National Aeronautics and Space Administration

THE CRITICAL PATH

A FLIGHT PROJECTS DIRECTORATE PUBLICATION ■ 2018 WINTER ISSUE

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ENABLING EXPLORATION AND EARTH + SPACE SCIENCE BY TRANSFORMING CONCEPTS AND QUESTIONS INTO REALITY

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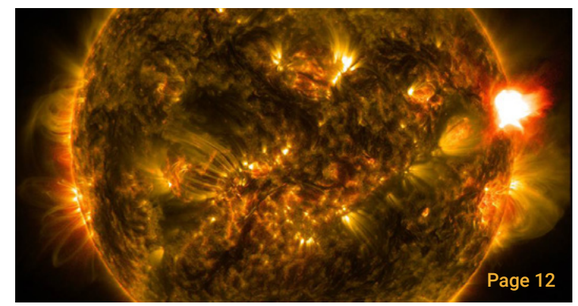
Cars line up to view Delta-II's historic final launch. Credit: Joe Krygiel



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THE CRITICAL PATH
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The deadline for the next issue is
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DOWNLOAD ISSUE

Message from the DIRECTOR

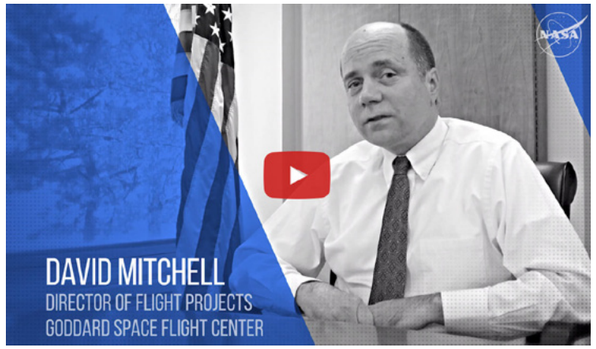
Congratulations to the ICESat-2 and ATLAS teams for the successful launch and on-orbit checkout of our newest Earth science mission. This is the culmination of over a decade of development and is already showing early glimpses of the stunning science to come. Likewise, congratulations are in order for the MetOp-C team. MetOp-C successfully launched from French Guiana, the instruments have been activated, and checkout of the system is active. For MetOp-C, the U.S.-developed instruments onboard are the last in a series that Goddard has been working on since the 1970s. We anticipate these measurements will continue to build on the legacy of the many previous missions to inform us on what is occurring with our planet's weather and climate. Of significance, GOES-17 was officially handed over from NASA to NOAA this past quarter and is now our "eyes in the skies" as the new GOES West.

An important mission operations milestone occurred this quarter with Parker Solar Probe as it successfully completed its first close approach to the Sun. All systems continue to operate nominally. We look forward to the PSP heliophysics science to come.

If all goes well, we will soon have both Global Ecosystem Dynamics Investigation (GEDI) and Robotic Refueling Mission (RRM)-3 launched and mounted on the International Space Station. GEDI and RRM3 were both successfully installed in the SpaceX "trunk" and subsequently integrated into the launch vehicle capsule. All systems are go for a launch in early December. The Ionospheric Connection Explorer (ICON) mission remains on the ground for now as the launch vehicle team works through technical issues; we look forward to seeing that mission get into orbit early in 2019.

The James Webb Space Telescope's spacecraft element successfully completed its acoustic test program and is now in the midst of vibration testing.

OSIRIS-REx successfully arrived at the asteroid Bennu and will now conduct operations around the asteroid for the next 18 months before going down to the surface to retrieve asteroid material to bring back to Earth. The released pictures of Bennu are just stunning. I look forward to the tag event and the sample science back at Earth in the years to come.



The Lucy mission successfully completed its confirmation review and is now officially in Phase C. This exciting planetary mission will conduct a grand tour of the Jupiter Trojan asteroids. Congratulations on the progress to date on the road to launch in 2021.

I'm really excited about the new work that is coming our way in the optical communications arena. Great job by the Exploration & Space Communication Division for their efforts to land this important work for Goddard and the Agency.

As we launch missions, we of course have to find new opportunities to build upon. Several of our teams have been working hard to complete proposals and prepare for site visits prior to the hopeful selection of Goddard missions by NASA Headquarters. The new business environment is a tough one given the limited resources available and the schedule pressures inherent with bidding on the work. Many people take part in this work while performing other "day jobs." I greatly appreciate the effort that people put into this work as it is so essential to our future.

While safety is always critical to the success of our projects and the well-being of our workforce, every once in a while it is worth taking a step back to review what and how we are doing things. Our reality is that schedule and cost pressures exist on every project and can drive decisions that in hindsight could bring with them too much risk. We have seen a recent uptick in incidents not just on Flight Projects but across the Center. In October Chris Scolese had an All Supervisors safety discussion in which each Director Of spoke on

Dave Mitchell signing the Delta-II rocket before ICESat-2 launch

the importance of safety and steps that we can take to improve across the Center. Following that forum, we held an All Hands meeting with our Flight Projects employees to discuss safety. To summarize some of the talking points, I'm asking everybody to redouble their efforts to ensure a safe environment, including learning from recent incidents, looking out for your co-workers, paying attention to details, slowing down as appropriate during critical activities, being mindful of the pressures inherent in projects, and being mindful of complacency that can creep into project activities. Most importantly, I want everybody to feel empowered to speak up when they see something that does not feel right, even if others do not necessarily believe it to be the case. Your actions can prevent a bad thing from happening, thereby protecting our fellow workers and ensuring mission success.

On October 1st a third of our workforce, the resources folks, transitioned to the Chief Financial Officer (CFO) organization. Things have gone smoothly and as I've said since this organizational change took place, the resources folks remain a part of the FPD family. Keep me, Tom McCarthy, Wanda Peters, Rich Ryan, and Steve Shinn apprised of any challenges you see as we work together in this new organizational model.

I also want to announce that the results of the annual Employee Viewpoint Survey were released. I am very proud of our directorate's results which has us rated with an overall score of 85%, placing FPD at the top of all directorates at Goddard. Of course there's always room for improvement and we are actively working on that, but we should all be proud of these results.
It is my sincere hope that all of you can take some time off during this upcoming holiday season to relax, enjoy time with family and friends, and get recharged for an exciting 2019. Thank you for everything you do to make the Flight Projects Directorate a successful and great place to work. Happy holidays!

David F. Mitchell
Director, Flight Projects
david.f.mitchell@nasa.gov

A WORD FROM THE DEPUTY

In our recurring series, Dr. Wanda Peters, FPD Deputy Director for planning and business management, discusses the transition of Code 400 resources personnel to Code 150 with the GSFC Chief Financial Officer, Steve Shinn.

Delta II's final launch to space

ICESat-2 TAKES OFF!

ICESat-2 was successfully launched from Vandenberg Air Force base at 6:02 AM (local time) aboard the final Delta II launch vehicle. The observatory successfully completed on-orbit commissioning on November 13, 2018.

Doug McLennan, ICESat-2 Project Manager
CREDIT: NASA

Cathy Richardson, Deputy Program Manager, Earth Science Projects Division
CREDIT: NASA

Tom Neumann, ICESat-2 Deputy Project Scientist
CREDIT: NASA

Understanding the causes and magnitude of change in the cryosphere remains a priority for Earth science research. Over the past decade, NASA Earth observing satellites have documented a decrease in both the extent and thickness of Arctic sea ice, and ongoing loss of grounded ice from the Greenland and Antarctic ice sheets. Understanding the pace and mechanisms of these changes requires long-term observations of ice sheets, sea ice thickness, and sea ice extent. In response to this need, NASA's Goddard Space Flight Center (GSFC) developed the Ice, Cloud and land Elevation Satellite-2 (ICESat-2) mission, a next-generation laser altimeter designed to measure changes in ice sheet elevation, sea ice thickness, and vegetation canopy height. ICESat-2 uses a photon-counting micro-pulse laser altimeter, the advanced topographic laser altimeter system (ATLAS) instrument to collect these key data.

SYSTEM OVERVIEW

Northrop Grumman Innovation Systems (NGIS) developed the spacecraft bus and Mission Operations Center (MOC); the United Launch Alliance (ULA) built the Delta-II launch vehicle. The ATLAS instrument was developed in-house at Goddard. The primary contracts for the ATLAS include Fibertek for the laser development and Northrop Grumman for the telescope.

The space segment of ICESat-2 consists of the observatory and a single instrument, ATLAS, on that observatory. The ICESat-2 observatory will operate at 500 km in a frozen 92-degree inclination orbit, consisting of 1387 revolutions repeated every 91 days. The observatory is responsible for the collection and downlink of all science data. These data (as well as housekeeping telemetry data from both the spacecraft and ATLAS) are stored on board the observatory on solid-state recorders. Data is downlinked to ground stations via an X-band communications link to Near Earth Network (NEN) ground stations. The observatory also receives ground commands and transmits real-time housekeeping telemetry via an S-band link to the NEN ground stations during nominal operations and to the Space Network (SN) immediately after launch and during contingency operations.

The ground segment (GS) provides observatory command and control, monitoring, and health and safety of the observatory and ATLAS instrument on orbit, as well as the generation of all data products from the level zero data transmitted from the observatory, and the distribution of these data products to the data center. The data center for ICESat-2 is the National Snow and Ice Data Center (NSIDC). The GS provides mission planning and scheduling, coordination with the ground stations for data downlink, and generation of the observatory command loads necessary to execute the mission plan.

Dave Mitchell and ICESat team conduct a launchpad walkdown.
CREDIT: NASA

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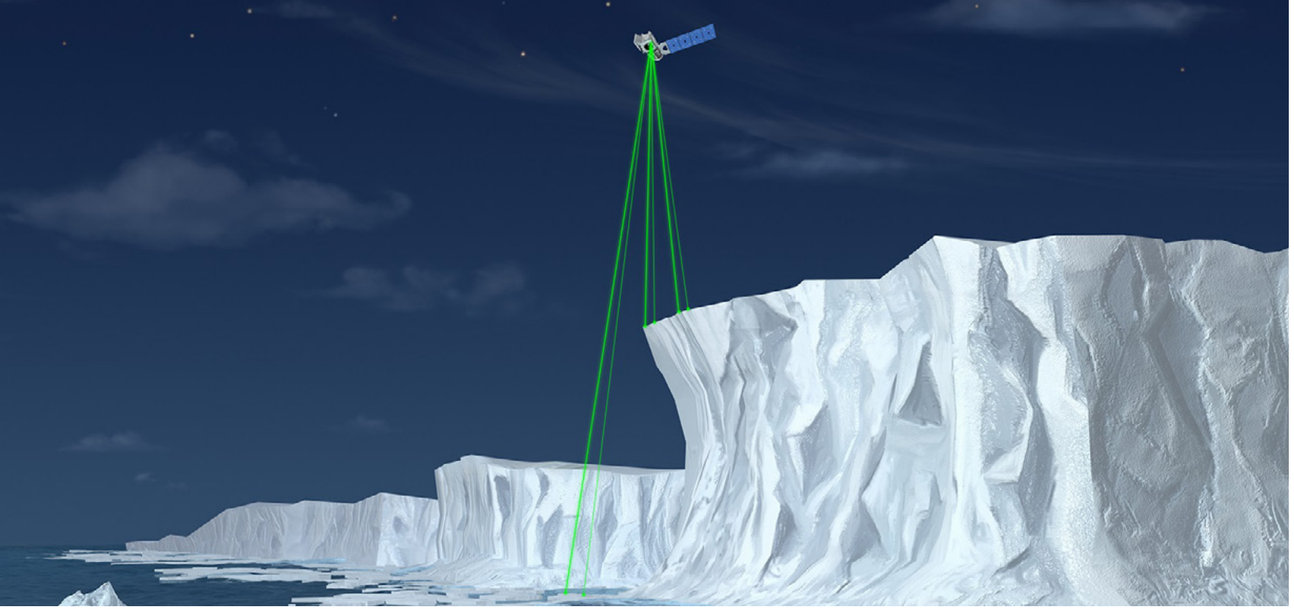

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ICESat-2 will measure the changing height of Earth's ice. CREDIT: NASA

ATLAS INSTRUMENT

To measure ice sheet elevation or forest canopy height, the ICESat-2 mission requires three key pieces of information:

1. the travel time of a pulse of light from the altimeter to the target (such as the surface of the Earth) and back
2. the direction ATLAS was pointing when that travel time was measured, and
3. the position of the observatory in space.

