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## NASA's Michoud Assembly Facility, Louisiana Aerospace Industry Honored by Louisiana Legislature

*By Kenneth Kesner*

NASA and its Michoud Assembly Facility were honored by the Louisiana State Legislature May 7 during NASA Louisiana Aerospace Day 2014 events at the Capitol in Baton Rouge.

Lawmakers and state officials met with Michael Kynard, deputy director of Michoud; astronaut

Dr. Jeanette Epps and other NASA officials. Proclamations in the House and Senate recognized the Michoud facility's critical role in future space exploration, in the nation's space history and in the state's economy and cultural life.

A number of NASA exhibits and activities inside the Capitol and on

*See Michoud Assembly Facility on page 2*

## NASA Student Launch Competition May 17; Watch Live on NASA TV and UStream

Students from more than 20 American colleges and universities will gather on Utah's Bonneville Salt Flats May 17 to launch rockets of their own design. Some will soar as high as 20,000 feet. All will carry sophisticated science and engineering experiments.

Their builders, participants in the 2013-14 NASA Student Launch competition, will be watching eagerly from the ground -- and NASA is encouraging their friends, classmates and rocketry



*Participants in a previous NASA Student Launch challenge watch their rocket take flight. (NASA/MSFC)*

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## Michoud Assembly Facility *Continued from page 1*

the Capitol lawn conveyed a vivid picture of work now underway on the Space Launch System (SLS) -- the most powerful rocket in history and the vehicle that will take astronauts to Mars; on science missions aboard the International Space Station; and on additive manufacturing and 3-D printing technologies helping develop aerospace technology faster and at lower costs.

“Together We Make Bold Things Happen” was the theme for NASA Louisiana Aerospace Day. Students from the Louisiana State University College of Engineering in Baton Rouge displayed some of the research they are conducting with NASA and the National Center for Advanced Manufacturing, which is located at Michoud.



*Trey Cate, Space Launch System (SLS) strategic communication lead, tells students visiting the Louisiana Capitol how the powerful rocket is designed to carry explorers on deep-space missions and eventually to Mars. During NASA Louisiana Aerospace Day events May 7, thousands of Louisiana students, tourists, legislators and officials visited exhibits about the work underway on SLS and at the Michoud Assembly Facility. (NASA/Michoud Assembly Facility/Eric Bordelon)*

## Student Launch *Continued from page 1*

enthusiasts worldwide to watch along with them.

The launch event, to begin at 8:30 a.m. MDT, will be broadcast live on [NASA Television](#) and [streamed live on UStream](#). Real-time [Twitter updates](#) also will be available. In the event of rain, rocket launches will be held May 18 at the same site and time.

A preliminary awards banquet will be held at 6:30 p.m. May 17 at the Salt Lake City Community College in Sandy, Utah. Twitter users can follow that event in



*Astronaut Jeanette Epps addresses the Louisiana House of Representatives -- a rare privilege that was part of NASA Louisiana Aerospace Day events in Baton Rouge on May 7. Proclamations were presented in the House and Senate honoring the many contributions of NASA and the Michoud Assembly Facility to the state's economy and educational system. (NASA/Michoud Assembly Facility/Eric Bordelon)*

“Our partners in the Legislature, industry and education have always been important to NASA and Michoud Assembly Facility,” Kynard said. “Today, the highly skilled workforce at Michoud is building the core stage of SLS -- America’s next great ship, the most powerful rocket in history.

“SLS is on schedule to carry astronauts deeper into space than ever before and eventually to Mars,” he said. “It was exciting to talk with lawmakers and officials about Louisiana’s role in space exploration, and how Michoud -- one of the world’s largest manufacturing facilities -- is also host to a number of government and high-tech commercial tenants.”

*Kesner, an ASRC Federal/Analytical Services employee, supports the Office of Strategic Analysis & Communications.*

real time as well, as student teams are honored with numerous awards for their rocket and payload designs and flight achievements.

The first-prize winner and “Rookie of the Year” will be announced in June after judges have thoroughly reviewed all reports and presentations associated with each team’s rocket. The NASA Student Launch competition is organized each year by NASA’s Marshall Space Flight Center and sponsored by ATK Aerospace Group of Magna, Utah.

