

**USCG Report, SCOAR Meeting  
June 28,29, CIRPAS, Marina, CA  
Dr. Phil McGillivary, USCG PACAREA**

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**POLAR STAR imaged from NOAA PUMA UAS, McMurdo Sound, Antarctica, 2016**

# Ongoing CG Aircraft Oceanographic Research: NOAA

## PI: Colm Sweeney

- Continued gas sampling from CG C130s as part of Arctic Domain Awareness Flights. Results summarized in two publications:
  - *“Detecting Regional Patterns of Changing CO<sub>2</sub> Flux in Alaska.” N. Parazoo, et al. Proc. Nat. Acad. Scis., Accepted, June, 2016. Forthcoming.*  
Concludes: current airborne & satellite CO<sub>2</sub> monitoring networks are sufficient for summer CO<sub>2</sub> monitoring, but insufficient for winter monitoring requiring year-round vertical profiles & improved spatial sampling.
  - *“No Significant Increase in Long-term CH<sub>4</sub> Emissions on North Slope of Alaska Despite Significant Increase in Air Temperature.” C. Sweeney, et al. Geophys. Res. Letters. Accepted 6/1/2016, DOI: 10.1002/2016GL069292 .*  
Concludes: Despite slight observed winter flux increase, and increasing temperature, Arctic changes will have little effect on global atmospheric CH<sub>4</sub> budgets in the near future.
- Plans to make increased use of weekly CG C130 Arctic Shield flights currently establishing a forward operating base in Deadhorse for summer 2016 arctic aircraft operations.

**CG Aircraft Oceanographic Research 2015 & 2016:  
Navy SIZRS project.  
PI: Jamie Morison, UW**

This effort has continued support of Navy funded SIZRS project at UW. C130 deployments over the Beaufort Sea have continued to deploy Arctic Buoys and AXCTDs and expendable current meters, along with video filming of SST (as discussed in SCOAR 2015 presentation.

# NOAA & CG UAS Operations CGC HEALY summer 2015: tested Aerostat to enable UAS BLOS Comms

On left: LRS1800 Aerostat used in 2014; right and center: upgraded smaller, more rugged KF-13 MW unit used in 2015.

Aerostat experienced some icing at times affecting performance.

Demonstrated control and communications of PUMA from aerostat.

Successfully transitioned imagery and control of gimballed camera system to bridge..



# **NOAA & CG UAS Operations CGC HEALY summer 2015: tested Aerostat to enable UAS BLOS Comms**

Aerostat launch failed (went into water but was successfully retrieved) with winds 28-34 knots (32-39 MPH), but operated successfully in winds <22-28 knots.

Launch required ship positioning for wind somewhat athwartship.

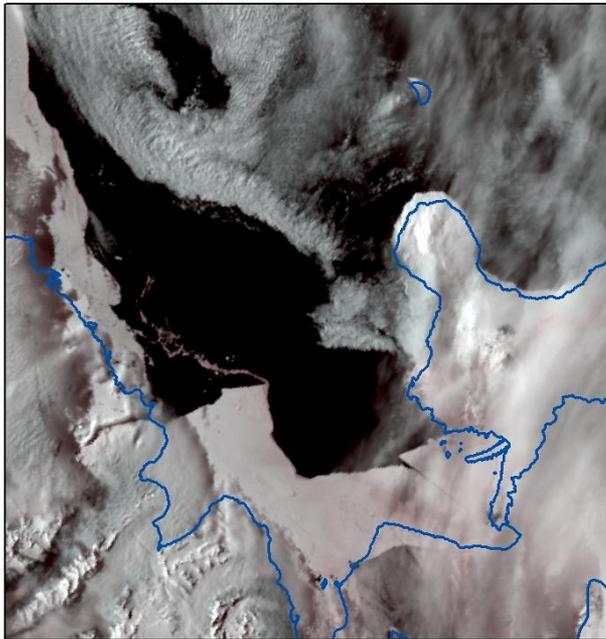
Pix of HEALY from Aerostat.



# NOAA & CG UAS Ops, POLAR STAR Operation Deep Freeze, 2016

From Jan.2-6 Feb.6, 2016 the PUMA UAS completed 14 flight hours in 24 flights. There were 6 manual net captures, 11 auto net captures, 2 skid landings (flight deck), 4 failed net captures (water or ice) and 1 failed launch.

Launching PUMA in >15 knots of relative wind proved extremely challenging due to turbulence from ship superstructure.



**McMurdo Zoom**

No analysis provided for this increased zoom.

Image provided as a courtesy

U. S. NATIONAL ICE CENTER

Operation Deep Freeze Support  
04February 2015

MODIS.....04 FEB 2015



# NOAA & CG UAS Ops, POLAR STAR Operation Deep Freeze, 2016

Image on left from PUMA shows annual ice in McMurdo Sound; image on right shows NOAA PUMA UAS 'SuperGimbal' image of area of stress fractures at westernmost end of Ross Ice Shelf considered critical for nascent giant iceberg break-off.



2016-02-05 00:49:44  
59C MQ 58491 04328  
Alt: 499 ft MSL  
True Heading: 283°



CFOV Hdg: 202°  
CFOV Position:  
59C MQ 58230 03622  
CFOV Elevation: 3 ft

FOV Corner Positions:  
UL: 59C MQ 58201 03395  
UR: 59C MQ 58117 03472  
LR: 59C MQ 58248 03767  
LL: 59C MQ 58307 03725

# **Additional CG PACAREA UAS activities, 2015-2016**

- AGU Dec. 2015 UAS session co-chair
- 3<sup>rd</sup> Arctic Observing Summit, AOS 2016 invited talk on UAS in Arctic; nominated/approved for US Dept. of State Arctic UAS Expert Working Group.
- Meeting w/ NASA Ames re joint NASA-CG X-Project SAR UAS (ready @2018)
- Co-convended UAS session 6/20-24/2016 at 13<sup>th</sup> quadrennial Intl. Coral Reef Symposium, Honolulu with >100 attendees.