

# Spaceport News

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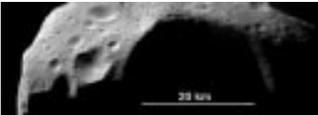
John F. Kennedy Space Center

## STS-94



The crew of STS-94 arrived at KSC on June 28 for the mission's scheduled launch on July 1. The launch window opened at 1:50 p.m. EDT as this issue of *Spaceport News* was going to press. The 23rd flight of Columbia and the 85th mission flown since the start of the Shuttle program, STS-94 is the reflight of the Microgravity Science Laboratory-1 payload.

## NEAR



Launched from Cape Canaveral Air Station Feb. 17, 1996, the Near Earth Asteroid Rendezvous spacecraft made history June 27 with its close-up images of the Asteroid 253 Mathilde. This image was captured from about 750 miles away (NEAR's closest approach point) and reveals numerous craters on the asteroid ranging from more than 18 miles to less than 0.3 miles across. NEAR returned more than 500 images of Mathilde.

## ACE



Jim Hutchenson of Johns Hopkins University's Applied Physics Laboratory unveils NASA's Advanced Composition Explorer (ACE) in the Spacecraft Assembly and Encapsulation Facility-2. ACE, which will investigate solar phenomena, arrived at KSC in June for prelaunch processing.

## Node 1 at KSC signifies new era in space history

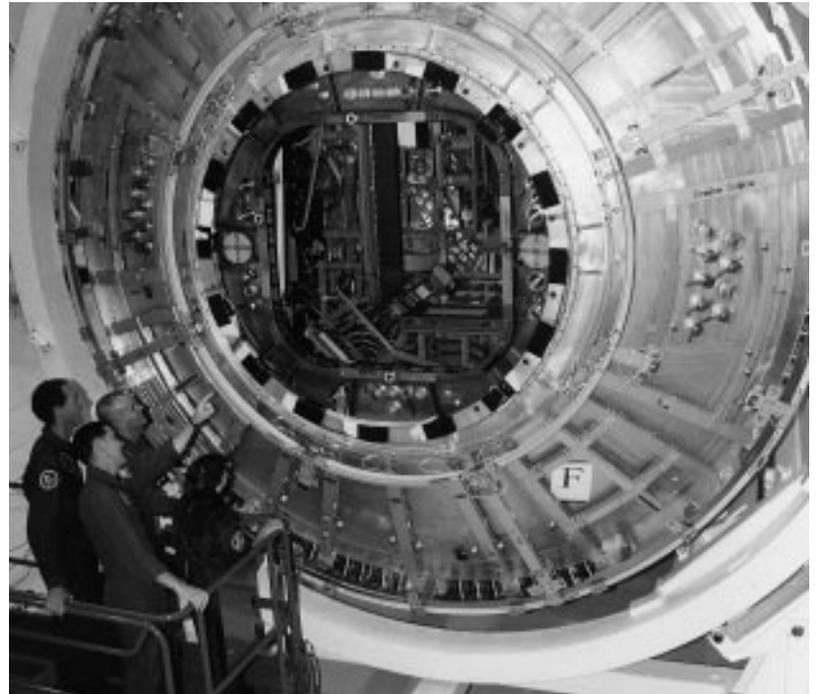
The International Space Station program reached a major milestone June 23 as the first U.S.-manufactured component began a year of launch preparations at Kennedy Space Center.

A connecting module, called Node 1, was shipped by a C-5 air cargo plane to KSC from the Marshall Space Flight Center in Huntsville, Ala. The node will be the first U.S.-built segment for the station to reach orbit when it is launched in July 1998 aboard Endeavour on the STS-88 mission.

"The International Space Station has begun moving from the factory floor to the launch pad," Space Station Program Manager Randy Brinkley said. "By the time Node 1 is launched next year, pieces of the station will be leaving factories in locations worldwide to be readied for launch. From now through the turn of the century, the processing of station components will be a major focus at KSC."

Endeavour's crew will use the Shuttle's robotic arm to dock the Functional Cargo Block (known by the Russian

(See **NODE**, Page 2)



MEMBERS OF THE STS-88 CREW take a look at Node 1 in its work stand in the Space Station Processing Facility. They are Commander Robert D. Cabana (pointing at node); and (from left) Mission Specialist James H. Newman; Pilot Frederick W. "Rick" Sturckow; and Mission Specialist Nancy Jane Currie. In space, the node will be a connecting passageway to living and working areas of the International Space Station.

## NTD transitions responsibilities

A significant milestone in the transition of NASA functions to United Space Alliance (USA) under the Space Flight Operations Contract (SFOC) has occurred with transfer of test management oversight of many daily Shuttle processing operations from the NASA Test Directors (NTD) Office to the contractor.

