

NSF Airborne Status: ICCAGRA, NOAA AOC

November 9-10, 2009

Stephan Nelson (James Huning)

C-130Q



NRL P-3 and ELDORA Radar



CIRPAS T-O



Wyoming King Air



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A-10 replacement for T-28 SPA



Gulfstream V



LC-130 Ski



NSF Sponsored Lower Atmospheric Observing Facilities

- NCAR Operated and Maintained
 - Ground based sounding systems
 - Deployable (S-POL) radar; combining with the CHILL radar at CSU to make a front range radar laboratory
 - Airborne instrument/sounding systems
 - Research aircraft – GO/CO (restrictions per 41 CFR 102-33, “Management of Government Aircraft”)
- Aircraft supported through Cooperative Agreements at the University of Wyoming (King Air)
- Interagency and International Facilities
 - Campaigns conducted in collaboration with partners, e.g., NOAA, NASA, NRL, DOE, UK Met Office, CNES, DLR



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



Federal Aircraft Issues

- The NSF G-V and C-130 aircraft
 - These aircraft operate as Public Use in the United States, and did operate as State aircraft internationally but now have concern that EUROCONTROL *will not recognize research aircraft as State aircraft*. Our DOS is negotiating this issue, which could have major impact on international campaigns
 - EUROCONTROL: "...with reference to article 3(b) of the Chicago Convention, only aircraft used in military, customs and police services shall qualify as State Aircraft....Civil registered aircraft used by a State or other than military, customs and police services shall not qualify as State Aircraft."
 - G-V is fully certified and so will not be a major issue
 - SMS: Who will affirm that an agency (organization) has an effective SMS in place? FAA will **NOT** be doing so for Part 91 operations and ICAO will require a certification for landing permission in member states – potential major issue
 - FAA JPDO/SMS representative: Parts 121 and 135 will be modified to require SMS, but not Part 91 and other CAAs are requiring SMS in order to fly in their airspace
 - Legislation will mandate SMS (currently in discussion in House and Senate)
- LC-130 aircraft maintained and operated by the NY ANG 109th Airlift Wing for the Office of Polar Programs (Antarctica and Greenland). As military operated aircraft they are not managed per 41CFR 102-33
- The University of Wyoming King Air is a state owned aircraft, operates under Part 91



Federal Aircraft Issues

- ICAP group did a re-write of Advisory Circular 00-1.1.B Determination of Public (Government) Aircraft Operations
 - Currently in review by FAA General Counsel – and not for distribution
 - Will define, again, what is a government function and how it is determined
 - As noted in the AC: The designation “public aircraft” does not extend to international airspace. An aircraft without an airworthiness certificate (“public aircraft”) cannot be operated outside the United States unless it has been defined as a state aircraft per AC 20-132, Public Aircraft, paragraph 3.c.
 - As noted on the previous slide about State aircraft designation there is confusion as there are conflicting documents from EUROCONTROL. Concern is that if EUROCONTROL does limit State A/C to military, police and customs (per 1931 Chicago Convention) it could spread to other aviation authorities.
 - EUROCONTROL in 2004 stated Definition of State aircraft in Principle 1 that “only aircraft used in military, customs and police services shall qualify as State Aircraft.”
 - “...to fully preserve the sovereignty of every State to define what State Aircraft are ***within their national borders.***”
 - Principle 3: “States shall ensure compliance with the above mentioned recommendations and investigate reports of incorrect claims.”



Gold Standard in Aircraft Operations *Interagency Committee on Aviation Policy (ICAP)*

- NSF/NCAR received the ICAP Gold Standard in Aviation from ICAP; certificate will be awarded at December ICAP meeting in Washington
 - Currently 8 agencies have the Gold Standard representing 51 bureaus
 - Voluntary self certification program by individual civilian agencies
 - ARMS (Aircraft Resource Management Survey) required
 - Agencies committed to Federal aviation safety by implementing and actively supporting the ICAP Safety Standards Agreement, the Guidelines, and adhering to 41 CFR 102-33
 - Recent ASO Workshop (July in Chicago) 54 persons received ASO certification: DOJ 7;GSA 8;NSF 4;NASA 2;NOAA 6; DOS 2; DOE 5; FAA 10; USDA 4; DOI 1; TVA 1; EPA 1; DHA 1; DOD 2
 - FAA accepts FedFleet Aviation ASO training to qualify for FAA ASO certification
 - Because the ANG operates and maintains the LC-130s they will have a separate Gold Standard (date TBD)



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.



