National Aeronautics and Space Administration

Airborne Science Newsletter

Fall 2010

What's Inside...

In Brief ...

B200 Update

The HSRL and RSP instruments acquired 21 hrs of data on 14 flights under the CALIPSO satellite track on the NASA B200 in 2010. The data are used for validation of the CALIPSO calibration and retrieval algorithms as well as combined lidar+polarimeter aerosol retrievals. The LaRC team has now achieved 1000 HSRL hours and 100 CALIPSO under flights.

G-III UAVSAR

The G-III UAVSAR program had a successful summer conducting: 1) soil moisture studies in Canada and California, 2) oil spill measurements in the Gulf with baseline images of the coastline, 3) volcano studies in the Cascades, Aleutian Islands, and Yellowstone, 4) tidal studies and levee monitoring in the Sacramento Delta, and 5) earthquake response flights in Southern California. A third UAVSAR is on schedule to be completed by Dec. 1 to support integration onto Global Hawk.

Genesis and Rapid Intensification Processes (GRIP)

NASA's program to study hurricane development

Hurricane damages in the U.S. have risen exponentially in recent decades. The scientific community has made substantial improvements in accurate storm track prediction; however, it's still difficult to predict a storm's intensity. NASA's GRIP program has brought together scientists from six NASA centers and many universities to study hurricane development. The focus is on both the fundamental internal processes and external environmental factors influencing hurricane development that will identify the key triggers of hurricane formation and intensification.

Thirteen instruments are collecting data on-board NASA's DC-8, Global Hawk and WB-57. The DC-8, with a range of 8-10 hours, has been deployed to Ft. Lauderdale, FL, as well as to St. Croix for short periods. The WB-57 is operated out of JSC, TX, and deployed to Tampa, FL, for a short period. The Global Hawk, with a range of 24-28 hours, is operated out of DFRC, CA. It can fly to the Atlantic to study storms in conjunction with the other aircraft.

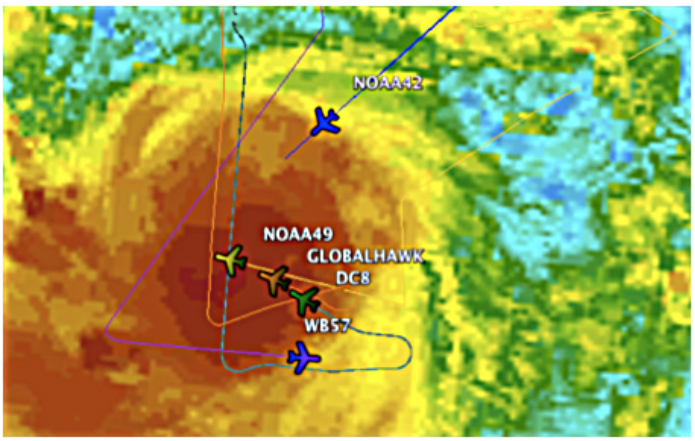
NASA has collaborated significantly with NOAA and NCAR, who are performing their own hurricane studies during this complex mission. They have accomplished close flight coordination of the three NASA aircraft, the NOAA G-IV and P-3s, and the NCAR G-V as well as the U.S. Air Force C-130s. In Hurricane Karl, there were an unprecedented six aircraft in the storm at the same time.

The Global Hawk UAS, a new tool in hurricane research, passed over the eye of Karl 20 times and provided an amazing data set.

While not yet complete, GRIP has already yielded a wealth of data. In Karl they had unprecedented multiday coverage from first detection of a storm through genesis. It also provided observations of rapid intensification from storm stage to Category 3 and landfall. Tropical Storm Gaston provided a null case for development. Hurricane Earl was an opportunity to document rapid intensification as well as weakening of a large Category 5 storm.

The GRIP airborne science campaign runs through the end of September.

Website: http://grip.nsstc.nasa.gov/



Five aircraft tracked by the Real Time Mission Manager. The Air Force C130s don't appear on RTMM.

HQ Aircraft Management Office

This is an important reminder to everyone who works with the Airborne Science Program and any NASA employee or affiliate that utilize aircraft in the name of NASA science, that we must follow NASA policies and procedures. As the responsible party, NASA becomes liable, so let us help. If you utilize aircraft, please contact someone in the ASP program or at the HQ Aircraft Management Office. The following is additional information from our friends in the HQ Management Office.

