



MARSHALL STAR

Serving the Marshall Space Flight Center Community

Feb. 7, 2008

Center Director David King says 2009 budget very good for NASA and Marshall

By Rita Roberts

On Feb. 4, President Bush announced a \$17.6 billion Fiscal Year 2009 budget request for NASA – a 1.8 percent increase over its FY 2008 enacted budget – along with a steady, five-year runout that includes an increase each year of around 2.4 percent.

The request also included an operating budget of almost \$2.5 billion for the Marshall Center. Marshall Center Director David King characterized the budget as a very good budget for NASA and Marshall, one that provides stability for the center and enables us to accomplish our country's space exploration policy. He also said new lunar science work in the Science Mission Directorate will be a great addition to the work Marshall does today in the lunar and planetary world.

See Budget on page 4



Emmett Givern/MSFC

Taking questions from employees during the "Employee Exchange" request are members of Marshall's management team, from left, Teresa Vanhooser, deputy manager of the Ares Projects Office; Pamela Cucarola, Chief Financial Officer; Marshall Center Deputy Director Robert Lightfoot; Marshall Center Director David King; Marshall Associate Director Robin Henderson; and Dr. John Horack, manager of the Science & Mission Systems Office.

NASA gives 'go' for space shuttle launch

By Sanda Martel

At Marshall Star press time, space shuttle Atlantis was scheduled to launch from the Kennedy Space Center, Fla., Feb. 7 at 1:45 p.m. CST for an 11-day mission to the International Space Station.

During the STS-122 mission, Commander Steve Frick and his six crewmates will install the European Space Agency's new Columbus laboratory on the International Space Station. Columbus will expand the research facilities of the station and provide scientists around the world with the ability to conduct a variety of life, physical and materials science experiments.

The mission will include three spacewalks, delivery of a new crew member to the station and the return of another astronaut after nearly four months on board the station.

NASA senior managers announced the Feb. 7 launch date Jan. 30 after they completed an executive-level flight readiness review of shuttle Atlantis' readiness for flight. The one-day video teleconference meeting was led from NASA Headquarters in Washington. Top NASA and

contractor managers assessed any risks associated with the mission and determined the shuttle's equipment, support systems and procedures are ready for flight. The first executive-level flight readiness review for STS-122 was held Nov. 30.

The STS-122 mission was delayed in December 2007 after failures occurred in a fuel sensor system while Atlantis' external fuel tank was being filled. A tanking, or fueling, test on Dec. 18, 2007, revealed that open circuits in the external tank's feed through connector were the most likely cause of false readings in the system during launch attempts on Dec. 6 and Dec. 9. A modified connector was designed with pins and sockets soldered together.

Both the original and modified connector configurations were tested at the Marshall Center's unique engineering and test facilities to verify that the new design corrects the open circuits found in the original connector.

The sensor system is one of several that protect the shuttle's main

See STS-122 on page 5

Designing robot teams, Marshall carves out networking niche

An interview with Ken Fernandez, manager of Marshall's Lunar Surface Mobility Project

What is your background as a technologist in the robotics field?

I received my bachelor's degree in electrical engineering from Northwestern University, Evanston, Ill. My first job after college was with the Marshall Center. I came to Huntsville in 1968, one year before the Apollo lunar landing, and had the good fortune of working with the agency during a very exciting and significant time in history. In 1974, Marshall had an initiative to obtain work for the shuttle arm project. When that work was not awarded to the center, we shifted gears and focused on robotics work in the materials lab where I served as a consultant on the use of robotics for shuttle manufacturing.

In 1988, I received a doctorate degree in electrical engineering from Vanderbilt University, Nashville, Tenn. My research included the development of a graphics-based simulator that was designed to verify equations before connecting to actual robotic hardware. During my career at Marshall I have served in a variety of assignments such as supporting Space Station Freedom, Space Transportation Directorate and microgravity projects. I am now in the Science and Mission Systems Office on the Advanced Technology team. My focus is on robotics and I am managing an innovative lunar surface mobility project.

