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MARSHALL STAR

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NASA Managers to Meet June 28 to Assess Mission Readiness

Marshall's Propulsion Elements Ready to Support STS-135 Mission

By Sanda Martel

NASA managers will meet June 28 at Kennedy Space Center for an agency-level Flight Readiness Review and to set the launch date for the final space shuttle mission, designated STS-135.

Image right: Technicians install cargo inside the Raffaello multi-purpose logistics module at the Space Station Processing Facility at Kennedy Space Center. (NASA)

NASA is targeting launch for July 8 at 10:26 a.m. CDT, but the official launch date will be announced at the conclusion of the readiness review.

The Space Shuttle Program held a readiness review June 21 and determined the space shuttle main engines, external tank and reusable solid rocket boosters are ready to lift shuttle Atlantis from the launch pad.

"For the last time, we have certified that our external tank, main engines and boosters, managed from the Marshall Space Flight Center, are fully ready to support launch," said Steve Cash, manager of the Shuttle Propulsion Office.

"Once more, I am so proud of our team, which has stayed focused until the end," Cash added.

As Cash and his team travel to Kennedy for the last readiness review, and again for shuttle Atlantis' launch, it will be a happy, but bittersweet time.

"It will be sad to see the shuttle launch for the last time, but we have so much to be proud of," he said. "This team has worked hard, done its job in an excellent manner and we are finishing strong and leaving a legacy for future NASA programs to learn from."

Commander Chris Ferguson will lead a crew of four astronauts aboard Atlantis on a 12-day mission. They will deliver the Raffaello multipurpose logistics module, filled with supplies, equipment and spare parts to sustain space station operations once the shuttles are retired. The module is managed by engineers at the Marshall Center.

Raffaello is approximately 21 feet long, 15 feet in diameter, weighs 4.5 tons and can deliver up to 10 tons of cargo to the space station.

The mission will fly an experiment, the Robotic Refueling Mission, designed to investigate the potential for robotically refueling existing spacecraft in space. The crew also will return an ammonia pump that recently failed on the space station. Engineers want to understand why the pump failed and improve designs for future spacecraft.

Atlantis, the fourth orbiter built, flew its maiden voyage Oct. 3, 1985, on the STS-51-J mission. Later missions included the first docking to the Russian Mir space station on STS-71 in June 1995; delivery of the Destiny Laboratory to the space station on STS-98 in February 2001; the first launch with a camera mounted to the external tank, which captured the shuttle's ascent to orbit on STS-112 in October 2002; and the final servicing mission to the Hubble Space Telescope on STS-125 in May 2009.

STS-135 is the 33rd flight of Atlantis and the 135th and final shuttle mission. For more information, visit http://www.nasa.gov/mission_pages/shuttle/main/index.html.

Martel, an AI Signal Research Inc. employee, supports the Office of Strategic Analysis & Communications.

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Marshall Center Astrophysicist Dr. Gerald Fishman to Receive 2011 Shaw Prize
By Rick Smith

Dr. Gerald J. Fishman, an astrophysicist at the Marshall Space Flight Center, has been named a recipient of the 2011 Shaw Prize in Astronomy, for which he will share a $1 million award.


Dr. Gerald J. Fishman (NASA/MSFC)

Fishman is being recognized for his leadership in research that has shed new light on the space phenomena known as gamma-ray bursts -- the brightest, most explosive events known to occur in the universe. He shares the award with Dr. Enrico Costa, director of research at the Institute of Space Astrophysics and Cosmic Physics in Rome.

The awards will be presented at a ceremony in Hong Kong on Sept. 28.

Established in 2004 by Hong Kong media entrepreneur Sir Run Run Shaw, the Shaw Prize includes annual awards for achievement in the fields of astronomy; life sciences and medicine; and mathematics. The awards

recognize individuals who have achieved significant breakthroughs in science and research with a positive, lasting impact on humankind.

Fishman, a NASA astrophysicist since 1974, was the principal investigator for the Burst and Transient Source Experiment or BATSE, an extremely sensitive gamma-ray burst detector which flew on NASA's Compton Gamma Ray Observatory from 1991-2000. He currently is a co-investigator on the Gamma-ray Burst Monitor, a key instrument aboard the Fermi Gamma-ray Space Telescope, which was launched in 2008 to study gamma-ray bursts that appear randomly in the sky at a rate of about 300 each year.

