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# NOAA UAS Program

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NOAA UAS Operations

ICCAGRA Meeting

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# NOAA UAS Program

## Robbie Hood, Program Manager



### **Vision**

Unmanned Aircraft Systems will revolutionize monitoring of the Earth system, much as radar and satellite technology have done in the past.

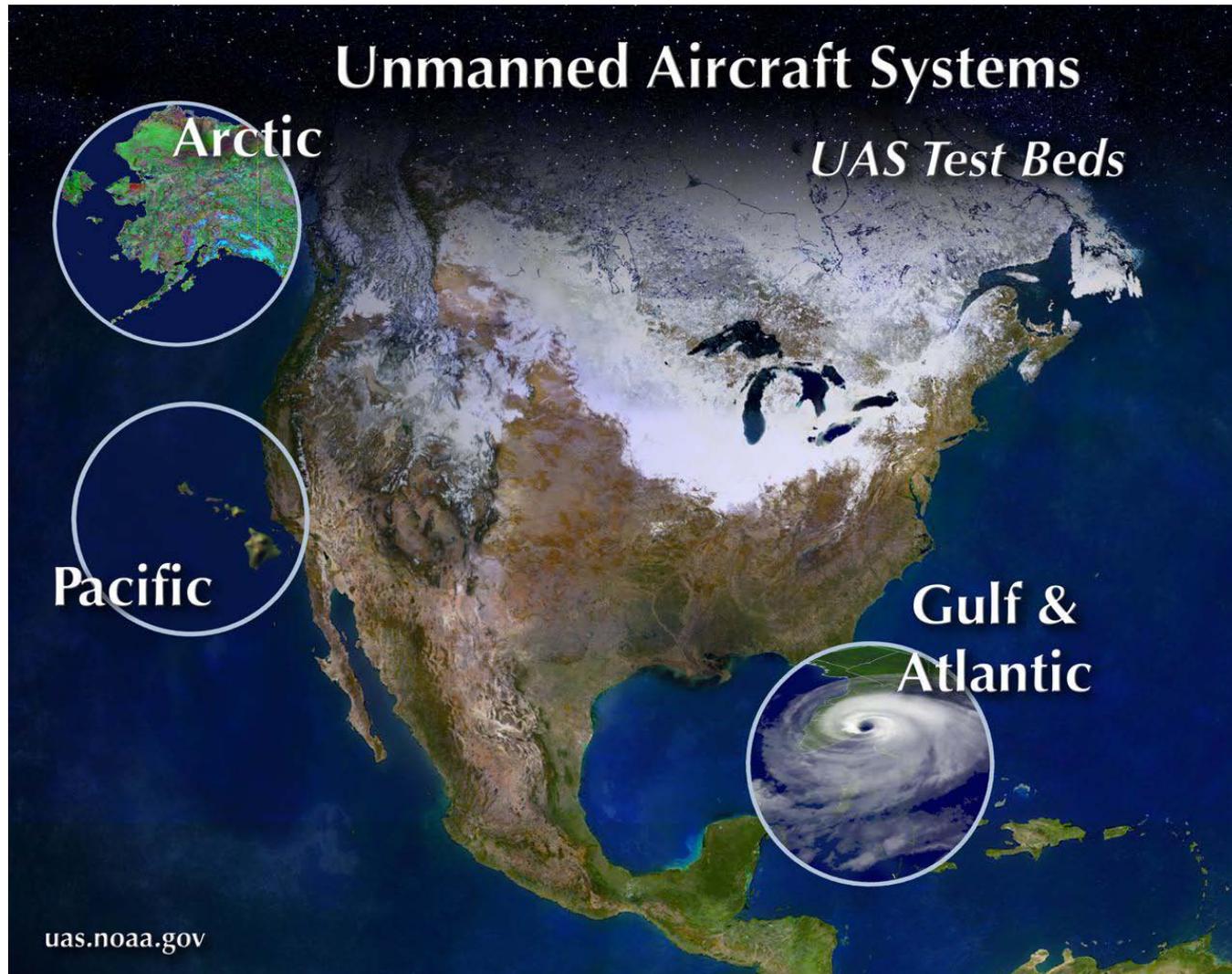
### **Mission**

To use UAS to fill critical gaps in the current observing system to help meet NOAA's Mission Goals in:

