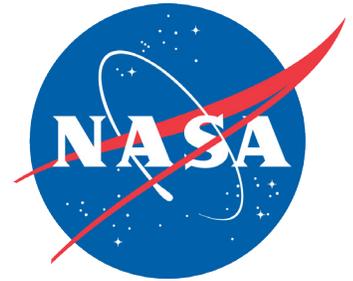


Spaceport News

John F. Kennedy Space Center - America's gateway to the universe



Lightfoot visits, reports on initiatives

By Bob Granath
Spaceport News

NASA Associate Administrator Robert Lightfoot and Kennedy Space Center Director Bob Cabana reported on the space agency's current and future initiatives during an employee briefing June 4. The meeting was part of a tour of facilities at the Florida spaceport where Lightfoot saw many of the activities taking place to meet NASA goals.

"I had a great visit this morning," Lightfoot said. "We got to look around the Vehicle Assembly Building and the (launch) pad to see the transformation that is ongoing."

Kennedy continues to make transitional strides from a historically government-only launch facility to an affordable, sustainable center for government and commercial customers.

"We've asked you to do so much to turn this into a multi-user spaceport," said Lightfoot. "It's really encouraging to see the transformation that Kennedy is going through under Bob's leadership."

In his introduction, Cabana



NASA/Jim Grossmann

NASA Associate Administrator Robert Lightfoot discusses current and future initiatives for the agency and Kennedy Space Center, including an astronaut mission to study an asteroid, during an all-hands meeting with employees in Kennedy's Training Auditorium on June 4.

explained that as associate administrator, Lightfoot serves in a role similar to a corporate chief operating officer. Named to his current position in August 2009, Lightfoot previously was director of NASA's Marshall Space Flight Center in Huntsville, Ala., after serving as director of the Propulsion Test Directorate at the agency's Stennis Space Center in Mississippi.

President Barack Obama's Fiscal Year 2014 budget request

for NASA provides funding for an initiative to robotically capture an asteroid and redirect it closer to the Earth-moon system. Astronauts then would launch an Orion multi-purpose crew vehicle (MPCV) aboard a Space Launch System (SLS) rocket to collect samples and explore the relocated asteroid.

"In 2010, when the president said we were going to an asteroid, that was no easy feat," Lightfoot said. "When you look

at the moon and Mars, they're actually closer to Earth so we can track them and we know when to launch. Asteroids are a little different. They come and go and they are sometimes hard to track. Even harder would be to take humans to an asteroid which would require a minimum of 180 days. You've got to have life support, you've got to have radiation protection."

Lightfoot explained the question then became, "what if we could bring the asteroid to us?"

"We will look for a seven- to 10-meter, 500-ton asteroid and bring it into a stable orbit around the moon," he said. "This approach takes advantage of our SLS and MPCV that will have the capability to fly around the moon as early as 2021. As a result, we start developing some of the techniques we're going to need to go to Mars."

Lightfoot had high praise for the team at Kennedy.

"It's encouraging to see the work that is getting done," he said. "You should be proud."

For the complete story, go to <http://www.nasa.gov/kennedy>

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Pride fueling commercial space activities

By Rebecca Regan
Spaceport News

The three commercial space companies working with NASA's Commercial Crew Program (CCP) may have very different spacecraft and rocket designs, but they all agreed on the need for the United States to have its own domestic capability to launch astronauts.

"Today, there are nine humans on orbit," said Ed Mango, CCP's program manager, at a National Space Club meeting June 11 in Cape Canaveral. "All of those folks got there on a vehicle that did not have a U.S. flag on it. We, and the people in this room, and the people at this table, need to fix that."

Mango was joined by partner representatives from The Boeing Company, Sierra Nevada Corporation (SNC) and Space Exploration Technologies Inc. (SpaceX) to discuss the future of commercial space.

"We pay one of our partners, the Russians, \$71 million a seat to fly," Mango said. "What we want to do is give that to an American company to fly our crews into space."

Since the dawn of space exploration, Florida's Space Coast has been the iconic site for launching men and women aboard American rockets. During the meeting, all three partner representatives said they plan to bring the work associated with commercial space activities back to the area.

