



MARSHALL STAR

Serving the Marshall Space Flight Center Community

July 21, 2005

Hubble mission testing completed at Marshall

By Sherrie Super

Imagine a Space Shuttle docking with NASA's Hubble Space Telescope – not in the void of space, but rather surrounded by engineers and technicians at the Marshall Center. Thanks to the capabilities of a Marshall laboratory, this was a recent scenario that played out on Earth.

True, it wasn't a genuine Space Shuttle, nor an actual space telescope. But the setting, Marshall's Contact Dynamics Simulation Laboratory, is an Earthly destination for those seeking to simulate the process of connecting two spacecraft together.

See Hubble on page 3

Discovery to launch no earlier than July 26

By Lynnette Madison from combined reports

Discovery will launch on its STS-114 Return to Flight Mission no earlier than July 26, Space Shuttle Program



Space Shuttle Discovery awaits launch.

managers announced in a press briefing Monday.

Marshall Center engineers continue to troubleshoot low-fuel sensor system issues that delayed the launch of STS-114 July 13. Program managers have not set a new launch date, but say a launch attempt could be made as early as four days after the sensor system is fixed.

The sensor system failed a routine, pre-launch check during the launch countdown of the STS-114 mission, prompting managers to postpone the Discovery launch attempt. The computerized test revealed a faulty reading from one of the four liquid hydrogen engine cutoff (ECO) sensors in the Shuttle's External Tank.

Engineers in Marshall's Space Shuttle Propulsion Office and its Engineering and Safety and Mission Assurance directorates are part of 12 engineering teams from across the country reviewing the history of the sensors, assessing the system's cabling

See Discovery on page 7

Pride in flight

Marshall Safety Directorate helps Discovery take wing

By Rick Smith

It's the task of the Marshall Center's Safety and Mission Assurance (S&MA) Directorate to oversee the safe execution of all activities and work at the Center. Yet, like so many NASA employees and contractors, a primary focus of the team has been Space Shuttle Discovery and the STS-114 mission to kick off America's Return to Flight.

The entire S&MA organization, led by Dr. Jan Davis, played a major role helping the Space Shuttle Propulsion Office at

Marshall get Discovery to the pad. Foremost among these groups is the Shuttle Assurance Department, led by acting manager Dan Dumbacher, which spearheads safety and mission support for all Shuttle propulsion elements: the External Tank, the Reusable Solid Rocket Motors, the Solid Rocket Boosters and the Main Engines.

"We've been part of the process every step of the way," Davis said. "We've had people serving at resident offices during hardware development, participating in design reviews and partnering with S&MA organizations at the Kennedy, Johnson and Stennis Space

See Safety on page 2

Rocket propulsion achieves milestone



Photo by NASA/SSC

Rocket propulsion achieved a significant milestone recently during ignition tests at NASA's Stennis Space Center. The Integrated Powerhead Demonstration, or IPD, ground engine opened both the main hydrogen and oxygen valves for the first time. The demonstration project is positioned to develop and test fire the first new liquid engine cycle in 35 years. The project is a joint collaboration of the Integrated High Payoff Rocket Propulsion Technology Program and NASA's Exploration Systems Mission Directorate Advanced Development Program under Constellation Systems. It is managed by the Air Force Research Laboratory at Edwards Air Force Base, Calif., with technical support from the Marshall Center.

Safety

Continued from page 1

Centers and NASA Headquarters to make STS-114 the safest mission possible."

Since 2003, the S&MA team has contributed to numerous Shuttle safety modifications. Team members supported development of the "bolt-catcher" mechanism that captures half of the forward connecting bolt during separation of the Solid Rocket Boosters from the External Tank. They monitored testing and recertification of External Tank foam modifications and additional components that join the tank and the boosters until separation. And the organization's non-destructive evaluation team spent two years developing cutting-edge technologies to evaluate the quality of the External Tank's protective foam insulation — without cutting it off the tank. Instead, they used technologies similar to X-rays and sonograms to look *through* the foam, probing for



Davis

internal anomalies in a non-destructive manner.

