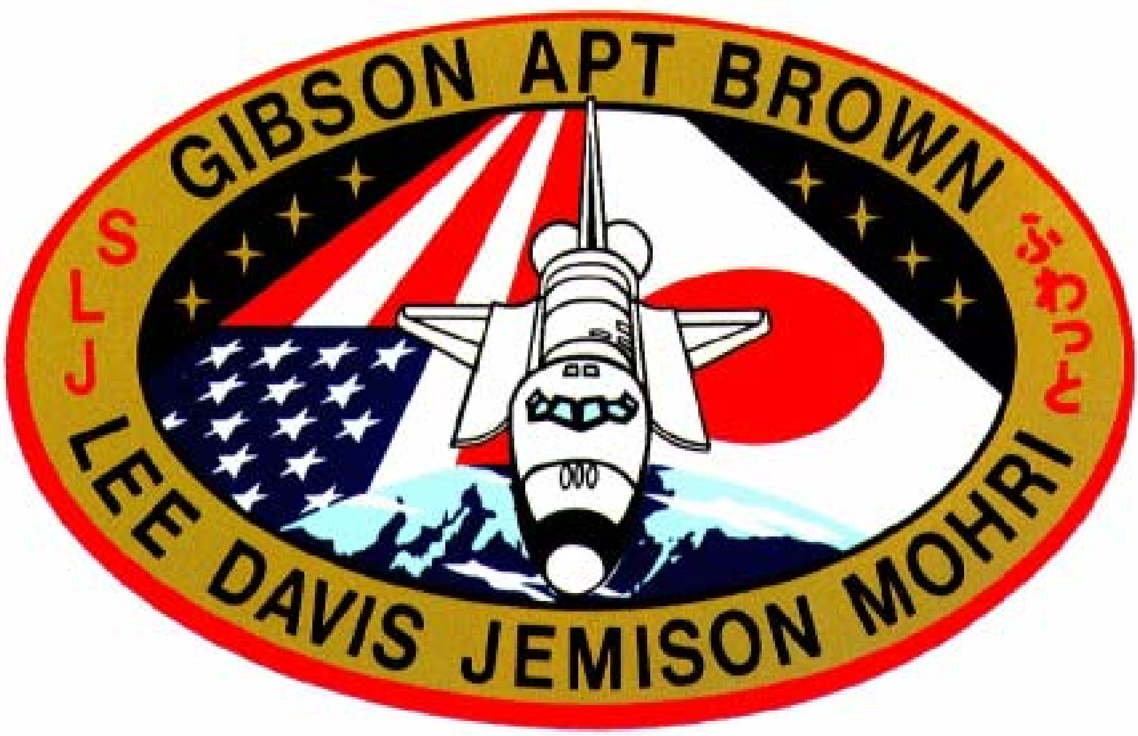
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

SPACE SHUTTLE MISSION STS-47

PRESS KIT
SEPTEMBER 1992



SPACELAB J MISSION

STS-47 INSIGNIA

STS047-S-001 -- Designed by the crewmembers, the STS-47 mission insignia depicts the space shuttle orbiter with the Spacelab module in the cargo bay against a backdrop of the flags of the United States and Japan. The flags symbolize the side-by-side cooperation of the two nations in this mission. The land masses of Japan and Alaska are represented on the insignia, emphasizing the multi-national aspect of the flight as well as the high inclination orbit of 57 degrees. The initials "SLJ" on the left border of the insignia stand for Spacelab Japan; the name generally used for the mission is Spacelab-J. The Japanese characters on the right border form the word Fuwatto which means "weightlessness."

The NASA insignia design for space shuttle flights is reserved for use by the astronauts and for other official use as the NASA Administrator may authorize. Public availability has been approved only in the form of illustrations by the various news media. When and if there is any change in this policy, which we do not anticipate, it will be publicly announced.

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RELEASE: 92-128 **September 1992**

STS-47 FLIGHT MARKS JAPAN'S MAJOR FORAY INTO HUMAN SPACEFLIGHT

The 50th Shuttle flight marks the first NASA mission devoted primarily to Japan. Space Shuttle Endeavour will carry a crew of 7, including a Japanese mission specialist, and Spacelab-J (SL-J) science laboratory into Earth orbit on the STS-47 mission. SL-J contains 43 experiments, 34 provided by Japan, 7 from the United States and 2 joint experiments.

"Missions such as Spacelab-J mirror the way science is done on Earth," said SL-J Program Scientist Dr. Robert S. Sokolowski. "Astronauts aboard the orbiting laboratory will conduct experiments around-the-clock. These experiments will add to basic knowledge about the behavior of everything from crystals, fluids and even humans when exposed to the near weightless environment of spaceflight."

Commander of the mission is Robert "Hoot" Gibson, making his fourth Shuttle flight. Curtis Brown, making his first, is the pilot. Making their second Shuttle flights are mission specialists Mark Lee and Jay Apt. First time space travelers Jan Davis and Mae Jemison, the first African American woman to fly in space, round out the NASA crew.

Endeavour's crew also will include the first Japanese to fly aboard a NASA spacecraft, payload specialist Dr. Mamoru Mohri.

STS-47 will be the second flight of NASA's newest Space Shuttle, Endeavour. Scheduled for launch around Sept. 11, the mission is scheduled to last 6 days, 20 hours and 36 minutes. At the end of its mission, Endeavour will land at the Kennedy Space Center, Fla.

SL-J Laboratory

Spacelab is a 23-foot long pressurized laboratory built by the European Space Agency specifically for conducting experiments in a shirt-sleeve environment aboard the Space Shuttle.

"On Spacelab missions, astronauts do the science. They have an essential role in the conduct of the experiments, both as investigators and as test subjects," said Gary W. McCollum, SL-J Program Manager. "This mission is typical of how we will routinely work in space for much longer periods when Space Station Freedom begins operations later this decade."

Research conducted on Spacelab missions and later on Freedom offers unique opportunities to learn about basic scientific processes, which ultimately may lead to useful commercial and medical applications.

But, the effects of microgravity on plants and animals, including humans, must be understood before long-term space travel and exploration missions can be undertaken.

"Our life sciences research seeks to distinguish the role gravity plays in the development and functions of life on Earth. We can study plants and animals -- including humans -- in the microgravity of space," said Dr. Thora Halstead, SL-J Program Scientist. "With the overwhelming influence of gravity removed, basic physical processes can be studied more easily."

"This information is critical to keeping people healthy and productive on the space station and on long space missions to the planets," Halstead said. "But the application of this knowledge has far-reaching benefits because some of what we learn on these missions will be useful to researchers studying medical problems on Earth."

Materials Science Experiments

On Spacelab-J, 24 experiments will study various materials and processes in the near absence of gravity. This includes studies of protein crystals, electronic materials, fluids, glasses and ceramics, metals and alloys --

A frequent flier on Space Shuttle missions, the protein crystal growth experiment will make its 15th trip into space. Proteins are building blocks of living organisms. Understanding how proteins work could lead to new and improved medicines and foods.

Due to the forces of gravity, the internal structures of protein crystals grow imperfectly on Earth. Absent of gravity-induced flaws, the internal structure of protein crystals grown in space can be studied on the ground more easily .

Returned to Earth and examined using powerful x-ray diffractometers and computers, these space-grown protein crystals reveal their molecular structure. Understanding how proteins work could lead to new and improved medicines and protein-rich foods.

Semiconductors, an integral component of electronic devices used in industrial and consumer products, are the focus of several materials experiments. Six types of semiconductor crystals will be grown aboard Spacelab.

In the miniature world of semiconductor chips, gravity-induced flaws in crystals can alter dramatically the performance of the chip. With no gravity, researchers believe they can grow crystals of unparalleled quality and consistency. This could eventually lead to improved semiconductors and superconductors and more efficient electronic components.

Endeavour's crew also will conduct investigations on the behavior of mineral oil drops. This is part of a continuing effort to identify the potential for processing materials without the need for containers that, like gravity, reduces the quality of the material processed.

Other experiments will manufacture glass and a rare mineral compound called samarskite, which will test theories on material properties. A series of 10 metals and alloys experiments will look into the ways that ingredients may be combined to form new, improved materials.

Life Sciences Experiments

The remaining 20 experiments are life science research. Life science experiments include cell separation, cell biology, developmental biology, animal and human physiology and behavior, space radiation and biological rhythms.

Astronauts will separate mixtures of proteins using an electrical field as a way of obtaining purer proteins. They will grow plant and animal cells to see how microgravity alters their development and to learn more about how they function.

Frog eggs will be fertilized in space and examined at various stages of development -- from embryos to tadpoles to adults. The influence of weightlessness on the stages of development and the behavior of the frogs will be determined. Chicken embryos also will be flown to study how space flight alters the development of bones and other tissues.

Scientists will study the human body's motion and balance mechanisms and visual stability as altered by space flight. Endeavour's crew will be the test subjects.

They also will participate in experiments to test the effectiveness of biofeedback to ward off space motion sickness. Magnetic Resonance Imaging (MRI) equipment will be used pre- and post-flight to measure muscle and bone loss due to space travel.

