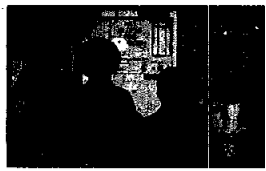


**NASA**

National Aeronautics and Space Administration

Lyndon B. Johnson Space Center  
Houston, Texas



**'Scope scoping**

Telescope gazing was one of the premiere activities onboard *Discovery* during STS-31. Photos on Page 3.



**In memorium**

A memorial to space food pioneer Rita Rapp now hangs in the Bldg. 17 food laboratory. Story on Page 4.

# Space News Roundup

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No. 19

**\*Astro-1 to give cosmic CAT scan**

By Kelly Humphries

In medical terms, Astro-1 with its three ultraviolet telescopes and one X-ray telescope will give the universe a cosmic CAT scan and provide unparalleled information about high-energy celestial objects.

Dr. Edward Weiler, Astro-1 program scientist and chief of astrometry at NASA Headquarters, said the telescope array to be launched aboard *Columbia* in two to three weeks will extend scientists' vision beyond the visible light spectrum and allow them to see some of the most energetic events in the universe. Earth's atmosphere absorbs most of the ultraviolet and X-rays before they can reach the ground.

The first Spacelab mission since 1985 will look at other galaxies, neutron stars, pulsars, black holes, quasars, binary star systems, star clusters, the interstellar medium and the recently discovered Supernova 1987a and more.

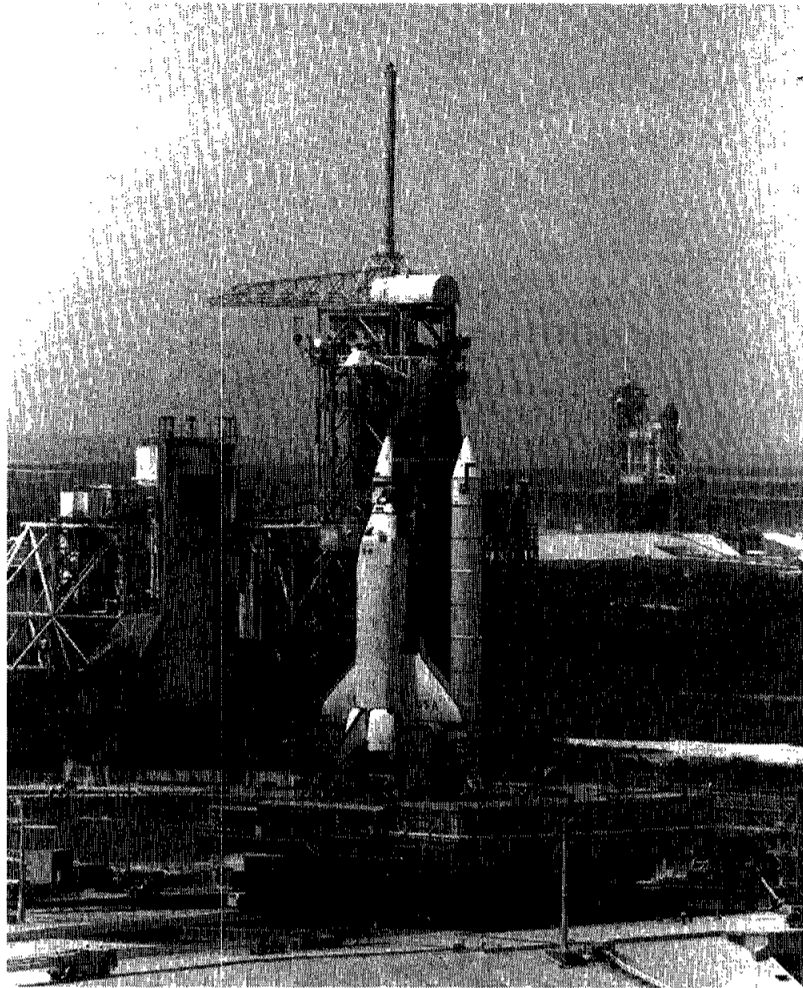
"If you were a doctor and a very sick patient came into your office and all you had was a stethoscope and a thermometer, the doctor would have a hard time diagnosing that complex human being," Weiler said.

"The same is true with astronomy," he explained. "We need to study objects that are hundreds, thousands, even billions of light years away and all we have is light. Objects tend to give off light in all wavelengths. We need to study things across the color spectrum, just as a doctor has to study a human being with many instruments."

