NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

SPACE SHUTTLE MISSION
STS-61C

PRESS KIT
DECEMBER 1985

RCA SATCOM K-1; MATERIALS SCIENCE LABORATORY 2

STS-61C INSIGNIA

S85-41917 **--** *Columbia, which opened the era of the space transportation system with four orbital flight tests, is featured in reentry in the insignia designed by the crew to represent the seven team members who will man the vehicle for its seventh mission. Gold lettering against black background honors the astronaut crew members on the delta pattern surrounding colorful reentry shock waves, and the payload specialists are honored similarly below the sphere.*

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 NO. 85-167 **December 1985**

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RELEASE NO. 85-167 **December 1985**

COLUMBIA TO MAKE 24TH STS FLIGHT ON DEC. 18

The Space Shuttle Columbia will make its first space flight in two years on mission 61-C, the 24th flight of America's Space Transportation System. Liftoff is scheduled for Dec. 18 at 7 a.m. EST. The launch window extends for 49 minutes that day.

Robert L. "Hoot" Gibson will command this last shuttle mission for 1985, his second trip into space. Charles F. Bolden, making his first space trip, is the 61-C pilot. Three mission specialists will by flying aboard Columbia: Franklin R. Chang-Diaz, Steven A. Hawley and George D. "Pinky" Nelson. Chang-Diaz will be the first Hispanic American to journey into space. Hawley and Nelson will be making their second space flights. The two payload specialists are Robert J. Center of RCA and Florida U.S. Rep. Bill Nelson.

Columbia will be launched into a 201-mile, circular orbit inclined 28.5 degrees to the equator, for its 5-day mission.

During the mission, the crew will deploy RCA's Satcom K-1 communications satellite, the second in a series of three, with its PAM D-2 upper stage. Satcom K-2 was deployed on flight 61-B in November 1985.

Also aboard Columbia in the payload bay are the Materials Science Laboratory-2 (MSL-2); the first Hitchhiker payload; the RCA Infrared Imaging Experiment (IR-IE); and 13 Getaway Special Experiments in specializing canisters, 12 of which are mounted on a GAS bridge which is attached to the payload bay.

MSL-2, sponsored by the Marshall Space Flight Center, Huntsville, AL, is controlled by onboard computers and contains three materials processing experiments to be operated by Chang-Diaz. Samples of a variety of materials will be carefully observed while they are melted and solidified in zero gravity. Those materials will be compared with their ground controls.

The Hitchhiker (HG-1), sponsored by Goddard Space Flight Center, Greenbelt, MD, is mounted to the side of the payload bay and supports three experiments. One of the experiments is the Particle Analysis Cameras for the Shuttle (PACS) experiment to provide film images of any particle contamination around the Shuttle in support of future Department of Defense infrared telescope operations. Another experiment is the Capillary Pump Loop to provide a zero-gravity test of a new two-phase heat transport system. The third experiment uses coated mirrors to test the effects of the Shuttle's environment.

The IR-IE infrared camera was developed by RCA and will be under the supervision of Cenker during the mission. Its purpose is to acquire radiometric information that appears within the field of view of the self-contained optical system. RCA hopes to have an opportunity to photograph storms, volcanic activity or other natural occurrences during the mission as well as mapping the orbiter's payload bay to determine its thermal characteristics at various times on orbit.

Middeck payloads include the Comet Halley Active Monitoring Program (CHAMP), Initial Blood Storage Experiment (IBSE) and three student experiments.

IBSE, funded by Johnson Space Center, with the Center for Blood Research, Boston, acting as the lead institution, will study blood storage and sedimentation characteristics in microgravity.

This is one of several Shuttle flights on which the CHAMP experiment will be flown to obtain photographs and spectra of Halley's Comet as well as its dynamic and structural behavior and its chemical structure.

During the mission, Chang-Diaz will produce a videotape in Spanish for live distribution to audiences in the United States and Latin America via the NASA Select television circuit.

Payload specialist Bill Nelson will participate in the University of Alabama at Birmingham Comprehensive Cancer Center experiment. The object of the experiment is to try to grow crystal proteins in space for cancer research.

Columbia's last flight was STS-9, launched Nov. 28, 1983. After that flight, hundreds of modifications were made to Columbia during its 18-month visit at the Rockwell International Shuttle manufacturing plan, Palmdale, CA.

One modification includes the installation of a cylindrical housing atop the vertical stabilizer which contains the Shuttle Infrared Leeside Temperature Sensing (SILTS) experiment. SILTS will obtain high-resolution, infrared images of the upper (leeside) surfaces of Columbia's port wing and fuselage as the orbiter reenter Earth's atmosphere. The infrared images will provide detailed temperature maps that will indicate the amount of aerodynamic heating of those surfaces in flight.

Another less obvious change to Columbia is a new nose cap to house the Shuttle Entry Air Data System (SEADS) experiment. A number of pressure sensors inside the nose cap will provide aerodynamic flight characteristics during reentry.

Another modification was made to accommodate the Shuttle Upper Atmosphere Mass Spectrometer (SUMS) experiment. Inside the nosewheel well, SUMS will sample air at Columbia's surface through a small hole to measure the number of molecules of various gas species. This data, combined with vehicle motion information, will allow determination of orbiter aerodynamic characteristics at altitudes where the atmosphere is extremely thin.

On ascent, the wing pressure distribution will be measured for the first time with transducers located on the top and bottom sides of the wings. The actual load on the wings will be accurately calculated to determine if more performance can be gained form the orbiter.

Another orbiter experiment is the Forward Reaction Control System (FRCS) test which involves firing the forward thrusters on the nose of the orbiter. Five tests will be conducted at various Mach speeds. One jet from the left and right FRCS will be fired for one second and seven seconds later. This test is a simulation for future missions that may require lighter abort-landing weights. In such a case, the FRCS propellant would be dumped before landing.

This will be the first KSC landing since mission 51-D on April 19, 1985, when Discovery's right main landing gear tire experienced a blowout. Shuttle managers then decided to introduce modifications permitting nosewheel steering capability on the orbiters. That system was verified with Challenger at the conclusion of mission 61-A at Edwards Air Force Base, CA.

