



MARSHALL STAR

Serving the Marshall Space Flight Center Community

June 8, 2006

NASA announces distribution of Constellation work

From NASA Headquarters

NASA announced Monday agency center responsibilities associated with the Constellation Program for robotic and human moon and Mars exploration.

This distribution of work across NASA's centers reflects the agency's intention to productively use personnel, facilities and resources from across the agency to accomplish the Vision for Space Exploration.

"Our past experiences have provided the foundation to begin shaping the space exploration capabilities needed to create

a sustained presence on the moon and on to Mars," said Scott Horowitz, associate administrator for NASA's Exploration Systems Mission Directorate. "Our programs and projects are evolving as we develop the requirements to execute the Vision for Space Exploration. At the same time, we are aligning the work that needs to be accomplished with the capabilities of our NASA centers."

In addition to primary work assignments, each center will support moon and Mars surface systems conceptual designs. Centers also support additional Constellation

program and project activities. Center assignments:

The Marshall Center hosts the Constellation Launch Vehicle Projects. The projects are responsible for project management of all Crew Launch Vehicle and cargo launch vehicle related activities. Marshall provides the CLV first stage design, and is responsible for launch vehicle demonstration testing including the Advanced Development Flight Test-0.

Marshall Center Director David King said: "The NASA Administrator shared with the

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Deputy Administrator Shana Dale to hold all-hands meeting with Marshall employees June 9

By Sheri Bechtel

NASA Deputy Administrator Shana Dale and Constellation Program Manager Jeff Hanley will visit the Marshall Center Friday, June 9, to discuss in more detail the distribution of exploration work among NASA centers.

Friday's visit follows the June 5 NASA Employee Update by Administrator Michael Griffin, who outlined the exploration program and the work being assigned.

Dale and Hanley will join Marshall Center Director David King for an all-hands briefing with Marshall employees on June 9 from 9:30 to 11 a.m., in the Center Activities Building 4316. Employees will have the opportunity to ask questions.

Other visiting exploration officials will include Doug Cooke,

deputy associate administrator for Exploration Systems; Mark Geyer, Constellation deputy program manager; Marsha Ivins, Constellation special assistant; and Skip Hatfield, project manager for the Crew Exploration Vehicle at NASA's Johnson Space Center, Houston. Steve Cook, director of NASA's Exploration Launch

Projects office at Marshall, will participate in the visit.

Bus transportation to the event will be available. All center employees are encouraged to attend.

The writer, an employee of ASRI, supports the Office of Strategic Analysis and Communications.



Shana Dale

Constellation

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Agency workforce the roles the NASA field centers will play in implementing the Vision for Space Exploration. All NASA centers will share in this important effort, working together to support the agency's exploration goals.

"Marshall Space Flight Center has been asked by NASA Headquarters to play a significant role in the agency's exploration effort that will take astronauts to the moon, Mars and beyond.

"Marshall will manage NASA's Exploration Launch Projects, including the Crew Launch Vehicle, which will carry the Crew Exploration Vehicle to space, and the heavy-lift Cargo Launch Vehicle and Earth Departure Stage, which will transport large structures, materials and supplies to space, with the dual purpose of establishing a permanent moon base and extending human presence beyond Earth orbit.

"Most recently, the Marshall Center has been selected to lead the Lunar Precursor and Robotic Program — an effort that will pave the way back to the moon. The office will manage projects and direct studies on lunar robotic precursor activities across NASA.

"A new Lunar Lander Project Office also will be established at Marshall, reporting to the Constellation Program Office. This office will be responsible for performing early trade studies and developing requirements for the Lunar Surface Access Module, the capsule that will transport crew members to and from the surface of the moon.

"This is indeed an exciting time for NASA and the Marshall Center. We appreciate the confidence NASA Headquarters has in our Marshall team and our capabilities.

"We have teams in place to perform these functions and are already making good progress. I couldn't be more positive

about the Vision for Space Exploration and the roles Marshall Space Flight Center will play in it. We have challenges ahead, and that is just the way we like it.

"As you know, within a month we will be ready to launch the Space Shuttle (the window opens July 1), which will be another step along the way, by working to complete the International Space Station and fly out the Shuttle program successfully.

