National Aeronautics and Space Administration

The Critical PATH

2014 Summer Issue / A Flight Projects Directorate Publication

GPM: from Goddard to Japan to Orbit

In the lobby of building 32 sits a model of the Global Precipitation Measurement (GPM) mission's Core Observatory. The 1/20 scale size is deceptive; the GPM Core Observatory is the largest satellite ever built and tested at Goddard Space Flight Center (GSFC). A joint mission between NASA and the Japan Aerospace Exploration Agency (JAXA), the satellite measures rainfall and snowfall over the whole world. It has just begun its 3-year mission, the beginning of a new era of precipitation science, and the culmination of a long journey from the East Coast of the U.S. to Tanegashima Island in Japan for its February 27, 2014 launch into space.

A Journey of 7300 miles begins with One Truck

Pack it up, put it on a plane, and fly it to Japan. It sounds simple enough, but when your package is a satellite, it's anything but.

Unlike missions launching from the United States that are trucked to their launch site, GPM traveled by truck, plane, and ship in a complex journey that took

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Inside This Issue

NASA's James Webb Space Telescope Hitting Major Milestones

Gearing up for its 2018 launch date, the James Webb Space Telescope (JWST), the highly anticipated successor to the Hubble telescope, continues to hit many milestones. Now, all 18 of Webb's mirror segments and four science instruments have been delivered to NASA's Goddard Space Flight Center (GSFC).

Expected to trigger an avalanche of discoveries and significantly advance our understanding of the universe, the Webb Telescope will be used by thousands of astronomers worldwide.

Once launched and fully unfolded in space, Webb will have a 6.5-meter (21.3-foot) primary mirror and a sunshield the size of a tennis court. At its orbit about one million miles from Earth, at the Lagrange Point 2 or L2, the infrared space telescope will operate at temperatures around -240C (-400F).

This frigid condition was chosen for a specific purpose: to optimize Webb's infrared sensitivity to

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Message from the Director Of

George Morrow

It is a thrill to realize that everyone who is reading these words is reading them on some type of a "computer" screen. This is the first all-electronic issue of The Critical Path. There were no hardcopies printed for the first time in 22 years! Please forward the publication to others that you feel may be interested in it.

While we have not had any launches of Flight Projects Directorate (FPD) missions since the last issue, our recently launched missions are performing extremely well. The Global Precipitation Mission (GPM) became operational in May and data from it are now publicly available and also being used in weather forecast models. Likewise, the Tracking and Data Relay Satellite–L (TDRS-L) passed its On-orbit Acceptance Review, was handed over to the Space Network project for operations, and is in on-orbit storage adding to the robustness of the constellation.

The Mars Atmosphere and Volatile Evolution (MAVEN) spacecraft is ever closer to Mars and has passed all of its Mars orbit insertion (MOI) readiness reviews. The trajectory is spot on and currently the instruments have been turned off in final MOI configuration. Remember that MOI will be on September 21, 2014. It will be an extremely exciting day!

So often we must concentrate on the negative issues and problems that confront our projects. On an extremely positive note, Landsat Data Continuity Mission, TDRS-K, MAVEN, TDRS-L, and GPM all completed development and were launched ahead of the schedule and under the budget that we committed to. That is a great accomplishment!

All four Magnetospheric Multi-scale spacecraft have now completed thermal vacuum testing. Post-test activities are underway in preparation for shipment to the launch site in November with launch scheduled for early March 2015. Deep Space Climate Observatory is finishing up pre-ship activities and will also ship to the launch site in November for a January 2015 scheduled launch on a Space-X Falcon vehicle.

I'm looking forward to one of the most enjoyable and important events of the year to be scheduled in mid to late September 2014 – the FPD Peer Awards Ceremony. We had a wonderful slate of nominations this year and the list of awardees is spectacular. The amazing work that the FPD team accomplishes never ceases to amaze. I want to express my sincere appreciation and gratitude to all the folks that make the success of Goddard projects possible.

Sincerely,

George W. Morrow
Director of Flight Projects
george.w.morrow@nasa.gov

Personality Tintypes

Celina Hanewich

Celina Hanewich

Celina is the Flight Projects Directorate secretary. Prior to coming to Goddard, she worked as a paralegal for several years in Prince George's County. She also has many years of experience in human resources and accounting.

Education:

AA Degree in Paralegal Studies,
Anne Arundel Community College

Life at Goddard:

Celina came to Goddard in 2011 to join the Mission Support Division (Code 320) as a PAAC employee. She was the secretary for the Division Chief and subordinate Branch Chiefs. She provided project support to CSOs, Reliability, Safety and Software engineers.

In April 2013, Celina became a civil servant and continued to support Code 320 in the capacity of the Division Secretary. She became involved in several projects such as process maps for HQ and other activities above and beyond her role as a secretary. Celina enjoys being engaged here at Goddard by participating in Center procedural committees, such as Feds Feed Families, Peer Award Committees, the Safety Awareness Campaign and other planning committees. She also participates in Diversity and Inclusion events and Veteran's affairs events.

Celina joined the Flight Projects Directorate (FPD) in June of 2014 as the Directorate secretary. She is excited to continue to grow here at Goddard and learn about Code 400. She is looking forward to providing excellent administrative support to the FPD and building strong working relationships within Code 400. Celina is always looking for ways to

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Steve Padgett

Steve Padgett

Steve is the Deputy Program Director, Integrated Program Task Lead (IPTL) and IT Lead for the Program Analysis And Control (PAAC) III Contract. PAAC provides over 500 support personnel to Goddard in the areas of Planning and Scheduling, Configuration Management, Information Technology, Documentation and Library, General Business and General Accounting.

Born:

Washington, DC

Residence:

Lives in Alexandria, VA with his wife Kellie, daughter Haven, and son Sean

Education:

B.S. East Carolina University
M.S. University of Maryland University College,
Computer Systems Management

Steve didn't start out as a computer science major. He went to East Carolina University with the goal of becoming a Physical Therapist. Steve was also a placekicker for their Division-I football team, and the Captain of their Club Lacrosse team. Steve was red-shirted as a freshman, which meant he had a 5th year at the University to play football (and take additional coursework). During that extra time, Steve took additional classes in Computer Science and Psychology. As he progressed through the program, he quickly became enamored with the similarities between recording the electrophysiology of muscle and brain activity with computer processing. Whenever possible, he stayed late in the labs to learn more about the design and application of these systems. That applied use of computer science made a pronounced impact on how he views IT today.

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Working at extremely cold temperatures, the James Webb Space Telescope will see deeper into the universe than ever before.

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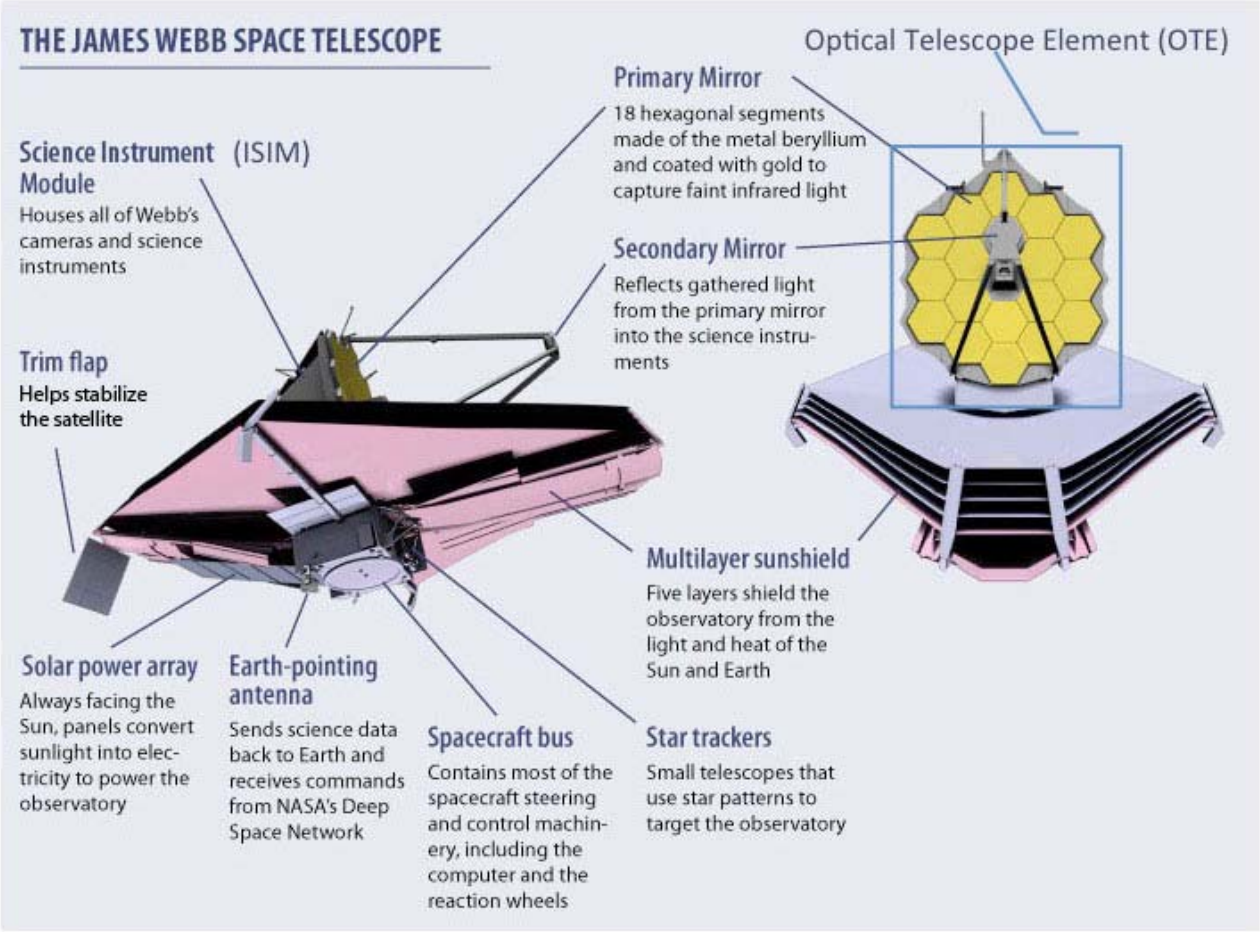
see ancient stars and galaxies. Infrared light is basically heat radiation, and the Sun, Earth, Moon and stars – anything with a temperature – give off infrared light. In order to see faint and distant objects, Webb will need to deploy the huge sunshield and stay very cold to prevent stray infrared light from reaching its sensitive instruments.