"It was incredibly important for us, from a business-case standpoint, to not only locate our launch services here, but also our manufacturing, refurbishment and turnaround operations -- essentially having the entire team co-located here in Florida," said John Mulholland,



NASA/Kim Shifflett

Ed Mango, manager of NASA's Commercial Crew Program, speaks to a crowd of spaceflight enthusiasts at the National Space Club Florida Committee's June meeting near the Kennedy Space Center. Seated from left are John Mulholland, manager of The Boeing Company's Commercial Program; Dan Ciccateri, chief systems engineer for Sierra Nevada Corporation; and Adam Harris, vice president of Government Sales for Space Exploration Technologies.

vice president and program manager of Boeing's Commercial Programs.

Boeing's CST-100 is on track to take up residency this summer in one of Kennedy Space Center's former orbiter processing facilities. Space Florida, the state's aerospace economic development agency, is continuing to modernize the facility to accommodate commercial space operations. Current plans call for Boeing, along with SNC, to launch their

spacecraft atop United Launch Alliance Atlas V rockets from Cape Canaveral Air Force Station, a few miles away from Kennedy.

"This is the Space Coast. It is the transportation hub. There's land, sea, air and space and it all happens right here in Brevard County," said Dan Ciccateri, SNC's chief systems engineer. "It is key for that to continue into commercial crew space."

During the meeting, Cic-

cateri also shared SNC's plans to use the center's Shuttle Landing Facility as the primary runway for the Dream Chaser spacecraft.

SpaceX already is launching its NASA-contracted cargo resupply missions to the International Space Station atop the Falcon 9 rocket and uncrewed version of its Dragon spacecraft from Cape Canaveral Air Force Station. The company also is planning to launch satellite missions from Vandenberg Air Force Base in California.

"It's to be seen what future markets will come from the Commercial Crew Program," said Adam Harris, vice president of Government Sales for SpaceX. "My kids, who are two boys, seven and three, want to see the United States fly to space. And I think that is what inspires folks and I think that's the reason that this is a great program."

"We pay one of our partners, the Russians, \$71 million a seat to fly. What we want to do is give that to an American company to fly our crews into space."

Ed Mango,
Commercial Crew Program Manager

CubeSat launch tests innovations

By Steven Siceloff
Spaceport News

A series of tiny satellites equipped with an array of sensors will take a jarring ride above the California desert on a small rocket June 15 and tell designers whether they are on track to launch into orbit next year.

Built by several different organizations, including a university, a NASA field center and a high school, the spacecraft are 4-inch cubes designed to fly on their own eventually, but will remain firmly attached to the rocket during the upcoming mission. Each of the CubeSats, as they are called, is focused on a specific experiment related to spaceflight.

Success at this point could clear the way for more such spacecraft missions that scientists say could have a big impact on how satellites are designed in the future and what kind of stresses they actually face during the climb into space.

There also are high hopes for the rocket itself, which was designed with CubeSats in mind. Built by Long Beach, Calif.-based Garvey Spacecraft Corp., the Prospector-18 rocket, flew several test flights starting in 2011 and completed a successful operational mission in December 2012. It is powered by a single engine burning liquid oxygen and ethanol.

The flight will take

the satellites between 15,000 and 20,000 feet into the air before a parachute releases, and the launch vehicle and its payloads float back to Earth.

The flight also is being watched closely as a model for trying out new or off-the-shelf technologies quickly before putting them in the pipeline for use on NASA's largest launchers.

"Overall it's a very exciting mission because we're developing new things that are going to benefit us in the future," said Garrett Skrobot, project manager for the effort under NASA's Launch Services Program. "We can test the environments, and then we know when we put it onto a flight system, we have confidence the system's going to work."

The rocket will carry four CubeSats and conduct a test of a lightweight, nano-launcher and carrier.

The new launcher weighs one-third as much as the standard rack that held three CubeSats. With the same size and capacity as the previous design known as a poly-picosat orbital deployer or P-POD, the lower-weight carrier and launcher will give satellite designers about two more pounds to work with.