"So, it's great to be where we are right now, and we have great, challenging things ahead."

Other center assignments

Ames Research Center, Moffett Field, Calif., leads the Crew Exploration Vehicle Thermal Protection System Advanced Development Project. Ames is developing information systems to support the Constellation Program Safety, Reliability and Quality Assurance Office.

Dryden Flight Research Center, Edwards, Calif., leads CEV Abort Flight Test integration and operations including Abort Test Booster procurement and integration with the Flight Test Article.

Glenn Research Center, Cleveland, leads the CEV Service Module and Spacecraft Adapter integration, providing oversight and independent analysis of the prime contractor's development of these segments.

Glenn has lead responsibility for the design and development of several Crew Launch Vehicle upper stage systems.

Goddard Space Flight Center, Greenbelt, Md., provides co-leadership of the Constellation Program's System Engineering and Integration navigation team and software and avionics team.

Jet Propulsion Laboratory, Pasadena, Calif., leads a multi-center activity in support of the Mission Operations Project to plan systems engineering processes related to operations development and preparation. JPL provides co-leadership for

the Constellation Program Office Systems Engineering and Integration Software and Avionics team.

Johnson Space Center, Houston, hosts the Constellation Program, the CEV Project and the Mission Operations Project. The Constellation Program manages and integrates the program and all projects. The CEV Project Office manages and integrates all CEV elements including prime contractor work. The Mission Operations Project manages and integrates all activities related to mission operations.

Kennedy Space Center, Fla., hosts the Ground Operations Project. The project manages all activities related to ground operations for the launch and landing sites, including ground processing, launch and recovery systems.

Langley Research Center, Hampton, Va., leads Launch Abort System integration supporting the CEV Project, and providing oversight and independent analysis of the CEV prime contractor's development of the system. Langley leads the Command Module Landing System Advanced Development Project for CEV. Langley provides vehicle integration and CEV test article module development for the Crew Launch Vehicle Advanced Development Flight Test-0.

Stennis Space Center, Miss., manages and integrates rocket propulsion testing for the CLV Project. Stennis leads sea-level development, certification and acceptance testing for the upper stage engine; sea-level development testing for the upper stage main propulsion test article; and sea-level acceptance testing for the flight upper stage assembly.

While these decisions will result in budget and personnel allocations at the centers, detailed estimates will not be available until after prime contractors are formally selected for the program's major projects, such as the Crew Exploration Vehicle, Crew Launch Vehicle and Cargo Launch Vehicle.

Marshall planetary team helps to 'walk-in' Mars Reconnaissance Orbiter

By Lori Meggs

Sending a spacecraft into the atmosphere of Mars is no easy job. That's why a current project doing just that draws on collaboration of NASA centers from different parts of the country: the Marshall Center, the Jet Propulsion Laboratory in Pasadena, Calif., and Langley Research Center in Hampton, Va.

The Terrestrial and Planetary Environments Team in Marshall's Engineering Directorate provided an engineering-grade model used in a process called aerobraking to slowly "walk-in," or shrink the orbit of the Mars Reconnaissance Orbiter.

NASA's multipurpose spacecraft — intended to advance our understanding of Mars — arrived at the red planet March 10. Scientists will use the spacecraft to study the surface, monitor the atmosphere and probe underground, all to gain better knowledge of the distribution and history of Mars' water.

The orbiter currently is flying in elongated loops around Mars. At first, each orbit lasted about 34 hours and took the spacecraft nearly 27,000 miles away from the planet before swinging back to circle the planet again. Three weeks after arrival, the spacecraft began gradually changing the shape of its orbit from that elongated ellipse to a near-circular, two-hour orbit. By mid-May, the orbit had been trimmed to about 25 hours.

The process uses controlled contact with Mars' atmosphere. Each pass through the upper portions of the atmosphere slows the spacecraft's orbital speed. When complete, the process brings the vehicle down to a different orbit.

Marshall's Terrestrial and Planetary Environments team helped design this phase of the mission by providing a tool it developed to simulate the variations in Mars' atmospheric properties called the Global Reference Atmospheric Model, or Mars-GRAM.