The largest space telescope ever built, Webb will be capable of capturing images of the universe from 13.4 billion years ago. To be able to see that far, its mirror will be so large that it will not fit into any rocket. The entire telescope must be folded up to fit into

(JWST continued on page 5)



The Observatory is the space-based portion of the James Webb Space Telescope system and is comprised of three elements: the Integrated Science Instrument Module (ISIM); the Optical Telescope Element (OTE), which includes the mirrors and backplane, and the Spacecraft Element, which includes the spacecraft bus and the sunshield.

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a rocket and must open up like a transformer in space. See Webb's deployment video:

https://www.youtube.com/watch?v=bTxLAGchWnA

To make this happen, there are many engineering milestones that must be hit prior to meeting its launch date.

"This isn't a marathon where we have a long time to get to launch," said Webb's Deputy Project Manager Paul Geithner. "This is a series of sprints to meet each of the major milestones."

Testing Webb's "Heart"

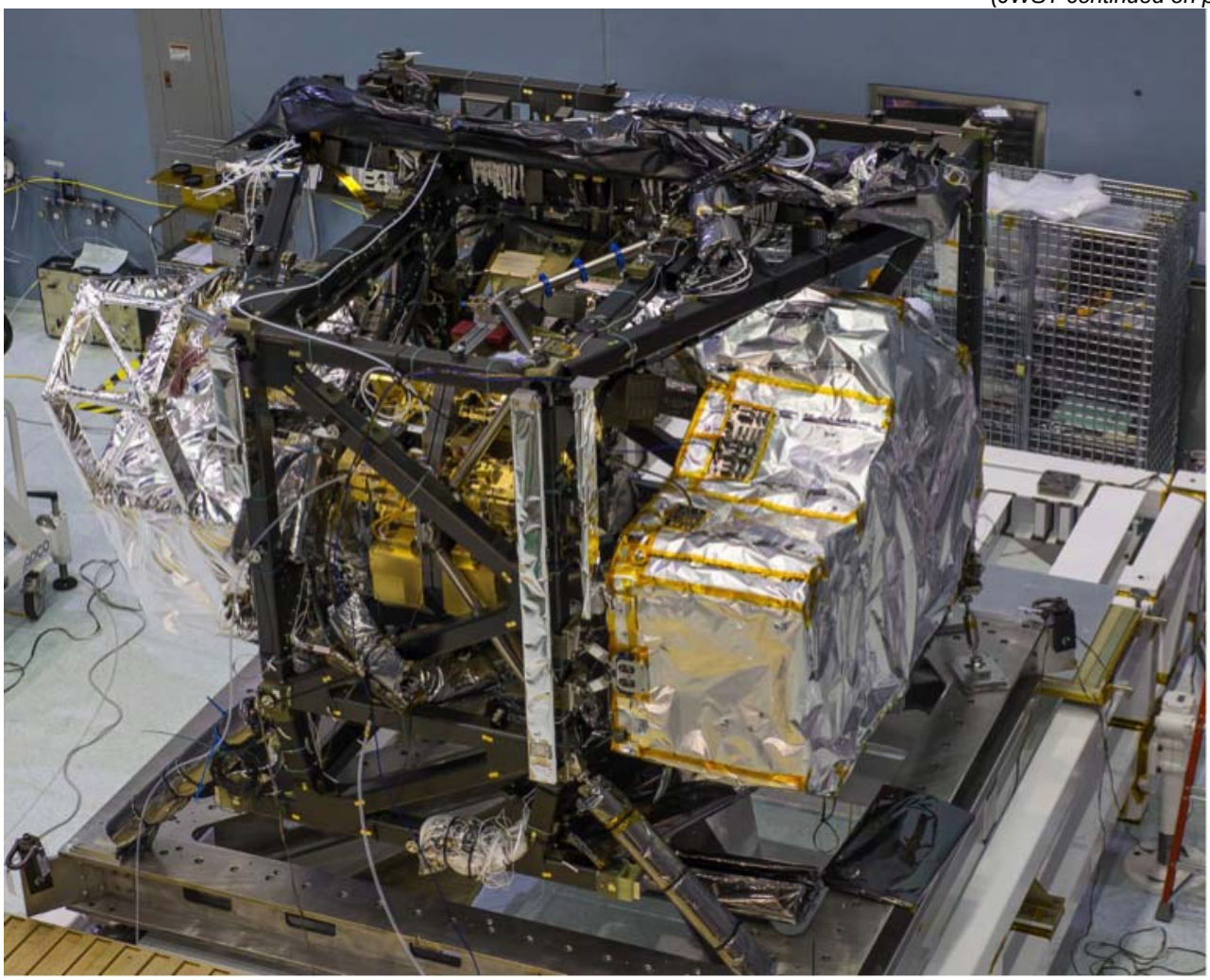
On March 25, 2014 teams of engineers navigated very cramped spaces dense with delicate materials to install the last piece of Webb's 'heart' inside the world's largest clean room at Goddard.

This 'heart' of Webb is called the ISIM, or Integrated Science Instrument Module, which holds all four of Webb's science instruments. Together, Webb's instruments will help unlock the history of our universe, from the first luminous glows after the Big Bang, to the formation of stellar systems capable of supporting life on planets like Earth, to the evolution of our own solar system.

