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Spaceport News

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John F. Kennedy Space Center

Fortieth Anniversary
Pioneering the Future

Zarya awaits Unity on orbit

A Russian Proton rocket carrying the first International Space Station (ISS) component, a control module named Zarya, launched on time at 1:40 a.m. EST on Nov. 20. The Zarya module was lifted into orbit from the Baikonur Cosmodrome in Kazakstan.

Zarya was released from the Proton's third stage at nine minutes and 49 seconds into flight, and within minutes the module's communications antennas and solar arrays were deployed.

The 42,600-pound pressurized control module will provide orientation control, communications and electrical power when attached to the Unity connecting module.

Zarya will provide power for several months while the station awaits launch of its third component, a Russian-provided crew living quarters and early station core known as the Service Module. The Service Module will enhance or replace many functions of Zarya. Later in the station's assembly sequence, Zarya will be used primarily for its storage capacity and external fuel tanks.

Zarya is scheduled to be mated to Unity during the STS-88 mission, beginning the assembly of the International Space Station.

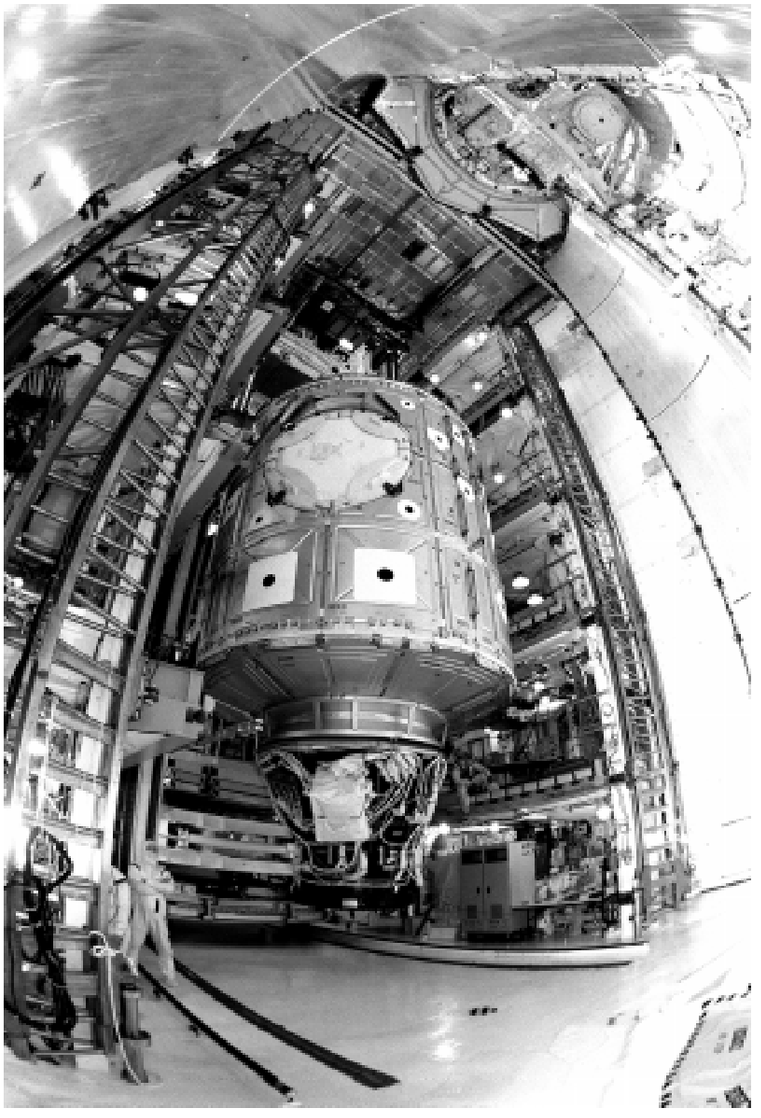
The dawn of a new era in space history begins with the International Space Station

Zarya, the first element of the International Space Station to be launched (see sidebar at left), means 'sunrise' in Russian, but it will be the uniting of the Zarya control module with the Unity connecting module that will mark a new dawn for the 15-year effort of 16 countries to jointly construct the largest international peacetime scientific project in history — the International Space Station.