Astro-1 will use a Spacelab pallet with an Instrument Pointing System (IPS) and a cruciform structure to bear three ultraviolet instruments mounted in parallel configuration. Also in the payload bay is the Broad Band X-Ray Telescope which has two co-aligned imaging telescopes.

The three instruments are the Hopkins Ultraviolet Telescope (HUT), the Wisconsin Ultraviolet Photo-polarimeter Experiment (WUPPE) and the Ultraviolet Imaging Telescope (UIT). A star tracker, which supports the instrument pointing system, also is mounted on the cruciform.

"It's by viewing the sky from multiple wavelengths that we find many new exciting objects which we pull out of the background," said Dr.



NASA Photo  
**The Space Shuttle *Columbia*, foreground, joins *Discovery* at Kennedy Space Center's Launch Complex 39 prior to the STS-31 launch. It was only the second time in history that two shuttles occupied launch pads at the same time.**

Ted Gull, Astro mission specialist at Goddard Space Flight Center. "And quite often, when we look at old favorite objects that we think we understand so much, we gain a lot of new insight."

Weiler and Gull are leading the team of scientists behind Astro-1. Dr. Art Code, University of Wisconsin, is principal investigator for WUPPE. Dr. Art Davidson, Johns Hopkins University, is principal investigator for HUT. Dr. Peter Serlemittos, Goddard, is BBXRT principal investigator, and Ted Stecher, also of Goddard, is UIT principal investigator.

HUT will study faint astronomical objects such as quasars, active galactic nuclei and supernova remnants. It consists of a mirror that focuses on an aperture of a prime focus spectrograph. Observations of the outer planets of the solar system will be made to investigate aurorae and gain insight into the interaction of each planet's magnetosphere with the solar wind.

WUPPE will measure the polarization of ultraviolet light from celestial objects such as hot stars, galactic nuclei and quasars. It uses two-mirror telescope optics in conjunction with a spectropolarimeter. This instrument will measure the polarization by splitting a beam of light into two mutually perpendicular planes, passing the beams through a spectrometer and focusing them on two separate array detectors.

UIT consists of a telescope and two image intensifiers with 70mm film. It will acquire images of faint objects in broad ultraviolet bands in the wavelength range and serve as a spotter for more detailed telescope investigations. This experiment also will investigate the present stellar content and history of star formation in galaxies.

BBXRT will study active galaxies, clusters of galaxies, supernova remnants and stars. BBXRT will directly measure the amount of

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

**Two to three weeks**

**\*Coolant valve problem delays *Columbia* liftoff**

By Kyle Herring

Replacement of a valve in one of *Columbia*'s two Freon coolant loops will delay the launch of the STS-35 mission two to three weeks, shuttle managers said Thursday.

Both of the coolant loops, located beneath the forward portion of the payload bay, are required so that a backup is available should one fail.

The system provides cooling for orbiter and payload avionics electronics equipment.

At the close of the two-day flight readiness review Wednesday, shuttle program managers elected to remove the flow proportioning valve at the launch pad and inspect it for contamination that may be restricting the flow through Freon coolant loop 1.

"We are obviously disappointed that we are not ready to fly," said William B. Lenoir, associate administrator for space flight. "However, this particular system is absolutely critical to the safety of the crew and overall mission success, so we have decided to change the component."

Launch had been scheduled for May 16 before the coolant loop problem was detected. The primary payload for STS-35 is the Astro-1 array of ultraviolet telescopes and the Broad Band X-Ray Telescope.

Vance Brand will command the 36th space shuttle mission and Guy Gardner will be pilot. Mission specialists are Mike Lounge, Jeff Hoffman and Robert Parker. Payload specialists are Sam Durrance and Ron Parise.

After weighing the relative risks associated with performing the work at the launch pad or in the Orbiter Processing Facility, the managers decided replacement and checkout on the pad is just as safe and effective.

A detailed timeline for the work is being developed and managers expect to have a better idea of how

long the job will take by early next week. A more definitive schedule will not be available until the major work items

have been identified, since Freon loop work involves activities that frequently do not proceed according to its schedule.

Another flight readiness review will be held before launch. The impact of the delay on remaining shuttle flights is still under evaluation. Once a target date for STS-35 is established, NASA managers will assess the effect on the overall manifest.

