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NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
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For Release:

Pam Alloway
Release No. 91-1

January 4, 1991
3 P.M. CST

NASA AWARDS SPACE SHUTTLE ORBITER DRAG CHUTE CONTRACT MOD

NASA has modified its OV-105 Space Shuttle production contract with Rockwell International Corporation's Space Division, to include the design, fabrication and installation of an orbiter drag chute system.

The total price of the modification is $33.3 million. The total OV-105 production contract including the drag chute modification and support by all other shuttle-related contractors is $1.8 billion. The drag chute system work will be performed at Rockwell's facilities in Downey, Calif., and Palmdale, Calif.

The drag chute system is part of NASA's continuing program to upgrade the Shuttle's operational capabilities and flight safety. The system will improve the landing capabilities of space shuttles.

The drag chutes are specially designed parachutes deployed from the Shuttle's aft end to supplement the Shuttle's braking system and help slow the vehicle's speed after the orbiter has landed on a runway. Drag chutes on OV-105, Endeavour, and other Shuttles will permit them to land in shorter distances and also help reduce the brake wear. Endeavour is expected to make its first flight in early 1992.

The orbiter drag chute program is managed by Johnson Space Center. Also participating are Rockwell International Corporation's Space Division which designed the orbiter drag chute system; Irvin Industries of Santa Ana, Calif., which designed the parachute; and the Boeing Airplane Co., Seattle, Wash., which designed the modifications to the B-52 test aircraft.

- end -

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January 4, 1991
3 P.M. CST

NASA JOHNSON SPACE CENTER EXTENDS COMPUTER SUPPORT CONTRACT

NASA's Johnson Space Center, Houston, has extended a contract with Computer Sciences Corp., Houston, to provide the center with computer support through Dec. 31, 1991.

The amount of the 1-year extension is $37.4 million, bringing the total estimated contract value to $230.8 million. The basic contract term began Jan. 1, 1988.

The work will be performed at and nearby JSC. The contract requires Computer Sciences Corp. to provide maintenance, operations and systems engineering of the Johnson's Automatic Data Processing (ADP) facilities, networks and work stations. The contractor also will provide help desk services to the users of the ADP equipment.

- end -

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National Aeronautics and
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For Release:

January 8, 1991

Barbara Schwartz
Release No. 91-3

ASTRONAUT FISHER TO LEAVE NASA

Astronaut William F. Fisher, M.D., will resign from NASA effective Jan. 31, 1991. He will return to the full-time practice of medicine as an emergency specialist at Humana Hospital-Clear Lake, Houston, Texas.

Selected by NASA in 1980, Dr. Fisher was a mission specialist on the 20th Space Shuttle mission in August 1985. During this flight the crew deployed three communication satellites, then performed a successful on-orbit rendezvous with the ailing 15,400 lb SYNCOM IV-3 satellite. Fisher, along with Astronaut James van Hoften, performed two EVA's (Extravehicular Activity) to successfully repair the satellite. The first of these spacewalks was the longest in the history of spaceflight.

In his 10 years with NASA, Dr. Fisher's work has included high altitude research on the WB57 aircraft, astronaut office representative for Extravehicular Mobility Unit or spacesuit and EVA procedures and development, support crewman for Shuttle mission STS-8, capsule communicator for STS-8 and STS-9, Chief of Astronaut Public Appearances and the Manned Maneuvering Unit jet-powered backpack development team. His most recent assignment was to co-chair, with NASA robotics expert Charles R. Price, the External Maintenance Task Team for Space Station Freedom.

In his letter of resignation, Dr. Fisher stated, "It has been both an honor and a privilege to have served as a NASA astronaut over the past 10 years. I know of no higher purpose, and have met no finer people. I wish you every success in the future."

-end-

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National Aeronautics and
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January 9, 1991

Pam Alloway
Release No. 91-4

SPACE SHUTTLE ORBITER PRODUCTION CONTRACT MODIFIED

NASA has modified its Space Shuttle orbiter production contract with Rockwell International Corp., Space Systems Div., Downey, Calif., to include modifications to accommodate long duration space flights on board the Space Shuttle Columbia.

The negotiated amount of the modification is $93.5 million. The current negotiated value of the Rockwell contract is $5.6 billion and is a cost-plus-fixed-fee/award-fee contract.

Work on Columbia's modifications will take place at Rockwell's Downey and Palmdale, Calif., facilities, and various vendors' facilities. The modifications are to be completed by April 1992 according to the contract terms.

Under the terms of the modification, Rockwell is required to modify the Columbia orbiter to extend the mission duration of flights from 10 days to 16 days, plus a 2-day contingency. The orbiter's life support systems are dependent on mission duration and the number of crew members.

Environmental control and life support system modifications required to accommodate longer missions include a regenerative carbon dioxide removal system, improved waste collection provisions and added gaseous nitrogen and crew stowage provisions.

Additional power to extend the mission duration to 16 days is furnished by an Extended Duration Orbiter cryogenic pallet which holds spherical tanks of liquid hydrogen and liquid oxygen and is installed in the orbiter payload bay. The cryogenic pallet is being developed by Rockwell as a commercial venture.

NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
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For Release:

January 14, 1991

Barbara Schwartz
Release No. 91-5

NOTE TO EDITORS: SHUTTLE MISSION STS-39 PREFLIGHT BRIEFINGS SCHEDULED

A series of preflight briefings for mission STS-39, the first unclassified Department of Defense Space Shuttle flight, will be held Jan. 23 and 24, 1991, at the Johnson Space Center, Houston, Building 2, Room 135.

Lead Flight Director Ronald D. Dittemore will begin the briefings on the 23rd at 8:30 a.m. CST with a mission overview. DOD payload briefings will begin at 10 a.m. CST. The STS-39 astronauts will present information on their individual flight assignments at 1 p.m. CST.

On Jan. 24, beginning at 1 p.m. CST, the astronaut crew will be available for round robin interviews. Media representatives wishing to participate in the interviews should notify the JSC newsroom by the afternoon of Jan. 17.

Only the briefings will be carried on NASA Select television. Two-way audio for questions and answers will be available at NASA Headquarters, Washington, D.C., and other NASA centers.

NASA Select programming is carried on Satcom F2R, transponder 13, located at 72 degrees west longitude.

- end -

NASA News

National Aeronautics and
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For Release:

Kari Fluegel
Release No. 91-6

January 10, 1991
Noon CST

MISHAP SIM TO TEST EMERGENCY PREPAREDNESS

The Johnson Space Center, the City of Houston and the Air National Guard will put their collective emergency response preparedness to the test Jan. 17 in a KC-135 mishap simulation at Ellington Field.

The simulation will focus on a "crippled" KC-135 returning to Ellington with passengers and crewmembers and 25,000 pounds of jet fuel. Simulation participants will secure the area and plane, and rescue the injured passengers.

The KC-135 used for the simulation in reality will be returning from an actual flight with passengers and crew members being used as simulation participants. The test will begin at about 11:30 a.m. when the KC-135 rolls safely into position on the NASA ramp adjacent to Hangar 990.

JSC participants will represent aviation safety and operations, safety, security, public affairs and medical operations. The City of Houston will support the exercise with the Ellington Fire and Crash and Rescue teams, security, air traffic control and ambulance services. The Air National Guard will assist in safing the area. Coordinators for the exercise are Dr. Phil Stepaniak of JSC's Medical Operations Branch and John Starnes, ground safety officer in the Aviation Safety Office.

Simulations are done periodically to evaluate the network put in place to respond to such emergencies.

"The main purpose of the JSC mishap simulation is to bring all the essential personnel together to gain a better understanding of each person's role in the event of an actual mishap and to be familiar with JSC mishap plans, policies and procedures," Stepaniak said.

-end-

NOTE TO EDITORS: To keep the simulation as authentic as possible, a complete scenario of the test will not be available until test day. Members of the news media wishing to observe the simulation should contact Kari Fluegel at the Johnson Space Center Newsroom. In keeping with the tone of the simulation, the area will be sealed once the test begins. All media representatives should plan to be in place at Ellington Field no later than 11 a.m.

NASA News

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For Release:

Kelly Humphries
Release No. 91-007

January 17, 1991

SOME JSC FACILITIES TEMPORARILY CLOSED TO PUBLIC

Johnson Space Center will remain open to the public in spite of the recent outbreak of hostilities in the Persian Gulf area, but some facilities will be temporarily closed to the public.

Beginning today, visitors will be restricted to the Bldg. 2 Visitor Center, the Bldg. 3 cafeteria and Rocket Park.

Bldg. 9A-B, which houses space station and space shuttle mock-ups; Bldg. 30, the Mission Control Center; and Bldg. 31A, which houses the Lunar Sample Bldg., are closed to the public.

Weekday visitors will be required to park their vehicles in the Rocket Park parking lot. On weekends, parking will be permitted in the lot just south of the Visitor Center.

Visitors will not be permitted to drive or walk to other buildings.

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NASA News
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For Release:

Jeffrey Carr
Release No. 91-8

January 22, 1991

FLIGHT CONTROL OF STS-39

Flight control for STS-39, the thirty-ninth voyage of the Space Shuttle, the twelfth flight of Discovery, will follow the procedures and traditions common to U.S. manned space flights since the Mission Control Center was first used in 1965.

Responsibility for conduct of the mission will revert to the Mission Control Center (MCC) in Houston once Discovery's two solid rocket boosters ignite. Mission support will begin in the MCC about five hours prior to launch and will continue around the clock through landing and post-landing activities.

STS-39 will be the eighth dedicated Department of Defense (DOD) mission of the Shuttle program, the first to be completely unclassified. Once Discovery has been cleared for orbital operations, payload and science activities will be coordinated by the DOD Mission Director and payload controllers from a Payload Operations Control Center (POCC) in the MCC. DOD support operators will also be located at Vandenberg Air Force Base in California. Payload operations will be conducted continuously througout the orbit phase.

During some payload operations, use of the primary A/G voice channel will be shared between orbiter and payload control teams. Orbiter flight operations will have priority, with the spacecraft communicator (CAPCOM) in the MCC using the call sign "Houston," and the orbiter hailed as "Discovery." Direct interaction between crew and AFP-675 payload controllers will be conducted with a DOD Crew Interface Coordinator (CIC) using the call sign "POCC."

The mission will be conducted from Flight Control Room One (FCR-1) on the second floor of the MCC located in Bldg. 30 at Johnson Space Center. The teams of flight controllers will alternate shifts in the control center and in nearby analysis and support facilities.

-more-

The handover between each team takes about an hour and allows each flight controller to brief his or her oncoming colleague on the course of events over the previous two shifts. Change-of-shift press conferences with offgoing flight directors generally take place 30 minutes to an hour after the shift handovers have been completed.

The four flight control teams for this mission will be referred to as the Ascent/Entry, Orbit 1, Orbit 2, and Orbit 3 teams. The ascent and entry phases will be conducted by Flight Director Alan L. (Lee) Briscoe. The Orbit 1 team will be led by Flight Director Robert E. (Bob) Castle, Jr. The Orbit 2 team, will be headed by STS-39 Lead Flight Director Ronald D. (Ron) Dittemore. The Orbit 3 team will be directed by Flight Director Robert M. (Rob) Kelso.

MCC POSITIONS AND CALL SIGNS FOR STS-39

The flight control positions in the MCC, and their responsibilities, are:

Flight Director (FLIGHT)

Has overall responsibility for the conduct of the mission.

Spacecraft Communicator (CAPCOM)

By tradition an astronaut; responsible for all voice contact with the flight crew.

Flight Activities Officer (FAO)

Responsible for procedures and crew timelines; provides expertise on flight documentation and checklists; prepares messages and maintains all teleprinter and/or Text and Graphics System traffic to the vehicle.

Integrated Communications Officer (INCO)

Responsible for all Orbiter data, voice and video communications systems; monitors the telemetry link between the vehicle and the ground; oversees the uplink command and control processes.

Flight Dynamics Officer (FDO)

Responsible for monitoring vehicle performance during the powered flight phase and assessing abort modes; calculating orbital maneuvers and resulting trajectories; and monitoring vehicle flight profile and energy levels during reentry.

Guidance Procedures Officer (GPO)

Responsible for the onboard navigational software and for maintenance of the Orbiter's navigational state, known as the state vector.

Trajectory Officer (TRAJECTORY)

Also known as "TRAJ," this operator aids the FDO during dynamic flight phases and is responsible for maintaining the trajectory processors in the MCC and for trajectory inputs made to the Mission Operations Computer.

Environmental Engineer & Consumables Manager (EECOM)

Responsible for all life support systems, cabin pressure, thermal control and supply and waste water management; manages consumables such as oxygen and hydrogen.

Electrical Generation and Illumination Officer (EGIL)

Responsible for power management, fuel cell operation, vehicle lighting and the master caution and warning system.

Payloads Officer (PAYLOADS)

Coordinates all payload activities; serves as principal interface with remote payload operations facilities.

Data Processing Systems Engineer (DPS)

Responsible for all onboard mass memory and data processing hardware; monitors primary and backup flight software systems; manages operating routines and multi-computer configurations.

Propulsion Engineer (PROP)

Manages the reaction control and orbital maneuvering thrusters during all phases of flight; monitors fuel usage and storage tank status; calculates optimal sequences for thruster firings.

Rendezvous Guidance and Procedures Officer (RENDEZVOUS)

Monitors onboard navigation of the Orbiter during rendezvous operations, and advises the control team on the status and effect of rendezvous events.

Booster Systems Engineer (BOOSTER)

Monitors main engine and solid rocket booster performance during ascent phase.

Guidance, Navigation & Control Systems Engineer (GNC)

Responsible for all inertial navigational systems hardware such as star trackers, radar altimeters and the inertial measurement units; monitors radio navigation and digital autopilot hardware systems.

Ground Controller (GC)

Coordinates operation of ground stations and other elements of worldwide space tracking and data network; responsible for MCC computer support and displays.

Maintenance, Mechanical, Arm & Crew Systems (MMACS)

Formerly known as RMU; responsible for remote manipulator system; monitors auxilliary power units and hydraulic systems; manages payload bay and vent door operations.

Payload Data & Retrieval System (PDRS)

A specialist responsible for monitoring and coordinating the operation of the remote manipulator system.

Flight Surgeon (SURGEON)

Monitors health of flight crew; provides procedures and guidance on all health-related matters.

Public Affairs Officer (PAO)

Provides real-time explanation of mission events during all phases of flight.

# # #

STS-39 FLIGHT CONTROL TEAM STAFFING

Position	Ascent/Entry	Orbit 1	Orbit 2	Orbit 3
FLIGHT	Lee Briscoe	Bob Castle	Ron Dittemore	Rob Kelso
CAPCOM	Brian Duffy (A) Ken Bowersox (E)	Brian Duffy	Kathy Thornton	Marsha Ivins
FAO	Pete Hasbrook	Pete Hasbrook	Neil Woodbury	Gail Schneider
INCO	Jay Conner	Jay Conner	Ed Walters	Chris Counts
FDO	Brian Perry (A) Doug Rask (E)	Mark Haynes	Phil Burley	Tim Brown
TRAJ	Matt Abbott (A) Keith Fletcher (E)	Bill Britz	Lisa Shore	Dick Tice
GPO	John Turner (A) Ken Patterson (E)	/////	/////	/////
EECOM	Leonard Riche	Leonard Riche	Pete Cerna	David Herbek
EGIL	Ray Miessler	Ray Miessler	Charles Dingell	Mark Fugitt
PAYLOADS	Mark Kirasich	Mark Kirasich	Sharon Conover	Jean Costlow
DPS	Terry Keeler	Terry Keeler	Gary Sham	James Hill
PROP	Keith Chappell	Keith Chappell	Lonnie Schmitt	Matthew Barry
RENDEZVOUS	/////	Mark Thomas	John Malarkey	Chris Meyer

-more-

STS-39 FLIGHT CONTROL TEAM STAFFING
(Continued)

Position	Ascent/Entry	Orbit 1	Orbit 2	Orbit 3
PDRS	Don Palleson	Don Palleson	Gary Pollock	David Moyer
BOOSTER	Mark Jenkins (A) Franklin Markle(E)	/////	/////	/////
GNC	John Shannon	Stanley Schaeffer	Heather Mitchell	Charles Alford
GC	Per Barsten Bob Reynolds	Ed Klein John Wells	Mike Marsh Al Davis	Henry Allen Larry Foy
MMACS	Kevin McCluney	Kevin McCluney	William Anderson	James Medford
SURGEON	John Schultz	Denise Baisden	Richard Jennings	John Schultz
PAO	Jeff Carr (A) Kyle Herring (E)	Kyle Herring	Kari Fluegel	James Hartsfield

(A) = Ascent; (E) = Entry

# # #

NASA News

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058
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For Release:

James Hartsfield
Release No. 91-9

January 31, 1991

CHIEF ASTRONAUT DESCRIBES FLYING THE SPACE SHUTTLE

It is the dawn of another long, hot Florida summer day at the Kennedy Space Center. For a place filled with high-tech, heavy industry, the site is eerily quiet, minus even a tick from the digital clock, counting seconds in quartz-timed, 20th-century silence.

In contrast to the flat swamp, in contrast to the gulls that circle as the sun boils from the Atlantic, the space shuttle is graceless, ungainly and out of its element.

One can see it from all angles.

From one view, it is a machine, polished, processed and ready. In fact, it is a composite of hundreds of noisy small and large machines and turbines, metals, bolts and seals and washers and plumbing.

From another side, it is the fruit of a thousand careers, jutting in white, black and orange from a concrete pad. In the carbon-carbon tip of the nose are the best and most innovative years of far more than a hundred lives; in the curve of the wings are more years and more lives spent calculating, drawing, designing, testing, and designing again.

To another set of eyes, it is a shell, a lifeguard that will protect its inhabitants from the hostilities it must face to spend just a few days as a world unto itself and return home. The machines, materials and careers that compose the spacecraft are a barrier between the constant, often torturous change it will face outside and the safe haven it must maintain within.

But for all these angles the world can see, only one person at a time can see this machine truly do its job. The left-hand seat is a single seat, and only an individual can know how it flies, or what it looks like, or what it feels like and sounds like and is like.

He is at the controls and in command, and by the time he takes his seat, he is engrossed in the complexity of the machine and the task it will perform. Dan Brandenstein, chief of the Astronaut Office, has taken that seat for two flights, and ridden next to it once. Along with the burden of responsibility a commander carries on board, he carries another when he returns: to describe his journey to the thousands that made it happen. And all they can do is ask.

"When you've had the opportunity to work with the shuttle and fly it, you get a real appreciation for the total team," Brandenstein says. "You really see how broad a scope of folks are involved in it and just how complex it is. And then you see it operate as well as it does.

"I really don't think people understand the versatility of the shuttle. I don't think they understand what it can do and really how complicated it is. As a crew member, as a commander, you become more familiar with it. With each flight, you become more familiar with it. But it's just that the more and the better you know it, the more you understand just how elaborate it really is."

When the silent clock strikes zero, more than 250 NASA television and film cameras are trained on the shuttle. Commercial television cameras line platforms three miles away, and the scenes on which they focus are transmitted to every major American network. Still cameras are planted remotely in the swamps around the launch pad; even more cameras click in a press grandstand. And no one counts those that line the roads for 10 and 20 miles around.

At ignition, the solid rockets go from zero to 44 million horsepower in a split second. The main engines produce a power equal to that generated by 23 Hoover Dams.

But all the eyes that study it as a spectacle, both electronic and human, can't see it from the perspective of that single, front left seat.

"If you aren't keyed up, when the boosters light, you ought to get keyed up then. For a certain amount of time, from liftoff through the roll program, you feel you don't have much control to fall back on. The roll program would be a very difficult maneuver to fly manually. Beyond that, we practice flying ascents manually in the simulator, and I feel very confident that if you had to, you could fly it. But the roll program is a very coordinated maneuver. In the simulator, you can fly it, but you can't fly it very well and you can't always fly it.

"You know, I've flown three times on the shuttle, but I've probably looked out the window for only two or three glances on ascent. You are really focused on making sure the vehicle is operating properly. You're cycling through the various displays and you're monitoring trajectory very closely to be sure it's doing what it's supposed to be doing. In that dynamic a region, if it starts to do something wrong, you can't be hesitant. You know what the limits are and when you are going to have to take over manually if something happens."

Eighty NASA cameras still focus on the shuttle at 150,000 feet, two minutes and 10 seconds after launch, when the solid rockets burn out. From the ground, they appear to fall away like arrows at the height of their flight, with a slow grace that camoflauges the explosive charges that push them away. The spacecraft is moving more than four times the speed of sound.

"Before my first shuttle flight, the highest altitude I'd been to was probably a little over 50,000 feet.

"When the solids go, you feel a dip. It feels like you're falling for just a second. It doesn't really do anything like that, but it feels that way. After SRB sep is past, it gets so smooth. I always refer to it like a sewing machine. It just kind of purrs.

"My first glance out the windows on a flight was right after the roll program. You look out then to check for debris going by the windows. The sky was still blue. The second glance after that, there was a little bit of blue, but the sky was mostly black."

For six and a half minutes after the solids have expired, the main engines continue to burn, pulling fuel from the external tank at a rate that would drain an average swimming pool in less than nine seconds. To those watching, it is simply streaking toward space, continually climbing, constantly accelerating and slowly disappearing. But to those flying, it is passing through boundary after boundary, climbing a set of safety-net stairs to orbit.

"You are always busy monitoring systems. You give the middeck folks a slight play by play of what's happening now, what's about to happen, to keep them informed. Your concentration on trying to keep track of options does decrease some, though it is more like it shifts. When you pass the negative return call, you don't have to worry about a return-to-launch-site abort. That's one less thing you have to worry about, so you kind of flush that. But you still have a variety of abort boundaries to go through.

"Then, when you get the press-to-main engine cutoff (MECO) call, well, your transatlantic aborts are gone, so you kind of relax on that. But you still have more things ahead.

"We're comfortable with the whole system as we have it now. As long as you can override something that's automated if it isn't doing the right thing, and as long as you can do that before it puts you in a situation that you can't recover from, then automating things is better.

"Anytime that you can have more capability by doing it automatically, that's the thing to do. Given enough computer power and enough sensors, you can automate a lot of things. But anything that happens has to fall within something that you've programmed. You gain by having a man in the loop in a lot of areas, areas where there are so many variables, because he has the ability to take over if something happens that falls out of what the computers can handle. Humans are creative. They're intuitive and can make decisions. You have to take some trade-offs."

When the main engines cut off, the shuttle is about 70 miles high and traveling around 17,400 miles per hour. But the sensations in the front left seat say it may as well be sitting still.

"What's really strange is that when the engines cut off, your arms just float up. It doesn't feel like you stopped. The G's build up the most right before MECO and you're being pushed back, but you aren't thrown forward in your straps when the engines shut down. The acceleration that pushed you in the seat is gone, and you're just floating."

Energy, though it can't be touched or held in a hand, is as real a part of the universe as a nut, a bolt or a chair. It exists, in one form or another, before it is used and after it is used. Going into orbit is a ballet of energy. The 44 million horsepower per second put out by the solid rockets are still within the shuttle. The 23 Hoover Dams per second of the main engines have been imparted to the spacecraft. All that remains to put the shuttle in orbit now is a slight boost, an adjustment, a baby step in comparison to a sprinted marathon, without which the spacecraft would descend as quickly as it rose. The orbital maneuvering system engines are a fine-tuning mechanism, easing the shuttle into a free-fall around Earth, too fast to come down, too slow to go higher, with a gentle push rarely longer than a couple of minutes.

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"Relative to the sensations of ascent, the OMS burn is not much. But it is very noticeable. Once you've been in zero-g for a while, any burn is very noticeable. You're more sensitive. The burn is a bit of a jolt when it starts, and it's just a smooth, gentle acceleration after that. You don't really see yourself get any higher. It is so gradual; you do a burn on one side of the Earth and you don't really see that you're any higher until you're half an orbit away.

"The ground sends information for the burn up to you. The orbit you want is entered into the computer, and it calculates when to do the burn and how long the burn should be. Then you execute the burn, monitor the engines and monitor the trajectory data as the burn continues.

"You don't relax afterward, because then you're into post-insertion. You're configuring for on-orbit operations. You're opening the payload bay doors, you're stowing the seats and getting out of your suits. You're adjusting all the systems for orbit. It's a very busy time and it normally sets the tone for the mission. You want to get through that and stay ahead of the timeline, because as soon as post-insertion is done, then you start getting into the meat of the mission. You don't want to get behind or get caught short.

"It isn't really until the pre-sleep period on the first day when you can really kind of relax and say, 'We're all caught up; We got today done.' Then you can spend more time looking out the window, and you can eat a slow meal. In fact, for lunch on the first day, we usually just carry a bag of sandwiches we can eat on the run."

Brandenstein's first flight, STS-8, launched at night. The shuttle reached orbit in darkness, and created its own new day within a few minutes.

"We launched at night, we crossed the Atlantic at night, and, just as we got to Africa, we saw the first sunrise. Of all three flights, seeing that first sunrise is something that's most memorable to this day. In your training, you get briefed on what things are going to be like: 'ascent is going to be like this.' But no one ever said how phenomenal those sunrises were. And it was so gorgeous, it just took my mind away.

"Sunsets and sunrises happen very fast. At sunrise, you see a sliver of sky turn blue, and then you get this tremendous spectra of color all along the horizon. The colors are just so vivid and so bright that it is really amazing."

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To the Earth-bound, the shuttle in orbit is at best a twinkle crossing from horizon to horizon at dawn or dusk, and it is seen then only if conditions, location and timing fall correctly. The strings that bind the ship to Earth are invisible: the gravity that keeps it circling; the signals that bounce off other satellites to a desert dish antenna and become hundreds of displays and a few voices; a television picture that falls from an object unseen in a clear, blue sky. They would appear tenuous.

"Through your training, you develop this teamwork. Mission Control is there and is another part of the team. You're part of the team. You don't ever feel alone. I have never felt anything like that on orbit. But you don't feel like they're right next door to you, or like they are always looking over your shoulder, either.

"You have to have what we somtimes refer to in the flying business as 'situational awareness.' You have to know what's going on all around you. You have to have a big picture of all the systems on board. But, then again, by the time we fly, we've been trained by so many experts that we also have a very intimate knowledge of each particular system.

"You have to be able to look at the shuttle in both ways: an objective view of the whole and a narrow, very focused view of a small part. You move back and forth as the situation dictates. When things are going normally, you see the whole. And when you're working a specific problem, you home in on the thing at hand. Once you resolve it, you step back to the whole picture. Still, in general, you'll never know everything.

"I sleep on the flight deck. If something happens during the night, you're right there ready to respond. I sleep in the seat so the rest of the crew can sleep downstairs. If there is an alarm, the controls are right there. You can get to it quickly and not disturb the whole crew, especially if it's something that's not very significant.

"I sleep well on orbit, but I don't think I sleep as soundly as I do back home. I believe it's mainly because I don't want to get too sound asleep just in case there is an alarm or something.

"Day-to-day, when you are doing experiments, eating dinner, or doing housekeeping chores, you let the caution and warning system do its job. You don't monitor things very much. But when you have a spare moment, you go and cycle through the displays."

Flight in orbit is not flight, although it is called that for lack of a better word. Movements of the shuttle in space are adjustments made to a perpetually falling object through the use of 38 primary jets, six small jets or the two large OMS engines. The wings are simply waiting. Due to the unnatural feel of orbital mechanics, flight is now a precise calculation of cause and effect more than it is a human feel for what will occur and why. The idea of any movement at all is relative to where you are looking.

"You don't have a sensation of speed such as driving fast down the road, because poles aren't whizzing past you, you aren't hearing the rumble of wheels on the ground. It's not even like flying an airplane at low altitude, where you see the terrain zipping past, you feel the turbulence and you hear the wind noise. You're in a silent environment other than the cockpit noise, and the only sensation you have is when you look out the windows and see the ground tracking below you. But to see continents come and go, to take on the order of 10 minutes to cross the United States, it's obvious you're really humming. But it's a different sensation of speed. You don't have the acceleration. It's just zero gravity, floating at almost 18,000 miles an hour.

"We did some preparatory burns the day before we caught up to the Long Duration Exposure Facility and, with those, you don't really feel like you're catching up to anything. They are just OMS burns. But the night before the rendezvous, when we went to bed, with the sun angle right, we could see LDEF, though we didn't really get close to it until the next day.

"The reaction control system feels very tight when you are flying close to another object. You fire the primary jets and the vehicle gets a big thump, shakes and it moves. When you get into very close proximity operations, precision flying of the shuttle is based on two things: first, it has a really well-designed flight control system; second, you train a lot.

"You can control it to within inches this way or inches that way relative to the task you're trying to accomplish. We did that when we retrieved LDEF, and we did that when we retrieved Spartan on my second flight. The flight control system holds an attitude so well, and it makes flying it so precise, you can make very specific movements.