"By using this engineering-grade model,

we can characterize upper air winds, surface climates and atmospheric temperature, humidity and pressure properties that are critical to the development, design and operation of aerospace vehicles



An artist's rendering of the Mars Reconnaissance Orbiter, the NASA spacecraft that will measure thousands of Martian landscapes.

NASA/JPL

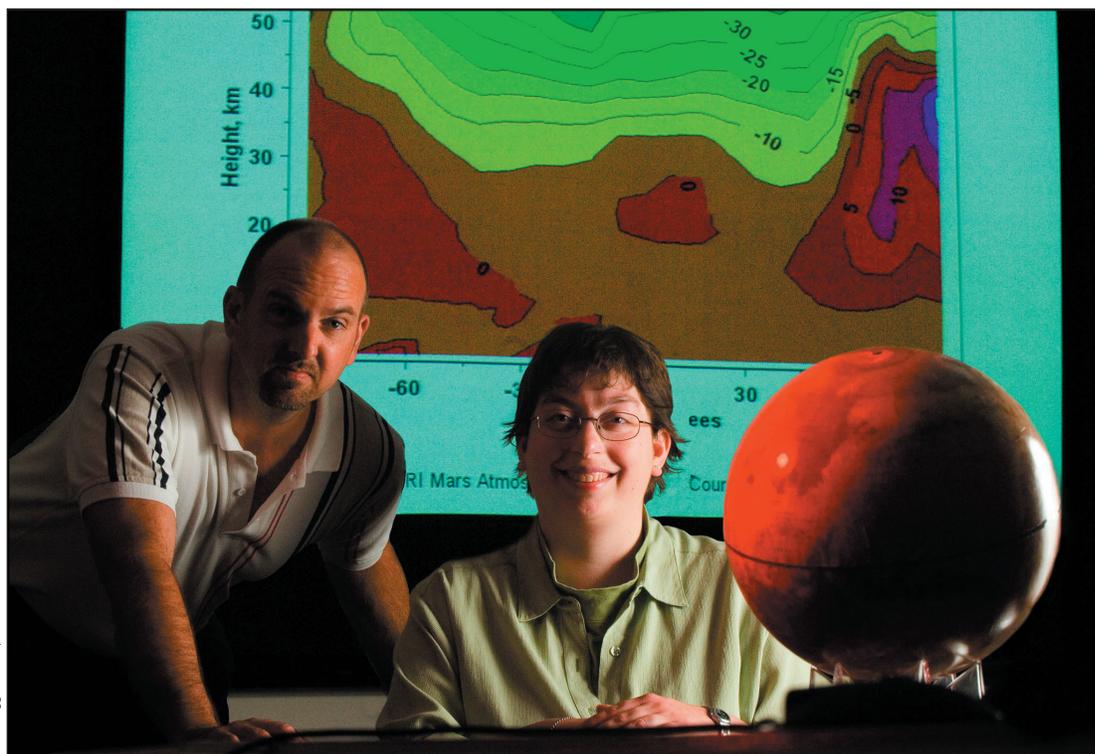
like the Mars Reconnaissance Orbiter," said Barry Roberts, lead for the Terrestrial and Planetary Environments Team at Marshall.

Density measurements of Mars' atmosphere taken by the spacecraft are compared to the density generated by the Mars-GRAM during the pass through Mars' atmosphere. The team at the Jet Propulsion Laboratory then compares the Mars-GRAM data to the measured density to determine if there is a difference, which enables them to adjust the path of the spacecraft accordingly.

The Marshall team has developed GRAMs for five of the eight bodies of the solar system that have atmospheres — Earth, Neptune, Titan, Venus and Mars.

Once the Mars Reconnaissance Orbiter moves into the proper orbit for its primary science phase, the six science instruments on board will begin their systematic examination of the planet.

The writer, an ASRI employee, supports the Office of Strategic Analysis and Communications.



David Higginbotham/MSEC

From left, Barry Roberts and Hilary Justh are members of the Terrestrial and Planetary Environments Team in Marshall's Engineering Directorate.

Marshall medical and environmental services strive to protect employee health

By Jonathan Baggs

During a Marshall employee's annual physical examination, tests showed elevated levels of lead in his blood.