"An extra two pounds for a nanosatellite is huge," said Roland Coelho, program lead at CalPoly, the California Polytechnic Institute in San Luis Obispo. The



NASA/Kim Shiffett

Student engineers evaluate the StangSat and PolySat during lab tests May 31, at Kennedy Space Center. The two craft will fly together on a brief, high-altitude flight to check out their systems, as well as those on other payloads.

extra allowance provides designers significantly more versatility in their designs and widens the CubeSat's abilities.

For this mission, the prototype carrier will hold CubeSats loaded with instruments that will measure vibration, heat and other conditions. Those readings will be used to find out whether the lightweight carrier is as strong as the previous model.

"We've had the P-POD design for over a decade and we have a lot of lessons-learned," Coelho said. "In this instance, we could design something from scratch and see how it works."

Engineers at Kennedy working through Rocket University designed and

built a CubeSat called RUBICS-1 that will test a low-cost avionics system Garvey could use on its rocket for future launches. The RUBICS-1, which is short for Rocket University Broad Initiatives CubeSat, is one of the measurement satellites that will ride in the new, lightweight carrier.

The structure and components of the satellite, are built modularly, so a cube can be adapted easily to specific missions.

The RUBICS-1 includes, for example, a GPS, radio unit and antenna, plus a small suite of sensors.

Designing and building a functioning spacecraft that can power

itself, communicate with ground stations on Earth and still collect useful information while keeping to the strict 4-inch requirement is a great challenge to satellite designers and teaches them how to adapt, the CubeSat managers said.

"We're seeing big satellites and now we're seeing guys drive down the size," Skrobot said. "They think about all the different ways they can get smaller and smaller to fit in that cube. We're a 4-inch cube and you're trying to get power, instrument and all that stuff into that package, they get very creative. It's fascinating what they come up with."

The hope is that a successful test of the ability will allow future CubeSat networks to gather data and send it to a specialized, central cube that will downlink data to the ground.

This flight will not spell the end of the mission for the satellites. The PolySat is to be refurbished and a new StangSat will be built to fly together into orbit in 2014 as a secondary payload on a cargo resupply mission to the International Space Station. "From a technical perspective, you can move down a magnitude to build a satellite and test a satellite," Daly said. "You can drastically reduce the cost of testing and developing a satellite."

For the complete story, go to <http://www.nasa.gov/kennedy>

May helps develop CCP's next-gen rockets

By Bob Granath
Spaceport News

Henry May grew up on Florida's Space Coast. From his home he watched rockets lift off from the Kennedy Space Center and Cape Canaveral Air Force Station. At the time, his father helped launch astronauts to the moon as part of the Apollo Program. May now is a member of NASA's Commercial Crew Program (CCP), a team that is developing new ways for the next generation of space explorers to travel to low-Earth orbit.

May, the Launch Vehicle Systems lead for Boeing, is working in an effort to design transportation for astronauts to the International Space Station. His job focuses on ensuring the partner's spacecraft will integrate with the designated launch vehicle.

A second-generation participant in America's space program, May spent his earliest years in California.

"My father worked at Vandenberg Air Force Base," he said. "We moved to Merritt Island when he got a job working in the Apollo Program on the Saturn V launch vehicle at Kennedy."

May was inspired by the sight of missiles heading to space from Kennedy and the Cape.

"I remember running into the backyard and looking into the sky and seeing rockets take off



NASA/Jim Grossmann

Henry May of the Commercial Crew Program, and a second-generation participant in America's space program, bonded the last tile on space shuttle Columbia before it flew the first time.

and being excited that all this was happening so close to my home," he said.

Shortly after the space shuttle Columbia arrived in 1979 to be prepared for its first mission, May had an opportunity to follow in his father's footsteps.

"I started at Kennedy fresh out of high school," he said. "I was 18 years old and was hired as a tile technician working for Rockwell International. I did that for about seven years."

When Columbia rolled out to the launch pad at the end of 1980, May was selected for a special honor.

"I bonded the last tile on Columbia before it flew the first time," he said.

When the shuttle lifted off for the STS-1 mission on April 12, 1981, he stood in awe as the engines thundered to life.

