



National Aeronautics and Space Administration

Airborne Science Newsletter



Summer 2011

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In Brief ...

SIERRA in Railroad Valley

SIERRA deployed to Railroad Valley in Nevada, June 16-23, to support a JPL/JAXA GOSAT calibration mission in preparation for OCO-2. SIERRA carried a Picarro gas analyzer and MMS (PI: Paul Bui) to measure vertical profiles and surface fluxes of CO₂ and H₂O.

GRC Twin Otter

The GRC Twin-Otter aircraft is completing a nadir port installation and avionics upgrade modification this summer and will be ready to start flying ASP payloads this fall. Plans are to have the aircraft visit JPL (Burbank airport) and the DAOF in Palmdale in early August after the modifications are complete to allow researchers the opportunity to view the aircraft and discuss potential future flight programs before the aircraft returns to GRC.

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MACPEX

Understanding Trace Species in Earth's Atmosphere

The Mid-latitude Airborne Cirrus Properties Experiment is an airborne science field campaign focused on investigating the properties of mid-latitude cirrus clouds, the processes affecting these properties and their impact on the earth's radiation. The campaign took place during spring 2011 (March and April) over central North America with special emphasis in the vicinity of the DoE ARM SGP site in Oklahoma.

Based from Ellington Field, TX, the MACPEX mission integrated 24 science instruments on board the WB-57 to make critical measurements needed for the mission objectives. The main focus of the measurements were the aerosol and cloud microphysical properties, including particle size distribution, composition, extinction, ice water content, and ice crystal habitat. In addition other instruments provided measurements of water vapor, water isotopes, chemical tracers (CO, CH₄, O₃), and the dynamics including pressure, temperature, vertical and horizontal winds.

Flight were planned with an emphasize on ground based and satellite observations including the EOS/ A-Train satellites Aqua, Aura, CALIPSO, CloudSat, PARASOL, and Terra for the purposes of scientific utilization, as well as, satellite validation. In addition, the field measurements should provide the cirrus microphysical information needed for improvement and evaluation of remote-sensing retrievals and climate model cloud parameterizations.

Sponsored by the Atmospheric Composition focus area of NASA Earth Science Division, the investigation will contribute to the understanding of the sources, transformation, and transport of trace species in the Earth's atmosphere.

For more information on the MACPEX mission, please visit the mission web site at: <http://www.espo.nasa.gov/macpex/>



A40 Awards

Three proposals were selected from the 35 received for the UAS Enabled Earth Science ROSES solicitation. The selected included Dr Stan Herwitz of the UAV Collaborative to do a "High Resolution Assessment of Carbon Dynamics in Seagrass and Coral Reef Biomes"; Dr Jim Maslanek of the University of Colorado, Boulder to observe the "Spatial and Temporal Variability of Ocean and Ice Conditions In and Near the Marginal Ice Zone"; and Dr Jonathon Glen from USGS Menlo Park to investigate "Long-term Earthquake Hazards and Groundwater Resources in a Tectonically Active Region: Critical insights from UAS". SIERRA, Swift and Ikhana are the NASA aircraft that are to be used along with the University of Alaska Fairbank's ScanEagle, MLB Co's BAT-4 and a University of Colorado adapted Micro UAV. NOAA's Unmanned Aircraft Project Office is also partnering in Dr Maslanek's proposal. The \$7.5M ROSES solicitation is funded through the Aeronautics Research Mission Directorate's Integrated Systems Research Program and is a companion to the \$7.5M Research Opportunities in Aeronautics solicitation regarding UAS.

Contributed by Randy Albertson

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)

HS3 Integration

The HS3 (Hurricane and Severe Storm Sentinel) project will perform a series of test flights this summer on the Global Hawk (AV-6) from DFRG. These test flights are in preparation for the hurricane research flights that will take place over the next three years (2012-2014) from Wallops.

ASP Leadership Perspective



Welcome to the summer 2011 ASP Newsletter. We've got a lot going on, as usual, including supporting Earth Venture 1, Operation IceBridge, a UAS ROSES call, GIII/UAVSAR flights to the Gulf of Mexico and Hispaniola, ER-2/AVIRIS and MASTER flights, including re-flying last year's Gulf Oil Spill area and our Student Airborne Research Program. In addition to mission support, we are also working to improve our infrastructure through our NASDAT and EIP modernization, and our revamped ASP web presence. Our new ASP web presence includes an updated website as the gateway to all things airborne including:

online schedules (3 month daily, 6 month and 5 year planning), an airborne instrument database, an asset tracker, and 3D walkthroughs of our aircraft with ICDs. Plans for the future will depend upon your feedback, but already we have been thinking about a mission execution portal and a cost section with historical estimates and cost estimation tools. I look forward to an exciting summer, hearing about your ASP experiences, and I hope everyone gets a chance to enjoy some time off with family. As always, feel free to contact me directly with any comments, concerns, and ideas about the Airborne Science Program.

*Bruce Tagg
Airborne Science Program Director*

Operation Ice Bridge, Spring 2011

On May 19, Michael Studinger, Operation IceBridge Project Scientist, wrote:

"Over the past 67 days, the P-3 has been in the air 325 hours. It is difficult to comprehend the magnitude of airborne activities that have taken place over Greenland, the Canadian Arctic, and the Arctic Ocean [during] the past couple of weeks. IceBridge deployed two aircraft that have collected a tremendous amount of data, but we were not alone. Our colleagues from the European Space Agency had an extremely successful CryoVEx campaign with two survey aircraft involved and many ground activities. The UK-US project named GROGG surveyed the Greenland Ice Sheet as well, and so did a team from CReSIS. In the Beaufort Sea, the US Navy and its partners conducted ICES 2011, with survey aircraft and measurements on the sea ice. The scope and level of coordination between all these airborne and ground campaigns makes the International Polar Year look small. Thank you all for the excellent coordination!"