ATLAS provides the first two pieces of information, while additional data from the spacecraft provides the third. Unlike its single-beam predecessor on ICESat, ATLAS is a multi-beam, photon-counting laser altimeter. It illuminates six spots on the ground simultaneously by splitting the light from a single laser pulse with a diffractive optic element. While the altimeter on ICESat (the Geoscience Laser Altimeter System, or GLAS) operated at 40 Hz and produced a measurement about every 140 meters (approximately 450 feet) along-track, ATLAS will use lower-energy pulses at a repetition rate of 10 kHz to produce measurements about every 70 centimeters (or approximately 2 feet) along track for each of the six spots. A small fraction of the transmitted laser light is scattered by the Earth's surface and atmosphere and collected by the ATLAS receiver, along with "background" light from sunlight scattered by the Earth and clouds. The ATLAS detectors record the arrival times of individual photons irrespective of the source of a given photon. Using precise measurements of both the time that a laser pulse is transmitted, and the photon arrival times, the time of flight of a given photon is calculated to about150 picoseconds.

The second key piece of information provided by ATLAS is the pointing direction. This is important, as it allows the ground segment to determine where on Earth the laser spots illuminated for a given shot (i.e., the geolocation of a given laser spot). To meet the mission geolocation requirement of 6.5 meters (approximately 20 feet), ATLAS has an advanced laser reference system (LRS). Within the LRS, ATLAS monitors the pointing direction of the laser beams and the star field with respect to a common reference structure and reports both to the ground.

Although these are the essential ATLAS measurements that enable generation of the science data products, ATLAS has a number of other capabilities to produce high quality measurements. Perhaps the most important of these is ensuring the laser light reflected from the surface of the Earth will be viewed by the ATLAS telescope. If the laser and telescope fall out of alignment, the ATLAS detectors will only record background photons. To keep the laser spots within the ATLAS field of view, ATLAS uses an alignment monitoring control system to actively align the transmitted laser beams with the telescope field of view. This system monitors the pointing direction of the telescope, and uses a beam steering mirror to keep the laser spots in the telescope field of view.

Thorsten Markus, ICESat-2 Project Scientist, describes the mission. CREDIT: NASA

SPACECRAFT

The ICESat-2 spacecraft is provided under contract with NGIS and performs the standard functions of data collection, communications, command and data handling, attitude and orbit control, power and thermal control, health and safety monitoring, and providing fail-safe protection in the event of anomalous conditions. The spacecraft is also responsible for precision navigation and pointing to support nominal science operations.

To allow the time of flight and pointing direction measurements from ATLAS to be converted to an elevation on the surface of the Earth, the ICESat-2 observatory carries a global-positioning system (GPS) antenna and dual-frequency receiver. The low-level data from the GPS is downlinked and processed on the ground to determine the position of the observatory, to within about 3 centimeters, at the time of each transmitted laser pulse. Once the observatory position is known, processing in the ground segment can remove the effects of changes in the observatory altitude and convert differences in time of flight and pointing direction into elevation along the ground track illuminated by ATLAS.

Another important capability of the spacecraft is the pointing control of the ICESat-2 observatory. Since one of the main objectives of the ICESat-2 mission is to measure elevation change in the polar regions, it is imperative that the same ground tracks are illuminated every 91 days. Therefore, the observatory must control where the observatory is pointed and adjust as needed, in addition to the geolocation, or pointing knowledge, described above. The spacecraft uses the pointing direction of the laser beams with respect to the star field from the ATLAS LRS in the spacecraft navigation solution to enable precision pointing of the ATLAS telescope using reaction wheels to adjust the pointing direction as needed. The pointing control requirement on the ground for ICESat-2 is 45 meters.

As with ATLAS, the spacecraft has a number of additional functions and capabilities. For example, gyro and star trackers are mounted on the ATLAS optical bench to minimize impacts of the thermal and mechanical interface between the spacecraft and ATLAS. The high-precision data from the gyro are used by the spacecraft in the pointing solution, and are sent to the

The ICESat-2 payload is secured prior to launch from VAFB. CREDIT: NASA

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ground for use in science data processing. Additionally, to ensure overall observatory timing synchronization within 100 nanoseconds, and to correlate ATLAS laser pulse and returned photon timing with the spacecraft attitude and position, the spacecraft provides a highly accurate GPS-generated 1 pulse-per-second signal and associated timing message to ATLAS.

GROUND SYSTEM

The GS provides the command and control, monitoring, and health and safety of the observatory on orbit, as well as the functions for science data processing of higher-level data products and distribution to the Earth Observing System Data and Information System (EOSDIS) Distributed Active Archive Center (DAAC). The ground segment provides mission planning and scheduling, coordination with the ground stations for the X-band downlink of the data, generation of the observatory command loads necessary to execute the mission plan, and the sustainment of the observatory.

The GS is comprised of the MOC, the instrument support facility (ISF), and science investigator-led processing system (SIPS). The MOC is responsible for command and control of the observatory, the nominal safety of the observatory, and downlink of data from the observatory. The ISF, located at Goddard, provides for the safety of the ATLAS instrument, planning for science data collection, and calibration data collection as needed.

The SIPS, also located at Goddard, produces the science data products for the ICESat-2 mission. The SIPS processes the level-1 to level-3 datasets using progressively more precise orbit and attitude data from the precision orbit determination/precision pointing determination and provides the capability to reprocess the data based on algorithm or calibration changes. The level-1 to level-3 products are verified by the science team prior to distribution to the NSIDC DAAC for dissemination to the community at large. The SIPS posts the level-1 to level-3 products to a server and the NSIDC DAAC automatically and routinely transfers the products from the SIPS server to the NSIDC archive. The SIPS is located at GSFC and is an augmentation to the ICESat SIPS similar to the ISF above.

SUMMARY

The ICESat-2 mission will continue the high-quality elevation measurements of the Earth's surface begun by the ICESat mission. The ATLAS instrument is optimized for cryospheric science objectives, thus allowing ICESat-2 to provide elevation data to study changes in the great ice sheets and sea ice thickness over the life of the mission. By combining ICESat-2 with other available altimetric data, scientists will be able to produce a 15-year record of ice sheet changes and changes in the sea ice thickness. ■

Doug McLennan / Code 425
ICESat-2 Project Manager

ICESat-2 team at the launch pad. CREDIT: NASA

FOCUS ON FACILITIES

JPSS Coming on Center-Update

In the summer edition of The Critical Path, we mentioned planning to bring the Joint Polar Satellite System (JPSS) program to the Greenbelt main campus, before the Greentec building lease expires in May 2021. Since then, Center management approved planning recommendations to relocate JPSS to Building 6, and to relocate the Geostationary Operational Environmental Satellite (GOES) program to Building 1. A rigorous analysis of the housing plans by both JPSS and GOES followed to ascertain potential unmet needs. The period needed to address unmet needs coupled with unexpected budget reductions led Center management to delay full implementation scheduling from 2021 to 2025, as well as to approve extending JPSS' off-center leasing until 2025. As a result, the Management Operations Directorate will begin the process of establishing a brand new lease and GOES will remain in Building 6. Both programs will relocate to the main campus per the original plan as we near the new lease expiration. The renovations to Buildings 1 and 6, and transitional housing will be part of reaching the end state.

All I want for Xmas is…!

Depending on your generation you are likely to answer this in many ways. The first thing that comes to mind for me is …"my two front teeth;" these are the words to a song many Baby Boomers probably remember well. The second thing that comes to mind here at Goddard is…space. The desire for space at Goddard is cross-generational, cross-directorate, cross-divisional and downright universal. So, this article includes just a few reminders about space here at Goddard.

Unlike the universe, space at Goddard is finite. In fact, it is shrinking. Each time the Center gets approval to add a new building, we have to remove square footage. The trend on guidance has gone from "freeze the footprint" to "reduce the footprint."

Your office space allocation is a MAXIMUM per the space guideline allowances. It is NOT an entitlement. However, every attempt is made to get as close as possible to your allocated square footage when layouts are planned. Planners consider it reasonable to get within plus or minus 10%. Sometimes the most functional and efficient plan in a finite area comprises a few lucky spaces that exceed the guideline.

Open office space still yields the greatest density of seats and maximizes usable square footage. On average, the typical building layout consumes 30% of the space with walls, circulation and non-assignable area. If we can minimize these elements, more space is available to support your work activities. If you prefer minimal distraction by your neighbors' holiday music, there are new technologies being implemented more and more to manage noise in open workspace.

If you are interested in the details of our space allocation guidelines, look to the GPR 8800.1A, Facilities Utilization Program. Be informed, be brave and make space a holiday list item. If I'm lucky, all you want for Xmas might be two more…square feet. ■

Bill Glenn / Code 400
Mission Support Manager

PARKER SOLAR PROBE

MAKING HISTORY

In early November, a speck sailed past the blazing face of the Sun and made history. The Parker Solar Probe, launched in August, came within 15.43 million miles of the Sun — closer than any other spacecraft and at a speed faster than any other human-made object in space.

And that's just the start. Over the next several years, Parker will draw closer and closer to the Sun, zooming repeatedly by Venus for assists from that planet's gravity, its orbit narrowing until the final close approach in 2024 of 3.83 million miles from the Sun's surface, while travelling 430,000 miles per hour.

PSP prepares for launch aboard a Delta-IV Heavy rocket at Cape Canaveral.

CREDIT: NASA

As it orbits, it'll collect data on the Sun's corona and solar wind, focused on solving the many mysteries around our home star. Why is the corona, the outermost layer of the Sun's atmosphere, millions of degrees hotter than the surface of the Sun? Why are there slow and fast speeds of solar winds, and what causes the solar wind's dramatic acceleration? What are the mechanisms behind solar energetic particles, some of which can reach near-light speed?

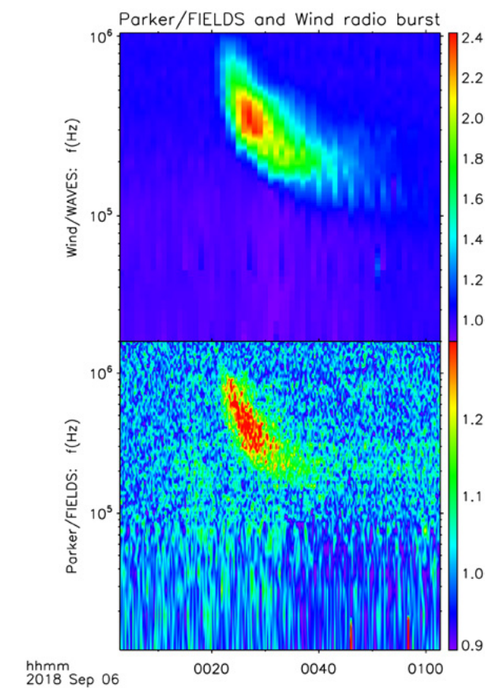
Parker's research is expected to revolutionize our understanding of the Sun. With its unique design, Parker will explore a region of our solar system that's never been visited before, dipping into the Sun's atmosphere and capturing data from the vast outbursts of magnetic energy and particles sent rocketing through space by the Sun's roiling dynamics.

There's a highly practical aspect of the Parker Solar Probe's mission. Humanity literally lives in the atmosphere of the Sun but has limited understanding of how that atmosphere works. The data the probe collects will help astronomers' understanding and prediction of "space weather" — solar effects that include the solar wind, solar flares, and coronal mass ejections — that can disrupt satellite communications, affect power grids, increase radiation exposure on airline flights, and threaten astronauts.

The early phases of the Parker Solar Probe's mission, while operating at a distance from the Sun, will allow the probe to keep pace with the Sun's rotation, allowing it to observe a single area for days and monitor changes that occur over time.

As the probe skims closer and closer to the Sun's surface over time, it'll take the same measurements at different depths, giving an onion-like overview that compares layer after layer of the corona.

Furthermore, since the mission will last multiple years, astronomers will get a good look at the Sun's behavior as it cycles between calm and active periods, an 11-year process that includes a complete flip of the Sun's magnetic field.



Early data from Parker Solar Probe's FIELDS instrument suite (bottom) showing a radio burst from a solar flare, with data from NASA's Wind mission (top) for comparison.

CREDIT: NASA/UC BERKELEY/PARKER SOLAR PROBE/WIND

The Parker Solar Probe is already showing its promise, capturing early data from the solar wind and almost immediately finding its first radio burst from a solar flare.

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PARKER SOLAR PROBE CREDIT: NASA/JHUAPL

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Parker's observations will be captured by four major suites of instruments:

1

Fields Investigation (FIELDS) will capture the scale and shape of electric and magnetic fields in the Sun's atmosphere. By measuring waves and turbulence in the inner heliosphere —the "bubble" created by the solar wind that extends beyond the planets — FIELDS will help astronomers understand the fields associated with waves, shocks, and the realignment of magnetic field lines. FIELDS is key to understanding why the Sun's corona is hundreds of times hotter than its surface.