Doctors at the Marshall Medical Center immediately notified environmental health officials. An investigation kicked into gear. Where had this employee been working? What materials had he handled? What air had he breathed?



David Thaxton

It's situations like this that send David Thaxton and Marshall's industrial hygiene experts into "detective mode." If one Marshall employee possibly has been exposed to lead contamination, there may be others. As the center's occupational health officer, it is his job to find and identify possible contaminants and mitigate their effects to keep the workforce safe. "We're the 'CSI' of the Marshall Center," Thaxton said of his group, referring to a popular crime and forensics television show.

Thaxton works with the combined staff of Marshall's Occupational Medicine and Environmental Health Services program — part of the Environmental Engineering and Occupational Health Office under the Office of Center Operations.

Occupational medicine includes preventive medical care, emergency treatment, and paramedic and ambulance services through the Marshall Medical Center, which has two full-time physicians and a complete nursing staff, as well as an ambulance service. "Our truck is always staffed with licensed paramedics," Thaxton said.

A few years ago, a Marshall employee began experiencing sharp pains and numbness in his chest and arm. He went to the Medical Center, where it was discovered he was having a heart attack. Quick action by the Marshall staff saved his life.

"The idea is to provide a full range of medical services at Marshall to save response time and reduce time away from work to a minimum," Thaxton said. "The key is to diagnose early. We've had employees who, during routine voluntary or mandatory examinations, were found to have cardiac disease, certain cancers and diabetes."

The Medical Center provides employees with immunization

requirements for worldwide travel and provides an annual voluntary immunization program for influenza. A counseling and referral program assists employees with emotional, drug and alcohol-related problems.

"We also provide mandatory health monitoring for employees whose work environment requires specific medical examinations — people whose work has the potential to expose them to chemicals, radiation or biological hazards," Thaxton said. "At Marshall, there are approximately 20 job classifications that require mandatory examinations."

Thaxton said the Medical Center also provides mission support services to ensure the medical qualifications of Marshall employees who are part of aircraft support crews. These services extend to participants in NASA's reduced-gravity test flights or those who require contact with space crews before launch or contact with program-critical hardware. Space crews cannot afford to be infected with a bacteria-induced sickness that could jeopardize their health or a mission. Likewise, space hardware can fail to function properly if contaminants are introduced into delicate systems when years of work and millions of dollars could be at stake.

How Occupational Medicine works with Environmental Health

Working hand-in-hand with Occupational Medicine is Environmental Health Services, which includes industrial hygienists, respirator service technicians and a health physicist.

Environmental health staff members conduct annual inspections of all Marshall buildings and work sites to identify potential health hazards. They observe employee work behavior; review standard operating procedures, engineering drawings and chemical inventories; and conduct investigations if a mishap occurs. Building surveys include air-quality testing, asbestos monitoring, noise surveys, ergonomic evaluations, and surveying potential laser and radiation exposure risks to employees.

When a potential hazard is identified — such as the possible exposure seen in the employee with elevated levels of lead in his blood — Thaxton's first job is to find out where the exposure occurred, whether on-site at Marshall or somewhere else. "We're scientists and detectives first," he said.

If the source is at Marshall, the first step in protecting employees is to try to eliminate the threat by substituting a less hazardous material. If the threat can't be eliminated, the second step is to attempt to reduce exposure levels using engineering processes. It may be recommended that an employee use personal protective equipment.

After an extensive investigation, Marshall's environmental health staff determined the employee with a high lead level in his blood was a car racing fan. The employee not only attended races on weekends, but also worked on race cars.

"At the time, race cars still used leaded fuel," Thaxton said, "so it was found that the lead exposure was coming from outside the

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Marshall Shuttle support teams hold final pre-launch simulation June 2

By Rick Smith

On Friday, June 2, unbeknownst to most of the outside world, scores of NASA personnel at the Marshall Center watched as the space shuttle counted down to liftoff.

The event was a full-scale launch contingency simulation, likely the agency's final practice run for STS-121, the next mission of Space Shuttle Discovery scheduled for July.

More than 80 Marshall employees and contractors in the Huntsville Operations Support Center, or HOSC, joined shuttle engineers and technicians at NASA's Kennedy Space Center, Fla., and Johnson Space Center in Houston for the intensive, two-hour event.

