National Aeronautics and Space Administration

EXPLORE AIRBORNE SCIENCE NEWSLETTER

Fall 2025

Leadership Corner

Thanks for taking the time to catch up with the NASA Earth Science Division Airborne Science Program (ASP). ASP continues to thrive, developing and flight testing new instruments, supporting space-based missions, and exploring processes here on Earth.

Over the past 6 months, we have supported NASA teams working on current and future spaceborne missions including ECOSTRESS, EMIT, PACE, PBL, and SBG through calibration, validation, and complimentary data collection during AirSHARP, APMAC, and GEMx airborne campaigns. Over the summer, teams from multiple projects and organizations coordinated flights using six aircraft to maximize the potential of multi-tiered air quality data through the MAGEQ effort.

Meanwhile, ASP continued to make significant strides in a multi-year transition effort to drive toward more efficient operations replacing aging platforms with newer, sustainable, and more capable aircraft. The G-IV is being modified to support the UAVSAR follow-on, AirSAR-NG, with an anticipated delivery in Spring 2026. The B777 continues its transformation into the largest flying laboratory as the major structural modification will be complete in April 2026. The aircraft will return to NASA and begin preparations for the first science flight planned for early FY27. Finally, ASP's internally developed precision autopilot, called Soxnav, and our next generation science data and telemetry system completed successful flight tests. Thanks for your interest and support for Airborne Science, and please let us know how we can help move Earth Science forward.

Derek Rutovic
Program Executive,
Airborne Science Program

What's Inside

Farewell to Bruce Tagg

Contributed by Derek Rutovic, Matt Fladeland

Bruce Tagg was named as Director of the NASA Science ESD ASP in 2010 after having served as a Lieutenant Colonel in the Missile Defense Agency before coming to NASA. His tenure in the Agency saw the introduction of new and exciting technologies for the science and engineering community, enabling new observations and improving the efficiency of flight operations across NASA flight centers.

One of his first actions was to formalize the online flight tracking and mission support software, now known as Mission Tools Suite (MTS), which allowed for real-time tracking of aircraft along with visualization of relevant satellite and model products georeferenced on moving map displays. It was during Bruce's tenure that NASA and NOAA funded GLOPAC and GRIP, the first use of the Global Hawks to explore the science of hurricanes. This work was a precursor to the HS3 Earth Venture

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Farewell to Bruce Tagg

hurricanes. This work was a precursor to the HS3 Earth Venture Suborbital flights, which successfully explored hurricanes using the Global Hawk and demonstrated the utility of real-time data from dropsondes to improve numerical weather prediction models of hurricane track and intensity.

When Bruce came to NASA, the Airborne Science fleet included a number of mature aircraft in the twilight of their service. Most notable among these was the NASA DC-8 flying laboratory operated out of Armstrong Flight Research Center (AFRC). Bruce led the effort to work with the science community to identify ongoing requirements for such an aircraft and then supported Jack Kaye in requesting a National Academies study to advise on whether and how to replace the DC-8. The resulting report confirmed the need for a replacement. Together with his Deputy, Derek Rutovic, Bruce successfully made the case to the NASA Administrator and Congress that Earth Science needed a replacement large-body aircraft. Through his leadership, NASA purchased a Boeing 777 that had been lightly used and then retired by Japanese Airlines. The NASA B777 is currently being modified for science. Its operation, beginning in 2027, will be an enduring legacy of Bruce Tagg's dedication to the NASA Earth Science Mission.

Other notable flight missions successfully completed during Bruce's tenure included Operation IceBridge, which filled a critical data gap in cryospheric altimetry between ICESat-1 and the launch of ICESat-2, other international missions including KORUS-AQ, ATOM, CAMP2Ex, BioSCape, and more recently ASIA-AQ. During this time, ASP also supported the ongoing data collections of airborne facility instruments (e.g., UAVSAR on the G-III), serving many science communities. Bruce was also instrumental in acquiring the G-IV as a follow-on to the G-III. This aircraft, currently under modification at AFRC, will carry several next-generation SAR instruments in support of NISAR, STV and process studies well into the next decade.

Bruce's 14+ years of service and dedication to the NASA community will not be forgotten and the team wishes him a fulfilling and restful retirement.

Missions and Instruments

FireSense 2025 Campaign Activities Over Wildfires and Prescribed Fires

Contributed by Jacquelyn Shuman (NASA ARC), Jennifer Fowler (NASA LaRC), Milan Loiacano (NASA ARC)

In Spring 2025, NASA's FireSense project conducted airborne observations over a total of 32 wildland fires in Alabama, Texas, Mississippi, Florida, and Georgia to test new instrumentation and collect both remotely-sensed and in-situ data. This campaign gathered data to inform fire management decisions, improve fire models, and test innovative technological capabilities with operational agencies.

FireSense campaign activities are a component of the project's overarching objective to deliver innovative technological capabilities to operational agencies to address challenges in U.S. wildland fire management. To accomplish this, partners across State and Federal agencies, academic institutions, and private partners worked closely to coordinate measurements from research teams on

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Fire progression and ignition pattern captured by the MASTER sensor during a prescribed burn at Fort Stewart-Hunter Army Airfield on April 16, 2025. The image is a geocorrected false color composite showing the active fire as bright yellow and burning or recently burned areas as red and orange. Credit: ARC ASF MASTER Team / NASA

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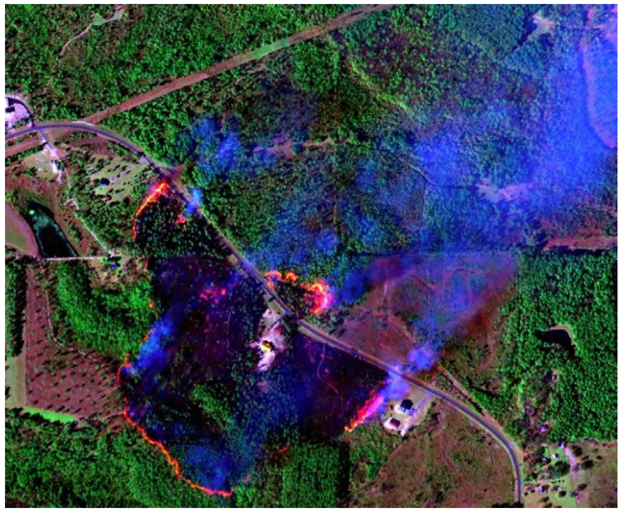
FireSense 2025 Campaign Activities Over Wildfires and Prescribed Fires

the ground, in the air, and from space.