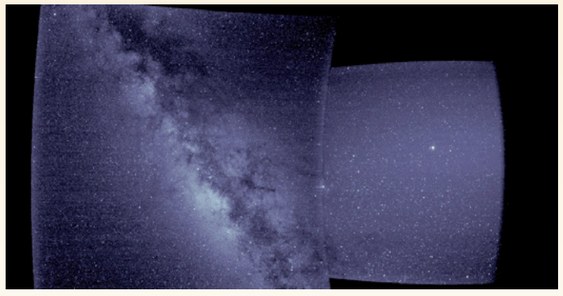
Five FIELDS antennas measure the electric field around the spacecraft. Four of them jut out beyond the spacecraft's heat shield into the intense temperatures of the corona, depending on the heat-resistant nature of the niobium alloy they're made of to keep them intact. Those four antennas measure the properties of the fast and slow solar winds. The fifth antenna, which remains in the shade of the heat shield, creates a three-dimensional picture of the Sun's electric field.

A trio of magnetometers, devices that measure magnetic forces, will assess the Sun's magnetic fields from a distance and close up. A special "search coil magnetometer" is necessary closer to the Sun, where the field changes quickly. The one on the Parker Solar Probe can sample the magnetic field at a rate of two million times per second.

FIELDS was designed, built, and is operated by a team led by the Space Sciences Laboratory at the University of California, Berkeley.

2

The Wide-Field Imager for Parker Solar Probe (WISPR) is the probe's only camera. WISPR looks at the large-scale structure of the corona and solar wind before the spacecraft flies through it. WISPR takes images of structures like coronal mass ejections, jets and other ejecta from the Sun. These structures travel out from the Sun and eventually engulf the spacecraft, where the other instruments take measurements. WISPR's images will help link events in the corona to the detailed measurements being captured by the other instruments.



First light data from Parker Solar Probe's WISPR (Wide-field Imager for Solar Probe) instrument suite showing the Milky Way, looking at the galactic center.

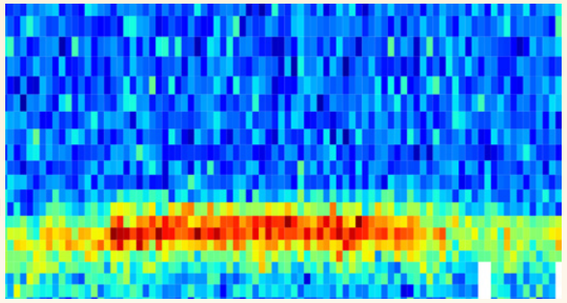
CREDIT: NASA/NAVAL RESEARCH LABORATORY/PARKER SOLAR PROBE

To observe the solar atmosphere, WISPR primarily uses the heat shield to block most of the Sun's light, which would otherwise obscure the much fainter corona. Its cameras have radiation-hardened detectors to stand up to cosmic rays and high-energy particles from the Sun, while the lenses are also made of a tough glass designed to resist both radiation and damage from impacts with cosmic dust. WISPR's proximity to the Sun will allow it to produce some of the most detailed pictures ever taken of the corona.

WISPR was designed and developed by the Solar and Heliophysics Physics Branch at the Naval Research Laboratory in Washington, D.C., which is also responsible for the instrument observing program.

3

The Solar Wind Electrons Alphas and Protons (SWEAP) suite gathers observations using two complementary types of instruments: the Solar Probe Cup (SPC) and the Solar Probe Analyzers (SPAN). The instruments count the most abundant particles in the solar wind — electrons, protons and helium ions — and measure such properties as velocity, density, and temperature.



Early data from the Solar Probe Cup, part of the SWEAP (Solar Wind Electrons Alphas and Protons) instrument suite aboard Parker Solar Probe, showing a gust of solar wind (the red streak).

CREDIT: NASA/UNIVERSITY OF MICHIGAN/PARKER SOLAR PROBE

SPC is what's known as a Faraday cup, a metal device that can catch charged particles in a vacuum. Poking up over the heat shield to measure how electrons and ions are moving, the cup is exposed to the full light, heat and energy of the Sun. As it passes close to the Sun, SPC takes up to 146 measurements per second to accurately determine the velocity, density and temperature of the Sun's plasma.

SPAN is a two-part instrument that sorts particles based on their mass and charge. One part measures both electrons and ions, and another looks only at electrons.

SWEAP was built mainly at the Smithsonian Astrophysical Observatory in Cambridge, Massachusetts, and at the Space Sciences Laboratory at the University of California, Berkeley. The institutions jointly operate the instrument.

4

While SWEAP focuses on the solar wind, the Integrated Science Investigation of the Sun (ISʘIS), which includes the symbol for the Sun in its acronym, concentrates on solar activity like flares and coronal mass ejections. It measures electrons, protons and ions in order to understand the particles' lifecycles: where they came from, how they became accelerated and how they move out from the Sun through space.

ISʘIS has two energetic particle instruments. One, EPI-Lo, measures the lower-energy particles, and the other, EPI-Hi, measures the higher-energy particles. High-energy is an understated term — EPI-Hi will study the fraction of the charged particles from the Sun that reach near-light speeds. These particles, protons, electrons and heavy ions can cross the distance from the Sun to Earth in less than an hour, creating space weather hazards to humans and satellites in space. ISʘIS will also measure high-energy solar wind particles that cannot be detected by SWEAP.

ISʘIS is led by Princeton University in Princeton, New Jersey, and was built largely at the Johns Hopkins Applied Physics Laboratory (APL) in Laurel, Maryland, and Caltech, in Pasadena, California, with contributions from Southwest Research Institute in San Antonio, Texas, and Goddard Space Flight Center in Greenbelt, Maryland. The ISʘIS Science Operations Center is operated at the University of New Hampshire in Durham.

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Parker Solar Probe's heat shield is made of two panels of superheated carbon-carbon composite sandwiching a lightweight 4.5-inch-thick carbon foam core. To reflect as much of the Sun's energy away from the spacecraft as possible, the Sun-facing side of the heat shield is also sprayed with a specially formulated white coating.

CREDIT: NASA/JOHNS HOPKINS APL/ED WHITMAN

None of the Parker Solar Probe's observations would be possible without its innovative Thermal Protection System, or heat shield. Parker can withstand its trips through the corona due to the carbon composite shield, whose outer temperatures will reach nearly 2,500 degrees Fahrenheit. The corona itself is several millions of degrees Fahrenheit, but because space is mostly empty and the plasma particles are spread out, the spacecraft and shield doesn't heat up to millions of degrees immediately -- just as your hand won't immediately burn if you put it in an oven without touching the side.

The shield, combined with the probe's water cooling system, will keep the spacecraft at a pleasant 85 degrees Fahrenheit. The front and back faces of the heat shield are made of thin sheets of carbon-carbon -- a superheated form of the graphite epoxy put into golf clubs. Between them is about 4 ½ inches of carbon foam, typically used in the medical industry for bone replacement.

The carbon foam, in addition to conducting less heat than metal would, is 97 percent evacuated space. That both keeps critical weight off the spacecraft and means there's not much material for heat to travel through.

The heat shield, designed by APL, is covered with a white ceramic coating specially created by Johns Hopkins University's Whiting School of Engineering. The aluminum oxide coating, engineered to both scatter light and emit heat, reflects about 95 percent of the energy from the Sun and is made to handle the extreme high and low temperatures of traveling from bitterly cold space into the corona without flaking away or losing its reflective properties.

Other basic elements of the spacecraft, designed and built by APL, also required extra care to withstand the corona's temperatures. Electrical wires for the SPC Sensor were made of niobium and suspended with lab-grown sapphire crystal tubes where necessary. The solar panels, which use the Sun's energy to power the spacecraft, can retract almost entirely behind the heat shield, and are cooled by a water cooling system.

As the Parker Solar probe draws nearer and nearer to the Sun, data will begin to pour in, illuminating our relationship with the star that gives Earth light and life. The more we understand about the way the Sun works, the better humanity will be able to function as it slowly extends its reach into space through satellites and spacecraft.

The Parker Solar Probe is part of NASA's Living With a Star program, which seeks to improve our understanding of how and why the Sun varies, how the Earth and solar system respond, and how this affects humanity in space and on Earth. The Living With a Star flight program is managed by Goddard Space Flight Center for NASA's Science Mission Directorate in Washington. APL manages and operates the Parker Solar Probe mission for NASA. ■

Tracy Vogel / Code 440
Astrophysics Projects Division
Technical Writer

PSP prepares to move to the launch pad at Cape Canaveral. CREDIT: ULA

PSP payload aboard the Delta IV Heavy launch vehicle.

CREDIT: ULA

PSP launches at 3:31 a.m. on August 12, 2018.

CREDIT: ULA

INNOVATION IN OUTREACH

Flight Projects Lead the Charge

THE INVISIBLE NETWORK

"We approach outreach with the same drive for innovation as we do technology development," said Bob Menrad, Associate Director of Flight Projects for the Exploration and Space Communications (ESC) projects division. "As a result, our engagement efforts spark interest in students, putting them on the path to be the next generation of NASA innovators."

Over the past few months, the ESC Communications and STEM Engagement (CaSE) team debuted two innovative campaigns that promote the ***Decade of Light***, a bold vision for the future of mission support.

The Space Communications and Navigation (SCaN) program developed the Decade of Light around groundbreaking technologies that will propel NASA into the next generation of space communications. Featured among these technologies is optical communications, which use lasers to provide spacecraft with improved data rates and reduced size, weight, and power requirements.

On October 31, ESC and SCaN debuted a new, interactive exhibit at the Goddard Visitor Center showcasing the Decade of Light, optical communications, and NASA's storied legacy of continued communications innovation.

The exhibit features NASA's three major space communications networks, two of which are managed by ESC here at Goddard, the Near Earth Network (NEN) and the Space Network (SN). The NEN provides direct-to-ground communications services for NASA missions using 17 ground stations across all seven continents. The SN utilizes a constellation of Tracking and Data Relay Satellites to enable near-continuous communications services for spacecraft in low-Earth orbit, such as the International Space Station.

Working with the Goddard Visitor Center, the CaSE team developed four visually dynamic panels showcasing aspects of space communications technology. Using the Next Generation Science Standards and Smithsonian accessibility guidelines, the team crafted an experience that can be enjoyed by all visitors, about 40,000 per year on average.

"Through our Decade of Light exhibit, we share Goddard's role in space communications and navigations with visitors of all ages," said Barbara

ESC Communications and STEM Engagement (CaSE) team.

CREDIT: AMBER JACOBSON

Continued on page 20

Continued from page 19

A student learns about the history of space communications using the exhibit's interactive touchscreen.

CREDIT: AMBER JACOBSON

Goddard employees try out one of the interactive portions of the exhibit, which demonstrates how optical communications will transmit data to and from spacecraft.

CREDIT: AMBER JACOBSON

Adde, SCaN's Policy and Strategic Communications director. "We're also reaching out to a broader audience through our recently released podcast series. NASA is creating the next generation of space communications and navigation technology, and we seek to inspire our next generation workforce."

The new exhibit offers a variety of interactive media catering to several learning types. One panel hosts a large touchscreen, which uses video and animation to enable a deeper dive into communications topics and may be updated as new technologies mature and new missions launch.

Two of the modules on this touchscreen were developed by SCaN summer interns. These interns received valuable experience in computer programming, animation, and outreach.

In the realm of digital media, NASA debuted "The Invisible Network," an agency-wide podcast developed here at Goddard about communications and navigation. "The Invisible Network" isn't an interview podcast. There's no question-and-answer portion. It's the first NASA podcast to embrace narrative storytelling. The goal is to engage listeners with oft-overlooked technologies in a fresh, exciting way.

The narrative format allows the listener to delve deeply into a topic, while uncovering the human side of space technology and exploration. In the podcast, seemingly esoteric technologies become vital and personal pieces of NASA's story – a rich legacy of continued innovation amongst the stars.

The podcast's title comes from author and former NASA engineer Sunny Tsiao's book, "Read You Loud and Clear," which NASA published in 2008. Tsiao notes that NASA's communications and tracking programs are often described as "invisible." Infrastructures, he writes, are seldom recognized, except when they fall short. If NASA's networks are invisible, perhaps it's because they work so well.

