

- **NSF Airborne Status : for SCOARS - UNOLS**
Monterey, June 2010 - Jim Huning, Peter Milne



C-130Q



NRL P-3 and ELDORA
Radar



CIRPAS T-O



Wyoming King Air



Gulfstream V



LC-130 Ski

A-10 replacement for
T-28 SPA



NSF Sponsored Lower Atmospheric Observing Facilities

- NCAR Operated and Maintained
 - Budget for maintenance, flight crews, hangar are part of overall budget provided to NCAR (FFRDC) by NSF
 - Deployment Pool is approximately \$6M but that supports all National Facilities supported by NSF, not just aircraft.
 - OPP budget is separate and coupled with all of the logistics funding.
- King Air supported through Cooperative Agreements at the University of Wyoming (King Air) and an MOA is in progress to use the CIRPAS Twin Otter at the Naval Post Graduate School
- NRL P-3B integrated with ELDORA and supported through an MOA for approved ELDORA field campaigns
- Interagency and International Facilities
 - Campaigns conducted in collaboration with interagency partners, e.g., NOAA, NASA, NRL, DOE, and EUFAR members



Deployment Pool

- Deployment Pool funds approved deployments of all facilities and in 2010 will be approximately \$6M.
- Typical deployment (2-8 weeks) requires \$100K – 2.5M
 - Two upcoming campaigns, PREDICT and PLOWS, require \$2,419,974 and \$2,296,193, respectively, in deployment pool funding (this does not include the funding of the numerous science proposals)
- Observing Facilities Assessment Panel (OFAP) meets semi-annually to provide guidance on experimental design (flight hours, proper suite of instruments, as well as other facilities)
- Recently included a special set-aside within the deployment pool for educational uses of the facilities.
 - Proven to be a very popular activity and have had requests from numerous universities to bring a facility to a university for demonstration and science applications (usually on the order of \$25-50K)
 - Have not had an educational use for aircraft to date but numerous faculty have made inquiries about bringing an aircraft to their area



NSF C-130Q

Highly modified, re-engined
medium altitude, large payload
platform



Avionics upgrade contract signed (ARRA
funding), ASB Avionics, Mojave, CA.

Will install electronic propeller controls
after completion of avionics upgrade.



G-V continues in the major science missions, **HIPPO** (HIAPER Pole-to-Pole). **PREDICT** will be conducted out of St Croix this summer. Its objective is to better understand the process of tropical depression formation that result in tropical cyclones.



NSF Flight Hours: Polar Programs, NCAR Operations, and University of Wyoming FY 2009

- Office of Polar Program (Antarctic Fly in is over 4 months only Oct-Feb)
- Beginning in 1998 and after 42 years the ANG 109th (NY) replaced the Navy's VX6 to support operations in Antarctica and the Arctic
- 2009 flight hours for Fixed Wing and Rotorcraft:
 - Twin Otters (2, KBA): 950
 - DC-3 (Bassler, KBA): 336
 - AS350B (Helo 2, PHI, Inc.) 466
 - Bell212 (2, PHI, Inc.): 654
- LC 130s (4): lots ANG 1,134
- UAS Aerosonde (1): 130
- UAS CReSIS (U Kansas) test hours only

- **Subtotal Flight Hours: 3,670**

- OPP also uses CAS: Australia (A318), NZ (C-130s, 757)

- NCAR has been an FFRDC since 1961
- NCAR operations of GV: 230
- NCAR operations of C-130Q: 171 (major inspection; was out of service)

- University of Wyoming King Air: 111 (over 15 years of service to NSF)
- **Grand Total NSF Flight Hours: 4,182**



2010 Planning Chart

2010 Planning Chart													
NCAR / EOL Research Aviation Facility													
Aircraft	Project Location PI	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
C130													
Approved AJ / JBJ	PLOWS (US Mid-west) Rauber	1 15	28	1 10 20									
Request	Intercompare (France) EUFAR / NSF										2 20 31	10	
Approved	WAMO (JeffCO) Jaffe et al									1	1 15 22		
	Maintenance Schedule (JeffCO)			PKG 1		avionics → upgrade	PKG 2	avionics → upgrade	avionics → upgrade	PKG 3		PKG 4	
GV													
Approved PR	HIPPO (Global) Wofsy			1 22 31	15 22	1							
Approved JBJ / AJS	PREDICT (St Croix) Davis						24	1 15 31		30	10		
required	HEFT - 4 "HSRL" (JeffCO)	1 22 31	1 15 22										
Approved	AMAX-DOAS (JeffCO) Volkamer	linked to	HEFT-4										
	Maintenance Schedule (JeffCO)				48 Month Inspection (JeffCO)	Gear Inspection (GAC) 1 - 30	96 Month Inspection (JeffCO)	→			24 Month & ANNUAL (6 weeks)	→	→
P3													



Proposed Field Campaigns for Balance of 2010 and into 2011/12

ADELE II & III G-V 88 hours Melbourne Florida- Airborne detector for Energetic Lightning Emissions

