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# MARSHALL STAR

Serving the Marshall Space Flight Center Community

Aug. 10, 2006

*Marshall manages the development of NASA instrument components*

## Japanese space agency sets Sept. 23 launch date for Solar-B, an international mission to study the sun

*By Sherrie Super*

The Japan Aerospace Exploration Agency has set Sept. 23 as the launch date for Solar-B, an international mission to study the sun. The mission is a collaboration among the space agencies of Japan, the United States, the United Kingdom and Europe.

The Marshall Center managed the development of the instrumentation provided by NASA, with additional support by academia and industry. From Marshall, Larry Hill is the Solar-B project manager, and John M. Davis is the Solar-B project scientist.

NASA helped in the development, funding and assembly of the spacecraft's science instruments — the Solar Optical Telescope, developed by the National Astronomical Observatory of Japan; the Focal Plane Package, developed by Lockheed Martin in Palo Alto, Calif., and the High-Altitude Observatory in Boulder, Colo.; the X-ray telescope, developed by the Smithsonian Astrophysical Observatory in Cambridge, Mass., and the Japan Aerospace Exploration Agency;

*See Solar-B on page 5*

Mullard Space Science Laboratory

**Within a Japan Aerospace Exploration Agency clean room in the Tokyo suburb of Sagamihara, engineers complete the attachment of the Extreme Ultraviolet Imaging Spectrometer — one of three telescopes for studying the sun — to the Solar-B spacecraft. The spectrometer is the long black box on the bottom.**

## *NASA's first exploration quarterly review hosted by Marshall*

*By Sheri Bechtel*

The Marshall Center hosted NASA's first Exploration Systems Mission Directorate Quarterly Program Management Review on Aug. 1-3. The unprecedented event brought together more than 150 invited guests from across the agency to discuss NASA's exploration program and projects and mission goals.

The three-day review was held at the Monte Sano Lodge in Huntsville. Among those attending was NASA Administrator Michael Griffin, who participated in the management review. Griffin joined Marshall Center Director David King, center directors and senior managers from NASA Headquarters in Washington, Johnson Space Center in Houston, Kennedy Space Center in Florida, the Marshall Center and other NASA field centers.

The review included a state-of-affairs update on exploration systems activities by Scott Horowitz, associate administrator of NASA's Exploration Systems Mission Directorate at NASA Headquarters; and a presentation on NASA's exploration strategy and architecture by Doug Cooke, deputy associate administrator of Exploration Systems at NASA Headquarters. Jeff Hanley, manager of the Constellation Program at the Johnson Center, briefed the Constellation Program's budget and schedule, including

*See Quarterly review on page 5*

# Where did the name Apollo come from?

On June 30, NASA announced the names for the next generation launch vehicles that will return humans to the moon and later take them to Mars and other destinations.

After selecting the name Ares, the Greek name for Mars, NASA selected Ares I for the crew launch vehicle and Ares V for the cargo launch vehicle. The "I" and "V" designations pay homage to the Apollo Program's Saturn I and Saturn V rockets, the first U.S. space vehicles conceived and developed specifically for human spaceflight.

Today, the name Apollo stirs recollections of the 1960s and early 1970s, and NASA's first series of human-tended flights to the lunar surface. Still, many people wonder how NASA selected Apollo as the name for its lunar landing project. It was in William Shakespeare's play, "Romeo and Juliet," that the lovely Juliet first posed the question to Romeo, her lover, "What's in a name?"

But when it comes to learning more about how NASA has selected the names for its programs, projects and launch vehicles, one might pose the question to Helen T. Wells, Susan H. Whiteley and Carrie E. Karageannes. They are authors of the "Origin of NASA Names." The book was published by NASA in 1976 and carries the designation NASA SP-4402.

MSFC archives

**The Saturn V rocket, developed by the Marshall Center, lifts the Apollo 11 astronauts to the moon in 1969.**

Regarding the name Apollo, the authors trace the origin of the name back to July 1960 at the NASA Industry Program Plans Conference in Washington. NASA was preparing to implement its long-range plan beyond Project Mercury and to introduce a manned circumlunar mission project — then unnamed.