- Ecosystems
- Climate
- Weather and Water
- Commerce and Transportation



# Implementation Strategy: Regional UAS Testbeds



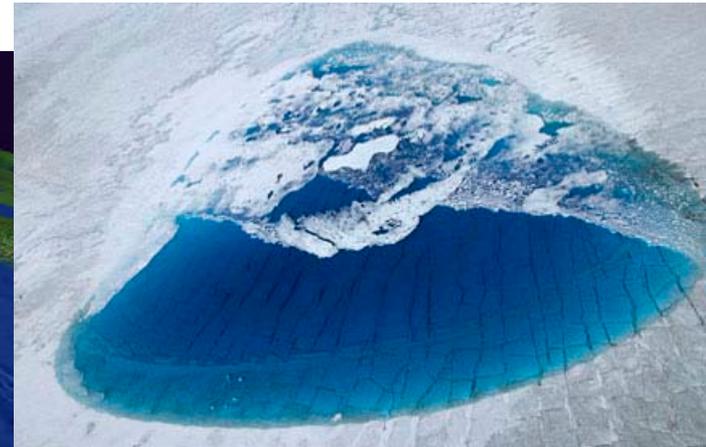
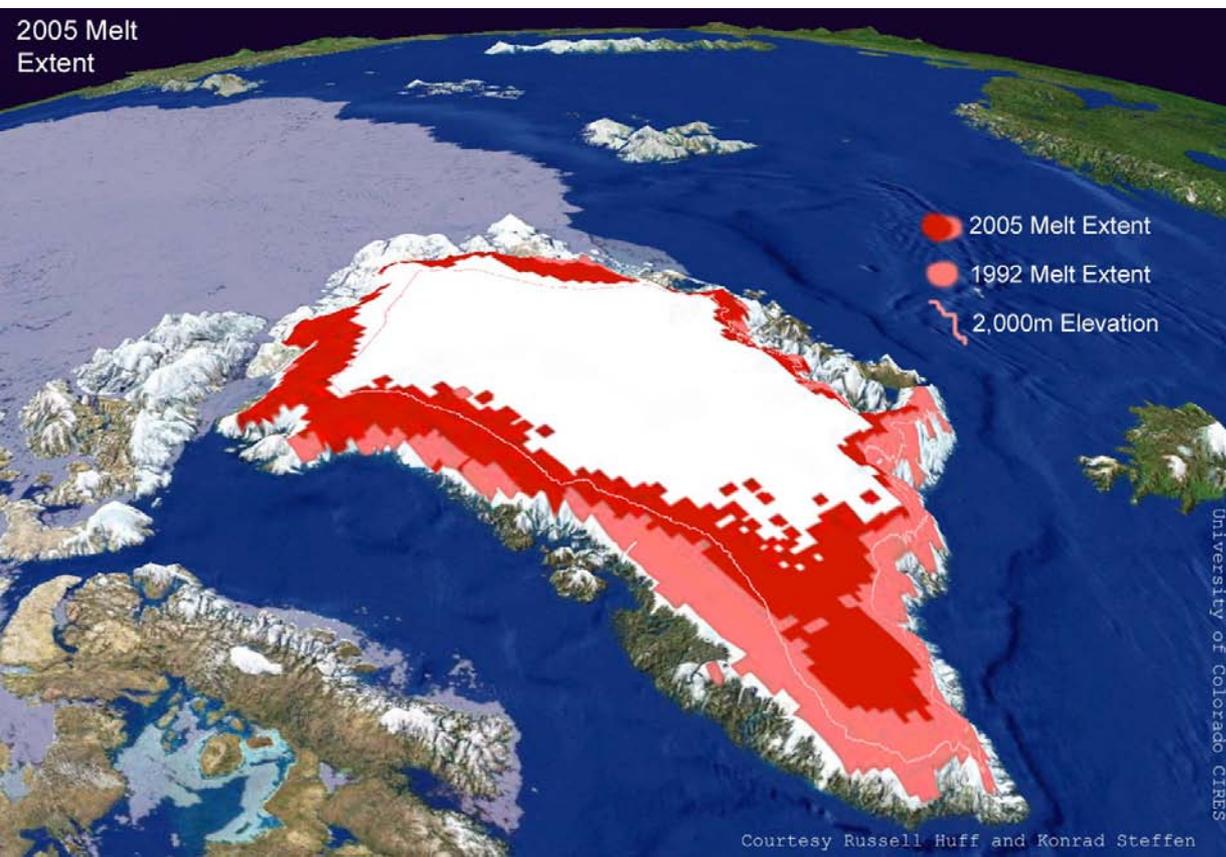