Landing will come on Flight Day 6 at Kennedy Space Center on orbit 80, Dec. 23 at 7:13 a.m. EST.

(END OF GENERAL RELEASE; BACKGROUND INFORMATION FOLLOWS.)

GENERAL INFORMATION

NASA Select Television Transmission

NASA-Select television coverage of Shuttle mission 61-C will be carried on a full satellite transponder:

Satcom F-2R, Transponder 13, C-Band
Orbital Position: 72 degrees west longitude
Frequency: 3954.5 MHz vertical polarization
Audio Monaural: 6.8 MHz

NASA-Select video also is available at the AT&T Switching Center, Television Operation Control in Washington, DC, and at the following NASA locations:

NASA Headquarters, Washington, DC
Langley Research Center, Hampton, VA
John F. Kennedy Space Center, FL
Marshall Space Flight Center, Huntsville, AL
Johnson Space Center, Houston, TX
Dryden Flight Research Facility, Edwards, CA
Ames Research Center, Mountain Valley, CA
Jet Propulsion Laboratory, Pasadena, CA

The schedule for television transmissions from the orbiter and for the change-of-shift briefings from Johnson Space Center will be available during the mission at Kennedy Space Center, Marshall Space Flight Center, Johnson Space Center, and NASA Headquarters.

The television schedule will be updated daily to reflect changes dictated by mission operations. Television schedules also may be obtained by calling COMSTOR (713/280-8711). COMSTOR is a computer data-base service requiring the use of a telephone modem.

Special Note to Broadcasters

Beginning Dec. 13 and continuing throughout the mission, approximately 7 minutes of audio interview material with the crew of 61-C will be available to broadcasters by calling 202/269-6572.

Briefings

Flight control personnel will be on 8-hour shifts. Change-of-shift briefings by the off-going flight director will occur at approximately 8-hour intervals.

61-C BRIEFING SCHEDULE

Time (EST)	Briefing	Origin
T-1 Day		
9:00 a.m.	RCA Satcom K-1	KSC
9:25 a.m.	Infrared Imaging Experiment	KSC
9:40 a.m.	Hitchhiker	KSC
10:00 a.m.	Getaway Specials	KSC
11:45 a.m.	Comet Halley Active Monitoring Program	KSC
1:00 p.m.	Materials Science Laboratory-2	KSC
1:30 p.m.	Shuttle Student Involvement Program	KSC
2:00 p.m.	Initial Blood Storage Experiment	KSC
2:30 p.m.	Pre-launch Press Conference	KSC
T-Day		
8:00 a.m.	Post-launch Briefing	KSC
Launch Through End of Mission		
Times announced on NASA Select		
	Flight Director Change-of-Shift Briefings	JSC
Landing Day		
8:15 a.m.	Post-landing Briefing	KSC