"It's one of the first major steps in truly empowering our contractors and holding them accountable for integrating and managing daily work," commented Eric Redding, NASA division chief of Shuttle Process, Launch and Recovery.

Under the plan, which took effect June 23, United Space Alliance (USA) through the

SFOC contract assumes NTD test team leadership responsibilities for daily Space Shuttle processing activities in the newly created office of Chief Test Conductors (CTC). At this time, the transition does not include major integrated procedures and emergency management, for which the NTD retains responsibility until a second phase of the plan goes into effect later this year.

There are no plans to transition NASA test management responsibilities for launches or landings. The NTD will continue to direct and integrate all flight crew,

(See **NTD**, Page 2)

### MARK YOUR CALENDARS!

KSC's Employee Open House is scheduled for Saturday, Nov. 8, from 9 a.m. to 3 p.m.

Read *Spaceport News* for more information in upcoming issues.

## NTD. . .

(Continued from Page 1)

orbiter, external tank, solid rocket booster and ground support testing in the Shuttle launch countdown, reporting directly to the NASA launch director.

The daily processing operations affected by the first phase of the plan include most of the activities involving the orbiters in the Orbiter Processing Facility, as well as stacking of the solid rocket boosters and checkout of the external tank, both of which occur in the Vehicle Assembly Building (VAB). The CTC now makes decisions on allocating resources and setting priorities for those activities. CTC operations are conducted 24 hours a day, seven days a week.

Once the orbiter rolls over to the VAB to be mated to the tank, major integrated procedures come into play and the NTD takes over. The NTD also

retains emergency management responsibility over all Launch Complex 39 activities. Even during daily processing operations, an NTD representative will be in the control room to oversee the management of any emergency situation, such as a hypergolic fuel leak or a fire.

Major integrated procedures and emergency management — except during launch countdowns and landing operations — will transition to SFOC later this year, possibly as early as October, according to Larry Ostarly, manager of Test Operations for the CTC.

"We are trying to make the transition as smooth and as invisible to the test team as we can," said Bill Potteiger, supervisor of the Chief Test Conductors Team.

"The call signs will change, but the service remains the same," agreed Ostarly. "We want to continue the good job that the NTD Office has done."

Besides the lengthy and

often difficult process to work out the details of the NTD transition, all of the 13 SFOC employees who became part of the CTC team had to undergo further training, although most were already senior orbiter test conductors.

Also, each CTC member had to demonstrate their knowledge and qualifications under rigorous questioning by a committee chaired by Michael Leinbach, chief of the NASA Test Directors Office. This process, known as being 'standboarded,' in effect certified that the employee was qualified to do the job.

"It may seem unusual for NASA to certify USA employees, but it was simply the logical culmination of the CTC training process," Leinbach said.

The NTD Office remains intact; what has changed is that the NASA test management engineers can now concentrate more of their efforts on Shuttle launches

and landings, as well as offer their expertise to projects such as the new Checkout and Launch Control System (CLCS), the X-33 and X-34 reusable launch vehicle programs, other launch vehicles, and to possible efforts to return to the Moon or travel to Mars, according to Redding.

"This is one of the first transition activities that really allows us to refocus our talents and resources on solving tomorrow's problems and challenges," he said.

### Hurricane Awareness

#### 1997 Atlantic Season Storms by Name

Ana	Henri	Odette
Bill	Isabel	Peter
Claudette	Juan	Rose
Danny	Kate	Sam
Erika	Larry	Teresa
Fabian	Mindy	Victor
Grace	Nicholas	Wanda

## Node. . .

(Continued from Page 1)

acronym FGB) with Node 1 as the node sits atop the Orbiter Docking System in the orbiter's cargo bay. The FGB is a component that supplies early power and propulsion systems for the station.

The FGB will be the first element to be placed in orbit and will be launched two weeks before the STS-88 mission on a Russian Proton rocket from the Baikonur Cosmodrome in the Republic of Kazakhstan.

After the two components are linked together, three spacewalks will be performed from the Shuttle orbiter to connect power, data, and utility lines and install exterior equipment.

In addition to its connection to the FGB, the node will serve as a passageway to the U.S. laboratory module, U.S. habitation module and an airlock. It has six hatches that

serve as docking ports for the other modules. It will be the first major U.S.-built component of the station.

Node 1 is now in the Space Station Processing Facility, which was designed specifically for preparing International Space Station elements for launch. The node will be joined by two Pressurized Mating Adapters, the first arriving at KSC in early July from the McDonnell Douglas manufacturing facility in Huntington Beach, Calif.

