

# NASA Day at State Capitol



(Top photo) Apollo 13 astronaut Fred Haise addresses members of the Mississippi House of Representatives during NASA Day at the State Capitol activities in Jackson on March 18. Haise is flanked by members of the Mississippi Gulf Coast delegation, as well as Stennis Space Center Director Rick Gilbrech (fourth from left) and NASA Shared Services Center Executive Director Mark Glorioso (sixth from left). During the day, Stennis officials displayed exhibits highlighting the 45th anniversary of the Apollo 13 mission and NASA's new Space Launch System, America's next giant leap in space exploration.

(Right photo) Sen. Philip Moran of Kiln (r) presents Apollo 13 astronaut Fred Haise with a framed copy of Senate Concurrent Resolution No. 616, which welcomed the former astronaut to his native state for NASA Day at the State Capitol activities. Haise is a native of Biloxi. Applauding Haise on the occasion are Stennis Space Center Director Rick Gilbrech (r) and NASA Shared Services Center Executive Director Mark Glorioso.



*“Rest assured that our team is poised to support both our center and the agency in ... an ever-changing business environment.”*

From the desk of

**Jim Bevis**

Chief Financial Officer, Stennis Office of the Chief Financial Officer



**G**reetings again from the budget and finance world! As usual, we are working several fiscal year budgets at once. We just completed the Stennis FY2015 Mid-Year Operating Plan update, reflecting our current performance through February with a forecast for the remainder of the fiscal year. Our agency leaders are currently testifying before Congress in support of the FY2016 budget, and the agency’s programming, planning, budgeting and execution process has begun for the preparation of the FY2017 budget, which goes to the Office of Management and Budget in early September.

Since my last article, a few key personnel changes have occurred in our organization. Patricia Fairley was selected as the deputy chief financial officer (CFO) for finance after Mary Whitehead’s retirement; she leads our financial management, internal controls, reimbursable and audit activities. Deborah Norton has returned from her special assignment to her position as deputy CFO for resources, leading our budget formulation and implementation activities. A longtime employee, Wendall Pigott, recently retired, and Joseph Ladner has been selected as team lead for the Institutional Support Branch.

During the past year, we also awarded the Financial, Resources, Program, Planning and Control (FRPPC) support contract, which consolidated support activities previously performed by three different contractors for our Resources and Finance Divisions. Additionally, we incorporated new requirements to

support the Engineering and Test Directorate’s Project Planning and Control Branch. The new contract will facilitate greater synergy and flexibility to support changing center requirements. We are also supporting the center’s major procurement activities under way, including the Synergy Achieving Center Operation and Maintenance Contract, as well as information technology services and lab services contracts.

With increasing demands for limited budgets, the agency has decided to conduct in-depth analyses of major support functions performed across all centers and Headquarters. The Business Service Assessment initiative was established to identify best practices, cost efficiencies and areas for consolidation. Information technology is the first area of emphasis, and this review is currently under way. Initial findings will be presented to agency leadership in late March or early April. The next areas of emphasis are procurement, human capital, resources and facilities. Separate teams will be established for each, and studies will be initiated sequentially over the remainder of the fiscal year.

As you all know, we now live in a world where “change is our only constant,” and our organization is no exception. Rest assured that our team is poised to support both our center and the agency in meeting the needs of future rocket engine testing and an ever-evolving business environment.

*Jim Bevis*

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## FULFILLING NASA'S EXPLORATION MISSION

# Countdown to RS-25 engine testing under way on A-1 Test Stand

NASA operators on the A-1 Test Stand at Stennis Space Center are counting down to the next test of the RS-25 rocket engine – not so much in terms of hours and minutes as usually seen during a rocket launch but moreso in items to be completed.

Work at A-1 is under way on several fronts related to test preparation and maintenance as NASA moves toward an April test of the rocket engine that will provide core-stage power to its new Space Launch System (SLS).