The OIB science planning meeting took place June 14-16 at UC Irvine. We are again looking to base the 2011 Antarctic portion of OIB in Punta Arenas Chile with the NASA DC-8. Operation IceBridge is also adding the NSF G-V Hiaper aircraft that will fly the LVIS instrument. The mission schedule begins with the NSF G-V arriving in Punta Arenas on October 5 and continues until November 3. The DC-8 is scheduled to arrive in Chile October 10 and will be there through November 22.

Contributed by Kent Shiffer



The new OIB logo that is now available from the ESPO OIB web site home page <http://www.espo.nasa.gov/oib/>.



Spotlight On

The researchers, crew, and logistics staff behind MACPEX



Paul Bui showing WB-57 staff members the MMS instrument.



Dave Jordan and WB-57 electrician Walt Townley.



ESPO Staff (l. to r.) Marilyn Vasquez, Erin Justice, and Bernie Luna at the WB-57 hangar.



WB-57 crew working on the aircraft.



Performing sheet metal modifications to superpod.

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Spotlight On

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Dave Jordan getting briefed on superpod modifications



WB-57 crew installing an instrument.



Troy Thornberry and Paul Bui underneath the WB-57.

NASA SMD ESD Airborne Science Program 6-Month Schedule

FY11		Jun	Jul	Aug	Sep	Oct	Nov
ER-2	806	AVIRIS, MASTER, RSP, AirMSPI			MR-TCDL	MR-TCDL	
	809	BAS			Maintenance		
G-III	30502	Various UAVSAR Flights (Costa Rica, HI, San Andreas, Gulf of Mexico, Hispaniola, Cascades, AK)				Sac'to Delta	
GH	871	Reimbursable Mods				Reimbursable Mission	
	872	Reimbursable Mods		HS3 Upload	HS3 Flts	ATTREX Upld	ATTREX Flights
	873	Non-flyable Storage					
P-3	426	Integration: DISCOVER	DISCOVER-AQ	DBSAR Int.	DBSAR	AITT Int.	AITT Mission
DC-8	817	SARP	Sweep SAR	ASCENDS II	CH ₄ Sounder/Downair	OIB Upload	OIB
WB-57	926	Reimbursable Flight Missions					
	928	Reimbursable Flight Missions				Annual Maintenance	

CATALOG		Jun	Jul	Aug	Sep	Oct	Nov
Ikhana (DFRC)	870						
B200 (LaRC)	529	DEVOTE Mods		Upload DEVOTE	DEVOTE		
UC-12B (LaRC)	528	Upload DISCOVER-AQ	DISCOVER-AQ	Upload DEVOTE	DEVOTE		
Cessna 206H (LaRC)	504	EPA Sensors & G-LiHT	G-LiHT				
SIERRA (ARC)	707	GOSAT/OCO2 cal/val					
S-3B	601	NAVAIR				AFRL	
LJ25 (GRC)	616	Dwnld		ALIST		Dwnld	NAIMS
T-34C	606	Auto-Pilot modification					
Twin Otter (GRC)	607	NADIR PORT MODs	Flight Testing				
Viking 300 UAS (WFF)	Catalog	Applanix		Mini-ATM			
Twin Otter (WFF)	Contract	CARVE Flights		CARVE Flights			
Twin Otter (JPL)	Catalog	AVIRIS Flights		AVIRIS Flights			

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://www.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
	Global Hawk	NASA-DFRC	31	1500	25,600	65,000	335	11,000	http://airbornescience.nasa.gov/platforms/aircraft/globalhawk.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
	SIERRA	NASA-ARC	11	100	445	12,000	60	550	http://airbornescience.nasa.gov/platforms/aircraft/sierra.html

ASP Upcoming Events

- * IGARSS 2011
July 24-29, 2011
<http://igarss11.org>
Meeting moved to Vancouver, Canada.
- * AUVSI's Unmanned Systems North America 2011
August 16-19, 2011; Washington DC
<http://symposium.auvsi.org/auvsi11/public/enter.aspx>
Registration open.
- * SPIE Remote Sensing Conference
September 19-21, 2011
Prague, Czechoslovakia
<http://spie.org/x6262.xml>
- * HYSPIRI Science Workshop
August 23-25, 2011, Washington DC
<http://hyspiri.jpl.nasa.gov/events/2011-hyspiri-science-workshop>
- * AGU Joint Assembly
Sept. 27-30, 2011
Marseilles, France
<http://www.agu.org/meetings/>
- * Carbon Cycle and Ecosystems Joint Science Workshop
October 3-7, 2011, Alexandria, VA
http://cce.nasa.gov/meeting_2011/index.htm
- * UVS-Canada
November 7-10, 2011, Halifax, Canada
<http://www.unmannedsystems.ca/content.php?doc=155>
- * ASRPS 2011 Fall Pecora Conference
Nov. 14-17, 2011
Hilton Hotel at Washington Dulles Airport
Herndon, VA
- * AGU Fall Meeting
December 5-9, 2011, San Francisco, CA
<http://www.agu.org/meetings/>
- * UAS TAAC Symposium
December 6-8, 2011, Albuquerque, NM
Includes UAS demo
<http://taac.psl.nmsu.edu/>
Registration open.