National Aeronautics and Space Administration

Airborne Science Newsletter

Spring 2019

ORACLES Completes Study of African Air Quality

In early November 2018, the Observations of Aerosols Above CLouds and their InteractionS (ORACLES) team completed its 3rd and final airborne science deployment; this was the 2nd deployment based in the small island nation of São Tomé (the first deployment was based in Namibia in 2016). The overall goal of the ORACLES project is to study the interactions between clouds and biomass burning aerosols. São Tomé is located at the northern edge of the annual biomass burning aerosol plume that originates on the continent.

What's Inside

Southern Africa produces between one third and one half of the Earth's biomass burning aerosol particles, yet the fate of these particles and their influence on regional and global climate is poorly understood, and therefore poorly represented in models. ORACLES has input from teams with both regional and process modeling components. The data collected will be used to reduce uncertainty in both regional and global forecasts. The purpose of the three ORACLES airborne campaigns was to capture the seasonal cycle of absorbing aerosol radiative forcing and absorbing aerosol-cloud interactions, with the following overarching goals:

- Characterize the absorbing aerosol and cloud conditions and its variability over the southeast Atlantic from August through October, the main months in which substantial biomass-burning aerosol is advected westward off of continental Africa.
- Determine the impact of African biomass burning aerosols on cloud properties and the radiation balance over the South Atlantic, using state of the art in situ and remote sensing instruments to generate data sets that can also be used to verify and refine current and future observation methods.
- Acquire a process-level understanding of aerosol-cloud-radiation interactions and resulting cloud adjustments that can be applied in global models.

The P-3 platform began ORACLES integration in early August, with only one minor payload change: the Photo Thermal Interferometer (PTI; Brookhaven National Lab) was once again included (it did not fly in 2017). After its on-time arrival on September 24th, the P-3 flew a total of 13 science flights (~105 hours). Approximately one-half of the flights followed a north-south line directly into the heart of the aerosol plume. (See Figure 11.) As in 2017, several flights were dedicated to sampling the same polluted air masses days apart, to gain information

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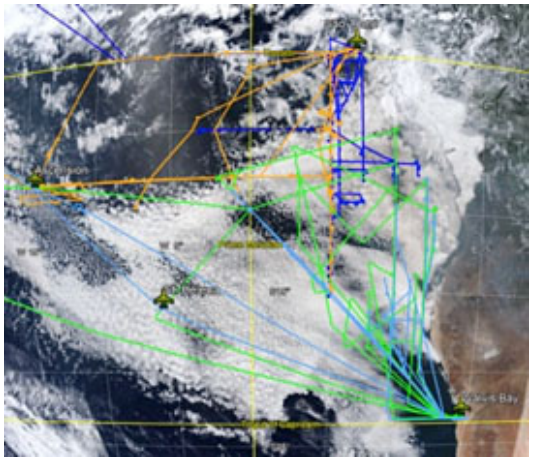

P-3 and ER-2 flight tracks from three ORACLES deployments, overlaid on a VIIRS true color image taken on Sep. 13, 2018, showing a typical cloud deck and overlying (brown color) aerosol layer. Flight tracks shown are from 2016 (P3: light blue; ER2: green), 2017 (orange) and 2018 (dark blue)

ORACLES *(continued from page 1)*

on aerosol aging. Two flights focused on radiation, and the remainder were comprehensive surveys of the aerosol plume and cloud deck.

For the 2018 campaign, Dr. Robert Wood and Dr. Paquita Zuidema stepped in to share PI duties, following the departure from NASA of former PI Dr. Jens Redemann. They guided the team through a very successful deployment phase wrap-up. Over the entire mission, ORACLES completed 56 science flights and 447 hours of science flight. The project achieved its baseline science requirements after flying for two weeks in 2018, achieving 9 consecutive weeks of flight coverage from August to October. The mission succeeded in acquiring detailed measurements of aerosol and cloud properties over an extended region of the Southeast Atlantic, where there is a dearth of measurements and major disagreements between modeled climate effects of biomass burning aerosol.

Science highlights include: (a) the first measurements showing aerosol chemical aging on timescales of 3-8 days, whereby organic carbon is removed leaving behind more strongly sunlight-absorbing black carbon cores; (b) new constraints on aerosol spectral absorption from remote sensing using novel radiation flight maneuvers; (c) data indicating that much of the biomass-burning aerosol entrained into the boundary layer within the stratocumulus deck is removed by precipitation as the cloud deck moves equator-ward, with an associated decrease in the mean cloud droplet number concentration; and (d) first mapping of seasonal differences in the biomass burning aerosol plume and its vertical structure. In addition, ORACLES was the first mission to empirically investigate the effects of the relative placement of cloud

