National Aeronautics and Space Administration

Airborne Science Newsletter

Summer 2010

What's Inside...

In Brief ...

Planning for 34th ISRSE

The International Symposium for Remote Sensing of the Environment (ISRSE) has announced a Call for Papers for the 2011 conference to be held in Sydney, Australia. The Earth Science and Airborne Science communities are encouraged to submit abstracts for technical sessions. Workshops on UAS, wildfires, and international collaborations are being planned. See the conference website at http://isrse34.org/.

ASP Call Letter

The Airborne Science Program sends out an Annual Call Letter to the science community. This letter is a request to submit flight requests for those who plan to make use of the NASA aircraft observing platforms and capabilities in Fiscal Year 2011. The letter also provides the current requirements, costs, and contacts. It will have a wide distribution in July and will be posted on the Airborne Science website at http://airbornescience.nasa.gov/

Geomatics and ISPRS Tech Commission

At the Canadian Geomatics and ISPRS Technical Commission 1 Conference, held June 14-18 in Calgary, Canada June 14-18, the International Airborne Science

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NASA's ER-2 collects imagery of Gulf Oil Spill

In less than 72 hours and at the request the National Oceanic and Atmospheric Administration (NOAA), NASA Airborne Science deployed its instrumented research aircraft the Earth Resources-2 (ER-2) to the Gulf as part of the national response to the spill on May 6 – 25. NASA sent the ER-2 outfitted with the Airborne Visible/Infrared Imaging Spectrometer (AVIRIS) and the Cirrus Digital Camera System (DCS) to collect detailed images of the Gulf of Mexico and its threatened coastal wetlands. The DCS camera system is supplied by NASA's Ames Research Center, Moffett Field, Calif. Led by Robert Green of NASA's Jet Propulsion Laboratory, AVIRIS measured how water absorbs and reflects light in order to map the location and concentration of oil as it separates into a widespread, thin sheen and smaller thick patches.

AVIRIS collected an image (see below) of the site of the Deepwater Horizon BP oil rig disaster on May 17. Crude oil on the surface appears orange to brown. Scientists are using spectroscopic methods to analyze measurements for each point in images like this to detail characteristics of oil on the surface.

AVIRIS image of Deepwater Horizon BP oil rig, site of oil spill.

AVIRIS and the DCS extensively mapped the region affected by the spill during 11 flights conducted between May 6-25. In total, AVIRIS and DCS measured more than 100,000 square kilometers (38,610 square miles) in support of the national response. The instrument flew at altitudes up to 19,800 meters (65,000 feet) aboard the ER-2. AVIRIS mapped the occurrence and condition of oil on the surface of the Gulf, and continued to estimate the amount of surface oil to help scientists and responding agencies better understand the spill and how to address its effects. In addition, coastline maps created from the AVIRIS overflights will provide a baseline of ecosystems and

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Earth Venture Awards Announced

Five competitively-selected proposals are the first investigations in the new venture class series of low-to-moderate cost projects established last year. The missions will be funded over the next five years at a total cost of not more than $30 million each. The cost includes initial development and deployment through analysis of data. The five missions were chosen out of 35 proposals.

The selected missions are:

1. Airborne Microwave Observatory of Subcanopy and Subsurface. Principal Investigator: Mahta Moghaddam, University of Michigan. Investigators will use NASA's Gulfstream-III aircraft to fly a modified UAVSAR that can penetrate vegetation and soil to depths of several feet.

2. Airborne Tropical Tropopause Experiment. Principal Investigator: Eric Jensen, NASA Ames Research Center. Investigators will launch four airborne campaigns with NASA's Global Hawk remotely piloted aerial systems. The flights will study chemical and physical processes at different times of the year from bases in California, Guam, Hawaii, and Australia.

3. Carbon in Arctic Reservoirs Vulnerability Experiment. Principal Investigator: Charles Miller, NASA Jet Propulsion Laboratory. Instruments will be flown on a Twin Otter aircraft to produce the first simultaneous measurements of surface characteristics that control carbon emissions and key atmospheric gases.

4. Deriving Information on Surface Conditions from Column and Vertically Resolved Observations Relevant to Air Quality. Principal Investigator: James Crawford, NASA Langley Research Center. NASA's B-200 and P-3B research aircraft will fly together to sample a column of the atmosphere over instrumented ground stations.

5. Hurricane and Severe Storm Sentinel. Principal Investigator: Scott Braun, NASA Goddard Space Flight Center. Two Global Hawks will deploy from NASA's Wallops Flight Facility in Virginia during the 2012-14 Atlantic hurricane seasons.

