

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-1 Columbia	Apr 12, 1981 KSC	Apr 14, 1981 DFRF	Cdr: John W. Young Plt: Robert L. Crippen	Deployable Payloads: None Attached PLB Payloads: 1. Passive Sample Array 2. DFI (Development Flight Instrumentation) Pallet 3. ACIP (Aerodynamic Coefficient Identification Package)	GAS (Getaway Special): None Crew Compartment Payloads: None Special Payload Mission Kits: None
STS-2 Columbia	Nov 12, 1981 KSC	Nov 14, 1981 DFRF	Cdr: Joe Henry Engle Plt: Richard H. Truly	Deployable Payloads: None Attached PLB Payloads: 1. OFT (Orbital Flight Test) Pallet a. MAPS (Measurement of Air Pollution From Satellite) b. SMIRR (Shuttle Multispectral Infrared Radiometer) c. SIR (Shuttle Imaging Radar) d. FILE (Features Identification and Location Experiment) e. OCE (Ocean Color Experiment) 2. DFI (Development Flight Instrument) Pallet 3. ACIP (Aerodynamic Coefficient Identification Package)	4. IECM (Induced Environment Contamination Monitor) 5. OSTA-1 (Office of Space and Terrestrial Applications) GAS (Getaway Special): None Crew Compartment Payloads: None Special Payload Mission Kits: 1. RMS (Remote Manipulator System (S/N 201))
STS-3 Columbia	Mar 22, 1982 KSC	Mar 30, 1982 White Sands	Cdr: Jack R. Lousma Plt: Charles G. Fullerton	Deployable Payloads: None 1. Plasma Diagnostic Package Attached PLB Payloads: 1. OSS (Office of Space Science)-1 Pallet a. Plant Lignification Experiment b. Plasma Diagnostic Package * c. Vehicle Charging and Potential d. Space Shuttle Induced Atmosphere e. Thermal Canister f. Solar Flare X-ray Polarimeter g. Solar Ultraviolet and Spectral Irradiance Monitor h. Contamination Monitor Package i. Foil Microabrasion Package *RMS deployed/berthed	2. DFI (Development Flight Instrument) Pallet 3. ACIP (Aerodynamic Coefficient Identification Package) GAS (Getaway Special): 1. Verification Canister Crew Compartment Payloads: 1. MLR (Monodisperse Latex Reactor) 2. HBT (Heflex Bioengineering Test) Special Payload Mission Kits: 1. RMS (Remote Manipulator System (S/N 201))

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STS-4 Columbia	Jun 27, 1982 KSC	Jul 4, 1982 DFRF	Cdr: Thomas K. Mattingly, II Plt: Henry W. Hartsfield, Jr.	<p>Deployable Payloads: None</p> <p>1. IECM (Induced Environment Contamination Monitor) deployed/reberthed by RMS</p> <p>Attached PLB Payloads</p> <p>1. DFI (Development Flight Instrument) Pallet</p> <p>Department of Defense</p> <p>1. DOD 82-1</p> <p>GAS (Getaway Special):</p> <p>1. Utah State University</p> <p>a. Drosophila Melanogaster (fruit fly) Growth Experiment</p> <p>b. Artemia (Brine Shrimp) Growth Experiment</p> <p>c. Surface Tension Experiments</p> <p>d. Composite Curing Experiment</p> <p>e. Thermal Conductivity Experiment</p> <p>f. Microgravity Soldering Experiment</p>	<p>g. Root growth of Lemna Minor L. (Duckweed) in Microgravity</p> <p>h. Homogeneous Alloy Experiment</p> <p>i. Algal Microgravity Bioassay Experiment</p> <p>Crew Compartment Payloads:</p> <p>1. MLR (Monodisperse Latex Reactor)</p> <p>2. CFES (Continuous Flow Electrophoresis System)</p> <p>3. SSIP (Shuttle Student Involvement Program)</p> <p>S404: Effect of Prolonged Space Travel on Levels of Trivalent Chromium in the Body</p> <p>S405: Effect of Diet, Exercise, and Zero Gravity on Lipoprotein Profiles</p> <p>4. VPCF (Vapor Phase Compression Freezer)</p> <p>Special Payload Mission Kits:</p> <p>1. RMS (Remote Manipulator System (S/N 201)</p>
STS-5 Columbia	Nov 11, 1982 KSC	Nov 16, 1982 DFRF	Cdr: Vance DeVoe Brand Plt: Robert F. Overmyer MS: Joseph P. Allen MS: William B. Lenoir	<p>Deployable Payloads: None</p> <p>1. SBS-C/PAM-D (Satellite Business Systems/Payload Assist Module)</p> <p>2. ANIK-C/PAM-D (Telesat Canada, Ltd/Payload Assist Module)</p> <p>Attached PLB Payloads</p> <p>1. DFI (Development Flight Instrument) Pallet</p> <p>a. EIOM (Effects of Interaction of Oxygen with Materials)</p> <p>b. ISAL (Investigation of STS Atmospheric Luminosities)</p>	<p>GAS (Getaway Special):</p> <p>1. G-026: ERNO/Stability of Metallic Dispersions (JSC PIP 14021)</p> <p>Crew Compartment Payloads:</p> <p>1. SSIP (Shuttle Student Involvement Program)</p> <p>a. SE81-5 - Crystal Formation in Zero Gravity</p> <p>b. SE81-9 - Convection in Zero Gravity</p> <p>c. SE81-2 - Growth of Porifera</p> <p>Special Payload Mission Kits:</p> <p>1. Mission Specialist Seats (2)</p>
STS-6 Challenger	Apr 4, 1983 KSC	Apr 9, 1983 DFRF	Cdr: Paul J. Weitz Plt: Karol J. Bobko MS: Donald H. Peterson MS: Story Musgrave	<p>Deployable Payloads: None</p> <p>1. TDRS-A/IUS (Tracking and Data Relay Satellite/Inertial Upper Stage)</p> <p>Attached PLB Payloads</p> <p>1. CBSA (Cargo Bay Stowage Assembly)</p> <p>GAS (Getaway Special):</p> <p>1. G-005: Asahi Shimbun, Japan</p> <p>2. G-049: U.S. Air Force Academy</p> <p>3. G-381: Park Seed Company</p>	<p>Crew Compartment Payloads:</p> <p>1. CFES (Continuous Flow Electrophoresis System)</p> <p>2. MLR (Monodisperse Latex Reactor)</p> <p>3. RME (Radiation Monitoring Experiment)</p> <p>4. NOSL (Night/Day Optical Survey of Lightning)</p> <p>Special Payload Mission Kits:</p> <p>1. Mini-MADS (Modular Auxiliary Data System)</p> <p>2. EMU (Extravehicular Mobility Unit)</p>

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STS-7 Columbia	Jun 18, 1983 KSC	Jun 24, 1983 DFRF	Cdr: Robert L. Crippen Plt: Frederick H. Hauck MS: John M. Fabian MS: Sally K. Ride MS: Norman E. Thagard	<p>Deployable Payloads: None</p> <ol style="list-style-type: none"> 1. ANIK-C/PAM-D (Telesat Canada Satellite) 2. Palapa-B1/PAM-D (Indonesian Satellite) 3. SPAS (Shuttle Pallet Satellite)-01 Unberthing/Berthing Tests <p>Attached PLB Payloads:</p> <ol style="list-style-type: none"> 1. OSTA (Office of Space and Terrestrial Applications)-2 2. CBSA (Cargo Bay Stowage Assembly) <p>GAS (Getaway Special):</p> <ol style="list-style-type: none"> 1. G-033: California Institute of Tech - Plant Gravireception and Liquid Dispersion 2. G-088: Edsyn, Inc. - Soldering of Material 3. G-002: Kayser Threde, W. Germany - Youth Fair Experiment 	<ol style="list-style-type: none"> 4. G-009: Purdue University - Geotropism Fluid Dynamics and Nuclear Particle Velocity 5. G-305: U.S. Air Force and National Research Labs - Ultraviolet Spectrometer 6. G-012: RCA, Camden, NJ Schools - Ant Colony 7. G-345: Goddard Space Flight Center and National Research Labs - Payload Bay Environment <p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> 1. CFES (Continuous Flow Electrophoresis System) 2. MLR (Monodisperse Latex Reactor) 3. SSIP (Shuttle Student Involvement Program) <p>Special Payload Mission Kits:</p> <ol style="list-style-type: none"> 1. RMS (Remote Manipulator System) S/N 201 2. TAGS (Text and Graphics System) 3. Mini-MADS (Modular Auxiliary Data System)
STS-8 Challenger	Aug 30, 1983 KSC	Sep 5, 1983 DFRF	Cdr: Richard H. Truly Plt: Daniel C. Brandenstein MS: Dale A. Gardner MS: Guion S. Bluford, Jr. MS: William E. Thornton	<p>Deployable Payloads:</p> <ol style="list-style-type: none"> 1. Insat/PAM-D: Indian National Satellite 2. PFTA (Payload Flight Test Article) Unberthing/Berthing Tests <p>Attached PLB Payloads:</p> <ol style="list-style-type: none"> 1. DFI (Development Flight Instrumentation) <ol style="list-style-type: none"> a. Oxygen Interaction and Heat Pipe Experiment b. Postal Covers (2 boxes) 2. CBSA (Cargo Bay Stowage Assembly) 3. SPAS (Shuttle Pallet Satellite)-01 Umbilical Disconnect <p>GAS (Getaway Special):</p> <ol style="list-style-type: none"> 1. U.S. Postal Service - 8 cans of philatelic covers 2. G-475: Asahi Shimban - Artificial Snow Crystal Experiment 3. G-348: Office of Space Science - Atomic Oxygen Erosion 4. G-347: Navy Research Lab - Ultraviolet PhotoFilm Test 	<ol style="list-style-type: none"> 5. G-346: Goddard Space Flight Center - Cosmic Ray Upset Experiment <p>Crew Compartment Payloads :</p> <ol style="list-style-type: none"> 1. CFES (Continuous Flow Electrophoresis System) 2. ICAT (Incubator-Cell Attachment Test) 3. ISAL (Investigation of STS Atmospheric Luminosities) 4. AEM (Animal Enclosure Module) - Evaluation of AEM using rate 5. RME (Radiation Monitoring Experiment) 6. SSIP (Shuttle Student Involvement Program) - Biofeedback <p>Special Payload Mission Kits:</p> <ol style="list-style-type: none"> 1. RMS (Remote Manipulator System) S/N 201 2. MADS (Modular Auxiliary Data System) II 3. COMSEC (Communication Security) 4. TAGS (Text and Graphics System)

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STS-9 Columbia	Nov 28, 1983 KSC	Dec 8, 1983 DFRF	Cdr: John W. Young Plt: Brewster W. Shaw MS: Owen K. Garriott MS: Robert A. R. Parker PS: Byron K. Lichtenberg PS: Ulf Merbold Mission Duration: 247 hrs 47 mins 24 secs	Deployable Payloads: None Attached PLB Payloads: <ol style="list-style-type: none"> 1. Spacelab-1: <ol style="list-style-type: none"> a. Spacelab Long Module b. Spacelab Pallet c. Tunnel d. Tunnel Extension e. Tunnel Adapter 2. Experiments <ol style="list-style-type: none"> a. Astronomy and Physics (6) b. Atmospheric Physics (4) c. Earth Observations (2) 	<ol style="list-style-type: none"> d. Life Sciences (16) e. Materials Sciences (39) f. Space Plasma Physics (5) g. Technology (1) GAS (Getaway Special): None Crew Compartment Payloads: None Special Payload Mission Kits: <ol style="list-style-type: none"> 1. Cryogenic sets 4 and 5 2. Spacelab Utility Kit 3. TAGS (Text and Graphics System) 4. Galley
STS-41B Challenger	Feb 3, 1984 KSC	Feb 11, 1984 KSC	Cdr: Vance D. Brand Plt: Robert L. Gibson MS: Bruce McCandless MS: Robert L. Stewart MS: Ronald E. McNair Mission Duration: 191 hrs 15 mins 55 secs	Deployable Payloads: <ol style="list-style-type: none"> 1. Westar VI/PAM-D - Western Union Communications Satellite/Payload Assist Module 2. Palapa-B/PAM-D - Indonesian Communications Satellite/Payload Assist Module 3. SPAS (Shuttle Pallet Satellite)-01 - Not Deployed due to RMS anomaly 4. IRT (Integrated Rendezvous Target) - Failed to inflate due to internal failure Attached PLB Payloads: <ol style="list-style-type: none"> 1. MFR (Manipulator Foot Restraint) 2. SESA (Special Equipment Stowage Assembly) 3. Cinema 360 - High Quality Motion Picture Camera GAS (Getaway Special): <ol style="list-style-type: none"> 1. G-004: Utah State University/Aberdeen University 2. G-008: Utah State University/University of Utah/Brighton High School 	<ol style="list-style-type: none"> 3. G-051: General Telephone Labs 4. G-309: U.S. Air Force 5. G-349: Goddard Space Flight Center (re: flight STS-8) Crew Compartment Payloads: <ol style="list-style-type: none"> 1. ACES (Acoustic Containerless Experiment System) 2. IEF (Isoelectric Focusing) 3. Cinema 360 Camera 4. Student Experiment SE81-10 - Effects of Zero g on Arthritis 5. MLR (Monodisperse Latex Reactor) 6. RME (Radiation Monitoring Experiment) Special Payload Mission Kits: <ol style="list-style-type: none"> 1. RMS (Remote Manipulator System) S/N 201 2. MMU (Manned Maneuvering Unit) - 2 3. Mini-MADS (Modular Auxiliary Data System) 4. Galley