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Directors' Corner

Hi All. Welcome to the 36th Airborne Science Newsletter I've been involved with. It's also my last as the Program's Deputy Director. I've been blessed with having almost all of my 21 plus years affiliated with NASA as being part of the Airborne Science team. I've seen many changes with the program over those years. To the chagrin of many of my ARC colleagues, I was hired to help establish the ER-2s and DC-8 at DFRC in late 1997, after their storied history at Ames. At that time the program consisted of 4 dedicated aircraft and we'd typically fly about 1,400 hours a year, plus a few more on non-program aircraft. Since then, we've gone to seven program aircraft (two of which are shared with another program), and for the past 7 years we've flown over 3,000 hours, with about a third of those hours flown on non-program aircraft. Twenty years ago almost all missions were focused on process studies, satellite cal/val and our facility instrument missions. Now there are many more new instrument and technology development flights taking place, as well as a dedicated student mission. Depending on the needs of the Earth Science community and budgets, the Airborne Science Program has added and subtracted aircraft, including unmanned systems, over the years. The WB-57, Global Hawk, Ikhana, SIERRA, Sherpa and C-130 have all been in and out of the fleet. It seems like the documentation needed and cost to get a mission flown have seen a substantial increase. Budgets also seem to be a bigger challenge now. What hasn't changed has been the overall mission focus of the Airborne Science team and the support we get from our program scientists and the science community. Our missions can be complex and difficult, and we've had our ups and downs, but in the end I'm proud of the Airborne Science team's ability to overcome challenges and fulfill its commitments to our stakeholders and the Nation. I have the highest faith and confidence the team will continue to excel and be the standard for Earth Science airborne research.

Randy Albertson, Deputy Director
Airborne Science Program

All of us in the Airborne Science Program want to thank Randy for his dedication and leadership over all these years and he will be sorely missed. Of course, he's only a phone/email away and I'm sure we will see him around at AGU and possibly hiding on a SARP flight! Take care, Randy, and enjoy retirement.

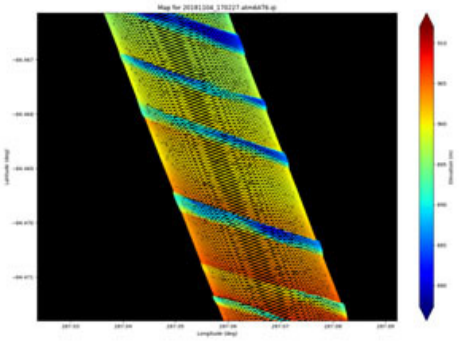
Additionally, Randy and I would also like to thank Tim Moes, Lenny Pfister, and Gailynne Bouret for their dedicated years of service to ASP. Tim brought outstanding leadership and passion to his years with the C-20, ER-2, and DC-8 at AFRC; Dr. Pfister brought that same dedication and passion to his years of expertise in atmospheric dynamics, meteorological forecasting and flight planning; and Gailynne has done a tremendous job over the years with her outstanding graphics and additions to the website and the annual reports. They look amazing thanks to her.

Bruce Tagg, Director
Airborne Science Program

Tenth Year of Operation IceBridge in the Antarctic Includes Its First Coincident Underflights with ICESat-2

Operation IceBridge completed its 10th consecutive year of airborne campaigns over parts of Antarctica and the surrounding sea ice in late 2018. During this campaign, many repeat IceBridge missions were flown, but the campaign also included multiple new ICESat-2 underflights and surveyed new areas of the Antarctic ice sheet, in particular the large ice streams that flow into the Ronne–Filchner Ice Shelf. IceBridge again deployed the NASA DC-8 aircraft with an advanced instrument suite of laser altimeters, shallow and deep sounding radars, a gravimeter and thermal, hyperspectral and visible imagers. The first half of the campaign was based out of Punta Arenas, Chile, and in early November the campaign repositioned to Ushuaia, Argentina for the first time.

Blowing snow off of Shackleton Range on Antarctica. Photo Credit: Michael Studinger



Airborne Topographic Mapper (ATM) T6 wide scan laser altimetry of crevassed Antarctic ice. Photo credit: Matt Linkswiler / NASA

A triangular iceberg surrounded by sea ice in the Weddell Sea. Photo credit: Linette Boisvert

Although shorter than previous campaigns, the IceBridge team was able to complete 24 science missions, tying the record previously set in 2012 and repeated in 2016. In total, the IceBridge campaign included over 288 flight hours and flew more than 200,000 km (half the distance to the Moon!). This campaign also included the first coordinated underflights of NASA's ICESat-2, a satellite laser altimeter that launched just a few weeks before the beginning of the campaign on September 15, 2018. Among this subset of ICESat-2 underflights was the first-ever IceBridge Antarctic "night flight." Not only did IceBridge fly during twilight, but the flight path was also adjusted in-flight to correct for the time lag between the satellite overpass and the aircraft underflight, so that the same floes of fast-moving sea ice would be measured by both the aircraft and the satellite. Because a significant portion of the flight plans included ICESat-2 underflights, many missions were redesigned on a daily basis along the ICESat-2 ground tracks that had

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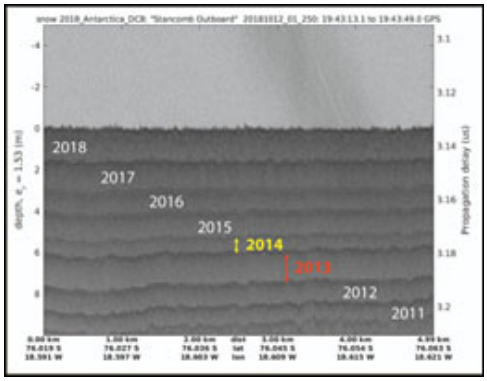
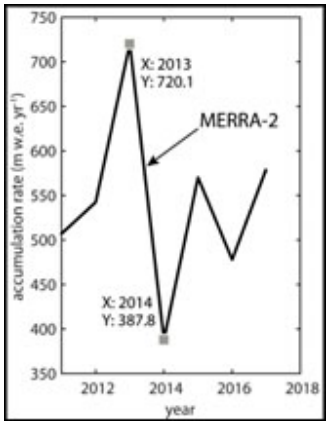




Quick-look 2–18 GHz snow radar data showing recent annual layers of snowfall, as compared to NASA MERRA-2 reanalysis. Both products indicate greater snowfall in 2013 and less in 2014. Photo credit: Jilu Li / KU and Brooke Medley / NASA

The Airborne Science Program newsletter is a biannual publication, appearing each Spring and Fall and is producted by Susan Schoenung (Editor) and Gailynne Bouret (Graphics and Layout), BAER Institute.