Abe Silverstein, director of Space Flight Development, proposed the name Apollo because it was the name of a god in ancient Greek mythology with attractive connotations. The precedent for naming spaceflight projects for mythological gods and heroes had been set with Mercury. Apollo was god of archery, prophecy, poetry, music and most significantly, he was god of the sun. In his horse-drawn golden chariot, Apollo pulled the sun in its course across the sky each day.

NASA approved the name and publicly announced Project Apollo at the July 28-29, 1960, conference.

The authors also point out that Project Apollo took a new turn when a manned lunar landing was proposed to the Congress by President John F. Kennedy on May 25, 1961, and was subsequently approved by Congress. The program's three-man flights led to the landing of humans on the moon. Rendezvous and docking in lunar orbit of Apollo spacecraft components were vital techniques for the challenging flight to and return from the moon.

One of the biggest challenges involved developing the huge Saturn V launch vehicle that would launch the astronauts on their Apollo missions. The Marshall Center and its industry partners accomplished that goal. In fact, Dr. Wernher von Braun, who became the first director of the Marshall Center, proposed in October 1958 that the Juno V be renamed Saturn, also the name of an ancient Roman god.

The Apollo spacecraft consisted of the command module, which served as the crew's quarters and flight control section, and the service module, which contained propulsion and spacecraft support systems. It also included the lunar module, which carried two

***See Apollo on page 8***

# Marshall-managed GLAST Burst Monitor set for spacecraft integration

## *One step closer to tracking most powerful explosions in the universe*

*By Sherrie Super*

NASA scientists and engineers have completed final testing and integration of the GLAST Burst Monitor, a space-based instrument for studying gamma ray bursts.

These bursts, scientists believe, originate in the collapse of massive stars up to 100 times the size of our sun, a process that eventually forms a black hole in space and poses unanswered questions to scientists on Earth.

The monitor is one of two instruments on the Gamma-ray Large Area Space Telescope, or GLAST, an orbiting observatory scheduled to launch from the Kennedy Space Center, Fla., in fall 2007.