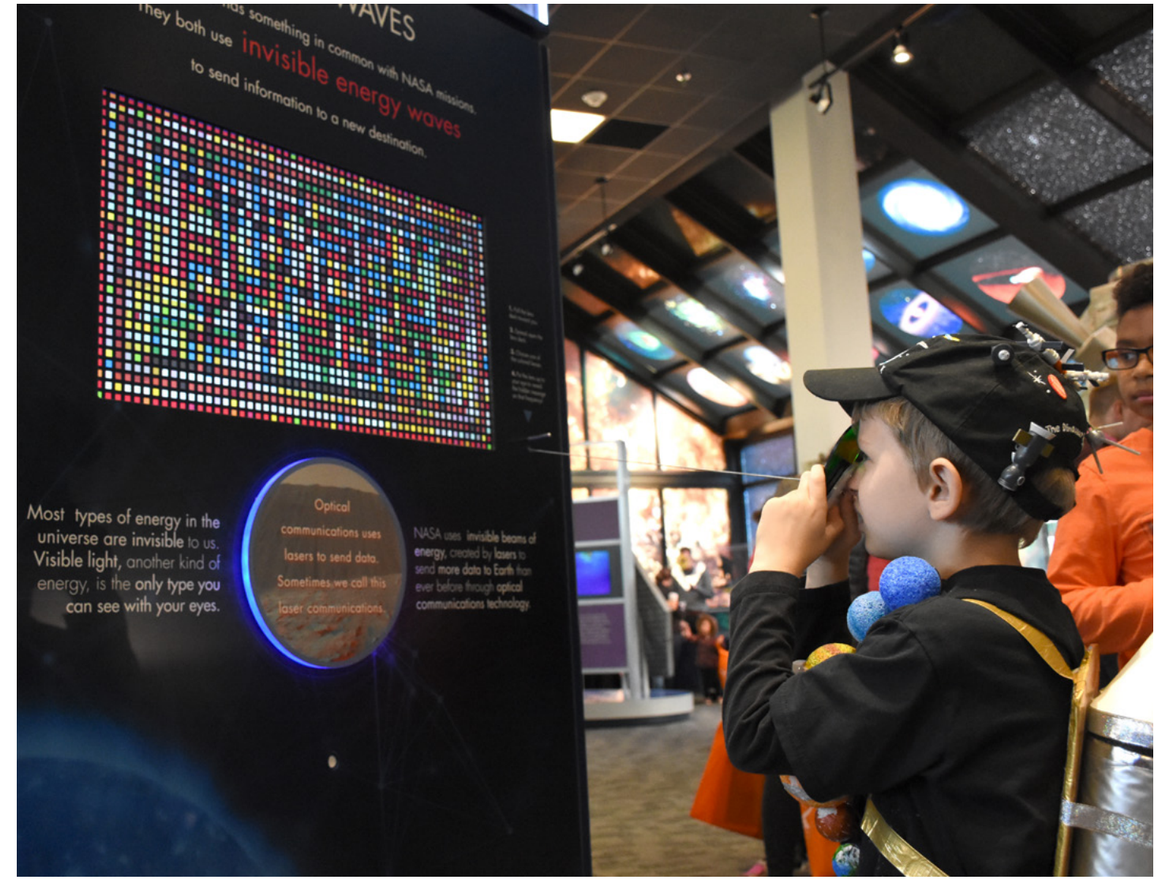
"The Invisible Network" debuted on October 16, and can be found online at nasa.gov/invisible, or on many popular podcast apps. The launch was promoted by lead NASA social media accounts across multiple platforms: Tumblr, Snapchat, Instagram, Facebook, and others.

Overall, products like the new Visitor Center exhibit and "The Invisible Network" position Goddard and the Flight Projects Directorate as leaders in the creation of interactive and engaging outreach products.

"Communications comes in multiple forms and for multiple purposes," said Menrad. "The Visitor Center exhibit and the podcast represent the latest achievements of the ESC team and demonstrate our proficiency in communicating with any user, whether they be student or spacecraft, citizen or astronaut." ■

Katherine Schauer / Code 450
Communications Specialist

Danny Baird / Code 450
Technical Writer



A young visitor uses color lenses to find the hidden image.

CREDIT: AMBER JACOBSON

Want to binge listen to all The Invisible Network podcasts?

All podcasts were released on October 18, 2018 and are available at your favorite app.

Subscribe and Listen now at:

nasa.gov/invisible

NASA PODCAST

Something (Special) On the Inside

If you are walking down the corridor in Building 36 behind Angela Conley, you may notice that she's in a wheelchair, but it's more likely that you would remember her because she's probably singing – Angela loves to sing! She has a beautiful voice that she shares with her church and a positive outlook on life that could seem surprising until you get to know her a little better.

Angela was injured in 1985 after a freak accident at work in a government building in Washington, DC. In route to her office, she slipped on some fluid on the floor. When she fell, her right leg had hyper-extended at the knee and after looking at her foot looking at her, she pushed it back causing a dislocation of the knee. She was rushed to the George Washington University Hospital, where she had surgery; she went in at 8:30 a.m. and when she woke up, it was midnight on a Friday. Over the weekend, a problem with the procedure and lack of circulation caused her foot to turn blue. On Monday, the staff advised her it had become gangrenous and the suggestion was to amputate above the knee.

On her first day of physical therapy, the reality of her situation hit Angela. She had only one leg; she had two small girls, aged 5 and almost 2; she had just moved to a three-level home. She was just starting to feel sorry for herself when she saw another patient with no legs roll by in a wheelchair. Angela recalls, "My viewpoint changed in the blink of an eye as I realized there was someone worse off than I was. My entire attitude changed and every positive instinct overtook my negative view."

After having her third child, a son, Angela stayed home for a while but decided to return to the workforce in 1998. She had two job offers – one was downtown in a nice building with covered parking; the other was at Goddard where she would be exposed to the elements while parking, but she chose Goddard, which had just begun a new program of hiring people with disabilities. She began as a contractor working in Code 200, then after a couple of years, moved to Code 410, Explorers Program, still as a contractor. She was offered an administrative assistant position which was switched to civil service in 2006, and she has worked there ever since (now Code 460).

Angela was determined to get personalized plates for her car and was told "Angela" was not an option. She wrote her name backwards – ALEGNA – and got that instead. With her typical humor, she immediately realized this was a rather droll play on words: "A leg NA" (not applicable). When her mother fell ill in 2015, Angela was visiting her at the hospital. She decided to get valet parking and the valet told her that in his language, Alegna means "something on the inside." That stuck in her mind.

In April 2015, Angela's church choir lost a member and she wrote a poem of comfort to her choir family. A friend told her she should copyright it and she received the copyright in November 2015. Recalling the meaning of Alegna, the poem, "From Alegna's Heart," now had a special meaning: "From Something on the Inside of my Heart." The poem she wrote to comfort her choir family was now comforting her own family; Angela's Mom passed away on November 29, 2015.

Always creative, Angela has written poetry and songs and was encouraged by a co-worker to attend a workshop for authors in 2016, which led to her developing a 'starter journal' which she called "Something on the Inside." She feels this was meant to be. The purpose of the journal is for the person to record significant events, a dream, or even a thought and she includes one of hers' as an entry. She says there's no right or wrong way to begin writing and to emphasize that, the journal can be started from either end – the back cover is printed upside down to encourage that! She encourages the writer to write it, read it, remember it.

The journal pages are images of different cloud formations, which Angela took herself. She named some of the photos, including one she calls, "Cloud with Attitude," which she entered into a photo contest. She has also had some of the pictures made into puzzles and wrapping paper, which she plans to sell at craft shows and recently introduced at an Expo she attended. Why clouds? Angela says she loves the sky; "I'm always looking up." She hopes to encourage others to write and with the funds generated from the sale of her journals and other products, her plan is to make her house more wheelchair-accessible.

Working in Flight Projects has provided Angela with the opportunity to travel for work, including to three launches, most recently to the launch of the Transiting Exoplanet Survey Satellite (TESS). She much prefers ground transportation via car or even train but co-workers persuaded her to fly to Florida for the TESS launch. It was, she says, "the launch of me!" While she was in Florida, the tragic accident on Southwest Airlines where a window blew out and a passenger was partially sucked out of the window was on the news, which her co-workers tried to hide from her. Although she had an aisle seat on the way down, she had a window seat on the way back so she could get some good photos of the sky that she might use in her book. She put on headphones to distract herself and was keeping time with the music, when she realized the plane was keeping time too as it flew through an area of extreme turbulence! She still prefers ground transportation and is in no rush to fly again any time soon.

Angela with some of creative products at a recent Expo.

CREDIT: EYE REFLECTIONS MEDIA / SONIA WASHINGTON

Angela feels she has received good workplace accommodations for her disability. She has always had a handicapped parking space and automatic doors in the buildings she's worked in. She drives to work, church, choir rehearsals, and other engagements, exits her vehicle using crutches, lifts out her wheelchair from the trunk of her wagon, and assembles it while balancing on one leg. She says people often offer to help, but she has her routine down and asks them to save the offer for a rainy, snowy, or icy day. She has tried three prosthetic legs but since her amputation was above the knee, she just couldn't manage the rhythm needed to walk. She says she doesn't like being the center of attention but has learned to live with people noticing her disability and tries to engage them. Recently Angela participated in a Diversity and Inclusion (D&I) committee initiative called 'Diversity Dialogue,' which met every week for 6 months. They discussed the different challenges and 'unwritten rules' that affect work, home, and all aspects of living with a disability.

> Why clouds? Angela says she loves the sky; "I'm always looking up."

Angela belongs to three choirs in her church and is also a member of the church's 'Praise' team which starts the church services. She has sung in school choirs since 7th grade, joined her first church choir in 1985, and over the years, has been asked to sing the National Anthem at various Goddard events. Her pet peeves include having to buy two shoes (she donates the single shoes to Purple Heart in hopes that another amputee can use them) and doesn't get pedicures as she's not going to pay full price for one foot! ■

Laura Paschal / Code 443
TCP Team

An Arianespace Soyuz rocket lifts off from the Guiana Space Center in Kourou, French Guiana, to deliver the European weather satellite MetOp-C into orbit on Nov. 6, 2018.

CREDIT: ARIANESPACE

MetOp-C

LAUNCH MARKS THE CULMINATION OF 40-YEAR ERA

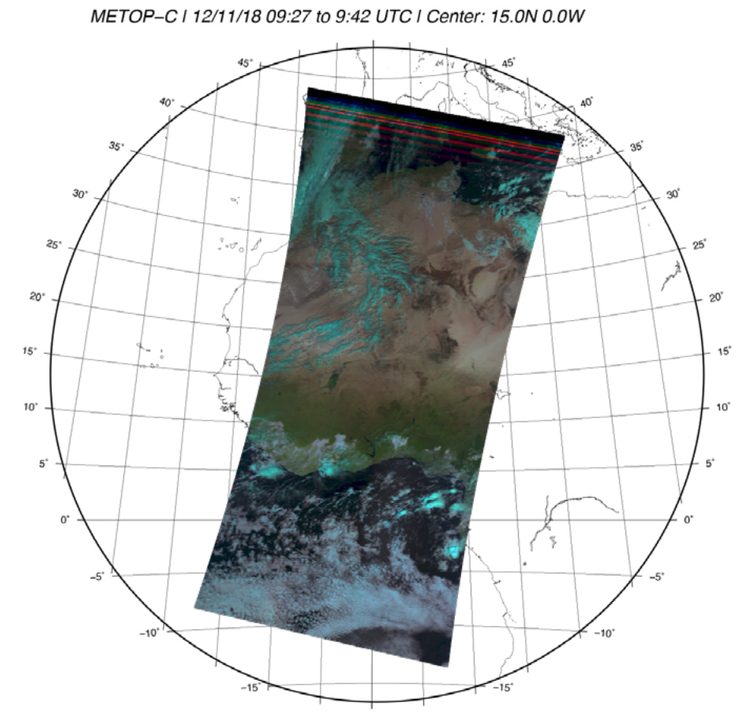
On November 6, 2018, the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) launched its final Meteorological Operational satellite (MetOp)-C, from the Guiana Space Center (CSG) in Kourou, French Guiana, at 7:47 p.m. EST (0047 GMT on Nov. 7), on a European Soyuz rocket. MetOp-C will collect valuable data about Earth's atmosphere, land, and oceans and be used for daily weather forecasts around the globe.

GSFC Building 6

EUMETSAT-HQ in Darmstadt, Germany

CSG in Kourou, French Guiana

A joint effort between EUMETSAT, the European Space Agency (ESA), NASA, and the National Oceanic and Atmospheric Administration (NOAA), MetOp-C is the third satellite in the EUMETSAT Polar System series, which started with the launch of MetOp-A in 2006 and was followed by MetOp-B in 2012. For NASA and GSFC's Polar-orbiting Operational Environmental Satellite (POES)/MetOp project (Code 421) the MetOp-C launch marks the end of a 40-year era, commencing with the launch of the Television Infrared Observation Satellite (TIROS)-N on October 13, 1978 and included the NOAA-6 through NOAA-19 series of satellites, providing continuous global coverage over the decades. NASA and NOAA had personnel supporting the launch from three different continents – in North America at GSFC in Building 6, in Europe at EUMESAT Headquarters in Darmstadt, Germany, and in South America at CSG in Kourou, French Guiana.