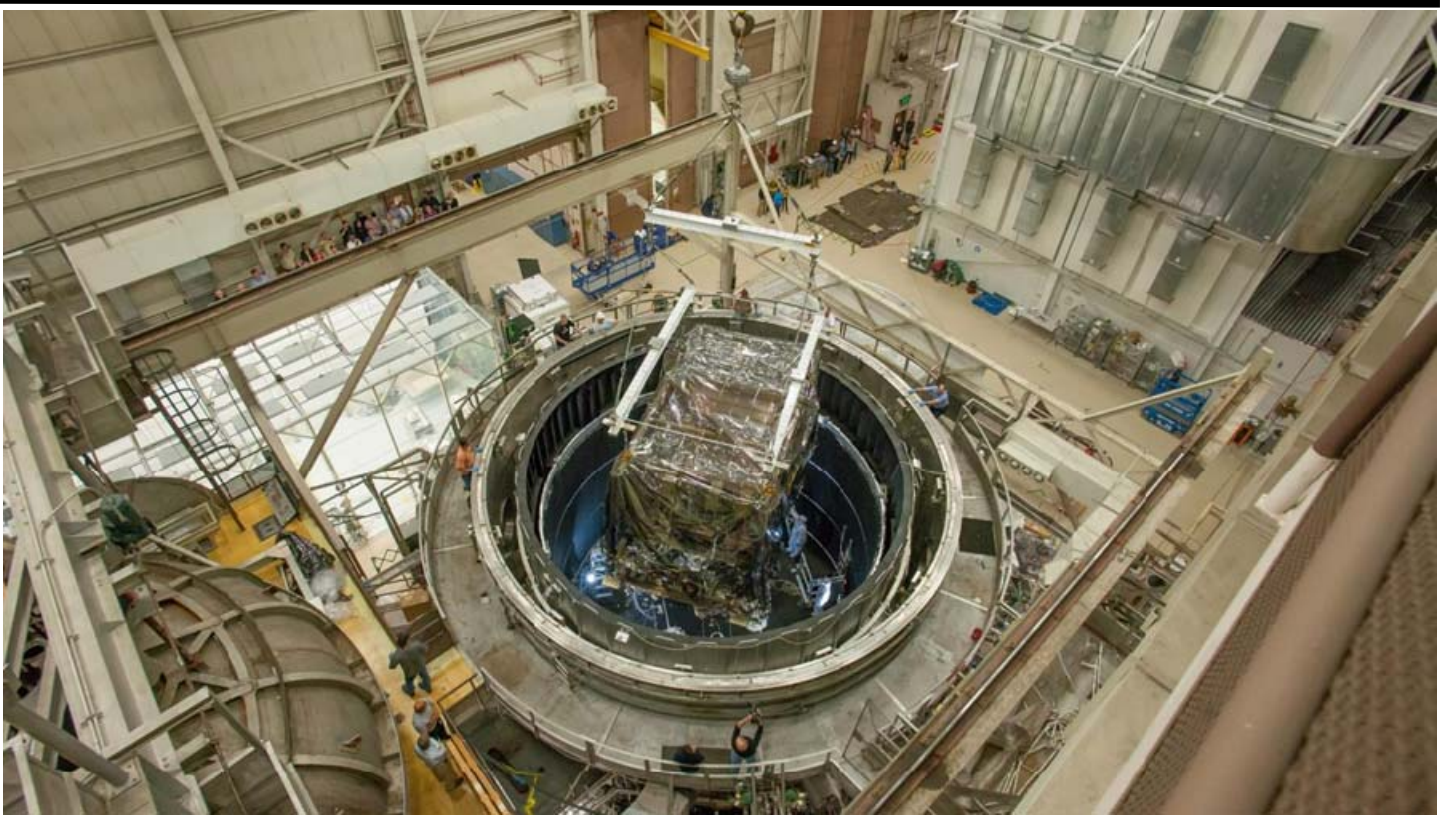
"Webb will be the premier on-orbit observatory for decades to come. Across the entire U.S. hardware is being built, delivered, assembled and tested as we are now in full up integration and test," said Webb's Project Manager Bill Ochs. "The completion of each activity brings us one step closer to launch."

After engineers installed the four science instruments, a crane lifted ISIM 30 feet in the air and lowered it into the Space Environment Simulator, Goddard's large thermal vacuum chamber, where it is currently undergoing its second cryogenic test.

(JWST continued on page 6)



The JWST Integrated Science Instrument Module (ISIM) with the last science instrument installed
Credit: NASA/Chris Gunn



Standing on the highest catwalk in the Integration and Test Facility, Webb photographer Desiree Stover captured this image of the "heart" of the* James Webb Space Telescope *as it was lowered into the massive thermal vacuum chamber at NASA's Goddard Space Flight Center in Greenbelt, Maryland. This "heart" of Webb is called the ISIM or Integrated Science Instrument Module, which along with its thermal vacuum test frame and supporting hardware, weighs about as much as an elephant. Within this test frame, ISIM sits inside a big-mirrored cube of cryo-panels and blankets.

Image credit: NASA/Desiree Stover

This process can be seen in a video by a Goddard videographer: https://www.youtube.com/watch?v=JszEpqqu9Xo.

(JWST continued from page 5)

"This is the first time we are able to test the 'heart' in this configuration, which includes all four of Webb's science instruments installed on ISIM," said Engineer Jack Marshall at NASA Goddard.

After 4 months of testing, the ISIM will return to the world's largest clean room at Goddard for additional work and testing. Another thermal vacuum test of ISIM is scheduled in 2015.

Mirror, mirror on the wall, who's the largest one of all?

On December 16, 2013, a giant truck rolled into Goddard's Building 29 parking lot holding the last of Webb's 18 primary mirrors. This was another huge milestone for the development of Webb. Those segments make up the huge primary mirror. All of the mirrors can be seen in their containers inside the world's largest clean room at Goddard. A mirror this large has never before been launched into space. The Webb Telescope team decided to make the mirror segments from beryllium, which is both strong and light. Each segment weighs only approximately 20 kilograms (46 pounds).

Since the telescope and instruments are being built on Earth – at room temperature in a 1g environment – but will operate at frigid "cryogenic" temperatures while weightless in space, engineers have to design and build them considering how the parts will change shape with temperature and behave without gravity. Typically, materials shrink when they get cold, and different materials shrink at different rates with temperature, and Webb is made of many different materials and will operate hundreds of

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The powerful primary mirrors of the JWST will be able to detect the light from distant galaxies. The manufacturer of those mirrors, Ball Aerospace & Technologies Corp. of Boulder, Colorado, celebrated their successful efforts as mirror segments were packed up in special shipping canisters (cans) before they were shipped to NASA.

Credit: Ball Aerospace

(JWST continued from page 6)

degrees below room temperature. "We have to build the telescope and science instruments exactly wrong so that they will be exactly right in space. That's a real engineering challenge," said Geithner.

Testing Webb's Backbone

On July 18, 2014, the engineering test unit for the backplane that acts as a spine connecting the mirrors to the instruments arrived at Goddard. This test unit, called the Pathfinder backplane, will not be the one flying in space although it is basically a prototype. It will be used for testing so the engineers can practice installing the spare mirrors onto it.

Over the next few months, engineers will install two spare primary mirror segments and the spare secondary onto it. Then the Pathfinder will be shipped to NASA Johnson to be tested in Chamber A, where the Apollo spacecraft were tested.

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Across the country at Northrop Grumman in Redondo Beach, California, the actual flight backplane center section and the Backplane Support Frame (BSF—the structure behind the backplane center section that will house the ISIM structure) completed static load testing in July. "Static testing demonstrates the backplane has the structural integrity to withstand the forces and vibrations of launch. This is the final test prior to starting the integration of the backplane with the rest of the telescope," said Lee Feinberg, NASA's optical telescope element manager at Goddard.

Sunshield: One million SPF

None of this amounts to much without the sunshield to protect the telescope and instruments from direct illumination that would prevent the system from making observations.

The Sunshield is the largest part of the Webb telescope. The five layers of thin membrane called Kapton, that feels like a Mylar balloon, must unfurl reliably in space like a parasol.

In July, for the first time engineers stacked and unfurled a full-sized test unit of the Sunshield at a cleanroom in the Northrop Grumman facility in California. It worked perfectly.

Northrop Grumman is also continuing to manufacture the spacecraft.

Webb is an international project led by NASA with its partners, the European Space Agency and the Canadian Space Agency.

For more information about the Webb telescope, visit: www.jwst.nasa.gov or www.nasa.gov/webb

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The Sunshield is about the length of a tennis court, and will be folded up like an umbrella around the Webb telescope's mirrors and instruments during launch. Once it reaches its orbit, the Webb telescope will receive a command from Earth to unfold, and separate the Sunshield's five layers into their precisely stacked arrangement with its kite-like shape. The Sunshield test unit was stacked and expanded at a cleanroom in the Northrop Grumman facility in Redondo Beach, California.

Credit (and photo on next page): NASA/Chris Gunn

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For more news on JWST check out these links:

In a JWST press conference, NASA Administrator Charlie Bolden said, "JWST will revolutionize our understanding of the universe." NASA Highlights James Webb Space Telescope Progress with Senator Barbara Mikulski and NASA Administrator Charles Bolden:
https://www.youtube.com/watch?v=k6ve3E7O1Dk

The Amazing Anatomy of James Webb Space Telescope Mirrors http://www.nasa.gov/content/goddard/the-amazing-anatomy-of-james-webb-space-telescope-mirrors/#.U9B6YyTuxiM

Webb Telescope Microshutters Journey into NASA Clean Room:
http://www.nasa.gov/content/goddard/webb-telescope-microshutters-journey-into-nasa-cleanroom/

Discover the "X-Factor" of NASA's Webb Telescope in "Behind the Webb" Video http://www.nasa.gov/content/goddard/discover-the-x-factor-of-nasas-webb-telescope-in-behind-the-webb-video/

Finding Life Beyond Earth is Within Reach:
http://www.nasa.gov/content/finding-life-beyond-earth-is-within-reach/

Testing Completed on NASA's James Webb Space Telescope Backplane:
http://www.nasa.gov/press/2014/july/testing-completed-on-nasas-james-webb-space-telescope-backplane/

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Dr. Neil deGrasse Tyson, Director of the Hayden Planetarium in New York and host of the PBS 'Cosmos' series, visited with Goddard Space Flight Center Director Chris Scolese and the James Webb Space Telescope team at GSFC on June 3, 2014. Tyson spoke to the team and was able to see the giant vacuum test chamber that now holds the heart of the telescope, the Integrated Science Instrument Module. Tyson said, "So good to meet the heartbeat behind the James Webb Space Telescope."

