



## Huntress Cites Team Effort on AXAF During Center Visit

**D**r. Wesley T. Huntress Jr., NASA associate administrator for Space Science in Washington, D.C., visited the Marshall Center Monday to recognize the center for its contributions to the



Associate Administrator for Space Science Dr. Wesley Huntress speaks to employees in the Advanced X-ray Astrophysics Facility during a visit to the center Monday. Marshall Director Dr. Wayne Little looks on. Photo by Jack Ray

ongoing development of the Advanced X-ray Astrophysics Facility (AXAF).

Huntress addressed members of the AXAF team, including the X-ray Calibration Test Team which recently completed calibration of the high-resolution mirror assembly and science instruments for NASA's most powerful X-ray telescope.

He commended team members for their effort, resulting in the successful completion of a major AXAF program milestone.

Dr. Alan N. Bunner, AXAF program scientist, accompanied Huntress and also addressed the gathering in Marshall's X-ray Calibration Facility. Bunner, in addition to underscoring Huntress' comments about a job well done, looked ahead to what AXAF will be able to reveal when completed, placed in orbit, and turned over to astronomers.

Scheduled for launch aboard the Space Shuttle in August 1998, the X-ray telescope will obtain never-before-seen images of highly energized X-ray sources, which are some of the most remarkable objects in the universe — such as neutron stars, black holes, debris from exploding stars, quasars, centers of galaxies and galaxy clusters.

## Atlantis Completes Sixth Mission to Mir; Foale Continues U.S. Presence in Space

**S**pace Shuttle Atlantis and Space Station Mir joined together for the sixth time Friday night with a flawless docking which began a nearly five-day period of docked operations. Ten astronauts and cosmonauts greeted one another and then began the business of transferring about 7,000 pounds of food, water, experiments and other supplies to each other's spacecraft.

Commander Charlie Precourt guided Atlantis to its docking with the Mir to cap off a 42-hour chase which began with the Shuttle's launch.

Less than two hours after the 9:33 p.m. CDT docking, the hatches between the two space vehicles swung open. Among the first 'items' to be transferred to the station was U.S. astronaut Mike Foale,

who swapped places with Jerry Linenger to maintain a permanent American presence in space which now has stretched to 14 months. Linenger has spent 123 days as a Mir crew member following his arrival on the Russian outpost in January.

Joint activities by the Atlantis-Mir crew continued in high gear throughout the period of docked operations. Work performed involved conducting science experiments in the Spacehab double module in Atlantis' payload bay and transferring myriad supply items to and from Mir.

Transfer activities over the weekend included moving a Marshall-managed Protein Crystal Growth dewar container from Mir to Atlantis for return to Earth.

## AIAA to Honor Olivier With Toftoy Award

**J**ean Olivier, deputy manager of Marshall's Observatory Projects Office, will receive the Holger Toftoy Award presented by the Alabama/Mississippi



Jean Olivier

Section of the American Institute of Aeronautics and Astronautics (AIAA). The award, recognizing outstanding technical management in the fields of aeronautics and astronautics, will be presented at the AIAA annual awards banquet on May 22 at the Redstone Arsenal Officers Club.

Olivier began his NASA career in 1964 as a senior project engineer at the Kennedy Space Center, Fla.. He has been with the

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# NASA Studying How to Use Mother Nature to Keep Cities Cool

by Kelly McFalls

When you think of a forest, a thriving metropolis isn't exactly the first thing that comes to mind.

But researchers from the Marshall Center are studying how



Marshall Researchers Dr. Jeff Luvall, left, and Dr. Dale Quattrochi prepare experiment equipment for flight aboard NASA's Lear Jet during the Urban Heat Island study in Atlanta.

Photo by Emmett Given

## Little's Receives Honorary Doctorate Degree From UAH

Marshall Center Director Wayne Little's received an honorary doctorate of science degree from the University of Alabama in Huntsville during the university's spring commencement exercises at the Von Braun Center Sunday.

Little's was honored by the university for "his scientific and engineering achievements as well as his contributions to Huntsville, the state of Alabama and America's space program."

