



# THE CRITICAL PATH

A FLIGHT PROJECTS DIRECTORATE PUBLICATION | 2021 WINTER ISSUE

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

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The Lucy team celebrates the successful launch on the beach in Florida. CREDIT: NASA

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# THE CRITICAL PATH

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## PUBLISHED BY THE FLIGHT PROJECTS DIRECTORATE

### TCP TEAM

Michelle Belleville  
Rachel Brinson  
Maureen Disharoon  
Catherine Dolch  
Sarah Harnish  
Laura Paschal  
Jennifer Poston  
Shannon Smith  
Paula Wood



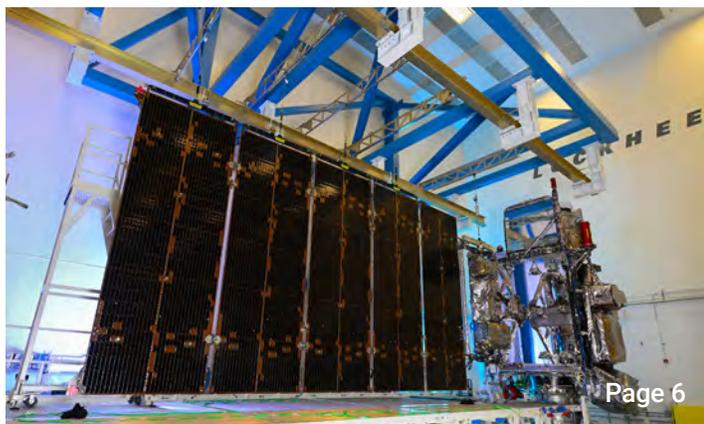
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### SUPERVISING EDITOR

Donna Swann



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## Have a story idea, news item or letter for **The Critical Path**?

Let us know about it. Include your **name**, **phone number** and send it to:

 [paula.l.wood@nasa.gov](mailto:paula.l.wood@nasa.gov)

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The deadline for the next issue is **March 18, 2022**



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# Message from the **DIRECTOR**

In writing this introduction, I took a moment of reflection before Thanksgiving. By year's end, we will have successfully completed and supported approximately 20 agency key decision points spanning standard lifecycle phases and replans for more than half of our projects. This requires an immense amount of work, dedication, and coordination with our teams. I feel immense gratitude for the people I get to work with and the work I get to do.

We continue to have a really special and equally challenging year. But in spite of the challenges, we saw successful launches of two of our missions, Landsat 9 and Lucy (see pages 13 and 25), with three more in the coming months. All of these projects should be commended for getting to launch in a year of COVID; an era at Goddard that we will not forget.

COVID impacts have caused battles over replans and the money needed to execute them – and we are not done yet. The Flight Projects Directorate (FPD) and the Center are working to reclaim trust with all stakeholders to overcome these challenges via extensive transparency, inclusion, and communication. These experiences will truly serve as a lesson for all of us for the future and will be incorporated into how FPD manages and sets its objectives and goals going forward.

Personally, I am overwhelmed in anticipation of the momentous launch of the James Webb Space Telescope (JWST), which is more than 20 years in the making. I joined Goddard in 2001 in the Thermal Engineering Branch and remember meeting Keith Parrish who was the thermal lead and Mark Voyton who was the command and data handling lead at the time. Now, Keith is leading JWST as the commissioning czar and Mark is leading launch site preparations. These awesome

career journeys serve as examples of the many folks who have worked on JWST and are just some of the inspirational people we have been able to watch over the years.

This brings me to my most important reflection for the year—what matters most in our work is our people. Our people enable the outstanding work we do and their dedication to flight projects is next level. If there was ever a year to see this evidenced, it's been 2021. Although launches represent NASA and the Center's objectives, the achievements of our people are how I also measure our success. I want to personally thank project management and all of our team members who have made immense sacrifices in often unheralded ways.

As one last reminder, especially in challenging times, we must be committed to choices that are civil and respectful; it is within all of us to make this conscious choice each and every day. Going forward, FPD intends to be strategic and intentional about streamlining our operations and we need everyone to be part of that. The way we work has changed and we have to adapt our thinking. Our future of work requires open minds to embrace change.

Thank you for your work and perseverance over the last year. Thank you in advance for your patience as we continue to navigate this new operating environment. Lastly, join me in congratulating our remaining three launch teams in their final throes of the culmination of years of work: the Laser Communication Relay Demonstration, JWST, and Geostationary Operational Environmental Satellite-T. Have a wonderful end of year and know that we are here if you need anything. ■

**Tom McCarthy**  
*Director, Flight Projects*  
[thomas.v.mccarthy@nasa.gov](mailto:thomas.v.mccarthy@nasa.gov)



Flight Projects Diversity and Inclusion (FP D&I) starts here.

# Can we count you in?



FP D&I is recruiting new 2022/2023 members to be part of a committee that listens to all perspectives, provides an opportunity for learning, and promotes voices for inclusion.

Learn more and consider joining by contacting:

✉ [donna.j.swann@nasa.gov](mailto:donna.j.swann@nasa.gov)

or

✉ [tara.dulaney@nasa.gov](mailto:tara.dulaney@nasa.gov)

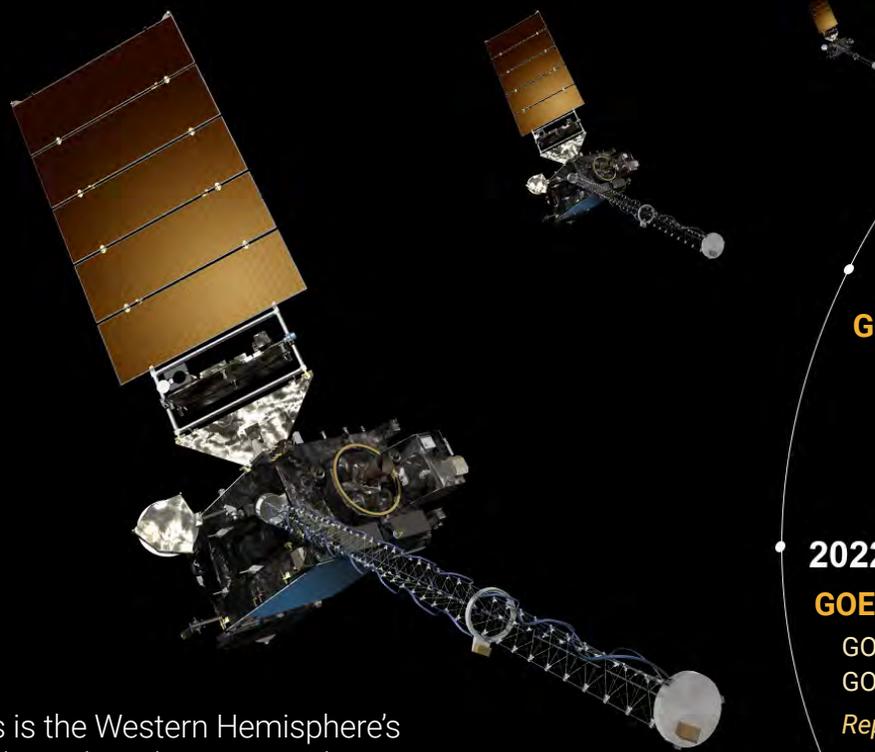
# NOAA's Geostationary Satellite Missions Take Off

GOES-T is scheduled to launch early next year, and the GeoXO program begins Phase A



NOAA's Geostationary Operational Environmental Satellites (GOES) and Geostationary Extended Observations (GeoXO) programs, both supported by NASA, have been busy ensuring the continuity of geostationary satellite operations well into the future.

*Artist's rendering of a GOES-T Series spacecraft. CREDIT: NOAA*



• **2016**  
**GOES-R**  
 GOES-16  
 GOES EAST

• **2018**  
**GOES-S**  
 GOES-17  
 GOES WEST

• **2022**  
**GOES-T**  
 GOES-18  
 GOES WEST  
*Replacing GOES 17*

The GOES-R Series is the Western Hemisphere’s most sophisticated weather-observing and environmental monitoring system. The satellites provide advanced imagery and atmospheric measurements, real-time mapping of lightning activity, and space weather monitoring. The first satellite in the series, GOES-R, was renamed GOES-16 after its launch in November 2016 and operates as NOAA’s GOES East. GOES-S, now GOES-17, was launched in March 2018 and operates as NOAA’s GOES West. GOES-T, the third satellite in the GOES-R Series, is preparing for its launch in early 2022 from Cape Canaveral Space Force Station in Florida.

After GOES-T launches, it will be renamed GOES-18 once it reaches geostationary orbit. Following a successful on-orbit checkout of its instruments and systems, NOAA plans to put GOES-T immediately into operational service, replacing GOES-17 as the new GOES West. GOES-18 will work in tandem with GOES-16 to watch over more than half the globe – from the west coast of Africa to New Zealand. When GOES-18 goes into operational service, GOES-17 will become an on-orbit spare.



GOES satellite coverage of the Western Hemisphere. CREDIT: NOAA

Continued from page 7

Artist's rendering of a GOES-R Series spacecraft.