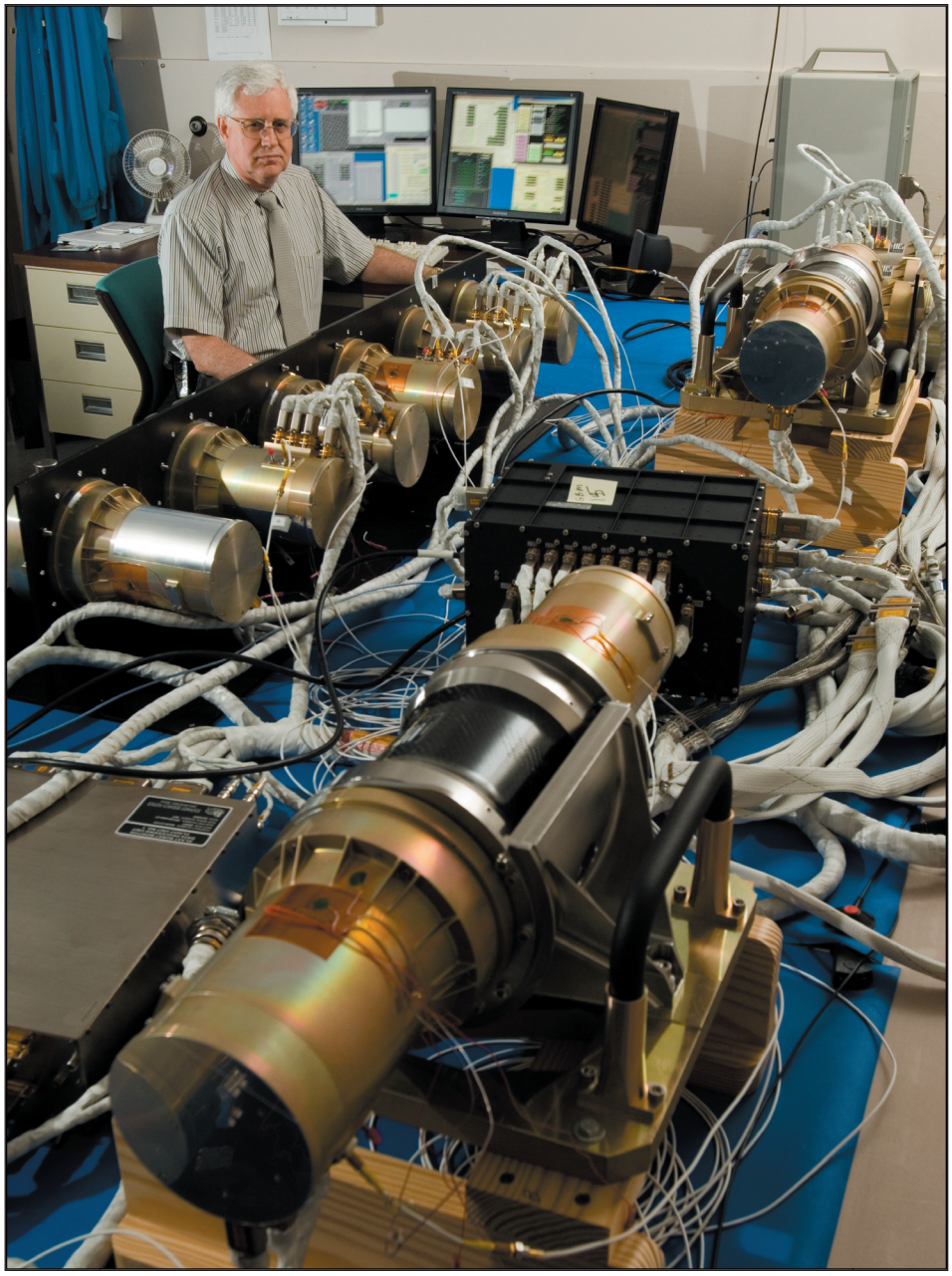
The GLAST Burst Monitor shipped from the Marshall Center on July 24. It arrived two days later at General Dynamics C4 Systems, Scottsdale, Ariz., where it will be integrated with the spacecraft.

GLAST's primary instrument, the Large Area Telescope, is nearing completion of four months of environmental testing at the U.S. Naval Research Laboratory, Washington, its final stop before shipment to General Dynamics.

Together, the Large Area Telescope and the GLAST Burst Monitor will observe gamma rays ranging in energy from a few thousand electron volts to many tens of billions of electron volts the widest range of coverage ever available on a single spacecraft for gamma ray studies.

"A single gamma ray burst releases more energy than the sun will release during its entire 4.5-billion-year life cycle," said the project's principal investigator, Dr. Charles Meegan, an astrophysicist at Marshall. "Believed to be the explosions of massive stars, gamma rays remain one of the greatest mysteries of astrophysics."

More energetic than X-rays, gamma rays are the highest energy form of electromagnetic radiation. When a burst occurs, the GLAST Burst Monitor will detect gamma rays from the explosion. Within seconds, the instrument will identify the location of the burst. This information will be sent to scientists on the ground, and, if the burst is exceptionally strong, the spacecraft will reorient its position so that the Large Area Telescope also can observe the burst. Data gleaned by GLAST will span an energy range hundreds of times larger than ranges monitored by earlier instruments.



David Higginbotham/MSFC

**Dr. Charles Meegan, a Marshall astrophysicist, tests the GLAST Burst Monitor, a space-based instrument for studying gamma ray bursts. Meegan is the project's principal investigator.**

The GLAST project builds on previous experience developing and integrating large complex space systems. To design and test the GLAST Burst Monitor, Marshall Center scientists tapped more than two decades of experience building and operating the Burst and Transient Source Experiment, also known as BATSE. One of four instruments on NASA's Compton Gamma Ray Observatory, BATSE observed more than 2,700 gamma ray bursts from 1991 to 2000. The instrument fueled a greater

***See GLAST on page 8***

# *Science and Mission Systems Office honors team members*

*By Rick Smith*

The Marshall Center's Science and Mission Systems Office honored the accomplishments of its employees and contractors at an annual award ceremony July 25 at the Marshall Activities Building.