Testing of 8-bladed props in Greenland



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



Testing of 8-bladed props in Greenland



GV continues to participate in major science missions, Sensing, **HIPPO** (HIAPER Pole to Pole) will see several more pole to pole flights over the next two years missions. **PREDICT** is a major campaign that will be conducted out of St Croix next summer. Its goal to better understand the process of tropical depression formation that lead to tropical cyclones. An atmospheric electrification mission, **SPRITE SPECTRA**, and **ADELE**, a study to examine electron runaway breakdown in thunderstorms were recently conducted in Florida and included filming (remote operation) of the spites and jets for TV. A major accomplishment was receiving FAA certification for the large underwing pods.



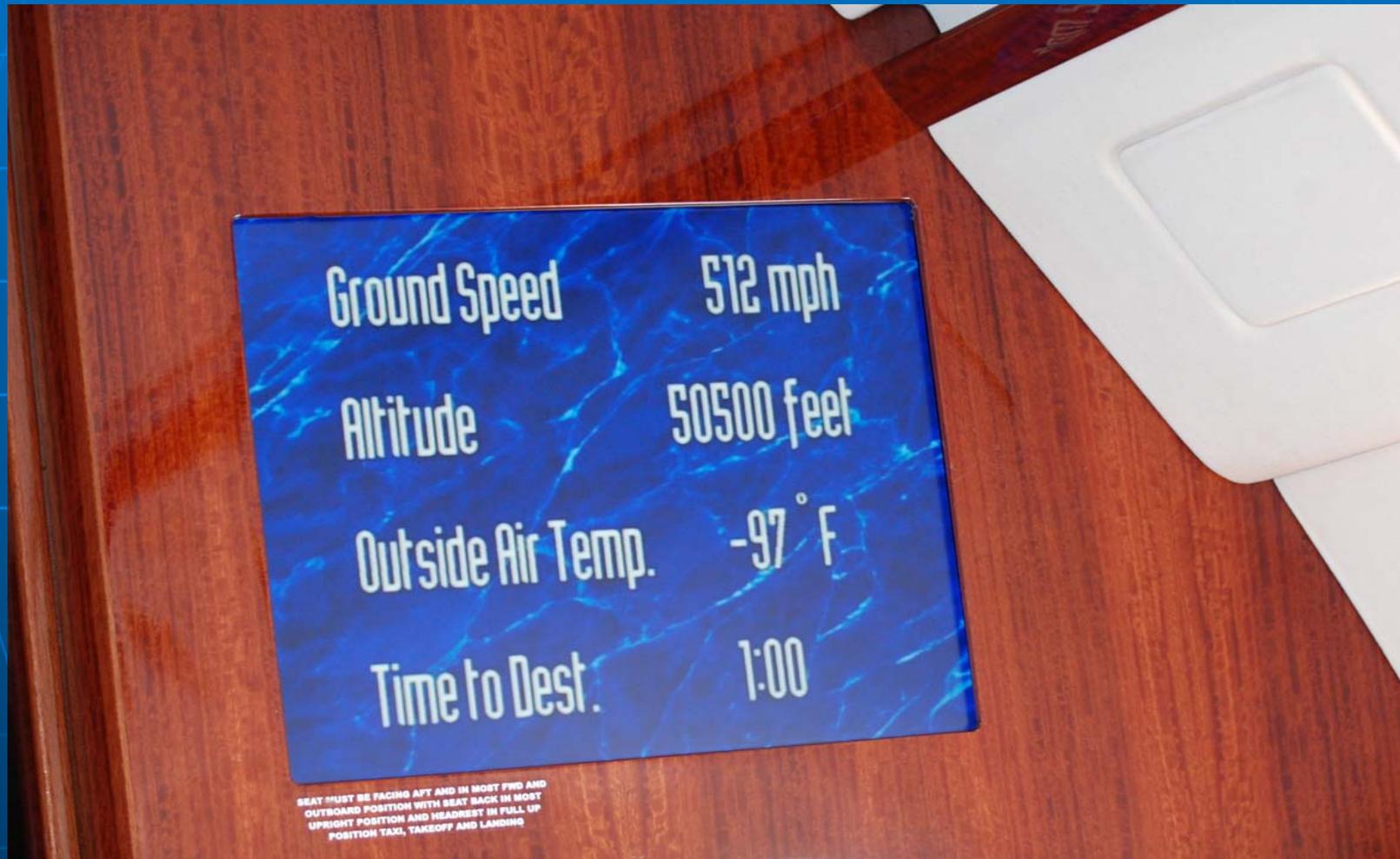
Chase plane photo of FAA cert flight of large wing stores



