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National Aeronautics and
Space Administration



KENNEDY SPACE CENTER'S

SPACEPORT

MAGAZINE

**GROWING
VEGGIES
IN SPACE**

**ASTRONAUT
CANDIDATES
AT KENNEDY**

**NIGHT SKY FUELS
ENGINEER'S PASSION**

**PROTECTING THE
FLORIDA SCRUB JAY**



FROM THE CENTER DIRECTOR

Hi, I'm Bob Cabana, director of NASA's Kennedy Space Center in Florida -- America's gateway to space. We've been launching American craft into space for more than 50 years. I'm glad you're here to help us launch *Spaceport Magazine*.

Whether we're launching rockets or testing new technologies, our goal is to push human exploration, increase scientific discovery and educate America on all things space and aeronautics. *Spaceport Magazine* is your looking glass into life here at Kennedy.

As America's space program continues to explore and inspire, I hope you will stop by every month to see how things on the Space Coast are going.

-- Keep charging, Bob



On the cover . . .



NASA's Project Morpheus prototype lander ignites its engine during a tethered test near the Shuttle Landing Facility. The test was performed to verify the lander's recently installed autonomous landing and hazard avoidance technology, or ALHAT, sensors and integration systems. With the successful completion of the test, the Morpheus project team will begin preparing for the first free flight test with ALHAT. Morpheus tests NASA's ALHAT, and an engine that runs on liquid oxygen and methane, or green propellants, into a fully-operational lander that could deliver cargo to other planetary surfaces. Project Morpheus is being managed under the Advanced Exploration Systems, or AES, Division in NASA's Human Exploration and Operations Mission Directorate. For more information on Project Morpheus, visit <http://morpheuslander.jsc.nasa.gov/>. Photo credit: NASA/Glenn Benson

6

2013 ASTRONAUT CANDIDATES

Eight highly skilled military aviators and researchers visit NASA's Kennedy Space Center, where America's efforts to explore space began.

11

SCIENTIST OF THE YEAR

Ecological Program manager and scientist Carlton Hall protects Kennedy's land resources for future generations.

18

AMONG NASA'S FINEST

Born in Kuwait, avionics and flight controls engineer Hibah Rahmani shares her passion for science, space and astronomy.

24

PROTECTING FLORIDA SCRUB JAYS

You won't find this bird anywhere else in the world, and Kennedy is supporting adaptive resource management science to help save the species.

36

COLORADO KID

Six-year-old Connor Johnson's online petition to save NASA and the space program lands him at America's spaceport as a guest of honor.

42

SUPER CAR: HENNESSEY AT KENNEDY

After signing a Space Act Agreement, the Hennessey Venom GT team breaks the record for fastest production car at the Shuttle Landing Facility.

NASA'S LAUNCH SCHEDULE

April

Mission: SpaceX-3 Commercial Resupply Services flight

Launch Vehicle: Falcon 9

Launch Site: Space Launch Complex 40, Cape Canaveral Air Force Station, Fla.

Description: SpaceX-3 will be the third commercial resupply mission to the International Space Station by Space Exploration Technologies (SpaceX).

April 9

Mission: Progress 55

Launch Vehicle: Russian Soyuz

Launch Site: Baikonur Cosmodrome, Kazakhstan

Description: Progress 55 will deliver cargo and crew supplies to the International Space Station.

May 6

Mission: Orbital 2 Commercial Resupply Services flight

Launch Vehicle: Antares

Launch Site: Wallops Flight Facility

Launch Pad: Mid-Atlantic Regional Spaceport Pad-0A

Description: Orbital 2 will deliver cargo and crew supplies to the ISS.

May 28

Mission: Expedition 40

Launch Vehicle: Soyuz 39

Launch Site: Baikonur Cosmodrome, Kazakhstan

Description: Soyuz 39 will carry Russian cosmonaut Maxim Suraev, Expedition 40 flight engineer and Expedition 41 commander, along with NASA astronaut Reid Wiseman and European Space Agency astronaut Alexander Gerst, both Expedition 40/41 flight engineers, to the ISS.

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Gioia Massa showcases how Veggie will provide fresh vegetables for astronauts aboard the International Space Station.

'Outredgeous' Veggies in space

By Linda Herridge

A plant growth chamber bound for the International Space Station inside the Dragon capsule on the upcoming SpaceX-3 resupply mission may help expand in-orbit food production capabilities, offering astronauts something they don't take for granted, fresh food.

NASA's Veg-01 experiment will be used to study the in-orbit function and performance of a new expandable plant growth facility called Veggie and its plant "pillows." The investigation will focus on the growth and development of "Outredgeous" lettuce seedlings in the space-flight environment.

"Veggie will provide a new resource for U.S. astronauts and researchers as we begin to develop the capabilities of growing fresh produce and other large plants on the space station," said Gioia

Massa, NASA payload scientist for Veggie. "Determining food safety is one of our primary goals for this validation test."

Veggie is a low-cost plant growth chamber that uses a flat-panel light bank that includes red, blue and green LEDs for plant growth and crew observation.

Veggie's unique design is collapsible for transport and storage and expandable up to a foot and a half as plants grow inside it.

"The internal growing area is 11.5 inches wide by 14.5 inches deep, making it the largest plant growth chamber for space to date," Massa said.

Orbital Technologies Corp. (ORBITEC) in Madison, Wis., developed Veggie through a Small Business Innovative Research Program.



“Veggie will provide a new resource for U.S. astronauts and researchers as we begin to develop the capabilities of growing fresh produce and other large plants on the space station.”

Gioia Massa,
NASA payload scientist for Veggie



“Outredgeous” red romaine lettuce plants grow inside in a prototype Veggie flight pillow. Photo credit: NASA/Gioia Massa

NASA and ORBITEC engineers and collaborators at NASA’s Kennedy Space Center in Florida worked to get the unit’s hardware flight-certified for use on the space station.

Because real estate on the station is limited, some adjustments to the growth chamber were made to accommodate space requirements. At Kennedy’s Space Life Sciences Laboratory, a crop of lettuce and radishes was grown in the prototype test unit. Seedlings were placed in the Veggie root-mat pillows, and

their growth was monitored for health, size, amount of water used, and the microorganisms that grew on them.

“I am thrilled to be a member of the Veggie and Veg-01 team and proud of all the work we have done to prepare for flight,” Massa said. “Our team is very excited to see the hardware in use on the space station.”

As NASA moves toward long-duration exploration missions, Massa hopes that Veggie will be a resource for crew food growth

and consumption. It also could be used by astronauts for recreational gardening activities during long-duration space missions. The system may have implications for improving growth and biomass production on Earth, thus benefiting the average citizen.

For the future, Massa said she is looking forward to seeing all sorts of “neat payloads” in the Veggie unit and expanding its capability as NASA learns more about the food safety of crops grown in microgravity. ♦



By Bob Granath

ASTRONAUT CANDIDATES

In June 2013, NASA announced its 21st class of astronauts, eight highly skilled military aviators and researchers who will be a part of the agency's missions beyond low-Earth orbit to destinations in the solar system.

Their early training brought them to NASA's Kennedy Space Center in Florida where America's efforts to explore space began.



NASA astronaut candidates share a moment inside the cab of the crawler. Photo by NASA/Kim Shiflett

Josh Cassada, Victor Glover, Tyler “Nick” Hague, Christina Hammock, Nicole Aunapu Mann, Anne McClain, Jessica Meir and Andrew Morgan began their adventure in August 2013 when they reported to the agency's Johnson Space Center in Houston to start training, a process that usually takes about two years.

In announcing the latest group of astronauts, NASA Administrator Charles Bolden stated that they will be developing missions to go farther into space than ever before.

“They're excited about the science we're doing on the International Space Station and our plan to launch from U.S. soil on spacecraft built by American companies,” said Bolden, who flew four space shuttle missions, “and they're ready to help lead the first human mission to an asteroid and then on to Mars.”

The astronaut candidates' visit to the Florida spaceport began with a briefing by Kennedy's director, Bob Cabana, who also was a member of four shuttle crews. He briefed the group on the ongoing efforts to transform the center into a 21st century spaceport.

“These new astronauts are an impressive group of individuals,” he said. “It takes me back to when I was first selected. There was so much to learn.”

In Kennedy's Operations and Checkout Building, the candidates were briefed on preparations for the launch of the Orion spacecraft on Exploration Flight Test-1. Plans call for the Lockheed Martin-built Orion to launch atop a United Launch Alliance Delta IV Heavy rocket from Cape Canaveral Air Force Station later this year.

Inside the space center's Vehicle Assembly Building, Mary Hanna, crawler-transporter (CT) integration manager, discussed recent work to upgrade components on the behemoth CT-2 vehicle. Recent modifications will enable the crawler to carry the greater loads anticipated with the agency's new Space Launch System rocket designed to take astronauts beyond low-Earth orbit for the first time since the early 1970s.

