Marshall Star, May 30, 2012 Edition

MARSHALL STAR

In This Week's Star ⊟ (Click to Expand)

Marshall Center Concludes Wind Tunnel Testing to Aid in SpaceX Reusable Launch System Design

The Marshall Space Flight Center completed wind tunnel testing for Space Exploration Technologies (SpaceX) of Hawthorn, Calif., to provide Falcon 9 first stage re-entry data for the company's advanced reusable launch vehicle system.

Image right: The first stage of the SpaceX Falcon 9 rocket is in the foreground, the second stage (background). The Falcon 9 rocket is responsible for launching the Dragon spacecraft. (NASA/Jim Grossmann)

Under a Reimbursable Space Act Agreement, Marshall conducted 176 runs in the wind tunnel test facility on the Falcon 9 first stage to provide SpaceX with test data that will be used to develop a re-entry database for the recovery of the Falcon 9 first stage. Tests were conducted at several orientations and speeds ranging from Mach numbers 0.3, or 228 miles per hour at sea level, to Mach 5, or 3,811 miles per hour at sea level, to gage how the first stage

reacts during the descent phase of flight.

"Marshall's aerodynamics team has vast experience in launch vehicle design and development and our wind tunnel offers an affordable, quick-turn solution to companies who are looking to generate aerodynamic test data on early launch vehicle design configurations," said Teresa Vanhooser, manager of the Flight Programs and Partnerships Office at Marshall. "We believe that providing technical expertise enables development of new and innovative technologies that aid the industry as a whole and helps NASA to continue with our deep space exploration mission."

Marshall's Aerodynamic Research Facility's 14-square-inch trisonic wind tunnel is an intermittent, blow-down tunnel that operates from high-pressure storage to either vacuum or atmospheric exhaust. The facility is capable of conducting tests in the subsonic, transonic, and supersonic mach ranges using its two interchangeable test sections. Subsonic Mach numbers are below Mach 1, the speed of sound, or 760 miles per hour at sea level, while transonic speeds approach and are slightly above Mach 1. The facility can achieve a maximum supersonic Mach number of 5, or five times the speed of sound.

In addition to wind tunnel testing, Marshall is providing propulsion engineering support to SpaceX in the development of the SuperDraco Launch Abort System (LAS) and on-orbit propulsion systems. Marshall is supplying SpaceX with Reaction Control Systems lessons learned that will be incorporated into the Dragon spacecraft's design for steering and attitude control. Marshall engineers also are providing technical insight in the development of materials and processes to support future improvements of the Falcon 9 and Dragon to be used in the SpaceX Commercial Crew Development Program.

"Since 2007, Marshall has supported the Commercial Orbital Transportation Services (COTS) Program by providing engineering expertise and technical insight to aid our commercial partners in developing their transportation capabilities," stated Vanhooser. "The Marshall Center has over 50 years of spaceflight experience and propulsion expertise to draw upon to help our commercial partners solve the complex challenges of space travel."

Marshall has been engaged throughout the development in evaluating the Falcon 9 launch vehicle and Dragon spacecraft systems' design under the Commercial Orbital Transportation Services Program led by the Johnson Space Center for the Human Exploration and Operations Mission Directorate (HEOMD) in Washington. The Marshall team supported various design reviews, flight readiness reviews, post-flight reviews and special studies.

The Marshall Center also provides SpaceX technical support as requested under the Commercial Crew Program (CCP) led by the Kennedy Space Center for HEOMD. Engineers from the Marshall Center have been engaged with SpaceX by serving as the CCP launch vehicle systems lead and by providing discipline support to the partner integration teams.

For more information on COTS, visit:

http://www.nasa.gov/cots

For more information on CCP, visit:

http://www.nasa.gov/commercialcrew

For more information on SpaceX or the Dragon spacecraft, visit:

http://www.spacex.com

› Back to Top

J-2X Engine Continues to Set Standards

Testing of the next-generation J-2X rocket engine continues to set standards. Last fall, the engine attained 100 percent power in just its fourth test and became the fastest U.S. rocket engine to achieve a full-flight duration test, hitting that 500-second mark in its eighth test. On May 25, NASA recorded another first during a 40-second test of the engine on the A-2 Test Stand at the Stennis Space Center. For the first time, test conductors fired the J-2X in both the secondary and primary modes of operation, 20 seconds in each. Previous tests were run in one mode only. Combining the two allowed operators to collect critical data on engine performance.

