

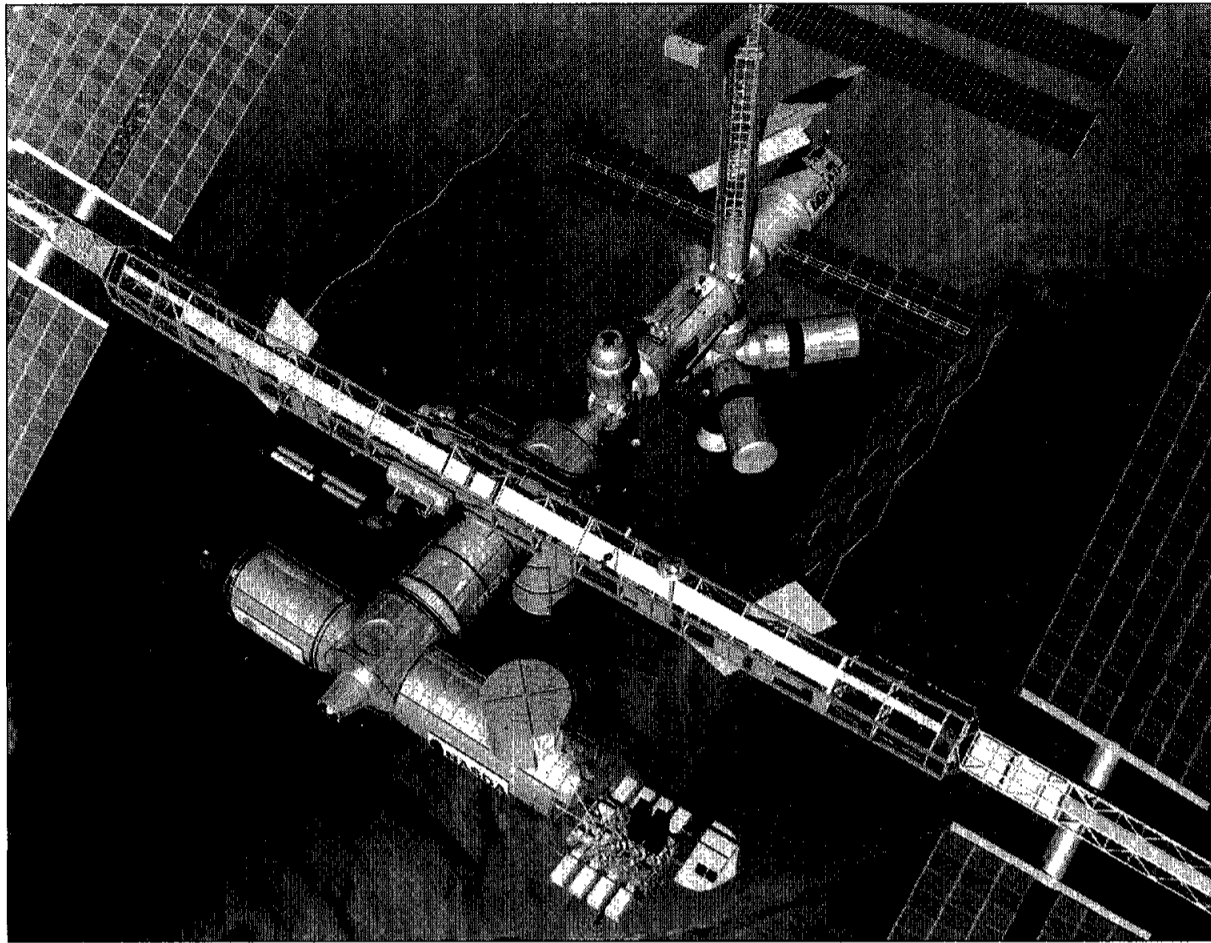


# Space News Roundup

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No. 13



NASA Illustration

This illustration shows Phase III of the planned international space station in its fully operational state including elements from the United States, Europe, Canada, Japan and Russia. The space station system design review involving NASA and its international partners concluded last week at JSC.