CREDIT: LOCKHEED MARTIN

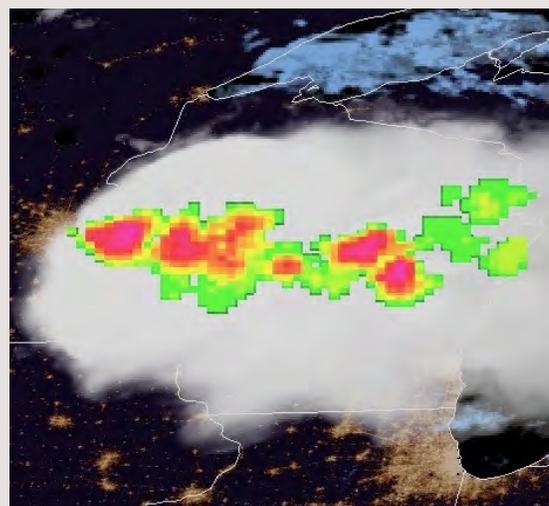
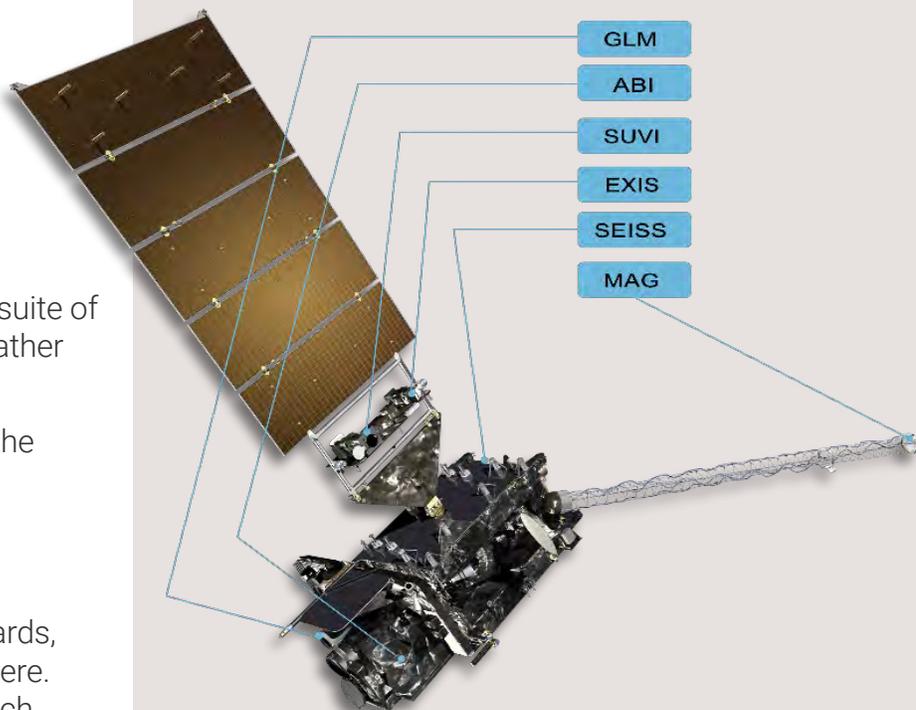
## Monitoring weather on Earth and in space

Like its sister satellites, GOES-T carries a suite of advanced instruments for monitoring weather and hazards on Earth and in space.

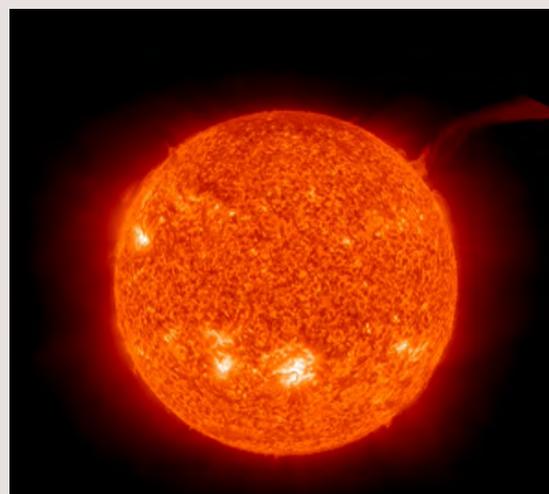
The **Advanced Baseline Imager (ABI)** is the primary instrument on the GOES-R Series for imaging Earth's weather, oceans and environment. This instrument is used for a range of applications related to severe weather, hurricanes, aviation, natural hazards, the atmosphere, oceans, and the cryosphere. The ABI scans Earth with 16 channels, each providing specific information on various elements of Earth's surface or atmosphere, such as trees, water, clouds, moisture, and smoke. ABI data is critical for accurate and reliable forecasts and severe weather warnings.

GOES-R Series satellites also carry the **Geostationary Lightning Mapper (GLM)**, the first operational lightning mapper flown in geostationary orbit. Developing severe storms often exhibit a significant increase in lightning activity, and GLM data can help forecasters focus on initial thunderstorm development and intensifying severe storms before they produce damaging winds, hail, or even tornadoes.

The satellites also host a suite of instruments that detect and monitor approaching space weather hazards. The **Solar Ultraviolet Imager (SUVI)** and **Extreme Ultraviolet and X-ray Irradiance Sensors (EXIS)** provide imaging of the Sun and detection of solar flares. The **Space Environment In-Situ Suite (SEISS)** and **Magnetometer** monitor energetic particles and the magnetic field variations associated with space weather, respectively. Together, observations from these instruments contribute to space weather forecasts and provide early warning of disruptions to power utilities, communications, and navigation systems and radiation damage to orbiting satellites.



GOES-16 visible imagery with GLM overlay of a powerful derecho that swept across the Midwest on July 28, 2021. CREDIT: NOAA



Solar flare captured by the GOES-16 SUVI on Oct. 28, 2021. CREDIT: NOAA / CIMSS

## What's new with GOES-T

As GOES-18, GOES-T will provide the same observations that GOES-16 and GOES-17 do, but with slight modifications to two of the instruments. In 2018, during post-launch testing of the GOES-17 ABI, scientists discovered an issue with the instrument's cooling system. The loop heat pipe subsystem, which transfers heat from the ABI electronics to the radiator, is not operating as designed. As a result, the ABI detectors can't be maintained at their intended temperatures under specific orbital conditions, leading to a partial loss of infrared imagery at certain times.

An investigation found the most likely cause of the thermal performance issue to be foreign object debris blocking the flow of the coolant in the loop heat pipes. As a result, changes to the design of the ABI radiator and loop heat pipes for GOES-T were implemented to decrease the chance of future cooling system malfunctions. The new design utilizes a simpler hardware configuration that eliminates the filters that are susceptible to debris.

GOES-T also carries an upgraded magnetometer instrument from the one onboard GOES-16 and GOES-17. The new magnetometer, built by NASA Goddard Space Flight Center and called GMAG, is expected to provide improved performance for measuring the magnetic field variations associated with space weather.

## Providing advanced observations for the western U.S.

As GOES West, GOES-18 will be positioned to watch over the western contiguous United States, Alaska, Hawaii, Mexico, Central America, and the Pacific Ocean. The satellite will be ideally located to monitor weather systems and hazards that most affect these areas of the Western Hemisphere. GOES-18 will collect critical data over the northeastern Pacific Ocean, where many weather systems that impact the continental United States originate. The satellite will monitor atmospheric river events that can cause flooding and mudslides in coastal areas. GOES-18 data will



Technicians install the GOES-T GMAG sensor unit on the satellite. CREDIT: LOCKHEED MARTIN

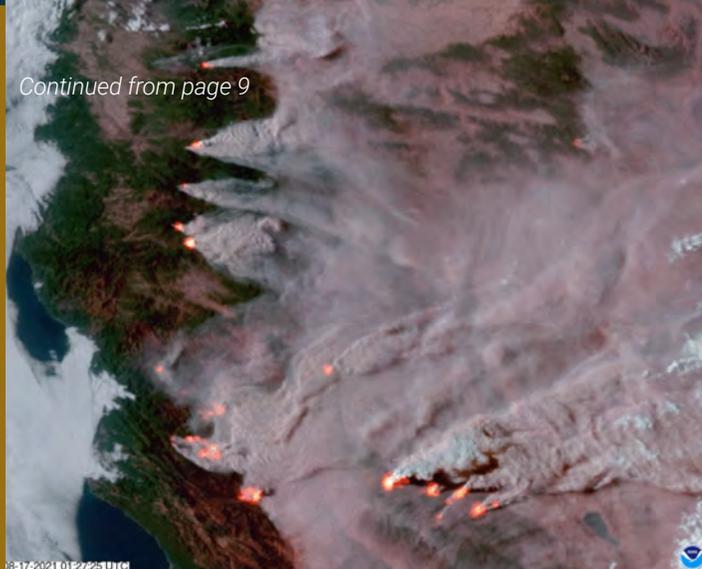
also be important for detecting volcanic eruptions and monitoring ash and sulfur dioxide.

Wildfires are of particular concern in the western U.S., and GOES-18 will provide crucial information for detecting and monitoring these hazards. The satellite is skilled at locating fire hot spots, detecting changes in fire behavior, predicting the motion of fires, estimating a fire's intensity, and monitoring smoke output and air quality effects from smoke. GOES-18 can identify the lightning strikes most likely to ignite fires and characterize pyrocumulonimbus clouds that threaten the safety of firefighters. Data from GOES-18 will aid forecasters, decision-makers, and first responders during fire emergencies.

Coastal fog is a particular hazard in San Francisco and parts of the Pacific Northwest. Not only will GOES-18 provide high-resolution, real-time

*Continued on page 10*

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GOES-17 imagery of numerous fires burning in California on August 17, 2021, combines GeoColor imagery with the fire temperature data product to highlight both the fires' hotspots and smoke plumes. CREDIT: NOAA/CIRA



GOES-17 GeoColor imagery of Hurricane Linda on August 13, 2021. CREDIT: NOAA/CIRA

imagery of fog conditions, but the satellite's rapid scanning capabilities will also help forecasters predict when fog will clear.

GOES-18 will also provide high-resolution imagery of Pacific hurricanes that track toward Hawaii or Mexico. GOES-18 data will alert forecasters of storm formation and track and monitor tropical storms and hurricanes in near-real-time. The satellite will provide a detailed look at the storm properties of hurricanes, including cloud top cooling, convective structures, specific features of a hurricane's eye, upper-level wind speeds, and lightning activity. This information is critical to estimating a storm's intensity.