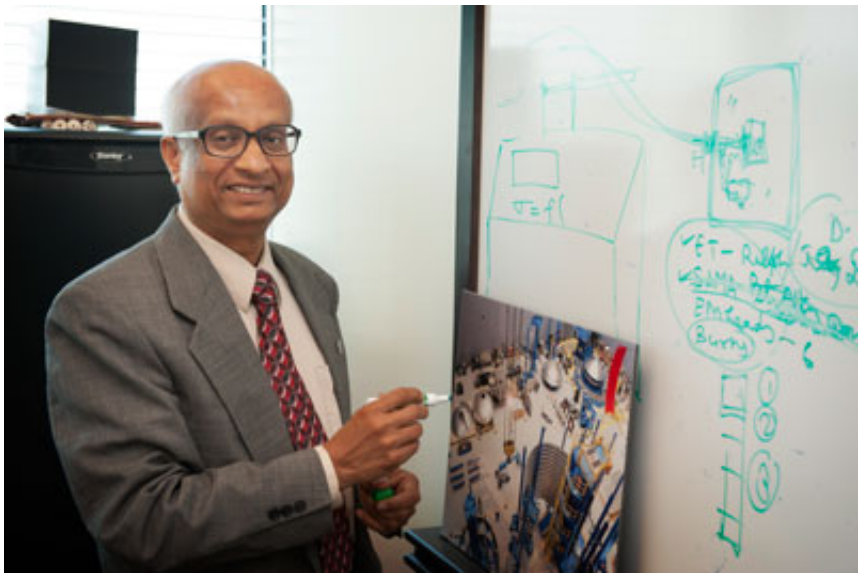
The data will be used in continued development of the engine, which is being built to help carry humans deeper into space than ever before. The space agency conducted an initial round of sea-level tests on the engine last year, then removed it from the Stennis test stand to prepare both the stand and engine for the second round of testing at simulated altitudes up to 50,000 feet. Such testing is critical to characterize nozzle and system performance at elevated altitude and to demonstrate engine operation across its throttle range.

The J-2X engine is the first human-rated liquid oxygen and liquid hydrogen rocket engine to be developed in four decades. It will power the upper stage of NASA's Space Launch System, an advanced heavy-lift rocket that will provide an entirely new national capability for human exploration beyond Earth's orbit. Pratt & Whitney Rocketdyne is developing the J-2X engine for the Marshall Space Flight Center. (NASA/SSC)

› Back to Top

The Face Of Mission Success at Marshall Is: Suren Singhal
Deputy Manager of the Materials and Processes Laboratory

Image right: Suren Singhal
(NASA/MSFC/Fred Deaton)



- **Organization:** Engineering Directorate
- **Years at Marshall:** 9 years
- **Education:** Bachelor's degree in mechanical engineering, Indian Institute of Technology, Kanpur, India, 1973; master's degree in fluid, thermal and aerospace science, Case Western Reserve University, Cleveland, Ohio, 1975; master's degree in quantitative management sciences, University of Houston, Texas, 1976; master's degree and doctorate in engineering mechanics, University of Wisconsin, Madison, 1978 and 1980.