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STS-41C Challenger	Apr 6, 1984 KSC	Apr 13, 1984 DFRF	Cdr: Robert L. Crippen Plt: Francis R. Scobee MS: Terry J. Hart MS: James D. Van Hoften MS: George D. Nelson Mission Duration: 167 hrs 40 mins 7 secs	<p>Deployable Payloads:</p> <ol style="list-style-type: none"> 1. LDEF (Long Duration Exposure Facility) - Office of Aeronautics and Space Technology 2. SMM (Solar Maximum Mission) Spacecraft - Rendezvous/Retrieve/Repair/Deploy <p>Attached PLB Payloads:</p> <ol style="list-style-type: none"> 1. SMRM (Solar Maximum Repair Mission) - Flight Support System 2. Cinema 360 - High Quality Motion Picture Camera 3. CBSA (Cargo Bay Stowage Assembly) - Bay 2, starboard side <p>GAS (Getaway Special): None</p>	<p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> 1. RME (Radiation Monitoring Experiment) 2. IMAX Camera - Canadian Commercial Company color film camera using 70mm x 280mm film 3. SSIP (Shuttle Student Involvement Program) - Comparison of honeycomb structure of bees in low g and bees in 1g <p>Special Payload Mission Kits:</p> <ol style="list-style-type: none"> 1. MMU (Manned Maneuvering Units) - 2 2. EMU (Extravehicular Mobility Units) - 3 3. RMS (Remote Manipulator System) S/N 302
STS-41D Discovery	Aug 30, 1984 KSC	Sep 5, 1984 EAFB	Cdr: Henry W. Hartsfield Plt: Michael L. Coats MS: Richard M. Mullane MS: Steven A. Hawley MS: Judith A. Resnik PS: Charles D. Walker Mission Duration: 144 hrs 56 mins 4 secs	<p>Deployable Payloads:</p> <ol style="list-style-type: none"> 1. SBS/PAM-D (Satellite Business System/Payload Assist Module) 2. Syncom IV-2 (Leased to DOD for UHF and SHF communications, also called Leasat) 3. Telstar/PAM-D (American Telephone and Telegraph/Payload Assist Module) <p>Attached PLB Payloads:</p> <ol style="list-style-type: none"> 1. OAST-1 (Office of Aeronautics and Space Technology) <ol style="list-style-type: none"> a. SAE (Solar Array Experiment) b. DAE (Dynamic Augmentation Experiment) c. SCCF (Solar Cell Calibration Facility) <p>GAS (Getaway Special): None</p>	<p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> 1. CFES III (Continuous Flow Electrophoresis System) 2. IMAX Camera - IMAX System Corporation (Canadian Company) 70mm x 280mm film 3. RME (Radiation Monitoring Experiment) USAF Space Division 4. Clouds - USAF Mikon F 3/T with 105mm lens 5. SSIP - (Shuttle Student Involvement Program) - Grow single crystal of Indium, Shawn Murphy, Hiram, OH; Rockwell Intl, Sponsor <p>Special Payload Mission Kits:</p> <ol style="list-style-type: none"> 1. RMS (Remote Manipulator System) S/N 301 2. MADS (Modular Auxiliary Data System)

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STS-41G Challenger	Oct 5, 1984 KSC	Oct 13, 1984 KSC	Cdr: Robert L. Crippen Plt: Jon A. McBride MS: Kathryn D. Sullivan MS: Sally K. Ride MS: David D. Leetsma PS: Marc D. Garneau PS: Paul D. Scully-Power Mission Duration: 197 hrs 23 mins 33 secs	<p>Deployable Payloads:</p> <ol style="list-style-type: none"> ERBS (Earth Radiation Budget Satellite) <p>Attached PLB Payloads:</p> <ol style="list-style-type: none"> OSTA-3 (Office of Space and Terrestrial Applications) <ol style="list-style-type: none"> SIR-B (Shuttle Imaging Radar) FILE (Feature Identification and Location Experiment) MAPS (Measurement of Air Pollution from Satellite) LFC (Large Format Camera) ORS (Orbital Refueling System) <p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> APE (Auroral Photography Experiment) CANEX (Canadian Experiments) <ol style="list-style-type: none"> VISET ACOMEX OGLOW (Orbital Glow and Atmospheric Emissions) SPEAM (Sun Photometer Earth Atmosphere Measurement) SASSE (Space Adaptation Syndrome Stidoes Exp) IMAX Camera RME (Radiation Monitoring Experiment) TLD (Thermoluminescent Dosimeter) 	<p>GAS (Getaway Special):</p> <ol style="list-style-type: none"> G007: Alabama Space and Rocket Center - Solidification of lead-antimony; and aluminum-copper student experiment G032: ASAHI National Broadcasting Corp. Japan - Surface tension and viscosity; and materials experiment G306: Air Force and U.S. Naval Research Lab - Low Energy Heavy Ions Search in the Inner Magnetosphere G469: Goddard Space Flight Center - Cosmic Ray Upset Experiment (CRUX) G038: Marshall-McShane - Vapor Deposition of Metals And Non-Metals G074: McDonnell Douglas Company - Study Proposed Propellant Acquisition System G013: Kayser Threde, West Germany - Verify Transport Mechanism in Halogen Lamps Performance in Extended Micro-g G518: Utah State University - Study Solar Flux Separation, Capillary Waves on Water Surface, and Thermo-Capillary Flow in Liquid Columns <p>Special Payload Mission Kits:</p> <ol style="list-style-type: none"> RMS (Remote Manipulator System) S/N 302 Galley MMU (Manned Maneuvering Units) - 2 EMU (Extravehicular Mobility Units) - 3 PSA (Provisions Stowage Assembly)

Summary of Shuttle Payloads and Experiments

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STS-51A Discovery	Nov 8, 1984 KSC	Nov 16, 1984 KSC	Cdr: Frederick H. Hauck Plt: David M. Walker MS: Joseph P. Allen MS: Anna L. Fisher MS: Dale A. Gardner	<p>Deployable Payloads:</p> <ol style="list-style-type: none"> Telesat-H (ANIK)-D2/PAM-D - Canadian 24 channel communications satellite. Syncom IV-1 - Synchronous Communications Satellite, also called Leasat, leased to U.S. Navy <p>Retrieved Payloads:</p> <ol style="list-style-type: none"> Palapa-B2 - Deployed during mission STS 41-B, failed to achieve proper transfer orbit due to PAM-D failure Westar-VI - Deployed during mission 41-B, failed to achieve proper transfer orbit due to PAM-D failure <p>Attached PLB Payloads: None</p> <p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> DMOS (Diffusive Mixing of Organic Solutions) 3M Corp RME (Radiation Monitoring Experiment) 	<p>GAS (Getaway Special): None</p> <p>Special Payload Mission Kits:</p> <ol style="list-style-type: none"> RMS (Remote Manipulator System) S/N 301 MMU (Manned Maneuvering Units) (2) EMU (Extravehicular Mobility Units) (3) PSA (Provisions Stowage Assembly) (2) Satellite Retrieval Hardware: <ol style="list-style-type: none"> Modified Spacelab Pallet (2) MFR (Manipulator Foot Restraint) (2) Stinger Adapter (2) Satellite Adapter Trunnion (2) Berthing A Frame
STS-51C Discovery	Jan 24, 1985 KSC	Jan 27, 1985 KSC	Cdr: Thomas K. Mattingly Plt: Loren J. Shriver MS: Ellison S. Onizuka MS: James F. Buchli PS: Gary E. Payton	<p>Deployable Payloads:</p> <p>Data not available, DOD Classified Mission</p> <p>Attached PLB Payloads:</p> <p>Data not available, DOD Classified Mission</p> <p>GAS (Getaway Special):</p> <p>Data not available, DOD Classified Mission</p>	<p>Crew Compartment Payloads:</p> <p>Data not available, DOD Classified Mission</p> <p>Special Payload Mission Kits:</p> <ol style="list-style-type: none"> RMS (Remote Manipulator System) S/N 301 Other data not available, DOD Classified Mission
STS-51D Discovery	Apr 12, 1985 KSC	Apr 19, 1985 KSC	Cdr: Karol J. Bobko Plt: Donald E. Williams MS: M. Rhea Seddon MS: S. David Griggs MS: Jeffrey A. Hoffman PS: Charles D. Walker PS: E. J. Garn	<p>Deployable Payloads:</p> <ol style="list-style-type: none"> Syncom IV-3 - Synchronous Communications Satellite, built by Hughes, third in a series of 4, leased to the Navy. Failed to activate after nominal deploy from Orbiter. Telesat I (Anik C-1)/PAM-D - Canadian communications satellite. Placed in 3 year storage orbit. <p>Attached PLB Payloads: None</p> <p>GAS (Getaway Special):</p> <ol style="list-style-type: none"> G035 - Asahi National Broadcasting Corp, Japan <ol style="list-style-type: none"> Surface tension and viscosity Alloy, lead oxide and carbon fiber 	<ol style="list-style-type: none"> G471 - Goddard Space Flight Center, Thermal Engineering Branch. Capillary Pump Loop (CPU) Priming Experiment <p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> CFES III (Continuous Flow Electrophoresis System) AFE (American Flight Echocardiograph) PPE (Phase Partitioning Experiment) SSIP (Shuttle Student Involvement Program) (2) <ol style="list-style-type: none"> Corn Statolith Brain Cell <p>Special Payload Mission Kits:</p> <ol style="list-style-type: none"> RMS (Remote Manipulator System) S/N 301 PSA (Provision Stowage Assembly) MADS III (Modular Auxiliary Data System)

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STS-51B Challenger	Apr 29, 1985 KSC	May 6, 1985 DFRF	Cdr: R. F. Overmyer Plt: F. D. Gregory MS: Don L. Lind MS: Norman E. Thagard MS: William E. Thornton PS: Lodewijk Vandenberg PS: Taylor Wang Mission Duration: 168 hrs 8 mins 46 secs	<p>Deployable Payloads: Refer to GAS Section</p> <p>Attached PLB Payloads: Spacelab 3</p> <ol style="list-style-type: none"> 1. Materials Processing in Space <ol style="list-style-type: none"> a. Solution Growth of Crystals in Zero Gravity b. Mercuric Iodide Crystal Growth, Vapor Crystal Growth System (VCGS) c. Mercury Iodide Crystal Growth (MICG) 2. Technology <ol style="list-style-type: none"> a. Dynamics of Rotating and Oscillating Free Drops (DROP) 3. Environmental Observations <ol style="list-style-type: none"> a. Geophysical Fluid Flow Cell Experiment (GFFC) b. Atmospheric Trace Molecule Spectroscopy (ATMOS) c. Very Wide Field Galactic Camera (VWFGC) d. Aurora Observation 4. Astro Physics <ol style="list-style-type: none"> a. Studies of the Ionization States of Solar and Galactic Cosmic Ray Heavy Nuclei (ION) 5. Life Sciences <ol style="list-style-type: none"> a. Research Animal Holding Facility (RAHF) b. Urine Monitoring Investigation (UMI) c. Autogenic Feedback Training (AFT) 	<p>GAS (Getaway Special):</p> <ol style="list-style-type: none"> 1. G010 - NUSAT, Northern Utah Satellite. Weber State College, Utah, Utah State University, and New Mexico State University. First successful payload ejection from a GAS canister. 2. G303 - GLOMR, Global Low Orbiting Message Relay Satellite. Defense Systems, Inc., McLean, VA. Failed to eject from GAS canister. <p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> 1. UMS: Urine Monitoring System <p>Special Payload Mission Kits:</p> <ol style="list-style-type: none"> 1. Airlock 2. Long Transfer Tunnel 3. Galley 4. MPRESS - Mission Peculiar Equipment Support Structure, carried ATMOS and ION.