## What's next for geostationary satellite observations

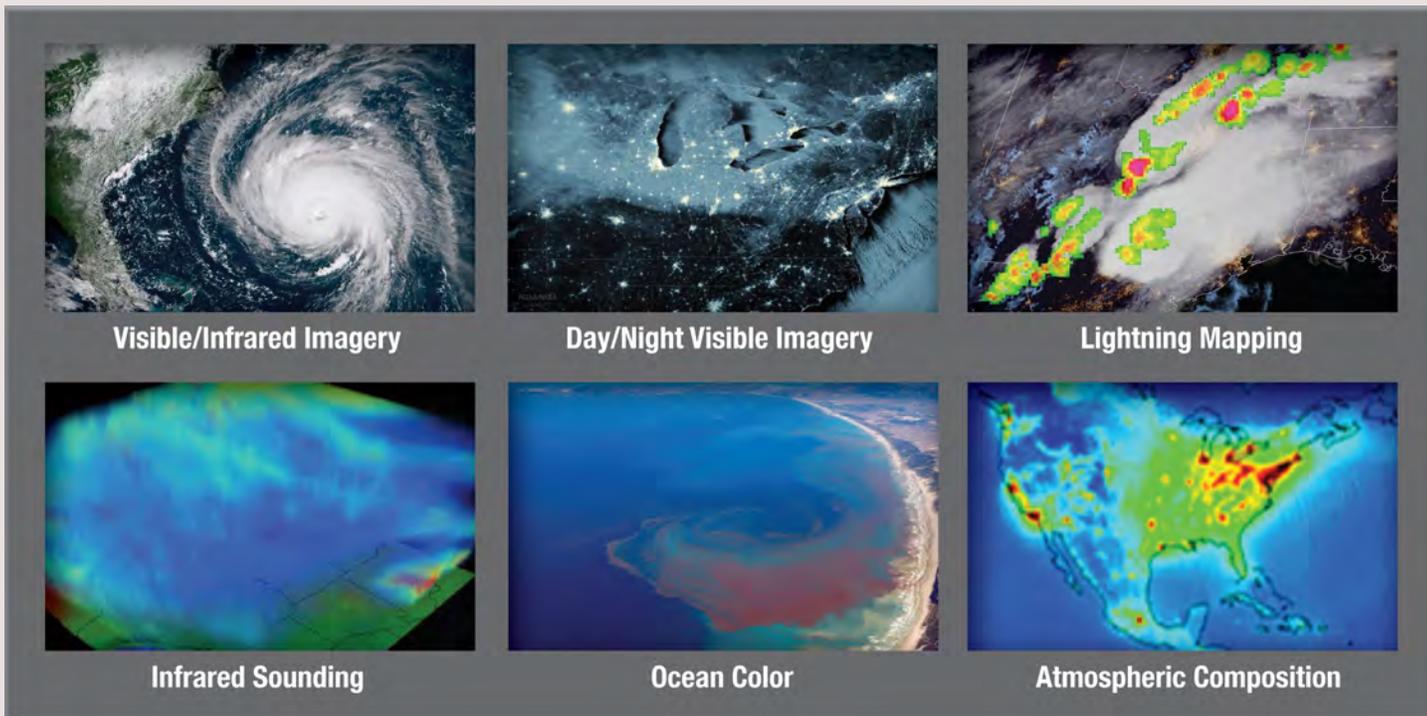
GOES-U, the final satellite in the GOES-R Series, is scheduled to launch in April 2024. Looking ahead, NOAA is working with NASA on the next-generation geostationary satellite mission called GeoXO. GeoXO will bring new capabilities to support U.S. weather, ocean, and climate operations in the 2030s, as the GOES-R Series nears the end of its operational lifetime.

The GeoXO satellite system will advance Earth observations from geostationary orbit and bring new capabilities to address emerging environmental issues and challenges that threaten the security and well-being of every American.

New technology and scientific advancements will improve observations for weather forecasting and provide new ocean and atmospheric measurements. GeoXO will provide real-time, high-resolution visible and infrared imagery for monitoring Earth's weather, oceans, and environment. Data from GeoXO will contribute to weather forecast models and drive short-term weather forecasts and severe weather warnings. This new generation of satellites will also provide advanced detection and monitoring of environmental hazards like wildfires, smoke, dust, pollution, volcanic ash, drought, and flooding.

Recommended additional observations will address our changing planet and evolving user needs. NOAA plans to incorporate day/night visible imagery, infrared sounding, atmospheric composition, and ocean color, as well as an improved lightning mapper in the GeoXO system. These observations will provide vital data to complement information from NOAA's partners in Europe and Asia, building a seamless global observing system.

In July 2021, GeoXO completed its Key Decision Point A review. The joint NOAA/NASA Agency Program Management Council affirmed the program addresses a critical need, and the proposed mission concept is feasible. During Phase A, the GeoXO Program will develop the



Planned GeoXO observations. CREDIT: NOAA

final mission concept, system-level requirements, necessary system technology developments, and program/project technical management plans.

The GeoXO program was formally initiated by the Department of Commerce in November 2021, after completing a successful Milestone 1 review.

“Phase A” studies with industry are underway for the GeoXO imager and sounder. These definition-phase study and development contracts will help define each instrument’s potential performance, risks, costs, and development schedule. Additional Phase A study contracts will be awarded in the future for the other planned GeoXO instruments.

The program is working toward System Requirements and Milestone 2 reviews in 2022. The System Requirements Review will ensure the requirements will satisfy the mission, while Milestone 2 will approve proceeding to the program development phase of the mission.

### Collaboration delivers the mission

NOAA and NASA work together to deliver these critical geostationary satellite systems. NOAA manages the GOES-R and GeoXO programs through an integrated NOAA-NASA office, administering the ground system contract, operating the satellites, and distributing their data to users worldwide. NASA’s Goddard Space Flight Center oversees the acquisition of the GOES-R spacecraft and instruments, and NASA’s Launch Services Program launches the satellites. Industry partners are critical to meeting the mission. NOAA and NASA work with commercial partners to design and build the spacecraft and instruments and the ground system infrastructure. ■

**Michelle Smith / NOAA Satellite and Information Service**  
[GOES-R/GeoXO Program Communications](#)



# FPD

## Project Support Community Spotlight

The Project Support Community Spotlight seeks to recognize and connect members of the project support community across the Flight Projects Directorate. Additionally, resources and relevant information will be highlighted in each Critical Path publication. The Critical Path team looks forward to connecting with and highlighting the project support community.

### How can we support you?

Contact FPD Project Support website for general information.

 Admin Space Station (AdSS) for Goddard Space Flight Center (GSFC)  
[https://fpdsp13.gsfc.nasa.gov/sites/100/SitePages/Admin\\_Portal.aspx](https://fpdsp13.gsfc.nasa.gov/sites/100/SitePages/Admin_Portal.aspx)

 Flight Projects Directorate Project Support  
[https://fpd400.gsfc.nasa.gov/sites/400/FPD\\_Internal/SitePages/ProjectSupport.aspx](https://fpd400.gsfc.nasa.gov/sites/400/FPD_Internal/SitePages/ProjectSupport.aspx)

 [jacqueline.seymore@nasa.gov](mailto:jacqueline.seymore@nasa.gov)

 (301) 286-6307

 [sarah.a.harnish@nasa.gov](mailto:sarah.a.harnish@nasa.gov)

 (301) 286-6567



## Jennifer (Jen) Clark

***Geostationary Operational Environmental Satellite-R Series (GOES-R) Program***  
**Senior Project Support Specialist**

Jennifer (Jen) Clark first joined NASA's workforce as a contractor in 1988. After several years, she began working at Goddard Space Flight Center in 2004, when she accepted a support position within the Flight project of the GOES program. After 17 years with the program, Jen is now a Senior Project Support Specialist for the program office of the latest generation of GOES satellites, the GOES-R Series. When asked what the best part of her role is, Jen says "My favorite part is knowing that I am a part of a meteorological program that is so important to the safety of our Nation." Outside of her role for the program, Jen enjoys taking care of her furry friends and spending time with her family. ■

**Alysha Payne / Code 410**



# CONGRATULATIONS TO THE Landsat 9 Team!

Congratulations to the Landsat 9 team on a successful launch on September 27, 2021 aboard a United Launch Alliance Atlas V 401 rocket from Space Launch Complex 3 at Vandenberg Space Force Base in California. A joint NASA and U.S. Geological Survey mission, Landsat 9 will continue the legacy of monitoring Earth's land and coastal regions that began with the first Landsat satellite in 1972.

Once fully commissioned in orbit, Landsat 9 will replace Landsat 7 and join its sister satellite Landsat 8 to collect images from across the planet every eight days. This calibrated data will continue the Landsat program's critical role in monitoring land use and helping decision-makers manage essential resources, including crops, water resources, and forests.

For more information on the Landsat 9 mission, [read the article](#) from the Spring 2021 edition.



## Interactive Mission Website

To help the public learn more about the project and its nearly 50-year history, NASA has recently launched a new interactive website.

o [www.nasa.gov/landsat9](http://www.nasa.gov/landsat9)



CREDIT: SARAH MCINTIRE

# NASA's Near Space Network

*One Year of a New Communications and Navigation Paradigm at Goddard*

At the beginning of the 2021 fiscal year, the Exploration and Space Communications (ESC) projects division began reorganizing its portfolio to execute a bold commercialization plan set forth by NASA's Space Communications and Navigation (SCaN) program. The resulting creation of NASA's Near Space Network cements Goddard's commitment to engage private industry in a manner that builds a robust commercial space economy.

"Over the course of a year, we've deepened our focus on relationships with commercial service providers," said Near Space Network Project Manager Vir Thanvi. "Though much has changed, our profound dedication to providing customer missions with robust communications and navigation support remains the same."

*Collage of Near Space Network Antennas. CREDIT: NASA/DAVE RYAN*



## The Near Space Network

NASA's Near Space Network is pioneering a new paradigm to fulfill the needs of customer missions. The Near Space Network orchestrates communications services, space links, and data transports for user missions from the launch pad out to two million kilometers away from Earth. It does this through an innovative blending of commercial and government space communications infrastructure around the world and in orbit.

With the Near Space Network, mission teams no longer need to independently research service providers. The network leverages a broad spectrum of capabilities, negotiating on behalf of all missions to provide cost-effective, reliable, and secure services. It serves as the single, unified interface for all lifecycle phases of near-space missions. This includes mission concept, spectrum management, mission integration, operational readiness, launch, nominal and critical operations, and post-operations support.