See more pictures from his visit: www.flickr.com/photos/gsfc/sets/72157644988859321/

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Space Experts Discuss the Search for Life in the Universe at NASA: https://www.youtube.com/watch?v=GNjuz6MO0eU

Webb's Fully Integrated 'Heart' Lowered into the Chamber (feature): http://www.nasa.gov/content/goddard/webbs-fully-integrated-heart-lowered-into-the-chamber/#.U58HCyjCD1c,
Video: http://svs.gsfc.nasa.gov/vis/a010000/a011500/a011570/

The James Webb Space Telescope by Peter Cullen ('Optimus Prime'). Voice actor Peter Cullen, known for bringing to film and television numerous characters including Optimus Prime of "Transformers", Disney's Eeyore and many more, describes NASA's next generation space telescope: https://www.youtube.com/watch?v=X1m68NSaTYs.

Laura Betz / 443
JWST Science Writer

Richard Ryan / 443
Deputy Project Manager / Resources

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more than 2 years to plan. While the GPM engineering team integrated and tested the satellite at Goddard, the logistics team worked out hundreds of details from customizing GPM's shipping container and the truck that transferred it to the Air Force Super Galaxy C-5 cargo plane, to arranging the flight, and cranes to move the container, to lining up wide-load permits in the United States and Japan, accommodating to Japanese customs, and the personnel required to do all the work.

"It was above and beyond the mundane stuff," said Jean Manall of Goddard's Logistics and Project Support Branch, who led the effort. "I can ship a spacecraft down to Kennedy [Space Center in Florida] with my eyes closed, you know, but this involved a lot more."

On November 21, 2013, the C-5 took off from Joint Base Andrews in Maryland, flying north. When strong headwinds prevented the originally planned in-flight refuel, the C-5 landed at Elmendorf Air Force Base in Anchorage, Alaska, to gas up. Then a winter storm swept in, and the 2-hour stopover turned into 2 days. The unexpected landing threw off GPM's timetable, and Manall was on the phone as soon as the plane landed, calling ahead to adjust the arrangements already in place in Japan.

The C-5 continued on November 23, crossing the dateline and landing at Kitakyushu Airport on November 24. Loaded onto another truck, the GPM shipping container traveled about a mile to the port where a cargo ship was waiting. Weather again interrupted the journey, when winds and rough seas forced the freighter to weigh anchor for 24 hours at the port of Saiki, halfway down the coast of Kyushu Island. The freighter arrived at Tanegashima Island on November 26, and the container offloaded onto another truck. After waiting until midnight, when the roads would clear, the GPM Core Observatory travelled the last few miles to Tanegashima Space Center.

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GPM's shipping container is unloaded from the U.S. Air Force C-5 cargo plane that carried it to Kitakyushu Airport, Japan.

Credit: NASA/Michael Starobin

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An American Engineering Team in Japan

Tanegashima is a small island off the southern coast of Kyushu, the southernmost of Japan's four big islands. It's about 35 miles long and 9 miles wide, similar in size to Guam, and covered in sugar cane and sweet potato farms as well as a dense sub-tropical forest. It's small-town rural Japan, but as soon as you drive into the southernmost town of Minamitane, rockets start appearing on every major signpost.

Minamitane is the closest town to Tanegashima Space Center. It has a few main streets, a mix of modern shops, Sixties concrete facades, and hotels studded with every JAXA and NASA mission sticker that's passed through the space center going back two decades.

Tanegashima Space Center is 20 minutes down a twisting highway east of town. As you enter the grounds, the road splits. Downhill goes to the Space Museum and Takesaki Observation stand, and the dense foliage gives way to a sloping beach and sandstone sea rocks off the coast. Visible to the north are the red and white towers of the two side-by-side launch pads of the Yoshinobu Launch Complex.

"About 200 people working on GPM came to Tanegashima at one point or another," said Kelly Catlett, the GPM project's support team lead.

A rolling staff began arriving just before the spacecraft arrived in Japan. Most came in December for the Core Observatory post-shipping performance tests, then returned home, some to return in January or February. Some GPMer's lived on Tanegashima for the entire 4 months before launch, with just short breaks to return home. Collectively they knew the restaurants in Minamitane and all the spots to go in Tanegashima -- it's not a big island, smaller than NASA's Kennedy Space Center.

(GPM continued on page 13)

A Japanese H-IIA rocket carrying the NASA-JAXA, GPM Core Observatory is seen as it rolls out to launch pad 1 of the Tanegashima Space Center, Tanegashima, Japan.

Credit: NASA/Bill Ingalls

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The rocket arrived on January 20, and the GPM team was invited to participate in a Shinto blessing ceremony in front of the rocket on January 22. The GPM Instruments' Chief Safety and Mission Assurance Officer, Lynette Marbley, represented the team.

"The ceremony was broken into several sections with the Shinto priest doing a lot of chanting approaching the altar, bowing and shaking a large branch in front of the altar and over his shoulders. The room was very quiet," she said of the ceremony. While the whole GPM team participated in bowing and clapping as a group at certain times, as the NASA representative Marbley's role was to take the offering branch in a specific way and place it on the alter. "I was very nervous," she said. "I have never felt so proud to represent NASA and my country."

Living and working in Japan, the language barrier was one of the challenging things to cope with, said Glenn Bock, a test conductor who stayed in Japan for the whole stint. At the Space Center the Japanese engineers speak English, however most business owners in Minamitane only have a few English words. But, Bock said, for everyday transactions "if they don't know English, you can write it down and they'll be able to understand it, or you point."

Lighting Up the Night, Skyward

On February 27, 2014, at 3:37 a.m. local Japan time, the sky above Tanegashima island lit up as bright as daylight. The Japanese H-IIA rocket blasted off into a clear night, blinding out the view of the rocket itself. About 20 seconds later, the rumble reached observers at minimum 3 kilometers (1.9 miles) away as they watched the tiny speck fade into a field of stars.

Meanwhile, in three control rooms at Tanegashima Space Center and two at Goddard, the engineering and launch team sat at their consoles monitoring every second of progress as the GPM Core

(GPM continued on page 14)

A Japanese H-IIA rocket, with the NASA/JAXA GPM Core Observatory onboard, is seen launching from the Tanegashima Space Center on Friday, February 28, 2014.

Credit: NASA/Bill Ingalls

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Observatory passed through the first critical milestones after launch.

The first is fairing jettison, when, about 4 minutes after liftoff, the white nose cone that protects the spacecraft through the atmosphere released and fell away, the spacecraft still attached to the still-ignited rocket. The second is spacecraft separation, which occurred at a little over 15 minutes, viewed on telemetry and the camera attached to the rocket. For the Japanese teams who provided the rocket, these were moments of celebration.

Caitlin Bacha of the GPM propulsion team, on console in the Launch Support Room at Goddard, wrote a few hours after launch. "Wahoo! Success!! I also think it's funny how many videos have all the cheering after the rocket goes up. In here it was silent. The cheers came 10 minutes after with acquisition of signal. And again with the solar arrays deployed. Since then it's been a flurry of activity in the LSR!"

The Core Observatory had one hitch as it entered orbit, a gain in rotational momentum due to reversed polarity on its torquer bars, which was quickly fixed by a software patch, one of the first adjustments made during the check-out period from March to May.

Spinning Up to Speed

The check-out period is like taking a new car out on a road trip – the engineers in the driver's seat learn how it handles and make adjustments to find the "sweet spots" for smooth flying and data collection. In the first weeks after launch the Flight Operations Team at Goddard, supported by the engineers who built the spacecraft, turned on spacecraft systems and ran them through normal procedures.

The team turned on both science instruments a few days after launch: the GPM Microwave Imager on March 1, and the Dual-frequency Precipitation Radar on March 2. Two weeks after launch, both instruments were collecting data and the team had begun calibration procedures to ensure that the data returned is as accurate as possible.

"GMI is the best calibrated radiometer out of the box that we've ever had. And DPR is well-calibrated for this stage," said Erich Stocker, GPM deputy project scientist and project manager for the Precipitation Processing System at Goddard, which handles data for GPM.

The spacecraft's first public images, released on March 25, 2014, show precipitation falling inside a March 10 cyclone over the northwest Pacific Ocean, approximately 1,000 miles east of Japan. The data were collected by the Core Observatory's two instruments: JAXA's Dual-frequency Precipitation Radar (DPR), which imaged a three-dimensional cross-section of the storm; and, NASA's GPM Microwave Imager (GMI), which observed precipitation across a broad swath.

"It was really exciting to see this high-quality GPM data for the first time," said GPM project scientist Gail Skofronick-Jackson. "We now can measure global precipitation of all types, from light drizzle to heavy downpours to falling snow."