First seen by American satellites in the late 1960s, gamma-ray bursts remained a mystery for more than three decades until BATSE and other high-powered instruments identified them: titanic detonations more than a million times as powerful as a supernova, heralding the death of massive stars, billions of light years from Earth's solar system. Since then, researchers have used Fermi and other instruments to study these distant blasts in greater detail, determining that they likely signal the birth of new black holes.

"BATSE and other instruments helped lay the groundwork for many of the discoveries related to gamma-ray bursts that have been made since," Fishman said. "It is a great honor to see that work -- achieved through the efforts of so many people -- recognized in this manner."

Fishman received his undergraduate degree in physics in 1965 from the University of Missouri in Columbia. He earned his doctorate in space science from Rice University in Houston, Texas, in 1970. He has published more than 200 scientific papers in his areas of research, and has been cited in other academic works more than 11,000 times to date, according to the Thomson ISI Highly Cited list. He was awarded the American Astronomical Society's Bruno Rossi Prize for achievements in high-energy astrophysics in 1994, and received the NASA Outstanding Scientific Achievement Award for his research in 1982, 1991 and 1993.

Read the complete NASA news release about Fishman's award here.

Smith, an AI Signal Research Inc. employee, supports the Office of Strategic Analysis & Communications.

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NASA'S Chandra Finds Massive Black Holes Common in Early Universe
Headquarters news release

Using the deepest X-ray image ever taken, astronomers found the first direct evidence that massive black holes were common in the early universe. This discovery from NASA's Chandra X-ray Observatory shows that very young black holes grew more aggressively than previously thought, in tandem with the growth of their host galaxies.

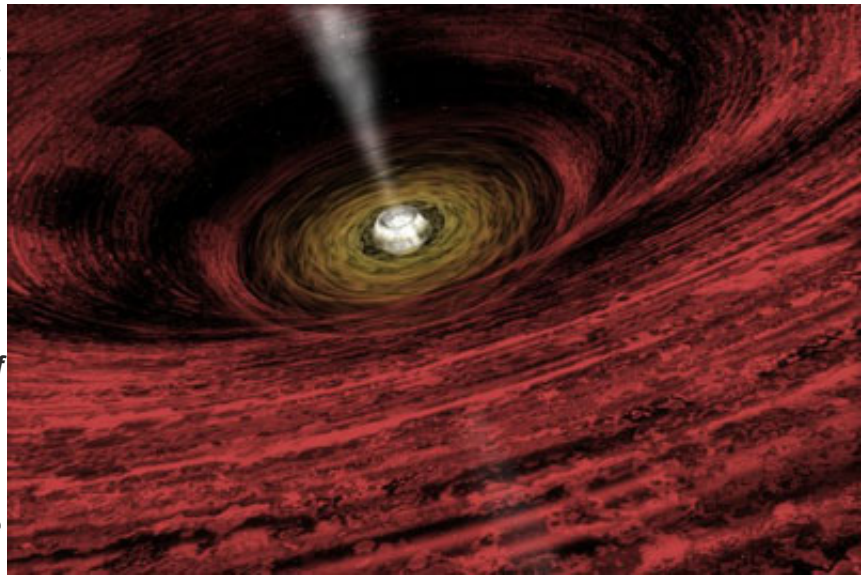

Image right: This is an artist's impression of a growing supermassive black hole located in the early universe, showing a disk of gas rotating around the central object that generates copious amounts of radiation. This gas is destined to be consumed by the black hole. (NASA/CXC/A.Hobart)

NASA's Marshall Space Flight Center manages the Chandra program for the agency's Science Mission Directorate in Washington. The Smithsonian Astrophysical Observatory controls Chandra's science and flight operations from Cambridge, Mass.

By pointing Chandra at a patch of sky for more than six weeks, astronomers obtained what is known as the Chandra Deep Field South (CDFS). When combined with very deep optical and infrared images from NASA's Hubble Space Telescope, the new Chandra data allowed astronomers to search for black holes in 200 distant galaxies, from when the universe was between about 800 million to 950 million years old.