“We go through a number of steps for every engine test, including some of the same procedures used for an actual launch,” A-1 Test Stand Director Jeff Henderson explained. “In addition, we’re preparing to test engine and performance profiles that have never been run.”

The RS-25 engine is a modified space shuttle main engine, one of the most sophisticated

engines ever developed. Following completion of the Space Shuttle Program, NASA made changes to the remaining space shuttle main engines in order to generate additional thrust. The modified engines also must withstand colder liquid oxygen and engine compartment temperatures, higher propellant pressure and greater exhaust nozzle heating.

The engine also operates with a redesigned controller or “brain.” The engine controller unit allows communication between the space vehicle and the engine, relaying commands to the engine and transmitting data back to the vehicle. It also allows for engine management by regulating the thrust and fuel mixture ratio and monitoring engine health and status.

Performance of the controller is the primary focus of the seven-test series to begin in April. To test the full range of the controller, the upcoming tests will feature several special firing profiles.

Blake Ford (right photo), a Lockheed Martin employee at Stennis Space Center, works on the engine deck hydraulic panel on the A-1 Test Stand in early March. Ford and other Stennis employees are completing maintenance work on the stand and preparing it to resume testing of RS-25 rocket engines in April. An initial RS-25 engine test was successfully conducted earlier in the year. Testing then was suspended to allow upgrade work on the Stennis high-pressure industrial water system (left photo), which supplies thousands of gallons of water needed to conduct engine tests. RS-25 engines tested at Stennis will power the core stage of NASA's new Space Launch System.



“The firing profile for an actual launch is pretty straightforward; you change power level two times,” Henderson noted. “For the stand tests, the profiles are very, very complex. We’ll run the engine through a whole range of levels. It’s a very challenging test series.”

NASA conducted an initial test of the RS-25 engine Jan. 9, collecting critical data during a successful 500-second firing. Follow-up tests were put on hold as work proceeded on the high-pressure industrial water system that services the Stennis test stands, including A-1. The original 50-year-old water system is being replaced throughout the Stennis test complex to provide the stands with the tens of thousands of gallons of water needed to test an engine.

However, even though test operations are temporarily on hold at the A-1 stand, considerable work is progressing. Operators are completing normal test turnaround items, such as checking

system readiness, loading propellants, optimizing test profiles and completing pretest planning and programming. They also are preparing the stand to meet specific test requirements, which involves implementing changes in various stand systems and capabilities.

In addition to test-specific work, operators are engaged in activities to support the high-pressure water system work under way, including the realignment and checkout of stand systems once water service is restored.

Various maintenance and modification work is being completed as well, including such items as repair of the liquid oxygen run line insulation, replacement of stand filters, calibration of the thrust measurement system, evaluation of load frame welds and reconfiguration of video systems power supplies.

Completion of each item upgrades the condition

of the stand or represents another step toward resumption of engine testing, which is critical as NASA continues preparations to return to deep-space missions. The SLS is being developed as the most powerful launch vehicle in the world, with more than twice the payload mass of the space shuttle and with the ability to carry humans deeper into space than ever before.

The SLS core stage will be powered by four RS-25 engines, firing simultaneously to provide more than 2 million pounds of launch thrust for the vehicle. In addition to testing individual RS-25 engines that will be used for SLS flights, Stennis also is preparing its B-2 Test Stand to test the SLS core stage. Those tests will involve mounting a flight core stage on the stand and firing its four RS-25 engines simultaneously, just as during an actual flight.

For more about NASA's SLS Program, visit: <http://www.nasa.gov/exploration/systems/sls/>.