A Japanese experiment will use two koi fish (carp) to study effects of weightlessness on a fish's gravity-sensing organ, which is very similar to the same organ in humans. Effects of space cosmic radiation will be measured using fruit fly larvae and eggs.

A new piece of medical equipment to convert contaminated water into a sterile (glucose and saline) fluid for intravenous use will be tested. This experiment is directed toward future medical care on Space Station Freedom.

Several other experiments will be carried in the Shuttle middeck compartment. Also a Getaway Special Bridge in the cargo bay will house 9 experiments.

(END OF GENERAL RELEASE; BACKGROUND INFORMATION FOLLOWS.)

MEDIA SERVICES INFORMATION

NASA Select Television Transmission

NASA Select television is available on Satcom F-2R, Transponder 13, located at 72 degrees west longitude; frequency 3960.0 MHz, audio 6.8 MHz.

The schedule for television transmissions from the Space Shuttle orbiter and for the mission briefings will be available during the mission at Kennedy Space Center, Fla.; Marshall Space Flight Center, Huntsville, Ala.; Ames-Dryden Flight Research Facility, Edwards, Calif.; Johnson Space Center, Houston and NASA Headquarters, Washington, D.C. The television schedule will be updated to reflect changes dictated by mission operations.

Television schedules also may be obtained by calling COMSTOR 713/483-5817. COMSTOR is a computer data base service requiring the use of a telephone modem. A voice update of the television schedule is updated daily at noon eastern time.

Status Reports

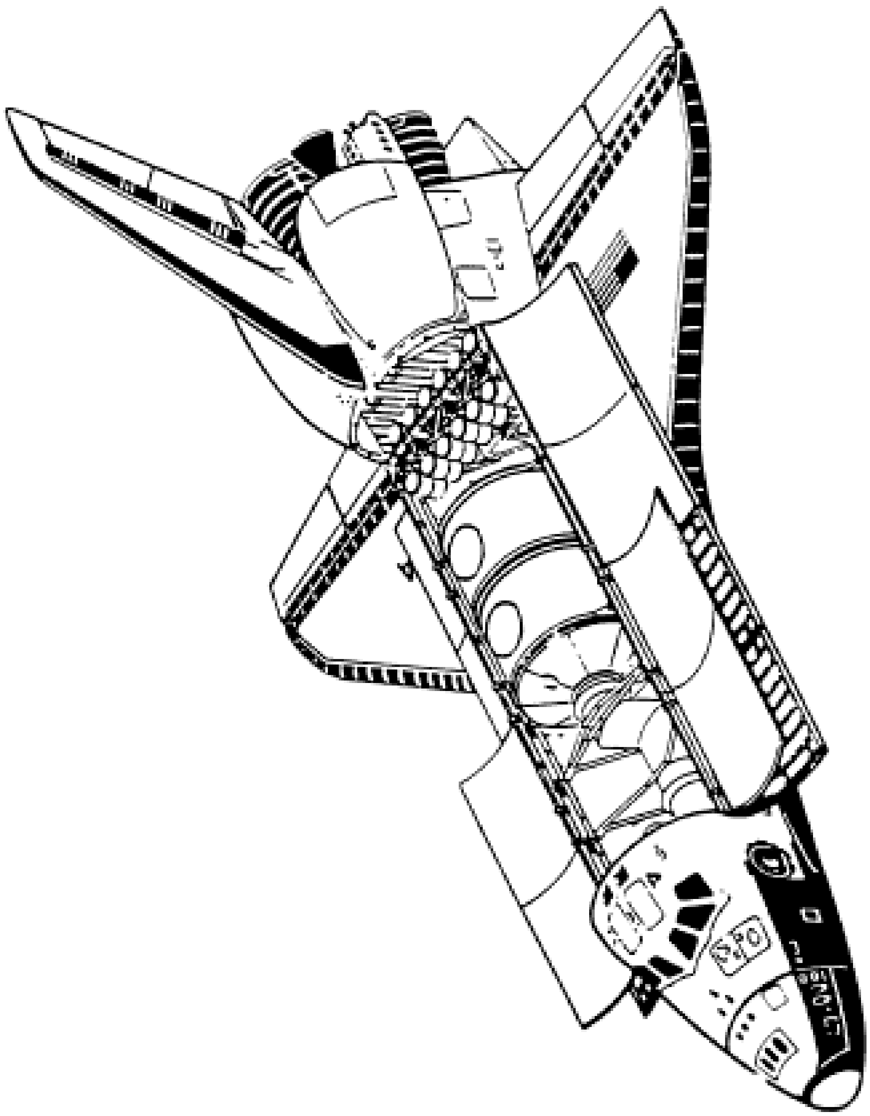
Status reports on countdown and mission progress, on-orbit activities and landing operations will be produced by the appropriate NASA news center.

Briefings

A mission press briefing schedule will be issued prior to launch. During the mission, change-of-shift briefings by the off-going flight director and the science team will occur at least once per day. The updated NASA Select television schedule will indicate when mission briefings are planned.

STS-47 QUICK LOOK

Launch Date and Site:	Sept. 11, 1992, Kennedy Space Center, Fla., Pad 39A
Launch Window:	10:25 a.m. - 12:55 p.m. EDT
Orbiter:	Endeavour (OV-105)
Orbit:	163 n.m. x 163 n.m.; 57 degrees inclination
Landing Date:	September 18, 1992
Landing Time:	7:01 a.m. EDT
Primary Landing Site:	Kennedy Space Center, Fla.
Abort Landing Sites:	Return to Launch Site - Kennedy Space Center, FL Transoceanic Abort Landing - Zaragoza, Spain Ben Guerir, Morocco Moron, Spain Abort Once Around - White Sands Space Harbor, N.M.
Crew:	Robert Gibson, Commander Curtis Brown, Pilot Mark Lee, Mission Specialist 1 Jay Apt, Mission Specialist 2 Jan Davis, Mission Specialist 3 Mae Jemison, Mission Specialist 4 Mamoru Mohri, Payload Specialist 1
Operational Shifts:	Red team -- Brown, Lee, Mohri Blue team -- Apt, Davis, Jemison
Cargo Bay Payloads:	Spacelab-J GAS Bridge (Get-Away Specials)
Middeck Payloads:	ISAIAH (Israeli Space Agency Investigation About Hornets) SSCE (Solid Surface Combustion Experiment) SAREX-II (Shuttle Amateur Radio Experiment-II)



SL-J mission configuration

VEHICLE AND PAYLOAD WEIGHTS

	Pounds
Orbiter (Endeavour) Empty and 3 SSMEs	173,174
Spacelab-J Module	21,861
Get-Away Specials Bridge	5,000
Israel Space Agency Investigation About Hornets	70
Solid Surface Combustion Experiment	253
Shuttle Amateur Radio Experiment	36
Detailed Supplementary Objectives	51
Total Vehicle At SRB Ignition	4,510,542
Orbiter Landing Weight	219,247

SPACE SHUTTLE ABORT MODES

Space Shuttle launch abort philosophy aims toward safe and intact recovery of the flight crew, orbiter and its payload. Abort modes include:

- Abort-To-Orbit (ATO) -- Partial loss of main engine thrust late enough to permit reaching a minimal 105-nautical mile orbit with orbital maneuvering system engines.

- Abort-Once-Around (AOA) -- Earlier main engine shutdown with the capability to allow one orbit around before landing at either Edwards Air Force Base, Calif.; White Sands Space Harbor, N.M; or the Shuttle Landing Facility (SLF) at the Kennedy Space Center, Fla.

- Trans-Atlantic Abort Landing (TAL) -- Loss of one or more main engines midway through powered flight would force a landing at either Zaragoza, Spain; Ben Guerir, Morocco; or Moron, Spain.

- Return-To-Launch-Site (RTLS) -- Early shutdown of one or more engines without enough energy to reach Zaragoza would result in an orbiter pitch around and thrust back toward KSC until within gliding distance of the SLF.

STS-47 contingency landing sites are Edwards Air Force Base, the Kennedy Space Center, White Sands Space Harbor, Zaragoza, Ben Guerir and Moron.

TRAJECTORY SEQUENCE OF EVENTS

Event	MET (d/h:m:s)	Relative Velocity (fps)	Mach	Altitude (ft)
Launch	00/00:00:00			
Begin Roll Maneuver	00/00:00:10	189	0.17	801
End Roll Maneuver	00/00:00:19	430	0.38	3,674
SSME Throttle Down 67%	00/00:00:32	765	0.69	10,663
SSME Throttle Up 104%	00/00:01:04	1,513	1.57	41,860
Maximum Dyn. Pressure (Max Q)	00/00:01:05	1,548	1.62	43,059
SRB Separation	00/00:02:04	4,131	3.89	155,869
Main Engine Cutoff	00/00:08:34	25,000	21.61	376,708
Zero Thrust	00/00:08:40	25,000	N/A	376,909
ET Separation	00/00:08:52			
OMS-2 Burn	00/00:36:12			
Landing	06/20:36:00			

Apogee, Perigee at MECO: 160 x 17 nautical miles
Apogee, Perigee post-OMS 2: 163 x 163 nautical miles

STS-47 PRE-LAUNCH PROCESSING

KSC's Shuttle processing team began work to ready Endeavour for its second voyage into space on May 31 when the vehicle arrived at Orbiter Processing Facility bay 3 following its ferry flight back from California.