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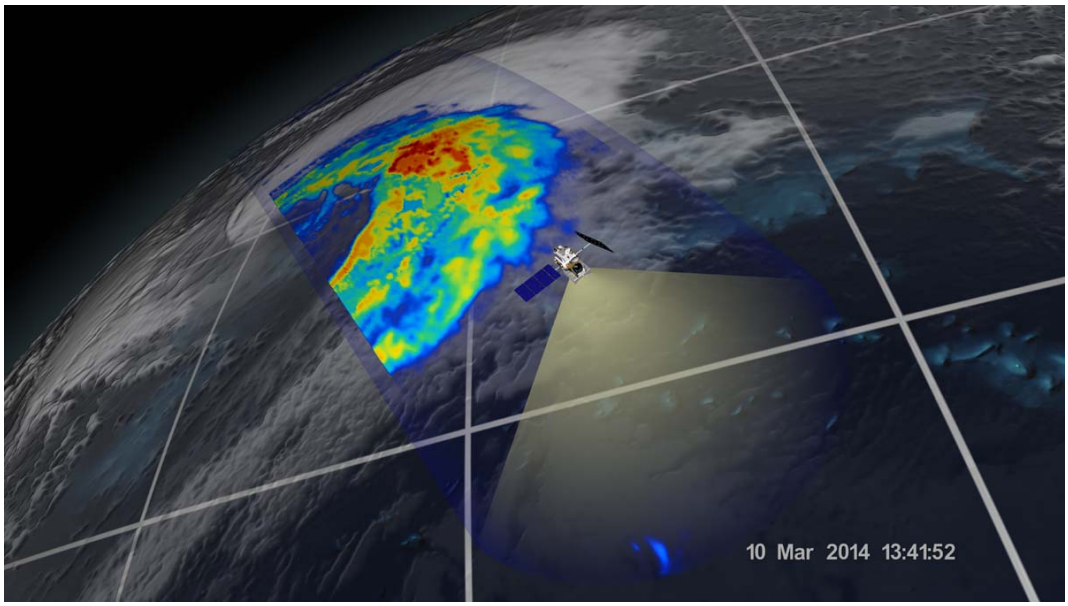

GMI image of March 10 extra-tropical cyclone. The colors show the rain rate: red areas indicate heavy rainfall, while yellow and blue indicate less intense rainfall. The upper left blue areas indicate falling snow.

Credit: NASA/JAXA

(GPM continued from page 14)

The satellite's capabilities are apparent in the first images of the cyclone. Cyclones such as the one imaged – an extra-tropical cyclone – occur when masses of warm air collide with masses of cold air north or south of the tropics. These storm systems can produce rain, snow, ice, high winds, and other severe weather. In these first images, the warm front ahead of the cyclone shows a broad area of precipitation – in this case, rain – with a narrower band of precipitation associated with the cold front trailing to the southwest. Snow is seen falling in the northern reaches of the storm.

The GMI instrument has 13 channels that measure natural energy radiated by Earth's surface and also by precipitation itself. Liquid raindrops and ice particles affect the microwave energy differently, so each channel is sensitive to a different precipitation type. With the addition of four new channels, the GPM Core Observatory is the first spacecraft designed to detect light rain and snowfall from space.

In addition to seeing all types of rain, GMI's technological advancements allow the instrument to identify rain structures as small as about 3 to 9 miles (5 to 15 kilometers) across. This higher resolution is a significant improvement over the capability of an earlier instrument flown on TRMM.

The DPR instrument adds another dimension to the observations that puts the data into high relief. The radar sends signals that bounce off the raindrops and snowflakes to reveal the 3D structure of the entire storm. Like GMI, its two frequencies are sensitive to different rain and snow particle sizes. One frequency senses heavy and moderate rain. A new, second radar frequency is sensitive to lighter rainfall and snowfall.

"Both return independent measurements of the size of raindrops or snowflakes and how they are distributed within the weather system," said DPR scientist Bob Meneghini at Goddard. "DPR allows scientists to see at what height different types of rain and snow or a mixture occur – details that show what is happening inside sometimes complicated storm systems."

The DPR data, combined with data from GMI, also contribute to more accurate rain estimates. Scientists use the data from both instruments to calculate the rain rate, which is how much rain or snow falls to Earth. Rain rate is one of the Core Observatory's essential measurements for understanding where water is on Earth and where it's going.

On May 29, GPM Deputy Project Manager Candace Carlisle (left) handed over the "key" to the GPM Core Observatory to GPM Mission Director James Pawloski (center, blue shirt). Also pictured, left to right, Wynn Watson, Art Azarbarzin, Gail Skofronick-Jackson and David Ward.

Credit: NASA

Free Flying

A series of propulsion burns in March and early April took the Core Observatory into its final orbit at 253 miles (407 kilometers). At that altitude, however, drag is still a problem – a very thin layer of atmosphere still exists, which can slow down a quickly moving satellite with two extended solar arrays. In low-Earth orbit slowing down means losing altitude. To counteract the drag, the thrusters had a

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planned burn every week to maintain speed and altitude. After evaluating how well the solar arrays were collecting power – very well – the flight team made minute adjustments to the angle of the arrays to reduce drag, reducing the need for altitude maintenance burns to every other week.

Altitude adjustments are one part of the Core Observatory's new routine, which also includes retrieving housekeeping data on the satellite systems and maintaining contact with NASA's communications satellites for speedier data downlinks. And, approximately every 40 days, moving in the same orbit direction, the team flips the spacecraft front-to-back. Due to GPM's inclined orbit 65 degrees from the equator, the spacecraft has an odd angle to the Sun. The reversal of its orientation keeps the Sun on the appropriate side of the spacecraft and prevents overheating.

The check-out period ended and the official handover to the Earth Science Mission Operations (ESMO) team at Goddard took place on May 29. Final tweaks and validation of the science data continue through the summer, and the Precipitation Processing Center will continue to streamline its production of multiple kinds of datasets, from the Core Observatory's individual 90-minute orbits to combining data with other satellites into global precipitation maps. All GPM data will be available to the public by September 2014.

Ellen Gray / Code 130
Science Writer

Note: The preceding article is adapted from previously published articles that can be found on http://www.nasa.gov/gpm.

To Debris Or Not Debris

Yes dear reader, it is debris. And the number of pieces comprising this debris numbers in the hundreds of thousands (most likely millions), although only about 23,000 are large enough (the size of a basketball) to be currently tracked. Travelling at three times the speed of a bullet, every active spacecraft and the ISS are in constant danger of a disastrous collision. To help consolidate forces in recognition of this looming danger, The University of Maryland (UMD) has established the Center for Orbital Debris Education and Research (CODER) and will serve as a mid-point for academic, government and industry research collaboration.

Almost at the same time the Air Force has awarded Lockheed Martin a nearly 1 billion-dollar contract to develop a surveillance system that will provide continuous tracking of space debris (junk), including dead, destroyed and colliding satellites, spent rocket stages, astronaut lost equipment; a veritable mine field of objects lost in space over the past half-century.

Much like the environment, orbital debris is a global issue, and it is hoped that between the two organizations, solutions to this critical problem can be addressed and solved. The eventual goal of CODER would be to create a system to clean up near–Earth orbit debris in the future. Concurrently the Lockheed goal is to track all debris down to the size of a softball, rather than the current tracking capability of junk the size of a basketball. This new "Space Fence" will replace the Space Surveillance Network which has been spotting debris objects since 1957, the year that Sputnik was launched. Precision tracking will be conducted by the Space Fence utilizing a higher wavelength frequency capable of detecting small objects than heretofore in low-Earth orbit .The Fence will provide continuous radar pulses that detects, tracks, and determines orbits of objects as they go through the pulse field.

CODER will be an international clearinghouse for research on orbital debris issues and will be a hub for the interchange of ideas, conferences, research and solutions. There are currently 60 countries operating in space in one form or another.

The Editor

Social News

* Best wishes to Margaret Metcalf (405) and her husband Jason. They welcomed the arrival of their son, Jacob Samuel Metcalf, into the world on January 30, 2014.

* Congratulations to Jared Mattick (Prototype Productions/426) and his wife Heather on the birth of their son. Max was born on July 12, 2014 at 12:00 noon, weighing 9 lbs., .04 oz. Both mother and baby are doing great.

* Nita Aanderud Jilek (433) and Steven E. Pszcolka (401) were recently engaged. A January 2015 wedding is planned. They will honeymoon for 2 weeks in Hawaii.

* Best wishes to Caleb Noblitt (405) and his wife Kathy, who welcomed the arrival of their son Zachary Addison Noblitt into the world on July 22, 2014.

* Congratulations to Ricardo Martinez-Serrano (470) on receiving his Master's Degree in Business from University of Maryland, University College, June 2014.