# Arctic Testbed Greenland Ice Sheet Melt



## Arctic Mission Requirements:

- a) Reduce climate forecast uncertainty related to glacial ice-melt and its impact on sea level





# Arctic Testbed Ice Seals



## Arctic Mission Requirements:

- b) Complete NMFS stock assessments for ice seals





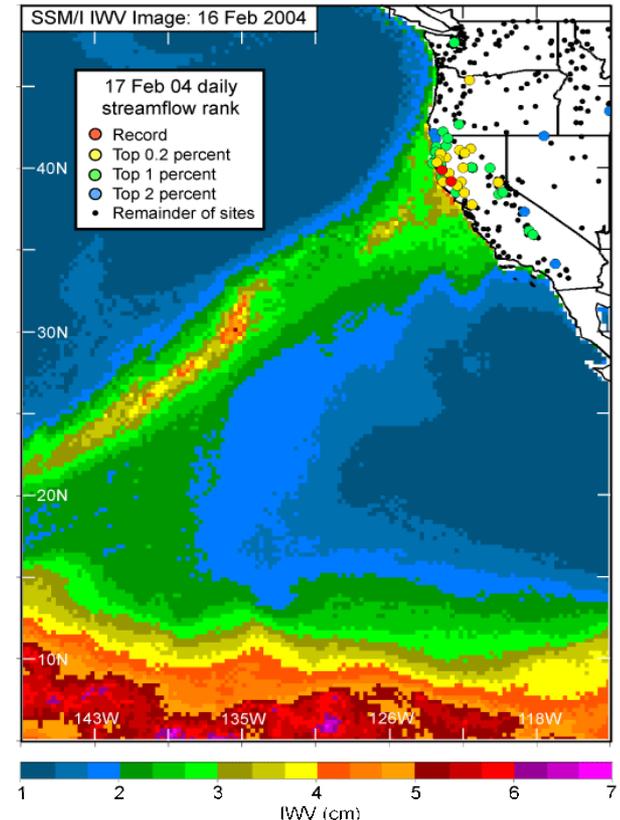
# Pacific Testbed

## Atmospheric Rivers and Ghost Nets



### Pacific Mission Requirements:

- a) Forecast precipitation and flooding along the West Coast with enough accuracy and lead time to enable forecast-based reservoir operations
- b) Protect marine ecosystems within the Papahānaumokuākea Marine National Monument





# Gulf/Hurricane Testbed

## Low-altitude Hurricane winds



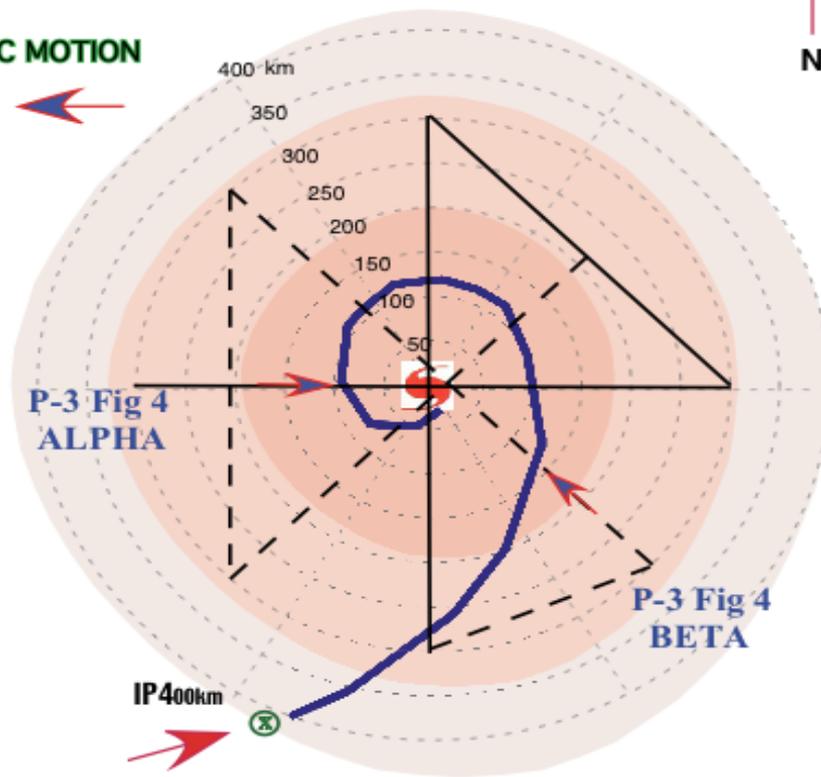
### Primary Aerosonde UAS Demonstration Objectives