The full press release is available at:
http://www.nasa.gov/home/hqnews/2010/may/Hq_10-127_Venture_Program.html

Note from the Top

I'd like to start off my first address by saying that I am excited and proud to be a part of the Airborne Science Program. It's been an interesting few weeks (deployments to Greenland for Ice Bridge, Australia for Hayabusa, and to the Gulf to respond to the oil spill) and I wanted to say how incredibly impressed I have been with everyone I've met so far. I had the privilege of working with several of you before and I look forward to meeting and working with you in the future. I would also like to thank Randy Albertson for the great job he's done as the acting Director, and for his patience as he brings me up to speed on the Program.

Bruce Tagg
Airborne Science Program Director

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).

In Brief *(continued from page 1)*

Standards Working Group had a very successful meeting with two dedicated sessions and nine papers presented. These papers continue to show the relevant topics that need to be engaged from an international perspective for strengthening the contributions of airborne platforms to global science objectives.

Oil Spill
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habitats that can be compared with data from future AVIRIS flights to assess the oil spill's impacts. These measurements included the Gulf coast, including part of the Texas Point National Wildlife Refuge prior to possible oil contamination and impact.

AVIRIS data provide scientists with many different types of information about the spill. Researchers at the U.S. Geological Survey's Spectroscopy Laboratory in Golden, Colorado are working to determine the characteristics of the oil based upon the AVIRIS measured spectral signature. The Department of Homeland Security (DHS) and the Interagency Remote Sensing Coordination Committee (IRSCC) are also utilizing the AVIRIS and DCS data.

Contributed by Ian McCubbin

Global Hawk in the Pacific

UAS technology breaking new grounds

The Global Hawk Pacific Mission (GloPac) was the first demonstration of the Global Hawk (GH) unmanned aircraft system (UAS) for Earth science. The GloPac mission included two test flights within range of Dryden Flight Research Center and three science flights over the Pacific.

During GloPac, the GH team and scientists installed all the computers, experiment interface panels, and 11 science payload instruments onto the GH. However, placing instrument and payload computers was only the first task. The communications between the instrument payload and the Global Hawk Operations Center (GHOC) had to be completed. After completing installation and associated trouble-shooting, we demonstrated instrument data communications through both the Ku and the Iridium links.

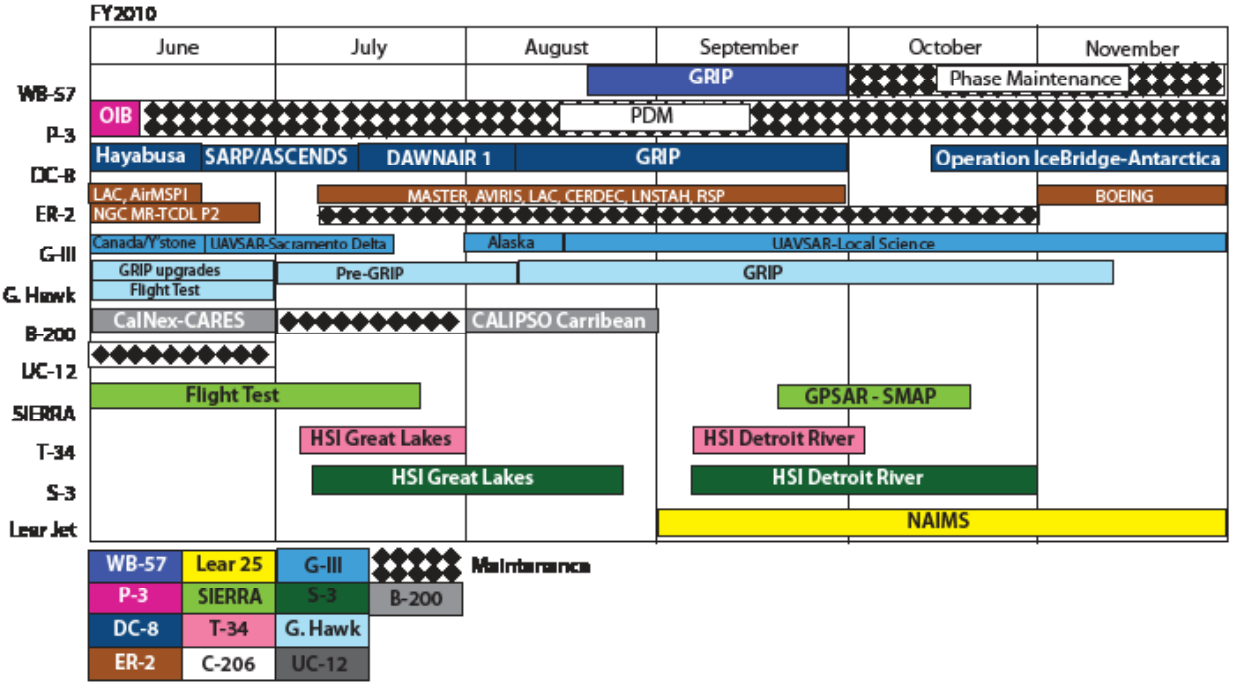
The first GloPac goal was to demonstrate using the GH UAS for NASA and NOAA Earth science by: 1) acquiring a Certificate of Authorization (COA) from the FAA for GH flights over the Pacific Ocean, Alaska, and the Arctic: 2) devising methodologies and procedures for daily integration and instrument testing onboard the GH; and 3) coordinating GHOC protocols for communication between the payload and flight operation rooms during the flights. The GH set Earth science records with nearly every science flight including a 28.6 hr. flight that crossed Alaska and became the first GH to travel north of 70˚N. GH performance was demonstrated by reaching latitudes of 12˚N and 85˚N from the NASA DFRC base and by extended flight legs at the ceiling altitude of 65,000 feet.