NASA astronaut candidates visit Launch Complex 5 where Mercury astronaut Alan Shepard lifted off on May 5, 1961, to become America's first man in space.
Photo by NASA/Kim Shiflett





Tyler "Nick" Hague inspects at the Orion heat shield inside of the Operations and Checkout Building at Kennedy Space Center, in Florida. Photo by NASA/Kim Shiflett

Other briefings included updates on work at Launch Pad 39B, the Launch Control Center and the Thermal Protection System Facility.

The group spent the second day of tours at Cape Canaveral Air Force Station, where the nation's first class of astronauts ventured into space. Stops included Launch Pad 5 where Alan Shepard and Gus Grissom flew the Mercury Redstone on suborbital missions. They also saw Launch Pad 14 where John Glenn and three others flew the Mercury Atlas into orbit, as well as Launch Pad 19 where 10 Gemini missions lifted off for flights that involved the first spacewalks and rendezvous missions.

During a visit to the Beach House, the astronaut candidates had lunch with Cabana and his directors. Through the years, the house has become a traditional gathering place for astronauts and families just before they fly into space.

"With all that NASA has planned, these men and women are going to fly missions that will be historic as we, again, explore beyond Earth," Cabana said. ♦



NASA astronaut candidates observe the Apollo 14 command module inside the Apollo Saturn V Center at Kennedy Space Center in Florida. Photo by NASA/Kim Shiflett

2013 ASTRONAUT CANDIDATES



Josh Cassada

Josh Cassada, Ph. D., is a lieutenant commander in the U.S. Navy. He is originally from White Bear Lake, Minn. Cassada is a naval aviator who holds an undergraduate degree from Albion College and advanced degrees from the University of Rochester in New York. He is a physicist by training and previously served as co-founder and chief technology officer for Quantum Opus.



Nicole Aunapu Mann

Nicole Aunapu Mann is a major in the U.S. Marine Corps. Originally from Penngrove, Calif., she is a graduate of the U.S. Naval Academy, Stanford University and the U.S. Naval Test Pilot School at Patuxent River, Md. Mann was an F/A-18 pilot, serving as an Integrated Product Team lead at the U.S. Naval Air Station, Patuxent River, when selected to be an astronaut.

Victor Glover

Victor Glover is a lieutenant commander in the Navy. He hails from Pomona, Calif., and Prosper, Texas. Glover is an F/A-18 pilot and graduated from the U.S. Air Force Test Pilot School. He holds degrees from California Polytechnic State University, San Luis Obispo, the Air University and the Naval Postgraduate School. At the time of his selection by NASA, he was serving as a Navy Legislative Fellow in the U.S. Congress.



Anne McClain

Anne McClain is a major in the U.S. Army and lists her hometown as Spokane, Wash. She is a graduate of the U.S. Military Academy at West Point, N.Y., as well as the University of Bath and the University of Bristol, both in the United Kingdom. McClain is an OH-58 helicopter pilot and a recent graduate of the U.S. Naval Test Pilot School at Naval Air Station, Patuxent River.



Tyler 'Nick' Hague

Tyler "Nick" Hague is a lieutenant colonel in the U.S. Air Force. He calls Hoxie, Kan., home and is a graduate of the U.S. Air Force Academy, the Massachusetts Institute of Technology, and the U.S. Air Force Test Pilot School at Edwards, Calif. Hague was supporting the Department of Defense as deputy chief of the Joint Improvised Explosive Device Defeat Organization when selected to be an astronaut.



Jessica Meir

Jessica Meir, Ph.D., is from Caribou, Maine. She is a graduate of Brown University, has an advanced degree from the International Space University and earned her doctorate from Scripps Institution of Oceanography in La Jolla, Calif. Meir was an assistant professor of anesthesia at Harvard Medical School, Massachusetts General Hospital, Boston, when selected.

Christina Hammock

Christina Hammock, calls Jacksonville, N.C., home. She holds undergraduate and graduate degrees from North Carolina State University in Raleigh. Hammock was serving as the National Oceanic and Atmospheric Administration (NOAA) station chief in American Samoa when selected.



Andrew Morgan

Andrew Morgan, M.D., is a lieutenant colonel in the U.S. Army and considers New Castle, Pa., home. Morgan is a graduate of the U.S. Military Academy at West Point and earned a doctorate in medicine from the Uniformed Services University of the Health Sciences, Bethesda, Md. He has experience as an emergency physician and flight surgeon for the Army special operations community and was completing a sports medicine fellowship when selected by NASA to be an astronaut.





Morpheus testing

KSC SCIENTIST OF THE YEAR CARLTON HALL



By Linda Herridge

Ecologist Carlton Hall is on a different kind of mission at Kennedy Space Center -- one to take care of and protect the center's land and resources for current and future generations. To recognize his efforts in climate change research related to Kennedy's future launch capabilities, Hall, with InoMedic Health Applications Inc., received the KSC Scientist of the Year Award during the 2014 NASA Kennedy Space Center Honor Awards ceremony.

"I was shocked and speechless," Hall said. "Everything we do here is a team effort."

Hall has worked at Kennedy for 31 years. He is the Ecological Program manager and a scientist under the Medical and Environmental Support Contract. He also was one of the founding scientists on the space shuttle and center operations ecological monitoring and research project in the early 1980s.

At that time, extensive testing was conducted to assess and document environmental impacts of space shuttle launches, and the results were summarized in a recently-published NASA technical publication, "Ecological Impacts of the Space Shuttle Program at John F. Kennedy Space Center."

“We are situated in an ideal place to study climate change. Kennedy is in the transition region between the subtropical and temperate climatic zones. As temperatures rise, we expect to see a shift in the species of plants and animals present in our ecosystem.”

Carlton Hall,
2014 KSC Scientist of the Year

Hall and his team work closely with the U.S. Fish and Wildlife Service at the Merritt Island National Wildlife Refuge. The refuge recently was selected by the U.S. Department of the Interior as one of three test sites nationwide to conduct research on how to enhance scrub jay habitats. Florida scrub jays have been on the threatened species list since 1987.

“Carlton always strives to put Kennedy at the forefront of ecological research and find ways to showcase what an incredible place the center is,” said John Shaffer, environmental planning lead in the Center Operations Directorate. “He and his group of scientists and researchers have showcased Kennedy’s unique environment and ensured NASA continues to succeed with its mission.”

Working together they have made significant progress in determining how controlled burns are

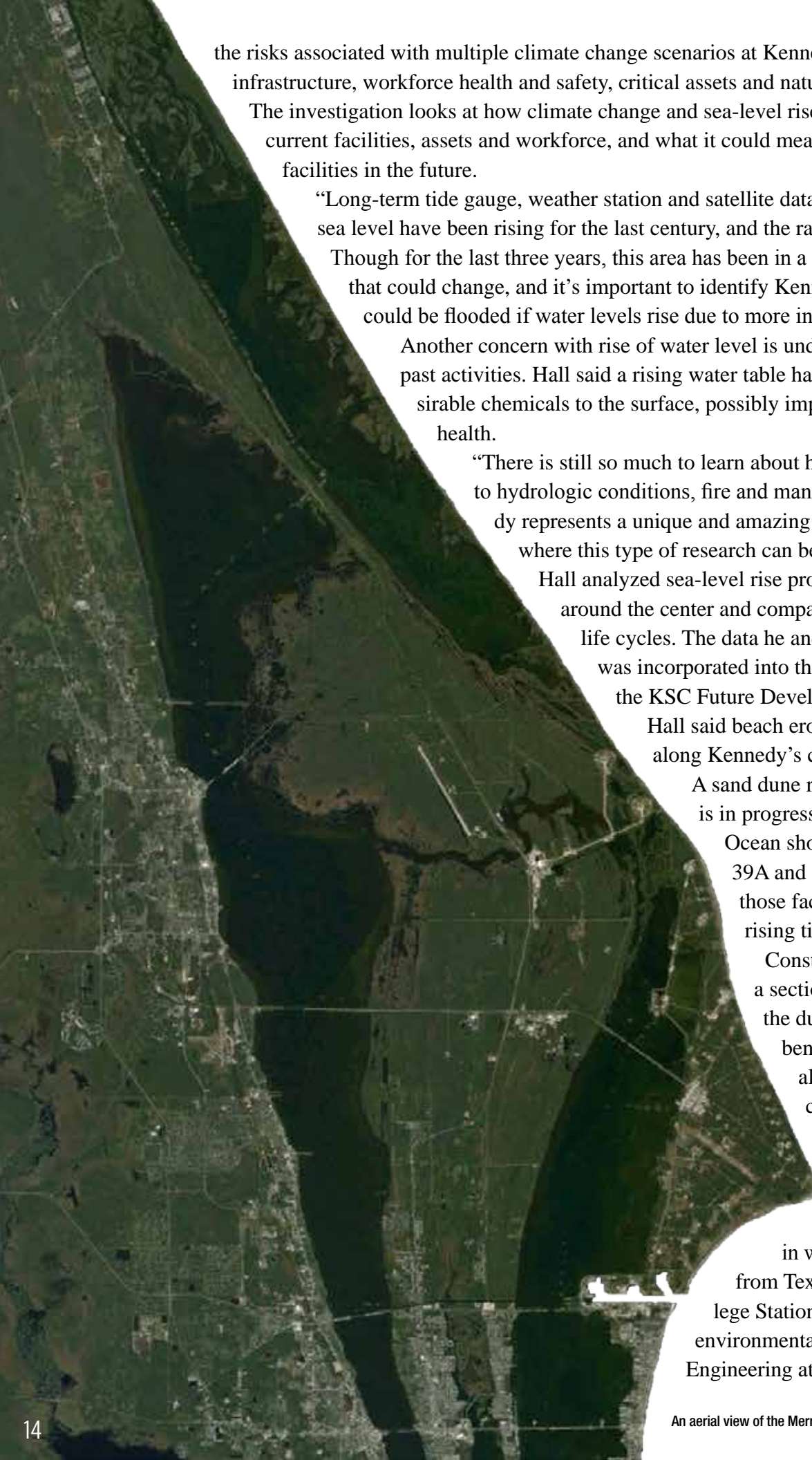
conducted for land management, proposing smaller patches of burns rather than burning huge swathes at the same time.