Other work at the launch pad in the last week included the flight readiness test of *Columbia*'s main engines. This hydraulic test simulates the main engine start sequence, including movement of the valves within the three main engines.

The liquid hydrogen fill and drain flex line in the mobile launcher platform, which was disconnected for removal of small debris last week, was retested with no problems earlier this week. Last week, ordnance work was completed and the payload bay doors were opened for continued servicing of Astro-1 and the Broad Band X-Ray Telescope.



**\*Hubble nearly ready to snap first photo**

By Pam Alloway

Ground controllers believe the Hubble Space Telescope may be ready to take its first photographs of deep space sometime next week despite concerns over a slight wobble and problems with the telescope's pointing system.

Controllers at the Space Telescope Operations Control Center (STOCC) at Goddard Space Flight Center on Tuesday began a 36-hour process of properly pointing the telescope and focusing its wide field camera. The process will entail a sequence of commands that will complete the first "bootstrap" phase of focusing the telescope. Operators will position the telescope, lock the fine guidance sensors onto guide and target stars, and complete general focusing.

Early this week, controllers commanded the telescope to look for stars

of a certain brightness in what scientists thought was a rich field, but the telescope didn't find any. Wednesday, controllers reported that an older coordinate system had been used in updates to the telescope's pointing system. The difference between the older system and the current system, coupled with the way the system was implemented, apparently caused Tuesday's pattern matching difficulties. Once the telescope locks onto bright stars, it will remember where it was pointing and be able to find other targets.

When a "first light" test image is attempted, scientists expect the observatory to train in on a star cluster that is about 1,200 light years away and 3 billion years old. The cluster is in the Milky Way and was formerly known as NGC 3532. It is an open

Please see **HUBBLE**, Page 4



JSC Photo Scott Wickes

**ON BUILDINGS OFF SITE—Vicki Cantrell of JSC's Documentation Management Branch places the NASA logo on the Nova Bldg. last Friday. The vinyl letters, which will be on the Nova, Vanguard, Atlas, Eagle and One Harbour Square buildings leased by NASA, will make it easier for visitors to find NASA offices and conference facilities off site, said Patsy Mitchell, JSC resident facilities manager for Off-site Space.**

**Pink, green, blue sheets go white**

By Pam Alloway

Pink, green and blue are out and white is in. Paper that is.

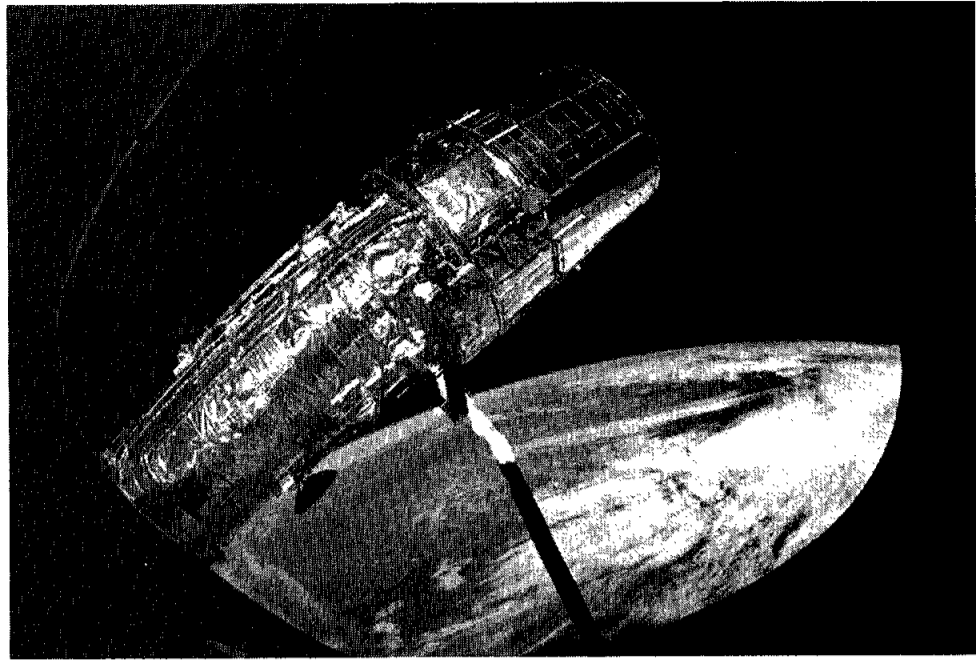
In support of JSC's recycling effort, pink and green announcement sheets will be obsolete within the next few weeks. The Management Services Division, JSC's printing shop and others are in the process of replacing the pink JSC Announcement and green management directive paper with white sheets.