That's about half the number of personnel who typically work in the operations center

during shuttle launch activities. During pre-mission testing, countdown and launch, they view the shuttle via closed-circuit television, monitor real-time data from the orbiter and maintain more than 25 direct communication links with the launch site.

The June 2 trial run was conducted to simulate a launch-abort contingency scenario. Engineers and specialists on console, performing their duties just as they do for a real launch, received streaming video images, voice communications and real-time shuttle telemetry that indicated an off-nominal launch. Switching to contingency procedures, they responded to the situation, ensuring the safety of the hypothetical shuttle crew and minimizing the possibility of a major failure or loss of the vehicle.

"Running contingency sims is a critical part of mission readiness," said John Chapman, manager of the Shuttle External Tank Project for Marshall's Space Shuttle Propulsion Office, who took part in Friday's event. "It's important to be prepared for any eventuality, to take proper action automatically and solve problems as they occur."

Lisa Watson-Morgan, chief of the Ground

Systems Operations Branch at the HOSC, said NASA conducts countdown simulations every six weeks or so. After each practice run, participants at Marshall, Kennedy, Johnson and a number of shuttle contractor sites convene via teleconference to discuss operational effectiveness and resolve issues.

"Remote, state-of-the-art facilities such as the HOSC enable NASA to bring all its widespread expertise to bear for each mission, maintaining our dedication to safety without all those participants traveling to Florida for every simulation," Watson-Morgan said.

"We keep all the right hands and minds involved," she added. "And that's more important than ever now, as we work to safely return the shuttle to space, where it will permit us to complete assembly of the International Space Station and embark on the next stage of NASA's mission of discovery."

STS-121, scheduled to launch to space in early July, is the 115th space shuttle mission, and the 32nd flight for Discovery.

The writer, an ASRI employee, supports the Office of Strategic Analysis and Communications.

Health

Continued from page 4

Marshall work environment."

That was good news for the center and, to an extent, good news for the employee. Early detection allowed him time to eliminate the threat to his health.

"That's our job — to protect your long-term health," Thaxton said.

For more information on Marshall's Occupational Medicine and Environmental Health Services, go to <http://health.msfc.nasa.gov/about.html>.

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David Higginbotham/MSFC

Eric Stewart has his blood pressure checked by occupational medicine nurse Diana Douglas at the Marshall Medical Center.

Orbital Express to use Marshall's avionics expertise

Satellite servicing program to develop techniques for automated docking, refueling of unpiloted spacecraft

By Jonathan Baggs

Automated rendezvous and docking technology for robotic satellites, recently tested at the Marshall Center and scheduled for a demonstration flight in October, could help pave the way for long-duration journeys in space.

The technology is part of the Orbital Express satellite servicing and demonstration program funded through the Defense Advanced Research Projects Agency — the central research and development organization for the Department of Defense.

The goal of the program is to develop and demonstrate autonomous techniques for on-orbit refueling, service, repair and reconfiguration of satellites and the potential application of these techniques to future spacecraft. Such techniques, if proven successful by the Orbital Express mission, have the potential to keep obsolescence at bay and extend a satellite's usefulness.

A component of the technology uses the Advanced Video Guidance Sensor, a laser-based tracking and rendezvous sensor developed by Marshall avionics engineers. In addition to supporting satellites, the guidance sensor technology proven on Orbital Express may support lunar and Mars exploration missions and resupply missions to the International Space Station.

In the future, the technology also could be used to assemble large spacecraft in orbit to enable crewed exploration beyond the moon. Currently, most of a spacecraft's launch weight is fuel. Using the guidance sensor to help with the assembly and refueling of spacecraft already in orbit would enable humans to go farther than with conventional rockets by allowing multiple launches to support a single mission.