OIB Antarctica *(continued from page 3)*

the lowest time latency in target regions with favorable weather. In the end, nearly 21,000 km of ICESat-2 ground tracks were flown. IceBridge surveyed the massive A68 iceberg again this year, following its calving from the Larsen C Ice Shelf in July 2017, and were the first to capture the newly calved Pine Island Glacier iceberg, B46.

This last IceBridge campaign onboard the DC-8 also had substantial media coverage and outreach. Interviews with CBS News, National Geographic, France2 and local news outlets continued to raise awareness of NASA studies in the polar regions. The IceBridge team again hosted the U.S. Ambassador to Chile, and IceBridge team members visited local students in both Punta Arenas and Ushuaia to describe the campaign and its science. IceBridge scientists onboard the DC-8 interacted 560 students during virtual classroom chat sessions with students from around the world, bringing the total number of students reached since the beginning of these chats in 2012 to more than 10,000.

Contributed by Linette Boisver McPartland, GSFC

OMG Spring Mission features GLISTIN-A on the JSC G-III

The G-III (N992NA) departed from JSC on February 26, 2019 to begin the fourth and final year of GLISTIN-A radar measurements in support of the EVS-2 program Oceans Melting Greenland (OMG). The initial deployment plan was reworked to have the early stages of the mission fly from Iceland instead of Sondrestrom Air Base because a hangar door there had failed. The mission was then executed as planned until a left main tire failed on the G-III during the takeoff roll at Thule Air Base on March 19. The aircraft sustained damaged to multiple components as a result. Personnel and parts were flown from JSC on the cargo rotator to fix the airplane, permitting a ferry flight home to Houston on April 1. Following a thorough inspection of affected areas and replacement of a speed brake, the aircraft departed JSC again on April 9 to complete the final four science flights for the OMG mission.

This was a total team effort at JSC and across Airborne Science to work together, address the issue, and smartly return the aircraft to service in a timely fashion.

The Ka-band radar system collected 91.1 flight hours (~32,000 miles) of data along nearly the entire coastline of Greenland. The red tracks on the map indicate the final four flight days, which covered extensive regions of the west and north coasts. This year's ice survey was extremely important, especially in the northwest, as the science team wanted to see if cold North Atlantic water, which had been working its way up Greenland's west coast since the first OMG ice survey, was affecting glaciers farther north. Thule Air Base, situated in northwest Greenland, was the ideal location to complete this survey, so it was very important to repair the aircraft and return to finish the mission in this most important region.

Flight tracks of JSC G-III with GLISTIN-A during OMG in Spring 2019.

The radar images are providing detailed views of the effects of ocean waters on glaciers as they reach the sea by observing changes in the thickness and retreat of the glacier front. The four-year study has allowed a return to various locations to see trends over time.

Contributed by Derek Rutovic, JSC

NASA JSC G-V Completes First Science Mission in preparation for SWOT

Welcome NASA's new G-V to Airborne Science! After a 5-month modification period, the G-V (N95NA) was ready for science on February 14, 2019 with two, large nadir portals (22-inch x 22-inch) installed in the forward fuselage area. This was the final modification effort required for the G-V to meet initial operations capability for the Earth science community, and the aircraft was immediately pressed into service. The Modular Aerial Sensing System (MASS) instrument was installed over both portals enclosed inside a pressure "dog house" structure in the plane. The MASS instrument, a waveform scanning lidar, is provided by the Scripps Institution of Oceanography to measure sea surface altimetry. The goal of this first mission was to validate the instrument's performance on the G-V in a geographic location over the Pacific Ocean under the track of the future SWOT satellite mission.

After a smooth integration of the MASS instrument onto the G-V, the airborne campaign was carried out in the vicinity of JSC and then from the Monterey, California Regional Airport over the identified SWOT cal/val site just off-shore. With 37.1 science flight hours, the mission finished on schedule, achieving all science objectives. According to Scripps Principal Investigator Luc Lenain, "The G-V platform has demonstrated to be an ideal platform for this work, meeting the speed, endurance and flight altitude required for this project."

The G-V team will next begin integration of the Land, Vegetation and Ice Sensor (LVIS) on the aircraft. LVIS, a wide-swatch imaging laser altimeter, will be flown in May to provide calibration and validation of measurements generated by the GEDI Ecosystem Lidar on the International Space Station.

Contact Derek Rutovic (mihailo.rutovic-1@nasa.gov) with questions to pertaining to payload installation on the G-V.

Contributed by Derek Rutovic, JSC

The MASS instrument was installed to make use of G-V nadir portals.