Describe your current project working on the Lunar Surface Mobility System?

Our current project, the lunar surface mobility system, is funded by the center through a strategic investment. While most centers are looking at the specific vehicles and rovers, the focus at Marshall is on the networking and infrastructure that will allow robotic systems to work together in a controlled manner with the expectation that they will be compatible with systems of the future.

To demonstrate this capability, we purchased some off-the-shelf robotic vehicles and are designing the network technology to link them. Two systems came from the U.S. Army Joint Program Office in robotics systems called MARCbots, or Multi-function Agile Remote Control Robot. The MARCbots are a small robotic platform that soldiers in the field use to inspect objects believed to be improvised explosive devices. Another system, the R-Gator, is a larger military utility vehicle that is a collaboration between iRobot and the John Deere Corporation. This vehicle is used by the Army to perform unmanned reconnaissance and can relay real-time video, sounds and sensor readings from a potentially hostile area without putting soldiers at risk. We developed a network using donated intellectual property from the Schafer Corporation and adapted the vehicles to work together. This is a significant issue when dealing with systems from different manufacturers because they usually are not compatible. We adapted and changed the vehicles systems, specifically the MARCbots, which were designed to be tele-operated remotely controlled vehicles. We added a network controller that allowed the use of a global positioning system, or GPS, and automated waypoint navigation to enable us to program a point or points on a map and have the vehicle automatically

traverse the defined path.

The Army has decided to retrofit its existing robots in the field because the added enhancements we designed meet some of their needs. We are currently able to supplement the funds received from the center because of the collaboration with the Army and the research and development contributions from industry partners. We also are working to adapt this effort in ways that can directly advance NASA's Lunar Surface Mobility Systems, and we are coordinating with the Exploration Technology Development Program and others in the agency working on surface systems.



Emmett Given/MSC
Ken Fernandez

How important do you think robotics technology development is in helping NASA explore the moon?

Unlike the Apollo mission where we landed in various places and only stayed for a couple of days, NASA's vision for future lunar exploration will require going to a location and building an infrastructure. Some of the tools that are projected for that include robotics systems that not only can be driven, but can be remotely piloted and may have a certain degree of autonomy so that they can operate whether or not an astronaut crew is present. I think robotics will be a very important part, and also the network infrastructure to manage the systems and to control them, and to allow an orderly addition of enhancements. That's an area that our project is addressing. Future missions will rely on the use of robotics to directly assist astronauts, to maintain the lunar infrastructure, and to explore wider regions of the moon than by astronauts alone.

How important do you feel the cultivation of technologists in robotics is to Marshall and to NASA?

I think it is very important. When we started robotics at the center in the early shuttle days no one really had robotics experience, but our engineers had technical experience. There are many different fields in control systems and computer science that directly relate to robotics. There has been a large transition to a contractor-based technology, and that's very important, but NASA always has to maintain its technical in-house structure to perform its oversight role and to perform work that may not be easily performed under contract. For that reason, having a technology activity like the surface mobility project is an excellent way of training our workforce who already have the basic technical abilities, but do not have the specific skills in cutting-edge robotics.

See Fernandez on page 3

This month in history ...

Fifty years ago this month, America was still celebrating the launch of Explorer I on Jan. 31, 1958. Following the launch, James H. Doolittle, chairman of the National Advisory Committee for Aeronautics, or NACA, testified before the U.S. Senate Committee on Appropriations and charted a rise in space activities in the last decade.

The National Advisory Committee had been founded in 1915 to help find solutions to problems associated with aeronautics. However, in the 1950s, NACA was devoting



increasing time to activities related to space. In 1954, about 10 percent of NACA's activities were related to space objectives.

That level rose to 25 percent in 1956, and Doolittle estimated that in 1959, NACA would be devoting about half of its time to space-related questions. Explorer I and Doolittle's report on increased space activities were part of a cycle of events that would ultimately lead to establishment of NASA in 1958. As part of the plan for NASA, NACA activities would fall under the new space agency.