In addition to Little's, the university awarded honorary doctorate degrees to David G. Bronner, chief executive officer of the Retirement Systems of Alabama, and Chessie Harris, who with her late husband George, founded the Harris Home for Children in Huntsville.

## Center Employees to Speak at Regional Schools on Space Day

Many communities across the country will "Embrace Space" on a national Space Day being promoted by Lockheed Martin Thursday. In an effort to celebrate the achievements, benefits and opportunities of space exploration, Marshall employees representing Technology Transfer, Microgravity Research and the Propulsion Laboratory will serve as members of traveling teams which will make presentations to regional schools. The visits are part of activities planned for Space Day to emphasize the importance of science and math programs in schools.

"urban forests" could allow cities to continuously grow while maintaining air quality and the environment — as well as lower cooling costs during sweltering summers.

Collaborating with 10 Atlanta schools, the Atlanta Regional

Commission and the Environmental Protection Agency, two NASA researchers from the Global Hydrology and Climate Center in Huntsville have begun a study in Atlanta to learn how rapid urbanization affects temperature and air quality, and what can be done to lessen the impact.

The researchers, Dr. Jeff Luvall and Dr. Dale Quattrochi, are studying bubble-like accumulations of hot air, called urban heat islands, that have developed as Atlanta has grown during the past 20 years.

"Urban heat islands result when naturally vegetated surfaces are replaced with asphalt, concrete, rooftops and other man-made materials," said Quattrochi.

According to Quattrochi, the temperatures of artificial surfaces can be 20-40 degrees higher than those of vegetated surfaces.

"Materials, such as asphalt, store much of the sun's energy and remain hot long after sunset," said Quattrochi. "This produces a dome

over the city of temperatures 5-10 degrees higher than air temperatures over adjacent rural areas."

"The more a city grows — replacing trees and grass with buildings and roads — the warmer it becomes, increasing peak power demands.

To meet these demands, power plants must utilize fossil fuels to a greater extent which ultimately have a negative impact on air quality," said Luvall.

In findings from similar studies, the two researchers found that city parks and other urban areas with trees and grass were cooler than parking lots and areas with a high concentration of buildings.

"These 'green areas' are cooler because they dissipate solar energy by absorbing surrounding heat and using it to evaporate water from leaves, thereby cooling the air," said Luvall.

To determine where Atlanta's hot spots are, a Lear Jet equipped with thermal imaging equipment flew over the metropolitan area on May 11 and 12 taking heat images at mid-day — the period of maximum heating — and again 12 hours later when surfaces began to cool.

On the ground, some Atlanta elementary students took part in the experiment by taking temperature and moisture readings of different surfaces at their schools in conjunction with the mid-day flight. The students will compare and verify their measurements with those recorded by instruments on the jet.

Information collected from the air study will allow researchers to understand the effect of tree cover — or lack thereof — on Atlanta's temperature and air quality.

# History Web Page Projects Marshall Center's Heritage

There are ways to make history come alive that go beyond textbooks and lectures. One way is through the Internet, and that's what Marshall Center Historian Mike Wright says he's trying to do with the images and information he has compiled for the MSFC History Home Page on the Internet.

The page is located at <http://www.msfc.nasa.gov/general/history.html>. It is accessible to persons both inside and outside of the Marshall Center. Wright is primarily responsible for selecting the content for the page. Jeff Robinson, who works for MSI, handles the technical aspects of the production.

"The Marshall Center has a rich history that has its roots in the Wernher von Braun team in Germany. It spans the 1950s and the team's assignments with the U.S. Army in Huntsville. It officially begins in 1960 when the center was formed," Wright said.

"We have established the history page to help Marshall employees who need information about the center's history. But we know that it has a much wider appeal especially to students at all levels outside of Marshall who are doing research related to the history of the space program," Wright added.

The history page is divided into several different sections. For example, it includes a very brief history of the center and a more extended narrative covering most of the center's major programs up to about 1990.

It also includes a photo gallery and individual articles and papers compiled by the Marshall historian or by other historians. "You can read about everything from the sites at Marshall that have been designated as National Historic Landmarks to the days when Wernher von Braun invited Walt Disney to visit the Marshall Center," Wright added.

