



NOAA

October 4, 2022

2022 SCOAR Meeting

NOAA's Uncrewed Systems

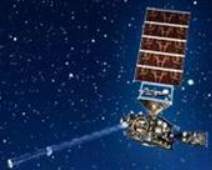
CDR Paul Hemmick, NOAA UAS Division





NOAA

SCIENCE. SERVICE. STEWARDSHIP.



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NOAA Line Offices



National Marine Fisheries Service (NMFS)



Oceanic and Atmospheric Research (OAR)



National Ocean Service (NOS)



National Weather Service (NWS)



National Environmental Satellite, Data and Information Service (NESDIS)



Office of Marine and Aviation Operations (OMAO) & NOAA Corps

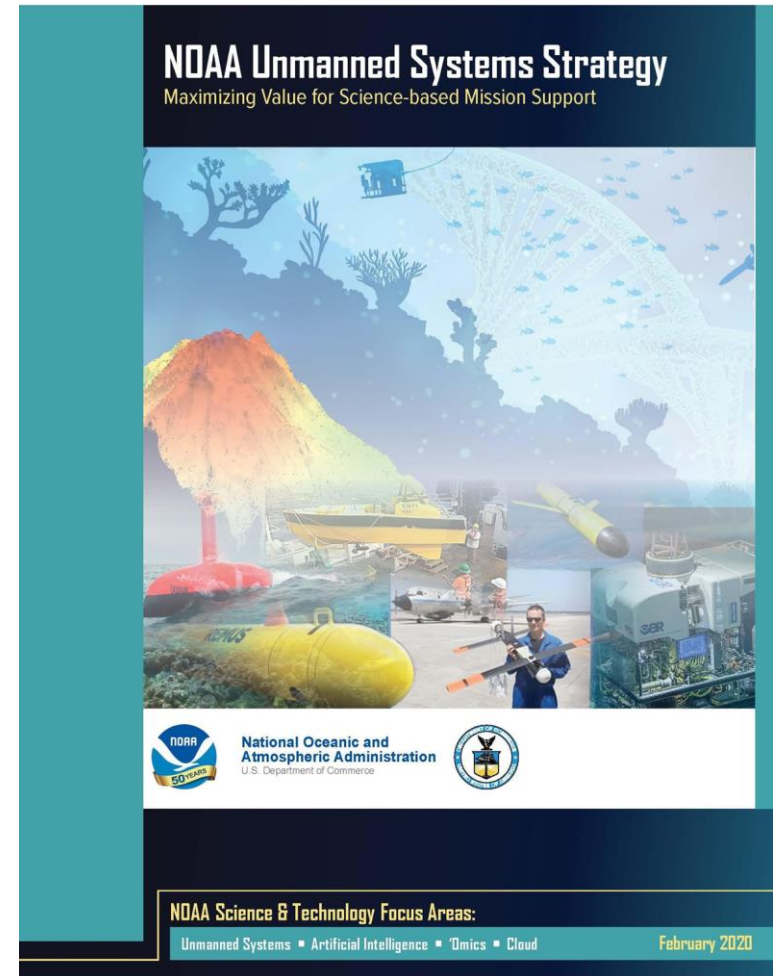
UAS Division



UxS Operations Center (UxSOC)



- Coordinate/support UxS Ops
- Expand UxS Ops
- Accelerate transition
- Strengthen partnerships
- Promote workforce proficiency