First AVHRR Image from MetOp-C on November 12, 2018.

CREDIT: EUMETSAT/NOAA

Together with the NOAA polar satellites, the European MetOp contribution constitutes the joint European/US operational polar system. These polar-orbiting satellites orbit the Earth from pole to pole about 14 times each day, and are considered the backbone of the US and European weather forecasting systems. The satellites provide the bulk of the observations required to generate medium- and long-range weather forecasting successfully.

While the MetOp satellites are operated by international partners, NASA and NOAA have been closely involved in the planning, design, implementation, and testing of the MetOp-C mission. NOAA funded NASA to procure and supply the four legacy POES instruments that are flying on the MetOp-C mission. Two microwave radiometers, called the Advanced Microwave Sounding Unit (AMSU) A1 and AMSU A2, will measure global atmospheric temperature and humidity in all weather conditions, as well as sea ice. A visible/infrared radiometer called the Advanced Very High Resolution Radiometer (AVHRR)

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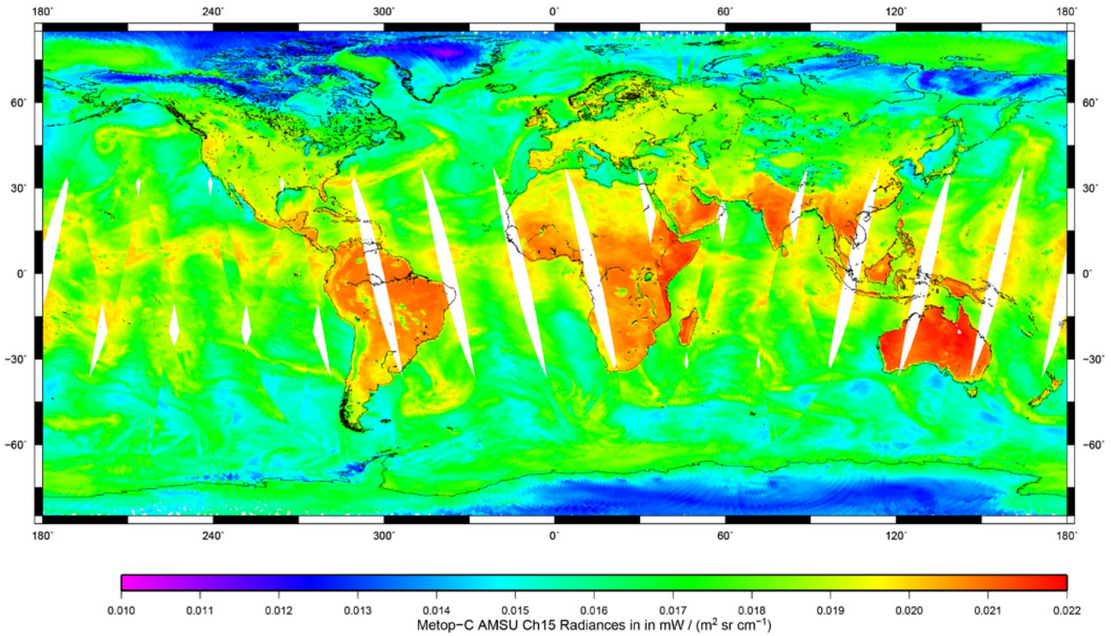


First AMSU A1 Channel 15 Image from MetOp-C on November 14, 2018.

CREDIT: EUMETSAT/NOAA

will deliver global visible and infrared imagery of clouds, oceans, ice, and land surfaces. A fourth instrument suite, the Space Environmental Monitor (SEM), will monitor the space plasma and radiation environment around the spacecraft. Of significant note is that the AVHRR and SEM instruments have been in continuous on-orbit operation since the TIROS-N launch in 1978 with MetOp-C marking the 17th flight unit launched to orbit for each. The AMSU A instruments have been flying continuously in orbit since the NOAA-15 launch in 1998 (for a total of nine sets of instruments including the Earth Observing System (EOS)-Aqua).

Earlier this year NASA engineers and NOAA scientists continued working with EUMETSAT and ESA at the launch site in French Guiana to ensure that the US-provided instruments were calibrated, integrated, tested, cleaned, and working properly in the build-up of MetOp-C for launch. Now in orbit, it will take about 6 weeks for the turn-on and check-out of the US-provided instruments, after which NOAA will proceed into the calibration and validation phase of the program and the POES/MetOp project will wrap up its 40-year program, quietly, with a job well done. ■

Gene Martin / Code 421
POES/MetOp-C Project Manager

Co-authored by:

Ron Hooker / Code 421
POES/MetOp-C Deputy Project Manager/Technical

Theresa Thomas / Code 421
POES/MetOp-C Deputy Project Manager/Resources

For more information:

- https://poes.gsfc.nasa.gov/
- https://www.eumetsat.int/website/home/Satellites/CurrentSatellites/Metop/index.html
- https://earth.esa.int/web/eoportal/satellite-missions/m/metop
- https://www.star.nesdis.noaa.gov/icvs/index.php

WHAT'S UP WITH FPDP COHORT #3?

Flight Projects Development Program

The Flight Projects Development Program (FPDP) is a rigorous, two-year program designed to develop highly skilled flight project management personnel through an accelerated learning and development curriculum. Participants complete required and elective coursework, attend various developmental opportunities, receive comprehensive mentoring, complete two specially selected work assignments, and develop a Capstone Project.

The FPDP's Cohort #3 officially began on April 4, 2018. The participants were busy this summer transitioning into their first work assignments, as well as fulfilling their coursework.

Work assignments are selected by the FPDP Governance Board, currently chaired by Dave Mitchell, Director of Flight Projects Directorate. The assignments are foundational to the program, filling identified gaps, enhancing the participant's understanding of flight project management, and providing hands-on, real-world experiences.

The participants are currently serving in the following positions:

Ben Hall
Financial Manager
HUBBLE SPACE TELESCOPE (HST)

Joe Stevens
Formulation Manager
PROJECT FORMULATION AND DEVELOPMENT OFFICE (PFDO)

Cathy Stickland
Cost Volume Manager
COST ESTIMATING, MODELING, AND ANALYSIS (CEMA)

Jesse Walsh
Formulation Manager
PROJECT FORMULATION AND DEVELOPMENT OFFICE (PFDO)

(left to right) FPDP Cohort #3 Participants: Ben Hall, Cathy Stickland, Joe Stevens, and Jesse Walsh

In addition to attending multiple training courses over the last six months, on August 28 and 29, the Cohort, along with over 50 other attendees from across NASA, participated in a Code 400-sponsored workshop at Johns Hopkins University Applied Physics Laboratory (JHU/APL) in Laurel, Maryland. The workshop provided not only project management insights and lessons learned from leaders and subject matter experts, but also a great opportunity for networking across the Agency. The two-day workshop was filled with an array of speakers including Agency senior leaders and our very own Chris Scolese, several discussion panels, a tour of JHU/APL, and a presentation from FPDP's Cohort 3. Cohort 3 reviewed the Government Accountability office (GAO) report on the performance of NASA programs, interviewed Flight Project managers to discuss the report findings and how they, as project managers, handled similar issues affecting their projects. After the Cohort presented the results of their interviews at the workshop, they facilitated different breakout groups with the attendees to further discuss the findings and recommendations for NASA. ■

(left to right) FPDP Cohort #3 Participants: Ben Hall, Joe Stevens, Cathy Stickland, and Jesse Walsh, and Program Manager, Donna Swann at FPDP's first workshop at APL on August 28.

The next workshop the Cohort will attend will be at Johnson Space Center (JSC) in early March.

For more information about the FPDP, please contact Donna Swann at:

donna.j.swann@nasa.gov

Special thanks to: (pictured, left to right) Teresa Kauffman, Marissa Luedtke, Donna Swann, Sandra Vilevac, Reese Patillo, Sally Lim, William Varner, as well as Leslie Ambrose, Tracy Dorsey, Celina Hanewich, Rebecca Levy, Morgan Nichols, Jen Poston, Guillermo Diaz, Aggie Dorsey, Pam Kauffman, and Rich Kauffman (not pictured). Thanks also to People's Supply, Inc. who supplied many of the materials! CREDIT: KRYSTAL GLENN

From Vision to Reality

The Grand Opening of the new Flight Projects-sponsored Cyber Room at the

SHEPHERD'S COVE
EMERGENCY SHELTER

Shepherd's Cove is an emergency shelter for women and children not far from GSFC in Prince George's County, MD. It is open 24 hours a day, 365 days a year, and offers 100 beds to those in need.

A group of FPD's Diversity & Inclusion committee members drove out to the shelter in January and immediately knew we could make a difference. We partnered with staff and residents with the goal of identifying their real needs and desires for the facility with hopes to focus on one room that residents and staff could truly enjoy!

Throughout 2018, a small sub-team planned and executed the creation and sponsorship of a technology learning center. The team, under the leadership of Marissa Luedtke, envisioned various settings that would be conducive to learning for a variety of ages and abilities. They assessed the bleak room of dull beige walls, stained floors, a few book shelves, and many boxes of unorganized books. Hundreds of books were organized and color-coded for ease in identifying appropriate age groupings. Through the vision and talents of Sandra Vilevac, a space-themed cyber room came together. Most weekends throughout the summer teams worked on painting the walls a colorful blend of

FPD D&I committee volunteers spent many weekends to completely repaint the room. CREDIT: TERESA KAUFFMAN

purples and pinks while Sandra painted a spectacular mural inspired by NASA's Women of Color publication. The team effort was remarkable as family members, friends, and even summer interns joined in to help! Months of gathering donations, securing building materials, organizing books, cleaning, painting, and finding furniture, led to a magical room that will impact residents at Shepherd's Cove for years to come.

(left) Books are color-coded by age group. (right) Inspirational verses were included in the mural. CREDIT: KRYSTAL GLENN

Sandra Vilevac and Rasheeda Jamison proudly display the inspiration for the wall design. A special shout out to Sandra for her passion in inspiring students and interns to excel! CREDIT: KRYSTAL GLENN

Rasheeda Jamison, President and CEO of United Communities Against Poverty, Inc. said, "Life is like an airplane flight, sometimes you need a layover and because of this new room, children and adults will have an inspired place to go to have a positive learning environment thanks to the Flight Projects team at Goddard while they have a layover at Shepherd's Cove."

We look forward to an ongoing relationship with United Communities against Poverty (UCAP) and Shepherd's Cove! ■

Donna Swann / Code 400
FPD Assistant Director / D&I Committee Lead

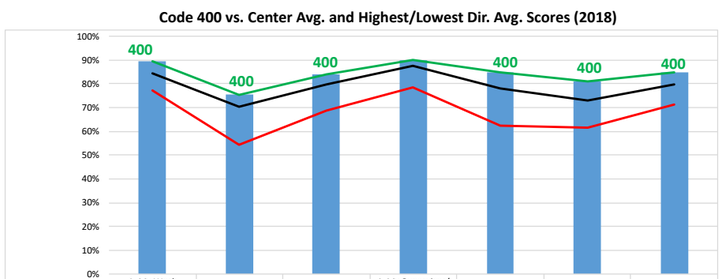
D&I Committee members Marissa Luedtke and Teresa Kauffman in front of the Cyber Room's galaxy wall designed and painted by Reese Patillo. CREDIT: DONNA SWANN

EMPLOYEE VIEWPOINT SURVEY

On an annual basis, the Office of Personnel Management (OPM) administers the Employee Viewpoint Survey (EVS) to all permanent Federal employees. This survey tool gathers opinions from employees on all aspects of their employment experience – from satisfaction with their job and agency, to views on their immediate supervisors, managers, and senior leaders. Results help drive organizational change.

In 2017, NASA was named the Best Place to Work in federal government, in the large agency category, for the sixth year in a row. NASA had an overall positive score of 82%. GSFC ranked on top of all NASA Centers for the second consecutive year with an 84% overall positive score. Code 400's Flight Projects Directorate (FPD) increased its overall average score in 2017 to 83.7%.

The 2018 EVS results were recently released, and the FPD ranked highest across GSFC in five of six dimensions, resulting in the highest overall average. We are anxiously awaiting the Best Places to Work reveal for 2018!