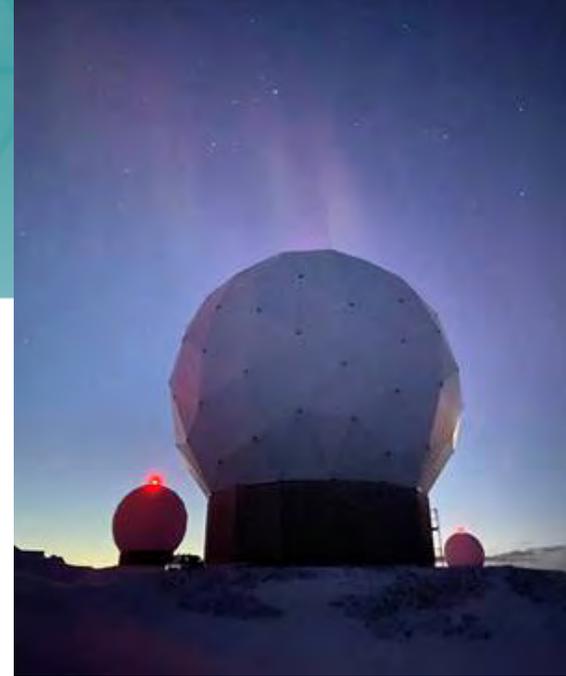
*A tri-band antenna at a commercially operated ground station in Svalbard, Norway, developed for the NIKA effort.*  
CREDIT: NASA/KONGSBERG SATELLITE SERVICES (KSAT)

## The ACCESS Project

The network's government-owned infrastructure is maintained, sustained, and enhanced by the Advanced Communications Capabilities for Exploration and Science Systems (ACCESS) project. ACCESS manages a worldwide network of ground stations for direct-to-Earth data transfer. Their constellation of Tracking and Data Relay Satellites can offer near-continuous space relay services to launch vehicles and low-Earth orbit missions.

"The breadth of work within the ACCESS project is tremendous," said ACCESS Deputy Project Manager Risha George. "In addition to overseeing much of NASA's existing space communications infrastructure, we're addressing the communications challenges of the future with innovation today."

ACCESS is infusing new capabilities like high data rate Ka-band and optical communications systems into the Near Space Network. Additionally, they're helping to build systems that will allow the Near Space Network to support future missions in the lunar region and at Earth-Sun Lagrange points.



## The Commercialization, Innovation, and Synergies Office

In the commercial sector, relationships with new service providers are garnered through the Commercialization, Innovation, and Synergies (CIS) office. CIS fosters relationships with private industry, other government agencies, and international partners that accelerate infusion opportunities for the Near Space Network. The office is dedicated to increasing the network's industry base, encouraging new commercial service providers to enter NASA's space communications marketplace through engagement events and opportunities.

"An interoperable network that embraces commercial and government service providers requires a shared vision and purpose," said CIS industry engagement lead Ali Hale.



*The Lucy mission launched from Kennedy Space Center in Florida on October 16, 2021, to study the Trojan asteroids. The Near Space Network supported the Atlas V launch vehicle that propelled Lucy to space.* CREDIT: NASA/BILL INGALLS

Continued on page 16



A commercially operated ground station in Puntas Arenas, Chile. CREDIT: NASA/KONGSBERG SATELLITE SERVICES (KSAT)

“Our office connects NASA to industry, finding prospective service providers and onboarding them into the Near Space Network.”

CIS also works with other government agencies to find shared interests, strategize needed capabilities, and promote collaboration. In addition, CIS engages with mission teams early in their lifecycle to share Near Space Network capabilities and innovations.

## One Year of This New Paradigm

In the year since Goddard established the Near Space Network, the network team has passed critical milestones, advanced capabilities, fostered new relationships, and provided unparalleled support to mission customers. In fact, the Near

Space Network provided over 10 million minutes of space relay services and over 2 million minutes of direct-to-Earth services for over 50 missions and 17 launches.

The ACCESS team completed upgrades to their space relay network which allow more

data to flow through the system, create additional data transfer modes, and increase antenna reliability. They’re also preparing to incorporate high-data-rate Ka-band and optical communications systems into the network with efforts like the Near Space Network Initiative for Ka-band Advancement and the Low-Cost Optical Terminal development effort.

The CIS office facilitated engagement events that reached over 250 companies. They also connected with 30 other government agencies to identify shared needs and opportunities for collaboration. All the while, they met with 11 divisions at Goddard to share Near Space Network capabilities.



The LCOT optical telescope  
CREDIT: NASA

## The Future for Near Space Communications

As the Near Space Network continues to innovate and expand participation in exploration, the team is developing cloud software for mission support, welcoming new spacecraft into its relay fleet, and preparing to support bold science and exploration initiatives.

The Near Space Network's NexTEra system will be a virtual network manager that maximizes the benefits of cloud services for Near Space Network users. NexTEra will empower the network to embrace a next-generation concept for providing reliable, proficient, and secure communications and navigation services.

The ACCESS team is integrating the Laser Communications Relay Demonstration (LCRD) into the Near Space Network. LCRD launched in early December as NASA's first end-to-end optical relay system. Using infrared lasers, it will provide missions with higher data rates than comparable radio systems, allowing for increased science and exploration data returns.

All the while, the network is gearing up to support the Artemis missions, NASA's grand return to the Moon. The Near Space Network will provide support to the Artemis missions during the majority of their flights, with additional support from NASA's Deep Space Network, managed by the Jet Propulsion Laboratory in Southern California.

## Get Involved

To meet all their communications and navigation needs, Near Space Network users can confidently rely on the expertise of Goddard Space Flight Center, which has a legacy of excellence in managing NASA communications services extending back to the start of U.S. space program. Looking to the future, the Near Space Network will continue that storied history as NASA reaches for new heights for the benefit of all.

"Goddard has long been a center of excellence for mission-critical space communications and navigation services and technologies," said Bob Menrad, Associate Director for Flight Projects – ESC. ■

**Katherine Schauer, Danny Baird**  
**/ Code 450**

*Technical Writers, Exploration and Space Communications*

"With this reorganization we reimagine government's relationship with industry in space communications and navigation for the future, contributing to NASA's efforts to grow a robust and competitive marketplace, and advance human understanding of our planet and ourselves. Now that's exciting."

– Bob Menrad, Associate Director for Flight Projects

To seek Near Space Network support, fill out the network's service inquiry form here: <http://go.nasa.gov/NSNServiceInquiry>

Have questions about Goddard's role in commercial communications? Reach out to the CIS office here: [nasa-commercialsynergies@mail.nasa.gov](mailto:nasa-commercialsynergies@mail.nasa.gov)

*A rendering of the LCRD instrument aboard the Space Test Program Satellite 6 (STPSat-6).*  
CREDIT: NASA/DAVE RYAN



# An Ongoing Legacy of Innovation

Recent Developments at Goddard's Explorers and Heliophysics Projects Division (EHPD)



EXPLORERS AND HELIOPHYSICS PROJECTS DIVISION CODE 460

Uniquely situated to answer enduring questions about our solar system, the Sun, and the cosmos, the Explorers and Heliophysics Projects Division (EHPD) is entering an exciting new chapter.

Located at NASA's Goddard Space Flight Center (Goddard), EHPD includes three programs: **Explorers**, Living With a Star (**LWS**), and Solar Terrestrial Probes (**STP**). While each program existed in some form previously, EHPD was created in 2006 to house these three programs under the same roof. Since then, the Division has developed and launched dozens of missions.

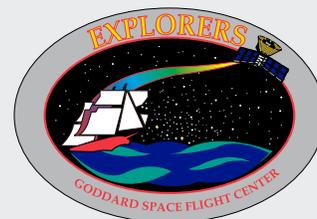
Most recently, EHPD has supported several important mission launches, including Transiting Exoplanet Survey Satellite (**TESS**) in April 2018, Parker Solar Probe (**PSP**) in August 2018, Ionospheric Connection Explorer (**ICON**) in October 2019, and **Solar Orbiter** in February 2020. EHPD

continues this momentum and growth, and its volume of new and ongoing work stands as a testament to the dedication of its personnel and successful oversight approach.

The Division currently has more missions in operation or development than ever before, with 21 missions in development and several missions scheduled for launch over the next year.

EHPD's next launch is the Imaging X-ray Polarimetry Explorer (**IXPE**) mission, scheduled for December 9, which will be the division's first launch since the Solar Orbiter mission in February 2020. As an Explorers

## Explorers and Heliophysics Projects Division (EHPD) Programs



## Upcoming EHPD Launches: IXPE, GUSTO, AWE, and XRISM (2021 - 2023)



December 2021



December 2022



2023



2023

## Explorers Program

**Program Manager:** Nick Chrissotimos

**Deputy Program Manager:**  
Gregory Frazier

### History:

- Explorers is the oldest of the EHPD programs – in fact, the Explorers program has been functioning in one form or another since 1958.
- Currently the largest EHPD program, with 13 astrophysics or heliophysics missions in development.

### Recent Developments:

- IXPE mission launch scheduled for December 9, 2021.
- New astrophysics mission added: **Compton Spectrometer and Imager (COSI)**

## Living With a Star (LWS) Program

**Program Manager:** Nick Chrissotimos

**Deputy Program Manager:**  
Michael Delmont

### History:

- Program proposed in 2000, approved/funded by 2001.
- The program's first mission, **Solar Dynamics Observatory (SDO)**, launched in 2010 and is still in operation today.
- Notable mission: GDC is a first-of-its kind constellation of spacecraft to study the coupling between the magnetosphere and the ionosphere/thermosphere.

### Recent Developments:

- GDC recently passed Key Decision Point A.

## Solar Terrestrial Probes (STP) Program

**Program Manager:** Nick Chrissotimos

**Deputy Program Manager:**  
Michael Delmont

### History:

- The first STP mission, the **Thermosphere Ionosphere Mesosphere Energetics and Dynamics (TIMED)** mission, launched December 7, 2001 and is still in operation today.
- Notable missions: IMAP is scheduled to launch in 2025 and will carry Solar Cruiser and GLIDE as rideshare missions.

### Recent Developments:

- Solar Cruiser and GLIDE missions in development.

program astrophysics mission, IXPE will study neutron stars and pulsar wind nebulae, in addition to stellar and supermassive black holes.

Currently, at least three EHPD missions have near-term targeted launch dates, including

Atmospheric Waves Experiment (**AWE**), Galactic/Extragalactic ULDB Spectroscopic Terahertz Observatory (**GUSTO**), and X-Ray Imaging and Spectroscopy Mission (**XRISM**).

With a planned launch of mid-2023, AWE, an Explorers program

heliophysics mission, will study space weather in the upper atmosphere by studying airglow from its eventual home attached to the exterior of the International Space Station.

Scheduled for launch in December 2022, GUSTO will launch from Antarctica on an Ultralong-Duration Balloon (ULDB) to study interstellar medium emissions. An Explorers program astrophysics mission, GUSTO will be the first mission to provide a complete study of each phase in the stellar lifecycle.