They also work closely with the U.S. Air Force, the National Park Service and university partners to collect information and develop knowledge for environmental compliance and natural resource management needs in east central Florida.

“Our goal is to ensure that NASA operates the center in a sustainable and environmentally friendly way,” Hall said. “We are situated in an ideal place to study climate change. KSC is in the transition region between the subtropical and temperate climatic zones. As temperatures rise, we expect to see a shift in the species of plants and animals present in our ecosystem.”

Hall and his group are working on a Climate Adaptation Science Investigators program to assess





the risks associated with multiple climate change scenarios at Kennedy. Areas of concern include infrastructure, workforce health and safety, critical assets and natural resources.

The investigation looks at how climate change and sea-level rise could affect the center's current facilities, assets and workforce, and what it could mean for the construction of new facilities in the future.

“Long-term tide gauge, weather station and satellite data indicate temperatures and sea level have been rising for the last century, and the rates appear to be accelerating. Though for the last three years, this area has been in a water deficit,” Hall said. “But that could change, and it's important to identify Kennedy roads or facilities that could be flooded if water levels rise due to more intense storms.”

Another concern with rise of water level is underground contaminants from past activities. Hall said a rising water table has the potential to carry undesirable chemicals to the surface, possibly impacting human and ecosystem health.

“There is still so much to learn about how our ecosystem responds to hydrologic conditions, fire and man-made change, and Kennedy represents a unique and amazing ‘outdoor living laboratory’ where this type of research can be conducted,” Hall said.

Hall analyzed sea-level rise projections in various areas around the center and compared them to projected facility life cycles. The data he and his group produced recently was incorporated into the Kennedy Master Plan and the KSC Future Development Concept document. Hall said beach erosion already is a real problem along Kennedy's coastline.

A sand dune restoration project currently is in progress along a mile of the Atlantic Ocean shoreline between Launch Pads 39A and 39B in an attempt to protect those facilities from storm surges and rising tides.

Construction workers removed a section of the railroad west of the dunes, along with the gravel beneath, to recycle the materials and ensure sea turtles can continue to nest successfully in the area after the dune is restored.

Hall has a bachelor's and master's of science degree in wildlife and fishery science from Texas A&M University in College Station, and holds a doctorate in environmental science from the College of Engineering at Florida Tech in Melbourne. ♦

a look online@www.nasa.gov/kennedy

EFT-1 update



Photo by Kim Shiflett

Full story: <http://go.nasa.gov/1m64jUe>

Kennedy Space Center Director Bob Cabana updates members of the media about preparations for the Orion Exploration Flight Test-1 (EFT-1) inside the Horizontal Integration Facility at Launch Complex 37 at Cape Canaveral Air Force Station in Florida on March 17. The event was held to showcase two of the three ULA Delta IV boosters for the Orion EFT-1, mission. EFT-1, is scheduled to launch in 2014 atop a Delta IV rocket and in 2017 on NASA's Space Launch System rocket.-- **By Linda Herridge**

AIRCRAFT RESCUE & FIRE FIGHTING



Passion inspires avionics, flight controls engineer



Hibah Rahmani is an avionics and flight controls engineer in NASA's Engineering and Technology Directorate. She supports Kennedy's Launch Services Program, working expendable launch vehicles. Photo by NASA/Dan Casper

By Bob Granath

Hibah Rahmani likes to encourage young people, especially girls, to “stay focused and dream big.” That’s the philosophy she has followed since growing up in Kuwait and looking up at the night sky in awe of the moon and stars. Today, Rahmani is an avionics and flight controls engineer in NASA’s Engineering and Technology Directorate, helping launch rockets from the Kennedy Space Center in Florida.

Rahmani was born in Pakistan, but she and her family moved to Kuwait when she was just a month old.

“My fondest memory growing up is taking walks with my family at night, either in the desert or on the sidewalk by the Arabian (Persian) Gulf, looking up at the sky to admire the moon and stars, and thinking about astronauts such as Neil Armstrong who have stepped on the moon,” she said. “It was around this time I developed a passion for science, space and astronomy.”

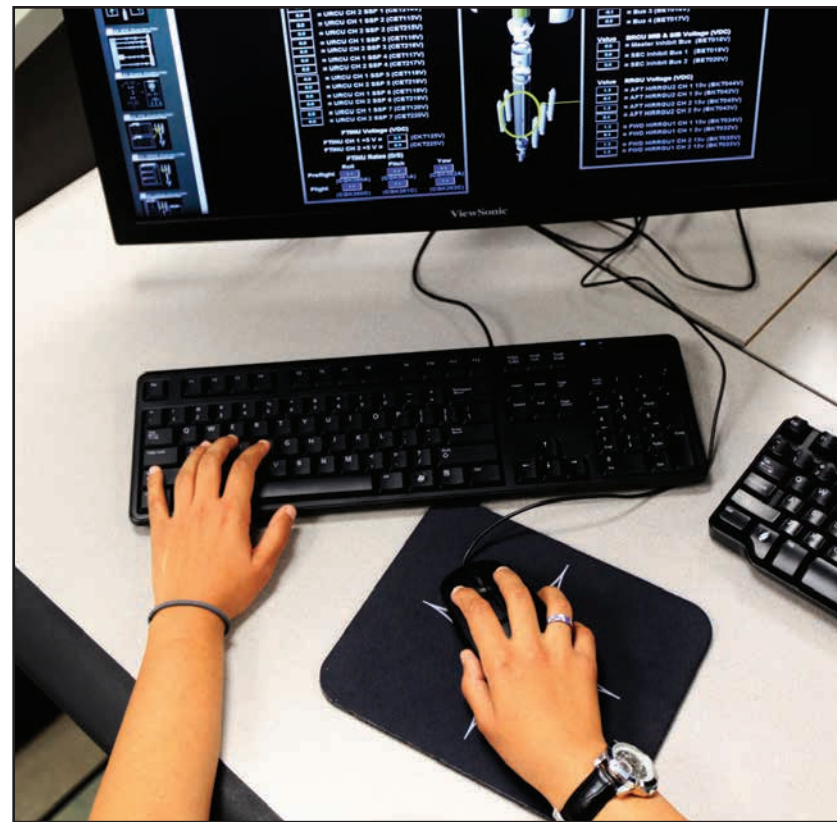
That peaceful childhood was interrupted when Iraqi troops invaded Kuwait in August 1990. While the attack was met with international condemnation, refugees fled westward across the desert. Rahmani, her mother and sister were among them, taking a bus and eventually reaching an area known as “no man’s land” near the Iraqi-Jordanian border.

“We arrived late at night,” she said. “We could not get a tent since all of them were taken by other refugees. Even though this was a tough time for us, one of the things I remember from that night was having a nice view of the sky with the golden moon and stars, while trying to sleep on the cold desert sand. It reminded me of my goals and dreams.”

After staying in Jordan for a few days, Rahmani, along with her mother and sister, traveled to Pakistan. Rahmani’s father was in the United States at the time of the invasion, but flew to Pakistan to be reunited with his family.



Hibah Rahmani, at about four years of age, plays in the sand in Kuwait along the Arabian (Persian) Gulf. She said that some of her fondest memories growing up were taking walks with her family either in the desert or on the sidewalk by the gulf. *Photo by family of Hibah Rahmani*



The U.S.-led coalition was successful in expelling the Iraqi forces from Kuwait with a ceasefire agreement negotiated and signed on Feb. 28, 1991.

Rahmani and her family moved back to Kuwait the following year and her aspirations continued as she decided to become an engineer.