# Inside the Flame Nebula

*From press release*

Stars are often born in clusters, in giant clouds of gas and dust. Astronomers have studied two star clusters using NASA's Chandra X-ray Observatory and infrared telescopes and the results show that the simplest ideas for the birth of these clusters cannot work.

A study of NGC 2024, found in the center of the so-called Flame Nebula about 1,400 light years from Earth, and the Orion Nebula Cluster, another region where many stars are forming, suggest that the stars on the outskirts of these clusters are older than those in the central regions. This is different from what the simplest idea of star formation predicts, where stars are born first in the center of a collapsing cloud of gas and dust when the density is large enough.

A research team from Penn State University, led by Konstantin Getman, developed a two-step process to make this discovery. First, they used Chandra data on the brightness of the stars in X-rays to determine their masses. Next, they found out how bright these stars were in infrared light using data from Spitzer, the 2MASS telescope, and the United Kingdom Infrared Telescope. By combining this information with theoretical models, the ages of the stars throughout the two clusters could be estimated.



*In this image, X-rays from Chandra are seen as purple, while infrared data from NASA's Spitzer Space Telescope are colored red, green and blue. (X-ray: NASA/CXC/PSU/K.Getman, E.Feigelson, M.Kuhn & the MYStIX team; Infrared:NASA/JPL-Caltech)*

According to the new results, the stars at the center of NGC 2024 were about 200,000 years old while those on the outskirts were about 1.5 million years in age. In Orion, the age spread went from 1.2 million years in the middle of the cluster to nearly 2 million years for the stars toward the edges.

Explanations for the new findings can be grouped

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# Marshall Built Adapter Arrives at Cape for Orion's First Flight Test

The port booster, stage adapter and the second stage of the Delta IV rocket -- which will take NASA's Orion spacecraft to space for its first flight test -- recently arrived by barge at Cape Canaveral, Florida, from United Launch Alliance in Decatur. The adapter, designed and built at NASA's Marshall Space Flight Center, will connect Orion to the Delta IV rocket. United Launch Alliance is constructing the Delta IV for that maiden flight. The hardware is now housed at the Horizontal Integration Facility at Space Launch Complex 37 on Cape Canaveral Air Force Station. The pieces are being processed and checked out prior to being moved to the nearby launch pad.

During the flight test, scheduled for December, Orion will travel to an altitude of approximately 3,600 miles above Earth's surface before re-entering the atmosphere traveling approximately 20,000 mph at temperatures above 4,000 degrees Fahrenheit. The uncrewed flight will provide engineers with important data about Orion's heat shield and other elements, including the



*adapter's performance before it is flown in 2017 as part of the first SLS mission. (NASA/KSC)*

# Mars Team Redstone Alliance for Cycling Hosts 13th Annual Directors Tour d’Arsenal May 20

On May 20, Mars Team Redstone Alliance for Cycling (MTRAC) will host the 13th annual Directors Tour d’Arsenal. The ride will be led by Steve Doering, director of the Office of Center Operations at NASA’s Marshall Space Flight Center. Maj. Gen. Lynn A. Collyar, commanding general of the U.S. Army Aviation & Missile Command, will join the ride as well.

Beginning at 5 p.m. at the Activities Building 4316 parking lot, riders will take an afternoon cycle on low-traffic roads at an easy pace through interesting and little-known areas of Redstone Arsenal. The ride follows the historical railroad route around the southern part of the arsenal making a loop along Dodd, Buxton and Patton roads, and featuring a trip through Army Test Area 1 and the NASA Test Area.

Last year marked the largest ever Tour d’Arsenal with nearly 250 riders, making it the largest free bike ride in North Alabama. The ride is mostly flat, approximately 18 miles long with 22-25 mile options. All adult, badged Marshall or Redstone

Arsenal personnel and escorted guests are welcome to participate.

All you need is a bicycle, helmet, water bottle and reflective vest per Army regulations. Riders can set their own pace for completing the route. Signs will be placed at intersections reminding riders of turns. A water jug will be placed at the halfway point and restrooms are available at the campground near the Tennessee River. Assistance will be available, if needed, for unforeseen difficulties.