## System design review complete

By Kari Fluegel

With the completion of the system design review last week, plans for the international space station are maturing rapidly and the orbiting research facility is on track for assembly to begin in 1997 as scheduled.

"This was a major milestone for the international space station," said Space Station Director Wilbur Trafton. "The space station team has just conducted a comprehensive review of the requirements, configuration and the maturity of the station's technical definition."

The system design review included participants from NASA, the Canadian Space Agency, the European Space Agency, the Italian Space Agency, the Japanese Space Agency, the Russian Space Agency, the prime contractor Boeing and Tier I subcontractors Rocketdyne and McDonnell Douglas.

module will be launched on the third U.S. flight in May 1998 and will signal the beginning of human-tended science operations.

The Canadian-built robotic arm will be launched in June 1998 and the addition of the Soyuz transfer vehicle in August 1998 will provide capabilities for extended on-orbit operations. The Japanese experiment module will be launched in early 2000 and the ESA laboratory module added in June 2001. Assembly of the station should be complete in June 2002.

In total, the sequence provides for 13 Russian and 16 U.S. assembly flights, with use of the Ariane V



launcher to carry the European module to the station added to the technical baseline. The amount of extravehicular activity required for station assembly and the estimated EVA crew hours for maintenance during the station's 10-

year operational lifetime have been significantly reduced.

The SDR also confirmed that all station systems have a high degree of design maturity. The guidance, navigation and control system is 97 percent complete, and the communications and tracking system is very mature with analysis and testing indicating all station requirements will be achieved.

Of the 17 open issues remaining, most deal with providing for additional on-orbit payload storage, addressing Japanese experiment module and ESA module ventilation noise levels and determining the location and specifications for an optical quality window in the station design.

With the completion of the SDR, the space station team will refine the design to more detailed levels. In April 1995, the program will conduct the critical design review for the station, a milestone that means the detailed engineering design essentially will be complete.

"We have come a long way in a short amount of time, and that is due to an unbelievable level of professional dedication and hard work by all the program team members," Brinkley said.

## Senate approves buyout package

Agency plans to reduce staffing by 825 positions

By Eileen Hawley

The long-awaited Government-wide buyout bill was passed by the Senate on March 23 paving the way for eligible NASA employees to receive a lump sum payment of up to \$25,000 if they voluntarily leave the agency before July 3, 1994.

President Clinton is expected to sign the bill shortly providing federal agencies with the legal authority to proceed with the buyout. NASA Administrator Daniel Goldin said passage of the bill was "a key development that will benefit the entire NASA family as we reshape the agency to meet new realities."

According to the Associate Administrator for Human Resources and Education, Spence Armstrong, NASA intends to reduce the agency staff by 825 full-time equivalent positions through the buyout program. Those buyouts will be allocated to the field centers that are over ceiling due to

realignments or changes in connection with space station redesign. JSC has an initial allocation of 132 buyout packages.

Allotments also were provided to Headquarters, Kennedy Space Center, Lewis Research Center and Marshall Space Flight Center. Remaining centers will receive buyout slots only if the other centers do not use their allocation or if additional funds become available.

"The suspense is over for the many NASA employees and workers throughout the federal government," Armstrong said. "We anticipate that many long-time dedicated NASA employees will take advantage of this opportunity. They will go with the satisfaction of a job well done and the knowledge that their departure helps NASA avoid a very difficult reduction in force."

According to Harv Hartman, director of Human Resources, priority for

buyout will be given first to those employees who voluntarily leave by May 3 and then to those employees who leave between May 4 and July 3. Within those categories, buyouts will be offered in the following priority order: those employees eligible for "early out"; supervisors and managers GM 14 or above; all other GS/GM 13's and above; and all remaining employees. All permanent employees with at least one year of service, with the exception of the Senior Executive Service and astronauts, are eligible to participate in this program.

"I am very pleased the buyout bill was approved," said Center Director Dr. Carolyn Huntton. "It provides the sort of incentive that private industry has offered for many years, and benefits our employees who were considering retirement."

