SPARTAN grappled at 2:04:22:34 MET and berthed at 2:05:25:41 MET. - PAMS/STU deployed at 2:22:50:00 MET.  <b>RENDEZVOUS #28:</b> Rendezvous, capture, and berth (return) of SPARTAN-207.  <b>RENDEZVOUS #29, #30, &amp; #31:</b> Rendezvous & PROXIMOUS OPS with PAMS/STU payload.  <b>SIGNIFICANT ANOMALIES:</b> - IPS file server (MPSR1) disk crash prelaunch. - FES failure to come out of standby. - PCS 1 O2 supply transducer failed. - WSB 2 failed to cool during ascent. - APU 2 fuel pump seal cavity drain line pressure decay. - WSB 3 overcool during entry. - RCS jet F2F fail leak (oxidizer leak). - RCS jet R3A heater failed off.

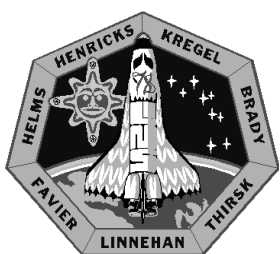




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FLT NO.	ORBITER	CREW (7)		LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE, LANDING TIMES, FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT		FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
		TITLE, NAMES & EVA'S						INC	HA/HP			
<b>STS-78</b>  SEQ FLT #78  KSC-78  PAD 39B-34  MLP-3	OV-102 (Flight 20) Columbia  19th Spacelab Flight  LM-13  EDO 8  OMS PODS: LPO5-9 RPO1-24 FRC2-20	<b>CDR:</b> Terence T. (Tom) Henricks (Flt4 - STS-44, STS-55 STS-70) P442/R135/V93/M120  <b>PLT:</b> Kevin Kregel (Flt 2 - STS-70) P443/R197/V129/M172  <b>M/S 1:</b> Richard M. Linnehan P444/R214/M187  <b>M/S 2 (PAYLOAD CDR):</b> Susan J. Helms (Flt 3 - STS-54, STS-64) P445/R158/V108/F19  <b>M/S 3:</b> Charles E. Brady, Jr. P446/R215/M188  <b>P/S 1:</b> Jean-Jacques Favier (France) P447/R216/M189  <b>P/S 2:</b> Robert B. Thirsk (Canada) P448/R217/M190		KSC PAD 39B 172:14:48:59.98Z (Flt4 - STS-44, STS-55 STS-70) 10:49:00 AM EDT (P) 10:49:00 AM EDT (A) Thursday 23 6/20/96 (8)	KSC 33 (KSC 31) 189:12:36:36Z 10:49:00 AM EDT 8:39:36 AM EDT  Sunday 12 7/7/96 (7)  <b>DEORBIT BURN:</b> 189:11:36:36Z  <b>LAUNCH WINDOW:</b> 2H30M CTOB  <b>EOM PLS:</b> KSC <b>TAL:</b> BEN <b>TAL WX:</b> MRN, ZZA  <b>SELECTED:</b> <b>RTL:</b> KSC 33/N/N <b>TAL:</b> BEN 36/N/N <b>AOA:</b> EDW 22/N/N <b>PLS:</b> EDW 22/N/N  <b>TDEL:</b> 0 -0.178/0.02  <b>MAX Q NAV:</b> 705 714  <b>SRB STG:</b> 2:04.6 204  <b>PERE:</b> NOMINAL  <b>2 ENG TAL (BEN):</b> 2:43 2:41  <b>NEG RETURN:</b> 3:57 3:59  <b>PTA (U/S 240):</b> 5:15 5:15  <b>DROOP:</b> 5:25 5:24  <b>PTM (U/S 240):</b> 5:47 5:45  <b>MECO CMD:</b> 8:27.9 8:29.6  <b>VI:</b> 25865.4 25856  <b>OMS-2:</b> 41:28.7 41:28.6 185.6 FPS 185.7 FPS 1:59 1:59  <b>OV-102:</b> 200:00:05:10  <b>DISTANCE:</b> 7,046,000 sm	104/104/ 109%  <b>PREDICTED:</b> 100/104/104/ 67/104  <b>ACTUAL:</b> 100/104/104/ 72/104  1 = 2041 (1) 2 = 2039 (2) 3 = 2036 (3)  <b>DRAG CHUTE</b> <b>DEPLOY:</b> 191 KEAS 189:12:36:40Z  <b>NLGTD:</b> 6537 FT 189:12:36:48Z <b>VEL:</b> 158 KGS <b>HDOT:</b> -5.2 FPS  <b>BRK INIT:</b> 124 KGS  <b>DRAG CHUTE</b> <b>JETTISON:</b> 189:12:37:12 Z 59KGS  <b>AVE BRK DECEL:</b> 5.6FPS/S  <b>WHEELS STOP:</b> 189:12:37:31Z 11639 FT  <b>ROLLOUT:</b> 9339 FT 55 SEC  <b>WINDS:</b> T3, L1 KTS <b>OFFICIAL:</b> 1803P5 T3, L2  <b>DENS ALT:</b> 854 FT  <b>FLT DURATION:</b> 16:21:47:35  <b>S/T:</b> 631:10:30:25  <b>OV-102:</b> 200:00:05:10  <b>DISTANCE:</b> 7,046,000 sm	BI-081  RSRM 55  ET-79  LWT 72  ET RPT 271.3K  ET BR/UP 214K  ET IMPACT 1:24:50 MET <b>LAT:</b> 2.86°N <b>LONG:</b> 138.9°W	39.03° (6)  DIRECT INSERTION  POST OMS-2: 153.6 X 146.7 NM  TRIM 1 BURN: 4:30:00 MET 146.6 X 146.4 NM  TRIM 2 BURN: 15:23:29:00Z 142.3 X 129.6 NM	OI-24 (9)	<b>CARGO:</b> 31854 LBS  <b>PAYLOAD</b> <b>CHARGEABLE:</b> 23666 LBS  <b>DEPLOYED:</b> 0 LBS  <b>NON-DEPLOYED:</b> 21598 LBS  <b>MIDDECK:</b> 2066 LBS  <b>SHUTTLE</b> <b>ACCUMULATED</b> <b>WEIGHTS:</b> <b>DEPLOYED:</b> 819825 LBS <b>NON-DEPLOYED:</b> 1113422 LBS <b>CARGO TOTAL:</b> 2343391 LBS  <b>PERFORMANCE</b> <b>MARGINS (LBS):</b> FPR: 3080 FUEL BIAS: 900 FINAL TDDP: 3683 RECON: 4245  <b>PAYLOADS:</b> <b>PLB:</b> LIFE AND MICROGRAVITY SCIENCES (LMS) Musculoskeletal Physiology, Fluid Physics, Advanced Semiconductory and Metal Alloys Processing (SPACELAB LM) OARE  <b>MIDDECK:</b> BRIC SAREX II  5 CRYO TK SETS + 4 EDO, 5 GN2 TANKS EDO PALLET  NO RMS	KSC W/D: OPF 63, VAB 7, PAD 19 = 89 days total.  <b>LAUNCH POSTPONEMENTS/ADVANCEMENTS:</b> - Baselined launch date of 6/27/96 on 3/30/95. - Advanced launch date to 6/20/96 on 3/21/96.  <b>LAUNCH SCRUBS:</b> None  <b>LAUNCH DELAYS:</b> None  <b>TAL WX:</b> - BEN (prime and selected) and MRN were forecast and observed GO. ZZA was forecast and observed NO-GO (thunderstorms within 20 NM).  <b>DOLILU-II I-LOADS:</b> DOLILU-II uplink #9, I-load uplink #28  <b>FLIGHT DURATION CHANGES:</b> - Extended flight 1 day to 17 days for additional science (planned 16 + 1).  <b>EVENTS:</b> - Longest space shuttle flight to date.  <b>RADIATOR DEPLOY #19:</b> Full deploy for cooling.  <b>SIGNIFICANT ANOMALIES:</b> - Main engine 2036 violated thrust build up rate at engine start (>14,000 lbs thrust change for any two consecutive 20 millisecc time intervals). - MPS LH2 low level cutoff sensors indicated dry (flashed) 2.3 seconds after MECO during shutdown transient flow (changed mixture ratio for STS-79 to 6.020). - Heavy sooting and heat effect (discoloration and charring) observed on insulation interfaces within STS-78 field joints. No heat effects to metal interface or capture feature o-ring, no gas past CF O-rings. (Environment process change this fight to J-leg adhesive and joint cleaning process.) Postponed STS-79 to use STS-80 stack with old processing. - Center MPS LH2 inlet pressure failed OSH. - BFS I/O TERMINATE B discrete toggling low. BFS moved to GPC 2 for entry. - FES high-load duct temps low during ascent and high-load core freeze-up during deorbit prep. High-load core was flushed. - FES topping core freezeup at 2 days 1 hour MET and during deorbit prep. Core flush procedure performed. - Cryo N2 tank 4B heater failed. - Spacelab EPDB 2 AC phase A amps and EPDB 3 AC phase C amps transducer failures. - Loss of MCC read/write (aka HA) servers. - APU 1 fuel pump seal leakage more severe than seen on STS-75. - APU 1 turbine speed transducer erratic. - WSB 1 ready indication intermittent (or bypass valve indication).	



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7) 6 UP / 6 DOWN	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM-ABORT EMERG	SRB RSRM	ORBIT		FSW	PAYLOAD WEIGHTS,  PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS,  TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
		TITLE, NAMES & EVA'S	LANDING SITES, ABORT TIMES	LANDING TIMES FLT DURATION, WINDS	THROTTLE PROFILE ENG. S.N.	AND ET	INC	HA/HP			
<b>STS-79</b>  SEQ FLT #79  KSC-79  PAD 39A-45  MLP-1	OV-104 (Flight 17) Atlantis  Spacehab 5  OMS PODS: LPO3-21 RPO4-17 FRC4-17	<b>CDR:</b> William F. Ready (Flt 3 - STS-42, STS-51) P449/R140/V96/M125  <b>PLT:</b> Terrence W. Wilcutt (Flt 2 - STS-68) P450/R183/V130/M160  <b>M/S 1:</b> Jay Apt (Flt 4 - STS-37, STS-47, STS-59) P451/R123/V79/M110  <b>M/S 2:</b> Thomas D. Akers (Flt 4 - STS-41, STS-49, STS-61) P452/R115/V74/M103  <b>M/S 3:</b> Carl E. Walz (Flt 3 - STS-51, STS-65) P453/R170/V106/M148  <b>M/S 4:</b> Ascent John E. Blaha (Flt 5 - STS-29, STS-33, STS-43, STS- 58, stay on Mir 22, and return on STS-81) P454/R97/V48/M88  <b>M/S 4:</b> Descent Shannon Lucid (Flt 5 - STS-51-G, STS-34, STS-43, STS-58, Ascent on STS-76, on-orbit stay on Mir 21 and Mir 22) P455/R65/V45/F6  MCC WHITE FCR (9)  <b>FLIGHT DIRECTORS:</b> ASC - R. D. Jackson ENT- L. J. Ham LD/O 1 - P. F. Dye O 2 - R. E. Castle PLNG - W. D. Reeves MOD - A. L. Briscoe	KSC PAD 39A 260:08:54:48.96Z 4:54:49 AM EDT (P) 4:54:49 AM EDT (A) Monday 11 9/16/96 (8)  <b>LAUNCH WINDOW:</b> 5:47M MIR PLANAR/ PHASE WINDOW  <b>EOM PLS:</b> KSC <b>TAL:</b> ZZA <b>TAL WX:</b> MRN, BEN  <b>SELECTED:</b> <b>RTL:</b> KSC 33/N/SF <b>TAL:</b> ZZA 30/N/SF <b>AOA:</b> KSC 15/C1/N <b>PLS:</b> EDW 22/N/N  <b>TDEL:</b> 0.06 -0.018/0.02  <b>MAX Q NAV:</b> 697 705  <b>SRB STG:</b> 2:02.4 2:05  <b>PERF:</b> NOMINAL  <b>2 ENG TAL (ZZA):</b> 2:38 2:35  <b>NEG RETURN:</b> 4:06 4:03  <b>PTA (U/S 260):</b> 4:46 4:48  <b>PTM (U/S 260):</b> 5:20 5:24  <b>DROOP (BYD):</b> 5:28 5:28  <b>MECO CMD:</b> 8:33 8:34.6  <b>VI:</b> 25878 25880  <b>OMS-2:</b> 42:50.9 42:50.9 75.9 FPS 75.9 FPS 00:47 00:47	KSC 15 (KSC 32) 270:12:13:13Z 8:13:13 AM EDT  Thursday 8 9/26/96 (9)  <b>DEORBIT BURN:</b> 270:11:06:14Z  <b>XRANGE:</b> 777 NM  <b>ORBIT DIR:</b> DR 19  <b>AIM PT:</b> CLOSE IN  <b>MLGTD:</b> 807 FT 270:12:13:13Z <b>VEL:</b> 217 KGS 217 KEAS HDOT: -4.3 FPS  <b>TD NORM 195:</b> 2496 FT  <b>DRAG CHUTE DEPLOY:</b> 192 KEAS 270:12:13:22Z  <b>NLGTD:</b> 5760 FT 270:12:13:29Z <b>VEL:</b> 150 KGS HDOT: -4.2 FPS  <b>BRK INIT:</b> 89 KGS  <b>DRAG CHUTE JETTISON:</b> 55 KGS 270:12:13:57Z  <b>AVE BRK DECEL:</b> 3.1FPS/S  <b>WHEELS STOP:</b> 270:12:14:34Z 11788 FT  <b>ROLLOUT:</b> 10981 FT 81 SEC  <b>WINDS:</b> H4, L3 KTS OFFICIAL: 1206P09 H5, L3  <b>WEIGHT:</b> 21590 LBS  <b>X CG:</b> 1081.31  <b>LANDING:</b>  <b>WEIGHT:</b> 21590 LBS  <b>X CG:</b> 1083.02	104/104/ 109%  <b>PREDICTED:</b> 100/104/104/ 67/104  <b>ACTUAL:</b> 100/104/104 67/104  1 = 2012 (18) 2 = 2031 (14) 3 = 2033 (8)  <b>ET PRED RPT:</b> 271.3K  <b>ET BRKUP:</b> 214K  <b>ET IMPACT</b> 1:26:47 MET <b>LAT:</b> 0.65°S <b>LONG:</b> 125.96°W	BI-083  RSRM 56  ET-82  LWT 75  <b>ET RPT:</b> 271.3K  <b>ET BRKUP:</b> 214K  <b>ET IMPACT</b> 1:26:47 MET <b>LAT:</b> 0.65°S <b>LONG:</b> 125.96°W	51.67 (5)  DIRECT INSERTION  POST OMS-2: 158.6 X 85.3 NM  <b>NC6:</b> 2:14:05:33 MET 203.7 X 201 NM  <b>NC2:</b> 2:15:38:10 MET 208.8 X 201.9 NM  <b>SEP BURN:</b> 7:16:49:15 MET 211 X 201.3 NM	OI-25 (1)  CARGO: 27812 LBS  <b>PAYLOAD CHARGEABLE:</b> 19039 LBS  <b>DEPLOYED:</b> 3170 LBS  <b>NON-DEPLOYED:</b> 15151 LBS  <b>MIDDECK:</b> 718 LBS  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 822995 LBS <b>NON-DEPLOYED:</b> 1129291 LBS <b>CARGO TOTAL:</b> 2371203 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 4456 FUEL BIAS: 432 FINAL TDDP: 462 RECON: 716  <b>PAYLOADS:</b> <b>PLB:</b> SHUTTLE/MIR MISSION 4 SPACEHAB 5 (DOUBLE MODULE) ODS  <b>MIDDECK:</b> SAREX IMAX MSX CPCG MGM SAMS CGBA MGBX  5 CRYO TK SETS 4 GN2 TANKS  NO RMS	KSC W/D: OPF 73 (2), VAB 17 (3), PAD 25 (3) = 115 days total  <b>LAUNCH POSTPONEMENTS:</b> - Baselined 8/1/96 launch date on 5/4/95. - 5/4/95 launch date was postponed when the shuttle was rolled back from pad A to VAB on 7/10/96 under threat from Hurricane Bertha. - Due to STS-78 booster sooting and heat effects in field joints, decision was made to restack using STS-80 SRB's (and ET) which used old process. Set launch date to 9/12/96. - Rolled out to pad A on 8/30/96. - Rolled back to VAB 9/4/96 under threat of Hurricane Fran. Postponed launch to 9/16/96. Rolled to pad on 9/6/96.  <b>LAUNCH SCRUBS:</b> None  <b>LAUNCH DELAYS:</b> None  <b>LAUNCH WINDOW:</b> - Mir rendezvous planar/phase window was 7M00S; however, it was limited to 5M47S due to a negative performance margin (-523 lbs) at window opening. Liftoff was delayed (per plan) for 36 seconds for zero performance margin plus an additional 10 seconds (total delay 46 seconds) which allowed approx + 200 lbs APM (wind, loads allowance).  <b>SHUTTLE NIGHT LAUNCH #14</b>  <b>DOLILU-II I-LOADS:</b> DOLILU-II uplink #10, I-load uplink #29.  <b>FLIGHT DURATION CHANGES:</b> Extended 1 day for additional science.  <b>FIRSTS:</b> - First U.S. spaceflight with female flight director for entry/ landing (Linda Ham).  <b>RENDEZVOUS #32:</b> Rendezvous and dock with Mir (fourth docking).  <b>EVENTS:</b> - Shannon Lucid was carried to Mir 21 on STS-76 and was replaced on Mir 22 by John Blaha on this flight. - Shannon Lucid's total flight time: 188:04:00:09 and total Mir time: 178:22:23:45. - Docking complete at 263:03:21:20Z, 2:18:26:31 MET. - Transferred 2025 lbm H <sub>2</sub> O, 69 lbm O <sub>2</sub> , and 43 lbm N <sub>2</sub> to Mir. - At 3:02:11 MET, Shannon Lucid transferred to STS-79 and John Blaha transferred to Mir-22 crew. (263:11:05:49Z) - Undocking at 268:01:31:29Z, 07:16:36:40 MET.  <b>RADIATOR DEPLOY #19:</b> - Both port and starboard radiators were deployed for cooling and to conserve water for transfer to Mir. - Transferred 20 CWC's with 2025 lbs water.  Continued . . .		



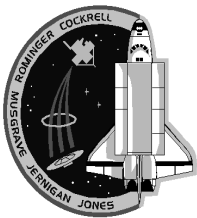
# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (6)	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, SIGNIFIC:T ANOMALIES, ETC.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-79 Continued				Continued . . .  <u>DENS ALT:</u> 1084 FT  <u>FLT DURATION:</u> 10:03:18:24  <u>S/T:</u> 641:13:48:49  <u>OV-104:</u> 120:16:54:18  <u>DISTANCE:</u> 3,900,000 sm							Continued . . .  <u>SIGNIFICANT ANOMALIES:</u> - RH RSRM nozzle erosion beginning in throat ring and extending aft into forward exit cone (approx 60 longitudinal erosion areas up to 0.4 inches diameter). - Supply water tank B quantity transducer dropouts. - Fuel cell O2 flow transducer degraded. - Cryo H2 tank 3 B heater failure. - Single string GPS erroneous time reference, loss of lock and runaway. (Firmware problem.) - TCS range discrepancy. - APU 2 underspeed shutdown at 13:14 MET. Two-APU entry/landing. - APU 2 fuel pump seal cavity drain line pressure decay to vacuum.

# SPACE SHUTTLE MISSIONS SUMMARY

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FLT NO.	ORBITER	CREW (5)		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.)
		TITLE, NAMES & EVA'S						INC	HA/HP			
<b>STS-80</b>	OV-102 (Flight 21 Columbia EDO 9 OMS PODS: LPO5-10 RPO1-25 FRC2-21 MLP-3)	<b>CDR:</b> Kenneth D. Cockrell (Flt 3 - STS-56, STS-69) P456/R159/V121/M140  <b>PLT:</b> Kent V. Rominger (Flt 2 - STS-73) P457/R200/V131/M174  <b>M/S 1 (EV1):</b> Tamara E. Jernigan (Flt 4 - STS-40, STS-52, STS-67) P458/R130/V83/F14  <b>M/S 2 (EV2):</b> Thomas D. Jones (Flt 3 - STS-59, STS-68) P459/R177/V111/M155  <b>M/S 3:</b> F. Story Musgrave (Flt 6 - STS-6, STS 51-F, STS-33, STS-44, STS-61) P460/R15/V19/M15  Two 6-hour EVA's planned by Jernigan (EV1) and Jones (EV2) for EDFT. EVA's were canceled when crew could not get "B" hatch open.	KSC PAD 39B 324:19:55:46.95Z 2:53:00 PM EST (P) 2:55:47 PM EST (A) Tuesday 10 11/19/96 (11)  <b>LAUNCH WINDOW:</b> 2H30M CTOB  <b>EOM PLS:</b> KSC TAL: BEN TAL WX: MRN  <b>SELECTED:</b> RTLS: KSC15/N/N TAL: BEN36/N/N AOA: EDW22/N/N PLS: EDW22/N/N  <b>IDEL:</b> -0.04 -0.238/-0.2  <b>MAX Q NAV:</b> 717 719  <b>SRB STG:</b> 2:04.3 -2:05  <b>PERE:</b> NOMINAL  <b>2 ENG TAL (BEN):</b> 3:03 3:03  <b>NEG RETURN:</b> 3:58 3:59  <b>PTA (U/S 304):</b> 4:55 4:51  <b>DROOP (BYD):</b> 5:28 5:28  <b>PTM (U/S 304):</b> 5:57 5:55  <b>MECO CMD:</b> 8:29.9 8:30.4  <b>VI:</b> 25922 25915  <b>OMS-2:</b> 40:24 40:24 279 FPS 279 FPS  MCC WHITE FCR (10)  <b>FLIGHT DIRECTORS:</b> A/E - N. W. Hale LD/O 2 - G. A. Pennington O 1 - R. M. Kelso O 3 - J. P. Shannon O 4 - B. P. Austin MOD - J. W. Bantle	KSC 33 (KSC 33) 342:11:49:04Z 6:49:04 AM EST  Saturday 17 12/7/96 (8)  <b>DEORBIT BURN:</b> 342:10:48:02Z  <b>XRANGE:</b> 72 NM  <b>ORBIT DIR:</b> DL 37 TAL: BEN AIM PT: NOMINAL  <b>MLGTD:</b> 3068 FT 342:11:49:04Z VEL: 210 KGS 203 KEAS HDOT: -1.0 FPS  <b>TD NORM 205:</b> 3063 FT  <b>DRAG CHUTE</b> DEPLOY: 193 KEAS 342:11:49:08Z  <b>NLGTD:</b> 7100 FT 342:11:49:17Z VEL: 149 KGS HDOT: -5.5 FPS  <b>BRK INIT:</b> 121 KGS  <b>DRAG CHUTE</b> JETTISON: 54 KGS 342:11:49:40Z  <b>BRK DECEL FPS<sup>2</sup>:</b> AVE 5.1 PK 7.6  <b>WHEELS STOP:</b> 342:11:50:13Z 11789 FT  <b>ROLLOUT:</b> 8721 FT 69 SEC  <b>WINDS:</b> 2T, 4L KTS OFFICIAL: 2006P9 4T, 4L  <b>DENS ALT:</b> 522 FT  <b>FLT DURATION:</b> 17:15:53:17  <b>S/T:</b> 659:05:42:06  OV-102 217:16:58:27  <b>DISTANCE:</b> 7,043,950 sm	104/104/ 109%  <b>PREDICTED:</b> 100/104/104/ 67/104  <b>ACTUAL:</b> 100/104/104/ 67/104  1 = 2032 (5) 2 = 2026 (6) 3 = 2029 (14)  ET <b>PRED RPT:</b> 271.3K  ET <b>BRKUP:</b> 214K  ET <b>IMPACT</b> 1:22:40 MET <b>LAT:</b> 15.5°N <b>LONG:</b> 159.6°W	28.45 (42)  DIRECT INSERTION  POST OMS-2: 190 X 188 NM  LWT 73  ET <b>RPT:</b> 271.3K  ET <b>BRKUP:</b> 214K  ET <b>IMPACT</b> 1:22:40 MET <b>LAT:</b> 15.5°N <b>LONG:</b> 159.6°W	OI-25 (2)  CARGO: 31111 LBS  <b>PAYLOAD</b> <b>CHARGEABLE:</b> 21208 LBS  <b>DPLY/RETRIEVE:</b> 12524 / 12427 LBS  <b>NON-DEPLOYED:</b> 7575 LBS  <b>MIDDECK:</b> 1109 LBS  <b>SHUTTLE</b> <b>ACCUMULATED</b> <b>WEIGHTS:</b> <b>DEPLOYED:</b> 822995 LBS <b>NON-DEPLOYED:</b> 1137975 LBS <b>CARGO TOTAL:</b> 2402314 LBS  <b>PERFORMANCE</b> <b>MARGINS (LBS):</b> FPR: 3100 FUEL BIAS: 884 FINAL TDDP: 486 RECON: 1102  <b>PAYLOADS:</b> PLB: ORFEUS-SPAS (Astronomical observations) WSF-3 (Epitaxial semiconductor) SEM  <b>MIDDECK:</b> PARE/NIH-R CMIX VIEW-CPL CCM-A, BRIC, MSX  5 CRYO TK SETS + 4 EDO & 5 N2 TANKS  <b>EDO PALLET</b>  RMS 46 (S.N. 202) RMS used for ORFEUS-SPAS de- ploy, grapple & berth and WSF deploy, grapple & berth and EDFT-05	KSC W/D: OPF 80, VAB 6, PAD 33 = 119 days total.  <b>LAUNCH POSTPONEMENTS:</b> - Baselined launch date of 11/7/96 on 7/14/95. - Advanced launch date to 10/31/96 on 4/23/96. - Postponed launch date to 11/8/96 on 9/20/96 to analyze implications of STS-79 RH SRM nozzle erosion. - Postponed launch date to 11/15/96 to allow Thiokol time to complete SRM analysis.  <b>LAUNCH SCRUBS:</b> - Scrubbed 11/15/96 launch date after L-2 MMT on 11/13/96 due to forecast of high surface winds at KSC from 11/15/96 through 11/18/96. New launch date of 11/19/96.  <b>LAUNCH DELAYS:</b> - Launch delayed 2M47S at T-31 secs while measuring H2 gas in aft compartment per preplanned procedure to confirm <600 ppm.  <b>TAL WX:</b> - Ben Guerir (prime and selected) was forecast and observed GO. Moron was forecast and observed NO-GO for 300 ft overcast. Banjul was not available.  <b>DOLILU-II I-LOADS:</b> - DOLILU-II uplink #12, I-Load uplink #30.  <b>FLIGHT DURATION CHANGES:</b> - Extended a day for science, then changed to original landing day due to weather at KSC. Waved off landing at KSC on orbits 248 and 249 (broken ceiling). Waved off landing on orbits 264 and 265 due to forecast and observed ground fog. Total extension of 2 days.  <b>RENDEZVOUS #33:</b> Rendezvous, deploy, grapple, berth and return ORFEUS-SPAS. <b>RENDEZVOUS #34:</b> Rendezvous, deploy, grapple, berth and return WSF-3.  <b>FIRSTS/LASTS:</b> - First flight with two free-flyers (ORFEUS-SPAS and WSF) and orbiter in constrained motion.  <b>EVENTS:</b> - ORFEUS-SPAS deployed by RMS at 325:04:10:50Z, 08:15:03 MET. - SEP 1 maneuver at 325:04:11:48Z, SEP 2 at 325:04:44:11Z. - WSF-3 deployed by RMS at 328:01:37:40Z, 03:05:41:53 MET. - WSF-3 grappled, berthed at 331:02:33:51Z, 06:06:38:04 MET. - Crew attempted opening "B" hatch at 334:02:30Z, 09:06:34 MET. Being unsuccessful, the two EVA's were canceled. - ORFEUS-SPAS grappled at 339:08:25:47Z; berthed at 339:13:03:41Z.  <b>SIGNIFICANT ANOMALIES:</b> - Loss of LMG down indications. - Crew unable to unlatch and open "B" hatch (outer airlock). Crew able to turn handle only 30 degrees. Resulted in cancellation of two EVA's. Found screw backed out and in latch actuator planetary gears. - Window W8 impact damage. - IMU 1 BITE annunciations (deselected from selection filter for entry.) - EV2 helmet difficult to latch.				