Fernandez

Continued from page 2

Over your career, was there one technology that you developed that you are particularly proud of?

When I worked directly on robotics systems in support of the materials laboratory, I was also working on my doctorate at Vanderbilt. My specific topic was optimal control of multiple robots and making them work together as though they were one. Anybody who has worked on software systems knows that a glitch in your software can have significant results especially if it is tied to hardware. To get past that problem, I developed a graphics-based simulator that I called "ROBOSIM" that allowed me to verify my equations before connecting to the actual robotic hardware. The combined robots had greater than six degrees of freedom, and the simulator ensured that the programming of the robots was accurate before we connected space hardware. ROBOSIM was used to verify robotic systems for welding complex shapes, most notably the space shuttle main engine manifold.

Even today, the software package has been adapted by others to more current platforms. My original software was written in

Fortran and the current version of ROBOSIM is developed in the Lisp language. But the user interface is very similar to the original system. Because of the advances in computer hardware, back when I first developed ROBOSIM it took a million dollars worth of computer hardware that included about a \$300,000 graphics station. Now you can get better performance on a laptop running ROBOSIM than I could with the original system. It really is interesting to see it. This is the single technology that I look back at and stands out in my mind as something that I'm really proud of.

One final question: Do you own a "Roomba," that little vacuum cleaner robot?

Yes, we actually have two Roombas! We are using Building 4614 as our development laboratory. We bought the Roombas from iRobot, the same company that built our large robotic system, the R-Gator. I'm thankful for our janitorial service, but I do have to attest to the fact that the Roomba really does work!

Jennifer Morcone, who works in the Public & Employee Communications Office, contributed to this article.

NASA exploration exhibit to help Daytona Speedway celebrate 50 years

The NASA Exploration Experience exhibit, the multimedia attraction spotlighting America's plans for opening the space frontier, will headline a pair of race extravaganzas this month in Daytona Beach, Fla.

The exhibit will be part of Ford Motor Company's annual "Race & Rock Fest" Feb. 12-13 on Beach Street in downtown Daytona Beach. It then will move to Daytona International Speedway Feb. 15-17 to help the American racing institution celebrate an anniversary it shares with the U.S. space program.

"NASA is 50 years old this year, and so is the Daytona Speedway,"

said Marshall outreach coordinator and exhibit tour guide Shannon Ridinger. "Marshall is excited to celebrate Daytona 'Speedweek' together with the technology innovators and adventurous spirits of this prestigious keystone of the NASCAR racing circuit.

"We hope the experience will excite visitors and demonstrate how space exploration not only fosters inspiration, innovation and discovery, but creates a better future for all of us," she said.

The rolling exhibit, which is managed by the Marshall Center for NASA's Exploration Systems Mission Directorate in Washington, simulates a breathtaking visit to the moon and Mars — the earliest destinations in America's next great era of solar system exploration. Interactive control panels and activity stations, immersive 3D imagery and audio effects plunge visitors into a not-too-distant future, living and working on the surfaces of other worlds for the betterment of our own.

For more information, visit <http://exploration.nasa.gov>.

Budget

Continued from page 1

In a statement on the agency budget, NASA Deputy Administrator Shana Dale said the "increase demonstrates the president's commitment to funding the balanced priorities he set forth for the agency in space exploration, Earth and space science, and aeronautics research. We are making steady progress in achieving these goals."

Dale noted that the full funding provided by Congress this year for the Orion crew exploration vehicle and the Ares I crew launch vehicle will enable NASA, according to best estimates, to achieve operational capability for the vehicles by March 2015. She reminded everyone that NASA will need its full funding request this year to maintain that schedule.

"While it will require a great deal of sacrifice of time and effort from many thousands of people in NASA and industry across this great country to turn this unifying vision into a reality," said Dale, "it also requires a sustained commitment from all of us to ensure that our nation is once again pushing the boundaries of our solar system through a robust exploration program and maintaining our strategic capabilities by being first in space."