* Charles J. Dobrosielski, the last child (fifth) of Steve Dobrosielski (417) and his wife Marguerite, graduated from Eleanor Roosevelt High School in May 2014 with a 4.39 GPA. In addition, he passed 11 AP courses. Also, he achieved the rank of Eagle Scout in the Boy Scouts of America in February 2014, and will be going to the University of Maryland this Fall, probably doing a double major. Steve said that for those of you who may be wondering, Charles got most of his smarts from his mother, Marguerite!

* Janet Wood's (ASRC/460) daughter, Stacy (ASRC/615) was married to Michael Milligan (ALUTIIQ LLC/ 240), on July 26, 2014. After their beautiful Eastern Shore wedding, the happy couple took a well-deserved cruise as well as a trip through the Florida Keys.

ISEE-3—Then (1978) and Now (2014)

The International Sun/Earth Explorer 3 (ISEE-3), later renamed the International Cometary Explorer (ICE) was launched August 12, 1978 in a heliocentric orbit to study the interaction between the Earth's magnetic field and the solar wind. Years later it became the first spacecraft to visit a comet, passing through the tail of Comet Giacobini-Zinner. Routine contact was suspended with the spacecraft in 1997.

Dr. Robert Farquhar was a spaceflight engineer on ISEE-3 at Goddard and later played a pivotal role in redirecting the spacecraft to ride tail on a comet. Today, in 2014, at the age of 82, he is part of a 'cowboy' unofficial group with support from Skycorp company to resuscitate the spacecraft in what was called a 'Reboot" effort to further carry out its original mission. NASA announced a Non-Reimbursable Space Act Agreement with the Reboot Project on May 21, 2014. Although two-way communication was established with the s/c in May of 2014, unfortunately thrusters failed (after initially being fired) due to a lack of nitrogen pressurant in the fuel tanks.

As a result the team intends to use those instruments still working to gather data as it flies by the moon on August 10 and enters a heliocentric orbit similar to Earth's.

Bob Farquahr will be the guest speaker at the September 9 GRAA luncheon at 11:30 a.m. at Greenbelt American Legion Post #136 at 6900 Greenbelt Road. He will speak primarily about the ISEE-3 Reboot Project in a talk entitled: "Teaching Old Spacecraft New Tricks." Email your interest at: mdspacebr@aol.com.

The Editor

Knowledge Management Corner

The Dynamic Puzzle of Project Office Space

How is office space allocated to project staff? What can be done to make the process more efficient? Optimizing the use of available space to satisfy project needs is a complex and dynamic puzzle which starts with the Center's Facility Master Plan.

How does the Facility Master Plan affect the Flight Projects Directorate?

Two guiding principles of the Facility Master Plan are driving changes for the Flight Projects Directorate (FPD):

1) *Renew facilities to meet future mission requirements*

The biggest change in the near future for FPD will be the move of more than 300 employees into the new Flight Projects Building (building 36) and the removal of buildings 16 and 16W. The removal of these two buildings will allocate space for the Instrument Development Facility.

2) *Consolidate activities into strategic "neighborhoods"*

Currently, the Center has enough office space to support the directorates but vacant offices tend to be fragmented across the Center. While this may be acceptable to other directorates, FPD looks for a large portion of contiguous space to house a project.

Over the past few years, FPD has significantly consolidated its office space. FPD is now controlling all of building 12, the ground floor of building 23, and part of building 22. Following the opening of building

(KM continued on page 19)

Artist's concept of the new Flight Projects Directorate Building, Building 36
Credit: AECOM

(KM continued from page 18)

36, the directorate will centrally house 1,000 employees, including contractors and those matrixed to a FPD-managed project.

Who manages the process at the Center level and at the directorate level?

At the Center level, Nancy Abell, Associate Center Director, allocates space to the directorates and then the directorates are responsible for allocating space to their organization.

Each directorate has a representative on the Facilities Review Committee (FRC). The FRC discusses space issues and facilities, as well as allocates and prioritizes funding for facility upgrades across the Center. The FRC oversees facilities with guidance from technical experts. James Barcus is FPD's representative and Cecilia Czarnecki is the alternate.

FPD's FRC representative keeps track of FPD office space availability by using a Center-wide database commonly referred to as the "Ches report" (named after long-time Goddard employee Chesley Looney). It is critical to keep the database up to date with information regarding who is occupying what offices which in turn determines the office space available.

FPD determined that the co-location of project personnel is preferable whenever possible. Co-location is more efficient and facilitates informal and formal communications, to include impromptu meetings, and team spirit. For some projects, co-location is not an option since a portion of the work may be done in partnership with outside contractors, academic institutions, and foreign partners with facilities in other countries. For team members working within the Goddard Greenbelt campus, co-location is important.

Within buildings and floors now controlled by FPD, how is space allocated to projects?

There are no policies that require project team members to be co-located, but there are other types of requirements that affect how space is allocated. For example, Goddard Procedural Requirement (GPR) 8800.1, *Facilities Utilization Program*, provides specific guidelines for the amount of space allocated to different categories of employees. FPD civil servants are allocated between 75 square feet and 375 square feet (director-of) while most contractors are allocated 75 square feet. Within the civil servant office space allocations, there are also distinctions based on grade level. The challenge for the FPD FRC representative is to keep a close watch on projects' space requirements. This can only be done by working closely with project managers and their project support manager to come up with optimal solutions. For in-house projects, space requirements may change throughout the project life cycle. For example, during the integration and testing (I&T) phase, projects want to have office space as close as possible to the I&T facilities, which is controlled by the Applied Engineering and Technology Directorate (AETD). The FPD housing coordinator will work with AETD and projects as needed to find space during their I&T phase.

> *"The primary reason for keeping the LIST database current is that it's the database security uses to locate an employee in an emergency."*
>
> *~ Jimmy Barcus*

Within their space allocation (based on staff numbers and categories), projects have some flexibility to give individuals more or less space than is technically mandated by GPR 8800.1. Projects may transform an office into a conference room but otherwise they have to use shared conference space available throughout the buildings. When it comes to prioritizing project requests for space, large in-house projects (James Webb Space Telescope, Magnetospheric Multiscale Mission, Advanced Topographic Laser Altimeter System) may receive priority depending on the timing of their needs, and project classification. The closer a project nears its launch readiness date, the more likely their requirements will be given top priority.

When new projects are selected, project management notifies the directorate housing coordinator of their space requirements. Giving the directorate housing coordinator advance notice allows time to provide housing options. Ideally, for competed missions, the Advanced Concepts and Formulation Office contacts the directorate housing coordinator and provides a list of submitted proposals and anticipated space requirements.

(KM continued on page 20)

(KM continued from page 19)

Each move of one person can trigger a domino effect, opening up one space that may be needed by someone else, triggering a second move. At times, other people have been moved to allow a team to be together.

What can projects do to facilitate the process?

In light of the dynamic nature of the project space/ housing puzzle and the anticipated number of up-coming moves, projects are best served if they observe the following guidelines regarding their office space:

Let the FPD Housing Coordinator know of your needs as early as possible.

Provide as much detail as possible in terms of numbers and staff categories.

Exercise creativity and/or flexibility in terms of how space allocated to you as a project is utilized.

Barbara Fillip, Code 400
Knowledge Management Project Manager

Jimmy Barcus, Code 400 / ARTS
Administrative Manager

Housing Coordinator Challenges:

- Avoid having individuals with multiple offices (typically matrixed personnel with one office in their home division and one office with the project). It is important to know exactly where individuals are sitting for emergency and security-related purposes.

- Obtain detailed information about project needs. Just having the total number of people needing space is not sufficient information. The Housing Coordinator needs to know how many are contractors and how many are civil servants since the space allocation is different. Projects should develop a "project space utilization form" which includes names of individuals, status (contractor versus civil servant), administrative level, and starting date.

- Identify "underutilized" space. Some offices are not technically empty or available, yet they can be "underutilized". For example, an office may be occupied yet underutilized if it is large enough to accommodate two contractors yet only one contractor is occupying it.

Cultural Tidbits

Did you Know……

... that during Ramadan, Muslims observe the month by fasting? According to a 2013 poll that surveyed Muslims in 39 countries, fasting during Ramadan was observed by 93%. This year, Ramadan began in the evening of June 28 and ended the evening of July 28. The observance is one of the Five Pillars of Islam. Fasting lasts from dawn until sunset each day. During the month, Muslims also refrain from other behavior, such as having disagreements.

Do you have a cultural tidbit to share? Send it to the Code 400 Diversity Council
c/o Matthew Ritsko at:
matthew.w.ritsko@nasa.gov
and we'll publish it in a future issue of The Critical Path.

Rock & Roll Engineering

On a chance meeting 10 years ago, Raymond Pages of the GOES-R Ground System Team, Code 416, met famed Rock and Roll star John Oates of "Hall and Oates". John Oates informed Ray that his then 8-year-old son, Tanner, loved science and technical things. With that, Ray offered John Oates' wife Aimee and son Tanner a tour of Goddard. As the years passed, Ray assisted Tanner with a few science projects in middle school and high school, and also assisted John and Tanner with the selection of a good engineering school for Tanner to attend. Tanner chose Electrical Engineering at Virginia Tech (VT) in Blacksburg, Virginia.