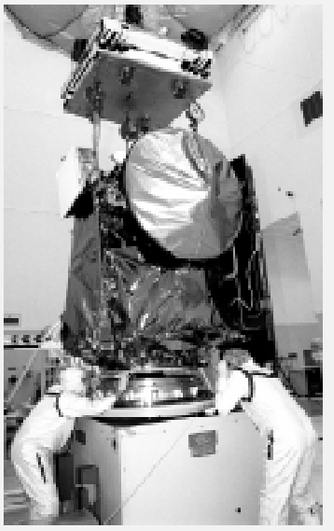
The first two building blocks of the station, Zarya and Unity, will be joined in space during Space Shuttle Mission STS-88, which, at press time, was scheduled for launch on Dec. 3 at 3:59 a.m. from KSC's Launch Pad 39A.

These two major station components will form the

(See Unity, Page 2)



The Unity connecting module was moved to the payload bay of the orbiter Endeavour at Launch Pad 39A in mid-November. At press time, Unity was scheduled for launch Dec. 3 at 3:59 a.m. on STS-88. Unity is a connecting passageway to the living and working areas of the International Space Station. While on orbit, the crew will deploy Unity from the payload bay and attach it to the Zarya control module already on orbit.



Spacecraft Assembly and Encapsulation Facility-2 workers take the Mars Climate Orbiter for a spin, assuring its secure positioning on spin test equipment.

Ready for the Red Planet

The Mars Climate Orbiter spacecraft is scheduled for launch on a Delta II rocket from Cape Canaveral Air Station's (CCAS) Launch Complex 17 during a 14-day launch period that begins on Dec. 10.

The Climate Orbiter will primarily support its companion Mars Polar Lander spacecraft, which is planned for launch on Jan. 3, also from CCAS. The orbiter's instruments will monitor the Martian atmosphere and image the red planet's surface on a daily basis for 687 Earth days.

It will observe the appearance and movement of atmospheric dust and water vapor and will characterize seasonal changes. Detailed images of the surface features will provide important clues to the planet's early climate history and give scientists more information about possible liquid water reserves beneath the surface.

Giving thanks for giving

Many are the rewards of giving, not least of which is the opportunity to be served a feast cooked up by your own managers!

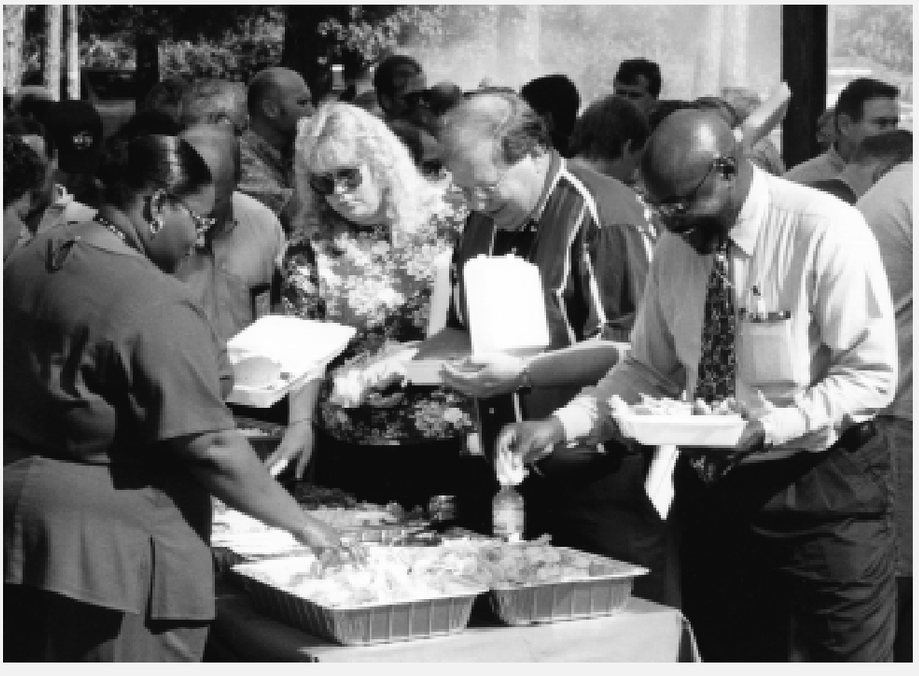
On Nov. 18, NASA employees were treated to a Combined Federal Campaign (CFC) Victory Celebration Picnic with hamburgers cooked by KSC Director Roy Bridges (right) and other center managers.