NOAA UAS FY21 Report

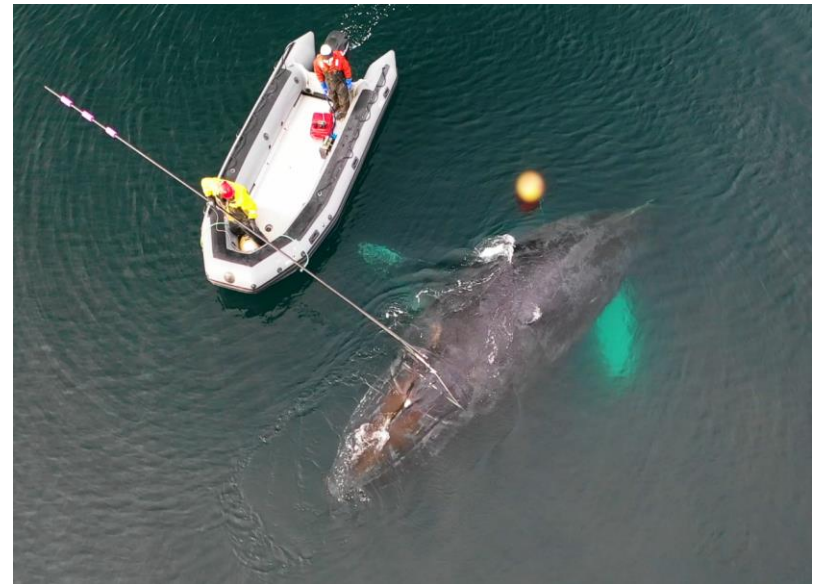




National Marine Fisheries Service (NMFS)

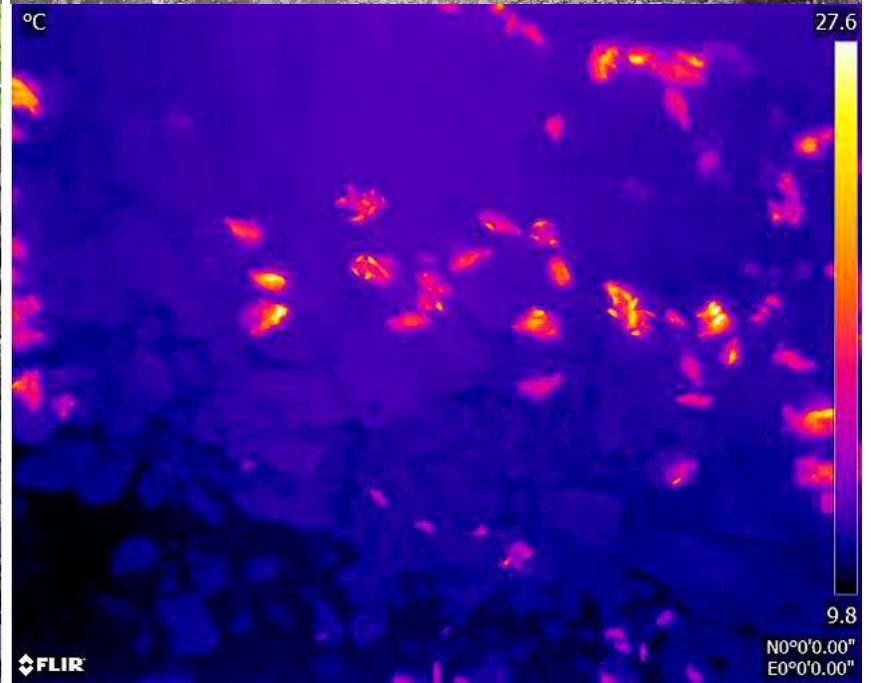


NMFS Permit # 20648



National Marine Fisheries Service (NMFS)







National Weather Service

- River floods
- Ice jams - Alaska
- Severe Wx Damage Assessment
- Radome/Tower inspection