One of the sections also includes an extensive bibliography of articles that Von Braun wrote and published during his years at  
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## Facility to Reduce Chemical Wastes

NASA unveiled a new facility -- using readily available off-the-shelf components -- that will help reduce chemical wastes, and the technology could be applied in constructing similar facilities throughout the country for better storage of hazardous materials.

Called the Chemical Crib, Dryden Flight Research Center unveiled the facility that will help reduce the center's chemical wastes by 50 percent in three years.

According to Hazardous Materials Officer John L. Torres, Dryden currently spends about \$90,000 per year to dispose of waste. That's down from \$310,000 a few years ago. "For every dollar spent to buy chemicals, we spend three dollars to dispose of them," Torres said. "One of the biggest costs involved in waste management is not weight but volume, because waste-disposal space is so precious." Thus, reducing the volume of waste is a key component of Dryden's environmental program.



Associate Administrator for Space Flight Fred Gregory, left, presents the NASA Flight Safety Award to Marshall Propulsion Laboratory employee Tim Sanders, middle, during the STS-84 Space Flight Awareness activities at Kennedy Space Center. Looking on is Mike Sanders, father of Tim. Photo by Dennis Keim

## IMAX to Document International Space Station Assembly in 3-D

The historic, on-orbit construction of the International Space Station will be documented in 3-D by the Imax Corporation in a large-format (70-mm) feature film to be seen around the world.

This will be the first 70-mm space film to be captured in 3-D, a breakthrough made possible by Imax's current development of a 3-D movie camera that will meet the exacting requirements and strict limitations of flying on spacecraft. The film also will be distributed in Imax's 2-D format.

"Our astronauts have said that previous Imax films are the closest thing to actually being in space," NASA Administrator Daniel S. Goldin said. "Capturing the assembly of the International Space Station in this realistic and compelling format will help NASA share this experience with the public. After all, the station belongs to the public."

The feature film will be made under a Space Act Agreement between NASA and Imax. NASA will own the copyright on all film footage shot in space under the agreement. The agency, in turn, has granted Imax a limited license to create a large-format feature film using the footage. All of the footage eventually will be made available publicly. Meanwhile, NASA retains the right to disseminate, at any time, still photos and videotape segments made from the 70-mm footage.

Under previous Space Act Agreements, Imax has produced three documentaries about the space program: "The Dream is Alive," "Blue Planet" and "Destiny in Space." Collectively, these films have been viewed by more than 60 million people and still are being shown across the United States and internationally. The announcement of the International Space Station film was made in conjunction with the premiere in Washington, D.C., of a fourth Imax space film, "Mission to Mir."

# Space Station Control Board Approves New Assembly Schedule

The International Space Station Control Board has approved a new baseline schedule that keeps the assembly sequence intact and targets the first station launch for June 1998 -- an eight-month delay from the previous schedule.

As announced by NASA in April, the revision in the station's assembly schedule is the direct result of funding delays in the construction of the Service Module, the primary Russian contribution to the early assembly of the station and a component that will supply the early living quarters, life support systems and propulsion. Russian-funded work on the Service Module now has fully resumed as a result of Russian government funding, and it is rapidly progressing.

"The recent completion of a major Russian general designers review for the Service Module, in which I participated, and full Russian funding of the work, gives us high confidence that the Service Module can meet a revised launch date of December 1998," Program Manager Randy Brinkley said.

"The Russian Space Agency has been

extremely forthcoming in its dealings with NASA on this subject, and they and their contractors have gone out of their way to demonstrate their resolve to meet their commitment. Based on what I saw and heard during my most recent visit to Russia, I have every confidence that RSA and the Russian space industry are fully committed to meeting their obligations for the Service Module and ISS."

Although the first station launch, the launch of the Functional Energy Block (FGB) on a Russian Proton booster, is delayed by eight months in the new schedule, the beginning of full-fledged research flights to the station in August 1999 -- the end of Phase 2 of the program -- is a delay of only four months from what previously had been planned. To enhance the station's capabilities, modifications will be made to the FGB to allow it to be refueled and to accommodate dockings by Russian Soyuz capsules.