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STS-51G Discovery	Jun 17, 1985 KSC	Jun 24, 1985 EDW	Cdr: Daniel Brandenstein Plt: John O. Creighton MS: John M. Fabian MS: Steven R. Nagel MS: Shannon W. Lucid PS: Patrick Baudry PS: Prince Sultan Salman Al-Saud	<p>Deployable Payloads:</p> <ol style="list-style-type: none"> 1. Telstar-3D/PAM-D: Hughes 376 Communications Satellite with McDac Payload Assist Module Booster. Owned by AT&T Co. 2. ARABSAT-A/PAM-D: Aerospatiale Communication Satellite with McDac Payload Assist Module Booster. Owned by Saudi Arabian Communications Organization 3. MORELOS-A/PAM-D: Hughes 376 Communications Satellite with McDac Payload Assist Module Booster. Owned by Mexican Communications and Transportation Agency 4. Spartan-1: Shuttle Pointed Autonomous Research Tool for Astronomy <ol style="list-style-type: none"> a. SPSS: Spartan Flight Support Structure b. REM: Release/Engage Mechanism c. SEC: Scientific Experiment Carrier The SEC was released and retrieved using REM and RMS (Remote Manipulator System) <p>Attached PLB Payloads: None</p>	<p>GAS (Getaway Special);</p> <ol style="list-style-type: none"> 1. G007 - Alabama Space and Rocket Center/Marshall Amateur Radio Club - <ol style="list-style-type: none"> a. Solidification of Metals b. Crystal Growth c. Radish Seed Root Study d. Radio Transmission Experiment 2. G025 - ERNO - Dynamic Behavior of Liquid Propellants in low-g 3. G027: DFVLR of West Germany - Slipcasting in micro-g. 4. G028: DFVLR of West Germany - Manganese - Bismuth production in micro-g. 5. G034: Dickshire Coors, Texas High School Students <ol style="list-style-type: none"> a. 12 Biological/physical science experiments b. 1 Microprocessor controller 6. G314: USAF and USNRL - SURE (Space Ultraviolet Radiation Experiment) <p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> 1. ADSF - Automated Directional Solidification Furnace 2. FEE - French Echocardiograph Experiment 3. FPE - French Postural Experiment 4. HPTE - High Precision Tracking Experiment <p>Special Payload Mission Kits:</p> <ol style="list-style-type: none"> 1. RMS (Remote Manipulator System) S/N 301 2. Galley
Mission Duration: 169 hrs 38 mins 52 secs					

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-51F Challenger	Jul 29, 1985 KSC	Aug 6, 1985 EDW	Cdr: Charles Fullerton Plt: Roy D. Bridges MS: F. Story Musgrave MS: Anthony W. England MS: Karl G. Henize PS: Loren W. Acton PS: John-David Bartoe	<p>Deployable Payloads:</p> <ol style="list-style-type: none"> Ejectable Plasma Diagnostic Package, Exp No 3, second flight of PDP (STS-3 first flight). First flight as free flyer to sample plasma away from Shuttle <p>Attached PLB Payloads: Spacelab 2</p> <ol style="list-style-type: none"> Plasma Physics <ol style="list-style-type: none"> Deployable/Retrievable Plasma Diagnostic Package (PDP) (Exp 3) Plasma Depletion Experiments for Ionospheric and Radio astronomical Studies (Exp 4) Astrophysical Research <ol style="list-style-type: none"> Small Helium Cooled Infrared Telescope (IRT) (Exp 5) Hard X-ray Imaging of Cluster of Galaxies and Other Extended X-ray Sources (XRT) (Exp 7) Elemental Composition and Energy Spectra of Cosmic Ray Nuclei (CRNE) (Exp 4) Solar Astronomy <ol style="list-style-type: none"> Solar Magnetic and Velocity Field Measurement System (SOUP) (Exp 8) Coronal Helium Abundance Spacelab Experiment (CHASE) (Exp 9) High Resolution Telescope and Spectrograph (HRTS) (Exp 10) Solar Ultraviolet Spectral Irradiance Monitor (SUSIM) (Exp 11) Technology <ol style="list-style-type: none"> Properties of Superfluid Helium Zero-g (SFHe) (Exp 13) 	<p>GAS (Getaway Special): None</p> <p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> Life Sciences <ol style="list-style-type: none"> Vitamin D Metabolites and Bone Demineralization (Exp 1) The Interaction of Oxygen and Gravity Induced Lignification (Exp 2) Shuttle Amateur Radio Experiment (SAREX) Dispenser Technology Experiment Dispensing Carbonated beverages in Micro-g Protein Crystal Growth <p>Special Payload Mission Kits:</p> <ol style="list-style-type: none"> RMS (Remote Manipulator System) S/N 302 Galley
Mission Duration: 190 hrs 45 mins 26 secs					

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-51I Discovery	Aug 27, 1985 KSC	Sep 3, 1985 EDW	Cdr: Joe H. Engle Plt: Richard O. Covey MS: James van Hoften MS: John M. Lounge MS: William F. Fisher	Deployable Payloads: <ol style="list-style-type: none"> ASC-1/PAM-D: American Satellite Company, first of two satellites built by RCA and owned by a partnership between Fairchild Industries and Continental Telecon Inc. PAM-D Payload Assist Module built by McDonnell Douglas. "D" indicates used for lightweight satellites, less than 2,250 lbs. AUSSAT-1/PAM-D: Australian Communications Satellite, owned by Aussat Proprietary Ltd., built by Hughes Communications International, Model HS376. SYNCOM IV-4: Synchronous Communications Satellite. Last in a series of four satellites built by Hughes Communication Services and leased to the Navy. Referred to as LEASAT when deployed. Failed to function after reaching correct geosynchronous orbit. 	Attached PLB Payloads: None GAS (Getaway Special): None Crew Compartment Payloads: <ol style="list-style-type: none"> PVTOS - Physical Vapor Transport Organic Solid Experiment, 3M Corporation. Special Payload Mission Kits: <ol style="list-style-type: none"> RMS (Remote Manipulator System) S/N 301 Galley Leasat-3 Salvage Equipment. Leasat-3 was successfully retrieved, repaired, and redeployed.
STS-51J Atlantis	Oct 3, 1985 KSC	Oct 7, 1985 EDW	Cdr: Karol Bobko Plt: Ronald J. Grabe MS: Robert C. Stewart MS: David C. Hilmers PS: William A. Pailles	Deployable Payloads: Data not available, DOD Classified Mission Attached PLB Payloads: Data not available, DOD Classified Mission GAS (Getaway Special): Data not available, DOD Classified Mission	Crew Compartment Payloads: Data not available, DOD Classified Mission Special Payload Mission Kits: Data not available, DOD Classified Mission

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-61B Atlantis	Nov 26, 1985 KSC	Dec 3, 1985 EAFB	Cdr: Brewster H. Shaw Plt: Bryan D. O'Connor MS: Mary L. Cleave MS: Sherwood C. Spring MS: Jerry L. Ross PS: Rudolfo Neri Vela PS: Charles Walker	<p>Deployable Payloads:</p> <ol style="list-style-type: none"> MORELOS-B/PAM-D: Hughes 376 Comm Satellite with McDAC Payload Assist Module booster. Owned by Mexican Communications and Transportation Agency. AUSSAT-2/PAM-D: Hughes 376 Comm Satellite with McDAC Payload Assist Module booster. Owned by Aussat Proprietary Ltd SYNCOM KU-2/PAM-D: RCA built/owned 16 channel Ku-band communication satellite. First of four satellites. McDAC Payload Assist Module D2 is an updated version of the PAM-D used for heavier payloads. <p>Attached PLB Payloads:</p> <ol style="list-style-type: none"> EASE (Experiment Assembly of Structures in Extravehicular Activity): A study of EVA dynamics and human factors in construction of structures in space. An inverted tetrahedron consisting of six 12-foot beams was constructed by EV-1 and EV-2. ACCESS (Assembly Concept for Construction of Erectable Space Structures): A validation of ground based timelines based on simulations. A 45-foot truss was assembled/disassembled by the two EV crew members. ICBC (IMAX Cargo Bay Camera): A joint effort between the Canadian IMAX Corp and NASA, consists of a 70mm film camera in pressurized container used to document EASE/ACCESS experiments. 	<p>GAS (Getaway Special):</p> <ol style="list-style-type: none"> G-479 - Telesat-Canada <ol style="list-style-type: none"> Primary surface mirror production Metallic crystal production <p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> CFES (Continuous Flow Electrophoresis System): Owned by McDonnell Douglas, separates biological samples using electrophoretic process. Third flight of this experiment. DMOS (Diffusive Mixing of Organic Solutions); Sponsored by 3M Corporation, used to study organic crystal growth/kinetics, test molecular orbital model, and produce new materials for electro-optical applications. MPSE (Morelos Payload Specialist Experiments): includes experiments in transportation of nutrients inside bean plants, inoculation of group bacteria viruses, germination of three seed types, and medical experiments testing internal equilibrium and volume change of the leg due to fluid shifts in zero-g. OEX (Orbiter Experiments): An onboard experimental digital autopilot software package designed to provide precise stationkeeping capabilities between space vehicles. <p>Special Payload Mission Kits:</p> <ol style="list-style-type: none"> Food Warmers (2), galley not flown. RMS (Remote Manipulator System) S/N 301 PSA (Provision Stowage Assembly)
Mission Duration: 165 hrs 4 mins 49 secs					

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-61C Columbia	Jan 12, 1986 KSC	Jan 18, 1986 KSC	Cdr: Robert L. Gibson Plt: C. F. Bolden, Jr. MS: F. R. Chang-Diaz MS: George D. Nelson MS: Steven A. Hawley PS: Robert J. Cenker PS: C. William Nelson	<p>Mission Duration: 146 hrs 3 mins 51 secs</p> <p>Deployable Payloads:</p> <ol style="list-style-type: none"> SATCOM KU-1/PAM D-2: RCA built/owned 16 channel Ku-band communications satellite. Second of four satellites. McDAC Payload Assist Module D2 is an uprated version of the PAM-D which is used for heavier payloads. <p>Attached PLB Payloads:</p> <ol style="list-style-type: none"> MSL-2 (Materials Science Laboratory) consisting of MSL carrier; MPE (Mission Peculiar Equipment), and 3 experiments: <ol style="list-style-type: none"> 3AAL (3-Axis Acoustic Levitator) ADSF (Automated Directional Solidification Furnace) SEECM (Shuttle Environmental Effects of Coated Mirror) Hitchhiker G-1: A Goddard Space Flight Center (GSFC) managed program consisting of 3 experiments: <ol style="list-style-type: none"> PACS (Particle Analysis Camera for Shuttle) CPL (Capillary Pump Loop) SEECM (Shuttle Environmental Effects of Coated Mirror) IR-IE (Infrared-Imaging Experiment) consisting of an RCA IR TV camera mounted in Orbiter CCTV pan/tilt unit. <p>GAS (Getaway Special):</p> <ol style="list-style-type: none"> G-464: UVX (Ultraviolet Experiment), referred to as UCB University of California at Berkley) contains a Bowyer UV spectrometer. GSFC experiment. G463: UVX, referred to as JHU (John Hopkins University) contains a Feldman Spectrophotometer. GSFC experiment. ACCESS experiments. G462: UVX, referred to as GAP (GSFC Avionics Package) contains Telemetry System, Tape Recorder, and Battery. GSFC experiment. G007: Alabama Space and Rocket Center/Marshall Amateur club. Contains 3 student experiments and 1 radio transmission experiment. G446: HPLC (High Performance Liquid Chromatography) analytical columns. All Tech Assoc. Inc. 	<ol style="list-style-type: none"> G494: PHOTONS (Photometric Thermospheric Oxygen Nightglow Study). Canada Centre for Space Science, National Research Council of Canada. Not Numbered: EMP (Environmental Monitoring Package) measures the environment for GSFC. G481: Unprimed, Prepared linen and painted canvas reactions to space travel. Vertical Horizons. G062: 4 part experiment from PA State University/GE. G449: JULIE (Joint Utilization of Laser Integrated Experiments) 4 part experiment from St. Mary's Hospital, Milwaukee, WI. G332: 2 part experiment from Booker T. Washington Senior High School and High School for Engineering, Houston, TX G310: USAF Academy experiment. <p>Note: Above 12 listed GAS canisters mounted on GAS Bridge Carrier</p> G470: Experiment from GSFC and US Dept of Agriculture <p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> IBSE (Initial Blood Storage Experiment) package in 4 middeck lockers. CHAMP (Comet Halley Active Monitoring Program) uses cameras, spectroscopic grating, and filters to observe comet through aft flight deck overhead window. HPCG (Handheld Protein Crystal Growth) experiment SSIP (Shuttle Student Involvement Program) <ol style="list-style-type: none"> SE83-4, Production of Paper Fiber in Space SE83-6, Argon Injection as an Alternative to Honeycombing. SE82-19, Measurement of Auxin Levels and Starch Grains in Plant Roots. <p>Special Payload Mission Kits:</p> <ol style="list-style-type: none"> GAS Bridge Carrier Galley