Post-flight tests and evaluations were performed on Endeavour following its maiden voyage. On July 14, the primary STS-47 payload, the Spacelab-J laboratory, was installed in Endeavour's payload bay while in the Orbiter Processing Facility (OPF). Interface verification tests between the orbiter and laboratory were conducted within the next few days.

While in the OPF, technicians installed the three main engines in July. Engine 2026 is in the No. 1 position, Engine 2022 is in the No. 2 position and Engine 2029 is in the No. 3 position.

After being readied for its second flight, Endeavour was transferred out of the OPF and towed several hundred yards to the Vehicle Assembly Building and connected to its external tank and solid rocket boosters.

Meanwhile, solid rocket booster stacking activities commenced on June 11 and concluded in July. The external tank was attached to the boosters on July 13. Mobile launcher platform number 2 is being used for Endeavour's second flight.

Technicians attached the 100-ton space plane to its already stacked solid rocket boosters and external tank. Endeavour was transferred to pad 39-B. The Terminal Countdown Demonstration Test with the STS-47 flight crew was completed.

A standard 43-hour launch countdown is scheduled to begin 3 days prior to launch. During the countdown, the orbiter's fuel cell storage tanks and all orbiter systems will be prepared for flight.

About 9 hours before launch, the external tank will be filled with its flight load of a half million gallons of liquid oxygen and liquid hydrogen propellants. About 2 and one-half hours before liftoff, the flight crew will begin taking their assigned seats in the crew cabin.

Endeavour's end-of-mission landing is planned at Kennedy Space Center's Shuttle Landing Facility. KSC's landing and recovery team will perform normal convoy operations on the runway to safe the vehicle and prepare it for tow to the OPF.

Endeavour's next flight, STS-54, is targeted for the end of the year. The STS-54 crew aboard Endeavour will loft NASA's Tracking and Data Relay Satellite-F into geosynchronous orbit.

SPACELAB-J

Spacelab research offers unique opportunities to learn about basic scientific processes and the effects of space travel on humans in preparation for longer stays in space. These opportunities ultimately may lead to useful commercial and medical applications on Earth.

The Spacelab-J mission is a joint project in space-based research between the United States and Japan. Within the Spacelab, NASA will fly Japan's "First Materials Processing Test," a collection of 34 material- and life-science investigations, seven U.S. experiments, plus two collaborative experiments between the two agencies.

For Spacelab-J, the long module is used. This self-contained 23-foot-laboratory contains a series of equipment racks that hold furnaces, computer and biological workstations, biological incubators, storage lockers and other equipment to perform experiments in space. Additional storage space and experiments are located in the orbiter crew cabin's mid-deck area.

SPACELAB-J EXPERIMENTS

These experiments should provide scientists with a better understanding of fundamental materials and biological processes. There are 43 investigations, including 24 dedicated to materials science and 19 to life science research.

The materials science experiments will explore five major areas -- biotechnology, electronic materials, fluid dynamics and transport phenomena, glasses and ceramics, and metals and alloys.

The life science experiments include cell separation, cell biology, developmental biology, animal and human physiology and behavior, space radiation and biological rhythms. A medical technology experiment also will be conducted.

MATERIALS SCIENCE

Spacelab-J microgravity science experiments cover three research disciplines: biotechnology, fluid dynamics and transport phenomena, and materials science. Within these disciplines, the areas covered include: protein crystal growth, electronic materials, fluid dynamics, glasses and ceramics, and metals and alloys. One instrument will collect data on the microgravity environment aboard Spacelab.

Protein Crystal Growth

This research field seeks to develop higher quality protein crystals than those developed on Earth and understand their internal crystalline order.

Protein crystals on the Spacelab-J mission are grown in two scientific instruments, each relying on a different technique to promote crystallization: vapor diffusion and liquid/liquid diffusion.

Proteins are complex amino-acid compounds present in all life forms. They perform numerous, critical roles in biochemical processes. If scientists can determine how proteins work, new and improved medicines may be developed.

The functions of most organic molecules are determined by their three-dimensional structure. If scientists can determine the structure of a protein, this knowledge may allow the development of new and improved medicine and synthetic products.

Electronic Materials

In the electronic materials experiments, five kinds of semiconductor crystals will be grown using four specialized furnaces -- the gradient heating furnace, the image furnace, the crystal growth furnace and the continuous heating furnace. Semiconductors will be melted and solidified slowly to obtain high quality crystal.

The resulting crystals will be returned to Earth for in-depth study and may lead to a better understanding of manufacturing similar crystals on Earth. This eventually may lead to improved semiconductors and superconductors, and more efficient electronic components.

Fluid Dynamics and Transport Phenomena

Fluid dynamics and transport phenomena experiments will study the underlying physics at work when fluids are subjected to different conditions under microgravity conditions.

Liquid drops will be levitated and manipulated using sound waves in the Drop Dynamics in Space and Interference with Acoustic Field experiment.

Two other experiments -- the Study of Bubble Behavior and Marangoni-Induced Convection in Materials Processing Under Microgravity -- will study Marangoni convection, fluid movement caused by surface tension variations between regions of different temperatures.

On Earth, liquids are affected by buoyancy-driven convection. When a fluid is heated, lighter fluids rise and heavier fluids fall. In microgravity, this is much weaker, allowing Marangoni or surface tension driven convection to be studied. Marangoni convection is one of many phenomena that must be better understood for materials processing techniques to become more effective.

Photography and videotape recordings will be important tools in documenting these and other experiments. Such technology permits in-depth, frame-by-frame study of recordings of complex physics phenomena in laboratories back on Earth.

Glasses and Ceramics

New types of glasses and ceramics also may be developed through containerless processing methods. The Preparation of Optical Materials Used in Non-Visible Region experiment will create a non-silicone-based glass like that used in infrared-detecting devices such as telescope lenses.

This will be accomplished in an acoustic levitation furnace. This furnace uses sound waves to suspend, combine and melt ingredients in microgravity. It will form a glass after cooling. Containerless processing eliminates the possibility of introducing impurities, perhaps leading to glasses that will transmit more light.

The image furnace also will be used for two glass and ceramics experiments. The High Temperature Behavior of Glass experiment will collect data on the physical processes behind glass melting. The Growth of Samarskite Crystal in Microgravity will produce a rare mineral compound to better understand its properties and possible usefulness.

Metals and Alloys

A series of ten metals and alloys experiments will study the ways that ingredients may be combined to form new, improved materials. The large isothermal furnace will heat elements to a liquid state under various levels of pressure and cool them from the molten state to a useable solid.

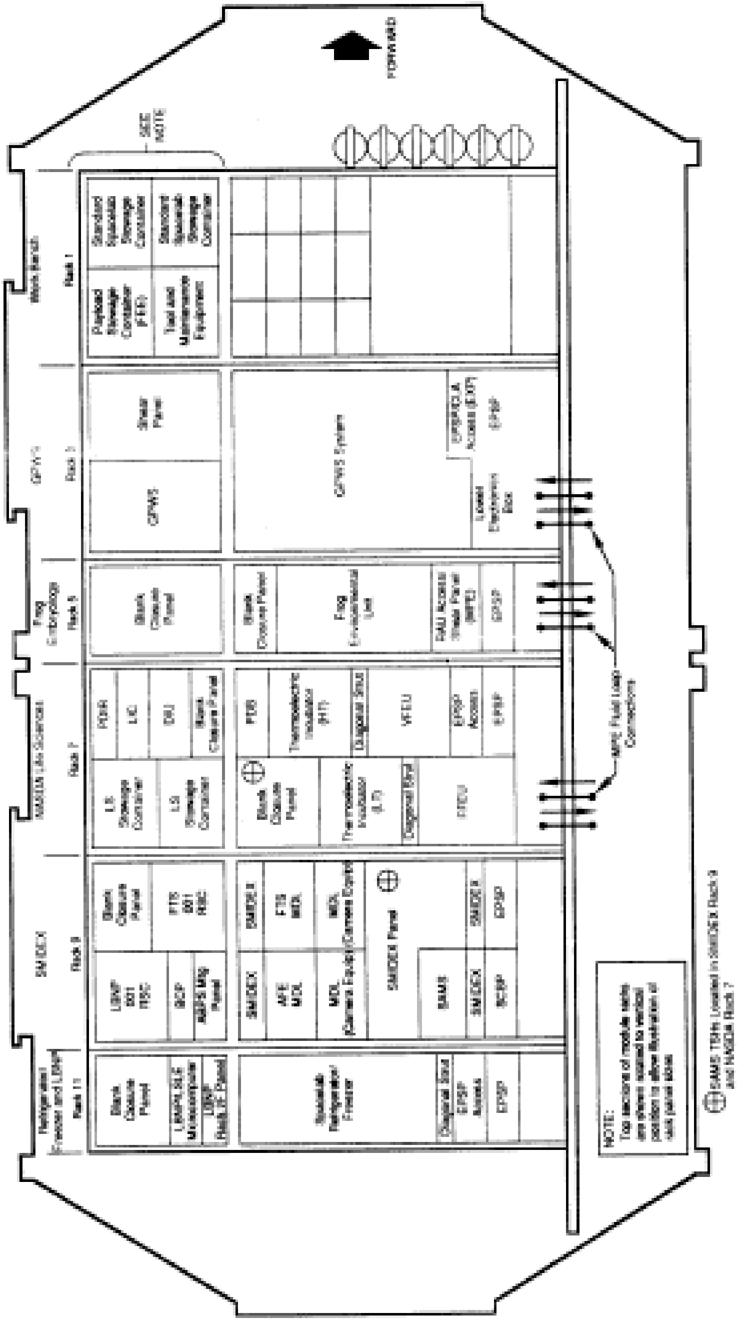
On Earth, these processes are affected by gravity's pull. In space, substances can be mixed with much more control as they float in a weightless condition. The result is a more uniformly combined material with fewer impurities.

