

Scientific Committee for Oceanographic Aircraft Research UNOLS SCOAR

Report to the UNOLS Council - November 9, 2020

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- Provide advice and recommendations to the National Oceanographic Aircraft Facility managers and supporting federal agencies on aspects of operations, sensor development, fleet composition, utilization and data services as appropriate
- Provide the ocean science user community with valuable information and advice concerning experiment design, facility usage, scheduling and capabilities
- Develop and review flight policies, operating procedures and regulatory and safety issues to ensure compatibility with research plans and research vessel (e.g. **UNOLS UAS policy and associated Operator handbook**)
- Promote collaborations and cooperation between facility operators, funding agencies and the scientific community to improve the availability, capabilities and quality of aircraft facilities supporting the ocean and atmospheric sciences
- Promote the coordinated use of aircraft Facilities with research vessel operations and facilitating the scheduling of joint research vessel and aircraft
- Technical/scientific briefings on past and future field programs

Current Membership:

Luc Lenain, Scripps Institution of Oceanography (SIO)

Hanumant Singh, Northeastern University (NEU)

Mike Starek, Texas A&M University (TAMU)

Chris Zappa, Lamont-Doherty Earth Observatory (LDEO)

Britton Stephens, National Center for Atmospheric Research, (NCAR)

New member:

Ronni Avissar, University of Miami (RSMAS)

Andrew Woogen, Oregon State University (OSU) Committee-Rep RVTEC

Anthony Bucholtz, Naval Postgraduate School (NPS)

Keep a balance between **unmanned** and **piloted** aircraft research expertise

During the COVID pandemic, switching annual in-person meeting to monthly 1-2hr remote "Zoom" video conference calls.

Following the completion of the Unmanned Aerial Systems (UAS) Operations from the Academic Research Fleet Operator's Handbook, we are now pushing to advertise UAS capability to the broader science community, and make it standard on all research vessels

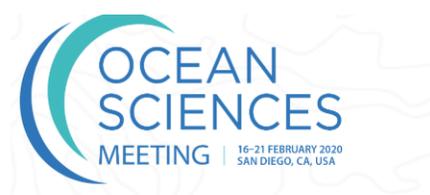
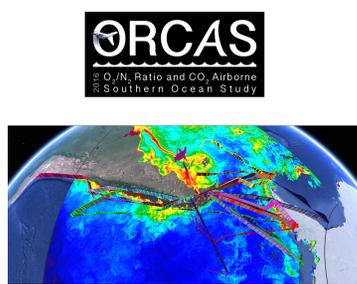
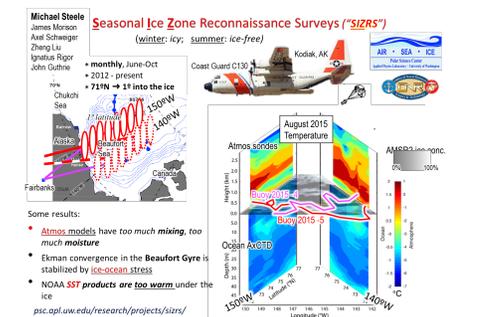
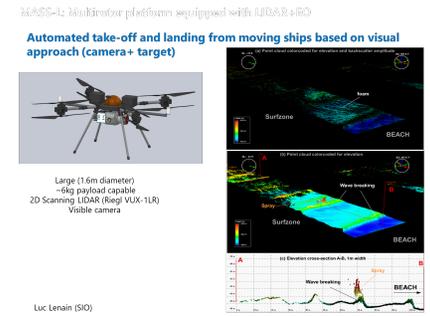
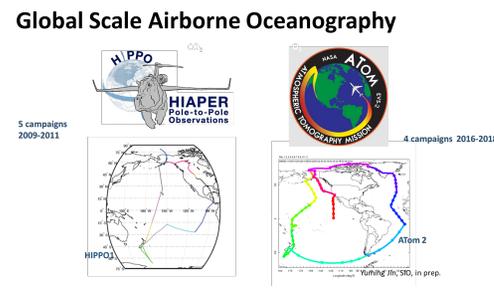
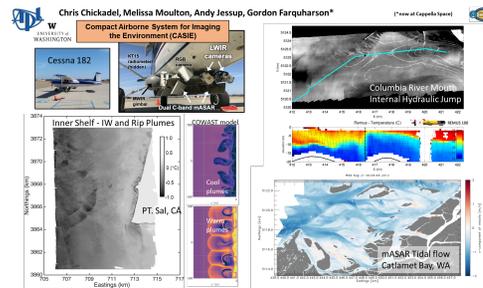
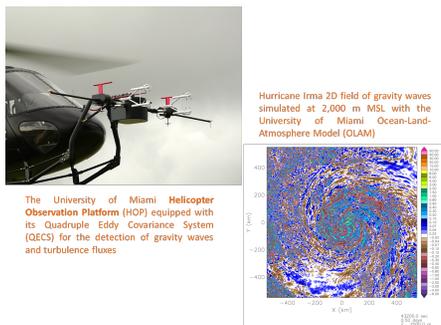
- Ocean Sciences 2020 Town Hall meeting
- Update UNOLS SCOAR website to provide aircraft information (manned and unmanned) along with science POCs
- Create a roadmap for making UASs a standard part of the US ARF (likely joined effort between SCOAR & RVTEC)

COVID pandemic impact on airborne research: Gather user and operator experience, mitigation plans, etc.