“My parents always emphasized the value of a good education and hard work,” Rahmani said. “Math and science were my favorite subjects in school. Math was also my dad’s favorite subject and he used to tell me that I should try to get 100 percent marks on my math tests.”

After completing high school in Kuwait, Rahmani moved to the United States in 1997 to pursue a bachelor’s degree in computer engineering at the University of Central Florida (UCF).

“I remember physics being my first hard class and I did not do well on the first exam,” she said. “I went to the library and spent hours and hours there, reading physics books and practicing problems. When time came for the final exam, I calculated that I needed to get exactly a 100 on the exam to get an ‘A’ in the class. I could not

believe that I received a 105 on the exam. I even got the bonus question right.”

“This experience reemphasized to me that anything is possible with consistent hard work and dedication, and to never give up on your goals and dreams,” she said.

After graduating from UCF in 2000, Rahmani went to work for Boeing at Kennedy as a systems engineer working on processing the International Space Station (ISS).

“I was involved with integrated testing of the ISS components and sometimes astronauts would stop



“My parents always emphasized the value of a good education and hard work,” Hibah Rahmani said. At age five, she studied in her home in Kuwait. She developed a passion for science, space and astronomy at about that time. *Photo by family of Hibah Rahmani*

by to either view or participate in the testing,” she said. “It is during this time that I developed a strong desire to become an astronaut and started taking steps toward that goal.”

This new ambition led to a new objective -- while still working full-time.

“I knew that in order to become an astronaut I had to pursue an advanced degree,” she said, “so between 2002 and 2005, I obtained a master’s degree in electrical and computer engineering from Georgia Tech.”

In 2008, Rahmani accepted her current position with NASA at Kennedy in the Engineering and Technology Directorate.

“I support NASA’s Launch Services Program, working on expendable launch vehicles such as the Pegasus XL and Falcon 9,” she said. “I provide technical expertise, follow launch vehicle testing, perform data reviews and provide technical assessments of engineering issues.”

Pegasus is Orbital Science Corp.’s rocket dropped from beneath an L-1011 aircraft for launching payloads such as

NASA’s Interface Region Imaging Spectrograph (IRIS) solar observatory. Falcon 9 is the SpaceX launch vehicle used to boost the Dragon spacecraft for space station resupply missions and has also been selected to launch the Jason-3 spacecraft.

Hibah Rahmani likes to encourage young people, especially girls, to “stay focused and dream big.”

“The happiest and most exciting moment of my job is to watch a rocket take off from the launch pad and go into space,” she said.

Passion for her work is evident when Rahmani volunteers for outreach activities to inspire others.

“I have the privilege of working with an amazing team, while doing what I love,” she said. “I speak to students at local schools about my career and have

volunteered as a science fair judge.”

For Rahmani, her key to success is setting high goals and putting in the effort to get there.

“The experiences of my life have taught me to always dream big and to never give up,” she said, “because you can achieve whatever you want if you work hard.” ♦



During expendable rocket countdowns, Hibah Rahmani monitors launch vehicle avionics telemetry from a console in the Telemetry Laboratory in Hangar AE at Cape Canaveral Air Force Station., Fla. *Photo by NASA/ Dan Casper*



Walk and Run

Florida Scrub Jay

By Anna Heiney

Found only in the Sunshine State, the intelligent, social Florida scrub jay serves as an environmental indicator of the health of the state's scrub habitats. Ecologists at Kennedy Space Center are supporting adaptive resource management science to help save the species.

If you walk into Florida's sandy pine flatwoods, you probably won't see them right away.

But they'll see you. As you move among the saw palmettos and scrub oaks, they'll watch your every move to see if you're a threat.

It won't take long, though, for the Florida scrub jay's natural curiosity to kick in -- and one or more of the blue-and-gray birds might come a little closer to get a good look at you.

"This is a bird that is very intelligent, very social, and tends to be very curious about humans," said David Breininger, a wildlife ecologist with InoMedic Health Applications (IHA) at NASA's Kennedy Space Center in Florida, home to one of three remaining large scrub jay populations.

The Florida scrub jay (*Aphelocoma coerulescens*) is endemic to the Sunshine State; you won't find one anywhere else in the world. It's similar to a blue jay in color and size, but there are some physical differences, such as the lack of a crest on the back of the scrub jay's head. But there is one

social/behavioral characteristic that sets this bird apart from most other birds -- including its distant relative, the Western scrub jay.

"The big difference is that they have a cooperative breeding system," Breininger said.

"Their kids stay with them, often for years, helping their parents watch out for predators, defend their territory and feed future generations of young. They're in evolutionary and ecology textbooks around the world because the cooperative breeding system is considered fairly unusual."

Breininger, leader of the ecology program's habitat assessment group, has researched Florida scrub jays for 30 years. He and colleagues Geoff Carter and Stephanie Legare, both of IHA, and Jim Lyon of the U.S. Fish and Wildlife Service work together to study the birds and their scrubby habitats, and to help with the decision-making process in endangered species habitat management.



Because of high winds, this Florida scrub jay appears as if it has a crest on top of its head. The scrub jay actually lacks the crest and is the only species of bird endemic to Florida.
Photo by NASA/Dan Casper



Photo by Dan Casper

The Florida scrub jay was added to the endangered species list in 1987 and is classified as threatened, meaning it's not yet at the brink of extinction, but likely will be in the near future. Preserving, restoring and maintaining the bird's remaining habitat is the key to saving the species.

The 140,000-acre Merritt Island National Wildlife Refuge overlays the space center on central Florida's east coast. Roughly 300 Florida scrub jays call the refuge their home. But the bird's statewide population continues to decline, due not only to habitat loss, but also to the overgrowth and unsuitability of the habitat that remains.

"This is a bird that is very intelligent, very social, and tends to be very curious about humans."

David Breininger,
wildlife ecologist with InoMedic Health Applications
at NASA's Kennedy Space Center in Florida

Florida scrub jay populations across the state have generally been declining by 25 to 65 percent per decade.

Florida scrub jays live in families numbering between two and eight birds. They eat small vertebrates and insects during most of the year. In the fall, each jay will cache 6,000-8,000 acorns in open, sandy areas, and the family will rely on this private stash when temperatures drop in the winter.

A breeding pair mates for life and makes a home in a territory typically encompassing about 25 acres of land. One bird will serve as a sentinel, keeping an eye on the family's territory to defend

it against intruding scrub jays or, more importantly, predators. If a threat is detected, the lookout bird makes a telltale "ground predator call" and territorial boundary lines are temporarily abandoned as all the able-bodied jays in the area converge on the intruder, mobbing it until it leaves.

"The landscape's full of early warning systems," Breininger explained.

"If a predator's coming through that landscape, and the scrub is nice and open so the jays can see well, you can hear them calling to each other. They know what's happening."

Many of the scrub jay's predators are





natural: the Cooper's hawk that stealthily glides into the scrub undetected or the snakes that prey on jays' nests, devouring the unhatched eggs and nestlings.

The jays have to defend against these threats every day. But the loss of their habitat and the degradation of what's left are wider-scope, systemic problems. When scrub land becomes unsuitable, the impact shows in declining recruitment, the number of young who've survived to become adults.

"Their mortality rates exceed their recruitment rates, and so populations just gradually wink out," Breininger said. "We're working on developing strategies to bring back the habitat to where recruitment exceeds mortality rate, so populations can grow."

Scrub refers to ancient beach dunes, a result of changes in sea level, and the surrounding pine flatwoods. Scrub jays need medium-height oaks interspersed with sandy expanses where they can forage, cache their acorns and see predators. These areas have been prime sites for development, and over time, the birds' natural habitat has been fragmented and built upon.

What remains is often thick and overgrown due to decades of fire suppression. The lightning-sparked fires that once occurred regularly across Florida now are put out quickly, before they can spread. The result: thick forests that contain far more fire fuel than normal. Not only can jays not survive in such areas, once the area does burn, the fire is unplanned and difficult to safely contain.

Today, Breininger and many others are working to

better understand how to restore these remaining habitats using controlled burns or strategic cutting of overgrowth.

"We recently had all the land managers from east central Florida who have scrub jays come join us for an approach called 'adaptive resource management,' which is a direct integration of science and land management," he said.

This collaborative method brings together scientists, land managers and other stakeholders to agree on an objective and choose the best action to take. But it doesn't stop there.

"You look at the habitat and at the state of the scrub jays, and you make a decision, based on a set of models using past data, about what would be the best management action. Then you perform that action -- it may be no action, burn, cut and burn -- and you measure the response. You then use the response to update your models," Breininger explained.

This repetitive, ongoing process widens the knowledge base, improves models, reduces uncertainty and makes management more efficient and reliable.

"Scrub jays are a management indicator species for a whole group of animals and plants that are not adapted to this overgrown, dense, scrubby-type environment," Breininger said. "Usually if you restore habitat to what's good for scrub jays, you restore an entire ecosystem."