As firefighters from the Alabama Forestry Commission fought a wildfire, NASA's AVIRIS-3 provided data on the active fire front and hot spots to support operational response. Credit: AVIRIS Team / NASA JPL-Caltech

On the Ground

Ground crews measured micrometeorology, fuels, and fire behavior to capture pre-fire conditions, active fire characteristics, and post-fire effects.

In the Air

Three crewed aircraft flew over the burns, hosting a total of five instruments to collect measurements related to fire characteristics, smoke, and fuel consumption. Additionally, three uncrewed aircraft flew in Alabama collecting micrometeorology data, as well as fire and fuel characteristics before, during, and after fires.

The crewed assets included the following:

- Dynamic Aviation B-200 carrying NASA JPL's AVIRIS-3 (Airborne Visible and InfraRed Imaging Spectrometer) sensor
- NASA B-200 carrying the NASA / University of Texas FireTIRS infrared sensor and NASA's MASTER (MODIS / ASTER Airborne Simulator) sensor
- Trident Sensing Inc. Twin Comanche aircraft carrying the U.S. Forest Service-funded TACFI-RS infrared sensor and a filter for smoke sampling.

The uncrewed assets included the following:

- NASA-operated Alta-X carrying a NASA sensor
- InterMet-operated CopterSonde carrying a radiosonde
- Desert Research Institute-operated Alta-X carrying a NASA / Clemson multi-spectral sensor and a commercial sensor.

The teams for crewed and uncrewed aircraft completed a combined 104.45 flight hours, including six days of flying active wildfires and four days over prescribed fires.

From Space

Satellite sensors such as synthetic aperture radar, spaceborne LiDAR, imaging spectrometers, and more enabled the creation of integrated datasets and validated airborne and in-situ data.

FireSense collaborated with agency partners to task public and commercial satellites for detailed data collection, including GEDI, ECOSTRESS, EMIT, VIIRS, MODIS, GOES, TEMPO, Umbra, Capella, ICEYE, BlackSky, SkySat, SMAP, SMOS, Aura, Sentinel-1, Sentinel-5, and others. With these sensors and subsequent data collection, NASA and its partners are developing products to capture fire radiative power, soil moisture, vegetative stress, active fire spread, fuel consumption, and air pollutants from wildfire smoke. Comparisons across ground, airborne and spaceborne data also help

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Three crewed aircraft outfitted with five total instruments sit on the tarmac at Fort Stewart Hunter Army Airfield. From front to back: a Dynamic Aviation B-200 carrying AVIRIS-3, NASA B-200 carrying the FireTIRS and MASTER sensors, and Trident Sensing's Piper Twin Comanche carrying the TACFI-RS sensor. Credit: Milan Loiacono / NASA

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FireSense 2025 Campaign Activities Over Wildfires and Prescribed Fires

to identify areas of success and potential improvement, thereby advancing science and technologies for wildland fire management.

This coordinated ensemble of air and ground assets provided real-time intelligence to practitioners, evaluated in real time for its potential to assist in future wildland fire operations. Additionally, the consistent spatial and temporal overlap of the data collection provides each sensor team with opportunities to comparatively assess their data collection and products.

FireSense is supported by the NASA Science Mission Directorate. The campaign was led by FireSense Project Scientist Jacquelyn Shuman (ARC), FireSense Project Manager Jennifer Fowler (LaRC), and FireSense Project Coordinator Harrison Raine (ARC), with communications support by Science Communication Specialist Milan Loiacono (ARC), and logistics support by Dan Hodkinson (GSFC). Future flight campaign operations will be coordinated for both prescribed burn activities and wildfires.

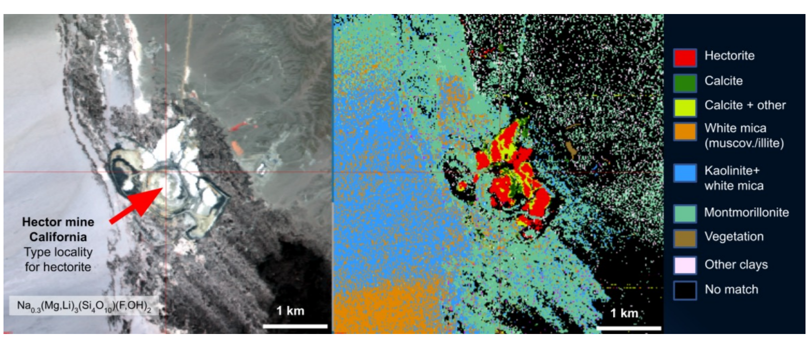
Geological Earth Mapping Experiment (GEMx) Collects Geology Data Over 8 U.S. States

Contributed by Kevin Reath (NASA HQ), Brenna Biggs (NASA ARC / BAERI-NSRC)

The Geological Earth Mapping Experiment (GEMx) is a joint campaign between NASA and the USGS to map portions of the United States for critical minerals using advanced airborne imaging.

In 2022, the U.S. was 100% dependent on imports for 10 critical mineral commodities (e.g., arsenic, asbestos, cesium, graphite), and was at least 50% dependent on imports for another 33 critical mineral commodities (e.g., peat, tin, cobalt, zinc, nickel, aluminum). The U.S. needs better natural resource mapping to understand how to best mitigate this risk.