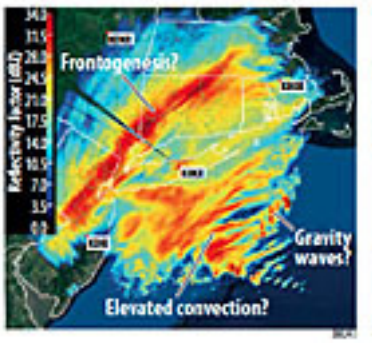
JSC Gulfstream team in Houston following first G-V science flight

New Earth Venture Suborbital Awards (EVS-3) to begin in 2019

Five new NASA Earth science campaigns will take to the field starting in late 2019 to investigate a range of pressing research questions, from what drives intense East Coast snowfall events to the impact of small-scale ocean currents on global climate. These studies will explore important, but not-well-understood, aspects of Earth system processes and were competitively selected as part of NASA's Earth Venture-class program. This is NASA's third series of Earth Venture suborbital investigations, which are regularly solicited, sustained observation projects first recommended by the National Research Council in 2007. According to Jack Kaye, Associate Director for ESD research, these innovative investigations tackle difficult scientific questions that require detailed, targeted field observations combined with data collected by our fleet of Earth-observing satellites.

The five newly selected Earth Venture investigations are:

IMPACTS: Investigation of Microphysics and Precipitation for Coast-Threatening Snowstorms

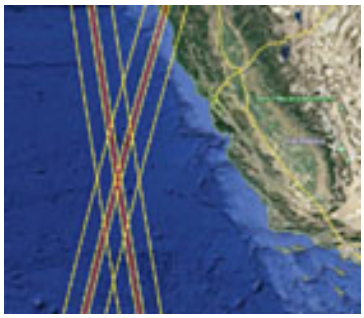


Lynn McMurdie of the University of Washington will lead the Investigation of Microphysics and Precipitation for Atlantic Coast-Threatening Snowstorms project to study the formation of snow bands in East Coast winter storms. Better understanding of the mechanisms of snow band formation and the factors that influence the location of the most intense snowfall will help improve forecasts of these extreme weather events. This study will involve flights of NASA's ER-2 and P-3B research aircraft over the northeastern United States.

DCOTSS: Dynamics and Chemistry of the Summer Stratosphere

K enneth Bowman of Texas A&M University will lead the Dynamics and Chemistry of the Summer Stratosphere project to investigate how strong summertime convective storms over North America can change the chemistry of the stratosphere. These storms regularly penetrate deep into the lower stratosphere, carrying pollutants that can change the chemical composition of this atmospheric layer, including ozone levels. Flights of NASA's ER-2 high-altitude aircraft will be based in Salina, Kansas.

S-MODE: Submesoscale Ocean Dynamics and Vertical Transport



Thomas Farrar of Woods Hole Oceanographic Institute will lead the Submesoscale Ocean Dynamics and Vertical Transport investigation to explore the potentially large influence that small-scale ocean eddies have on the exchange of heat between the ocean and the atmosphere. The project will collect a benchmark data set of climate and biological variables in the upper ocean that influence this exchange. Measurements will be collected by research aircraft and shipborne instruments 200 miles off the coast of San Francisco, in the vicinity of the SWOT cross-over tracks.

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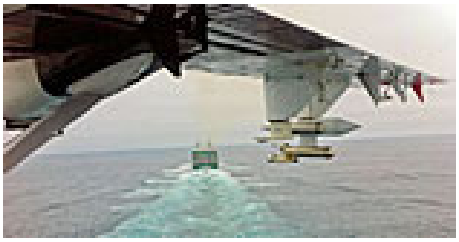
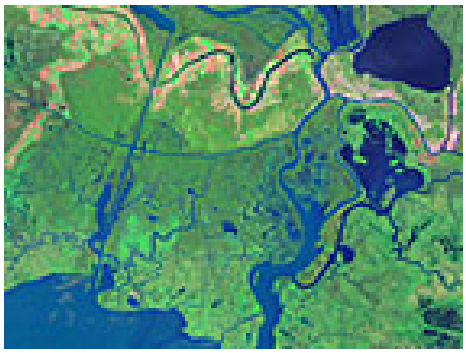
EVS-3 *(continued from page 6)*

ACTIVATE: Aerosol Cloud Meteorology Interactions over the Western Atlantic Experiment



Armin Sorooshian of the University of Arizona will lead the Aerosol Cloud Meteorology Interactions over the Western Atlantic Experiment to identify how aerosol particles change cloud properties in ways that affect Earth's climate system. The investigation will focus on marine boundary layer clouds over the western North Atlantic Ocean that have a critical role in our planet's energy balance. Two NASA research aircraft, an HU-25 Falcon and a B-200 King Air, will fly from NASA's Langley Research Center in Hampton, Virginia, to gather measurements from above, below, and within.

Delta-X



Marc Simard of NASA's Jet Propulsion Laboratory in Pasadena, California, will lead the Delta-X investigation to better understand the natural processes that maintain and build land in major river deltas threatened by rising seas. The project will improve models that predict loss of coastal land from sea level rise by improving estimates of how deltas add land—a process that involves trapping sediments and creating organic soils as plants grow. Delta-X will focus on the Mississippi River Delta using instruments on three NASA research aircraft.

A total of six NASA centers and 27 educational institutions are participating in these five Earth Venture projects. The five-year investigations were selected from 30 proposals. The Delta-X project is funded at a total cost of no more than $15 million; each of the other projects is funded at no more than $30 million. Three of the missions include management from the Earth Science Project Office (ESPO).