The understanding of such processing may lead to lighter, more stress-resistant metals, as well as more uniform semiconductors and superconductors. Such materials may have a broad range of uses -- from cars to computers to construction.

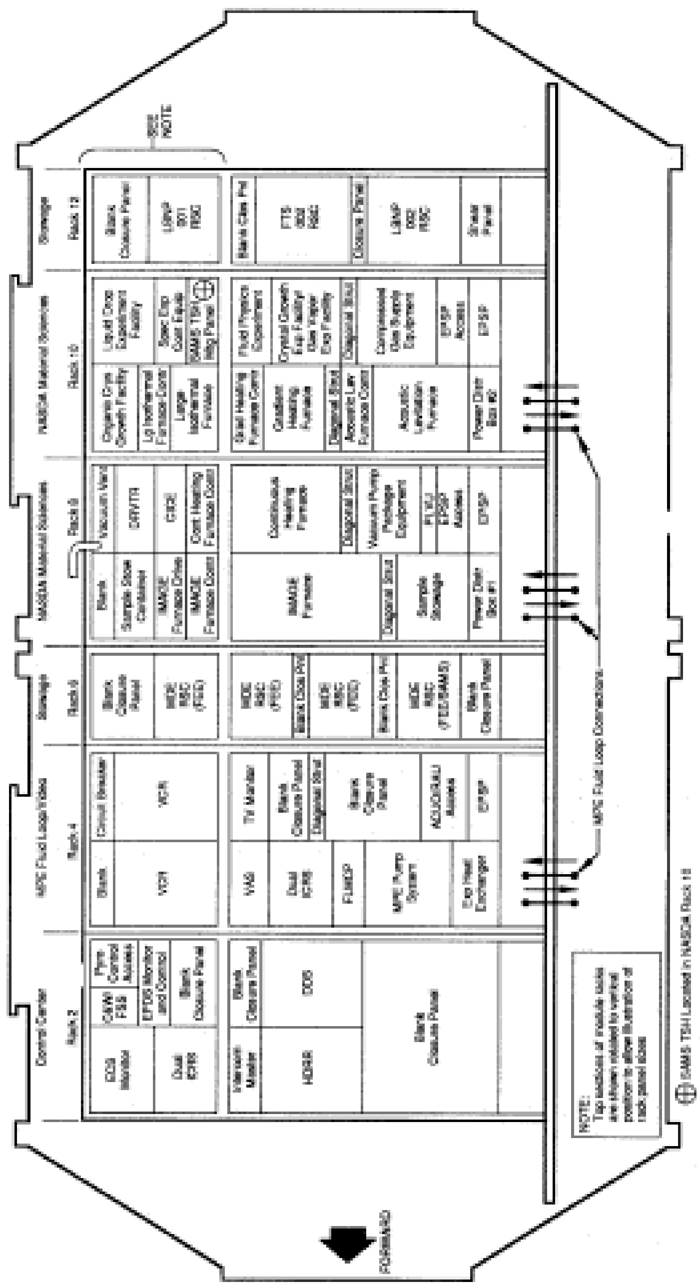
The Casting of Superconducting Filamentary Composite Materials and the Preparation of Nickel-Base Dispersion Strengthened Alloys experiments will contribute to this field of study.

Acceleration Data Collection

The Space Acceleration Measurement System will be used for the fourth time in Spacelab to collect data about acceleration forces experienced during the mission. This system of three sensor heads will be located in the Spacelab-J module. Such information will assist planners in developing scientific equipment and in placing sensitive experiments where they are least likely to be disturbed.



SL-J MODULE CONFIGURATION (PORT SIDE)



SL-J MODULE CONFIGURATION (STARBOARD SIDE)

LIFE SCIENCES

The effects of microgravity on plants and animals, including humans, must be understood before long-term space travel and exploration missions can be undertaken. Life sciences research seeks to discover the effects of gravity versus microgravity environments on various life forms.

With that information, researchers hope to correct or prevent adverse physiological effects that result from living and working in space and to develop new scientific information to improve life on Earth.

Life sciences experiments aboard Spacelab-J include: cell biology, developmental biology, animal and human physiology and behavior, space radiation and biological rhythms. One technology experiment in the medical field also will be conducted.

Biotechnology

Two biological experiments will separate biological sample mixtures, composed of several types of cells or proteins, into individual purified fractions consisting of a particular protein or cell-type using electrical fields.

Cell Biology

Three cell culturing experiments will grow plant and animal cells to test the influence of gravity on development and function at the cellular level. One such test will be the production of antibodies in space.

Developmental Biology

Other experiments in the life sciences will study how gravity affects the development of animals. An experiment entitled Effects of Weightlessness on the Development of Amphibian Eggs Fertilized in Space will study the role of gravity in fertilization and development.

Female frogs will be carried aboard Spacelab-J. Their eggs will be fertilized during the flight and will develop in a microgravity environment. Some eggs will be fixed at a certain point in their development, while others will be allowed to develop into tadpoles and adult frogs.

Another experiment to study the role of gravity on the early development of animals is The Effect of Low Gravity on Calcium Metabolism and Bone Formation. This study will examine how microgravity affects calcium metabolism and bone formation in chick embryos.

Physiology

Several experiments will examine the physiology of living organisms on this mission. These experiments will reveal more about how organisms function in the space environment. Several experiments will focus on the physiology of the vestibular-ocular system.

One experiment, The Comparative Measurement of Visual Stability in Earth and Cosmic Space, will study the effects of microgravity on visual stability. This experiment will examine head and eye movements while the crew member visually tracks a flickering light target.

Another experiment designed to study the vestibular-ocular system is The Neurophysiological Study on Visuo-vestibular Control of Posture and Movement in Fish During Adaptation to Weightlessness.

In this experiment, two Japanese koi fish (carp) will be exposed to a varying light stimulus. One fish will have its otolith structure removed. The otolith is a gravity-sensing structure in the inner ear. This fish's response will be compared to the other fish to identify differences in how each reacts to the same stimulus.

Three crew members will participate in experiments on physical adaptation to space. While awake, each will wear a special suit fitted with various sensors that monitor and record various physical responses. Urine collection will gauge the intake and output of fluids, which shift toward the upper body in microgravity.

Space motion sickness is an element of general Space Adaptation Syndrome that affects many space travelers. A possible countermeasure for this will be studied in an experiment entitled The Autogenic Feedback Training Experiment: A Preventative Method for Space Motion Sickness; Autogenic Feedback Training for Vestibular Symptomology.

This two-part experiment is a continuation from an experiment that flew on the Spacelab-3 mission. On Spacelab-J two crew members are participants in this experiment.

One crew member will use biofeedback, a technique where one becomes aware of unconscious or involuntary bodily processes (such as heartbeat and skin temperature), in order to consciously control them. The goal is to train astronauts to overcome the effects of space motion sickness without using artificial means, such as drugs.

The second participant, the control, has not been trained in biofeedback techniques. But that participant's responses to similar circumstances will be recorded. Data collected from the sensor suits they will wear also may help predict the likelihood of space motion sickness in future candidates for space travel.

In space, muscles do not have to work as hard as they do under gravity's influence. Bones do not receive the same stress that they do when under a gravitational field. As a result, crew members from previous missions have lost calcium from bones and protein from muscles during flight.

These losses could become a serious problem if crews spend many months or years in a microgravity environment. Several experiments being flown aboard Spacelab-J have been designed to study this problem. These experiments will gather information about the process and extent of bone and muscle loss after exposure to space.

Two experiments will specifically study bone loss. Fertilized chicken eggs and rat bone cells will be examined after the mission for cartilage growth and bone formation.

To study how muscle mass is lost while in space, the Magnetic Resonance Imaging (MRI) After Exposure to Microgravity experiment employs MRI to examine muscle and bone in selected crew members before and after the mission.

MRI uses a magnetic field and radio waves to produce an image of the inside of the body, much better than conventional x-rays, but unlike conventional x-rays, it has no known health hazards. The MRI will allow investigators to examine calf and thigh muscles and to look for changes in spinal bone marrow and discs (vertebrae).