The second GloPac goal was to explore the trace gases, aerosols, and dynamics of remote upper troposphere and lower stratosphere regions. A specific GloPac objective was to sample ozone depleted fragments of the stratospheric Arctic polar vortex. The GH sampled some of these fragments with instruments that measure ozone and other stratospheric trace gases. Another objective was to survey aerosol dust plumes from Asia. On April 22, the GH observed an extensive dust cloud over the eastern Pacific that extended from the surface to an altitude of 10 km. Ultimately, GloPac was to provide validation for the NASA A-train satellite retrievals. The GH flew long flight legs along the A-train ground track on three separate flights thereby demonstrating its ability to coordinate with other measurement platforms. GH quantifications of a number of trace gases will provide excellent validation data for A-train retrievals.

The third goal of GloPac was to reduce the risk for future GH missions. There are a number of missions already in the GH queue: the Genesis and Rapid Intensification Processes (GRIP) experiment, scheduled for this August and September, the UAV SAR mission, the Airborne Tropical TRopopause Experiment (ATTREX) planned for 2011-2014, and the Hurricane and Severe Storm Sentinel (HS3) mission that will begin in 2011 through 2014. GloPac has demonstrated that GH and a substantial science payload can be routinely operated on long duration missions in areas remote from the GH deployment base.

Contributed by Paul Newman, David Fahey and Michael Craig

NASA SMD ESD Airborne Science Program 6-Month Schedule



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

* IEEE IGARSS 2010
  July 25-30, 2010; Honolulu, Hawaii
  Registration is OPEN
  http://www.igarss10.org/

* AUVSI's Unmanned Systems North America 2010
  Aug. 24-27, 2010
  Denver, CO, USA
  Registration is OPEN.
  http://www.auvsi.org/events/ reservations

* AGU 2010 The Meeting of the Americas
  Aug. 8-13, 2010
  Rafain Hotel and Convention Center, Brazil
  http://www.agu.org/meetings/ja10/

* 2010 HYSPIRI Science Workshop
  August 24-26, 2010; Pasadena
  http://hyspiri.jpl.nasa.gov/events/2010-hyspiri-workshop

* SPIE Remote Sensing 2010
  Sept. 20-23, 2010
  Centre de Congrès Pierre Baudis
  Toulouse, France
  http://spie.org/x6262.xml

* The 11th International Circumpolar Remote Sensing Symposium
  Sept. 20-24, 2010; Cambridge, UK
  http://alaska.usgs.gov/science/geography/CRSS2010/index.html

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

* AIAA Infotech@Aerospace 2011
  March 29-31, 2011; St. Louis, MO
  Call for Papers is OPEN; abstracts due Sept. 13, 2010.
  http://www.aiaa.org/events/I@A

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

* 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/

* ICARE 2010
  Oct. 25-30, 2010
  Toulouse, France
  http://environmentalresearchweb.org/cws/event/15217

* ASPRS 2011 Annual Conference
  May 1-5, 2011; Milwaukee, WI
  Call for Papers is OPEN; abstracts due Sept. 1, 2010
  www.asprs.org/milwaukee2011