"We'll have two different banners to help people distinguish these in a sea of white paper in people's in baskets," said Bill Larsen, chief of the Management Services Division. "We're not talking about large numbers of papers in the overall scheme of things but we are talking about the center's leadership saying we want our management documents to reflect the ecological needs of this Earth."

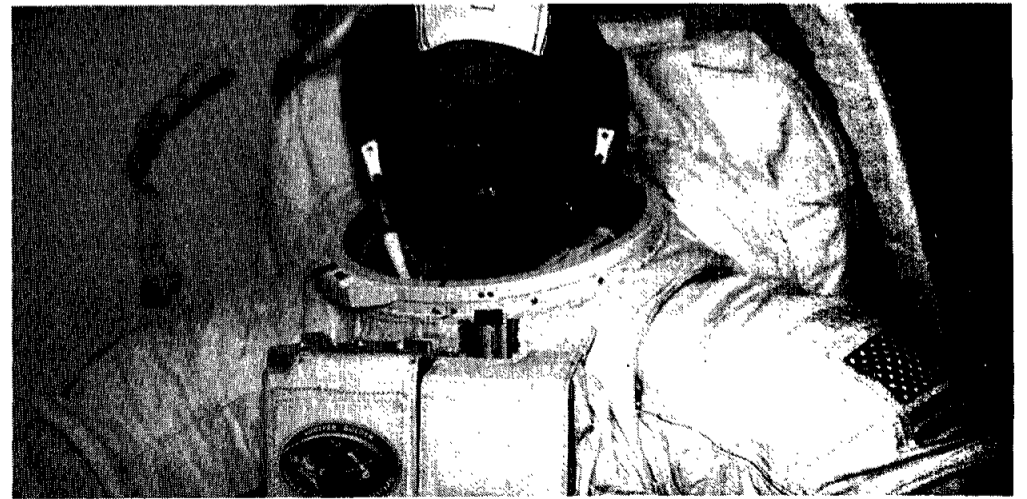
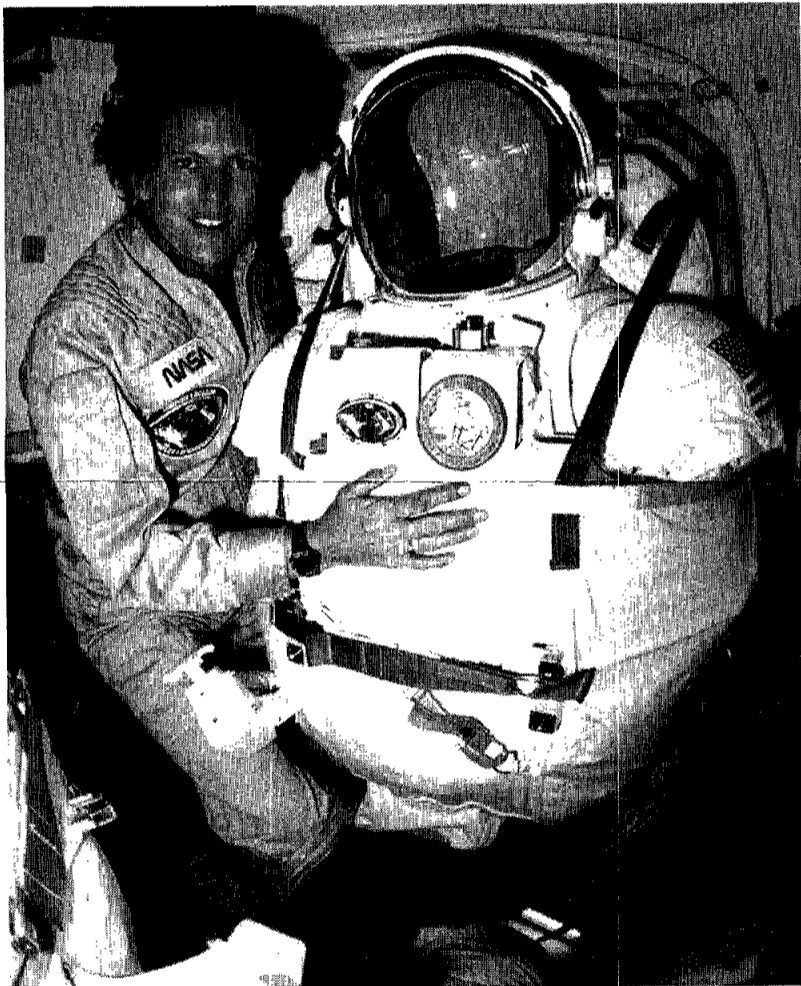
Blue personnel announcements already have gone by the wayside.