## FULFILLING NASA'S EXPLORATION MISSION

## NASA in the News

### SLS booster passes major ground test

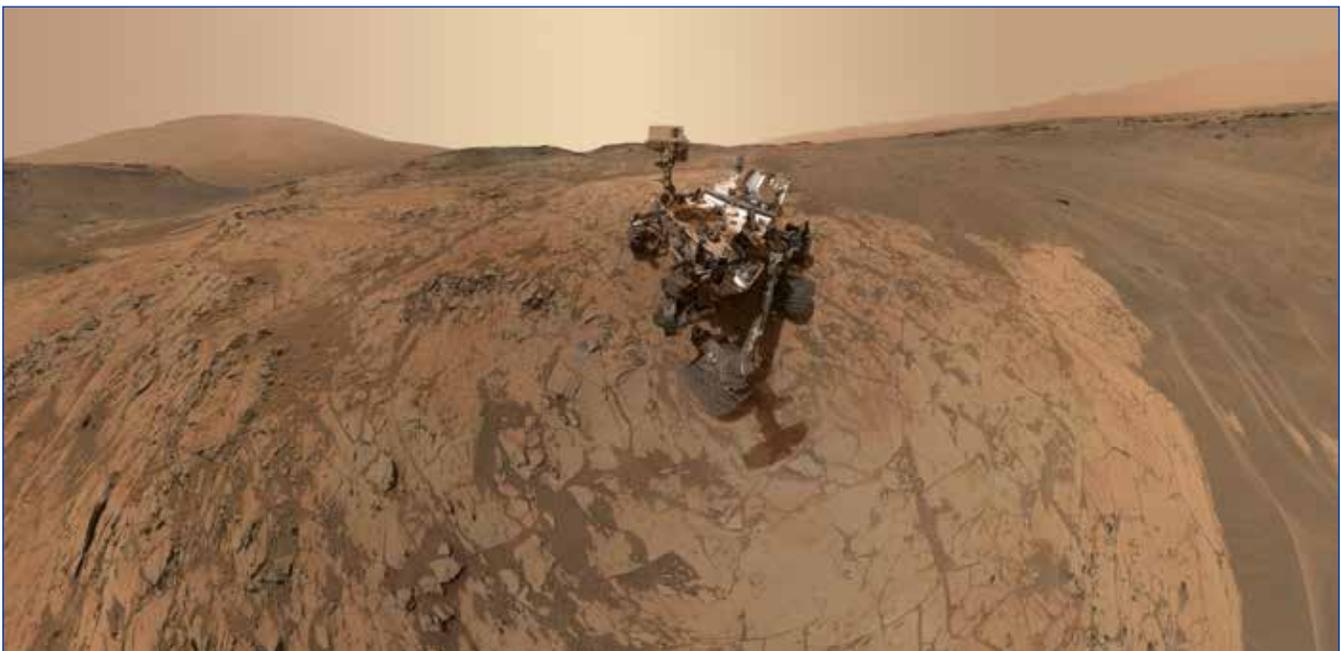
The largest, most powerful rocket booster ever built successfully fired up March 11 for a major-milestone ground test in preparation for future missions to help propel NASA's Space Launch System (SLS) rocket and Orion spacecraft to deep-space destinations, including an asteroid and Mars. The booster fired for two minutes, the same amount of time it will fire when it lifts the SLS off the launch pad, and produced about 3.6 million pounds of thrust. The test was conducted at the Promontory, Utah, test facility of commercial partner Orbital ATK, and is one of two tests planned to qualify the booster for flight. Once qualified, the flight booster hardware will be ready for shipment to NASA's Kennedy Space Center in Florida for the first SLS flight. When completed, two five-segment boosters and four RS-25 main engines will power the SLS on deep-space missions. The 177-foot-long solid rocket boosters operate in parallel with the main engines for the first two minutes of flight. For more information on SLS, visit: <http://www.nasa.gov/sls>.