Employees lined up (below) for salads and fixings at the second CFC picnic, held at KARS Park II.

The picnic was held in honor of the many NASA employees who generously contributed to this year's Combined Federal Campaign and raised $228,736.52, which was 109 percent of this year's goal.

Employee participation overall was 83.6 percent with 1,450 pledges entered on-line through the CFC site on the Internet. Major contributors totaled 311 in the following categories: 26 Eagle Club ($1,000 or more) members; 69 Flag Club ($500 to $999) members; and 216 Stargiver ($240 to $499) members.

The Combined Federal Campaign is the largest workplace campaign in the country.



Unity ...

(Continued from Page 1)

cornerstone of what will be a world-class orbiting research laboratory and the long-term living and working quarters of space fliers from around the world.

STS-88, the first U.S. launch dedicated to space station assembly, closely follows the November launch of the U.S.-funded and Russian-built Zarya on an unmanned Proton rocket from the Baikonur Cosmodrome in Kazakstan. In the assembly sequence of 45 U.S. and Russian launches over more than five years, STS-88 is called the ISS-2A flight. The "A" denotes that it is an American mission.

The 1998 Russian launch of Zarya and the U.S. launch of Unity are the first missions in Phase 2 of the International Space Station.

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Phase 1 included nine dockings between the Space Shuttle and the Russian Space Station Mir and prolonged stays on Mir by U.S. astronauts.

The joint space operational experience and test data from Phase 1 have been incorporated into procedures and activities planned for Phase 2, as well as for Phase 3, when a permanent human presence is established and construction is completed in 2004.

The first major U.S.-built station component, Unity, will serve as the connecting passageway to living and working areas of the station.

Attached to both ends of Unity are pressurized mating adapters, or PMAs, which will be used by the orbiter and by Russian modules for docking with Unity..

The 22-ton Zarya will be joined in space with the 12.5-ton Unity and attached adapters. The multiport Unity will be the main connecting point for later U.S. station modules and components.

Three extravehicular activities or spacewalks will be performed by Mission Specialists Jerry Ross and Jim Newman to connect power, data and utility lines and install exterior equipment and hardware.

This is the 93rd Space Shuttle mission and 13th flight of Endeavour. Landing of the planned 12-day mission is scheduled at KSC's Shuttle Landing Facility on Dec. 14 at 11:48 p.m.

KSC spinoff technologies contribute the most down-to-Earth benefits

The contributions that NASA makes to the quality of life are not unknown — from unique images of outer space to valuable insight on the inner workings of the human body. The same technologies used by NASA on missions to the moon and to Mars have been used to develop CAT scans, detect breast cancer and enhance pacemaker technology. We've studied black holes and also discovered an ozone hole above Earth.

The work of KSC's Technology Programs and Commercialization Office together with industry entrepreneurs helps to fuel our economy today.

Among the best of NASA spinoffs recently published by NASA Headquarters are seven spinoff technologies from Kennedy Space Center — the most from any individual NASA center. For more information on KSC's technology transfer efforts, visit http://technology.ksc.nasa.gov.

The seven KSC spinoffs that rank among the best are:

Ground Processing Scheduling System

An advanced NASA software technology that schedules prelaunch work for the entire Space Shuttle fleet was spiced-up by the Red Pepper Software Company (now PeopleSoft), of San Mateo, Calif., to help some of America's corporate giants.

NASA's unique Ground Processing Scheduling System, or GPSS, is a computer-based scheduling tool that helps planners manage the thousands of overlapping activities that prepare each of the orbiters for their respective launch days.

While technicians repair the delicate heat shielding tiles on an orbiter, other workers may be modifying the crew module and simultaneously others may be installing a payload. GPSS reacts to any clogs in the refurbishment process and provides real-time solutions to schedule conflicts, minimizing a possible "domino effect" impact on the fleet and reducing processing costs.

The system was developed by Kennedy Space Center, Ames Research Center and divisions of the Lockheed Company to maintain the scheduling for preparing a Space Shuttle orbiter for a mission.

Red Pepper Software Company commercialized the software as its ResponseAgent production line. The software enables users to monitor manufacturing variables, report issues and develop solutions to existing problems. Now, Fortune 500 companies like Texas Instruments, Bausch & Lomb, Coors and Hewlett Packard have begun to apply this space-age technology to their diverse industries.