The HQ Aircraft Management Division is located within the Mission Support Directorate at HQ and establishes policy for all NASA aircraft operations. The guiding documents are NPD and NPR 7900, titled "NASA Aircraft Operations Management" and can be found on NODIS. NASA aircraft are not only those owned by NASA as government aircraft. They include aircraft that are bought, borrowed, chartered, rented, or otherwise procured or acquired--including aircraft produced with the aid of NASA funding--regardless of cost, from any source for the purpose of conducting NASA science, research, or other missions, and which are operated by NASA or whose operation is managed by NASA. Our standard saying is, "If NASA people, money, or equipment are involved with an aircraft operation, it's a NASA aircraft." In addition, unmanned aircraft systems (UAS) are defined as aircraft and must meet the requirements of NPD/NPR 7900. If your center has a Flight Operations Office, your Center Chief of Flight Operations must be involved with any aircraft and aviation related program/project to ensure all NPD/NPR 7900 requirements are met. If your center does not have a Flight Operations Office, contact Richard Schlatter (richard.schlatter-1@nasa.gov) in the HQ Aircraft Management Division for assistance.

Call for Content

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

Contact Steve Wegener (650/604-6278, steven.s.wegener@nasa.gov) or Matt Fladeland (650/604-3325, matthew.m.fladeland@nasa.gov).

ASP Leadership Perspective

In this edition of the ASP Newsletter, I would like to take a moment to recognize and thank the people who ensure ASP aircraft and systems are ready to perform the mission. I'm talking about the mechanical and electrical technicians, the logisticians, the life support and other infrastructure personnel who never ask for anything except possibly a better tool to get the job done better, quicker and more efficiently. I had the pleasure of meeting some of the deployed crews at JSC and Ft. Lauderdale and I just wanted to personally thank you (all the crew I've met and have yet to meet) for your hard work and dedication to the mission of the Airborne Science Program. [See the new "Spotlight" section of the newsletter on page 4.]

Bruce Tagg
Airborne Science Program Director

SARP 2010

The second NASA/NSERC Student Airborne Research Program (SARP) was held during June and July. The six week program was designed to expose and engage advanced undergraduate and early graduate students into NASA research and airborne science and engineering. The program was based at both the University of California at Irvine for the lectures and data analysis and the NASA Dryden Aircraft Operations Facility in Palmdale, CA. for the preparation and execution of two 6 hour research data flights.

The program contained the following elements:

- An introductory student poster session. The 28 students from 24 different universities in 18 states presented their varied research interests to other students and SARP faculty and staff. Student interests included:
  - Geoscience
  - Atmospheric Chemistry
  - Oceanography
  - Biology
  - Aerospace Engineering
  - Environmental Chemistry
  - Physics
  - Chemical Engineering
  - Computer Science
- Lectures on NASA research, airborne science, instrumentation, meteorology,

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Student and research mentors at the DC-8 for first data flight.

SARP 2010

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Nobel Laureate Dr. Sherwood Rowland lectures class on ozone depletion and climate change.