The organization's commitment never faltered as launch neared. After the planned July 13 launch was postponed, S&MA team members consulted with Shuttle propulsion and systems integration managers at the Kennedy Space Center and around the nation, working to resolve a fuel sensor issue and to ready Discovery for a new countdown.

Davis and Dumbacher were at the Cape, leading inputs from the Marshall safety team. And at the Huntsville Operations Support Center at Marshall, S&MA technical experts led by Davis' deputy manager, Roy Malone, teamed with members of the Shuttle Propulsion Office and Engineering Directorate to ensure Shuttle voice communications and other data were properly fed back and forth between Marshall and Kennedy and to all other Shuttle-related remote sites.

A three-time Shuttle flight crew member, Davis sees the rescheduling of the launch as an opportunity to refine NASA's spaceflight knowledge — further safeguarding the Shuttle crew and hardware in the process.

That's the core purpose of the Safety and Mission Assurance Directorate, Davis said. "We have always made it our business to



Photo by NASA/MSFC

John Ratliff with the Marshall Center's non-destructive evaluation team prepares to X-ray External Tank hardware.

mitigate risk wherever we find it. I think we know our hardware better now than ever before. And we're very aware of what's at stake."

The writer, an ASRI employee, supports the Public and Employee Communications Office.

Marshall's Contact Dynamics Simulation Laboratory

Facility has capability to simulate connections in space

By Sherrie Super

As NASA developed different space vehicles, they also developed different ways for vehicles to rendezvous during missions. Marshall's Contact Dynamics Simulation Laboratory was created to evaluate how different interfacing mechanisms – such as latches and locks – respond in the dynamic Earth-orbit environment.

Force and torque data gleaned during a simulation also can reveal stresses a device might experience in space. Simulations have led to the redesign

of some mechanisms, improving their performance.

In the laboratory, one component – such as a Space Shuttle mechanism – is attached to a motion-base mounted on the floor, while the other component – such as a Hubble mechanism – is mounted to a sensor fixed in a support structure above the motion-base. The structure's load capacity is 20,000 pounds.

Hydraulically driven, the motion-base simulates the relative motion of docking and berthing mechanisms in the six degrees of freedom – linear and rotational – that exist in space. This capability is what led to the laboratory's nickname, the Six Degrees

of Freedom Laboratory.

Among its first uses, the facility was home to testing of spacecraft for NASA's 1960s-era Apollo program – the initiative that landed the first humans on the Moon. More recently, the facility was used to test the Common Berthing Mechanism – consisting of connectors between modules – for assembling the International Space Station, the orbiting research complex that the United States and 15 other nations are building in space.

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Hubble

Continued from page 1

Marshall engineers point to recent tests as just one way to identify and solve hardware and software issues, should NASA pursue a mission to repair Hubble.

Conducted with the Hubble Robotic Servicing and De-orbit mission office at the Goddard Center, the tests explored two scenarios – berthing a Space Shuttle with the telescope so astronauts could make repairs, or docking a robotic spacecraft to the telescope so machines, guided by controllers on the ground, could do the work.

In both cases, the focus was achieving a secure connection, or latch, between Hubble and the spacecraft sent to rendezvous with it more than 300 miles above Earth, enabling completion of necessary repairs with minimal disturbance to the telescope or its service-calling visitor.

"While NASA reviews options for the Hubble Space Telescope, we've been working with Goddard to make sure we have all the information needed for successful development of the latches," said Mark Slone, team lead in the Contact Dynamics Simulation Laboratory.

"The tests went well," said Drew Hall, an engineer in the Contact Dynamics Simulation Laboratory. "We're still evaluating the results, but our preliminary data looks encouraging."