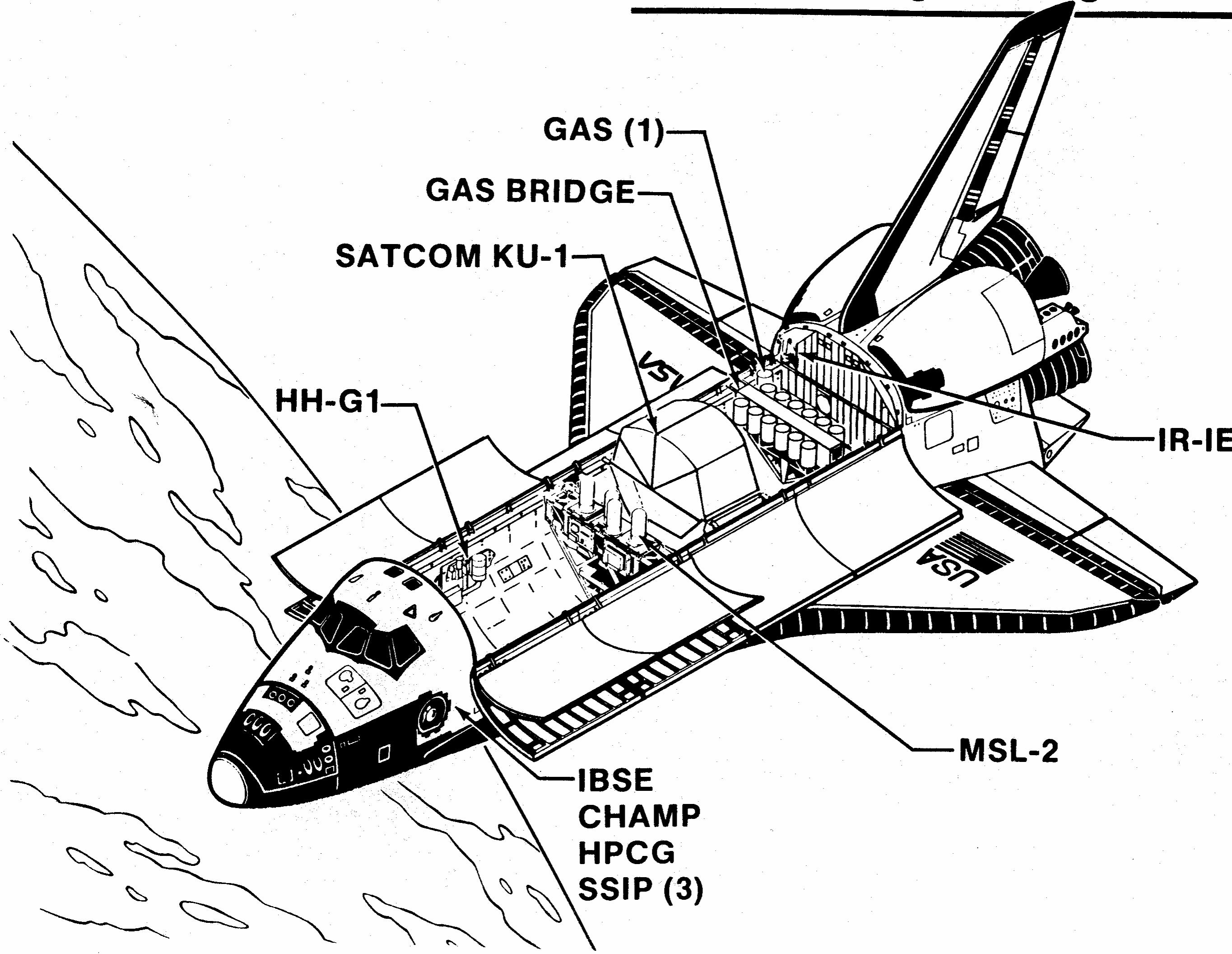
SHUTTLE MISSION 61-C – QUICK LOOK

Crew:	Robert L. Gibson, Commander Charles F. Bolden Jr., Pilot George D. Nelson, Mission Specialist (MS-1) Steven A Hawley, Mission Specialist (MS-2) Franklin Chang-Diaz, Mission Specialist (MS-3) Robert J. Cenker, Payload Specialist (PS-1) C. William (Bill) Nelson, Payload Specialist (PS-2)
Orbiter:	Columbia (OV-102)
Launch Site:	Pad 39A, Kennedy Space Center, FL
Launch Date/Time:	Dec. 18, 1985 -- 7:00 a.m. EST
Window:	49 minutes to 7:49a.m. EST
Orbital Inclination:	28.45 degrees
Insertion Orbit:	201 mi. circular
Mission Duration:	5 days; 79 full orbits, landing on orbit 80
Landing Date/Time:	Dec. 23, 1985; 7:13 a.m. EST
Primary Landing Site:	Kennedy Space Center, FL, Runway 33
Weather Alternate:	Edwards Air Force Base, CA, Runway 22
Trans-Atlantic Abort:	Dakar, Senegal
Abort-Once-Around:	Edwards AFB

Cargo and Payloads:

Deployable:	Satcom K-1/PAM-D2 (RCA American Communications, Inc.)
Attached:	Hitchhikerp-G1 13 Getaway Special (GAS) canisters Infrared Imaging Experiment (IR-IE) Materials Science laboratory (MSL-2)
Crew Compartment:	Initial Blood Storage Experiment (IBSE) Comet Halley Active Monitoring Program (CHAMP) Three Student Experiments (SSIP)

National STS Program
STS 61-C Cargo Configuration



61-C TRAJECTORY SEQUENCE OF EVENTS

Event	Orbit	Tig MET (d:h:m)	Burn Duration (min-sec)	Delta V (fps)	Post-Burn Apogee/Perigee (s mi)
Launch		0:00:00			
MECO		0:00:09			
OMS-1		0:00:13		271	
OMS-2	1	0:00:48	2:18	216	201x201
Satcom Ku-1 Deploy	7D	0:09:32			
OMS-3 Sep	7	0:09:47	0:12	14	201x211
Satcom/PAM D-2 PMF	8A	0:10:17			
Deorbit Burn	79	4:23:12	3:58	321	24x203
Landing	80	5:00:13			

SUMMARY OF MAJOR ACTIVITIES

Flight Day 1
Launch
Payload bay doors open
Activate Materials Science Laboratory (MSL-2)
Three-Axis Acoustic Levitator (3AAL)
Automated Directional Solidification Furnace (ADSF)
GAS (G449, 494, 056, 007)
Measure Emissions in Terrestrial Night Glow
Hitchhiker
Deploy Satcom K-1

Flight Day 2
GAS Ultraviolet Experiment (UVX)
Comet Halley Active Monitoring Program (CHAMP)
Materials Science Laboratory:
Electromagnetic Levitator (EML)
ADSF
GAS Experiments (G446 and G007)
Deploy Satcom K-1 B/U

Flight Day 3
UVX experiments
CHAMP
Operate MSL-2: EML (Sample 3) and ADSF (Sample 1)
Hitchhiker
GAS Experiments (G310 and G007)
Student Experiments

Flight Day 4
Infrared Imaging Experiment
UVX operations
MSL-2 operations
CHAMP

Flight Day 5
UVX operations
MSL-2 operations
GAS experiments
RCS hot fire
Crew Conference
Stow Cabin

Flight Day 6
Deactivate:
- MSL-2
- Hitchhiker
- GAS Experiments

Student Experiment
Deorbit Preparations
Landing (KSC)

61-C PAYLOAD AND VEHICLE WEIGHTS SUMMARY

	Pounds
Orbiter Without Consumables	182,028
Satcom and PAM-D-2	12,258
Miscellaneous, GAS, Experiments & Support Hardware	28,555
Orbiter Including Cargo at SRB Ignition	255,471
Total Vehicle at SRB Ignition	4,516,472
Orbiter Landing Weight	211,000

RCA SATCOM K-1

Satcom K-1, the second of a planned fleet of three communications satellites operating in the Ku-band part of the spectrum, will be deployed during mission 61-C. The first, Satcom K-2, was carried aboard flight 61-B in November 1985 and the third is scheduled for launch in 1987. Satcom K-1 has been assigned an orbital position of 85 degrees west longitude.

Each of the spacecraft will have 16 channels operating at 54 MHz usable bandwidth. The spacecraft are designed to provide coverage to the continental 48 states or to either the eastern half or western half.

The three-axis stabilized spacecraft are equipped with power, attitude control, thermal control, propulsion, structure, and command ranging and telemetry systems necessary to support mission operations from launch vehicle separation through 10 years of operational life in geosynchronous orbit.

This new generation of spacecraft carries 45-watt transponders, which permits the use of Earth station antennas as small as 3 ft. in diameter. Because Ku-band frequencies are not shared with terrestrial microwave systems, antennas served by the satellites can be located within major metropolitan areas characterized by heavy terrestrial microwave traffic.

Following the launch of Satcom K-1, it will be placed into a 23,000-mi. geosynchronous orbit. After this, the 280-square-ft. solar panels will deploy from the 67-by-84-by-60-in. main spacecraft structure. The spacecraft then will be tested for in-orbit operation and locked into its orbital slot.