The Florida scrub jay has been a Sunshine State resident for at least 2 million years. With the help of ecologists at Kennedy and across the state, these smart, inquisitive birds will thrive once again. ♦



Bearing the heat

MARIA COLLURA

Commercial Crew Program

Father's footsteps inspire effort to lead America's path back to space

(Interview by Rebecca Regan)



Maria Collura may not have been the first woman to fly solo across the Atlantic Ocean or to command a space shuttle mission . . . but she is leading a team that will help America and the aerospace industry blaze a new, exciting and sustainable path into space for NASA astronauts. Vehicles developed and flown under the Commercial Crew Transportation Capability (CCtCap) contract could make space more accessible than ever before and her participation is allowing Collura to live out her childhood dream of following her father's footsteps.

SPACEPORT MAGAZINE: Who inspired you to become an engineer?

MARIA: My dad worked on the Apollo transition to shuttle and his job was to instrument the crawler-transporter for the new vehicle. He was so busy that he slept out here and we wouldn't see him for weeks, literally. He was the one who encouraged me to get into engineering and to get a degree. My dad never obtained a degree, but he is, in my opinion, probably the best engineer I know. He never had those way-too-technical types of discus-

sions that no one would understand. But he can still read a book cover-to-cover and then tell you exactly what it says and how to troubleshoot problems. He taught me a lot and explained why he thought I would be a good engineer -- that engineering was a logical way of figuring things out.

SpM: What was your childhood like?

MARIA: I have a pretty big Italian family -- three brothers and one sister. My dad worked at Kennedy Space Center and my mom stayed home to take care of us. Growing up, we didn't have a lot of money, so when I think about my childhood and what we did for fun, it mostly involved being outdoors, playing hide-and-go-seek in the neighborhood, fishing, bike riding, swimming or going to the beach. My dad also bought us a jukebox that we kept in our garage and we used to have dance-a-thons and hula-hoop contests. I can remember going down to the river in Titusville, camping out with our lawn chairs and food, and watching the space shuttles lift off. It always intrigued me and was way more exciting than shopping, fancy restaurants or arcades.

SpM: Where did you go to college?

MARIA: I lived at home while I got my undergrad from Brevard Community College and then went on to get a Bachelor of Science in electrical engineering from the University of Central Florida. Because

my dad never had a chance to get his own degree, he made sure he saved up enough money to afford all of his kids that opportunity. I was just so appreciative that I couldn't see asking for a penny more to move out on my own. I always knew that I wanted to work at Kennedy Space Center and that I wanted to be an engineer like my dad. I was just so anxious to start work. I mean, even when he was having a bad day, the excitement and the look on his face about what he was accomplishing made me want to be here. Within the last few years, I earned my master's in engineering management, a program facilitated through Kennedy and UCF.

SpM: What has your career with NASA been like?

MARIA: I started working at Kennedy as a payloads engineer for the shuttle program. The awesomeness of sitting in the cockpit and running tests in the same seats that astronauts would be occupying in space, I'm just so grateful for that experience. The technology of the shuttle program was pretty old when I came in, though. I mean, I was learning and building and working with components in college that far exceeded the technology of the shuttle. So, I always felt like maybe there's something more and that's when I jumped at the opportunity to work at the Dryden Flight Research Center in California. Learning the aeronautics side of things and being a part of flight testing really broadened my perspectives. I was flying flight sim-

"It takes a lot for a team of 20 plus people, all from different disciplines, to come together and agree on something as important as the next commercial vehicle for American human spaceflight."

Maria Collura,
Certification Manager, Commercial Crew Program

ulators, riding in the back of F-18s and working on the X programs, things that I never thought I would get to do growing up in Titusville.

SpM: What's it like working in the "bunker" -- first developing the CCt-Cap Request for Proposals and then evaluating them with the Source Evaluation Board?

MARIA: My gut reaction is lonely (laughter). I say lonely, only because you're so busy and you know that you're missing out on things. But, you're also so busy that you stop thinking about what you're missing out on. And, now, you've got this new little family, which is one of the best experiences of doing this job.

The people I'm working with today will be people I consult with, and really, will be friends with, throughout the rest of my career and life. You know, you spend two years together this close, this often . . . so being a cohesive team makes all the difference in evaluating these proposals efficiently and effectively.



Photo by Ben Smegelsky



SpM: What will it feel like when a CCtCap announcement is made later this year?

MARIA: (Deep breath) Oh my God . . . I can't even tell you. It will be exciting! I will feel very privileged to have been a part of the leadership of this procurement and making it possible. To know that we accomplished this big thing

. . . a firm fixed-priced contract to go do this activity that not many people thought was possible, I'll probably be speechless. Awarding this contract will ultimately be the best scenario for NASA and the country -- having the capability to meet our International Space Station crew rotation needs right here from the U.S. -- in my backyard again. And then I'll be anxious to watch the continued development. Flight tests will be even more amazing because then we're actually lighting the fire. It's anxiousness and enormous responsibility all mixed together. Of course, there's risk involved in human spaceflight, but our requirements are solid, they're there, we've got enough oversight and insight and the right level of safety involvement.

SpM: What will those first crewed launches be like to watch?

MARIA: No matter what is launching, even satellite or payload missions today, I hold my breath every time they go up. It's just one of those things that carried over from when I was a kid watching launches from the river in Titusville. I always held my breath then. In a few years when a crew climbs aboard and we're launching from U.S. soil, ultimately our goal will be achieved

-- we'll have work brought back to the area and we'll be prospering together as a nation. The best part is that CCtCap will lead to a series of significant events that will make history. It will be like reading a really good book and you're ready for the next chapter -- they'll just keep coming!

SpM: What qualities does a good leader possess?

MARIA: I am 100 percent convinced that everyone needs to respect one another in order to have a successful team. Respect and integrity go hand-and-hand in my mind. And those two things can get you through anything. For the CCtCap Source Evaluation Board, we have to come to a consensus on the proposals we're evaluating. And we've developed this camaraderie because in the end when we're reporting up to the selecting official, everyone has to say "Yes, and I stand behind that." It takes a lot for a team of 20 plus people, all from different disciplines, to come together and agree on something as important as the next commercial vehicle for American human spaceflight."

SpM: What advice would you give to young women?

MARIA: Explore and understand what makes sense for you before you make a career choice. Always trust in your abilities. Most importantly, be confident but know that you are going to make mistakes.

And it's OK as long as you learn from them. I had a boss once that told me, "Look, if you never make a mistake then you're not working. You haven't tried hard enough to push the boundaries. Always try to challenge yourself and others." ♦



Maria Collura and her father share a moment in an airplane her brother piloted while in the U.S. Air Force. Photo provided by Maria Collura