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7) 6 UP / 6 DOWN	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM-ABORT EMERG	SRB RSRM	ORBIT		FSW	PAYLOAD WEIGHTS,	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
		TITLE, NAMES & EVA'S	LANDING SITES, ABORT TIMES	LANDING TIMES FLT DURATION, WINDS	THROTTLE PROFILE ENG. S.N.	AND ET	INC	HA/HP		PAYLOADS/ EXPERIMENTS	
<b>STS-81</b>	OV-104 (Flight 18) Atlantis  Spacehab 6	CDR: Michael A. Baker (Flt 4 - STS-43, STS-52, STS-68) P461/R133/V81/M118  PLT: Brent W. Jett, Jr. (Flt 2 - STS-72) P462/R206/V132/M179  M/S 1: Peter J. K. (Jeff) Wisoff (Flt 3 - STS-57, STS-68) P463/R166/V110/M145  M/S 2: John M. Grunsfeld (Flt 2 - STS-67) P464/R191/V133/M167  M/S 3: Marsha S. Ivins (Flt 4 - STS-32, STS-46, STS-62) P465/R109/V77/F12  M/S 4: Ascent Jerry M. Linenger (Flt 2 - STS-64, stay on Mir 22, and return on STS-84) P466/R182/V134/M159  M/S 4: Descent John E. Blaha (Flt 5 - STS-29, STS-33, STS-43, STS-58, Ascent on STS-79, and stay on Mir 22) P467/R97/V48/M88  MCC WHITE FCR (11)  FLIGHT DIRECTORS: ASC - R. D. Jackson ENT - L. J. Ham LD/O 1 - W. D. Reeves O 2 - P. F. Dye PLNG - P. L. Engelauf MOD - R. E. Castle	KSC PAD 39B 12:09:27:23Z 4:27:23 AM EST (P) 4:27:23 AM EST (A) Sunday 10 1/12/97 (9)	KSC 33 (KSC 34) 22:14:22:44Z 9:22:44 AM EST  Wednesday 9 1/22/97 (7)  DEORBIT BURN: 22:13:17:33Z  XRANGE: 34 NM  ORBIT DIR: DL 38  AIM PT: NOMINAL  MLGTD: 2926 FT 22:14:22:44Z VEL: 199 KGS 195 KEAS HDOT: -1.4 FPS  TD NORM 195: 2961 FT  DRAG CHUTE DEPLOY: 187 KEAS 22:14:22:55Z  NLGTD: 6377 FT 22:14:22:55Z VEL: 144 KGS 136 KEAS HDOT: -6.5 FPS  BRK INIT: 79 KGS  DRAG CHUTE JETTISON: 56 KGS 22:14:23:26Z  BRK DECEL FPS <sup>2</sup> AVE 4.0 PK 7.7  WHEELS STOP: 22:14:23:51Z 12276 FT  ROLLOUT: 9350 FT 67 SEC  WINDS: 4T, 1R KTS OFFICIAL: 1404P6 4T, 1R  DENS ALT: 86 FT  FLT DURATION: 10:04:55:21  S/T: 669:10:37:27  OV-104: 130:21:49:39  DISTANCE: 3,900,000 sm	104/104/ 109%  PREDICTED: 100/104/104/ 67/104  ACTUAL: 100/104/104/ 70/104  1 = 2041 (2) 2 = 2034 (8) 3 = 2042 (3)	BI-082  RSRM 54  ET-83  LWT 76  ET PRED RPT: 271.3K  ET BRKUP: 214K  ET IMPACT 1:26:53 MET LAT: 0.38°S LONG: 125.6°W	51.67 (6)	DIRECT INSERTION  POST OMS-2: 159.9 X 84.9 NM  NC5: 14:09:10:43Z 209.9 X 142.4 NM  NC6: 14:23:41:15Z 209.9 X 201.6 NM  BRAKING: 15:02:38:46Z 209.5 X 208.9 NM  SEP: 20:04:01:40Z 212.7 X 203.2 NM	OI-25 (3)	CARGO: 28149 LBS  PAYLOAD CHARGEABLE: 19321 LBS  DEPLOYED: 4019 LBS  NON-DEPLOYED: 14492 LBS  MIDDECK: 810 LBS  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 827014 LBS NON-DEPLOYED: 1153277 LBS CARGO TOTAL: 2430463 LBS  PERFORMANCE MARGINS (LBS): FPR: 3100 FUEL BIAS: 884 FINAL TDDP: 1285 RECON: 2117  PAYLOADS: PLB: ODS  SHUTTLE-MIR MISSION 5  SPACEHAB DOUBLE MODULE  MIDDECK: CREAM KIDSAT SAMS MSX  5 CRYO TK SETS 4 N2 TANKS  NO RMS	KSC W/D: OPF 62, VAB 5, PAD 24 = 91 days total.  LAUNCH POSTPONEMENTS: - Baselined 12/5/96 as launch date on 9/1/95. - Postponed launch date to 1/16/97 on 8/1/96 (SRM heat effects and nozzle erosion on STS-79 and STS-80). - Advanced launch date to 1/12/97 on 9/5/96.  LAUNCH SCRUBS: None  LAUNCH DELAYS: None  TAL WX: - Zaragoza was prime but NO-GO due to forecast overcast 500 feet and observed broken 300 feet. Moron was selected. Moron and Ben Guerir were forecast and observed GO.  DOLILU-II I-LOADS: - DOLILU-II uplink #12, I-Load uplink #31  SHUTTLE NIGHT LAUNCH #15  FLIGHT DURATION CHANGES: - Waved off landing at KSC on orbit 161 due to forecast of broken 4000 foot ceiling. - Flight duration extended one orbit.  EVENTS: - Mir capture at 15:03:54:49Z, 2:18:27:26 MET. - Docking at 15:04:02:28Z, 2:18:35:05 MET. - Blaha transferred to STS-81/Atlantis and Linenger transferred to Mir 22 at 3:00:17:00 MET. - Blaha total flight time 127:05:27:55 and Mir time 116:22:38:34. - Hatch closure at 07:03:19 MET and undocking at 20:02:15:23Z, 07:16:48:00 MET.  RENDEZVOUS #35: Rendezvous and dock with Mir (fifth docking).  SIGNIFICANT ANOMALIES: - Fuel Cell 1 voltage erratic below MNA voltage. - Fuel Cell 2 cell performance monitor self test anomaly. - OCA video conference VLHS cable adapter failure. - LiOH door latch jammed closed. - EVA protect mode command fails when used in TEC (capability not in software). - VIU S.N. 1025 failure. - IMU3 exhibited large X and Y gyro drift rates. Took to standby.





# SPACE SHUTTLE MISSIONS SUMMARY

<b>STS-82</b>  SEQ FLT #82  KSC-82  PAD 39A-46  MLP-1	OV-103 (Flight 22) Atlantis  OMS PODS: LPO1-25 RPO3-23 FRC3-22	CDR: Kenneth D. Bowersox (Flt 4 - STS-50, STS-61, STS-73) P468/R146/V97/M130  PLT: Scott J. (Doc) Horowitz (Flt 2 - STS-75) P469/R210/V135/M183  M/S 1/EV-4 Joseph R. Tanner (Flt 2 - STS-66) P470/R185/V136/M162  M/S 2: Steven A. Hawley (Flt 4 - STS 41-DR, STS 61-C, STS-31) P471/R39/V29/M38  M/S 3/EV-3: Gregory J. Harbaugh (Flt 4 - STS-39, STS-54, STS-71) P472/R125/V88/M112  M/S 4/EV-1: Mark C. Lee (Flt 4 - STS-30, STS-47, STS-64) P473/R100/V78/M91  M/S 5/EV-2: Steven L. Smith (Flt 2 - STS-68) P474/R184/V137/M161	KSC 39A 42:08:55:16.98Z 3:55:17 AM EST (P) 3:55:17 AM EST (A) Tuesday 11 2/11/97 (6)  LAUNCH WINDOW: 1H6M30S HST PLANAR/ PHASE WINDOW  EOM PLS: KSC TAL: BEN TAL WX: NONE  SELECTED: RTL: KSC 15/N/N TAL: NONE AOA: KSC 15/N/N PLS: KSC 22/N/N  TDEL: -0.01 0.312/0.35  MAX Q NAV: 745 PSF 754 PSF  SRB STG: 2:04.3 2:05  PERF: NOMINAL  2 ENG TAL (BEN): NO CALL  NEG RETURN: 4:04 4:05  PTA (U/S 500): 3:56 3:51  DROOP: 5:27 5:25  PTM (U/S 500): 5:14 5:04  MECO CMD: 8:30.1 8:29.8  VI: 26129 26119  OMS-2: 44:29.6 44:33.6 273.8 FPS 276 FPS	KSC 15 (KSC 35) 52:08:32:24Z 3:32:24 AM EST  Friday 9 2/21/97 (4)  DEORBIT BURN: 52:07:21:55Z  X RANGE: 484 NM  ORBIT DIR: DL 39  AIM PT: CLOSE IN  MLGTD: 2522 FT 52:08:32:24Z VEL: 184 KGS 191 KEAS HDOT: -1.5 FPS  TD NORM 195: 2394 FT  DRAG CHUTE DEPLOY: 184 KEAS 52:08:32:27Z  NLGTD: 5581 FT 52:08:32:34Z VEL: 136 KGS 140 KEAS HDOT: -6.7 FPS  BRK INIT: 94 KGS  DRAG CHUTE JETTISON: 52 KGS 52:08:32:56Z  BRK DECEL FPS <sup>2</sup> : AVE 5.2 PK 7.7  WHEELS STOP: 52:08:33:16Z 9588 FT  ROLLOUT: 7066 FT 52 SEC  WINDS: 5H, 1L KTS OFFICIAL:1407P13 7H, 1L  Continued ...	104/104/ 109%  PREDICTED: 100/100/100/ 67/104  ACTUAL: 100/100/100/ 68/104  1 =2037 (3) 2 =2040 (2) 3 =2038 (2)  M 3 EOM: AVE WEIGHT: 213949 LBS  X CG: 1077.83  LANDING:  WEIGHT: 213869 LBS  X CG: 1079.57	BI-085 28.46 (43)  RSRM 58  ET-81  LWT-74  ET PRED RPT: 271.3K  ET BRKUP: 214K  ET IMPACT 1:29:22 MET LAT: 17.4°N LONG: 141.1°W	DIRECT INSERTION  POST OMS-2: 312.9 X 186.3 NM  FINAL BRAKES: 322.3 X 316.4 NM  REBOOST 1: 323.7 X 319.2 NM  REBOOST 1A: 325.4 X 320.0 NM  REBOOST 2: 328.9 X 320.5 NM  REBOOST 3: 335.1 X 321.0 NM  DEORBIT: 334.1 X 312.2 NM  DEORBIT BURN: 504 FPS  VELOCITY: 26120 FPS  ENTRY RANGE: 4238 NM	O1-25 (4)  CARGO: 24891 LBS  PAYLOAD CHARGEABLE: 17374 LBS  DEPLOYED: 6941 LBS  NON-DEPLOYED: 9921 LBS  MIDDECK: 512 LBS  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 833955 LBS NON-DEPLOYED: 1163710 LBS CARGO TOTAL: 2455354 LBS  PERFORMANCE MARGINS (LBS): FPR: 3100 FUEL BIAS: 884 FINAL TDDP:3503 RECON:4235  PAYLOADS: PLB: Hubble Space Telescope Service Mission 2 (HST SM-02)  MIDDECK: MSX  5 CRYO TK SETS + 5 N2 TANKS  RMS 47 (S.N. 301)  RMS USED FOR HST CAPTURE, BERTH, & DEPLOY	KSC W/D: OPF 147, VAB 5, PAD 26 = 178 days total.  LAUNCH ADVANCEMENTS: - Baselined 2/13/96 launch date on 10/27/96. - Advanced launch date to 2/11/97 on 1/15/97.  LAUNCH SCRUBS: None  LAUNCH DELAYS: None  TAL WX: - Only Ben Guerir was manned; however, Ben Guerir was NO-GO for ceiling and visibility (overcast 500 feet and ground fog). There was no requirement for a TAL site due to a planned 8-second overlap between RTLs and PTA (actual overlap 14 seconds).  DOLILU-II I-LOADS: - DOLILU-II uplink #13, I-Load uplink #32  SHUTTLE NIGHT LAUNCH #16  FLIGHT DURATION CHANGES: - Waved off landing at KSC on orbit 149 due to clouds forming over runway with chance of 3000 feet broken. Landed on orbit 150. - Extended flight duration 1 rev.  SHUTTLE NIGHT LANDING #9  FIRSTS/LASTS: - First night landing at KSC with centerline lights.  EVENTS: - HST grapple at 1:23:38 MET - Space Shuttle altitude record 335.1 NM X 321.0 NM after Reboost 3 maneuver.  RENDEZVOUS #36: - Rendezvous, grapple, service, reboost, and release of HST.  HST REBOOST MANEUVERS: - Reboost 1 was 20M43S at 04:01:09:28 MET. - Reboost 1A was 10M13S at 04:06:07:02 MET with delta V 33 FPS. Maneuver was to avoid a conjunction with Pegasus debris. - Reboost 2 was 19M47S at 05:01:15:00 MET. - Reboost 3 was 31M54S at 07:01:32:58 MET.  SIGNIFICANT ANOMALIES: - HST + V2 solar array rapid slew during airlock depress. For subsequent airlock depresses, one equalization valve on each hatch was duct-taped to limit air flow. - EMU gloves had yellow smudges from HST handrails. - FES feedline A accumulator heater failure. - Erratic supply water tank D transducer.
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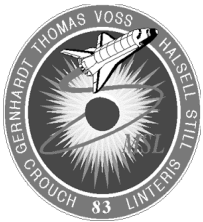
# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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, SIGNIFIC:T ANOMALIES, ETC.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-82 Continued		<p>Continued . . .</p> <p>SS EVA #34 EMU/tethered EVA 1 by EV1 and EV2 on 2/13/97 Scheduled EVA #30 6H42M21S duration</p> <p>SS EVA #35 EMU/tethered EVA 2 by EV3 and EV4 on 2/14/97 Scheduled EVA #31 7H27M31S duration</p> <p>SS EVA #36 EMU/tethered EVA 3 by EV1 and EV2 on 2/15/97 Scheduled EVA #32 7H11M00S duration</p> <p>SS EVA #37 EMU/tethered EVA 4 by EV3 and EV4 on 2/16/97 Scheduled EVA #33 6H34M30S duration</p> <p>SS EVA #38 EMU/tethered EVA 5 by EV1 and EV2 on 2/17/97 Unscheduled EVA #5 5H17M21Sduration</p> <p>MCC WHITE FCR (12)</p> <p>FLIGHT DIRECTORS: AVE - N. W. Hale LD/O 1 - J. W. Bantle O 2 - B. P. Austin PLNG - C. W. Shaw MOD - A. L. Briscoe</p>		<p>Continued . . .</p> <p>DENS ALT: 926 FT</p> <p>FLT DURATION: 9:23:37:07</p> <p>S/T: 679:10:14:34</p> <p>OV-103: 155:23:27:01</p> <p>DISTANCE: 3,800,000 sm</p>							<p>Continued . . .</p> <p>SIGNIFICANT ANOMALIES (CONTINUED):</p> <ul style="list-style-type: none"> <li>- Fuel cell 3 water flow through alternate path causing concern that H2 gas would get into EMU's during recharge from tank C.</li> <li>- Bent pins on SADE-2R P2 harness.</li> <li>- Three PGSC problems.</li> <li>- No RSRM erosion found.</li> </ul>



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE, LANDING TIMES, 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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-83</b>	OV-102 (Flight 22) Columbia  20th Spacelab Flight  LM-14  EDO 10	<b>CDR:</b> James D. Halsell, Jr. (Flt 3 - STS-65, STS-74) P475R178/V123/M156  <b>PLT:</b> Susan L. Still P476/R218/F28  <b>M/S 1 (PAYLOAD CDR):</b> Janice E. Voss (Flt 3 - STS-57, STS-63) P477/R167/V115/F22  <b>M/S 2:</b> Michael L. Gernhardt (Flt 2 - STS-69) P478/R199/V138/M173  <b>M/S 3:</b> Donald A. Thomas (Flt 3 - STS-65, STS-70) P479/R180/V119/M158  <b>P/S 1:</b> Roger Crouch P480/R219/M191  <b>P/S 2:</b> Gregory T. Linteris P481/R220/M192	KSC, PAD 39A 94:19:20:31.98Z 2:00:00 PM EST (P) 2:20:32 PM EST (A) Friday 16 4/4/97 (12)  <b>LAUNCH WINDOW:</b> 2H30M CTOB  <b>EOM PLS:</b> KSC TAL: BYD TAL WX: BEN, MRN  <b>SELECTED:</b> RTL: KSC 15/N/N TAL: BYD 32/N/N AOA: KSC 15/N/N PLS: FD1 NONE FD2 DELAY PRESS 12 SECONDS  <b>TDDEL:</b> 0.01 0.012/0.05  <b>MAX Q NAV:</b> 709 708  <b>SRB STG:</b> 2:03.5 2:03  <b>PERE:</b> NOMINAL  <b>2 ENG TAL (BYD):</b> 2:40 2:41  <b>NEG RETURN:</b> 3:57 4:00  <b>PTA (U/S 154):</b> 5:21 5:16  <b>DROOP (BYD):</b> 5:29 5:30  <b>PTM (U/S 243):</b> 5:45 5:45  <b>MECO CMD:</b> 8:29.7 8:30.7  <b>VI:</b> 25877 25871  <b>O/S-2:</b> 39:53 39:54.7 221.6FPS 222 FPS	KSC 33 (KSC 36) 94:18:33:11Z 2:33:11 PM EDT  Tuesday 12 4/8/97 (10)  <b>DEORBIT BURN:</b> 98:17:31:18Z  <b>XRANGE:</b> 56 NM  <b>ORBIT DIR:</b> DL 40  <b>AIM PT:</b> NOMINAL  <b>MLGTD:</b> 3127 FT 98:18:33:11Z <b>VEL:</b> 193 KGS 197 KEAS <b>HDOT:</b> -1.3 FPS  <b>TD NORM 205:</b> 2553 FT  <b>DRAG CHUTE</b> <b>DEPLOY:</b> 186 KEAS 98:18:33:15Z  <b>NLGTD:</b> 6654 FT 98:18:33:23Z <b>VEL:</b> 145 KGS 151 KEAS <b>HDOT:</b> -5.8 FPS  <b>BRK INIT:</b> 85 KGS  <b>DRAG CHUTE</b> <b>JETTISON:</b> 57 KGS 98:18:33:48Z  <b>BRK DECEL FPS<sup>2</sup>:</b> AVE 4.8 PK 6.9  <b>WHEELS STOP:</b> 98:18:34:11Z 11729 FT  <b>ROLLOUT:</b> 8602 FT 60 SEC  <b>WINDS:</b> H10, R2 <b>OFFICIAL:</b> 0209P18 H6, R6  <b>DENS ALT:</b> 963 FT  <b>FLT DURATION:</b> 3:23:12:39  <b>S/T:</b> 683:09:27:13  <b>OV-102:</b> 221:15:11:06  <b>DISTANCE:</b> 1,500,000 sm	104/104/ 109%  <b>PREDICTED:</b> 100/104/104/ 67/104  <b>ACTUAL:</b> 100/104/104/ 67/104  1 = 2012 (19) 2 = 2109 (17) 3 = 2019 (17)  <b>DRAG CHUTE</b> <b>DEPLOY:</b> 186 KEAS 98:18:33:15Z  <b>NLGTD:</b> 6654 FT 98:18:33:23Z <b>VEL:</b> 145 KGS 151 KEAS <b>HDOT:</b> -5.8 FPS  <b>BRK INIT:</b> 85 KGS  <b>DRAG CHUTE</b> <b>JETTISON:</b> 57 KGS 98:18:33:48Z  <b>BRK DECEL FPS<sup>2</sup>:</b> AVE 4.8 PK 6.9  <b>WHEELS STOP:</b> 98:18:34:11Z 11729 FT  <b>ROLLOUT:</b> 8602 FT 60 SEC  <b>WINDS:</b> H10, R2 <b>OFFICIAL:</b> 0209P18 H6, R6  <b>DENS ALT:</b> 963 FT  <b>FLT DURATION:</b> 3:23:12:39  <b>S/T:</b> 683:09:27:13  <b>OV-102:</b> 221:15:11:06  <b>DISTANCE:</b> 1,500,000 sm	BI-086  RSRM 59  ET-84  LWT-77  ET PRED RPT: 271.3K  ET BRKUP: 214K  ET IMPACT 1:21:10 MET LAT: 13.68°N LONG: 163.15° W	28.46 (44)  DIRECT INSERTION  POST OMS-2: 163.5 X 160.1 NM	OI-25 (5)  CARGO: 34373 LBS  PAYLOAD <b>CHARGEABLE:</b> 25556 LBS  <b>DEPLOYED:</b> NONE  <b>NON-DEPLOYED:</b> 23536 LBS  <b>MIDDECK:</b> 2020 LBS  <b>SHUTTLE</b> <b>ACCUMULATED</b> <b>WEIGHTS:</b> <b>DEPLOYED:</b> 833955 LBS <b>NON-DEPLOYED:</b> 1189266 LBS <b>CARGO TOTAL:</b> 2489727 LBS  <b>PERFORMANCE</b> <b>MARGINS (LBS):</b> FPR: 3100 FUEL BIAS: 884 FINAL TDDP: 4820 RECON: 3741  <b>PAYLOADS:</b> <b>PLB:</b> Microgravity Science Laboratory. Protein Crystallography, Combustion Science, and Materials Sciences (MSL-1/LM) OARE CRYOFD  <b>MIDDECK:</b> SAREX-II MSX  5 CRYO TK SETS + 4 EDO 5 N2 TANKS  EDO PALLET  NO RMS	KSC W/D: OPF 73, VAB 6, PAD = 24, 103 days total.  <b>LAUNCH POSTPONEMENTS:</b> - Baselined 3/27/97 as launch date on 12/14/95. - Postponed launch date to 4/3/97 on 1/16/97  <b>LAUNCH SCRUBS:</b> - Scrubbed 4/3/97 launch on 4/1/97 at approximately L-42 hours based on decision to add missing insulation blankets to water coolant lines on 576 bulkhead.  <b>LAUNCH DELAYS:</b> - Launch delayed 20M32S during T-9 minute hold because the cabin pressurization probe nose seal was found damaged and was replaced. Followed by high O2 reading in mid-body caused by cabin vent into PLB.  <b>TAL WX:</b> - Banjul (prime and selected) and Moron were forecast and observed GO. Ben Guerir was forecast NO-GO for crosswinds but observed GO.  <b>DOLILU-II I-LOADS:</b> - DOLILU-II uplink #16, I-Load uplink #33.  <b>FLIGHT DURATION CHANGES:</b> - Planned NEOM was on orbit 251. A Minimum Duration Flight (MDF) was declared due to concern about fuel cell 2 substack 3 increasing delta volts. Landing occurred on orbit 64 (11 days and 11 orbits early).  <b>FIRSTS/LASTS:</b> - First U.S. spaceflight with female flight director for ascent (Linda Ham).  <b>SIGNIFICANT ANOMALIES:</b> - FC2 substack 3 delta volts unusual start up and continuing on-orbit trend toward 300 mvolts caused a Minimum Duration Flight (MDF) to be declared. Post-flight analysis indicated trend in multiple cells, not a single cell. - FC2 H2 reactant valve failed to close by switch action when shutting down FC2 (regulator vented reactants). Valve closed 6 hours later. - -Y star tracker bypassed by PASS. - -Z star tracker pressure fail. - F3F failed off (low PC). - Subsystem RAU E transient - Multiple ECOS "hang" occurrences.		