As with many engineering colleges now, VT advised Tanner that it would be a good idea to pull a summer internship before arriving at VT to start his freshman semester - a sort of double-check that engineering is where Tanner wants to focus his career. Ray had Tanner pull a 'shadow' internship with him from July 7-18th. During that time Tanner spent time with the LDCM, SDO, and EOS flight operations teams, time at the WFF launch facility, a day with the MMS Mission Assurance Team, and time with the GOES-R Ground System Project Office. Ray believes Tanner enjoyed his internship and Tanner appeared to be more enthusiastic about become an engineer than ever.

With Hall and Oates on their summer tour from June through July, Ray volunteered to take Tanner down to Virginia Tech for his freshman orientation classes. "I am pretty sure Tanner has both the technical savvy and the drive to be a superior engineer," Ray said, adding that he hopes Tanner finds his way back to NASA and Goddard Space Flight Center.

Note from The Editor: Ray Pages graduated from Virginia Tech in 1985 with a BS degree in Electrical Engineering. He was on faculty/staff there for 5 years supporting Chemistry and Department of Life Sciences research projects before starting his career at Goddard.

Quotes to Think About

" Jaw-jaw is always better than to war-war."
− Winston Churchill −

"Early in life I was visited by the
bluebird of anxiety."

− Woody Allen −

"You only find out who is swimming naked
when the tide goes out."

− Warren Buffett −

"Age is a question of mind over matter.
If you don't mind, it doesn't matter."

− Satchell Paige −

"No society can make a perpetual constitution,
or even a perpetual law.
The Earth belongs to the living generation."

− Thomas Jefferson −

Swift Telescope – A Winner

SPACE reports that in the recent biannual review of NASA's astronomy missions, which did not include the Hubble or Chandra telescopes, officials gave the Swift X-ray observatory the "top spot." According to the review, "Swift is the premier facility for multi-wavelength time-domain astronomy in the world." …Principal Investigator Neil Gehrels of GSFC added, "Swift's built-in, near-immediate response capability allows us to make early, frequent, and continuing observations of new gamma-ray bursts, supernova explosions, and other powerful explosions in the universe."

Abstracted from NASA's Bulletin Intelligence

2014 Robert H. Goddard Awards

Code 400 Awardees

The Robert H. Goddard Honor Awards Ceremony was held on May 8, 2014. Noted below are awards to Code 400.

Exceptional Achievement Award for:

ENGINEERING (INDIVIDUAL AND TEAM RECOGNITION)

Larry Green/Jackson and Tull, Inc./408

For outstanding engineering skills associated with packaging, building, and testing Robotic Refueling Mission (RRM) Phase 2 and 3 electronics for the Satellite Servicing Capabilities Office.

Jeffrey Kronenwetter/Chesapeake Aerospace LLC/417

In recognition of tireless contributions and sustained level of excellence which were critical to the successful Pre-Ship Review (PSR) of the Geostationary Operational Environmental Satellite (GOES-R) Advanced Baseline Imager instrument.

Gary Galica/Lockheed Martin Space Systems Company/417

In recognition of exceptional technical and programmatic leadership in the development of the Geostationary Operational Environmental Satellite (GOES-R) Series Space Environment In-Situ Suite (SEISS) instrument.

Travis Chezick/General Dynamics Corp./427

For excellent engineering leadership in the completion of the Landsat Data Continuity Mission Operations Center Integration, and ground-readiness testing.

Edward Grems/AI Solutions, Inc./427

For extraordinary achievement in ensuring the successful integration and test of the Operation Land Imager (OLI) and Thermal Infrared Sensor (TIRS) instruments, with the Landsat Data Continuity Mission (LDCM) spacecraft.

Megan Gorham/ASRC Management Services, Inc./454

For dedication, perseverance and outstanding leadership in managing the Tracking and Data Relay Satellite (TDRS-K) requirements and on-orbit testing, resulting in successful acceptance of the TDRS-K during launch and on-orbit testing.

David Uveges/MUNIZ/472

In recognition of leadership, creativity, commitment, and willingness to go above and beyond to make the Landsat Data Continuity Mission (LDCM) successful.

(RHG Awards continued on page 23)

(RHG Awards continued from page 22)

LDCM Observatory Team

In recognition for the heroics, exemplary performance, and successful on-time completion of the unprecedented Landsat Data Continuity Mission Observatory campaign.

GOES-R Advanced Baseline Imager Development Team

For inspiration and diligence over the past decade which produced our Nation's next generation geo-stationary imaging instrument.

MAVEN Team

For the outstanding team that delivered on all MAVEN technical, schedule, and cost commitments through launch for Goddard's first mission to Mars.

SMAP Microwave Radiometer Team

For exceptional achievement in engineering development and delivery of the SMAP microwave radio-meter.

PROFESSIONAL ADMINISTRATIVE (INDIVIDUAL AND TEAM RECOGNITION)

Belinda Barker/Aero Systems Engineering Inc./432

In recognition of outstanding accomplishments as the Mars Atmosphere and Volatile Evolution Project Support Manager.

Sandra Sumner/443

For exceptional, sustained performance to the Landsat Data Continuity Mission project and contribution to its success.

Angela Schuler/450

In recognition of sustained, superior performance and exemplary contributions to the Center and the Agency.

Karilys Montanez/460

For sustained excellence as the business lead for the Lunar Atmosphere & Dust Environmental Explorer (LADEE) and Global-scale Observations of the Limb and Disk (GOLD) missions, and out-standing commitment to professional development and diversity for GSFC's greater good.

JWST Configuration and Data Management Team

For a decade of exceptional excellence to develop and maintain robust configuration and data management processes and procedures for the JWST Project.

(RHG Awards continued on page 24)

(RHG Awards continued from page 23)

SCIENCE (INDIVIDUAL AND TEAM RECOGNITION)

Marcia Rieke/University of Arizona/443

For exceptional scientific leadership, perseverance, and resiliency in development of the James Webb Space Telescope (JWST) Near Infrared Camera (NIRCam) science instrument.

CUSTOMER SERVICE (INDIVIDUAL AND TEAM RECOGNITION)

Margery Rich/420

For rapid response and selfless support in coordinating challenging, new conference and conference travel reporting during the FY2013 Federal Budget Sequestration.

Karla Kahler/ASRC Research & Tech. Solutions/427

For superior customer service above and beyond as the Project Support Manager for the Landsat Data Continuity Mission.

KSC Propellant Transfer System Team

For the sustained level of extraordinary effort in the rapid development of the Propellant Transfer System engineering unit for on-orbit satellite servicing.

Resource Analysis Office Team

For the team's continued excellence in service to the Center by producing high quality models, estimates, and project life-cycle products.

LDCM Ground and Operations Integration Team

For superior service to NASA and external partners in LDCM ground system and operations testing, and product development.

LEADERSHIP

Andre Dress/472

For exceptional leadership in the Earth Science Projects Division.

Kevin Carmack/476

For recognition of outstanding leadership, innovation, and perseverance in the formulation of the Free Flyer Project.

Robert Estep/490

For excellent leadership of the Soil Moisture Active-Passive in-house radiometer development and successful instrument delivery to the Jet Propulsion Laboratory (JPL) in May 2013.

(RHG Awards continued on page 26)

Comings & Goings

April 1, 2014 through June 30, 2014

Comings:

* Nylsevalis Ortiz Collazo (from 210Y) to Flight Projects Development Program (FPDP) Administrative Manager
* Donald E. Whiteman (from 592) to FPDP Technical Management
* Beth E. Weinstein (from 568) to FPDP Technical Management
* Theresa P. Quarles (from 152) detail to 421/POES Project, Financial Manager
* Celina L. Hanewich (from 320) to 400/Flight Projects Directorate, Directorate Secretary
* Khrista N. White (from 110.1) to 470/JPSS Program Office, Program Analyst
* Wen-Ting Hsieh (from 553) detail to 401/ACFO, Instrument Capture Manager
* James E. Simpson (from 599) detail to 401/ACFO, Instrument Capture Manager

Goings:

* Greg Boegner transferred to NSA from 454/TDRS Deputy Telecommunications Systems Manager
* Michael S. Seablom detailed (from 407) to HQ/SMD, Chief Technologist
* Mindy Deyarmin retired from 470/JPSS Program Office, Program Analyst
* Akinwunmi T. Akinwande resigned from 453/Near Earth Network (NEN) Project, Resources Analyst
* William C. Anselm retired from 472/JPSS Flight Project, Observatory Manager
* Shahriar Etemad detailed (from 401) to Code 544/Electromechanical Systems Branch
* Donald M. Cornwell (from 450.2) detail to HQ/HEOMD, Director of Optical Communications
* Helen L. Sullivan retired from 451/LCRD Project, Deputy Project Manager-Resources