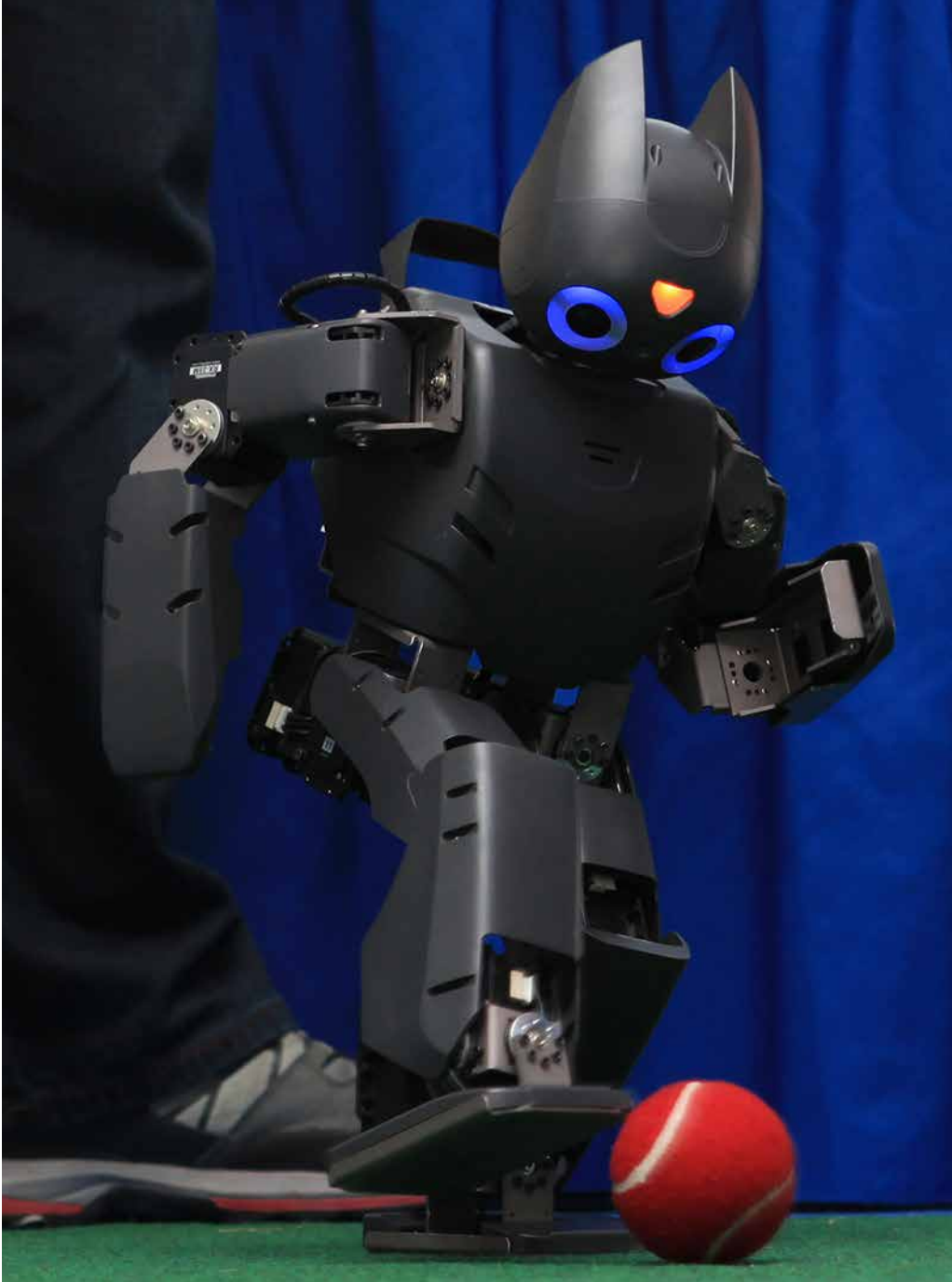
Image by NASA/Greg Lee

Read more at: <http://go.nasa.gov/NclbNk>

This graphic depicts the goal of NASA's Commercial Crew Program (CCP) heading into the Commercial Crew Transportation Capability contract known as CCtCap. This phase of the CCP will enable NASA to ensure a company's crew transportation system is safe, reliable and cost-effective. The certification process will assess progress throughout the production and testing of one or more integrated space transportation systems, which include rockets, spacecraft, missions and ground operations. Requirements under CCtCap also will include at least one crewed flight test to the space station before certification can be granted.

a look online@www.nasa.gov/kennedy

robot rocket rally



Full story: <http://go.nasa.gov/1h9VKY1>

A miniature humanoid robot known as DARwin-OP, from Virginia Tech Robotics, plays soccer with a red tennis ball at the Robot Rocket Rally. Robots developed by NASA, universities, high schools and private industry showed off their skills with demonstrations and hands-on exhibits during the three-day event, which was designed to raise public awareness and encourage students to consider pursuing careers in the “STEM” fields of science, technology, engineering and math. -- **By Anna Heiney**

I am
GSDO

Sasha Sims

Business Management and
Analysis Branch Chief

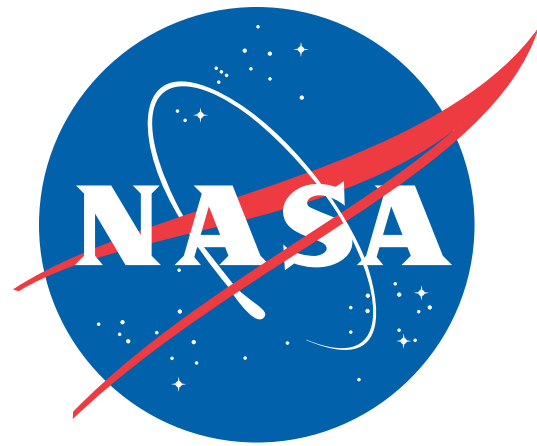
GROUND SYSTEMS DEVELOPMENT AND OPERATIONS

National Aeronautics and
Space Administration



Kennedy Space Center

Exploration Begins Here



FUTURE ASTRONAUT



NASA Kennedy Space Center Director and former astronaut Robert Cabana, left, presents a space-program memento to six-year-old Connor Johnson on March 15 in the Kennedy Space Center Visitor Complex's Rocket Garden to inspire the youngster to continue the dream he has had since the age of three of becoming an astronaut. Photo by NASA/Dan Casper

THE RIGHT STUFF

By Frank Ochoa-Gonzales

While most 6-year-olds are eager to get an autograph of their favorite pro athlete or theme-park character, Connor Johnson was seeking signatures for an online petition to save NASA's funding from budget cuts.

When Connor learned of potential budget cuts last year that threatened his dream of working for NASA, he decided to do something about it.

First, Connor wanted to donate his piggy bank, all \$10.41. But after talking it over with family, Connor decided to start a petition on the White House website.

And it's that forward thinking that has allowed Connor and his family from Denver, Colo., to be invited as guests of the Kennedy Space Center Visitor Complex in Florida. As a guest of honor March 15, Connor met Kennedy Director Bob Cabana, who gave him a mission patch and a bolt from the International Space Station as a token of appreciation from the agency.

"I think it's great for Connor to be so interested in the future of NASA," Kennedy Center Director Bob Cabana said. "It shows great initiative on his part to do what he's done."

NASA has inspired generations of children such as Connor, who says he has wanted to be an astronaut since he was three.

Using social media and emails, Connor's friends and family got the ball rolling.

A news broadcast from a Denver TV station helped boost his tally.

Connor obtained more than 22,000 signatures, but needed 100,000 to get recognition from the White House. He's not giving up on his dream to become an astronaut and discover new worlds and asteroids.

"I really want our country to still be the leader in space," Connor said. "I hope someday I can be an astronaut who goes to Mars."

And at six, Connor is about the right age to be one of the astronauts to go to Mars in the 2030s.

During his visit to the Space Coast, Connor and his family enjoyed Lunch With An Astronaut, featuring space shuttle astronaut Sam Durrance, and encountered the Astronaut Training Experience, with space shuttle astronaut Mike McCulley.

And Durrance and McCulley are not the first astronauts to lend Connor an ear.

Connor shared a recent conversation he had with former NASA astronaut Gene Cernan, the last man to step on the moon. Connor said Cernan told him, "Dream the unimaginable."

While at Kennedy, Connor also experienced a space shuttle mission simulation, performed hands-on space exploration activities, and learned about current astronauts and their training programs.

The Johnsons also took part in the Robot Rocket Rally, a three-day festival celebrating the latest in robotic technology from NASA, industry leaders and universities, where Connor had the opportunity to operate a real robot.

Connor and his family also toured the new Space Shuttle Atlantis exhibit and got an up-close look at the Orion capsule mock-up, America's new spacecraft for human exploration.

Connor said he thinks he can accomplish his mission because NASA has taught him that any goal can be reached if one takes small steps.

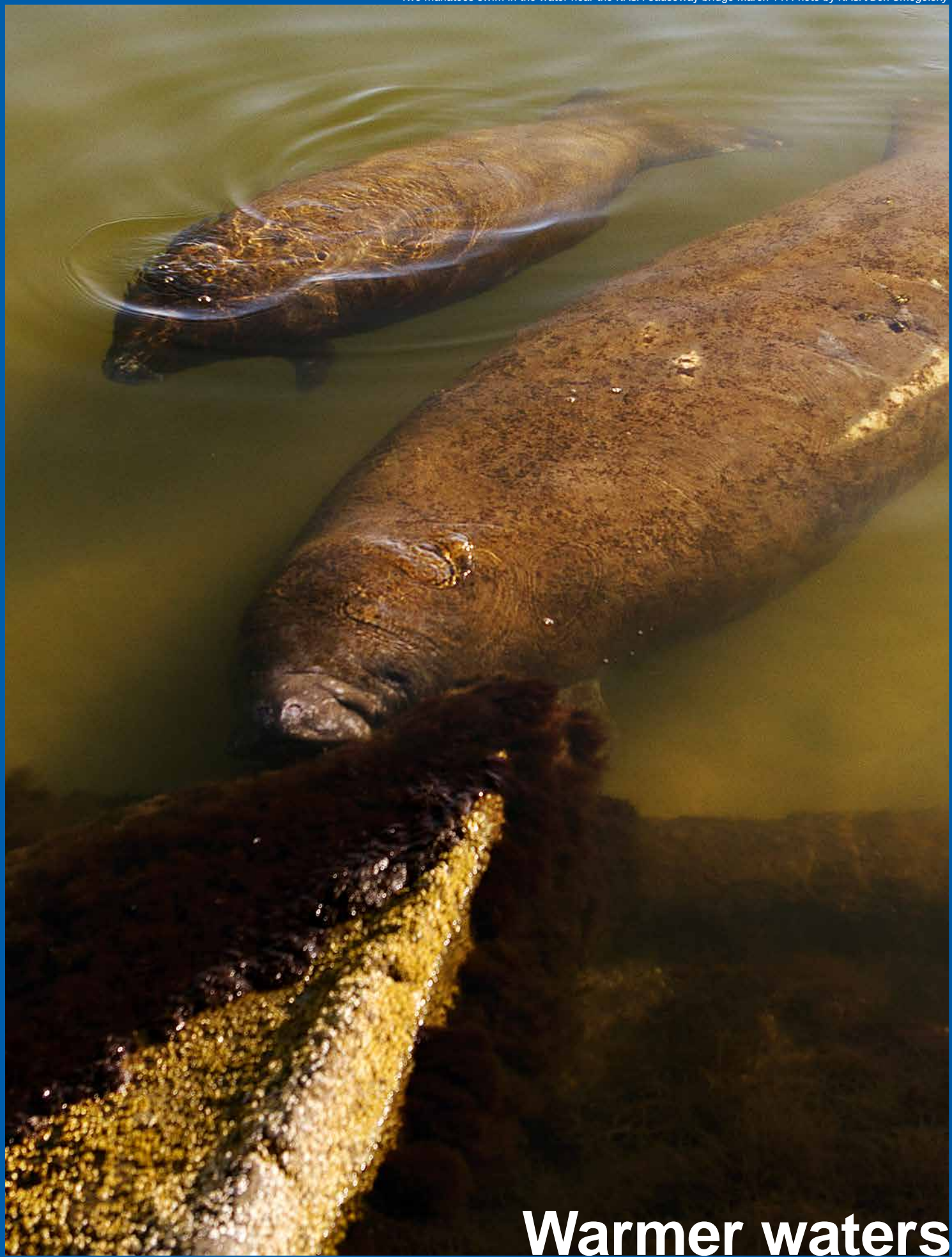
Connor proudly gave Cabana \$9 to help fund NASA.