Satcom K-1, owned and operated by RCA American Communications (RCA Americom), is one of three Ku-band domestic communications satellites operating in the 12 to 14 Gigahertz range. There are 16 operational transponders and six spares, each transmitting 45 watts of power, more than the 12 to 30 watts used for C-band transponders.

RCA Satcom K-1 is a version of the RCA 4000 three-axis, stabilized spacecraft, similar in appearance to the ASC-1 satellite deployed from Discovery in August 1985. It will provide Direct-to-Home Television program distribution and Satellite Master Antenna Television for hotels, apartment houses, other multi-unit dwellings and institutions.

NASA has been reimbursed $14.2 million by RCA Americom for launch services associated with the Satcom K-1 satellite.

HITCHHIKER

Spacelab Hitchhiker, a new payload carrier system which provides rapid and low-cost access to space, will be carried on Shuttle mission 61-C.

Developed as a Shuttle payload-of-opportunity carrier, Spacelab Hitchhiker primarily will accommodate science, technology and commercial payloads requiring rapid access to space on a standby basis, but having only limited pointing and onboard data processing requirements. The Hitchhiker system will provide a payload support capability between those of payload carriers currently in use – the Getaway Special (GASS) and the Multiplexer/Demultiplexer pallet.

Unlike the autonomous GAS canisters, Hitchhiker communications channels are provided through the Payload Operations Control Center, Goddard Space Flight Center, Greenbelt, MD, enabling real-time customer interaction and control. Hitchhiker's mounting hardware also provides access to the Shuttle's 1,400-watt power supply.

Two Hitchhiker systems are being developed under the management of the Office of Space Flight, NASA Headquarters, one by NASA's Goddard Center (Hitchhiker-G), which will have its verification flight on mission 61-C, and one by NASA's Marshall Space Flight Center, Huntsville, AL (Hitchhiker-M). Both systems are designed to use the cargo space remaining after the Shuttle's primary payload has been accommodated.

Hitchhiker-G will have standard hardware interfaces and simplified documentation procedures permitting nominal development time and lower customers costs.

Hitchhiker-G consists of either two 50- by 60-inch aluminum plates or a single plate for mounting experiments and a GAS canister. It can accommodate four experiments having a total combined weight of 750 pounds or less. The aluminum plates and/or GAS canister will be located on the starboard wall in the forward end of the orbiter bay.

Marshall's Hitchhiker-M uses an across-the-cargo-bay type structure with greater weight capacity than Hitchhiker-G. Hitchhiker-M is expected to be used on a Shuttle flight in the late summer or fall of 1986. Both systems are designed to be compatible with users needs.

Hitchhiker-M is composed of a Multi-Purpose Experiment Support Structure pallet, a power control box and a Smart Flexible Multiplexer/Demultiplexer. Hitchhiker-M is limited to carrying three experiments having a total weight of 1,200 lb. or less. Like the Goddard Hitchhiker, no active cooling is provided. It will have the same telemetry, power and command and control capability as Hitchhiker-G.

The objectives of the Hitchhiker program are to:

1. Provide reduced flight opportunity lead time;
2. Provide increased reflight opportunity;
3. Reduce integration cost; and
4. Maximize Shuttle load factors.

The first Hitchhiker flight carrier (HG-1) will contain three experiments: Particle Analysis Cameras (PACS) to study particle distribution within the Shuttle bay environment; coated mirrors to test the effects of the Shuttle's environment; and a Capillary Pump Loop (CPL) heat acquisition and transport system. The particle study, the coated mirror test and their avionics package will be mounted on a vertical plate attached to Columbia's starboard side. The pump loop experiment, which shares the same avionics system, will be mounted next to the plate inside a GAS canister.

The U.S. Air Force built the Particle Analysis Cameras. The coated mirror experiment was built by Perkin-Elmer. The Capillary Pump Loop is a high-density thermal system under development at Goddard for use on the Space Station and orbiting spacecraft. Containing no moving parts, it uses the same principle of capillary action by which plants and trees transport water and nutrients to their leaves.

The NASA Headquarters Hitchhiker program manager is Edward James, Mail Code MLD.

MATERIALS SCIENCE LABORATORY-2 (MSL-2)

Resting on the Mission Peculiar Equipment Support Structure (MPESS) in the payload bay, the Materials Science Laboratory-2 (MSL-2), provides accommodations for the following three experiments in the materials processing field:

Electromagnetic Levitator (EML) – This experiment will study the effects of material flow during solidification of a melted material in the microgravity environment. Six samples will be suspended in the electromagnetic field of a cusp coil and melted by induction heating from the coil's electromagnetic field. Dr. Merton C. Flemings, Massachusetts Institute of Technology, is principal investigator.

Automated Directional Solidification Furnace (ADSF) – Consisting of four furnace/sample units, the experiment is designed to investigate the melting and solidification process of four different materials. Post-flight, the samples will be compared to samples of the same materials that were processed terrestrially. Dr. David J. Larson Jr., Grumman Aerospace, Bethpage, NY, is principal investigator.

Three-Axis Acoustic Levitator (3AAL) - Twelve liquid samples will be suspended in sound pressure waves, rotated and oscillated in a low-gravity, nitrogen atmosphere. Investigators will study the degree of sphericity attainable and small bubble migration similar to that having to do with the refining of glass. Dr. Taylor Wang, Jet Propulsion Laboratory, Pasadena, CA, and Dr. R. S. Subramanian, Clarkson University, Potsdam, NY, are co-principal investigators.

Activation, deactivation and status monitoring capability will be provided by the standard switch panel in the orbiter aft flight deck.

The MSL-2 mission manager is Richard Valentine of Marshall Space Flight Center, Huntsville, AL. Nelson Wirman, Shuttle Payload Engineering Division, Office of Space Science and Applications, NASA Headquarters, is program manager.