"It is a tribute to how well designed it is. That's the type of control you have. Still, you can't always get it perfectly stopped relative to another object, so you might just move it so far and let it take a very slow drift."

The only time the shuttle's speed is constant is when it is in orbit. To go from zero to almost 18,000 mph in eight and a half minutes is a feat, but the bigger feat is to go from 18,000 mph to zero and remain intact. The shuttle poses for its return to air and wind and land like the traveler who pulls coat collar tight and puts chin and chest into a bitter winter breeze: It takes a posture of defiance. To designers, crew and flight controllers, it is called a high angle of attack; its nose is angled high, and its most durable portion, the tiles underneath, greet Earth first in a battle between air and speed.

"The deorbit burn feels just like the OMS burn on ascent. But as soon as you're done with it, you pitch around to get the nose forward and up. Then, as you start your fall toward the atmosphere, you do notice that you're coming down. It looks like you are getting closer to the Earth. But you normally go into night very quickly, and then your visual cues are gone.

"Then, in darkness, the first sensation you get is when you are a bit into the atmosphere and the Gs start building up. It still doesn't feel like a descent; it feels like being in an airplane and pulling Gs. It just feels like you're squishing down in the seat. The only real sensation of descent is from watching the altimeter click off.

"From the sensations, without instruments, you wouldn't know the difference between Mach 25 and Mach 1."

The shuttle's entry is automated from the deorbit burn through three gradual, sweeping S-turns, one of which can take half an ocean to complete. The atmosphere is the only brake it has to slow it from Mach 25 to 200 miles an hour. The friction between air and spacecraft produces temperatures of almost 3,000 degrees Fahrenheit. To release the energy it received at launch, it creates as much of a spectacle on entry.

"You don't get used to seeing the plasma build up. At about 350,000 feet, you start to see a little pink out of the windows, coming up from the bottom.

"It turns into kind of a pink glow, and, from that, becomes an orange glow. It then becomes a very deep orange, before it turns practically white -- it is so hot. The plasma flow is that dense. In fact, on the corners of the windows, you can see a turbulent flow with swirls in it. It's sort of like rain on the car window, but it isn't drops, it's a flow pattern.

"Then at about 180,000 feet, it goes in reverse: the white gets less dense, then it goes to orange, then pink and then it's gone.

"During this phase, you come into daylight. The Earth is still dark, and the upper part of the sky is still dark, and in those areas you can still see the plasma. But where the sun is rising, you can't see it because of the light background. On both extremes, you have the orange, pinkish plasma. In the middle, you have a blue stripe where the sun is coming up. It only lasts a few seconds.

"You've trained to the point where you know that if you had to take over, you could do it. But you don't even hold your hand on the stick all the time during entry. You are just monitoring systems, cycling through displays on the screens, and checking them against your checklist cards. It's a very close analogy to an airplane on autopilot, though you are monitoring things very closely.

"When you see the sun come back up again, it's obvious that you're much lower than you had been. But even then, when you break out of night, you don't have a sensation of going down. You still feel mostly just a forward velocity."

As the shuttle descends and slows, the jets that have kept it stable are replaced by the rudder and elevons for control. Flight becomes flight again in the traditional sense.

"You can hear the primary jets fire, and you can see them in front. But you don't hear wind noise, and you don't hear much of anything except what is coming through your headset.

"You don't notice the change from the jets to the aerosurfaces; it's very subtle.

"When we go subsonic, at about 60,000 feet or so, we take over manually, flying it around the heading alignment circle all the way to touchdown. That way, when you get to the landing phase, you're in tune with the vehicle. You're aware of its responses.

"The shuttle has an autoland capability built in, but it has never been tested. Early in the program, we looked at a possible test of it, but the concern is that if it errs close to the ground, there's nothing you can do to take over. Say it made an error at 50 feet from touchdown, and you've got a pilot who had been in orbit five days, done the entire landing on autopilot and suddenly had to take control. In an unpowered vehicle, he'd essentially be helpless. There wouldn't be time to make a proper correction. Trying to take over suddenly without getting used to the vehicle first would be difficult. The tendency would be to overreact.

"On first landings, almost everyone notices a sort of time compression. The events seem to happen faster than they did in the simulator or in the Shuttle Training Aircraft. The STA is very accurate in duplicating the shuttle, so your landing feels very much the same; you feel like you've done it before. The time compression is probably due to anxiety, because it doesn't seem to happen the second time you land.

"The shuttle goes through 'mach buffeting' as it goes subsonic. It's a shaking kind of like a car going down a gravel road, due to air transitioning from supersonic to subsonic flow over the wings, and it lasts about 10 to 15 seconds.

"It flies very crisply. It is very adaptable. The digital flight control system allows it to respond very much the same with different centers of gravity and different weights.

"I've flown 747s and the KC-135, which are big airplanes. In them, you have a certain lag in the responses. But the shuttle flies more like a fighter than a big airplane. You know you are flying a large aircraft, but the controls are positive and crisp.

"You don't get much of a sensation of descent until you drop the nose on final. The approach pattern is much different than a fighter, carrier approach or anything else. In the shuttle, you have no power, and most of the time you're constantly decelerating. On the outer glide slope to the runway, maintaining a constant speed of 290 knots, and it's pretty steep. You're kind of hanging in the straps then. You keep your speed constant by opening and closing the speed brake. You feel the speed brake take hold and you feel the drag in general."

On its final approach to the runway, the shuttle descends seven times more steeply than a commercial airliner. It is dropping from the sky 20 times as fast. Less than 2,000 feet above the runway, it pulls up to reduce its angle of descent to just slightly less than that of an airliner. Its final maneuver before touchdown is a slight flare upward of the nose, to slow it even more and allow a gentle easing down of the nose landing gear after the main gear has touched Earth.

"You don't feel the final flare. The only big difference on touchdown is between the lakebed and the concrete runway. Rollout on the runway is much smoother. The lakebed is pretty rough.

"If you bring it to touchdown right, you hardly notice it. It's smoother than a landing in a commercial jet.

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"When it was first being designed, they said the shuttle was gong to fly every two weeks, 60 missions a year. That was obviously far too optimistic. If you could simplify the turnaround, reduce the care and feeding, then that would be a big help. But I don't consider today's flight rate any type of a drawback to the vehicle, simply because there is nothing else like the shuttle, nothing else that can do what it can do. And there never has been.

"It is being a part of a team that accomplishes a mission that you remember. That's the whole thing. You take it in steps. You're proud of your part in it; your proud of your crew; you're proud of everyone that worked on the flight; and you're proud of the whole team that made the shuttle perform. When you walk away and you're all done, that's what you remember and that's what really makes you feel good."

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NASA AWARDS MEDICAL RESEARCH AND SERVICES CONTRACT

NASA has awarded a $191 million, 5 year contract to KRUG Life Sciences, Inc., Houston, for the provision of medical operations and research support services.

The company has provided medical research and support services for the past 23 years and won this recent contract award following full and open competition. KRUG Life Sciences, Inc., is a subsidiary of KRUG International Corp. based in Dayton, Ohio.

The estimated value of the cost-plus-award-fee, level-of-effort contract, including options is $191 million. That amount excludes materials and travel expenses during the final 3 years of the contracted time period. The contract performance period is from March 1, 1991 through Feb. 29, 1996. The work will be performed at Johnson Space Center, Houston.

KRUG's support services include biomedical research, laboratory operations, development of medical testing equipment and medical support of NASA's Space Shuttle and Space Station Freedom programs.

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February 6, 1991

NASA AWARDS SPACE SHUTTLE ORBITER 14-INCH DISCONNECT

NASA has modified its Space Shuttle contract with Rockwell International Corporation's Space Division, to include the design, fabrication, testing and installation of main propulsion system 14-inch disconnects into orbiter umbilicals.

The total price of the modification is $27.6 million. The disconnect work will be performed at Rockwell's facilities in Downey and Palmdale, Calif.

Workers will install the 14-inch disconnects into the orbiter's existing umbilicals that are connected to external tank liquid oxygen and liquid hydrogen propellant feedlines and associated hardware.

The 14-inch disconnect program is part of NASA's continuing effort to increase flight safety of the Space Shuttle fleet. NASA managers consider the 14-inch disconnects an improvement in design over the 17-inch disconnect program. The 14-inch disconnects are designed to prevent inadvertent disconnect closure during a Shuttle flight, which would be catastrophic.

Johnson Space Center, Houston, manages the 14-inch disconnect program. Also participating in the program are: Rockwell International Corp., the prime contractor; Parker Hannifin, which designed, developed and qualified the disconnects; and Martin Marietta, which performed the cryogenic flow test on the disconnects.

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February 8, 1991

JSC APPOINTS CENTER EDUCATION PROGRAMS OFFICER

Dr. Robert Fitzmaurice will become Center Education Programs Officer within the Public Affairs Office, effective Feb. 11.

Fitzmaurice, an administrator with the La Porte Independent School District who has extensive hands-on experience as a high school teacher and a university associate professor, will be the senior person in the Public Services Branch's educational efforts. Those efforts are designed to encourage interest in the fields of aerospace, engineering, mathematics and science among public school and university students in an eight-state area.

Employed by the La Porte district since 1981, Fitzmaurice was instructional coordinator for kindergarten through high school, responsible for science, health, sex education, drug education and physical education curricula. He also was district coordinator of the Texas Teacher Appraisal System, the Teacher Career Ladder, and professional growth for teachers and administrators.

Fitzmaurice, an educator since 1978, was an assistant and associate professor in Professional Education and Biological Sciences at the University of Houston-Clear Lake from 1976 to 1981. He was assistant director of UH-CL's Teacher Center from 1978 to 1981.

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Barbara Schwartz
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NOTE TO EDITORS: SHUTTLE MISSION STS-37 PREFLIGHT BRIEFINGS

News media are invited to attend briefings on Space Shuttle mission STS-37 Feb. 25 and 26 to be held at the Johnson Space Center (JSC) in Houston and at Goddard Space Flight Center (GSFC) in Greenbelt, Maryland. The major objectives of this mission are to deploy the Gamma Ray Observatory (GRO) and to conduct a six-hour EVA (Extravehicular Activity better know as a "spacewalk") to evaluate proposed Space Station Freedom equipment operations.

On Feb. 25 at 8 a.m. CST, Lead Flight Director Chuck Shaw will begin the briefings with a mission overview. At 9 a.m. CST, GRO engineers and scientists will report on the status and mission of NASA's second great observatory. This will be followed by briefings on Bioserve-Instrumentation Technology Associates Materials Dispersion Apparatus (BIMDA) and Protein Crystal Growth (PCG-III). At 1 p.m. CST, the STS-37 crew will review each person's flight duties. All briefings will originate from JSC except the GRO briefings which will be held at GSFC.

The astronauts will be available for round robins interviews following the briefings. News media wishing to participate in the interview sessions should contact Barbara Schwartz at (713) 483-5111 by Feb. 20. Media planning to attend the briefings at GSFC should call Randee Exler (301) 286-8955.

An EVA workshop has been planned for Feb. 26 beginning at 9 a.m. CST in Bldg. 9B on the air bearing floor. Activities include a briefing on EVA planning and equipment development, an opportunity to try out the equipment, a display of EVA tools and spacesuit, and a visit to the Weightless Environment Training Facility to see astronauts participating in an EVA training exercise.

The briefings on Feb 25 will be carried on NASA Select television with two-way audio for press participation at NASA Headquarters, GSFC, and other NASA Centers. The round robins and EVA workshop will not be televised.

NASA Select television is carried on RCA SATCOM F2R, transponder 13, located at 72 degrees west longitude.

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NASA INVENTOR OF THE YEAR ANNOUNCED

Johnson Space Center's Leo Monford, NASA's Inventor of the Year, is determined to make the Space Shuttle's robot arm even more useful than it is, and his inventions could revolutionize orbital docking and robotics use.

The invention that earned him the award is a "Docking Alignment System." Monford calls it the Targeting and Reflective Alignment Concept, or TRAC.

By itself, the new precision alignment system is a significant improvement. But used in concert with another of Monford's inventions, a Magnetic End Effector, it could change the shape of future robot arms, satellites and space stations.

Monford, who works in the New Initiatives Office's Space Servicing Systems Project Office, is the first JSC employee to receive the Inventor of the Year award since its inception in 1980. The award will be presented March 28 at a NASA Headquarters ceremony, according to NASA General Counsel Edward Frankle, who announced Monford's selection Feb. 5.

"My job is to come up with innovative thoughts and technologies and stimulate others into producing those products," Monford said. "I honestly can't think of an award I would desire more than this one."

TRAC utilizes a television camera mounted inside the arm's end effector and a monitor on the shuttle's aft flight deck, both with alignment marks, and a flat, mirrored target marked with cross hairs on the target object. It has been tested extensively at the manipulator development facility and is able to routinely insert square pegs into square holes with only 0.03 of an inch clearance.

Here's how it works: An astronaut operating the remote manipulator system from the aft flight deck moves the arm to within range of the fixed-focus television camera inside the arm. The operator makes translational corrections with the arm until the cross hairs on the target and the monitor line up.

Then, the operator uses rotational controls until the camera is able to see its own image. Since the camera can see only directly in front of itself, it will not see its own image until the end effector and the target are perpendicular to each other. When the camera can see itself and the cross hairs are lined up, alignment is complete.

"It's like looking through a rifle scope," Monford said. "Once you understand the idea of aligning the cross hairs, it just comes naturally to you."

The existing alignment system uses a target with a protruding post. The main advantage of Monford's system is that the target is flat. Many proposed space operations for the shuttle's arm or a space station arm involve stacking and unstacking objects for construction purposes.

"When you try to make things stack up, a protruding target gets in the way," Monford said. The beautiful thing about the TRAC system, he added, is that it works perfectly with the operator's hand controllers, which maneuver the arm through separate rotational and translational controls.

The first practical application of TRAC will be on STS-37, as a part of Development Test Objective 1205, "TRAC Application for RMS Alignment/Deflection Measurements." TRAC will be used to provide precise data on the amount of "play" in the remote manipulator system when a space walking astronaut applies force to the oustretched arm. The targeting system will gather data that would be difficult or impossible to gather otherwise.

Monford said researchers at Texas A&M, his alma mater, are working on automating TRAC. Instead of cross hairs, the automated system uses corner cubes on the target that reflect light back only in the direction of its origin, similar to bicycle reflectors, and a light-emitting diode on the camera lens. A computer lines up the flood-lit corner cubes to determine when the arm is perpendicular to its target. When the camera can see the reflection of the LED on its lens, the computer will know the alignment is exact.

"It's really a generic concept. It has very broad application," he said, explaining that it can provide a precise reference point for intelligent robots that need to perform exacting tasks on

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three-dimensional surfaces. Put the TRAC system together with Monford's Magnetic End Effector, patent pending, and the possibilities grow.

The MEE is a potential replacement for the Standard End Effector, which grapples payloads through electro-mechanical means, using cables to snare a protruding grapple fixture. The MEE, with no moving parts, uses electro-magnetic force to "clomp onto" a plate made of ferrous metal that is attached to the payload. The metal plate shares the advantage of flatness with the alignment target, and the MEE's centerline camera would allow the docking plate to double as the target plate for the TRAC system.

Monford's smaller, lighter MEE is two-fault tolerant both in grappling and releasing payloads and requires no regularly scheduled maintenance or pyrotechnic safety release devices.

Proposed MEEs would give different sized arms the capability to grapple common target plates, add the ability to transfer both power and data to payloads and provide a method of attaching a variety of power tools that could help alleviate the need for some extravehicular activity space walks by astronauts. "I think in the space station era, this type of an end effector will be baselined," Monford said.

The TRAC, MEE, a JPL Force Torque Sensor that provides a representation of forces and moment on the arm, and a Carrier Latch Assembly that uses electromagnetic force to help hold satellites in the payload bay, are scheduled to fly as part of the Dexterous End Effector Flight Demonstration on STS-56. "I'm looking forward to some other exciting flight experiments that would leapfrog from this one."

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Photos to illustrate this story are available to media representatives by calling the JSC Still Photo Library (713) 483-8603. Photo numbers are: S91-28033 and S91-28080 thru 82.

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Barbara Schwartz
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NOTE TO EDITORS: NATIONAL ENGINEERS WEEK ACTIVITIES

The week of Feb. 18 is National Engineers Week. During this week more than 150 JSC engineers will be teaching classes in 10 area school districts in an effort to inspire students in all grade levels to prepare themselves for careers in engineering, science, and technology.

News media are invited to attend two of the sessions with engineer astronauts Mary Cleave and Bonnie Dunbar.

On Feb. 20 at 1 p.m., Cleave will address about 100 fifth grade students at Red Bluff Elementary, 416 Bearle, in Pasadena. Dr. Cleave has flown on two Space Shuttle missions. During STS 61-B, three telecommunication satellites were deployed and two six-hour "spacewalks" were conducted to demonstrate Space Station Freedom construction techniques. Cleave also flew on STS-30, on which crew members successfully deployed the Magellan Venus-exploration spacecraft. Cleave will be showing a film from her second flight during her presentation.

On Feb. 22 at 1 p.m., Dunbar will teach a class at Carter G. Woodson Middle School, 10720 Southview, in Houston. Dr. Dunbar has flown on the Shuttle twice. Her first flight was STS 61-A, a West German D-1 Spacelab mission, on which 75 scientific experiments were completed in the areas of physiological sciences, materials science, biology, and navigation. Her second flight was STS-32 which successfully deployed a communications satellite and retrieved the Long Duration Exposure Facility. Dunbar is currently assigned as payloads commander for STS-50 U.S. Microgravity Laboratory.

News media wishing to attend one of these activities should notify Barbara Schwartz, 483-8647, prior to the event.

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SPACE AGE LEARNING TOOLS AVAILABLE

Although NASA has been sending humans into space for more than 30 years, spaceflght is still new to middle school children and basic questions are very much on their minds. With the help of the Astronaut Corps, NASA is producing space age learning tools to relate space flight and other scientific concepts to teachers and students at all grade levels and subject areas. NASA today released the first in this new series of educational video products. This new video package, Liftoff to Learning: Space Basics, illustrates orbital science.

Space Basics was filmed on location at the NASA Johnson Space Center, Houston, NASA Kennedy Space Center, Fla., and in orbit onboard Space Shuttle mission STS-41. The 21-minute video combines the answers to basic questions with exciting space photography and colorful special effects. Accompanying the tape is an 8-page video resource guide for teachers that provides background information on rockets and orbits as well as suggestions for hands-on classroom activities. The guide also includes a vocabulary list, reference list and details about the crew members.

Observing that space captures students interest in science, math and technology, NASA is developing a variety of educational materials, including video tapes, slide sets and educational publications relating to specific Space Shuttle missions and space flight concepts. For each Shuttle mission a 4-page teachers guide, Mission Watch, will be produced describing the mission, payloads, experiments, and science objectives, and includes suggested classroom activities and references. At the end of the mission, a 4-page summary report, Mission Highlights will be available to educators.

These new space age learning products are the result of a team effort involving NASA Headquarter's Educational Affairs Division, the Astronaut Corps, Space Shuttle Support Office, program and science people, flight directors and planners, television production people and public affairs.

Products currently available include:

- o Liftoff to Learning: Space Basics, video and teachers guide (available March 4)
- o Mission Watch teachers guides for STS-41 and 35
- o Mission Highlights summary for STS-41 and 35
- o STS-35 Astro-1 teachers guide and slide set

The video Liftoff to Learning, Space Basics, can be taped at home or at school by tuning to Satcom F2R satellite, 72 degrees West longitude, transponder 13. The video will be transmitted at noon and repeated at 6 p.m. EST every Tuesday and Thursday in February and will run periodically thoughout the month of March.

Educators can contact NASA's Teacher Resource Centers for information on obtaining copies of the Space Basics videotape and resource guide (available March 4), Mission Watch and Mission Highlights. Videotapes and slide sets are also available by phoning NASA CORE on 216/774-1051 for information. And with a modem, educators can access NASA Spacelink, a computerized space education data base on 205/895-0028 for all printed education materials.

- end -

NASA News

National Aeronautics and
Space Administration
Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Barbara Schwartz

February 26, 1991

SPECIAL ADVISORY: NEWS RELEASE NO. 91-016

In the last paragraph of NASA News Release 91-016 - Space Age Learning Tools Available - the telephone number for NASA CORE is incorrect. The correct number is 216/774-1051.

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NASA News

National Aeronautics and
Space Administration
Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Jeffrey Carr
Release No. 91-017

February 25, 1991

FLIGHT CONTROL OF STS-37

Flight control for STS-37, the eighth flight of Atlantis, will follow the procedures and traditions common to U.S. manned space flights since 1965, when the Mission Control Center was first used.

Responsibility for conduct of the mission will revert to the Mission Control Center (MCC) in Houston once Atlantis's two solid rocket boosters ignite. Mission support in the MCC will begin about five hours prior to launch and will continue through landing.

STS-37 mission objectives include deployment of the Gamma Ray Observatory (GRO) and the evaluation of various crew and equipment translation aids (CETA) and techniques for possible application to Space Station Freedom space walks.

Once Atlantis and crew are cleared for orbital operations, preparation and deployment of the GRO will be coordinated between flight controllers in Houston and payload controllers at the Payload Operations Control Center (POCC), located at the Goddard Space Flight Center in Greenbelt, Maryland. The deployment is scheduled for flight day three.

Preparations and conduct of extravehicular activities (EVA) to support the CETA investigations will be managed and controlled by project experts and flight controllers in Houston. EVA is scheduled for flight day four.

The mission will be conducted from Flight Control Room One (FCR-1) on the second floor of the MCC located in Bldg. 30 at Johnson Space Center. The teams of flight controllers will alternate shifts in the control center and in nearby analysis and support facilities.

(more)

The handover between each team takes about an hour and allows each flight controller to brief his or her replacement on developments during the previous two shifts. If warranted, press briefings by offgoing flight directors can be conducted 30 minutes to an hour after each shift handover is complete.

The four flight control teams for this mission will be referred to as the Ascent/Entry, Orbit 1, Orbit 2, and Planning teams. The ascent and entry phases will be conducted by Flight Director N. Wayne Hale, Jr. The Orbit 1 team will be led by Flight Director J. Milt Heflin, Jr. The Orbit 2 team, will be headed by STS-37 Lead Flight Director Charles W. Shaw. The planning team will be directed by Flight Director Philip L. Engelauf.

# # #

MCC POSITIONS AND CALL SIGNS FOR STS-37

The flight control positions in the MCC, and their responsibilities, are:

Flight Director (FLIGHT)

Has overall responsibility for the conduct of the mission.

Spacecraft Communicator (CAPCOM)

By tradition an astronaut; responsible for all voice contact with the flight crew.

Flight Activities Officer (FAO)

Responsible for procedures and crew timelines; provides expertise on flight documentation and checklists; prepares messages and maintains all teleprinter and/or Text and Graphics System traffic to the vehicle.

Integrated Communications Officer (INCO)

Responsible for all Orbiter data, voice and video communications systems; monitors the telemetry link between the vehicle and the ground; oversees the uplink command and control processes.

Flight Dynamics Officer (FDO)

Responsible for monitoring vehicle performance during the powered flight phase and assessing abort modes; calculating orbital maneuvers and resulting trajectories; and monitoring vehicle flight profile and energy levels during reentry.

Guidance Procedures Officer (GPO)

Responsible for the onboard navigational software and for maintenance of the Orbiter's navigational state, known as the state vector.

Trajectory Officer (TRAJECTORY)

Also known as "TRAJ," this operator aids the FDO during dynamic flight phases and is responsible for maintaining the trajectory processors in the MCC and for trajectory inputs made to the Mission Operations Computer.

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Environmental Engineer & Consumables Manager (EECOM)

Responsible for all life support systems, cabin pressure, thermal control and supply and waste water management; manages consumables such as oxygen and hydrogen.

Electrical Generation and Illumination Officer (EGIL)

Responsible for power management, fuel cell operation, vehicle lighting and the master caution and warning system.

Payloads Officer (PAYLOADS)

Coordinates all payload activities; serves as principal interface with remote payload operations facilities.

Data Processing Systems Engineer (DPS)

Responsible for all onboard mass memory and data processing hardware; monitors primary and backup flight software systems; manages operating routines and multi-computer configurations.

Propulsion Engineer (PROP)

Manages the reaction control and orbital maneuvering thrusters during all phases of flight; monitors fuel usage and storage tank status; calculates optimal sequences for thruster firings.

Rendezvous Guidance and Procedures Officer (RENDEZVOUS)

Monitors onboard navigation of the Orbiter during rendezvous operations, and advises the control team on the status and effect of rendezvous events.

Booster Systems Engineer (BOOSTER)

Monitors main engine and solid rocket booster performance during ascent phase.

Guidance, Navigation & Control Systems Engineer (GNC)

Responsible for all inertial navigational systems hardware such as star trackers, radar altimeters and the inertial measurement units; monitors radio navigation and digital autopilot hardware systems.

(more)

Ground Controller (GC)

Coordinates operation of ground stations and other elements of worldwide space tracking and data network; responsible for MCC computer support and displays.

Maintenance, Mechanical, Arm & Crew Systems (MMACS)

Formerly known as RMU; responsible for remote manipulator system; monitors auxilliary power units and hydraulic systems; manages payload bay and vent door operations.

Extravehicular Activities (EVA)

A specialist responsible for monitoring and coordinating preparations for and execution of space walks. Responsibilities include monitoring suit and EVA hardware performance.

Payload Data & Retrieval System (PDRS)

A specialist responsible for monitoring and coordinating the operation of the remote manipulator system.

Flight Surgeon (SURGEON)

Monitors health of flight crew; provides procedures and guidance on all health-related matters.

Public Affairs Officer (PAO)

Provides real-time explanation of mission events during all phases of flight.

# # #

STS-37 FLIGHT CONTROL TEAM STAFFING

Position	Ascent/Entry	Orbit 1	Orbit 2	Orbit 3
FLIGHT	Wayne Hale	Milt Heflin	Chuck Shaw	Phil Engelauf
CAPCOM	Stephen Oswald (A) Brian Duffy (E)	Marsha Ivins	Kathy Thornton	Bob Cabana
FAO	Jeff Davis	Jeff Davis	Neil Woodbury	Fisher Reynolds
INCO	Harry Black	Harry Black	Joe Gibbs	Richard LaBrode
FDO	Phil Burley (A) Ed Gonzalez (E)	Doug Rask	Richard Theis	Deborah Langan
TRAJ	Steve Stitch (A) Bruce Hilty (E)	Keith Fletcher	William Tracy	Lisa Shore
GPO	Glenn Hillier (A) John Turner (E)	/////	/////	/////
EECOM	David Herbek	David Herbek	Daniel Molina	Peter Cerna
EGIL	Robert Armstrong	Robert Armstrong	Robert Floyd	Mark Fugitt
PAYLOADS	Nellie Carr	Nellie Carr	Cheryl Molnar	Jeffrey Hanley
DPS	David Tee	David Tee	James Hill	Gary Sham
PROP	Karen Jackson	Karen Jackson	William Powers	Thomas Lazo

(more)

STS-37 FLIGHT CON... TEAM STAFFING
(Continued)

Position	Ascent/Entry	Orbit 1	Orbit 2	Planning
PDRS	David Moyer	David Moyer	Ron Zaguli	Albert Lee
BOOSTER	Mark Jenkins Frank Markle	/////	/////	Terri Stowe
GNC	David Miller	Kenneth Bain	Stanley Schaefer	Heather Mitchell
GC	John Wells Larry Foy	Chuck Capps Victor Lucas	Al Davis Frank Stolarski	Joe Aquino Terri Quick
MMACS	Robert Doremus	Robert Doremus	Ladessa Hicks	Kevin McCluney
EVA	James Thornton	James Thornton	Bob Adams	Richard Fullerton
SURGEON	Phil Stepaniak	Larry Pepper	Richard Jennings	/////
PAO	Jeff Carr (A) Kyle Herring (E)	James Hartsfield	Kari Fluegel	Pam Alloway

(A) = Ascent; (E) = Entry

# # #

NASA News

National Aeronautics and
Space Administration
Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Jeffrey Carr
RELEASE NO. 91-018

February 26, 1991

JSC ESTABLISHES FREEDOM OPERATIONS PROJECT OFFICE

The Johnson Space Center has established a project office for the development and implementation of Space Station Freedom (SSF) flight operations.

The Space Station Mission Operations Project Office resides within the Mission Operations Directorate (MOD), which has overall responsibility for the development and conduct of flight planning, training, and operations for the Space Shuttle and SSF programs.

MOD Director Eugene Kranz described the new organization, saying, "It's intended to provide for more direct interaction between MOD and the work packages, institutions, and international elements in developing and defining operating concepts, requirements, and responsibilities. The change will also enhance our support of these organizations in the design of space systems and the development of operations facilities".