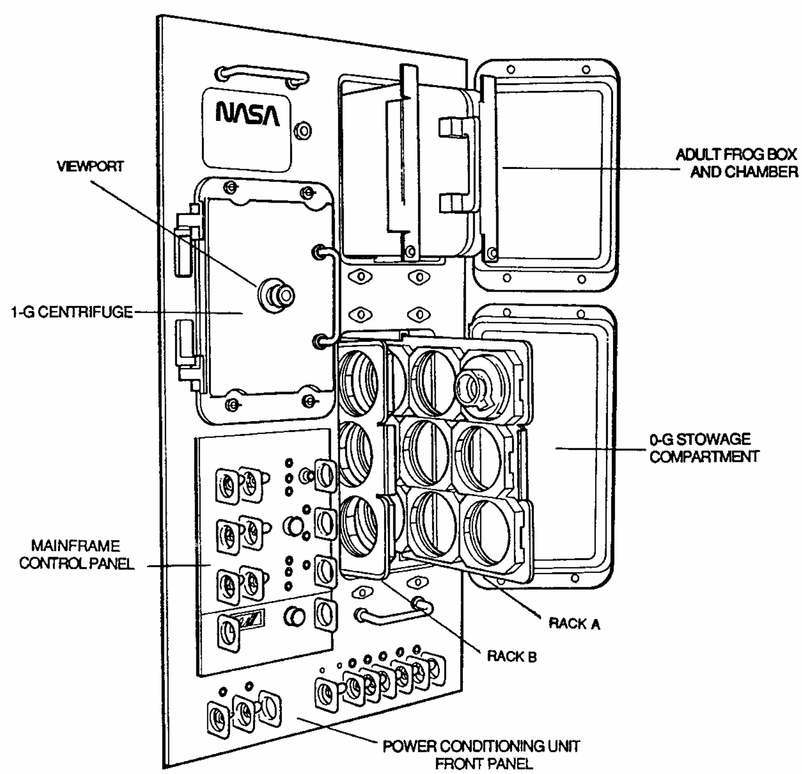
Radiation and Environmental Health

An understanding of the radiation environment in space and the effects of radiation on life forms is critical before long-term space journeys are undertaken.

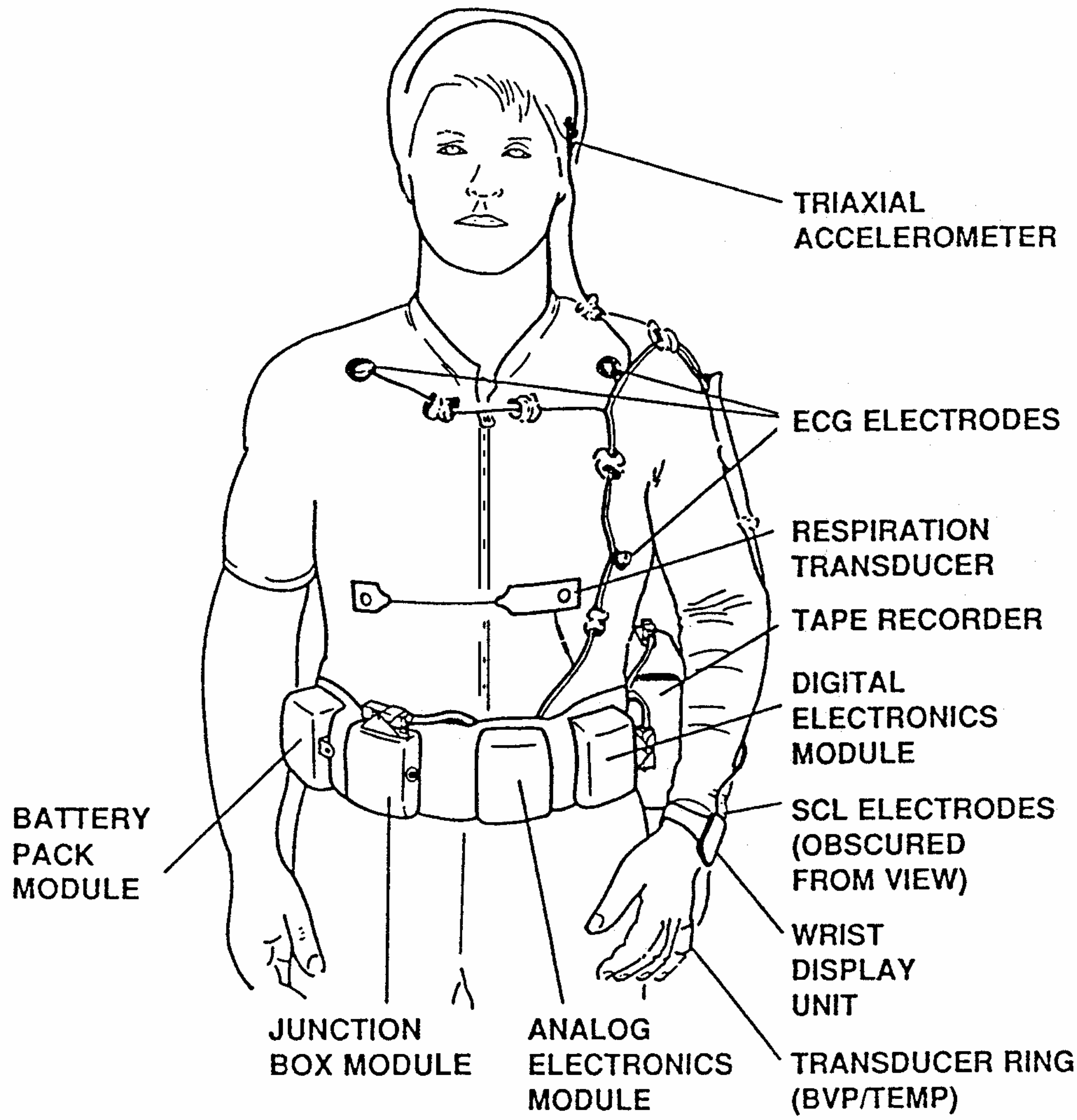
To examine the biological effects of space radiation, fruit fly larvae will be flown in special incubators exposed to the cosmic ray environment. When the flies hatch, they will be examined for radiation-induced mutations.

Technology Experiment

When intravenous (IV) fluids are administered to a patient on Earth, gravity aids in their delivery and flow. The absence of gravity presents a problem should such medical treatment be needed during a space mission. Therefore, the Fluid Therapy System will be tested on Spacelab-J. The tests will examine the production of medicines and the administration of IV fluids in the absence of gravity.



FRONT VIEW
FROG ENVIRONMENTAL UNIT



FRONT VIEW OF AFS-2 INSTRUMENTATION

SPACELAB-J EXPERIMENTS LISTING

Sponsored by the National Aeronautics and Space Administration

Materials Sciences

Space Acceleration Measurement System
Dr. Richard DeLombard, Lewis Research Center, Cleveland

Fluid Therapy System: Inflight Demonstration of the Space Station Freedom Health Maintenance Facility Fluid Therapy System
Dr. Charles Lloyd, Johnson Space Center, Houston

Magnetic Resonance Imaging After Exposure to Microgravity
Dr. Adrian LeBlanc, Methodist Hospital, Houston

Life Sciences

Protein Crystal Growth
Dr. Charles Bugg, University of Alabama, Birmingham

Autogenic Feedback Training Experiment: A Preventative Method for Space Motion Sickness: Autogenic Feedback Training for Vestibular Symptomology
Dr. Patricia Cowings, Ames Research Center, Moffett Field, Calif.

Bone Cell Growth and Mineralization in Microgravity
Dr. Nicole Partridge, St. Louis University Medical School, St. Louis

Effects of Weightlessness in the Development of Amphibian Eggs Fertilized in Space
Kenneth A. Souza, Ames Research Center, Moffett Field, Calif.

Lower Body Negative Pressure: Countermeasure for Reducing Post-Flight Orthostatic Intolerance
Dr. John Charles, Johnson Space Flight Center, Houston

Plant Culture Research (Gravity, Chromosomes, and Organized Development in Aseptically Cultured Plant Cells)
Dr. Abraham Krikorian, State University of New York, Stony Brook

Magnetic Resonance Imaging After Exposure to Microgravity
Dr. Adrian LeBlanc, Methodist Hospital, Houston, TX

From The National Space Development Agency of Japan

First Materials Processing Test -- 34 materials and life sciences experiments

Materials Sciences

Growth Experiment of Narrow Band-Gap Semiconductor Pb-Sn-Te Single Crystals in Space (M-1)
Dr. Tomoaki Yamada, Nippon Telegraph And Telephone Corp.

Growth of Pb-Sn-Te Single Crystal by Traveling Zone Method in Low Gravity (M-2)
Dr. Souhachi Iwai, Nippon Telegraph and Telephone Corp.