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (8) 7 UP & 7 DOWN	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.)
		TITLE, NAMES & EVA'S				INC	HA/HP				
STS-84 SEQ FLT #84 KSC-84 PAD 39A-48 MLP-2	OV-104 (Flight 19) Atlantis  Spacehab 7  OMS PODS: LPO3-23 RPO4-19 FRC4-19	CDR: Charles J. Precourt (Flt 3 - STS-55, STS-71) P482/R161/V118/M141  PLT: Eileen M. Collins (Flt 2 - STS-63) P483/R188/V139/F24  M/S 1 (PAYLOAD CDR): Jean-Francois Clervoy (Flt 2 - STS-66) ESA Astronaut (France) P484/R186/V140/M163  M/S 2: Carlos I. Noriega P485/R221/M193  M/S 3: Edward T. Lu P486/R222/M194  M/S 4: Elena V. Kondakova (Russia) P487/R223/F29  M/S 5: Ascent C. Michael Foale (Flt 4 - STS-45, STS-56 & STS-63, stay on MIR 23, and return on STS-86) P488/R143/V92/M127  M/S 6: Descent Jerry M. Linenger (Flt 2 - STS-64, ascent on STS-81, and stay on Mir 22 and 23) P489/R182/V134/M159  VCC WHITE FCR (14)  FLIGHT DIRECTORS: A/E - N. W. Hale LD/O 1 - P. L. Engelaufl O 2 - R. E. Castle PLNG - P. F. Dye MOD - A. L. Briscoe	KSC, PAD A 135:08:07:47.9Z 4:07:48 AM EDT (P) 4:07:48 AM EDT (A) Thursday 24 5/15/97 (4)  LAUNCH WINDOW: 7M00S MIR PLANAR/ PHASE WINDOW  EOM PLS: KSC TAL: ZZA TAL WX: MRN, BEN  SELECTED: RTL: KSC 33/N/N TAL: ZZA 30 AOA: KSC 15/N/N PLS: EDW 22/N/SF  TDEL: 0.06 0.142/0.18  MAX Q NAV: 725 728  SRB STG: 2:04.2 2:04  PERE: NOMINAL  2 ENG TAL (BEN): 2:32 2:37  NEG RETURN: 4:03 4:05  PTA (U/S 263): 4:37 4:35  DROOP (ZZA): 5:20 5:25  PTM (U/S 263): 6:07 6:07  MECO CMD: 8:32.1 8:33.4  VI: 25873 25870  O/S-2: 44:01.6 43:04 75.6 FPS 76 FPS	KSC 33 (KSC 37) 144:13:27:43Z 9:27:43 AM EDT  Saturday 18 5/24/97 (7)  DEORBIT BURN: 144:12:23:33Z  XRANGE: 34 NM  ORBIT DIR: DL 41  AIM PT: NOMINAL  MLGTD: 2882 FT 144:13:27:43Z VEL: 208 KGS 196 KEAS HDOT: -1.0 FPS  TD NORM 195: 2989 FT  DRAG CHUTE DEPLOY: 183 KEAS 144:13:27:47Z  NLGTD: 5720 FT 144:13:27:52Z VEL: 175 KGS 156 KEAS HDOT: -6.9 FPS  BRK INIT: 134 KGS  DRAG CHUTE JETTISON: 53 KGS 144:13:28:17Z  BRK DECEL FPS <sup>2</sup> : AVE 6.2 PK 9.6  WHEELS STOP: 144:13:28:36Z 11266 FT  ROLLOUT: 8384 FT 53 SEC  WINDS: 6T, R6 KTS OFFICIAL: 1109P13 T7, R6  DENS ALT: 1316 FT  FLT DURATION: 9:05:19:55  S/T: 692:14:47:10  OV-104: 140:03:09:34  DISTANCE: 3,600,000 sm	104/104/ 109%  PREDICTED: 100/104/104/ 67/104  ACTUAL: 100/104/104/ 67/104  1 = 2032 (6) 2 = 2031 (15) 3 = 2029 (15)  M 3 EOM:  WEIGHT: 216168 LBS  X CG: 1080.95  LANDING:  WEIGHT: 216021 LBS  X CG: 1082.57	BI-087  RSRM 60 ET-85  LWT-78  ET PRED RPT: 271.3K  ET BRKUP: 214K  ET IMPACT 1:26:42 MET LAT: 0.95°S LONG: 128.0°W	51.65 (7)  POST OMS-2: 160.6 X 85.5 NM  TI 1:17:11:52 MET 215.6 X 203.4 NM  7:03:48 214.3 X 199.7 NM  07:08:10:39 214.3 X 199.7 NM  1:26:42 MET LAT: 0.95°S LONG: 128.0°W	DIRECT INSERTION  POST OMS-2: 160.6 X 85.5 NM  TI 1:17:11:52 MET 215.6 X 203.4 NM  7:03:48 214.3 X 199.7 NM  07:08:10:39 214.3 X 199.7 NM	OI-25 (6)  CARGO: 28497 LBS  PAYLOAD CHARGEABLE: 19643 LBS  DEPLOYED: 3902 LBS  NON-DEPLOYED: 14605 LBS  MIDDECK: 1136 LBS  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 1205007 LBS NON-DEPLOYED: 2042864 LBS CARGO TOTAL: 2518224 LBS  PERFORMANCE MARGINS (LBS): FPR: 3100 FUEL BIAS: 884 FINAL TDDP: 938 RECON: 868  PAYLOADS: PLB: SHUTTLE/MIR MISSION 6  SPACEHAB DOUBLE MODULE  MIDDECK: CREAM MSX SIMPLEX RME-III EPICS PCG-STES LME  5 CRYO TK SETS 4 N2 TANKS  NO RMS	KSC W/D: OPF 76, VAB 4, PAD 21 = 101 days total.  LAUNCH POSTPONEMENTS: - Baselined 5/1/97 launch date on 1/12/96. - Postponed launch date to 5/15/97 on 2/1/96 due to STS-78 SRB sooting and heat effects in field joints.  LAUNCH SCRUBS: - None  LAUNCH DELAYS: - None  TAL WX: - Zaragoza (prime and selected), Moron, and Ben Guerir All forecast GO and observed GO.  DOLILU-II I-LOADS: - DOLILU-II uplink #15, I-Load uplink #34  SHUTTLE NIGHT LAUNCH #17  FLIGHT DURATION CHANGES: - Waved off landing on orbit 144 due to forecast of 5000 feet variable broken and too dynamic. - Extended flight one orbit and landed on orbit 145.  EVENTS: - Elena Kondakova's first flight was on Soyuz TM-17. - Mir 23 crew is Commander Vasily Tsibilyev and Flight Engineer Alexander Lazutkin. - Mir capture at MET 1:18:25:36. Hooks closed at MET 1:18:33. - Hatch open at MET 1:20:16. - Crew transfer time: Foale to Mir 23 and Linenger to STS-84 was 2D6H13M. Linenger stay time on Mir was 122:04:36:25 and total flight time was 132:04:00:20. - Transferred equipment, 1038 lbm H <sub>2</sub> O, 82 lbm O <sub>2</sub> , and 21 lbm N <sub>2</sub> to Mir. - Hatch closing at MET 6:04:32; undocking at MET 6:15:56.  FIRSTS: - First EVA by a U.S. astronaut from Mir Space Station to deploy optical properties monitor by Linenger and Tsibilyev. EVA was on 4/29/97. Exit from KVANT-2 airlock in Orlan M suit. Duration 4:57:30.  RENDEZVOUS #37: - Rendezvous and dock with Mir (sixth docking).  SIGNIFICANT ANOMALIES: - GPC Transient Mode Switch - dump indicated it was procedural problem. - Aft PL MNC amps measurement failed. - GPS/INS and GPS DTO problems. - Primary VHF and radio interface unit failure. - Window 1 impact reported by crew. - MS4 lightweight seat entry position/"A" hatch interference.	



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-94</b> (STS-83R)  SEQ FLT #85  KSC - 85  PAD 39A-49  MLP-1	OV-102 (Flight 23) Columbia  21st Spacelab Flight  LM-15  EDO 11  OMS PODS: LPO5-12 RPO5-11 FRC2-23	<p><b>CDR:</b> James D. Halsell, Jr. (Flt 4 - STS-65, STS-74, &amp; STS-83) P490/R178/V123/M156</p> <p><b>PLT:</b> Susan L. Still (Flt 2 - STS-83) P491/R218/V141/F28</p> <p><b>M/S 1 (PAYLOAD CDR):</b> Janice E. Voss (Flt 4 - STS-57, STS-63, &amp; STS-83) P482/R167/V115/F22</p> <p><b>M/S 2:</b> Michael L. Gernhardt (Flt 3 - STS-69 &amp; STS-83) P493/R199/V138/M173</p> <p><b>M/S 3:</b> Donald A. Thomas (Flt 4 STS-65, STS-70, STS-83) P494/R180/V119/M158</p> <p><b>P/S 1:</b> Roger Crouch (Flt 2 - STS-83) P495/R219/V142/M191</p> <p><b>P/S 2:</b> Gregory T. Linteris (Flt 2 - STS-83) P496/R220/V143/M192</p> <p>MCC WHITE FCR (15)</p> <p><b>FLIGHT DIRECTORS:</b> A/E - L. J. Ham LD/O 3 - R. M. Kelso O 1 - W. D. Reeves O 2 - G. A. Pennington O 3 - J. P. Shannon MOD - A. L. Briscoe</p>	<p>KSC PAD 39A 182:18:01:59.96Z 1:50:00 PM EDT (P) 2:02:00 PM EDT (A) Tuesday 12 7/1/97 (5)</p> <p><b>LAUNCH WINDOW:</b> 2H30M CTOB</p> <p><b>EOM PLS:</b> KSC <b>TAL:</b> BYD <b>TAL WX:</b> BEN</p> <p><b>SELECTED:</b> <b>RTLS:</b> KSC 15/N/N <b>TAL:</b> BYD 32 <b>AOA:</b> EDW 22/N/N <b>PLS:</b> EDW 22/N/N</p> <p><b>TDEL:</b> 0.01    0.382/0.42</p> <p><b>MAX Q NAV:</b> 701 PSF    703 PSF</p> <p><b>SRB STG:</b> 2:03.5    2:04</p> <p><b>PERE:</b> NOMINAL</p> <p><b>2 ENG TAL (BYD):</b> 2:41    2:41</p> <p><b>NEG RETURN:</b> 3:56    3:58</p> <p><b>PTA (U/S):</b> 5:11    5:08</p> <p><b>DROOP (BYD):</b> 5:27    5:30</p> <p><b>PTM (U/S):</b> 7:03    7:05</p> <p><b>MECO CMD:</b> 8:28.6    8:29</p> <p><b>VI:</b> 25877    25871</p> <p><b>OMS-2:</b> 39:53    39:53 222 FPS    221.7 FPS</p> <p><b>BURN TIME:</b> 2:23    2:23</p>	<p>KSC 33 (KSC 38) 198:10:46:33Z 6:46:33 AM EDT</p> <p>Thursday 9 7/1/97 (8)</p> <p><b>DEORBIT BURN:</b> 198:09:43:45Z</p> <p><b>XRANGE:</b> 81.7 NM</p> <p><b>ORBIT DIR:</b> DL 42</p> <p><b>AIM PT:</b> NOMINAL</p> <p><b>MLGTD:</b> 3056 FT 198:10:46:33Z <b>VEL:</b> 208 KGS 202 KEAS <b>HDOT:</b> -1.1 FPS</p> <p><b>TD NORM 205:</b> 2774 FT</p> <p><b>DRAG CHUTE</b> <b>DEPLOY:</b> 194 KEAS 198:10:46:37Z</p> <p><b>NLGTD:</b> 6583 FT 198:10:46:44Z <b>VEL:</b> 158 KGS 152 KEAS <b>HDOT:</b> -5.9 FPS</p> <p><b>BRK INIT:</b> 100 KGS</p> <p><b>DRAG CHUTE</b> <b>JETTISON:</b> 52 KGS 198:10:47:12Z</p> <p><b>BRK DECEL FPS<sup>2</sup>:</b> AVE 5.8 PK 7.2</p> <p><b>WHEELS STOP:</b> 198:10:47:31Z 11948 FT</p> <p><b>ROLLOUT:</b> 8892 FT 58 SEC</p> <p><b>WINDS:</b> T1, 0X KTS <b>OFFICIAL:</b> 1502P02 T2, 0X KTS</p> <p><b>DENS ALT:</b> 1113 FT</p> <p><b>FLT DURATION:</b> 15:16:44:33</p> <p><b>S/T:</b> 708:07:31:41</p> <p>OV-102: 237:07:55:39</p> <p><b>DISTANCE:</b> 6,200,000 sm</p>	<p>104/104/ 109%</p> <p><b>PREDICTED:</b> 100/104/104/ 67/104</p> <p><b>ACTUAL:</b> 100/104/104/ 69/104</p> <p>1 = 2037 (4) 2 = 2034 (9) 3 = 2033 (9)</p> <p><b>M 3 EOM:</b></p> <p><b>WEIGHT:</b> 230818 LBS</p> <p><b>X CG:</b> 1078.40</p> <p><b>LANDING:</b></p> <p><b>WEIGHT:</b> 230773 LBS</p> <p><b>X CG:</b> 1080.10</p>	<p>BI-088</p> <p>RSRM 62</p> <p>ET-86</p> <p>LWT-79</p> <p>ET PRED RPT: 271.3K</p> <p>ET BRKUP: 214K</p> <p>ET IMPACT 1:21:04 MET LAT: 13.5°N LONG 163.46° W</p>	<p>28.45 (45)</p> <p>DIRECT INSERTION</p> <p>POST OMS-2: 163.4 X 160.1 NM</p> <p>DEORBIT: 162 X 156.4 NM</p> <p><b>VELOCITY:</b> 25793 FPS</p> <p><b>ENTRY RANGE:</b> 4396 NM</p>	<p>OI-25 (7)</p> <p>CARGO: 34359 LBS</p> <p>PAYLOAD <b>CHARGEABLE:</b> 25568 LBS</p> <p><b>DEPLOYED:</b> 0 LBS</p> <p><b>NON-DEPLOYED:</b> 23536 LBS</p> <p><b>MIDDECK:</b> 2032 LBS</p> <p><b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 837857 LBS <b>NON-DEPLOYED:</b> 1230575 LBS <b>CARGO TOTAL:</b> 2552583 LBS</p> <p><b>PERFORMANCE MARGINS (LBS):</b> FPR: 3200 FUEL BIAS: 809 FINAL TDDP: 2845 RECON: 4193</p> <p><b>PAYLOADS:</b> <b>PLB:</b> Microgravity Science Laboratory. Protein Crystallography, Combustion Science, and Materials Sciences (MSL-1/LM) OARE CRYOFD</p> <p><b>MIDDECK:</b> SAREX-II MSX</p> <p>5 CRYO TK SETS + 4 EDO 5 N2 TANKS EDO PALLET</p> <p>NO RMS</p>	<p>KSC W/D: OPF 53, VAB 7, PAD 21 = 81 days total.</p> <p><b>LAUNCH POSTPONEMENTS:</b> None - Reflight of MSL-01/STS-83 was baselined as STS-83R on 4/10/97 with a launch date of 7/1/97. - On 4/25/97, STS-83R was renumbered STS-94.</p> <p><b>LAUNCH SCRUBS:</b> None</p> <p><b>LAUNCH DELAYS/EARLY LAUNCH TIMES:</b> At the L-1 MMT, the weather forecast at KSC for 7/1/97 launch at 1837Z was thunderstorms/rain with 90% probability of NO-GO. The decision was made to move the launch time 47 minutes early to improve the probability of launch, which changed the EDW landing opportunities from 2-2-2 to 1-1-1. New launch time was 1750Z. Counted down to T-9 minutes and held due to thunderstorm forecast for RTLS landing time. Thunderstorms at RTLS time was removed from the forecast. Launch delay was 12M00S</p> <p><b>TAL WX:</b> Banjul was prime and selected. Banjul was NO GO for most of the count for 3000 feet broken but became GO late in count. Ben Guerir forecast and observed GO.</p> <p><b>DOLILU-II I-LOADS:</b> DOLILU-II uplink #16, I-load uplink #35.</p> <p><b>KSC LANDING WEATHER:</b> - Forecast for landing time was technically NO-GO for rain within 30 NM; however, rain was offshore, moving NE, and approach path was clear. Observed GO at deorbit burn minus 2 minutes. At landing time, rain was 29 ESE. Flight rule waiver written.</p> <p><b>FLIGHT DURATION CHANGES:</b> None.</p> <p><b>FIRSTS/LASTS:</b> - First reflight of same payloads (MSL-01 with same crew after STS-83 minimum duration flight declared due to FC2, substack 3 delta volts change). - First flight of Wraparound DAP (called part 5) used for complete entry. RCS usage 500 lbs vs baseline 700 lbs and redline 1430 lbs (28.45 inclination).</p> <p><b>EVENTS:</b> - Entry was observed at approx 16 degrees elevation in Houston. - Deorbit burn was 298.5 FPS.</p> <p><b>SIGNIFICANT ANOMALIES:</b> - Fuel cell 3, substack 2, cell performance monitor output increased approximately 32 mv in 20 minutes. - TDRSS Ku-band channel lock dropouts (worse with 48 MBPS on TDRS-E). - Loss of aero surface actuator (ASA) 4 redundant power. - Lower port fastener retainer housing separated from locker L6G (transfer from Spacelab to MF28K &amp; M as DTO). - Ku-band channel 2 frequency shifts. - Ku-band roll/alpha gimbal anomaly. - Window #7 debris impact reported by crew. - APU 3 fuel isolation valves on heated string B cycling low. - Tempus top video camera failure.</p>		



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-85</b>  SEQ FLT #86  KSC - 86  PAD 39A-50  MLP-3	OV-103 (Flight 23) Discovery  OMS PODS: LPO1-26 RPO3-23 FRC3-23	<b>CDR:</b> Curtis L. Brown, Jr. (Flt 4 - STS-47, STS-66 & STS-77) P497/R152/V112/M136  <b>PLT:</b> Kent V. Rominger (Flt 3 - STS-73, STS-80) P498/R200/V131/M174  <b>M/S 1 (PAYLOAD CDR):</b> N. Jan Davis (Flt 3 - STS-47, STS-60) P499/R153/V100/F17  <b>M/S 2:</b> Robert L. Curbeam, Jr. P500/R224/M195  <b>M/S 3:</b> Stephen K. Robinson P501/R225M196  <b>P/S 1:</b> Bjarni V. Tryggvason (Canada) P502/R226/M197  MCC WHITE FCR (16)  <b>FLIGHT DIRECTORS:</b> A/E/O1 - N. W. Hale LD/O 2 - B. P. Austin PLNG - G. A. Pennington MOD - A. L. Briscoe & J. W. Bantle	KSC PAD 39A 219:14:40:59.98Z 10:41:00 AM EDT (P) 10:41:00 AM EDT (A) Thursday 25 8/7/97 (6)	KSC 33 (KSC 39) 231:11:07:58Z 7:07:58 AM EDT  Tuesday 13 8/19/97 (5)	104/104/ 109%  <b>PREDICTED:</b> 100/104/104/ 67/104  <b>ACTUAL:</b> 100/104/104/ 67/104  1 = 2041 (3) 2 = 2039 (3) 3 = 2042 (2)	BI-089  RSRM 57  ET-87  LWT-80  ET PRED RPT: 271.3K  ET BRKUP: 214K  ET IMPACT 1:14:30 MET LAT: 42.77°S LONG 154.86° W	57 (19)  DIRECT INSERTION  POST OMS-2: 161 X 160 NM  SEP-1: 219:22:28:00 160.0 X 158.9 NM  TI: 228:12:50:47 157.7 X 154.3 NM	OI-26 (1)	<b>CARGO:</b> 31959 LBS  <b>PAYLOAD CHARGEABLE:</b> 24982 LBS  <b>DEPLOYED:</b> 0 LBS  <b>NON-DEPLOYED:</b> 24982 LBS  <b>MIDDECK:</b> 1590 LBS  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> <b>DEPLOYED:</b> 837857 LBS <b>NON-DEPLOYED:</b> 1247831 LBS <b>CARGO TOTAL:</b> 2584542 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 3200 FUEL BIAS: 809 FINAL TDDP: 1446 RECON: 3065  <b>PAYLOADS:</b> PLB: CRISTA-SPAS-02 (Atmospheric physics, dynamics, and chemistry by MAHRSI, SESAM, MIDES, GAPS, and IPEX) MFD (Robot Arm) TAS-01 (8 technology and science experiments) IEH-2 (UV exp)  <b>MIDDECK:</b> SWUIS, BDS-03, BRIC-10, PCG-STES, SSCE, ACIS, MSX, SIMPLEX  5 CRYO TK SETS 5 N2 TANKS RMS 48 (S.N. 301) RMS Used For CRISTA-SPAS deploy, grapple, and berth	KSC W/D: OPF 102 , VAB 5, PAD 23 = 130 days total.  <b>LAUNCH POSTPONEMENTS:</b> - Baselined launch date of 7/17/97 on 3/28/96. - Postponed launch date to 8/7/97 on 4/17/97 caused by remanifest to reflly MSL-1 due to STS-83 early termination.  <b>LAUNCH SCRUBS:</b> None  <b>LAUNCH DELAYS:</b> None.  <b>TAL WX:</b> - ZZA was prime but forecast NO GO with thunderstorms within 20 nm. MRN (selected) and BEN were forecast and observed GO.  <b>DOLILU-II I-LOADS:</b> DOLILU-II uplink #17, I-load uplink #36.  <b>PERFORMANCE ENHANCEMENTS (FIRST FLIGHT):</b> - Flight control filter updates. - Yaw gain enhancement. - Constant pitch rate at SRB separation.  <b>FLIGHT DURATION CHANGES:</b> - Planned landing time was 230:11:14 on 8/16/97 , orbit 174. Waved off this only landing opportunity to land at KSC due to forecast of probability of fog. SLF was observed GO at landing time. Landed on orbit 190. - Flight duration extended 1 day.  <b>FIRSTS/LASTS:</b> PLB: - First flight of OI-26. - First flight at 57 degrees inclination since STS-66. - First flight of complete Wraparound DAP (DTO 255). Used approximately 330 lbm RCS from EI to M=1 (vs redline of 1630 lbm).  <b>EVENTS:</b> - Launched on Kent Rominger's birthday. - CRISTA-SPAS deployed at 00:07:46:04 MET, 219:22:27:04Z. - CRISTA-SPAS captured at 228:15:13Z, 09:00:32 MET. - Berthed and latched at 228:16:30:12Z, 09:01:49:32 MET.  <b>RENDEZVOUS #38:</b> Deployed, rendezvoused, grappled, and berthed CRISTA-SPAS.  <b>SIGNIFICANT ANOMALIES:</b> - CRT 1 transient BITE message. - Supply water tank A quantity erratic. - APU 1 seal cavity drain line pressure decay. - APU 1 fuel pump thermostat cyclic in narrow band. - Payload commanding problems with MCC input set to 3/sec.	