If implemented, a Hubble repair mission would replace the gyroscopes and batteries aboard the scientific instrument, enabling the Hubble telescope to continue scanning the universe beyond 2006 or 2007.

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Photo by NASA/MSFC

At Marshall's Contact Dynamics Simulation Laboratory, the team that conducted the testing included, from left, Brian Allen, David Hood, Patrick Tobbe, Geri Tobbe, Heath Wilson, Chris Cagle-Brown, Drew Hall and Mark Slone.

29 selected for Space Flight Awareness honors



Tammy K. Barcala, ER02



David Beaman, MP51



JoAnn Belt, JE Sverdrup Inc.



Belinda Bishop, AD01



Matthew Bolling, Hernandez Engineering Inc.



Brenda Bradford, HEMSI



Katrina Byrd, RS20



Daniel Dodson, CSC



Daniel Dorney, ER42



Stephen Fall, BAE Sys.



John Fikes, SP20



Wayne Gandy, EI52



Richard Grugel, XD41



Lisa Hall, ASRI



Donna Hardage, EI03

Twenty-nine Marshall Center employees and contractors are being honored for their significant contributions to the space program.



Thad Henry, NP21



Donald Holt, R.W. Beck



Mary Beth Koelbl, ER21



Gray Marsee, LS01



Elizabeth Paschall, IS05



Larry Pigott, MP21



Carolyn Plank, RS10



Edwin Ricks, EV21



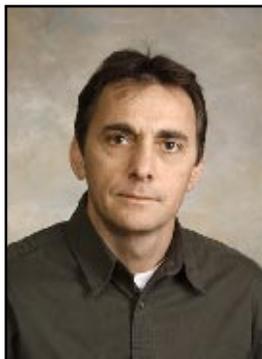
Peter Romine, JE Sverdrup Inc.



Dwayne Sanders, Teledyne Brown Engineering



Bobby Stone, EV21



Tony Stewart, Lockheed Martin Info. Tech.



Jack Stokes, Snyder Tech.



Michael Trischitta, Smithsonian Astrophysical Observatory

NASA to implement new financial management coding structure

NASA's Integrated Enterprise Management Program Office will implement a new budget coding structure — Project Management Information Improvement, or PMI² — for fiscal year 2006. It will provide better reporting capabilities and more effective support for NASA's Project Management processes.

PMI² will improve NASA's full-cost accountability, and is expected to benefit the entire NASA community, providing managers with effective, consistent and reliable data for decision-making purposes.

PMI² is the result of a program office study to expand the functional capabilities of its data management system, to provide integrated technical and financial information for use in project planning and execution.

The basic capabilities of the Core Financial system will not change. Instead, the existing NASA Budget Structure and Technical Work Breakdown Structure are

being rolled into a single, robust financial management coding structure.

The new coding will replace the existing financial Work Breakdown Structure — formerly known as the "Unique Project Number," which was derived from the Agency Wide Coding Structure. The existing structure will remain in effect for any project using funding solely from fiscal year 2005 or earlier.

The Office of the Chief Financial Officer at NASA Headquarters also is developing the Meta Data Management System to serve as the central repository for the new financial management coding structure. All project financial management structures, along with associated attributes and nomenclature, will reside in this system. Assigned attributes will identify each project's source of appropriation, mission, theme and program ownership. The new structure will consist of a randomly generated, six-digit Level 1 project number, followed by as many as six additional levels of two-digit numbers

that reflect each project's technical Work Breakdown Structure.

Implementing the new structure requires an aggressive data mapping effort by every Center project and activity. Local project managers will work closely with their mission and program leadership to ensure their project structure satisfies their management and reporting needs. A coding template will be provided by program managers to project owners by August 1 for mapping technical Work Breakdown Structure elements unique to the Center into the new structure. All Center project elements must be encoded by Aug. 15.

A data-mapping workshop will be held the week of July 25 at the Integrated Enterprise Management facility in Intergraph Bldg. 600. Program offices will notify those required to attend.