A photo of the NASA ER-2 high-altitude aircraft with the GEMx payload installed on the tarmac at AFRC. Credit: NASA



An example of data from GEMx showing lithium-bearing minerals in Nevada and California. Credit: Raymond Kokaly / USGS

GEMx is a multi-year mission collecting measurements spanning visible through infrared throughout the U.S. to identify and map minerals at 15 m^2 resolution. In the 2025 campaign, the following instruments flew over 470,000 km^2 in 36 flights (200 flight hours) on the NASA ER-2, collecting new information about Earth's surface and atmosphere to help scientists understand Earth's geology:

- NASA's Airborne Visible/Infrared Imaging Spectrometer (AVIRIS-C and AVIRIS-5)
- MODIS/ASTER Airborne Simulator (MASTER)

The 2025 campaign brings the total coverage close to 1,000,000 km^2, and covered areas in Nevada, California, Arizona, Utah, Idaho, Oregon, New Mexico, and Texas, some as far as 1,500 km

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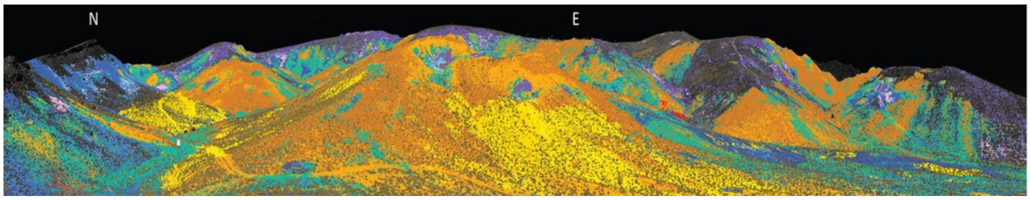
Geological Earth Mapping Experiment (GEMx) Collects Geology Data Over 8 U.S. States

away from home base at Edwards AFB.

This project will complement data from several of NASA's instruments on the International Space Station (ISS), including the Earth Surface Mineral Dust Source Investigation (EMIT), which maps the mineral dust source composition of Earth's arid regions to better understand mineral dust's role in climate change, as well as other instruments and missions like ECOsystem Spaceborne Thermal Radiometer Experiment on Space Station (ECOSTRESS) and the upcoming Surface, Biology, and Geology (SBG) mission, recommended by the most recent NASEM Decadal Survey.



Various minerals are revealed in vibrant detail in this sample mineral map of Cuprite, Nevada, following processing of AVIRIS data. Credit: USGS

SARP Shares NASA Airborne Science with 47 Undergraduate Students

Contributed by Joelle Hopkins (NASA HQ / BAERI)

In August 2025, 47 students from NASA's Student Airborne Research Program (SARP) completed a summer of science by presenting their research to an audience of mentors, professors, family, friends, and NASA personnel.

SARP is a summer internship for undergraduate students, hosted in two cohorts:

- SARP West in Southern California (Guardian Jet Center and the University of California (UC), Irvine)
- SARP East operated in Virginia (Wallops Flight Facility and Virginia Commonwealth University (VCU)).

SARP randomly assigns students into different research disciplines to encourage interdisciplinary collaboration and give them the opportunity to work outside their comfort zone. Each discipline is led by a faculty researcher who is an expert in their field and supported by a graduate mentor. This year,

The students and faculty of 2025 SARP East pose in front of NASA's P-3 aircraft. Credit: Milan Loiacono / NASA

The students and faculty of 2025 SARP West pose in front of NASA's P-3 aircraft. Credit: Milan Loiacono / NASA

SARP research topics spanned three spheres: atmosphere, biosphere, and hydrosphere, covered between the two cohorts.

Over the course of two months, students learned more about NASA's Airborne Science Program and Earth Science through

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SARP Shares NASA Airborne Science with 47 Undergraduate Students

lectures led by SARP faculty and guest speakers from NASA and the Earth Science community. Students also engaged in Earth science data collection while flying onboard the Dynamic Aviation B-200 and NASA P-3 aircraft, and performed ground sampling fieldwork. Students also visited NASA JPL, NASA GSFC, and NASA HQ. This summer, SARP also included other enriching opportunities such as visiting the WAVElab at UC San Diego and the Rice Rivers Center at VCU.

Students attended introductory programming sessions and received hands-on support from a coding mentor to develop and strengthen their experience with code and incorporate code in their research project.

Principal Investigator Joshua DiGangi shows SARP students Jacob Garside and Robert Purvis how to use the Diode Laser Hygrometer (DLH) onboard the NASA P-3 during a SARP 2025 research flight. Credit: Milan Loiacono / NASA

NASA Aircraft Coordinate Science Flights Over Mid-Atlantic During MAGEQ Campaign

Contributed by Erica McNamee (NASA GSFC), Glenn Wolfe (NASA GSFC), Lesley Ott (NASA GSFC)

Magic is in the air. No wait… MAGEQ is in the air.

This summer, teams from different organizations and agencies coordinated flights over the mid-Atlantic U.S. The effort, called MAGEQ (Mid-Atlantic Gas Emissions Quantification), is not one mission, but rather several individual ones, working together to maximize the potential of multi-tiered air quality data.

Scientists from NASA's Goddard Space Flight Center in Greenbelt, Maryland teamed up with NASA Langley Research Center, NOAA (the National Oceanic and Atmospheric Administration) and other university and government partners and collaborators. Over the course of the campaign, aircraft flew over urban, wetland, agricultural, and coal mining areas, all with the goal of gathering data on emissions and air quality.

NASA Goddard's G-LiHT flying on the A90 flies over Shenandoah Valley in the US East Coast during the week of August 11-15, 2025, for MAGEQ. Credit: Shawn Serbin / NASA

"Each aircraft team consists of highly skilled and motivated people who understand how to fly their particular plane to achieve the science they want," said Glenn Wolfe, research physical scientist and project lead for MAGEQ. "The complexity comes in identifying how each platform can complement or supplement the others."

Coordinating flights requires both advanced planning and on-the-fly flexibility. Weather proved to be a primary challenge for the team, who worked around cloudy days, wind, and storms to make sure flights were able to fly safely. The six different aircraft required different conditions. In general, remote sensing aircraft fly at higher

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NASA Aircraft Coordinate Science Flights Over Mid-Atlantic During MAGEQ Campaign

altitudes and are able to work around windy days but cannot measure through clouds; aircraft taking in-situ measurements can work under the clouds (but not in precipitation) and prefer steady winds for capturing the outflow of gases from surface emitters.

The MAGEQ team poses in front of the P-3 aircraft at NASA's Wallops Flight Facility in Virginia. Credit: Roy Johnson / NASA

Despite weather challenges, flight teams worked together to coordinate as many multi-aircraft flight days as possible.

"By collecting data together, not only can we do a better job for us as scientists, but we can also do a better job of making usable data sets for lots of different people," said Lesley Ott, research meteorologist and lead carbon cycle modeler for NASA's Global Modeling and Assimilation Office at NASA Goddard.

Stakeholders can use the data being collected to support policy decisions. For example, wetlands in areas like the Chesapeake Bay absorb carbon from the atmosphere, and monitoring can benefit coastal communities for tourism and resilience to storms. In the case of facilities that produce methane, if there is a leak, monitoring facilitates faster interventions, which not only helps the environment and local community, but also helps the industry minimize waste and save money.