Growth of Semiconductor Compound Single Crystal by Floating Zone Method (M-3)
Dr. Isao Nakatani, National Research Institute for Metals

Casting of Superconducting Filamentary Composite Materials (M-4)
Dr. Kazumasa Togano, National Research Institute for Metals

Formation Mechanism of Deoxidation Products in Iron Ingot Deoxidized With
Two or Three Elements (M-5)
Dr. Akira Fukuzawa, National Research Institute for Metals

Preparation of Nickel Base Dispersion Strengthened Alloys (M-6)
Dr. Yuji Muramatsu, National Research Institute for Metals

Diffusion in Liquid State and Solidification of Binary System (M-7)
Dr. Takehiro Dan, National Research Institute for Metals

High Temperature Behavior of Glass (M-8)
Dr. Naohiro Soga, Kyoto University

Growth of Silicon Spherical Crystals and Surface Oxidation (M-9)
Dr. Tatau Nishinaga, University of Tokyo

Study on Solidification of Immiscible Alloy (M-10)
Dr. Akihiko Kamio, Tokyo Institute of Technology

Fabrication of Very-Low-Density, High-Stiffness Carbon Fiber/Aluminum Hybridized Composites (M-11)
Dr. Tomoo Suzuki, Tokyo Institute of Technology

Study on the Mechanisms of Liquid Phase Sintering (M-12)
Dr. Shiro Kohara, Science University of Tokyo

Fabrication of SL-As-Te:Ni Ternary Amorphous Semiconductor in Microgravity Environment (M-13)
Dr. Yoshihiro Hamakawa, Osaka University

Gas-Evaporation in Low Gravity Field: Congelation Mechanism of Metal Vapors (M-14)
Dr. Nobuhiko Wada, Nagoya University

Drop Dynamics in Space and Interference With Acoustic Field (M-15)
Dr. Tatsuo Yamanaka, National Aerospace Laboratory

Study of Bubble Behavior (M-16)
Dr. Hisao Azuma, National Aerospace Laboratory

Preparation of Optical Materials Used in Non-Visible Region (M-17)
Junji Hayakawa, Government Industrial Research Institute

Marangoni Induced Convection in Materials Processing Under Microgravity (M-18)
Dr. Shintaro Enya, Heavy Industries

Solidification of Eutectic System Alloys in Space (M-19)
Dr. Atsumi Ohno, Chiba Institute of Technology
Growth of Samarskite Crystal in Microgravity (M-20)
Dr. Shunji Takekawa, National Institute for Research in Inorganic Materials

Growth Experiment of Organic Metal Crystal in Low Gravity (M-21)
Dr. Hiroyuki Anzai, National Electorotechnical Laboratory

Crystal Growth of Compound Semi-conductors in a Low-Gravity Environment (M-22)
Dr. Masami Tatsumi, Sumitomo Electric Industries, Ltd.

Life Sciences

Endocrine and Metabolic Changes in Payload Specialist (L-1)
Dr. Hisao Seo, Nagoya University

Neurophysiological Study on Visuo-Vestibular Control of Posture and Movement in Fish
During Adaptation to Weightlessness (L-2)
Dr. Masao Kuroda, Osaka University

Comparative Measurement of Visual Stability in Earth and Cosmic Space (L-4)
Dr. Kazuo Koga, Nagoya University

Crystal Growth of Enzymes in Low Gravity (L-5)
Dr. Yuhei Morita, Kyoto University

Studies on the Effects of Microgravity on the Ultrastructure and Functions of
Cultured Mammalian Cells (L-6)
Dr. Atsushige Sato, Tokyo Medical and Dental University

The Effect of Low Gravity on Calcium Metabolism and Bone Formation (L-7)
Dr. Tatsuo Suda, Showa University

Separation of the Animal Cells and Cellular Organella by Means of Free Flow Electrophoresis (L-8)
Dr. Tokio Yamaguchi, Tokyo Medical and Dental University

Genetic Effects of HZE and Cosmic Radiation (L-9)
Dr. Mituo Ikenaga, Kyoto University

Space Research on Perceptual Motor Functions Under the Zero Gravity Condition (L-10)
Akira Tada, National Aerospace Laboratory

Study on the Biological Effect of Cosmic Radiation and the Development of
Radiation Protection Technology (L-11)
Dr. Shunji Nagaoka, National Space Development Agency of Japan

Circadian Rhythm of Conidiation in Neurospora Crassa (L-12)
Dr. Yasuhiro Miyoshi, University of Shizuoka

GETAWAY SPECIAL EXPERIMENTS ON STS-47

Ten years ago, the first Get Away Special payload flew on Space Shuttle Columbia. Since then, several hundred experiments have been carried out in space as part of NASA's Get Away Special (GAS) Program. GAS payloads from industry, educational institutions, domestic and foreign governments, as well as from individuals wanting to carry out scientific research on Shuttle flights have participated in the GAS program, managed by NASA's Goddard Space Flight Center, Greenbelt, Md. This program is offered to customers for a nominal fee on a space-available basis. Clarke Prouty is GAS Mission Manager, and Larry Thomas provides customer support at Goddard.

The GAS bridge, capable of holding a maximum of 12 canisters, spans the payload bay of the orbiter and offers a convenient way of flying several canisters simultaneously. Ten GAS payloads originally were scheduled to fly on this mission. However, one GAS payload canceled because of technical difficulties. To fill the bridge, three GAS ballast payloads will be used.

The most recent GAS payload flew on STS-45 in March 1992. To date, 78 GAS cans have flown on 18 missions. GAS experiments from five countries are on this mission. The countries represented are Sweden, France, Canada, England and the United States. Brief descriptions of the payloads on STS-47 follow.

G-102 Sponsor: Boy Scouts of America's Exploring Division (in cooperation with the TRW Systems Integration Group, Fairfax, VA)

In 1978, Explorer posts were invited to submit ideas for experiments. This final flight complement of seven experiments was selected through a three-stage elimination process from 38 proposals originally submitted.

The seven experiments and their sponsors are: Capillary Pumping developed by Explorer Post 9005 and sponsored by the McDonnell Douglas Corp., St. Louis, Mo.; Cosmic Ray developed by Explorer Ship 101 and sponsored by the American Legion of Bridgeport, Conn.; Crystal Growth developed by Explorer Post 310 and Emulsions developed by Explorer Post 475, both sponsored by Chesebrough Pond's Research Laboratory, Trumbull, Conn.; Fiber Optics developed by Explorer Post 475 sponsored by the Naval Avionics Center, Indianapolis, Ind.; Floppy Disk developed by Explorer Post 1022 sponsored by the Church of Jesus Christ of Latter Day Saints, Columbia, Md.; Fluid Droplets developed by Explorer Post 822 sponsored by Martin Marietta, Littleton, Colo; Command, Power and Mechanical Systems designed by Explorer Post 1275 sponsored by the Goddard Explorer Club of NASA Goddard Space Flight Center, Greenbelt, Md.

G-255 Sponsor: Kansas University Space Program, Lawrence, KS

This payload contains three experiments based on the analysis of biochemistry structures in microgravity. The payload uses a computer controller and an active thermal control system. The first experiment will crystallize enzymes. The second will conduct research in cell formations. In the third experiment, seeds will be used to test any effects that the space environment may have on seed germination rates.

The Kansas University Space program is comprised of volunteer undergraduate engineering and science majors.

G-300 Sponsor: Matra Marconi Space/Laboratorie De Genie Electrique De Paris, Paris, France

This is the first GAS payload to fly from France. The objective of this experiment is to explore thermal conductivity of liquids in microgravity. Measurements will be performed on three liquids: distilled water (as a standard) and two silicone oils. Using a modified "hot plate" method, a simplified guard ring reduces the heat losses.

G-330 Sponsor: Swedish Space Corporation, Solna, Sweden

The scientific aim of this experiment is to study the breakdown of a planar solid/liquid interface when the growth rate increases from stable to unstable conditions. To do this, a sample of Germanium doped with Gallium will be processed during the flight. To perform the experiment, a gradient furnace was developed in which the growth rate can be controlled along the crystal. The gradient furnace consists of a ceramic crucible with five heating elements and a cooler.

G-482 Sponsor: Spar Aerospace Ltd., Quebec, Canada

The purpose of this experiment is to compare the behavior of bread yeast in the absence of gravity to the behavior of bread yeast in normal atmospheric conditions. The experiment mixes flour, water and the designated yeast on-orbit, allows the mixture to rise, and then "bakes" it.

G-520 Sponsor: Ashford School, Kent, England

This payload is the first British school experiment to fly in space. The project won first-prize in a nationwide school competition run by Independent Television News (ITN). Two experiments are part of this payload. In the first, the students designed a small, leak-proof, transparent container filled with sodium silicate solution. A few grams of cobalt nitrate crystals will be released into the center of the solution. As soon as the crystals are dropped into the solution, a camera will record about 100 pictures for study on return to Earth.

In the second experiment, a chemical solution is placed on a gel containing another compound, resulting in a series of rings appearing in the gel. The resulting rings will be photographed by a second camera, taking 100 pictures of crystal growth at varying intervals over 4 days.

G-521 Sponsor: Canadian Space Agency, Ottawa, Canada

This payload is called QUESTS (Queens' University Experiment on the Shuttle Transportation System) and includes 15 furnaces. Twelve of the furnaces are constant-temperature furnaces. These furnaces will be used for studies of diffusion in metals when in the liquid state. The other three furnaces are temperature-gradient, in which a uniform temperature gradient is applied along the sample, and the temperatures are slowly decreased to allow crystal growth to occur from one end of the sample.