More than 300 members attended the event, which featured a catered luncheon and live music from local folk-and-bluegrass quartet Wolves A-Howlin. Organization and project leaders, including John Horack, assistant manager of the Science and Mission Systems Office, took the stage to present awards to noteworthy project teams and individuals.

"We've had an extremely successful year, and we've done great things" Horack told attendees. "The work we do will make it possible for numerous other NASA organizations to do great things as well. We're all thankful to be part of something greater than ourselves, and for the legacy we leave for our kids and our nation."

Group Achievement Award recipients included:

- The WB-57 Airborne Video Experiment team, which developed an innovative imaging system mounted on high-flying chase planes to provide NASA with extra "eyes in the sky" to help document the space shuttle's return to flight
- The Robotic Lunar Exploration Program team, tapped to plan NASA's "RLEP-2" robotic lunar lander, a precursor to new human missions to the moon
- The development team for SERVIR, a Spanish acronym for the Mesoamerican Regional Visualization and Monitoring System, a server-based environmental imaging system designed to protect Central America against environmental threats
- The Gamma-ray Large Area Space Telescope Burst Monitor team, which developed a key instrument slated to fly to space in 2007 on board the GLAST satellite
- The Lab-on-a-Chip Applications Development team, which pursues integrated microchip functionality for space-based environmental life control systems, medical applications and remote deep-space exploration activities
- The Service Module Proposal and Smart Buyer Team, which supported a NASA-wide initiative to identify major design drivers and develop innovative design concepts for the Crew Exploration Vehicle scheduled to carry human explorers back to the moon in coming years

Peer awards were given to 10 individuals — five civil servants and five contractors, nominated by organization team members — in five award categories: communication, teamwork, excellence, innovation and above-and-beyond service.

Beth Cook, manager of the organization's New Projects and Partnerships Office, and Betty Tittsworth, a Jacobs Sverdrup engineering technician supporting the Environmental Control and Life Support System project, received the communication peer awards.

Larry Kos, an aerospace engineer and group technical lead for in-space mission analysis within the Advanced Concepts Office, and Julie Ray, a Qualis Corp. engineer supporting the Lunar Precursor and Robotic Program Office, were honored with teamwork peer awards.

Ginger Flores, manager of the Lab-on-a-Chip Application Development Portable Test System, and Pamela Perez, a Digital Fusion budget analyst supporting the National Space Science and Technology Center's business office and the Solar-B and GLAST Burst Monitor satellite instrument projects, received the excellence peer awards.

Jessica Gaskin, research space scientist for the X-ray Astronomy Group, and Dr. Mikhail Gubarev, a staff scientist with the nonprofit Universities Space Research Association headquartered in Columbia, Md., were honored with the innovation peer awards. Gaskin is developing a miniaturized scanning electron microscope with broad applications in planetary research, materials analysis, astrobiology and terrestrial science. Gubarev developed a practical demonstration of an innovative optical fabrication technique that could prove invaluable to Marshall and NASA space optics development projects.

Patricia Puckett, office automation assistant for the Science and Exploration Research Office, and Janet Salverson, a technical illustrator for Teledyne Brown Engineering and task coordinator for the Advanced Materials for Exploration activity at Marshall, received the above-and-beyond peer awards.

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


Doug Stoffer/MSFC

**NASA archaeologist Dr. Tom Sever, left, accepts a Group Achievement Award on behalf of the SERVIR team, which developed the Mesoamerican Regional Visualization and Monitoring System for Central America. The award, presented by Todd May, right, deputy manager of the Science and Mission Systems Office, was one of numerous team honors presented July 25 during the office's awards day ceremony.**

# *Moon to 'dim' Perseids at peak of celestial fireworks Aug. 12*

*By Sherrie Super*

Each August, sky-gazers are treated to a free fireworks show as the Perseid meteor shower illuminates the nighttime skies. This year's shower will peak in the pre-dawn hours of Saturday, Aug. 12.