COMET HALLEY ACTIVE MONITORING PROGRAM (CHAMP)

Objectives of the CHAMP payload include investigating the dynamical/morphological behavior as well as the chemical structure of Comet Halley. Photographic images and spectra will be obtained through the windows of the orbiter crew cabin, using hand-held 35 mm camera and equipment. A crew member will enclose himself in a camera shroud to eliminate all cabin light interference. Using International Halley Watch standard comet filters, several image-intensified monochromatic exposures will be made. In addition, spectra of the comet will be photographed with the aid of a grating and image intensifier.

Similar observations will be made on the Shuttle flights in January and March in order to study the variations of the comet with time. CHAMP requires no orbiter systems support and is stored in two-thirds of one middeck locker.

The principal investigators for CHAMP are S. Alan Stern, Laboratory for Atmospheric and Space Physics (LASP), University of Colorado-Boulder and Dr. Stephen Mende, Lockheed Palo Alto Research Laboratory. Mission management support is provided by the Engineering Directorate, Johnson Space Center for the Office of Space Science and Applications, NASA Headquarters.

GETAWAY SPECIALS (GAS)

Mission 61-C will be the maiden flight of the GAS bridge, an aluminum structure designed to span the width of the payload bay and accommodate up to 12 GAS canisters. It was developed to reduce the backlog of GAS flight requirements.

The following 13 GAS containers (12 with experiments and one with the Environmental Monitoring Package - EMP) will be on 61-C:

Ultraviolet Experiment (UVX) - This three-canister payload is designed to measure diffuse ultraviolet background radiation. The UVX consists of the following three interconnected 5-ft. GAS canisters:

G-463 (JHU) – This canister contains the Feldman Spectro-photometer from the Johns Hopkins University. It also has a motorized door assembly (MDS) as well as a slit aperture with a field of view of 4 by 0.3 degrees.

G-464 (UCB) – Sponsored by the University of California at Berkeley, this canister contains the Bowyer UV spectrometer, has an MDA, and a slit aperture with a field of view of 4 by 0.1 degrees.

G-462 (GAP) – The third canister (without an MDA) will contain the Goddard Avionics Package, which consists of a tape recorder, battery, and telemetry system and is pressurized with dry nitrogen. G-462 is mounted adjacent to G-463 and is connected to both canisters by electric cables.

G-007 – This canister houses four specific payloads. One of the three student experiments (see Shuttle Student Involvement Program section) onboard will study the solidifications of lead-antimony and aluminum-copper alloys. The second student contribution is a comparative morphological and anatomical study of the primary root system of radish seeds. The third experiment examines the growth of metallic-appearing needle crystals in an aqueous solution of potassium tetracyanoplatinate. The fourth payload is a radio transmission experiment sponsored by the Marshall Amateur Radio Club and consists of a half-wave dipole antenna installed on the canister's top cover plate. Temperature and status information will be broadcast to radio operators around the world. A voice synthesizer Digitalker system will convert the data into English during the three planned transmission cycles of 8 hours each.

G-062 – The following four student experiments from Pennsylvania State University and sponsored by the General Electric Co. make up this payload. The liquid droplet heat radiator experiment will test an alternative method of heat transfer which investigates how moving droplets can radiate heat into space. The second experiment will study the effect of microgravity on the surface tension of a fluid. This will be accomplished by placing a droplet of fluid in the path of a moving piston and photographing the collision so that the terminal velocity can be measured. The third experiment will study the effect of convection on heat flow in a liquid by submersing a heat source in a container of liquid. Thermisters will record resulting temperature fluctuations in any flow patterns. The fuel slosh experiment studies the slosh modes, frequencies, amplitudes, time constants and energy dissipation factors of liquid slosh in spin-stabilized satellites. Behavior of sample liquids in two model tanks will be recorded by a camera and piezoelectric force transducers.

G-310 – The objective of this U.S. Air Force Academy sponsored payload is to measure the dynamics of a vibrating beam in a zero-g environment. During its 71 minutes of operation, the test beam is repeatedly struck, allowed to vibrate freely for five minutes, and then damped for two minutes. Five strain gauges at various points on the beam will record measurings on tape. Measurements of an accelerometer an a thermister located near the beam also will be recorded. Post-mission, on-orbit data will be compared with baselined ground data.

G-332 – This GAS canister contains two contributions from Houston, TX. The Brine Shrimp Artemia experiment from Booker T. Washington High School will determine the behavioral and physiological effects of microgravity on eggs hatched in space. Activation involves injecting the eggs into a temperature-controlled, light-cycled growth chamber and initiating the photographic cycles for documentation.

The High School for Engineering provided the fluid physics experiment which will examine the behavior of fluid physics experiment which will examine the behavior of fluid when heated in microgravity. As the fluid chamber is heated to cause temperature gradients, readings and photographs will be taken at predetermined intervals.

G-470 – In a joint effort by the Goddard Space Flight Center and the United States Department of Agriculture, an investigation will be made concerning the effects of weightlessness on Gypsy Moth eggs and engorged female American dog ticks. The 200-lb, 5-ft. canister will contain the egg masses and engorged ticks individually rolled in monofilament nylon mesh tied to a large sheet of coarse-mesh cotton screen and rolled around a temperature recording device in a humidity controlled atmosphere. Data obtained may lead to new mean f controlling these insect pests.