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-51L Challenger	Jan 28, 1986 KSC	Jan 28, 1986	Cdr: Francis R. Scobee Plt: Michael J. Smith MS: Judith A. Resnik MS: Ellison S. Onizuka MS: Ronald E. McNair PS: Gregory Jarvis PS: S. Christa McAuliffe (Teacher)	<p>Deployable Payloads:</p> <ol style="list-style-type: none"> 1. TDRS-B/IUS: Tracking and Data Relay Satellite/ Inertial Upper Stage. 2. SPARTAN-203/Halley: Shuttle pointed Autonomous Research Tool for Astronomy/Halley's Comet Experiment Deployable/retrieval packages using RMS: <ol style="list-style-type: none"> a. SPARTAN experiment package: <ol style="list-style-type: none"> 1) 2 UV Spectrometers from Univ of Colorado 2) 2 Nikon F-3 Cameras 3) Optic Bench b. Halley's Comet Experiment; measure Halley's Comet composition/activity <p>Attached PLB Payloads: None</p> <p>GAS (Getaway Special): None</p> <p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> 1. Fluid Dynamics Experiment (FDE) - Hughes Aircraft Company Experiment composed of 6 experiments: <ol style="list-style-type: none"> a. Fluid position and ullage b. Fluid motion due to spin c. Fluid self-inertia d. Fluid motion due to payload deployment e. Energy dissipation due to fluid motion f. Fluid transfer 2. Comet Halley Active Monitoring Program (CHAMP), second flight. 	<ol style="list-style-type: none"> 3. Phase Partitioning Experiment (PPE) dissolves two polymer solutions in water to observe their separation 4. Teacher in Space: Six experiments including hydroponics, magnetism, Newton's laws, effervescence, chromatography, and simple machines. 5. SSIP (Shuttle Student Involvement Program) packages: <ol style="list-style-type: none"> a. SE82-4: "The effects of weightlessness on grain formation and strength in metals" - L. Bruce, St. Louis, MO - Sponsor: McDonnell Douglas b. SE82-5: "Utilizing a semi-permeable membrane to direct crystal growth in zero gravity" - S. Cavou, Marlboro, NY - Sponsor: Union College c. "Chicken Embryo Development in Space" - J. Vellinger, Lafayette, IN - Sponsor: Kentucky Fried Chicken Corporation <p>Special Payload Mission Kits:</p> <ol style="list-style-type: none"> 1. RMS (Remote Manipulator System) 2. Galley 3. MADS
Mission Duration: N/A					

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-26 Discovery	Sep 29, 1988 KSC	Oct 3, 1988 EAFB	Cdr: Frederick H. Hauck Plt: Richard O. Covey MS: John M. Lounge MS: David C. Hilmers MS: George D. Nelson	<p>Deployable Payloads:</p> <ol style="list-style-type: none"> 1. TDRS-C/IUS: Tracking and Data Relay Satellite/ Inertial Upper Stage. <p>Attached PLB Payloads:</p> <ol style="list-style-type: none"> 1. OASIS-1: Orbiter Experiment Autonomous Supporting Instrumentation System measures and records payload bay environmental data. <p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> 1. PVTOS - Physical Vapor Transport of Organic Solids, 3M Corporation. Second flight 2. ADSF - Automated Directional Solidification Furnace, MSFC, third flight, test material solidification in zero g. 3. IRCFE - Infrared Communication Flight Experiment, JSC, first flight. Test infrared transmitting crew headsets. 4. PCG - Protein Crystal Growth, MSFC, flown four previous flights in less complicated configurations to examine growth of protein crystals in zero g. 5. IEF - Isoelectric Focusing, MSFC, second flight, test isoelectric transport through a permeable membrane in zero g. 	<ol style="list-style-type: none"> 6. PPE - Phase Partitioning Experiment, MSFC, second flight, photograph fluid phase partitioning phenomena in zero g 7. ARC - Aggregation of Red Blood Cells, MSFC and Australia, investigate aggregation characteristics of human red blood cells in zero g. 8. MLE - Mesoscale Lightning Experiment, MSFC, first flight, photograph atmospheric lightning activity from orbit. 9. ELRAD - Earth Limb Radiance Experiment, JSC, first flight, photograph earth limb radiance pre-sunrise/post-sunset. 10. Student Experiment SE82-4 - "Effects of weightlessness on Ti grain formation and strength." L. Bruce, St. Louis, MO, Sponsor: McDonnell Douglas 11. Student Experiment SE82-5 - "Utilizing a semi-permeable membrane to direct crystal growth in zero gravity." S. Cavou, Marlboro, NY, Sponsor: Union College <p>GAS (Getaway Special): None</p> <p>Special Payload Mission Kits:</p> <ol style="list-style-type: none"> 1. Galley 2. MADS
STS-27 Atlantis	Dec 2, 1988 KSC	Dec 6, 1988 EAFB	Cdr: Robert L. Gibson Plt: Guy S. Gardner MS: Richard M. Mullane MS: Jerry L. Ross MS: William M. Shepherd	<p>Deployable Payloads:</p> <p>Data not available, DOD Classified Mission.</p> <p>Attached PLB Payloads:</p> <p>Data not available, DOD Classified Mission.</p> <p>GAS (Getaway Special): None</p> <p>Data not available, DOD Classified Mission.</p>	<p>Crew Compartment Payloads:</p> <p>Data not available, DOD Classified Mission.</p> <p>Special Payload Mission Kits:</p> <p>Data not available, DOD Classified Mission.</p>

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-29 Discovery	Mar 13, 1989 KSC	Mar 17, 1989 EAFB	Cdr: Michael L. Coats Plt: John E. Blaha MS: James P. Bagian MS: James F. Buchli MS: Robert C. Springer	<p>Deployable Payloads:</p> <ol style="list-style-type: none"> TDRS-D/IUS: Tracking and Data Relay Satellite/ Inertial Upper Stage. One of four identical communications satellites providing support for STS and other customers. <p>Attached PLB Payloads:</p> <ol style="list-style-type: none"> SHARE (Space Station Heat Pipe Advanced Radiator Element) OASIS-1 (Orbiter Experiments Autonomous Supporting Instrumentation System) 	<p>GAS (Getaway Special): None</p> <p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> Protein Crystal Growth (PCG-111-1) Chromosome and Plant Cell Division in Space (CHROMEX) IMAX Camera Air Force Maui Optical Site Calibration Test (AMOS) Chicken Embryo Development (CHIX) in space. Effects of Weightlessness of Bones (SSIP 82-08) <p>Special Payload Mission Kits: None</p>
STS-30 Atlantis	May 4, 1989 KSC	May 8, 1989 EAFB	Cdr: David M. Walker Plt: Ronald J. Grabe MS: Norman E. Thagard MS: Mary L. Cleave MS: Mark C. Lee	<p>Deployable Payloads:</p> <ol style="list-style-type: none"> Magellan/IUS - Unmanned three-axis attitude-controlled exploration spacecraft containing systems required to achieve orbit of Venus and map its surface. <p>Attached PLB Payloads: None</p>	<p>GAS (Getaway Special): None</p> <p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> Fluids Experiment Apparatus (FEA) Mesoscale Lightning Experiment (MLE) Air Force Maui Optical Site Calibration Test (AMOS) <p>Special Payload Mission Kits: None</p>
STS-28 Columbia	Aug 8, 1989 KSC	Aug 13, 1989 EAFB	Cdr: Brewster H. Shaw Plt: Richard N. Richards MS: David C. Leetsma MS: James C. Adamson MS: Mark N. Brown	<p>Deployable Payloads:</p> <p>Data not available, DOD Classified Mission.</p> <p>Attached PLB Payloads:</p> <p>Data not available, DOD Classified Mission.</p> <p>GAS (Getaway Special):</p> <p>Data not available, DOD Classified Mission.</p>	<p>Crew Compartment Payloads:</p> <p>Data not available, DOD Classified Mission.</p> <p>Special Payload Mission Kits:</p> <p>Data not available, DOD Classified Mission.</p>
STS-34 Atlantis	Oct 18, 1989 KSC	Oct 23, 1989 EAFB	Cdr: Donald E. Williams Plt: Michael McCulley MS: Ellen S. Baker MS: Franklin R. Chang-Diaz MS: Shannon W. Lucid	<p>Deployable Payloads:</p> <ol style="list-style-type: none"> Galileo/IUS - Unmanned spin-stabilized exploration spacecraft comprising a Jupiter orbiter and a Jupiter atmospheric entry probe mated to the IUS. <p>Attached PLB Payloads:</p> <ol style="list-style-type: none"> Shuttle Solar Backscatter Ultraviolet (SSBUV) <p>GAS (Getaway Special):</p> <ol style="list-style-type: none"> Zero Gravity Growth of Ice Crystals 	<p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> Polymer Morphology Growth Hormone Concentration & Distribution in Plants Sensor Technology Experiment IMAX Camera Mesoscale Lightning Experiment Air Force Maui Optical Site Calibration Test (AMOS) <p>Special Payload Mission Kits: None</p>

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-33 Discovery	Nov 22, 1989 KSC	Nov 27, 1989 EAFB	Cdr: Frederick D. Gregory Plt: John E. Blaha MS: Manley L. Carter MS: Franklin Musgrave MS: Kathryn C. Thornton	Deployable Payloads: Data not available, DOD Classified Mission. Attached PLB Payloads: Data not available, DOD Classified Mission. GAS (Getaway Special): Data not available, DOD Classified Mission.	Crew Compartment Payloads: Data not available, DOD Classified Mission. Special Payload Mission Kits: Data not available, DOD Classified Mission.
Mission Duration: 120 hrs 6 mins 46 secs					
STS-32 Columbia	Jan 9, 1990 KSC	Jan 20, 1990 EAFB	Cdr: Daniel C. Brandenstein Plt: James D. Wetherbee MS: Bonnie J. Dunbar MS: Marsha S. Ivins MS: G. David Low	Deployable Payloads: 1. Syncom IV-5, a geostationary communications satellite also known as Leasat; leased to U.S. Navy Attached PLB Payloads: None Returned Cargo: 1. LDEF, a non-powered space vehicle containing experiments - Deployed on STS-41C. Crew Compartment Payloads: 1. American Flight Echocardiograph (AFE) 2. Air Force Maui Optical Site Calibration Test (AMOS) 3. Characterization of Neurospora Circadian Rhythms (CNCR)	4. Fluids Experiment Apparatus 5. IMAX Camera 6. Latitude/Longitude Locator (L3) 7. Mesoscale Lightning Experiment (MLE) 8. Protein Crystal Growth (PCG) GAS (Getaway Special): None Special Payload Mission Kits: 1. Remote Manipulator System (RMS) 2. Galley 3. MADS
Mission Duration: 261 hrs 0 mins 37 secs					
STS-36 Atlantis	Feb 28, 1990 KSC	Apr 14, 1990 DFRF	Cdr: John D. Creighton Plt: John H. Casper MS: David C. Hilmers MS: Richard M. Mullane MS: Pierre J. Thuot	Deployable Payloads: Data not available, DOD Classified Mission. Attached PLB Payloads: Data not available, DOD Classified Mission. GAS (Getaway Special): Data not available, DOD Classified Mission.	Crew Compartment Payloads: Data not available, DOD Classified Mission. Special Payload Mission Kits: Data not available, DOD Classified Mission.
Mission Duration: 106 hrs 18 mins 22 secs					
STS-31 Discovery	Apr 24, 1990 KSC	Apr 29, 1990 EAFB	Cdr: Loren J. Shriver Plt: Charles F. Bolden MS: Bruce McCandless MS: Steven A. Hawley MS: Kathryn D. Sullivan	Deployable Payloads: 1. Hubble Space Telescope (HST), a large aperture optical telescope. Attached PLB Payloads: 1. IMAX Cargo Bay Camera (ICBC) 2. Ascent Particle Monitor (APM) GAS (Getaway Special): None Crew Compartment Payloads: 1. Air Force Maui Optical Site Calibration Test (AMOS)	2. IMAX Camera 3. Investigation into Polymer Membrane Processing (IPMP) 4. Protein Crystal Growth (PCG) 5. Radiation Monitoring Experiment (RME) 6. Investigation of Arc and Ion Behavior in Microgravity (Student Experiment 82-16) Special Payload Mission Kits: 1. Remote Manipulator System (RMS) 2. Galley 3. HST EVA Tools
Mission Duration: 121 hrs 16 mins 6 secs					