IDEAS IV G-V 30 hours, C-130 25 hours, KA 28 hours 25 hours, new instrument development and education RMMA, Laramie and marine location Request

NAAMEX – C-130 152 hours, western and eastern USA locations North American Airborne Mercury Experiment

PREAMBLE – King Air (hours TBD, 2011) Precision Atmospheric Marine Boundary Layer Experiment, California

SAANGRIA – G-V (estimate 300 hours) Southern Andes-Antarctic Gravity Wave Initiative, Chile (In evaluation for 2011/2012 deployment)

SPRITES 2 – G-V (34 hours), RMMA

TORERO - G-V (140 hours) Tropical Ocean Troposphere Exchange of Reactive Halogen Species and Oxygenated VOC, Ecuador (2012 deployment)



GPS Dropsonde



Deployment an issue
over land and congested
air routes

NCAR worked with FAA to receive
permission to drop during
the PLOWS campaign
next winter (C-130)



University of Wyoming King Air
State Owned – NSF Funded

Will be participating in several research campaigns in 2010
Wyoming Cloud Radar and Cloud Lidar included in the Cooperative
Agreement



NSF LC-130 ski plane Maintained and Operated by ANG109th Military Tail Numbers

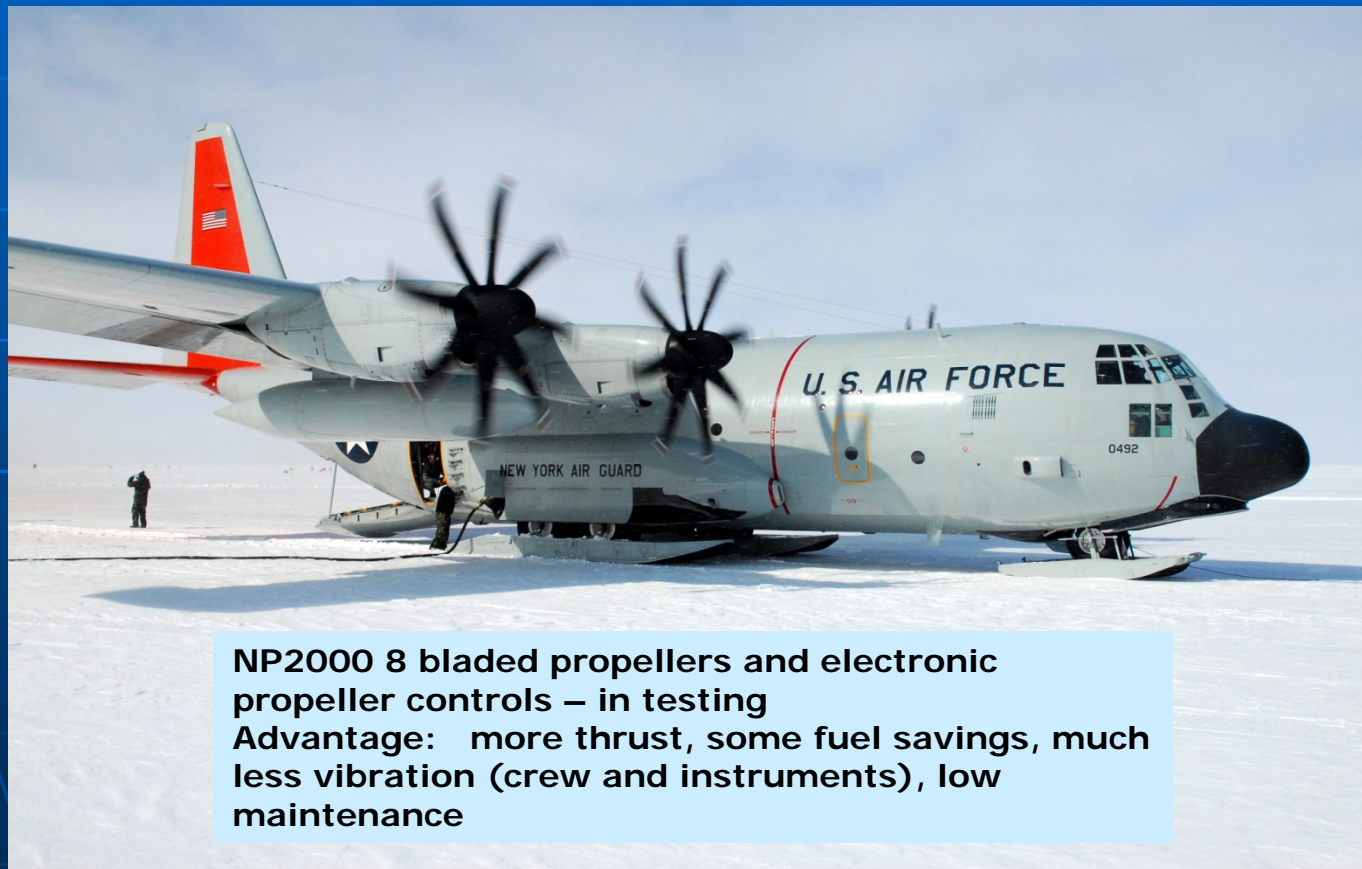


A Navy C-130 is undergoing tests of the NP2000 propeller system (8 bladed). If sufficient increased thrust is realized then the objective is to remove JATO assist from LC-130s. The annual cost savings would be significant, ~\$7M.