They'll also use the measurements to verify satellite data. Spaceborne instruments like Tropospheric Emissions: Monitoring of Pollution (TEMPO) collect data similar to what the aircraft collected during the campaign. Scientists can compare the airborne and satellite data to identify discrepancies and improve the satellite retrievals.

"Every aircraft does something different and contributes a different type of data," said Steve Brown, leader of the tropospheric chemistry and atmospheric remote sensing programs at the NOAA chemical sciences laboratory in Boulder, Colorado. "We're going to have a lot of work to do at the end of this to put all those data sets together, but it will come together to make the best use of all those measurements."

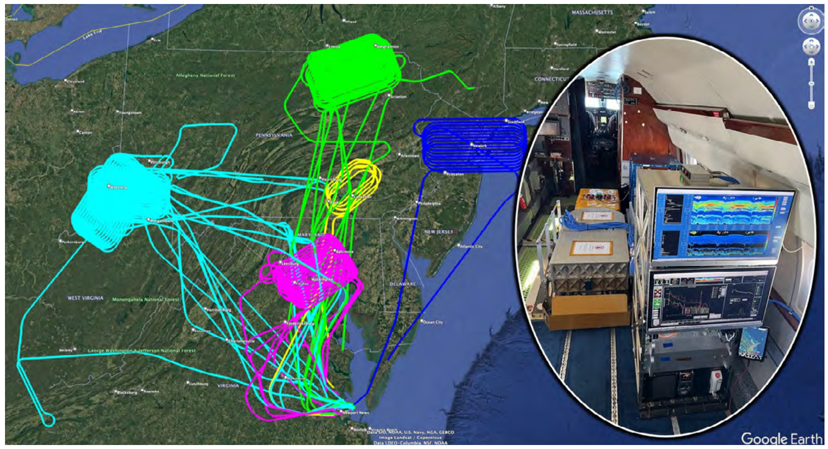
The MAGEQ team members from NOAA and NASA pose in front of the Twin Otter aircraft. Credit: Steve Brown / NOAA

MAGEQ required a large group of scientists, coordinators, and flight operations teams, which all came together to make the campaign run smoothly. "It's not just seasoned scientists who have been doing this for a long time, but also students who are getting to join in and participate," said Ott. "It's been inspiring to look at how everybody worked together. When it comes to science and measurements, we always do more and better when we work together."

APMAC Flights Collect Remote Sensing Data Across the Mid-Atlantic

Contributed by Amin Nehrir (NASA LaRC)

The Appalachian Active Passive Methane Constraints (APMAC) Campaign was a NASA ESD-funded field campaign that took place during July and August 2025 as a part of the broader Mid-Atlantic Gas Emissions Quantification (MAGEQ) project. Over the course of 32 days, the APMAC project flew 28 research flights on the NASA G-III spanning ~130 hours. The team coordinated with four other aircraft (NASA P-3, NOAA Twin Otter, B-200 with a gas flux payload, and B-200 with AVIRIS payload) as well as satellite overpasses of Tanager-1 to sample emissions across the Mid-Atlantic.



Flight track map of the G-III showing the geographic regions of intensive operation. The inset shows the MethaneAIR and HALO instruments on the forward and aft portals, respectively, along with the HALO real-time data display. Credit: NASA

The goal of APMAC was to create remote sensing datasets at regional scale that directly constrain methane emissions for important source regions (e.g., southwest and northeast Marcellus Shale, Washington D.C. / Baltimore metropolitan area). The payload consisted of the MethaneAIR spectrometer (i.e., airborne simulator for MethaneSAT) and the High-Altitude Lidar Observatory (HALO) lidar (i.e., methane lidar and high spectral resolution lidar).

The sampling strategy repeated surveys of the same region three times a day for a two-day period to create a unique, comprehensive benchmark of methane concentrations and their changes over time that can fully constrain regional emission rates.

The goal was to deliver "benchmark datasets" at regional scale, rich in remote sensing observations, where the emissions can directly be constrained in time and space within narrow limits. These datasets will enable rigorous testing of the accuracy of the inverse models used to quantify regional emissions and their transport, providing validation, and enhancing credibility for methane emission assessments based on remote sensing. These measurements were the first ever systematically measured day and night variations in column methane concentrations. Joint MethaneAIR and HALO observations provided this innovation by combining the HALO lidar's unique ability to "see" at night and measure planetary boundary layer (PBL) height with the broad area coverage of MethaneAIR.

Current satellites only provide daytime information; understanding how emissions vary over the course of a day has been a missing piece of the puzzle. The APMAC campaign was also a unique opportunity to capture – for the first time – the terrestrial diurnal variability of the PBL height with airborne remote sensing observations. HALO diurnal distributions of PBL height will serve as a benchmark dataset for the Decadal Survey PBL Incubation Program as well as provide a critical constraint on PBL heights used for deriving emissions from point and regional sources.

The APMAC team in front of the G-III after the conclusion of the mission. Credit: NASA

By Air and by Sea: Validating NASA's PACE Ocean Color Instrument with AirSHARP

Contributed by Milan Loiacano (NASA ARC), Liane Guild (NASA ARC)

In October 2024, California's Monterey Bay experienced an outsized phytoplankton bloom that attracted fish, dolphins, whales, seabirds, and – for a few weeks in October – scientists. A team from NASA ARC, with partners at the University of California, Santa Cruz (UCSC) and the Naval Postgraduate School (NPS), spent two weeks on the California coast gathering data on the atmosphere and the ocean to verify what the PACE (Plankton, Aerosol, Cloud, ocean Ecosystem) satellite sees from above. In May 2025, the team returned to gather data under different environmental conditions to validate the PACE Ocean Color Instrument (OCI).

Launched in February 2024, the PACE satellite was designed to provide a detailed look at life near the ocean's surface and the composition and abundance of aerosol particles in the atmosphere. PACE has three instruments:

- OCI: measures sunlight reflected off of the ocean's surface and near-surface water column, providing details about what is in the water column below (e.g., water molecules, phytoplankton, and particulates like sand, inorganic materials, and even bubbles).
- Spectro-polarimeter for Planetary Exploration (SPEXone) and the Hyper Angular Research Polarimeter (HARP2): measures how polarization is changed by passing through clouds, aerosols, and the ocean.