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-41 Discovery	Oct 6, 1990 KSC	Oct 10, 1990 DFRF	Cdr: Richard N. Richards Pit: Robert D. Cabana MS: Bruce E. Melnick MS: William M. Shepherd MS: Thomas D. Akers	<p>Deployable Payloads: 1. Ulysses/IUS/PAM-S</p> <p>Attached PLB Payloads: 1. Shuttle Solar Backscatter Ultraviolet (SSBUV) 2. Intelsat Solar Array Coupon (ISAC) - Attached to RMS arm</p> <p>GAS (Getaway Special): None</p> <p>Crew Compartment Payloads: 1. Chromosome and Plant Cell Division in Space (CHROMEX) 2. Solid Surface Combustion Experiment (SSCE)</p>	<p>3. Voice Command System (VCS) 4. Physiological Systems Experiment (PSE) 5. Radiation Monitor Experiment (RME-III) 6. Investigation into Polymer Membrane Processing (IPMP) 7. Air Force Maui Optical Site (AMOS)</p> <p>Special Payload Mission Kits: 1. Remote Manipulator System (RMS) 2. Galley 3. Radioisotope Generator (TRG) Cooling System</p>
STS-38 Atlantis	Nov 15, 1990 KSC	Nov 20, 1990 KSC	Cdr: Richard O. Covey Pit: Frank L. Culbertson MS: Robert C. Springer MS: Carl J. Meade MS: Charles D. Gemar	<p>Deployable Payloads: Data not available, DOD Classified Mission.</p> <p>Attached PLB Payloads: Data not available, DOD Classified Mission.</p> <p>GAS (Getaway Special): Data not available, DOD Classified Mission.</p>	<p>Crew Compartment Payloads: Data not available, DOD Classified Mission.</p> <p>Special Payload Mission Kits: Data not available, DOD Classified Mission.</p>
STS-35 Columbia	Dec 2, 1990 KSC	Dec 11, 1990 DFRF	Cdr: Vance Brand Pit: Guy S. Gardner MS: John M. Lounge MS: Jeffrey A. Hoffman MS: Robert A. R. Parker PS: Ronald A. Parise PS: Samuel T. Durrance	<p>Deployable Payloads: None</p> <p>Attached PLB Payloads: 1. Astro-1 - Three ultraviolet telescopes attached to an Instrument Pointing System (IPS): a. Wisconsin UV Photopolarimeter Experiment (WUPPE) b. UV Imaging Telescope (UIT) c. Hopkins UV Telescope (HUT) 2. BBXRT - Broad Band X-ray Telescope. Attached to its own two-axis pointing system (TAPS)</p>	<p>GAS (Getaway Special): None</p> <p>Crew Compartment Payloads: 1. Shuttle Amateur Radio Experiment (SAREX) 2. Air Force Maui Optical Site (AMOS)</p> <p>Special Payload Mission Kits: 1. Galley 2. Aerodynamic Coefficient Identification Package (ACIP)</p>
STS-37 Atlantis	Apr 5, 1991 KSC	Apr 11, 1991 EAFB	Cdr: Steven R. Nagel Pit: Kenneth D. Cameron MS: Linda M. Godwin MS: Jerome Apt MS: Jerry L. Ross	<p>Deployable Payloads: 1. Gamma Ray Observatory (GRO), an unmanned astronomical observatory designed to image objects at high energy (gamma ray) wavelengths.</p> <p>Attached PLB Payloads: 1. Crew and Equipment Translation Aids (CETA) - designed to evaluate candidate techniques/equipment for EVA crewmember translation 2. Ascent Particle Monitor (APM) - designed to assess the particulate contamination in the Orbiter PLB during ascent.</p>	<p>GAS (Getaway Special): None</p> <p>Crew Compartment Payloads: 1. Protein Crystal Growth (PCG)-II 2. Air Force Maui Optical Site (AMOS) 3. Radiation Monitoring Equipment (RME)-III 4. Shuttle Amateur Radio Experiment (SAREX)-II 5. Bioserve/Instrumentation Technology 6. Associates Materials Dispersion Apparatus (BIMDA)</p> <p>Special Payload Mission Kits: 1. Remote Manipulator System (RMS) S/N 301</p>

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-39 Discovery	Apr 28, 1991 KSC	May 6, 1991 EAFB	Cdr: Michael L. Coats Plt: Blaine L. Hammond, Jr. MS: Guion S. Bluford MS: Gregory J. Harbaugh MS: Richard J. Hieb MS: Donald R. McMonagle MS: Charles L. Veach	<p>Deployable Payloads:</p> <ol style="list-style-type: none"> 1. Shuttle Payload Autonomous Satellite (SPAS)-II/ Infrared Background Signature Survey (IBSS) - SPAS-II/IBSS was designed to observe rocket plume firings at infrared wavelengths. <p>Attached PLB Payloads:</p> <ol style="list-style-type: none"> 1. Air Force Program (AFP)-675 - The objective of AFP-675 was to observe near-Earth space and celestial objects at infrared & ultraviolet wavelengths. 2. Space Test Payload (STP)-1 - Five USAF experiments mounted on a Hitchhiker-M carrier. 	<ol style="list-style-type: none"> 3. Multi-Purpose Experiment Container (MPEC) - An additional USAF experiment mounted on STP-1. <p>GAS (Getaway Special): None</p> <p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> 1. Cloud Logic to Optimize Use of Defense Systems (CLOUDS)-1A 2. Radiation Monitoring Equipment (RME)-III <p>Special Payload Mission Kits:</p> <ol style="list-style-type: none"> 1. Remote Manipulator System (RMS) S/N 301
STS-40 Columbia	Jun 5, 1991 KSC	Jun 14, 1991 DFRF	Cdr: Bryan O. O'Connor Plt: Sidney M. Gutierrez MS: James P. Bagian MS: Tamara E. Jernigan MS: M. Rhea Seddon PS: Drew F. Gaffney PS: Millie Hughes-Fulford	<p>Deployable Payloads: None</p> <p>Attached PLB Payloads: Spacelab Life Sciences (SLS)-1</p> <ol style="list-style-type: none"> a. Spacelab Long Module b. Tunnel c. Tunnel Extension d. Tunnel Adapter Experiments a. 6 Body Systems b. 6 Cardiovascular/Cardiopulmonary c. 3 Blood System d. 6 Musculoskeletal e. 3 Neurovestibular f. 1 Immune System g. 1 Renal/Endocrine System <p>Gas Bridge Assembly (GBA)- 12 GAS experiments mounted on a truss structure in the PLB.</p> <p>GAS (Getaway Special):</p> <p>12 Experiments on GBA</p> <ol style="list-style-type: none"> 1. Solid State Microaccelerometer Experiment 	<ol style="list-style-type: none"> 2. Experiment in Crystal Growth 3. Orbital Ball Bearing Experiment 4. In-Space Commercial Processing 5. Foamed Ultralight Metals 6. Chemical Precipitate Formation 7. Microgravity Experiments 8. Flower and vegetable seeds exposure to Space 9. Semiconductor Crystal Growth Experiment 10. Active Soldering Experiments 11. Orbiter Stability Experiment 12. Effects of cosmic Ray Radiation on Floppy Disks and Plant Seeds Exposure to Microgravity <p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> 1. Physiological Monitoring System (PMS) 2. Urine Monitoring System (UMS) 3. Animal Enclosure Modules (AEM) 4. Middeck Zero-Gravity Experiment (MODE) <p>Special Payload Mission Kits:</p> <ol style="list-style-type: none"> 1. Airlock Transfer Tunnel

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-43 Atlantis	Aug 2, 1991 KSC	Aug 11, 1991 KSC	Cdr: John E. Blaha Plt: Michael A. Baker MS: James C. Adamson MS: G. David Low MS: Shannon E. Lucid	<p>Deployable Payloads:</p> <ol style="list-style-type: none"> 1. TDRS-E/IUS: Tracking and Data Relay Satellite/ Inertial Upper Stage. One of four identical communications satellites providing support for STS and other customers. <p>Attached PLB Payloads:</p> <ol style="list-style-type: none"> 1. Space Station Heatpipe Advanced Radiator Element (SHARE-II) 2. Shuttle Solar Backscatter Ultraviolet (SSBUV) 3. Optical Communications Through the Window (OCTW) Experiments <p>1. Gas Bridge Assembly (GBA)</p>	<p>GAS (Getaway Special):</p> <ol style="list-style-type: none"> 1. Tank Pressure Control Experiment (TPCE) <p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> 1. Air Force Maui Optical Site (AMOS) 2. Auroral Photography Experiment (APE) 3. Bioserve/Instrumentation Technology Associates Materials Dispersion Apparatus (BIMDA) 4. Investigations into Polymer Membrane Processing (IPMP) 5. Protein Crystal Growth (PCG) 6. Space Acceleration Measurement System (SAMS) 7. Solid Surface Combustion System (SSCS) 8. Ultraviolet Plume Instrument <p>Special Payload Mission Kits: None</p>
STS-48 Discovery	Sep 12, 1991 KSC	Sep 18, 1991 EAFB	Cdr: John O. Creighton Plt: Kenneth S. Reightler MS: Mark F. Brown MS: James F. Buchli MS: Charles D. Gemar	<p>Deployable Payloads:</p> <ol style="list-style-type: none"> 1. Upper Atmosphere Research Satellite (UARS) <p>Attached PLB Payloads:</p> <p>Experiments</p> <ol style="list-style-type: none"> 1. Gas Bridge Assembly (GBA) <p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> 1. Ascent Particle Monitor (APM) 2. Cosmic Radiation Effects and Activation Monitor (CREAM) 	<ol style="list-style-type: none"> 3. Radiation Monitoring Experiment (RME) 4. Investigations into Polymer Membrane Processing (IPMP) 5. Protein Crystal Growth (PCG) 6. Middeck 0-Gravity Dynamics Experiment (MODE) 7. Shuttle Activation Monitor (SAM) 8. Physiological and Anatomical Rodent Experiment (PARE) <p>GAS (Getaway Special): None</p> <p>Special Payload Mission Kits: None</p>
STS-44 Atlantis	Nov 14, 1991 KSC	Dec 1, 1991 EAFB	Cdr: Frederick D. Gregory Plt: Terence T. Henricks MS: F. Story Musgrave MS: Mario Runco, Jr. MS: James S. Voss PS: Thomas J. Hennen	<p>Deployable Payloads:</p> <ol style="list-style-type: none"> 1. Defense Support Program/Inertial Upper Stage satellite (DSP/IUS) <p>Attached PLB Payloads:</p> <ol style="list-style-type: none"> 1. Interim Operational Contamination Monitor (IOCM) Experiments <p>1. Gas Bridge Assembly (GBA)</p> <p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> 1. Terra Scout 2. Military Man in Space (M88-1) 	<ol style="list-style-type: none"> 3. Air Force Maui Optical Site (AMOS) 4. Cosmic Radiation Effects and Activation Monitor (CREAM) 5. Shuttle Activation Monitor (SAM) 6. Radiation Monitoring Experiment (RME-III) 7. Visual Function Monitor (VFT-1) 8. Ultraviolet Plume Instrument (UVPI) <p>GAS (Getaway Special): None</p> <p>Special Payload Mission Kits: None</p>

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-42 Discovery	Jan 22, 1992 KSC	Jan 30, 1992 EAFB	Cdr: Ronald J. Grabe Plt: Steven S. Oswald MS: Norman E. Thagard MS: William F. Readdy MS: David C. Hilmers PS: Roberta L. Bondar PS: Ulf D. Merbold	<p>Deployable Payloads: None</p> <p>Attached PLB Payloads: International Microgravity Laboratory-1 (Spacelab Long Module) Objective: Conduct 9 Materials Science and 7 Life Sciences experiments in microgravity:</p> <ol style="list-style-type: none"> 1. Fluid Experiment System - Crystal growth and fluid behavior 2. Vapor Crystal Growth System - Reflight from Spacelab 3 3. Mercury Iodide Crystal Growth - Reflight from Spacelab 3 4. Protein Crystal Growth - Reflight from STS 26, 29, 32, 37 (Middeck) 5. Organic Crystal Growth Facility - Crystal growth 6. Cryostat- Crystal growth 7. Space Acceleration Monitoring System - Measure on-orbit shuttle acceleration to support other microgravity experiments 8. Critical Point Facility - Measure material properties at the critical point 9. Gravitational Plant Physiology Facility - Biological Investigation of plants during spaceflight 10. Biorack - Biological investigation of various life forms during spaceflight 11. Space Physiology Experiments - Investigate human space adaptation and motion sickness 12. Microgravity Vestibular Investigations - Study space motion sickness 13. Biostack - Investigate space radiation effects on biological materials 14. Mental Workload and Performance Evaluation - Test human performance of computer tasks in Zero-G 15. Radiation Monitoring Container/Dosimeter - Measure effect of space radiation on biological material 	<p>GAS (Getaway Special) Bridge consisting of 12 canisters:</p> <ol style="list-style-type: none"> 1. G-086 - Effects of microgravity on cysts hatched in space; thermal conductivity and bubble velocity of air in water 2. G-140 - Marangoni convection in a floating zone 3. G-143 - Glass bubbles in glass melts 4. G-329 - Solidification of phenomena in metal alloys 5. G-336 - Measurement of diffuse zodiacal and galactic emissions at B, R, and V standard 6. G-337 - Performance of thermoacoustic refrigerator under microgravity 7. G-457 - Gas-liquid separation under microgravity 8. G-609, G-610 - Ultraviolet observations of deep space 9. G-614 - Motion of debris under microgravity conditions: low melting point materials processing 10. Middeck 0-Gravity Dynamics Experiment (MODE) 11. GAS ballast payload no. 1 (GPB #1) 12. GAS ballast payload no. 2 (GPB #2) <p>Crew Compartment Payload:</p> <ol style="list-style-type: none"> 1. Gelation of Sols: Applied Microgravity Research (GOSAMR) - Objective: Investigate processing of gelled sols in microgravity 2. Student Experiment SE 93-2 - Objective: Study zero gravity capillary rise of liquid through granular porous media 3. Student Experiment SE 81-9 - Objective: Study convection in zero gravity 4. Investigation into Polymer Membrane Processing (IPMP) - Objective: Manufacture polymers in space 5. Radiation Monitoring Experiment (RME-III) - Objective: Measure radiation environment on-orbit <p>Special Payload Mission Kits: None</p>