- **Responsibilities:** I support the manager of the Materials and Processes Laboratory in all aspects of leading the laboratory; in understanding what our customer needs, and delivering safe and reliable products to them within budget and schedule; in interacting effectively with all stakeholders; and in providing a full spectrum of support to all our people to help them accomplish their jobs and career aspirations. This includes facilitating new opportunities, innovations and collaborations; providing needed resources; mentoring; helping them safely accomplish their jobs; and keeping them enthusiastic and optimistic about the future. Our teams are innovating new materials and manufacturing technologies such as lightweight alloys and friction stir welding. We are creating a new future forged on budgetary and schedule efficiencies and addressing strategic future customer needs such as those of our commercial cargo and crew partners.
- **How does your work at Marshall support the agency's goals?** The laboratory supports the agency goal for the development of NASA's new heavy-lift vehicle, the Space Launch System, by providing affordable and timely expertise in materials selection and characterization, manufacturing technologies for all SLS elements and for Orion as needed. We support the broader agency goal to prepare to go beyond low-Earth orbit by developing technologies such as nuclear cryogenic propulsion. We support the goal for safe operation of the International Space Station by providing materials assessment for the station structure and for systems onboard that must operate in the aggressive space environment. We conduct experiments on new materials for future spacecraft applications onboard the space station, and we are looking at conducting proof-of-concept on manufacturing spare parts in space. We support our commercial partners, with equal access to all, by lending our specialized unique materials and manufacturing expertise and experience, such as failure analysis and friction stir welding, when asked. Our scientists support the agency's mission to advance our understanding of the universe by understanding in-situ resource utilization.
- **What piece of advice would you pass on to the next generation?** About 400 years ago, America was built by hard-working immigrants with innovative thinking. They did not let anyone or anything get in their way. Today's America is a land of opportunities for anyone who is willing to work hard. For the next generation, I pass on a challenge to do what will make Americans 400 years from now proud of what you did today. Specifically, be inquisitive. There is so much to learn and so much to discover. Learn mathematics, not just for the sake of it, but to learn how it explains the real world. And you shall make a good life for yourself while contributing to the greater goodness for the humanity.
- **Have you found any unique, cost-saving or collaborative processes or innovations in the last year?** In collaboration with the SLS Program Office, we have demonstrated proof-of-concept to build cost-effective engine parts using additive manufacturing, which is the process of making solid objects from a digital file while using a layering process. We are working with commercial partners to develop advanced manufacturing technologies -- prior to building flight hardware -- with significant cost savings potential for the SLS Program.
- **Safety remains Job One for NASA; how do you strive to live by that code?** Our goal is an incident- and injury-free workplace, i.e., not a single incidence and not one person gets hurt. We diligently and persistently communicate with our employees and practice each day to continue building a community committed to safety. We take on-the-spot actions when we see an unsafe condition or an unsafe act.
- **What do you hope to accomplish in your role this year?** To provide the needed materials and manufacturing support and leadership, resources and answers up and down the line for Marshall to safely and affordably deliver, within schedule, on all big and small programmatic and project commitments to the agency and all external stakeholders including commercial partners. I also aim to create and sustain a culture of transparent inclusion, effective communication, meaningful innovation, relevant collaboration and an environment in which all employees can grow to their highest potential and feel professionally fulfilled.
- **What is the biggest challenge you face?** To sustain core skills and facilities so we can deliver on all programmatic commitments, all of which we may not even be aware of today, while mothballing facilities that are crucial for our future but not needed currently. We are committed to parting with facilities that are not part of our present or future, and right-sizing institutional spending while keeping a high morale and growth prospective of our most important asset at Marshall -- our people. It is imperative that we succeed in developing a safe, affordable SLS vehicle for flight -- on schedule and within allotted budget. It is critical that we continue safe operation of the space station for its planned duration and use it as a national laboratory for science. We do all that we can to make all our commercial partners succeed in cargo and crew transport to the station and beyond.
- **Do you partner outside your org/outside Marshall on your work? What, in your mind, exemplifies Marshall's value as a business partner?** We have significant partnerships in multiple materials and manufacturing areas to

develop new technologies, to leverage our unique SLS vehicle and space transportation experience such as in failure analysis and advanced manufacturing, and to work together leveraging each other's complementary skills and facilities for a safe and affordable future in space exploration with industry, academia, other government institutions, professional societies and communities at large. Marshall's value as a business partner -- from the Materials and Processing Laboratory's perspective -- could not be exemplified better than our recent Space Act Agreements with multiple commercial partners. When they needed the experience and expertise that only we could offer, we provided equal access to all in an affordable and timely manner, as evidenced by positive feedback from our commercial partners.

To learn more about Singhal, visit http://www.youtube.com/watch?v=L8mpKnCm1JM.

› Back to Top

Marshall's Josh Whitehead Blazes to 26th Place in Boston Marathon; Encourages Workforce to Use Wellness Center to Meet Fitness Goals

By Jessica Eagan

When the gun went off at the start line last month and his feet hit the pavement, the Marshall Space Flight Center's Josh Whitehead would never have guessed that in a few hours, he'd finish 26th overall in the 2012 Boston Marathon.