Employees interested in participating please see **BUYOUT**, Page 4

## SRL-1 uses radar, people to view Earth with new eyes

By Kelly Humphries

The STS-59 Space Radar Laboratory-1 mission will be a tightly choreographed imaging flurry that uses new eyes and meshes people and machines in an attempt to understand our home world and its ecosystem.

"There's not anything that hits closer to home than something that touches every one of us," Payload Commander Linda Godwin said Tuesday. "We think this is a great dedicated Earth science mission to help us start to understand and at least produce more quantitative measurements of what is going on."

Commander Sid Gutierrez, Pilot Kevin Chilton and Mission Specialists

Jay Apt, Rich Clifford and Tom Jones will join Godwin in working 24 hours a day on two shifts to support the Space Radar Laboratory-1 instruments in the payload bay with more maneuvers and more Earth observations photography than has ever been attempted on a space shuttle flight.

To help point the synthetic aperture radars, the crew will divide evenly about 450 shuttle maneuvers taking 14,000 photographic images that will help scientists on the

ground interpret the radar data. Fourteen different cameras and special films will be used for the photography, plus television cameras in the payload bay will be aligned to give a

Please see **HOME**, Page 4



JSC Photo by Jack Jacob

STS-59 astronauts, from left, Kevin Chilton, Sid Gutierrez, Tom Jones, Linda Godwin, Jay Apt and Rich Clifford, check out some of the equipment they will be using on their upcoming mission during final bench review.

## Technicians closing Endeavour's hood for Thursday launch

By James Hartsfield

Technicians began shutting the hood on Endeavour's engine room and packing the crew's equipment in the cabin this week as preparations for a launch at 7:07 a.m. CDT Thursday of STS-59 entered the stretch.

Commander Sid Gutierrez, Pilot Kevin Chilton, Payload Commander Linda Godwin and Mission Specialists Jay Apt, Rich Clifford and Thomas Jones plan to depart JSC for Florida early Monday morning to prepare for the launch. The countdown clock is scheduled to start ticking at 10 a.m. Monday.

Endeavour's primary cargo is the Space Radar Laboratory-1, a radar that will study the Earth's oceans, geology, environment, topography and atmosphere. For STS-59, the crew will be at work around the clock in two 12-hour shifts, and an

Please see **SRL-1**, Page 4



# Structures, Science, & Observation

**T**he crew of STS-62 spent 13 days in orbit monitoring the Earth's environment, and studying the applications of materials processing and biotechnology in a microgravity environment.

The five member crew was led by Commander John Casper. His crew mates, Pilot Andy Allen and Mission Specialists Pierre Thuot, Sam Gemar and Marsha Ivins,

ended their mission just 57 minutes short of establishing a new endurance record for shuttle flights.

The crew of *Columbia* briefed employees on the mission

Thursday. Crew members also will be appearing at Space Center Houston at 11 a.m. April 7 to share their flight memories. JSC employees will be admitted to the briefing free of charge by showing their NASA badge at the entry turnstile.

Clockwise from top left, 1) On *Columbia's* flight deck, Ivins prepares to aim three Hasselblad cameras through the overhead windows of the orbiter. Ivins used the three cameras simultaneously to record the same images on three different types of film for comparison and experimentation.

2) From *Columbia's* middeck, Gemar talks with ground controllers while assisting Allen, in background, during a "soak" in the Lower Body Negative Pressure apparatus.