EVS-3 Missions, aircraft and tentative flight schedules (CY)

Mission	Aircraft	CY2019				CY2020				CY2021				CY2022		
IMPACTS	P-3, ER-2				■	■			■	■			■	■		
DCOTSS	ER-2					■		■			■	■				
S-MODE	G-V, B-200						■				■	■				
ACTIVATE	HU-25, B-200					■	■			■	■			■	■	
Delta-X	G-III, B-200 (2)						■	■		■			■		■	■

SOFRS Corner

SOFRS Website:
https://airbornescience.nasa.gov/sofr

Science Operations Flight Request System (SOFRS)

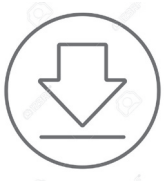
In this edition: 3 things you probably didn't know about SOFRS

Who can submit flight reports?

Are you looking for someone on your team to help submit flight reports? Did you know that all the associated users listed on your flight request have user permissions to submit a flight report? Don't see a team member that can help you? You can easily add him/her as an associated user by editing the flight request and adding their name to list.

Did you know that you can attach files to a flight request?

Sometimes your flight request requires of additional documentation, maybe some certification papers or additional figures to explain the flight lines that you are intending to do or files that will help the aircraft manager better understand your requirements. Did you know you can upload these files in the flight request? The file types you can upload are: PDF, DOC, XLS, PNG, JPG, etc. Once uploaded, these files become part of the flight request history and are available to the users associated with that specific flight request.



Is there a summary of my flight reports that can download from the website?

The flight reports are submitted via the unique log number of each flight request. The best summary of the submitted flight reports can be found towards the end of the actual flight request. Click on the log number, go towards the bottom of the page and you'll see all the submitted flight reports. Each flight report has a summary of all of the flight reports submitted previously, so to get a quick summary, click on the last one submitted.

Remember, send your SOFRS questions to: SOFRS_curators@airbornescience.gov.

Contributed by Vidal Salazar, ARC

TRANSITIONS

Retirements

Randy Albertson

Randy with SARP students at AFRC

Randy Albertson retires after a long career at NASA that saw the growth and modernization of the Airborne Science Program

"First and foremost, I'd like to say a huge 'Thank you' to Mr Randy Albertson for everything he has done for the Program and for me since I've come on board," said Bruce Tagg, ASP Director. "We wish him the best in retirement and look forward to seeing him show up at AGU every so often! Randy was quick to help me learn the NASA ways and the nuances of NASA versus my military background and he taught me about the great people who are the heart of the Program."

Randy started supporting the NASA Airborne Science Program (ASP) at Dryden Flight Research Center (DFRC) in October 1997, as a contractor transitioning the ER-2s and DC-8 from Ames Research Center (ARC) to DFRC as part of NASA's aircraft consolidation effort. His primary duties were managing the flight request process (primarily for the ER-2s, DC-8 and P-3B with a few miscellaneous aircraft), developing the 5-year plan, generating aircraft schedules for the web and creating progress and analysis reports. Randy's other duties included program management analyst duties for DFRC's aircraft consolidation, X-38, B-52, Eclipse and Lear Jet projects.

Randy became a civil servant in October 1998, where he continued with his ASP contractor duties in addition to representing the DFRC Code Y organization in center activities. In September 2000, he became the Airborne Science Program Coordinator where he assumed more program level responsibilities. In July 2002, Randy was reassigned to the DFRC Planning Office where he worked on the Center Implementation Plan, implementing Full Cost Accounting within the center and managed the Customer Expectations Management process for DFRC. Randy also assumed the role of liaison between NASA's Earth Science Division and ARMD Program offices where he helped determine the viability of a post-Environmental Research Aircraft and Sensor Technology (ERAST) UAS effort and the synergy between National Earth Science needs and UAS technology development and airspace integration. The most notable outcome of this effort was the initial formulation of the UAS in the NASA project. The UAV Science Demonstration Program and UAS-Enabled Earth Science Projects also resulted from his linkage with ARMD.

In August 2005, Randy became the Deputy Program Manager for the Suborbital Science Program along with other center responsibilities, primarily the Customer Expectations Management effort. Some of the accomplishments in this time were establishing a program requirements document and the joint ASP/ARMD Earth Science Capabilities Project that helped develop the Ikhana aircraft for science and the platform precision autopilot capability needed for the UAVSAR. He was also a supporter of continued development and demonstration of UAS, playing an instrumental role in acquiring the early Global Hawk prototypes, in addition to supporting SIERRA-A.

In November 2006, Randy became the acting Program Manager until Mr. Andy Roberts was detailed to that position in early 2007. Between 2006 and 2009, Randy was instrumental in establishing some of the ASP's most important programs including the Student Airborne Research Program (SARP), Operation IceBridge (OIB) and the first Earth Venture Suborbital Investigations. Randy also managed the infusion of funding under the American Recovery and

Continued on page 10

Transitions *(continued from page 9)*

Reinvestment Act (ARRA) to modernize aircraft IT and communications systems. He initiated the ASP recognition and history efforts and reinvigorating the Interagency Coordinating Committee for Airborne Geosciences Research and Applications (ICCAGRA).

When Mr. Andy Roberts retired in 2009, Randy again became the acting Program Director until Mr. Bruce Tagg was hired permanently in 2010. From 2010 through present, Randy has continued his outstanding leadership and contributions to the Program. He remained responsible for ensuring the continued success of the SARP program, working the budgets and representing the Program both inside and outside the Agency. He considers his most notable contributions SARP, the recognition program and OIB. Randy will be sorely missed but we wish him and Catherine all the best in retirement.

Lenny Pfister

Leonhard Pfister retires after 39 years of service to Earth and Airborne Science.