# Gazing at a stargazer




Along with star gazing, telescope gazing was one of the main activities on board *Discovery* during the recently completed STS-31 mission. Clockwise from top right: 1) The Hubble Space Telescope (HST) is suspended from the orbiter's remote manipulator system arm as Mission Specialist Steve Hawley works the controls. 2) Mission Specialist Bruce McCandless, Hawley and Commander Loren Shriver engage in some 'scope scoping through the overhead windows. 3) Mission Specialist Kathy Sullivan, left, and Shriver are captured by a fish-eye lens on the flight deck. Sullivan is working with a Hasselblad camera and Shriver, pen in hand, is amending flight data on the aft flight deck. 4) Sullivan stands by the airlock, almost fully suited in her extravehicular mobility unit (EMU) space suit. She and McCandless later came within minutes of stepping outside *Discovery* to assist with HST deployment. 5) Sullivan and McCandless work together to perform one of the mission's medical experiments, Detailed Supplementary Objective 462, designed to measure central venous pressure during space flight. Sullivan is applying a gel to a transducer that will be placed on McCandless' jugular vein to collect data. 6) Shriver uses the Hasselblad to take photographs from the flight deck's overhead window. 7) Sullivan meets a friend, her EMU, in the airlock. One patch on the suit's chest is the STS-31 mission patch; the other is the patch of the Weightless Environment Training Facility (WETF), where astronauts train for space walks in a large swimming pool.



 **STS-31**  
Hubble Space Telescope



  
HUBBLE SPACE TELESCOPE



# Payloads team hangs STS-31 plaque

Members of the Mission Control payloads team earned the honor of hanging the STS-31 plaque following the successful completion of the Hubble Space Telescope (HST) mission.

Payloads Officer Nellie Carr was singled out for coordinating operations support and leading the team through the difficult deployment when the solar arrays failed to unfurl properly, said Lead Flight Director Bill Reeves. Reeves also cited Jeff Hanley, Jeff Larson, Sherry Boyd and Pete Sprunger for their contributions.

"The whole team can be very proud of its contribution to this historic mission," Reeves said.

Hanley came up with the idea of modifying the shuttle communications system to enable communication with HST through the S-band system instead of the Ku-band system, increasing coverage essential to the deployment. Larson, Boyd and Sprunger were instrumental in developing command capability and malfunction procedures implemented during deployment, he said.

## JSC experts judge science fair projects

Fourteen JSC representatives employed their skills and expertise to judge almost 800 science exhibits in the 41st Annual International Science and Engineering Fair this past week in Tulsa, Okla.

The purpose of the fair is to stimulate in young people an active interest in science and engineering. Entries are received from students at the high school level who have qualified in local, city and regional fairs.

NASA selects 10 awards for aerospace research in the categories of aeronautics, computers, electronics and communications, life sciences, mathematics, physical sciences, propulsion, robotics and space vehicles. Judging took place Wednesday.

Judges from JSC were Stephen J. Feaster, research pilot, Aircraft Operations Division; Jon D. Erickson, chief scientist, Automation and Robotics Division; Mark V. Glorioso, communications and tracking project engineer, Tracking and Communications Division; Kenneth K. Kroll, aerospace engineer for liquid propulsion systems, Propulsion and Power Division; Pedro A. Martinez, computer engineer, Instrumentation and Processor Applications Branch, Flight Data Systems Division;

Paul O. Romere, shuttle technical manager for aerosciences, Navigation, Control and Aeronautics Division; Michael N. Rouen, deputy chief, Extravehicular Activity Branch, Crew and Thermal Systems Division; Lebarian Stokes, aerospace engineer, Robotics Systems Evaluation Branch, Automation and Robotics Division; Dr. Daniel H. Anderson, computer systems manager, Solar System Exploration Division; Dr. Jeffrey R. Davis, chief, Medical Operations Branch, Medical Sciences Division; Dr. C. Michael Foale, astronaut; Dr. Frank A. Kutyna, chief neuroscientist, Space Biomedical Research Institute; Dr. Doug Ming, staff scientist, Space Resource Utilization Office; and James D. Poindexter, educational specialist, Public Affairs Office.