Chase plane photo of FAA cert flight for large wing stores



50K with all wing stores



NSF C-130Q

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



Aircraft underwent a major inspection at Cascade in
Canada

Avionics upgrade funded by ARRA;
estimated cost \$6.5M (consistent with NexGen)\

Will install electronic propeller controls



2010 Deployments

		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 AJS / JBJ	PLOWS (US Mid-west) Rauber	----- 1 15	----- 28	----- 15									
	Maintenance Schedule (JeffCO)			PKG 1		PKG 2			PKG 3			PKG 4	
GV													
Approved TBD	HIPPO (Global) Wofsy			----- 10	----- 1 24 30				----- 10	----- 1 24 30			
request	GLIMPSE (Antarctica) Parish					----- 24	-----	-----	----- 1 31	----- 15			
request	PREDICT (St Croix) Davis						----- 23	-----	----- 1 15 31	----- 30	----- 10		
required	HEFT- 4 "HSRL" (JeffCO)	----- 1	----- 21 28	----- 1									
	Maintenance Schedule (JeffCO)											24 Month & ANNUAL (6 weeks)	----->
P3													



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)



NRL P-3 and ELDORA

MOU between NSF and NRL to provide platform support until 2012.
Planning for a campaign in 2011 called DYNAMO, a campaign on par with TOGA-COARE: ground based radars, sounding systems, ships and aircraft



DYNAMO Overall Goal:

to expedite our understanding of key MJO initiation processes and thereby improve our ability to simulate and forecast the MJO (Madden-Julian Oscillation)



University of Wyoming King Air
State Owned – NSF Funded

Will be participating in several research campaigns in 2010
Wyoming Cloud Lidar will be added to the Cooperative Agreement



**A-10: Replacement for T-28 Storm Penetration Aircraft
Possible Mid-Size Infrastructure Facility
XFR from USAF to USN and operated out of
CIRPAS, Naval Postgraduate School**



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



Performance was too limited for new
science requirements

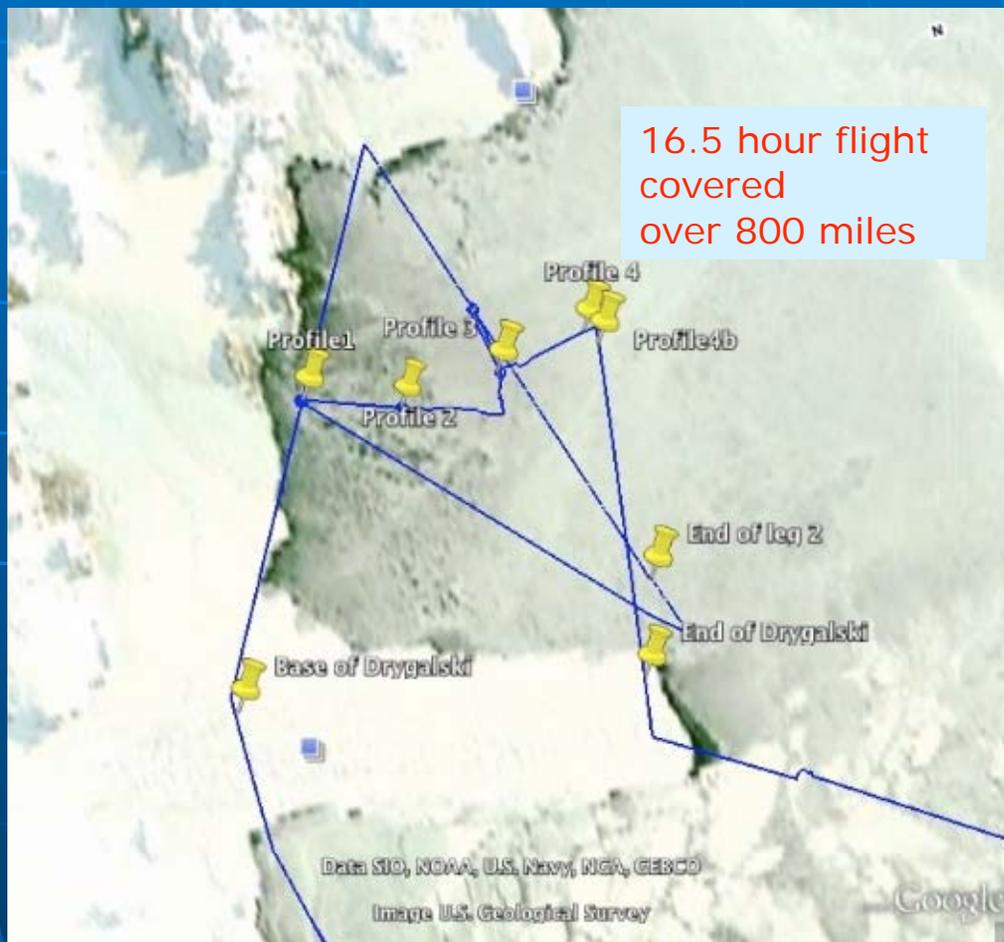


UASs

- 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



Aerosondes in Antarctica



Use of non-traditional facilities:
POST - Physics of Stratocumulus Tops
CIRPAS Twin Otter – Monterey, CA



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>)