TH33F - Expanding the Reach of the Research Fleet: Autonomous (and Piloted) Airborne Systems in Support of Ocean Sciences

Operation of unmanned aerial systems (UAS) from shore and ships can advance oceanographic research and expand capabilities of ocean observing systems. This town hall, hosted by the UNOLS Scientific Committee for Oceanographic Aircraft Research, will provide a forum for discussion of current and future methods and uses of unmanned and manned aircraft in support of ocean sciences. Unmanned and manned aircraft can assist in areas such as ocean-atmosphere interaction, remote sensing, satellite product validation, marine mammal and seabird populations, oceanographic mesoscale and submesoscale processes, as well as studies of sea ice, fisheries, and shipping. Further, the use of airborne systems in coastal and offshore waters can provide information for marine resource management and response to natural and shipping accidents. Discussion on aircraft in support of ocean sciences is timely because of advances in sensor capabilities and the increasing availability of UAS to the oceanographic community. This town hall discussion will also address UAS integration in the research fleet. Finally, the town hall will review the piloted aircraft available to the research community and provide resources on their use. Examples of airborne operations in support of oceanographic research will be highlighted. Community input on potential uses and needs is strongly encouraged.

Lots of interest, well attended, including early career scientists and students. UAS handbook overview + series of lightening talks that cover broad range of topics followed by discussions



History

1996 – ONR establishes the Center for Interdisciplinary Remotely-Piloted Aircraft Studies (CIRPAS) at the Naval Postgraduate School (NPS) to provide manned and unmanned air vehicle flight services to the scientific and engineering communities.

- Initially under NPS Research Department, **only one 'Pelican' aircraft**, some instrumentation

1998 – Twin Otter acquired and becomes primary research aircraft

2002 – Twin Otter declared a National Facility within UNOLS – first aircraft in UNOLS fleet

2000s – Developed additional capabilities:

- Acquired/developed suite of state-of-the-art instrumentation for measuring atmosphere and ocean
- McMillan Airfield at Camp Roberts (near Paso Robles, CA) to facilitate testing of unmanned aircraft
- Mobile Storm Radar Truck
- Acquired a number of Sentry UAVs to support Marine Corps activities
- 2010 joined NSF deployment pool (expired ~2016?)

2016/2017 – Major reorganization (driven by new directives from the Navy to NPS and funding constraints):

- **Decided to focus on Twin Otter and Pelican manned aircraft operations (ONR supported)**
 - Divested of many support activities (Radar Truck and Sentry UAVS)
 - Eliminated CIRPAS as an NPS 'Center'
 - Became a Laboratory under the Department of Meteorology
 - Reduced hangar footprint by half (**cut rent and utility costs in half**)
 - Bob Bluth retired Dec. 2017; Haf Jonsson took over
 - Director/Chief Scientist positions combined (**eliminated 1 FTE costs**)
 - Changed funding structure

2019/2020 – New leadership

- 2019: Rob Sparrock took over upon retirement Tim Schnoor
- Jan 2020: **Anthony Bucholtz** took over upon retirement of Haf Jonsson in Sept. 2019
- May 2020: Dan Eleuterio took over upon retirement of Ron Ferek in April 2020

- **CIRPAS no longer a 'Center' at NPS (since 2017)**
 - Therefore, can no longer be named the Center for Interdisciplinary Remotely-Piloted Aircraft Studies
- **However, facility has been known as 'CIRPAS' for almost 25 years at both NPS and in the broader scientific community**
 - Most people did not even know what 'CIRPAS' stood for
- **Therefore, decided to keep 'CIRPAS' in the name, not as an acronym, but as a moniker**

New name:

Naval Postgraduate School 'CIRPAS' Airborne Research Facility

or

NPS-CIRPAS

or

CIRPAS

CIRPAS name in UNOLS Charter changed
~2018 – Need to be revised again once a
decision is made for the new name...

Facilities and activities



Sept 9 2020 – 'Mars Flight'



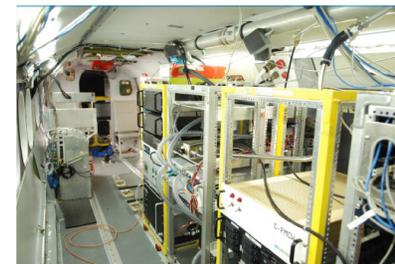
Hangar/Lab space in Marina, CA



Twin Otter DHC-6-300 (UV-18A)

1. **C-Harrier:** October 2019; Marina, CA; Lianne Guild, NASA-Ames
 - Test flights of NASA's 3STAR instrument
2. **SWESARR:** February, 2020; Grand Mesa, CO; B. Osmanoglu, NASA-Goddard
3. **Canceled Missions:** Three ONR missions planned for 2020 were canceled or postponed due to covid-19, or funding/scheduling
4. **Alternate mission => CA Smoke:** Sept. 2020; Marina, CA; Bucholtz; ONR
 - Radiative and microphysical properties and effects of smoke

In-house Instrumentation



Cabin: Nephelometer, Sootphotometer, CPCs, UFCPC, Data System Racks for 'Research' and 'Guest' Instruments. Satcom system



Wings: CAPS, FSSP, PCASP, CIP, PIP ...
Hard points and pods for 'research' or 'guest' instruments



Nose: Temperature, Dew Point, Pressure (Static, Dynamic Sideslip Attack angle), GPS/INS, IR Temperature, Liquid Water Content, Aerosol Inlet

- CIRPAS was previously a part of the National Science Foundation (NSF) research aircraft deployment pool
 - This facilitated requests for the Twin Otter by NSF funded projects that would be funded from the NSF Deployment Pool funds
 - It also expanded the number of potential users of our aircraft
- However, the Memorandum of Understanding (MOU) between NPS/CIRPAS and NSF, set up in 2010, has since expired and was not renewed
 - Plan is to implement a new MOU
 - New CIRPAS webpage under construction

Thank you!