Parking Garage Automation System

The Parking Garage Automation System is based on a technology developed by a KSC-sponsored project called Robot sensorSkin.

Merritt Systems, Inc., of Orlando, Fla., teamed up with NASA to improve robots working with critical flight hardware at Kennedy Space Center.

The system, containing smart sensor modules and flexible printed circuit board skin, helps robots steer clear of obstacles using a proximity sensing system.

Advancements in the sensor designs are being applied to various commercial applications, including the Parking Garage Automation System.

The system includes a smartSensor network installed around and within public parking garages to autonomously guide motorists to open facilities, and once within, to free parking spaces.

Advanced Lubricants

In 1994, Lockheed Martin Space Operations was searching for an environmentally safe lubricant for KSC's crawler-transporter. Sun Coast Chemicals developed a spray lubricant for the crawler-transporter and then introduced Train Track Lubricant, Penetrating Spray Lube for rust prevention, and Biodegradable Hydraulic Fluid. Since that time, the company also has developed Super Gun Cleaner and Lubricant for the gun devotee and the X-1R Tackle Pack for the fishing enthusiast.

Automotive Insulation

BSR Products created special thermal protection system materials from the Space Shuttle Thermal Protection System and used them for NASCAR automobiles to protect drivers from extreme heat coming through engine areas.

Nuclear Magnetic Resonance

An image processing technology used to sharpen the view of Jupiter and Saturn from Voyager and Mars from the Viking Probe was used by Michael Vannier, M.D., a former NASA engineer. He recognized the similarity of NASA's computerized image processing technology and nuclear magnetic resonance (NMR). With KSC's help, he developed a computer program enabling NMR to scan body tissue for earlier diagnoses.

Aerogel-Based Superinsulation

Aspen Systems, Inc. developed a super-insulation blanket that features an aerogel-based cryogenic insulation with extremely low thermal conductivity to satisfy NASA's need at KSC for superinsulation for many phases of launch processing operations.

Built-In Plant Nutrient

ZeoponiX, Inc. is manufaturing zeolite materials as a spinoff of NASA's advanced life support technology. The result is a growth medium/specialty fertilizer that improves plant performance.

Having flown around the world during STS-90, Puerto Rican flags return to their homeland

The flags from the municipalities of Manati and Ponce – which flew on STS-90 in April 1998 — were presented to their mayors on Nov. 19 at the Shuttle Plaza, Kennedy Space Center Visitor Complex.

STS-90 Mission Specialist Richard Linnehan (center) is seen here presenting the flag of Manati along with KSC Deputy Director for Business Operations James Jennings (left) to Jorge Allende, vice mayor of the municipality of Manati, who accepted the flag.

A committee from Puerto Rico had requested that the two flags of the commonwealth be flown aboard Columbia on STS-90 to commemorate the flags' 103rd anniversary. Upon return to Puerto Rico, the flags will be displayed in the Manati and Ponce museums.

Stardust spacecraft at Kennedy Space Center for pre-launch processing

Stardust, the space mission that will fly close to a comet and, for the first time, bring cometary material back to Earth, arrived at Kennedy Space Center on Nov. 12 for pre-launch processing.