### Research: Mars once had ocean of water

A primitive ocean on Mars held more water than Earth's Arctic Ocean, according to NASA scientists who, using ground-based observatories, measured water signatures in the Red Planet's atmosphere. Scientists have been searching for answers to why this vast water supply left the surface. Details of the observations and computations appear in the March 5 edition of Science magazine. Perhaps about 4.3 billion years ago, Mars would have had enough water to cover its entire surface in a liquid layer about 450 feet deep. More likely, the water would have formed an ocean occupying almost half of Mars' northern hemisphere. The estimate is based on detailed observations made at the European Southern Observatory's Very Large Telescope in Chile, and the W.M. Keck Observatory and NASA Infrared Telescope Facility in Hawaii. To view a video of this finding, visit online at: <http://youtu.be/WH8kHncLZwM>. For more on NASA's Mars programs, visit: <http://www.nasa.gov/mars>.

*For NASA news releases, visit: [www.nasa.gov/news/releases/latest/index.html](http://www.nasa.gov/news/releases/latest/index.html).*

## Curiosity takes wide view in latest 'self-portrait'



This self-portrait of NASA's Curiosity Mars rover shows the vehicle at the "Mojave" site, where its drill collected the mission's second taste of Mount Sharp. The scene combines dozens of images taken during January 2015 by the Mars Hand Lens Imager (MAHLI) camera at the end of the rover's robotic arm. The pale "Pahrump Hills" outcrop surrounds the rover, and the upper portion of Mount Sharp is visible on the horizon. Darker ground at upper right and lower left holds ripples of wind-blown sand and dust. The view does not include the rover's robotic arm. Wrist motions and turret rotations

on the arm allowed MAHLI to acquire the mosaic's component images. The arm was positioned out of the shot in the images, or portions of images, that were used in this mosaic. Curiosity used its drill to collect a sample of rock powder from this site on Jan. 31, 2015. The full-depth, sample-collection hole and the shallower preparation test hole beside it are visible in front of the rover in this self-portrait. For scale, the rover's wheels are 20 inches in diameter and about 16 inches wide. More information about Curiosity is online at <http://www.nasa.gov/msl> and <http://mars.jpl.nasa.gov/msl/>.

# Stennis recognized for recycling program

The Mississippi Recycling Coalition (MRC) has recognized Stennis Space Center with an “Environmental Hero” award for its recycling efforts.

Stennis representatives traveled to Jackson on March 4 to receive MRC’s 2014 Environmental Hero Award as the Recycler of the Year for state and federal government agencies and facilities in the state of Mississippi. The presentation was part of annual Recycling Awareness Day activities at the state Capitol.

“I am very proud about this recognition of Stennis’ recycling efforts,” said Dave Lorange, NASA environmental officer at Stennis. “These activities divert waste from our landfills and prevents pollution. It’s an important part of protecting our Earth and its resources for those who come after us. There’s a widely used quote in our work that says it well: We do not inherit the Earth from our ancestors; we borrow it from our children.”

Stennis recycling activities include a range of materials, including scrap metal, mixed paper, cardboard, batteries, used oil, toner cartridges, fluorescent and high-intensity discharge lamps, chlorofluorocarbon (CFC) refrigerants, aluminum cans/plastic bottles, activated carbon, used wood



Stennis Space Center representatives receive the Mississippi Recycling Coalition’s 2014 Environmental Hero Award as the Recycler of the Year for state and federal government agencies and facilities in Mississippi. Participating in the award ceremony were (l to r): MRC President Sarah Kountouris; state Rep. Patricia H. Willis of Bay St. Louis; Ed Renz with the Jacobs Technology Facility Operating Services Contract Group at Stennis; Stennis Environmental and Hygiene Office lead Jenette Gordon; Stennis Environmental Officer Dave Lorange; and state Rep. Timmy Ladner of Poplarville.

and pallets, concrete, vegetation, oily/solvent rags, ballasts and antifreeze.

The numbers associated with the program are significant. Last year, the center recycled almost 425,000 pounds of mixed, corrugated and shredded paper, more than 850,000 pounds of various metals (including iron, aluminum, stainless steel and copper) and 1.6 million pounds of wood waste. The center also recycled more than 22,000 pounds of plastic, glass and motor oil materials.