Reassignments/Realignments/Details within Code 400:

* Tanjira Ahmed (from 443) to 460/SPP, Resources Analyst
* Joyce King (from 441) detail to 450/Exploration & Space Communications Projects Division
* Lateef Ajayi (from 408) to Flight Projects Development Program (FPDP) Administrative Manager
* Karen Rogers to 400/Flight Projects Directorate, Administrative Officer Assistant
* Mark Voyton to 443/James Webb Space Telescope (JWST) OTIS Manager
* Thomas Johnson (from 490.3) detail to 443/JWST Deputy ISIM Manager
* Heather W. Keller (from 458) to 416/GOES-R Ground Project, Deputy Project Manager-Resources
* Carmen St. Paul (from 426) to 420/Earth Science Projects Division, Decadal Survey Financial Manager
* James R. Morrissey (from 432) to 444/SSMO, Deputy Project Manager

(Comings and Goings continued on page 26)

(Comings and Goings continued from page 25)

- Carrie B. White to 454/TDRS, Mission Segment Manager
- Tanjira Ahmed (from 460) to 408/SSCO, Senior Resources Analyst
- Lateef Ajayi (from 400) to 472/JPSS Flight, Administrative Manager (FPDP)
- Nylsevalis Ortiz Collazo (from 400) to 417/GOES-R Flight Project, Administrative Manager (FPDP)
- Beth E. Weinstein (from 400) to 472/JPSS Flight Project; Technical Management (FPDP)
- Donald E. Whiteman (from 400) to 410/GOES-R Program Office, Technical Management (FPDP)
- Candace C. Carlisle (from 422) to 424/PFF Project, Project Manager
- John J. Deily (from 422) to 472/JPSS Flight Project, Observatory Manager
- Carolyn L. Ellenes (from 420) to 428/ESMO Project, Deputy Project Manager-Resources
- Ellen Berkeley A. (from 425) to 403/FPD Business Management Office, Administrative Manager
- Ronnice Wedge (from 422) to 424/SIDR Project, Deputy Project Manager-Resources
- Paul W. Richards (from 417) to 451/LCRD Project, Deputy Project Manager
- Michael L. Weiss (from 451) to 450/Exploration & Space Communications Projects Division, Associate Program Manager
- Kevin K. Carmack (from 424) to 451/LCRD Project Manager
- Debra L. Dodson (from 424) to 451/LCRD Project, Deputy Project Manager-Resources
- Elizabeth Goelling (from 470) detail to 401/ACFO, Resources Analyst

Reorganizations within Code 400:

- Rename Polar Free Flyer Project to Solar Irradiance Data and Rescue (SIDAR) Project, Code 424

Lisa Hoffman, Code 400
Administrative Officer

(RHG Awards continued from page 24)

Arthur Jacques/492

For inspired and inspirational leadership of NASA's Magnetospheric MultiScale/Fast Plasma Investigation (MMS/FPI) Instrument Development Team during times of great challenge—leadership that made all the difference.

ROBERT H. GODDARD AWARD OF MERIT

John Decker/400

For exemplary contributions, passion, and dedication to the Goddard mission through support and leadership across various project functions.

Harry Born/405

In recognition of exceptional performance and achievements over a career of forty years and in honor of exemplary service to the Goddard Space Flight Center.

(Padgett continued from page 3)

After graduating from East Carolina University, Steve moved back to Annapolis, Maryland and began his career as a software developer for Bell Atlantic at their corporate headquarters in Beltsville. While working for Bell Atlantic, he was accepted into their management training program and began managing projects for the company. After 3 years of supporting Bell Atlantic as a programmer, he decided to change directions to computer networking. He had always received advice from his father that to become a successful IT Manager or CIO, you should have several years of experience in both programming and networking. So while taking graduate coursework at night, Steve also studied for and passed all six exams required to become a Microsoft Certified Systems Engineer. He was later able to apply these skills when he left the private sector to join QSS.

At QSS, he was responsible for managing their corporate IT infrastructure from configuring business applications to installing and maintaining their servers and networks. He was also assigned as the subcontracts lead and Project Manager for several Federal agency contracts ranging from less than 1M a year to 1.8B over 10 years. After spending six years at QSS, Steve had supported 10 different Federal agencies and his clear favorite was NASA/Goddard. This also had to do with the interactions Steve had supporting Matt Opeka on PAAC I. Matt represented the hard work, customer focus and integrity that Steve believed in so strongly.

The Goddard culture also made him feel like part of the family. That closeness may have also been due to the fact that his bedroom growing up was covered in posters of Goddard missions. His father, two brothers and wife also worked at Goddard, and his daughter attended the Goddard Child Development Center. His father, Jerry, operated as COO for ANSTEC, CBSI, ACS, QSS and others. His brother Chris was a Systems Administrator and later started his own international computer company. Chris actually sat in the same office where Steve sits today. His other brother, Mike, was a software developer at Goddard and is now working for the State of Hawaii as a software developer.

Steve has helped to enhance Goddard's IT infrastructure by bringing the first enterprise SharePoint solution in 2004 and converting all of the Flight Projects Directorate level applications under that platform. But if asked, Steve considers his greatest accomplishment to be the talent that he's helped bring to Goddard. He has hired a third of the current IPTLs and has developed techniques for reaching out and keeping candidates active and eager to join the PAAC team. His experience of being recruited by multiple colleges for football helped him to see firsthand what it takes to get someone interested in joining your team. As with football, the recruiting needs to start well before candidates are ready to make a decision. You need to show them your value system, as well as the before and after. Did employees grow while working on your team, did they obtain a sense of accomplishment, and did they enjoy it?

Steve has truly found his niche. He feels extremely fortunate to work for wonderful customers and contract managers that seek new ideas and encourage their implementations.

Life Outside of Goddard:

Steve and his wife Kellie have shared interests in organization development and relationship management, and take at least one training class per month together. If you can't find Steve on Center or in the classroom, he's likely on the golf course with Jay O'Leary, getting tips on improving his game.

(Hanewich continued from page 3)

improve and relieve the burden of those she supports with matters associated with the functioning of the office and providing day to day secretarial management of the flow of business.

Life outside of Goddard:

Celina and her husband, Matt, have two sons, ages 4 and 11. She spends most of her time outside of work at the baseball field supporting her 11-year-old's travel baseball team. She grew up in Severn, Maryland and recently built a house on the property where she grew up. Celina and her family enjoy playing board games, backyard sports games and cookouts with friends. She is passionate about helping the community, including tutoring children, volunteering at homeless shelters and events to clean up the Chesapeake Bay.

Congratulations to all the 2014 Agency Honor Awards Recipients. The Center will be celebrating all award recipients at 10:00 a.m. on Tuesday, August 26, 2014 in the Building 8 Auditorium. Please note that due to the number of award recipients that are being honored this year and the limited seating in Building 8 Auditorium; some guests may be escorted over to the Building 3 Goett Auditorium to view the ceremony. Please come out and support your peers and colleagues and celebrate their accomplishments. For a full list of award recipients, please click here.

We're on the WEB

http://fpd.gsfc.nasa.gov/news.html

or via the Code 400 Homepage

http://fpd.gsfc.nasa.gov

FUTURE LAUNCHES CY 2014 / 2015	
Soil Moisture Active & Passive (SMAP)	November 2014
Deep Space Climate Observatory (DSCOVR)	January 2015
Magnetospheric Multiscale Mission (MMS)	March 2015
Geostationary Operational Environmental Satellite GOES)-R	October 2015
Astro-H	November 2015
Tracking and Data Relay Satellite (TDRS)-M	December 2015

NOTICE—THE CRITICAL PATH

Like so many other communications and newsletters, The Critical Path (TCP) has transitioned to an electronic distribution. Each edition will be sent as an attachment in individual e-mails to all our current recipients. If you are not a current GSFC employee and you wish to continue to receive The Critical Path, it is important that you contact Paula Wood, TCP Editorial Assistant ,with your updated e-mail address.

Paula's e-mail address is: Paula.L.Wood@nasa.gov, or she can be reached by phone at: **(301) 286-9125.**

Others interested in receiving the electronic version of TCP may also contact Paula Wood with their e-mail address. Subsequent changes to e-mail addresses should be sent to Paula as well to receive future copies of TCP.

The Critical Path

Published by the Flight Projects Directorate

— In April, August, and December —

Howard K. Ottenstein,

Editor

Laura Paschal,

Production Assistant

Paula L. Wood,

Editorial Assistant

If you have a story idea, news item, or letter for The Critical Path, please let us know about it. Send your note to Howard Ottenstein via email: Howard.K.Ottenstein@nasa.gov, Mail: Code 403, or Phone: 6-8583. Don't forget to include your name and telephone number. Deadline for the next issue is November 3, 2014.