To validate OCI data, the AirSHARP (Airborne aSsessment of Hyperspectral Aerosol optical depth and water-leaving Reflectance Product Performance for PACE) team ran simultaneous airborne and seaborne campaigns in different seasons to collect data (i.e., water-leaving reflectance, aerosol optical depth) under different environmental conditions, validating as much of OCI's range as possible.

NASA Ames research scientist Kristina Pistone monitors instrument data while onboard the NPS Twin Otter aircraft, flying over Monterey Bay during the October 2024 deployment of the AirSHARP campaign. Credit: Samuel Leblanc / NASA

Through 12 days of flights on the NPS Twin Otter, the NASA-led team used C-AIR (Coastal Airborne In-situ Radiometers) and 4STAR-B (Spectrometer for Sky-Scanning Sun-Tracking Atmospheric Research B) to gather data from the air. At the same time, partners from UCSC used a host of matching instruments onboard the research vessel R/V Shana Rae to gather data from the water's surface and within the water column.

The AirSHARP team used radiometers with matching technology – C-AIR from the air and C-OPS (Compact Optical Profiling System) from the water – to gather water-leaving reflectance data. "The C-AIR instrument is modified from an instrument that goes on research vessels and takes measurements from the sky and of the water's surface to derive water-leaving reflectance from very close range," said NASA Ames research scientist Samuel LeBlanc. "The issue there is that you're very local to one area at a time. What our team has done successfully is put it on an aircraft, which enables us to span the entire Monterey Bay."
In addition to water-leaving reflectance, the team measured aerosol optical depth using the 4STAR-B spectrometer, which was engineered at NASA ARC and identifies which aerosols are present and how they interact with sunlight. "During AirSHARP, we were essentially measuring, at different wavelengths, how light is changed by the particles present in the atmosphere," said NASA Ames research scientist Kristina Pistone. "The aerosol optical depth is a

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By Air and by Sea: Validating NASA's PACE Ocean Color Instrument with AirSHARP

measure of light extinction, or how much light is either scattered away or absorbed by aerosol particulates."

Both C-AIR and 4STAR-B flew on the NPS Twin Otter, which can perform extremely low-altitude flights, making passes down to 100 feet above the water in clear conditions. "It's an intense way to fly. At that low height, the pilots continually watch for and avoid birds, tall ships, and even wildlife like breaching whales," said Anthony Bucholtz, director of the Airborne Research Facility at NPS. With the phytoplankton bloom attracting so much wildlife in a bay already full of ships, this is no small feat. "The pilots keep a close eye on the radar, and fly by hand," Bucholtz said, "all while following careful flight plans crisscrossing Monterey Bay and performing tight spirals over the Research Vessel Shana Rae."

Photographs taken from the window of the Twin Otter aircraft during the October 2024 AirSHARP deployment showcase the variation in ocean color, which indicates different molecular composition of the water column beneath. The red color in several of these photos is due to a phytoplankton bloom – in this case a growth of red algae. Credit: Samuel Leblanc / NASA

AirSHARP principal investigator Liane Guild walks towards the Twin Otter aircraft owned and operated by the Naval Postgraduate School. The aircraft's ability to perform complex, low-altitude flights made it the ideal platform to fly multiple instruments over Monterey Bay during the AirSHARP campaign. Credit: Samuel Leblanc / NASA

Platform Updates

AirSAR-NG and G-IV Modifications

Contributed by Fran Becker (NASA AFRC)

The Next Generation AirSAR (AirSAR-NG) instrument development and the NASA G-IV aircraft modification continued making steady progress. In August 2024, a contract was awarded to Avenger Aerospace Solutions for the engineering design work of the structural modification. Avenger utilizes a subcontractor, Phoenix Air Group, out of Cartersville, Georgia for the fabrication and installation of the structural modification. In addition, when the aircraft was delivered to Cartersville in March 2025, they conducted heavy maintenance inspections that were required. Subsequently, Phoenix began the fabrication of the structural modification parts in May 2025. That work is ongoing. The aircraft is expected to return to Armstrong Flight Research Center upon completion of the structural modification in early 2026, when it will then undergo the internal mission systems modifications required to operate AirSAR-NG. The team is targeting is an Initial Operating Capability in Fall 2026.

AirSAR-NG is a follow-on to the Unmanned Air Vehicle Synthetic Aperture Radar (UAVSAR) instrument developed and operated by the Jet Propulsion Lab (JPL),

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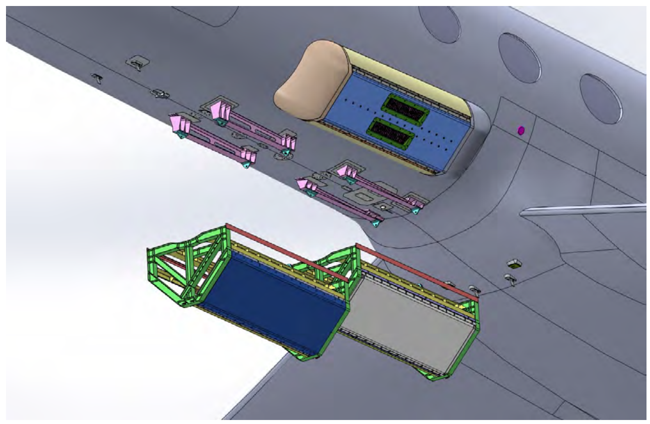
AirSAR-NG and G-IV Modifications

which has been deployed on multiple NASA Airborne Science platforms (perhaps most commonly the NASA C-20A). Platforms that can integrate UAVSAR utilize a large external centerline pod to house a single SAR antenna, configured for either L-, P-, or Ka-Band missions. When enabled with a Platform Precision Autopilot (PPA), the aircraft can fly repeatable flight tracks data to identify centimeter-level changes in the Earth's surface.

AirSAR-NG platform design. Credit: NASA



Removable modules on airborne platforms support AirSAR-NG. Credit: NASA

The new AirSAR-NG features improved design aspects and capabilities:

Multiband Radar Mission Capability: Instead of one frequency band, the aircraft will be able to fly up to three frequencies simultaneously using the fuselage blister pod and ventral canoe. This improves data quality, reduces the need for multiple flights, and nearly eliminates the need to remove or swap radar systems when changing frequency.