G-534 Sponsor: NASA Lewis Research Center, Cleveland, OH

The objective of this experiment is to improve the understanding of the fundamental mechanisms that constitute nucleate pool boiling. The experiment will investigate the heat transfer and vapor bubble dynamics associated with nucleation, bubble growth/collapse and subsequent motion.

G-613 Sponsor: University of Washington, Seattle, WA

This experiment -- an experimental cooling system -- was designed by University of Washington engineering students. Liquid droplets will be pumped from a shower head-like device to a spinning collection bowl that will substitute for gravity by acting as a centrifuge. The rotating bowl will throw the weightless liquid to the edge and direct it into a collection pipe for reuse. A smaller experiment, a micro heat pipe also will be flown in this canister.

ISRAELI SPACE AGENCY INVESTIGATION ABOUT HORNETS

The Israeli Space Agency Investigation About Hornets (ISAIAH) experiment will be carried on Endeavour's middeck to research the effect of weightlessness on combs built by oriental hornets.

The oriental hornet has a unique ability to build combs in the direction of gravity. Terrestrial studies using centrifugal force to simulate different directions of gravity other than Earth's gravity have shown that such forces are the only factor that determines the direction a comb is built. ISAIAH is designed to obtain insight into this unique trait of the oriental hornet by testing the hornets' ability to orient their combs when in weightlessness.

ISAIAH fits into one middeck locker and consists of two compartments. A front compartment contains electronics, a blower, two tape recorders and front panel controls for the experiment. A back compartment contains 18 test chambers of various shapes and a metronome. Each of the nine top side chambers has a lamp to simulate day and night, an audio sensor and a food and water container. Each of the bottom side chambers will remain in constant darkness when the experiment is inside the locker.

Two Lexan windows, one on the top and another on the bottom, will allow the crew to view and photograph the progress of the experiment. ISAIAH is sponsored by the Israeli Space Agency. The hardware was developed by Israel Aircraft Industries International, Inc.

SHUTTLE AMATEUR RADIO EXPERIMENT

The Shuttle Amateur Radio Experiment (SAREX) is designed to demonstrate the feasibility of amateur short-wave radio contacts between the Space Shuttle crew and ground amateur radio operators, often called ham radio operators. SAREX also serves as an educational opportunity for schools around the world to learn about space first hand by speaking directly to astronauts aboard the Shuttle via ham radio. Contacts with certain schools are included in planning the mission.

STS-47 crew members Jay Apt, call sign N5QWL, and Mamoru Mohri, call sign 7L2NJY, will operate SAREX. Ham operators may communicate with the Shuttle using VHF FM voice transmissions and digital packet. The primary voice frequencies to be used during STS-47 are 145.55 MHz for transmissions from the spacecraft to the ground and 144.95 MHz, 144.91 MHz and 144.97 MHz for transmissions from the ground to the spacecraft. Digital packet will operate on 145.55 MHz for transmissions from the Shuttle to the ground and on 144.70 MHz for transmissions from the ground to the Shuttle.

Equipment aboard Columbia will include a low-power, hand-held FM transceiver, spare batteries, headset, an antenna custom designed by NASA to fit in an orbiter window, an interface module and equipment cabinet.

SAREX has flown previously on Shuttle missions STS-9, STS-51F, STS-35, STS-37, STS-45 and STS-50. SAREX is a joint effort by NASA, the American Radio Relay League (ARRL), the Amateur Radio Satellite Corp. and the Johnson Space Center Amateur Radio Club. Information about orbital elements, contact times, frequencies and crew operating times will be available from these groups during the mission and from amateur radio clubs at other NASA centers.

Ham operators from the JSC club will be operating on HF frequencies, and the AARL (W1AW) will include SAREX information in its regular HF voice and Teletype bulletins. The Goddard Space Flight Center Amateur Radio Club, Greenbelt, Md., will operate 24 hours a day during the mission, providing information on SAREX and retransmitting live Shuttle air-to-ground communications. In addition, the NASA Public Affairs Office at the Johnson Space Center will have a SAREX information desk during the mission.

SAREX Operating Frequencies

Location	**Shuttle Transmission**	**Shuttle Reception**
U.S., Africa	145.55 MHz	144.95 MHz
South America and Asia	145.55	144.97
	145.55	144.91
Europe	145.55	144.80
	145.55	144.75
	145.55	144.70

Goddard Amateur Radio Club Operations (SAREX information and Shuttle audio broadcasts)

3.860 MHz	7.185 MHz	14.295 MHz	21.395 MHz	28.395 MHz

SAREX information also may be obtained from the Johnson Space Center computer bulletin board (JSC BBS), 8 N 1 1200 baud, at 713/483-2500 and then type 62511.

SOLID SURFACE COMBUSTION EXPERIMENT

The Solid Surface Combustion Experiment (SSCE) is a study of how flames spread in microgravity. Comparing data on how flames spread in microgravity with knowledge of how flames spread on Earth may contribute to improvements in fire safety and control equipment. This will be the fifth time SSCE has flown aboard the Shuttle. Ultimately, plans call for SSCE to fly a total of eight times, testing the combustion of different materials under different atmospheric conditions.

In the SSCE planned for STS-47/SL-J, scientists will test how flames spread along a instrumented filter paper sample in a test chamber containing 35% oxygen and 65% nitrogen at 1.5 atmospheric pressure.

During the four previous missions on which this experiment was flown, samples of the filter paper were burned in atmospheres with different levels of oxygen and pressure. The filter paper and Plexiglas for later flights were chosen as test materials because extensive data bases already exist on the combustion of these materials in Earth's gravity. Thus, combustion processed on Earth and in space can be readily compared.

Scientists will use computer image enhancement techniques to analyze the film record of the Solid Surface Combustion Experiment. They then will compare the enhanced images and recorded temperature and pressure data with a computer simulation of the flame spreading process. Reconciling the two sets of data is expected to provide new insights into the basic process of combustion.

Robert A. Altenkirch, Principal Investigator, Mississippi State University
John M. Koudelka, Project Manager, NASA Lewis Research Center, Cleveland

SPACE ACCELERATION MEASUREMENT (SAMS)

The Space Acceleration Measurement System (SAMS) is designed to measure and record low-level acceleration that the Spacelab experiences during typical on-orbit activities. The three SAMS sensor heads are mounted on or near experiments to measure the acceleration environment experienced by the research package. The signals from these sensors are amplified, filtered and converted to digital data before it is stored on optical disks.

For the first SL-J mission, the main unit of the Space Acceleration Measurement System will be mounted in the SMIDEX Rack of the Spacelab module, near the aft end of the module. Its three remote sensor heads will be mounted on the First Material Processing Test Modular Electronic Levitator, Life Science and Rack #9.

SAMS flight hardware was designed and developed in-house by the NASA Lewis Research Center and Sverdrup Technology Inc. project team.

Charles Baugher, Principal Investigator, NASA Marshall Space Flight Center, Huntsville, AL
Richard DeLombard, Project Manager, NASA Lewis Research Center, Cleveland, OH

STS-47 CREWMEMBERS

STS047-S-002 -- STS-47 Endeavour, Orbiter Vehicle (OV) 105, official portrait includes the seven crewmembers wearing launch and entry suits (LESs). These seven crewmembers are currently in training for the STS-47 Spacelab J (SLJ) mission scheduled for later this year. Pictured are (left to right, front) mission specialist Jerome Apt and pilot Curtis L. Brown Jr. (both holding launch and entry helmets (LEHs)); and (left to right, rear) mission specialist N. Jan Davis, and payload commander (PLC) Mark C. Lee, mission commander Robert L. Gibson, mission specialist Mae C. Jemison, and Japanese payload specialist Mamoru Mohri. Mohri is representing the National Space Development Agency of Japan (NASDA). In the background are the flags of the United States (U.S.) and Japan. Portrait was made by NASA JSC contract photographer Robert G. Markowitz.

PHOTO CREDIT: NASA or National Aeronautics and Space Administration.

BIOGRAPHICAL DATA

ROBERT L. GIBSON, 45, Capt., USN, is commander of Endeavour for mission STS-47. selected as an astronaut in January 1978, Gibson considers Lakewood, CA, his hometown and will be making his fourth space flight.

Gibson graduated from Huntington High School, Huntington, NY, in 1964 and received a bachelor's in aeronautical engineering from California Polytechnic State University in 1969.

Gibson first flew as pilot of STS-41B in February 1984, a mission that deployed two communications satellites and was the first flight of the Manned Maneuvering Unit, a spacewalker's jet backpack. He next served as Commander of STS-61C in January 1986, a mission during which the crew deployed a communications satellite and conducted various experiments in astrophysics and materials processing. His third flight was Commander of STS-27, a Department of Defense-dedicated Shuttle mission in December 1988.

Gibson has been a private airplane pilot since age 17 and entered the Navy in 1969, flying combat missions in Southeast Asia from 1972-1975 and graduating from the Naval Test Pilot School in 1977.

He has logged 442 hours in space and more than 4,600 hours flying time in more than 45 types of aircraft.

CURTIS L. BROWN Jr., 36, Major, USAF, will serve as Pilot. Selected as an astronaut in June 1987, Brown was born in Elizabethtown, NC, and will be making his first space flight.