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (8) 7UP, 7DOWN	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM-ABORT EMERG	SRB RSRM	ORBIT		FSW	PAYLOAD WEIGHTS,	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
		TITLE, NAMES & EVA'S	LANDING SITES, ABORT TIMES	LANDING TIMES FLT DURATION, WINDS	THROTTLE PROFILE ENG. S.N.	AND ET	INC	HA/HP		PAYLOADS/ EXPERIMENTS	
<b>STS-86</b>	OV-104 (Flight 20) Atlantis  Spacehab 8  KSC - 87	<u>CDR:</u> James D. Wetherbee (Flt 4 - STS-32, STS-52, STS-63) P503/R108/V80/M97  <u>PLT:</u> Michael J. Bloomfield P504/R227/M198  <u>M/S 1 EV2:</u> Vladimir Titov (Russia) (Flt 2 - STS-63) P505/R189/V144/M165  <u>M/S 2 EV1:</u> Scott E. Parazynski (Flt 2 - STS-66) P506/R187/V145/M164  <u>M/S 3:</u> Jean-Loup Chretien (France) P507/R228/M199  <u>M/S 4:</u> Wendy B. Lawrence (Flt 2 - STS-67) P508/R192/V146/F25  <u>M/S 5:</u> Ascent David A. Wolf (Flt 2 - STS-58, stay on Mir 24 and return on STS-89) P509/R173/V147/M151  <u>M/S 6:</u> Descent Michael C. Foale (Flt 4 - STS-45, STS-56, STS-63, ascent on STS-84, on-orbit stay on Mir 23 and Mir 24, and descent on STS-86) P510/R143/V92/M127  Continued...	KSC PAD 39A 269:02:34:18.96 Z 10:34:19 PM EDT (P) 10:34:19 PM EDT (A) Thursday 26 9/25/97 (9)	KSC 15 (KSC 40) 279:21:55:10Z 5:55:10 PM EDT  Monday 16 10/6/97 (7)	104/104/ 109%  PREDICTED: 100/104/104/ 67/104  ACTUAL: 100/104/104/ 67/104  1 = 2012 (20) 2 = 2040 (3) 3 = 2019 (18)	BI-090  RSRM 61  ET-88  LWT-81  ET PRED RPT: 271.3K  ET BRKUP: 269.1K  ET IMPACT 1:26:44 MET LAT: 0.52°S LONG: 126.53°W	51.65 (8)	DIRECT INSERTION  POST OMS-2: 161 X 138.5 NM  NC1: 269:05:59:10Z 201 X 150.9 NM  TI: 270:17:31:56Z 211.2 X 203.5 NM  MCC4: 270:18:52:13Z 211.8 X 204.3 NM  UNDOCK: 276:17:28:34Z 212 X 204.4 NM  SEP: 276	OI-26 (2)	CARGO: 29728 LBS  PAYLOAD CHARGEABLE: 21039 LBS  DEPLOYED: 6058 LBS  NON-DEPLOYED: 14379 LBS  MIDDECK: 602 LBS  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 843915 LBS NON-DEPLOYED: 1262812 LBS CARGO TOTAL: 2614270 LBS  PERFORMANCE MARGINS (LBS): FPR: 3200 FUEL BIAS: 809 FINAL TDDP: 1446 RECON: 3065  PAYLOADS: PLB: SHUTTLE/MIR MISSION 7  SPACEHAB DOUBLE MODULE  ODS, SEEDS - II  MIDDECK: CREAM SIMPLEX KIDSAT CPCG CCM-A  5 CRYO TK SETS 4 N2 TANKS  NO RMS	KSC W/D: OPF 60, VAB 5, PAD 29 = 94 days total.  LAUNCH POSTPONEMENTS: - Baseline launch date of 9/11/97 on 6/21/96; orbiter OV-104. - Postponed launch date to 9/18/97 on 8/1/96; multi-flight changes. - Changed from orbiter OV-104 to OV-105 on 3/27/97. - Postponed launch date to 9/25/97 on 4/17/97; multi-flight changes for refight of MSL-01 (on STS-94). - Advanced launch date to 9/18/97 on 4/25/97 and moved back to orbiter OV-104 (from OV-105). - Postponed launch date to 9/26/97 (GMT), 9/25/97 EDT, on 8/21/97.  LAUNCH SCRUBS: None  LAUNCH WINDOWS: - The total launch window for the two panes was 10:57. However, using the preferred liftoff time of 269:02:34:19 (4m19s into window) the window was only 6m38s.  LAUNCH DELAYS: None  TAL WX: - ZZA was prime but was forecast NO GO (ceiling) at L-15 minutes, MRN was forecast GO and was selected. Both ZZA and MRN were observed GO at TAL time. BEN was forecast NO GO (ceiling) until L-8 minutes and was observed GO at TAL time.  SHUTTLE NIGHT LAUNCH: #18  DOLILU II I-LOADS: - DOLILU II uplink #18, total uplink #37.  PERFORMANCE ENHANCEMENTS: - Flight control filter updates. - Yaw gain enhancement. - Constant pitch rate at SRB separation. - Auto delta psi.  FLIGHT DURATION CHANGES: - Waved off landing on orbit 155 due to observed broken 4000 feet, but forecast GO. - Waved off landing on orbit 156 (observed GO), but forecast NO GO 5000 feet broken. - Landed on orbit 170. - Flight duration extended 1 day.  FIRSTS/LASTS: - First flight of auto delta psi. - First flight using a Preferred Liftoff Time (PLT), which was not at window opening. - First shuttle EVA with an International Partner (V. Titov, Russia).



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (8) 7UP, 7DOWN	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM-ABORT EMERG	SRB RSRM	ORBIT		FSW	PAYLOAD WEIGHTS,  PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS,  TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
		TITLE, NAMES & EVA'S	LANDING SITES, ABORT TIMES	LANDING TIMES FLT DURATION, WINDS	THROTTLE PROFILE ENG. S.N.	AND ET	INC	HA/HP			
STS-86  Continued		Continued...  SS EVA #39 EMU/Tethered EVA #32 Scheduled EVA #34 10/1/97 5H01M26S Duration  MCC WHITE FCR (17)  <u>FLIGHT DIRECTORS:</u> A/E - L. J. Ham LD/O 1 - P. D. Dye O 2 - C. W. Shaw PLNG - P. L. Engelauf MOD - R. E. Castle		Continued...  <u>DENS ALT:</u> 1506 FT  <u>FLT DURATION:</u> 10:19:20:51  <u>S/T:</u> 730:28:19:30  <u>OV-104:</u> 150:22:30:25  <u>DISTANCE:</u> 4,225,000 sm							Continued . . .  <u>EVENTS:</u> - Mir capture at 270:19:57:46Z, 01:17:23:27 MET - Docking complete at 270:20:06:15Z, 01:17:31:56 MET - Foale transfer to STS-86 and David Wolf transfer to Mir 24 at 2D14H00M, 271:16:34:19Z. Foale Mir stay time 134:02:13:31, total flight time 144:13:47:22. - Foale completed a Mir EVA with Anatoly Solovveyev with exit from KVANT-2 airlock in Orlan M suits (5.7 psia). Both were double tethered using U.S. tether reel and waist tethers. EVA duration was 5H59M to inspect Specktr module leak, slew solar arrays, and put out dosimeter. - Scott Parazynski and Vladimir Titov made a Shuttle EVA to retrieve MEEP experiments left on Mir DM on STS-76. - Jean-Loup Chretien flew on Soyuz T-6/Salyut 7 and Soyuz TM-7/Mir11. - Hooks open 276:17:25:59Z, 07:14:51:40 MET - Undock 276:17:28:15Z, 07:14:53:56 MET (one rev late to check Mir computer interface box). - Total consumables transferred to Mir: 1717.2 lbm H <sub>2</sub> O (17 CWC's), 75.7 lbm O <sub>2</sub> , 130.7 lbm N <sub>2</sub> . - Wendy was to replace Foale; however, concerns of inadequate reach in Orlan EVA spacesuit, Wolf moved to STS-86 from STS-89.  <u>RENDEZVOUS #39:</u> Rendezvous and dock with Mir Space Station.  <u>SIGNIFICANT ANOMALIES:</u> - Fuel Cell 2 substack 1 differential volts transient. - Primary RCS thruster L3D failed off. - EVA Safety Tether Reel failure. - WSB 3 vent heater failure on B controller.

# 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		FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
							INC	HA/HP			
STS-87 SEQ FLT #88 KSC - 88 PAD 39B-37 MLP-1	OV-102 (Flight 24) Columbia 22nd Spacelab Flight EDO 12 OMS PODS: LPO5-13 RPO5-12 FRC2-24	<p>CDR: Kevin R. Kregel (Flt 3 - STS-70, STS-78) P511/R197/V129/M172</p> <p>PLT: Steven W. Lindsey P512/R229/M200</p> <p>M/S 1: Kalpana Chawla P513/R230/F30</p> <p>M/S 2: Winston E. Scott (Flt 2 - STS-72) P514/R207/V148/M180</p> <p>M/S 3: Takao Doi (Japan) P515/R231/M201</p> <p>P/S 1: Leonid Kadenyuk (Ukraine) P516/R232/M202</p> <p>SS EVA #40 EMU/Tethered EVA #33 Scheduled EVA #35 on 11/24/97 7H42M55S Duration EVA start at 05:04:16:05 MET</p> <p>SS EVA #41 EMU/Tethered EVA #34 Unscheduled EVA #6 on 12/3/97 4H59M40S Duration EVA start at 13:13:24 MET</p> <p>MCC WHITE FCR (18)</p> <p>FLIGHT DIRECTORS: ASC - N. W. Hale ENT - J. P. Shannon LD/O 4 - W. D. Reeves O 2 - J. W. Bantle O 2 - P. S. Hill (1 Shift) O 1 - B. P. Austin O 3 - A. F. Algate MOD - A. L. Briscoe</p>	<p>KSC PAD 39B 323:19:45:95.6Z 2:46:00 PM EST (P) 2:46:00 PM EST (A) Wednesday 9 11/19/97 (12)</p> <p>LAUNCH WINDOW: 2H30M CTOB</p> <p>EOM PLS: KSC TAL: BYD TAL WX: BEN, MRN</p> <p>SELECTED: RTL: KSC 33/CI/N TAL: BYD 32/N/N AOA: EDW 22/N/N PLS: NOR 17/N/SF</p> <p>TDDEL: -0.03 0.132/0.17 MAX Q NAV: 731 741</p> <p>SRB STG: 2:03.8 2:04</p> <p>PERE: NOMINAL</p> <p>2 ENG TAL (BYD): 2:38 2:41</p> <p>NEG RETURN: 3:58 3:59</p> <p>PTA (U/S 219): 4:59 4:58</p> <p>DROOP (BYD): 5:25 5:30</p> <p>PTM (U/S 567): 6:58 7:00</p> <p>MECO CMD: 8:28.5 8:29.9</p> <p>VI: 25872 25873</p> <p>OMS-2: 41:04 41:08.9 192.9 FPS 193.8 FPS 2:05 2:08</p>	<p>KSC 33 (KSC 41) 339:12:20:04Z 7:20:04 AM EST</p> <p>Friday 10 12/5/97 (9)</p> <p>DEORBIT BURN: 339:11:21:28Z</p> <p>XRANGE: 66 NM</p> <p>ORBIT DIR: DL 43</p> <p>AIM PT: CLOSE IN</p> <p>MLGTD: 2549 FT 339:12:20:04Z VEL: 189 KGS 196 KEAS HDOT: -1.1 FPS</p> <p>TD NORM 205: 1821 FT</p> <p>DRAG CHUTE DEPLOY: 188 KEAS 339:12:20:08Z</p> <p>NLGTD: 5612 FT 339:12:20:14Z VEL: 147 KGS 151 KEAS HDOT: -4.6 FPS</p> <p>BRK INIT: 107 KGS</p> <p>DRAG CHUTE JETTISON: 61 KGS 339:12:20:38Z</p> <p>BRK DECEL FPS2: AVG 4.7 PK 7.7</p> <p>WHEELS STOP: 339:12:21:02Z 10553 FT</p> <p>ROLLOUT: 8004 FT 58 SEC</p> <p>WINDS: 6H, 0X KTS OFFICIAL: 3306P10 6H, 0X KTS</p> <p>DENS ALT: -195 FT</p> <p>FLT DURATION: 15:16:34:04</p> <p>S/T: 746:15:53:34</p> <p>OV-102: 253:00:29:43</p> <p>DISTANCE: 6,544,000 sm</p>	<p>104/104/ 109%</p> <p>PREDICTED: 100/104/104/ 67/104</p> <p>ACTUAL: 100/104/104/ 67/104</p> <p>1 = 2031 (16) 2 = 2039 (4) 3 = 2037 (5)</p> <p>ET BRKUP: 269.1K</p> <p>ET IMPACT 1:25:02 MET LAT: 20.28°N LONG: 147.99° W</p> <p>M 3 EOM:</p> <p>WEIGHT: 232930 LBS</p> <p>X CG: 1080.99</p> <p>LANDING: WEIGHT: 232849 LBS</p> <p>X CG: 1082.58</p>	<p>BI-092 28.45 (46)</p> <p>RSRM 63</p> <p>ET-89</p> <p>LWT-82</p> <p>ET PRED RPT: 271.3K</p> <p>ET BRKUP: 269.1K</p> <p>ET IMPACT 1:25:02 MET LAT: 20.28°N LONG: 147.99° W</p>	<p>DIRECT INSERTION</p> <p>POST OMS-2: 155 X 150 NM</p> <p>SEP BURN: 02:03:25:30 MET</p> <p>NC5 MANEUVER: 05:01:33:33 MET</p> <p>TI: 05:03:04:38 MET</p>	<p>OI-26 (3)</p>	<p>CARGO: 34395 LBS</p> <p>PAYLOAD CHARGEABLE: 21946 LBS</p> <p>DEPLOYED: 0 LBS</p> <p>NON-DEPLOYED: 17496 LBS</p> <p>MIDDECK: 1452 LBS</p> <p>SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 843915 LBS NON-DEPLOYED: 1281760 LBS CARGO TOTAL: 2648665 LBS</p> <p>PERFORMANCE MARGINS (LBS): FPR: 3085 FUEL BIAS: 853 FINAL TDDP: 4384 RECON: 6115</p> <p>PAYLOADS: PLB: SPARTAN-201 USMP-04 EDFT-05 SOLSE GAS (1) NASBE LHP TGDF AERCAM SPRINT</p> <p>MIDDECK: USMP-04/MGBX CUE, MSX, SIMPLEX</p> <p>5 CRYO TK SETS + 4 EDO 5 N2 TANKS RMS 49 (S.N. 301)</p> <p>RMS used for Spartan deploy, capture attempt, and assist berthing. Also EVA EDFT-5 ORU activities.</p>	<p>KSC W/D: OPF 94, VAB 5, PAD 22 = 121 days total.</p> <p>LAUNCH POSTPONEMENTS: - Baselined 10/9/97 launch date on 7/11/97. - Postponed launch date to 11/13/97 on 4/17/97. - Postponed launch date to 11/19/97 on 5/22/97.</p> <p>LAUNCH SCRUBS: None.</p> <p>LAUNCH DELAYS: None.</p> <p>TAL WX: - Banjul (prime and selected), Ben Guerir, and Moron were all forecast and observed GO.</p> <p>DOLILU/I-LOADS: - DOLILU-II uplink #19, total I-load uplink #38.</p> <p>PERFORMANCE ENHANCEMENTS: - Flight control filter updates. - Yaw gain enhancement. - Constant pitch rate at SRB separation. - First stage trim, second stage trim, and roll to headsup.</p> <p>FLIGHT DURATION CHANGES: - None. Landed on orbit 252.</p> <p>FIRSTS/LASTS: - First flight with the following performance enhancements: - Roll-to-heads-up at approximately 6:10 MET, APM loss of 70 lbs. - Ascent DAP trim (APM gain of approximately 270 lbs). - Extended pitch parallel to MECO (APM gain of approximately 125 lbs). - Second stage pitch gimbal relief (no APM change).</p> <p>EVENTS: - Spartan deploy was delayed 1 day to allow recovery of SOHO satellite. - Spartan deploy at 325:21:04:00Z, 02:01:18 MET. Spartan failed to perform pirouette maneuver indicating a problem. Attempt to grapple Spartan at 02:01:24 MET failed, and a tip-off rate of 2 deg/sec was introduced. - Separation burn was made at, 02:03:25:30 MET. - Decision to hand capture Spartan by two EVA crew, done at 05:05:18:00 MET (rates were very low). RMS berth assist was required with Spartan grapple at 05:06:53 and berth at 05:07:37:22 MET. - EDFT-05 tasks were performed on EVA 1 and evaluated crane. - An unscheduled EVA 2 was performed to deploy, maneuver, and retrieve a free flying video camera (AERCAM SPRINT) and to perform EDFT-05 tasks which were planned for EVA 1.</p> <p>RADIATOR DEPLOY #20 - Starboard and port radiators deployed twice for thermal control and water production.</p> <p>RENDEZVOUS #40: Deploy Spartan, separate, rendezvous and retrieve Spartan.</p> <p>SIGNIFICANT ANOMALIES: - Sticky supply water A/B check valve. - H2 tank 4 quantity measurement failure. - EV 2 helmet light intermittent. - Left outboard fire pressure measurement lost. - Spartan MPSS EVA ingress aid extend/stow difficulty during retrieval. - RCS jet R5D heater fail off. - Excessive tile damage by ET foam loss.</p>	