The new office will be headed by Charles R. Lewis who will report directly to Robert W. Moorehead, Deputy Director for Program and Operations, SSF Program Office, on all aspects of planning, training, and management of SSF flight operations.

After graduating from New Mexico State University with a B.S. in Electrical Engineering, Lewis worked for a year at the Goddard Space Flight Center on radio frequency systems, before joining the NASA Space Task Group at the Langley Research Center in 1962. Lewis moved to Houston with the task group in 1962 after establishment of the Manned Spacecraft Center, now the Lyndon B. Johnson Space Center.

(more)

Since 1962, Lewis has held several highly responsible positions at JSC in mission operations. He served during the Mercury and Gemini programs as remote site spacecraft communicator. He served as assistant flight director during Apollo, and as flight director for Apollo 17, all Skylab flights, the Apollo Soyuz Test Project, and Shuttle missions 1, 2, 4, and 9. In 1984, Lewis was named chief of flight operations integration, and then as the MOD chief of Space Station operations integration in 1985.

# # #

NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

James Hartsfield
RELEASE NO. 91-019

February 28, 1991

DISCOVERY'S FLIGHT ON STS-39 DELAYED, ATLANTIS ON STS-37 NEXT UP

NASA management decided today to move Discovery off the launch pad and to the processing hangar for repairs, delaying shuttle mission STS-39 until early May.

Discovery will fly after Atlantis is launched on STS-37. Columbia's preparations for launch on STS-40 are unaffected by the move.

Discovery's problem was found early last week when technicians at the launch pad spotted cracks in two support areas for closing mechanisms on the fuel line doors. The cracks are not in the door hinges, but rather in metal that supports the mounts for electric mechanisms that open and close the doors. The actual hinges are separate from these mechanisms. The doors must shut following jettison of the external tank to protect the spacecraft from the extreme heat of reentry.

The decision to repair Discovery follows more than a week of intensive investigation and anaylsis of the situation. Despite an analysis that showed the doors would operate properly in flight and tests that confirmed that outcome, Associate Administrator for Space Flight Dr. William Lenoir said management could not become totally confortable with flying the spacecraft in its current condition.

Moreover, there is no driving force such as a planetary window or urgent national defense need that requires a launch of STS-39 in March, Lenoir said.

Although documented events are suspected of overstressing Discovery's doors and initiating the cracks on Discovery, no conclusive evidence could be found to pin down exactly when the cracks began. With the cause of the cracks undetermined, Lenoir said, managers decided to take the conservative alternative.

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Very small fatigue cracks have been found on Columbia, but they are not comparable to Discovery's, Space Shuttle Program Director Bob Crippen said. The areas in question eventually will be strengthened on all the spacecraft, but the upcoming launches of Columbia and Atlantis should not be affected, Crippen added.

The delay in launching STS-39, however, will cause some changes in the flight manifest for this year, most likely causing one less shuttle flight, Crippen said.

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NASA News

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Kelly Humphries
Release No. 91-020

March 5, 1991

JSC FACILITIES REOPENED TO PUBLIC

Johnson Space Center has reopened all of its visitor attractions to the public now that hostilities have eased in the Persian Gulf area.

Visitors are again allowed in Bldg. 9A-B, which houses space station and space shuttle mock-ups; Bldg. 30, the Mission Control Center; and Bldg. 31A, which houses lunar samples. As before the closings, Mission Control visitors must obtain tour tickets at the Visitor Center information desk.

The temporary closing began January 17, 1991.

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NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Kari Fluegel
Release No. 91-021

March 13, 1991

RESEARCHERS GATHER FOR 22ND PLANETARY SCIENCE CONFERENCE

Investigating Venus, Earth and the moon through the eyes of Magellan and Galileo will be just one of the many highlights during the 22nd Lunar and Planetary Science Conference at the Johnson Space Center in Houston next week.

More than 750 scientists and researchers from around the world will focus on the latest discoveries and investigations of our universe during the weeklong conference starting Monday at JSC's Gilruth Center.

The manned exploration initiative and the current and on-going unmanned planetary exploration will be the focus of two evening sessions open to the public.

On March 18, senior NASA officials will discuss the agency's exploration initiative and the recent findings of the Advisory Committee on the Future of the U.S. Space Program chaired by Norman Augustine.

That session, "Science Exploration and the New NASA," will be led by Dr. Carolyn Huntoon, director of JSC's Space and Life Sciences Directorate, and Dr. Michael Duke, Lunar and Mars Exploration Program Office program scientist at JSC. Panel participants will be JSC Director Aaron Cohen; Chief Scientist for Martin Marietta Noel Hinners; Jet Propulsion Laboratory Director Edward C. Stone; and Assistant Administrator for the Office of Space Science and Applications Lennard Fisk.

On March 20, Wesley Huntress, director of NASA's Solar System Exploration Division, will lead a special session on "Venus, Earth and Moon: New Views from Magellan and Galileo."

Magellan, an unmanned planetary probe launched in May 1989, is now in orbit around Venus, doing a detailed mapping of the planet. Galileo, launched in October 1989, has completed

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gravity assist maneuvers around Venus, the Moon and Earth on its way to Jupiter.

Within the past year, the two probes have returned numerous photographs and spawned countless discoveries during their journeys. Huntress will discuss the latest pictures from the spacecrafts.

Both programs begin at 8 p.m. in the Bldg. 2 Teague Auditorium and are open to the public free of charge.

Topics for the conference seminars were drawn from a total of 791 abstracts submitted to the LPI. The concurrent technical sessions begin at 8:30 a.m. and at 1:30 p.m. Monday through Thursday. Friday's sessions begin at 8:30 a.m. only.

Monday's sessions will cover Magellan at Venus; Interstellar Grains; Venus Tectonics; Chondrules and Chondrites; Mars: Remote Sensing I; and Planetary Differentiation. On Tuesday, conference sessions will focus on Volcanism and Cratering; Mars Remote Sensing II; Cosmic Dust I; Basaltic Lunar Meteorites and Lunar Resource Utilization; Moonviews: From Galileo, Apollo and Earth; Refractory Inclusions; Cosmic Dust II and Comets; SNC, Ureilites and MAC88177.

Wednesday's sessions will be Terrestrial Impact Structures; Mars: Channels and Water; Rocks: A to HED; Mars Geology; From Interstellar Grains to Asteroids: Joint Session of the Division for Planetary Sciences and the Meteoritical Society; Terrestrial Impacts: Chemistry and Mineralogy; Irons and Mesosiderites.

Thursday conference attendees will discuss Mars: Tectonics, Geophysics, Atmosphere and Exploration; Asteroids; Solar Nebula Physics and Chemistry; Lunar Highlands; Carbonaceous Chondrites; Outer Solar System; Impact Models and Experiments; Lunar Mare Basalts. Friday the conference will conclude with sessions on Planetary Geological Processes; Phobos; Remote Sensing and Instrumentation and N&S Isotopes; and Cosmic Rays and Solar Wind.

Registration begins at 6 p.m. Sunday at the Lunar and Planetary Institute and continues throughout the conference on the second floor of the Gilruth Center.

NOTE TO EDITORS: Press abstracts of papers presented during the conference are available from Kari Fluegel at the Johnson Space Center Media Services Office at (713) 483-5111.

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NASA News

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Billie Deason
Release No. 91-022

March 14, 1991

NASA AWARDS MACHINING AND SHEETMETAL FABRICATION CONTRACT

NASA has awarded a contract to Esco, Inc., Houston, for finished machined and sheetmetal products.

The cost-plus-fixed-fee contract is for a 1-year effort plus four 1-year options. The first year of contract performance is May 1, 1991, through April 30, 1992. The value of the first-year contract is $2.9 million. If all options are exercised, the contract value will increase by $23.4 million.

Under the contract, Esco will produce aircraft/aerospace machined and sheetmetal items such as irregular shapes, three-dimensional contoured surfaces, layout and fitting of multimotional intricate assemblies, and fabrication and assembly of sheetmetal items. Work will be performed at the Esco, Inc., facilities in Houston and other designated locations.

One other proposal was received from Merritt Tool Co. of Kilgore, Tex.

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NASA News

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release

Pam Alloway
Release No. 91-023

April 2, 1991

NASA EXTENDS ROCKWELL STS OPERATIONS CONTRACT

NASA has extended its contract with Rockwell Space Operations Company (RSOC) to provide uninterrupted performance of the Space Transportation System Operations contract through Dec. 31, 2000.

The total estimated value of the extension is $2.3 billion. Total contract value, including all modifications, is $4.8 billion.

RSOC is based in Houston and the work covered in the contract is performed at the Johnson Space Center, Houston, and RSOC's building near the Center.

The cost-plus-award fee contract includes: the maintenance and operations of Shuttle facilities including, but not limited to, the Mission Control Center, crew trainers and simulators, flight design and crew activity planning systems, the Shuttle Avionics Integration Laboratory and the Shuttle benefitting portion of the Central Computing Facility; flight preparation activities, including flight planning and flight data generation orbiter software reconfiguration, simulation preparations and facilities reconfiguration; direct mission support (simulations and flight); and sustaining engineering support for the above activities.

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NASA News

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

James Hartsfield
Release No. 91-024

April 4, 1991

SATELLITE RESCUE, SPACEWALKS MARK ENDEAVOUR'S FIRST FLIGHT

The first flight of Endeavour, now set for May 1992, will send the spacecraft on a mission to reboost a communications satellite stuck in an errant orbit and feature three spacewalks, more than ever performed from a shuttle.

The seven-member crew of Endeavour on shuttle mission STS-49 will be commanded by Chief Astronaut Dan Brandenstein. The pilot will be Kevin Chilton. Mission specialists will be Pierre Thuot, Kathy Thornton, Rick Hieb, Thomas Akers and Bruce Melnick. Endeavour will fly to a 198 nautical mile-high orbit.

The primary objective will be to retrieve, modify, and reboost the International Telecommunications Satellite VI (Intelsat VI). A second objective will be for spacewalking astronauts to demonstrate space station assembly methods.

In all, three space walks, or extravehicular activities (EVAs), are planned, requiring four EVA crew members, operating in pairs, to venture outside the vehicle on three consecutive days. Members of the crew that will perform the spacewalks are Pierre Thuot, Rick Hieb, Kathy Thornton, and Thomas Akers.

The rescue and reboost of the Intelsat VI will require a spacewalk to capture and then berth the satellite atop a perigee kick motor (PKM) seated in Endeavour's payload bay. The satellite and booster will be mechanically mated by the astronauts and then released, using the shuttle's robot arm, at the retrieval altitude. Following completion of the EVA and deployment, Endeavour will be maneuvered to a safe distance from the augmented satellite, and its strapped-on booster will ignite, sending it to its intended operational altitude.

The Assembly of Station by EVA Methods, or ASEM objective, will require two additional spacewalks on the following two flight days. Two tandem EVA teams will alternate each day.

After spending a week in orbit, Endeavour will then return to Earth, landing on Rogers Dry Lake Bed at Edwards Air Force Base, California.

-end-

NASA News

National Aeronautics and Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

James Hartsfield
Release No. 91-025

April 4, 1991

SECOND SHUTTLE CARRIER AIRCRAFT LOFTS ENDEAVOUR ON MAIDEN FLIGHT

The Shuttle Carrier Aircraft, NASA 911, that will fly Endeavour to the Kennedy Space Center from its construction facilities will be making its first flight carrying a shuttle orbiter when it departs.

The new SCA is the second such aircraft owned by NASA and was delivered to NASA by Boeing Military Airplanes in November 1990. The SCA, a Boeing 747, was aquired by Boeing for NASA and modified at Boeing's Wichita, KS, facilities for two years to prepare for the job. Previously, the 747 had been a passenger carrier for Japan Air Lines. The SCA is now based in El Paso, TX, with the original SCA, NASA 905.

A second SCA was needed to provide a backup and strong reliability of shuttle ferrying operations. The contract for purchase and modification of the aircraft totaled $55 million.

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NASA News

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

April 5, 1991

James Hartsfield
Release No. 91-026

EQUIPMENT UPDATES ENHANCE ENDEAVOUR, ORBITER FLEET

Many systems onboard Endeavour have had design changes or have been updated from earlier equipment to take advantage of technological advances and continue improvements to the Space Shuttle. The upgrades include several improved or redesigned avionics systems; installation of a drag chute as part of a series of landing aid additions to the orbiters; and modifications to pave the way for possibly extending shuttle flights to last as long as three weeks in the future.

Some such updated systems already have been installed in the rest of the shuttle orbiters as well as Endeavour; some will be installed in all orbiters in the near future; and others will be used on Endeavour only.

UPDATED AVIONICS SYSTEMS

Advanced General Purpose Computers

The advanced general purpose computers (GPCs) are now in the process of being incorporated into the entire orbiter fleet and will be installed and used on Endeavour for its first space flight. The updated computers have more than twice the memory and three times the processing speed of their predecessors. Officially designated the IBM AP-101S, built by IBM, Inc., they are half the size, about half the weight, and require less electricity than the first-generation GPCs. The central processor unit and input/output processor, previously installed as two separate boxes, are now a single unit. The new GPCs use the existing shuttle software with only subtle changes. However, the increases in memory and processing speed allow for future innovations in the the shuttle's data processing system. Although there is no real difference in the way the crew will operate with the new computers, the upgrade increases the reliability and efficiency in commanding the shuttle systems. The predicted "mean time between failures" (MTBF) for the advanced GPCs is 6,000 hours. The flight computers are already exceeding that prediction with an MTBF of 18,500 hours. The MTBF for the original GPCs is 5,200 hours.

New GPC Specifications

Dimensions:	19.52" x 7.62" x 10.2"
Weight:	64 lbs
Memory capacity:	262,000 words (32-bits each)
Processing rate:	1.2 million instructions per second
Power requirements:	550 watts

HAINS Inertial Measurement Units

The High Accuracy Inertial Navigation System (HAINS) Inertial Measurement Unit (IMU) will be incorporated into the orbiter fleet on an attrition basis as replacements for the current KT-70 model IMUs. The three IMUs on each shuttle orbiter are four-gimbal, interially stabilized, all-attitude platforms that each measure changes in the spacecraft's speed used for navigation and provide spacecraft attitude information of flight control. For Endeavour's first flight, one HAINS IMU will fly with two accompanying KT-70 IMUs to provide redundancy with proven hardware. The HAINS IMU for the space shuttle is a deriviative of IMUs used in the Air Force's B-1B aircraft. It includes an improved gyroscope model and microprocessor and has demonstrated in testing improved abilities to hold an accurate alignment for longer periods of time. In addition, it has proven more reliable than the KT-70 IMUs. The new IMUs require no software changes on the orbiter or changes in electrical or cooling connections. The HAINS IMU is manufactured by Kearfott, Inc., of Little Falls, N.J.

Improved Tactical Air Navigation Systems

A complete set of three improved TACANs will fly on Endeavour's first flight. The improved TACAN is a modified off-the-shelf unit developed by Collins, Inc., of Cedar Rapids, Iowa, for military aircraft and slightly modified for the shuttle. The improved TACAN operates on 28-volt direct current electricity as compared to the current TACANs that use 110-volt alternating current for power. Also, the new TACANs do not require forced air cooling as do the current TACANs. The TACANs' connections to the shuttle's guidance, navigation and control system are identical. The TACANs provide supplemental navigational information on slant range and bearing to the orbiter using radio transmissions from ground stations during the final phases of entry and landing.

Enhanced Master Events Controller

The EMEC features improved reliability, lower power usage and less maintenance than current MECs. The new design uses 30 percent less electricity and has more internal backup components. The MECs, two aboard each shuttle, are a relay for onboard flight computers used to send signals to arm and fire pyrotechnics that separate the solid rockets and external tank during ascent. The EMECs were built by Rockwell's Satellite and Space Electronics Division, Anaheim, Ca. Present plans call for Endeavour to be the only orbiter with the EMECs.

Mass Memory Unit Product Improvement

Improvements to the current MMUs in the form of modifications include error correction and detection circuitry to accomodate tape wear, tape drive motor speed reduction to extend the tape's lifetime. In addition, modifications were made to the tape drive head to extend its lifetime. The improvements have no effect on the current software or connections of the MMUs. Two MMUs are on each orbiter and are a magnetic reel-to-reel tape storage device for the shuttle's onboard computer software. The modifications to the MMUs will be done for the first flight of Endeavour and for the rest of the orbiter fleet during normal maintenance activities. The MMUs were built and upgraded by Odetics of Anaheim, Ca.

Enhanced Multiplexer-Demultiplexer

The EMDM uses state-of-the-art components to replace obsolete parts and improve maintenance requirements. The new components have simplified the structure of the EMDM by more than 50 parts in some instances. The EMDMs are installed on Endeavour, but plans have not been made to replace the current MDMs in other orbiters. The MDMs, 19 located throughout each orbiter, act as a relay for the onboard computer system as it attains data from the shuttle's equipment and relays commands to the various controls and systems. The EMDMs are manufactured by Honeywell Space Systems Group, Phoenix, Az.

Radar Altimeter

The improved radar altimeter aboard Endeavour has already been installed and flown on all other shuttle orbiters since STS-26. The altimeter is an off-the-shelf model originally developed for the military's cruise missile program. The altimeter has the capability to automatically adjust its gain control as a function of changes in altitude. Along with anti-false lock circuitry, the improvements have eliminated a problem frequently experienced with the original radar altimeter caused by interference from the shuttle's nose landing gear. The radar altimeter is built by Honeywell, Minneapolis, Mn.

Improved Nosewheel Steering

Improvements to the nosewheel steering mechanisms include a second command channel, used as a backup in case of a failure in the primary channel, for controlling the steering through the onboard computers. In addition, a valve has been installed in the hydraulic system to switch in a secondary hydraulic pressure system in case of a failure in the primary system. Endeavour will have the modifications prior to its first flight, and the rest of the orbiter fleet will have the improvements made during their major modification periods. The improved nosewheel steering was designed by Sterer Engineering and Manufacturing Components, Los Angeles, Ca.

Solid State Star Tracker

The SSST is a new star tracker design developed for Endeavour which takes advantage of advances in star tracker technology. The two star trackers on each shuttle orbiter are used to search for, detect and track selected guide stars to precisely determine the orientation of the spacecraft. The precise information is used to periodically update the orbiter's IMUs during flight. The SSST uses a solid state charge coupled device to convert light from stars into an electric current from which the star's position and intensity are determined. The solid state design consumes less electricity provides greater reliability than the current star trackers. The SSSTs require no modifications to the orbiter or its software for installation. Current plans are for one SSST to be installed on Endeavour and another to be incorporated into the orbiter fleet on an attrition basis. The SSST was developed and built by Ball Aerospace Division, Boulder, Co.

UPDATED MECHANICAL SYSTEMS

Improved Auxiliary Power Units

An improved version of the Auxiliary Power Units, three identical units that provide power to operate the shuttle's hydraulic system, has been installed on Endeavour. The IAPUs will be installed on the rest of the shuttle orbiter fleet as each spacecraft in turn is taken out of operation for a major modification period during the next two years.

The IAPU is lighter than the original system, saving about 134 pounds. The weight savings are due to the use of passive cooling for the IAPUs, eliminating an active water spray cooling system required by the original units. The redesigned APUs are expected to extend the life of the units from the current 20 hours or 12 flights to 75 hours or 50 flights. The increased lifetime is anticpated to result in fewer APU changeouts and improved ground turnaround time between flights.

Components of the APU that have been redesigned to improve reliability include gas generator, fuel pump, redundant seals between the fuel system and gearbox lubricating oil, and a materials change in the turbine housings.

Orbiter Drag Chute

During construction, a drag chute was added to Endeavour to be deployed between main gear and nose gear touchdown to assist in stopping and add greater stability in the event of a flat tire or steering problem. The drag chute is another in a series of improvements to the shuttle's landing aids. Other improvements recently installed in shuttle orbiters and already in use include carbon brakes to replace the original beryllium brakes and nosewheel steering mechanisms.

The 40-foot diameter drag chute canopy will trail 87 feet behind the orbiter as it rolls out after landing. The main drag chute and a 9-foot diameter pilot chute are deployed by a mortar fired from a small compartment added to the bottom of the vertical stabilizer. The drag chute will be jettisoned when the spacecraft slows to less than 60 knots.

The drag chute is expected to decrease the orbiter's rollout distance by 1,000 to 2,000 feet. The drag chute is deployed using two switches located to the left of the commander's heads up display, one switch arms the mortar and a second switch fires it. A third switch, located to the right of the commander's heads up display, jettisons the drag chute. A second set of switches is mounted beside the pilot's heads up display.

From the time the pilot chute mortar is fired to full inflation of the main chute is anticipated to be less than 5 seconds. The drag chute system was designed by NASA's Johnson Space Center, Rockwell-Downey and Irvin Industries, Santa Ana, Ca.

EXTENDED DURATION ORBITER MODIFICATIONS

Although there are no plans currently to use it as such, Endeavour has been fitted with internal plumbing and electrical connections needed for a series of Extended Duration Orbiter (EDO) modifications that could enable the spacecraft to stay in orbit as long as 28 days. The only official plans concerning implementation of the EDO package at present are for Columbia to recieve all modifications necessary for a 16-day stay in orbit when it is taken to Rockwell for major modifications later this year. The first extended duration flight is currently planned for June 1992, the USML-1 flight aboard Columbia planned to be 13 days long. Modifications necessary for extended stays include an improved waste collection system that compacts human waste, thus allowing greater capacity; extra middeck lockers for additional stowage; two additional nitrogen tanks for the crew cabin atmosphere; a regenerating system for removing carbon dioxide from the crew cabin atmosphere; and a set of supercold liquid hydrogen and liquid oxygen tanks mounted on a special pallet in the payload bay as supplemental fuel for the shuttle's electrical generation system.

Modifications already made to Endeavour include:

Additional Nitrogen Tanks

Endeavour does not have additional nitrogen tanks, however the internal electrical and plumbing connections have been built into the spacecraft to allow for their installation. At present, there are no plans and no timetable for installation of these tanks. If installed, they would be located near the current nitrogen tanks below the payload bay.

Additional Cryogenic Tanks

Endeavour has five liquid hydrogen and five liquid oxygen tanks installed internally. On the rest of the orbiter fleet, Columbia also has five tank pairs, and Atlantis and Discovery each have four tank sets. In addition, Endeavour has the internal connections needed to hook up an Extended Duration Orbiter crygenic payload bay pallet, containing four additional tanks of both hydrogen and oxygen. The plumbing sytems on board Endeavour could be hooked up to feed fuel from such a pallet to the spacecraft's three fuel cells, which combine hydrogen and oxygen to create electricity for the shuttle as well as water. The four payload bay tank sets, coupled with five internal sets, provide a 16-day mission capability. For a 28-day mission, four additional tank sets would be required in the payload bay on either a second pallet or larger pallet.

Improved Waste Collection System

Hookups for an Improved Waste Collection System are built into Endeavour. The IWCS compacts human waste and has an increased capacity for storage of waste.

Regenerative Carbon Dioxide Removal System

Endeavour is outfitted with a Regenerative Carbon Dioxide Removal System that may be used in tandem with Lithium Hydroxide (LioH) canisters to remove carbon dioxide from the crew cabin atmosphere. The regenerative system, if used alone, would eliminate the need to carry extensive amounts of LioH canisters for a long flight. Currently, the crew must change out LioH canisters daily as part of spacecraft housekeeping. The regenerative system works by removing the $CO2$ and then releasing it to space through a vent. The new system will not be used alone for Endeavour's first flight, but will be tested. Enough LioH canisters for the first flight will be flown aboard Endeavour to allow proven equipment to be used for the duration. The regenerative system is located under the middeck floor.

Additional Cabin Stowage

Endeavour is outfitted with brackets necessary to mount additional middeck lockers on board. About 127 cubic feet of additional stwoage would be needed for an extended duration flight. The crew compartment size, however, is exactly the same as all other orbiters.

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NASA News

National Aeronautics and
Space Administration
Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Billie Deason
Release No. 91-27

April 5, 1991

NOTE TO EDITORS: MRS. DANA CARTER NOT INVOLVED IN AIRPLANE ACCIDENT

Mrs. Dana Carter, wife of Astronaut Manley L. "Sonny" Carter, Jr., was not involved in the airplane accident on April 5. She is with her family.

We are continuing to receive inquiries regarding a false story circulating about Mrs. Carter.

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NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

April 9, 1991

James Hartsfield
RELEASE NO: 91-028

NOTE TO EDITORS: SHUTTLE 10TH BIRTHDAY FEATURES MANAGERS, CREWS

NASA will celebrate the 10th anniversary of the space shuttle April 15 with a day of activities at the Johnson Space Center, including a roundtable discussion featuring the designers and first crews of the shuttle followed by an evening outdoor ceremony.

Media are invited to attend the roundtable discussion from 1 p.m. to 3 p.m. CDT in JSC's Teague Auditorium, featuring John Yardley, NASA Associate Administrator for Manned Space Flight 1974-1981; Robert Thompson, Space Shuttle Program Manager, 1970-1981; Christopher C. Kraft, JSC Director, 1972-1982; current JSC Director Aaron Cohen, who was Space Shuttle Orbiter Project Manager from 1972-1982; John Young and Robert Crippen, prime crew of STS-1; and Joe Engle and Richard Truly, STS-1 backup crew and prime crew of STS-2.

Participants will present their recollections of events leading up to STS-1 and their present perspectives. If time permits, questions will be taken from the audience.

Beginning at 4:30 p.m., festivities will be held at JSC's Gilruth Recreation Center. They will last until 8:30 p.m. A short ceremony about 6 p.m. will honor the STS-1 crew.

Media wishing to attend either or both of these events should check in at the JSC News Center in building 2 by 5 p.m.

NASA News

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AC 713 483-5111

For Release:

Barbara Schwartz
RELEASE NO. 91-029

April 10, 1991

ASTRONAUT GARDNER NAMED COMMANDANT USAF TEST PILOT SCHOOL

Col. Guy S. Gardner has been named Commandant of the USAF Test Pilot School at Edwards Air Force Base, California. He will leave the astronaut corps in June 1991 to assume his new position which is a part of the Air Force Systems Command.

Gardner was pilot on two Space Shuttle missions, STS-27 a Department of Defense flight aboard Orbiter Atlantis on December 2-6, 1988, and STS-35 ASTRO-1 astronomy laboratory aboard Orbiter Columbia on December 2-10, 1990. He has worked at NASA Johnson Space Center since his selection in May 1980.

After graduating from the Test Pilot School in 1975, Gardner served as a test pilot with the 6512th Test Squadron and then as an instructor test pilot at the Edwards facility.

"We are happy that Guy has this outstanding opportunity. Although we'll miss his expertise here, we will look forward to working with him in his new assignment." deputy director of Flight Crew Operations David Leestma said.

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NASA News

National Aeronautics and
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AC 713 483-5111

For Release:

Kelly Humphries
RELEASE NO. 91-030

April 11, 1991

MEMORIAL ESTABLISHED FOR ASTRONAUT SONNY CARTER

A memorial has been established in the name of Astronaut Manley L. "Sonny" Carter Jr., who was killed April 5, 1991, in the crash of a commuter aircraft at Brunswick, Ga.

The Sonny Carter Memorial Scholarship Fund has been set up in care of the Astronaut Office, Mail Code CB, NASA Johnson Space Center, Houston, Texas, 77058. Donations also may be made in Carter's name to the Boy Scouts of America and sent to the same address.

Carter was born Aug. 15, 1947, in Macon, Ga., and grew up in nearby Warner Robins, Ga. Throughout his youth, he was active in scouting, obtaining the grade of Eagle Scout. He attended Lanier High School in Macon, graduating in 1965. In 1969, he received a bachelor of arts degree from Emory University, and continued his studies at Emory University Medical School, graduating in 1973. While enrolled in medical school, Carter played professional soccer for the Atlanta Chiefs of the North American Soccer League. Carter completed his internal medicine internship at Grady Memorial Hospital in Atlanta.

In 1974, Carter entered the U.S. Navy and completed flight surgeon school in Pensacola, Fla. After serving as a flight surgeon with the 1st and 3rd Marine Air Wings, he was assigned to Naval Flight Training in Beeville, Texas, and received his Naval Aviator wings in 1978. Immediately afterward, Carter was assigned as the senior medical officer aboard the USS Forrestal.

The 43-year-old Navy captain had served as an F-4 fighter pilot with the Marine Fighter Attack Squadron 333 at the Marine Corps Air Station in Beaufort, S.C., and aboard the Forrestal with Marine Fighter Attack Squadron 115.

Carter completed training at the U.S. Navy Fighter Weapons School (TOPGUN) in 1982 and the U.S. Navy Test Pilot School in 1984. During his aviation career, Carter logged more than 3,000 hours and made 160 carrier landings.