Image left: And he's off! Josh Whitehead, an engineer for Jacobs Engineering Group, supporting Marshall's Systems Test and Verification Branch in the Engineering Directorate, runs to the 26th spot in the 2012 Boston Marathon last month out of 24,000 participants. (Photo courtesy)

Whitehead -- an engineer for Jacobs Engineering Group, supporting the Systems Test and Verification Branch in the Engineering Directorate -- not only dominated the 26.2-mile race at 2 hours, 31 minutes and 16 seconds, but he represented the United States in 14th place.

Five years ago, if you'd told Whitehead this is what he was to accomplish, he probably wouldn't have believed it.

Having competed as a cyclist beginning in junior high school, he switched to running in late 2007. His first race was the Liz Hurley Ribbon Run, which takes places every October in downtown Huntsville. He participated in honor of his mother, who had been diagnosed with breast cancer. The 5K run, established by Huntsville TV news anchor Liz Hurley after she was diagnosed and successfully treated for breast cancer, raises money for breast cancer equipment for Huntsville Hospital.

"My wife dared me to sign up," said Whitehead. "What's 3.1 miles? I can do it. I train on bicycle rides 75 miles long many weekends, so how hard could it be to run a 5K? It was pretty tough. I was so sore after the race, I had trouble walking up and down steps for a solid week. It was terrible."

But after that race, Whitehead became focused on running. He started off small -- jogging for as little as 10 minutes -- and worked his way up to more than 100 miles a week, half-marathons and marathons.

While training for the Boston Marathon, he would run twice on weekdays, and once on Saturdays and Sundays, averaging 120 miles a week. Five months later, he'd find himself surrounded by 24,000 others with the same passion.

"This marathon is the only one I've run in which I've felt that if they were offering buses back to the start line to run it a second time, I totally would," said Whitehead. "There were so many spectators on the course it was mind-boggling. The newspapers in Boston the next day estimated that we had over 2.75 million people surrounding the course, cheering us on. What a great rush!"

At home, Whitehead and his wife Deanna, a software engineer with Dynamic Concept Inc., supporting Marshall's Engineering Directorate, have been members of the Marshall Exchange Wellness Center and are current members of the center's MARS Running Club.

Image right: Josh Whitehead, center, shows off his Boston Marathon medal with his wife Deanna, left, daughter Madeline, and in-laws Earl and Ramona Hendrix. (Photo courtesy)

He encourages those who'd like to get on track toward a healthier lifestyle to take advantage of the "excellent gym that's right up the road from your desks," and slowly begin to prevent injury and increase motivation.

The more than 18,000-square-feet wellness facility on Digney Road next to Activities Building 4316 offers an array of exercise equipment; aerobic classes such as Zumba, sculpting, cycling and yoga; basketball and racquetball courts; and locker rooms with showers. Also available is Cardio Theater, a system that allows employees to watch TV or listen to radio while working up a sweat. For those who'd like help getting started on a workout routine, the facility is staffed with four professionally trained fitness specialists who can help achieve desired results.

"While not everyone is able to compete in or do as well in the Boston Marathon as Josh," said Bill Mayo, manager of the NASA Exchange, "it is still possible for anyone to workout, get healthier and perform better in any physical activity. It could be playing softball, running that first 5K race, playing longer with your children or grandchildren, or just being able to go up the stairs easier. To reach your goals, the Wellness Center is here to help you out. Contact us at 544-0252 if you'd like to join and we'll help you get on the road to better health. Your body will thank you for it!"

The facility is free to all NASA civil service employees; there is an $80 annual fee for their spouses and dependents who are full-time students, ages 15-25 for $80; membership for NASA retirees and spouses also is $80 a year; and the fee for Marshall on-site contractors is $180 annually. Classes are $3 for those who choose not to become members.

"Start walking around 20 minutes a day and work yourself up," suggested Whitehead. "For those interested in running, gradually progressing those walks to short jogs and eventually longer runs is the best way to get started. It takes time to adjust to strenuous activity, but setting incremental goals, building a manageable routine and finding ways to integrate fitness into your daily life is key. I'm a bit of a morning person, so my routine is to get up early, exercise before work and have the afternoon to spend with my wife and daughter. It might be a cliché to say, 'If I can do it, anyone can,' but it's really true!"