For more information about PMI² implementation and training, contact Jimmy Black at 544-8858 or Ken Poole at 544-2419.

Chandra launched six years ago

By Sherrie Super

NASA's Chandra X-ray Observatory launched July 22, 1999, at 11:30 p.m. CDT aboard Space Shuttle Columbia. It marked the first Shuttle mission commanded by a woman, Air Force Col. Eileen Collins, who is commanding the Return to Flight mission. "With its Inertial Upper Stage and support equipment, Chandra was the largest and heaviest payload ever launched by the Shuttle," said Chandra Program Manager Keith Hefner of Marshall. "And with its amazing discoveries over the past six years, it's proven to be worth its weight in gold." Marshall manages the Chandra program for NASA.

The writer, an ASRI employee, supports the Public and Employee Communications Office.



Chandra's launch aboard the Space Shuttle July 22, 1999.

Be 'protective' of NASA ID badges

Just like protecting Personal Identification Numbers on a bank card, Marshall team members also should protect their NASA identification badges to prevent identity theft and threats to the security of Redstone Arsenal.

Technology exists that could allow someone to recreate a NASA badge. Theft or copying of an official badge used for access to Redstone is a security risk that affects all employees. Marshall ID badges should never be worn off Redstone Arsenal or left in plain sight in a vehicle.

Lost or stolen badges should immediately be reported to the Protective Services Office by calling 544-HELP.

Shuttle Buddies to meet July 25

The Shuttle Buddies will meet at 9 a.m. July 25 at Mullins Restaurant on Andrew Jackson Way. For more information, call Deemer Self at 881-7757.

Classified Ads

To submit a classified ad to the Marshall Star, go to Inside Marshall, to "Employee Resources," and click "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

Bushnell Reflector telescope, 36", two lenses, \$100; violin, 3/4 size, case & bow, \$50. 489-1933

Coat, large, 3M insulate, Mossy Oak Tree Stand brand, never worn, \$50. 776-9810

Black Montegi rims, 16", 5-lug, \$300; two Fosgate Punch 12" speakers, \$200; w/enclose, \$300. 256-990-1842

Pennsylvania House video cabinet, Cherry, holds up to 30" TV, VCR, DVD, \$750. 931-427-2059

Three piece entertainment center, glass and wood shelves and doors, \$1,000. 566-1321

Tandem axle trailer, 6'x16', new wood in bed, \$750. 683-9364

Longaberger baskets: 1993 Inaugural, \$70; 1994 May basket, \$130. 509-2536/Charlie

Toshiba television, 32", Model CZ32V61, 4:3 screen, 750x562 resolution, \$250. 895-9592/Paul Luz

Daybed, white finish w/polished brass finials, includes link spring, \$200. 585-0473

Mikasa Marquax china set, 55 pieces including plates, cups, saucers, bowls & more, \$600. 534-9838

Backstreet Boys tickets, Atlanta, Gwinnett Center Arena, July 24, two floor seats, F3, Row C, \$128. 682-7945

Alpinestar motorcross boots, size 7, \$100. 603-6264

Gas leaf blower, \$75; gas line trimmer, \$60; microwave cart, \$25. 772-1509

Craftsman riding mower, 13HP, 42" deck, \$375; Adams Trail-a-Bike, \$90. 256-651-9744

Antique dining room Mahogany table & 6 chairs, \$500. 922-1980

Maple trundle bed, twin mattresses, \$90; wood toy chest, padded seat, \$25; console TV, \$45. 890-0755

Chandelier, \$75; coffee table w/glass top, \$25; stair stepper, \$15. 256-858-5552

Two 2.5" Flowmasters, \$100. 256-572-1197

Maple kitchen table w/four Windsor style chairs, \$150. 256-551-0276

Incline/decline weight bench, Body Solid Powerhouse, \$125; Dumbbell sets: 3#-\$10; 10#-\$20; 12#-\$25; 15#-\$30. 318-5738