Carter joined NASA in 1984 as an astronaut candidate and became a mission specialist in 1985. He was the astronaut representative on numerous NASA projects involving extravehicular activity and human physiology in space flight.

In November 1989, Carter flew aboard the Space Shuttle Discovery on STS-33, a Department of Defense mission. At the time of his death, he was preparing for his second space flight on STS-42, the first International Microgravity Laboratory mission scheduled for January 1992.

"The Astronaut Office will never be the same," said Dan Brandenstein, chief of the Astronaut Office. "Sonny's friendly helpful personality touched all with whom he associated. Likewise, his exceptional technical expertise and versatility resulted in many contributions to all aspects of our nation's space program. Sonny was one of a kind and he will be sorely missed."

He is survived by his wife, Dana, and two daughters, Olivia Elizabeth and Meredith Corvette.

"Sonny was an incredibly active and vital man," said his wife. "Above all, he was a warm and loving husband and father. In addition to his professional career, Sonny dedicated himself to numerous charitable activities."

Carter was the recipient of numerous awards, including the Air Medal, the Meritorious Service Medal, the Navy Achievement Medal, the Navy Meritorious Unit Citation, the Marine Corps Aviation Association Special Category Award, the NASA Meritorious Service Medal and the NASA Space Flight Medal.

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NASA News
National Aeronautics and
Space Administration
Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:
April 12, 1991

Barbara Schwartz
RELEASE NO. 91-031

NOTE TO EDITORS: STS-37 POSTFLIGHT CREW PRESS CONFERENCE

The STS-37 postflight crew press conference will be held Friday, April 19, 1991, at 9 a.m. CDT at the Johnson Space Center in building 2, room 135. News media are invited to participate on location at JSC or by two-way audio from other NASA centers.

The crew members will describe their recent flight which included the successful deployment of the Gamma Ray Observatory and the first spacewalk in more than five years. They will show and narrate film highlights of the mission activities.

The press conference will be broadcast on NASA Select television which is carried on RCA SATCOM F2R, transponder 13, located at 72 degrees west longitude.

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NASA News

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Barbara Schwartz

April 19, 1991

RELEASE NO. 91-032

SHUTTLE CREW ASSIGNMENTS ANNOUNCED

David C. Hilmers, Lt. Col., USMC, has been named mission specialist on STS-42, the International Microgravity Laboratory (IML-01) flight and Jerry L. Ross, Lt. Col., USAF, has been named Payload Commander for the Spacelab D-2 mission, STS-55.

IML-01 launch is scheduled for February 1992 and Hilmers will perform the duties previously assigned to the late Manley L. "Sonny" Carter. "It is with regret that I have to make this selection under these circumstances. We all miss Sonny Carter. He was a special person and friend who can never be replaced," Director of Flight Crew Operations Donald R. Puddy said.

Hilmers served as a mission specialist on three Shuttle flights, two of which were Department of Defense missions, STS- 51J and STS-36. He was one of five crew members on STS-26, the first flight after the Challenger accident, on which the crew successfully deployed NASA's Tracking and Data Relay Satellite.

STS-55, the second German Spacelab flight, is scheduled for February 1993. As Payload Commander, Ross will provide long-range leadership in the development and planning of payload crew science and training activities.

Ross has flown as a mission specialist on three Shuttle missions. On STS-61B, the crew deployed three communications satellites and Ross performed two 6-hour spacewalks to test Space Station construction techniques. Mission STS-27 was a Department of Defense flight. During STS-37, the Gamma Ray Observatory mission, Ross performed an unscheduled spacewalk to assist in the successful deployment of the observatory and a planned spacewalk to test potential maneuvering devices to help crew members move easily about the outside structure of Space Station Freedom.

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NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Barbara Schwartz
RELEASE NO. 91-033

April 25, 1991

NOTE TO EDITORS: NEW SPACE SHUTTLE TO STOP IN HOUSTON

NASA's newest space shuttle, Endeavour, tentatively is scheduled to land at Houston's Ellington Field no earlier than noon, May 2 on its first ferry flight to Kennedy Space Center in Florida. News media and the public are invited to attend the arrival and a brief welcoming ceremony to be held as soon as possible after landing. The area around Hangar 990 will be open from an hour before the time of anticipated arrival until 10 p.m.

Among the participants at the ceremony will be Johnson Space Center Director Aaron Cohen and the astronaut flight crew for Endeavour's first mission, STS-49. Press information will be available in the JSC Newsroom or at the ceremony. News media requests for interviews at the ceremony should be made ahead of time by calling Barbara Schwartz, (713) 483-5111, before May 2.

There will be no reserved parking area for this event. Only television trucks with microwave equipment will be allowed through the gates by Hangar 990.

If the weather is unfavorable, this event may be rescheduled or cancelled. Please call the JSC Broadcast News Service at 483-8600 for updated information on this event.

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NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release

Barbara Schwartz
RELEASE NO. 91-034

April 30, 1991

ACCIDENT DURING TEST INJURES TWO NORTHROP EMPLOYEES

During checkout today of a newly installed engine on NASA 2, a Gulfstream I aircraft, two ground mechanics were injured. They were bleeding fuel from the engine when a spark ignited the fuel.

Northrop Worldwide Aircraft Services, Inc., employees Jeffrey Lightfoot and Joseph Bezner were taken to Humana Hospital-Clear Lake. Lightfoot was admitted to the hospital with a fractured heel. His injury was caused when he jumped from a ladder. Bezner was treated for burns on his hand and released.

The fire was quickly extinguished by on-site personnel with insignificant damage to the aircraft. The accident occurred at 9:30 a.m. at Ellington Field.

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NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Barbara Schwartz
Release NO. 91-035

May 2, 1991

ASTRONAUT MARY CLEAVE JOINS ENVIRONMENTAL PROJECT AT GODDARD

Astronaut Mary L. Cleave, Ph.D., P.E., will become Deputy Project Manager for SeaWiFS, Sea Viewing Wide Field Sensors, at NASA Goddard Spaceflight Center in Greenbelt, Maryland, beginning May 19, 1991.

SeaWiFS is a joint NASA and commercial project to learn about the biological mass in the ocean by studying the chlorophyll content to determine how much plankton is produced. Information on whether plants in the ocean can absorb enough carbon dioxide and produce necessary oxygen to prevent global warming will be one focal point for this research. An eight-channel visible camera for data collection will be launched using a Pegasus booster deployed from a an aircraft.

Cleave has flown on two Space Shuttle missions. During STS 61-B, three telecommunication satellites were deployed and two six-hour "spacewalks" were conducted to demonstrate Space Station Freedom construction techniques. Cleave controlled the Shuttle's robot arm to assist in these activities. On STS-30, crew members successfully deployed the Magellan Venus-exploration spacecraft and performed numerous middeck experiments.

"Earth observations experience I gained as an astronaut will be beneficial to me in this new capacity. I'm eager to have this opportunity to make a contribution to environmental research," Cleave said.

"We are sorry to see Mary leave JSC (Johnson Space Center) but are happy that she will stay in the NASA family. We wish her success in her new job," Director of Flight Crew Operations Donald R. Puddy said.

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NASA News
National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Barbara Schwartz
Release NO. 91-036

May 2, 1991

NASA PREPARES FOR NEXT ROUND OF ASTRONAUT SELECTIONS

NASA conducts astronaut candidate selections on a two-year cycle and has scheduled the next class of candidates for July 1992. Interested individuals may apply until the cut-off date of July 1, 1991. Applications received after the deadline will be eligible for consideration in the next cycle.

After a six-month process which will include screening applications, interviews, and medical evaluations, selections will be announced early in 1992, and the new candidates will report to the Johnson Space Center in July. The limited number of selections to be made every two years is based on projected requirements.

There are two types of astronaut candidate positions--mission specialist and pilot. Successful pilot applicants typically have extensive piloting experience in high-performance jet aircraft and flight test experience. Successful applicants for the mission specialist positions typically have significant backgrounds in the sciences (materials science, earth science, medical science, and space science) or engineering. This year, because of the requirements of some future payloads and experiments, NASA is particularly interested in individuals with backgrounds in medical sciences research, microgravity research, and materials processing.

Applicants for the Astronaut Candidate Program must be citizens of the United States.

An application package may be obtained by writing to the following address:

NASA Johnson Space Center
Astronaut Selection Office
Attn: AHX
Houston, TX 77058

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NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

May 2, 1991

Barbara Schwartz
RELEASE NO. 91-037

NOTE TO EDITORS: ENDEAVOUR FERRY FLIGHT POSTPONED

The newest Space Shuttle, Endeavour, will not be ferried into Houston today. The flight has been postponed because of turbulent weather between Edwards Air Force Base in California and any potential midway points. A weather briefing will be held tomorrow morning prior to takeoff to make a decision on departure and potential routing of the flight. If the flight to Houston is possible, the vehicle will arrive at approximately noon central time at Ellington Field. There will be a welcoming ceremony at that time.

NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Barbara Schwartz
RELEASE NO. 91-037A

May 3, 1991

ENDEAVOUR FERRY FLIGHT SCHEDULE

Space Shuttle Endeavour on top of the Boeing 747 Shuttle Carrier Aircraft will depart Palmdale, California, at 8:15 a.m. central time enroute to Biggs Army Airfield near El Paso, Texas, for an overnight stay. Tomorrow's route will be determined after a weather assessment. The Shuttle cannot fly into rain because of possible damage to the thermal tile covering the spacecraft.

NASA News

National Aeronautics and
Space Administration
Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

Barbara Schwartz
May 4, 1991
RELEASE NO. 91-037B

UPDATE TO SPACE SHUTTLE ENDEAVOUR FERRY FLIGHT

The Space Shuttle Endeavour stayed at Biggs Army Airfield near El Paso, Texas, last night following the first leg of its ferry flight to the Shuttle Landing Facility at Kennedy Space Center in Florida.

Plans for continuing the cross-country journey will be determined later today after assessment of weather. A decision is not expected before midday.

NASA News
National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

Barbara Schwartz
RELEASE NO. 91-037C

May 4, 1991

SPACE SHUTTLE ENDEAVOUR TO MOVE ON SUNDAY

The Space Shuttle Endeavour will remain on the ground at Biggs Army Air Field near El Paso tonight before continuing it's cross country journey to Florida tomorrow.

Current plans are for Endeavour to travel atop it's 747 carrier aircraft from Biggs to Kelly Air Force Base in San Antonio as early in the day as central Texas weather will permit. Weather in that region is expected to clear by midday. A decision to continue the trip to Florida or to remain overnight at Kelly will be made based on further weather assessment and available time.

At this time, Houston area weather is not expected to support an appearance at Ellington Field on Sunday. Should Endeavour remain in San Antonio Sunday night, a decision will be made early Monday morning on the routing of the flight for that day.

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NASA News

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

May 5, 1991

Barbara Schwartz
RELEASE NO. 91-037D

SPACE SHUTTLE ENDEAVOUR TO MOVE TODAY

The Space Shuttle Endeavour remained on the ground at Biggs Army Air Field near El Paso overnight and is expected to continue it's cross country journey to Florida today.

Current plans are for Endeavour to travel atop it's 747 carrier aircraft from Biggs to Kelly Air Force Base in San Antonio as early in the day as central Texas weather will permit. Weather in that region is expected to clear by midday. A decision to continue the trip to Florida or to remain overnight at Kelly will be made based on further weather assessment and available time.

At this time, Houston area weather is not expected to support an appearance at Ellington Field today. Should Endeavour remain in San Antonio tonight, a decision will be made early tomorrow on the routing of the flight for the remainder of the trip.

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NASA News
National Aeronautics and
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For Release:

Barbara Schwartz
RELEASE NO. 91-037E

May 5, 1991

SPACE SHUTTLE ENDEAVOUR AND SCA FLY TO KELLY AFB, TX

The Space Shuttle Endeavour traveled atop its 747 carrier aircraft today from Biggs Army Air Field near El Paso to Kelly Air Force Base in San Antonio. It left Biggs about 2 p.m. CDT and arrived at Kelly Air Force Base in San Antonio at 3:25 p.m. Managers will meet in a weather briefing at 6:30 p.m. today to discuss tomorrow's plans for Endeavour's journey to Kennedy Space Center.

NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Barbara Schwartz
RELEASE NO. 91-037F

May 5, 1991

SPACE SHUTTLE ENDEAVOUR AND SCA FLY TO STOP IN HOUSTON

The Space Shuttle Endeavour atop its 747 carrier aircraft is expected to stop over briefly Monday at Ellington Field in Houston on its way to the Kennedy Space Center, Florida. Endeavour will arrive in Houston at approximately 10 a.m. CDT and remain until 2 p.m. before flying on to Columbus AFB, Miss., where it will stay the night.

Endeavour is on a cross-country trek from the orbiter's assembly plant in California to KSC where it will be prepared for its first space flight in 1992.

Poor weather along the route has slowed the trip. The orbiter and 747 have made stops at Biggs Army Air Field near El Paso and Kelly Air Force Base in San Antonio. Endeavour spent Sunday night at Kelly AFB after flying in from El Paso Sunday afternoon.

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NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Barbara Schwartz
RELEASE NO. 91-038

May 7, 1991

NOTE TO EDITORS: STS-39 POSTFLIGHT CREW PRESS CONFERENCE

The STS-39 postflight crew press conference will be held Friday, May 17, at 1:30 p.m. central time at the Johnson Space Center, building 2, room 135. News media are invited to participate on location at JSC or by two-way audio from other NASA centers.

The crew members will describe their recent Department of Defense flight and show film highlights of the mission activities.

The press conference will be broadcast on NASA Select television which is carried on RCA SATCOM F2R, transponder 13, located at 72 degrees west longitude.

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NASA News

National Aeronautics and Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

May 7, 1991

Barbara Schwartz
RELEASE NO. 91-039

NOTE TO EDITORS: STS-40 PREFLIGHT BRIEFINGS

Preflight briefings on the Spacelab Life Sciences 1 flight, Space Shuttle mission STS-40, will be held May 14-15. On Tuesday, the briefings will originate from the Johnson Space Center, building 2, room 135, beginning at 1:30 p.m. CDT with a mission overview by lead flight director Al Pennington followed at 2:30 p.m. by the astronaut crew briefings. On Wednesday beginning at 9 a.m. CDT, the mission scientists will provide detailed information on the life sciences research to be conducted on this Spacelab mission. Wednesday's briefings will begin at Johnson Space Center and conclude at Kennedy Space Center.

News media may participate from these locations or by two-way audio from other NASA centers. The briefings will be carried on NASA Select television, Satcom F2R, transponder 13, at 72 degrees West longitude, frequency 3960.0 MHz, Audio 6.8 MHz.

Because of scheduling constraints, the flight crew will not have time for round-robin interviews, and the mission scientists will not be able to participate in additional briefings before the flight.

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NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

May 15, 1991

Ed Campion
NASA Headquarters
(202) 453-8536

Pam Alloway
Johnson Space Center
Release No. 91-040

NASA Awards Operations Automatic Data Processing Contract

NASA today announced the selection of IBM Federal Sector Division of Houston as the company with which it will negotiate concerning a 13-year contract to provide as many as 48 ground based mission operations main frame computer systems, peripheral equipment and services.

These computer systems will be used in the development of the Space Station Mission Control Center and the Space Station Training Facility. Additionally, they will be used in upgrading systems in the existing Mission Control Center and Shuttle Mission Training Facility. This contract also will provide ground based computer systems for future, yet unspecified, programs at JSC and other NASA centers.

The proposed indefinite delivery/indefinite quantity, firm-fixed price contract consists of a basic eight year performance period with five additional one year options.

During the initial eight year period, the U.S. Government will be able to issue delivery orders for hardware, system software, services and maintenance up to maximum quantities specified in the contract. The five additional one-year options may be used only for the purchase of maintenance for hardware and system software acquired under the proposed contract.

Because of its indefinite delivery/indefinite quantity feature, the value of the Operations Automatic Data Processing contract will depend upon the number and type of systems, equipment, and services which NASA will order under the contract. It is anticipated that about $191 million in delivery orders may be issued during the 13 year contract period. However, that amount may increase, depending upon future requirements.

-more-

The proposed contract will require the contractor to provide commercial off the shelf hardware and system software as well as commercially available system engineering, maintenance, and training services as specified in delivery orders issued against the proposed contract. No funds will be obligated and the U.S. Government will not incur any liability except as a result of an issuance of a delivery order.

JSC's Mission Operations Directorate is responsible for the OADP contract.

The other companies submitting proposals were: Encore Computer Corporation of Fort Lauderdale, Fla. and Convex Computer Corporation of Houston. The Convex proposal, however, was submitted late and was not evaluated.

-end-

NASA News
National Aeronautics and Space Administration
Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:
May 15, 1991

Ed Campion
NASA Headquarters

Pam Alloway
Johnson Space Center
Release No. 91-041

NASA Awards Institutional Automatic Data Processing Contract

NASA today announced the selection of PacifiCorp Capital Inc. of Reston, Va. as the company with which it will negotiate a contract for Institutional Automatic Data Processing.

IADP will support the Johnson Space Center and the White Sands Test Facility by providing IBM-compatible central processing unit subsystems, direct access storage device subsystems, cartridge tape drive subsystems, and front end processor subsystems. The IADP support services will include maintenance, initial systems engineering support, per-call systems engineering support, operator training, documentation, and facilities and resources for benchmarking activities.

Amdahl Corporation of Washington, D.C. and Memorex Telex of Vienna, Va. were proposed as subcontractors with PacifiCorp Capital Inc.

IADP is a firm-fixed price, indefinite delivery/indefinite quantity type contract. The initial contract period of performance will be for one year, followed by nine additional one-year option periods.

IADP will provide IBM plug-compatible systems for JSC and WSTF for five years. Maintenance on these systems would continue for an additional five years for systems procured in the second through fifth years of the contract.

Because of its indefinite delivery/indefinite quantity feature, the value of the IADP contract will depend on the number and type of systems, equipment, and services NASA will order under the contract. It is anticipated that about $54 million in delivery orders may be issued during the 10 year contract period. However, that amount may increase, depending on future requirements. JSC's Information Systems Directorate is responsible for IADP.

The other contractor which submitted a proposal was Federal Data Systems Corporation of Bethesda, Md. and its associated subcontractors were IBM Corporation of Houston and Storage Technology Corp. of Silver Spring, Md.

-end-

NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Jeffrey Carr
Release No. 91-042

May 16, ~~1990~~ 1991

FLIGHT CONTROL OF STS-40

Flight control for STS-40, the forty-first voyage of the Space Shuttle, the eleventh flight of Columbia, will follow the procedures and traditions common to U.S. manned space flights since the Mission Control Center was first used in 1965.

STS-40 marks the first use of the Spacelab long module since October, 1985, and the first Space Shuttle mission dedicated exclusively to study of human physiology and the relative effects of the micro-gravity environment.

Responsibility for conduct of the mission will revert to the Mission Control Center (MCC) in Houston once Columbia lifts off at the Kennedy Space Center. Mission support will begin in the MCC about five hours prior to launch and will continue around-the-clock through the landing and post-landing activities.

Once Columbia has been cleared for orbital operations, and Spacelab systems have been activated, management of science activities will be the responsibility of JSC controllers manning the Payload Operations Control Center (POCC) at the Marshall Space Flight Center in Huntsville, Alabama.

These simultaneous operations will be conducted around the clock. Throughout the orbital phase, voice communications between Columbia and the ground will be carried on two separate channels--one devoted to science operations, the other devoted to Orbiter operations.

Science operations will be the subject of communications on the air-to-ground one (A/G-1) channel, with the Crew Interface Coordinator (CIC) at the POCC using the call sign "Huntsville," and the crew using the call sign "Spacelab." Orbiter flight operations will be the subject of communications on the air-to-ground two (A/G-2) channel, with the spacecraft communicator (CAPCOM) in the MCC using the call sign "Houston," and the orbiter hailed as "Columbia."

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In Houston, the mission will be conducted from Flight Control Room One (FCR-1) on the second floor of the MCC located in Bldg. 30 at Johnson Space Center. The teams of flight controllers will alternate shifts in the control center and in nearby analysis and support facilities. The handover between each team takes about an hour and allows each flight controller to brief his or her oncoming colleague on the course of events over the previous two shifts.

Four flight control teams for this mission will be referred to as the Ascent/Entry, Orbit 1, Orbit 2, and Planning teams. The ascent and entry phases will be conducted by Flight Director N. W. (Wayne) Hale. The Orbit 1 team will be headed by Flight Director R. E. (Bob) Castle. The Orbit 2 team, who will support the activation and deactivation of the Spacelab, will be led by Lead STS-40 Flight Director, G. A. (Al) Pennington. The Planning team will be directed by J. W. (Jeff) Bantle.

MCC POSITIONS AND CALL SIGNS FOR STS-40

The flight control positions in the MCC, and their responsibilities, are:

Flight Director (FLIGHT)

Has overall responsibility for the conduct of the mission.

Spacecraft Communicator (CAPCOM)

By tradition an astronaut; responsible for all voice contact with the flight crew.

Flight Activities Officer (FAO)

Responsible for procedures and crew timelines; provides expertise on flight documentation and checklists; prepares messages and maintains all teleprinter and/or Text and Graphics System traffic to the vehicle.

Integrated Communications Officer (INCO)

Responsible for all Orbiter data, voice and video communications systems; monitors the telemetry link between the vehicle and the ground; oversees the uplink command and control processes.

Flight Dynamics Officer (FDO)

Responsible for monitoring vehicle performance during the powered flight phase and assessing abort modes; calculating orbital maneuvers and resulting trajectories; and monitoring vehicle flight profile and energy levels during reentry.

Trajectory Officer (TRAJECTORY)

Also known as "TRAJ," this operator aids the FDO during dynamic flight phases and is responsible for maintaining the trajectory processors in the MCC and for trajectory inputs made to the Mission Operations Computer.

Guidance, Navigation & Control Systems Engineer (GNC)

Responsible for all inertial navigational systems hardware such as star trackers, radar altimeters and the inertial measurement units; monitors radio navigation and digital autopilot hardware systems.

Guidance & Procedures Officer (GPO)

Responsible for the onboard navigation software and for maintenance of the Orbiter's navigation state, known as the state vector. Also responsible for monitoring crew vehicle control during ascent, entry, or rendezvous.

Rendezvous Guidance and Procedures Officer (RENDEZVOUS)

This position is a GPO specialist who onboard navigation of the Orbiter during rendezvous operations, and advises the control team on the status and effect of rendezvous events.

Environmental Engineer & Consumables Manager (EECOM)

Responsible for all life support systems, cabin pressure, thermal control and supply and waste water management; manages consumables such as oxygen and hydrogen.

Electrical Generation and Illumination Officer (EGIL)

Responsible for power management, fuel cell operation, vehicle lighting and the master caution and warning system.

Payloads Officer (PAYLOADS)

Coordinates all payload activities; serves as principal interface with remote payload operations facilities.

Data Processing Systems Engineer (DPS)

Responsible for all onboard mass memory and data processing hardware; monitors primary and backup flight software systems; manages operating routines and multi-computer configurations.

Propulsion Engineer (PROP)

Manages the reaction control and orbital maneuvering thrusters during all phases of flight; monitors fuel usage and storage tank status; calculates optimal sequences for thruster firings.

Booster Systems Engineer (BOOSTER)

Monitors main engine and solid rocket booster performance during ascent phase.

Ground Controller (GC)

Coordinates operation of ground stations and other elements of worldwide space tracking and data network; responsible for MCC computer support and displays.

Maintenance, Mechanical, Arm & Crew Systems (MMACS)

Formerly known as RMU; responsible for remote manipulator system; monitors auxilliary power units and hydraulic systems; manages payload bay and vent door operations.

Extravehicular Activities (EVA)

A specialist responsible for monitoring and coordinating preparations for and execution of space walks. Responsibilities include monitoring suit and EVA hardware performance.

Payload Data & Retrieval System (PDRS)

A specialist responsible for monitoring and coordinating the operation of the remote manipulator system.

Flight Surgeon (SURGEON)

Monitors health of flight crew; provides procedures and guidance on all health-related matters.

Public Affairs Officer (PAO)

Provides real-time explanation of mission events during all phases of flight.

# # #

STS-40 FLIGHT CONTROL TEAM STAFFING

Position	Ascent/Entry	Orbit 1	Orbit 2	Planning
FLIGHT	Wayne Hale	Bob Castle	Al Pennington	Jeff Bantle
CAPCOM	Ken Bowersox (A) Steve Oswald (E)	Bill Shepherd	Marsha Ivins	Kathy Thornton
FAO	Fisher Reynolds	Fisher Reynolds	Debbie Jackson	John Curry
INCO	Harry Black	Harry Black	Roberto Moolchan	Richard LaBrode
FDO	Ed Gonzalez (A) Doug Rask (E)	Debbie Langan	Dan Adamo	Tim Brown
TRAJ	Bruce Hilty (A) Keith Fletcher (E)	Steve Stich	Richard Theis	Bill Britz
GPO	Jeff Bertsch (A) Dennis Bentley (E)	/////	/////	/////
EECOM	Dave Herbek	Pete Cerna	Quinn Carelock	Dan Molina
EGIL	Robert Floyd	Robert Floyd	Charles Dingell	Robert Armstrong
PAYLOADS	Debbie Bulgher	Debbie Bulgher	Roger Galpin	Debbie Pawkett
DPS	Gloria Araiza	Gloria Araiza	David Tee	Terry Keeler
PROP	Tony Ceccacci	Tony Ceccacci	Matt Barry	Bill Powers

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STS-40 FLIGHT CO[illegible]L TEAM STAFFING
(Continued)

Position	Ascent/Entry	Orbit 1	Orbit 2	Planning
BOOSTER	Franklin Markle (A) Jon Reding (E)			
GNC	Steve Elsner	Stanley Schaefer	Kenneth Bain	Edward Trlica
GC	Per Barsten Larry Foy	John Wells Frank Stolarski	Ed Klein Joe Aquino	Bob Reynolds Terry Quick
MMACS	James Medford	James Medford	Alan Bachik	Ladessa Hicks
SURGEON	Denise Baisden Larry Pepper	Brad Beck	John Schulz	/////
PAO	Kyle Herring (A) James Hartsfield (E)	Kyle Herring	Jeff Carr	Pam Alloway
POCC PAO	Billie Deason	Billie Deason Brian Welch	Brian Welch	

(A) = Ascent; (E) = Entry

# # #

NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
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For Release:

Barbara Schwartz
RELEASE NO. 91-043

May 16, 1991

NOTE TO EDITORS: NEWSROOM SCHEDULE FOR UPCOMING SHUTTLE MISSION

The Spacelab Life Sciences-1 Mission, STS-40, is a nine-day flight dedicated to life sciences research and is scheduled to be launched on May 22, at 7 a.m. CDT. The Johnson Space Center Newsroom will be open on launch day from 5 a.m. until 7 p.m. CDT, and from 3:30 a.m. to 7 p.m. CDT for the remainder of the mission. This is a change from the usual 24-hour mission operation schedule.

The news media working area located in the Teague Auditorium will be open to reporters 24 hours a day, and television coverage of mission operations will be around the clock.

NASA Select programming will continue to be broadcast on a 24-hour schedule. Two special programs will be broadcast daily. "Today in Space" hosted by astronauts Bonnie Dunbar and Robert L. "Hoot" Gibson is scheduled for 2 p.m. CDT, and a mission status briefing is scheduled for 3 p.m. CDT. These programs are in addition to other television events such as flight deck, middeck, and Payload Operations Control Center activities. NASA Select can be accessed through GE Satcom F2R transponder 13. The frequency is 3960 MHz with a look angle of 72 degrees West longitude. Two-hour edited programs of each flight day's activities will be replayed for Hawaii and Alaska at 11 p.m. CDT on Spacenet 1, transponder 18. The look angle is 120 degrees West longitude, and a frequency of 4060.8 MHz. Audio is on 6.8 MHz.

This is the first Spacelab mission to be managed by Johnson Space Center. Principal human life sciences investigators will be at JSC during the mission operations. JSC personnel will direct Spacelab science activities from the Spacelab Mission Operations Control facility at the Marshall Space Flight Center in Huntsville, Alabama.

For more information on mission activities, please call the JSC newsroom at (713) 483-5111.

# # #

NASA News

National Aeronautics and
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For Release:

Pam Alloway
RELEASE NO. 91-044

May 24, 1991

SPRING PLANTING AND CROP HARVEST TIME UNDERWAY AT NASA

Spring is not only planting time at Johnson Space Center, Houston, it also is harvest time in the Engineering Directorate's Crew and Thermal Systems Division (CTSD). And the crop harvested will give scientists and engineers vital information that could impact human's self-sufficiency on the Moon and Mars.