"Until now, we had no idea what the black holes in these early galaxies were doing, or if they even existed," said Ezequiel Treister of the University of Hawaii, lead author of the study appearing in the June 16 issue of the journal Nature. "Now we know they are there, and they are growing like gangbusters."

The super-sized growth means that the black holes in the CDFS are less extreme versions of quasars -- very luminous, rare objects powered by material falling onto supermassive black holes. However, the sources in the CDFS are about a hundred times fainter and the black holes are about a thousand times less massive than the ones in quasars.

The observations found that between 30 and 100 percent of the distant galaxies contain growing supermassive black holes. Extrapolating these results from the small observed field to the full sky, there are at least 30 million supermassive black holes in the early universe. This is a factor of 10,000 larger than the estimated number of quasars in the early universe.

"It appears we've found a whole new population of baby black holes," said co-author Kevin Schawinski of Yale University. "We think these babies will grow by a factor of about a hundred or a thousand, eventually becoming like the giant black holes we see today almost 13 billion years later."

A population of young black holes in the early universe had been predicted, but not yet observed. Detailed calculations show that the total amount of black hole growth observed by this team is about a hundred times higher than recent estimates.

Because these black holes are nearly all enshrouded in thick clouds of gas and dust, optical telescopes frequently cannot detect them. However, the high energies of X-ray light can penetrate these veils, allowing the black holes inside to be studied.

Physicists studying black holes want to know more how the first supermassive black holes were formed and how they grow. Although evidence for parallel growth of black holes and galaxies has been established at closer distances, the new Chandra results show that this connection starts earlier than previously thought, perhaps right from the origin of both.

It has been suggested that early black holes would play an important role in clearing away the cosmic "fog" of neutral, or uncharged, hydrogen that pervaded the early universe when temperatures cooled down after the Big Bang. However, the Chandra study shows that blankets of dust and gas stop ultraviolet radiation generated by the black holes from traveling outwards to perform this "reionization." Therefore, stars and not growing black holes are likely to have cleared this fog at cosmic dawn.

Chandra is capable of detecting extremely faint objects at vast distances, but these black holes are so obscured that relatively few photons can escape and hence they could not be individually detected. Instead, the team used a technique that relied on Chandra’s ability to accurately determine the direction from which the X-rays came to add up all the X-ray counts near the positions of distant galaxies and find a statistically significant signal.

More information, including images and other multimedia, can be found at:

http://www.nasa.gov/mission_pages/chandra/main/index.html

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First Robotics Competition Teams Visit Marshall

Tereasa Washington, director of the Marshall Space Flight Center's Office of Human Capital, left, greets members of "The Gearheads," during a recent recognition day of the 2010-11 Marshall-sponsored For Inspiration and Recognition of Science and Technology, or FIRST, Robotics Competition teams. FIRST Robotics is one of several engineering design challenges to inspire young people to pursue careers in science, technology, engineering and math fields. "The Gearheads" team, from the Walker County Center for Technology in Jasper, Ala., was among several teams that visited with Marshall employees to showcase its robotics accomplishments. Marshall sponsors student teams from the southeast region.