# SPACE SHUTTLE MISSIONS SUMMARY

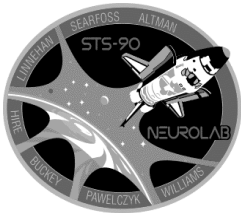
FLT NO.	ORBITER	CREW 7 UP, 7 DOWN  TITLE, NAMES & EVA'S	LAUNCH SITE, LIFTOFF TIME, LANDING SITES, ABORT TIMES	LANDING SITE/ RUNWAY, CROSSRANGE LANDING TIMES FLT DURATION, WINDS	SSME-TL NOM-ABORT EMERG THROTTLE PROFILE ENG. S.N.	SRB RSRM AND ET	ORBIT		FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
							INC	HA/HP			
<b>STS-89</b>  SEQ FLT #89  KSC - 89  PAD 39A-52  MLP-3	OV-105 (Flight 12) Endeavour  Spacehab 9  OMS PODS: LPO4-19 RPO1-26 FRC5-12	<b>CDR:</b> Terrence W. Wilcutt (Flt 3 - STS-68, STS-79) P517/R183/V130/M160  <b>PLT:</b> Joseph F. Edwards Jr. P518/R233/M203  <b>M/S 1:</b> James F. Reilly, II P519/R234/M204  <b>M/S 2:</b> Michael Anderson P520/R235/M205  <b>M/S 3: (PAYLOAD CDR):</b> Bonnie J. Dunbar (Flt 5 - STS-61-A, STS-32, STS-50, STS-71) P521/R79/V49/F7  <b>M/S 4:</b> Salizhan Shakirvich Sharipov (Russia) P522/R236/M206  <b>M/S 5</b> Ascent Andrew S. W. Thomas (Flt 2 - STS-77) Stay on Mir 24 and Mir 25, return on STS-91. P523/R213/V149/M186  <b>M/S 6</b> Descent David A. Wolf (Flt 2 - STS-58) Ascent on STS-86, stay on Mir 24. P524/R173/V147/M151  MCC WHITE FCR (19)  <b>FLIGHT DIRECTORS:</b> ASCENT - L. J. Ham LD/O 1 - P. L. Engelhauf O 2 - R. E. Castle PLNG - P. S. Hill ENTRY - J. P. Shannon MOD - A. L. Briscoe	KSC PAD 39A 23:02:48:14.98Z 9:48:15 PM EST (P) 9:48:15 PM EST (A) Thursday 27 1/22/98 EST (9)  <b>LAUNCH WINDOW:</b> 7M 56S Using PLT MIR PLANAR/ PHASE WINDOW  <b>EOM PLS:</b> KSC TAL: ZZA TAL WX: MRN, BEN  <b>SELECTED:</b> RTL: KSC 15/CI/N TAL: ZZA 30/CI/N AOA: NOR 17/N/SF PLS: EDW 22/N/SF  <b>TDEL:</b> 0.14 -0.098/0.1  <b>MAX Q NAV:</b> 702 PSF 710 PSF  <b>SRB STG:</b> 2:03.8 2:06  <b>PERF:</b> NOMINAL  <b>2 ENG TAL (ZZA):</b> 2:26 2:25  <b>NEG RETURN:</b> 4:02 4:05  <b>PTA (U/S 265):</b> 4:42 4:35  <b>DROOP (ZZA):</b> 5:20 5:22  <b>PTM (U/S 265):</b> 5:50 5:48  <b>MECO CMD:</b> 8:28.9 8:29  <b>VI:</b> 25876 25873  <b>OMS-2:</b> 41:46 41:48 213 FPS 213 FPS	KSC 15 (KSC 42) 31:22:35:09Z 5:35:09 PM EST  Saturday 19 1/31/98 (8)  <b>DEORBIT BURN:</b> 31:21:27:55Z  <b>XRANGE:</b> 600NM  <b>ORBIT DIR:</b> AL 20  <b>AIM PT:</b> NOMINAL  <b>MLGTD:</b> 2702 FT 31:22:35:09Z <b>VEL:</b> 202 KGS 198 KEAS <b>HDOT:</b> -2.3 FPS  <b>TD NORM 195:</b> 2776 FT  <b>DRAG CHUTE</b> <b>DEPLOY:</b> 190 KEAS 31:22:35:13Z  <b>NLGTD:</b> 6112 FT 31:22:35:20Z <b>VEL:</b> 152 KGS 149 KEAS <b>HDOT:</b> -5.9 FPS  <b>BRK INIT:</b> 94 KGS  <b>DRAG CHUTE</b> <b>JETTISON:</b> 56 KGS 31:22:35:53Z  <b>BRK DECEL FPS<sup>2</sup>:</b> AVE 3.6 PK 5.0  <b>WHEELS STOP:</b> 31:22:36:21Z 12492 FT  <b>ROLLOUT:</b> 9790 FT 72 SEC  <b>WINDS:</b> 4T, 4L KTS <b>OFFICIAL:</b> 0205P11 7T,8L  <b>DENS ALT:</b> -103 FT  <b>FLT DURATION:</b> 8:19:46:54  <b>S/T:</b> 755:11:40:28  <b>OV-105:</b> 121:08:50:00  <b>DISTANCE:</b> 3,610,000 sm	104/104/ 109%  <b>PREDICTED:</b> 100/104/104 67/104  <b>ACTUAL:</b> 100/104/104 67/104  1 = 2043 (1) 2 = 2044 (1) 3 = 2045 (1)  <b>M 3 EOM:</b>  <b>WEIGHT:</b> 217475 LBS  <b>X CG:</b> 1086.45 <b>LANDING:</b>  <b>WEIGHT:</b> 217422 LBS  <b>X CG:</b> 1088.16	BI-093  RSRM 64  ET-90  LWT-83  ET <b>RPT:</b> 271.3K  ET <b>BRKUP:</b> 269.1K  ET <b>IMPACT</b> 1:27:09 <b>MET</b> <b>LAT:</b> 0.69°N <b>LONG:</b> 120.7°W	51.65 (9)  DIRECT INSERTION  POST OMS-2: 162.4 X 161.1 NM  TI: 1:15:03:04 <b>MET</b> 215.6 X 203.4 NM  <b>SEP1:</b> 6:15:28:26 <b>MET</b> 206.6 X 203.2 NM	OI-26 (4)  CARGO: 28040 LBS  <b>PAYLOAD</b> <b>CHARGEABLE:</b> 22163 LBS  <b>DEPLOYED:</b> 4596 LBS  <b>NON-DEPLOYED:</b> 16699 LBS  <b>MIDDECK:</b> 868 LBS  <b>SHUTTLE</b> <b>ACCUMULATED</b> <b>WEIGHTS:</b> <b>DEPLOYED:</b> 848511 LBS <b>NON-DEPLOYED:</b> 1299327 LBS <b>CARGO TOTAL:</b> 2676765 LBS  <b>PERFORMANCE</b> <b>MARGINS (LBS):</b> <b>FPR:</b> 3272 <b>FUEL BIAS:</b> 854 <b>FINAL TDDP:</b> 2309 <b>RECON:</b> 3594  <b>PAYLOADS:</b> <b>PLB:</b> SHUTTLE/MIR MISSION 8  SPACEHAB (Double Module)  <b>GAS (4)</b> ODS  <b>MIDDECK:</b> HP, MPNE, AST, CREAM, SIMPLEX, SAMS, MGM (2), CEBAS, EARTH CAM  <b>5 CRYO TK SETS</b> <b>6 GN2 TANKS</b>  NO RMS  <b>DEORBIT:</b> 207.1 X 193.7 NM  <b>VELOCITY:</b> 25900 FPS  <b>ENTRY</b> <b>RANGE:</b> 4341 NM	KSC W/D: OPF 202, VAB 7, PAD 26 = 235 days total.  <b>LAUNCH POSTPONEMENTS:</b> - Baselined 1/15/98 launch date on 10/1/96. - Moved STS-89 from OV-103 to OV-105 on 5/22/97. - Postponed launch date to 1/22/98 EST (1/23/98 GMT) on 12/18/97.  <b>LAUNCH SCRUBS:</b> None  <b>LAUNCH DELAYS:</b> None  <b>TAL WX:</b> - Zaragoza (prime and selected) and Moron forecast and observed GO. Ben Guerir was forecast NO GO for ceiling and visibility (very dense fog).  <b>SHUTTLE NIGHT LAUNCH:</b> #19  <b>DOLILU/I-LOADS:</b> - DOLILU II uplink #20, total uplink #39.  <b>PERFORMANCE ENHANCEMENTS:</b> - Standard set plus Block IIA SSME's.  <b>FLIGHT DURATION CHANGES:</b> - None. Landed on orbit 139.  <b>FIRSTS/LASTS:</b> - First flight using Block IIA SSME's. (Rocketdyne HPFTP) - First flight with external airlock. - Record number of people in orbit: Mir 3 - 2 Russians, 1 American; Soyuz 3 - 2 Russians, 1 French; Endeavour 7 - 6 Americans, 1 Russian.  <b>EVENTS:</b> - Mir capture at 24:20:14:21Z, 1:17:26:06 MET. - Docking complete at 24:20:23Z, 1:17:35 MET. - Andrew Thomas transferred to Mir 24 and David Wolf to STS-89 Endeavour at 26:05:51:15Z, 3D13H3M. David Wolf total Mir time 119:23:16:56 and total flight time 127:20:00:50. - Undocking at 29:16:56:56Z, 6:14:08:41 MET. - Inert weight adjustment of -200 lbs included in STS OPR chargeable.  <b>RENDEZVOUS #41:</b> - Rendezvous and dock with Mir.  <b>RADIATOR DEPLOY #21:</b>  <b>SIGNIFICANT ANOMALIES:</b> - GPC 3 mode switch no apparent detent at standby. Went to halt from run. - Payload bay floodlights FWB STBD and MID PORT failed (new design). - TIPS and OCA problems. - Z Startracker pressure fail BITE. - S-Band antenna electronics 2 failed to select the best antenna. - Vestibule vent valves were misconfigured (3 of 4 open). - Vernier thruster L5D oxidizer temp failed erratic, attitude control passed to Mir jets, then to orbiter PRCs. - Right RCS fuel helium isolation valve B failed to open. - Vernier driver F5 RPC 2 failed off.		





# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-90</b> SEQ FLT #90 KSC-90 PAD 39B-38 MLP-2	OV-102 (Flight 25) Columbia 23 RD Spacelab Flight  LM-16 EDO 13  OMS PODS: LPO5-14 RPO5-13 FRC2-25	<p>CDR: Richard A. Searfoss (Flt 3 - STS-58, STS-76 P525/R171/V126/M149)</p> <p>PLT: Scott D. Altman P526/R237/M207</p> <p>M/S 1 (PAYLOAD CDR): Richard M. Linnehan (Flt 2 - STS-78) P527/R214/V150/M187</p> <p>M/S 2: Kathryn P. Hire P528/R238/F31</p> <p>M/S 3: Dafydd R. Williams (Canada) P529/R239/M208</p> <p>P/S 1: Jay C. Buckley, Jr. P530/R240/M209</p> <p>P/S 2: James A. Pawelczyk P531/R241/M210</p>	<p>KSC 39B 107:18:18:59.99Z 2:19:00 PM EDT (P) 2:19:00 PM EDT (A) Friday 17 4/17/98 (13)</p> <p>LAUNCH WINDOW: 2H30M NeuroLab Crew Circadian Constraint</p> <p>EOM PLS: KSC TAL: BEN TAL WX: MRN, ZZA</p> <p>SELECTED: RTLS: KSC 15/C1/N TAL: BEN 36/N/N AOA: EDW 22/N/N PLS: EDW 22/N/N</p> <p>TDDEL: 0.08 0.322/0.36</p> <p>MAX Q NAV: 694 697</p> <p>SRB STG: 2:05.1 2:05</p> <p>PERF: NOMINAL</p> <p>2 ENG TAL (BEN): 2:50 2:49</p> <p>NEG RETURN: 3:56 3:58</p> <p>PTA (U/S 248): 5:31 5:29</p> <p>DROOP (ALL): 5:24 5:25</p> <p>PTM (U/S 390): 7:08 7:11</p> <p>MECO CMD: 8:27.3 8:28.4</p> <p>VI: 25864 25860</p> <p>MCC WHITE FCR (20)</p> <p>FLIGHT DIRECTORS: A/E - J. P. Shannon LD/O 2 - G. A. Pennington O 1 - B. P. Austin O 3 - R. M. Kelso MOD - J. W. Bantle</p>	<p>KSC 33 (KSC 43) 123:16:08:59Z 12:08:59 PM EDT</p> <p>Sunday 13 5/3/98 (13)</p> <p>DEORBIT BURN: 123:15:10:10Z</p> <p>XRANGE: 245.9 NM</p> <p>ORBIT DIR: DR 20</p> <p>AIM PT: NOMINAL</p> <p>MLGTD: 1561 FT 123:16:08:59Z VEL: 224 KGS 218 KEAS HDOT: -6.0 FPS</p> <p>TD NORM 195: 2451 FT</p> <p>DRAG CHUTE DEPLOY: 194 KEAS 123:16:09:06Z</p> <p>NLGTD: 6288 FT 123:16:09:12Z VEL: 167 KGS 161 KEAS HDOT: -4.6 FPS</p> <p>BRK INIT: 122 KGS</p> <p>DRAG CHUTE JETTISON: 56 KGS 123:16:09:37Z</p> <p>BRK DECEL FPS2: AVE 5.7 PK 9.3</p> <p>WHEELS STOP: 123:16:09:57Z 11559 FT</p> <p>ROLLOUT: 9998 FT 58 SEC</p> <p>WINDS: T1, L4 KTS OFFICIAL: 2204P11 T1, L4 KTS</p> <p>DENS ALT: 1560 FT</p> <p>FLT DURATION: 15:21:49:59</p> <p>S/T: 771:09:30:27</p> <p>OV-102: 268:22:19:42</p> <p>DISTANCE: 6,375,000 sm</p>	<p>104/104/ 109%</p> <p>PREDICTED: 100/104/104 67/104</p> <p>ACTUAL: 100/104/104 69/104</p> <p>1 = 2041 (4) 2 = 2032 (7) 3 = 2012 (21)</p>	<p>BI-094  RSRM 65  ET-91  LWT-84  ET RPT: 283K  ET BRKUP: 215K  ET IMPACT 1:24:30 MET LAT: 1.88°N LONG: 139.9°W</p>	<p>39° (7)</p> <p>DIRECT INSERTION</p> <p>POST OMS-2: 154 X 138 NM</p>	<p>OI-26B (1)</p>	<p>CARGO: 35549 LBS</p> <p>PAYLOAD CHARGEABLE: 25625 LBS</p> <p>DEPLOYED: 0 LBS</p> <p>NON-DEPLOYED: 9944 LBS</p> <p>MIDDECK: 2340 LBS</p> <p>SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 848511 LBS NON-DEPLOYED: 1325532 LBS CARGO TOTAL: 2712754 LBS</p> <p>PERFORMANCE MARGINS (LBS): FPR: 3085 FUEL BIAS: 853 FINAL TDDP: 3162 RECON: 1999</p> <p>PAYLOADS: PLB: NEUROLAB SVF GAS (3)</p> <p>MIDDECK: BIOREACTOR DEMO. SYSTEM</p> <p>5 CRYO TK SETS + 4 EDO &amp; 5 N2 TANKS</p>	<p>KSC W/D: OPF 80, VAB 5, PAD 24 = 109 days total.</p> <p>LAUNCH POSTPONEMENTS: - Baselined launch date of 3/18/98 on 1/10/97. - Postponed launch date to 4/2/98 on 4/17/97. - Postponed launch date to 4/16/98 on 2/13/98.</p> <p>LAUNCH SCRUBS: - Scrubbed 4/16/98 launch attempt at approximately L-6 hours due to an NSP 2 problem (did not tank). Replaced NSP 2.</p> <p>LAUNCH DELAYS: None</p> <p>TAL WX: - Ben Guerir (prime and selected) was forecast and observed GO. Moron was forecast GO late after ceiling violation, Zaragoza was forecast NO GO for crosswinds and low ceiling, but observed GO at TAL time.</p> <p>DOLILU/I-LOADS: - DOLILU II uplink #21, I-Load uplink #40.</p> <p>PERFORMANCE ENHANCEMENTS: - Standard set plus OMS assist is 4000 lbs.</p> <p>FLIGHT DURATION CHANGES: None. Landed on orbit 256.</p> <p>FIRSTS/LASTS: - First use of OMS assist during ascent (102 seconds) 4000 lbs. - Final flight of Spacelab. - Total size of the seven crewmembers was the largest. - Largest number of animals (over 2000 animals on board).</p> <p>EVENTS: - SSME 1 Block IIA and SSME 2 &amp; 3 Phase 2 engines.</p> <p>RADIATOR DEPLOY #22: Port radiator only.</p> <p>SIGNIFICANT ANOMALIES: - Water spray boiler 3 failed to cool, APU3 shutdown at 13:05 MET. Also failed to cool during FCS C/O, so was not started until TAEM for entry. - Icing in topping FES core (did FES core flush). - CO2 removal system failure. RCRS recovered with IFM. - Waste water dump clogged filter. IFM preformed but urine filter clogged. - APU 2 Gas Gen/Fuel Pump B heaters failed. - DOLILU processor integrity rule violation at L-6.5 hours.</p>	



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW 6 UP, 7 DOWN	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.)
		TITLE, NAMES & EVA'S				INC	HA/HP				
<b>STS-91</b>	OV-103 (Flight 24) Discovery	CDR: Charles J. Precourt (Flt 4 - STS-55, STS-71, STS-84) P532/R161/V118/M141	KSC PAD 39A 153:22:06:24Z 6:06:24 EDT (P) 6:06:24 EDT (A) Tuesday 13 6/2/98 (9)	KSC 15 (KSC 44) 163:18:00:17Z 2:00:17 PM EDT  Friday 11 6/12/98 (4)	104/104/ 109%  PREDICTED: 100/104/104/ 67/104  ACTUAL: 100/104/104/ 67/104	BI-091  RSRM 66  ET-96  SLWT-1	51.65 (10)	DIRECT INSERTION  POST OMS-2: 177 X 129 NM	OI-26B (2)	CARGO: 35549 LBS  PAYLOAD CHARGEABLE: 25625 LBS  DEPLOYED: 2419 LBS  NON-DEPLOYED: 2 LBS  MIDDECK: 891 LBS  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 850930 LBS NON-DEPLOYED: 1348738 LBS CARGO TOTAL: 2748303 LBS  PERFORMANCE MARGINS (LBS): FPR: 3783 FUEL BIAS: 720 FINAL TDDP: 631 RECON: 403  PAYLOADS: PLB: ODS  SHUTTLE/MIR MISSION 9  SPACEHAB (Single Module)  AMS, SEM (2), GAS (6)  MIDDECK: SSCE SIMPLEX CPCG  5 CRYO TK SETS 5 N2 TANKS RMS 50 Used to check out S.N. 201 With new digital SPA H/W.  ENTRY RANGE: 4418 NM	KSC W/D: OPF 168, VAB 4, PAD 29 = 201 days total.  LAUNCH POSTPONEMENTS: - Baseline launch date of 5/28/98 EDT (5/29/98 GMT) on 2/20/97. - Changed launch date to 5/28/98 EDT (5/29/98 GMT) on 8/25/97. - Postponed launch date to 6/2/98 to allow AMS additional time.  LAUNCH SCRUBS: None  LAUNCH WINDOW: - 7M42S based on Mir planar/phase window (not PLT) to increase LO2 drainback time.  LAUNCH DELAYS: None  TAL WX: - ZZA prime and selected. - ZZA, MRN, and BEN were forecast and observed GO.  DOLILU/I-LOADS: - DOLILU II uplink #22, I-Load uplink #41.  PERFORMANCE ENHANCEMENTS: - Standard set plus MECO altitude is 52 NM, plus Delta psi. - First use of MECO is 52 NM.  FLIGHT DURATION CHANGES: - None. Landed on orbit 155.  FIRSTS/LASTS: - First flight of Super Light Weight tank - First flight of Block IIA SSME 2047 - Last Shuttle flight to Mir (ninth docking).  EVENTS: - Valery Ryumin's previous flights were Soyuz-25, Soyuz/Salyut-6 (2 flights). - WRAP DAP entry. - Andrew Thomas, last American to visit Mir. Andy transferred to STS-91 from Mir at 155:18:33:24Z. Mir time is 129:02:42:09 and total flight time is 140:15:11:45.  RENDEZVOUS #42: - Rendezvous and docking with Mir.  SIGNIFICANT ANOMALIES: - Center SSME PC sensor failure. - Fuel cell 3 overboard relief. - Fuel cell monitoring time word problem. - MAGR-S3S GPS ascent performance anomaly. - Cyclic GNC GPC errors caused by bad GPS SV caused by handshaking problem between GPS and the GNC. - Failure of Ku-Band to radiate (no Ku-Band return link). - Camera C pan and tilt failure. - Thrusters R2U and F2U failed off at first command firing of both jets (low chamber pressures). - LOMS ball valve I failed open. - RPOP error during approach.



MCC WHITE FCR (21)

**FLIGHT DIRECTORS:**  
A/E – N. W. Hale  
LD/O 1 – P. F. Dye  
O 2 – A. F. Algate  
PLNG – P. L. Engelauf  
MOD – A. L. Briscoe

# SPACE SHUTTLE MISSIONS SUMMARY

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FLT NO.	ORBITER	CREW (7)	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM-ABORT EMERG	SRB RSRM	ORBIT		FSW	PAYLOAD WEIGHTS,	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
		TITLE, NAMES & EVA'S	LANDING SITES, ABORT TIMES	LANDING TIMES FLT DURATION, WINDS	THROTTLE PROFILE ENG. S.N.	AND ET	INC	HA/HP		PAYLOADS/ EXPERIMENTS	
<b>STS-95</b> SEQ FLT #92  KSC-92  PAD 39B-39 MLP-2	OV-103 (Flight 25) Discovery  OMS PODS: LPO1 - 28 RPO3 - 26 FRC3 - 25	CDR: Curtis L. Brown (Flt 5 - STS-47, STS-66, STS-77, STS-85) P539/R152/V112/M136  PLT: Steven W. Lindsey (Flt 2 - STS-87) P540/R229/V131/M200  M/S 1: Stephen K. Robinson (Flt 2 - STS-85) P541/R222/V152/M196  M/S 2: Scott E. Parazynski (Flt 3 - STS-66, STS-86) P542/R187/V145/M164  M/S 3: Pedro Duque (ESA-Spain) P543/R245/M213  P/S 1: Chiaki Mukai (Japan) (Flt 2 - STS-65) P544/R181/V153/F23  P/S 2: Senator John H. Glenn (2) P545/R246/M214  MCC WHITE FCR (22)  FLIGHT DIRECTORS: A/E - L. J. Ham LD/O1 - P. L. Engelauf O 2 - P. S. Hill O 3 - P. F. Dye MOD - J. W. Bantle	KSC 39B 302:19:19:33:98Z 2:00:00 PM EST (P) 2:19:34 PM EST (A) Thursday 28 10/29/98 (10)  LAUNCH WINDOW: 2H30M CTOB  EOM PLS: KSC TAL: BYD TAL WX: BEN, MRN  TDEL: -0.03     -0.108/0.07  MAX Q NAV: 755                      765  SRB STG: 2:03.7                      2:03  PERE: NOMINAL  2 ENG TAL (BYD): 2:11                      2:13  NEG RETURN: 3:45                      3:52  PTA (U/S 500): 4:12                      4:08  DROOP:  5:21  PTM (U/S 500): 5:13                      5:06  MECO CMD: 8:20.7                      8:21.6  VI: 26102                      26092  OMS-2: 41:57                      41:57 5.02 FPS     5.02 FPS	KSC 33 (KSC 45) 311:17:03:30Z 12:03:30 PM EST  Saturday 20 11/7/98 (11)  DEORBIT BURN: 311:15:52:54Z  XRANGE: 172 NM  ORBIT DIR: DL 44  AIM PT: NOMINAL  MLGTD: 3243 FT 311:17:03:30Z VEL: 199 KGS 196 KEAS HDOT: -1.0 FPS  TD NORM 205: 2559 FT  DRAG CHUTE DEPLOY: NOT USED  NLGTD: 6248 FT 311:17:03:40Z VEL: 164 KGS 164 KEAS HDOT: -6.6 FPS  BRK INIT: 138 KGS 8726 FT  DRAG CHUTE JETTISON: NOT USED  BRK DECEL FPS <sup>2</sup> : AVE 5.8 PK 7.8  WHEELS STOP: 311:17:04:30Z 12751 FT  ROLLOUT: 9508 FT 60 SECS  WINDS: OH, 10R KTS OFFICIAL: 0609P14 TO, R9 KTS	104.5/104.5/ 109%  PREDICTED: 100/104.5/ 104.5/67/ 104.5  ACTUAL: 100/104.5/ 104.5/72/ 104.5  ALL BLOCK II A ENGINES  M 3 EOM  WEIGHT: 228455 LBS  X CG: 1076.83  LANDING:  WEIGHT: 228388 LBS  X CG: 1078.45	BI-096  RSRM 68  ET-98  SLWT-2  SLWT RPT MAX: 283K MIN: 215K  SLWT IMPACT 1:28:02 MET LAT: 20.8°N LONG: 147.2°W	28.45° (47)  DIRECT INSERTION  POST OMS-2: 303 X 295 NM  SEP 1: 2:23:46:30 MET 302.2 X 294 NM  SEP 2: 3:06:16:40 MET  TI: 5:22:01:37 MET 301.5 X 293.5 NM  DEORBIT ALT: 301.5 X 285.9 NM  VELOCITY 26063 FPS  ENTRY RANGE 4290 NM	OI-26B (3)  CARGO: 38618 LBS  PAYLOAD CHARGABLE: 28520 LBS  DEPLOYED: 125 LBS  NON-DEPLOYED: 24108 LBS  MIDDECK: 1314 LBS  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 850155 LBS NON-DEPLOYED: 1378355 LBS CARGO TOTAL: 2824652 LBS  PERFORMANCE MARGINS (LBS): FPR: 3783 FUEL BIAS: 720 FINAL TDDP: 1587 RECON: 2740  PAYLOADS: PLB: SPACEHAB (Single) HOST SPARTAN-201 (Deploy & Retrieve) (Solar Wind Exp.) GAS (2) IEH-3 (PANSAT) (Deployed)  MIDDECK: PCG-STES SAREX-II BRIC  5 CYRO TK SETS 5 GN2 TANKS  Continued...	KSC W/D: OPF 76, VAB 5, PAD 29 = 110 days  LAUNCH POSTPONMENTS: - Baselined launch date of 10/8/98 on 7/31/97. - Postponed launch date to 10/29/98 on 12/18/97.  LAUNCH SCRUBS: None  LAUNCH DELAYS: - Held for 9 minutes 36 seconds during T-9 minute hold to understand the cause of the three master alarms (MA) during cabin leak checks. First MA was cabin P reached 15.35 psi during cabin leak check. Two MA's were differential pressure/differential time alarms. It was concluded that the alarms were expected and count was resumed. - Held for 9 minutes 58 seconds at T-5 minutes for range safety hold call for two intruder aircraft in Launch Danger Area. Resumed count but two calls were made to hold at T-31 seconds, one for engine 2 pitch position NO GO and the second for range safety NO GO. These holds were removed before count reached T-31 seconds; hence, no additional delay.  TAL WX: - Banjul, Ben Guerir, and Moron were forecast and observed GO. Banjul was prime and selected.  DOLILU/I-LOADS: - DOLILU II uplink # 23, I-Load uplink # 42.  PERFORMANCE ENHANCEMENTS: - Standard set plus PE High Q.  FLIGHT DURATION CHANGES: None  FLIGHT RULE WAIVER: - Forecast at deorbit burn time was a maximum crosswind of 16 knots. Flight rule limit is 15 knots. Observed crosswind < 10 knots. Landed on orbit 135.  FIRSTS/LASTS/RECORDS: - First flight using High Q flight design. - First flight with three Block IIA SSME's (Rocketdyne HPFTP). - John Glenn's first flight was Mercury-Atlas 6 on 2/20/62. - Glenn's age at first flight 40Y7.5M, second flight 77Y4M, 36Y8.5M between flights. - First flight using space-to-space comm system (as DTO). - Second flight of Super Lightweight Tank (SLWT).  Continued...		



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM-ABORT EMERG	SRB RSRM	ORBIT		FSW	PAYLOAD WEIGHTS,	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
		TITLE, NAMES & EVA'S	LANDING SITES, ABORT TIMES	LANDING TIMES FLT DURATION, WINDS	THROTTLE PROFILE ENG. S.N.	AND ET	INC	HA/HP		PAYLOADS/ EXPERIMENTS	
STS-95  Continued				Continued... DENS ALT: 965 FT FLT DURATION: 8:21:43:56 S/T: 790:03:08:16 OV-103: 186:13:31:48 DISTANCE: 3,644,459 sm						Continued... RMS 51 (S.N. 201) RMS used for SPARTAN-201 deploy, retrieve and berth, ACVS, OSVS, and VGS OPS.	Continued... <u>EVENTS:</u> - SPARTAN-201 release 305:19:00:12Z, 2:23:40:36 MET. - Due to drag chute anomaly, drag chute was not armed and deployed. - Inert weight adjustment -200 lbs included in STS OPR chargeable. - SPARTAN capture 307:20:47:49Z, 5:01:28 MET. Berth 5:01:46 MET. <u>RENDEZVOUS # 43:</u> - Deployed, separated, rendezvoused with SPARTAN-201. <u>RADIATOR DEPLOY # 23</u> - Both port and starboard panels deployed. <u>SIGNIFICANT ANOMALIES:</u> - Low Iodine Residual System (LIRS) large spraying leak. Used backup galley iodine removal system. - Unpleasant taste (rubber hose) from LIRS. - During space-to-space comm tests, no data from EMU 1 in primary. - Drag chute door fell off during ME throttle up at T-5 seconds; hence, not deployed during landing. - Decision made to disable chute for STS-88. - WSB 2 overcooled six times during entry. - SPARTAN ground command problem. - RCS jet L3L failed off, then failed leak.

# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (6)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-88</b> ISS-2A First Shuttle Flight to ISS  SEQ FLT #93  KSC-93  PAD 39A-54MLP-3	OV-105 (Flight 13) Endeavour	CDR: Robert D. Cabana (Flt 4 - STS-41, STS-53, & STS-65) P546/R113/V84/M101  PLT: Frederick W. Sturckow P547/R247/M215  M/S 1/EV 1: Jerry L. Ross (Flt 6 - STS-61-B, STS-27, STS-37, STS-55, & STS-74) P548/R89/V38/M80  M/S 2: Nancy J. Currie (Flt 3 - STS-57, STS-70) P549/R165/V120/F21  M/S 3/EV 2: James H. Newman (Flt 3 - STS-51, STS-69) P550/R168/V122/M146  M/S 4: Sergei Krikalev (Russia) (Flt 2 - STS-60) P551/R176/V154/M154  SS EVA #42: EMU/Tethered EVA #35 Scheduled EVA #36 on 12/7/98 Duration 7H21M EVA start at 3D13H34M MET  SS EVA #43: EMU/Tethered EVA #36 Scheduled EVA #37 on 12/9/98 Duration 7H02M EVA start at 5D11H57M30S MET  SS EVA #44: EMU/Tethered EVA #37 Scheduled EVA #38 on 12/12/98 Duration 6H59M EVA start at 8D11H57M50S MET  Continued...	KSC 39, PAD A 338:08:35:34Z 3:35:34 AM EST (P) 3:35:34 AM EST (A) Friday 18 12/4/98 (5)	KSC 15 (KSC 46) 350:03:53:30Z 10:53:30 PM EST  Tuesday 14 12/15/98 (10)	104.5/104.5/ 109%  PREDICTED 100/104.5/ 104.5/72/ 104.5  ACTUAL 100/104.5/ 104.5/72/ 104.5 1 = 2050 (1) 2 = 2044 (2) 3 = 2041 (5)	BI-095  RSRM 67  ET-97  SLWT-3  SLWT RPT 283K  SLWT BR/UP 207K  SLWT IMPACT: 1:27:30 MET LAT: 1.72°N LONG: 127.2°W	51.60 (1)	DIRECT INSERTION  POST OMS-2 175 X 97 NM  DEPLOY:  SEP BURN: 347:21:49Z 213.1 X 209 NM  RCS-2  COLLISION AVOIDANCE	OI-26B (4)	CARGO: 37731 LBS  PAYLOAD CHARGABLE: 30986 LBS  DEPLOYED: 26791 LBS  NON-DEPLOYED: 3073 LBS  MIDDECK: 1122 LBS  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 877846 LBS NON-DEPLOYED: 1378355 LBS CARGO TOTAL: 2824652 LBS  PERFORMANCE MARGINS (LBS): FPR: 3783 FUEL BIAS: 720 FINAL TDDP: 2365 RECON: 1043  PAYLOADS: PLB: ISS - 2A Node 1/PMA 1&2 (Deployed to ISS) ICBC Mighty Sat (Deployed) SAC-A (Deployed) GAS (1), SEM RMS, ODS  MIDDECK: SIMPLEX  5 CYRO TK SETS 6 GN2 TANKS  RMS 52 RMS used to grapple Node 1 and position on ODS. Grapple FGB and dock with Node 1.	KSC W/D: OPF 187, VAB 5, PAD 37 = 229 days  LAUNCH POSTPONEMENTS: - Baselined launch date of 12/4/97 on 6/21/96. - Postponed launch date to 7/9/98 on 5/27/97. - Postponed launch date to 12/3/98 on 6/4/98.  LAUNCH SCRUBS: - Scrubbed 12/3/98 launch attempt after LO2 drainback hold time of 3M42S expired based on preferred launch time (PLT) 5-minute window (LO2 drainback hold time was 5M19S based on T-0 at PLW opening and 3M42S nominal T-0 at PLT). The Planar Launch Window was 7M48S (opened at 337:08:55:31 and closed at 337:09:03:19). Opted for use of the Preferred Launch Time of 377:08:58:19 which provided a window of 5M00S. An unexpected master alarm (MA), associated with hydraulic system 1 momentary pressure spike, caused an automatic hold at T-4 minutes. After holding at T-4 minutes for 3 minutes, the count was resumed. At T-31 seconds, another hold was called while troubleshooting the MA. Resolution of the MA occurred slightly after the expiration of the 3M42S LO2 drainback hold time. The count was resumed; however, the launch window had expired. Post-flight, it was concluded that the most probable cause of the pressure spike was a "Switch Tease" which momentarily reenergized the systems 1 hydraulic pump pressure solenoid valve.  SHUTTLE NIGHT LAUNCH #20  LAUNCH DELAYS: None. Launched on-time at 338:08:35:34Z, 3:35:34 AM EST, on Friday, December 4, 1998.  TAL WX: - Zaragoza (prime) forecast and observed NO GO (ceiling and crosswind), Moron (selected) forecast and observed GO. Ben Guerir forecast NO GO (ceiling & rain) but observed GO.  DOLILU-II I-LOADS: - Uplink #24, I-Load uplink #43.  PERFORMANCE ENHANCEMENTS: - Standard set plus PE High Q WIN/DEC, OMS assist 4000 lbs, 52 NM MECO, and Del Psi.  FLIGHT DURATION CHANGES: None  FIRSTS/LASTS: - First Shuttle flight to International Space Station (FGB), docked node to PMA/FGB. - First ISS assembly flight.  Continued...



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (6)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-88  Continued		Continued...  MCC WHITE FCR (23)  <u>FLIGHT DIRECTORS:</u> A/E/O 4 - J. P. Shannon LD/O 1 - R. E. Castle O 2 - P. L. Engelauf PIng/O 3 - A. F. Algate MOD - J. W. Bantle ISS LD/O 2 - M. A. Kirasich ISS/O 1 - S. P. Davis ISS/PIng/O 3 - J. M. Hanley		Continued...  <u>WINDS:</u> 5T, 1R KTS <u>OFFICIAL:</u> 3105P09 R2, T5 KTS  <u>DENS ALT:</u> -854 FT  <u>FLT DURATION:</u> 11:19:17:56  <u>S/T:</u> 801:22:26:12  <u>OV-105:</u> 133:04:07:58  <u>DISTANCE:</u> 4,650,000 sm							Continued...  <u>SHUTTLE NIGHT LANDING #10</u> - Landed on orbit 186 on KSC 15.  <u>EVENTS:</u> - STS-88/2A first International Space Station (ISS) assembly flight carried NODE, Unity. - First ISS element, the FGB Zarya, was launched from Baikonar Cosmodrome by a PROTON at 324:06:40:006Z into an orbit of 191.4 X 100 NM at inclination of 51.62 degrees. - STS-88/2A was the first rendezvous and docking of the ISS Program. - RMS grapple of PMA-1/Node 1/PMA-2 at 339:21:54:19Z, unberth at 339:22:08:10Z, installed on ODS at 339:23:52:40Z, ungrapple at 340:00:09:30Z. - RMS grapple of FGB at 340:23:47:02Z, FGB ungrapple at 341:02:43:52Z. - EVA 1 start at 341:22:09:51Z, end at 342:05:30:42Z, duration 7H21M51S. - ISS reboost burn start at 342:20:35:34Z, duration ____. - EVA 2 start at 343:20:33:04Z, end at 344:03:34:34Z, duration 7H01M30S. - Node 1 (Unity) ingress at 344:19:54Z, FGB ingress at 344:21:11Z. - EVA 3 start at 346:20:33:24Z, end at 347:03:32:01, duration 6H58M37S. - SAC-A deployed at 9:20:15 MET. - Mighty SAT deployed at 10:17:13 MET. - Drag Chute was disarmed pending resolution of STS-95 Drag Chute door anomaly. (Mortar was removed.) - Undock at 347:20:24:34Z. - ISS Visitor time 6D17H34M20S  <u>SIGNIFICANT ANOMALIES:</u> - Galley iodine removal assembly hose QD incompatibility. - Five PLB floodlights failed. - Anomalous SAFER S/N 1007 GN2 and tank pressure reading. - GPS anomalies. - APU 2 fuel pump drain line pressure decay. - RCS jet R2D fail leak. - Right Pad A heater circuit failure. - Right RCS 1/2 tank isolation valves fail open. - Right inboard tire pressure indication failed low. - Failed portable foot restraint attachment device hatch pin came out, then broke.  <u>RENDEZVOUS #44</u> - Rendezvous and dock with ISS PMA 2 Node 1 forward port.



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM-ABORT EMERG	SRB RSRM	ORBIT		FSW	PAYLOAD WEIGHTS,	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
		TITLE, NAMES & EVA'S	LANDING SITES, ABORT TIMES	LANDING TIMES FLT DURATION, WINDS	THROTTLE PROFILE ENG. S.N.	AND ET	INC	HA/HP		PAYLOADS/ EXPERIMENTS	
<b>STS-96</b> <b>ISS-2A.1</b>  SEQ FLT #94  KSC-94  PAD 39B-40 MLP-2  Second Shuttle Flight to ISS  First Flight With Logistics and Maintenance  Spacehab #13	OV-103 (Flight 26) Discovery  OMS PODS: LPO1 - 29 RPO3 - 27 FRC3 - 26	CDR: Kent Rominger (Flt 4 - STS-73, STS-80, STS-85) P552/R200/V131/M174  PLT: Rick D. Husband P553/R248/M216  M/S 1/EV 1: Tamara E. Jernigan (Flt 5 - STS-40, STS-52, STS-67, STS-80) P554/R130/V83/F14  M/S 2: Ellen Ochoa (Flt 3 - STS-56, STS-66) P555/R160/V113/F20  M/S 3/EV 2: Daniel T. Barry (Flt 2 - STS-72) P556/R209/V155/M182  M/S 4: Julie Payette (Canada) P557/R249/ F33  M/S 5: Valery Tokarev (Russia) P558/R250/M217	KSC 39B 147:10:49:42Z 6:49:42 AM EDT (P) 6:49:42 AM EDT (A) Thursday 29 5/27/99 (5)  LAUNCH WINDOW: 8M6S USING PREFERRED LAUNCH TIME  EOM PLS: KSC TAL: ZZA TAL WX: MRN, BEN  SELECTED: RTLS: KSC 33/CI/N TAL: MRN 20/N/N AOA: KSC 15/N/N PLS: EDW 22/CI/N  TDEL: 0.1      -0.18/+0.18  MAX Q NAV: 740                      740  SRB STG: 2:04.6                      2:05  PERE: NOMINAL  2 ENG TAL (MRN): 2:17                      2:21  NEG RETURN: 3:54                      3:57  PTA (U/S 272): 4:21                      4:24  DROOP (ZZA): 5:22                      5:24  PTM (U/S 272): 5:30                      5:39  SE TAL (ZZA): 5:51                      5:52  SE PTM: 6:41                      6:48  MECO CMD: 8:22.1                      8:22  VI: 25931                      25929	KSC 15 (KSC 47) 157:06:02:43Z 02:02:43 AM EDT  Sunday 14 6/6/99 (5)  DEORBIT BURN: 157:04:54:09Z  X RANGE: 712 NM  ORBIT DIR: AL 23  AIM PT: CLOSE IN  MLGTD: 1963 FT 157:06:02:43Z 157:06:02:57Z 157:06:03:18Z  NLGTD: 6504 FT 157:06:02:57Z 157:06:03:18Z  VEL: 156 KGS 149 KEAS HDOT: -5.8 FPS  DRAG CHUTE DEPLOY:184 KEAS 157:06:02:51Z  DRAG CHUTE JETTISON: 53 KGS 157:06:03:18Z  BRK DECEL FPS2: AVE 7.1 PK 9.0  WHEELS STOP: 157:06:03:35Z 10829 FT  ROLLOUT: 8866 FT 52 SECS  WINDS: 2H, 5L KTS OFFICIAL: 0904P07 2H, 3L KTS	104/104/ 109%  PREDICTED: 100/104.5/ 104.5/72/ 104.5  ACTUAL: 100/104.5/ 104.5/72/ 104.5  1 = 2047 (2) 2 = 2051 (1) 3 = 2049 (1)  ALL BLOCK IIA SSME'S	BI-098  RSRM 70  ET-100  SLWT-4  ET IMPACT: 1:26:12 MET LAT: 2.46°S LONG: 127.99°W	51.60° (2)  DIRECT INSERTION  POST OMS-2: 182.7 X 177.1 NM  TI: 149:01:35:18Z MET 208.3 X 202.4 NM  MC4: 149:02:55:18Z 209.3 X 208.4 NM  REBOOST: 154:09:36:53Z 213.9 X 208.6 NM  DEORBIT: 213.9 X 208.6 NM  ENTRY VELOCITY 25915 FPS  ENTRY RANGE 4358 NM	OI-27 (1)	CARGO: 33808 LBS  PAYLOAD CHARGABLE: 22707 LBS  DEPLOYED: 4228 LBS  NON-DEPLOYED: 17994 LBS  MIDDECK: 1034 LBS  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 882074 LBS NON-DEPLOYED: 139783 LBS CARGO TOTAL: 2858460 LBS  PERFORMANCE MARGINS (LBS): FPR: 3783 FUEL BIAS: 720 FINAL TDDP: 4435 RECON: 4306  PAYLOADS: PLB: ISS 2A.1 SPACEHAB (Double Module) ODS, OTD STARSHINE (DEPLOYED) SVF ICC  MIDDECK: DTO EMU H/W EMU TOOLS  5 CYRO TK SETS 5 GN2 TANKS  RMS 53 (S.N. 303)	KSC W/D: OPF 122, VAB 12 (2), PAD 30 (2) = 164 days total (Rollback to repair ET foam)  LAUNCH POSTPONEMENTS: - Baselined launch date of 12/9/98 on 10/2/97. - Postponed launch date to 5/13/99 on 6/4/98 (Multi-flight changes to ISS flights), then to 5/20/99, to 5/24/99, and to 5/20/99 on 4/21/99. - Postponed launch date to NET 5/27/99 based on 5/13/99 decision to roll back to VAB on 5/16/99 to repair hail damage to ET foam (648 divots, 459 required repair). - Rolled back to pad on 5/21/99 and confirmed 5/27/99 as the launch date.  LAUNCH SCRUBS: None  LAUNCH WINDOW: - The launch window was in two panes. Pane 1 opened at 147:10:48:46Z and closed at 147:10:54:42Z. There was a 10-second cutout with pane 2 opening at 147:10:54:52Z and closing at 147:10:57:48Z. The total launch window was 9M2S with a 10-second cutout between panes based on the ISS Planar/Phase window. The decision was made to use the Preferred Launch Time (PLT) of 147:10:49:42Z for a launch window of 8 minutes 6 seconds, in two panes with a 10-second gap.  LAUNCH DELAYS: None - Launch occurred on time at 147:10:49:42Z, 6:49:42 AM EDT on Friday, May 27, 1999.  TAL WX: - ZARAGOZA (Prime) was forecast NO GO - tailwind (at landing time observed NO GO, tailwind and thunderstorms). Moron (Selected) and Ben Guerir were both forecast GO and observed GO at landing time.  PERFORMANCE ENHANCEMENTS: - Standard set plus: (1) PE High Q SUM/MAY, (2) OMS assist is 4000 lbs, (3) 52 nm MECO, and (4) Del Psi.  FLIGHT DURATION CHANGES: None - Landed on orbit 154 as planned.  FIRSTS/LASTS/RECORDS: - First flight of Functional Drag Chute with strengthened door pins after problem on STS-95 (Inconel was aluminum). - First logistics/maintenance flight to ISS, Third ISS flight, 2nd Docking Flight to ISS (PMA2) Node 1 forward port.	
		Continued...	Continued...	Continued...						Continued...	Continued...



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM-ABORT EMERG	SRB RSRM	ORBIT		FSW	PAYLOAD WEIGHTS,	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
		TITLE, NAMES & EVA'S	LANDING SITES, ABORT TIMES	LANDING TIMES FLT DURATION, WINDS	THROTTLE PROFILE ENG. S.N.	AND ET	INC	HA/HP		PAYLOADS/ EXPERIMENTS	
STS-96 ISS-2A.1  Continued		Continued...  SS EVA #45: EMU/Tethered EVA #38 on 5/29/99 Scheduled EVA #39 ISS EVA #4 7H55M Duration  MCC WHITE FCR (24)  FLIGHT DIRECTORS: A/E - L. J. Ham LD/O1 - N. W. Hale O 2 - P. F. Dye PLNG - W. D. Reeves MOD - J. W. Bantle ISS LD/O1 - P. S. Hill ISS/O2 - M. J. Kirasich ISS/PLNG - M. J. Ferring	Continued...  OMS-2: 43:11      43:10.6 255 FPS    255 FPS 2:43        2:43	Continued...  DENS ALT: 1321 FT  FLT DURATION: 9:19:13:01  S/T: 811:17:39:13  OV-103: 196:08:44:49  DISTANCE: 4,051,000 sm						Continued...  RMS USED FOR EVA SUPPORT AND SURVEY SVS (SPACE VISION SYSTEM)	Continued...  SHUTTLE NIGHT LANDING # 11: KSC runway 15  EVENTS: - OMS assist burn 147:10:51:57Z with a duration of 2M42S. - RCS MC4 at 149:02:55:17/01:16:05:35 MET. - ISS ring capture 149:04:23:51Z, docking 149:04:37:38Z/01:17:47:56 MET at PMA2, Node 1 Forward Port. - STARSHINE deployed at 156:07:21Z/08:20:32 MET. - Crew ingress ISS PMA2 at 149:07:00Z/01:20:10 MET. - IFM: Replaced FGB Battery MIRT's, and Replaced ECOMM Transceiver and Power Distribution Box. - EVA Start Time 150:16:21:36Z/03:05:31:54 MET. EVA End Time 151:00:16:36Z/03:13:26:54 MET. EVA tasks include Installation of FGB target mask, installed Orbital Transfer Device and IAPFR on PAM 1, installed Strela crane on PMA2, installed trunnion pin cover, and transferred EVA tools to Node 1. - Reboost Start 154:09:36:54Z/06:22:47:11 MET. Reboost End 154:10:11:40Z, Delta V 21.8 fps, altitude increased 6 nm, orbit 212.1 by 206.2 nm. - Undocking complete 154:22:39:17Z/07:11:36 MET. - ISS Visitor time is 5:18:01:39. - Final transfers to ISS: EVA 661 lbs, IVA transfers 2881 lbs, and water transfers 686 lbs (7 CWC's), Total to ISS 4228 lbs. To Shuttle 197 lbs. - Return IVA transfers to Discovery 213 lbs. - Landed on orbit 154, Ascending Left 23, Crossrange 712 NM, range 4370 NM, Runway 15.  RENDEZVOUS # 45: - Rendezvous and dock with ISS.  RADIATOR DEPLOY # 24:  SIGNIFICANT ANOMALIES: - Humidity separator B water carryover. - Vestibule leakage during airlock depress. - SSOR anomalies: choppy EVA comm, EVA comm squeal, SSOR noise malfunctions during EVA, EMU TLM from SSOR static. - Difficulty attaching SCU 1 to DCM. - Lost LG/SM retractable tether - came off fish stringer. - Small equipment hook failed open - tether release from D-ring on miniworkstation. - SAFER Pyro Valve Fired/Manual Isolation Valve open. - F4R Thruster declared failed leak by RM.



# 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		FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
							INC	HA/HP			
<b>STS-93</b>  SEQ FLT # 95  KSC- 95  PAD 39B-41  MP-1L	OV-102 (Flight 26) Columbia  OMS PODS: LPO5-15 RPO5-14 FRC2-26  PLT: Jeffrey S. Ashby P560/R251/M218  M/S 1: Cady G. Coleman (Flt 2 - STS-73) P561/R201/V156/F27  M/S 2: Steven A. Hawley (Flt 5 - STS 41-D, STS 61-C, STS-31 & STS-82) P562/R39/V29/M38  M/S 3: Michel Tognini (CNES-France) P563/R252/M219  MCC WHITE FCR (25)  FLIGHT DIRECTORS: A/E/O1 - J. P. Shannon LD/O 2 - B. P. Austin & P. F. Dye PLNG - C. W. Shaw MOD - B. R. Stone & J. W. Bantle	KSC PAD 39B 204:04:31:00Z 12:24:00 AM EDT (P) 12:31:00 AM EDT (A) Friday 19 7/23/99 (6)  LAUNCH WINDOW: 46 Minutes  EOM PLS: KSC TAL: BYD TAL WX: BEN  SELECTED: RTLS: KSC 15/N/N TAL: BEN 36/N/N AOA: EDW 22/N/N PLS: EDW 22/CI/N  TDEL: 0.05      0.092/0.13  MAX Q NAV: 673                  675  SRB STG: 2:03.5                  2:04  PERE: NOMINAL  2 ENG TAL (BEN): 3:20                  3:18  NEG RETURN: 3:52                  3:59  PTA (U/S 219): 5:25                  5:19  DROOP: 5:26                  5:25  SE TAL (BYD): 6:02                  5:59  PTM (U/S 219): 6:20                  6:10  MECO CMD: 8:28                  8:28  VI: 25876                  25859  Continued...	KSC 33 (KSC 48) 209:03:20:35Z 11:03:20:35 PM EDT  Wednesday 10 7/28/99 (9)  DEORBIT BURN: 209:02:19:00Z  X RANGE: 83 NM  ORBIT DIR: DL 45  AIM PT: NOMINAL  MLGTD: 2533 FT 209:03:20:35Z VEL: 201 KGS 196 KEAS HDOT: -1.0 FPS  TD NORM 195: 2628 FT  DRAG CHUTE DEPLOY: 190 KEAS 209:03:20:37Z  NLGTD: 5470 FT 209:03:20:44Z VEL: 159 KGS 149 KEAS HDOT: -4.1 FPS  BRK INIT: 122 KGS  DRAG CHUTE JETTISON: 43 KGS 209:03:21:05Z  BRK DECEL FPS <sup>2</sup> : AVE 9.1 PK 10.4  WHEELS STOP: 209:03:21:19Z 9384 FT  ROLLOUT: 6851 FT 44 SEC  Continued...	104/104/ 109%  PREDICTED: 100/104/104/ 67/104  ACTUAL: 100/104/104/ 67/104  1 = 2012 (22) 2 = 2031 (17) 3 = 2019 (19)  M 3 EOM:  WEIGHT: 202872 LBS  X CG: 1097.54  LANDING:  WEIGHT: 202796 LBS  X CG: 1099.36	BI-097  RSRM 69  ET-99  SLWT-5  ET RPT: 283K  ET BR/UP: K  ET IMPACT  MET: 1:23:16 LAT: 17.54°N LONG: 154.66°W	28.45° (48)  DIRECT INSERTION  POST OMS-2: 154 X 145 NM	OI-26B (5)	CARGO: 52382 LBS  PAYLOAD CHARGEABLE: 49798 LBS  DEPLOYED: 43080 LBS  NON-DEPLOYED: 5171 LBS  MIDDECK: 1538 LBS  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 925154 LBS NON-DEPLOYED: 1404092 LBS CARGO TOTAL: 2910842 LBS  PERFORMANCE MARGINS (LBS): FPR: 3553 FUEL BIAS: 720 FINAL TDDP: 2081 RECON: -3981  PAYLOADS: PLB: AXAF-I/IUS (CHANDRA deployed)  MIDDECK: MSX, SIMPLEX, SWUIS, GOSMAR, STL-B, LFSAH, CCM, SAREX-II, EARTHKAM, PGIM, CGBA, MEMS, BRIC	KSC W/D: OPF 223, VAB 5, PAD 43 = 271 days total.  LAUNCH POSTPONEMENTS: - Baselined 8/27/98 as launch date on 5/16/97. - Postponed launch date to 12/3/98 and to 1/21/99 (Multi-flight change to ISS flights). - Postponed to 3/18/99, to 3/25/99, to 4/8/99, to 4/15/99, to 7/9/99, to 7/22/99, and to 7/20/99 (primarily Chandra AXAF/IUS delays).  LAUNCH SCRUBS: - 7/20/99 (12:36 AM EDT.) Launch attempt was halted with a manual GLS cutoff at T-7 seconds (approximately 200 milliseconds prior to Main Engine Start) due to a (false) spike indication of 640 ppm H2 concentration in the aft. Insufficient time to wait for the confirmation sample at T-8 seconds and allow time to issue a manual GLS cutoff before Main Engine Start at T-6.33 seconds. The manual cutoff call was made at T-10 seconds. A 48-hour scrub turnaround was required to replace the Hydrogen Long-Throw Igniters. KSC, BYD, and BEN were forecast and observed GO. Launch reset for 7/22/99. Technical Scrub. - 7/22/99 (12:28 AM EDT.) Launch attempt was scrubbed at T+47:30 due to Range and RTLS weather. During count, rain and lightning hits within 20 NM, and thunderstorms within 20 NM. Counted down to T-5 minutes and held awaiting improved weather. Mission Director gave ok to extend window 36 minutes by giving up first day deploy. Scrubbed launch at 203:05:17:35Z (T+47:30) with no signs of improvement in weather (lightning within 8.6 miles of SLF and thundershowers within 20 NM). Banjul was NO GO for ceiling/rain. Ben Guerir was GO. Launch reset for 7/23/99. Weather Scrub.  LAUNCH WINDOW: 46 Minutes planned window. During count, the customer relaxed contingency deploy opportunities and IUS battery eclipse constraints to extend window to 116 minutes; however, launch window was limited to Range availability (60 minutes).  LAUNCH DELAY: - Launch was delayed 7MOS during T-20 minute hold for MILA to change out A Frame Sync Box to restore the forward link. - Launched at 204:04:31:00Z, 12:31:00 AM EDT on July 23, 1999.  SHUTTLE NIGHT LAUNCH #21  Continued...		