As an active member on the Earth Science Division at Ames, Lenny played a valuable role in the support of research missions studying convection, atmospheric waves, and water vapor exchange in the upper troposphere and lower stratosphere, the Earth Observing System program calibration and the validation of the Aura satellite. His expertise in atmospheric dynamics enabled him to become a leader in meteorological forecasting and flight planning as he supported over 20 successful airborne science campaigns, from STEP in 1987 to ORACLES in

Lenny receiving the Airborne Science Program award for Career Sustained Excellence from NASA Ames Earth Science Division Chief, Ryan Spackman in 2018.

2018. Dr. Pfister's contribution to the campaign began early in the planning stage where he advised the science team on the meteorological conditions relevant for a given science question, which are key to identifying where and when the best measurements can be made. He also orchestrated and led pre-deployment forecasting and flight planning 'dry runs' for the specific deployment site sometimes a year in advance in order to arrive in the field with sufficient forecasting and flight planning experience for that particular location and time. His long and successful career in airborne science has resulted in a stellar reputation and the respect of his peers. He has also trained the next generation of meteorologists and set a standard for others to follow.

In 2018, Lenny was awarded the Airborne Science Program award for Career Sustained Excellence. The Airborne Science Program is very grateful for all his contributions to both Earth Science and airborne mission success.

Best wishes to Lenny and Margaret in this next phase of life when he can look up to the sky without it being a matter of work!

Tim Moes

Tim Moes, DC-8 Platform Manager, retires after 35 years in NASA service.

Tim became a full-time NASA employee in 1986 as the Vehicle Aerodynamics Group Lead to manage and mentor other young engineers. He served on X-43A Flight Readiness Review Committee (Flight 2) and on the American Institute of Aeronautics and Astronautics (AIAA) Atmospheric Flight Mechanics (AFM) Technical committee. Tim was then assigned as the Principle Investigator responsible for establishing stability and control derivatives for any new flight configuration. He led or participated on teams obtaining derivative estimates for the SR-71 / Linear Aerospike Rocket Engine, F-18 Active Aeroelastic Wing, F-15 Intelligent Flight Control System, and the hypersonic X-43A project. As Chief Engineer for the F-15B Testbed Aircraft, Tim led multiple, diverse experiments with partners in industry, academia, and small businesses. In one effort, the F-15 was used to integrate multiple instruments to prove the Space-Based Telemetry and Range Safety (STARS) concept to save the Nation millions in launch infrastructure costs.

After spending a year in leadership training at NASA Headquarters, Tim returned to Dryden in 2005 and began his tenure in program management. He was appointed the F-15B Project Manager for the Intelligent Flight Controls Systems and Lift and Nozzle Change Effects on Tail Shock projects. He was then promoted to the Dryden Deputy Program Manager for the Aeronautical Research Mission Directorate Supersonics Project.

Transitions *(continued from page 10)*

Tim Moes with SARP students at the DC-8

In 2009, he was assigned to lead the C-20 Uninhabited Air Vehicle Synthetic Aperture Radar (UAVSAR) project. He also led UAVSAR team in collecting valuable data on Hawaii and Mexico volcanoes, the San Andreas Fault, and several other areas of critical public interest. In 2012, he was assigned to recover a struggling ER-2 science platform. He turned the program around and brought users back, increasing science flight hours 36% (sustained). He led a major Earth science deployment, Multiple Altimeter Beam Experimental Lidar (MABEL) to Iceland to validate a new instrument to measure changes in polar ice, vegetation, and clouds.

Finally, in 2015 Tim was assigned as the project manager for the DC-8, the most intense 3 year period for any NASA Earth Science aircraft. He led two Operation Ice Bridge (OIB) deployments to Punta Arenas, Chile, to study ice and snow in Antarctica (2015, 2017); as well as several other international deployments, Finally, he led four separate around-the-world air composition campaigns (2016-2018) for the Earth Venture Suborbital-2 Atmospheric Tomography (Atom) Project. Tim Moes has had a career that few others can match. His expertise and personal approach have not only consistently produced superior results, it has gained him significant respect in both the Aeronautical Research and Earth Science community.

● ● ● ●

Gailynne Bouret

After 22 years (collectively) at NASA Ames Research Center, Gailynne Bouret will retire September 1, 2019.

Gailynne first came to Ames in 1989 to support the newly established Earth Science Division under the direction of Jim Lawless. Hired by TGS (later Johnson Controls), she produced newsletters, annual reports, and various presentations designed to promote the division within NASA Ames and the agency. Gailynne left Ames in 1996 to pursue a career as a corporate paralegal. With the burst of the tech bubble in 2001, she ventured into litigation. Dismayed with the legal world, she gratefully accepted the offer to return to the Earth Science Division in 2003, this time through employment with the Bay Area Environmental Research Institute (BAERI). In addition to desktop publishing duties, Gailynne helped develop content for the division's website, assisted with logistics for off-site activities, even designing logos for missions and other related projects and events. She was the on-site HR assistant for BAERI for 3 years.

Her association with the Airborne Science program began in 2004 when she was asked to produce the ASP Annual Report, which she did until 2015. At the request of then ASP Director Andy Roberts, she provided note taking and assistance for a number of ICCAGRA meetings. She began production of the ASP newsletter in 2008, working with the late Steve Wegener. That first issue was just four pages in length! All in all, Gailynne has found her association with ASP and NASA a wonderful experience. For an English major, she has gained insights into and knowledge of science and engineering, as well as making lifelong friends among her NASA family.