Modular Radar System Design: Sensitive radar equipment will be relocated from the external radar pod to the aircraft cabin environment. This simplifies system troubleshooting and maintenance, eliminates the need for critical lift procedures, and replaces the centerline pod with a conformal radar enclosure.

Reduced Crew Requirement: The majority of missions will require only one radar operator for all radars. Cockpit aircrew will serve as the PPA operator, eliminating the need for a dedicated operator position.

Standardizing the ASP fleet: Unlike the NASA C-20A, the AirSAR-NG platform will take advantage of common ASP capabilities (e.g., NASDAT). In turn, AirSAR-NG will be first to implement a new PPA system, referred to as Soxnav, designed to be interchangeable with other ASP aircraft, such as the GV and B-777.

NASA and BAERI Reach More Soxnav Engineering Milestones During Summer 2025

Contributed by John Sonntag

The Soxnav aircraft guidance system is the culmination of more than 30 years of development. It will help aircraft maintain a precise course even while flying at high speeds up to 500 mph. NASA and the Bay Area Environmental Research Institute (BAERI), affiliated with NASA Ames Research Center through a cooperative research agreement, have been working together to develop and test this technology on NASA aircraft, like the NASA G-IV.

The most recent developments include the following:

- The 3D-printed ABS plastic enclosures for the prototype Soxnav radio-frequency electronics modules were replaced with custom machined aluminum enclosures,

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NASA and BAERI Reach More Soxnav Engineering Milestones During Summer 2025

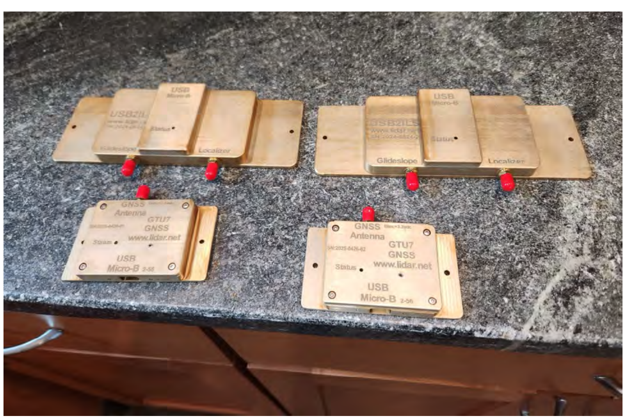
utilizing an innovative and economical desktop CNC process. These modules also received alodine surface treatment for long-term corrosion resistance.

- Low-cost native global navigation satellite system (GNSS) real-time positioning modules were integrated into the Soxnav hardware. For its initial application within the NASA Airborne Science ecosystem, Soxnav will ingest position and velocity information from a very high-quality JPL-developed GNSS system, which is part of the AirSAR-NG payload. Both as a backup to the JPL system and as an independent capability that may assist with other potential Soxnav applications, Soxnav now has its own inexpensive native position and velocity capability – Soxnav can be switched, easily and in real-time, between any properly formatted GNSS source, enhancing its operational flexibility for many use cases.

AFRC's Cryss Punteney (left) and Karen Estes (right) preparing one of the Soxnav flight hardware assemblies for vibration testing. Red cables are accelerometer leads, which enable the response of the hardware to be monitored at many discrete points. Credit: John Sonntag

Both existing copies of the Soxnav flight hardware were put through their paces during a formal environmental testing procedure at NASA AFRC. The functioning hardware was subjected to prolonged vibrations in all three dimensions, and to heat, cold, and high altitudes, while continuously being monitored to ensure its correct operation before, during, and after the testing. These environmental extremes were selected by AFRC engineering leaders to ensure that Soxnav would survive and operate under – and well beyond – any environmental conditions it might encounter during its operational lifetime, on the ground or while airborne. Both copies of the Soxnav system passed all elements of the testing with no issues.

Ongoing efforts will be focused on transferring management and maintenance of Soxnav to full-time personnel at BAERI's National Suborbital Research Center (NSRC).



Production Soxnav radio-frequency electronics modules (top) and GNSS modules (bottom). Credit: John Sonntag

Soxnav flight hardware inside one of AFRC's environmental test chambers. This chamber exposed the flight hardware to extremes of heat, cold, and altitude. Credit: John Sonntag

P-3 Transitions from WFF to LaRC

Contributed by Mike Cropper (NASA WFF)

In August 2024, a decision was made to transition the WFF Aircraft Office to the LaRC Research Services Directorate. This kicked off a yearlong effort to move and disposition aircraft located at WFF along with their associated equipment and parts to LaRC and other locations. As part of this effort, the P-3 Orion (N426NA) was flown to LaRC in August 2025 after completing the last two WFF-based missions in the summer 2025, the Student Airborne Research Program (SARP) and the Mid-Atlantic Gas Emission Quantification (MAGEQ). During these missions, logistics personnel and maintenance staff packed and shipped items to LaRC in order to provide a smooth transition of P-3 flight operations and to allow the aircraft to continue flight operations as needed upon arrival at LaRC.

NASA P-3 Orion (N426NA) in flight. Credit: NASA

In addition to transitioning N426 to LaRC, the WFF Aircraft Office also completed the following:

- Transferred the C-130 Hercules (N436NA) aircraft to CalFire
- Transferred the B-200 aircraft (N8NA) and a spare parts P-3 aircraft to LaRC
- Sold two remaining C-23 Sherpa aircraft
- Worked to excess four additional spare parts aircraft at WFF.

N426's arrival at LaRC in August 2025 marked the end of 56 years of flight operations at WFF. The WFF Aircraft Office formally closed on September 30, 2025.

The WFF Aircraft Office officially opened in 1969 and supported dozens of aircraft types from fixed-wing aircraft to helicopters and even Unmanned Aerial Systems (UAS) over hundreds of missions worldwide. In the early days of WFF, missions varied from surveillance, telemetry, and recovery operations. Eventually, missions became more advanced, including highly technical aeronautics flight testing followed by a focus on airborne research flights. Impressively, WFF Aircraft Office was the first to land a NASA aircraft on Antarctica.