Prior to launch, the two conical mating adapters will be attached to either end of the node at KSC. In orbit, the two adapters will serve as the connecting point for the U.S. and Russian station segments and as a docking location for the Space Shuttle orbiter.

"The KSC team at the Space Station Processing Facility has been preparing for several years for this occasion," said Glenn Snyder, KSC's payload manager for STS-88. "We are

looking forward to getting started with the processing of the first element as well as the others that will follow."

Work on Node 1 at KSC will include the completion of assembly and checkout tasks, acceptance testing of the node



CONGRESSMAN Dave Weldon fields questions from the media on June 27 when he visited KSC to see Node 1. KSC's Director of Public Affairs Hugh Harris (at right) is seen with Weldon during his visit.

and mating adapters, communications testing with Mission Control, leak testing, and toxicology testing.

Also, optical targets will be installed on the node that will assist the Shuttle's robotic arm operator during the docking in orbit.

The FGB, a U.S.-funded and Russian-built component, is currently undergoing modifications and enhancements at the Krunichev State Research and Production Space Center in Moscow. It is scheduled to be shipped to Kazakhstan in January 1998 to begin final preparations.

The International Space Station program has three distinct phases, each building on the prior one. Phase 1, now under way, involves stays by U.S. astronauts aboard the Russian Mir Space Station and dockings between the Space Shuttle and Mir.

Phase 2, construction in orbit, begins in June 1988 with the launch of the FGB.

## Roberts appointed KSC Administration director

Kennedy Space Center Director Roy Bridges Jr., has appointed C. Shannon Roberts to the position of director, Administration Office, effective June 22, 1997. She succeeds James Jennings, who has been named the center's deputy director for Business Operations.

"Shannon Roberts brings a wealth of experience in strategic planning and institutional management," said Bridges. "I look to her to provide strong support in those areas to me and to the rest of the center's leadership team."

Roberts will lead many

areas, including human resources programs for civil service personnel, work force effectiveness and organization, industrial labor relations, strategic planning, continuous improvement, and functional management reviews.

She joined the agency in 1990, serving as an assistant to the associate and deputy associate administrators for the Office of Space Flight; director, Benchmarking and Continual Improvement; and leader of the National Performance Review Outreach Team (on detail) before transferring to KSC in February 1997.

"It's an honor for me to join the KSC team, who are already well-known for their quality work in Shuttle and payload operations," noted Roberts. "I plan on continuing to support positive, effective programs for staff, while also looking into new growth areas and strategic initiatives."

Prior to joining NASA, Roberts was executive coordinator and director of Communications for the President's Council on Management Improvement in Washington, D.C. She also has served as director of quality with the Xerox Corp. and has held planning, budgeting, and financial management positions with the Department of Justice and the Department of Transportation, including



Roberts

deputy director of Commercial Space Transportation from 1983 to 1984.

She is a graduate of the University of North Carolina and holds a master's degree in public administration from Harvard University and a doctorate in public administration from the University of Southern California.

## Astronaut McMonagle launches into new assignment at KSC

Astronaut Donald McMonagle has been named manager, Space Shuttle Launch Integration, at Kennedy Space Center, succeeding Loren Shriver, who has been appointed deputy director for Launch and Payload Processing. McMonagle's position will be effective Aug. 15, following the STS-85 mission.

McMonagle will begin the transition, however, to his new position immediately. He will be responsible for final Shuttle preparation, mission execution, and return of the orbiter to Kennedy Space Center following landings at Edwards Air Force Base, Calif.

"Every experience I have had working with KSC, from my initial training and astronaut support role through space flight, has been very positive," said McMonagle.

"I look forward to again working closely with the KSC team to get payloads into orbit safely," he added.

As the first manager of the then-newly formed directorate-level position of manager, Extravehicular Activity Projects Office, McMonagle was responsible for overseeing



McMonagle

the development of all spacewalk requirements, techniques, and tasks for Shuttle-based missions as well as assembly and operation of the International Space Station.

Gregory J. Harbaugh has been named acting manager of the Extravehicular Activity Projects Office, succeeding McMonagle.

McMonagle and Harbaugh flew together on Shuttle flights STS-39 and STS-54. McMonagle was commander of his third mission, STS-66.

For complete biographical information on McMonagle, Harbaugh, and other astronauts, see the NASA Internet astronaut biography home page at:

<http://www.jsc.nasa.gov/Bios/>

## Mir crew preparing for challenging EVA

At the time this issue went to press, a Progress supply vehicle has been scheduled to dock with the Russian Space Station Mir July 7 as the three crew members aboard the damaged station prepare for a challenging internal extravehicular activity (EVA) to restore full power to the modular spacecraft.