To review Whitehead's results, visit here. To learn more about the Boston Marathon, visit here.

To learn more about the Wellness Center and what it has to offer, visit here. For a tour of the facility, call Bill Stafford, building manager, at 544-0252. The hours are Monday-Friday, 5 a.m. to 8:30 p.m., and Saturday from 7 a.m. to 12 p.m.

For more information about MARS sports clubs such as the Running Club, visit here.

Eagan, an AI Signal Research Inc. employee and the Marshall Star editor, supports the Office of Strategic Analysis & Communications.

› Back to Top

Welcome, Summer Interns!

More than 150 summer interns are welcomed by Marshall Space Flight Center Acting Director Gene Goldman during orientation May 29 at Marshall's Education Training Facility. Team members can meet these new faces from colleges and universities across the country at the June 2 MSFC Family Picnic. The interns will be among the volunteers working the event. To learn more about the summer intern program, visit the NASA One Stop Shopping Initiative LaunchPad. (NASA/MSFC/Fred Deaton)

› Back to Top

MSFC Family Picnic to be Held June 2

Come out to the MSFC Family Picnic, from 10:30 a.m. to 3 p.m. June 2. All Marshall Space Flight Center team members, retirees and their families are invited to the event, which will be held around the walking trail -- across from the Marshall Child Development Center -- and Buildings 4315 and 4316. Lots of fun activities are planned, including a dunking booth, water activities and bingo. Bingo prizes will include flat-screen televisions, iPads and 2,000-watt, portable generators. Most games and inflatable activities are free – tickets are required only for bingo, crafts and the dunking booth. "New this year is 'Oscar the Robot' -- who's sure to entertain throughout the day -- and more crafts and exhibits for kids," said Edwin Jones, Marshall Exchange operations manager.

Lawler's Barbecue will cater the event. Meal tickets are $5 and must be pre-purchased through administrative officers by close of business May 30, or by June 1 at the Space Shop in Building 4203. Barbecue plates include a choice of hand-pulled barbecue pork or turkey, potato salad, baked beans, coleslaw, bun, sauces and a drink. Veggie plates include a salad, tomato wedges, cucumber slices, a baked potato, potato salad, coleslaw, a variety of dressings and a drink.

"Final preparations are being made to help make this picnic and family fun day one of the best yet," said Jones. "And for the first time in three years, the forecast for Saturday is a high near 80 degrees, mostly sunny and a humidity of less than 60 percent. What a change from the past two years of 95-plus degrees!

"The location this year is the same as last year and centered around the walking trail with plenty of shade and ease of access. Bingo, one of the most popular events at the picnic, is back with more great prizes."

The music lineup includes several Marshall Center team members and their families: sixth-grade singing phenom Elaina Walker and her dad, James Walker (acoustic country); music group Nuthin Fancy, which includes Pete Allen and Louie Clayton (classic rock); the Bluegrass Bandits (bluegrass and country); Larry Jones and Ravi Purandare (modern rock); and Wayne Gamwell (country folk).

A car, truck and bike show will be featured at the event, showcasing classic and exotic cars and motorcycles, owned and maintained by Marshall team members and their guests. The vehicles will be on display in the west lane of Morris Road alongside the walking trail parking area. A parking area for trailers is available in the lot adjacent to Building 4347, just south of the Marshall Medical Center. Cash prizes of $50, $100 and $150 will be awarded to the top three vehicles. Marshall team members can find more details about the car show on ExplorNet at https://explornet.msfc.nasa.gov/docs/DOC-7252.

Picnic parking will be available in the parking lots of several buildings adjacent to and surrounding the walking trail area, including the lot just north of the Marshall softball field on Pioneer Street. Overflow parking will be available at the Building 4200 complex. Other than Activities Building 4316, no Marshall Center buildings will be open during the event.

More information about the picnic is available on ExplorNet. Grab your kids, your camera and enjoy a great time -- courtesy of the Marshall Exchange.

Guidelines for non-badged family members

Family members arriving unescorted by a permanently badged team member must have a one-day pass prior to arrival. Team members can pick up one-day family passes from 8 a.m. to 3:30 p.m. until May 31 at the security desk in the lobby of Building 4200. Marshall team members will be required to provide the name of the family member who will use the pass. Passes should be placed on the driver's side of the windshield. Drivers must present a valid driver's license, proof of insurance and vehicle registration when arriving at a Redstone Arsenal gate.