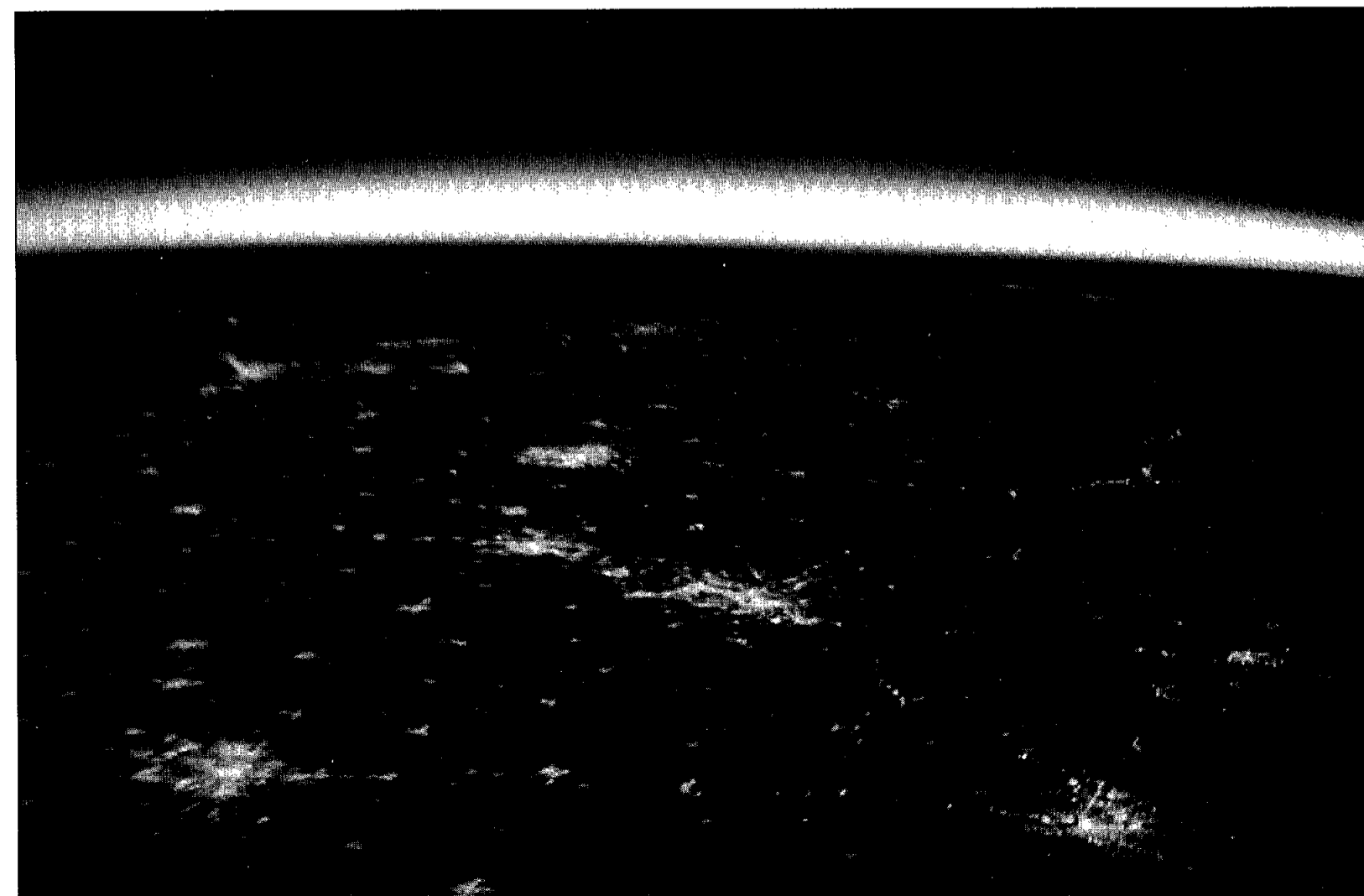
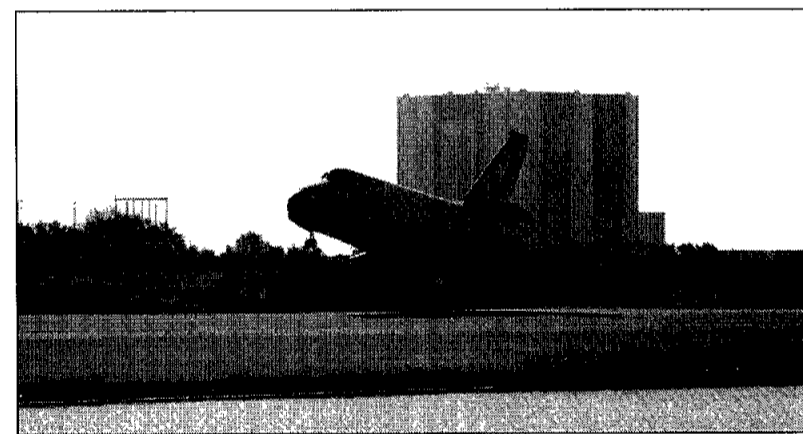
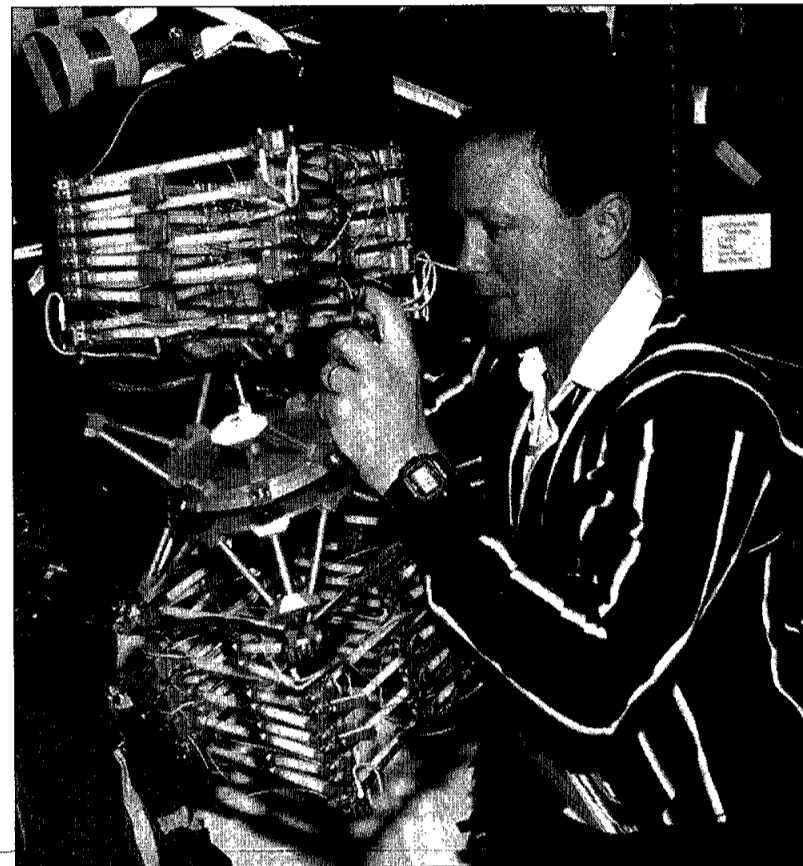
3) Thuot works with the Middeck 0-Gravity Experiment. MODE is a reusable test facility designed to study the nonlinear, gravity-dependent behavior of two types of space hardware. In this photo, Thuot is working with a model of a large space structure with applications for future spacecraft. MODE also was designed to study the behavior of contained fluids.