Mir sustained damage to one of its critical solar arrays and a depressurizing puncture to the Spektr Module at about 5 a.m. EDT June 25 during a re-docking test with a Progress

supply vehicle. Commander Vasily Tsibliev, Flight Engineer Alexander Lazutkin, and U.S. astronaut Michael Foale closed the hatch to the leaking Spektr and have been working with flight controllers since then to develop and implement the most suitable plan of action.

At press time, the EVA has been scheduled to occur no earlier than July 11, preceded by thorough planning and rehearsal, said Frank Culberston, Phase One program director.

### GUESS WHO'S TURNING 40!

NASA's 40th anniversary is a little more than a year away. To commemorate NASA's founding on Oct. 1, 1958, NASA HQ is seeking a slogan for use in activities and programs. If you have an idea that could be NASA's 40th anniversary slogan, submit it in writing to

Steve Garber in the NASA HQ Office of Policy and Plans, Code ZH, Washington, D.C. 20546 or by e-mail to [steve.garber@hq.nasa.gov](mailto:steve.garber@hq.nasa.gov). Deadline for entries is July 31, 1997. The winner will receive a special illustrated book about space exploration.

## KSC serves as host to Mission STS-84 SFA honorees

Kennedy Space Center was host to approximately 250 NASA and contractor employees from throughout the space agency who were recognized for exemplary work in the space program at a special Space Flight Awareness (SFA) Honoree Event in May.

The Honoree Award is the highest form of recognition bestowed upon an employee by the NASA Space Flight Awareness Program.

Recipients are selected for their professional dedication and outstanding achievement in support of the human space flight program.

Forty-nine civil service and contractor employees from KSC were among those honored. The employees and their guests attended a reception held in their honor at Port Canaveral, where the honorees were joined by astronauts and top NASA and industry officials of the Space Shuttle and International Space Station team.

They also viewed the IMAX movie "The Dream is Alive," took a VIP tour of KSC and watched the launch of the Shuttle Atlantis on May 15.

KSC honorees and their guests then were taken to KSC's Shuttle Landing Facility to watch the landing of Atlantis at the conclusion of the STS-84 mission on May 24.

The KSC honorees and their guests also traveled to Houston, Texas, as part of the SFA activities. They were given a two-day tour of Johnson Space Center on May 28 and 29, which included astronaut-guided walks through the Space Shuttle and space station mockups and visits to the Boeing Equipment Processing Facility, NASA's new Neutral Buoyancy Laboratory, the Mission Control Center, Ellington Field, and Space Center Houston.

The 10 KSC civil service employees were Helen Allen, John Branard, Shirley Bumatay, Helen Coddington, Ray Garrett, Cheryl Hurst, David Kruhm, Kenneth Mathews, J. Charles Sawyer Jr. and Dale Sewell.

Contractor employees honored included Marley Story, The Bionetics Corp.; William Muddle, Boeing North American Inc., Rocketdyne; Phillip Koon and Elaine West, Boeing North American Inc., Space Systems Division; Guy Smith, I-NET Inc., and Boyce Reeves, Lockheed Martin Space Mission Systems and Services.

Also, Ferrell Ard, Wang Federal Inc.; Michael Garten, Wiltech Corp; Ronald Feile, Suzanne Larson, Joseph Prann, Robert Trujillo and William Woodward, EG&G



STS-84 CIVIL SERVICE Honorees are, from left, Ray Garrett, Dale Sewell, J. Charles "Buz" Sawyer Jr., Cheryl Hurst, Shirley Bumatay, David Kruhm, John Branard, Helen Allen and Helen "Cindy" Coddington. Kenneth W. Mathews is not shown.

Florida Inc.; Paula Shawa and Susan Walsh, Sherikon Space Systems Inc.; Francis Beach, Michael Cressy, Brenda Morgan, Nancy Schulte, and Vijai Tiwari, McDonnell Douglas Space and Defense Systems-KSC; Claude "Chip" Albers, Florida Seal and Rubber Co.; Kathy Johnson Dudley, Precision Fabricating & Cleaning Co.; and John Ghaneie, Randy Halcom and Herbert Muchow, United Technologies, USBI Co.

United Space Alliance (USA) honorees were James Adams, John Bailey, Joseph Coughlin, Sherrie Dennison, David Eadens, Timmy Griffith, Katherine Laufenberg, Richard Louizos, Steven Murphy, Paula Partlow, Clifford Pitts, Edward Preciado, Dayton Reedy and Lisa Sullivan.