"When I saw the solid rocket boosters ignite on the first flight," he said,

"I was surprised at how much power they generated."

"In 1986, shortly after I witnessed the Challenger accident, I thought about my future and realized I needed more formal education," he said.

While working full time, he attended the University of Central Florida (UCF) where he was awarded a bachelor's degree in mechanical engineering in 1999. He later earned a master's degree in industrial engineering from UCF in 2011.

"I believe almost anyone who works in the aerospace business wants to work for NASA," he said. "In 2007, I learned that there was an opening in the Shuttle Transition and Retirement organization."

In his new role, May worked with a team that was laying the groundwork to decommission the shuttles and transfer them to be exhibited at

museums.

When the CCP office was established a few years later, May was assigned to work in their Launch Vehicle Systems Office. The commercial space transportation effort will be a vital component of future human spaceflight as NASA focuses its efforts on sending humans deeper into space.

"NASA will be purchasing transportation services to the space station," May said. "It's going to be like the start of the commercial airline industry in the early days of aviation. Our commercial partners have told us they are ready to take on this challenge and they've showed us that they can do the job."

With industry providing access to low-Earth orbit, NASA can concentrate on new destinations.

"This will allow NASA to do the big jobs such as the mission to an asteroid or going to

Mars," May said. "These are efforts that will require considerable resources and allow us to explore beyond Earth."

In the Launch Vehicle Systems Office, May's work is focusing on the rockets that will boost commercial spacecraft to low-Earth orbit.

"We're now working the Commercial Crew Integrated Capability phase of the CCP in which our partners come to us with an integrated capability – that is a transportation system including the spacecraft and the launch vehicle," he said. "I'm currently a part of the Boeing team integrating their CST-100 crew module with United Launch Alliance's Atlas V rocket."

In addition to Boeing, Sierra Nevada Corp. is developing the Dream Chaser, also set to launch atop an Atlas V and SpaceX is building the Dragon spacecraft that will lift off on their Falcon 9 rocket.

"It's going to be a shift in the way we do business," May said. "That first commercial crew launch is going to be awe-inspiring."

Commercial spaceflight, May believes, will open vistas for more individuals to travel in space, especially for the next generation of space explorers.

"The opportunities for kids today are endless," he said. "In the future, spaceflight will be open to anyone."

Scenes Around Kennedy Space Center



[CLICK ON PHOTO](#)

NASA/Kim Shifflett

Stephen Pilkenton, center, shows how to save a life for Kennedy employees attending a hands-on workshop as Scott Praetorius looks on. The event, at the Kennedy Learning Institute on June 4 in observance of National CPR/AED Awareness Week, was sponsored by the KSC Health Training Program. The session teaches workers how to use an Automated External Defibrillator (AED). For more about AEDs at Kennedy, click on the photo.



[CLICK ON PHOTO](#)

NASA/Randy Beaudoin, VAFB

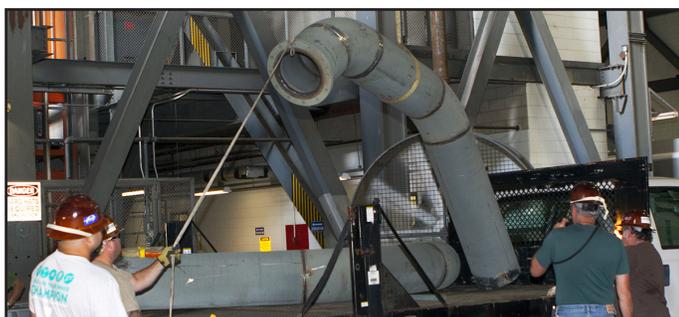
Engineers position the starboard side of the payload fairing around NASA's IRIS spacecraft June 10. The fairing connects to the nose of the Orbital Sciences Pegasus XL rocket that will lift the solar observatory into orbit in June. The work is taking place in a hangar at Vandenberg Air Force Base where IRIS, short for Interface Region Imaging Spectrograph, is being prepared for launch. For more on the mission, click on the photo.