Despite delays in the Russian hardware, work has continued

on all U.S. station components, and the first U.S.-built component, Node 1, will be delivered to the Kennedy Space Center this summer for pre-launch testing and processing. Node 1 will be launched on Space Shuttle mission STS-88 in July 1998 to be mated to the already-orbiting FGB. Because U.S. components such as the laboratory module, the first truss segment and the first solar array remain on schedule, NASA will take advantage of the extra time in assembly to pursue integrated testing of components after they are shipped to KSC.

"A little more than a year from now, we'll launch the first component. About a year and a half from now, we will launch the first crew. Only two years from today, that first crew will be finishing up the first tour onboard. Four Shuttle assembly flights will already have been completed. And we'll be only a few months from completing Phase 2 of the program," Brinkley said. "This spacecraft is on deck, and we are number one on the runway."

## Mobile Tests Space Age Road Repair System

by Bob Thompson

Motorists in Mobile, Ala., and elsewhere on the U.S. highway system may soon be a little safer thanks to Space Shuttle technology.

This week, the Bankhead Tunnel under Mobile Bay in Mobile, Ala., will serve as a test site for a unique, environmentally friendly, potentially economical method for rapidly applying skid-resistant surfaces to highway bridges and tunnels.

The Marshall Center and USBI Co. of Huntsville have developed the system from technology originally designed to apply a heat-resistant coating to the Space Shuttle's twin Solid Rocket Boosters.

Alabama Department of Transportation is the first state agency to demonstrate the new process, which takes a fraction of the time required by current methods.



Dr. Alan Bunner, AXAF program scientist, discusses AXAF milestones completion with AXAF team members while visiting Marshall's X-ray Calibration Facility. Bunner accompanied Associate Administrator for Space Science Dr. Wesley Huntress to the Center Monday. (See article on page 1) Photo by Jack Ray

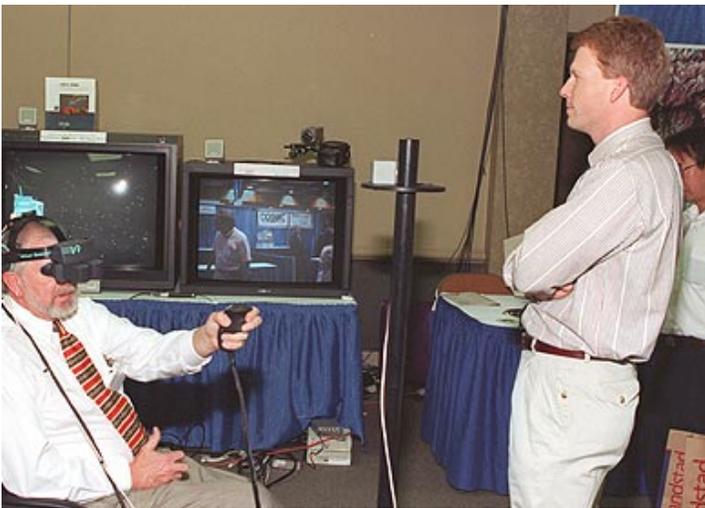
## Lucid Receives Russian Medal

Astronaut Shannon Lucid received the Order of Friendship medal from Russian President Boris Yeltsin during a ceremony at the Kremlin honoring Russian Cosmonauts and international astronauts who have flown on the Russian space station Mir in 1996.

The Order of Friendship medal is one of the highest Russian civilian awards and the highest award that can be presented to a non-citizen.

Lucid spent a U.S. record of 188 days in space last year. She was launched to Mir on the Space Shuttle Atlantis (STS-76) on March 22, 1996, and returned to Earth on Atlantis (STS-79) on September 26, 1996.

Lucid was selected as an astronaut in 1978, the first astronaut class to include women to train for Space Shuttle missions. Lucid has flown on five space missions including her Mir mission. Lucid holds pilot ratings in commercial, instrument and multi-engine aircraft.



*During the 13th annual Technical and Business Exhibition/Symposium (TABES) earlier this month in Huntsville, Chris Daniel, standing, of New Technology Incorporated, observes while an attendee participates in a collaborative virtual reality simulation.*

*Photo by Dennis Olive*

## Marshall Center History Web Page

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Marshall. "We have also compiled a gallery of about 100 Von Braun photographs and hope to add more in the near future," the historian said.