Marshall Director David King spoke with employees at an "Employee Exchange, a Chat with Marshall Leaders," in Morris Auditorium and via Marshall TV after the deputy administrator's briefing. "This budget is a very good budget," stated King. "Our budget and workforce are essentially stable. We will have about the same number of civil service and contractor workforce in FY 2009 as we have in 2008. That's a very good thing and allows us to do some things and make some of the transitions we need to make and keep our workforce stable. We are very excited about that."

King explained that a 2.7 percent decrease in Marshall's Fiscal Year 2009 budget from this year's budget was largely driven by the shuttle's retirement and the completion of International Space Station elements. He said "we are on track for meeting our commitments" to international partners in completing the space station, retiring the shuttle no later than October 2010, maintaining initial operational capability for Orion and Ares by March 2015, investing more in high priority Earth sciences missions and lunar science missions, and maintaining 10 healthy NASA centers.

"The budget will allow us to have another year of work on the things we have to do and continue to make great progress as we have over the past year," said King. "I am very excited about that."

King turned the stage over to Marshall Center Deputy Director Robert Lightfoot who talked about shuttle work and transitioning to the Constellation Program at the Marshall Center and Michoud Assembly Facility. Lightfoot spoke about completing the

commitments made to our international partners for the space station and discussed the shuttle flights planned for 2008.

"We all get wound up about this transition, but we have done it about three or four times in this agency," said Lightfoot. "Some of our facilities have been used multiple times and that's the challenge we get to do here. We get to move our people from one facility to the other. We are fortunate to have that overlap and bring that knowledge and expertise on to the next program and apply it."

Ares Projects Office Deputy Manager Tereasa Vanhooser spoke next about the successes achieved and the milestones in the year ahead for the Ares I and Ares V. She said that the Ares 1-X test flight will be launched from Kennedy Space Center in April 2009. Also, study work for the Ares V cargo launch vehicle is progressing, and they expect to start development in Fiscal Year 2011.

Dr. John Horack, manager of Marshall's Science & Mission Systems Office, spoke of mission successes in the past year and what is coming this year. He talked about new responsibilities, including the announcement of a \$344 million lunar science program in the Fiscal Year 2009 budget for a series of orbital and lander lunar robotic missions between now and 2014. Marshall has been given the opportunity to manage that program for NASA's Science Mission Directorate and to lead the lander development. He said that phase A studies for the science missions will begin this year. Instruments and science teams will be selected competitively.

Marshall Center Associate Director Robin Henderson spoke to employees about effective management at the center. "We are in a great position as a center," she said, "and we have significant work that we have to provide to the agency and our country."

Henderson introduced two new terms: institutional risk to mission and baseline performance review. She said institutional risk to mission is penetrating and understanding what is critical in mission support that has to be delivered. Baseline performance review is a new agency-level monthly review that looks at technical risks and institutional risks, integrating those and understanding how, as centers and an agency, we are mitigating those risks.

Henderson said everyone at the center will be asked to play a part in providing our external stakeholders with a clear picture of how Marshall is managing or stewarding our taxpayer money.

At the conclusion of the briefings, King, Lightfoot, Henderson, Horack, Vanhooser and Marshall Center Chief Financial Officer Pamela Cucarola answered a series of questions from employees.

For more information about NASA's Fiscal Year 2009 budget request go to www.nasa.gov/budget. A video of the "Employee Exchange" as well as the presentation charts will be available on Inside Marshall.

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

Steve Cook, Jan Davis, Jack Lee talk space with students

Participating in a live television conversation with Huntsville-area school kids about America's 50th anniversary in space are, from left, Steve Cook, manager of the Marshall Center's Ares Projects Office; retired astronaut Dr. Jan Davis, who flew on three space shuttle missions between 1992-1997 and served as director of Marshall's Safety & Mission Assurance Directorate from 2003-2005; and retired Marshall Center Director Jack Lee, who led the center from 1989-1994. They appeared on WHNT-TV Jan. 25 to talk to students about NASA's past, present and future missions, from the Mercury and Apollo programs that sent the first American into space and to the moon, respectively, to the next-generation Ares launch vehicles, now in development at Marshall, which will send a new generation of explorers to the moon and beyond. Students asked questions of the three space experts via Huntsville City Schools' E-TV video network. The commercial-free broadcast, cosponsored by WHNT and Huntsville City Schools, commemorated the anniversary of the Jan. 31, 1958, launch of Explorer I, America's first satellite, and NASA's year-long celebration of a half-century of space exploration and discovery.