4) *Columbia* passes in front of the Vehicle Assembly Bldg. at Kennedy Space Center moment before its touchdown on March 18.

5) This night view of Indiana, Kentucky and Ohio is just one example of the observation photos taken on board *Columbia*. The bright lights in the photo are major cities in the three states, with Springfield, Dayton and Cincinnati in the center with Lake Erie, Cleveland and Akron in the upper left quadrant. The border-forming Ohio River delineates Louisville and New Albany in the lower right corner with Lexington visible just below center at the right edge of the photo. Indianapolis can be seen in the lower left corner.

6) Crew members take a moment to pose for the on-orbit crew photo. From left front are Casper and Thuot, and in the back row from left, Allen, Ivins and Gemar.

7) Casper and Gemar prepare to film additional Earth observations during their 13-day flight. Casper holds a large format, Linhof camera, while Gemar finishes adding a roll of film to a 70mm Hasselblad camera. Documentation and Earth observations occupied much of the on-duty time for all five crew members. □





# Ida's moon providing new clues to asteroid origins, evolution

The discovery of a natural satellite orbiting asteroid Ida is providing scientists an intriguing new clue in deciphering the origins and evolution of these ancient bodies, most of which orbit the Sun in the main asteroid belt between Mars and Jupiter.

The first-ever photograph of an asteroid's moon was taken by the Galileo spacecraft as it flew past Ida on Aug. 28. The image was not transmitted to Earth until recently because the probe is sending back data at a very slow rate.

Amateur astronomers for many years have observed the light of stars blinking off and on as objects such as asteroids pass in front of them in events called stellar occultations. Some have reported "blink-outs" that suggest some asteroids have moons, but such reports have never been confirmed by definite second sightings. The Galileo dis-

covery is the first unambiguous evidence of an asteroid moon.

"It previously was thought that natural satellites of asteroids could form, but they probably weren't common," said Torrence Johnson, Galileo Project Scientist at NASA's Jet Propulsion Laboratory. "Having found one fairly quickly, we can say that they're probably more common than previously thought." However, much information including where the moon came from, or details of its orbit are still unclear.

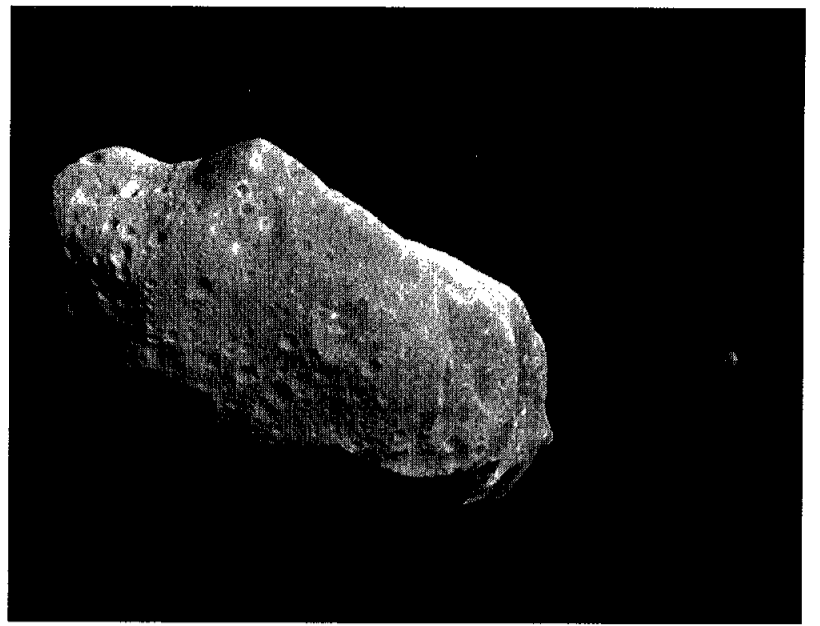
As yet, project scientists do not know the parameters of the moon's orbit, critical information that can reveal the mass of the asteroid. From the photo and spectrometer data, scientists estimate the moon is about 1 mile across, about 60 miles from Ida's center. The position will be more accurately determined as new data are analyzed. The asteroid itself is about 35 x 15

x 13 miles in size.

Galileo's near-infrared mapping spectrometer which scans space objects at a variety of wavelengths to reveal their chemical compositions, suggests that Ida's moon is made from essentially the same kind of material as the asteroid. Ida is classified as an S-type asteroid, composed mostly of silicate rocks.

Scientists believe it is virtually impossible that the moon is merely a "captured object" that wandered near the asteroid and was caught by its gravitational field. According to the laws of celestial mechanics, such an event would deflect the smaller object, but not capture it, unless a third force of some kind slowed it down.

"Once we have determined the object's orbit, we can estimate time scales and make better guesses as to where it came from," said Johnson.