Finally, XRISM is also scheduled to launch in 2023. A collaboration with the Japanese Aerospace Agency (JAXA), XRISM will study X-ray objects with high-

*An artist's illustration of the Transiting Exoplanet Survey Satellite.*  
CREDIT: NASA'S GODDARD SPACE FLIGHT CENTER



*Continued on page 20*



Artist's concept of the Gateway Power and Propulsion Element, or PPE, and Habitation and Logistics Outpost, or HALO, in orbit around the Moon. The gold box on the right side of the image depicts the HERMES payload. The ERSA payload is the silver box just below it. CREDIT: NASA

throughput imaging and high-resolution spectroscopy. This strategic Explorers program astrophysics mission will resume much of the science capability of the previous Hitomi mission, specifically the study of soft X-ray bands. Goddard is developing the Resolve detector system and the X-ray Mirror Assemblies. Goddard also

An artistic view of Athena space observatory. CREDIT: ESA/IRAP/CNRS/UT3/CNES/FAB&FAB



operates XRISM's Science Data Center, and administers its Guest Observer Program.

In addition to its standard Explorers, LWS, and STP missions, EHPD also now manages several new stand-alone strategic projects. This includes the Advanced Telescope for High-ENERgy Astrophysics (**ATHENA**) and Heliophysics Environmental and Radiation Measurement Experiment Suite (**HERMES**) missions. Additionally, an ambitious new initiative, the Space Weather Instrument Pipeline, promises to accelerate the development of new space weather missions by leveraging EHPD's extensive knowledge and record of previous successful space weather launches.

At Goddard, EHPD has a long history of hosting innovative



## HERMES Highlights

### Goals:

- HERMES will study sun-driven space-weather variability modulated by the magnetosphere.

### Development:

- One of several exciting new space weather instrument projects undertaken by EHPD.
- Strategic mission managed at Goddard.
- Instrument package to be integrated with the Gateway orbital outpost.

### Launch:

- To be launched with the first two Gateway modules to be placed in lunar orbit.
- Estimated November 2024 launch date.

projects, and the Space Weather Pipeline is no exception. One of the first examples of this novel concept is the **HERMES space-weather instrument**, which will launch on Gateway ahead of the first moon-bound Artemis astronauts.

The insights gathered from HERMES are paving the way for EHPD to formulate other space



## GDC Highlights

### Goals:

- GDC will study **the coupling between the magnetosphere and the ionosphere/thermosphere system.**

### Development:

- LWS program heliophysics mission to study how the processes of the Earth's upper atmosphere are structured and their role in magnetospheric activity.
- The first mission of its kind to use a constellation of spacecraft to obtain simultaneous multi-point observations.

### Launch:

- Entire GDC constellation planned to launch on a single launch vehicle.
- KDP-A launch date range: 2027 – 2028, will be further refined during formulation.

weather instrument missions, some of which are already in development. EHPD will also leverage knowledge gained from current strategic projects to expand on future rideshare or other innovative mission development opportunities.

But innovation doesn't stop there – EHPD is also pursuing a suite of new technology

demonstration missions, as well as pioneering rideshare procedures that allow multiple payloads to launch on the same vehicle.

For example, the Interstellar Mapping and Acceleration Probe (**IMAP**) mission will utilize an Evolved Expendable Launch Vehicle (EELV) Secondary Payload Adapter (ESPA) ring to launch four rideshare payloads, including two payloads for other EHPD missions – **Global Lyman-alpha Imagers of the Dynamic Exosphere (GLIDE)** and **Solar Cruiser**.

Another notable mission, this time under LWS heliophysics, the Geospace Dynamics Constellation (GDC) is a first-of-its kind constellation of spacecraft set to study the coupling between the magnetosphere and the

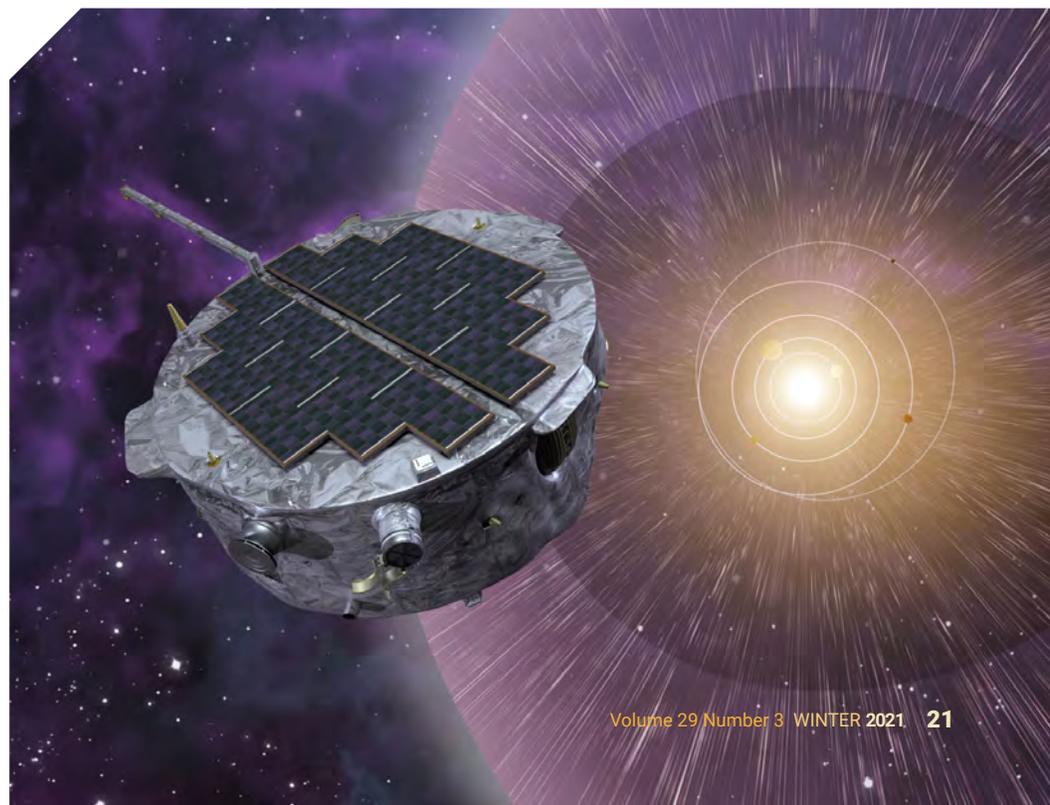
ionosphere/thermosphere in our upper atmosphere.

Recommended by NASA's 2013 Heliophysics Decadal Survey, GDC promises to investigate a long-awaited area of study – though it's far from the only EHPD mission aiming to do so.

In fact, each of the three programs that make up EHPD, Explorers, LWS, and STP, have their own unique history of contributions to the legacy of development and transformative work at Goddard and NASA as a whole. Together, they comprise a division that's constantly pushing the envelope to deliver the highest quality missions, results, and data.

**Titus Stupfel / Code 460**  
*Explorers and Heliophysics*  
*Projects Division*  
*Senior Technical Writer*

*Artist's impression of the Interstellar Mapping and Acceleration Probe (IMAP). The mission will help us better understand the flow of particles from the Sun called the solar wind – and how those particles interact with space within the solar system and beyond. CREDIT: NASA/JOHNS HOPKINS APL/ PRINCETON UNIVERSITY/ STEVE GRIBBEN*



# WHAT'S UP WITH OUR Flight Projects Development Program?

## Flight Projects Development Program (FPDP) Fall Workshop



The Flight Project Development Program Cohort 4 presented findings from their Project Manager interviews to the attendees of the fall workshop. Cohort 4 also led networking sessions in breakout groups. Top to bottom, left to right: Melanie Crespo Ramos, Walt Faulconer (FPDP Facilitator), Freda Kagere, Adam Matuszeski, Kristen Brown, Milton Davis, Joe Hickman, Chetan Sayal, Corina Koca, and Donna Swann (FPDP Program Manager). CREDIT: NASA

On November 16-18, the Flight Projects Directorate (FPD) hosted our Flight Projects Development Program (FPDP) Fall Workshop focusing on political engineering. Although we were unable to meet in-person in Washington, D.C. as originally planned, our virtual event had a robust agenda, with presentations and discussions on how “Washington” operates while navigating budget and policy landscapes. The influential speakers included former NASA Administrator, Mike Griffin, former Executive Secretary of the National Space Council, Scott Pace, former

NASA Deputy Administrator, Lori Garver, and former NASA Associate Administrator for the Human Exploration and Operations Mission Directorate (HEOMD), Bill Gerstenmaier. Interactive discussion panels with guests from the United States House of Representatives subcommittees and the United States Senate Committee on Appropriations were also incorporated in the workshop. Throughout the three days, more than 50 attendees, comprised of our current FPDP cohort, FPDP alumni, and employees from the Engineering & Technology Directorate (ETD/Code

500), Sciences & Exploration Directorate (SED/Code 600), and every NASA center, heard real stories of leadership and project management challenges. They also received guidance on the importance of alliances

and maintaining integrity and ethics to persevere. Though the workshop was virtual, attendees had several interesting networking and team-building opportunities through breakout sessions led by our FPDP cohort.