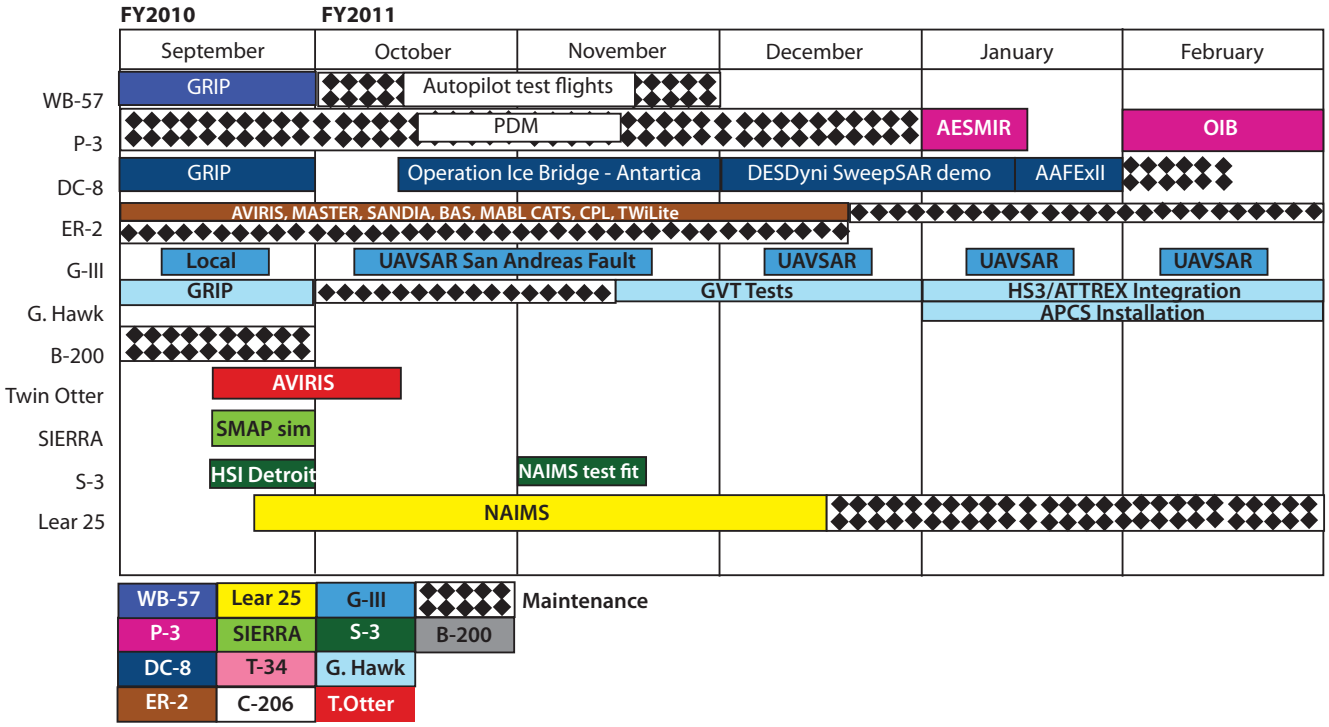
atmospheric chemistry research, remote sensing, oceanography, agricultural practices, instrument integration, airborne data systems, and sustainability and the environment. (See insert, at right, for list of lecturers.)

- Experience with instrument integration, flight planning, and data collection on two 6-hour flights on the NASA DC-8.
- Research projects in the atmosphere, oceans, and land including:
  - o Atmospheric effects of dairy emissions
  - o Distribution and abundance of giant kelp
  - o Evapotranspiration from orchards and row crops
  - o Using remote sensing and in situ sampling techniques.
- Conducting field trips for ground truth validation of the airborne measurements.
- Taking measurements in almond orchards during DC-8 overflight
- Air sampling on the ground surrounding a dairy farm
- Collecting reference spectra of kelp from a boat in Monterey Bay
- Sample and data analysis after the research flights.

The program culminated in the students' formal presentations of results and conclusions.

Speaker	Organization	Lecture Topic
Mr. Randal Albertson	NASA HQ	NASA's Airborne Science Program
Dr. Hal Maring	NASA HQ	NASA and Atmospheric Composition Research
Dr. Jay Al Saadi	NASA HQ	Tropospheric Chemistry Research
Dr. Susan Ustin	UC Davis	Remote Sensing and Agricultural Practices
Dr. Nicholas Clinton	UC Santa Cruz	MASTER Instrument
Dr. Clarissa Anderson	UC Santa Cruz	Ocean Optics and Giant Kelp
Dr. Donald Blake	UC Irvine	Atmospheric Chemistry and Gulf Oil Spill data
Dr. Sherwood Rowland	UC Irvine	Ozone Depletion and Climate Change
Dr. George Seielstad	BAERI	Sustainability and the Environment
Dr. Henry Fuelberg	Florida State	Meteorology for Airborne Science
Dr. Edward Browell	New Hampshire	Lidar Technology and ASCENDS
Ms. Stephanie Vay	NASA LaRC	Atmospheric Carbon Dioxide Measurements
Mr. Adam Webster	NSERC	Instrument Integration Engineering
Mr. David Van Gilst	NSERC	Airborne Data Systems and Communications
Mr. Eric Buzay	NSERC	Airborne Facility Instrumentation

NASA SMD ESD Airborne Science Program 6-Month Schedule

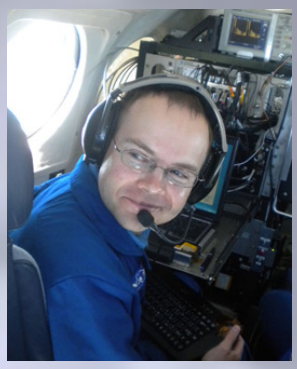


Spotlight

This issue features the crew and personnel from recent GRIP mission and Gulf overflights.

Dale R. Bowser, Aircraft Crew Chief, with the LaRC B200 on the Ramp at Gulfport.