NASA Photo

This photograph transmitted from the Galileo spacecraft shows the first conclusive evidence that natural satellites of asteroids exist. A small moon, about 1 mile across, can be seen orbiting around Asteroid Ida. Ida is about 35 miles long. Galileo took the photograph from a distance of 6,755 miles away during an August pass of the satellite. The moon appears to be about 60 miles away from the center of the asteroid.

## SRL-1 readied for Earth studies

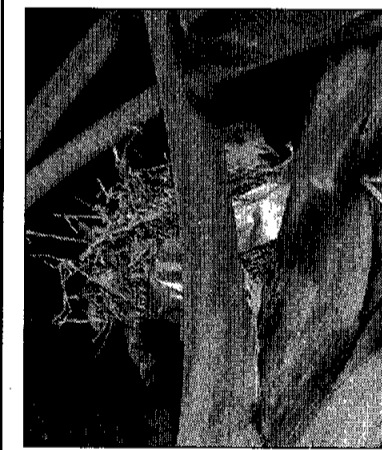
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on-time launch Thursday would have landing planned at 12:14 p.m. central April 16. However, the planned nine-day flight may be extended by a day if supplies prove plentiful aboard *Endeavour* and science operations find the extra time beneficial.

Work at the pad this week included installation of space suits that would be used in the event an unplanned spacewalk is required; flushes of *Endeavour's* primary steering thrusters; and closeouts of the shuttle's avionics bays. Today, the SRL-1 batteries are being charged and the launch pad tanks are being filled with the liquid oxygen that will be loaded aboard *Endeavour* the night before launch.

Meanwhile, *Columbia* is going through post-flight servicing in the Bay 2 shuttle hangar. Work this week on the maiden shuttle, which has its next flight scheduled for July, included the removal of the mechanical arm, testing of the forward reaction control system steering jets, and the draining of excess propellants.

Elsewhere, *Discovery* is in the Bay 3 hangar in the midst of a standard set of inspections performed on each orbiter after about each five flights. Tests of the main propulsion system plumbing are under way, a new cockpit window is being installed and electrical tests of the drag chute deploy system are being performed.



**HELPING HAND**—A pair of mourning doves received a helping hand from JSC employee Ron Bernhard after the nest they were building in a tree in the Bldg. 31 lobby atrium was dislodged by high winds.

Above, Bernhard points at the reinforced nest he built for the doves with stainless steel netting. At left, one of the nesting pair of doves nestles over its eggs in its newly-secured home.

JSC Photos by Jack Jacob

## Home planet focus of STS-59 mission

(Continued from Page 1)

visual image of each radar swath.

"By the time we get down, we hope to have about 12,000 CD-ROM's worth of data," Gutierrez said. "Nobody's ever attempted to do a mission like this one before. It's going to involve a lot of very precise choreography up there to get it all done."

SRL-1 instruments include the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar and the Measurement of Air Pollution from Satellites instruments.

The imaging radar of the SIR-C/X-SAR instruments have the ability to make measurements over virtually any region at any time, regardless of weather or sunlight conditions. The radar waves can penetrate clouds, and under certain conditions, can also "see" through vegetation, ice and extremely dry sand.

An international team of 49 science investigators from 13 countries — Australia, Austria, Brazil, Canada, China, the United Kingdom, France, Germany, Italy, Japan, Mexico, Saudi Arabia and the United States — will conduct the SIR-C/X-SAR research.

The MAPS experiment will measure the global distribution of carbon monoxide in the troposphere, or lower atmosphere. These measurements will provide scientists with indi-

cations of how well the atmosphere can clean itself of "greenhouse gases," chemicals that can increase the atmosphere's temperature.

In addition to the crew's observations and photography, scientists and students on the ground will take verification readings.

"When you take a radar image of a planet," Apt said, "mostly what you see is the roughness of the surface, and in the case of being over trees and vegetation, you see how much of the radar signal has been absorbed and how much has been bounced by the trunks of the trees. We're mapping 5 percent of the world, and there are going to be things there that are going to be difficult to interpret. Having a visible image of the frame that the radar is mapping will help the scientists a great deal in interpreting their data. And they've asked for our help."

