NOAA Unmanned Aircraft Systems (UAS) Program

Robbie Hood, Program Director

Office of Oceanic and Atmospheric Research

Earth System Research Laboratory

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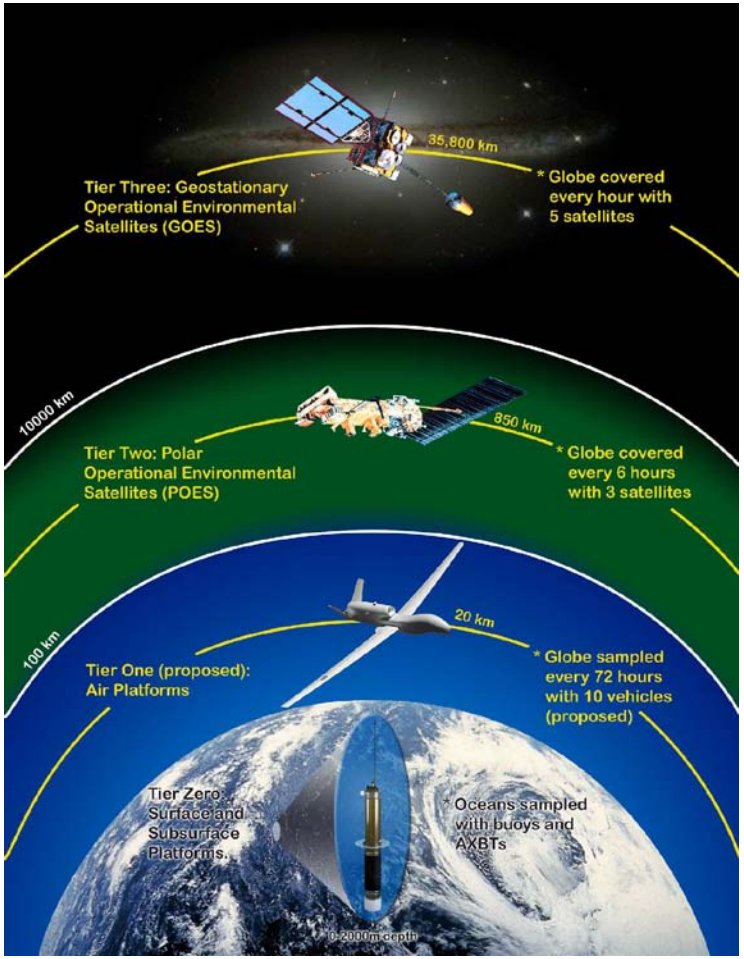
Overview

The NOAA Unmanned Aircraft Systems (UAS) Program is evaluating the feasibility of UAS platforms to meet the NOAA Mission's goals in

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

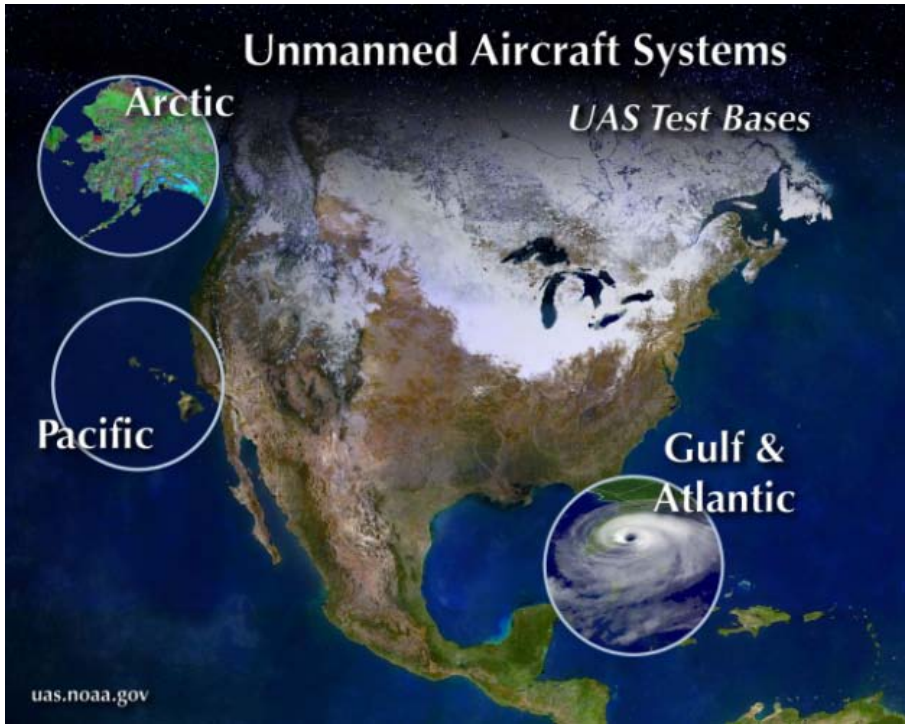
The evaluation will be based on NOAA observational requirements, technology readiness assessments, UAS science demonstrations and acquisition strategy