Pearl Snare drum w/case, pad, stand, key, lesson books, \$150. 882-6449

Whirlpool gas dryer, \$150. 256-585-9393

Short S-10 camper shell, \$125; Sunn guitar amp, \$500; Marshal dual 50W power amp, \$250. 851-8085

Kenmore Series 80 washer & dryer, \$250. 837-7732

TV/DVD console for van, \$225; Monessen vented LP gas logs, \$125; Beanie babies & buddies. 881-7000

Sunbeam gas grill, 2-full gas tanks; GE TV, 19", all for \$70. 895-9520/Philip

Washer & dryer, \$100 each; boy's Power Wheels jeep, \$100. 655-2939

Walker w/wheels, hand break, basket & seat; \$150; bedside potty chair, \$60. 256-883-9509

Madam Alexander dolls, Wizard of Oz, set of 6, \$400. 533-9683

Baldwin Spinnet upright piano, \$500. 468-1999

Fiberglass shell for full-size short bed pickup, \$150. 961-1282

Oak kitchen/breakfast round pedestal table, 3.5' diameter top, 4-chairs, \$400. 655-3920

Rattan wicker pedestal square rounded-corner glass top table w/4 chairs, blush, make offer. 772-7262

Vehicles

1997 Jeep grand Cherokee Laredo, 6-cyl./auto, a47K miles, leather, all-power, \$4,500. 256-228-9513

1997 Cadillac Deville, V8/auto, leather, 4-door, tan, 115K miles, \$6,500. 256-479-8917

1998 Buick LeSabre Limited sedan, 4-door, 35K miles, Gran-Touring package, leather, \$6,995. 508-2598

1998 BMW 740iL, hunter green, tan leather, 105K miles, new tires, \$15,000. 682-0888

2005 Yamaha Bruin 350, 4x4/auto, warn winch, camo hardwoods, HD camo package, \$3,950. 256-233-5032

1997 Camry LE, auto, 106K miles, new Michelin tires, green, 4-door, \$5,000. 256-508-1568

1998 Silverado, 3-door, ext. cab, Vortec 350, 76K miles, automatic, \$9,600. 256-728-4113

2002 Ford F250 Superduty Supercrew Lariat, 7.3 diesel, 4x4, 136.5K miles, white, \$21,000. 256-497-3518

2004 Honda Pilot, sagebrush pearl, leather, 3rd row seats, 14.4K miles, \$28,500. 350-6477

1986 Toyota pickup, new tires, bedliner, \$975. 852-2219 after 5 p.m.

1993 Yamaha FZR600R, metallic blue, 22K miles, \$2,100. 256-881-7690

2000 Kawasaki KDX200 trail bike, stock, \$1,700. 256-353-6635

2002 Ford Explorer XLT, silver, V8, all-power, a/c, CD, 65K miles, one-owner, garaged, \$15,900. 256-881-6094

1999 Ford Explorer XLS, 4-door, 4x4, 79K miles, towing package, \$8,150. 353-3229

1993 Chevy G20 high top, white, Sherrod van, leather, TV/VCR, \$7,600. 882-2076

2000 Dodge Grand Caravan, silver, 103K miles, \$7,000. 797-2656

Wanted

Certain older digital cameras: Canon G1, Sony 707, Olympus 2040 to use for digital infrared. 541-0522

Treadmill. 233-5403

Good homes for young mother cat & 3 kittens, abandoned on Monte Sano, vet checked, healthy. 539-5886

Treadmill, quiet, very good condition. 256-784-5299

Free

To good home, Collie and Border Collie, need room to run. 882-1566

Male dog, looks like Blue Heeler, will pay to have neutered. 883-7089

Longhaired kittens, 6-months old, indoor pets, black/white male, two Calico females, black/white mother cat. 751-4043

Found

Sunglasses, 2 pair. Call 544-3623 to claim/identify

Discovery

Continued from page 1

and control electronics in the Orbiter, and re-evaluating changes made in the tank and any procedural changes that might possibly have an impact.