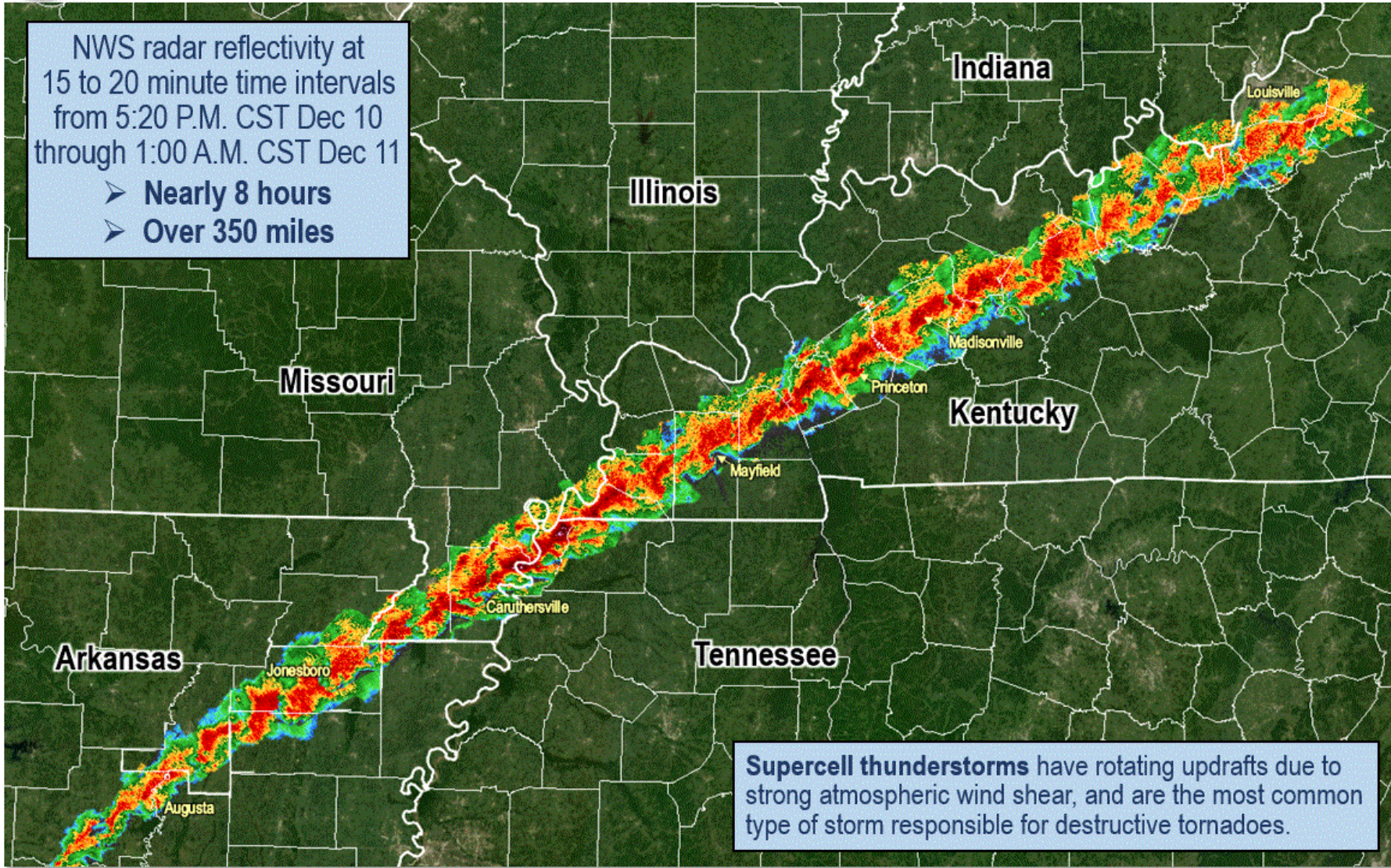




December 10-11, 2021: Long-lived Supercell Thunderstorm

NWS radar reflectivity at 15 to 20 minute time intervals from 5:20 P.M. CST Dec 10 through 1:00 A.M. CST Dec 11