David Higginbotham/MSFC

STS-122

Continued from page 1

engines by triggering their shutdown if fuel runs unexpectedly low. NASA's current launch commit criteria require that three of the four engine cutoff, or ECO, sensors function properly before liftoff from the Kennedy Center.

Joining Commander Frick on STS-122 will be Pilot Alan Poindexter and mission specialists Leland Melvin, Rex Walheim, Stanley Love and European Space Agency astronauts Hans Schlegel and Leopold

Eyharts. Poindexter, Love and Melvin will be making their first spaceflight. Eyharts will replace current station crew member Dan Tani, who has lived on the outpost since October. Eyharts will return to Earth on shuttle Endeavour's STS-123 mission, targeted for launch March 11.

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

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, Feb. 14, is 4:30 p.m. Thursday, Feb. 7.

Miscellaneous

Bowflex Tread Climber TC5000. 541-9071
 Portable 23k BTU kerosene heater, \$40; electric smoker/cooker, \$25. 883-1953
 Registered American Bullmastiff pups, seven females, two males, champion bloodline, \$1,200. 337-4086
 Siberian Husky, fixed, female, 1 year old, \$50. 489-1445
 Women's Justin boots, size 6b, \$60; Stetson hat, \$40; leather vest, size 40, \$25. 828-1441
 Golden Retriever puppies, 6 weeks old, first shots, wormed, parents on site, \$125. 773-0660
 Nokia 2610 T-Mobile cell phone, \$25. 797-7392
 Indoor dog cage, \$190. (813) 391-9673
 Broyhill kitchen hutch, glass sides, doors, shelves, \$575; wood kitchen table, four chairs, \$375. 975-1667
 Engagement/wedding ring set, marquise center stone, \$700. 337-4315

18-foot metal garage door, opener, \$250; Gateway computer, monitor, Windows XP, \$75. 233-5620
 Completed slide bracelet, \$1,250. 777-2374
 Whirlpool bathtub, 72 by 42 inches, almond, six jets, working pump, \$150. 655-6701
 Diamond/sapphire ring, \$125; sapphire earrings, bracelet, \$40, \$25; diamond anniversary band, \$275, \$400 all. 426-7862
 Nunchuk remote control for Nintendo Wii, \$25. 828-1234
 8-foot Brunswick pool table, oak, cover, play accessories, \$3,000. 412-3406
 Contemporary dining room set, 72-inch glass table, six upholstered chairs, two China cabinets, \$950. 603-1273
 Ferret/Chinchilla/reptile cage, 18x36x54, three levels, \$75 obo. 655-5436
 Huntsville Memory Garden, Garden of Devotion, six adult spaces, \$2,195 each, negotiable. 859-4002
 Two counter-height upholstered barstools, cherry finish. 503-7060

Vehicles

2007 Chrysler 300, 25k miles, \$17,000; 2003 Galant, 77k miles, \$5,500; 2004 Monte Carlo, \$6,300. 520-2802
 2007 Kawasaki Brute Force 750, 4X4i, 57 operating hours, extended warranty, 445 miles, \$6,500. 665-5946
 2007 Toyota Corolla S, silver, black interior, automatic, all power, 24k miles, \$14,900. 830-9507
 2006 Starcraft SB21 travel trailer, many extras, must sell, \$19,500 obo. 864-8045
 2005 Honda VTX1300R motorcycle, many accessories, 9k miles, \$6,150. 564-7499
 2005 Toyota Tundra, limited, 4 door, leather, white, tow package, 18k miles, \$23,750. 776-4331
 2004 Grand Prix GT2, silver, leather, sunroof, Monsoon audio, 53k miles, \$12,500. 303-0661
 2004 VW Jetta, 1.8T, manual, leather, heated seats, sunroof, 42k miles, \$11,700. 426-7862
 2004 F-150 supercrew, Lariat, 2WD, leather, sunroof; tow package, 48k miles, \$19,500 obo. 426-1822