The next FPDP workshop is being planned for May 2022 at Kennedy Space Center (KSC). ■

**Donna Swann / Code 400**  
*FPD Assistant Director*  
*FPDP Program Manager*

## The impressive speakers at the FPDP Fall Workshop included:

- **Mike Griffin** – *Co-President, LogiQ, Inc.; former Under Secretary, Defense for Research and Engineering of the United States; former Administrator, National Aeronautics and Space Administration*
- **Scott Pace** – *Director, Space Policy Institute, and Professor of the Practice of International Affairs, George Washington University's Elliott School of International Affairs; former Executive Secretary, National Space Council*
- **Paul Shawcross** – *Program Examiner, Office of Management and Budget, Science and Space Branch*
- **Lori Garver** – *Chief Executive Officer, Earthrise Alliance; former Deputy Administrator,*  
National Aeronautics and Space Administration
- **James Wise** – *Professional Staff, United States House of Representatives Subcommittee of Commerce, Justice, Science, & Related Agencies (under House Committee on Appropriations)*
- **Tom Hammond** – *Staff Director, United States House of Representatives Committee on Science, Space, & Technology*
- **Jeremy Weirich** – *Vice President for Corporate Strategy, Aura; former Staff Director, United States Senate Committee on Appropriations*
- **Dan Dumbacher** – *Executive Director, American Institute of Aeronautics and Astronautics*
- **Jim Green** – *Chief Scientist, National Aeronautics and Space Administration*
- **Chris Shank** – *Vice President, Maxar Technologies*
- **Kevin Kelly** – *Attorney at Law, Clark Hill*
- **Brandon Eden** – *Manager for Washington Operations, United Launch Alliance*
- **Bill Gerstenmaier** – *Vice President of Build & Flight Reliability, SpaceX; former Associate Administrator for Human Exploration and Operations, National Aeronautics and Space Administration*
- **Walt Faulconer** – *Facilitator, Flight Projects Development Program*



The Flight Projects Development Program Cohort 4 started in April 2020, after mandatory telework began. The cohort enjoyed meeting in-person for the first time on November 5: (left to right) Adam Matuszeski, Chetan Sayal, Milton Davis, Melanie Crespo Ramos, Joe Hickman, Kristen Brown, Donna Swann (Program Manager), Freda Kagere. Not pictured: Corina Koca. CREDIT: ADAM MATUSZESKI

For more information about the FPDP, please look for an overview on the [FPD hub](#), or contact Donna Swann at:

✉ [donna.j.swann@nasa.gov](mailto:donna.j.swann@nasa.gov)

# JWST's Successful Journey from California to South America

SEAL BEACH, CALIFORNIA

KOUROU, FRENCH GUIANA

After more than a decade of complex assembly, integration, and testing all over the globe, the James Webb Space Telescope (JWST) successfully journeyed by land and sea from California to South America, its final earthly destination. Packed into its protective shipping container, this amazing telescope first traveled by land at 7 miles per hour in the middle of the night to Seal Beach where the MN Colibri, the cargo ship that would house this precious payload, would cruise along the Baja coast on its way to the Panama Canal. Going through three locks at the Panama Canal took 8 hours with the journey continuing around the coast of South America to its final destination at the launch site in Kourou, French Guiana 16 days later (October 12). Launch preparations are well underway with a launch date of December 18, 2021. To read more about JWST's journey the launch site in South America, [check out this article](#) by Isabelle Yan and the accompanying videos produced by other talented individuals at Goddard.

**Maureen Disharoon / Code 443**  
*JWST Data Manager*

## Watch the videos

Watch JWST's journey the launch site in South America.





# CONGRATULATIONS TO THE Lucy Team!

NASA's Lucy mission, the Agency's first to Jupiter's Trojan asteroids, launched on October 16, 2021 on a United Launch Alliance (ULA) Atlas V rocket from Space Launch Complex 41 at Cape Canaveral Space Force Station in Florida.

Over the next 12 years, Lucy will fly by one main-belt asteroid and seven Trojan asteroids, making it the agency's first single spacecraft mission in history to explore so many different asteroids. Lucy will investigate these "fossils" of planetary formation up close during its journey.

Lucy sent its first signal to Earth from its own antenna to NASA's Deep Space Network at 6:40 a.m. The spacecraft is now traveling at roughly 67,000 mph (108,000 kph) on a trajectory that will orbit the Sun and bring it back toward Earth in October 2022 for a gravity assist.

For more information on the Lucy mission, [read the article](#) from the Spring 2021 edition.



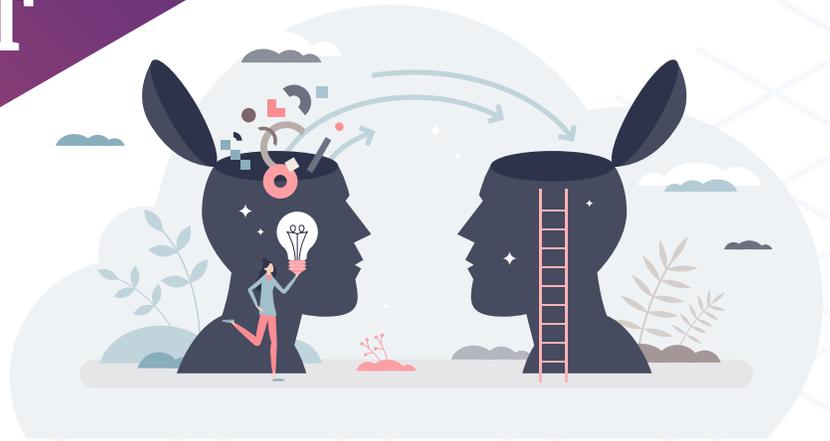
## More on Lucy

For the complete article, go to

[o nasa.gov/press-release/nasa-ula-launch-lucy-mission-to-fossils-of-planet-formation](https://www.nasa.gov/press-release/nasa-ula-launch-lucy-mission-to-fossils-of-planet-formation)

CREDIT: NASA

# KNOWLEDGE MANAGEMENT *Insights*



## Retirements and Critical Knowledge

Goddard employees move in and out of new roles on an ongoing basis. Every transfer of responsibility due to retirements, promotions, or details, involves some loss and re-creation of knowledge as the incumbent is replaced by someone new to the job. For some NASA organizations, the potential loss of critical knowledge due to pending retirements is a concern.

### What is Critical Knowledge?

According to Dorothy Leonard, author of *'Critical Knowledge Transfer'*, employees with years of experience have deep smarts or tacit knowledge. Tacit knowledge is frequently subconscious. For example, experts may not be able to explain what they had been thinking when they solved a particularly challenging problem.

*'Think of an expert's mind as a box of Lego pieces'*, per Leonard. Like everyone, experts store what they learn, not as lessons or answers, but as fragments or bits and pieces throughout their minds. Having worked through many problems over years, experts have a large variety of pieces they can utilize for future challenges. In addition, experts appear to have an especially strong intuition or sixth sense. This intuition is a very swift pattern recognition born from experience.

Experts typically build up strong relationship networks. They know which people to call for specific kinds of information. Per Leonard, *"smart people know other smart people."*

Loss of know-how can impact the ability to produce the next generation of products. Innovation emerges from new applications of deep expertise. Therefore, it is important to comprehend the risks associated with the loss of critical knowledge.

### How do you identify Critical Knowledge?

Some questions for managers and co-workers to consider:

- What is it that keeps you awake when someone leaves the organization?
- Who is making your team vulnerable if they leave?
- What kinds of situations requiring knowledge transfer are most important?
- Have there been incidents of project delays, problems with partners, or mishaps, because a highly experienced employee left?
- Do you know of planned departures by people that you rely on for analysis, feedback, judgment calls, or other decisions? If so, what knowledge transfer efforts should happen before they leave?

## Transfer Expert Knowledge

Effective tacit knowledge transfer has these properties, according to Leonard:

- Learner observes the expert in action
- It involves *real* problems, not hypothetical
- Expands learner's base of experience
- Learner can question the expert's actions and probe his or her reasoning
- Learner is actively involved and engaged in problem solving

Though not an exhaustive list, following are several ideas for tacit knowledge transfer.

### See, Do, Teach

**See** – Learner shadows the Expert over time as he/she interacts with problems, partners, or issues. The Learner can see how an Expert picks up the critical signals from large amounts of data and uses them to diagnose specific problems. A debrief is held to understand the 'why' behind the Expert's actions.

**Do** – In this stage, the Learner interacts with problems or issues while being shadowed by the Expert. Again, a debrief follows.

**Teach** – Learner takes the role of Expert and a new Learner is assigned to shadow him/her. Teaching the skills to another embeds the knowledge more deeply, helping it to become increasingly tacit.

Imagine if you expand this process to 5 or 20 experts all participating in See, Do, Teach, each with a shadow. Expertise could grow quickly as each shadow gains expertise and is ready to continue expanding the overall pool of experts.

## Storytelling

Stories create pictures in our minds with rich context and detail and are memorable vehicles for transferring knowledge. Consider holding transition workshops to allow departing people to tell their stories and to answer questions.

## Knowledge Sharing

Multiple NASA knowledge sharing vehicles are available wherein experts can make sense of critical incidents, provide project histories, and contribute other narratives. Examples include the Chief Knowledge Officer's Knowledge Sharing Workshop, Project Knowledge Expos, Case Studies, Goddard Masters Forums, APPEL courses and the 'Small Steps, Giant Leap' podcast.

## Microlearning

A learning transfer trend that is taking hold is to record brief courses as part of a curriculum, much like the Khan Academy. A good illustration of this is Nalco Water's journey into microlearning. [[Nalco Microlearning](#)]

## Resources for Successors

- Identify go-to information sources and names of network members
- Submit your most-used documents
- Contribute important files, tag, and make them searchable
- Guidelines for successor; rules of thumb; cautionary tales
- Top priorities including problems and opportunities

Though there will always be some loss of productivity in any transition, new people can bring strong skills, fresh perspectives, and creative ideas. Managing transitions, well, accelerates the time it takes for new employees to reach full performance. ■

**Judy Dickinson / Code 400**  
*FPD Knowledge Management Lead*

*Dorothy Leonard, Critical Knowledge Transfer: Tools for Managing Your Company's Deep Smarts, Harvard Business Review Press, 2014.*

# FPD Mission Updates

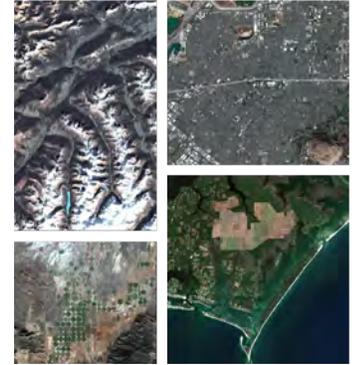


## LCRD

The Laser Communications Relay Demonstration (LCRD) Key Decision Point-E Directorate Program Management Council was successfully completed on October 14. The payload is ready for launch! The LCRD team uninstalled the 'Remove Before Flight' covers and completed the final inspection of the LCRD payload at Astrotech.



Advanced Concepts Team (IMPACT) / Harmonized Landsat Sentinel (HLS) science team released Harmonized-Landsat Sentinel02 observations, a global observation of the land every 2 to 3 days at 30-meter spatial resolution.