Another popular item is an illustrated history of rocketry through the ages. "What we've tried to do here is present a set of more than 50 photos and captions that trace the history of rocketry all the way back to the Chinese up through the present day. This is something we think that students and teachers will find especially useful."

Like all Internet pages at Marshall, and elsewhere, the Marshall History page is updated periodically to add new features and items. Sometime in the future, the page will include both sound recordings and movie files. "We encourage everyone both inside and outside of NASA to make use of this service," Wright said.



*West Madison Elementary School students from left, Ryan Lumpton, Cedric Sanders and Josh Rountree prepare to answer question during a Science Bowl held at the school during Science Week. Carolyn King of Project LASER was the moderator.*

*Photo by Emmett Given*

## Holger Toftoy Award

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Marshall Center since 1965 when he joined the center's Future Projects Office. In 1969, he became chief of the Astronomy Group in the Mission and Payload Planning Office and in 1973 was named chief engineer of the Large Space Telescope (later the Hubble Space Telescope) development team. In 1974, he became chief engineer for the Hubble Space Telescope Project — a position he held until assuming his current position.

Olivier has received numerous agency and government awards including a NASA Outstanding Leadership Medal in 1991 and the Presidential Rank/Meritorious recognition award in 1992.

## First Ukrainian Astronaut Named to Marshall-Managed STS-87 Mission

NASA has announced the selection of Col. Leonid Kadenyuk, the first Ukrainian to fly on the U.S. Space Shuttle, as the primary payload specialist for STS-87. The Marshall-managed mission will be the fourth U.S. Microgravity Payload flight, scheduled for launch in November 1997. The other crew members are Commander Kevin Kregel, Pilot Steven Lindsey and Mission Specialists Winston Scott, Dr. Kalpana Chawla and Dr. Takao Doi.

## Obituaries

**French, Price, 80**, Decatur, died April 15. He retired from Marshall in 1974 where he worked as a technician in science and engineering. He is survived by his wife Elgin French.

**Neighbors, Billy, 67**, Newell, Ala., died April 26. He retired from Marshall in 1985 where he worked an an aerospace engineer. He is survived by his wife Joyce Neighbors.

**Stucker, John, 70**, Huntsville, died April 30. He retired from Marshall in 1986 where he worked in technical management.

## Employee Ads

### Miscellaneous

- ★ Kenmore dryer \$20; oak entertainment center with audio compartment storage cabinet and drawer \$400. 830-9507
- ★ Tractor, Farmall super A with cultivator, disc, and drawbar \$950. 859-2610
- ★ Power mower 3.75HP, self propelled \$60. 534-4919
- ★ Beanie Babies and Teenie Beanie Babies; Liberty \$100; Sting \$75; others \$10 and up. 757-0469
- ★ 9.5 cu. ft. refrigerator \$85; microwave \$40; GE 30" electric stove \$50; kitchen table w/chairs \$50. 603-8288
- ★ 1 1/2 years Hawaiian tanning \$300. 883-5653
- ★ Soundblaster 16 audio card for IBM type computer with amplified speakers and Wingman extreme joystick \$95. 882-1780
- ★ Ultra Vu II diving goggles (similar to Pursuit DL), used once \$50. 773-4461
- ★ Wire fence, 32' x 4 1/2', 4 poles \$10; Schwinn Traveller 10-speed 26" bike \$175. 881-8953
- ★ Burley lite bicycle trailer for children. 100lb capacity, quick release hitch asking \$185. 881-0533
- ★ Epson AP-2250 printer \$50; Broderbond Printshop Ensemble II, \$25; PB8538-SVGA 14" monitor \$100. 351-6806
- ★ Two older professional keyboards, one digital, one analog. Two tier professional stand \$50 each. 828-5879
- ★ Luggage carrier \$50; manual treadmill \$50; Jenny Lind crib \$60. Call after 5 p.m. 205-593-9395
- ★ Sofa, cocktail, and end tables. Solid maple with burl inlay, walnut finish \$600. 895-9520
- ★ Intel Pentium Processor 133 Mhz. Six months old \$133, 233-5247