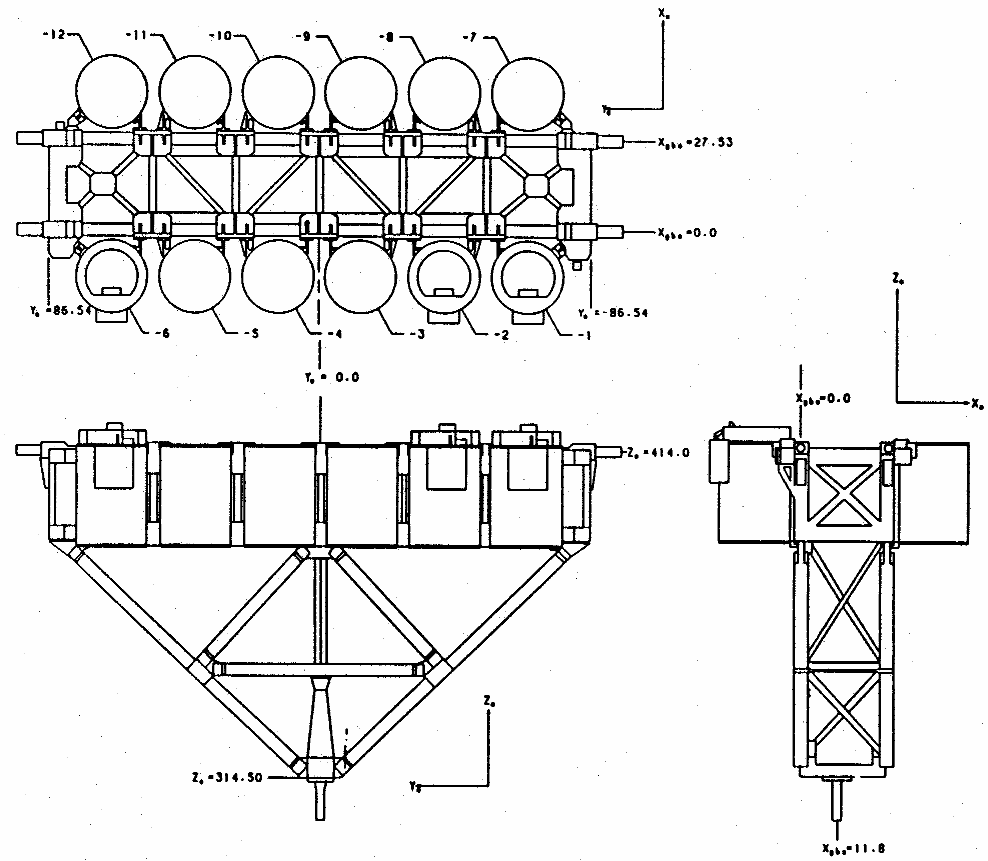
G-446 – The purpose of this experiment is to learn what effect gravity has on particle dispersion of packing material in High Performance Liquid Chromatography (HPLC) analytical columns. Contained in a 2.5-ft., 60-lb canister, the payload consists of an automated HPLC analytical column manufacturing system that will produce HPLC columns in microgravity. Post-landing, the samples will be returned to Alltech Associates, Inc., for analysis.

G-449 – The Laser Laboratory at St. Mary's Hospital in Milwaukee, WI, is the sponsor of this four-part experiment. The BMJ experiment will study the biological effects of neodymium and helium-neon laser light upon desiccated human tissue undergoing cosmic ray bombardment. Medications also will be exposed to laser light and cosmic radiation. LEDAJO is an experiment to determine cosmic radiation effects upon medications and medical/surgical materials using Lexan detectors. BLOTY will analyze contingencies that develop because of zero gravity in blood typing. In earthbound blood typing, gravity is essential to produce clumping. CROLO is designed to evaluate laser optical protective eye-wear materials following exposure to cosmic radiation. Lexan detectors will determine particle tracks and energies.

G-481 – Vertical Horizons contributed this experiment to the flight in order to determine how unprimed canvas, prepared linen canvas, and portions of oil painted canvas react to space travel. A total of 10 samples and a thermograph will be rolled between layers of foam in a 2.5-ft. canister purged with dry air. These samples will be compared with control samples post flight.

G-494 – This payload is co-sponsored by the Canada Centre for Space Science and the National Research Council of Canada. The experiment consists of seven filtered photometers that will measure oxygen, oxide, and continuum emissions in the terrestrial night glow and in the Shuttle night glow. The emissions will be observed through windows beneath the motorized door assembly. Data will be recorded on digital tape.

Environmental Monitoring Package (EMP) – The EMP is contributed by Goddard Space Flight Center and will measure the environment of the GAS Bridge Assembly during launch and landing. Data will be collected by 24 accelerometers, eight strain gauges, three acoustic microphones and 10 thermocouples, all located at various places on the bridge. Cables connect these sensors to the electronics within the EMP canister, where the data is processed and recorded on tape for use post flight.



- 1 G-464 NASA HQ CODE E
- 2 G-463 NASA HQ CODE E
- 3 G-462 NASA HQ CODE E
- 4 G-007 ALABAMA SPACE AND ROCKET CENTER
- 5 G-446 ALL TECH ASSOCIATI
- 6 G-494 NRCC
- 7 EMP GSFC
- 8 G-481 VERTICAL HORIZONS
- 9 G-062 GEN. ELEC./PENN STATE
- 10 G-449 ST. MARY HOSPITAL
- 11 G-332 B. T. WASHINGTON
- 12 G-310 USAF ACADEMY

GAS BRIDGE ASSEMBLY

INITIAL BLOOD STORAGE EXPERIMENT (IBSE)

The objective of the Initial Blood Storage Experiment (IBSE) is to understand better the factors which limit the storage of human blood. The experiment will attempt to isolate factors such as sedimentation that occur under standard blood bank conditions. A comparison will be made of changes in whole blood and blood components which have experienced weightless conditions in orbit, with similar samples stored in otherwise comparable conditions on the ground. The blood samples will be housed in four stainless steel dewars placed in two orbiter middeck lockers. With the exception of weightlessness, the conditions for both the flight samples and the control samples on the ground are intended to be like those in a standard blood bank. Specified temperature levels for the samples will be maintained by thermoelectric coolers.

After landing, the IBSE will be removed from the orbiter within two hours. The samples will be processed in laboratory facilities at the Kennedy Space Center, in preparation for shipment to the investigators' laboratories in Boston for analysis.

The IBSE principal investigator is Dr. Douglas M. Surgenor, President, Center for Blood Research, Boston. Mission management support for the IBSE payload is provided by the Engineering Directorate, Johnson Space Center, for the Office of Space Science and Applications, NASA Headquarters.