## Roman

The Roman Mission and Spacecraft Critical Design Reviews were successfully completed. The Wide Field Instrument (WFI) engineering test unit Focal Plane System has started thermal vacuum testing.



## NSN

The Near Space Network (NSN) successfully supported the launch and docking of the Cygnus Northrop Grumman-16 resupply mission vehicle to the International Space Station and the Atlas V / Landsat 9 launch, providing communications services to both the launch vehicle and Goddard satellite.



## TSIS-2

Substantial progress is being made on the Total and Spectral Solar Irradiance Sensor (TSIS-2) Spectral Irradiance Monitor preparing for Charged-Coupled Device alignment.



## ILLUMA-T

The Integrated LCRD Low-Earth Orbit User Modem and Amplifier Terminal (ILLUMA-T) flight article (without flight modem) was delivered to Goddard and successfully completed vibration testing as part of an optimized qualification program.

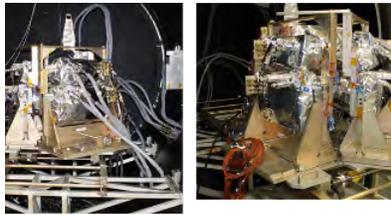


## ESDIS

The Earth Science Data and Information System (ESDIS) Land Processes Distributed Active Archive Center (LP DAAC) and the Marshall Space Flight Center Interagency Implementation and

## JPSS-3

The Joint Polar Satellite System (JPSS)-3 Advanced Technology Microwave Sounder (ATMS) instrument (top) successfully completed thermal vacuum testing and is being prepared for storage in its shipping container. Its Ozone Mapping and Profiler Suite (OMPS) instrument integrated sensor suite has completed all pre-environmental testing and its pre-environmental review (bottom).



to Goddard from Kennedy Space Center and is being prepared for environmental testing.

## Hubble

An October 21 press release discussed Hubble witnessing the first moments of a star's death after a supernova exploded inside the Butterfly Galaxies.



## XRISM

The X-Ray Imaging and Spectroscopy Mission (XRISM) Resolve instrument completed magnetics and performance tests in September at the Tsukuba Space Center in Japan.



## ESMO

The Earth Science Mission Operations (ESMO) project conducted a successful reset of Terra's solid-state recorder on September 22. Of the 16 boards previously off line, all 16 were recovered, and the first manual playback executed on September 22 was successful.



## OSAM-1

The On-orbit Servicing, Assembly, and Manufacturing (OSAM-1) team at Goddard (top) supporting testing of the Client Berthing System. The flight Hose Management Assembly (bottom) has been delivered



## O2O

The Orion Artemis II Optical Communications system, known as O2O, successfully completed its first instance of the comprehensive performance test and has started thermal vacuum testing.





## Jim Jeletic

*Hubble Space Telescope Project (Code 441)*

Deputy Project Manager

**Born** Pittsburgh, PA

**Education** B.S.E. Computer Science and Engineering, University of Pennsylvania; M.S. Engineering Management, George Washington University

### Life Before Goddard

As a kid, Jim had no down time. He was a boy scout, local newspaper sports reporter, paperboy, class officer, and was even in an 18th century British redcoat reenactment group. He loved competitive running and ran track and cross country for a powerhouse high school, going on to compete at the NCAA Division 1 level. He also loved music and was a percussionist playing in marching bands, dinner theaters, and nightclubs even through college.

But his most passionate interest was the American space program. He read every article he could get his hands on about the space race and space exploration. Watching the Apollo 11 astronauts walk on the moon was mesmerizing. From there on his dream was to explore the universe and work for NASA.

### Life at Goddard

Jim got his chance in 1984 right out of college when he was

hired by Goddard to develop orbit, attitude, and mission planning ground systems in the former flight dynamics organization. His work included development of applications for visualizing spacecraft and space environment data. This was a relatively new field at the time as such data was typically shown as numbers or x-y plots, and workstations were just starting to become available. He developed real-time 3D visualization systems and graphical mission planning tools. Jim received seven NASA innovation awards for this work. He served 13 years in that organization, eventually becoming head of their software engineering branch and a co-director of NASA's Software Engineering Laboratory, an organization committed to improving the software development process.

Jim's involvement with Hubble began in 1998. "I wanted to move on to something new and exciting. I did a self-assessment. I loved astronomy. I wanted to be part of a group making

discoveries. I wanted to work with the astronauts. And I wanted to be part of a team that did things never done before. It all added up to the Hubble mission."

He was offered and accepted the position of science operations manager, technically overseeing that contract work and administering the budget of the research grant program. It also had him working the JWST mission, setting up its science operations framework. For the Hubble servicing missions, Jim worked in the control center as part of the Goddard management team, tracking the spacecraft commanding, following the status of the extra-vehicular activities, and supporting management discussions when things didn't go as planned. "The servicing missions will be a highlight of my career. They were exciting, tiring, and fascinating."

After Hubble's final servicing mission, the deputy project manager position became open and Jim was selected. It was

Clockwise from left: The Jeletic family; Speaking at the Hubble anniversary event; Giving a control center tour to Apollo 8 astronaut, Bill Anders. CREDIT: ALL PHOTOS COURTESY OF JIM JELETIC



a position that allowed him to work in both science and flight operations and lead the mission's outreach. "Sharing my excitement with the public and inspiring youth to pursue careers in STEM is fun and rewarding." He feels lucky to spend many enjoyable hours a week working with a group of quality, like-minded individuals on the Hubble outreach team. With his 23 years on Hubble, he also serves as a historian, collecting historical documents, photos, and videos and overseeing the production of a Hubble history book.

### Life Outside Goddard

Jim lives in Annapolis, Maryland, with his wife Kelly, a ground systems engineer on JPSS, whom he met at Goddard back in 1984. His time used to be spent following, volunteering, and chauffeuring his three kids

to their many activities. "We were blessed with three great kids. They were A students, active, successful, and community-oriented." His sons both had sports careers at nationally ranked DeMatha high school. His oldest son, Chris, holds the school record for most varsity letters and is a recent graduate of the Rochester Institute of Technology working as a mechanical engineer. His middle son, Jordan, is a senior (First Class) oceanography major at the Naval Academy and spends his summers flying through the eyes of hurricanes as part of the *Hurricane Hunters*. His daughter, Jenna, is a freshman (Plebe) at the Naval Academy after graduating valedictorian at Elizabeth Seton High School.

With his kids now moving on, Jim has started back doing his other interests. He continues to

participate in track as an official in charge of the starting line at the Penn Relays, the largest track meet outside of the Olympics. Jim exercises daily but has substituted his love of biking for the running – enjoying long bike rides at new places while sightseeing. He also enjoys amateur astronomy, genealogy, and sports photography.

"For over 35 years I have been fortunate to live my dream. I am exploring the universe and working for NASA with outstanding people. Along the way I picked up a great family. I am blessed." ■

**"What we do at NASA is inspiring. It's reaching, it's visionary, and it inspires people on Earth to try hard things."**

**Astronaut John Grunsfeld**



## Jimmy Acevedo

*Exploration and Space Communications (ESC) Division (Code 450)*  
Education & Outreach / Intern Program Coordinator

**Born** Gaithersburg, MD

**Education** B.S. Engineering Physics

### Life Before Goddard

Jimmy was steeped in the hospitality industry, having been raised in an antebellum bed and breakfast by parents who met in the Washington, D.C. catering industry. At the age of one week, he was passed around to their coworkers on a 16" oval silver platter (with a tastefully-arranged bed of garnish). Unfortunately, no photographs exist.

Jimmy took the path of the non-traditional student while he identified his calling. As a hobby, he developed a text-based online game, which led to a professional role working on "massively multiplayer" games. Starting in quality assurance, he migrated over to game design and production. When his time at the studio ended, he moved to North Carolina to be near his fiancée, Maria.

There, he taught at Pinewoods Montessori while pursuing an Associate's degree at Durham Technical Community College, before transferring to NC Central University. He stayed busy fabricating research prototypes

for an experimental water purification system, tinkering in the campus makerspace, and working two jobs. Any spare time went into leading seven NASA/[Space Grant](#) undergraduate research engineering projects, which ultimately led him to working at Goddard.

The 'flagship' projects focused on high-altitude balloon platforms: small experiments designed to take advantage of the near-space environment.

Jimmy, with immense support from then-faculty advisor and current Goddard employee Julie Hoover, gathered a team of student volunteers, coordinating everything from fundraising and travel to engineering and safety. These projects created travel opportunities, resulting in visits to the Columbia Scientific Ballooning Facility in Texas and New Mexico as well as a chance to inaugurate a new thermal/vacuum chamber at Langley Research Center.

### Life at Goddard

In the summer of 2016, Jimmy was selected for an internship

working on a "big-kid" NASA balloon mission, the [Primordial Inflation Polarization Explorer](#). Jimmy built flight cables, designed and manufactured ground support equipment, assembled the payload frame, and automated vacuum tests with heaters and cryogenics. A second summer working with the team cemented a love for hands-on work; seeing immediate and tactile results of engineering efforts is deeply satisfying.

A third Goddard internship combined his three skill sets: game design, education, and engineering. The position challenged him to [build](#) educational [activities](#) for Code 450, a task he still revels in. The activities he designs prioritize making a fun, engaging experience with the learning objectives snuck in around the edges. From there, the summer internship matured into a full-time role.

Currently, his primary responsibility is shepherding the [SCaN Internship Project](#), implemented by the Exploration and Space Communications



Left to right: Physics and inertia lesson; Jimmy and Maria. CREDIT: ALL PHOTOS COURTESY OF JIMMY ACEVEDO

(ESC) projects division, through its year-round cycle. His responsibilities include: formalizing a rigorous year-round internship program; developing and executing professional development events for summer students, training mentors on new instructional methods, and coaching students on public speaking and professional skills; keeping current with educational methods to refine the program; cultivating a network of schools to sustain a student pipeline; managing the long-term strategic vision for the intern program to serve hiring priorities for skills and diversity; and tracking the achievements of former interns.

Specific highlights include 'Innovation Bootcamp', a one-day mission design exercise started by George Bussey, and 'Down to the Wire', a small-group communications exercise derived from flight controller training modules.