LC 130 Ski Plane

NSF has 4 Operational and 4 in Storage



NP2000 8 bladed propellers and electronic propeller controls – in testing
Advantage: more thrust, some fuel savings, much less vibration (crew and instruments), low maintenance



T-28 Storm Penetration Aircraft (Removed from Service 2003)



Performance was too limited for new
science requirements



Report of the October 2006 Storm Penetrating Aircraft Workshop



Edited by Paul L. Smith

Prepared for:

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A-10 Storm Penetration Aircraft; CIRPAS Twin Otter, and NRL P-3 with ELDORA Radar



A-10 Transfer from USAF
To USN, NPS CIRPAS



CIRPAS Twin Otter; to augment
C-130Q and GV where appropriate



NSF and NRL MOA through
2012 for ELDORA operations

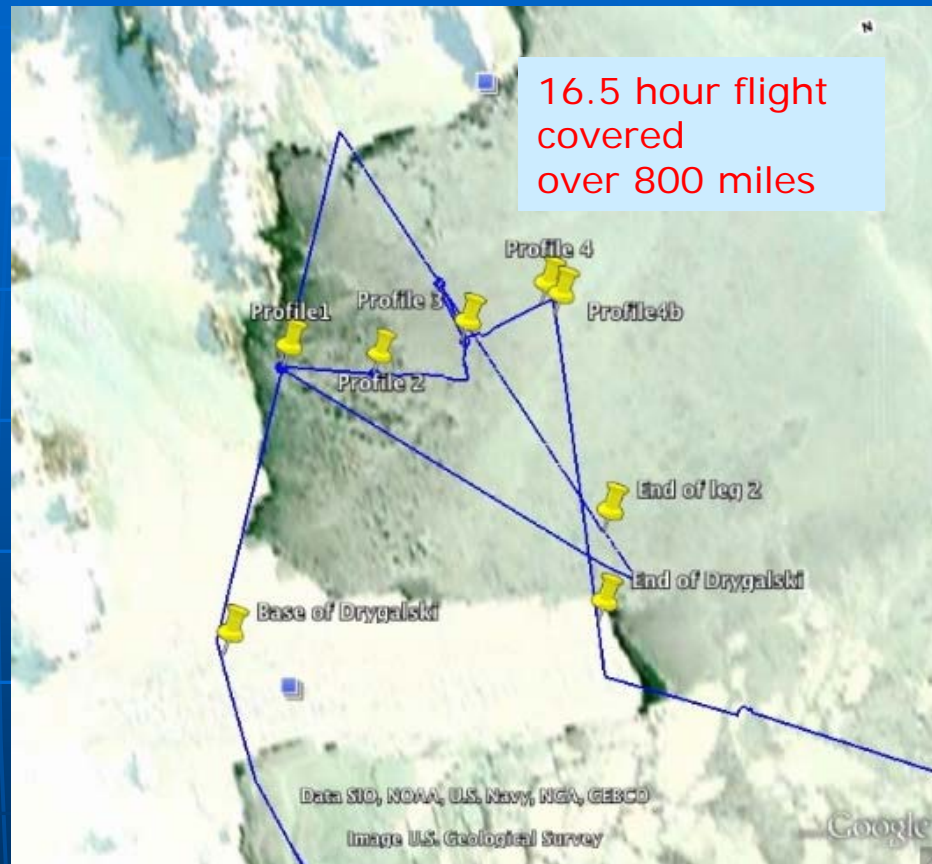


UASs

- Unpiloted Aerial Vehicle Systems will play an increasing role in ATM's research programs
- NSF will leverage its partner agencies (NASA, NOAA, DOE, DOD) to maximize return on investments
- NSF, and other agencies, have used UAS platforms to acquire critical research data (e.g., Alaska, Maldives, Galapagos) and NSF will continue to expand their use
- Most recent and extensive use is in Antarctica through funding from the Office of Polar Programs



Aerosonde in Antarctica: 130 hours in 2009



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Concluding Remarks

- NSF sponsors a number of research facilities that are available to an NSF funded PI(s) at no cost to deploy worldwide
- Deployment supports NSF funded science proposals (all sciences eligible)
- Facilities available to other agencies at reimbursable cost and non-interference basis
- Facilities mix is changing in response to science initiatives and on-going facilities assessment
- *Planning charts* and "how to request facilities" are on line on new NCAR/EOL web site (<http://www.eol.ucar.edu/about/our-organization/fps>)