2003 Ford Ranger Edge, four door, super cab, new tires, 77k miles, \$8,500. 931-0077
 2003 Nissan Altima, silver, black cloth interior, 49k miles, \$11,100. 227-5266 or 466-0203
 2001 Ford Taurus SES, 3.8L V6, new tires, 84k miles, \$5,500 obo. 682-8795
 2001 Nissan Quest, video, CD, \$5,700; 1979 Chevy pickup, \$1,000. 931-2447
 2000 VW Jetta, green, auto, air, alloys, power windows, locks, 119k miles, \$5,500 obo. 509-3559
 1999 Lexus ES 300, fully equipped, 21k miles, \$14,500. 890-0499
 1999 Yamaha TT225, \$1,400. 233-5620
 1999 Toyota 4-Runner Limited Edition, white, brown interior, sunroof, CD, A/C, \$7,000. 694-1260
 1998 Oldsmobile Silhouette minivan, 150k miles, \$3,500. 498-1421
 1998 Pace enclosed trailer, 5X10, black, new aluminum wheels, tires, \$1,500. 777-8906
 1998 Pontiac Grand Prix, GTP package, black, leather, 145k miles, \$3,695. 776-0811
 1994 Chevrolet Silverado, extended cab pickup, 159k miles, \$4,500 obo. 603-5833
 1992 Volvo 240 Wagon, black, auto, cloth seats, service records, 110k miles, \$1,500. 880-0308
 1989 Nissan 240SX, cherry red, new tires, 165k miles, \$1,500. 722-2190

Wanted

Book shelves, fair condition. 586-2994
 Electrician or recommendation for electrician in Harvest area, Nick Davis Road. 325-8126

Free

Parakeet, cage. 655-6293

Other

NEED A BABYSITTER? Available most nights and weekends, experienced. 698-7867

Guests dine under Saturn V at dedication of Davidson Center



Emmett Given/MSFC

More than 1,400 guests attended the grand opening and dedication event Jan. 31 of the new Davidson Center for Space Exploration at the U.S. Space & Rocket Center. The event also commemorated NASA's 50th anniversary. More than 10 days of activities around the community capped an almost three-year effort to restore the museum's Saturn V artifact and bring it indoors to preserve it for future generations.



Marshall Center Director David King addresses guests at the grand opening ceremonies for the U.S. Space & Rocket Center's new Davidson Center for Space Exploration.



From left, NASA Associate Deputy Administrator Charles Scales and his wife, the former Vernal "Bunnie" Roberson, discuss the evening's activities with Alabama Space Science Exhibits Commission member Dorothy Davidson, at right, and her husband, Julian Davidson, for whom the center is named.

MARSHALL STAR

Vol. 48/No. 19

Marshall Space Flight Center, Alabama 35812
 (256) 544-0030
<http://www.nasa.gov/centers/marshall>

The Marshall Star is published every Thursday by the Public and Employee Communications Office at the George C. Marshall Space Flight Center, National Aeronautics and Space Administration. Classified ads must be submitted by 4:30 p.m. Thursday, and other submissions no later than 5 p.m. Friday to the Marshall Public and Employee Communications Office (CS20), Building 4200, Room 102. Submissions should be written legibly and include the originator's name. Send e-mail submissions to: intercom@msfc.nasa.gov. The Star does not publish commercial advertising of any kind.

Manager of Public and Employee
 Communications — Dom Amatore
 Editor — Jessica Wallace



U.S. Government Printing Office 2008-723-022-20135

PRSR STD
 US POSTAGE PAID
 HUNTSVILLE, AL
 PERMIT NO. 298