INFRARED IMAGING EXPERIMENT (IR-IE)

The objective of the IR-IE is to acquire radiometric pictures/information of selected terrestrial and celestial targets. Contributed by RCA Communications, the IR camera should provide a ground field of view of approximately 27 by 21 n. mi. at an orbital altitude of 160 n. mi. A partial list of targets includes the Aurora, volcanoes, zodiacal light, the moon, and the cities of Honolulu, Houston, Galveston, Miami and San Juan.

Operating in the 2.5 to 3.0 and 3.5 to 4.2 micron bands, the instrument will generate a television signal that is compatible with the existing CCTV video system onboard.

The IR-IE will be mounted on a standard pan/tilt unit in the C position of the payload bay (aft, starboard). Data collection will be made on Flight Days 2 and 4 for approximately one hour each with a crew member stationed at the aft flight deck to operate the camera controls. All data will be recorded on the video tape recorder. Post flight, the IR-IE video tape data will be analyzed by RCA officials.

SHUTTLE STUDENT INVOLVEMENT PROGRAM (SSIP)

The following three SSIP experiments will be on 61-C:

Argon Injection as an Alternative to Honeycombing – Occupying a locker in the middeck, this material processing experiment will examine the ability to produce a light-weight, honey-comb structure superior to Earth-produced structures. The process involves injecting argon bubbles into a molten metal alloy, ceralow, under microgravity conditions. After landing, the package will be returned to Rachel Safman, Germantown, MD, and her sponsor, Fairchild Space Co., Gaithersburg, MD, for post-flight analysis.

Formation of Paper in Microgravity – Daniel J. Hebert of Appleton, WI, and his sponsor, the James River Paper Corp. of Neenah, WI, contributed this experiment to the flight. The objective of the experiment is to study the formation of cellulose fibers in a fiber mat under weightless conditions. Experiment hardware consists of nine individual acrylic cylinders that are filled with the fibers mixed in a slurry solution. The fiber/slurry mixture is forced through a screen by a piston. Fibers are deposited on the screen mat while the slurry is returned to the back side of the piston by a ball valve pipe. Each cylinder will be billed with a different polymer in order to vary fiber arrangements. The package will be stowed in one middeck locker.

Measurement of Auxin Levels and Starch Grains in Plant Roots – The objective of this experiment is to study the geotropism of a corn root growth in microgravity as well as determine if starch trains in the root cap are actually involved with auxin production and transport. Occupying half of a middeck locker, the experiment consists of 18 plastic bags that contain one corn root and one small pouch of fixative. A crew member will be required to open each fixative pouch and knead the fixative into the corn root and then return each bag to the locker. Chia-Lien Wang of Waco, TX , and her sponsor, Baylor University, are credited with this addition to the mission.

ORBITER EXPERIMENTS PROGRAM

Significant modifications have been made on orbiter Columbia in order to accommodate the following three research experiments developed by the Langley Research Center as part of the Orbiter Experiments Program. These experiments are designed to measure orbiter aerodynamic and aerothermodynamic characteristics during reentry.

Shuttle Infrared Leeside Temperature Sensing (SILTS) – The SILTS package will replace the fintip atop the vertical tail an consists of a cylindrical housing approximately 20 inches in diameter and is capped at the leading edge by a spherical dome. Mounted inside the dome is an infrared camera which will obtain images of the upper (leeside) surfaces of Columbia's port wing and fuselage during reentry. The images will provide detailed temperature maps at the surface of the leeside thermal protection materials and indicate the amount of aerodynamic heating of the surfaces in flight. SILTS will be activated by Columbia's computer at about 400,000 ft. above Earth and will terminate after passing through the period of significant aerodynamic heating.

Shuttle Entry Air Data System (SEADS) – Housed in a completely new nosecap, SEADS will measure local surface air pressure through 14 penetration assemblies distributed about the nosecap's surface. Each assembly contains a small hole through which oncoming air passes. This experiment will allow precise post-flight determination of the orbiter's attitude relative to the oncoming airstream and the density of the atmosphere through which the vehicle has flown. SEADS will be activated at an altitude of about 56 miles through landing.

Shuttle Upper Atmosphere Mass Spectrometer (SUMS) – Located inside the nose wheel well, SUMS will sample air at Columbia's surface through a small hole to measure the number of molecules of various gas species.

This data, combined with vehicle motion information will allow determination of orbiter aerodynamic characteristics at altitudes where the atmosphere is extremely thin. SUMS was originally developed for the Viking spacecraft that landed on Mars in 1976 and has been modified to operate in the orbiter reentry flight atmosphere.

REP. BILL NELSON'S ACTIVITIES

U.S. Rep. Bill Nelson (D-FL), will operate the Handheld Protein Crystal Growth (HPCG) experiment on mission 61-C. The experiment will continue the development and demonstration of techniques that use the weightless environment of space flight to produce protein crystals of sufficient size and quality to allow analysis of their nature and structure. Gravitational effects such as sedimentation have prevented the production of many such crystals in ground-based laboratories. The HPCG operations involve the use of four pieces of equipment to attempt the growth of 60 different types of crystals; 12 by means of dialysis and 48 via the vapor diffusion method.

Additionally, Nelson will participate in 10 Detailed Supplementary Objective (DSO) studies for NASA's Space Biomedical Research Institute. These will include studies of the physiological adaptation of the sensory-motor and cardiovascular systems as well as studies of fluid shifts, electrolyte changes and pharmacokinetics. The results from these studies will provide additional insight into the effects of microgravity on the body's systems and will be used in the development of countermeasures against the adverse aspects of physiologic adaptation.

Nelson will also assist mission specialist George Nelson in monitoring the operations of the Initial Blood Storage Experiment (IBSE).

STS-61C CREWMEMBERS

S85-43570 – The official portrait of the STS-61C crewmembers include in the front row (l.-r.): Robert J. Cenker, payload specialist; Charles F. Bolden, pilot; Robert L. "Hoot" Gibson, mission commander; and Franklin R. Chang-Diaz, mission specialist. Back row (l.-r.) are: U.S. Congressman Bill Nelson, payload specialist; Steven A. Hawley, mission specialist; and George D. Nelson, mission specialist.