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-45 Atlantis	Mar 24, 1992 KSC	Apr 2, 1992 KSC	Cdr: Charles F. Bolden Plt: Brian K. Duffy MS: Kathryn D. Sullivan MS: David C. Leestma MS: C. Michael Foale PS: Dirk D. Frimout PS: Bryon K. Lichtenberg	<p>Deployable Payloads: None</p> <p>Attached PLB Payloads:</p> <p>ATLAS-1 (2 Spacelab Pallet and Igloo) - Objective: Study the composition of the middle atmosphere and its variations over an 11 year solar cycle. This is the first of 10 planned ATLAS missions over the next 11 years.</p> <p>Atmosphere Physics:</p> <ol style="list-style-type: none"> 1. Atmosphere Trace Molecule Spectroscopy (ATMOS) - Previously flown on Spacelab 1, Reflight from Spacelab 3 2. Millimeter Wave Atmospheric Sounder (MAS) - First flight 3. Atmospheric Lyman Alpha Emissions (ALAE) - Previously flown on Spacelab 1 4. Grille Spectrometer (GRILLE) - Previously flown on Spacelab 1 5. Imaging Spectrometric Observatory (ISO) - Previously flown on Spacelab 1 <p>Solar Science:</p> <ol style="list-style-type: none"> 1. Active Cavity Radiometer Irradiance Monitor (ACRIM) - ACRIM 1 flown on the solar maximum satellite 2. Measurement of the Solar Constant (SOLCON) - Previously flown on Spacelab 1 3. Solar Spectrum Measurement from 180 to 3200 Nanometers (SOLSPEC) - Previously flown on Spacelab 1 4. Solar Ultraviolet Spectral Irradiance Monitor (SUSIM) - Previously flown on Spacelab 2 and on the Upper Atmosphere Research Satellite (UARS) <p>Space Plasma Physics:</p> <ol style="list-style-type: none"> 1. Atmospheric Emissions Photometric Imaging (AEPI) - Previously flown on Spacelab 1 2. Space Experiments with Particle Accelerators (SEPAC) - Previously flown on Spacelab 1 3. Energetic Neutral Atom Precipitation 	<p>Ultraviolet Astronomy:</p> <ol style="list-style-type: none"> 1. Far Ultraviolet Space Telescope (FAUST) - Previously flown on Spacelab 1 2. Shuttle Solar Backscatter Ultraviolet/A (SSBUV/A) - Objective: To provide more accurate and reliable readings of global ozone to aid in the calibration of backscatter ultraviolet instruments being flown on free-flying satellites <p>GAS (Getaway Special):</p> <ol style="list-style-type: none"> 1. Getaway Special 229 (GAS-229) - Objective: To melt and regrow gallium arsenide crystals with convective effects absent <p>Crew Compartment Payload:</p> <ol style="list-style-type: none"> 1. Investigation into Polymer Membranes Processing (IPMP) - Objective: To flash evaporate mixed solvent systems in the absence of convection to control the porosity of the polymer membrane in microgravity 2. Space Tissue Loss-01 (STL-01) - Objective: To monitor the activities of tissue samples at the cellular level under the influence of microgravity 3. Radiation Monitoring Equipment-III (RME-III) - Objective: To measure ionizing radiation over repeated time intervals and digitally store the resulting data 4. Visual Function Tester-2 (VFT-2) - Objective: To measure basic vision performance parameters in an orbital space flight environment 5. Cloud Logic to Optimize Use of Defense System - Objective: To obtain photographic sequences of cloud fields of interest as targets of opportunity 6. Shuttle Amateur Radio Experiment (SAREX II) - Objective: To demonstrate voice, slow-scan television (SSTV), and pocket radio. All transmitted on 2 meter capabilities and fast scan television (FSTV) transmitted on 70 cm capability.
Mission Duration: 214 hrs 10 mins 24 secs					

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-49 Endeavour	May 2, 1992 KSC	May 16, 1992 EAFB	Cdr: Daniel C. Brandenstein Plt: Kevin P. Chilton MS: Richard J. Hieb MS: Bruce E. Melnick MS: Pierre J. Thout MS: Kathryn C. Thornton MS: Thomas D. Akers	Deployable Payloads: 1. Intelsat VI F3 (International Telecommunications Satellite)/perigee kick motor (PKM) Attached PLB Payloads: 1. Assembly of station by EVA methods GAS (Getaway Special): None	Crew Compartment Payloads: 1. Commercial protein crystal growth (CPGC) 2. Air Force Maui Optical Site Calibration (AMOS) 3. Ultraviolet Plume Instrument (UVPI) Special Payload Mission Kits: None
STS-50 Columbia	Jun 25, 1992 KSC	Jul 9, 1992 KSC	Cdr: Richard N. Richards Plt: Keneth D. Bowersox MS: Bonnie J. Dunbar MS: Carl J. Meade MS: Ellen S. Baker PS: Lawrence J. DeLucas PS: Eugene H. Trinh	Deployable Payloads: None Attached PLB Payloads: 1. U.S. Microgravity Laboratory (USML-1) 2. Investigation into Polymer Membrane Processing (IPMP) 3. Shuttle Amateur Radio Experiment-II (SAREX-II) 4. Ultraviolet Plume Instrument (UVPI) 5. Orbital Acceleration Research Experiment (OARE) 6. Zeolite Crystal Growth (ZCG) 7. Astroculture 8. Generic Bioprocessing Apparatus (GBA) 9. Protein Crystal Growth (PCG) Block 1	GAS (Getaway Special): None Crew Compartment Payloads: 1. Zeolite Crystal Growth 2. Generic Bioprocessing Apparatus with 1 Refrigerator/Incubator Module (R/IM) 3. Astroculture (ASC) 4. Protein Crystal Growth (PCG) Block 1 with 3 R/IMs 5. Investigation into Polymer Membrane Processing (IPMP) 6. Shuttle Amateur Radio Experiment-II (SAREX-II) 7. Ultraviolet Plume Instrument (UVPI) Special Payload Mission Kits: None
STS-46 Atlantis	Jul 31, 1992 KSC	Aug 8, 1992 KSC	Cdr: Loren J. Shriver Plt: Andrew M. Allen MS: Jeffrey A. Hoffman MS: Franklin R. Chang-Diaz MS: Claude Nicollier MS: Martha S. Ivins PS: Franco Malerba	Deployable Payloads: 1. EURECA Attached PLB Payloads 1. Tethered Satellite System (TSS-1) 2. Evaluation of Oxygen Interaction with Materials-III/Thermal Energy Management Processes 2A-3 (EOIM-III/Temp 2A) 3. IMAX Cargo Bay Camera (ICBC) 4. Consortium for Material Development in Space Complex Autonomous Payload-II (CONCAP-II) 5. CONCAP-III 6. Limited Duration Space Environment Candidate Materials Exposure (LDCE)	GAS (Getaway Special): None Crew Compartment Payloads: 1. Gas Autonomous Payload Controller (GAPC) for Use in ICBC Operations 2. Pituitary Growth Hormone Cell Function (PHCF) 3. Air Force Maui Optical Site Calibration (AMOS) (Passive Requirements Only) 4.. Ultraviolet Plume Instrument (UVPI) Special Payload Mission Kits: None

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-47 Endeavour	Sep 12, 1992 KSC	Sep 20, 1992 KSC	Cdr: Robert L. Gibson Plt: Curtis L. Brown MS: Mark C. Lee MS: N. Jan Davis MS: Mae C. Jemison MS: Jerome Apt PS: Mamoru Mohri	Deployable Payloads: None Attached PLB Payloads: 1. Japanese Spacelab (Spacelab-J) Long Module Gas Bridge Assembly (GBA) with 12 Gas Canisters GAS (Getaway Special): None	Crew Compartment Payloads: 1. Israeli Space Agency Investigation about Hornets (ISAI AH) 2. Shuttle Amateur Radio Experiment (SAREX) 3. Solid Surface Combustion Experiment (SSCE) 4.. Ultraviolet Plume Instrument (UVPI) - Payload of Opportunity Special Payload Mission Kits: None
STS-52 Columbia	Oct 22, 1992 KSC	Nov 1, 1992 KSC	Cdr: James D. Wetherbee Plt: Michael A. Baker MS: William M. Sheperd MS: Tamara E. Jernigan MS: Charles L. Veach PS: Steven G Mac Lean	Deployable Payloads: None 1. Laser Geodynamics Satellite (LAGEOS) Attached PLB Payloads 1. United Stated Microgravity Payload (USMP-1) GAS (Getaway Special): None Crew Compartment Payloads: 1. Queens University Experiment in Liquid Metal Diffusion (QUELD) 2. Phase Partition in Liquid (PARLIQ) 3. Sun Photo Spectrometer Earth Atmosphere 3. Sun Photo Spectrometer Earth Atmosphere Measurement-2 (SPEAM)	4. Orbiter Glow-2 5. Commercial Materials Dispersion Apparatus Instrumentation Technology Associates Experiments (CMIX) 6. Crystal by Vapor Transport Experiment (CVTE) 7. Heat Pipe Performance (HPP) 8. Commercial Protein Crystal Growth (CPCG) 9. Shuttle Plume Impingement Experiment (SPIE) 10. Physiological System Experiment (PSE) Special Payload Mission Kits: None
STS-53 Discovery	Dec 2, 1992 KSC	Dec 9, 1992 EAFB	Cdr: David M. Walker Plt: Robert D. Cabana MS: Guion S. Bluford, Jr MS: James S. Voss MS: M. Richard Clifford	Deployable Payloads: DoD payload Attached PLB Payloads: 10 secondary payloads	GAS (Getaway Special): None Crew Compartment Payloads: Special Payload Mission Kits: None

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-54 Endeavour	Jan 13, 1993 KSC	Jan 19, 1993 KSC	Cdr: John H. Casper Plt: Donald R McMonagle MS: Mario Runco, Jr MS: Gregory Harbaugh MS Susan Helms	Deployable Payloads: None 1. Tracking and Data Relay Satellite/Inertial Upper Stage(TDRS/IUS) Attached PLB Payload: 1. Diffuse X-Ray Spectrometer(DXS) GAS(Getaway Special): None Crew Compartment Payloads: 1. Chromosome and Plant Cell Division in Space(CHROMEX)	2. Commercial Generic Bioprocessing Apparatus(CGBA) 3. Physiological and Anatomical Rodent Experiment(PARE) 4. Solid Surface Combustion Experiment(SSCE) Special Payload Mission Kits: None
STS-56 Discovery	Apr 8, 1993 KSC	Apr 17, 1993 KSC	Cdr: Kenneth Cameron Plt: Steven S. Oswald MS: C. Michael Foale MS: Kenneth Cockrell MS: Ellen Ochoa	Deployable Payloads: 1. Shuttle Point Autonomous Research Tool for Astronomy - 201(SPARTAN-201) Attached PLB Payloads: 1. Atmospheric Laboratory for Applications and Science (ATLAS-2) GAS (Getaway Special): None Crew Compartment Payloads: 1. Solar Ultraviolet Spectrometer(SUVE) 2. Hand-Held, Earth-Oriented, Real Time, Cooperative, User-Friendly, Location Targeting, and Environmental System(HERCULES) 3. Radiation Monitoring Equipment II(RME-III)	4. Cosmic Radiation Effects and Activation Monitor(CREAM) 5. Shuttle Amateur Radio Experiment II(SAREX II) 6. Commercial Materials Dispersion Apparatus ITA Experiments(CMIX) 7. Space Tissue Loss Experiment(STL) 8. Physiological and Anatomical Rodent Experiment(PARE) Special Payload Mission Kits 1. Remote Manipulator System
STS-55 Columbia	Apr 26, 1993 KSC	May 6, 1993 EAFB	Cdr. Steven R. Nagel Plt. Terence T. Hendricks MS. Charles Precourt MS. Bernard Harris, Jr. PS. Ulrich Walter PS Hans Schlegel	Deployable Payload: None Attached PLB Payload: 1. D2 payload user support structure: German(SPACELAB) 2. Material Science Autonomous Payload(MAUS) 3. Atomic Oxygen Exposure Tray(AOET) 4. Galactic Ultrawide Angle Schmidt System Camera(GAUSS) 5. Modular Opto-Electronic Multispectral Stereo Scanner (MOMS)	GAS (Gateway Special): 1. Reaction Kinetics in Glass Melts(RKGM) Crew Compartment Payload: 1. Crew Telesupport Experiment 2. Shuttle Amateur Radio Experiment(SARAX) Special Payload Mission Kits: None