Participants are also invited to a free pizza lunch (donations accepted), ride pre-registration and a welcome from Marshall Center Director Patrick Scheuermann, followed by the annual MTRAC meeting at 11 a.m. To RSVP for lunch, contact Scott Stevens at 256-961-1246 or [scott.stevens@nasa.gov](mailto:scott.stevens@nasa.gov).

## Flame Nebula *Continued from page 3*

into three broad categories. The first is that star formation is continuing to occur in the inner regions. This could have happened because the gas in the outer regions of a star-forming cloud is thinner and more diffuse than in the inner regions. Over time, if the density falls below a threshold value where it can no longer collapse to form stars, star formation will cease in the outer regions, whereas stars will continue to form in the inner regions, leading to a concentration of younger stars there.

Another suggestion is that old stars have had more time to drift away from the center of the cluster, or be kicked outward by interactions with other stars. Finally, the observations could be explained if young stars are formed in massive filaments of gas that fall toward the center of the cluster.

The combination of X-rays from Chandra and

infrared data is very powerful for studying populations of young stars in this way. With telescopes that detect visible light, many stars are obscured by dust and gas in these star-forming regions, as shown in this optical image of the region.

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

## Never Too Busy for SHE: Safety Stand-Down Day Activities Draw Hundreds of Marshall Team Members

While the Safety, Health and Environment, or SHE, Day activities began early on May 7 with a mile-long walk and 5-kilometer fun run, Marshall Space Flight Center organizers officially kicked off the event's day-long activities with a tree-planting ceremony outside Building 4316. Taking shovel to dirt are, from left, Steve Doering, director of Marshall's Office of Center Operations; Robin Henderson, Marshall's associate director; Ed Kiessling, manager of the center's Environmental Engineering & Occupational Health Office; Pete Allen, manager of the center's Safety & Quality Department; and Teresa Vanhooser, Marshall's deputy director. Dozens of vendors exhibited wares supporting the tenets of safety, health and the environment inside and outside the Activities Building throughout the day. (NASA/MSFC/Emmett Given)



Steve Cash, left, director of Marshall's Safety & Mission Assurance directorate, learns from David Lofts, of Past Glory Miniatures, about different ways to create art using recycled materials. Lofts uses recycled metal and handmade molds to create soldiers and field artillery models. To view a photo gallery of SHE Day activities, visit [here](#). (NASA/MSFC/Emmett Given)

## Marshall SLS, Engineering Programs Hold Town Hall on Rocket Progress

Space Launch System (SLS) chief engineer Garry Lyles, right, talks to the NASA Marshall Space Flight Center team about progress on the agency's new rocket at a town hall meeting May 5 in Activities Building 4316. The SLS will be used for deep space missions, including to an asteroid and ultimately to Mars. Presenting at the town hall are, from left, Preston Jones, deputy director of Marshall's Engineering Directorate; Todd May, manager of the SLS Program; and Bill Hill, NASA assistant deputy associate administrator for exploration systems. (NASA/MSFC)



## Marshall Center's ISERV Program Debuts New Images on NASA-TV

NASA unveiled a collection of new images of Earth taken for the ISERV program -- the International Space Station SERVIR Environmental Research and Visualization System managed at the Marshall Space Flight Center -- during the weekly Space Station Live program on NASA-TV. The ISERV camera, mounted on the International Space Station, takes hundreds of photographs each week to record the ever-changing landscape and environment of Earth.

ISERV is an offshoot of SERVIR -- an acronym meaning "to serve" in Spanish -- which works with officials in countries around the world using the unique vantage point of the orbiting station to create images that show the effects of natural

disasters or man-made development of the planet. The program scientists use these images, comparing them with previously acquired photographs, to help developing nations improve their environmental decision making by identifying major topographical changes, and also work with disaster responders to assist in recovery efforts by showing before and after images of the areas affected.

The [video of ISERV principal investigator Burgess Howell showing and explaining the importance of the new images](#) is available online at the [International Space Station playlist on the Marshall Center's YouTube channel](#).