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (5)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-93  Continued			Continued...  <u>OMS-2:</u> 41:04      41:06.9 200 FPS    200 FPS 2:14            2:14	Continued...  <u>WINDS:</u> 04T, 5L KTS <u>OFFICIAL:</u> 2405P06 SS: OT, 5L PK: OT, 6L  <u>DENS ALT:</u> 1551 FT  <u>FLT DURATION:</u> 4:22:49:35  <u>S/T:</u> 816:16:28:48  <u>OV-102:</u> 273:21:09:17  <u>DISTANCE:</u> 1,796,000 sm						Continued...  <u>TAL WX:</u> - Banjul (prime) was forecast NO GO (thunderstorms and anvil clouds) and observed NO GO (thunderstorms and ceiling). Ben Guerir (selected) was forecast and observed GO.  <u>PERFORMANCE ENHANCEMENTS:</u> - Standard set. - PE LO Q SUM/JUL  <u>SHUTTLE NIGHT LANDING # 12:</u> KSC 33 on Wednesday, 7/28/99 at 11:20:35 PM EDT - moonlit landing.  <u>FLIGHT DURATION CHANGES:</u> None - Landed on orbit 80 as planned.  <u>FIRSTS/LASTS:</u> - First space flight with female Commander (Eileen Collins). - First U.S. flight for Michel Tognini (CNES-France). Michel's first space flight was to Mir on Soyuz TM-15S. - Last flight of phase 2 engines. - Most aft landing Xcg (1099.36)  <u>SHUTTLE NIGHT LAUNCH #21</u>  <u>SHUTTLE NIGHT LANDING #12:</u>  <u>SIGNIFICANT ANOMALIES:</u> - At approximately Liftoff plus 5 seconds, there was a short circuit on AC1 Phase A for approximately 0.5 seconds. The resultant under voltage caused SSME 1 "A" and SSME 3 "B" controllers to be disqualified. Postflight, it was determined the short was on AC1 Phase A to SSME 1 "A" controller. - At liftoff, the right SRB hydraulic pressure sensor 2 was erratic. - Four ET LO2 sensors indicated dry resulting in low-level cutoff of main engines and slightly early MECO. - Right SSME multiple performance parameters deviations (Post-flight inspection revealed ruptures in three Engine 2019 nozzle tubes caused by an impact of a loose LOX post deactivation pin. LH2 leak resulted in controller compensating for fuel loss with additional LOX flow, a 16 fps underspeed, and 8 nm lower altitude). - CRT 3 Critical BITE. - High-load FES excessive water carryover. - Camcorder tape jam. - Primary thruster F2D low fuel injector temperature.	

# SPACE SHUTTLE MISSIONS SUMMARY

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FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
<b>STS-103</b>  SEQ FLT #96  KSC-96  PAD 39B-42 MLP-2  HST FLT #4 (SM-3A)  HST SERVICE FLT #3	OV-103 (Flight 27) Discovery  OMS PODS: LPO1-30 RPO3-28 FRC3-27	<b>CDR:</b> Curtis L. Brown (Flt 6 - STS-47, STS-66, STS-77, STS-85, & STS-95) P564/R152/V112/M136  <b>PLT:</b> Scott J. Kelly P565/R253/M220  <b>M/S 1/EV 1:</b> Steven L. Smith (Flt 3 - STS-68, STS-82) P566/R184/V137/M161  <b>M/S 2:</b> Jean-Francois Clervoy (ESA-France) (Flt 3 - STS-66, STS-84) P567/R186/V140/F163  <b>M/S 3/EV 2:</b> John M. Grunsfeld (Flt 3 - STS-67, STS-81) P568/R191/V133/M167  <b>M/S 4/EV 3:</b> Michael Foale (Flt 5 - STS-45, STS-56, STS-63, Up STS-84, & Dn STS-86) P569/R143/V92/M127  <b>M/S 5/EV 4:</b> Claude Nicollier (ESA-Switzerland) (Flt 4 - STS-46, STS-61, & STS-75) P570/R150/V98/M134  SS EVA #4 EMU/TETHERED EVA #39 ON 12/22/99 SCHEDULED EVA #40 DURATION 8:15:30  Continued...	KSC, PAD 39B 354:00:50:00Z 7:50:00 PM EST (P) 7:50:00 PM EST (A) Sunday 12 12/19/99 (6)  <b>LAUNCH WINDOW:</b> 42M16S HST Planar/Phase Window  <b>EOM PLS:</b> KSC TAL: BYD TAL WX: BEN  <b>SELECTED:</b> RTLS: KSC 15/N/N TAL: BEN 36/N/N AOA: EDW 04/N/N PLS: EDW 22/N/N  <b>TDEL:</b> 0.08 -0.158/-0.12  <b>MAX Q NAV:</b> 718 720  <b>SRB STG:</b> 2:05.3 2:05  <b>PERF:</b> NOMINAL  <b>2 ENG TAL (BEN):</b> 2:05 2:05  <b>NEG RETURN:</b> 3:51 3:54  <b>PTA (U/S 500):</b> 3:09 3:08  <b>PTM (U/S 500):</b> 4:16 4:15  <b>SE TAL (BYD):</b> 5:37 5:43  <b>MECO CMD:</b> 8:24.4 8:25.9  <b>VI:</b> 26128 26124  Continued...	KSC 33 (KSC 49) 362:00:00:47Z 7:00:47 PM EST  Monday 17 12/27/99 (11)  <b>DEORBIT BURN:</b> 361:22:48:26Z  <b>XRANGE:</b> 155 NM  <b>ORBIT DIR:</b> DL 46  <b>AIM PT:</b> NOMINAL  <b>MLGTD:</b> 2804 FT 362:00:00:47Z VEL: 187 KGS 186 KEAS HDOT: -2.9 FPS  <b>TD NORM 195:</b> 2237 FT  <b>DRAG CHUTE DEPLOY:</b> 176 KEAS 362:00:00:50Z  <b>NLGTD:</b> 5955 FT 362:00:00:58Z VEL: 141 KGS 138 KEAS HDOT: -4.6 FPS  <b>BRK INIT:</b> 111 KGS  <b>DRAG CHUTE JETTISON:</b> 54 KGS 362:00:01:18Z  <b>BRK DECEL FPS:</b> AVE 6.5 PK 10.0  <b>WHEELS STOP:</b> 362:00:01:35Z 9809 FT 48 SECS  <b>ROLLOUT:</b> 7005 FT  Continued...	104/104/109%  <b>PREDICTED:</b> 100/104.5/104.5/67/104.5  <b>ACTUAL:</b> 100/104.5/104.5/67/104.5  ALL IIA ENGINES  <b>M 3 EOM:</b>  WEIGHT: 212288 LBS  X CG: 1080.64  <b>LANDING:</b>  WEIGHT: 212217 LBS  X CG: 1082.39	BI-099  RSRM 73  ET-101  SLWT-6  ET RPT: 283K  ET IMPACT: 1:19:15 MET LAT: 17.4°N LONG: 141.4°W	28.45° (49)  DIRECT INSERTION  <b>POST OMS-2:</b> 315.4 X 170.2 NM  DEORBIT: 330 X 301 NM  <b>ENTRY VELOCITY:</b> 26114 FPS  <b>ENTRY RANGE:</b> 4237 NM	OI-26B (6)  <b>CARGO:</b> 20276 LBS  <b>PAYLOAD CHARGABLE:</b> 13208 LBS  <b>DEPLOYED:</b> 5423 LBS  <b>NON-DEPLOYED:</b> 6451 LBS  <b>MIDDECK:</b> 1334 LBS  <b>SHUTTLE ACCUMULATED WEIGHTS DEPLOYED:</b> 930577 LBS <b>NON-DEPLOYED:</b> 1411877 LBS <b>CARGO TOTAL:</b> 2931118 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 3783 FUEL BIAS: 720 FINAL TDDP: 13576 RECON: 13308  <b>PAYLOADS PLB:</b> HST SM-3A (3rd HST Service Flight)  5 CYRO TK SETS 6 GN2 TANKS  RMS 54 (S.N. 301)  RMS USED FOR HST GRAPPLE, BERTH, AND RELEASE AND EVA SUPPORT	KSC W/D: OPF 141, VAB 9, PAD 36 = 186 days  <b>LAUNCH POSTPONEMENTS:</b> - Baselined 10/14/99 as launch date on 3/18/99. - Postponed launch to 11/19/99 on 9/16/99. OV-103 wire inspections and repair. - Postponed launch to 12/2/99 on 10/22/99. OV-103 wire inspections and repair. - Postponed launch to 12/6/99 on 11/10/99. OV-103 wire inspections and repair. - Postponed launch to 12/11/99 on 12/7/99. Replacement of damaged SSME wiring harness. - Postponed launch to 12/16/99 on 12/9/99. Changeout of dented LH2 4-in Recirc manifold.  <b>LAUNCH SCRUBS:</b> - Scrubbed 12/16/99 launch attempt at 9:18 AM EST at ET Tanking MMT while holding at T-6 hours. ET weld wire issue caught by vendor X-ray inspection. ET cleared ET hardware. Orbiter needed 24 hours to review orbiter weld processes and personnel records to evaluate possible impact to orbiter hardware. Review found no issue to orbiter fleet. Reset launch to 12/17/99. Technical Scrub. - Scrubbed 12/17/99 launch attempt at 8:47 PM EST at 4 minutes into window due to KSC range and RTLS weather. Weather concerns were low ceiling (broken 6500 feet), rain, turbulence, thick cloud layer (triggered lightning), and RTLS crosswinds at limit. Had difficulty getting Jimsphere balloons to altitude due to icing conditions. Use of 450 Mhz radar profiler as backup confirmation of wind persistence was being worked. EDW runway distance lighting markers power failure. FD switched to NOR for AOA and first day PLS. Launch was scrubbed when it became evident bad weather conditions would continue throughout the remainder of the window. Ben Guerir and Banjul TAL sites were GO. Ben Guerir was selected. Reset launch to 12/18/99. Window was 42M11S first pane, 10 second cutout, and then 4M11S in second pane. Weather Scrub. - Scrubbed 12/18/99 launch attempt at 8:21 AM EST at ET Tanking MMT while holding at T-6 hours due to observed and forecast bad Range and RTLS weather: Rain, low ceiling, and thick clouds triggered lightning conditions. Decision to evaluate 8 + 2, 3 EVA flight, evaluate landing as late as 12/29/99, and vehicle configuration for holiday standdown. At MMT Meeting at 8:30 AM EST on 12/19/99, decision was made to recommend GO for launch on 12/19/99 at 7:50 PM EST. Weather forecast was good and ET MMT gave a GO to tank. Range and RTLS Weather Scrub.  Continued...		



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM-ABORT EMERG	SRB RSRM	ORBIT		FS W	PAYLOAD WEIGHTS,	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
		TITLE, NAMES & EVA'S	LANDING SITES, ABORT TIMES	LANDING TIMES FLT DURATION, WINDS	THROTTLE PROFILE ENG. S.N.	AND ET	INC	HA/HP		PAYLOADS/ EXPERIMENTS	
STS-103 Continued		Continued...  SS EVA #47 EMU/TETHERED EVA #40 ON 12/23/99 SCHEDULED EVA #41 DURATION 8:10  SS EVA #48 EMU/TETHERED EVA #41 ON 12/24/99 SCHEDULED EVA #42 DURATION 8:09  MCC WHITE FCR (26)  FLIGHT DIRECTORS: A/E/O 4 - N. W.Hale LD/O 1 - L. J. Ham O 2 - B. P. Austin Plng - J. M. Hanley MOD - J. W. Bantle	Continued...  OMS-2: 44:15                      44:08 252 FPS                  247 FPS 2:34                              2:34  DISTANCE:	Continued...  WINDS: 1T, 7L KTS OFFICIAL: 2406P12  DENS ALT: -107 FT  FLT DURATION: 7:23:10:47  S/T: 824:15:39:35  OV-103: 204:07:55:46  DISTANCE: 3,267,360 sm							Continued...  LAUNCH WINDOW: Launch window 42M16S in one pane.  LAUNCH DELAYS: None - Launched at 354:00:50:00Z (GMT date 12/20/99), 7:50:00 PM EST, on Friday, 12/19/99.  TAL WX: - Banjul (prime) was forecast and observed NO GO with visibility 3 miles (smoke/haze). Ben Guerir (selected) was forecast and observed GO.  PERFORMANCE ENHANCEMENTS: - Standard set. PE LO Q WIN/DEC  SHUTTLE NIGHT LAUNCH #22  FLIGHT DURATION CHANGES: - Planned landing at KSC on orbit 119. Extended flight one orbit for weather. Waved off landing at KSC on orbit 119 due to crosswinds of 18 knots, peak 19 knots and STA reported turbulence at 500 feet. Landed on KSC 33 on orbit 120.  SHUTTLE NIGHT LANDING #13 - Landed on KSC 33 on orbit 120 at 362:00:00:47Z, 7:00:47 PM EST on Monday, December 27, 1999.  EVENTS: - HST grapple at 356:00:34:01Z; HST berth 356:01:42:00Z. - EVA-1 - Start at 356:18:41:01Z; MET 02:18:04:40 to 03:02:19 MET; duration 8:15:30. - EVA 2 - Start MET 03:18:16 to 04:02:26; duration 8:10. - EVA 3 - MET 04:13:27 to 05:02:36; duration 8:09. - HST unberth at 359:21:18:41Z; HST release 359:23:03:01Z.  RENDEZVOUS # 46: - Rendezvous, capture, service, and release HST.  SIGNIFICANT ANOMALIES: - Jammed PFR roll joint. - Loss of power indication on middeck EMU battery charger. - HST PFR pitch joint would not lock. - Release hatch Pip Pin on Starboard Airlock hinge. - EMU 2 Power up failure. - Bent pin on EMU3 DCM.



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (6)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-99 Continued			Continued...  OMS-2: 34:59.5      35:03 181 FPS      181 FPS	Continued...  FLT DURATION: 11:05:38:44  S/T: 835:21:18:19  OV-105: 144:09:46:40  DISTANCE: 4,708,821 sm							Continued...  <u>PERFORMANCE ENHANCEMENTS:</u> - Standard Set plus: (1) Interim generic High Q WIN/FEB, and (2) OMS Assist is 4000 lbs.  <u>FLIGHT DURATION CHANGES:</u> Extended One Rev due to Crosswind Violations at KSC. Waved off landing on orbit 181.  <u>FIRSTS/LASTS:</u> - First Shuttle flight in the year 2000. - First flight of Shuttle Radar Topography Mission using dual-antenna imaging radar with antennas mounted on 200 foot extended boom. - Last flight of Lightweight ET.  <u>EVENTS:</u> - Landed on KSC runway 33 on orbit 182 at 53:23:22:24Z, 6:22:24 PM EST on Tuesday, 2/22/00.  <u>SIGNIFICANT ANOMALIES:</u> - GPC I/O Errors and EMEC preflight BITE error. - LH2 Manifold Pressure Tape Meter Oscillations. - WSB 2 undercool during ascent. - CRT 1 BITE. - ET GH2 Ullage Pressure Low at MECO. - Forward Mission Timer Display Elements Failed. - RRCS Fuel Regulator B Primary Stage Leakage. - Vernier Thruster L5D Oxidizer Temperature Erratic. - Supply water dump nozzle blockage. - APU 1 GG Injector tuber temperature failure.

# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	LAUNCH SITE, LIFTOFF TIME,	LANDING SITE/ RUNWAY, CROSSRANGE	SSME-TL NOM-ABORT EMERG	SRB RSRM	ORBIT		FSW	PAYLOAD WEIGHTS,	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS,
		TITLE, NAMES & EVA'S	LANDING SITES, ABORT TIMES	LANDING TIMES FLT DURATION, WINDS	THROTTLE PROFILE ENG. S.N.	AND ET	INC	HA/HP		PAYLOADS/ EXPERIMENTS	TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
<b>STS-101/ISS 2A.2a</b>  SEQ FLT #98  KSC-98  PAD 39A-56 MLP-1  THIRD SHUTTLE FLIGHT TO ISS  SPACEHAB #14	OV-104 (Flight 21)  Atlantis  OMS PODS: LPO3-25 RPO4-21 FRC4-21	<b>CDR:</b> James D. Halsell (Flt 5 - STS-65, STS-74, STS-83, STS-94) P577/R178/V123/M156  <b>PLT:</b> Scott J. Horowitz (Flt 3 - STS-75, STS-82) P578/R210/V135/M183  <b>M/S 1:</b> Mary Ellen Weber (Flt 2 - STS-70) P579/R198/V160/F26  <b>M/S 2/EV1:</b> Jeffrey N. Williams P580/R255/M222  <b>M/S 3/EV2:</b> James S. Voss (Flt 4 - STS-44, STS-53, STS-69) P581/R136/V85/M121)  <b>M/S 4:</b> Susan J. Helms (Flt 4 - STS-54, STS-64, STS-78) P582/R158/V108/F19  <b>M/S 5:</b> Yuri Usachev (Russia) P583/R256/M223	KSC 39A 140:10:11:10Z 6:11:10 AM EDT (P) 6:11:10 AM EDT (A) Friday 21 5/19/00 (6)	KSC 15 (KSC 51) 150:06:20:19Z 2:20:19 AM EDT  Monday 18 5/29/00 (9)	104/104/ 109%  PREDICTED: 100/104.5/ 104.5/72 104.5  ACTUAL: 100/104.5/ 104.5/72/ 104.5  1 = 2043 (4) 2 = 2054 (1) 3 = 2049 (3)  ALL BLOCK IIA SSME'S	BI-101  RSRM 74  ET-102  SLWT-7  ET IMPACT 1:26:29 MET  LAT: 1.955  LONG: 127.3 W	51.60 (3)  DIRECT INSERTION  POST OMS-2: 178.9 X 85.2 NM	01-27 (3)	<b>CARGO:</b> 35604 LBS  <b>PAYLOAD CHARGEABLE:</b> 24733 LBS  <b>DEPLOYED:</b> 3371 LBS  <b>NON-DEPLOYED:</b> 20159 LBS  <b>MIDDECK:</b> 1262 LBS  <b>SHUTTLE ACCUMULATED WEIGHTS:</b> DEPLOYED: 934208 LBS NON-DEPLOYED: 1462107 LBS <b>CARGO TOTAL:</b> 3002132 LBS  <b>PERFORMANCE MARGINS (LBS):</b> FPR: 3783 FUEL BIAS: 720 FINAL TDDP: 733 RECON: 998  <b>PAYLOADS:</b> PLB:  ISS 2A.2a Spacehab DM ICC, SEM-06, MARS RMS, ODS  <b>MIDDECK:</b> CPCG PCG-BAG BIOTUBE AST  5 CRYO TK SETS 6 GH2 TANKS RMS 55  RMS USED FOR EVA SUPPORT	<b>KSC W/D:</b> OPF 333, VAB 8, PAD 50 = 391 days total.  <b>LAUNCH POSTPONEMENTS:</b> - Baselined 8/5/99 as launch date on 10/5/98. Postponed to 10/14/99, then 12/2/99. TACAN scars removed for GPS scar then reinstated TACAN. - Postponed launch to 11/19/99 on 9/16/99. OV-103 wire inspections and repair. - Postponed launch to 12/2/99 on 10/22/99. OV-103 wire inspections and repair. - Postponed launch to 4/14/00 on 4/16/00. CDR training accident (ankle) - Postponed launch to 4/24/00 on 4/16/00. OV-104 Rudder/Speed Brake PDU R&R from OV-102.  <b>LAUNCH SCRUBS:</b> - Scrubbed 3:17:17 PM EDT (115:20:17:17Z) 4/24/00 launch attempt while holding at T-9 minutes due to high RTLS crosswinds. Scrub was declared at approximately L-15 minutes, when RTLS crosswinds observed and forecast to exceed the 15-knot limit. - Scrubbed 2:53:17 PM EDT (116:19:53:17Z) 4/25/00 launch attempt at L-1:35:00 by Launch Director when RTLS crosswinds persisted in 29-30 knots range and were forecast to exceed limit. RTLS Weather Scrub. - Scrubbed 2:34:16 PM EDT (117:19:34:17Z) 4/26/00 launch attempt at 117:19:21Z (L-0H13M) while holding in T-9 min hold due to no TAL site. All three TAL sites were observed and forecast NO GO: ZZA for showers within 20 nm and forecast chance of broken 4000 feet. MRN for showers/thundershowers and forecast chance of broken 3000 feet. BEN was observed and forecast NO GO for crosswind violation. BEN wind swing from around 285 degrees to around 300 degrees after sundown did not materialize - crosswind forecast was steady state R11 and P16. The launch window opened 117:19:24:42Z and closed at 117:19:34:16Z and the PLT was 117:19:29:13Z for a launch window of 4M55S. TAL WX Scrub. - Unable to get May 9 launch date due to GOES launch delays. Scheduled a May 18 launch at 6:32:00 AM EDT. At approximately L-36 hours, the Atlas III launch scrub due to high winds caused a slip to May 19.  <b>LAUNCH WINDOW:</b> - Window opened at 140:10:09:29Z and closed at 140:10:16:14Z for a total window of 6M45S. Selected Preferred Launch Time (PLT) of 140:10:11:10Z for a launch window of 5M4S.  <b>LAUNCH DELAYS:</b> None - Launched on time at 140:10:11:10Z, 6:11:10 AM EDT on Friday, May 19, 2000.  <b>TAL WX:</b> - Zaragoza (Prime and Selected), Moron, and Ben Guerir all forecast and observed GO.	



Continued...