CTSD scientists and engineers on May 30 will harvest their first research crop of Waldman's Green Lettuce grown in a specially outfitted chamber at Johnson. This crop follows the successful harvest of a test crop of lettuce in late February, that marked an important milestone in studies on Regenerative Life Support Systems (RLSS). These studies are focusing on recycling air and water and the production of food, all critical elements to NASA's future long duration missions.

CTSD personnel designed the test that ended with the February harvest to verify the new fully-automated RLSS test-bed plant growth chamber, its ability to operate at reduced atmospheric pressures that more closely duplicate lunar and martian habitat environments and whether it can grow crops from seed to harvest with minimal human intervention.

The crop in the RLSS test bed is grown in an array of 480 receptacles that contain a solid substrate medium irrigated with a standardized nutrient solution added via an automated irrigation system. The test bed was designed to grow enough plants to provide food for one person and air and drinking water for several people, said Wil Ellis, CTSD chief.

"We can control and monitor all environmental conditions essential to plant growth," said Don Henninger, RLSS chief scientist. "There are about 250 measurements obtained every hour."

more

Samples of the chamber's atmosphere pass through a series of gas analyzers to measure and control the atmospheric composition. Outside the chamber are three large tanks in which excess oxygen produced by plants during photosynthesis is stored. Nearby, two other tanks hold carbon dioxide which is injected to meet plant photosynthesis requirements. Water transpired by the plants is collected, measured and analyzed.

Engineers and scientists have taken a multi-level approach to JSC's RLSS project. The project includes physical and chemical life support research, plant growth research and life sciences requirements, all of which contribute to a RLSS data base. Scientists and engineers will use this information to develop a human-rated RLSS test facility.

"The purpose of the regenerative life support system test bed is to gather data to provide information for designing similar systems for lunar and Mars' bases," said Ellis. "The four unique aspects of this regenerative life support test bed activity that JSC offers the agency are: a closed chamber; reduced pressure capability; integration of biological, physical, and chemical systems; and the ability to get direct engineering data to build a human-rated test facility."

A RLSS would make humans on a lunar or Mars outpost more self-sufficient and less dependent on resupplied expendables from Earth, Ellis said. The system would use plants and microbes in various bioregenerative processes to produce food and regenerate the outpost's air and water.

Ellis said it is likely a life support system for a lunar or Mars outpost will combine advanced biological, physical and chemical regenerative systems and current shuttle-type or proposed space station life support technologies. An initial outpost, not much larger than a spaceship, probably would use pumps, fans and filters similar to those found in the shuttle or the proposed space station life support system. Later, the outpost's life support system could evolve into progressively more complex systems with integrated physical, chemical and biological components.

Scientists and engineers working on this project are focusing research efforts on integrating a RLSS in preparation for eventual flight hardware development. Along with that effort is the need to identify areas where technology development is necessary to coordinate the integration and allow the systems to evolve together.

Scientists and engineers are in phase two of a four phase RLSS project. During this phase, they will add hydroponics to their growing regimen which now uses a solid substrate medium. By using a hydroponic system, plants will grow in a continuous flowing nutrient solution rather than a solid substrate. To complete the first phase, a lunar simulant will be used in the near future to grow lettuce in the growth chamber.

Scientists opted not to concentrate on hydroponics exclusively because the lunar soil has some unique characteristics. Synthetic soils called zedlites can be manufactured from lunar materials. The third phase will allow for the study of plant growth in sub-ambient total gas pressures, while the fourth phase will incorporate physical and chemical systems. The current study provides a baseline data set for system performance evaluations to be made in later phases of the project.

- end -

A 3 minute-11 second video clip, called Recycling In Space, is available from the Johnson Space Center Media Services Branch by calling (713) 483-5111.

NASA News

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For Release:

Kari Fluegel May 28, 1991

Release No. 91-045

NEW TRANSPORT VEHICLE ALLOWS MORE TIMELY ORBITER EGRESS

A new transport vehicle, designed to improve egress for shuttle crewmembers after space flight, will be introduced to the landing operations when the STS-40 crew returns from their nine-day flight. The new Crew Transport Vehicle (CTV) joins the landing convoy to permit safer, more efficient crew egress and will facilitate medical investigations that take place immediately after landing.

The CTV is a renovated "people mover" acquired from the Baltimore Washington International Airport earlier this year. "People-movers" are used at large airports worldwide to transport passengers from the terminal to the aircraft. These vehicles can be raised or lowered by lifts from a floor height of 5 feet 9 inches to a maximum of 18 feet 4 inches for convenience in loading and unloading passengers.

NASA will use the new CTV to allow the crew efficient egress after shuttle flights to facilitate life science or mediacal investigations and to ferry crewmembers from the orbiter after landing, said Travis Brown, manager of flight projects for the Medical Sciences Division, NASA's Johnson Space Center, Houston.

As after past landings, the convoy's "white room" vehicle, housing the shuttle changeout crew and flight surgeons, will move into place at the hatch once the orbiter is safed. When the hatch is opened, the changeout crew and flight surgeons will enter, Brown said. The CTV will pull up next to the white room and extend a ramp to the orbiter.

Inside the CTV, the passenger seats have been removed and the interior remodeled to meet the unique needs of the returning astronauts. The CTV provides space for special equipment and for the CTV crew including space suit technicians, medical personnel and a driver. The vehicle will be maintained along with other convoy vehicles at NASA's Dryden Flight Research Facility, Edwards, Calif.

The CTY contains 11 standard chairs, seven astronaut special chairs, a bathroom, refrigerator, stryker stretcher and stowage, all located in compartments behind the vehicle driver's area.

Brown added that because of its past use as an airport vehicle, the CTV has a number of safety provisions installed to meet Federal Aviation Administration safety guidelines.

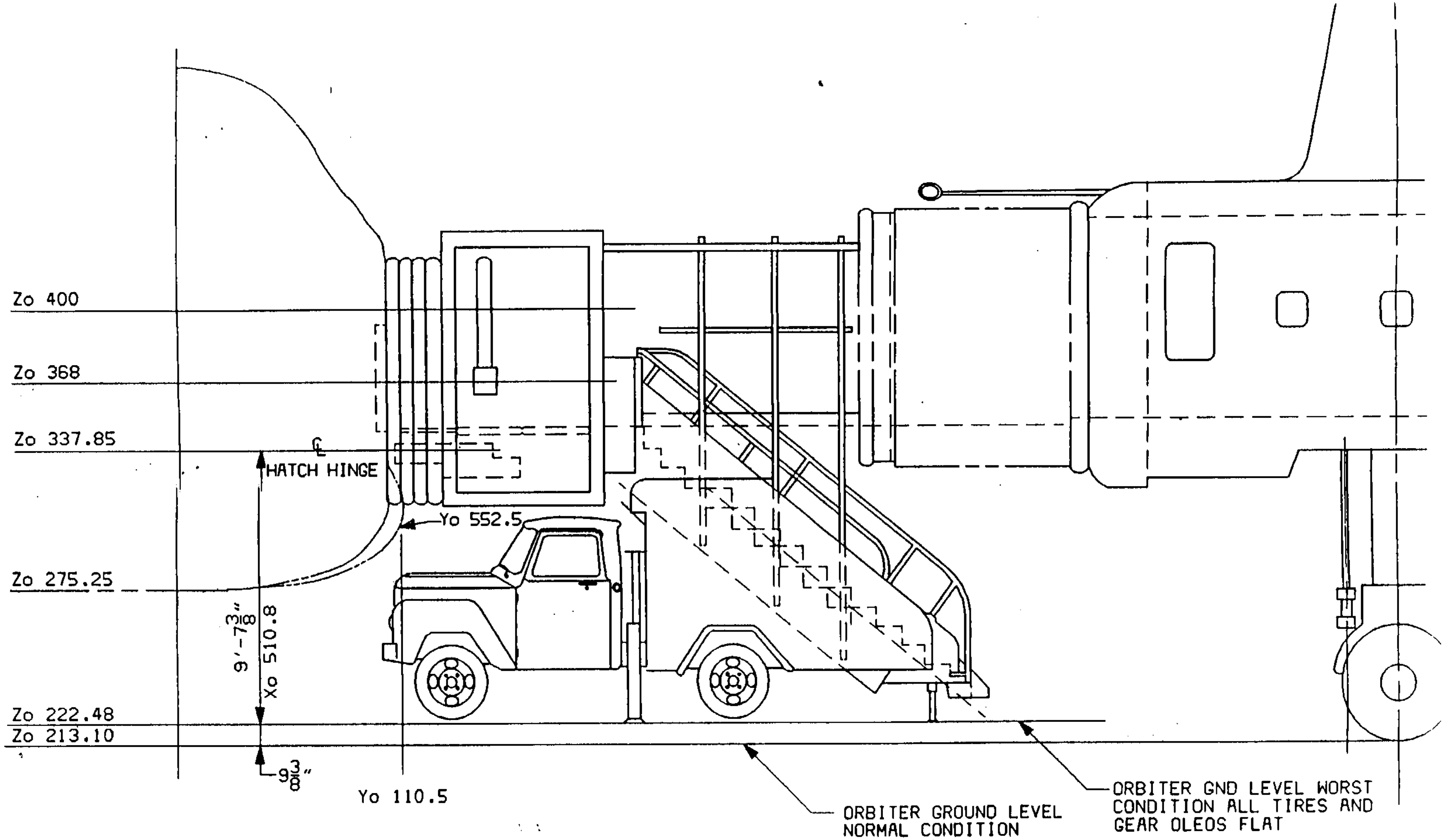
For STS-40, which is dedicated to the exploration of the human body's reaction in space, the ability to get information immediately after flight enhances the investigations done on orbit before the crew readapts to the presence of gravity, Brown said.

"When NASA decided to try to extend shuttle mission durations, a medical investigation project was initiated to both assess the risks of longer exposure to microgravity and develop some inflight countermeasures to enhance readaptation," Brown said.

- end -

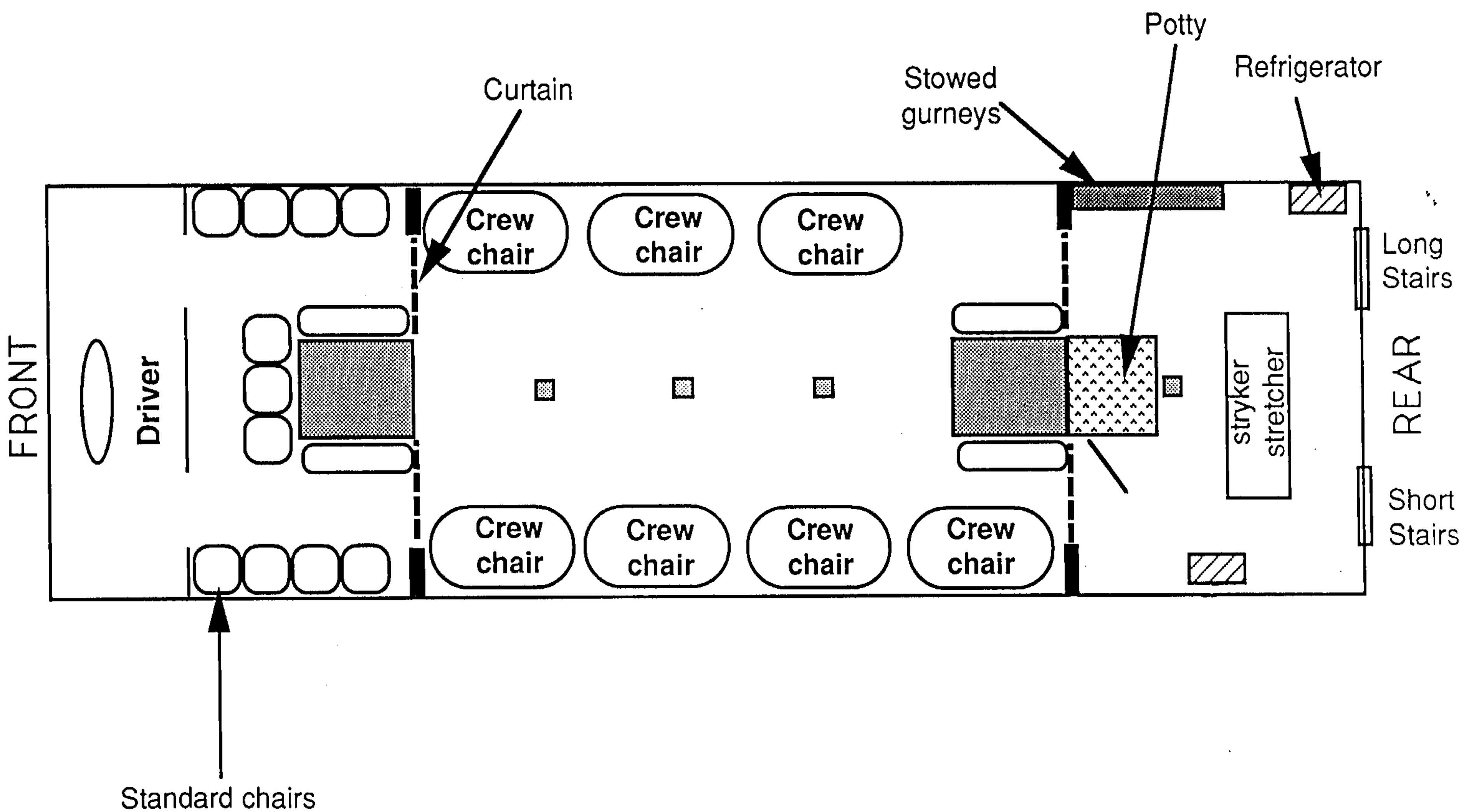
Crew Transport Vehicle Specifications

Overall width of body	15 ft. 6 in.
Overall height in lowered position	14 ft. 9 in.
Floor height in lowered position	5 ft. 9 in.
Floor height in max. elevated position	18 ft. 4 in.
Height of shuttle hatch bottom	10 ft. 6 in.
Overall length with gangway retracted	49 ft. 0 in.
Overall length with gangway extended	59 ft. 4 in.
Chassis wheel base	21 ft. 8 in.
Weight of elevating body	32,000 lbs.
Chassis weight	42,000 lbs.
Driver and fuel	800 lbs.
Operating weight	74,800 lbs.
Maximum speed	20 mph
Maximum acceleration rate	1.6 mph/sec.
Maximum braking rate	5.0 mph/sec
Minimum lifting time to maximum elevation	60 sec.



ELEVATION

SCALE: NONE


Curtain
Stowed gurneys
Potty
Refrigerator
Crew chair
Crew chair
Crew chair
Long Stairs
FRONT
Driver
stryker stretcher
REAR
Crew chair
Crew chair
Crew chair
Crew chair
Short Stairs
Standard chairs

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For Release:

Pam Alloway
Release No. 91-046

May 28, 1991

JSC SELECTS OPERATIONS SUPPORT SERVICES CONTRACTOR

NASA's Lyndon B. Johnson Space Center, Houston, has selected Johnson Controls World Services, Inc., Cape Canaveral, Fla., to begin final negotiations for the JSC plant maintenance and operation support requirements contract.

The total proposed cost and fee of the 5-year effort, beginning Nov. 1, is about $96 million. The 5-year performance period will be divided into a 1-year base contract period and four 1-year contract option periods. The award will be a continuation of the maintenance and operations support currently being performed by Johnson Controls World Services, Inc.

The contracted work will be performed at JSC and at NASA-owned facilities at Ellington Field in Houston. The work covered under the contract includes the continuous operation and maintenance of all JSC utility systems, potable water systems, electrical power systems, waste disposal systems, building structures, roads, parking lots and a variety of special equipment.

- end -

NASA News

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For Release:

Barbara Schwartz
RELEASE NO. 91-047

May 30, 1991

ASTRONAUT LOUNGE TO LEAVE NASA

Astronaut John M. "Mike" Lounge will leave NASA June 21 to become Director of Houston Operations for SPACEHAB, Inc. SPACEHAB is providing a pressurized module to be flown in the orbiter's payload bay to augment NASA's ability to carry middeck experiments. It will fly on a series of Space Shuttle flights beginning in late 1992.

Lounge is currently Chief of the Space Station Support Office in the Flight Crew Operations Directorate, dealing with Space Station design and operation. Lounge was hired by JSC in 1978 as an engineer in the Payloads Operations Division. He was selected as an astronaut candidate in 1980.

Lounge has flown on three Shuttle missions: STS 51-I launched August 23, 1985; STS-26, September 29, 1988; and STS-35 December 2, 1990. During STS 51-I, Lounge deployed the Australian AUSSAT communications satellite and operated the Shuttle's robot arm while fellow crew members successfully repaired the SYNCOM IV-3 satellite. Two other communications satellites were deployed on this mission. On STS-26, the first flight to be flown after the Challenger accident, the crew successfully deployed NASA's Tracking and Data Relay Satellite (TDRS-C). Lounge was flight engineer on STS-35, ASTRO-1, which was dedicated to astronomical research.

"Mike has made many significant contributions to this organization and to the space program during his tenure. He will be missed by everyone. We wish him the best in his new position and look forward to working with him in this capacity," Director of Flight Crew Operations Donald R. Puddy said.

-more-

Lounge provided the following statement regarding his decision to leave NASA:

"This is a very tough job to leave, but I feel that three flights is my fair share, and I'm ready for a new challenge.

"I remain completely dedicated to our long-term mission of the exploration and exploitation of Space. We are building the pyramids of our civilization, and it takes a huge team to get that done. I'm not leaving the team, I'm just changing positions.

"For the past several years I have been working on design and operations concepts for the Space Station Freedom. When I made my decision to leave NASA several months ago, I thought the Station program was finally in pretty good shape and could look forward to a period of stability and real design progress. I'm sorry to see such a vital project become embroiled in politics. The Station is a very important stone in this pyramid we are building.

"I'll always be inspired by the professionalism, the dedication, and the talent of the great NASA family."

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NASA News

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For Release:

Pam Alloway
Release No. 91-048

June 4, 1991

NASA AWARDS AVIONICS SYSTEMS ENGINEERING CONTRACT

NASA has awarded an avionics systems engineering and analysis support contract to the Charles Stark Draper Laboratory, Cambridge, Mass. The work will be performed at Cambridge and at the contractor's offices adjacent to the Johnson Space Center, Houston.

The estimated value of the 3-year basic period covered by the contract, which runs from June 10, 1991 through June 9, 1994, is $46.7 million. The estimated values of the two 1-year priced options are $15.4 million and $15.7 million. The total estimated value of the 5-year contract is $77.8 million.

The contract covers engineering support and verification of the Space Shuttle avionics system; engineering assessment of Space Station Freedom guidance, navigation and control system and information system; research and development in guidance, navigation and control systems for advanced spacecraft, both manned and unmanned; and related design activities for NASA technology initiatives.

- end -

NASA News

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Barbara Schwartz
Release No. 91-49

June 17, 1991

SHUTTLE MISSION STS-43 BRIEFINGS SET

A series of preflight briefings on Space Shuttle mission STS-43 will be held June 26 and 27 at the Johnson Space Center, Houston, building 2, room 135.

The primary payload Tracking and Data Relay Satellite briefing will be Wednesday at 9 a.m. EDT followed by the STS-43 crew briefing at 9:30 a.m. The astronaut crew will be available for round robin interviews after the briefing. Media representatives wishing to participate in the interviews should notify the JSC newsroom by the afternoon of June 24.

Beginning at 9 a.m. on Thursday, lead flight director Rob Kelso will present a mission overview followed by payloads briefings on the Space Station Heat Pipe Advanced Radiator Element-II, Bioserve-Instrumentation Technology Associates Materials Dispersion Apparatus and Protein Crystal Growth.

All briefings will be carried on NASA Select television with two-way audio for questions and answers from other NASA centers. NASA Select programming is carried on Satcom F2R, transponder 13, located at 72 degrees west longitude.

- end -

NASA News

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For Release:

Barbara Schwartz
Release No. 91-050

June 17, 1991

STS-40 POSTFLIGHT CREW PRESS CONFERENCE

The STS-40 postflight crew press conference will be held Friday, June 28, at 2 p.m. EDT at the Johnson Space Center, Houston, in building 2, room 135. News media are invited to participate on location or by two-way audio from other NASA centers.

The crew members will describe their recent Spacelab Life Sciences mission while narrating film highlights of the mission activities.

The press conference will be broadcast on NASA Select television which is carried on SATCOM F2R, transponder 13, located at 72 degrees west longitude.

- end -

NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
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For Release:

June 20, 1991

Billie Deason
RELEASE NO. 91-051

NOTE TO EDITORS: HOUSE SUBCOMMITTEE ON SPACE TO VISIT JOHNSON SPACE CENTER

Several members of the House Subcommittee on Space, chaired by Rep. Ralph Hall, D-TX, will visit JSC Saturday, June 22.

The visit is part of a trip to Kennedy Space Center, Florida; Marshall Space Flight Center, Alabama; and JSC, coordinated by the NASA Headquarters Office of Legislative Affairs.

Members expected for the JSC portion of the trip are Chairman Ralph Hall, D-TX; Rep. Jim Bacchus, D-FL; Rep. Robert "Bud" Cramer, D-AL; Rep. Ron Packard, R-CA; Rep. John Rhodes III, R-AZ; and Rep. Joe Barton, R-TX.

A brief media opportunity is scheduled at the conclusion of the tour at 11:45 a.m. at the Bldg. 30 Space Station Control Center.

Media interested in participating should contact the JSC Media Services Branch for credential and scheduling details.

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NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
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For Release:

Kelly Humphries
RELEASE NO. 91-52

June 21, 1991

JSC SPACE ACT, SUGGESTION AWARD WINNERS IN SPOTLIGHT

JSC's contributions to world technology and its efforts to keep program costs down were spotlighted recently when employees received two of the largest Space Act and Suggestion Awards ever.

Dr. Frederic Dawn of JSC's Crew and Thermal Systems Division received a $25,000 Space Act Award for a scientific or technical contribution. He was recognized for his development and application of nonflammable, high-temperature Beta fibers. Beta fibers, developed for use on Apollo space suits, are now being used as a lightweight roofing material for structures like the Detroit Lions' Silverdome in Pontiac, Mich.

This is only the second time such a sizable award has been presented throughout NASA, said Duane Ross, chief of Human Resources' Program Support Branch. The first $25,000 award went to Richard Whitcomb of Langley Research Center in 1974 for a super critical wing that increases fuel economy and aircraft range at transonic speeds.

JSC's largest Suggestion Award in the past three years -- $4,905 -- went to Mark Anderson of the Space Shuttle Avionics Office for his development of a way to reuse electronics in the solid rocket booster rate gyro assembly, a critical part of the space shuttle's flight control system.

For several years, the two rate gyro assemblies on each SRB were completely replaced after each mission because the two gyro sensors in each assembly have a relatively high trouble rate, Anderson said. His suggestion was to reuse the electronics associated with the gyros instead of replacing the whole assembly. This is estimated to save about $344,000 each shuttle flight, he said.

The 41 awards, presented by JSC Director Aaron Cohen on June 12, totaled $68,950 for Space Act Awards and $6,555 for Suggestion Awards.

Space Act Awards were established by the National Aeronautics and Space Act of 1958. They are presented for U.S. Patent applications, NASA Tech Briefs approved for publication and scientific or technical contributions of significant value.

NASA News

National Aeronautics and
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For Release:

Barbara Schwartz
RELEASE NO. 91-53

June 24, 1991

NOTE TO EDITORS: REVISED DATES AND TIMES FOR STS-40 & STS-43 BRIEFINGS

The pre-flight briefing schedule for Shuttle mission STS-43 has been revised. The STS-43 crew press conference is still scheduled for Wednesday, June 26, but the time has changed. The new time is noon CDT. News media who wish to attend should contact Barbara Schwartz by 5 p.m. CDT Tuesday, June 25. All payload briefings are now scheduled for Thursday, June 27 and the times have been adjusted from what was announced last week. A revised schedule with correct times is shown below.

The post-flight press conference with the STS-40/Spacelab Life Sciences crew remains scheduled for Friday, June 28, but will now start at 1 p.m. CDT.

All of the above briefings will still take place at the Johnson Space Center, Houston, Texas, and will be carried on NASA Select television, Satcom F2R, transponder 13, located at 72 degrees West longitude; frequency 3960 MHz, audio 6.8 Mhz.

WEDNESDAY, JUNE 26, 1991

12 noon	STS-43 Crew Briefing

THURSDAY, JUNE 27, 1991

8:00 a.m.	Flight Director
9:00 a.m.	Tracking and Data Relay Satellite
10:00 a.m.	Inertial Upper Stage
10:30 a.m.	Space Station Heat Pipe Advanced Radiator Element
11:00 a.m.	Bioserve ITA Materials Dispersion Apparatus
11:30 a.m.	Protein Crystal Growth

FRIDAY, JUNE 28, 1991

1:00 p.m.	STS-40 Crew Post-Flight Press Conference

-end-

NASA News

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Kari Fluegel
RELEASE NO. 91-054

June 26, 1991

JSC SELECTS TAFT BROADCASTING FOR TV SUPPORT SERVICES

NASA has selected Taft Broadcasting Co. of Houston for final negotiations of a contract providing television support services for the Johnson Space Center, Houston.

The proposed cost-plus-award-fee contract, which begins Sept. 1, covers a 1-year basic performance period and four 1-year options, for 5 years total. The contract value totals about $40.4 million.

Services provided by the approximately 100 contract employees will include television operations in support of test and training facilities at JSC, television support for Shuttle missions, video productions, imagery management services, television engineering services and maintenance and repair of television systems and equipment at JSC.

-end-

NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release

Barbara Schwartz
RELEASE NO. 91-055

June 28, 1991
1 p.m. CDT

ASTRONAUT O'CONNOR TO LEAVE NASA

Astronaut Bryan D. O'Connor will leave NASA July 29 to become Commander of the Marine Air Detachment at the Naval Air Test Center, Patuxent River, Md., effective August 2. O'Connor is a colonel in the U.S. Marine Corps.

O'Connor has flown on two Space Shuttle missions. He was Commander on STS-40 Spacelab Life Sciences-1 mission, June 5-14, 1991, which was dedicated to life sciences research, and Pilot on Space Shuttle mission STS-61B launched Nov. 26, 1985, on which three communications satellites were deployed and two 6-hour "spacewalks" were conducted to demonstrate Space Station Freedom construction techniques.

In addition to his flight assignments, O'Connor has served in several key positions during his 11-year tenure at Johnson Space Center, Houston. O'Connor was Assistant to the Shuttle Program Manager from March 1986 until February 1988, Chairman of NASA's Space Flight Safety Panel from September 1986 to February 1989 and Deputy Director of Flight Crew Operations since August 1989.

"My career at NASA has been extremely rewarding. I return to the Marine Corps enriched by the experiences and friendships I've gained over these 11 years." O'Connor said.

"Bryan's outstanding contributions to the Shuttle Program, to the safety panel and to this directorate exemplify standards of excellence to which everyone should aspire. His leadership qualities will serve him well in his new assignment. We will miss him and wish him continued success.", Director of Flight Crew Operations Donald R. Puddy said.

end

NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Kelly Humphries
RELEASE NO. 91-056

July 3, 1991

FORMER WICHITAN ASSIGNED TO MANAGE NASA CONTRACT

The Johnson Space Center has assigned Michael E. Read as business manager of the Space Shuttle Systems Integration prime contract.

Read is now responsible for the financial administration of the five-year, $580 million contract with Rockwell Space Systems Division for flight and ground system integration of the Space Shuttle Program.

Read, who has been with NASA since 1989, holds a bachelor's degree in finance from Kansas State University and a master's degree in Public Administration from Wichita State University. He is the grandson of Mr. and Mrs. Roy Carpenter and Mrs. Dorothy Read and great-grandson of Mrs. Lillian Crowe, all of Osawatomie, Kansas.

-end-

NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
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AC 713 483-5111

For Release:

Kelly Humphries
RELEASE NO. 91-057

July 1, 1991

JSC GIVES EQUAL OPPORTUNITY TROPHY MONEY TO EDUCATION

Johnson Space Center will give $10,000 worth of videodisc equipment and calculators, purchased with NASA Equal Opportunity Trophy winnings, to area elementary schools.

Freda Marks, JSC's Deputy Director of Equal Opportunity Programs, said the money will be used to support President Bush's and NASA's educational initiative by helping generate the interest and enthusiasm of elementary school minority students in science and math.

Half of the money will be used to purchase videodisc players in support of the "Windows on Science" program and place them in 25 target elementary schools in need of the equipment. The curriculum program, approved by the Texas State Board of Education, provides coverage in English and Spanish of state-mandated content for elementary science education in grades one through six. Although the software can be provided by school districts with state funds, the hardware must be purchased with local funds.

JSC has identified 25 schools with primarily minority enrollment in the Pasadena, Texas City, Dickinson and LaMarque school districts that are without the necessary equipment.