[CLICK ON PHOTO](#)

NASA/Jim Grossmann

NASA Associate Administrator Robert Lightfoot gets a close look at the flame deflector on Launch Pad 39B during a visit to Kennedy on June 4. From left are Lightfoot; Jose Perez Morales, launch pad project manager; and Kennedy Director Bob Cabana. The pad is being modified to support NASA's new Orion spacecraft and Space Launch System heavy-lift rocket, the SLS. For more on the Ground Systems Development and Operations Program, click on the photo.



NASA/Jim Grossmann

Technicians prepare piping for a new exhaust system for crawler-transporter 1 (CT-1) inside the Vehicle Assembly Building at Kennedy on June 10. Work continues in high bay 3 to upgrade CT-1 as part of its general maintenance. CT-1 is being refurbished to carry commercial launch vehicles to the launch pad.



[CLICK ON PHOTO](#)

NASA/Kim Shifflett and Gianni Woods

NASA astronaut Dan Burbank, who served as commander of Expedition 30 on the International Space Station, signs autographs for Kennedy employees after speaking about his experiences aboard the orbiting laboratory June 7. Burbank spent 165 days living and working on the station during Expeditions 29 and 30. For more information on the space station, click on the photo.

Partnership retains crucial capabilities

By Bob Granath
Spaceport News

In June of last year, NASA signed a partnership agreement with Craig Technologies to maintain an inventory of unique processing and manufacturing equipment for future mission support at the agency's Kennedy Space Center. NASA Associate Administrator Robert Lightfoot and Kennedy's center director, Bob Cabana, recently toured the Cape Canaveral, Fla., facility, formerly known as the NASA Shuttle Logistics Depot (NSLD). In its new role, NSLD is now the Aerospace and Defense Manufacturing Center (ADMC).

During the space shuttle era, NASA's space program operations contractor, United Space Alliance, operated the NSLD, providing flight hardware and cable fabrication. It also was used in manufacturing, repair and inspection of spaceflight hardware, avionics and ground support equipment.

"I had the privilege of being on the other end of the quality products that this facility turned out keeping our shuttles flying," said Cabana, a former space shuttle commander. "I want you to know how much it means to me to see this facility still alive today. We're keeping alive a capability that we're going to need for the future."

Under a five-year, non-reimbursable Space Act Agreement (SAA), NASA has loaned hundreds of pieces of equipment to Craig Technologies retaining important assets and resulting in a significant cost savings. The NASA inventory has been enhanced with Craig Technologies' assets and investment to make an even more robust capability for wider application.

"This is an outstanding part-



NASA/Kim Shifflett

Craig Technologies electrical technician Joey Charvet checks an electrical cable in the facility's Avionics Laboratory at the Aerospace and Defense Manufacturing Center in Cape Canaveral, Fla., on June 3.

nership that we are putting in place," Cabana said. "Not only are we keeping this capability alive, but we save NASA and the taxpayer close to \$3.4 million."

NASA is developing other industry partnerships to maintain agency equipment and facilities.

"As the Kennedy Space Center turns into a multiuser facility, instead of being focused on one item like the shuttle," Lightfoot said, "more users, more people will take advantage of the investments we've made in this facility."

Established in 1999, Craig Technologies provides engineering and technical services to defense and government agencies nationwide. The company began independently operating the ADMC in January.

"I'm just very proud and very honored to have Craig Technologies to be trusted as the caretaker of these NASA assets for the next four and a half years," said Carol Craig, the company's founder and

chief executive officer.

In October 2012, Craig Technologies consolidated its corporate headquarters and manufacturing division to occupy the 161,000-square-foot ADMC facility where 53 people are employed.

"Through the SAA, NASA has provided Craig Technologies with the ability to use and maintain their 1,600 pieces of specialty equipment," said Mark Mikolajczyk, president of Craig Technologies. "ADMC continues to be capable of repairing, manufacturing and testing human spaceflight-rated hardware. We are also supporting commercial space customers, satellite manufacturers and varied commercial manufacturing fabrication and testing."

Cabana noted those capabilities will be crucial for several NASA programs on the near horizon, such as the Space Launch System (SLS), the Orion multi-purpose crew vehicle (MPCV) and the Commercial Crew Program.