Gailynne's first adventure post retirement is a costuming trip to Europe. An avid sewer and embroiderer and an amateur dress historian, she will travel to Austria for workshops and tours, to Paris for an outing to a French chateau in 18th c. dress, and to Bath, UK, to participate in the annual Jane Austen Festival dressed in Regency finery. As she says, it's a costumer's bucket list experience! We wish her, husband Brian, and their dogs, Lucy and Lina, all the best in their new home in Grass Valley, California.

ORACLES *(continued from page 12)*

cloud probes with respect to the leading edge of the wing, collecting unique data that will affect all future cloud probe missions. This was the second campaign in São Tomé for most of the aircraft, science and ESPO teams. The Portuguese language and the availability of quality infrastructure presented occasional challenges to the team. The airport and civil aviation organizations alleviated this through their support and local communities were very welcoming. The hotel staff proved to be extremely helpful in making connections outside the hospitality industry: shipping, customs, medical and governmental connections. Connections were established with the University of São Tomé and with the Meteorological officials at the airport, who assisted with forecasting local conditions. Weather conditions were expected to provide greater logistical challenges in 2018 than in 2017, due to the onset of the rainy season on the African continent to the east/north-east and associated squall lines that can reach São Tomé. However, the team quickly became adept at forecasting evolving local conditions and only one hour of flight time was lost due to bad weather.

Contributed by Bernie Luna, ARC

Upcoming Events

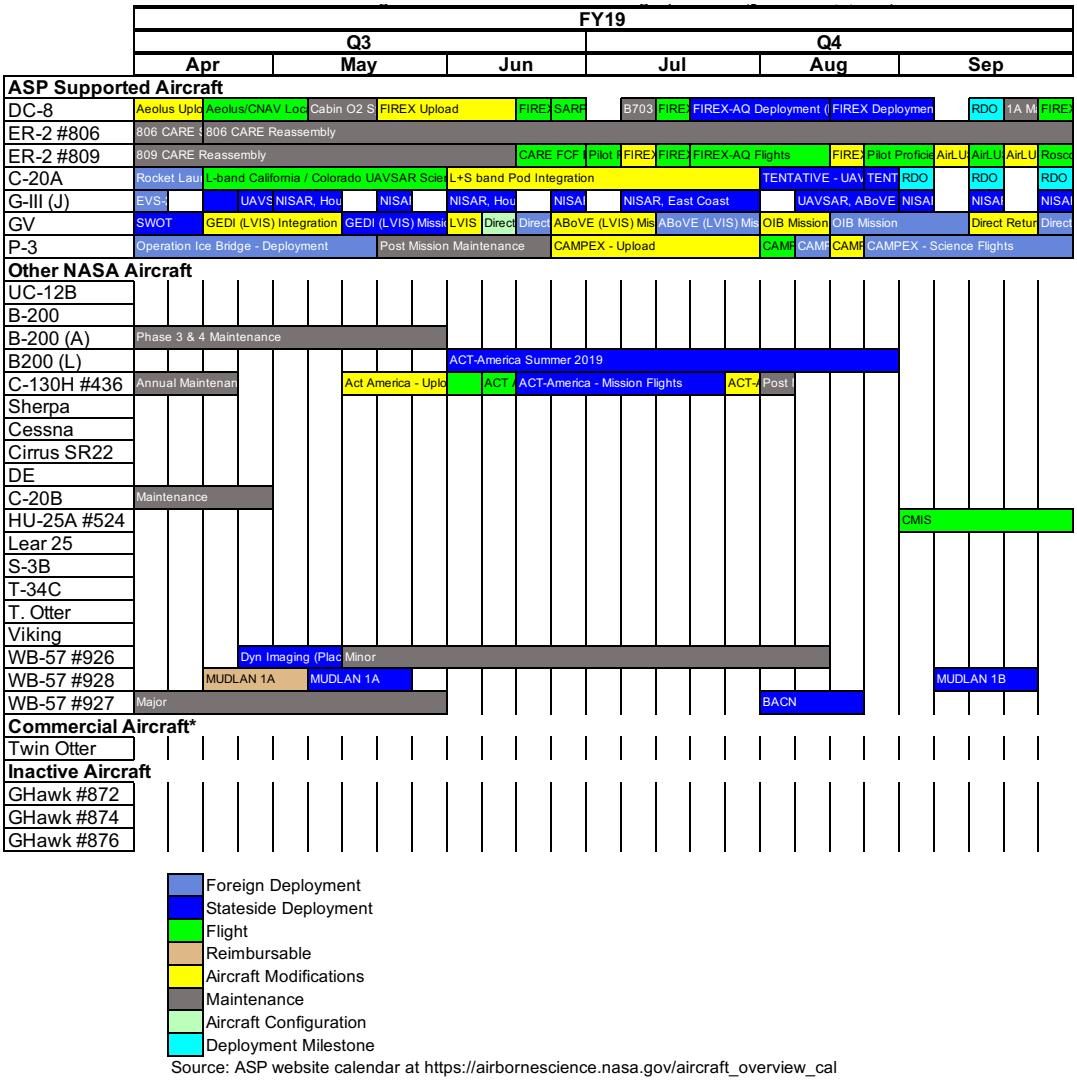
- ESA Living Planet Symposium
  May 13-18, 2019; Milan Italy
  https://lps19.esa.int
- 3rd Federal UAS Workshop
  May 14-16, 2019; Ames Research Center
  https://geography.wr.usgs.gov/InnovationCenter/UASworkshop.html
- 5th ABoVE Science Team Meeting
  May 20-23, 2019; LaJolla, CA
  ABoVE.jpl.nasa.gov
- TFRSAC Spring meeting
  May 29-30, 2019; NASA Ames Conference Center
  Contact: Everett Hinkley [ehinkley@fs.fed.us] or Vince Ambrosia [Vincent.g.ambrosia@nasa.gov]
- 2019 ESTO Forum
  June 11-13, 2019; NASA Ames Conference Center
  ESTO.nasa.gov
- Decadal Survey - Surface Biology and Geology Community Workshop
  June 12-14, 2019; Washington, DC
  Contact: Lisa.Henderson@nasa.gov
- AIAA Aviation
  June 17-21, 2018; Dallas, TX
  Aviation.aiaa.org
- International Conference on Precipitation
  June 19-21, 2019; Irvine, CA
  Ipc12.eng.uci.edu
- IGARSS 2019
  July 28-August 2; Yokohama, Japan
  https://www.igarss2019.org/
- Alaska UAS Interest Group
  September 23-26, 2019
  Fairbanks, Alaska
  http://uasalaska.org/
- Terrestrial Ecology Science Team Meeting
  September 23-25, 2019
  College Park, MD
  https://cce.nasa.gov/meeting_te_2019/index.html
- Pecora / International Symposium on Remote Sensing of the Environment
  October 6-11, 2019; Baltimore, MD
  https://pecora.asprs.org/