	1. My Work Experience	2. My Work Unit	3. My Agency	4. My Supervisor/ Team Leader	5. Leadership	6. My Satisfaction	7. Overall Average
Code 400	89.4%	75.3%	83.9%	89.7%	84.8%	81.1%	85.0%
2018 GSFC Avg.	84.3%	70.3%	79.7%	87.5%	78.1%	72.9%	79.9%
2018 Ctr High	89.4%	75.3%	83.9%	90.0%	84.8%	81.1%	85.0%
2018 Ctr Low	77.1%	54.3%	68.8%	78.5%	62.6%	61.7%	71.2%

Although the Federal Government, NASA, and GSFC response rates slightly declined in 2018, the FPD response rate increased by 0.03%.

Displayed are Divisions with 10+ responses

		2018 Response Rates			2017 Response Rates			Change
Organization Name	Division	Sample Size	Response Count	Response Rate	Sample Size	Response Count	Response Rate	2017 - 2018
National Aeronautics and Space Administration	NASA	16,974	11,568	68.2%	16,599	11,814	71.2%	-3.0%
Goddard Space Flight Center	**GSFC**	**3,162**	**1,983**	**62.7%**	**3,081**	**2,026**	**65.8%**	**-3.1%**
FLIGHT PROJECTS DIRECTORATE	400	394	249	63.2%	396	249	62.9%	0.3%
RESOURCE ANALYSIS OFFICE	405	17	13	76.5%	19	18	94.7%	-18.2%
EARTH SCIENCE PROJECTS DIVISION	420	67	45	67.2%	64	49	76.6%	-9.4%
ASTROPHYSICS PROJECTS DIVISION	440	40	21	52.5%	42	23	54.8%	-2.3%
EXPLORATION & SPACE COMM PROJ DIV	450	73	51	69.9%	72	42	58.3%	11.6%
EXPLORERS & HELIOPHYSICS PROJECTS DIV	460	34	17	50.0%	33	15	45.5%	4.5%
JOINT POLAR SATELLITE SYSTEM PROGRAM	470	35	20	57.1%	37	18	48.6%	8.5%
INSTRUMENT PROJECTS DIVISION	490	39	30	76.9%	39	30	76.9%	0.0%

Congratulations to Code 490 who had the highest division response rate across the FPD with 76.9%!

To thank them for their outstanding effort, Code 400 senior management treated Code 490's civil servants to an Ice Cream Social. Dave and Tom served as the "scoopers!"

CREDIT: ALL PHOTOS BY DONNA SWANN AND ALICIA JOSE

Code 450 also did a great job by increasing their division response rate 11.6% from 2017 to 2018!

Way to go Flight Projects Directorate!

Thank you to all who responded to the EVS!

Bruce Milam

Joint Polar Satellite System (JPSS)

Review and Analysis Manager, Acting Chief of Staff

Born Summersville, West Virginia

Education B.S. Aerospace Engineering: West Virginia University (WVU)
M.S. Organization Development: American University

Bruce Milam is the Joint Polar Satellite System (JPSS) review and analysis manager and acting chief of staff. The JPSS program is a unique blend of NASA and National Oceanic and Atmospheric Administration (NOAA) employees working towards a common goal. The JPSS program provides the weather satellites that cross the poles several time daily, gathering 85% of the data for the 2-to-7 day forecast. The JPSS data is used as input for the NOAA super-computers that generate the weather forecast used worldwide. Bruce's primary job is to manage the independent review process for the JPSS Program. This includes being the primary interface with the Standing Review Team and the Goddard Review Manager. A recent additional duty is acting chief of staff for the JPSS Program Office.

Life Before Goddard

Bruce and his sister grew up in Summersville, WV . Summersville is like a national park with a large lake at the head of the Gauley River with its spectacular whitewater rafting. Bruce had dreams of building spacecraft and flying planes at an early age. He started taking flying lessons at age 13, spending his earnings from mowing lawns and doing odd jobs at the airport. He flew solo at age 16, earned his private pilot's license at 17, bought a plane at 18 in Oakland, CA and flew it back to WV. Bruce towed banners over Daytona Beach at the Speedway while attending Embry Riddle Aeronautical University, then over Mountaineer Stadium and Deep Creek Lake while attending WVU.

Life at Goddard

Bruce arrived at GSFC at a magical time on the leading edge of a hiring trend that allowed those willing to work hard to move up and gain responsibility quickly. He started his career as a mechanism engineer in the Electro Mechanical Branch where he worked on COBE, STIS, XTE, advanced drift chambers and the International Space Station Work Package 3, robotically operated devices. He obtained three patents and won the Herzel Award for the best paper at the 24th Aerospace Mechanism Symposium. At the end of the Work Package 3, Bruce went to work on satellite servicing as a mechanism manager and the Hubble Space Telescope (HST) First Servicing Mission (SM1) orbital replacement unit carrier manager. This work included scuba diving with astronauts at both JSC and MSFC. He was selected as a member of the FPD Project Management Development Emprise in 1990. After HST SM1, Bruce was the Med-Lite launch services manager where he managed the development of the Delta 7300 and 7400 rockets until the rocket work was transferred to KSC. He then worked on the Center Director's staff as the program integration manager for Earth Science. He was a founding member of the Space Science Data Operations Office, assisting and advising principal investigators (PIs) developing new programs, projects, and instruments. He was PI for the lunar data effort to make Apollo lunar data accessible for the Lunar Exploration Program. This work led to winning proposals to restore/digitize Apollo data, create a Lunar Data Node and restore more Apollo data. He was co-investigator and proposal manager for a winning proposal, Seismology and Heat Flow Instrument Package for Lunar Science and Hazards with Dr. Patrick Taylor. Bruce returned to Code 400 to manage the development of teams, mission concepts, and mission proposals in response to Announcements of Opportunity and Broad Agency Announcements. This work included capture management for the Plume Locator for Mars Emissions (PLUME) for the Exo-Mars Mission, Atmosphere-Space Transition Region Explorer (ASTRE) for the Explorer Program, and Laser Communication Relay Demonstration (LCRD) for the Technology Demonstration Missions (TDM). He was also the instrument systems manager for the Comet Hopper (CHopper) Step I design and proposal team for the Discovery program. ASTRE, LCRD and CHopper were winning proposals. LCRD was a one-step proposal currently being implemented. Bruce followed LCRD into implementation as the LCRD spacecraft manager. In his current assignment in the JPSS Program Office, he takes pride that the data collected by the satellites is essential for the daily operations of aircraft, ships, and numerous other applications.

Life Outside Goddard

In parallel with Bruce's NASA career, he's an active pilot with 3,700 hours. He has towed banners, hauled skydivers, flight instructed, ferried aircraft, and traveled the US and Europe. The trip to Europe and return was piloting his Piper Twin Comanche pre-GPS, the acid test of navigation skills. He has owned a Citabria 7GCBC, Piper Twin Comanche PA-30, Pitts Special S1S, BD-4, and Piper Cherokee 180.

Bruce believes that the opportunities available in America must be appreciated and he gives back by engaging in STEM activities, American Institute of Aeronautics and Astronautics volunteer work, food bank donations, and has adopted a section of the WB&A Trail. His favorite STEM events target 5th grade future scientists and engineers since this is the age you make decisions on your life's work.

> "Happiness is for those who dream dreams and are willing to pay the price to make them come true."

The most joy in Bruce's life has been spending time his wife Debi, son Joshua, and daughter Lindsay. Debi is a senior paralegal with a local home builder. Josh is finishing his Master's thesis in Aerospace Engineering at WVU while working as a research engineer. Lindsay is a sophomore in Forensic and Investigative Science at WVU and a tree canopy zip line tour guide for WVU. ■

Cody Lanier

Resource Analysis Office (Code 405)
Operations Research Analyst

Born Oscoda, Michigan
Education BS Industrial Engineering: Wichita State University

Cody Lanier began working for the Resource Analysis Office (Code 405) as an operations research analyst a little over 2 years ago. In that position, he estimates cost and schedule duration on new projects or proposals. When not involved in the assessment of a mission, he is updating the cost models used for future assessments.

Life Before Goddard

Cody grew up in Kansas. When he was 17, he enlisted in the Marine Corps as an infantry rifleman and after finishing high school, he left for boot camp located at the Marine Corps Recruit Depot in San Diego, California. He was stationed at Camp Pendleton, California, then served two tours in Iraq. In his first tour, he had varied responsibilities, including manning camp security posts, foot patrols, filling sandbags, raiding insurgent positons, and a lot of other "grunt" work. During his second tour, he was a bodyguard for the Battalion Commander, who is the highest ranking officer in the unit. Cody was a part of his personal security detail and it was their job to keep the commander and other VIPs safe. One day they picked up some VIPs and in route to their destination engaged in a lot of of small talk with some of the guests riding with them. One passenger asked Cody where he was from and he answered, "Derby, Kansas." He then replied, "Me too!" Cody says, "I mean, what are the odds of two people from the same small town meeting randomly in the middle of Iraq? We took a picture together (I am on the left) and that guy sent it to the local paper in Derby and it made the news. The article is called "A Small World" and it's how we met." Cody got out of the military after his 4-year enlistment. He eventually went to community college and then transferred to Wichita State University in Wichita, Kansas, where he obtained an engineering degree. Prior to working for NASA, he worked for the Navy as an industrial engineer near Seattle.


The Derby Reporter
A small world

"Be your own success story."

Life at Goddard

Cody was hired directly into the Resource Analysis Office, Code405. He has assisted in providing estimates for the Wide Field Infrared Survey Telescope (WFIRST) mission, New Frontiers, and a variety of internal GSFC concept studies. He has also developed new cost models which the office has been using on a variety of missions.

Life Outside Goddard

Cody has a younger and older brother. They both still live in Kansas and he visits them and his nieces and nephews often. He is a fan of online gaming with his Xbox One and PC, and historical dramas, horror films, standup comedy, skydiving and crossfit. ■

Congratulations to GEDI and RRM3

on a successful launch on **December 5, 2018** from Cape Canaveral!

GEDI ECOSYSTEM LIDAR

Robotic Refueling Mission RRM3

MORE TO COME IN THE NEXT ISSUE

AGENCY HONOR AWARDS

Code 400 Awardees

The Agency Honor Awards Ceremony took place on Wednesday, October 24, 2018. Noted are awards to Code 400.

★ DISTINGUISHED SERVICE MEDAL ★

Dawn Lowe

For recognition of exceptional leadership and significant contributions to the development and operations of NASA's key ground and science systems.

★ OUTSTANDING LEADERSHIP MEDAL ★

Thoniel Cazeau

For exceptional leadership, dedication, and exemplary performance in the development of the NICER Instrument.

Bryan Fafaul

For exceptional leadership, persistence, hard work, and unique experience in producing the JPSS-1 spacecraft and instruments.

David Littman

For the relentless dedication in overseeing the development and launch of TDRS-M, which will serve NASA's priorities in space communications and exploration.

Veronica Otero

For your exceptional leadership of the TIRS-2 Thermal System through PDR, CDR, and system fabrication, assembly, and test.

★ OUTSTANDING PUBLIC LEADERSHIP MEDAL ★

Joseph Sullivan

For your sustained leadership to ensure the successful design, development, delivery, and testing of the Optical Telescope Element Simulator for the James Webb Space Telescope.

★ EXCEPTIONAL PUBLIC ACHIEVEMENT MEDAL ★

Michael Drury

For exceptional and sustained engineering expertise spanning 10 years to deliver the ISIM and OTE to meet major mission milestones for JWST.

Keith Havey

For outstanding contributions to the design, implementation, and execution of the cryo-vacuum testing of the telescope and instrument suite of the James Webb Space Telescope.

Jeremy Lyon

For outstanding efforts and excellence in supporting the critical Tracking and Data Relay Satellite (TDRS) and Space Network (SN) projects.

★ EXCEPTIONAL ACHIEVEMENT MEDAL ★

Leslye Boyce

For exceptional leadership and successful completion of the JPSS-1 Mission Systems Integration Effort.

Mark Brumfield

For exceptional diligence in advancing optical communications technology, thus expanding NASA's capability to provide critical communications support.

Elizabeth Corderman

For exceptional and tireless effort bringing the JPSS Block 2 C3S to fruition for the on-orbit missions and readiness for JPSS-1 launch.

Donya Douglas-Bradshaw

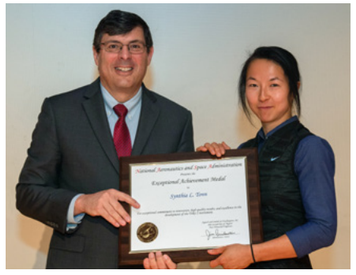
For exceptional achievements during the challenging time following the Advanced Topographic Laser Altimeter System (ATLAS) laser anomaly.

Heather Keller

For the extraordinary inter-agency support of the GOES-R mission in all aspects of financial and logistical management.