## Silver Snoopys awarded in May

Astronaut Kenneth D. Cockrell presented the prestigious Silver Snoopy Award to three United Space Alliance employees in May. They were Jerry Wojcieszak, Rick Zaintz, and Lonny Giberson. The Silver Snoopy Award honors persons who contribute to the safety and success of human space flight.



## Fellowship recipient announced

NASA recently announced the recipients of the 1997-98 Administrator's Fellowship Program, and KSC Chief of the Logistics Services Branch James Brown has been honored as one of the nine recipients this year.

Brown will spend the academic year teaching and conducting research in the Department of Industrial Engineering at Florida A&M

in Tallahassee.

The fellowship program is designed to enhance the professional development of mid-career science, mathematics, and engineering faculty at Historically Black Colleges and Universities, Hispanic-Serving Institutions, and Tribal Colleges.

It also helps universities become better qualified to assist NASA in research.

## STS-85 crew conducts CEIT



CREW MEMBERS for the STS-85 mission conduct the Crew Equipment Interface Test (CEIT) in June in the Orbiter Processing Facility Bay 2. Mission Specialists Stephen Robinson and Robert Curbeam (foreground) perform a sharp-edge inspection in Discovery's cargo bay. STS-85 is scheduled to launch Aug. 7 on a science research mission.

## KSC's new executive team looks to the future at press meeting

Kennedy Space Center executives are preparing for the future by determining the most effective use of the center's expertise and facilities in an increasingly complex aerospace market.

That was the message Center Director Roy D. Bridges Jr. and his newly appointed top management team gave to media representatives at a briefing June 18.

Bridges introduced the members of his new top team: Deputy Director of Launch and Payload Processing Loren Shriver, Deputy Director for Business Operations James Jennings, and Associate Director for Advanced Development and Shuttle Upgrades JoAnn Morgan.

"Reusable launch vehicles such as the X-34, liquid fly-back boosters for the Space Shuttle, and future Mars missions are just some of the projects in which KSC can play a significant role," Bridges said.

"There is some very intense economic competition going on out there globally, and we intend to be a substantive player," Morgan added. "As part of our planning process, we're trying to lay out some 25-year goals and how we will evolve from where we are today."

Bridges said that planning well for the future means making wise choices today. Most future initiatives are still in the early planning stages, he

noted. "By looking ahead, the Kennedy Space Center will be better able to leverage our 'Center of Excellence' capabilities," he added.

"Our customers tell us that they value our knowledge of flight hardware — how to process it, integrate it, test it, and launch it — more than anything else," Bridges said. "We're going to try to insert that knowledge as early as possible in the design process through partnerships with NASA centers and our customers."

When asked why KSC is such an attractive facility for some of these endeavors, Shriver noted that "there is a lot of knowledge here about the things it takes on a day-to-

day basis to routinely operate a reusable launch vehicle. The intent is to identify those basic things that probably are going to play into a reusable system in the future and enhance our ability to deal with those, both people-wise and facility-wise, so that as a potential reusable launch vehicle comes along, we have the people, knowledge, and background to deal with them."

Jennings affirmed the importance of the knowledge and experience of the KSC team. "Our people are responsible for making it all happen," he said. "It's important to focus on business processes and human resources if we are to be able to meet the challenges of the future."

## Study contracts awarded for fly-back rocket booster

NASA has awarded \$1 million contracts each to Lockheed Martin's Manned Space Systems Division, New Orleans, La., and the Boeing Company's Space Systems Division, Downey, Calif., to study a possible future Shuttle upgrade in which its rocket boosters would fly back to the launch site, rather than drop into the ocean for recovery.

The study effort, led by Marshall Space Flight Center, is part of a continuing program to upgrade the current Shuttle fleet — providing improved operability, enhanced performance, additional safety and reduced costs.

The KSC part of this study is managed by Advanced Development and Shuttle Upgrades, headed by JoAnn Morgan, with Chief Engineer Hugo Delgado. KSC Project Manager Frank Izquierdo and staff from several organizations are contributing to the effort.

Marshall is asking each contractor for an in-depth concept definition on the

liquid fly-back boosters (LFBBs). The studies are scheduled to be delivered to NASA later this year. Marshall is meanwhile conducting its own independent assessment as well.

"There can be significant advantages in using LFBBs," said Izquierdo. "Potential savings of \$500 million a year is one of several benefits.

"Others include significantly reducing processing time — possibly allowing for more launches per year — as well as eliminating hazardous operations currently performed in the Vehicle Assembly Building," he added. "Fly-back booster fueling operations, for example, would occur on the launch pad, much in the same way that the Shuttle's external tank is loaded today.