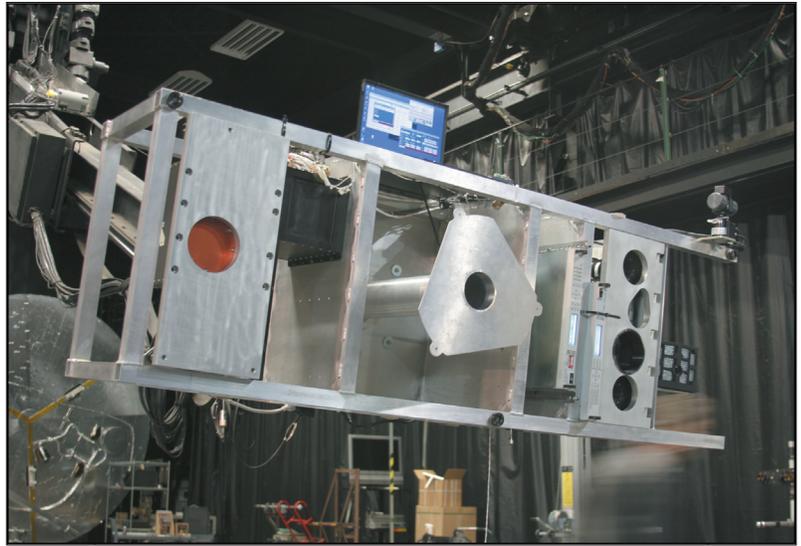
"To meet these goals, you have to be able to rendezvous and dock. That's where

Marshall's unique avionics capabilities come into play," said Ricky Howard, team lead of the Advanced Vehicle Sensors Team in the Engineering Directorate's Avionics Systems Test Branch.

The immediate challenge is to show that a satellite equipped with the Advanced Video Guidance Sensor, and other automated technologies, can target another satellite, catch up with it and dock — all without on-orbit or ground-based human assistance.

In October, the guidance sensor will be launched aboard an Atlas V rocket from Cape Canaveral Air Force Station, Fla., as part of a servicing satellite called ASTRO — Autonomous Space Transport Robotic Operations. The launch payload also will include a client satellite named NextSat — Next generation serviceable Satellite. The pair of satellites will undertake a series of on-orbit rendezvous and docking validation tests over several months using the guidance sensor to provide position data so the satellites can autonomously rendezvous and dock. In addition to validating navigation sensors and vehicle guidance, the vehicles will demonstrate resupply by transferring propellant between the two spacecraft using newly developed fluid transfer connections. ASTRO also will demonstrate repairs on orbit by transferring a working battery and a spacecraft computer assembly to NextSat using an autonomously operated robotic arm.

The Boeing Company in Huntington Beach, Calif., with support from its Huntsville



Emmett Given/MSFC

The brain of the servicing satellite called ASTRO — Autonomous Space Transport Robotic Operations, is this array of sensors, which includes Marshall's Advanced Video Guidance Sensor, located far left.

operations, is the Defense Department's prime contractor for ASTRO and NextSat.

ASTRO's Autonomous Rendezvous and Capture Sensor System, which includes the Marshall guidance sensor, was tested with a full-scale mockup of the NextSat satellite in February and early March at the Marshall Center's Flight Robotics Lab.

"Marshall participated with Boeing as they conducted the system test at the Flight Robotics Laboratory," Howard said. "We provided facilities and engineering support. Marshall's Advanced Video Guidance Sensor is one of a suite of sensors in the autonomous rendezvous-and-capture sensor system and it provides the location of the target vehicle, NextSat, to the ASTRO vehicle to guide it toward docking."

Keith Cornett, the guidance sensor's flight software project lead for the Marshall Engineering Directorate's Flight Software Branch, said earlier versions of the video guidance sensor have flown, but not with the enhancements that will be part of the ASTRO satellite's sensor package.

"A number of features were added that make Marshall's sensor more robust for Orbital Express," Cornett said. "We can update the sensor's flight software on orbit

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Classified Ads

To submit a classified ad to the Marshall Star, go to Inside Marshall, to "Employee Resources," and click on "Employee Ads — Submit Ad." Ads are limited to 15 words, including contact numbers. No sales pitches. Deadline for the next issue is 4:30 p.m. Thursday.