Some of his proudest moments include: "Missed Messages", a

**“Sparking interest and curiosity *first* is paramount; learning can follow once you have someone’s attention.”**

**Jimmy Acevedo**

relay/telephone style game which uses everyday materials to iteratively convey concepts of space communications; centering mental health discourse into the intern curriculum, elevating the importance of self-awareness to students and highlighting the pitfalls common to high-performing engineers; and providing live commentary on *2001: A Space Odyssey* as part of a panel screening for the Las Cruces Space Festival.

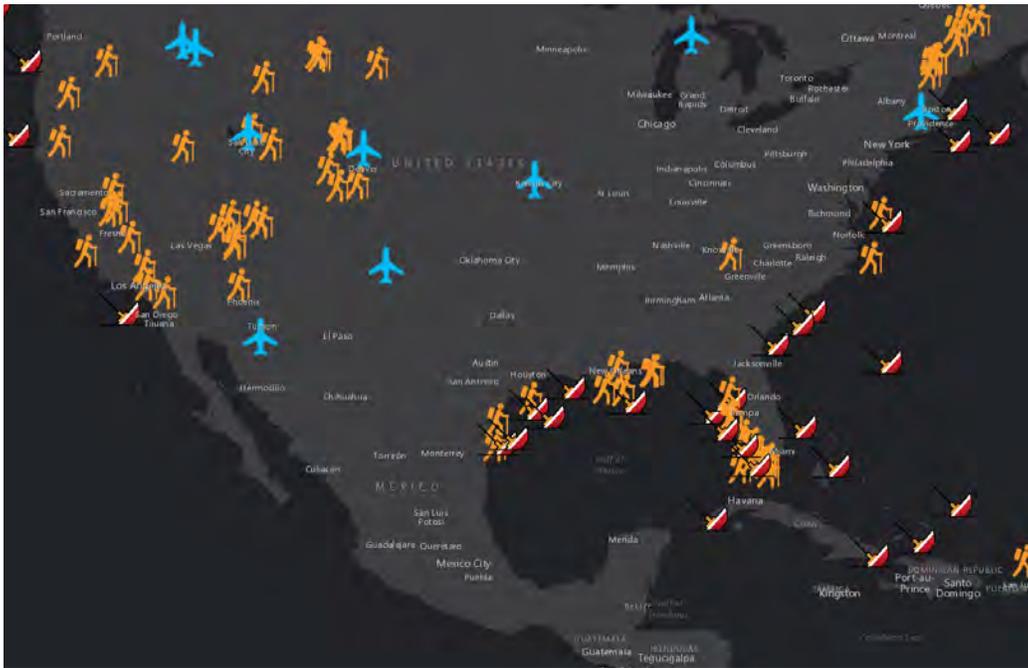
### **Life Outside Goddard**

Outside of Goddard, Jimmy is excited to continue expanding his home shop -- currently focused on woodwork and 3D

printing -- with two new welders and a foundry for casting metal. This summer, he adopted two beehives and has been enjoying watching them grow and -- carefully, with many lessons in humility -- tending them in preparation for winter. He and his wife enjoy canoeing, rock climbing, and foraging for wild plants and mushrooms. Tabletop roleplaying games remain another passion of his, and he is currently running a campaign set around White Sands Complex in the 1960s. Jimmy and his wife volunteer with home renovation groups like PG County's 'Christmas in April' and the Appalachia Service Project. Other members of the household include two cats, a corn snake, and several hundred worms (part of a vermicomposting operation in the basement). Jimmy harbors a long-term aspiration to visit Antarctica, and is not above smuggling himself into carry-on luggage. Contact him if you know of any opportunities. ■

# 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 July 2021 through November 2021 are shown above.



In Persian culture, the winter solstice is celebrated with Yaldā Night which has taken place for thousands of years. Friends and family gather to eat, drink and read poetry. During the celebration welcoming the return of light, red colors are throughout both food (watermelons and pomegranates) and clothing for the crimson hues of dawn and the glow of life.

## DID YOU KNOW..?

**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](mailto:matthew.w.ritsko@nasa.gov)



Flight Project Diversity and Inclusion Committee



Ext. 6-2515

# Coming and Goings

July 1 through October 31, 2021



## Comings

**Matthew Handy** (581) to 474/  
Joint Polar Satellite System  
(JPSS) Ground

**Rachid Chaoua** (External) to  
450/Exploration and Space  
Communications Division (ESC)

**Jeremy Wilson** (External) to  
410/ Geostationary Operational  
Environmental Satellite  
(GOES)-R

**Peyush Jain** (581) to 450.2/  
Tropospheric Emissions:  
Monitoring of Pollution (TEMPO)

**Harris Riris** (614) to 407/ Earth  
Science Technology Office  
(ESTO)

**Jesse Lewis** (543) to 426/  
Landsat NeXt

**Dan Tani** (External) to 450/ESC

**Amanda Shelton** (595) to  
401/Project Formulation and  
Development Office (PFDO)

**John Lee** (HQ) to 400/FPD

**Jay Falker** (HQ) to 400/Flight  
Projects Directorate (FPD)

**Jeff Volosin** (HQ) to 420/ESPD



## Goings

**Kevin Hartnett** (441)  
Retirement

**Michael Hill** (401) Retirement

**Hsaio Smith** (448) Retirement

**Christopher Morris** (410)  
Retirement

**LaNetra Tate** (450) Resignation

**Kira Blackwell** (450)  
Resignation

**Donita Marshall** (405) Detail to  
HQ

**William Glenn** (400)  
Retirement



## Reassignments/ Realignments Details within Code 400

**Andrea Poulin** (483) to 435/  
Mars Sample Return (MSR)  
the Capture, Containment, and  
Return System Project (CCRS)

**Dave Littmann** (458) to 435/  
MSR CCRS

**Adam Matuszeski** (422) to  
472/JPSS Flight

**Juli Lander** (483) to 427/  
Plankton, Aerosol, Cloud, ocean  
Ecosystem (PACE)

**Sridhar Manthripragada** (435)  
to 420/Earth Science Projects  
Division (ESPD)

**Keith Walyus** (472) to 435/  
MSR CCRS

**Obadiah Kegege** (457) to 422/  
GeoCarb

**Vir Thanvi** (457) to 450/ESC

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**Karen Rogers / Code 400**  
*Administrative Officer*

# OUT & ABOUT

LIFE'S HIGHLIGHTS OFF CAMPUS

Emily Roth (460) and Rodney Hill III welcomed their son, Zane Hendrix Hill on July 16, 2021, weighing 9 lbs, 8 oz. Zane joins big brother, Rodney IV and big sister, Ava. Best wishes to the family!



William Glenn on a boat in Greece.  
CREDIT: WILLIAM GLENN

The Flight Projects Directorate Mission Support Manager, Bill Glenn, recently retired. The Critical Path would like to thank Bill for his contributions as the author of the "Focus on Facilities" feature and to wish him an enjoyable retirement. Bill shared with us what he's been doing since leaving Goddard!

Every year for the last 13, I've spent some annual leave touring the world. I think I have visited 30 countries. Last year was the only exception because the trip I had planned for Greece was postponed a year and a half due to COVID. Finally, this past September we were able to go. Travel requirements were evidence of vaccination for entry to Greece and evidence of a negative PCR test for the USA prior to departing Greece. I spent 12 days touring Athens, Milos, Santorini and Mykonos. This trip sort of represented a final hoorah as a full-time employed person and maybe the last of such magnitude for a while. Attached is a photo of me on one of the private sailing trips arranged for our group of 15 while in Santorini. It was awesome! For retirement I've set myself up to provide professional personal coaching. With luck, maybe I'll make a few extra bucks to afford more fabulous trips. ■

**William Glenn/Code 400**  
*Mission Support Manager (Retired)*

**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](mailto:paula.l.wood@nasa.gov)
-  Code 460
-  Ext. 6-9125



Congratulations to new parents Tara Dulaney (450) and Matt Ritsko (155), who welcomed their little explorer, Austin Riley Ritsko, on October 17, 2021. He was 19" tall and weighed 6 lbs, 10 oz.

## IN MEMORIAM



*Frank J. Stocklin, "Space Pioneer", holding the Emmy awarded for Apollo-era television from the moon.*

### Frank J. Stocklin

1939 – 2021

Frank Stocklin's career at Goddard spanned more than five-decades from the Apollo era to the Artemis era.

Frank began his career after graduating with a B.S. in Electrical Engineering working for Grumman Aircraft and Motorola Corporation on the Apollo Lunar Excursion Module. In 1967, Frank began his civil servant career working for NASA Goddard Space Flight Center from where he would spend the next 54-years in service to our nation's space program. As the Radio Frequency (RF) Analysis and Integration Manager in the Exploration and Space Communications (ESC) projects division, Frank was known world-wide for his expertise defining the RF and optical links for each near-Earth mission's critical lifelines to and from Earth. He guided the end-to-end communication system design including input to mission's parameters and the ground

stations planned for use in all mission phases, ensuring compatibility for both communications and navigation. His ability to form working relationships enabled him to achieve optimal communications links no matter how complex the engineering challenge and this made Frank sought out as a key contributor to NASA's networks demonstrating nearly 100% proficiency.

Frank was instrumental in the design of Apollo era TV links that allowed the world to watch the first footsteps on another solar system body, resulting in an Emmy award, as well as the design of the Tracking Data and Relay Satellites System (TDRSS). He was critical in securing funds for the addition of Ka-band service to the Near Space Network that will enable unprecedented science data return via the new 3.5 Gbps direct to Earth links. He encouraged new talent and triggered innovation in ways that produced real results, such as his collaboration that guided a new capability for a high rate antenna arraying that is now under review for a U.S. patent. He went above and beyond to share knowledge, even lecturing at the University of Maryland during his personal time. He strove for balance in work and play and was a regular at the fitness center, helped organize the Goddard Softball league, and refereed high school and college basketball games. We admired Frank's dedication to his work, his skills and willingness to share...his friendship. He will be missed but has left a legacy that will continue to aid in NASA mission success for years to come. ■

**Cathy Barclay / Code 440**

*Proud colleague...and friend*

# FLIGHT PROJECTS

## LAUNCH SCHEDULE 2021-2022

### WINTER



Laser Communications  
Relay Demonstration  
(LCRD)



James Webb Space  
Telescope (JWST)

### SPRING



Geostationary Operational  
Environmental Satellite  
(GOES-T)