"The new LFBB has been baselined with liquid oxygen and RP-1 propellant engines, of which several types are currently in production," Izquierdo continued. "Both U.S. and international designs are under consideration."

The upgraded boosters, as they appear in current studies,

would look somewhat similar to the currently used solid rocket boosters, at least to casual observers on the ground.

After separation from the Shuttle, however, onlookers would see the boosters fly back to Kennedy Space Center. They may even see the LFBBs



BOEING's initial conceptual view of liquid fly-back boosters to assist in future Shuttle launches is shown here rolling out of the Vehicle Assembly Building. Boeing has several concepts under consideration.

loiter in a holding pattern in flight above the Shuttle Landing Facility (SLF) in the event of inclement weather.

"The increase in performance capability of the new booster system would be considerable," said KSC Process Engineering Branch Chief Philip Weber. "We're planning for the new system to be more tolerant of engine failure and less likely to require mission aborts. One of the design requirements, in fact, is that the crew be able to shut one booster engine down during launch if necessary and still continue."

A new LFBB system also would include throttling capability of the boosters, eliminating the current throttling on the Space Shuttle Main Engines (SSMEs).

"Throttling capability also provides extra safety and performance margins," noted Weber. "For example, the LFBB will give the Shuttle additional throttling capability if one booster or orbiter main engine shuts down at liftoff or

(See LFBB, Page 7)

## KSC/university partnerships develop new programs

Kennedy Space Center recently has initiated new partnerships and programs with Florida colleges and universities. NASA provides about \$24 million in research and education funding to Florida's universities each year, according to KSC University Programs Manager Gregg Buckingham.

**NASA Minority Partnership Awards** — KSC will partner with four Florida higher education minority institutions as part of a program initiated by the KSC Equal Opportunity (EO) Program Office. The partnership, led by Bethune-Cookman College of Daytona Beach, includes Edward Waters College in Jacksonville and Florida Memorial College and Florida International University in Miami. The agreement is made possible by an

\$800,000 grant through the EO Office.

The program at Bethune-Cookman and Edward Waters Colleges is to provide students and faculty exposure to high-technology small businesses.

The effort will involve the schools in technology transfer programs established by NASA and the state's Technological Research and Development Authority (TRDA). These programs include the commercialization of NASA technologies, assistance for companies seeking NASA Small Business Innovative Research Grants (SBIRs), the Florida/NASA Business Incubation Center in Titusville and the Technology Outreach Program (TOP).

Florida Memorial College and Florida International University students and faculty will work with NASA representatives, engineers,

and small-business owners to solve technical problems through TOP. Also, Florida Memorial participants will work with companies at the Incubation Center to assist and learn about small businesses. A two-week summer program for university faculty will kick off a partnership with training and briefings on the programs of the Technology Transfer and Commercialization Office at KSC.

Two other KSC EO Office grants will also be awarded to FIU. One is for the Applied Research in Industrial and Systems Engineering (ARISE) Center, designed to increase the number of minority students pursuing math, science or engineering degrees.

The other is for project VISION, which focuses on increasing the participation of middle school students in

science, mathematics and technology.

The Partnership Awards are a part of a NASA-wide effort involving 65 awards to 39 minority institutions.

**NASA/ Florida Board of Regents Interagency Agreement** — KSC Deputy Director for Business Operations James Jennings signed an agreement with the Board of Regents for the State University System of Florida to formalize how KSC will work with Florida institutions to identify areas in which universities could help NASA.

The agreement will help KSC find the best university that can assist with certain types of research. It will also facilitate use of KSC laboratories by faculty and students for research and education and establish a communications program to discuss areas of mutual cooperation.

## KSC Technology Outreach Program reaches new level of success

What if you had a great new product that would significantly reduce energy costs, but it wasn't working quite right?

To help with such problems, companies in Florida have been turning to KSC's Technology Outreach Program (TOP) to enlist the aid of NASA engineers and resources.

"Nearly 750 Florida firms have asked for assistance through Technology Transfer Agreements (TTAs) since the

program began in 1995," said Chuck Griffin, TOP manager for the KSC Technology Programs and Commercialization Office.

The TOP program is a cooperative venture between KSC and the State of Florida's Technological Research and Development Authority (TRDA) designed to transfer space program technology to industry and to assist companies with technical problems. KSC workers voluntarily involved with TOP are assigned as project engineers to research problems and make recommendations.

Eight company success stories were showcased at the third annual NASA-KSC/State of Florida Outreach Program Workshop held June 18-19 at the Center for Space Education. The audience was made up of more than 50 representatives of economic development organizations from every part of the state that work with KSC and the TRDA to

promote the program.