"Every penny helps," a delighted Cabana said. "Ultimately, the budget supports what we want to do with continuing International Space Station research and technology which will feed into SLS and Orion, leading to the asteroid initiative and on to Mars," Cabana said. "And it will dictate how we work with commercial partners to launch our astronauts from U.S. soil.

I consider this a down payment to make it happen."

When asked why he wants to be an astronaut, Connor replied, "I want to keep my dreams alive not just for me, but for anyone who wants to be an astronaut. I'm going to need a crew you know," further testimony that he definitely has the "right stuff." ♦





Warmer waters

TAKE A LOOK BACK

The First Spaceport News

SPACEPORT



NEWS

Vol. 1, No. 1

NASA Launch Operations Center, Cape Canaveral, Florida

December 13, 1962

MARINER II'S VENUS FLY-BY DUE TOMORROW

Name Contest Prize Copped By Whiteside

C. A. Whiteside, Deputy Chief, of LVOD's Navigation Group, topped more than 500 entries to win the newspaper name contest with "Spaceport News."

He will receive a cash prize of \$75, less withholding.

Whiteside edged three other entrants with similar titles.

Dr. A. H. Knothe, Technical and Scientific Staff, and N. F.



C. A. Whiteside

Hinds, LVOD Data Office, each submitted "Space Port News," and Patti Konneker of MSC offered "NASA Space Port News."

"Spaceport" was chosen as one word because it was described as "a catchword that best connotes Cape operations." News was picked as being "concise and to the point".

The winning entry was selected as "symbolic of all (See NAME Page 5)



WAY OUT — Artist H. A. Perez depicted Mariner II's flyby of the cloud-shrouded Venus with the above interpretation.

HOLD GREETING CARDS, SEND CASH FOR BASKETS

Employee interchange of Christmas cards will be foregone by many this season, so that underprivileged families in the area may receive needed food and clothing.

A device is underway to collect money that ordinarily would go for purchase and mailing of Christmas cards.

These funds will be turned over to Captain Vern Hall of the local Salvation Army, who will use them to provide food, clothing and other essentials to the most needy families within Brevard, without partiality to city of residence.

The idea for the drive was developed by Harry P. Shockey of the Vehicle and Missile Systems Group.

In a letter to LOC Director Dr. Kurt H. Debus, Shockey said, "Every year at this time the tiresome task of buying, addressing and mailing Christmas cards to the many people we work with and often see every day occurs. Wouldn't it be a gratifying gesture to donate to a NASA basket for

the needy?" Contributions should be forwarded to the Support Services Office of the Administrative Branch (LO-OA). Deadline is next Wednesday.

Names of donors and the total collection will be published later, and if the drive is successful it may become an annual event.

Four-Day Holiday Set For NASA Employees

NASA and other Federal employees at Canaveral will have a four-day Christmas holiday — courtesy of an executive order signed by President Kennedy.

With Christmas falling on a Tuesday this year, Mr. Kennedy has declared Monday, December 24th, a legal holiday for Federal workers.

The time off will not be charged to annual leave.

There will be no holiday decreed for New Year's Eve, Monday, December 31st, however.

'RECORD BOOK' VOYAGE BEGAN HERE IN AUGUST

Sometime tomorrow man may get his first closeup "glimpse" of the cloud-shrouded planet Venus through the "eyes" of the Mariner-II spacecraft.

If all goes well, the 447-pound, butterfly-paddled craft will pass within 21,000 miles of Venus and send back data on six separate experiments.

Launched from pad 12 at LOC last August 27th atop an Atlas-Agena rocket, Mariner-II has traveled close to 180 million miles during its historic 109 day journey.

It has already set innumerable milestones, including transmission of intelligible signals from record distances in space.

If all spacecraft experiments perform well:

- A detector will measure the density of cosmic dust.
- A microwave radiometer will determine the temperature of the planet surface and details concerning its atmosphere.
- A magnetometer will measure changes in the planetary and interplanetary magnetic fields.
- An infrared radiometer will determine any fine structure of the cloud layer.
- A solar plasma spectrometer will measure the intensity of low energy protons from the sun.
- An ion chamber and particle flux detector will measure charged-particle intensity and distribution in interplanetary space and near the planet.

Once Mariner-II has passed Venus, its mission will be completed and it will probably enter a permanent solar orbit.

Cal Tech's Jet propulsion Laboratory was responsible (See MARINER, Page 4)

To view the Spaceport News archive, click here or go to <http://go.nasa.gov/JGIdEA>

Spaceport Magazine brings a new look of the happenings at NASA's Kennedy Space Center in Florida.

Spaceport News, which has been published since Dec. 13, 1962, is now retired.

Project Mercury manager was space program pioneer

By Bob Granath

Paul C. Donnelly, a former NASA manager from Project Mercury through the Space Shuttle Program, died March 12, 2014. He was 90. A resident of Indian Harbor Beach, Fla., Donnelly worked in increasingly responsible roles for the space agency from 1958 through 1978. He was then employed by United Space Boosters Inc., or USBI, until his retirement in 1989.

“Paul Donnelly was a true pioneer of America’s space program,” said Kennedy Space Center Director Bob Cabana. “In the early days everything was new. All the procedures and processes had to be invented from the ground up. From Project Mercury all the way through the Space Shuttle Program, he helped lay the groundwork for where we are today.”

Donnelly was born March 28, 1923, in Altoona, Penn. He was studying for a business degree at Pennsylvania State University when the Japanese attacked Pearl Harbor. Like many Americans he joined the war effort, enlisting in the Navy in 1942.

During his time in the Navy, Donnelly married Margaret Mary Boyle, a registered nurse, in 1944.

After attending the Navy’s electronics and guided missile technical schools, he helped develop the U.S. Navy’s “Bat,” the first radar-guided “smart bomb” initially used in 1945.

Following World War II, Donnelly became a Navy civil service employee assigned to aircraft and ordnance testing at the Naval Air Ordnance Test Station at Chincoteague Island,

Va. and the Naval Air Station Patuxent River, Md. While assigned to the National Bureau of Standards’ National Hydraulic Laboratory in Washington, D.C., Donnelly worked for Hugh Dryden, who became NASA’s first deputy administrator when the space agency was formed in 1958. Dryden recommended him to Robert Gilruth who had been appointed to lead NASA’s Space Task Group at the Langley Research Center in Virginia.

“They sent me directly down (to Cape Canaveral) to help set up operations,” Donnelly said during an interview for an oral history project in August 2003.

He served as a spacecraft test conductor for all Project Mercury launches, the program that placed the first Americans in space between 1961 and 1963.

“I was the only spacecraft test conductor during (Alan) Shepard’s flight, (Virgil) Grissom’s flight and (John) Glenn, (Scott) Carpenter, (Walter) Schirra and (Gordon) Cooper.”

Astronauts Shepard and Grissom flew suborbital flights in 1961 and Glenn, Carpenter, Schirra and Cooper piloted orbital missions in 1962 and 1963.