"It truly is a benefit for all

of us and I look forward to continued success working with Craig Technologies as we move forward supporting the SLS, MPCV -- our heavy-lift vehicle and Orion crew vehicle -- as we charge off exploring into the future," he said.

Lightfoot also looked ahead to the agency's efforts to explore beyond low-Earth orbit.

"This is an exciting time as we get ready to start on this asteroid mission the president has asked us to do," he said. "There is going to be so much more going on here the next six to seven years. It's going to be exciting."

Craig echoed Lightfoot's view that the nation's space efforts are entering an important new era.

"American ingenuity helped us realize our dreams and lift off into space," she said. "I believe it's this same passion that will help to revitalize our industry with advanced manufacturing and research initiatives through private-public partnerships such as the one we have with NASA."

Swamp Works lab thrives on dedication

By Steven Siceloff
Spaceport News

Failure is not only an option for researchers, it's an expectation that's fundamentally tied to ultimate success. That's what two of the men behind the Swamp Works laboratory at Kennedy Space Center told colleagues taking part in a series of interviews with people who are moving the center into the future.

"Failure is not an option in a mission when you're dedicated to success," said Rob Mueller, senior technologist for advanced projects development at Swamp Works during the "Masters with Masters" session. "When you're developing the technologies, some that haven't even been invented yet, you have to fail. It's OK to fail as long as you learn from it and as



NASA/Jim Grossmann

Jack Fox, left, chief of the Surface Systems Office at Kennedy, and Rob Mueller, senior technologist for advanced projects development at Swamp Works, discuss the Swamp Works laboratory and how it takes on challenges in new ways.

long as you do it quickly and as long as you do it cheaply. Failure is not an option when you're going to the moon, but when you're in the lab, creating a little experiment, then it's certainly OK to fail."

The lab's motto, "fail fast forward," sounds unusual for a technical agency, but that's the point, Mueller said. After decades of methodically handling small issues and

moving slowly, NASA wants to take on the problems that come with deep-space exploration and use creative ways to tackle them.

Swamp Works is based inside a building behind the Space Station Processing Facility. Apollo astronauts used the facility to rehearse walking on the moon and setting up experiments.

Jack Fox, chief of the Surface Systems

Office at Kennedy, said the center has so much engineering expertise that establishing a lab to take advantage of it and use it in a different way was a comfortable fit.

"The starting point is that Kennedy has a long history of innovation and engineering technology in solving shuttle problems and payload problems," Fox said. "The easy part was we had a pretty good start-

ing point right off the bat. They wanted a lean development operation, a Skunk Works."

Ed Hoffman, NASA's chief knowledge officer and the host of "Masters with Masters," said touring the Kennedy laboratory with its collaborative teams and open spaces energized him.

"The first thing that hit me was the energy," Hoffman said. "People were engaged. It was the passion of doing a difficult thing."

The teams working in the Swamp Works have numerous experiments under way and are working up several concepts that could become operational one day.

"We felt we needed a new way to do things and that's Swamp Works," Mueller said.

For the complete story, go to <http://www.nasa.gov/kennedy>

FY 2013 Second Quarter Length of Service awardees

Herbert Rice	LX	45	Kevin Mellett	SA	30
William Dearing	IT	35	Charles Davis	TA	30
Joseph Porta	NE	35	William Glover	TA	30
Valencia Mitchell	OP	35	Kenneth Knauss	TA	30
Richard Bettin	SA	35	John Thiers	TA	30
Kenneth Strite	SA	35	Laura Thayer	IT	25
Dennis Chamberland	TA	35	William Simmonds	LX	25
Edward Tobin	TA	35	Christopher Forney	NE	25
Robert Johnson	AD	30	Gregory Galloway	NE	25
Penny Chambers	CC	30	Paul Mackey	NE	25
Susan Barth	GP	30	Brenda Penn	NE	25
Anthony Anania	IT	30	Lisa Singleton	BA	20
James Dumoulin	IT	30	Patricia Gillis	EX	20
Oscar Brooks	NE	30	Lisa Loiselle	GP	20
James Culver	NE	30	Michael Sanders	LX	20
Felix Joe	NE	30	Mary Kiss	OP	20
Roystan King Jr.	NE	30	John Newport	SA	20
Jeffrey Lamke	OP	30	Ana Contreras	TA	20
Gwendolyn Gamble	PA	30	Tiffany Nail	VA	20
Barry Braden	SA	30	Diane Vogler	VA	20
Debra Dukes	SA	30			