WFF Aircraft Office team. Credit: NASA

The L-188 Electra (the commercial aircraft model that the P-3 was based upon) and P-3 Orion aircraft variants were the most flown aircraft types at WFF. The final flown P-3 version operated by WFF was the P-3 known as NASA 426 (BuNo152735). It was built in 1966 and transferred from the US Navy to NASA in 1991. Over its 34-year history at WFF, the aircraft was extensively modified to support NASA's aviation needs and became one of the most modified aircraft in NASA's fleet, supporting a variety of Earth Science and technology demonstration missions. Due to the P-3's unique flight capabilities as a low, slow, heavy lift, long duration aircraft, the P-3 and the WFF Aircraft Office became a staple of cryospheric research in the Arctic and Antarctic as well as atmospheric chemistry missions.

(continued on Pg. 14)

(continued from Pg. 13)

P-3 Transitions from WFF to LaRC

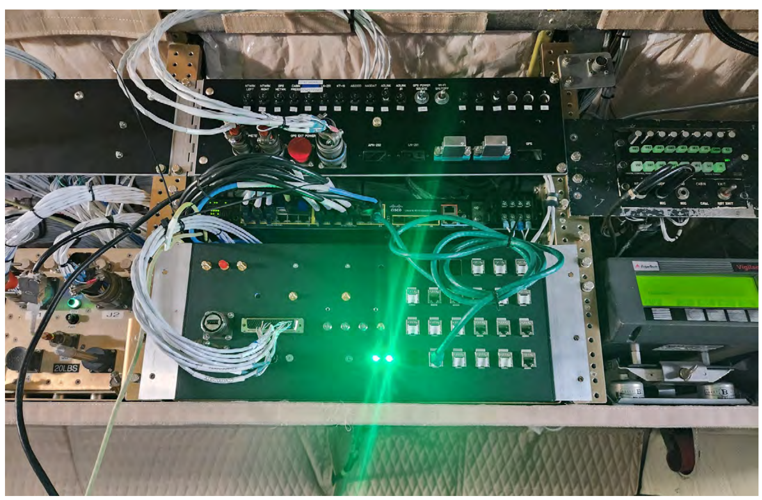
The NASA P-3 is a bona fide world traveler: it circumnavigated the Earth near the Equator in the 1990s; in 2013, it became the only NASA-owned aircraft, to date, to utilize McMurdo Station, Antarctica as a basing location to conduct science flights. The P-3 has flown 8,695 total flight hours with WFF, averaging 250 P-3 flight hours per year. The aircraft still has many good flying years ahead. In 2016, WFF installed new wings on the aircraft, converting the aircraft from a P-3B to a P-3C aircraft. This provided increased payload capacity and extended the life of the aircraft into the 2040s.

While the P-3 has performed successfully for 34 years, it would not have been possible without the people of the WFF Aircraft Office – those today and those from years gone by. Hundreds of personnel, Civil Servants and Contractors, have passed through the WFF hangars over 56 years, all with one goal in mind: safe and successful NASA flight operations. To those individuals and their families, we say Thank You for your tireless dedication to the Aircraft Office, its planes, and its missions. Your efforts advanced NASA research activities and goals for decades, and will continue to inspire future NASA aviation pioneers to come. To those who moved on to other areas within or outside of NASA or who retired in 2025, they will always be a member of the Code 830 Aircraft Office family.

NASDAT Next Generation Prototype Completes Flights

Contributed by David Van Gilst (BAERI-NSRC / NASA ARC)

NASA Airborne Science Data and Telemetry System (NASDAT) Next Generation (NG) development continued throughout 2025. After a successful Preliminary Design Review, the National Suborbital Research Center (NSRC) at the Bay Area Environmental Research Institute (BAERI) constructed an initial NASDAT NG prototype to provide a test bed for the proposed internal components and software in a field operations environment.



The NASDAT NG prototype system installed on the P-3. Photo credit: David Van Gilst / BAERI-NSRC and NASA ARC

This prototype was installed onboard the NASA P-3, where it successfully replaced several existing data system components during SARP and MAGEQ flights during June and July 2025. The system provided numerous improvements and new capabilities, including IT security improvements to meet agency standards and a new LTE-based communications capability, providing enhanced ground communications services. These enhancements will enable remote management of the new systems, which saves money and increases operational flexibility for data system operations throughout the ASP fleet.

The NASDAT NG system promises to provide a single-box data system solution for small- and medium-sized aircraft, replacing capabilities currently provided by as many as 4 or 5 devices with a single, easily installed and replaced Line Replaceable Unit (LRU).

SOFRS Corner

Science Operations Flight Request System (SOFRS) Corner
SOFRS Website: https://airbornescience.nasa.gov/sofrs

Contributed by Sommer Nicholas (NASA ARC) and Kelly Griffin (NASA WFF)

Airborne Science Website Improvements

The ESPO team has been working hard to continually improve the functionality of the **ASP website** as well the **Science Operations Flight Request System (SOFRS)**, resulting in several new features intended to enhance the ASP user experience and facilitate the continuing NASA mission of airborne science.

The **platforms** page has been revamped and streamlined with collapsible groupings. The platforms are grouped by core ASP platforms, other NASA platforms, and other federal aircraft. Buttons at the top of the aircraft list navigate to an aircraft capability comparison table and plot, cost information, and the current list of inspected Commercial Aviation Services (CAS) often contracted by NASA to perform airborne science missions.

Updated **instructions on how to file a flight report** are aimed to make the process more fluid and intuitive.

Please reach out to **sofrscurators@airbornescience.nasa.gov** for any assistance or if you have suggestions for improvements to the ASP website and SOFRS.

NASA Airborne Science Program 6 Month Schedule

Starting February 2026 *(generated 1/28/2026)*

FY2026 — Q2: Feb, Mar; Q3: Apr, May, Jun; Q4: Jul

ASP Supported	
ER-2 #806	airLUS; Profic; Maintenance / Ejec; GEMx; GEMx' GEMx'26 Stateside Deployment; WDTS Local Flights; GEMx
ER-2 #809	600-Hr Maintenance; Proficiency Flights; INSPYRE U; INSPYRE Pr; INSPY
C-20A	Ops 1&3 MX; P-Ban; P-Ban; L-Ban; NISAI; NISAI; TropiSAR Deployment; Student Airb; ASCENT Pla
G-III (LaRC)	NURTURE 2026; Upload Toky; Tokyo-FC; Maintenance
G-IV (AFRC)	Heavy Mx/Modification; [Tentative] FCF & Structura; Mission Systems Mod
G-V (AFRC)	Modifications
B777 #577	Undergoing Modifications
P-3	P-3 Aircraft Unavailable
Other NASA	
B200 (L)	FarmFlux Upload
B-200 (A)	MC2 I; Profic; Flyable Stora; Flyable Storage
Cirrus SR22	
GV	Human Spaceflight
WB-57 #926	Major Inspection; Imagery Sup; NOAA SABRE
WB-57 #928	Major Inspection On Indefinite Hold
WB-57 #927	Imagery Sup; Imagery Support (Placeho; Image