# SPACE SHUTTLE MISSIONS SUMMARY

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101/2A.2a

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-101/ISS 2A.2a		Continued... MCC WHITE FCR (28)  FLIGHT DIRECTORS: A/E - J. P. Shannon LD/O1 - P. L. Engelauf O2 - K. B. Beck PLNG - C. W. Shaw PLNG/O2 - L. E. Cain (Beck, Shaw, and Cain switched shifts during flight.)  ISS LD/O1 - P. S. Hill ISS O2 - A. F. Algate ISS PLNG - J. M. Curry MOD - J. W. Bantle		Continued...  FLT DURATION: 9:20:09:09  S/T: 845:17:27:28  OV-104: 160:18:39:34  DISTANCE: 5,076,281 sm							Continued...  PERFORMANCE ENHANCEMENTS: - Standard Set Plus: (1) PE Operational - High Q TRN/APR, (2) OMS Assist is 4000 lbs, (3) 52 NM MECO, and (4) Del psi  FLIGHT DURATION CHANGES: - One-day extension. Extended flight one day to accomplish ISS tasks.  SHUTTLE NIGHT LAUNCH #23  SHUTTLE NIGHT LANDING #14 - Landed on KSC runway 15 at 150:06:20:19Z, 2:20:19 AM EDT on Monday, May 29, 2000.  FIRSTS/LASTS: - First flight of glass cockpit (MEDS) - First flight of OV-104 since STS-86 after OMDP.  EVENTS: - ISS ring capture at 142:03:56:10Z - Docked with ISS PMA2 Node 1 Forward Port at 142:04:44:09Z, 1:18:32:59 MET. - EVA 1 Start at 143:01:52:58Z, 2:15:41:48 MET and End at 143:08:36:58Z, 2:21:25:48 MET, duration 6:44. - Reboost #1 - Start at 145:00:02:11Z, 4:13:51:01 MET, 29.06 fps, final orbit 190 by 184 nm, increase approximately 9 nm. - Reboost #2 - Start at 146:02:14:01Z, 5:16:02:51 MET, 29 fps, final orbit 196 by 195 nm, increase approximately 9 nm. - Reboost #3 - Start at 146:23:32:38Z, 6:13:21:28 MET, 28.2 fps, final orbit 206.7 by 199.5 nm. - Undocked at 147:23:02:38Z, 7:12:51:18 MET - STS-101/2A.2a ISS Visitor Time is 5D:18H:18M:29S (Docking to Undocking) - Total transfers: To ISS, 3371 lbs consisting of 2657 lbs dry cargo (IVA), 4 CWC's with 387 lbs H2O, and External (EVA) 327 lbs. From ISS, 1391 lbs. Net transfer to ISS was 1980 lbs. - Completed air quality work, R&R FGB failed electrical equipment and FGB lifetime equipment. EVA tasks completed include installation of OTD and Strela cranes and ECOMM antenna R&R.  RENDEZVOUS #47 - Rendezvous and dock with ISS at PMA2, Node 1 Forward Port.  SIGNIFICANT ANOMALIES: - Left OMS Engine Bipropellant Valve 2 indicates open. - Left OMS Engine GN2 regulator pressure low during Post-Firing Purges. - Ku-band radiating within RF Protect Box. - PRSD Oxygen Tank 4 Heater temporarily failed. - Collins TACAN BITE faults. - Slump tile at wing leading edge with internal flow. - APCU 1 converter B failure. - MEDS MDU CRT 2 display screen came up blank. - Speedbrake Ch 3 secondary Delta Pressure delayed response.



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)		
		TITLE, NAMES & EVA'S					INC	HA/HP					
<b>STS-106/ISS 2A.2b</b>  SEQ FLT #99  KSC-99  PAD 39B-43  MLP-2  FOURTH SHUTTLE FLIGHT TO ISS  SPACEHAB #15	OV-104 (Flight 22) Atlantis  OMS PODS: LPO3-26 RPO4-22 FRC4-22  PLT: Scott D. Altman (Flt 2 - STS-90) P585/R237/V161/M207  M/S 1/EV1: Edward T. Lu (Flt 2 - STS-84) P586/R222/V162/M194  M/S 2: Richard A. Mastracchio P587/R257/M224  M/S 3: Daniel C. Burbank P588/R258/M225  M/S 4/EV2: Yuri Malenchenko (Russia) P589/R259/M226  M/S 5: Boris Morukov (Russia) P590/R260/M227  SS EVA #50 EMU/TETHERED EVA #43 SCHEDULED EVA #44 DURATION 6:14	CDR: Terrence W. Wilcott (Flt 4 - STS-68, STS-79, STS-89) P584/R183/V130/M160	KSC PAD 39B 252:12:45:47Z 8:45:47 AM EDT (P) 8:45:47 AM EDT (A) Friday 22 9/8/00 (10)	KSC 15 (KSC 52) 264:07:56:44Z 3:56:44 AM EDT  Wednesday 11 9/20/00 (10)	104/104/ 109%  PREDICTED: 100/104.5/ 104.5/72 104.5  ACTUAL: 100/104.5/ 98/72/104.5  1 = 2052 (2) 2 = 2044 (4) 3 = 2047 (4)  ALL BLOCK IIA SSME'S	BI-102  RSRM 75  ET-103  SLWT-8  ET IMPACT 1:26:12 MET  LAT: 2.46°S  LONG: 128.1°W	51.60 (4)	DIRECT INSERTION  POST OMS-2: 176.4 X 85.0 NM	OI-27 (4)	CARGO: 34991 LBS  PAYLOAD CHARGEABLE: 23967 LBS  DEPLOYED: 5399 LBS  NON-DEPLOYED: 17935 LBS  MIDDECK: 1172 LBS  SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 939607 LBS NON-DEPLOYED: 1481214 LBS CARGO TOTAL: 3037123 LBS  PERFORMANCE MARGINS (LBS): FPR: 3274 FUEL BIAS: 818 FINAL TDDP: 1940 RECON: 317  PAYLOADS: PLB: ISS-2A.2b Spacehab/DM ICC (SHOSS Box, SOAR) GAS (2) RMS, ODS  MIDDECK: CGBA DTO EMU H/W EVA Tools  5 CRYO TK SETS 6 GN2 TKS RMS 56  RMS USED FOR EVA SUPPORT	KSC W/D: OPF 66, VAB 5, PAD 22 = 93 days total.  <u>LAUNCH POSTPONEMENTS:</u> - Baselined launch date of 8/19/00 on 2/17/00. - Postponed launch to 9/8/00 on 5/17/00.  <u>LAUNCH SCRUBS:</u> None  <u>LAUNCH WINDOW:</u> - Launch window opened at 252:12:42:01Z and closed at 252:12:49:41Z for a total window of 7M40S. Preferred Launch Time (PLT) (In-Plane Time) was 252:12:45:47Z, 8:45:47 AM EDT, resulting in a launch window of 3M54S.  <u>LAUNCH DELAYS:</u> None - Launch occurred on time at 252:12:45:47Z, 8:45:47 AM EDT on Friday, September 8, 2000.  <u>TAL WX:</u> - Zaragoza (Prime and Selected) and Moron (2-engine TAL) were both forecast and observed GO. Ben Guerir was forecast and observed NO GO for crosswinds. KSC RTLS forecast and observed precipitation within 20 nm; however, was GO based on Flight Rule A2.1.1-6C4e, f, and g. LANDING SITE WEATHER CRITERIA [HC], "2-nm vertical clearance from the top of that shower and a 10-nm lateral clearance must be maintained along the approach paths..."  <u>PERFORMANCE ENHANCEMENTS:</u> - Standard Set plus: (1) PE Operational High Q SUM/SEP, (2) OMS assist is 4000 lbs, (3) 52 NM MECO, and (4) Del Psi  <u>FLIGHT DURATION CHANGES:</u> - One-day extension. Extended Flight one day to accomplish additional ISS tasks.  <u>SHUTTLE NIGHT LANDING #15:</u> - Landed on KSC runway 15, orbit 185 at 264:07:56:44Z, 3:56:44 AM EDT on Wednesday, September 20, 2000.  <u>EVENTS:</u> - OMS Assist Start 2:23 MET - Orbiter/ISS capture at 254:05:51:16Z, 1:17:05:59 MET - Docked to ISS PMA2 Node 1 Forward Port at 254:06:04:53Z, 1:17:19:06 MET. - Shuttle ISS EVA #6. EVA Start at 255:04:46:47Z, 2:16:01:50 MET, EVA End 255:11:00:47Z, duration 6:14. Routed and connected 9 power, data, and comm cables between Zvezda (SM) and Zarya (FGB). Installed magnetometer to ISS for use as compass relative to Earth.		
		Continued...		Continued...		Continued...		Continued...		Continued...		Continued...	



# SPACE SHUTTLE MISSIONS SUMMARY

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FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-106/ISS 2A.2b		Continued... MCC WHITE FCR (29)  FLIGHT DIRECTORS: A/E - N. W. Hale LD/O1 - P. L. Engelauf O2 - P. F. Dye O3 - K. B. Beck O4 - W. D. Reeves  ISS LD/O1 - M. J. Ferring ISS O2 - J. M. Hanley ISS PLNG - R. E. LaBrode MOD - J. W. Bantle	Continued...  VI: 25926      25928  OMS-2: 44:00      44:00 81 FPS      81 FPS 00:52      00:54	Continued...  FLT DURATION: 11:19:10:57  S/T: 857:12:38:25  OV-102: 172:13:50:31  DISTANCE: 4,919,243 sm							Continued...  EVENTS: (Continued) - Inert weight adjustment is -200 lbs. - Reboost #1 - Start at 255:12:28:47Z, 2:23:43:00 MET, 11 fps, altitude increase 3.2 nm, orbit 201 by 191 nm. - Reboost #2 - Start at 258:06:13:17Z, 5:17:27:30 MET, 11.4 fps, altitude increase 3.2 nm, orbit 203.4 by 195.3 nm. - Reboost #3 - Start at 259:06:45:47Z, 6:18:00:00 MET, 11.4 fps, altitude increase 3.4 nm, orbit 206.3 by 199.2 nm. - Reboost #4 (Unplanned pre-mission) - Start at 261:03:25:47Z, 8:14:40:00 MET, 11.6 fps, altitude increase 3.3 nm, orbit 208.6 by 203.8 nm. - Undocked at 262:03:46:05Z, 9:15:00:18 MET - STS-106/2A.2b crew ISS Visitor Time is 7:21:41:05 (Docking to Undocking). - Total Transfers - Shuttle to ISS, 5399 lbs (Includes 10 CWC's with 780 lbs of H2O.) ISS to Shuttle, 948 lbs. Net transfer to ISS is 4451 lbs. - Installed magnetometer and three SM battery blocks. Connected FGB/SM cables. R&R'ed and C/O two FGB battery systems. R&R'ed FGB limited life items, delivered exercise devices. Prepared crew quarters for Expedition 1 crew.  RENDEZVOUS #48: - Rendezvous and dock with ISS at PMA2, Node 1 Forward Port  SIGNIFICANT ANOMALIES: - MNB APC5 60 ampere bus transient, power supply fail BITE - Fuel Cell 1 H2 flowmeter failed OSL - Aft Main Bus B current spike - Loss of crew audio for OCA video conferencing - Ku-band forward link lost - Z Star Tracker failure - Left OMS Forward Fuel Probe failure - Ops Recorder 1 defective tape segment - ODS C/L Camera Harness Assembly failure - ODS C/L Camera misalignment - Camera C Iris failed to fully close - Left Vent 8 and 9 Drive Microswitch failures - MSBLS 2 range failure

# 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		FSW	PAYLOAD WEIGHTS, PAYLOADS/ EXPERIMENTS	MISSION HIGHLIGHTS (LAUNCH SCRUBS/DELAYS, TAL WEATHER, ASCENT I-LOADS, FIRSTS, SIGNIFICANT ANOMALIES, ETC.)
							INC	HA/HP			
STS-92/ISS 3A	OV-103 (Flight 8) (Discovery)	<p>CDR: Brian Duffy (Flt 4 - STS-45, STS-57, STS-72) P591/R142/V94/M126</p> <p>PLT: Pamela A. Melroy P592/R261/F34</p> <p>M/S 1/EV1: Leroy Chiao (Flt 3 - STS-65, STS-72) P593/R179/V125/M157</p> <p>M/S 2/EV2: William S. McArthur (Flt 3 - STS-58, STS-74) P594/R172/V124/M150</p> <p>M/S 3/EV3: Peter J. K. (Jeff) Wisoff (Flt 4 - STS-57, STS-68, STS-81) P595/R166/V110/M145</p> <p>M/S 4/EV4: Michael E. Lopez-Alegria (Flt 2 - STS-73) P596/R202/V163/M175</p> <p>M/S 5: Koichi Wakata (Japan) (Flt 2 - STS-72) P597/R208/V164/M181</p> <p>SS EVA #51 EMU/TETHERED EVA #44 SCHEDULED EVA #45 DURATION 6:28</p> <p>SS EVA #52 EMU/TETHERED EVA #45 SCHEDULED EVA #46 DURATION 7:08</p> <p>Continued...</p>	<p>KSC 39A 285:23:17:00 Z 6:17:00 PM EST 6:17:00 PM EST Wednesday 10 10/11/00 (10)</p> <p>LAUNCH WINDOW: 4:12 USING PLT (IN-PLANE TIME)</p> <p>EOM PLS: KSC TAL: ZZA TAL WX: MRN, BEN</p> <p>SELECTED: RTL: KSC 33 N/N TAL: BEN 36 CI/N AOA: KSC 33 N/N PLS: EDW CI/N</p> <p>TDDEL: 0:00 -0:04</p> <p>MAX Q NAV: 752 748</p> <p>SRB STG: 2:02.6 2:02</p> <p>PERE: NOMINAL</p> <p>2 ENG TAL (BEN): 2:25 2:27</p> <p>NEG RETURN: 3:57 3:57</p> <p>PTA (U/S 282): 4:40 4:41</p> <p>PTM (U/S 282): 5:56 6:05</p> <p>SE ZZA: 6:02 6:02</p> <p>SE PTM: 6:48 6:55</p> <p>MECO CMD: 8:25.3 8:25.6</p> <p>Continued...</p>	<p>EDW 22, CONC EDW 46, CONC 27 298:20:59:42 Z 12:59:42 PM PST</p> <p>Tuesday 16 10/24/00 (8)</p> <p>DEORBIT BURN: 298:19:52:00Z</p> <p>XRANGE: 200 NM</p> <p>ORBIT DIR: AL 26</p> <p>AIM PT: NOMINAL</p> <p>MLGTD: 2656 FT 298:20:59:42Z</p> <p>VEL: 205 KGS 201 KEAS HDOT: -2.9 FPS</p> <p>TD NORM 195: 3287 FT</p> <p>DRAG CHUTE DEPLOY: 188 KEAS 298:20:59:46Z</p> <p>NLGTD: 6504 FT 298:20:59:54Z</p> <p>VEL: 144 KGS 152 KEAS HDOT: -6.7 FPS</p> <p>BRK INIT: 67 KGS</p> <p>DRAG CHUTE JETTISON: 55 KGS 298:21:00:21Z</p> <p>BRK DECELFPSS<sup>2</sup>: AVE 3.5 PK 5.3</p> <p>WHEELS STOP: 298:21:00:49Z 11746 FT</p> <p>ROLLOUT: 9090 FT 67 SEC</p> <p>WINDS: 2009P16 KTS SS: 8H 4L PK: 15H 7L</p> <p>DENS ALT: 3743 FT</p> <p>Continued...</p>	<p>104/104/ 109%</p> <p>PREDICTED: 100/104.5/ 104.5/72/ 104.5</p> <p>ACTUAL: 100/104.5/ 104.5/72/ 104.5</p> <p>1 = 2045 (3) 2 = 2053 (2) 3 = 2048 (2)</p> <p>ALL BLOCK IIA ENGINES</p> <p>LAT: 2.00 S°</p> <p>LONG: 127.7°W</p> <p>M 3 EOM:</p> <p>WEIGHT: 205188 LBS</p> <p>X CG: 1079.95</p> <p>LANDING: WEIGHT: 205129 LBS</p> <p>X CG: 1081.77</p>	<p>BI-104</p> <p>RSRM 76</p> <p>ET-104</p> <p>SLWT 9</p> <p>ET BRKUP: 283 K</p> <p>ET IMPACT 1:26:22 MET</p> <p>LAT: 2.00 S°</p> <p>LONG: 127.7°W</p> <p>DEORBIT: APOGEE 213 NM PERIGEE 200.9 NM</p> <p>ENTRY RANGE: 4352 NM</p> <p>ENTRY VELOCITY: 25901</p>	<p>51.60 (5)</p> <p>DIRECT INSERTION</p> <p>POST OMS-2: 175.1 x 85.4 NM</p> <p>TI BURN: 1/14:52 MET</p> <p>ORBIT: 206.2 X 200.1 NM</p> <p>DEORBIT: APOGEE 213 NM PERIGEE 200.9 NM</p> <p>ENTRY RANGE: 4352 NM</p> <p>ENTRY VELOCITY: 25901</p>	<p>OI-27 (5)</p> <p>CARGO: 35250 LBS</p> <p>PAYLOAD CHARGEABLE: 28009 LBS</p> <p>DEPLOYED: 21998 LBS</p> <p>NON-DEPLOYED: 4678 LBS</p> <p>MIDDECK: 1333 LBS</p> <p>SHUTTLE ACCUMULATED WEIGHTS: DEPLOYED: 961605 LBS NON-DEPLOYED: 1487225 LBS CARGO TOTAL: 3072373 LBS</p> <p>PERFORMANCE MARGINS (LBS): FPR: 3274 FUEL BIAS: 818 FINAL TDDP: 1532 RECON: 2330</p> <p>PAYLOADS: PLB: ISS-3A ISS Z1 TRUSS CMG'S KU/S-BAND PMA-3/SLP ICBC30 RMS, ODS</p> <p>MIDDECK: DTO EMU H/W EVA TOOLS</p> <p>5 CRYO TK SETS 6 GH2 TKS</p> <p>Continued...</p>	<p>KSC W/D: OPF 197, VAB 10, PAD 21 = 238 days total.</p> <p>LAUNCH POSTPONEMENTS: - Baselined launch date of 7/23/98 on 3/13/97 - Postponed launch to 1/14/99 on 5/27/97. ISS Flight Delays - Postponed launch to 6/17/99 on 6/4/98. ISS Flight Delays - Postponed launch to 12/2/99 on 2/4/99. ISS Flight Delays - Postponed launch to 6/14/00, then to 10/28/99, to 9/21/00, to 10/5/00 due to ISS Service Module Delays</p> <p>LAUNCH SCRUBS: - Scrubbed launch on EST date of 10/5/00 at ET Tanking MMT due to Orb/ET Attach Bolt Protrusion. Launch was scheduled for 9:38:46 PM EST (280:01:38:46Z GMT date of 10/6/00). A Review of STS-106 ET 35 mm film revealed RH Orbiter/ET attach bolt protruding several inches causing concern for bolt contact with Orbiter during sep sequence with potential for a tip load and subsequent ET/Orbiter contact. Film review of additional flights and loads analyses needed to clear STS-92 launch. During recycle, POGO valve #2 did not get an open indication when valve was cycled open. Replaced POGO valve with launch date of 10/9/00. Completed film review and analyses which cleared protruding bolt concern (within pogo valve replacement time.). Technical Scrub. Reset launch for 10/9/00 EST, 10/10/00 GMT. - Scrubbed launch on EST date of 10/9/00 at ET Tanking MMT due to wind gusts greater than 42 knots holding up extension of the GOX Vent Arm. Ran out of time to complete work in time for launch at 8:05:17 PM EST, 284:00:05:17Z GMT date of 10/10/00 (3.5 hours work after arm extension before tanking could start at L-8.5 hour). Weather Scrub. Reset launch for 10/10/00 at 7:39:36 EST. - Scrubbed 10/10/00 launch at L-1H07M due to a concern for debris damage by a wayward pip pin and tether seen on the LO2 feedline foam inboard support bracket. Pip pin was discovered during ice/debris team walkdown. (Launch had been scheduled for 7:39:36 EST. Technical scrub. Reset launch for 10/11/00.</p> <p>LAUNCH WINDOW: - Total launch window was 7M58S. Window opened at 285:23:13:14Z and closed at 285:23:21:12Z. Selected Preferred Launch Time (PLT) of 285:23:17:00Z (in-plane time) giving a launch window of 4M12S.</p> <p>LAUNCH DELAYS: None - Launched on time at 285:23:17:00Z, 6:17:00 PM EST on Wednesday, October 11, 2000.</p> <p>Continued...</p>		



# SPACE SHUTTLE MISSIONS SUMMARY

FLT NO.	ORBITER	CREW (7)	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.)
		TITLE, NAMES & EVA'S					INC	HA/HP			
STS-92/ISS 3A		Continued...	Continued...	Continued...						Continued...	Continued...
Continued...		<p>SS EVA #53 EMU/TETHERED EVA #46 SCHEDULED EVA #47 DURATION 6:48</p> <p>SS EVA #54 EMU/TETHERED EVA #47 SCHEDULED EVA #48 DURATION 6:56</p> <p>MCC WHITE FCR (30)</p> <p>FLIGHT DIRECTORS: Asc - N. W. Hale Ent - L. E. Cain LD/O3 - C. W. Shaw O1 - R. E. Castle O2 - J. P. Shannon O4 - B. P. Austin</p> <p>ISS LD/O1 - S. P. Davis ISS O2 - M. A. Kirasich ISS PIng/O3 - R. E. LaBrode MOD - J. M. Heflin</p>	<p>VI: 25931 25928</p> <p>OMS-2: 43.30 43.33 82.4 FPS 82.1 FPS 00:54 00:54</p>	<p>FLT DURATION: 12:21:42:42</p> <p>S/T: 870:10:21:07</p> <p>OV-103: 217:05:38:18</p> <p>DISTANCE: 5,331,301 sm</p>						<p>Continued...</p> <p>RMS 57 (S.N. 301)</p> <p>RMS USED FOR OSVS checkout, Z1 truss grapple and install on ISS and EVA support PMA3/SLP on Z1</p> <p>TAL WX: - Zaragoza (prime) forecast and observed NO GO for rain, Moron forecast and observed NO GO for violent storms, Ben Guerir (selected) Qbar 353 vs 350 limit at 1100 feet cleared by L-10 minute balloon. NOTE: PTA set on AOA FOR KSC even though forecast showed chance of rain and chance 4000 ft broken and peak winds of 13 knots. EDW and NOR down for AOA/PLS, FD2 PLS would have resulted in additional 10 second TAL exposure.</p> <p>PERFORMANCE ENHANCEMENTS: - Standard Set Plus: (1) PE Operational High Q TRN/OCT, (2) OMS assist is 4000 lbs, (3) 52 nm MECO, and (4) Del Psi. - Note: OMS Assist Time reduced from 102 seconds to 41 seconds with DOLILU uplink (2400 lbs more OMS to orbit). - Inert weight adjustment is 199 lbs; was -200 lbs.</p> <p>SHUTTLE NIGHT LAUNCH #24</p> <p>FLIGHT DURATION CHANGES: - Total Flight duration extension was 2 days plus 3 orbits. - EDW was not called up for NEOM. - Did not close PLBD's. Waved-off landing at KSC on orbits 170 and 171 due to sustained high SLF crosswinds. EOM+1. Waved-off landing at KSC on orbits 186 and 187 (Did not close PLBD's or crew in suits) due to high crosswinds. - Retargeted to EDW on orbit 187, then waved-off due to broken ceiling and showers within 30 nm. - Targeted EDW on orbit 188, closed PLBD's, and put crew in suits. Waved-off landing at EDW on orbit 188 at Tig-16 minutes due to forecast and observed showers and rain within 30 nm. Waved-off landing at EDW on orbit 189 at Tig-1 hour for showers and rain within 30 nm. NOEM+2. Activated NOR for EOM+2. Did not attempt to land at KSC on orbits 201 and 202 due to forecast and observed high crosswinds, low ceiling, and rain within 30 nm. Landed at EDW runway 22 on orbit 203 at 298:20:59:42Z, 12:59:42 PM PST, Tuesday, October 24, 2000.</p> <p>EVENTS: - Ring capture at 287:17:45:10Z, 1:18:28:10 MET - Docked at PMA2 Node 1 Forward Port at 287:17:57:55Z - Z1 Truss grapple at 288:15:57:14Z, Z1 release 288:19:05:30Z - EVA 1 Start at 289:14:26Z, duration 6H28M. - PMA grapple at 290:15:43:30Z, PMA release at 290:17:59:35Z - EVA 2 Start at 290:14:13Z, duration 7H08M. - ISS Reboost maneuver #1 Start at 290:21:03:00Z, 4:21:46:00 MET, Delta V was 6 fps, 1.5 nm, 208 by 202 nm. - EVA 3 Start at 291:14:29Z, duration 6H48M. - ISS Reboost maneuver #2 Start at 291:22:45:59Z, 5:23:28:59 MET, 5.8 fps, 1.5 nm, 211 by 202 nm. - EVA 4 Start at 292:15:00Z, duration 6H56M. - ISS Reboost maneuver #3 Start at 292:22:23:32Z, 6:23:06:32 MET, 5.6 fps, 1.5 nm, 214 by 202 nm.</p>	





# SPACE SHUTTLE MISSIONS SUMMARY

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