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-58 Columbia	Oct 18, 1993 KSC	Nov 1, 1993 EAFB	Cdr: John E. Blaha Pit: Richard Searfoss PC: Margaret Rhea Seddon MS: Shannon W. Lucid MS: David A. Wolf MS: William McArthur, Jr. PS: Martin J. Fettman Mission Duration: 336 hrs 12 mins 32 secs	Deployable Payloads: None Attached PLB Payloads: 1. Spacelab Life Sciences-2(SLS-2) <ul style="list-style-type: none"> a. Spacelab Long Module b. Spacelab Pallet c. Tunnel d. Tunnel Extension GAS (Getaway Special): None	Crew Compartment Payloads: 1. Urine Monitoring System (UMS) 2. Shuttle Amateur Radio Experiment (SAREX) Special Payload Mission Kits:
STS-61 Endeavour	Dec 2, 1993 KSC	Dec 13, 1993 KSC	Cdr: Richard O. Covey Pit: Kenneth D. Bowersox MS: F. Story Musgrave MS: Thomas D. Akers MS: Jeffery A. Hoffman MS: Kathryn C. Thornton MS: Claude Nicollier Mission Duration: 259 hrs 58 mins 35 secs	Deployable Payloads: 1. Hubble Space Telescope (HST) Service Mission - 01 <ul style="list-style-type: none"> a. Solar Array (SA) b. Wide Field/Planetary Camera (WFPC) c. Corrective Optics Space Telescope Axial Replacement (COSTAR) Attached PLB Payloads: 1. MFR (Manipulator Foot Restraint) 2. SESA (Special Equipment Stowage Assembly) 3. IMAX Cargo Bay Camera (ICBC-04) 4. Air Force Maui Optical Site Calibration Test (AMOS) GAS (Getaway Special): None	Crew Compartment Payloads 1. Hubble Space Telescope Special Tools 2. Shuttle Orbiter Repackaged Galley (SORG) 3. Electronic Still Camera Photography Test 4. Global Positioning System (GYS) Special Payload Mission Kits: None

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-60 Discovery	Feb 3, 1994 KSC	Feb 11, 1994 KSC	Cdr: Charles Bolden Plt: Ken Reightler MS: Franklin Chang-Diaz MS: Jan Davis MS: Ronald Sega MS: Sergei Krikalev	<p>Deployable Payloads: 1. Wake Shield Facility-1 (WSF-1)</p> <p>Attached PLB Payloads: 1. SPACEHAB-2 a. Experiments-12 2. Capillary Pump Loop (CAPL)</p> <p>GAS (Getaway Special): 1. Orbital Debris Radar Calibration Spheres (ODERACS) 2. BREMAN Satellite (BREMSAT) 3. G-071 (Ball Bearing Experiment) 4. G-514 (Orbiter Stability Exper.& Medicines in Microgravity) 5. G-536 (Heat Flux) 6. G-557 (Capillary Pumped Loop Experiment)</p>	<p>Crew Compartment Payloads: 1. Shuttle Amateur Radio Experiment-II (SAREX-2) 2. Aurora Photography Experiment-B (APE-B)</p> <p>Special Payload Mission Kits: None</p>
STS-62 Columbia	Mar 4, 1994 KSC	Mar 18, 1994 KSC	Cdr: John Casper Plt: Andrew Allen MS: Pierre Thuot MS Charles Gemar MS Marsha Ivins	<p>Deployable Payloads: None</p> <p>Attached PLB Payloads: 1. United States Microgravity Payload-2 (USMP-2) a. Experiments-5 2. Office of Aeronautics & Space Technology-2 (OAST-2) 3. Dexterous End Effector (DEE) 4. Shuttle Solar Backscatter Ultraviolet/A (SSBUV/A) 5. Limited Duration Space Environment Candidate Materials Exposure (LDCE)</p> <p>GAS (Getaway Special): None</p>	<p>Crew Compartment Payloads 1. Protein Crystal Growth Experiments (PCG) 2. Physiological System Experiment (PSE) 3. Commercial Protein Crystal Growth (CPCG) 4. Commercial Generic Bioprocessing Apparatus (CGBA) 5. Middeck O-Gravity Dynamics Experiments (MODE) 6. Bioreactor Demonstration System (BDS): Biotechnology Specimen Temperature Controller (BSTC)</p> <p>Special Payload Mission Kits: 1. Air Force Maui Optical Site Calibration Test (AMOS)</p>

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-59 Endeavour	Apr 9, 1994 KSC	Apr 20, 1994 KSC	Cdr: Sidney M. Gutierrez Plt: Kevin P. Chilton MS: Linda M. Godwin MS: Jay Apt MS: M.R. Clifford MS: Thomas D. Jones Mission Duration: 269hrs 49mins 30secs	Deployable Payloads: None Attached PLB Payloads: 1. Space Radar Laboratory-1 (SRL-1) 2. Consortium for Materials Development in Space Complex Autonomous Payload-IV (CONCAP-IV) GAS (Getaway Special): 1. G-203, New Mexico State University 2. G-300, Matra Marconi Space 3. G-458, The Society of Japanese Aerospace Companies, Inc.	Crew Compartment Payloads: 1. Space Tissue Loss (STL) 2. Shuttle Amateur Radio Experiment -II (SAREX-II) 3. Toughened Uni-Piece Fibrous Insulation (TUFI) 4. Visual Function Tester-4 (VFT-4) Special Payload Mission Kits: None
STS-65 Columbia	Jul 8, 1994 KSC	Jul 23, 1994 KSC	Cdr: Robert D. Cabana Plt: James D. Halsell MS: Richard J. Hieb MS: Carl E. Walz MS: Leroy Chiao MS: Donald A. Thomas PS: Chiaki Naito-Mukai Mission Duration: 353hrs 55mins 00secs	Deployable Payloads: None Attached PLB Payloads: 1. International Microgravity Lab-2 (IML-2) a. Large Isothermal Furnace b. Electromagnetic Containerless Processing Facility c. Bubble, Drop and Particle Unit d. Critical Point Facility e. Space Acceleration Measurement System f. Quasi-Steady Acceleration Measurement g. Vibration Isolation Box Experiment System h. Advanced Protein Crystallization Facility i. Applied Research on Separation Methods Using Space Electrophoresis j. Free Flow Electrophoresis Unit k. Aquatic Animal Experiment Unit l. Thermoelectric Incubator/Cell Culture Kit m. Biorack n. Slow Rotating Centrifuge Microscope o. Spinal Changes in Microgravity p. Extended Duration Orbiter Medical Project	q. Performance Assessment Workstation r. Biostack s. Real-Time Radiation Monitoring Device 2. Orbital Acceleration Research Experiment (OARE) GAS (Getaway Special): None Crew Compartment Payloads: 1. Commercial Protein Crystal Growth (CPCG) 2. Shuttle Amateur Radio Experiment-II (SAREX-II) 3. Military Applications of Ship Tracks (MAST) Special Payload Mission Kits: 1. Air Force Maui Optical Site (AMOS)

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-64 Discovery	Sep 9, 1994 KSC	Sep 20, 1994 EDW	Cdr: Richard N. Richards Plt: L. Blaine Hammond MS: Jerry M. Linenger MS: Susan J. Helms MS: Carl J. Meade MS: Mark C. Lee	<p>Deployable Payloads:</p> <ol style="list-style-type: none"> 1. Shuttle Pointed Autonomous Research Tool for Astronomy (SPARTAN 201) <p>Attached PLB Payloads:</p> <ol style="list-style-type: none"> 1. Lidar in Space Technology Experiment (LITE) 2. Robotic Operated Materials Processing System (ROMPS) 3. Shuttle Plume Impingement Flight Experiment (SPIFEX) <p>GAS (Getaway Special):</p> <ol style="list-style-type: none"> 1. G-178, Charge Coupled Device (CCD) 2. G-254, Utah State University; Spacepak 1-4 3. G-325, Norfolk Public Schools Science & Technology Advanced Research (NORSTAR) 4. G-417, Beijing Institute of Environmental Testing 5. G-453, The Society of Japanese Aerospace Companies (SJAC), Superconducting and Bubble Formation 	<ol style="list-style-type: none"> 6. G-454, The Society of Japanese Aerospace Companies (SJAC), Crystal Growth Experiments 7. G-456, The Society of Japanese Aerospace Companies (SJAC), Electrophoresis and Microgravity Tests 8. G-485, European Space Agency/ESTEC FTD 9. G-506, Orbiter Stability Experiment (OSE) 10. G-562, Canadian Space Agency, QUESTS-2 <p>Crew Compartment Payloads</p> <ol style="list-style-type: none"> 1. Air Force Maui Optical Site (AMOS) 2. Biological Research in Canisters (BRIC) 3. Military Application of Ship Tracks (MAST) 4. Radiation Monitoring Experiment-III (RME-III) 5. Shuttle Amateur Radio Experiment-II (SAREX-II) 6. Solid Surface Combustion Experiment (SSCE) <p>Special Payload Mission Kits: None</p>
STS-68 Endeavour	Sep 30, 1994 KSC	Oct 11, 1994 EDW	Cdr Michael A. Baker: Plt Terrence W. Wilcutt MS: Steven L. Smith MS Daniel W. Bursch MS Peter J. K. Wisoff MS Thomas D. Jones	<p>Deployable Payloads: None</p> <p>Attached PLB Payloads:</p> <ol style="list-style-type: none"> 1. Space Radar Laboratory-2 (SRL-2) <p>GAS (Getaway Special):</p> <ol style="list-style-type: none"> 1. G-316, Student Space Shuttle Program (SSSP) 2. G-503, Microgravity & Cosmic Radiation Effects on Diatoms (MCRED) Concrete Curing in Microgravity (ConCIM) Root Growth in Space (RGIS) Microgravity Corrosion Experiment (COMET) 3. G-541, Study breakdown of a planar solid/liquid interface during crystal growth <p>Special Payload Mission Kits: None</p>	<p>Crew Compartment Payloads</p> <ol style="list-style-type: none"> 1. Commercial Protein Crystal Growth (CPCG) 2. Biological Research in Canisters (BRIC) 3. Chromosomes & Plant Cell Division in Space Experiment (CHROMEX) 4. Cosmic Radiation Effects and Activation Monitor (CREAM) 5. Military Applications of Ship Tracks (MAST)

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-66 Atlantis	Nov 3, 1994		Donald R. McMonagle Curtis L. Brown, Jr. Ellen Ochoa Joseph R. Tanner Jean-Francois Clervoy (ESA) Scott E. Parazynski	<p>Sixty-sixth STS flight. Three main payloads:</p> <ol style="list-style-type: none"> 1. the third Atmospheric Laboratory for Applications and Science (ATLAS-3) 2. the first Cryogenic infrared Spectrometers and Telescopes for the Atmosphere-Shuttle Pallet Satellite (CRISTA-SPAS-1) 3. the Shuttle Solar Backscatter Ultraviolet (SSBUV) spectrometer. Astronauts also conducted protein crystal growth. 	

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-63 Discovery	Feb. 3, 1995 KSC	Feb. 11, 1995 KSC	Cdr: James D Wetherbee Plt: Eileen M. Collens MS: Bernard A. Harris, Jr. MS: Michael C. Roale MS: Janice Voss MS: Vladimir Georgievich Titov	Deployable Payloads: 1. Shuttle Mir Rendezvous and Fly Around 2. SPARTAN 204 Science 3. Extravhicular Activities (EVA) Attached PLB Payloads: 1. SPACEHAB-3	2. Solid Surface Combustion Experiment (SSCE) 3. Air Force Maui Optical Site (AMOS) GAS (Gateway Special): None Special Payload Mission Kits: None
STS-67 Endeavour	Mar. 3, 1995	Mar 18, 1995	Cdr: Steven S Oswald Plt: William G. Gregory MS: John M Grunsfeld MS: Wendy B. Lawrence MS: Tamara E. Jerrigan MS: Samuel T. Durrance MS: Ronald Parise	Deployable Paloads: None Attached PLB Payloads: 1. ASTRO 2 Spacelab 2. Ultraviolet Telescope of the Johns Hopkins Univ. (HUT) 3. Ultraviolet Imaging Telescope of NASA/GSFC (UIT) 4. Photo-Polarimeter Telescope of the Univ of Wisconsin (WUPPE)	GAS (Getaway Special): 1. ASTRO-2 Getaway Special Canisters Crew Compartment Payloads: 1. Commercial MDA ITA Experiments (CMIX) 2. Protein Crystal Growth (PCG) Experiments 3. Middeck Active Control Experiment (MACE) 4. Shuttle Amateur Radio Experiment (SAREX-II)
STS-71 Atlantis	June 27, 1995	July 7, 1995	Cdr: Robert L. Gibson Plt: Charles J. Precourt MS: Ellen S. Baker MS: Gregory J. Harbaugh MS: Bonnie Dunbar MIR 19-Ascent Only; Cdr: Anatoly Y. Solovyev MIR 19-Ascent Only, FE: Nikolai M. Budarin MIR 18-Descent Only; Cdr:Vladmir Dezhurov MIR 18-Descent Only, FE: Gennady Strekalov MIR 18-Descent Only, MS: Norm Thagard	Deployable Payloads: None Attached PLB Payloads: 1. Shuttle-Mir Rendezvous and Docking 2. Orbiter Docking System Crew Compartment Payloads 1. Shuttle-MIR Science 2. Protein Crystal Growth Experiment 3. Protocol Activities 4. IMAX 5. Shuttle Amateur Radio Experiment-II (SAREX)	GAS(Getaway Specials): None Special Payload Mission Kits: None
Mission Duration: 196 hrs 29 mins 36 secs					
Mission Duration: 399 hrs 09 mins 47 secs					
Mission Duration: 235 hrs 23 mins 09 secs					