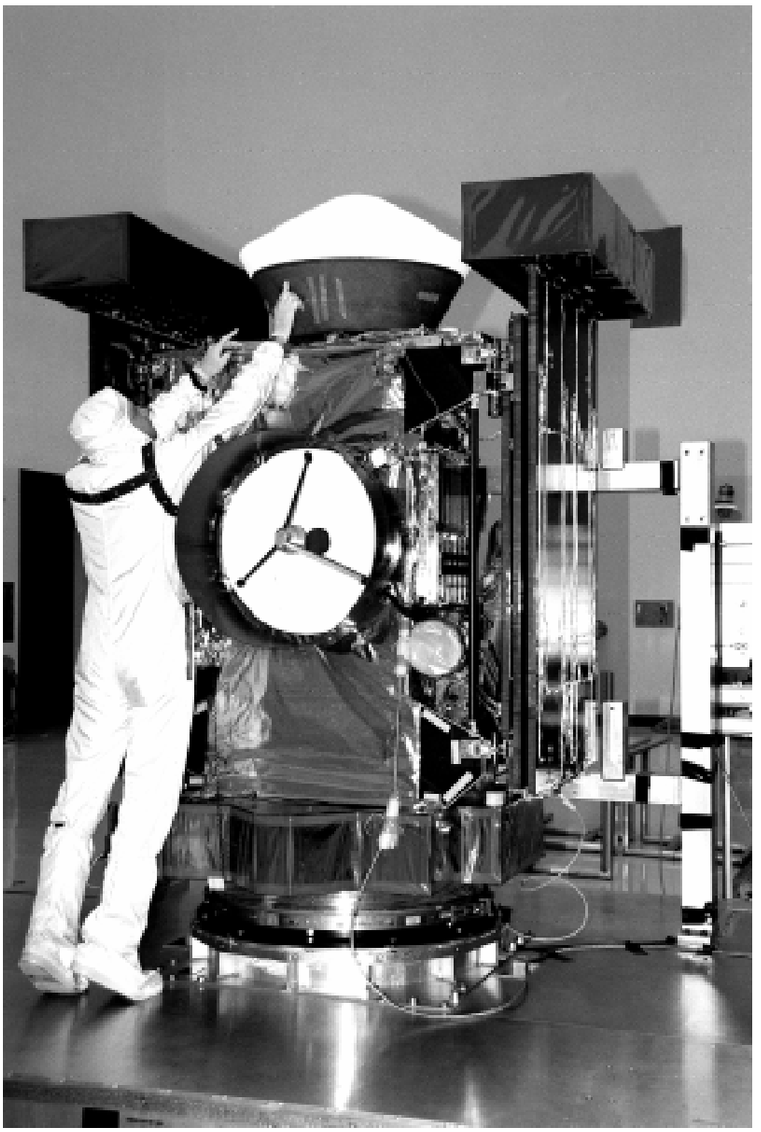
Stardust was selected by NASA as a mission for the Discovery Program of highly focused deep space missions with exceptional science return at the lowest possible cost.

Stardust is the first NASA mission dedicated to exploring a comet. As leftover materials that formed from the planets and the sun more than 4.5 billion years ago, comets are thought to be important to unlocking some of the mysteries of what materials make up our solar system.

Comet particles will be captured relatively gently by using a sponge-like cushioning material called aerogel.

Aerogel is a special type of foamed glass, made so lightweight that it is barely visible and almost floats in air.

Stardust is scheduled to launch from Cape Canaveral Air Station on Feb. 6, 1999.



A worker looks over the entry capsule on top of the Stardust spacecraft in KSC's Payload Hazardous Service Facility. The spacecraft will undergo installation and testing of solar arrays and spacecraft instruments, followed by an overall spacecraft functional test. Built by Lockheed Martin Astronautics for the Jet Propulsion Laboratory and NASA, Stardust will use a unique medium called aerogel to capture comet particles and interstellar dust for later analysis. Stardust will be launched aboard a Boeing Delta II rocket on Feb. 6, 1999. The collected samples will return to Earth in the entry capsule to be jettisoned from Stardust as it swings by Earth in January 2006.

Celebrate Christmas, Channukah and Kwanzaa over coffee

KSC's annual Holiday Coffees will be held Dec.16 from 9 to 10 a.m. in the Headquarters Building lobby and from 10:15 to 11:15 a.m. in the Operations and Checkout Building Mission Briefing Room. All KSC employees and NASA retirees are invited to attend.

This year, Christmas music will be provided by the chorus of Apollo Elementary School in Titusville, which is one of KSC's Educational Outreach Program schools.

Got a photographic memory?

Can you think of a favorite NASA photograph you've seen? Would you like to know what NASA photos have been taken that you haven't seen? Now you can look through all NASA photos taken at Kennedy Space Center and order a print of any photo in the NASA file through the NASA Exchange stores.

If you don't know what photos are out there to order from, you can search through photographs on the KSC Internet site at http://www-pao.ksc.nasa.gov/kscpao/captions/hotpics.htm or look through a much larger selection of all photos in the Johnson Controls photo lab in room 2340 on the second floor of the KSC Headquarters Building.

Then, at any NASA Exchange store, you can place your order directly for whatever size photo you want, using either the file number (attainable at the Johnson Controls lab), a description of the print or a copy of the photograph. The price will be determined by the size of the photograph you order.

Delivery takes about a week and you must pre-pay at the NASA Exchange store. For more information, call Sharon Dunn at 867-4308.

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