Miscellaneous

Tinplate toy friction "SkyExpress" rockets w/automatic vertical lift/door opens w/stairs for astronaut, boxed, \$20. 303-3702

Worth Copperhead baseball bat, 31", 18 oz., never used, \$45. 256-828-1234

Aria guitar, 3/4 size w/soft case, beginner instrument, \$110. 527-8116

Huntington House sofa sleeper, blue plaid, 7" queen size mattress, \$200. 256-694-1217

iPod remote Interactive Dock DS-A1, works w/Onkyo stereo/home theater system, NIB, \$75. 256-828-1234

Punching bag, 80 lb. w/chains to hang, \$25. 922-9294

Many collectible Barbies: Holiday, Spiegel, ornaments, Avon, Sears and others, in boxes, never opened, \$2,900. 233-2090

Solid oak blackjack, craps, roulette table, seats 8, \$500. 256-216-9973

Blaupunkt 6.5" coaxial car speakers, 40-watt, new in box, \$30. 683-9016

Two side-by-side eye level crypts, Valhalla Memory gardens, \$5,200, includes all fees. 860-558-3063

Four General AmeriTrac tires, P245/70R17, 3/4 tread, \$100. 837-6879

Bowflex Treadclimber TC3000 w/treadclimber mat, 1 yr. old, \$1,000. 468-6016

Yamaha PSRGX76 keyboard w/stand, adapter and sustain pedal, \$175. 509-9018

Camelot Recreation Association pool membership. 489-8029

Utility trailer, 4'x8', wood plank bottom, tilt, sides lined in decking board, wired for lights, \$550. 931-427-8205

Doberman red female, 2 yrs. old, family pet, full-blooded, no papers, spayed, \$150. 348-2670

Underdrive pulley set for 1986-1993 Mustang 5.0, uses stock belt, \$75. 679-1232

Vehicles

2002 Nissan Pathfinder SE, Bose CD changer, running boards, luggage rack, 63K miles, bronze, \$15,000. 880-9025

1998 Chevrolet Cavalier, 4 cylinder, burgundy, cruise, keyless, a/c, all power, CD/radio, 153K miles, tires good, \$1790. 256-603-3558

2000 Lincoln LS, black, 5 speed, sunroof, 130K miles, \$8,200. 797-2141

2000 Mercury Marquis LS, all power, 51K miles, silver metallic, leather interior, \$7,975. 931-728-3397

1989 fiberglass Bass Tracker w/150 HP Mercury motor, trolling motor, live wells, depth finder. 423-3559

2002 Honda VT1100 w/windshield, saddle bags, Vance & Hines pipes, \$5,700. 256-658-0987

Wanted

Turtle shells found in the woods; no live turtles. 256-572-7396

Free

Mixed dog, little, spayed, all shots. 650-5427

Glass patio door, one sliding door, one stationary door. 881-8009

Old MSFC phone books, 1970s to present. 539-8378

Outdoor brick fireplace grill, free for removing it from premises at 214 Teakwood Drive. 881-8879

Puppies, black and white, some have blue eyes, free to good home. 508-7527/Jason

Orbital Express

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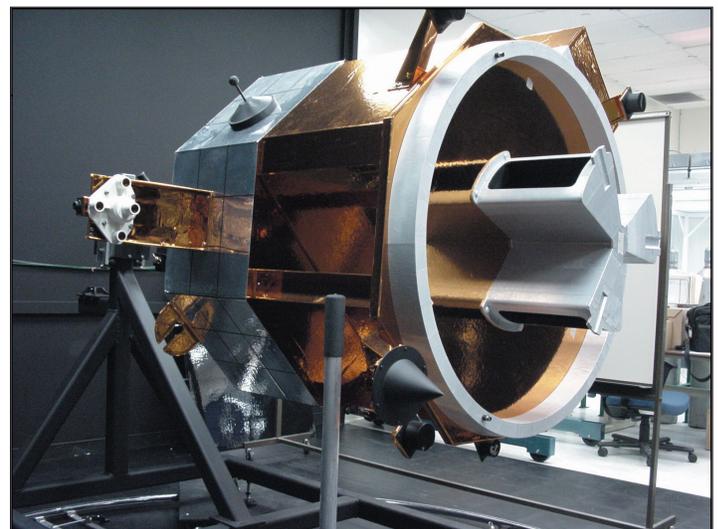
and recalibrate it by way of ground uplink if needed."

The Marshall sensor's lasers, optics, and thermal control systems also were substantially upgraded for the Orbital Express mission.