- 1) Fill critical data gaps. Provide observations from an important region of the storm that is very difficult (and dangerous) to observe.
  - Provide high resolution near-surface observations (V, P, T & RH)-
  - Ensure real-time data availability to NHC/EMC (and other interested operational centers)
- 2) Fully demonstrate the Aerosonde platform's overall capabilities and survivability in a variety of conditions within a hurricane environment. *Including missions flown at very low altitudes ( $\leq 200\text{m}$ ) in high wind conditions.*
- 3) Utilize NOAA P-3 manned aircraft to further enhance the utility of UAS-Hurricane missions (e.g. vertically stacked coincident data collection).



## Caribbean Tropical Cyclone

TC MOTION



### TC INFLOW/EYE/EYEWALL EXPERIMENT

Estimated Flight Time: 16-24h

Aerosonde avg Airspeed: 25ms (plus storm relative flow)

Inflow Angle Assumed: 20 deg

TC Init Intensity Range: TS - Cat 5

TC Rmax Assumed: 25km

#### Experimental Notes/Specifics -

Take-off/Recovery: Bridgetown, Barbados (2008)

Pre-IP: UAS-offshore buoy comparison (?) at ~ 50-75m (Ta,Td,P,V)

IP: 400km from TC center (Initial IP flight level: 1200m)

Descend to 100m. Remain at 100m until 350km

At 350km, ascend to 1200m, remain at 1200m until 300km

Descend to 100m, remain at 100m until 250km

At 250km, ascend to 1000m, remain at 1000m until 200km

From 200-100km, continuous 1000m-100m soundings

At 100km, ascend to 150m for eyewall penetration (~50km)

In eye, conduct multiple 5-15km radius corkscrew sounding from 75-1500m (eye/eyewall interactions?)

Begin final eyewall penetration at 3000m altitude (1000m if manned aircraft present)