Call for Content

Working on something interesting, or have an idea for a story? Please let us know, we'd love to put it into print.

Contact Susan Schoenung (650/329-0845, susan.m.schoenung@nasa.gov) or Matt Fladeland (650/604-3325, matthew.m.fladeland@nasa.gov).

NASA SMD ESD Airborne Science Program 6-Month Schedule



Source: ASP website calendar at https://airbornescience.nasa.gov/aircraft_overview_cal

For an up-to-date schedule, see
http://airbornescience.nasa.gov/aircraft_detailed_cal

Airborne Science Program

Platform Capabilities

Available aircraft and specs

Airborne Science Program Resources	Platform Name	Center	Duration (Hours)	Useful Payload (lbs.)	GTOW (lbs.)	Max Altitude (ft.)	Airspeed (knots)	Range (Nmi)	Internet and Document References
ASP Supported Aircraft*	DC-8	NASA-AFRC	12	30,000	340,000	41,000	450	5,400	http://airbornescience.nasa.gov/aircraft/DC-8
	ER-2 (2)	NASA-AFRC	12	2,900	40,000	>70,000	410	>5,000	http://airbornescience.nasa.gov/aircraft/ER-2
	Gulfstream III (G-III) (C-20A)	NASA-AFRC	7	2,610	69,700	45,000	460	3,400	http://airbornescience.nasa.gov/aircraft/G-III_C-20A_-_Armstrong
	Gulfstream III (G-III)	NASA-JSC	7	2,610	69,700	45,000	460	3,400	http://airbornescience.nasa.gov/aircraft/G-III_-_JSC
	Gulfstream V (G-V)	NASA-JSC	10	8,000	91,000	51,000	500	>5,000nm	https://airbornescience.nasa.gov/aircraft/Gulfstream_V
	P-3	NASA-WFF	14	14,700	135,000	32,000	400	3,800	http://airbornescience.nasa.gov/aircraft/P-3_Orion
Other NASA Aircraft	B-200 (UC-12B)	NASA-LARC	6.2	4,100	13,500	31,000	260	1,250	http://airbornescience.nasa.gov/aircraft/B-200_UC-12B_-_LARC
	B-200	NASA-AFRC	6	1,850	12,500	30,000	272	1,490	http://airbornescience.nasa.gov/aircraft/B-200_-_AFRC
	B-200	NASA-LARC	6.2	4,100	13,500	35,000	260	1,250	http://airbornescience.nasa.gov/aircraft/B-200_-_LARC
	B-200 King Air	NASA-WFF	6.0	1,800	12,500	32,000	275	1,800	https://airbornescience.nasa.gov/aircraft/B-200_King_Air_-_WFF
	C-130	NASA-WFF	12	36,500	155,000	33,000	290	3,000	https://airbornescience.nasa.gov/aircraft/C-130_Hercules
	Cessna 206H	NASA-LARC	5.7	1,175	3,600	15,700	150	700	http://airbornescience.nasa.gov/aircraft/Cessna_206H
	Cirrus SR22	NASA-LARC	6.1	932	3,400	10,000	150	700	http://airbornescience.nasa.gov/aircraft/Cirrus_Design_SR22
	Dragon Eye	NASA-ARC	1	1	6	500+	34	3	http://airbornescience.nasa.gov/aircraft/B-200_-_LARC
	Gulfstream III (G-III)	NASA-LaRC	7	2,610	69,700	45,000	460	3,400	http://airbornescience.nasa.gov/aircraft/G-III_-_LARC
	HU-25A Falcon	NASA-LARC	5	3,000	32,000	42,000	430	1,900	http://airbornescience.nasa.gov/aircraft/HU-25A_Falcon
	SIERRA-B	NASA-ARC	10	100	400	12,000	60	600	http://airbornescience.nasa.gov/platforms/aircraft/sierra.html
	Twin Otter	NASA-GRC	3	3,600	11,000	25,000	140	450	http://airbornescience.nasa.gov/aircraft/Twin_Otter_-_GRC
	WB-57 (3)	NASA-JSC	6.5	8,800	72,000	60,000+	410	2,500	http://airbornescience.nasa.gov/aircraft/WB-57