Personnel

- **Matrix team comprised of ~15 NOAA civil servant team members represented by OAR, OMAO, NOS, NWS, and NMFS and 1 CIRES member**

Testbed Approach to UAS Science and Technology Assessment

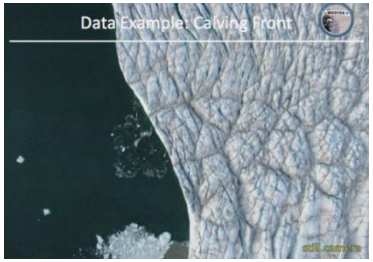


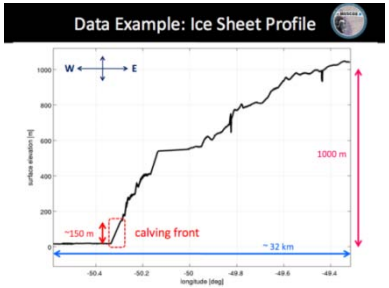
- ***ARCTIC MISSIONS***
  - Operational low altitude effort to monitor Arctic ice seal populations
  - Research low and high altitude effort to monitor Arctic sea ice conditions
- ***GULF/ATLANTIC MISSIONS***
  - Research low altitude effort to study air-sea interactions during hurricanes
  - Research/ Operational high altitude effort to study/monitor hurricane intensity
- ***PACIFIC MISSIONS***
  - Research low and high altitude effort to study air-sea interactions during atmospheric water vapor river event
  - Operational low altitude effort to monitor USA national marine monument
- ***CROSS-CUTTING APPLICATIONS***
  - Research low altitude effort to study fire weather

Arctic Testbed

- **Testbed Co-Leads: Dr. Elizabeth Weatherhead (ERSL/CIRES) & Dr. Robyn Angliss (NMFS/NMML)**
- **Recent Emphasis has been LALE Glacier and Ice Seal Monitoring**

2008 system testing of Low Altitude Long Endurance (LALE) UAS launch and recovery from NOAA ship for ice seal monitoring

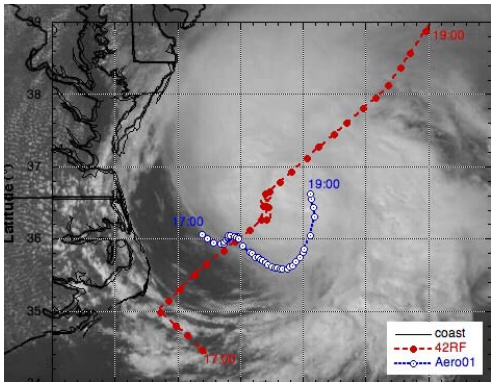




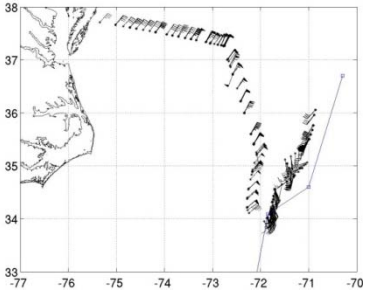
UAS data samples from 2008 Greenland glacier monitoring mission

Gulf / Atlantic Testbed

- **Testbed Co-Leads: Dr. Joseph Cione (OAR/AOML) , Dr. Robert Rogers (OAR/AOML), and and Dr. Christopher Landsea (NWS/NHC)**
- **Recent Emphasis has been LALE Hurricane Monitoring**