Andrew Peddie

For the successful delivery of critical spaceflight hardware for the Parker Solar Probe project and the Solar Wind Electrons Alphas and Protons instrument suite.



Synthia Tonn

For exceptional commitment to innovation, high quality results, and excellence in the development of the TIRS-2 instrument.

Ronnice Wedge

For exceptional and significant programmatic contributions to the Total and Spectral solar Irradiance Sensor (TSIS) mission.

Carrie White

For exceptional commitment, dedication, and leadership to the successful SGSS Project FY17 execution and Phase 2 Plan 2 Plan for SGSS mission success.

Continued on page 38

Continued from page 37

Kan Yang

For exceptional achievements and service to NASA as lead thermal analyst for the cryogenic testing of JWST's Optical Telescope Element Integrated Science Instrument Module.

★ EXCEPTIONAL ENGINEERING ACHIEVEMENT MEDAL ★

Derrick Early

For insightful engineering leadership and many contributions to the development and ultimate success of the GOES-R mission.

Mark Flanegan

For outstanding contributions to the innovative engineering test flow solution developed for the ICESat-2 mission to overcome the ATLAS laser anomaly.

John Johnston

For a decade of exceptional innovative engineering analysis critical to JWST's Pathfinder and OTIS development throughout the integration and test phase.

Matthew Macias

For exceptional and outstanding contributions to the James Webb Space Telescope mission.

★ EXCEPTIONAL SERVICE MEDAL ★

Catherine Barclay

For outstanding and continuous excellence in multiple contributions to space communications efforts, enabling NASA's success in supporting various missions.

Jerry Esper

For outstanding IT security contributions that enable NASA's scientific, technical and mission performance.

Karen Halterman

For exceptional service and substantial contributions to the success of several NASA missions throughout your extensive career.

★ EARLY CAREER PUBLIC ACHIEVEMENT MEDAL ★

Justin Deighan

For exceptional innovative science operations for MAVEN's Imaging UltraViolet Spectrograph leading to superior science observations enabling new discoveries at Mars.

Ashley Hume

For exceptional diligence in generating awareness of NASA's critical space communications and navigation activities.

Coralie Jackman

For exceptional contributions to optical navigation of NASA's New Horizons and OSIRIS-REx missions.

Devin Poland

For outstanding dedication in support of NASA's fleet of space science missions.

★ EXCEPTIONAL PUBLIC SERVICE MEDAL ★

Peter Antreasian

In exceptional contributions to NASA's Deep Space navigation enterprises and outstanding leadership of the navigation team for the OSIRIS-REx mission.

Gary Golnick

For exceptional expert-level optical engineering achievements spanning twenty years in support of the James Webb Space Telescope Program.

Michael Kimberling

For exceptional support as senior technical and program management advisor to the GOES-R Program.

Marc Rafal

For the passionate leadership and diligence over the past five years that produced our Nation's first-ever operational lightning mapper instrument.

★ SILVER ACHIEVEMENT MEDAL ★

Joy Henegar-Leon

For significant achievements in leading the ICESat-2 I&T team replan efforts reducing project risk while concurrently leading the GS team in the completion of major milestones.

James Valenti

For the successful management of the joint NASA-NOAA ground system project development team.

Continued on page 40

Continued from page 39

★ SILVER ACHIEVEMENT MEDAL (Team Award) ★

JPSS-1 AVX Capacitor Assessment Team

In recognition of your outstanding effort to address the AVX Capacitor parts issue for the JPSS-1 Satellite without impacting the mission's goals.

JPSS-1 Program Systems Engineering Team

For ensuring the integrity of the end-to-end Joint Polar Satellite System (JPSS-1) system prior to launch.

JWST ISIM and OTE Integration and Test Team

For significant achievements spanning ten extremely successful years of JWST's Integration and Test of the Integrated Science Instrument Module and Optical Telescope Element.

JWST OTIS CV Optical Test Conductor Team

For exceptional professionalism in helping the JWST OTIS cryo vacuum test to its successful completion through outstanding teamwork, problem solving, and overall dedication.

OSIRIS-REx Camera Suite (OCAMS) Instrument Team

For ingenuity and dedication toward the development and operation of the Origins, Spectral Interpretation, Resource Identification, and Security-Regolith Explorer Camera Suite.

OTIS LVTS Anomaly Review Board Team

For exceptional engineering achievement in commissioning the Large Vibration Test System for JWST/OTIS testing.

Planetary Science Solar Eclipse Communication Team

For exemplary work in the communication to the public of the importance of the Moon as the key player in Solar Eclipses.

SEXTANT Technology Demonstration Team

For successfully demonstrating the revolutionary technology of X-ray pulsar navigation.

TDRS-M Project Team

For outstanding, tireless commitment and contribution with rigor and detail, from exercise of spacecraft option through Government acceptance, enabling TDRS-M mission success.

TDRS-M Outreach Team

For outstanding efforts in promoting the TDRS-M launch and its significance on a variety of public-facing and NASA-internal platforms.

TIRS-2 Telescope, Optics, Detector, Electronics Team

For stellar achievement in implementing performance improvements and TIPCE test of the TIRS-2 Imaging Performance System, resolving the Detector-Electronics operation anomaly.

★ GROUP ACHIEVEMENT AWARD ★

Harris OTIS Cryo Vacuum Integration and Test Team

For exemplary engineering expertise and dedication demonstrated for the design, build, integration and testing of vital OTIS test GSE and flight hardware integration for JWST.

Hubble Cosmic Origins Spectrograph Operations Team

For sustained outstanding and vital contributions to maximizing the productivity of the Hubble Space Telescope Cosmic Origins Spectrograph Far Ultraviolet detector.

Hubble Gyro Running Restart Team

For ingenuity, foresight, and technical excellence required to provide autonomous capabilities that extended the life of a Hubble Space Telescope gyroscope.

JPSS Program Team

For exceptional leadership, persistence, hard work, and unique experience leading up to the successful launch of the JPSS-1 mission.

JPSS-1 ATMS Recovery Team

For exceptional engineering expertise and dedication in the troubleshooting and rebuilding the ATMS for the Joint Polar Satellite System.

JPSS-1 Flight Project Business Team

For exceptional and exemplary efforts in executing the JPSS resources in support of NASA's mission.

JPSS-1 Integration and Launch Team

For outstanding perseverance and dedication to overcome multiple challenges throughout the JPSS-1 integration, test, and launch campaign.

JPSS-1 Mission Operations Support Team

For exceptional dedication to commissioning the JPSS-1 satellite.

JSC Thermal Vacuum Facility Support Team

For outstanding support to refurbish and restore the world's largest thermal vacuum facility used to successfully test JWST's OTIS payload to meet a major mission milestone.

LCRD Optical Modem Team

For exceptional engineering expertise and achievement for space qualifying the Laser Communication Relay Demonstration Mission Flight Optical Modems.

LCRD Payload I&T Team

For exceptional achievement for the integration and testing of the Laser Communication Relay Demonstration (LCRD) Mission Flight Payload System.

Magnetospheric MultiScale Flight Operations Team

For enabling the record-breaking performance of Magnetospheric MultiScale mission's extraordinary investigation of reconnection between the Sun's and Earth's magnetic fields.

MAVEN Mission Team

For unlocking the mysteries of Mars atmosphere loss through exceptional operation and utilization of MAVEN.

Modular Unified Space Technology Avionics for Next Generation (MUSTANG) Team

For outstanding development and implementation of the Modular Unified Space Technology Avionics for Next Generation (MUSTANG) concept.

NASA Sentinel Gateway Team

For exceptional achievements enabling NASA access to European Commission Sentinel data and the development of the NASA Sentinel Gateway.

OSIRIS-REx Earth Gravity Assist (EGA) Team

For exceptional execution of OSIRIS-REx Earth gravity assist maneuvers and science instrument observations, resulting in a successful trajectory toward Asteroid Bennu.

PACE OCI FPA Development Team

For outstanding engineering developments for the PACE Ocean Color Instrument Risk Mitigation Unit Focal Plane Arrays.

Portable Automated Safe-to-Mate Team

For exceptional engineering expertise in developing the Portable Automated Safe-to-Mate system to safely and efficiently perform impedance measurements of electronics devices.

RAVEN Team

For the successful launch and demonstration of the Raven technology module to the International Space Station.

SGSS Revitalization Team

For outstanding leadership and collaboration in transforming the SGSS FY17 plan and the strong contributions to bolstering significant SGSS progress.

TDRS-M Omni Antenna Mishap Response Team

For outstanding leadership, tireless dedication, and safe return of the TDRS-M spacecraft to flight readiness for mission success following the forward Omni antenna mishap.

TDRS-M Game Team

For innovation in developing from scratch and promoting on various platforms a game to promote the TDRS-M satellite and launch.

TDRS-M Mission Operations Segment Team

For exceptional engineering analysis, preparation and execution of TDRS-M Launch and On-Orbit Test.

TDRS-M Team

For the tireless efforts in overseeing development and launch of TDRS-M, resulting in a relay satellite that will expand a national space communications resource.

Terra Lunar Deep Space Calibration Team

For the flawless execution of the Terra Lunar Deep Space Calibration Maneuver.

Coming and Goings

July 1 through September 30, 2018

Comings

Carla L. Matusow (GSFC-5830) to 4502/Technology Enterprise and Mission Pathfinder Office (TEMPO), mission manager for Ground Segment

Carol A. Fester (GSFC-1560) to 4501/Networks Integration Management Office (NIMO) financial management specialist

Thomas E. Martin (GSFC-3600) to 4502/TEMPO mission manager

Kevin C. Hyland (GSFC-5010) to 423/Earth Science Data and Information Systems (ESDIS) project, resources analyst

Darren C. Johnson (GSFC-5010) to 423/ESDIS project, senior resources analyst

Lanny Hicks (external hire) to 4501/Networks Integration Management Office (NIMO) supporting 4502/TEMPO, financial management specialist

Deysi Peterson (GSFC-6030) detail to 429/Landsat 9 project, senior resources analyst

Jermaine X. Starks (WFF-2280) to 450/Exploration & Space Communications Projects Division, contracting officer representative

Jason M. Baldessari (GSFC-6030) to 444/Space Science Mission Operations (SSMO) project, senior resources analyst

Goings

John O. Bristow (GSFC-4500) to 581/Software Systems Engineering Branch, computer engineer

Gregory W. Heckler (GSFC-4540) – detail to 599/Mission Systems Engineering Branch, lead systems engineer

Jeffrey J. Gramling (GSFC-4200) – retired from 420/Associate Director for the Earth Science Projects Division

Mark T. Severance (JSC-4501) – retired from 4501/NIMO, Human Space Flight Network Director

Scott A. Greatorex (GSFC-4501) – retired from 4501/NIMO, project manager

Moon J. Kim (GSFC-4800) - resigned from 480/Satellite Servicing Projects Division (SSPD), Resources Analyst

Christopher A. Carson (WSC-4540) – detail to 599/Mission Systems Engineering Branch, lead systems engineer

Cathy L. Stickland (GSFC-4250) – detail to 158/Cost Modeling & Analysis Estimating Office, Flight Projects Development Program (FPDP) Cohort #3 1st assignment, administrative manager

Sharon M. Purser (GSFC-4280) – retired from 428/SSMO project, financial management specialist

Ronald J. Sigrist (GSFC-4500) – transferred to National Oceanic and Atmospheric Administration (NOAA), general engineer

Mark A. Woodard (GSFC-4510) to 584/Mission Validation & Operations Branch, mission operations director

Ferzan Jaeger (GSFC-4990) – resigned from 490/Instrument Projects Division, instrument project manager

Frank J. Cepollina (GSFC-4080) – resigned from 480/SSPD rehired annuitant/consultant

George W. Heckler (GSFC-4540) – transfer to NASA Headquarters, AST-engineering project management

Elizabeth A. Fortner (GSFC-4430) – retired from 443/James Webb Space Telescope (JWST) project office, resources analyst

Lisa Renee Hoffmann (GSFC-4000) – detail to 150/Office of the Chief Financial Officer, special assistant for administrative operations

Reassignments/ Realignments Details within Code 400

Todd T. King (GSFC-4502) to 401/ Project Formulation & Development Office (PFDO), study manager

Leslie L. Ambrose (GSFC-4501 to 453/Near Earth Network (NEN) Project, Ground Systems mission manager

Richard J. Burley (GSFC-4740) to 444/SSMO project, deputy project manager

Lindsay L. Stroyen (GSFC-4900) to 490/Instrument Projects Division (IPD) supporting the Europa Clipper and Propulsion System, financial management specialist