- Nearly 8 hours
- Over 350 miles

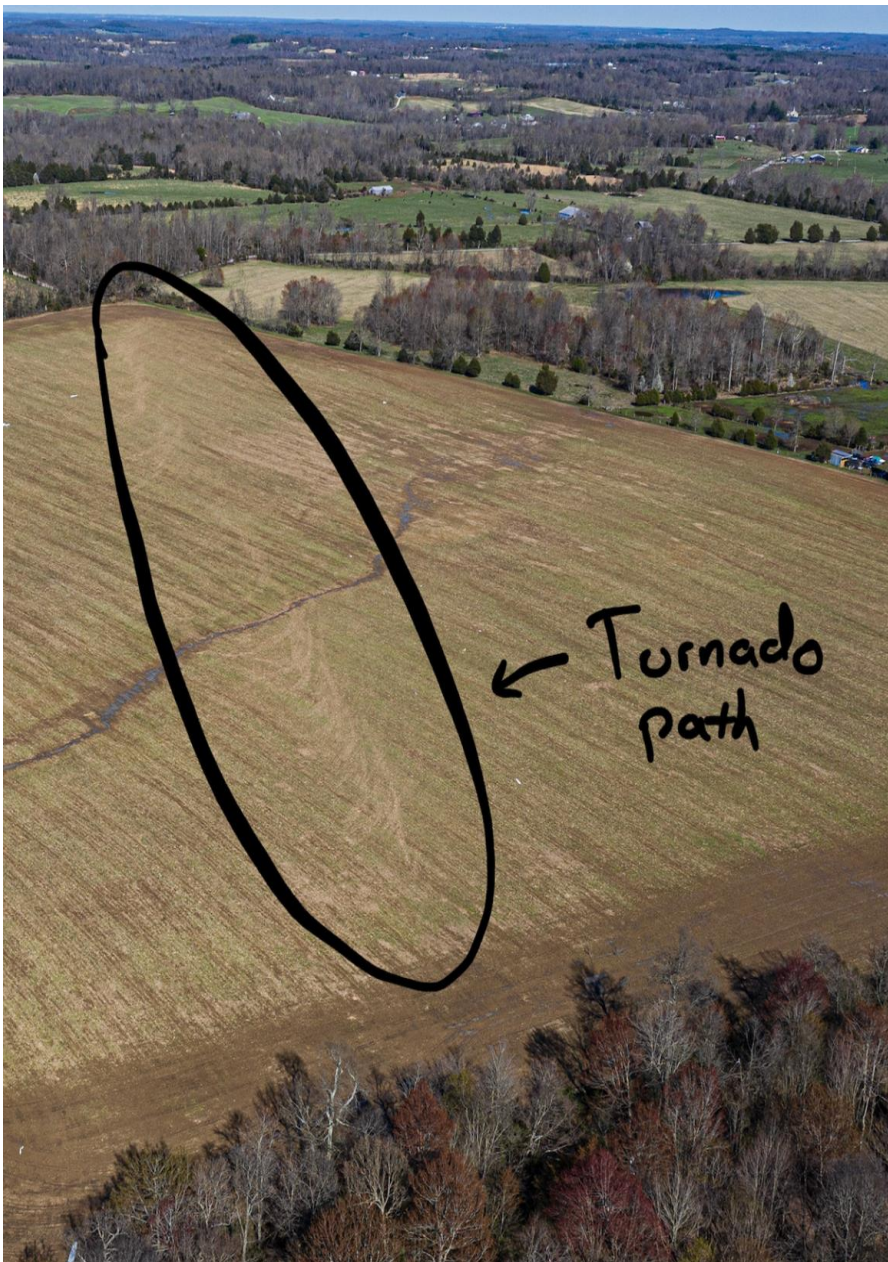


Supercell thunderstorms have rotating updrafts due to strong atmospheric wind shear, and are the most common type of storm responsible for destructive tornadoes.