SRL-1 will provide a unique vantage point for studying how the Earth's global environment is changing, helping distinguish human-induced environmental changes from other natural forms of change.

"When you're looking at things as in the sense of trying to measure biomass on the ground," Godwin said, "that's when you can start to see the changes and that is when

you can start to see what is happening on the surface. Maybe we can start to sort out what are people doing to produce these changes and what are going to occur naturally. The radar may help figure out what happens to the water cycle and how does that water cycle through our Earth and air and back again and that affects all of us."

"These instruments are much like other NASA instruments that have flown on planetary spacecraft. Magellan had a very nice radar that just mapped the entire surface of Venus in the last few years. This is a much more capable instrument than Magellan's radar and we should learn proportionately more about the Earth's surface. Our planet is unexplored in many regions and we lack firm numbers on what's going on in the ecosystem and oceanography and the atmosphere in those regions. To apply these same techniques that we have applied to the other planets and turn them on our home planet is the payoff of this kind of shuttle mission."

"We're really looking forward to realizing the excitement of discovering new things about our own planet," Jones said, "as well as telling us what's going on in this world so that we can make the right decisions about how to live on it properly."

## Space Center Houston plans cadet concert, summer job openings

Space Center Houston will present the United States Air Force Academy Cadet Chorale on April 9.

The Chorale will serenade guests at the visitors center at a concert beginning at 1:30 p.m. under the lunar lander on the main plaza. Musical selections will include patriotic, secular and sacred themes, as well as a "Salute to Broadway."

The Cadet Chorale is appearing as part of Space Center Houston's "Celebration 25 - Man on the Moon"

activities celebrating the 25th anniversary of the lunar landing and the Apollo program.

"The Cadet Chorale will definitely bring added excitement to the events surrounding 'Celebration 25,'" said Vance Ablott, general manager of Space Center Houston. The group consists of men and women from all four cadet classes who have represented the Academy through

music and song throughout the United States.

Celebration 25 activities will continue through the Labor Day weekend at Space Center Houston. Ongoing events include a lunar-themed laser show, the LEGO 'Travel in Space World Show', the NASA Preview Center, and a video retrospective of the lunar landing entitled 'A Leap of Faith.'

Meanwhile, Space Center Houston is interviewing for summer positions and part-

time operations positions.

Space Center Houston is accepting walk-in interviews from 9-11 a.m. today. Beginning next week, walk-in interviews will be from 9-11 a.m. on Thursdays.

For additional information on the interview schedule or job opportunities, contact Space Center Houston's job line at 244-2177 or Human Resources Department at 244-2150.

## Safety center to conduct refresher training course

JSC employees whose job duties may expose them to potentially hazardous materials must participate in a refresher hazardous communications training course.

"Even employees who have received previous training need to attend this refresher course," said Karen Bleam, HazCom course instructor. "A number of revisions have been made to HazCom program and we need to make sure our employees are informed about the latest procedures."

The goal of JSC's HazCom training is to ensure that employees who may come in contact with hazardous materials are aware of the hazards and know how to protect

themselves from potential harm.

The training will discuss protective measures employees can implement to ensure their safety, and will provide employees with an understanding of the hazardous materials that may be found in the workplace. Bleam will be going out to the work areas to conduct the retraining effort.

The changes in JSC's HazCom program, and NASA's efforts to become the first federal agency to be accepted into OSHA's Voluntary Protection Program requires retraining of employees.

For additional information on the HazCom training, contact the Safety Learning Center at x36369, or Bleam at x36475.

## Buyout in effect

(Continued from Page 1)

ing in the buyout program must submit an Application for Separation Incentive (Buyout) to the Employee Services Section, Bldg. 45, Rm. 140 by 5 p.m. April 15. All interested employees, even those who previously submitted their names to Employee Services, must complete and return the application to confirm separation date.

Headquarters will review the data from each center to determine how many of the applications for buyout will be approved, based on the funds available.

For additional information on the buyout program, contact Human Resources at x36251 or a benefits specialist at x32681.

## Space News Roundup

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