Julie A. Riveraperez (GSFC-4740) to 444/SSMO project, senior resources analyst

Richard A. Carter (GSFC-4200) to 420/Earth Science Projects Division, supervisory deputy program manager

Jesse A. Walsh (GSFC-4000) to 401/PFDO, FPDP Cohort #3 1st assignment, administrative manager

Jacqueline F. Ferguson (GSFC-4070) to 407/Earth Science Technology Office (ESTO), senior resources analyst

Arthur D. Jacques (GSFC-4900) to 401/PFDO, Associate Director for Formulation

Joe Stevens (GSFC-4740) to 401/PFDO, FPDP Cohort #3 1st Assignment, AST, technical engineer operations management

Vanessa Soto Mejias (GSFC-4200) – FPDP Cohort #2 graduation/ assignment to 420/Earth Science Projects Division, deputy program business manager

Brian Christopher Thomas (GSFC-4290) – FPDP Cohort #2 graduation/assignment to 480/ SSPD, deputy program business manager

Mellani Edwards (GSFC-4900) – FPDP Cohort #2 graduation/ assignment to 490/Instrument Projects Division supporting 4902/Resolve instrument project, financial management specialist

Wen-ting Hsieh (GSFC-4920) – FPDP Cohort #2 graduation/ assignment to 492/High Resolution Mid-Infrared Spectrometer (HIRMES) instrument project, deputy instrument project manager

Obadiah Kegege (GSFC-4530) – FPDP Cohort #2 graduation/ assignment to 453/NEN project, ground systems mission manager

Susan R. Breon (GSFC-4902) to 480/SSPD, project manager

David J. Littmann (GSFC-4540) to 458/Space Network Ground Segment Sustainment (SGSS) project, project manager

Robert P. Buchanan (GSFC-4540) to 450/Exploration & Space Communications Projects Division, associate program manager

Marco A. Toral (GSFC-4540) to 4503/Search & Rescue (SAR) Mission Office, deputy mission manager

Reorganizations within Code 400

Rename 456/Space Network Expansion (SNE) to Laser-Enhanced Mission Navigation and Operations Services (LEMNOS) project (pending)

Rename 401.2/Project Management Excellence & Innovation Office to NOAA Pre-Formulation Office (pending)

Lisa Hoffmann / Code 400
Administrative Officer

OUT & ABOUT

LIFE'S HIGHLIGHTS OFF CAMPUS

Best wishes to Barbara Haskell/155, on the birth of her newest grandson, Blake Jameson Blade. He was born on October 23, 2018, weighing 5 lbs., 2 oz., and was 17 in. long.

Laura (Quinn) Paschal (Code 443) and husband Michael were thrilled to welcome their first grandchild, Quinn Emilia, in September. She weighed 9 lbs. 8 oz. and was 21 inches long. Laura was especially tickled with the choice of name!

Congratulations to Kadie Esi/454, her husband Tega, and big sister Elohor Emma, on the birth of their son, Oba Emmanuel, on September 5, 2018, weighing 7 lbs.

Congratulations to Nicole Stone/410, her husband, Matthew, big sister, Charlotte and big brother, David, on the birth of their son, Paul Matthew Jr. on September 24, 2018, weighing 7 lbs., 11 oz.

Congratulations to Andre Young/480, and his wife Annuetta, on the birth of their son, Andre Jr. on September 12, 2018, weighing 6 lbs., 7 oz.

Congratulations to Ashley Holt/472 and Robby Curtis on the birth of their daughter, EmmaLynn Ann on October 23, 2018, weighing 8 lbs., 11 oz.

Steve Via, son of Lauri Via/155.1, and Alex Hart were married on September 7. Best wishes to the happy couple.

Congratulations to Mansoor Ahmed/440. His latest film, entitled "Tele-Phone", was screened at the DC South Asian Festival and the Berlin Flash Film Festival, where it received the Honorable Mention award.

Congratulations to Rachel Brinson/420, her husband, Patrick and big sister Parker, on the birth of their daughter, Sophie Grace on September 21, 2018, weighing 6 lbs., 2 oz.

Congratulations to Cameron Dunlap, Ralph Ralston and Monica Vigil, all from Code 450.S at the White Sands complex. All three were recipients of the Silver Snoopy award, presented by NASA Astronaut, Don Pettit.

In addition, folks at the White Sands complex also received the TDRS-M Success & Silver Achievement Award.

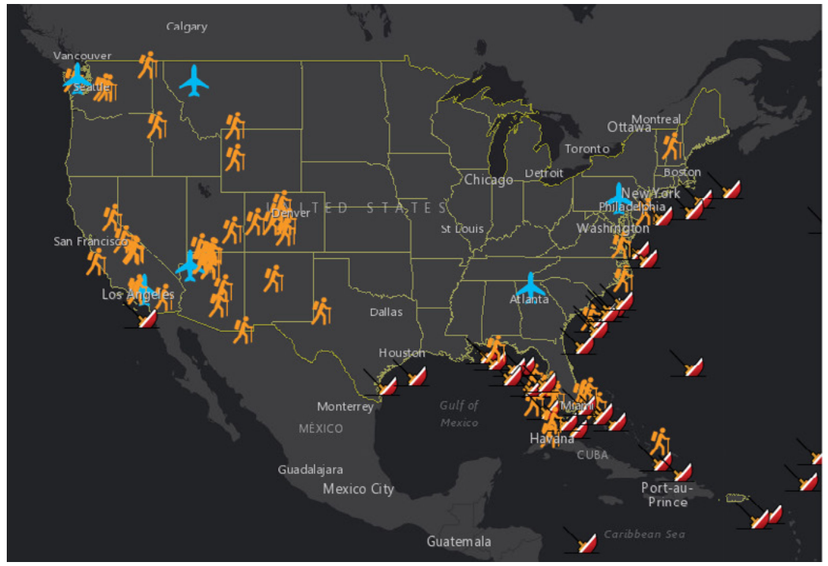
Share your news!
Weddings, births, interesting travel experiences...we want to know!

Please send your inputs to Paula Wood. Include your **name, phone number** to:

paula.l.wood@nasa.gov
Code 460
Ext. 6-9125

THE LATEST SAR SAVES

NASA'S SEARCH AND RESCUE (SAR) OFFICE CONTINUES ITS EFFORTS TO DEVELOP AND IMPROVE ON LIFE-SAVING DISTRESS BEACON TECHNOLOGIES.



Each icon on this map represents one rescue event, though multiple saves may be involved with each event. The Search and Rescue Satellite Aided Tracking (SARSAT) system is able to detect three types of beacons:

Personal Locator Beacons (PLBs)

Used primarily by hikers and outdoor enthusiasts

Emergency Position Indicating Radio Beacons (EPIRBs)

Used by commercial and recreation ships

Emergency Locator Transmitters (ELTs)

Used by civilian aircraft

COSPAS-SARSAT rescues from November 2017 through November 2018 are shown above.

DID YOU KNOW...?

Did you know that thousands of paper lanterns took to the sky on November 23 in Thailand for Yi Peng? There are so many lanterns in Chiang Mai, air traffic is grounded for several nights. The festival, held during a full moon of the Thai calendar's 12th lunar month, is to let go of ills and misfortunes of prior years, and to make wishes for good fortunes in the new year.

We want to be in the know!

If you have something to share, send it to Matthew Ritsko. Include your **name, phone number** and send it to:

matthew.w.ritsko@nasa.gov

Code 400 Diversity and Inclusion Committee

Ext. 6-2515

FLIGHT PROJECTS DIRECTORATE

SENIOR LEADERSHIP ROUNDTABLE

The Flight Projects Directorate (FPD) Roundtable is comprised of senior leaders within FPD, engaging in strategic initiatives for the good of the organization, Center and Agency. This effort creates a shared leadership vision, providing a forum for identifying our competitive advantage as well as our institutional barriers, and for discussing what collaborative actions could be executed within 400's control. There is an intentional push by directorate leadership to keep the momentum going, which has already resulted in a change to the FPD Tag-Ups once a quarter to allow for the Roundtable to dedicate a half day to work strategic initiatives. The Roundtable meets monthly and has divided FPD priorities into four initiatives. We are sharing our Strategic Initiatives with the FPD community and each meeting will focus on a different element. In our latest meeting, we focused on "Continuous Improvement" and planned initiatives are highlighted in green in the graphic below. ■

DR. WANDA PETERS / Code 400
FPD DEPUTY DIRECTOR FOR PLANNING AND BUSINESS MANAGEMENT

Flight Projects Directorate (FPD)/Senior Leadership Strategic Initiatives

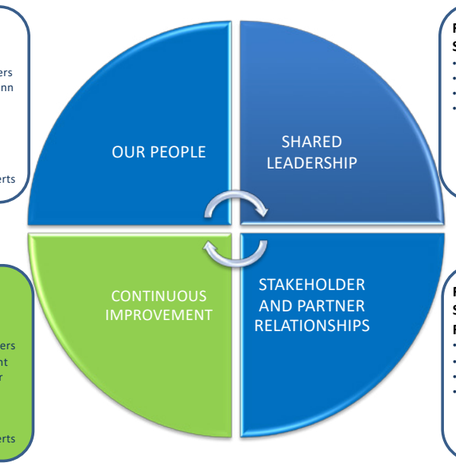
Purpose of FPD Roundtable - Enhance Goddard's program/project management, nurture our people, influence the external environment to sustain world class capabilities, and achieve mission success by cultivating a strategic and collaborative directorate.

The strategic competitive advantage of GSFC's FPD is multifaceted; enabling us to create an environment in which to accomplish our dynamic mission. Control of our resources enables us to be empowered to accomplish our mission. We strive to maintain and improve on being the premier program/project management organization at NASA which we accomplish through our **experience** and our **people**:

- We leverage and harness the experiences and passion of our people, to accomplish multiple missions and to collaborate for future work in a dynamic environment, enabling us to execute on a diversity of short/long term missions.
- We come to the game rooted in the experience base of our flight projects culture, with an agility and flexibility that serves our stakeholders and partners in the accomplishment of the mission.
- Our people get the job done in an environment of ever changing challenges.

Promote shorter meetings: Project Managers Staff scheduled NTE 50 minutes; quarterly Roundtable meetings scheduled during time harvested from Project Tag Ups.
Improve document routing: Electronic system (SharePoint) in use and under evaluation; working issues of style and editing across organizational boundaries.
Streamline Project Tag Ups: Eliminate purposeless repetition month-to-month; guidance is under review.
Bring sanity to policy directives: Requirements from Center directives number 7,316—defies comprehension and compliance; working within the Management System Committee on strategic alignment of directives, management of requirements, and an improved tool.
Space Management: FPD housing representative coordinates with Center space-holders and FPD space-needers.
Component Procurements: Developing an In-House Acquisition Strategy Meeting which obtains Center buy-in for procurements related to in-house developments (instruments, work packages, spacecraft, etc.). Avenues/decisions will be documented in a decision memorandum.

FPD Roundtable Team Updates



FPD Initiative: Our People
- Champion: Wanda Peters
- Co-Leader – Donna Swann
- Co-Leader – Barb Haskell/155
- Team Members
  - Nick Chrissotimos
  - Cindy Fryer
  - Subject matter experts

FPD Initiative: Shared Leadership
- Champion: Tom McCarthy
- Co-Leader – Bob Menrad
- Co-Leader – Preston Burch
- Team Members
  - Nick Chrissotimos
  - Donna Swann
  - Bill Ochs
  - Pam Millar
  - Subject matter experts

FPD Initiative: Continuous Improvement
- Champion: Wanda Peters
- Co-Leader – Tim VanSant
- Co-Leader – Ken Schwer
- Team Members
  - Rich Ryan/155
  - Art Jacques
  - Subject matter experts

FPD Initiative: Stakeholder and Partner Relationships
- Champion: Tom McCarthy
- Co-Leader – Moonie Ahmed
- Co-Leader – Rich Ryan/155
- Team Members
  - Ken Schwer
  - Subject matter experts

FLIGHT PROJECTS
LAUNCH SCHEDULE 2018-2019

DECEMBER 2018 | JULY 2019 | 2019 →

Robotic Refueling Mission RRM3

LAUNCHED!

12/2018
Robotic Refueling Mission (RRM)-3

7/2019 (TBC)
High Resolution Mid-InfrarEd Spectrometer (HIRMES)

TBC
Space Environment Testbed (SET)-1

GEDI ECOSYSTEM LIDAR

LAUNCHED!

12/2018
Global Ecosystem Dynamics Investigation (GEDI)

LCRD

8/2020 (TBC)
Laser Communications Relay Demonstration (LCRD)

ICON Ionospheric Connection Explorer

TBC
Ionospheric Connection Explorer (ICON)

TBC: To Be Confirmed