National Weather Service

December 12, 2021





Office of Marine and Aviation Operations (OMAO)

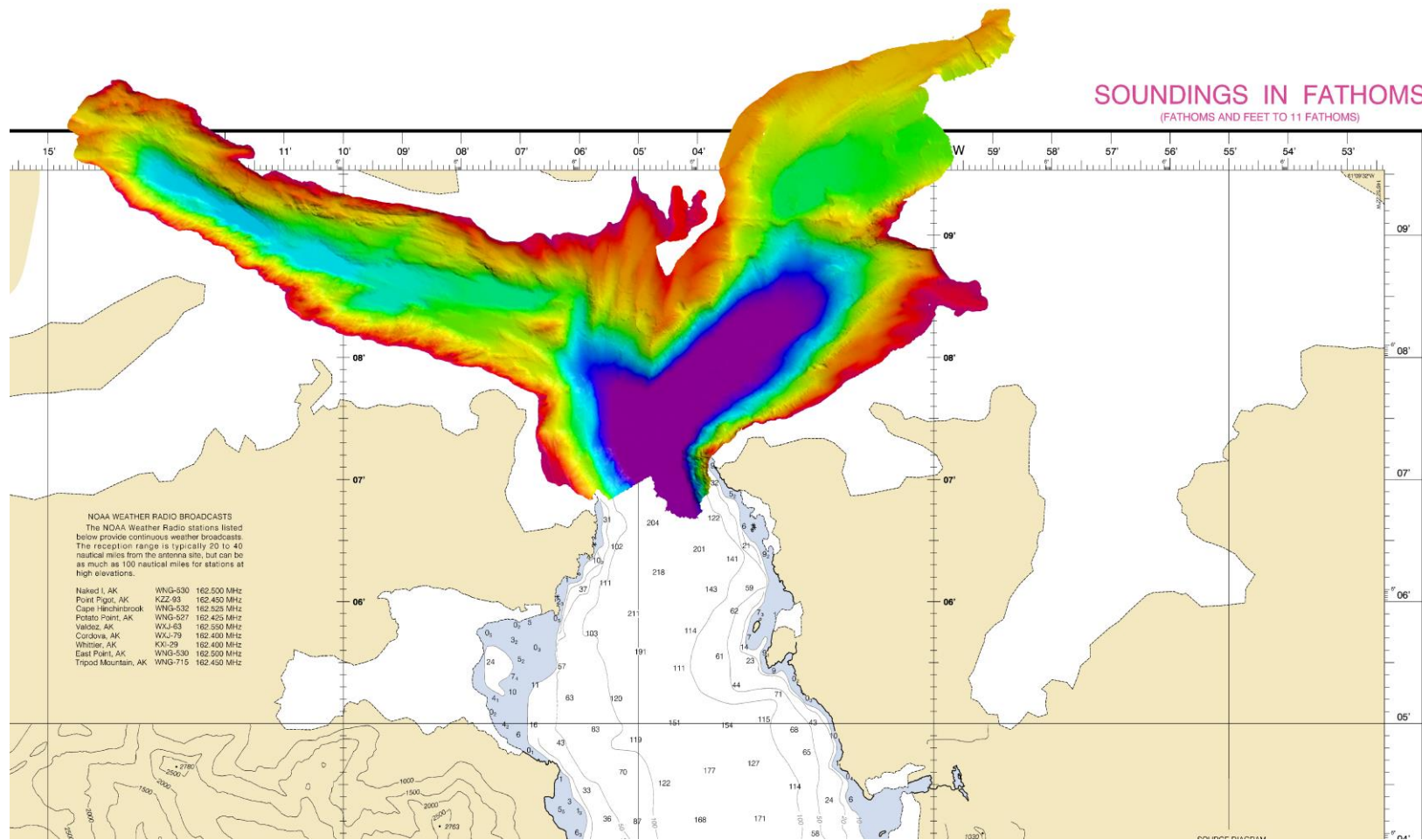




SOUNDINGS IN FATHOMS

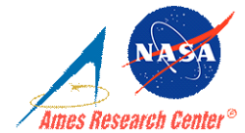
(FATHOMS AND FEET TO 11 FATHOMS)

16713





Uncrewed Surveys of Pinnipeds in the Aleutian Islands (USPAI) Project



Project Description

NOAA TEAM LEADS: Peter Boveng, Tom Gelatt, & Shawn Dahle
– NOAA, NMFS, AFSC, Marine Mammal Laboratory