But it will have competition: a nearly full moon.

How will this year's celestial show compare to those in previous years?

Not well, said Marshall Center astronomer Dr. Bill Cooke, a meteor shower forecaster in Marshall's Engineering Directorate.

"Optimum viewing occurs under clear skies after the moon sets," said Cooke. "But this year, a nearly full moon will brighten the sky all night. As a result, this year's shower will be less than stellar, with only the brightest meteors viewable to the unaided eye."

The Perseids appear annually when tiny bits and pieces of the Comet Swift-Tuttle shower Earth's skies. Swift-Tuttle is a large comet — its nucleus is about 10 miles across — and dumps considerable dust and debris, creating meteors near Earth.

At this year's peak, nearly 100 meteors per hour will shoot across the night sky.

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## Solar-B

***Continued from page 1***

and the Extreme Ultraviolet Imaging Spectrometer, developed by the Mullard Space Science Laboratory of the University College London, the United Kingdom and the Naval Research Laboratory in Washington.

Together, these instruments will study the generation, transport and dissipation of magnetic energy from the photosphere to the corona. They will record how energy stored in the sun's magnetic field is released, either gradually or violently, as the field rises into the sun's outer atmosphere.

By studying the sun's magnetic field, scientists hope to shed new light on explosive solar activity that can interfere with satellite communications and electric power transmission grids on Earth and threaten astronauts on the way to or working on the surface of the moon. In particular, they want to learn if they can identify the magnetic field configurations that lead to these explosive energy releases and use this information to predict when these events may occur.

After its launch from Uchinoura Space Center in Japan, the Solar-B spacecraft will circle Earth in a sun-synchronous orbit for at least three years. This is a polar, rather than equatorial, orbit that will allow the instruments to remain in continuous sunlight for nine months of each year.

Once the spacecraft is in orbit, NASA and the science teams will support instrument operations and data collection from the operations center at JAXA's Institute of Space and Astronautical Science facility in Sagamihara, a suburb of Tokyo.

Solar-B is part of the Solar Terrestrial Probes Program within the Heliophysics Division of NASA's Science Missions Directorate.

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## Quarterly review

***Continued from page 1***

key milestones.

The Constellation Program is developing the crew and space launch vehicle systems for NASA's bold plan to return humans to the moon, Mars and destinations throughout the solar system. The Exploration Launch Projects Office at the Marshall Center is part of the Constellation Program, overseen by NASA's Exploration Systems Mission Directorate.

Marshall's Steve Cook, manager of the Exploration Launch Projects Office, provided a status on development of the Ares I and Ares V launch vehicles. Ares I is the crew launch vehicle, which will carry the Crew Exploration Vehicle to space. Ares V will serve as NASA's primary vessel for safe, reliable delivery of large-scale hardware and resources to space for use by exploration missions to the moon and beyond. Following Cook, Jeff Sexton, deputy manager of the Vehicle Integration Office spoke about propulsion and systems integration efforts for Ares I. Mike Kynard, manager of the Ares V Core Stage, and Jim Snoddy, manager of the Upper Stage Engine Element, also briefed the group on hardware development and test activities being conducted at Marshall in coordination with other NASA field centers.

Skip Hatfield, manager of the Crew Exploration Vehicle Project at Johnson, spoke about the Crew Exploration Vehicle, the crew module that will transport four to six astronauts to space and will be carried to Earth orbit by Ares I.

Marshall's Tony Lavoie, manager of the Lunar Precursor Robotics Program, gave an update on the status of NASA's lunar resource utilization research projects.

Project updates also were presented by representatives of Missions Operations, Ground Operations and Advanced Projects, which include the lunar lander concept design study. Other topics discussed included program integration and roles and responsibilities.