The Shuttle's ECO sensors operate much like an automobile's "gas low" warning lamp. When the fuel level drops below a sensor, a message is sent to the Orbiter's computer indicating that the fuel tank is "dry." If two of the four sensors indicate "dry" -- signifying the tank is almost empty -- a signal is sent to all three Main Engines to shut down, which could affect whether or not the Orbiter reaches the appropriate orbit.

During a Shuttle mission countdown, a routine system check is performed about two-and-a-half hours before liftoff. On July 13,

the No. 2 low-level hydrogen sensor did not switch from "wet" to "dry" when instructed to do so, an indication that some part of the sensor circuit was not working properly. When the tank was drained, the other three sensors changed from "wet" to "dry" as expected. The No. 2 sensor remained "wet" for another three hours before switching back to "dry."

Deputy Program Manager Wayne Hale said managers are hopeful that this week the problem could be identified and are still optimistic about a launch within the current window, which ends July 31.

The writer, an ASRI employee, supports the Public and Employee Communications Office.

Marshall's John Chapman never stops looking to the sky

By Rick Smith

The old maxim says, "It's the journey that matters, not the destination." John Chapman, chief engineer for Space Shuttle Propulsion at the Marshall Center, would debate that idea. It's vital to have your destination in mind, he says — to know where you're going, and why.

But Chapman acknowledges whether you're road-tripping across America, soaring in a glider held aloft by thermal air currents, or working to put the most complex machine ever created — the Space Shuttle — into Earth orbit, there's nothing like the journey.

"What's always been most fascinating to me is the simple challenge of flight — persuading a chunk of metal anchored by gravity to fly into the sky," Chapman says. "Look at the solutions humanity has devised over the centuries to fly through the air, to enter space. Look at the concepts we're developing today. Imagine the possibilities we'll think of tomorrow."

As a leader in the Marshall Center Office of Chief Engineers, part of the Engineering Directorate at Marshall, Chapman is adept at finding solutions, and imagining possibilities. He provides technical recommendations about flight hardware and program issues to the Shuttle Propulsion Program manager, and leads a team of engineering experts who help solve

issues associated with sending the nation's flagship space vehicle back to orbit.

A 25-year NASA veteran, Chapman has held nearly every Shuttle office manager, deputy manager and business manager



Photo by Doug Stoffer, NASA/MSFC

Chapman

post at Marshall. His current job is the culmination of a love affair with flight that reaches back as far as he can remember, as an avid model builder and airplane enthusiast growing up in Spartanburg, S.C. He worked at a local airport through his high school and college years, eventually learning enough about aircraft mechanics and electrical systems to install hardware in private planes. He spent every spare

moment — and most of his earnings — taking flying lessons, and earned his pilot's license on July 15, 1969, the day before Apollo 11 left Earth, carrying the first humans to walk on the Moon.

Flying remains integral to Chapman's life. Over the years, he has owned a small plane and two unpowered gliders. He co-founded the Huntsville Soaring Club for glider enthusiasts, and even proposed to his wife Cindie, a chemist in the Materials and Processes Laboratory at Marshall, while soaring high over the green hills of east Tennessee.

Chapman earned a bachelor's degree in industrial engineering in 1973 from the Georgia Institute of Technology in Atlanta. After college, he worked for Huntsville contractors, performing engineering studies during early development of the Shuttle. He joined NASA in 1980, writing computer programs at Marshall to analyze Shuttle propulsion hardware.

When STS-1, the Shuttle's maiden space voyage, was launched in 1981, Chapman was watching. "I've never forgotten that experience," he says. "We've come a very long way since then, but the journey isn't over yet."

Where to next? "Pick a destination," he says, and points to the sky.

The writer, an ASRI employee, supports the Public and Employee Communications Office.

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