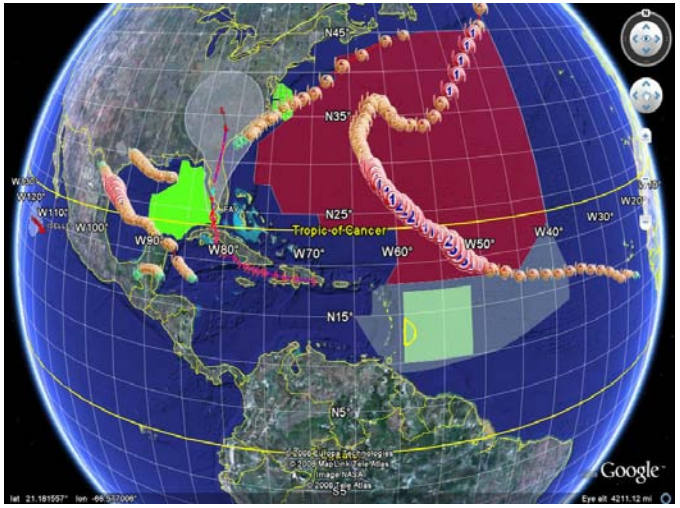
Hurricane Ophelia Imagery



Hurricane Noel Wind Data

LALE FLIGHTS

- ***2005 – Hurricane Ophelia***
- ***2007 – Hurricane Noel***
- ***2009 – Wallops, VA and Barbados deployment***

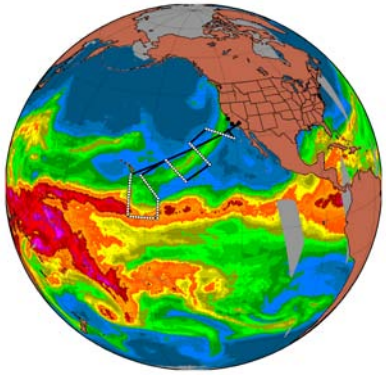


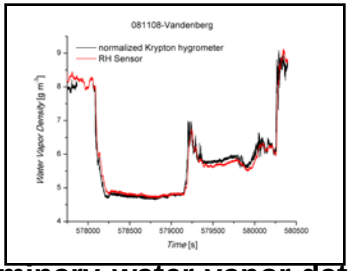
Potential 2009 Scenarios

Pacific Testbed

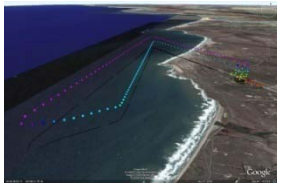
Testbed Co-Leads: Dr. Gary Wick (OAR/ESRL) and Todd Jacobs (NOS/ OOCRM)
Recent emphasis has been LALE oceanic water vapor and marine debris monitoring

Integrated Water Vapor From SSM/I

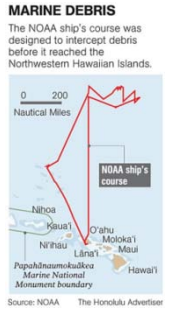




Preliminary water vapor data



2008 system testing of Low Altitude Long Endurance (LALE) UAS from Vandenberg, AFB for water vapor flux monitoring of atmospheric rivers

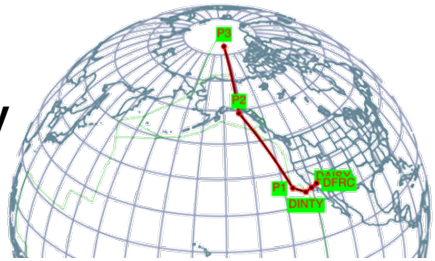


First NOAA Certificate of Authorization (COA) approved for 2008 marine debris

HALE Activities

- **Platform: NASA Global Hawk partnership planned during FY08 – FY10**

- **Missions:**
  - **2009 GloPac atmospheric chemistry**
  - **2010 hurricane and atmospheric rivers**



- **Sensor: HALE dropsonde system development led by Dr. David Fahey (NOAA/ESRL) in partnership with NCAR**

Observing System Simulation Experiment (OSSE)

- **An OSSE is a modeling experiment used to evaluate the impact of new observing systems on operational forecasts when actual observational data is not available**

- **UAS OSSE will be used to guide acquisition, flight planning, sensor development decisions**

- **Current efforts include global weather OSSE and regional hurricane OSSE**

Future Activities

- **Addressing how UAS can meet gaps in current NOAA observational requirements**
- **Designing UAS mission scenarios and concept of operations**
- **Developing information management and visualization plan**
- **Expanding science and OSSE topics in each testbed**
- **Evaluating sensor and platform capabilities**

Contact Information

NOAA UAS Web Site

http://UAS.noaa.gov

NOAA UAS Program Director

Robbie.Hood@noaa.gov

303-497-3008 (office) / 303-905-3411 (cell)