Official development and implementation of the Stennis recycling

program are the responsibility of the NASA Environmental Officer, in conjunction with the Jacobs Technology Facility Operating Services Contract Group. Under the program, personnel assigned to shops and activities that generate significant quantities of waste are trained in procedures for segregating and labeling waste, and coordinating collection. Stennis federal city residents are actively engaged in the recycling efforts, all designed to promote the longevity of the onsite landfill and to meet federal mandates for pollution prevention.

“Stennis Space Center has made a strong commitment to making recycling an important part of the activities, the work and the culture at your facility in Hancock County,” said Mark Williams, administrator of solid waste and recycling programs for the Mississippi Department of Environmental Quality. “MRC was impressed by the facility’s commitment to work towards reducing the waste that you send to landfills and, instead, to find opportunities to turn those wastes back into products.”

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– Dave Lorange

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# NASA honors Stennis employees

Several Stennis Space Center employees were recognized for contributions to flight safety with NASA Space Flight Awareness (SFA) awards during a March 10 ceremony in Ogden, Utah. The ceremony was held in conjunction with the March 11 test of Qualification Motor-1, the rocket booster being developed for use on NASA's new Space Launch System. Awards were presented by NASA Deputy Associate Administrator for Exploration Systems Development Bill Hill, Stennis Deputy Director Jerry Cook and astronaut Jim Kelly (center). Award recipients included (l to r): Richard Wear (NASA), Haley Quinn (Lockheed Martin Test Operations Contract Group), Kanokwan "Dao" Kooamphorn (NASA), George Taylor (Aerojet Rocketdyne), Bridget Moody (Jacobs Facility Operating Services Contract Group), and Jeanette Richard (A<sup>2</sup>Research). Chris Copelan (NASA), Travis Kennedy (Lockheed Martin Test Operations Contract Group) and Joel Lee (Aerojet Rocketdyne) also received SFA recognition but were unable to attend the March 10 ceremony.



## NASA exhibits personnel tour facilities

A group of NASA exhibits personnel toured Stennis facilities March 10, as part of their scheduled meetings at INFINITY Science Center. In addition to the Aerojet Rocketdyne engine assembly facility and NASA Shared Services Center, the group visited the A-1 Test Stand, which is testing RS-25 engines for use on NASA's new Space Launch System.

## Leadership class members visit Stennis

Members of the Hancock County Leadership Class toured Stennis facilities, including the A-1 Test Stand, during a site visit Feb. 25. During the day, class members also received briefings on work from NASA officials, as well as leaders of the Naval Meteorology & Oceanography Command and the NASA Shared Services Center. The group also visited the Aerojet Rocketdyne engine assembly facility and INFINITY Science Center.



# New rocket engine test site sparks interest

*Note: For more than 50 years, NASA's John C. Stennis Space Center has played a pivotal role in the success of the nation's space program. This month's Lagniappe provides a glimpse into the history of the south Mississippi rocket engine test center.*

Before former Stennis Space Center Director Jerry Hlass was approved by the U.S. Postal Service in 1983 to use "NSTL, Mississippi 39529" as the official mailing address, space enthusiasts all over the world managed to have letters delivered to the then-Mississippi Test Operations (MTO) some 18 years earlier.

In 1965, the aficionados shared a common interest to learn more about NASA's new static-test facility in Hancock County, Mississippi, that would test engines to carry humans to the moon. Different mailing addresses were used to reach MTO, but the correspondence from The Netherlands topped the list with this address to: Mississippi Test Operations, "East of the Pearl River and Forty Miles from Michoud, Louisiana, U.S.A." Most letters were sent to Bay St. Louis, while others were addressed to Gainesville, which no longer had a post office, and Logtown's residents had been relocated.