PERIOD OF PERFORMANCE: 06/2021 – 09/2023

PURPOSE: 1) Evaluate the feasibility of using a medium-range UAS to survey pinnipeds in remote areas of Alaska, and
2) Advance the application of BVLOS UAS operations in NOAA

EXPECTED BENEFITS:

- 1) Reduce down time of Twin Otters for other high-priority missions
- 2) Improve safety of NOAA aircrews and high-value aircraft
- 3) Reduce dependence on ship support for small UAS surveys
- 4) Increase logistical and operational efficiency

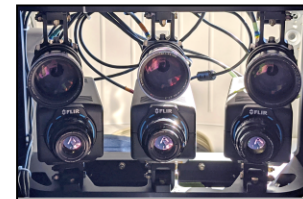
FUNDING: Total Proposed: \$2.47M

Platforms and Sensors



NASA's SIERRA-B UAS

- 20 ft wingspan
- 38 lb max payload
- 102 lb max fuel load
- 8.8 hr max endurance



MML's Payload Sensors

- 3 color cameras
- 3 thermal cameras
- 1 inertial nav unit

BEGINNING RL: Platform (8), Payload (4), Observing System (3)

CURRENT RL: Platform (8), Payload (5), Observing System (3)

Key Project Milestones

Issues and Risks

Description of Milestone	Status / Completion Date
Establish an Interagency Agreement between NOAA/OMAO and NASA	Completed 11/15/2021
Project feasibility study and updated cost estimate for NASA services	Completed 01/05/2022
Payload development, integration, and ground testing	In Progress ETC = 09/19/2022
Payload test flights at Crows Landing, CA	Delayed ETC = 09/30/2022
Field deployment, survey #1, Shemya Island, AK	Delayed ETC = 05/31/2023

POTENTIAL RISKS –and– MITIGATION PLANS:

- **Not receiving BVLOS airspace approvals** – Near Islands are remote with little air traffic; Only airport is owned by USAF; Nearly all air traffic is scheduled; Rec'd FAA waiver for BVLOS ops for Category 3 UAS over study area; FAA to provide a TFR for NASA-NOAA operations
- **Poor weather prevents flights** – Weather analysis indicated Sept as best month for initial test flights; No need to consider an alternate airport; Budgeted for several down days during field deployments
- **Icing conditions** – NASA designing and integrating icing detection
- **Cumulative delays knock us off our schedule** – Continue to refine schedule and identify intermediate milestones; Communicate new plans; Discuss back-up options
- **Unforeseen or uncertain costs result in budget over-runs** - Continue to update cost estimates and identify savings; Communicate new plans; Discuss options if needed

Updated: Sep 8, 2022

National Ocean Service (NOS)

- Shoreline mapping
- Coral reef survey
- Riverine mapping (water resources)
- Oil spill response