Following the completion of the Mercury program, Donnelly was named chief test conductor for the Manned Spacecraft Center’s Florida Operations during the Gemini program which flew 10 piloted missions in 1965 and 1966. He was named launch

operations manager for the Kennedy Space Center during Apollo, responsible for prelaunch processing of the spacecraft and launch vehicle, a role he held from the first piloted Apollo flight, Apollo 7 in 1968, through the Apollo-Soyuz Test Project in 1975.

Donnelly considered the final push to place the first astronauts on the moon during the early months of 1969 as one of the significant periods in American spaceflight history.

“The thing that I always remember in the total (lunar landing) program, was Apollo 9, 10 and 11 that were launched 60 days apart,” Donnelly said. “(For) the rest of the world, Apollo 11 was important. But for people like me, 9, 10 and 11 were (all) important.”

Apollo 9 was the first test flight of the Apollo lunar module in Earth orbit with the command and service modules. Apollo 10



Before John Glenn’s history flight as the first American to orbit the Earth on Feb. 20, 1962, NASA spacecraft test conductor Paul Donnelly, right, posed with General Dynamics chief test conductor Tom O’Malley, left, and Glenn in front of the Friendship 7 Mercury spacecraft. Photo by NASA

involved a crew flying both spacecraft in orbit around the moon and Apollo 11 was the first lunar landing -- all flown between March and July 1969.

Donnelly continued as launch operations manager through the final Apollo mission during which three American astronauts linked up with two Soviet cosmonauts aboard a Soyuz spacecraft in 1975.

In 1977, he led the NASA team conducting approach and landing tests of the prototype space shuttle Enterprise at the Dryden Flight Research Center at Edwards Air Force Base in California.

“I took the group out to Edwards’ Dryden Space Center,” Donnelly said, “and did the drop tests of the Enterprise. That was my last (NASA) project.”

Donnelly retired from the space agency as director of Space Transportation System (space shuttle) Processing at Kennedy in 1978. Soon after, he was named vice president of Florida Field Operations for United Space Boosters Inc. The company was the prime contractor for space shuttle solid

rocket booster assembly, integration, checkout and refurbishment. He retired from USBI in 1989.

Donnelly was the recipient of numerous awards and recognition, including two NASA Distinguished Service Medals in 1973 for his role in the Apollo Program and in 1981 for STS-1.

He was presented three Exceptional Achievement Medals: in 1969 for Apollo 8, in 1969 for Apollo 11, and in 1978 for the shuttle Approach and Landing Tests. In 1995, he was a recipient of the Lifetime Achievement Award from the National Space Club Florida Committee. ♦



Paul Donnelly stands in front of the Saturn V rocket for the Apollo 11 mission as it rolls to the launch pad on May 20, 1969. Photo by NASA

HENNESSEY VENOM GT ROCKETS DOWN SLF

By Steven Siceloff

Aerodynamic and high-performance engine testing at Kennedy Space Center recently saw the record for fastest production car in the world pass to Hennessey Performance following a 270.49 mph run at Kennedy's Shuttle Landing Facility on Feb. 14.

Outfitted with a suite of accelerometers and GPS receivers that would make a rocket engineer proud, the Hennessey Venom GT was able to collect precise information to confirm the car's safety and handling throughout its performance regime.

Without the real-world testing, the company could not be sure its computer models and limited evaluations were complete.

"The teams that have come here have all said the same thing: there's no substitute for this," said Johnny Bohmer of Performance Power LLC in West Palm Beach, Fla. "They go to wind tunnels that cost \$5,000 an hour. They'll do 10 million laps on simulated computer programs and then they come out here and it's all wrong. This runway is a tool, and it's the right tool."

Hennessey worked with Bohmer to use the NASA facility. Bohmer negotiated a Space Act Agreement with NASA to evaluate aerodynamic principles on cars using the runway.

Testing the American-made car at such extremes in speed is only possible in a few places in the world, and the 3.2-mile-long, 300-foot-wide runway at the

SLF was chosen because its concrete surface and expanse gives drivers confidence they can perform their trials safely. "Validating the Venom GT's performance, stability and safety on such an incredible runway is why we came here," said John Hennessey, owner of the Seeley, Texas-based auto maker. "I wanted to be an astronaut when I was a kid. Neil Armstrong was my childhood hero. Even though the astronaut thing didn't work out for me, I am humbled to have had the opportunity to conduct our testing on the hallowed grounds of the Kennedy Space Center."

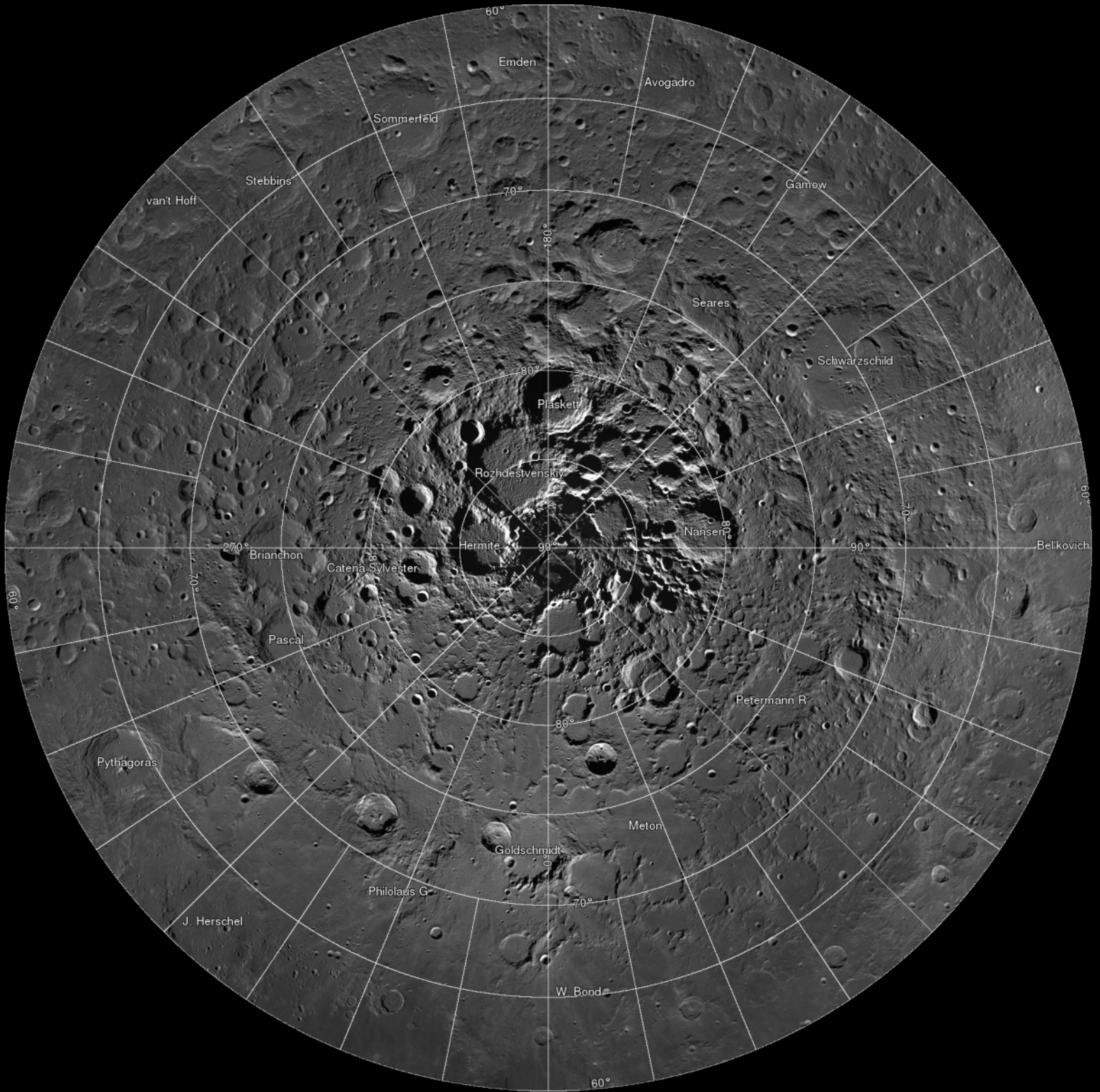
All the cars that are tested at Kennedy have to record measurable engineering data as part of their agreement. It's not a joy ride, in other words. The information that automakers and race teams gather

doesn't have to be shared, but it's expected to feed into future innovations and ultimately improve everyday cars at some point.

Speaking in January during the first trip by Hennessey to try out the Kennedy surface, both auto makers said there are not many places in the world to safely perform the critical evaluations that give them the confidence to sell their vehicles to the public.

"You can do all the modeling programs you want, you can do all the simulations and computers but you have to go out and hit the real world," Bohmer said. "Now if somebody goes out in the car and wants to push the car, he knows the car will be safe." ♦





National Aeronautics and Space Administration

John F. Kennedy Space Center
Kennedy Space Center, FL 32899

www.nasa.gov