Inquirers from as far away as Latin America had an interest in America's lunar landing program. Twenty-one University of Southern Mississippi students from six Latin American countries were briefed on develop-

Latin American students from the University of Southern Mississippi in Hattiesburg, look on as MTO staffer Joel T. Meriwether demonstrates an Apollo's Saturn model. Pictured are (l to r): Esther Valladares, Orlando Varela, Mary Lee Bridge, Meriwether and Marina Valladares. The students, all from El Salvador, were among early school-group visitors to the new rocket engine test site.



A 1965 photo shows construction of the dual-position S-IC test stand at MTO.

ments and witnessed the rise of the new space age era in Mississippi.

Continued growth in employment was on the rise 50 years ago this month. For the first time since construction began at MTO in 1963, employees associated with the facility surpassed the 3,000 mark. The population report for the week of March 15, 1965, showed 3,006 employees were engaged in work associated with establishment of the facility, an increase of 365 from the previous week's report.

A breakdown of employment

showed NASA with 46 employees; General Electric Co. with 412; G.E. subcontractors with 178; U.S. Army Corps of Engineers with 164; the Corps Land Acquisition Office in Bay St. Louis with eight; the U.S. Weather Bureau with nine; Hancock County Security Patrol with nine; The Boeing Co. with seven; North American Aviation Inc. with 78; and construction and installation workers totaling 2,095.

With construction workers dominating the workforce jobs, more would be added to the payroll after the Corps of Engineers announced a \$4.8 million contract in March 1965 to Blount Brothers Corp. in Montgomery, Ala., for the construction of the second test position in the dual-position S-IC test stand (now known as the B-1/B-2 Test Stand). Some of the work included construction of a structural steel tower 106 feet high on an existing concrete pier, a flame deflector, a stand platform, piping systems and utilities.

The Corps of Engineers, Mobile District, served as the construction agent for NASA.



## Office of Diversity and Equal Opportunity

# Celebrate Women's History Month in March

Change really can be good sometimes. Do you remember when young ladies had to wear dresses to school? It was basically unacceptable for ladies to be seen in slacks at school, work, church or any business setting. There was one lady that didn't agree with such requirements and fought to change it for women everywhere.

Kindergarten teacher Helen Hulick made Los Angeles court history and struck a blow for women's fashion in 1938. Hulick arrived in downtown L.A. court to testify against two burglary suspects. But the courtroom drama immediately shifted to the slacks she was wearing. Judge Arthur S. Guerin rescheduled her testimony and ordered her to wear a dress next time.

Hulick was quoted in the Nov. 10, 1938, Los Angeles Times saying, "You tell the judge I will stand on my rights. If he orders me to change into a dress I won't do it. I like slacks. They're comfortable." She returned to court five days later in slacks, infuriating the judge. The Times reported: "In a scathing denunciation of slacks which he prosaically termed pants as courtroom attire for women, Guerin yesterday again forbade Helen Hulick, 28, kindergarten teacher, to testify as a witness while dressed in a green and orange leisure attire.

"The last time you were in this court dressed as you are now and reclining on your neck on the back of your chair, you drew more attention from spectators, prisoners and court attaches than the legal business at hand," the judge said. "You were requested to return in garb acceptable to courtroom procedure.

"Today you come back dressed in pants and openly defying the court and its duties to conduct judicial proceedings in an orderly manner. It's time a decision was reached on this matter and on the power the court has to

maintain what it considers orderly conduct.

"The court hereby orders and directs you to return tomorrow in accepted dress. If you insist on wearing slacks again you will be prevented from testifying because that would hinder the administration of justice. But be prepared to be punished according to law for contempt of court."

Slack-shrouded Hulick was accompanied by attorney William Katz, who carried four heavy volumes of citations relative to his client's right to appear in court in whatever dress she chose. "Listen," said the young woman, "I've

worn slacks since I was 15. I don't own a dress except a formal. I'll come back in slacks and if he puts me in jail I hope it will help to free women forever of anti-slackism."