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-70 Discovery	July 13, 1995 KSC	July 22, 1995 KSC	Cdr: Terren T. Hendricks Pit: Kevin R. Kregel MS: Mary E. Weber MS: Donald A. Thomas MS: Nancy J. Curie	<p>Deployable Payloads:</p> <ol style="list-style-type: none"> 1. Tracking and Data Relay Satellite (TDRS-7) 2. Inertial Upper Stage (IUS) <p>Attached PLB Payloads:</p> <ol style="list-style-type: none"> 1. Biological Research in Canisters (BRIC) 2. Bioreactor Development Systems (BDS) 3. Commercial Protein Crystal Growth (CPCG) 4. National Institutes of Health R-2 (NIR R-2) 5. Space Tissue Loss-B (STL-B) 6. Midcourse Space Experiment (MSX) <p>GAS (Getaway Special): None</p>	<p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> 1. Hand-Held, Earth-Oriented, Cooperative, Real-Time, User-Friendly, Location Targeting and Environmental Systems (HERCULES) 2. Microencapsulation in Space-B (MIS-B) 3. Military Application of Ship Tracks (MAST) 4. Radiation Monitoring Equipment-III (RME-III) 5. Shuttle Amateur Radio Equipment (SAREX) 6. Window Experiment (WINDEX) 7. Visual Function Tester-4 m(VFT-4) <p>Special Payload Mission Kits: None</p>
STS-69 Endeavour	Sept. 7, 1995 KSC	Sept. 18, 1995 KSC	Cdr: David M. Walker Pit: Kenneth D. Cockrell PLC: James S. Voss MS Jim Newman MS Michael L. Gernhardt	<p>Deployable Payloads:</p> <ol style="list-style-type: none"> 1. Wake Shield Facility-2 (WSF-2) 2. SPARTAN 201-03 <p>Attached PLB Payloads</p> <ol style="list-style-type: none"> 1. International Extreme Ultraviolet Hitchhiker(IEU) 2. Solar Extreme Ultraviolet Hitchhiker (SEH) 3. Capillary Pumped Loop-1/Gas Bridge Assembly (CAPL-2/GBA) <p>GAS (Getaway Special):</p> <ol style="list-style-type: none"> 1. G-515, European Space Agency, Noordwijk, The Netherlands Control Flexibility Interaction Experiment 2. G-645, Millcreek Township School District, Erie, PA McDowell High School, LORD Corp. 3. G-702, The Microgravity Smoldering Combustion Experiment (MSC) NASA Lewis Research Center 4. G-726, The Joint Damping Experiment (JDX) NASA Langley Research Center 	<p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> 1. Space Tissue Loss/National Institutes of Health-Cells (STL/NIH-C) 2. Commercial Generic Bioprocessing Apparatus-7 (CCBA) 3. Biological Research In Canister (BRIC) 4. Electrolysis Performance Improvement Concept Study (EPICS) 5. Commercial MDA ITA Experiments (CMIX) <p>Special Payload Mission Kits: None</p>
Mission Duration: 214 hrs 21 mins 09 secs					
Mission Duration: 260 hrs 29 mins 56 ses					

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-73 Columbia	Oct. 20, 1995 KSC	Nov. 5, 1995 KSC	Cdr: Kenneth D. Bowersox Plt: Kent Rominger MS: Kathryn Thornton MS: Catherine Coleman MS: Michael Lopez-Alegria PS: Fred Leslie PS: Albert Sacco	<p>Deployable Payloads: None</p> <p>Attached PLB Payloads:</p> <ol style="list-style-type: none"> 1. United States Microgravity Laboratory-2 (USML-2) <ol style="list-style-type: none"> a. Surface Tension Driven Convection Experiment b. Drop Dynamics Experiment c. Geophysical Fluid Flow Cell Experiment d. Crystal Growth Furnace e. Protein Crystal Growth Experiments f. Astroculture Facility and Experiment 2. Orbital Acceleration Research Experiment (OARE) <p>GAS (Getaway Special): None</p>	<p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> 1. Education Experiments <p>Special Payload Mission Kits: None</p>
STS-74 Atlantis	Nov. 12, 1995 KSC	Nov. 20, 1995 KSC	Cdr: Ken Cameron Plt: Jim Halsell MS: Chris Hadfield MS: Jerry Ross MS: William McArthur	<p>Deployable Payloads: None</p> <p>Attached PLB Payloads:</p> <ol style="list-style-type: none"> 1. Docking Module w/Solar Arrays 2. Orbital Docking System 3. IMAX Cargo Bay Camera 4. GLOW-4 (GPP) 5. Photogrammetric Appedcage Structural Dynamics Experiment (PASDE) 6. Shuttle Glo Experiment (GLO-4) 	<p>GAS (Gateway Special): None</p> <p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> 1. Shuttle Amateur Radio Experiment-II (SAREX-II) 2. Detailed Test/Supplementary Objectives (DTOs/DSOs) <p>Special Payload Mission Kits: None</p>

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-72 Endeavour	Jan. 11, 1996 KSC	Jan 20, 1996 KSC	Cdr: Brian Duffy Plt: Brent W. Jett MS: Leroy Chiao MS: Daniel T. Barry MS: Winston E. Scott MS: Koichi Wakata	<p>Deployable Payloads:</p> <ol style="list-style-type: none"> 1. Deployed and retrieved SPARTAN 206 Flyer 2. Retrieved Japanese Space Flyer Unit <p>Attached PLB Payloads</p> <ol style="list-style-type: none"> 1. Shuttle Solar Backscatter Ultraviolet (SSBUV-8) 2. Shuttle Laser Altimeter Payload (SLA-1/GAS(5)) <p>GAS (Getaway Special):</p> <ol style="list-style-type: none"> 1. G-342, USAF Academy FLEXBEAM-2 2. G-459, Protein Crystal Growth Experiment and Ballast Can with Sample Return Experiment 	<p>Crew Compartment Payloads:</p> <ol style="list-style-type: none"> 1. Space Tissue Loss (STL/NIH-C) 2. Pool Boiling Experiment (PBE) 3. Thermal Energy Storage (STE-2) <p>Special Payload Mission Kits: None</p>
STS-75 Columbia	Feb. 22, 1996 KSC	Mar. 9, 1996 KSC	Cdr: Andrew M. Allen Plt: Scott J. Horowitz PL-CDR: Franklin Chang-Diaz MS: Jeffrey A. Hoffman MS: Claude Nicollier MS: Maurizio Cheli PS: Umberto Guidoni	<p>Deployable Payloads: None</p> <p>Attached PLB Payloads:</p> <ol style="list-style-type: none"> 1. Tethered Satellite System Reflight (TSS-1R) 2. United States Microgravity Payload (USMP-3) <ol style="list-style-type: none"> a. Advanced Automated Directional Solidification Furnace (AASDF) b. Space Acceleration Measurement System (SAMS) c. Orbital Acceleration Research Experiment (OARE) d. Isothermal Dendritic Growth Experiment (IDGE) 	<p>GAS (Gateway Special): None</p> <p>Crew Compartment Payloads:</p> <p>Special Payload Mission Kits: None</p>

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-76 Atlantis	Mar 22, 1996 KSC	Mar 31, 1996 EAFB	Cdr: Kevin P. Chilton Plt: Richard A Seaffoss MS: Linda Godwin MS: Ronald Sega MS: Michael R Clifford MS: Shannon Lucid MIR 21 - Ascent Only;	Deployable Payloads: 1. MIR Environmental Effects Payload Attached PLB Payloads: 1. Orbiter Docking System 2. SPACEHAB Module <ul style="list-style-type: none"> a. Russian Logistics b. EVA Tools c. American Logistics d. Science or Technology Experiments, e. Risk Mitigationa Experiments GAS (Getaway Special): 1. Trapped Ions inSpace (TRIS)	Crew Compartment Payloads: 1. Shuttle Amateur Radio Experiment(SAREX) 2. KidSat Special Payload Mission Kits: None
STS-77 Endeavour	May 19, 1996 KSC	May. 29, 1996 KSC	Cdr: John H Casper Plt: Curtis L Brown MS: Daniel W Bursch MS: Mario Runco, Jr. MS: Marc Garneau MS: Andrew S.W. Thomas	Deployable Payloads: None 1. SPARTAN 207/1AE 2. Passive Aerodynamically Stablized Magnetically Damped Satellite (PAMS) 3. Satellite Test Unit (STU) Attached PLB Payloads: 1. SPACEHAB Module /Experiments <ul style="list-style-type: none"> a. Advnaced Seperation Process for Organic Materials b. Commercial Generic Bioprocessing Apparatus c. Plant Generic Bioprocessing Apparatus d. IMMUNE-3 e. Commerical Protein Crystal Growth f. Space Experiment Faculty 2. TEAMS-01	GAS (Gateway Special: None 1. CAG-056: Gamma-ray Astrophysics Mission 2. G-142, G-144: Autonomous Material Sci Experiments 3. Detailed Test/Supplementary Objectives (DTOs/DSOs) 4. G-163 Diffusion Coefficient Measurment Facility Special Payload Mission Kits: None

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-78 Columbia	Jun. 20, 1996 KSC	Jul. 7, 1996 KSC	Cdr: Terence T. Henricks Plt: Kevin R. Kregel MS: Susan J. Helms MS: Richard M. Linnehan MS: Charles E. Brady, Jr. PS: Jean-Jacques Favier PS: Robert Brent Thirsk Mission Duration: 405 hrs 47 mins 45 secs	Deployable Payloads: None Attached PLB Payloads: <ol style="list-style-type: none"> 1. Life and Microgravity Spacelab (LMS) <ol style="list-style-type: none"> a. Musculoskeletal Investigations b. Metabolic Investigations c. Pulmonary Investigation d. Human Behavior and Performance Investigations e. Neuroscience Investigations f. Space Biology Experiments g. Bibble, Drop and Particle Unit h. Advance Gradient Heating Facility i. Advanced Protein Crystallization Facility j. Accelerometers 	GAS (Getaway Special): None Crew Compartment Payloads: <ol style="list-style-type: none"> 1. Shuttle Amateur Radio Experiment-II Special Payload Mission Kits: None
STS-79 Atlantis	Sep 14, 1996 KSC	Sep 26, 1996 KSC	Cdr: William F. Readdy Plt: Terence W. Wilcutt MS: Thomas D. Akers MS: Jerome Apt MS: Carl E. Walz MIR-23, Ascent Only: MS: John Blaha MIR-22, Desent Only: MS: Shannon Lucid MIR-22, Desent Only: Cdr: Valery Korzum MIR-22, Desent Only: FE: Alexandrer Kaleri Mission Duration: 243 hrs 18 mins 26 secs	Deployable Payloads: None Attached PLB Payloads: <ol style="list-style-type: none"> 1. Spacehab Module 2. Orbital Docking System 3. IMAX Cargo Bay Camera 	GAS (Gateway Special): None Crew Compartment Payloads: <ol style="list-style-type: none"> 1. Extreme Temperature Translation Furnace (ETTF) 2. Commercial Protein Crystal Growth (CPCG) Experiments 3. Mechanics of Granular Materials 4. Shuttle Amateur Radio Experiment (SAREX) Special Payload Mission Kits: None

Summary of Shuttle Payloads and Experiments

Flight	Launch Date	Landing Date	Crew	Payloads and Experiments	
STS-80 Columbia	Nov 19, 1996 KSC	Dec. 7, 1995 KSC	Cdr: Kenneth D. Cockrell Plt: Kent V. Rominger MS: Tamara E. Jernigan MS: Thomas D. Jones MS: F. Story Musgrave	Deployable Payloads: 1. Orbiting and Retrievable Far and Extreme Ultraviolet Spectrograph-Shuttle Pallet Sattelite II(ORFEUS-SPAS II) 2. Wake Shield Facility-3 (WSF-3) Attached PLB Payloads: 1. Visualization in an experimental Water Capillary Pumped Loop (VIEW-CPL) GAS (Getaway Special): 1. Space Experiment Module (SEM)	Crew Compartment Payloads: 1. NIH-R4 2. CCM-A 3. Biological Research in Canister (BRIC) 4. Commercial MDA ITA Experiment (CMIX-5) Special Payload Mission Kits: None
Mission Duration: 423 hrs 53 mins 18 secs					