Legend

- Unavailable
- Foreign Deployment / Stateside Deployment / Flight / Reimbursable / Aircraft Configuration
- Aircraft Modifications
- Maintenance

Source: “Aircraft Calendar - Overview” at https://airbornescience.nasa.gov/aircraft_overview_cal

Calendar of Events

2026 NASA Land-Cover and Land-Use Change Science Team Meeting*
TBD - *North Bethesda, MD*
https://lcluc.umd.edu/meetings/2025-nasa-lcluc-science-team-meeting
**Was postponed in 2025; 2026 dates TBD*

106th American Meteorological Society (AMS) Annual Meeting
January 25-29, 2025 - *Houston, TX*
https://annual.ametsoc.org/2026/attend/registration/

Transformative Vertical Flight (TVF) Meeting
January 27-29, 2026 - *San Jose, California*
https://vtol.org/tvf2026

Climate and Cryosphere (CliC) Open Science Conference
February 9-12, 2026 - *Wellington, New Zealand*
https://climate-cryosphere.org/announcement-climate-and-cryosphere-open-science-conference-2026/

AGU Ocean Sciences Meeting
February 22-27, 2026 - *Glasgow, Scotland*
https://www.agu.org/ocean-sciences-meeting

Polar Research Board Spring Meeting 2026
March TBD - *Virtual*
https://www.nationalacademies.org/prb/polar-research-board

Institute of Electrical and Electronics Engineers (IEEE) Aerospace Conference
March 7-14, 2025 - *Big Sky, MT*
https://www.aeroconf.org/

Arctic Systems Science Conference
March 23-27, 2026 - *Potsdam, Germany*
https://iasc.info/events/98-arctic-system-science-conference

Arctic Science Summit Week (ASSW) 2026
March 25 to April 1, 2026 - *Aarhus, Denmark*
https://assw.info

Seismological Society of America (SSA) Annual Meeting 2026*
April 14-18, 2026 - *Pasadena, CA*
https://meetings.seismosoc.org/
**Beneficial for STV community*

Atmo-"sphere" PI Input + Decadal Survey Meeting
April 20-24, 2026 - *NASA LaRC*
https://docs.google.com/forms/d/e/1FAIpQLSeA1-SnGLKlUORON61lI-7l4bXVQPIxEpVMIFRe54F3zB-gSBA/viewform

EGU 2026 Joint Meeting
May 3-8, 2026 - *Vienna, Austria*
https://www.egu26.eu/

AUVSI XPONENTIAL 2026
May 11-14, 2026 - *Detroit, MI*
https://www.auvsi.org/event/xponential-2026/

NASA Biodiversity and Ecological Conservation Team Meeting
May 12-14, 2026 - *Washington, DC*
https://cce.nasa.gov/biodiversity/

U.S. Marine Biodiversity Observation Network Meeting
May 15, 2026 - *Washington, DC, USA*

JpGU-AGU 2026 Joint Meeting
May 24-29, 2026 - *Chiba, Japan*
https://www.jpgu.org/meeting_e2026/

NSF NGF Earthscope Community Science Workshop
May 26, 28 & June 2, 4, 2026 - *Virtual*
https://www.earthscope.org/event/2026-nsf-ngf-community-science-conference/

World Biodiversity Forum
June 14-19, 2026 - *Davos, Switzerland*
https://worldbiodiversityforum.org/

Cascadia Region Earthquake Science Center (CRESCENT) Workshop
June 25-26, 2026 - *Portland, OR*
https://cascadiaquakes.org/2025/01/19/2026-partnerships-applications-workshop/

Farnborough Airshow
July 20-24, 2026 - *Farnborough, England, UK*
https://www.farnboroughairshow.com/

EAA AirVenture OshKosh 2026
July 20-26, 2026 - *OshKosh, Wisconsin*
https://www.eaa.org/airventure

Ecological Society of America (ESA) Annual Meeting 2026
July 26-31, 2026 - *Salt Lake City, UT*
https://esa.org/saltlake2026/

12th SCAR Open Science Conference
August 8-19, 2026 - *Oslo, Norway*
https://npolar.no/en/arrangement/scar2026/

2026 IEEE International Geoscience and Remote Sensing Symposium (IGARSS)
August 9-14, 2026 - *Washington, D.C.*
https://2026.ieeeigarss.org/

Statewide California Earth Center (SCEC) 2026 Annual Meeting
September 2026 - *Palm Springs, CA*
https://central.scec.org/workshops

The Geological Society of America (GSA) 2026 Joint Meeting
October 11-14 - *2026, Denver, CO*
https://connects.geosociety.org/

American Geophysical Union (AGU) Annual Meeting 2026
December 7-11 - *2026, San Francisco, CA*
https://www.agu.org/plan-for-a-meeting/agumeetings

Airborne Science Program Platform Capabilities

Available aircraft and specs

Platform Name	NASA Center	Payload Accommodations	Duration (Hours)	Useful Payload (lbs)	Max Altitude (ft)	Airspeed (knots)	Range (Nmi)
ASP Supported Aircraft							
B777	LaRC	nadir ports, dropsondes, in situ sampling	18	75,000	43,000	500	9,000
ER-2 (2)	AFRC	Q-bay (2 nadir ports), nose (1 nadir port), wing pods (4 nadir, 3 zenith ports), centerline pod (1 nadir port)	12	2,900	>70,000	410	5,000
G-III/C-20A	AFRC	UAVSAR pod	7	2,610	45,000	460	3,000
G-III	LaRC	2 nadir ports, dropsonde / sonobuoy	7	2,610	45,000	460	3,000
G-IV	LaRC	AirSAR next gen (future)	7.5	5,610	45,000	459	5,130
P-3	WFF	1 large and 3 small zenith ports, 3 fuselage nadir ports, 4 P-3 window ports, 3 DC-8 window ports, nose radome, aft tailcone, 10 wing mounting points, dropsonde	14	14,700	32,000	400	3,800