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*Can aerogel keep the cold in?*

# *Marshall materials engineers testing innovative insulation system for cryogenic tanks*

*By Rick Smith*

The dramatic insulating properties of aerogel — the unique, man-made substance so lightweight and transparent scientists dubbed it "frozen smoke" — have already proved valuable for keeping the cold out. During the 1997 Pathfinder mission to Mars, for example, aerogel insulation shielded the sensitive electronics inside the Sojourner rover.

But can aerogel insulation keep the cold in?

Two members of the Marshall Center's Engineering Directorate, materials engineer Gweneth Smithers and thermal systems engineer David Shular, are partnering with researchers at other NASA centers to investigate that potential application. They're studying whether aerogel can insulate cryogenic, or subzero-temperature, fuel tanks to maintain deep-cold conditions inside the tanks despite dramatically warmer launch pad temperatures in the hours leading up to liftoff. Such a breakthrough could reduce launch costs, improve fuel performance and boost the safety of the vehicle, cargo and crew.

Emmett Given/MSFC

**Marshall materials engineer Tom DeLay uses a filament-winding technique to fabricate a composite "cryotank" test article that will support aerogel insulation testing now underway at Marshall and Glenn Research Center in Cleveland.**

Shular is confident aerogel is the solution to maximize cryotank insulation and performance. "Solid and gaseous thermal conductivity is dramatically reduced, and thermal convection also is virtually eliminated," he said. "The only mechanism of heat transfer remaining is radiation, which can be controlled through coatings and other processes — leaving aerogels as a near-perfect insulator."

Working with their colleagues at NASA's Glenn Research Center in Cleveland, Ohio, and Kennedy Space Center, Fla., Smithers and Shular are conducting advanced proof-of-concept tests to demonstrate that insulator in action.

Their work is part of the Advanced Materials for Exploration Activity, within Marshall's Science and Mission Systems Office. The activity is part of a coordinated research effort that could, in time, answer NASA's call for new technical materials and manufacturing solutions to support the pursuit of long-term space exploration.

Aerogel may seem like a futuristic technology, but in fact the substance was developed in 1931 by Dr. Steven Kistler, a researcher at Stanford University in California. Kistler mixed a liquid silicon compound and a fast-evaporating liquid solvent, creating a jelly-like material. He dried it to a thick mixture using an autoclave — a type of industrial-strength pressure cooker — then carefully heated and depressurized it.

What was left was a delicate silicon "sponge," 99.8 percent air and a thousand times less dense than glass. It looked brittle, but surprised Kistler with its ability to withstand high compressive force — and even more so with its resistance to the transfer of heat or electrical energy. The key to the latter characteristic is the morphology, or structure, of aerogel. The pores through which air may travel, carrying heat energy via convection, are extremely minute — as small as 10 nanometers in diameter, or a bare fraction of the width of a human hair.

A primary challenge still being overcome, Smithers said, is fragility. Even given their compression strength, most aerogels and aerogel composites are not strong materials. Smithers and Shular's counterparts at Glenn have helped mitigate that problem by developing a polymer-crosslinked silica aerogel composite, "X-aerogel," that is 300-times more resistant to breaking but maintains the desirable porosity. It may also be molded to complex surfaces — making it ideal for the cryotank-bottle test series.

***See Aerogel on page 7***

# Aerogel

***Continued from page 6***

In this collaboration, Glenn researchers have developed a process to contour mold the X-aerogel to fit a curved surface, and are now producing enough X-aerogel composite to encase six test bottles. These composite bottles, manufactured earlier this year at Marshall by materials engineer Tom DeLay of the Non-Metals Engineering Branch, serve as stand-in "mini-cryotanks." Each is 10 inches long and 5 3/4 inches in diameter. All six have been shipped to Glenn where researchers are covering them in X-aerogel. Then they will be returned to Marshall for a second layer of fiber-wrapping.

The entire project is overseen by Brett Smith, team lead for the Composites Manufacturing Team, which manages all early-development cryotank projects at Marshall.

Once that final preparatory step is complete in the next eight weeks or so, Marshall materials and test engineers will begin conducting mechanical testing and non-destructive evaluation of the test articles. Their counterparts at Glenn and Kennedy also will conduct independent testing, studying the evaporative and thermal characteristics of the aerogel-wrapped bottles.