BIOGRAPHICAL DATA

ROBERT L. GIBSON, Cdr., USN, is mission commander. Born Oct. 30, 1946, in Cooperstown, NY, Gibson became an astronaut in 1978.

He was graduated from California Polytechnic State University with a B.S. degree in aeronautical engineering. He entered active duty with the Navy in 1969 and completed advanced flight training at the Naval Air Station, Kingsville, TX. While assigned to Fighter Squadrons 111 and 1, he flew 56 combat missions in Southeast Asia.

Gibson has flown more than 3,000 hours in 35 types of civil and military aircraft and holds commercial pilot, multi-engine and instrument ratings. He has complet6ed over 300 carrier landings.

Gibson was pilot on Space Shuttle Mission 41-B in 1984. He has logged 191 hours in space.

CHARLES F. BOLDEN JR., Lt. Col., USMC, is 61-C pilot. He was born Aug. 19, 1946, in Columbia, SC. He became a NASA astronaut in May 1980.

Bolden received a B.S. degree in electrical science from the U.S. Naval Academy and an M.S. in systems management from the University of Southern California. After flight training he flew more than 100 sorties into North and South Vietnam, Laos and Cambodia. He has more than 3,400 hours flying time – 3,100 in jet aircraft.

GEORGE D. NELSON, Ph.D., is one of three mission specialists. Born July 13, 1950, in Charles City, IA, he became a NASA astronaut in 1978.

Nelson received a B.S. degree in physics from Harvey Mudd College and an M.S. and Ph.D. in astronomy from the University of Washington. He performed various astronomical research projects at Sunspot, NM; Utrecht, the Netherlands; and Gottingen, West Germany. He was a post-doctoral research associate at the Joint Institute for Laboratory Astrophysics in Boulder, CO.

Nelson was a mission specialists on STS 41-C in April 1984. During that flight, the crew deployed the Long Duration Exposure Facility, retrieved and repaired the ailing Solar Maximum Satellite, then placed it back in orbit with the robot arm. He has logged 168 hours in space, including nine hours of EVA flight time.

STEVEN A. HAWLEY, Ph.D., mission specialist, was born Dec. 12, 1951, in Ottawa KS. He became a NASA astronaut in 1978.

Hawley received B.A. degrees in physics and astronomy from the University of Kansas and a Ph.D. in astronomy and astrophysics from the University of California. He was a post-doctoral research associates at Cerro Tololo Inter-American Observatory in La Serena, Chile.

Hawley was a mission specialist on STS 41-D in 1984, completing 96 Earth orbits and logging 144 hours in space. He served as simulator pilot for software checkout at the Shuttle Avionics Integration Laboratory before STS-1 and as a member of the astronaut support crews for the second, third and fourth Shuttle flights.

BIOGRAPHICAL DATA

FRANKLIN R. CHANG-DIAZ, Ph.D., mission specialist, was born April 5, 1950, in San Jose, Costa Rica. He became a NASA astronaut in 1980.

Chang-Diaz was gradated from Colegio De La Salle in San Jose, Costa Rica in 1967. He received a B.S. degree in mechanical engineering from the University of Connecticut and a Ph.D. in applied plasma physics from the Massachusetts Institute of Technology in 1977.

In addition to this mainline fields of science and engineering, Chang-Diaz worked 2-1/2 years as house manager in an experimental community residence for deinstitutionalizing chronic mental patients and was heavily involved as instructor/advisor with a rehabilitation program for Hispanic drug abusers in Massachusetts.

ROBERT J. CENKER is one of two payload specialists on 61-C. Born in Uniontown, PA, he graduated from St. Fidelis College and Seminary, Herman, PA. He received B.S. and M.S. degrees in aerospace engineering from Pennsylvania State University and an M.S. degree in electrical engineering from Rutgers University.

Cenker is a senior staff engineer at RCA Astro-electronics Division, East Windsor, NJ. Much of his career has been devoted to design and development of communications satellites including RA Satcoms 1 and 2, the GTE Spacenet satellites and the advanced series 4,000 spacecraft.

The first of these satellites, designated RCA Satcom Ku-Band-1 will be deployed during 61-C and Cenker will perform experiments with an infrared camera developed at RCA's David Sarnoff Research Center, Princeton, NJ.

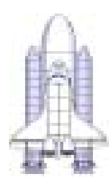
C. WILLIAM (BILL) NELSON, Congressman, 11th District of Florida, is a payload specialist on 61-C. He is a fifth generation Floridian whose family came to Florida in 1820. He is chairman of the Space Science and Applications Subcommittee and a member of the Banking, Finance and Urban Affairs Committee.

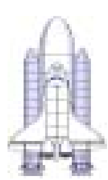
Nelson received a bachelor of arts degree from Yale University and a degree in law from the University of Virginia. A U.S. Army captain, he served in the reserves from 1965 to 1971 and was on active duty from 1968 to 1970.

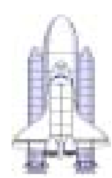
In 1972, he was elected to the Florida legislature and served six years until his election to Congress. He was honored by the Florida Jaycees as one of the five outstanding young men of Florida, and was nominated as the most valuable member of the Florida House of Representatives.

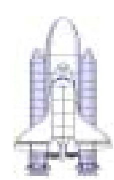
SHUTTLE FLIGHTS AS OF DECEMBER 1985

23 TOTAL FLIGHTS OF THE SHUTTLE SYSTEM









	STS-61A 10/30/85 - 11/06/85		
	STS-51F 07/29/85 - 08/06/85		
	STS-51B 04/29/85 - 05/06/85		
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-5 11/11/82 - 11/16/82	STS-41C 04/06/84 - 04/13/84	STS-51G 06/17/85 - 06/24/85	
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-3 03/22/82 - 03/30/82	STS-8 08/30/83 - 09/05/83	STS-51C 01/24/85 - 01/27/85	
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
OV-102 Columbia (6 flights)	**OV-099 Challenger (9 flights)**	**OV-103 Discovery (6 flights)**	**OV-104 Atlantis (2 flights)**