The rest of the money will be used to purchase "Math Explorer" calculators for fourth and fifth grade classes in schools within the Houston Independent School District. The calculators support a Math Technology Program that has been approved by the National Council of Teachers of Mathematics. Research on calculator use indicates that its use promotes achievement, improves problem solving skills and increases understanding of mathematical concepts. JSC is working directly with HISD to identify appropriate schools.

-more-

JSC won the NASA Equal Opportunity Trophy, which carries with it a $10,000 stipend, in January. The committee that recommended the plan to return the money to the community was comprised of Marks, Gregory Hayes, Deputy Human Resources Director, and Dr. Robert Fitzmaurice, Center Education Programs Officer.

-end-

NASA News

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release
July 3, 1991

Barbara Schwartz
RELEASE NO. 91-058

ASTRONAUT COATS TO LEAVE NASA

Astronaut Michael L. Coats will retire from the Navy and leave NASA Aug. 1 to become Director of Advanced Programs and Technical Planning at Loral in Houston. Coats is a captain in the Navy.

Coats was pilot on STS-41D launched Aug. 30, 1984, on which three satellites were deployed and the OAST-1 solar cell wing was tested. He was Commander of STS-29, a Tracking and Data Relay Satellite deployment mission, launched Mar. 13, 1989. He also commanded the crew of STS-39, the first unclassified Department of Defense flight, launched Apr. 28, 1991, on which the crew members worked around-the-clock in two-shift operations to deploy, operate and retrieve the SPAS-II spacecraft to gain research information on Shuttle engine firings. In addition to these flight assignments, Coats served as Acting Chief of the Astronaut Office from May 1989 to March 1990.

"My years at NASA have convinced me that the finest folks in the world are attracted to the space program. I am extremely pleased to be able to change career directions and still be involved with this wonderful group of people," Coats said.

"Mike has been an outstanding asset to the space program and his expertise will be missed. We are sorry to see him leave, but we are happy that we will be able to continue working with him in this new capacity," Director of Flight Crew Operations Donald R. Puddy said.

- end -

NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release

Jeffrey Carr
Release No. 91-059

July 8, 1991

FLIGHT CONTROL OF STS-43

Flight control for STS-43, the ninth flight of Atlantis, will follow the procedures and traditions common to U.S. manned space flights since 1965, when the Mission Control Center was first used.

Responsibility for conduct of the mission will revert to the Mission Control Center (MCC) in Houston once Atlantis's two solid rocket boosters ignite. Mission support in the MCC will begin about five hours prior to launch and will continue through landing.

STS-43 will feature the deployment of the Tracking and Data Relay Satellite (TDRS-E), the demonstration of a spaceborne heat pipe design, and measurements of solar backscatter to quantify ozone effects and to calibrate weather satellites. In addition, a variety of tests, experiments, and evaluations will contribute to the development of Extended Duration Orbiter capabilities and Space Station Freedom applications.

Once Atlantis and crew are cleared for orbital operations, preparation and deployment of the TDRS and its inertial upper stage (IUS) will be coordinated between flight controllers in Houston, TDRS controllers at the White Sands Ground Terminal in New Mexico, and Air Force IUS controllers at the Consolidated Space Test Center in Sunnyvale, California. The deployment is scheduled to occur about six hours after launch.

The mission will be conducted from Flight Control Room One (FCR-1) on the second floor of the MCC located in Bldg. 30 at Johnson Space Center. The teams of flight controllers will alternate shifts in the control center and in nearby analysis and support facilities.

The handover between each team takes about an hour and allows each flight controller to brief his or her replacement on developments during the previous two shifts.

(more)

The four flight control teams for this mission will be referred to as the Ascent/Entry, Orbit 1, Orbit 2, and Planning teams. The ascent phase will be conducted by flight director Ronald D. Dittemore and the entry phase by Jeffrey W. Bantle. The Orbit 1 team will be led by Philip L. Engelauf. The Orbit 2 team will be headed by STS-43 lead flight director, Robert M. Kelso. The planning team will be directed by Gary E. Coen.

# # #

MCC POSITIONS AND CALL SIGNS FOR STS-43

The flight control positions in the MCC, and their responsibilities, are:

Flight Director (FLIGHT)

Has overall responsibility for the conduct of the mission.

Spacecraft Communicator (CAPCOM)

By tradition an astronaut; responsible for all voice contact with the flight crew.

Flight Activities Officer (FAO)

Responsible for procedures and crew timelines; provides expertise on flight documentation and checklists; prepares messages and maintains all teleprinter and/or Text and Graphics System traffic to the vehicle.

Integrated Communications Officer (INCO)

Responsible for all Orbiter data, voice and video communications systems; monitors the telemetry link between the vehicle and the ground; oversees the uplink command and control processes.

Flight Dynamics Officer (FDO)

Responsible for monitoring vehicle performance during the powered flight phase and assessing abort modes; calculating orbital maneuvers and resulting trajectories; and monitoring vehicle flight profile and energy levels during reentry.

Trajectory Officer (TRAJECTORY)

Also known as "TRAJ," this operator aids the FDO during dynamic flight phases and is responsible for maintaining the trajectory processors in the MCC and for trajectory inputs made to the Mission Operations Computer.

Guidance, Navigation & Control Systems Engineer (GNC)

Responsible for all inertial navigational systems hardware such as star trackers, radar altimeters and the inertial measurement units; monitors radio navigation and digital autopilot hardware systems.

(more)

Guidance & Procedures Officer (GPO)

Responsible for the onboard navigation software and for maintenance of the Orbiter's navigation state, known as the state vector. Also responsible for monitoring crew vehicle control during ascent, entry, or rendezvous.

Rendezvous Guidance and Procedures Officer (RENDEZVOUS)

This position is a GPO specialist who monitors navigation of the Orbiter during rendezvous operations, and advises the control team on the status and effect of rendezvous events.

Environmental Engineer & Consumables Manager (EECOM)

Responsible for all life support systems, cabin pressure, thermal control and supply and waste water management; manages consumables such as oxygen and hydrogen.

Electrical Generation and Illumination Officer (EGIL)

Responsible for power management, fuel cell operation, vehicle lighting and the master caution and warning system.

Payloads Officer (PAYLOADS)

Coordinates all payload activities; serves as principal interface with remote payload operations facilities.

Data Processing Systems Engineer (DPS)

Responsible for all onboard mass memory and data processing hardware; monitors primary and backup flight software systems; manages operating routines and multi-computer configurations.

Propulsion Engineer (PROP)

Manages the reaction control and orbital maneuvering thrusters during all phases of flight; monitors fuel usage and storage tank status; calculates optimal sequences for thruster firings.

Booster Systems Engineer (BOOSTER)

Monitors main engine and solid rocket booster performance during ascent phase.

(more)

STS-43 FLIGHT C OL TEAM STAFFING
(Continued)

Position	Ascent/Entry	Orbit 1	Orbit 2	Planning
DPS	Terry Keeler	Terry Keeler	Gloria Araiza	Burt Jackson
PROP	Keith Chappell	Keith Chappell	Lonnie Schmitt	Tony Ceccacci
BOOSTER	Franklin Markle Michael Dingler	/////	/////	
GC	John Wells Bob Reynolds	Chuck Capps Joe Aquino	Lynn Vernon Frank Stolarski	Mike Marsh Melissa Blizzard
MMACS	Kevin McCluney	Karl Pohl	William Anderson	James Medford
EVA		James Thornton	Charles Armstrong	Robert Adams
SURGEON	Brad Beck	Phil Stepaniak	Larry Pepper	\\\\
PAO	Jeff Carr (A) James Hartsfield (E)	Jeff Carr	Pam Alloway	Kari Fluegel

(A) = Ascent; (E) = Entry

# # #

STS-43 FLIGHT CONTROL TEAM STAFFING

Position	Ascent/Entry	Orbit 1	Orbit 2	Planning
FLIGHT	Ron Dittemore (A) Jeff Bantle (E)	Phil Engelauf	Rob Kelso	Gary Coen
CAPCOM	Ken Bowersox (A) Bob Cabana (E)	Jan Davis Jim Halsell	Marsha Ivins Peter Wisoff	Bill Shepherd
FAO	Ann Bowersox	Ann Bowersox	Tony Griffith	Mike Hurt
INCO	Joe Gibbs	Joe Gibbs	Chris Counts	Ed Walters
FDO	Brian Perry (A) Ed Gonzalez (E)	William Tracy	Tim Brown	Steve Stich
TRAJ	Matt Abbott (A) Keith Fletcher (E)	Roger Balettie	Linda Shore	Mark Haynes
GNC	John Shannon	John Shannon	Heather Mitchell	Phillip Perkins
GPO	Dennis Bentley Glen Hillier	////	////	////
EECOM	Leonard Riche	Leonard Riche	Dan Molina	Quinn Carelock
EGIL	Charles Dingell	Charles Dingell	Mark Fugitt	Robert Armstrong
PAYLOADS	Tim Baum	Tim Baum	Mark Childress	Gene Cook

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NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release

Barbara Schwartz
RELEASE NO. 91-060

July 11, 1991

NASA RETIRES SUPER GUPPY

"It's like a flying dinosaur," pilot Frank Marlow said. He was referring to the NASA 940 "Super Guppy," a whale-shaped cargo aircraft that is being retired.

Marlow and copilot Arthur "Ace" Beall flew the "Super Guppy" to Davis-Monthan AFB, Arizona, July 9, for long-term storage. Flight engineers on the trip were Chuck Gillespie and Henry Marshall.

The outsized aircraft presents unique flying challenges for the crew. Because of its shape, the Guppy lands differently from most aircraft in that its nose gear touches down first and its nose gear leaves the runway last during takeoff.

The "Super Guppy" is being retired because it needs four new engines, and this requires strengthening the wings at a total cost of 6-10 million dollars.

The "Super Guppy," a highly modified Boeing KC-97, was purchased by NASA in 1979 from Aero Spacelines, Inc., in Santa Barbara, California, for $2.8 million. It was specifically designed for carrying outsized cargoes such as the S-IVB stage of the Saturn V launch vehicle and the Lunar Excursion Module Adapter for the Apollo Program. It is the world's largest aircraft in terms of cubic capacity.

"It was a bargain," Marlow said. He was referring to the original cost as well as the benefits derived from being able to use the "Super Guppy" to carry more than 2 million pounds of NASA cargo during its dozen years of service.

Marlow said Dr. Werner von Braun, one of the pioneers of modern rocketry and Director of Marshall Space Flight Center at that time, was one of the first people to fly in the "Super Guppy."

-more-

NASA has used the aircraft mainly for Shuttle cargo transportation, including the Hubble Space Telescope, Syncom satellites, Atlas-Centaur boosters, solid rocket booster aft skirts, and Shuttle orbital maneuvering system pods. Some of the other items transported were parts for Langley's National Transonic Facility, full-scale training equipment for use in the Weightless Environment Training Facility (WETF) at JSC, and F-14's for the Navy.

"We hate to lose this unique vehicle, but today our budget will not permit us to maintain the aircraft in a safe, flyable condition. In the future we will use specially modified Air Force C-5A's to transport Shuttle and Space Station equipment," director of Flight Crew Operations Donald R. Puddy said.

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NASA News
National Aeronautics and
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For Release:
July 11, 1991

Barbara Schwartz
RELEASE NO. 91-061

NASA 912 T-38A AIRCRAFT AVIONICS UPGRADE COMPLETE

NASA plans to upgrade its fleet of 28 T-38A aircraft with modern avionics equipment to enhance flight safety and improve system reliability. The first prototype modification was completed on NASA 912, and it will re-enter the fleet July 16.

Sierra Research Division of LTV in Buffalo, New York, completed the modification in May. The upgrade's main features include the addition of a weather radar, a flight management system, and an improved cockpit layout. Other changes include an altitude alert system, an outside air temperature probe, and a voice-activated intercom system.

Initial checkout of the aircraft went well, and it was delivered to Johnson Space Center at Ellington Field June 14, 1991. NASA test pilots and systems engineers are completing the acceptance inspection and are conducting a formal flight evaluation.

Astronauts will receive ground training and a short flight syllabus for familiarization before they begin regular flights. The T-38A's are used by astronauts to maintain their jet aircraft flying proficiency.

A brief ceremony to recognize those responsible for the modification program is planned for July 16, 1991, at 2 p.m., near Hangar 276 at Ellington Field where the aircraft will be on display. News media are invited to attend.

# # #

NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Barbara Schwartz
RELEASE NO. 91-062

July 18, 1991

NOTE TO EDITORS: NEWSROOM HOURS FOR SPACE SHUTTLE MISSION STS-43

Space Shuttle Mission STS-43, a nine-day flight to deploy a Tracking and Data Relay Satellite (TDRS) and to obtain data from a number of other payloads, is scheduled for launch at 9:54 a.m. CDT July 23.

The Johnson Space Center Newsroom will be open on launch day from 6 a.m. until approximately 9 p.m. or until after the TDRS post-deploy press conference scheduled for 8:30 p.m.

For the duration of the mission, the newsroom hours will be from 4 a.m. until 6 p.m. daily. The news media working area located in the Teague Auditorium will be open to reporters during newsroom hours or by special arrangement.

On landing day the newsroom will be open from 4 a.m. until the flight crew returns to Ellington Field.

Except for launch day, a single daily mission status briefing will be held with Flight Director Phil Engelauf. There will be no briefing at the change of each shift. The briefing schedule is:

July 23	1:25 p.m. (Ron Dittemore) and 8:30 p.m. (Rob Kelso)
July 24	noon
July 25	noon
July 26	10 a.m.
July 27	10 a.m.
July 28	9:30 a.m.
July 29	9:30 a.m.
July 30	9:30 a.m.
July 31	9:30 a.m.

This schedule may be revised during the mission or other briefings added as mission activities warrant.

-more

Around-the-clock television coverage of the flight with mission commentary will be carried on NASA Select television. NASA Select can be accessed through GE Satcom F2R, transponder 13, frequency 3960 MHz, and an orbital position of 72 degrees West longitude. An edited version of each flight day's activities will be replayed for Hawaii and Alaska at 11 p.m. CDT on Spacenet 1, transponder 18, frequency 4060.8 MHz, and an orbital position of 120 degrees West longitude, except July 25 when the program will be broadcast from 1:30 to 3:30 a.m. CDT. Audio is on 6.8 MHz.

For more information on mission events or this schedule, please call the JSC Newsroom at 713-483-5111.

# # #

NASA News

National Aeronautics and
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For Release

Kari Fluegel
RELEASE NO. 91-063

July 24, 1991

ELEMENTARY TEACHERS ATTEND NASA AEROSPACE WORKSHOP

Margaret Sadeghpour, a teacher at Lincoln Elementary School in Stanwood, IA along with 22 elementary and middle school educators, is participating in a hands-on exploration of the aerospace program at the NASA Educational Workshop for Elementary School Teachers (NEWEST) July 21 - August 2 at the Johnson Space Center in Houston.

NEWEST provides the teachers with a personal introduction to the U.S. space program. Participants examine topics such as Space Station Freedom and the exploration of the Moon and Mars. They also receive NASA educational material for the classroom and learn how to incorporate aerospace topics into all areas of their curriculum.

The NEWEST program is co-sponsored by the National Aeronautics and Space Administration and the National Science Teachers Association in cooperation with the National Council of Teachers of Mathematics and the International Technology Association.

-end-

Margaret Sadeghpour ----- Lincoln Elementary, Mechanicsville, IA 52306 -- Pioneer Herald, Mt. Vernon Sun, Anamosa Journal - Eureaka, Cedar Rapids Gazette

Betty Jo Banks ---- Leedey Public School, Leedey, OK 73654 Elk City Daily News

Kathleen A. Beddingfield ---- Bridgeton Middle School, Bridgeton, NJ 08302 - Bridgeton Evening News

Doris J. Douglas ---- Sallie Curtis Elementary School, Beaumont, TX 77706 - Beaumont Enterprise

Bonnie D. Ellington ---- Elrod Elementary, San Antonio, TX, 78250 San Antonio Light

Theresa Louise Ficken ---- Central Elementary, Nevada, IA 50201, - Nevada Journal

Claire Greene ---- Public School #139, Brooklyn, NY 11226, Courier-Life Publications

Timothy A. Hansen ---- Eisenhower Elementary, Junction City, KS 66441, Daily Union

Melodie Hrabak ---- Riverside Middle School, Fort Worth, TX 76111 Fort Worth Star Telegram

Gennaro Iacona ---- Robinson Elementary, Trenton, NJ 08610, The Trenton Times

Phoebe Janzen ---- Marion County Special Education Coop, Marion, KS 66861 - Marion County Record

K. Michael Lewis ---- McAuliffe Elementary - McAllen, TX 78501 The Monitor

Michael A. Lipinski ---- Erving Elementary School, Millers Falls, MA 01349, The Recorder

Lee Anthony Mosty ----- Sally B. Elliott Elementary, Irving, TX 75060 - Irving Daily News

Julia Kay Dearing Muffler ---- Acton Elementary, Granbury, TX 76049 - Hood County News

Gail Lynn Rabii ---- Bowne Munro School, East Brunswick, NJ 08816 - The Home News

Kay Ellen Risser ---- Murray Community School, Murray, IA 50174 Osceola Sentinel - Tribune

Barry A. Rose ---- Kent Elementary, Carrollton, TX 75007 - Carrollton Chronicle

Dr. Karen N. Sanders ---- Lake Highlands Elementary, Dallas, TX 75238 - Dallas Morning News

Sharon L. Struve ---- Franklin Learning Center, Omaha, NE 68111 Omaha World Herald

Susan M. Thompson ---- Central School, Longmont, CO 80501, Longmont Daily Times Call

Jeraldine M. Trabant ---- M.E. Costello, Gloucester City, NJ 08030 - Gloucester City News

National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Barbara Schwartz
RELEASE NO. 91-064

July 29, 1991

ASTRONAUT CLASS OF 1990 ELIGIBLE FOR FLIGHT ASSIGNMENTS

The Astronaut Candidate Class of 1990 became full-fledged astronauts today. The 23 new astronauts were presented a letter from chief of the Astronaut Office Dan Brandenstein recognizing the completion of their one-year training and evaluation period and making them eligible for future flight assignments.

"This outstanding group of men and women will be key figures in NASA's space programs. With their enthusiasm and technical expertise they will be a significant asset to the success of future missions," Brandenstein said.

The group includes 7 pilots and 16 mission specialists, 11 of them civilians and 12 are military officers. Among the 5 women in the group, 3 are military officers, including the first woman pilot. They are:

Pilots

Kenneth D. Cockrell, 41, Austin, TX
Air Force Maj. Eileen Collins, 34, Elmira, NY
Air Force Maj. William G. Gregory, 34, Lockport, NY
Air Force Maj. James D. Halsell, Jr., 34, Monroe, LA
Air Force Maj. Charles J. Precourt, 36, Waltham, MA
Air Force Capt. Richard A. Searfoss, 35, Portsmouth, NH
Marine Maj. Terrence W. Wilcutt, 41, Russellville, KY

Mission Specialists

Navy Lt. Cmdr. Daniel W. Bursch, 34, Vestal, NY
Leroy Chiao, Ph.D., 30, Danville, CA
Army Maj. Michael R. U. Clifford, 40, Ogden, UT
Bernard A. Harris, Jr., M.D., 35, Temple, TX
Air Force Capt. Susan J. Helms, 33, Portland, OR
Thomas D. Jones, Ph.D., 36, Baltimore, MD
Army Maj. William S. McArthur, Jr., 40, Wakulla, NC
James H. Newman, Ph.D., 34, San Diego, CA

-more-

Ellen Ochoa, Ph.D., 33, LaMesa, CA
Ronald M. Sega, Ph.D., 38, Northfield, OH, and
Colorado Springs, CO
Army Capt. Nancy J.Sherlock, 34, Troy, OH
Donald A. Thomas, Ph.D., 36, Cleveland, OH
Janice E. Voss, Ph.D., 34, Rockford, IL
Air Force Capt. Carl E. Walz, 35, Cleveland, OH
Peter J. K. Wisoff, Ph.D., 32, Norfolk, VA
David A. Wolf, M.D., 34, Indianapolis, IN

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NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Pam Alloway
RELEASE NO. 91-065

August 5, 1991
3 p.m. CDT

JSC SELECTS FLORIDA COMPANY FOR MAINTENANCE CONTRACT

NASA's Johnson Space Center, Houston, has signed a contract with Johnson Controls Inc., Cape Canaveral, Fla. to provide maintenance and operational services at JSC's institutional plant facilities.

The cost-plus-award-fee contract covers a basic year plus four 1-year options. The basic performance period is Nov. 1, 1991 through Oct. 31, 1992.

The value of the contract for the basic year is $18.6 million. If the options are exercised, the contract value for the options will be $18.8 million for the first option, $19.5 million for the second, $19.6 million for the third and $20.4 million for the fourth and last option.

The major responsibilities covered in the contract include plant operations and maintenance, special purposes equipment maintenance, maintenance and operations support, and analysis and documentation.

- end -

NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
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For Release:

Pam Alloway
RELEASE NO. 91-066

August 6, 1991
3 p.m. CDT

JSC EXECUTES SPACE STATION WORK PACKAGE MODIFICATION

The Johnson Space Center, Houston, has executed a supplemental agreement that provides for changed requirements to the Space Station Work Package 2 Design, Development, Test and Evaluation contract with McDonnell Douglas Space Systems Co., Huntington Beach, Calif.

This modification adjusts the contract to include the results of the Space Station Freedom Program review activities of 1989, including the changes to requirements resulting from the Program Requirements Review that occurred in September and October of 1988, the Program Technical Audit of March 1989 and the Space Station Freedom Program Configuration Budget Review of October 1989.

These activities resulted in lengthening by 17 months the Work Package 2 effort to June 30, 2000 and included such requirement changes as architectural control document updates, change from AC to DC power, addition of the responsibility for secondary power distribution, addition of the Avionics Development Facility, and a switch from hardware designed for flight to prototype such as dedicated test articles.

The negotiated amount for the modification is $597 million making the new estimated value of the cost-plus-award-fee contract $3.5 billion. The majority of the work will be performed at the McDonnell Douglas facilities in Huntington Beach and Houston.

- end -

NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Barbara Schwartz
RELEASE NO. 91-067

August 8, 1991

SHUTTLE MISSION STS-48 BRIEFINGS SET FOR AUGUST 15

A series of preflight briefings on Space Shuttle mission STS-48 will be held Aug. 15. The briefings will begin with a mission overview by Lead Flight Director Al Pennington at 8 a.m. CDT, originating from the Johnson Space Center, Houston, Building 2, Room 135. The primary payload briefing on the Upper Atmosphere Research Satellite will be held from 9 to 11 a.m. CDT and will originate from Goddard Space Flight Center, Greenbelt, Md. Returning to JSC at 11 a.m., the Protein Crystal Growth will be briefed, followed by Investigations into Polymer Membrane Processing at 11:30 p.m. There will be a 30-minute lunch break from noon to 12:30 p.m.

The briefings will resume with Middeck "0" Gravity Dynamics Experiment at 12:30 p.m., Physiological and Anatomical Rodent Experiment at 1 p.m., ~~Color Laser Imaging~~ at 1:30 p.m., and the astronaut crew briefing at 2 p.m. The crew will be available for round robin interviews after the briefings. Media representatives wishing to participate in the interviews should notify the JSC newsroom by the afternoon of Aug. 13.

STS-43 POST FLIGHT CREW PRESS CONFERENCE SET FOR AUGUST 21

The STS-43 postflight crew press conference will be held Wed., Aug. 21, at 10 a.m. CDT at the Johnson Space Center, Houston, in Building 2, Room 135. The crew members will describe their flight while narrating film highlights of the mission, including the successful deployment of a Tracking and Data Relay Satellite and scientific experiments performed.

Both the briefings and the conference will be carried on NASA Select television with two-way audio for questions and answers from other NASA centers and Headquarters. NASA Select programming is carried on Satcom F2R, transponder 13, located at 72 degrees west longitude.

- end -

National Aeronautics and
Space Administration
Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

NOTE TO EDITORS: CORRECTION TO NEWS RELEASE 91-067

The STS-48 briefing scheduled for Aug. 15 at 1:30 p.m. should be titled DTO 648 Electronic Still Photography. It was incorrectly called Color Laser Imaging which is only one part of the experiment.

NASA News

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Kelly Humphries
Release No. 91-068

August 9, 1991

JSC SPONSORS WASTE RECYCLING WORKSHOP

The success of human space flight largely depends on what explorers do with their waste products. As part of its search for reliable waste recycling technologies, Johnson Space Center will sponsor an assessment of space applications Aug. 12-14, 1991.

At a permanent Moon or Mars base, recycling must factor into daily living. Workshop scientists and engineers will assess methods for making unsanitary water drinkable, converting inedible materials into plant fertilizer and turning human waste into fuel. Such systems are called Controlled Ecological Life Support Systems (CELSS).

Top NASA, industry and academic experts in the field will gather at the NASA Workshop on Resource Recovery from Wastes to discuss methods of preserving the pristine space frontier and recycling wastes to recover the resources they contain.

NASA hopes to make long-range use of the ideas emanating from the workshop, which begins at 8 a.m. Monday at the South Shore Harbour Resort and Conference Center in League City, Texas.

-30-

NASA News

National Aeronautics and
Space Administration
Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Barbara Schwartz
RELEASE NO. 91-069

August 23, 1991

NASA ANNOUNCES CREW MEMBERS FOR FUTURE SHUTTLE FLIGHTS

NASA today announced crew members and changes to crew assignments for eight future Space Shuttle missions.

The STS-50 U.S. Microgravity Laboratory mission, scheduled for May 1992, is a complement of microgravity materials processing technology experiments to be flown on the first extended duration orbiter mission aboard Columbia. The 13-day flight will be the longest Shuttle mission to date. Crew members are:

Richard N. Richards, Capt. U.S. Navy, Commander
Kenneth D. Bowersox, Lt. Cdr. U.S. Navy, Pilot
Carl J. Meade, Lt. Col. U.S. Air Force, Mission Specialist
Ellen S. Baker, M.D., Mission Specialist
Bonnie J. Dunbar, Ph.D., Payload Commander
Lawrence J. DeLucas, Ph.D., University of Alabama, Payload Specialist
Eugene H. Trinh, Ph.D., Jet Propulsion Laboratory, Payload Specialist

Baker is an addition to this crew which was named earlier. Bowersox, a pilot astronaut previously assigned as a mission specialist, is reassigned as pilot in place of John H. Casper who has been named commander of STS-54.

Baker, 38, born in Fayetteville, N.C., was selected in 1984. She flew on STS-34. She has a B.A. in geology from the State University of New York at Buffalo and an M.D. from Cornell University.

- more -

The STS-46 Tethered Satellite Systems mission, scheduled for June 1992, features a satellite to be deployed from the orbiter payload bay on a 12-mile tether to collect electrodynamic data in the upper reaches of the Earth's atmosphere. Also, the European Retrievable Carrier, a free-flying reusable platform dedicated to materials science and life science experiments, will be deployed. Crew members are:

Loren J. Shriver, Col. U.S. Air Force, Commander
Andrew M. Allen, Maj. U.S. Marine Corps, Pilot
Franklin Chang-Diaz, Ph.D., Mission Specialist
Claude Nicollier, European Space Agency Astronaut, Mission Specialist
Marsha S. Ivins, Mission Specialist
Jeffrey A. Hoffman, Ph.D., Payload Commander
(An Italian payload specialist will be named.)

Ivins is an addition to this crew announced earlier. Allen, a pilot astronaut, previously had been assigned as a mission specialist, but is reassigned as pilot in place of James D. Wetherbee who is named as commander of STS-52.

Ivins, 40, born in Baltimore, Md., was selected in 1984. She flew as a mission specialist on STS-32 and has a B.S. in aerospace engineering from the University of Colorado.

STS-47 Spacelab J mission is scheduled for August 1992. Spacelab J is a joint mission with the Japanese Space Agency and is dedicated to materials processing and life science experiments. Crew members are:

Robert L. Gibson, Capt. U.S. Navy, Commander
Curtis L. Brown, Jr., Maj. U.S. Air Force, Pilot
N. Jan Davis, Ph.D., Mission Specialist
Jerome Apt, Ph.D., Mission Specialist
Mae C. Jemison, M.D., Science Mission Specialist
Mark C. Lee, Lt. Col. U.S. Air Force, Payload Commander
Mamoru Mohri, Ph.D., NASDA (Japan) Payload Specialist

Lee, Davis, Jemison, and Mohri were assigned to this mission earlier.

Gibson, 44, born in Cooperstown, N.Y., was selected in 1978. He was pilot on STS 41-B and commander on STS 61-C and STS-27. He has a B.S. in aeronautical engineering from the California Polytechnic Institute.