Eventually, Smithers noted, the improved strength of X-aerogel, and the fact that aerogel composites may be formulated in endless variety, density and transparency, could be of considerable value here on Earth, revolutionizing building insulation and other industrial needs. It also could find valuable applications on other worlds, helping insulate research outposts on the moon and Mars.

For now, however, Smithers and Shular will be most pleased to see the aerogel composite perform as anticipated during the test series, which is expected to conclude this fall. Data gathered from the testing could lead to full-scale development of aerogel-insulated cryotanks — a potentially crucial solution to help safely and cost-effectively launch our next-generation space vehicles into orbit and send them across the solar system.

For more information about the Advanced Materials for Exploration Activity, visit http://ame.msfc.nasa.gov .

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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

Dogloo large dog house w/flap door, $30. 337-2534

Callaway FT-3 Fusion driver, draw bias, NVS-55-R shaft w/head cover, $230. 880-7305

Weider Pro Power Stack home gym, moving, $150. 379-4677

Radio Flyer all-terrain red wagon, wooden sides, large tires, $75. 353-0370

Two tickets to Six Flags, $45. 509-3208

Marble-topped sofa table, $75; four piece Broyhill entertainment center, light wood, $500. 837-1006

Insignia TV w/ remote, 20", 2 months old, $50. 407-687-3772

Riding saddle, dark leather, stirrups, saddle pad, cover, riding accessories included, $575. 256- 534-0029

Croscill "Chambord": queen set, draperies, pillows, towels, bathroom accessories. 651-2234

Carolina Rustica queen-size iron bed with brass finials by Elliot's Design, $150. 256-468-4107

Lexington bedroom furniture: chest, nightstand, computer desk with hutch, antique white. 895-8294

Queen Anne loveseat, neutral background, mauve, blue, green floral print, $75, serving cart, $15. 603-3558

Thomasville Chippendale sofa and 2 wingback chairs, cream color, $400. 837-4524

Associated Electronics Monster GT Nitro Powered, Radio Controlled Monster truck, $350. 256-599-7381

Oak entertainment center, holds up to 36" TV, w/one side pier, $600. 829-0285

Girl's 20" pink/purple bicycle w/handlebar streamers, hand and foot brakes, $20. 895-0045

Maytag gas dryer, $75; swing set, pressure treated wood, $125; salvaged 2x6 lumber. 509-7907

Golf clubs, men's left-handed, woods: 1/3/5, irons: 3-9, PW, SW, putter, no bag, $150. 882-3983

Lady at the Well concrete fountain and pump, $100. 851-0008

iPod Remote Interactive Dock DS-A1 for Onkyo stereo/ home theater system, never used, $65. 256-828-1234

## Vehicles

Harley Sportster 1200XLC, 2003 100th Anniversary Gold Key Edition, 6.3K miles, extra chrome, $7,900. 658-6565