## Rummel to manage science payloads

Dr. John A. Rummel, Ph.D., has been appointed director for science payloads in the Space and Life Sciences Directorate.

Rummel is returning to NASA after spending six years running his own company, MAP Systems. He first joined JSC in 1966, and served as principal investigator on Apollo and Skylab physiology experiments. He was Spacelab Life Sciences-1 mission scientist from 1980-84.

## Brown manages payload specialist activities

Betty G. Brown has been appointed payload specialist manager at JSC, and will coordinate flight preparation activities as outlined in the Payload Specialist Operations and Integration Plan.

She will work all JSC requirements, sche-



Carr Rummel Brown Jones Davis

duling and accommodations activities related to shuttle flight preparation of payload specialists and space flight participants for the Space Shuttle Support Office in the Flight Crew Operations Directorate.

Brown, who came to JSC in 1973, had been a customer relations specialist in the Space Shuttle Customer Integration Office since 1983. In that position, she worked with payload customers and was in charge of the Customer Support Room in Mission Control.

## Jones finishes marathon

Coye "Mac" Jones, technical assistant and office manager in the Space Shuttle Engineering Integration Office, recently completed the Boston Marathon.

Jones finished the April 16 run with a time of 3 hours, 29 minutes and 52 seconds. Winner

of the race was Gelindo Bordin of Italy, with a time of 2 hours, 8 minutes, 19 seconds.

The grueling course over hilly terrain provided different challenges than relatively flat Texas courses, which are difficult because of the heat and humidity, Jones said.

## Davis earns honors

Margaret E. Davis, secretary to Center Operations Deputy Director Grady McCright, recently received the Marilyn Bocking Award for Secretarial Excellence.

Davis was cited for her quick adaptation to the office since joining it in July 1988, and for her ability to deal with calls and letters from state and local political figures, top management of attorneys' firms, banks, construction and architectural firms, developers and vendors of all kinds.

She received a plaque and a \$500 stipend.



JSC Photo by Jack Jacob

A memorial plaque in the Bldg. 17 food laboratory commends the late Rita Rapp for taking astronauts from "cubes and tubes" to conventional meals and utensils.

## Rapp memorial unveiled

By Pam Alloway

Officials recently unveiled a memorial plaque to Rita M. Rapp, a pioneer space food scientist and shuttle food subsystems manager at JSC.

Rapp, a physiologist and nutritionist, died at age 61 in July 1989 following a long illness. She joined NASA in 1961 during the Mercury program and continued her work through the Space Shuttle Program.

The plaque will be on permanent display in the Bldg. 17 food lab. On hand for the unveiling were Brewster Shaw, NASA's deputy director of space shuttle operations; Dr.

Carolyn Huntoon, director of JSC's Space and Life Science's Directorate; Dr. Don Robbins, deputy director of the directorate; Chris Perner, chief of the Man Systems Division; and Dr. Charles Bourland, subsystem manager of space station food.

Shaw, a former astronaut and commander of the STS-28 crew, flew a small gold shuttle pin in Rapp's memory during his final flight in August 1989. The pin was incorporated into the plaque, which commends Rapp for taking astronauts from "cubes and tubes" to conventional meals and utensils.

## JSC workers' children receive scholarships

By Pam Alloway

Kristen N. Jaax, daughter of a JSC employee, is one of the three recipients of the 1990 NASA College Scholarships.

Her father, James R. Jaax, is deputy chief of the Engineering Directorate's Crew and Thermal Systems Division. She will graduate first in her class at Clear Lake High School this month.

Jaax plans to attend Stanford University this fall to pursue a degree in biomedical engineering.

The NASA College Scholarship Fund Inc., established in 1982, was endowed by Pulitzer Prize winning author James A. Michener.

Other NASA College Scholarship recipients are: Timothy O. Jarrett, son of Langley Research Center employee Olin Jarrett Jr., and Sandor G. Lehoczky, son of Marshall Space Flight Center employee Sandor L. Lehoczky.