› Back to Top

More Than 150 Bike Enthusiasts Take Part in Annual Director's Tour d'Arsenal Ride

Marshall Space Flight Center's Stephen Doering, center, director of the Office of Center Operations, gets ready for the 11th annual Director's Tour d'Arsenal ride May 22 at Activities Building 4316. Doering, Stephen Cornelius, director of missile development for the U.S. Army Aviation and Missile Research Development and Engineering Center, and other Marshall and Redstone Arsenal leaders headed the 18-to-24-mile trek. The event is held every May during National Bike Month. (NASA/MSFC/Emmett Given)

More than 150 cyclists get off to a "wheelie" good start from the Building 4315 NASA Wellness Center parking lot for the Tour d'Arsenal. "Everything went perfectly," said Jamie Miernik, organizer of the event and senior engineer for Jacobs ESTS Group, supporting Marshall's Engineering Directorate. "This is the highest participation we've had in the ride's 11-year history." The event was approved by Redstone Arsenal Family and Morale, Welfare & Recreation and hosted by the MARS Team Redstone Alliance for Cycling, known as MTRAC. (NASA/MSFC/Ray Downward)

› Back to Top

Marshall's Dr. Gerald Fishman to Speak About High-Energy Astronomy May 30 at UAH

On May 30, Dr. Gerald Fishman, an astrophysicist at the Marshall Space Flight Center's Science & Technology Office, will provide an overview during the Distinguished Lecturer Series about the history of high-energy astronomy and his current work in this field. His emphasis will be on the research performed by scientists in Huntsville. High-energy astronomy is the study of the most energetic objects and regions of the universe.

The event will be held in the University of Alabama in Huntsville's Chan Auditorium in the Administrative Science Building on Ben Graves Drive at 7:30 p.m. Refreshments will be served following the lecture. All Marshall team members are invited to attend.

› Back to Top

Huntsville-Madison County Historical Society Invites Marshall, Families, Friends to Learn About Center's Historic Structures

Architect and former NASA employee Ralph Allen will present "What Can Be Historic - A Look at Historic Structures at the Marshall Space Flight Center" at 2 p.m., June 10, at the Huntsville-Madison County Public Library auditorium, 915 Monroe St. All team members and their families and friends are invited to attend.

Allen is trained in historic preservation. For the last 22 years, he worked at Marshall on architectural, planning and historic preservation issues in Alabama, California and Louisiana, and on the historic documentation of NASA's space shuttle. The U.S. National Park Service has documented his preservation efforts of numerous space-related structures and sites. Allen also worked with the late Huntsville architect Harvie Jones for 15 years on historic preservation projects around the city.

The event is hosted by the Huntsville-Madison County Historical Society. For more information about the society, visit here.

› Back to Top

NASA Acting Associate Administrator Robert Lightfoot to speak at National Space Club luncheon June 15


Robert Lightfoot. (NASA/MSFC)

Robert Lightfoot, NASA Acting Associate Administrator and former Marshall Space Flight Center director, will be the keynote speaker at the June 15 National Space Club luncheon. The event will be held at noon at the University of Alabama in Huntsville's Shelby Center, Room 301.

Reservation deadline is June 8. For more information and to register, visit the National Space Club events page.

› Back to Top

Obituaries

Lloyd James Engman Sr., 94, of Fairhope died May 3. He retired from the Marshall Center in 1983 as a flight systems test

engineer. He is survived by his wife, Anne Bird Engman.

Robert Asquith, 84, of Huntsville died May 10. He retired from the Marshall Center in 1988 as an engineer. He is survived by his wife, Jean Jewell Asquith.

Edward Demirjian, 85, of Madison died May 14. He retired from the Marshall Center in 1990 as an experimental facilities development supervisor. He is survived by his wife, Emma Lou Flanagan Demirjian.

Harvey A. Connell Jr., 87, of Huntsville died May 20. He retired from the Marshall Center in 1981 as an aerospace engineer supervisor.

Grover F. Daussman, 93, of Huntsville died May 21. He retired from the Marshall Center in 1970 as an engineer. He is survived by his wife, Ella Daussman.

Find this article at:

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