Cornett said the video guidance sensor's capabilities also could be important in supporting space station docking activities for the Cargo Launch Vehicle — NASA's next-generation launch system for hauling heavy cargo, materials and supplies to orbit. The sensor also could support future lunar missions that will require rendezvous and docking between the orbiting Crew Exploration Vehicle and a lunar exploration vehicle. Missions to return samples from Mars or resupply missions for Mars explorers also could use the Advanced Video Guidance Sensor.

"The new NASA Vision, returning astronauts to the moon and exploring Mars, forces the program to come up with new capabilities," Cornett said. "NASA's future missions require automated rendezvous and docking. The accuracy of our new Advanced Video Guidance System is incredible — within 33/1000ths of a degree in azimuth or elevation inside of 3 meters."

Routine, cost-effective, autonomous capability using the guidance sensor for resupply and reconfiguration of on-orbit spacecraft is

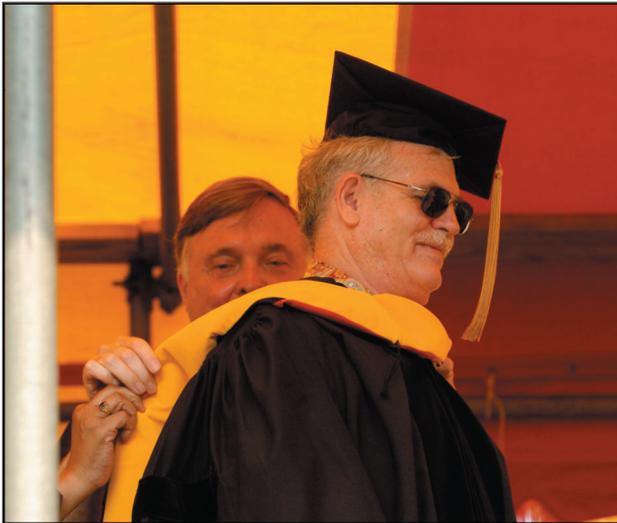


During recent testing at the Marshall Center, the ASTRO sensors had to rendezvous and dock with this full-scale mockup of NextSAT — Next generation serviceable Satellite.

planned for some time after 2010.

The writer, an employee of ASRI, supports the Office of Strategic Analysis and Communications.

Dr. Weisskopf receives honorary degree from Oberlin College



Dr. Martin Weisskopf

By Sherrie Super

Dr. Martin Weisskopf, the project scientist for NASA's Chandra X-ray Observatory, has received an honorary degree from Oberlin College in Oberlin, Ohio. The degree, a doctorate of science, recognizes Weisskopf's distinguished career in astrophysics.

Weisskopf, who earned his bachelor's degree in physics from Oberlin College in 1964, also has a doctorate in physics from Brandeis University in Waltham, Mass.

He joined the Marshall Center in 1977 and has dedicated nearly three decades of his career to ensuring the scientific integrity of the Chandra Program. During his career, Weisskopf has held numerous special appointments and earned a wide array of accolades. Most recently, he received the George W. Goddard Award for scientific contributions to Chandra.

Managed by Marshall, Chandra is the world's most powerful X-ray telescope. *The writer, an ASRI employee, supports the Office of Strategic Analysis and Communications.*

NASA announces engine development contract

NASA Headquarters news release

NASA has awarded Pratt & Whitney Rocketdyne Inc. of Canoga Park, Calif., a letter contract with a maximum value of \$50 million to initiate design, development, test and evaluation of the J-2X engine for the agency's crew and cargo launch vehicles.

The letter cost reimbursement contract runs from June 2 through November 30. It will initiate conceptual design; procurement

of long lead items; provide integration of the engine with the launch vehicles; and support associated vehicle reviews.

There is a Systems Requirements Review scheduled for September and a Systems Design Review in October.

The J-2X engine is planned to power the crew launch vehicle's upper stage and the Earth departure stage of the cargo launch vehicle. Development of the crew

and cargo launch vehicles is led by the Marshall Center in partnership with other agency centers.

It is managed by the Constellation Program Office at NASA's Johnson Space Center, Houston, for the agency's Exploration Systems Mission Directorate.

For information about development of the crew and cargo launch vehicles, visit <http://www.nasa.gov/exploration>.

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