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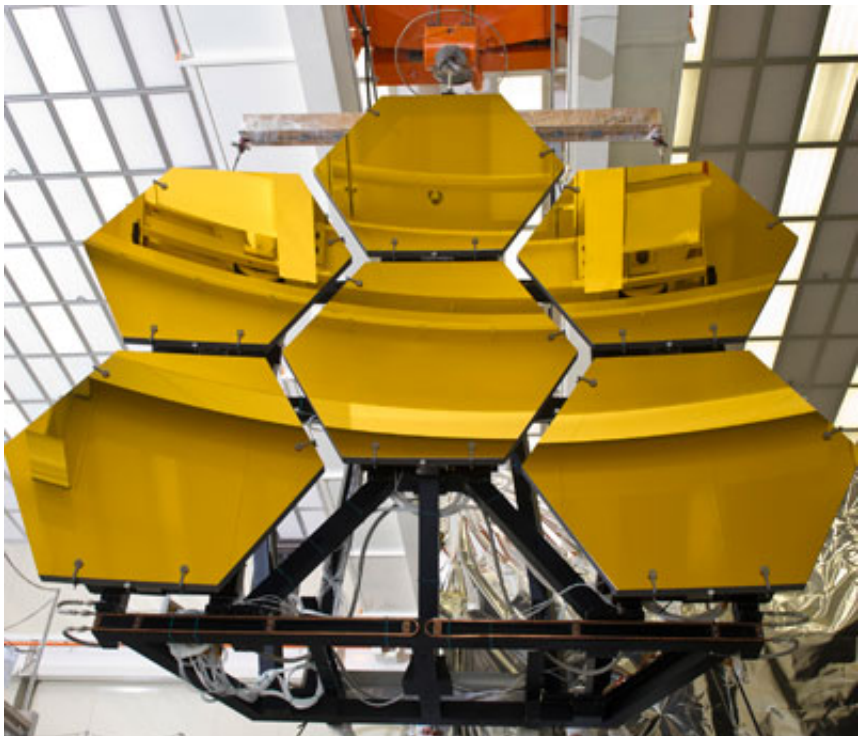
NASA's James Webb Space Telescope Completes First Round of Cryogenic Mirror Tests
By Kim Newton

The first six of 18 segments that will form NASA's James Webb Space Telescope's primary mirror for space observations has completed final cryogenic testing at the Marshall Space Flight Center. The 10-week test series included two test cycles in which the mirrors were chilled to -379 degrees Fahrenheit, and then returned to ambient temperature to ensure the mirrors responded as expected to the extreme temperatures of space.

Image right: Marshall engineers and technicians guide six mirror segments of the James Webb Space Telescope off the rails of the vacuum chamber after completing final cryogenic testing. (NASA/Emmett Given)



A second set of six mirror assemblies will arrive at Marshall in late July to begin testing, and the final set of six will arrive in the fall.

Marshall's X-ray and Cryogenic Facility provides a space-like environment to help engineers measure how well the telescope will image infrared sources once in orbit.

Each mirror segment measures approximately 4.3 feet in diameter to form the 21.3-foot hexagonal telescope mirror assembly critical for infrared observations. Each of the 18 hexagonal-shaped mirror assemblies weighs approximately 88 pounds. The mirrors are made of a light but strong metal called beryllium, and coated with a microscopically thin coat of gold to enable the mirror to efficiently collect infrared light.

The telescope is a combined project of NASA, the European Space Agency and the Canadian Space Agency. Northrop Grumman is the prime contractor under NASA's Goddard Space Flight Center. Ball Aerospace & Technologies Corp. in Boulder, Colo., is responsible for mirror development. L-3- Tinsley Laboratories Inc. in Richmond, Calif., is responsible for mirror grinding and polishing.

Newton is a public affairs officer in the Office of Strategic Analysis and Communications.

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Live Web Chat: Striking Up a Conversation about Lightning

June is Lightning Safety Awareness Month. Lightning is the number two cause of death in severe weather situations. Flooding is number one. A lot of people think if it is sunny, or if maybe there are just a few clouds around, and you hear thunder, it is okay to stay outside until you actually see the lightning. That is not true. If you hear thunder when you are outside, that means that lightning is close enough to strike you!

Image left: Lightning's connection to tropical storms and hurricane intensification has eluded researchers for years, but NASA scientists hope to answer some of these puzzling questions. (NASA)

On June 23, from 6-7 p.m. CDT, Dr. Richard Blakeslee, atmospheric research scientist at the Marshall Space Flight Center, will answer your questions about lightning safety, the global distribution and frequency of lightning occurrence, as well as some of its physical characteristics, the relationship of lightning to severe storms and weather (e.g., lightning rate changes may serve as a pre-cursor or advanced indicator to later severe weather at the ground, such as tornadoes), and other lightning research topics such as lightning-hurricane relationships and terrestrial gamma ray bursts.

To join in on the chat, visit http://www.nasa.gov/connect/chat/lightning_chat.html

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Shuttle Buddies to Meet June 27

The Shuttle Buddies will meet at 8:30 a.m., June 27, at Mullins Restaurant on Andrew Jackson Way. For more information,

call Deemer Self at 256-881-7757.

Find this article at:

http://www.nasa.gov/centers/marshall/about/star/index.html