One of the eight companies, Space Energy Timesaving Systems of Miami, developed a tankless water heater to reduce the energy needed for hot showers. However, the company had a problem with a flow switch, which kept the unit from operating properly.

"At first I really didn't understand what NASA could do for us," said company president Carlos Cabrera, "but not only did NASA solve our problem, they saved us some money in the process."

When Cabrera's company implemented the recommended new design, the firm was able to manufacture the water heater at a reduced cost and increase sales and profits.

Some of the other TOP success stories included:

■ A Cape Canaveral firm received NASA's help in developing a new energy-saving natural gas-fueled power source for home heating and air-conditioning systems.

■ A Lakeland company was able to reduce the failure rate of strobe lights during production through an analysis provided by a KSC engineer.

■ A NASA-coordinated effort led to testing of a Sarasota firm's sunlight and heat barrier for in and around windows that proved to be an excellent source of heat reduction in Florida buildings.

"Without your partnership, the TOP program would not be able to achieve this kind of success," Gail Allen, director of the KSC Technology Programs and Commercialization Office, told the workshop participants.

KSC Center Director Roy Bridges Jr. also addressed the audience at the workshop.

"Thank you for being here to help figure out how you can make the economy of these great United States strong so that we can continue to go forward and make life better for not only our generation but for future generations as well," Bridges said.



CENTER DIRECTOR Roy D. Bridges Jr. addresses participants at the third annual NASA-KSC/State of Florida Outreach Program Workshop on June 18.

## LFBB . . .

*(continued from Page 5)*

during ascent and still continue the mission."

In an LFBB launch, the system separates from the orbiter and external tank at an altitude of approximately 198,000 feet (about 40 seconds later than current SRBs) and coasts for about nine minutes.

The LFBBs then follow a descent trajectory to about 25,000 to 30,000 feet, when jet engines start and the computer-controlled system flies back to the SLF.

"This new system could potentially eliminate the need for Return to Launch Site abort scenarios," added Weber.

The proposals should provide data and configuration studies for the booster and its engine, focusing on the LFBB concept. This includes analysis and evaluation, model fabrication, and wind tunnel testing. KSC activities currently under way focus on vehicle engineering involvement in design, safety and mission assurance assessments, flow planning, and the overall effect on KSC.

If implemented, the LFBBs would become the first-stage

boosters of the Shuttle system.

"By substituting an alternate core vehicle for the orbiter and external tank, more growth options are available," said Weber. "This could include carrying more payload into high-inclination orbit or functioning as a first-stage rocket for lunar or Mars missions."

After receipt of the studies, NASA will decide whether to proceed with a preliminary design phase that could begin in early 1998. If LFBB proceeds to development, a first flight could occur early in the new millennium.



LOCKHEED MARTIN'S concept of liquid fly-back boosters shows winged boosters as they might appear in the future. This is one of several concepts under consideration.

## Print Shop reborn as better, faster Duplicating Facility

Gone are the bulky offset presses and platemaking equipment from the KSC Print Shop, located in the Headquarters Building. Sleek electronic publishers have taken their place and, in the process, eliminated the need for the hazardous chemicals that the old system required.

"All hazardous wastes have been eliminated," said KSC Printing Officer Ted Courson. "Where the old system required multiple processes to print a document, the new digital method is a streamlined, one- or two-step process."

Other advantages include the need for fewer staff to operate the equipment and freeing up office space. About 2,300 square feet of space is now available for other use.

On June 17, a ribbon cutting was held for the improved facility. Now called the Duplicating Facility, the shop also underwent a much needed renovation, the first since it was created in 1965. Carpeting, better lighting, and a good cleaning have yielded improved working conditions.

Three electronic publishers and one multicolor printer have replaced 22 pieces of equipment. The three Xerox DocuTech 6135s include

scanners to convert hard copy documents to electronic format.

The new equipment can print at a higher rate and the product quality is much improved, noted Dave Severance, project manager, Information Services, Sherikon Space Systems, the subcontractor that operates the facility for Base Operations Contractor EG&G Florida.

Customers now have two options for submitting a printing request. If they are online, the document can be sent electronically to a specified directory or subdirectory on a file server, assigned by the KSC Duplicating Center, also in Headquarters.

The customer then contacts the Work Control Center — the work order desk that has always supported the print shop — to complete the work order, specifying the number of copies needed, distribution requirements, and providing a reproduction credit card charge number.