Brown, 35, born in Elizabethtown, N.C., was selected in 1987. This is his first Shuttle flight. He has a B.S. in electrical engineering from the U.S. Air Force Academy.

Apt, 42, considers Pittsburgh, Penn., his hometown. Selected in 1985, he flew as a mission specialist on STS-37. He has a B.A. in physics from Harvard University and a Ph.D. in physics from the Massachusetts Institute of Technology.

STS-52 Laser Geodynamics Satellite II, scheduled for launch in September 1992, is a spherical satellite covered with retroflectors which will be illuminated by ground-based lasers to determine precise measurements of the Earth's crustal movements. Crew members are:

James D. Wetherbee, Cdr. U.S. Navy, Commander
Michael A. Baker, Cdr. U.S. Navy, Pilot
William M. Shepherd, Capt. U.S. Navy, Mission Specialist
Tamara E. Jernigan, Ph.D., Mission Specialist
Charles Lacy Veach, Mission Specialist

Wetherbee, 38, born in Flushing, N.Y., was selected in 1984. He was pilot on STS-32 and has a B.S. in aerospace engineering from the University of Notre Dame.

Baker, 37, considers Lemoore, Calif., his hometown. Selected in 1985, he was pilot on STS-43 and has a B.S. in aerospace engineering from the University of Texas.

Shepherd, 42, considers Phoenix, Ariz., his hometown. Selected in 1984, he was a mission specialist on STS-27 and STS-41. He has a B.S. in aerospace engineering from the U.S. Naval Academy and a degree in ocean engineering and an M.S. in mechanical engineering from the Massachusetts Institute of Technology.

Jernigan, 32, born in Chattanooga, Tenn., was selected in 1985. She was a mission specialist on STS-40. She has a B.S. in physics and an M.S. in engineering science from Stanford University, an M.S. in astronomy from the University of California at Berkeley and a Ph.D. in space physics and astronomy from Rice University.

Veach, 46, considers Honolulu his hometown. Selected in 1984, he was a mission specialist on STS-39. He has a B.S. in engineering management from the U.S. Air Force Academy.

STS-53 Department of Defense-1 mission launch is scheduled in Oct. 1992. Crew members are:

David M. Walker, Capt. U.S. Navy, Commander
Robert D. Cabana, Lt. Col. U.S. Marine Corps, Pilot
Guion S. Bluford, Col. U.S. Air Force, Mission Specialist
James S. Voss, Lt. Col. U.S. Army, Mission Specialist
Michael R. U. Clifford, Maj. U.S. Army, Mission Specialist

Walker, 47, considers Eustis, Fla., his hometown. Selected in 1978, he was pilot on STS-51A and commander on STS-30. He has a B.S. degree from the U.S. Naval Academy.

Cabana, 42, born in Minneapolis, Minn., was selected in 1985. He piloted STS-41 and has a B.S. in mathematics from the U.S. Naval Academy.

Bluford, 49, born in Philadelphia, Penn., was selected in 1978. He was a mission specialist on STS-8, STS-61A and STS-39. He has a B.S. in aerospace engineering from Pennsylvania State University and an M.S. and Ph.D. in aerospace engineering from the Air Force Institute of Technology.

Voss, 42, considers Opelika, Ala., his hometown. Selected in 1987, he will be a mission specialist on STS-44 in Nov. 1991. He has a B.S. in aerospace engineering from Auburn University and an M.S. in aerospace engineering sciences from the University of Colorado.

Clifford, 38, considers Ogden, Utah, his hometown. Selected in 1990, this is his first Shuttle flight. He has a B.S. in basic science from the U.S. Military Academy and an M.S. in aerospace engineering from the Georgia Institute of Technology.

STS-54 Tracking and Data Relay Satellite-F, scheduled for Nov. 1992, is a NASA satellite to provide communications for spacecraft in orbit around the Earth. Crew members are:

John H. Casper, Col. U.S. Air Force, Commander
Donald R. McMonagle, Lt. Col. U.S. Air Force, Pilot
Gregory J. Harbaugh, Mission Specialist
Mario Runco, Jr., Lt. Cdr., U.S. Navy, Mission Specialist
Susan J. Helms, Capt. U.S. Air Force, Mission Specialist

Casper, 48, considers Gainesville, Ga., his hometown. Selected in 1984, he flew as pilot on STS-36. He has a B.S. in engineering science from the U.S. Air Force Academy and an M.S. in astronautics from Purdue University.

McMonagle, 39, born in Flint, Mich., was selected as a pilot in 1987. He was a mission specialist on STS-39. He has a B.S. in astronautical engineering from the U.S. Air Force Academy and an M.S. in mechanical engineering from the California State University in Fresno.

Harbaugh, 35, considers Willoughby, Ohio, his hometown. Selected in 1987, he flew as a mission specialist on STS-39. He has a B.S. in aeronautical and astronautical engineering from Purdue University and an M.S. in physical science from the University of Houston-Clear Lake.

Runco, 39, considers Yonkers, N.Y., his hometown. Selected in 1987, he is scheduled as a mission specialist on STS-44 in Nov. 1991. He has a B.S. in meteorology and physical oceanography from City College of New York and an M.S. in meteorology from Rutgers University.

Helms, 33, considers Portland, Ore., her hometown. Selected in 1990, this is her first Shuttle flight. She has a B.S. in aerospace engineering from the U.S. Air Force Academy and an M.S. in aeronautics and astronautics from Stanford University.

STS-55 Spacelab-D2 is scheduled for Jan. 1993 to perform microgravity research and technology preparation for Space Station use. Robotics, galactic photography, and Earth observations will be part of this mission. Named are:

Jerry L. Ross, Lt. Col. U.S. Air Force, Payload Commander
Bernard A. Harris, Jr., M.D., Mission Specialist
(The German Space Agency will name two payload specialists.)

Jerry L. Ross, Lt. Col. U.S. Air Force, Payload Commander was assigned earlier.

Harris, 35, born in Temple, Texas, was selected in 1990. This is his first Shuttle flight. He has a B.S. in biology from the University of Houston and an M.D. from Texas Tech University.

STS-60 Space Radar Laboratory is scheduled for July 1993 to acquire radar images of the Earth's surface to be used for making maps, interpreting geological features, and resources studies. Named is:

Linda M. Godwin, Ph.D., Payload Commander

Godwin, 39, born in Cape Girardeau, Mo., was selected in 1985. She was a mission specialist on STS-37. She has a B.S. in mathematics and physics from Southeast Missouri State University and an M.S. and Ph.D. in physics from the University of Missouri.

Biographical information on previously named crew members follows:

STS-50

Richards, 44, considers St. Louis, Missouri, his hometown. Selected in 1980, he flew as pilot on STS-28 and commander on STS-41. He has a B.S. in chemical engineering from the University of Missouri and an M.S. in aeronautical systems from the University of West Florida.

Dunbar, 42, born in Sunnyside, Washington, was selected in 1980. She flew as a mission specialist on STS 61-A and STS-32. She has a B.S. and an M.S. in ceramic engineering from the University of Washington and a Ph.D. in biomedical engineering from the University of Houston.

Bowersox, 35, considers Bedford, Indiana, his hometown. Selected in 1987, this is his first Shuttle flight. He has a B.S. in aerospace engineering from the U.S. Naval Academy and an M.S. in mechanical engineering from Columbia University.

Meade, 41, was born at Chanute Air Force Base, Illinois. Selected in 1985, he flew on STS-38. He has a B.S. in electronics engineering from the University of Texas and an M.S. in electronics engineering from the California Institute of Technology.

STS-46

Shriver, 46, considers Paton, Iowa, his hometown. Selected in 1978, he flew as pilot on STS 51-C and as commander on STS-31. He has a B.S. in aeronautical engineering from the U.S. Air Force Academy and an M.S. in astronautical engineering from Purdue University.

Hoffman, 46, considers Scarsdale, New York, his hometown. Selected in 1978, he was a mission specialist on STS 51-D and STS-35. He has a B.A. in astronomy from Amherst College, an M.S. in materials science from Rice University, and a Ph.D. in astrophysics from Harvard University.

Allen, 36, born in Philadelphia, Pennsylvania, was selected in 1987. This is his first Shuttle flight. He has a B.S. in mechanical engineering from Villanova University.

Chang-Diaz, 41, born in San Jose, Costa Rica, was selected in 1980. He flew as a mission specialist on STS-61-C and STS-34. He has a B.S. in mechanical engineering from the University of Connecticut and a Ph.D. in applied plasma physics from the Massachusetts Institute of Technology.

STS-47

Lee, 39, born in Viroqua, Wisconsin, was selected in 1984. He was a mission specialist on STS-30. He has a B.S. in civil engineering from the U.S. Air Force Academy and an M.S. in mechanical engineering from the Massachusetts Institute of Technology.

Davis, 37, considers Huntsville, Alabama, her hometown. Selected in 1987, this will be her first Shuttle flight. She has a B.S. in applied biology from the Georgia Institute of Technology, a B.S. in mechanical engineering from Auburn University, and an M.S. and Ph.D. in mechanical engineering from the University of Alabama in Huntsville.

Jemison, 34, considers Chicago, Illinois, her hometown. Selected in 1987, this is her first Shuttle mission. She has a B.S. in chemical engineering from Stanford University and an M.D. from Cornell University.

STS-55

Ross, 43, born in Crown Point, Indiana, was selected in 1980. He flew as a mission specialist on STS 61-B, STS-27 and STS-37. He has a B.S. and an M.S. in mechanical engineering from Purdue University.

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NASA News

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Jeffrey Carr
Release No. 91-070

September 3, 1991

FLIGHT CONTROL OF STS-48

Flight control for STS-48, the thirteenth flight of Discovery, will follow the procedures and traditions common to U.S. manned space flights since 1965, when the Mission Control Center was first used.

Responsibility for conduct of the mission will revert to the Mission Control Center (MCC) in Houston once Discovery's two solid rocket boosters ignite. Mission support in the MCC will begin five hours prior to launch and continue through landing.

The primary objective of mission STS-48 is the deployment of the Upper Atmosphere Research Satellite (UARS). Once Discovery and crew are cleared for orbital operations, preparation and deployment of the UARS will be coordinated between flight controllers in Houston and payload controllers at the Payload Operations Control Center (POCC), located at the Goddard Space Flight Center in Greenbelt, Maryland. UARS activation is scheduled for flight day one, with the deployment set for flight day three.

The mission will be conducted from Flight Control Room One (FCR-1) on the second floor of the MCC located in Bldg. 30 at the Johnson Space Center. The teams of flight controllers will alternate shifts in the control center and in nearby analysis and support facilities.

The handover between each team takes about an hour and allows each flight controller to brief his or her replacement on developments during the previous two shifts.

The four flight control teams for this mission will be referred to as the Ascent/Entry, Orbit 1, Orbit 2, and Planning teams. The ascent and entry phases will be conducted by Flight Director Jeffrey W. Bantle. The Orbit 1 team will be headed by Lead Flight Director Granvil A. (Al) Pennington. The Orbit 2 team will be led by Robert M. Kelso. The planning team will be directed by Philip L. Engelauf.

(more)

MCC POSITIONS AND CALL SIGNS FOR STS-48

The flight control positions in the MCC, their call signs and responsibilities, are:

Flight Director (FLIGHT)

Has overall responsibility for the conduct of the mission.

Spacecraft Communicator (CAPCOM)

By tradition an astronaut; responsible for all voice contact with the flight crew.

Flight Activities Officer (FAO)

Responsible for procedures and crew timelines; provides expertise on flight documentation and checklists; prepares messages and maintains all teleprinter and/or Text and Graphics System traffic to the vehicle.

Integrated Communications Officer (INCO)

Responsible for all Orbiter data, voice and video communications systems; monitors the telemetry link between the vehicle and the ground; oversees the uplink command and control processes.

Flight Dynamics Officer (FDO)

Responsible for monitoring vehicle performance during the powered flight phase and assessing abort modes; calculating orbital maneuvers and resulting trajectories; and monitoring vehicle flight profile and energy levels during reentry.

Trajectory Officer (TRAJECTORY)

Also known as "TRAJ," this operator aids the FDO during dynamic flight phases and is responsible for maintaining the trajectory processors in the MCC and for trajectory inputs made to the Mission Operations Computer.

Guidance, Navigation & Control Systems Engineer (GNC)

Responsible for all inertial navigational systems hardware such as star trackers, radar altimeters and the inertial measurement units; monitors radio navigation and digital autopilot hardware systems.

(more)

Guidance & Procedures Officer (GPO)

Responsible for the onboard navigation software and for maintenance of the Orbiter's navigation state, known as the state vector. Also responsible for monitoring crew vehicle control during ascent, entry, or rendezvous.

Rendezvous Guidance and Procedures Officer (RENDEZVOUS)

The RENDEZVOUS GPO is the specialist who monitors onboard navigation of the Orbiter during rendezvous and proximity operations. The UARS deploy maneuver involves an active separation, using rendezvous radar to verify separation rates, requiring the support of this specialist

Environmental Engineer & Consumables Manager (EECOM)

Responsible for all life support systems, cabin pressure, thermal control and supply and waste water management; manages consumables such as oxygen and hydrogen.

Electrical Generation and Illumination Officer (EGIL)

Responsible for power management, fuel cell operation, vehicle lighting and the master caution and warning system.

Payloads Officer (PAYLOADS)

Coordinates all payload activities; serves as principal interface with remote payload operations facilities.

Data Processing Systems Engineer (DPS)

Responsible for all onboard mass memory and data processing hardware; monitors primary and backup flight software systems; manages operating routines and multi-computer configurations.

Propulsion Engineer (PROP)

Manages the reaction control and orbital maneuvering thrusters during all phases of flight; monitors fuel usage and storage tank status; calculates optimal sequences for thruster firings.

Booster Systems Engineer (BOOSTER)

Monitors main engine and solid rocket booster performance during ascent phase.

(more)

Ground Controller (GC)

Coordinates operation of ground stations and other elements of worldwide space tracking and data network; responsible for MCC computer support and displays.

Maintenance, Mechanical, Arm & Crew Systems (MMACS)

Formerly known as RMU; responsible for remote manipulator system; monitors auxilliary power units and hydraulic systems; manages payload bay and vent door operations.

Extravehicular Activities (EVA)

A specialist responsible for monitoring and coordinating preparations for and execution of space walks. Responsibilities include monitoring suit and EVA hardware performance.

Payload Data & Retrieval System (PDRS)

A specialist responsible for monitoring and coordinating the operation of the remote manipulator system.

Flight Surgeon (SURGEON)

Monitors health of flight crew; provides procedures and guidance on all health-related matters.

Public Affairs Officer (PAO)

Provides real-time explanation of mission events during all phases of flight.

# # #

STS-48 FLIGHT CC ᐧOL TEAM STAFFING

Position	Ascent/Entry	Orbit 1	Orbit 2	Orbit 3
FLIGHT	Jeff Bantle	Al Pennington	Rob Kelso	Phil Engelauf
CAPCOM	Bob Cabana (A) John Casper(E)	Jan Davis	Marsha Ivins	Bill Shepherd
FAO	Gail Schneider	Gail Schneider	Fisher Reynolds	Mary Ann Plaza
INCO	Chris Counts	Chris Counts	Richard LaBrode	Roberto Moolchan
FDO	Ed Gonzalez (A) Bruce Hilty (E)	Steve Stich	Richard Theis	Phil Burley
TRAJ	Matt Abbott (A) Keith Fletcher (E)	Dan Adamo	Lisa Shore	Mark Riggio
GNC	David Miller	David Miller	Phillip Perkins	Charles Alford
GPO	John Turner (A) Matt Glenn (E)	Lynda Slifer (RNDZ GPO)	John Malarkey (RNDZ GPO)	Jim Oberg (RNDZ GPO)
EECOM	Pete Cerna	Pete Cerna	Quinn Carelock	Leonard Riche
EGIL	Robert Armstrong	Robert Armstrong	Brian Anderson	Ray Miessler
PAYLOADS	Cheryl Molnar	Cheryl Molnar	Jeff Hanley	Susan Beisert

(more)

STS-48 FLIGHT CONTROL TEAM STAFFING
(Continued)

Position	Ascent/Entry	Orbit 1	Orbit 2	Planning
DPS	David Tee	David Tee	Gary Sham	James Hill
PROP	Karen Jackson	Carlyle Lowe	William Powers	Lonnie Schmitt
PDRS	Gary Pollock	Gary Pollock	Don Palleson	Albert Lee
BOOSTER	Mark Jenkins Terri Stowe	/////	/////	Terri Stowe
GC	John Wells Lynn Vernon	Larry Foy Johnnie Brothers	Mike Marsh Melissa Blizzard	Al Davis Terry Quick
MMACS	Robert Doremus	Robert Doremus	Ladessa Hicks	William Anderson
EVA	Robert Adams	Gerald Miller	Wayne Wedlake	James Thornton
SURGEON	Phil Stepaniak	Denise Baisden	Brad Beck	Phil Stepaniak
PAO	Kyle Herring (A) Kyle Herring (E)	Jeff Carr	Billie Deason	Pam Alloway

(A) = Ascent; (E) = Entry

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NASA News

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release

Barbara Schwartz
RELEASE NO. 91-071

September 4, 1991

NOTE TO EDITORS: NEWSROOM HOURS FOR SPACE SHUTTLE MISSION STS-48

The newsroom at the Johnson Space Center will be open 24-hours a day throughout Space Shuttle Mission STS-48 which is scheduled to launch Sept. 12 at 5:57 p.m. CDT and land Sept. 18 at 12:55 a.m. CDT.

The main purpose of this flight is to deploy an Upper Atmosphere Research Satellite (UARS) to study the Earth's upper reaches, including ozone depletion. The flight crew's workday during this mission will be from early afternoon until early morning.

On the morning following the launch there will be a UARS activation briefing with flight director Rob Kelso at 5:30 a.m. CDT. After that, a single mission status briefing will be held with flight director Al Pennington at 1 a.m. daily. There will be no briefing at the change of each shift; however, this schedule may be revised during the mission as activities warrant.

Television coverage of the flight will be carried on NASA Select television. NASA Select can be accessed through GE Satcom F2R, transponder 13, frequency 3960 MHz, and an orbital position of 72 degrees West longitude.

An edited version of each flight day's activities will be replayed for Hawaii and Alaska twice daily at 11 a.m. and shortly before the crew sleep period begins on Spacenet 1, transponder 18, frequency 4060.8 MHz, and an orbital position of 120 degrees West longitudy.

For more information on mission events, call the JSC Newsroom at 713-483-5111.

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NASA News

National Aeronautics and
Space Administration
Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Barbara Schwartz
RELEASE NO. 91-072

September 18, 1991

NOTE TO EDITORS: STS-48 POSTFLIGHT CREW PRESS CONFERENCE

The Shuttle mission STS-48 postflight crew press conference will be held Friday, Sept. 27, 1991, 10 a.m. CDT at the Johnson Space Center, Houston, building 2, room 135. News media may participate there or by two-way audio from other NASA Centers and Headquarters.

The crew members will narrate film highlights of the mission, including the successful deployment of the Upper Atmosphere Research Satellite (UARS) to study ozone depletion and middeck experiments to gain information for use in Space Station Freedom development.

The press conference will be broadcast on NASA Select television which is carried on Satcom F2R, transponder 13, frequency 3960 MHz, and an orbital position of 72 degrees West longitude.

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NASA News

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release

Pam Alloway
RELEASE NO. 91-073

September 24, 1991

NASA AWARDS OPERATIONS AUTOMATIC DATA PROCESSING CONTRACT

NASA's Johnson Space Center, Houston, has awarded the Operations Automatic Data Processing contract to IBM Federal Sector Division, Houston. The 13-year contract provides for as many as 48 ground based mission operations main frame computer systems, peripheral equipment and services.

The contract, awarded Sept. 20, is a firm-fixed price, indefinite delivery/indefinite quantity contract which consists of a basic 8-year performance period with five additional 1-year options.

During the initial eight-year period, the U.S. Government can issue delivery orders for hardware, system software, services and maintenance up to maximum quantities specified in the contract. The five additional one-year options are only for hardware and system software maintenance.

Because of its indefinite delivery/indefinite quantity feature, the value of the OADP contract will depend upon the number and type of systems, equipment and services which NASA orders. It is anticipated that about $191 million in delivery orders may be issued during the 13-year contract period.

The computer systems provided for in the contract will be used in the Space Station Mission Control Center and the Space Station Training Facility. They also will be used in upgrading systems in the Mission Control Center and Shuttle Mission Training Facility. Additionally, this contract will provide ground based computer systems for future, yet unspecified, programs at the Johnson Space Center and other NASA centers.

The contract requires IBM to provide commercial off-the-shelf hardware and system software as well as commercially available system engineering, maintenance and training services as specified in delivery orders issued against the contract.

end

NASA News

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:
October 17, 1991

Jeffrey Carr
RELEASE NO. 91-074

JSC TO HOST INFORMATION SYSTEMS SECURITY CONFERENCE

The Johnson Space Center's Mission Operations Directorate will host a two and a half-day conference on security technology for automated information systems, November 6-8. The conference, co-sponsored by the Information Systems Security Association (ISSA) - Texas Gulf Coast Chapter and the University of Houston - Clear Lake, will focus on new security technology and concepts for enhancing the integrity of automated information systems (AIS).

The Johnson Space Center is responsible for providing AIS security for Space Shuttle and Space Station operations. The Mission Operations Directorate (MOD) is currently in the process of developing information systems and security concepts for the Space Station Freedom.

The event is intended to promote an exchange of information among NASA and industry security professionals that will help assure that these systems are established with the best, most cost-effective security technology available.

According to MOD director Gene Kranz, "The systems we are developing for Space Station Freedom will be operational in 1995 and beyond. The challenge is to know which technologies to watch and when to choose them."
"For this conference, we have assembled some of the best minds and technologies available", said Kranz. "Now is the time for sharing ideas, lessons learned, and for establishing visions for the future."

The conference will be held at the Holiday Inn - Hobby Airport in Houston, and will operate in two disciplines. One will consist of papers and panels discussing NASA specific topics and AIS security concepts, and the other of vendor demonstrations. Speakers will emphasize the application of new technology and concepts, NASA experiences and development efforts, system integrity, and AIS architectures. A vendor exhibition area will be open to the public.

Editors Note: News media who are interested in attending should contact Jeff Carr, Media Service Branch, 713/483-5111.

# # #

NASA News

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

Pam Alloway
RELEASE: 91-075

October 17, 1991
3 p.m. CDT

JSC AWARDS MCDONNELL DOUGLAS SPACE STATION CONTRACT MOD

The Johnson Space Center (JSC), Houston, has awarded McDonnell Douglas Space Systems Co., Huntington Beach, Calif., a modification to the Space Station Freedom Program Integration Support (Schedule B) contract. Schedule B specifically involves the integration of space station components. JSC has a separate contract with McDonnell Douglas to provide hardware components for the Freedom station including the preintegrated truss, mobile transporter, the airlock, the integrated nodes and various subsystems.

The Schedule B modification extends the contract through December 2001. The modification was required following the restructuring of the space station program earlier this year which modified Freedom's design and pushed out the date for permanent manned capability from July 1997 to September 1999. The negotiated cost-plus-award fee amount for the modification was $17,939,000. An additional option was negotiated for $9,537,000. The option provides for an incremental increase in the number of hours if additional work hours are needed.

The majority of the work will be performed at the McDonnell Douglas facilities in Houston.

- end -

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NASA News

National Aeronautics and
Space Administration
Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release

Barbara Schwartz
RELEASE NO. 91-076

October 22, 1991

NOTE TO EDITORS: SHUTTLE MISSION STS-44 BRIEFINGS TO BE OCTOBER 28, 1991

A series of preflight briefings on Space Shuttle Mission STS-44 will be held October 28, 1991, at the Johnson Space Center, building 2, room 135, beginning at 9 a.m. central time. This mission is a Department of Defense flight.

The briefings will be carried on NASA Select television with two-way audio for questions and answers from NASA Headquarters and other centers. NASA Select programming is carried on Satcom F2R, transponder 13, located at 72 degrees West longitude.

Lead flight director Milt Heflin will commence with a mission overview followed at 10 a.m. by Department of Defense payloads briefing. At 11 a.m., Dr. Glenn Spaulding will present information about the bioreactor which will be flown for the first time on STS-44.

An hour-long lunch break is scheduled at 11:30 a.m., followed by a demonstration of the Lower Body Negative Pressure equipment by Dr. John Charles in building 36. This event will not be carried on NASA Select television.

The astronaut crew briefing will begin at 2 p.m. followed by round-robin interviews. The interviews will not be carried on NASA Select. News media representatives wishing to participate in the interviews should notify the JSC newsroom by noon, October 25, 1991.

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NASA News
National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release:

Barbara Schwartz
RELEASE: 91-077

October 23, 1991
11 am CDT

SEDDON NAMED PAYLOAD COMMANDER FOR SLS-2

Dr. M. Rhea Seddon has been named Payload Commander for Spacelab Life Sciences-2 (SLS-2), Space Shuttle mission STS-58, scheduled for launch in July 1993. The mission is dedicated to continued life sciences research on adaptation to microgravity in preparation for Space Station Freedon and future planetary exploration.

Payload Commander Seddon will have overall crew responsibility for long-range planning and integration of payloads, providing expertise for the coordination of science activities.

Seddon has conducted medical research during two previous Space Shuttle missions, STS-51D in April 1985 and STS-40 in June 1991. On STS-40, the first Spacelab Life Sciences mission, Seddon along with fellow crew members, performed numerous experiments in life sciences, materials science, plant biology and cosmic radiation. They also tested hardware proposed for the Space Station Freedom Health Maintenance Facility.

- end -

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NASA News

National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release

Billie Deason
(Phone: 713/483-5111)

NOTE TO EDITORS: 91-078

NASA/CONTRACTORS CONFERENCE AND SYMPOSIUM SET FOR NOV. 6-7

The Eighth Annual NASA/Contractors Conference and National Symposium on Quality and Productivity will take place at the George R. Brown Convention Center, Houston, on Nov. 6-7, 1991. The theme of this year's conference is "Extending the Boundaries of Total Quality Management." The event is expected to draw over 1,000 attendees, plus hundreds of other participants via satellite attending two concurrent conferences in Greenbelt, Md., and Denver, Colo.

The conference/symposium, hosted by NASA's Johnson Space Center, Houston, will provide a forum to discuss and exchange ideas, success stories and lessons learned in the practical application of the principles of Total Quality Management that spearhead continuous improvement within organizational structures and processes. The event also will explore quality imperatives underlying partnerships within local, regional and international community efforts.

Conference attendees will consist of top management officials from NASA, government, industry, academia, the community and representatives from Japan, China, Germany, Canada, South Africa, Indonesia, Brazil, Italy and Mexico.

NASA Administrator Richard H. Truly will give the opening keynote address and chair a "Top Leadership" panel consisting of Dr. Bob G. Gower, President and Chief Executive Officer, Lyondell Petrochemical Co., and Arthur R. Taylor, Dean, Graduate School of Business, Fordham University. A highlight of the event will occur when Truly announces the 1991 George M. Low Trophy, NASA's Quality and Excellence Award recipient(s) at the evening banquet Nov. 6.

- more -

This year's George M. Low Trophy finalists are:

% EG&G Florida, Inc., Kennedy Space Center, Fla.

% Grumman Technical Services Division, Titusville, Fla.

% Honeywell Inc., Space and Strategic Systems Operation, Clearwater, Fla.

% Computer Sciences Corp., Applied Technology Division, Houston

% Cray Research, Inc., Manufacturing Division, Chippewa Falls, Wis.

% Thiokol Corp., Space Operations, Brigham City, Utah

% TRW Space and Technology Group, Redondo Beach, Calif.

% Unisys Space Systems Division, Houston

Media interested in covering the event or requesting interviews should contact the Johnson Space Center Public Affairs Office at 713/483-5111.

- end -

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For Release

Jeffrey Carr
Release No. 91-079

November 13, 1991

FLIGHT CONTROL OF STS-44

Flight control for STS-44, the tenth flight of Atlantis, and the 44th Shuttle mission, will follow those procedures and traditions common to U.S. manned space flights since 1965, when the Mission Control Center was first used.

At Solid Rocket Booster ignition, responsibility for conduct of the mission will revert to the Mission Control Center (MCC) in Houston. Mission support in the MCC will begin five hours prior to launch and continue through landing.

The primary objective of mission STS-44 is the deployment of the Defense Support Program (DSP) satellite. Once Atlantis and crew are cleared for orbital operations, preparation and deployment of the DSP atop it's inertial upper stage will be coordinated between flight controllers in Houston and payload controllers at the Consolidated Space Test Center (CSTC) at Onizuka Air Force Base in Sunnyvale, California. Deployment is set for flight day one on orbit 5.