RETURN TO AEROSONDE BASE OF OPERATIONS

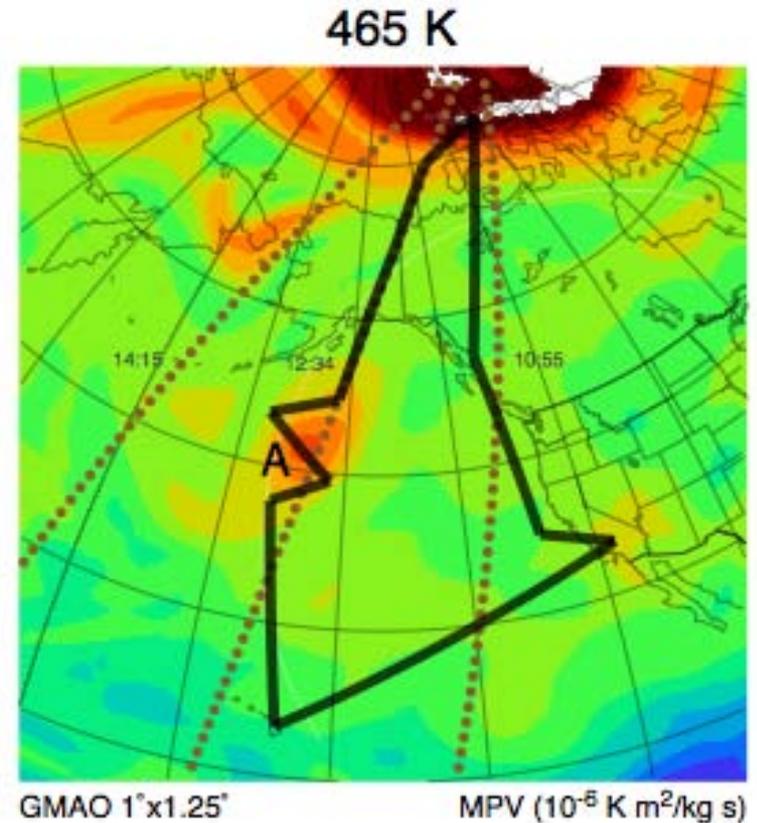


# Planning of Global Hawk Tests



## NASA Dryden Flight Research Center (DFRC)

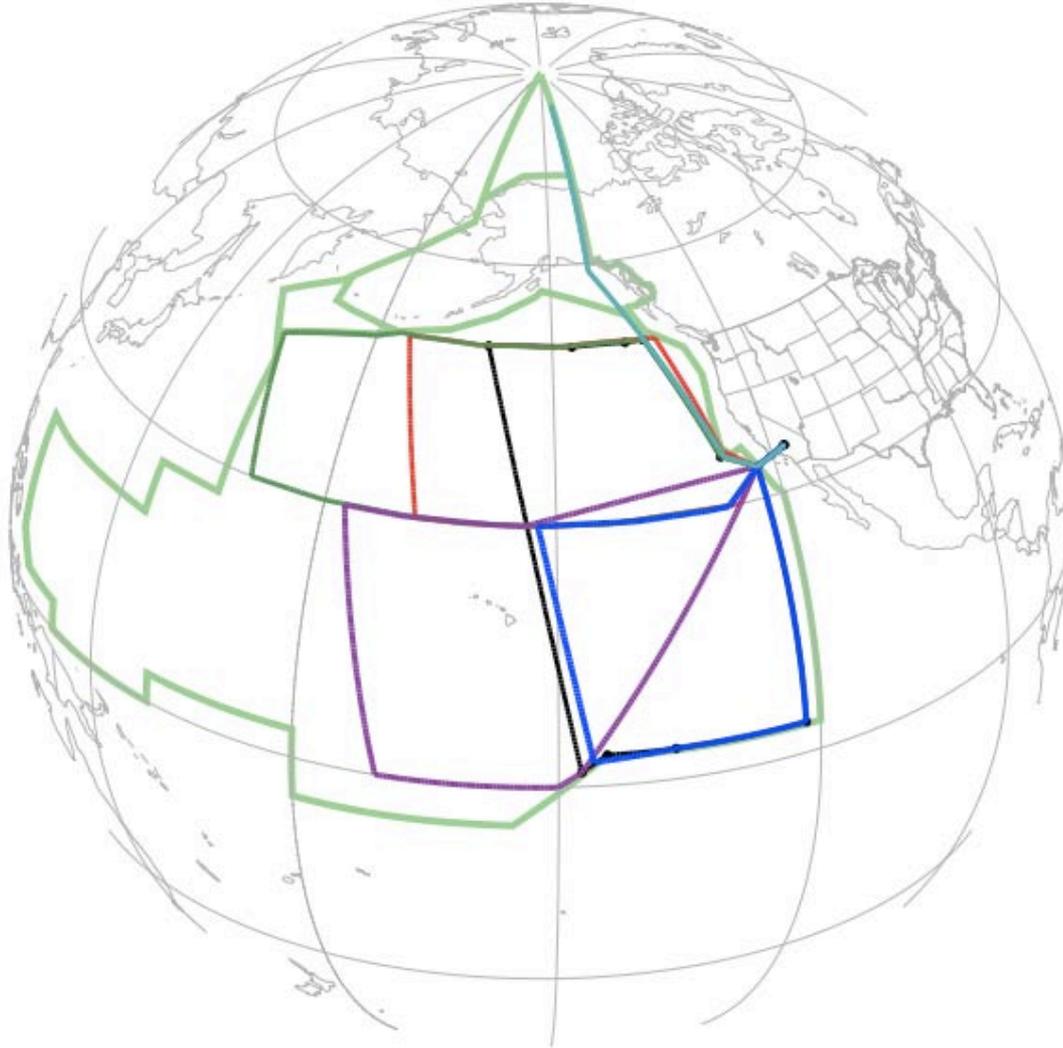
- NASA Global Hawks acquired and jointly funded/operated by NASA/NGC
- NOAA (with NASA and NCAR) is building a dropsonde system
- Global Pacific (GloPac) - Spring 2009





# Planning of Global Hawk Tests

NASA Dryden Flight Research Center (DFRC)





# Future Directions / Collaboration Opportunities



- NOAA UAS Testbeds
- Nov 08 - Scripps / NOAA Flux work at Vandenberg AFB
- Spring 09 - Insitu Insight A-20 missions in the Bering Sea
- Maritime Surveillance in Gulf and Elsewhere
- NOAA / NASA Collaborations on HALE



# NOAA UAS Project Contacts



## Questions ?

- <http://UAS.noaa.gov> (NOAA UAS Web Site)
- [Robbie.Hood@noaa.gov](mailto:Robbie.Hood@noaa.gov) (NOAA UAS Project Manager)
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