The NASA Exchange-JSC Scholarship program also has announced its 1990 winners. The scholarship, separate from the NASA College Scholarship, began in 1967. Each

scholarship provides \$4,000, or up to \$1,000 a year, for study at any university.

This year's winners are:

- Anne Jeannette Bobo, daughter of Sue E. Bobo of the EVA Branch in the Engineering Directorate's Crew and Thermal Systems Division. Bobo, a June 1989 graduate of Clear Creek High School, plans to enter Texas Women's University in Houston to pursue a bachelor's degree in nursing.

- Jeffery Scott Richeson, son of George L. Richeson Jr. of the Flight and Ground Support Systems Section in the Mission Operations Directorate (MOD). Richeson, a June 1989 graduate of Clear Lake High School, plans to study computer science and math at Baylor University.

- Angela Christine Snyder, daughter of Richard D. Snyder of the Orbit Procedures and Flight Data File Section, also in MOD. Snyder, 1988 Friendswood High School graduate, is majoring in Health Science at Texas A&M University. She plans to study nursing at the University of Texas Medical Branch in Galveston.

## Hubble images expected soon

(Continued from Page 1)

star cluster of about 150 stars visible to ground observers in the Earth's southern hemisphere in the constellation Theta Carina or "Ship's Keel." Whether that image is taken on Wednesday or Friday depends on the number of bootstrap operations that must take place.

Engineers also have built diagnostic tests that will be uplinked to the telescope to help determine the cause of a slight oscillation, or wobble, in the roll axis of the HST's fine guidance sensors. The sensors are part of the telescope's pointing and control system, and during its most sensitive uses will allow astronomers to measure the geometry of the universe and the exact distance between stars.

Another nagging problem is a shaking motion when the telescope

passes from shadow into sunlight. Engineers are studying both problems and believe they might not be with the telescope but with the computer program that guides its every move.

This past week, operators completed a number of objectives including: the alignment of the fixed head star tracker to the rate gyro assembly; bringing the high speed photometer to its ready, or "hold," state; verifying the faint object camera computer; checking the voltage readings on the high resolution spectrograph; activating and monitoring an ion gauge in the telescope's aft shroud; and uplinking new ephemeris tables.

The STS-31 crew placed the \$1.55 billion space telescope in a 380-mile orbit April 25, starting it on its 15-year mission of exploring the universe.

## Astro-1's vision of the universe, a look beyond

(Continued from Page 1)

energy in electron volts of each X-ray detected. Accurate pointing is achieved by a two-axis pointing system (TAPS).

Astro observations will begin about 23 hours after *Columbia* has completed its maneuvering burn to circularize its orbit at 190 nautical miles. BBXRT will be activated about 13 hours after orbital insertion.

STS-35 Commander Vance Brand said the crew cabin will be crowded on this mission, the first seven-member crew to fly since the Challenger accident. While it is a Spacelab mission, there will be no added pressurized volume for the crew to

move around in, and this will be the first large crew to deal with partial pressure suits, which will be stored in the airlock when not in use.

Brand said the crew will divide into two shifts, red and blue, to support around-the-clock observations by the telescopes. The red team will consist of Pilot Guy Gardner, Mission Specialist Robert Parker and Payload Specialist Ronald Parise. The blue team will be Mission Specialists Jeff Hoffman and Mike Lounge, and Payload Specialist Sam Durrance.

"We're excited about it," Brand said. "We're carrying instruments that in the past mainly have been used on small rockets. Instead of

getting a few minutes of observing, we'll get nine or 10 days continuous observing time. We think this has tremendous scientific potential."

The telescopes often will work together, taking different measurements of the same object.

"The three ultraviolet telescopes we have are co-pointed generally at the same target all the time," Parise said. "We're unique in that we can make several types of observations simultaneously of the same target."

Lead Flight Director Gary Coen said observation targets will change every half hour, which will create a busy schedule.

"In order to optimize the number

of stars we can see and the galactic objects that the scientists can point at, we have a pretty tight maneuver schedule," he said. "Over the course of the nine-day mission, we're doing some 240 attitude maneuvers to repoint the orbiter and to allow the IPS and the BBXRT to get new targets."

The mission also will be a pathfinder for Space Station *Freedom*.

"I'm really looking forward to this mission for what it will teach us about how to do science operations continuously and for relatively long duration," said Lounge, who, when not flying and training, works on space station projects.

## Space News Roundup

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