"This equipment offers increased flexibility to turn around large jobs in a short time," Courson observed. "Once a document is scanned into the system or electronically transferred to the print file server, the electronic



RIBBON CUTTING for the new Duplicating Facility was attended by (from left) Ted Courson, KSC printing officer; Marvin Jones, NASA director of Installation Operations; Skip Olson, VP and general manager of Sherikon Space Systems; Dan Hilburn, supervisor, Sherikon Space Systems; Bob Haas, associate general manager, Installation Services, EG&G Florida.; and Larry Hall, division manager, Sherikon Space Systems.

image can be networked to multiple publishers for simultaneous printing."

Hard copy documents can be submitted for reproduction as they always have by taking the document to the Work Control Center and completing a request form.

If the document has been prepared by the Sherikon Graphics Department on the second floor of Headquarters, staff members will handle the transfer to the Duplicating Facility.

Even that most gargantuan

of documents, the multi-volume S0007 launch countdown manual, is going electronic. Four of five volumes are now sent electronically to the Duplicating Facility.

Best of all, the new facility is less expensive to operate. Fiscal Year 1997 savings are estimated at about \$224,000, and out-year cost avoidance at about \$240,000 per year.

"This new facility puts KSC on the leading edge of technology and sets the standard for duplicating centers within NASA," Courson summed up.



RUNWAY CENTERLINE TEAM members were honored recently for their work designing the new runway centerline light system.

## Citation given to KSC Runway Centerline Team

In recognition of exceptional teamwork in designing, installing and testing the Shuttle Landing Facility new runway centerline light system ahead of schedule and below budget, the Runway Centerline Team was presented with a citation by Installation Operations Director Marvin Jones and astronaut Pam Melroy on May 29 at Kennedy Space Center.

The team was formed after the chief of the Astronaut Office determined difficulty perceiving the exact position of the runway centerline during night landings.

Teams at various centers formed to brainstorm and resolve the problem. Team members at Johnson Space Center coordinated all team meetings and handled intercenter assignments.

Kennedy Space Center team members confirmed that the light could be installed to no

more than 1/8th of an inch height above surface standard, while staff at Langley Research Center in Virginia did load-to-failure testing on the light.

After receiving approval from NASA Headquarters, KSC was then assigned responsibility for design and installation of the centerline lights.

KSC Base Operations Contractor EG&G Florida proceeded with an engineering design and selected subcontractor Advanced Electrical Installations Inc. (AEI) to install the system. AEI completed installation ahead of schedule and the pilot of STS-82 flew the Shuttle Training Aircraft for familiarity with the system and to recommend light intensity settings.

After the STS-82 mission, crew members said that the new system makes orbiter approach, landing, and especially rollout easier and safer.

## Cassini spacecraft stacking under way

Stacking of the elements of the Cassini spacecraft is under way in the Payload Hazardous Servicing Facility (PHSF) in KSC's Industrial Area.

The process began with positioning the first element, the lower equipment module, atop a work stand June 27.

Additional elements were to be added sequentially, including the propulsion module to be used for trajectory changes en route and orbit insertion at Saturn. Also to be added were the Remote Sensing Pallet containing cameras and remote sensing equipment, followed by the final element, the Huygens probe, no earlier than July 23.

Other related activities include thermal blanket installation and fit checks of the radioisotope thermoelectric generators (RTGs), and installation of a Titan launch vehicle adapter and a thermal skirt.

Two upcoming milestones include the Flight Events Demonstration test on July 18, to verify spacecraft perfor-



CASSINI propulsion module is lowered atop the lower equipment module.

mance following liftoff, and the launch dress rehearsal on Aug. 12.

Liftoff of the two-story Cassini spacecraft is still targeted for this October, kicking off a seven-year journey that will include four fly-bys total of Venus, Earth and Jupiter to accelerate Cassini to the needed speed to reach Saturn by June 2004 for planetary exploration.

### In Memoriam

Memorial services were held June 24 for aerospace technologist **Lynn Barnett**, who worked in Launch and Flight Operations of the Process and Analysis Branch in the Shuttle Processing Directorate. Barnett died of complications after

heart surgery. Also, services were held June 23 for **Daniel Disston**, NASA computer specialist, Independent Assessment and Project Office, Safety and Mission Assurance Directorate. At the time of printing, the cause of death was unknown.

### Updated first aid manual available this month

July's Health Education and Wellness Program focuses on First Aid and how you can help in the event of an emergency. The KSC First Aid Manual has been updated and revised with new American Heart



Association basic life support guidelines.

The manuals are available during the month of July at all three medical facilities and upon request from Carol Roth at 867-2026 (mail code: BOC-005).



John F. Kennedy Space Center

## Spaceport News

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