NASA/Tony Gray

Herb Rice, center, who joined NASA the year astronauts first left Earth for the moon, is honored for 45 years of service by Jennifer Kunz, deputy program manager of Kennedy Space Center's Ground Systems Development and Operations Program, and Kennedy Center Director Bob Cabana on April 22 in the Space Station Processing Facility.

45th Space Wing names Armagno new commander

Spaceport News Report

Brig. Gen. Nina Armagno took command of the 45th Space Wing from Brig. Gen. Anthony Cotton during a change of command ceremony June 12. Armagno recently completed an assignment as the commander of the 30th Space Wing and Western Range at Vandenberg Air Force Base in California. Armagno returns to the Space Coast as she was the 1st Space Launch Squadron Operations Officer at Cape Canaveral Air Force Station from July 2000 to September 2001.



Brig. Gen. Nina Armagno

Looking up and ahead . . .

** All times are Eastern*

2013

June 26

Mission: Interface Region Imaging Spectrograph (IRIS)

Launch Vehicle: Pegasus XL

Launch Site: Vandenberg Air Force Base, Calif.

Launch Window: 10:25:04 to 10:30:04 p.m.

Launch Time: 10:27:34 p.m.

Description: IRIS is designed to provide significant new information to increase our understanding of energy transport into the sun's corona and solar wind and provide an archetype for all stellar atmospheres.

To watch a NASA launch online, go to <http://www.nasa.gov/ntv>.

Lightning season under way

Spaceport News Report

You hear a "Phase-2 lightning warning," what do you do?

You're running outside and you hear thunder, what do you do?

Lightning is the leading source of weather deaths in Florida, killing more than nearly all other weather combined. Central Florida is "Lightning Alley," with the most lightning in the U.S. Our lightning season is late May through September.

In the U.S., 99 percent of lightning deaths occur outside. The 1 percent inside were people disobeying the indoor rules, which include staying away from conducting paths to the outside such as corded telephones, electrical appliances and wiring, and plumbing.

How can you be lightning safe?

On Kennedy Space Center, listen for the lightning watches and warnings. Follow your local procedures when you



NASA file/2002

A lightning storm flashes by Kennedy Space Center on May 30, 2002.

hear these alerts.

A "Phase-1 Lightning Watch" means lightning is expected within five nautical miles and is issued up to 30 minutes before the lightning is predicted. Five nautical miles is about six "normal" statute miles. Lightning that close is dangerous.

A "Phase-2 Lightning Warning" is issued when lightning is imminent or occurring within five nautical miles.

The 45th Weather Squadron issues lightning watches and warnings for 13 locations in the local area, including five locations at Kennedy: the Industrial Area (including Headquarters), the Vehicle Assembly Building, the Shuttle Landing Facility, Launch Complex 39, and Haulover Bridge.

NASA Spinoffs: Did you know?

The same sensors used to detect life on Mars are used to provide early warning of biological threats in water on Earth.

During the summer, a lot of people like to jump in the water . . . but what are they diving into?

Scientists at Ames Research Center created an ultra-sensitive biosensor that can detect minute amounts of potentially dangerous organic contaminants.

This NASA technology can alert organizations to potential biological hazards in water used for agriculture, food and beverages, showers, and at beaches and lakes -- within hours instead of the days required by conventional laboratory methods.

NASA has used this technology to detect biological traces, and thus life, on Mars.

Tiny, requiring little energy and no laboratory expertise, the sensor is ideal for use in space and, as it turns out, on Earth as well.

For more about NASA Spinoffs, go to <http://www.nasa.gov/spinoffs>.



John F. Kennedy Space Center

Spaceport News

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