The mission will be conducted from Flight Control Room One (FCR-1) on the second floor of the MCC located in Bldg. 30 at the Johnson Space Center. The teams of flight controllers will alternate shifts in the control center and in nearby analysis and support facilities.

The handover between each team takes about an hour and allows each flight controller to brief his or her replacement on developments during the previous two shifts.

The four flight control teams for this mission will be referred to as the Ascent/Entry, Orbit 1, Orbit 2, and Planning teams. The ascent and entry phases will be conducted by Flight Director Ronald D. Dittemore. The Orbit 1 team will be led by Flight Director Philip L. Engelauf. The Orbit 2 team, will be headed by Lead Flight Director J. Milt Heflin. The planning team will be directed by Flight Director Charles W. Shaw.

(more)

MCC POSITIONS AND CALL SIGNS FOR STS-44

The flight control positions in the MCC, and their responsibilities, are:

Flight Director (FLIGHT)

Has overall responsibility for the conduct of the mission.

Spacecraft Communicator (CAPCOM)

By tradition an astronaut; responsible for all voice contact with the flight crew.

Flight Activities Officer (FAO)

Responsible for procedures and crew timelines; provides expertise on flight documentation and checklists; prepares messages and maintains all teleprinter and/or Text and Graphics System traffic to the vehicle.

Integrated Communications Officer (INCO)

Responsible for all Orbiter data, voice and video communications systems; monitors the telemetry link between the vehicle and the ground; oversees the uplink command and control processes.

Flight Dynamics Officer (FDO)

Responsible for monitoring vehicle performance during the powered flight phase and assessing abort modes; calculating orbital maneuvers and resulting trajectories; and monitoring vehicle flight profile and energy levels during reentry.

Trajectory Officer (TRAJECTORY)

Also known as "TRAJ," this operator aids the FDO during dynamic flight phases and is responsible for maintaining the trajectory processors in the MCC and for trajectory inputs made to the Mission Operations Computer.

Guidance, Navigation & Control Systems Engineer (GNC)

Responsible for all inertial navigational systems hardware such as star trackers, radar altimeters and the inertial measurement units; monitors radio navigation and digital autopilot hardware systems.

(more)

Guidance & Procedures Officer (GPO)

Responsible for the onboard navigation software and for maintenance of the Orbiter's navigation state, known as the state vector. Also responsible for monitoring crew vehicle control during ascent, entry, or rendezvous.

Rendezvous Guidance and Procedures Officer (RENDEZVOUS)

The RENDEZVOUS GPO is specialist who monitors onboard navigation of the Orbiter during rendezvous and proximity operations. The UARS deploy maneuver involves an active separation, using rendezvous radar to verify separation rates, requiring the support of this specialist

Environmental Engineer & Consumables Manager (EECOM)

Responsible for all life support systems, cabin pressure, thermal control and supply and waste water management; manages consumables such as oxygen and hydrogen.

Electrical Generation and Illumination Officer (EGIL)

Responsible for power management, fuel cell operation, vehicle lighting and the master caution and warning system.

Payloads Officer (PAYLOADS)

Coordinates all payload activities; serves as principal interface with remote payload operations facilities.

Data Processing Systems Engineer (DPS)

Responsible for all onboard mass memory and data processing hardware; monitors primary and backup flight software systems; manages operating routines and multi-computer configurations.

Propulsion Engineer (PROP)

Manages the reaction control and orbital maneuvering thrusters during all phases of flight; monitors fuel usage and storage tank status; calculates optimal sequences for thruster firings.

Booster Systems Engineer (BOOSTER)

Monitors main engine and solid rocket booster performance during ascent phase.

(more)

<u>Ground Controller</u> (GC)

Coordinates operation of ground stations and other elements of worldwide space tracking and data network; responsible for MCC computer support and displays.

<u>Maintenance, Mechanical, Arm & Crew Systems</u> (MMACS)

Formerly known as RMU; responsible for remote manipulator system; monitors auxiliary power units and hydraulic systems; manages payload bay and vent door operations.

<u>Extravehicular Activities</u> (EVA)

A specialist responsible for monitoring and coordinating preparations for and execution of space walks. Responsibilities include monitoring suit and EVA hardware performance.

<u>Payload Data & Retrieval System</u> (PDRS)

A specialist responsible for monitoring and coordinating the operation of the remote manipulator system.

<u>Flight Surgeon</u> (SURGEON)

Monitors health of flight crew; provides procedures and guidance on all health-related matters.

<u>Public Affairs Officer</u> (PAO)

Provides real-time explanation of mission events during all phases of flight.

# # #

STS-44 FLIGHT CONTROL TEAM STAFFING
(Continued)

Position	Ascent/Entry	Orbit 1	Orbit 2	Planning
DPS	Gloria Araiza	Gloria Araiza	Burt Jackson	Clyde Sherman
PROP	Tony Ceccacci	Tony Ceccacci	Matthew Barry	Carlyle Lowe
BOOSTER	Franklin Markle Terri Stowe	/////	//////	Michael Dingler
GC	Chuck Capps John Wells	Bob Reynolds Henry Allen	Ed Klein John Snyder	Joe Aquino Frank Stolarski
MMACS	Kevin McCluney	Kevin McCluney	Paul Dye	Robert Doremus
EVA	Bob Adams	Bob Adams	Richard Fullerton	Jerry Miller
SURGEON				
PAO	James Hartsfield	Kyle Herring	Kari Fluegel	Billie DeasonPam

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(A) = Ascent; (E) = Entry
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# # #

STS-44 FLIGHT CONTROL TEAM STAFFING

Position	Ascent/Entry	Orbit 1	Orbit 2/Lead	Planning
FLIGHT	Ron Dittemore	Phil Engelauf	Milt Heflin	Chuck Shaw
CAPCOM	John Casper (A) Bob Cabana (E)	Jan Davis	Bill Shepherd	Marsha Ivins
FAO	John Curry	John Curry	Pete Hasbrook	Greg Smith
INCO	Ed Walters	Thomas Kalvelage	Jay Conner	Harry Black
FDO	Bruce Hilty (A) Doug Rask (E)	Dan Adamo	Mark Haynes	Carson Sparks
TRAJ	Brian Perry (A) Debbie Langan (E)	William Britz	Roger Simpson	Richard Theis
GNC	John Shannon	John Shannon	Stan Schaefer	Phillip Perkins
GPO	Ken Patterson (A) Glen Hillier (E)			
EECOM	Dave Herbek	Dave Herbek	Pete Cerna	Daniel Molina
EGIL	Ray Miessler	Brian Anderson	Mark Fugitt	Charles Dingell
PAYLOADS	Tim Baum	Tim Baum	David Schurr	Gene Cook

(more)

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For Release

Kelly Humphries
Release No. 91-180

November 15, 1991

COOKE TO MANAGE LUNAR AND MARS EXPLORATION PROGRAM OFFICE

Doug Cooke has been appointed manager of the Lunar and Mars Exploration Program Office at JSC, replacing Mark Craig who is expected to be reassigned to the Space Station Projects Office.

The program office, with a staff of about 40 civil service and contract workers, is responsible for defining an outpost on the Moon and human missions to Mars, both technically and programmatically.

Cooke, who has been deputy manager and acting manager of the office since its formation in February 1990, joined JSC in the Engineering Analysis Division in 1973 and has held progressively responsible managerial positions in the Space Station Program Office and the Space Shuttle Program Office. Before joining the LMEPO, he was deputy manager of the Space Shuttle Engineering integration Office and deputy manager of the Lunar and Mars Exploration Office in the New Initiatives Office.

Craig, who has managed the LMEPO since its formation, is on special assignment to support policy, programmatic and technical definition of the 90-day orbiter/space station integrated system. Pending NASA Headquarters' approval, Craig will be reassigned to the Space Station Projects Office.

Craig joined JSC as a co-op in the Engineering Directorate in 1967. He has been assistant manager and acting manager of the System Engineering and Integration Office, Space Station Program Office, and special assistant to the director of Engineering. He was manager of the Lunar and Mars Exploration Office and deputy manager of the Mars Rover Sample Return Project.

Most recently, he has been special assistant for exploration to the associate administrator for aeronautics, exploration and technology, and to the director of space exploration on special assignment to NASA Headquarters.

- END -

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Lyndon B. Johnson Space Center
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For Release
November 15, 1991

Barbara Schwartz
(Phone: 713-483-5111)

NOTE TO EDITORS: 91-081

NEWSROOM HOURS FOR SHUTTLE MISSION STS-44

The Johnson Space Center newsroom will open daily at 4 a.m. Central Standard Time during Space Shuttle Mission STS-44 which is scheduled to launch Nov. 19, 1991, at 5:51 p.m. A mission status briefing with flight director Phil Engelauf will be held daily during the mission. Newsroom closing times will vary the first four flight days because of the mission status briefing times. The specific schedule follows:

	Briefings		Newsroom Open	Newsroom Close
Launch/FD1	7 p.m.	Post Launch (KSC)	4 a.m.	8 p.m.
Flt Day 2	5 a.m.	Flt Dir Milt Heflin	4 a.m.	10 p.m.
	9 p.m.	Mission Status		
Flt Day 3	8:30 p.m.	Mission Status	4 a.m.	9:30 p.m.
Flt Day 4	8 p.m.	Mission Status	4 a.m.	9 p.m.
Flt Day 5	6:30 p.m.	Mission Status	4 a.m.	8 p.m.
Flt Day 6	7 p.m.	Mission Status	4 a.m.	8 p.m.
Flt Day 7	4:30 p.m.	Mission Status	4 a.m.	8 p.m.
Flt Day 8	4:30 p.m.	Mission Status	4 a.m.	8 p.m.
Flt Day 9	4:30 p.m.	Mission Status	4 a.m.	8 p.m.
Flt Day 10	4:30 p.m.	Mission Status	4 a.m.	8 p.m.
Landing/FD11	*2:30 p.m.	Post Mission	4 a.m.	5 p.m.

*Approximate time one hour after landing.

Twenty-four hour television coverage of this unclassified Department of Defense flight will be carried on NASA Select television accessed through GE Satcom F2R, transponder 13. The frequency is 3960 MHz with an orbital position of 72 degrees west longitude.

Two-hour edited programs of each flight day will be replayed for Hawaii and Alaska on Spacenet 1, transponder 17L, channel 18. The orbital position is 120 degrees west longitude, with a frequency of 4060 MHz. Audio is on 6.8 MHz. The programs will begin on launch day and continue through landing, airing at 11 p.m. Central time, with the exception of Nov. 22 and 29, when they will air at 2 a.m. Central time.

For more information on mission events, call the JSC Newsroom at 713-483-5111.

# # #

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Jeffrey E. Carr
RELEASE NO. 91-082

For Release

NOTE TO EDITORS: INFLIGHT CREW PRESS CONFERENCE PLANNED

An inflight press conference with the astronaut crew aboard Atlantis is planned for the upcoming Shuttle mission, STS-44.

The 20-minute interactive broadcast event is scheduled to occur 5 days, fifty minutes into the mission. Assuming a launch at 5:51 p.m. central time on Tuesday, November 19, the conference would begin about 6:40 p.m. central time on Sunday.

Accredited news media may participate from news conference facilities at the Kennedy Space Center or the Johnson Space Center.

An assessment will be made, one day prior, to determine whether there will be sufficient participation to warrant the event.

Those interested should monitor NASA Select television for additional information and updates, or contact the JSC newsroom at 713-483-5111.

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AC 713 483-5111

For Release:

Kari Fluegel
(Phone: 713/483-5111)

November 22, 1991

RELEASE: 91-083

MICROGRAVITY TEST OF CELL CULTURE VESSEL TO FLY ON ATLANTIS

Technology improvements are making medical advances more and more commonplace. Still, research remains limited by the boundaries of Earth's gravity.

One boundary, that of tissue growth in the laboratory, is being pushed farther out due to work in Johnson Space Cernter's (JSC) Biotechnology Program with a system that promotes such cell culturing.

The device, called the rotating wall vessel, cultures cells in an environment that approximates how they might grow in space. The rotating wall vessel nurtures the cell cultures in a horizontal cylinder that slowly rotates, bathing the cells in nutrients and oxygen and keeping them gently suspended in the liquid medium.

Tissues grown during the development and testing of the vessel already have been put to work in attempts to create drugs, grow tissue for transplantation and understand malignancies. The rotating wall vessel, developed as a cell culture growth tool for Space Station Freedom, has pioneered research in lung tissue growth, skin growth, small intestines, cartilage growth, colon cancer proliferation, brain tumor growth and therapeutics.

"The biggest problem with cell cultures grown in the laboratory is the mechanical means used to suspend them," said Glenn Spaulding, Manager of JSC's Space Biotechnology Program.

In other culture devices, cells become damaged by the suspension vessel or do not bond together to create tissues. Consequently, scientists have not had high-fidelity tissue models available for their research.

- more -

Research done with NASA's rotating wall vessel over the past 2 years, however, has produced cell cultures more like the human tissue. The more similar the cells are to the original tissue, the more applicable and appropriate they are to the intended research.

Research begins with a small seeding of starter cells from a donor or patient. Cell assemblies then begin to take form and resemble the original tissue.

The rotating wall vessel hardware will receive its first test and equipment checkout in space during next week's Space Shuttle Atlantis (STS-44) mission. Flown as Detailed Supplementary Objective 316, the vessel hardware will be used in a test that researchers hope will confirm their theories and calculations about how the flow fields work in space, thus validating the fluid dynamics of the device in the absence of living cells.

Plastic beads of various sizes rather than cell cultures are being flown in the vessel for the STS-44 test. Video of bead movement will be collected for postflight analysis to refine the system. Plans are to fly cell cultures on future shuttle flights and Space Station Freedom.

By emulating the space environment, the rotating wall vessel allows tissue cultures to grow for a longer time than previously was possible. "The longer certain cells grow, the larger and more well-developed they become, the more meaningful the medical application," Spaulding said.

The rotating wall vessel, however, may not speed the growth process. What takes months to generate within the body would also take months within the vessel.

Spaulding attributes the development of the rotating wall vessel to serendipity or to having the right people in the right place at the right time.

About 2 years ago, researchers who were developing a plan to grow tissue cultures in space were trying to solve the question of how to suspend the cells for the experiment, he said. The primary problem was stowing the suspension vessel in a middeck locker that would shift its orientation during Shuttle ascent, orbit and entry to the extent that the tissue would be damaged.

Then, with the help of a power drill and a small jar of beads, investigators Tinh Trinh and David Wolf gave birth to the concept of keeping the culture delicately suspended by maintaining it in a state of continual motion. The first vessel was built by Ray Schwartz and the hardware for the DSO was developed and constructed in 9 months, Spaulding said. "If it weren't for the teamwork and the Apollo-like spirit of this group, medical science would not have had this tool," Spaulding said.

Even though the rotating wall vessel greatly improves upon the older classical methods of tissue culturing on Earth, gravity still plays a role in the culture process. As the tissue becomes larger, it settles to the bottom of the growth chamber and is damaged. Following that, the cultures themselves settle too rapidly to stay suspended in the vessel. Cells can be grown successfully on Earth in the rotating wall vessel for about 3 months. They then drop to the bottom of the vessel and become damaged.

In the future, cultures may be grown on the Earth for the first 3 months, then flown in space where gravitational effects are miniscule for the remainder of their development.

Though never tested with tissue cultures in space where its full potential can be realized, the rotating wall vessel already has made important strides in medical research.

"We're using NASA's rotating wall vessel to study the interaction between the human colon fibroblast stromal support cells and human colon cancers because we feel that by being able to study phenomenon in this vessel we may gain a unique insight into the cellular interaction and how this relates to the progressive growth of tumor in patients," said Dr. John Jessup of the Harvard Medical School's Laboratory of Cancer Biology.

Jessup is one of many investigators already using the rotating wall vessel technology. His research focuses on understanding how colon tissue develops and why malignancies develop in certain patients.

"In this vessel, we're able to re-create a three-dimensional culture that is very difficult to do in any other tissue culture apparatus," he said. "Most tissue culture systems are gravity-limited to two-dimensional cultures. By lacking the third dimension of vertical growth, it's very difficult to be able to study what happens when cells are growing around one another."

A research group at the University of Texas Medical School has successfully grown a virus responsible for high infant mortality in Third World countries and is now laying the foundation for vaccine development. Still another at the Huntington Medical Research Institute, Pasadena, Calif., is using the rotating wall vessel to develop better methods of treating malignant brain tumors, which are 100 percent fatal.

"This will be a sterling collaborative effort because we very much want to call on the expertise of the JSC scientists and engineers who have developed this whole technology," said Dr. Marylou Ingram, Senior Research Scientist at the Huntington Medical Research Institute. "We will be studying the tumors that we get from our patients and our aim is to, as soon as possible, be able to produce tumor-sensitized lymphocytes which we may be able to use in the treatment of our patients."

Access to the microgravity environment of space, which will be available on Space Station Freedom, will only enhance the research begun with the rotating wall vessel in Earth-based laboratories.

"We need microgravity for an extended time period," Spaulding said. "Without space station there would be no opportunity to exploit the potential of this fascinating and important tool."

- end -

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For Release

Jeffrey E. Carr
RELEASE NO. 91-084

November 25, 1991

NOTE TO EDITORS: INFLIGHT CREW PRESS CONFERENCE PLANNED

An inflight press conference with the STS-44 astronaut crew aboard Atlantis is planned for Friday, November 29, at 6:34 pm central time (5 days 50 minutes, mission elapsed time).

News media may participate from press conference facilities at the Kennedy Space Center and the Johnson Space Center. A final assessment will be made, one day prior, to determine whether there will be sufficient participation to warrant the event.

Those interested should contact the JSC newsroom at 713-483-5111 or KSC newsroom at 407/867-2468, and monitor NASA Select television for additional information and updates.

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For Release:

Barbara Schwartz
RELEASE NO. 91-085

December 3, 1991

FIRST GROUP OF PROSPECTIVE ASTRONAUTS TO ARRIVE AT JSC

The first of several groups of prospective astronauts will be at Johnson Space Center (JSC) the week of Dec. 8 for orientation, interviews, and medical evaluations.

Approximately 90 of more than 2200 applicants are expected to be interviewed during December and January for a chance to be among the final 12 to 19 who will be named as astronaut candidates next spring. Those selected will join 6 international astronaut candidates representing Canada, Japan, and the European Space Agency for training at JSC beginning later in 1992.

The first group of 22 will consist of Jeffrey E. Anderson, M.D., of Chicago, IL; Daniel T. Barry, Ph.D., M.D., of Ann Arbor, MI; Roger D. Billica, M.D., of JSC; Charles E. Brady (Cdr., USN) of Oak Harbor, WA; Charles M. Buntin, Ph.D., of JSC; Catherine G. Coleman (Capt., USAF) of Dayton, OH; Robert E. Fishman, Ph.D., of Mill Valley, CA; Michael L. Gernhardt of Webster, TX; Lincoln J. Greenhill, Ph.D., of Kensington, CA; John M. Grunsfeld, Ph.D., of Pasadena, CA; G. Richard Holt, M.D., of San Antonio, TX; Richard T. Jennings, M.D., of JSC; Scott L. Klakamp, Ph.D., of Pasadena, CA; Taylor W. Lawrence of Livermore, CA; Issac Maya, Ph.D., of Gainesville, FL; Jan R. Rogers of Marshall Space Flight Center (MSFC) in Huntsville, AL; Allison C. Sandlin, Ph.D., of Fredericksburg, VA; Stephen A. Shoop, M.D., of Los Angeles, CA; Mark L. Sobczak (Lcdr., USN) of Oakton, VA; Andrew S. W. Thomas, Ph.D., of Jet Propulsion Laboratory in Pasadena, CA; Richard J. Tubb (Maj., USAF) of Lebanon, IL; and Dennis S. Tucker, Ph.D., of MSFC in Huntsville, AL.

Astronaut candidate selections are conducted on a biennial basis. The number of candidates selected depends upon the Space Shuttle flight rate, overall program requirements, and astronaut attrition.

# # #

NASA News

National Aeronautics and
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For Release:

Barbara Schwartz
Release No. 91-086

December 3, 1991

STS-42 PREFLIGHT AND STS-44 POSTFLIGHT BRIEFINGS SET

The astronaut crew for Space Shuttle mission STS-42, the International Microgravity Laboratory flight, will participate in a press conference at 1 p.m. Central time, Thursday, Dec. 12, at the Johnson Space Center, building 2 PAO briefing room. The astronauts will discuss their mission-specific duties and the materials and life sciences experiments on the IML-1 flight.

The briefing will be followed by round-robin interviews. News media representatives interested in participating in these one-on-one interviews should contact the Johnson Space Center newsroom at 713-483-5111 by close of business Dec. 10.

On Dec. 13, at 1 p.m. Central time, in the same location, the astronaut crew on Department of Defense mission STS-44, Nov. 24-Dec. 1, will narrate film and slides from their flight and answer questions.

Both press conferences will be carried on NASA Select television with two-way audio for questions and answers from NASA Headquarters and other centers. NASA Select programming is carried on Satcom F2R, transponder 13, located at 72 degrees West longitude.

Other background briefings on the IML-1 mission will be held Jan. 10 at JSC and the Marshall Space Flight Center in Huntsville, Alabama. A note to editors will be issued later with the schedule for those briefings.

# # #

NASA News

National Aeronautics and
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For Release

Pam Alloway
(Phone: 713/483-5111)

December 6, 1991

RELEASE: 91-087

NASA AWARDS CONTRACT EXTENSION FOR ADDITIONAL EMU

NASA's Johnson Space Center, Houston, has awarded a $97.3 million extension to United Technologies Corp.'s Hamilton Standard Division's Extravehicular Mobility Unit hardware (EMU) contract. The contract provides for the production and support of the EMU.

This supplemental agreement provides for additional EMU hardware and extends program and engineering support for the EMU through Sept. 30, 1997. The additional EMU hardware procured under this contract extension will support Space Station Freedom assembly and operations as well as the Space Shuttle program.

The cost-plus-incentive-fee/award fee contract for this agreement is $97,333,000. The total estimated cost and fee for the contract is increased to $211,954,655.

The work will be performed at United Technologies Corp.'s Hamilton Standard Division, Windsor Locks, Conn.

- end -

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For Release

Barbara Schwartz

December 6, 1991

RELEASE: 91-088

PAYLOAD CREW NAMED FOR SPACELAB LIFE SCIENCES-2 MISSION

Two additional NASA astronauts and three payload specialists have been named as payload crew for the Spacelab Life Sciences-2 mission, STS-58, set for launch in mid 1993.

Joining Payload Commander Rhea Seddon, M.D., as mission specialists are three-time space flight veteran Shannon Lucid, Ph.D., and David Wolf, M.D., astronaut class of 1990.

Named as payload specialist candidates for the ~~7-day~~ 13-day flight aboard Columbia are Jay Buckey, M.D. , an assistant professor at the University of Texas, Southwestern Medical Center, Dallas; Martin J. Fettman, D.V.M., an associate professor, Colorado State University, Fort Collins; and Laurence Young, Sc.D., professor and Director, Man-Vehicle Laboratory, Massachusetts Institute of Technology, Cambridge.

After further training and evaluation, one of the payload specialist candiates will be selected to fly as the prime payloads specialist and the others will support the mission from the ground as backups.

The SLS-2 mission will be the second Shuttle Spacelab mission dedicated to the investigation of the effects of microgravity on human physiology. SLS-1, flown in June of this year, was the first such Spacelab mission. Life sciences experiments and flight techniques developed on missions such as SLS-2 are precursors for research that will be done on Space Station Freedom. These investigations are crucial if humans are to live and work in space safely and effectively.

- end -

Ground Controller (GC)

Coordinates operation of ground stations and other elements of worldwide space tracking and data network; responsible for MCC computer support and displays.

Maintenance, Mechanical, Arm & Crew Systems (MMACS)

Formerly known as RMU; responsible for remote manipulator system; monitors auxilliary power units and hydraulic systems; manages payload bay and vent door operations.

Extravehicular Activities (EVA)

A specialist responsible for monitoring and coordinating preparations for and execution of space walks. Responsibilities include monitoring suit and EVA hardware performance.

Payload Data & Retrieval System (PDRS)

A specialist responsible for monitoring and coordinating the operation of the remote manipulator system.

Flight Surgeon (SURGEON)

Monitors health of flight crew; provides procedures and guidance on all health-related matters.

Public Affairs Officer (PAO)

Provides real-time explanation of mission events during all phases of flight.

# # #

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Lyndon B. Johnson Space Center
Houston, Texas 77058
AC 713 483-5111

For Release

Barbara Schwartz
December 11, 1991
RELEASE NO. 91-089

SECOND GROUP OF PROSPECTIVE ASTRONAUTS TO ARRIVE AT JSC

The second of several groups of prospective astronauts will be at Johnson Space Center (JSC) the week of Dec. 15 for orientation, interviews, and medical evaluations.

Approximately 90 of more than 2200 applicants are expected to be interviewed during December and January for a chance to be among the final 12 to 19 who will be named as astronaut candidates next spring. Those selected will join 6 international astronaut candidates representing Canada, Japan, and the European Space Agency for training at JSC beginning later in 1992.

The second group of 22 will consist of David M. Delonga (LCdr., USN) of Stonington, CT; David R. Forrest of Natrona Heights, PA; Clark B. Freise (Lt., USN) of Waldorf, MD; Laura E. Kay, Ph.D., of New York, NY; Arthur Kreitenberg, M.D., of Los Angeles, CA; Wendy B. Lawrence (LCdr., USN) of Crownsville, MD; Barry J. Linder, M.D., of San Francisco, CA; Jerry M. Linenger (Cdr., USN) of Coronado, CA; Samuel A. Lowry, Ph.D., of Huntsville, AL; Mark G. McKenney, M.D., of S. Miami, FL; William T. Norfleet, M.D., of JSC; Scott E. Parazynski, M.D., of Evergreen, CO; Larry J. Pepper, M.D., of JSC; Mark E. Perry, Ph.D., of Alexandria, VA; Ronald F. Schaefer, M.D., of Pasadena, CA; Charles D. Schaper, Ph.D., of Palo Alto, CA; Ann Marie Schuler, Ph.D., of Marina del Rey, CA; Piers J. Sellers, Ph.D., of Goddard Space Flight Center in Greenbelt, MD; David M. Shemwell, Ph.D., of Seattle WA; Steven L. Smith of JSC; J. Mark Stevenson of San Diego, CA; and Albert S. Yen of Jet Propulsion Laboratory in Pasadena, CA.

Astronaut candidate selections are conducted on a biennial basis. The number of candidates selected depends upon the Space Shuttle flight rate, overall program requirements, and astronaut attrition.

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NASA News

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058
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For Release:

Barbara Schwartz
RELEASE NO. 91-090

December 19, 1991

THIRD GROUP OF PROSPECTIVE ASTRONAUTS TO ARRIVE AT JSC

The third group of prospective astronauts will be at Johnson Space Center (JSC) the week of Jan. 5 for orientation, interviews, and medical evaluations.

Approximately 90 of more than 2200 applicants are expected to be interviewed during December and January for a chance to be among the final 12 to 19 who will be named as astronaut candidates next spring. Those selected will join 6 international astronaut candidates representing Canada, Japan, and the European Space Agency for training at JSC beginning later in 1992.

The third group of 22 will consist of Scott D. Altman (Lt., USN) of Lexington Park, MD; Gregory A. Bass (Capt., USMC) of Great Mills, MD; Daniel C. Burbank (Lt., USCG) of Chesapeake, VA; Ralph D. Cope, Ph.D., of Newark, DE; James W. Denham of Patuxent River, MD; Kevin M. Donegan (LCdr., USN) of Orange Park, FL; Patrick E. Duffy (Capt., USAF) of Edwards AFB, CA; Michael E. Fossum (Capt., USAF) of Henderson, NV; Dominic L. Gorie (LCdr., USN) of Orange Park, FL; Carl A. Hawkins (Maj., USAF) of Edwards, CA; Brent E. Jett, Jr., (LCdr., USN) of California, MD; Richard M. Linnehan, D.V.M., of San Diego, CA; Michael E. Lopez-Alegria (LCdr., USN) of Waldorf, MD; Douglas W. Lowery, M.D., of Venice, CA; Richard A. Mastracchio of JSC; David W. Miller, Sc.D., of Sharon, MA; William Nevius (LCdr., USN) of California, MD; Dana D. Purifoy (Maj., USAF) of Edwards AFB, CA; Stephen K. Robinson, Ph.D., of Langley Research Center, VA; Mark P. Stucky (Capt., USMC) of Ridgecrest, CA; Thomas A. Sullivan, Ph.D., of JSC; and J. Segun Thomas, Ph.D., of Houston, TX.

Astronaut candidate selections are conducted on a biennial basis. The number of candidates selected depends upon the Space Shuttle flight rate, overall program requirements, and astronaut attrition.

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