Brown graduated from East Bladen High School in Elizabethtown in 1974 and received a bachelor's in electrical engineering from the Air Force Academy in 1978.

Brown was commissioned in the Air Force in 1978 and graduated pilot training at McLaughlin Air Force Base, Del Rio, TX, in 1979. After completing training for the A-10 aircraft in January 1980, he began flying the A-10 at Myrtle Beach Air Force Base, SC.

In 1982, he was assigned as an A-10 instructor at Davis-Monthan Air Force Base, AZ. In 1983, he attended the Air Force Fighter Weapons School at Nellis Air Force Base and returned to Davis-Monthan as an A-10 weapons and tactics instructor later that year.

In 1986, he graduated from the Air Force Test Pilot School and was serving as a test pilot in the A-10 and F-16 aircraft at Eglin Air Force Base, Fla., upon his selection by NASA.

Brown has logged more than 3,100 hours flying time.

MARK C. LEE, 40, Lt. Col., USAF, will be Mission Specialist 1. Selected as an astronaut in May 1984, Lee considers Viroqua, WI, his hometown and will be making his second space flight.

Lee graduated from Viroqua High School in 1970, received a bachelor's in civil engineering from the Air Force Academy in 1974 and received a master's in mechanical engineering from the Massachusetts Institute of Technology in 1980.

Lee first flew as a mission specialist on STS-30 in May 1989, a flight that deployed the Magellan planetary probe to map Venus. Prior to joining NASA, Lee flew the F-4 aircraft at Okinawa Air Force Base, Japan, for 2 and a half years. At the time of his selection as an astronaut, he was stationed at Hill Air Force Base flying the F-16 as Flight Commander of the 4th Tactical Fighter Squadron. Lee has logged more than 2,750 flying hours in T-38, F-4 and F-16 aircraft. He has logged 97 hours in space.

BIOGRAPHICAL DATA

JAY APT, 43, will be Mission Specialist 2. Selected as an astronaut in June 1985, Apt considers Pittsburgh, PA, his hometown and will be making his second space flight.

Apt graduated from Shady Side Academy in Pittsburgh in 1967, received a bachelor's in physics from Harvard College in 1971 and received a doctorate in physics from the Massachusetts Institute of Technology in 1976.

Apt first flew on STS-37 in April 1991, a mission on which the Gamma Ray Observatory was deployed, and Apt performed two spacewalks. Prior to selection as an astronaut, Apt served as a staff member of the Center for Earth and Planetary Physics at Harvard from 1976-1980 and as Assistant Director of Harvard's Division of Applied Sciences from 1978-1980.

Apt joined NASA's Jet Propulsion Laboratory, Pasadena, CA, in 1980 and served as Science Manager of the Table Mountain Observatory before becoming a payloads officer working in Johnson Space Center's Mission Control in 1982. He was serving as a payloads officer at the time of his selection.

An instrument-rated private pilot, Apt has logged more than 2,500 flying hours in 25 types of aircraft, sailplanes and man-powered craft. He has logged 143 hours in space, including almost 11 hours spacewalking.

N. JAN DAVIS, 38, will be Mission Specialist 3. Selected as an astronaut in June 1987, Davis considers Huntsville, AL, her hometown and will be making her first space flight.

Davis graduated from Huntsville High School in 1971, received a bachelor's in applied biology from the Georgia Institute of Technology in 1975, received a bachelor's in mechanical engineering from Auburn University in 1975, received a master's in mechanical engineering from the University of Alabama in Huntsville in 1983 and received a doctorate in mechanical engineering from the University of Alabama in Huntsville in 1985.

Davis joined Texaco, Inc., in Bellaire, TX, in 1977 as a petroleum engineer working in tertiary oil recovery. In 1979, she joined NASA's Marshall Space Flight Center in Huntsville where she served as team leader in the Structural Analysis Division working on the structural analysis and verification of the Hubble Space Telescope (HST), the HST maintenance mission and the Advanced X-Ray Astrophysics Facility. She later was assigned as the Lead Engineer for redesign of the Shuttle's solid rocket booster external tank attach ring after the STS-51L accident.

As an astronaut, Davis' assignments have included technical support for development of the Tethered Satellite System mission and serving as spacecraft communicator in Mission Control for six Shuttle flights.

BIOGRAPHICAL DATA

MAE C. JEMISON, 35, will be Mission Specialist 4. Selected as an astronaut in June 1987, Jemison considers Chicago, IL, her hometown and will be making her first spaceflight.

Jemison graduated from Morgan Park High School in Chicago in 1973, received a bachelor's in chemical engineering from Stanford University in 1977 along with fulfilling requirements for a bachelor's in African and Afro-American studies and received a doctorate in medicine from Cornell University in 1981.

Jemison completed her internship at the Los Angeles County/University of Southern California Medical Center in July 1982 and worked as a general practitioner with the INA/Ross Loos Medical Group in Los Angeles until December 1982.

From 1983-1985, she served as the Area Peace Corps Medical Officer for Sierra Leone and Liberia in West Africa, managing the health care delivery system for the Peace Corps and the U.S. Embassy.

Jemison joined CIGNA Health Plans of California in October 1985 and worked as a general practitioner and studied engineering in Los Angeles until her selection by NASA.

MAMORU MOHRI, 44, will be Payload Specialist 1. Mohri was born in Yoichi-machi, Hokkaido, Japan and will be making his first space flight.

Mohri was selected as a payload specialist for the National Space Development Agency of Japan (NASDA) in 1985. He received an undergraduate degree from the Department of Chemistry at Hokkaido University, Hokkaido, Japan, in 1970, received a master's from Hokkaido University in 1972 and received a doctorate from South Australia State Flinders University, Australia, in 1976.

From 1975 until his selection by NASDA, Mohri served in various positions with the engineering faculty in the Department of Nuclear Engineering at Hokkaido University. His major field of expertise is in surface physics and ultra-high vacuum science. Mohri's current residence is in Matsudo-shi, Chiba, Japan.

MISSION MANAGEMENT FOR STS-47

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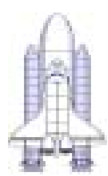
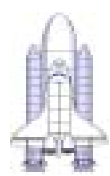
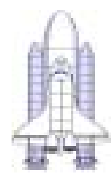
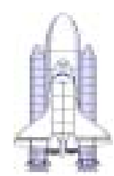
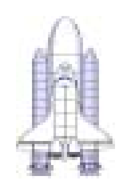
SHUTTLE FLIGHTS AS OF SEPTEMBER 1992

49 TOTAL FLIGHTS OF THE SHUTTLE SYSTEM -- 24 SINCE RETURN TO FLIGHT

		STS-42 01/22/92 - 01/30/92		
		STS-48 09/12/91 - 09/18/91		
STS-50 06/25/92 - 07/09/92		STS-39 04/28/91 - 05/06/91	STS-46 07/31/92 - 08/08/92	
STS-40 06/05/91 - 06/14/91		STS-41 10/06/90 - 10/10/90	STS-45 03/24/92 - 04/02/92	
STS-35 12/02/90 - 12/10/90	STS-51L 01/28/86	STS-31 04/24/90 - 04/29/90	STS-44 11/24/91 - 12/01/91	
STS-32 01/09/90 - 01/20/90	STS-61A 10/30/85 - 11/06/85	STS-33 11/22/89 - 11/27/89	STS-43 08/02/91 - 08/11/91	
STS-28 08/08/89 - 08/13/89	STS-51F 07/29/85 - 08/06/85	STS-29 03/13/89 - 03/18/89	STS-37 04/05/91 - 04/11/91	
STS-61C 01/12/86 - 01/18/86	STS-51B 04/29/85 - 05/06/85	STS-26 09/29/88 - 10/03/88	STS-38 11/15/90 - 11/20/90	
STS-9 11/28/83 - 12/08/83	STS-41G 10/05/84 - 10/13/84	STS-51-I 08/27/85 - 09/03/85	STS-36 02/28/90 - 03/04/90	
STS-5 11/11/82 - 11/16/82	STS-41C 04/06/84 - 04/13/84	STS-51G 06/17/85 - 06/24/85	STS-34 10/18/89 - 10/23/89	
STS-4 06/27/82 - 07/04/82	STS-41B 02/03/84 - 02/11/84	STS-51D 04/12/85 - 04/19/85	STS-30 05/04/89 - 05/08/89	
STS-3 03/22/82 - 03/30/82	STS-8 08/30/83 - 09/05/83	STS-51C 01/24/85 - 01/27/85	STS-27 12/02/88 - 12/06/88	
STS-2 11/12/81 - 11/14/81	STS-7 06/18/83 - 06/24/83	STS-51A 11/08/84 - 11/16/84	STS-61B 11/26/85 - 12/03/85	
STS-1 04/12/81 - 04/14/81	STS-6 04/04/83 - 04/09/83	STS-41D 08/30/84 - 09/05/84	STS-51J 10/03/85 - 10/07/85	STS-49 05/07/92 - 05/16/92
OV-099 Challenger (10 flights)	**OV-102 Columbia (12 flights)**	**OV-103 Discovery (14 flights)**	**OV-104 Atlantis (12 flights)**	**OV-105 Endeavour (1 flight)**