The next day, Hulick showed up in slacks. Judge Guerin held her in contempt. She was given a five-day sentence and sent to jail. "After being divested of her favorite garment by

a jail matron and attired in a prison denim dress, Miss Hulick was released on her own recognizance after her attorney obtained a writ of habeas corpus and declared he would carry the matter to the Appellate Court," The Times reported.

Hundreds sent letters of protest to the courthouse. Guerin's contempt citation was overturned by the Appellate Division during a habeas corpus hearing. Hulick was free to wear slacks to court. A couple of months later, Hulick came back to court. Her point made, this time she wore a dress.

Join in observing Women's History Month to help celebrate both past and present progress women have made. The Stennis Diversity Council has provided displays in various locations throughout the Roy S. Estess Building for your viewing pleasure.



## Did you know?

**A total of 1,766 women work for companies housed at Stennis Space Center. They serve in a variety of roles, ranging from secretaries to senior scientists, from custodians to comptrollers.**

## NASA teams with school in national competition

Building on support from NASA personnel at Stennis Space Center, Nicholson Elementary School in Picayune is competing for national honors in the 2015 Samsung Solve for Tomorrow contest.

The school presented its project, a robot that can be inserted into city drain lines to investigate clogging issues, to a panel of judges at the Intrepid Sea, Air and Space Museum in New York on March 18. Five national winners will be selected from the 15 finalists by the end of the month.

“This is a great example of NASA partnering with area schools to promote STEM (science, technology, engineering and mathematics) studies,” said Katrina Emery, director of the NASA Education Office at Stennis. “This kind of effort is critical to educating and empowering the scientific and engineering leaders of tomorrow. Regardless of the outcome of the national contest, these students already have won because they have laid the groundwork for their futures.”

The Samsung Solve for Tomorrow project was begun in 2010 to spur interests in STEM studies. It is open each year to students in grades 6-12 in publicly financed schools. Nicholson’s involvement was sparked by sixth-grade teacher Maureen Pollitz, who wrote a lesson plan for her students to analyze the engineering design process and apply it to a real-life problem.

The plan was accepted for the contest, and the Nicholson students partnered with Stennis educators to explore the steps of the engineering process. They then met with Picayune officials to explore how the steps – Ask, Imagine, Plan, Create, Experiment and Improve – might be applied to the real-life problem of clogged drainage lines.

Teaming with a Pearl River County high school robotics team, also supported by NASA, the students designed and built a prototype that could travel through drain lines and send back images. A video created for the national

contest outlines the steps followed by the students and shows the robot in action.

The Nicholson video may be accessed online at: [www.samsung.com/us/solvefortomorrow/contest](http://www.samsung.com/us/solvefortomorrow/contest).

Nicholson students first competed at the state level, gaining top honors to win \$20,000 worth of Samsung technology, including a laptop and video camera. Using the camera and computer, students produced the posted video for the national competition. If the school wins at that level, it will receive \$120,000 in Samsung technology and perhaps additional prizes from partner organizations.

Pollitz traveled with a Nicholson student and a member of the Pearl River County robotics team to New York for the project presentation. Later in the month, five Solve for Tomorrow competition winners will be announced, three chosen by a panel of judges, one by Samsung employees and one through online voting. Individuals viewing the Nicholson video may cast a vote for the project online.

The Nicholson project is just the latest in a line of Picayune

school partnerships with NASA. The Pearl River County robotics team was launched with Stennis support several years ago and has grown into a high-performing team that has won numerous *FIRST*<sup>®</sup> (For Inspiration and Recognition of Science and Technology) Robotics Competition awards. Based on that success, a *FIRST*<sup>®</sup> *LEGO*<sup>®</sup> League team was begun at Nicholson Elementary school. Nicholson also sponsors a SeaPerch underwater robotics team, participated in NASA Summer of Innovation events and has conducted NASA summer camps for several years.

Pollitz has been involved with the various partnership efforts, serving as coach of the Pearl River County robotics team and attending NASA professional development workshops to gain expertise on using agency materials in the classroom.

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