Ski boat, 17', 170HP, i/o, $1,750. 379-3780/Steve

2004 Toyota Solara, red w/beige leather, 90K highway miles, $15,000. 615-512-0673

1998 GMC Yukon SLT, maroon w/tan leather, heated seats, auto, 4WD, $9,400. 682-6326

2003 Black BMW Z4 convertible, loaded, 36K miles, $26,900. 256-461-8680

2005 Toyota Camry, ABS, CD, air, 28K miles, under warranty. $15,000. 461-9785

1995 Dodge Caravan, AC, struts, starter, tires, 146K miles, $2,500. 772-1870

2002 BMW 330ci, 31K miles, silver, 5-speed, Harmon Kardon, leather, black interior. 534-9678.

1999 Honda Shadow 1100 motorcycle, 6.5K miles, saddle bags and Helmet, $3,500. 777-1812/Bruce

1992 Bonneville SE, low miles, clean, $3,250. 539-7379

1994 GMC Suburban SLE, front/rear air, third seat, towing package, 177K miles, $3,500. 509-3510

2003 Chevy Avalanche 1500, 59K miles, black, $15,500; 1980 SWB Chevy truck parting out. 679-6319

1993 Holiday Rambler Imperial, 34', garage kept, one-owner, $12,500. 256-777-5449

1995 Cadillac Deville Concours, loaded, black, $2,150; 1996 Deville, green, loaded, $3,400. 256-520-2802

2000 Honda Odyssey EX, 130K miles, champagne, $10,995. 256-755-7772

2001 Ford Windstar SE, leather, left sliding door, rear a/c, pw/pdl, cassette/CD, 97K miles, $8,950. 256-497-3951

2003 Honda Civic LX, 4-door, automatic, 7.6K miles, light tan, $13,000. 655-1552

2003 Chevy Avalanche special pewter color, Z71, package new tires, DVD, 60K miles, $21,000. 256-520-2394

## Wanted

Booster Seat/Chair for toddler. 776-4702

## Free

IBM Selectric electric typewriter, Model 71, needs work. 256-679-2429

Siamese kitten to good home. 256-796-2414

# Apollo

*Continued from page 2*

crewmembers to the lunar surface, supported them on the moon, and returned them to the command and service module in lunar orbit. Module designations came into use in 1962 when NASA made basic decisions on the lunar orbit rendezvous flight mode. From that time until June 1966, the lunar module was called the lunar excursion module.

It was renamed by the NASA Project Designation Committee because the word excursion implied mobility on the moon, and this vehicle did not have that capability. The later Apollo flights, beginning with Apollo 15, carried the lunar roving vehicle to provide greater mobility for astronauts while on the surface of the moon

Beginning with the flight of Apollo 9, code names for both the command and service module and lunar module were chosen by the astronauts who were to fly each mission. For example, the Apollo 11 astronauts selected the code name Eagle.

The formula for numbering Apollo missions was altered when the three astronauts scheduled for the first manned flight lost their lives in a flash fire during a launch rehearsal on Jan. 27, 1967. In honor of Astronauts Virgil I. Grissom, Edward H. White II and Roger B. Chaffee, the planned mission was given the name Apollo 1, although it was not launched. Carrying the prelaunch designation AS-204 for the fourth launch in the Apollo Saturn IB series, the mission was officially recorded as First Manned Apollo Saturn flight — failed on ground test.

Deputy Director George Low of the Manned Spacecraft Center, later renamed the Johnson Space Center, requested from the astronauts' widows that the designation Apollo 1 — used by the astronauts publicly and included on their insignia — be retained. NASA therefore recommended the new numbering, and the NASA Project Designation Committee announced approval on April 3, 1967.

*Mike Wright, Marshall Center historian, contributed to this article.*

# GLAST

*Continued from page 3*

understanding of these powerful events.

To design the GLAST Burst Monitor, the Marshall Center scientists collaborated with scientists from the Max Planck Institute for Extraterrestrial Physics, Garching, Germany, who worked with NASA through an agreement with the German Aerospace Center. Marshall manages the GLAST Burst Monitor with the Max Planck Institute, which built the monitor's crystal detectors — the main component for intercepting gamma rays. Scientists from the Marshall Center and the University of Alabama in Huntsville provided flight electronics, software and testing for the instrument.

"The effort tapped local and international expertise," said Meegan. "When the GLAST Burst Monitor delivers its first set of data — about a month after launch — it will culminate years of research, design and testing by many dedicated individuals."

NASA Goddard Space Flight Center in Greenbelt, Md., manages the mission. The Stanford Linear Accelerator Center (a DOE Office of Science national laboratory) in Menlo Park, Calif., manages the Large Area Telescope with collaborators at Goddard, the University of Calif. in Santa Cruz; the University of Washington in Seattle; Ohio State University in Columbus; the U.S. Naval Research Laboratory; and institutions in France, Italy, Japan and Sweden. General Dynamics is responsible for spacecraft and instrument integration, and Sonoma State University in Rohnert Park, Calif., manages education/public outreach efforts for the Large Area Telescope.

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

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