### Vehicles

- ★ 1982 Winnebago MH: New diesel engine, roof air, refrigerator; generator; microwave; VCR. \$14,500 o.b.o. 461-8721
- ★ 1985 Mazda 626 less than 100K miles, 5-speed \$2,300. 837-2783

### Vehicles

- ★ 1987 Mercury Grand Marque runs \$850 o.b.o. 837-7382
- ★ 1991 Mazda RX-7 Coupe, 56K, adult owned, dealer serviced, \$9,300, trades? 881-0645
- ★ 1983 Buick Skyhawk one owner runs \$495 o.b.o 882-9591
- ★ 1989 Plymouth Grand Voyager \$3,500. Call after 5 p.m. 205-593-9395
- ★ 1992 Toyota Paseo, white, auto w/air, AM/FM cass., polished trio wheels, one owner \$7,000 o.b.o. 233-2837.

### Wanted

- ★ Hospital bed. 881-1981

### Found

- ★ Men's wedding band found near softball fields. 883-4309

### Free

- ★ 100' of 4' chain link fence with gate. Must remove. 881-7357

### Carpool

- ★ Carpool from Merry Oaks subdivision, northeast Huntsville. 852-3880
- ★ Carpool from Bob Wallace near Triana, southwest Huntsville. 544-1740

## Center Announcements

- ☛ **MOO**—The Management Operations Office retirees will meet for breakfast/lunch on May 22 (4th Thursday each month) at the Cracker Barrel in Madison at 10 a.m. All present or former MOO employees are welcome. Call 539-0042 if you have any questions.
- ☛ **Dry Cleaning**—The laundry/dry cleaning and shoe repair drop-off service, located in the basement of building 4200, room G-37, will change their hours of operation effective June 2. The new hours will be 7:30 a.m. to 4:30 p.m.
- ☛ **Auction of Government Surplus Property**—A local Sealed Bid Sale of government surplus property will be held May 23 at Bldg. 7415, Warehouse Rd., Redstone

Arsenal. Inspection is May 20-22 from 8 a.m. to 3 p.m. Bids must be submitted by 9 a.m. May 23. To view materials for sale or for further information call E. Russell at 955-0297 or D. Davis at 842-2570.

- ☛ **MESA**—The Marshall Engineers and Scientists Association, IFPTE Local 27 will be held May 22 at 11:30 a.m. in the MESA Office, Building 4471, room C-105. Refreshments will be served and all members are invited. For more information call Wesley Darbro at 4-7501.
- ☛ **NCMA**—The Huntsville Chapter of the National Contract Management Association and the U.S. Army Corp of Engineers will host a seminar entitled "Acquisition Reform 1996" on May 28 from 8 a.m. to 4:30 p.m. at the Tom Beville Center located on Sparkman Drive. The guest speakers will be Donna Ireton, director of contracts, Advanced Systems Development, and Kenneth Martin, aerospace counsel, Sundstrand Corporation. Registration forms are available from John Fletcher at 880-5744. The cost is \$95 for NCMA members and \$145 for non-members. Lunch will be provided. Information on membership is available from Peggy Gunter at 881-0544.
- ☛ **TV Special**—"Living and Working in Space: The Countdown Has Begun," a 90-minute television broadcast about the day-to-day realities of life in space, is to air on the Sci-Fi Channel cable outlet May 22. The program, scheduled for 7 p.m. and 10:30 p.m. CDT, is a joint effort of the Sci-Fi Channel and FASE Productions. It will be hosted by Nana Visitor and Terry Farrell from the television series Deep Space Nine and will include an interview with Sen. John Glenn. In addition to featuring a number of celebrities, the program will focus on people ranging from artists, engineers and interior decorators, to architects and space suit designers, who are working to make life in space a reality.

## Job Opportunities

**CPP 97-33-JB, Contract Specialist, GS-1102-5/7/9, Procurement Office, Research & Development Support Division. Closes May 22, 1997.**

# MARSHALL STAR

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Director, Media Services - David B. Drachlis  
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