Raymond R. Rogers, Physical Scientist, at the HSRL/RSP workstation in the LaRC B200.



Michael D. Obland, Physical Scientist, at the HSRL/RSP workstation in the LaRC B200.

Leslie O. Kagey, III, Research Pilot, in the left seat of the LaRC B200.

Eric Fraim on board the DC-8 during Gulf Spill overflight.

Michael S. Wusk, Flight Operations Engineer, in the right seat of the LaRC B200.

Lucille H. Crittenden, Flight Operations Engineer, LaRC B200 in New Orleans.

DC-8 (above) and its crew (right) prepare for GRIP mission at Ft. Lauderdale, FL.

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
Core Aircraft	ER-2	NASA-DFRC	12	2,900	40,000	>70,000	410	>5,000	http://www.nasa.gov/centers/dryden/research/AirSci/ER-2/
	WB-57	NASA-JSC	6	6,000	63,000	65,000	410	2,172	http://jsc-aircraft-ops.jsc.nasa.gov/wb57/
	DC-8	NASA-DFRC	12	30,000	340,000	41,000	450	5,400	http:///.nasa.gov/centers/dryden/research/AirSci/DC-8/
	P-3B	NASA-WFF	12	16,000	135,000	30,000	330	3,800	http://wacop/wff.nasa.gov
	Gulfstream III (G-III) (mil: C-20A)	NASA-DFRC	7	2,610	45,000	45,000	459	3,400	http://airbornescience.nasa.gov/platforms/aircraft/g3.html
NASA Catalog Aircraft	King Air B-200 AND UC-12B	NASA-LARC	6.2	4,100	12,500	35,000	260	1250	http://airbornescience.nasa.gov/platforms/aircraft/b-200.html
	DHC-6 Twin Otter	NASA-GRC	3.5	3,600	11,000	25,000	140	450	http://www.grc.nasa.gov/WWW/AircraftOps/
	Learjet 25	NASA-GRC	3	3,200	15,000	45,000	350/.81 Mach	1,200	http://www.grc.nasa.gov/WWW/AircraftOps/
	S-3B Viking	NASA/GRC	>6	12,000	52,500	40,000	450	2,300	http://www.grc.nasa.gov/WWW/AircraftOps/
	Ikhana (Predator-B)	NASA-DFRC	30	3,000	10,000	52,000	171	3,500	http://airbornescience.nasa.gov/platforms/aircraft/predator-b.html
New Technology	Global Hawk	NASA-DFRC	31	1500	25,600	65,000	335	11,000	http://airbornescience.nasa.gov/platforms/aircraft/globalhawk.html
	SIERRA	NASA-ARC	11	100	445	12,000	60	550	http://airbornescience.nasa.gov/platforms/aircraft/sierra.html

ASP Upcoming Events

* Intl. Conference on Airborne Research for the Environment (ICARE) 2010
  Oct. 25-30, 2010
  Toulouse, France
  http://environmentalresearchweb.org/cws/event/15217

* Unmanned Systems Canada Conference
  Nov. 2-5, 2010
  Fairmont Queen Elizabeth
  Montreal, QC, Canada
  Call for Papers is OPEN
  http://www.unmannedsystems.ca/content.php?doc=54

* UAS TAAC 2010 Conference
  Dec. 7-9, 2010
  Tamaya Hyatt Regency, Albuquerque, NM

* AGU 2010 Fall Meeting
  Dec. 13–17 2010, San Francisco, CA
  www.agu.org

* Third International Workshop: "The Future of Remote Sensing"
  Antwerp, Belgium; Autumn 2010
  http ://isprs.vgt.vito.be/cms/

* AUAA 49th Annual Aerospace Sciences Meeting
  January 4-7, 2011
  Orlando, FL
  http://www.aiaa.org/events/

* AMS 91st Annual Meeting
  January 23-27, 2011
  Seattle, WA
  www.ametsoc.org/meet/annual/

* Unmanned Systems Program Review
  February 1-3, 2011
  Washington, D.C.
  http://www.auvsi.org

* AIAA Infotech@Aerospace 2011
  March 29-31, 2011
  St. Louis, MO
  http://www.aiaa.org/events/I@A

* 34th International Symposium on Remote Sensing of the Environment (ISRSE)
  April 10-15, 2011; Sydney, Australia
  Registration is OPEN
  http://isrse34.org/abstracts.asp

* ASPRS 2011 Annual Conference
  May 1-5, 2011; Milwaukee, WI
  www.asprs.org/milwaukee2011