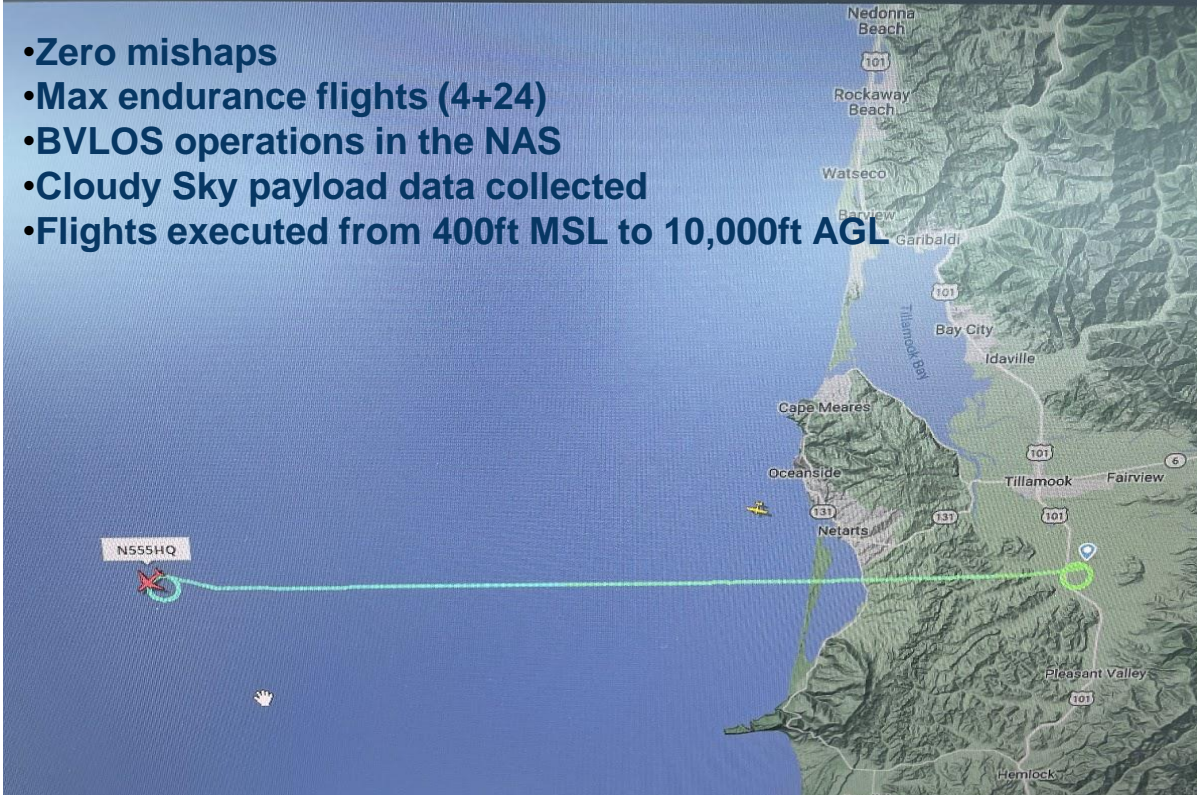


Office of Oceanic and Atmospheric Research (OAR)



FVR-55 Operations // Tillamook Range

- Zero mishaps
- Max endurance flights (4+24)
- BVLOS operations in the NAS
- Cloudy Sky payload data collected
- Flights executed from 400ft MSL to 10,000ft AGL



10:10 5G

Search

09:50 PDT Internet Traffic

3,075'

N124XD Bay City

10,500'

N8273Z

5,775'

N555HQ

V27

00:00

REC

09:50 - AUG 16

Distance Next	ETE Dest	Groundspeed	GPS Altitude	Track
0.0 nm	-----	0 kts	38'	327°M

Airports Maps Flights Plates More





NOAA
NATIONAL OCEANOGRAPHIC AND
ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE



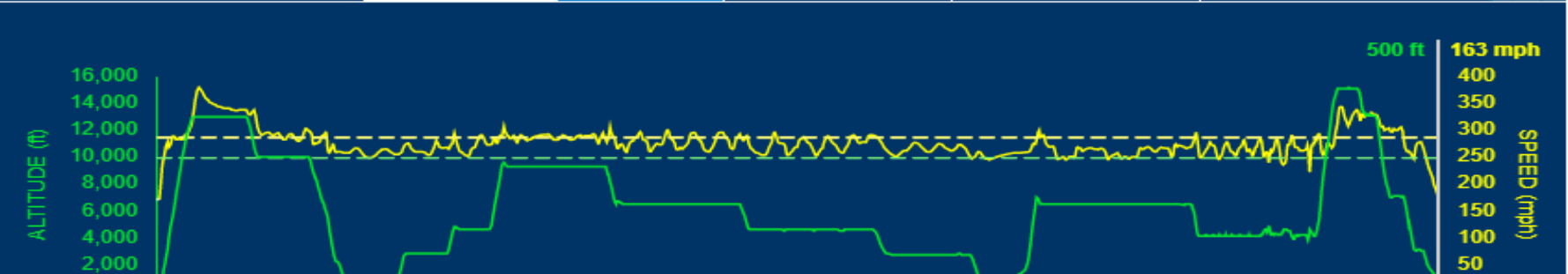
ALTIUS

AREAL

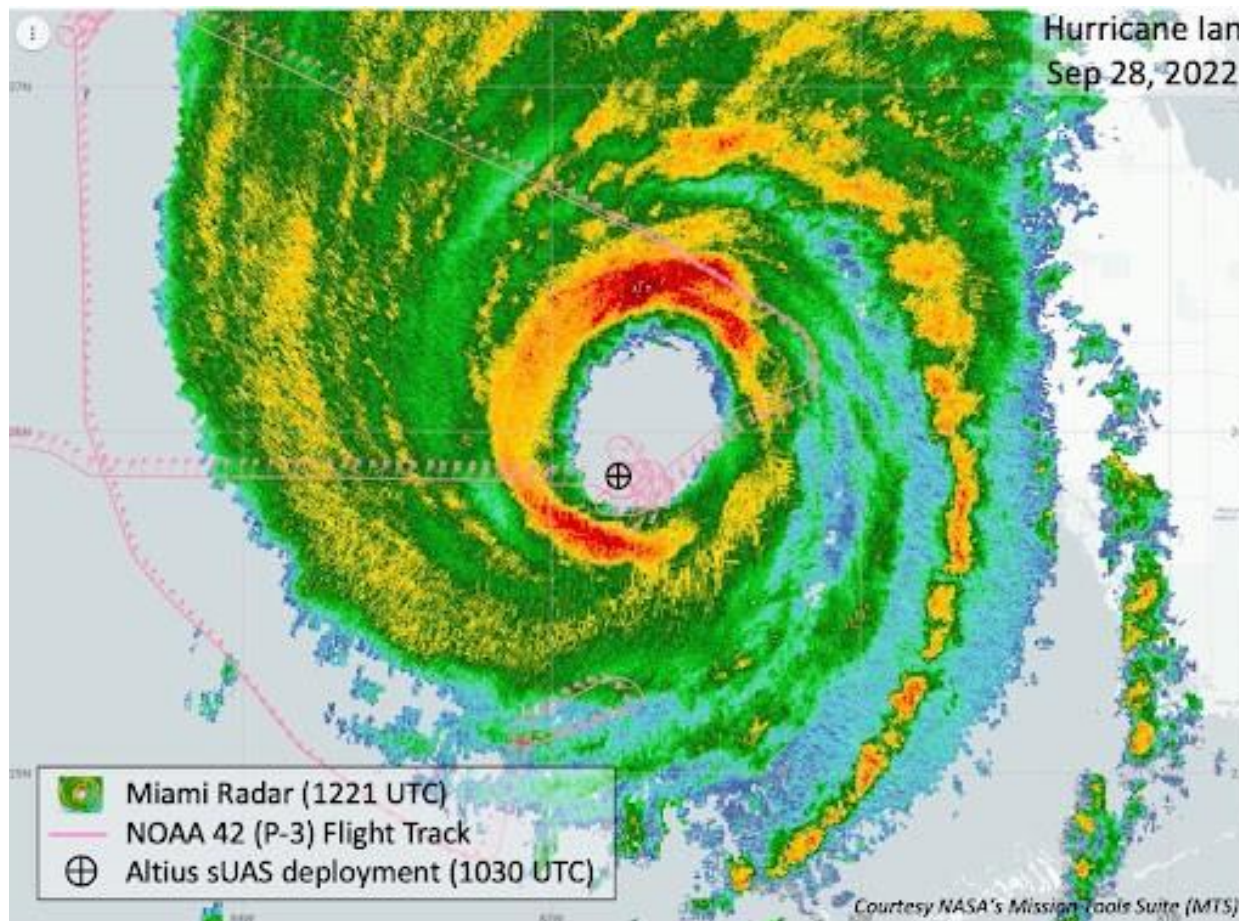
ConOp: Deploy a small, semi (eventually fully) autonomous
“uncrewed” aircraft from a “crewed” aircraft



NOAA

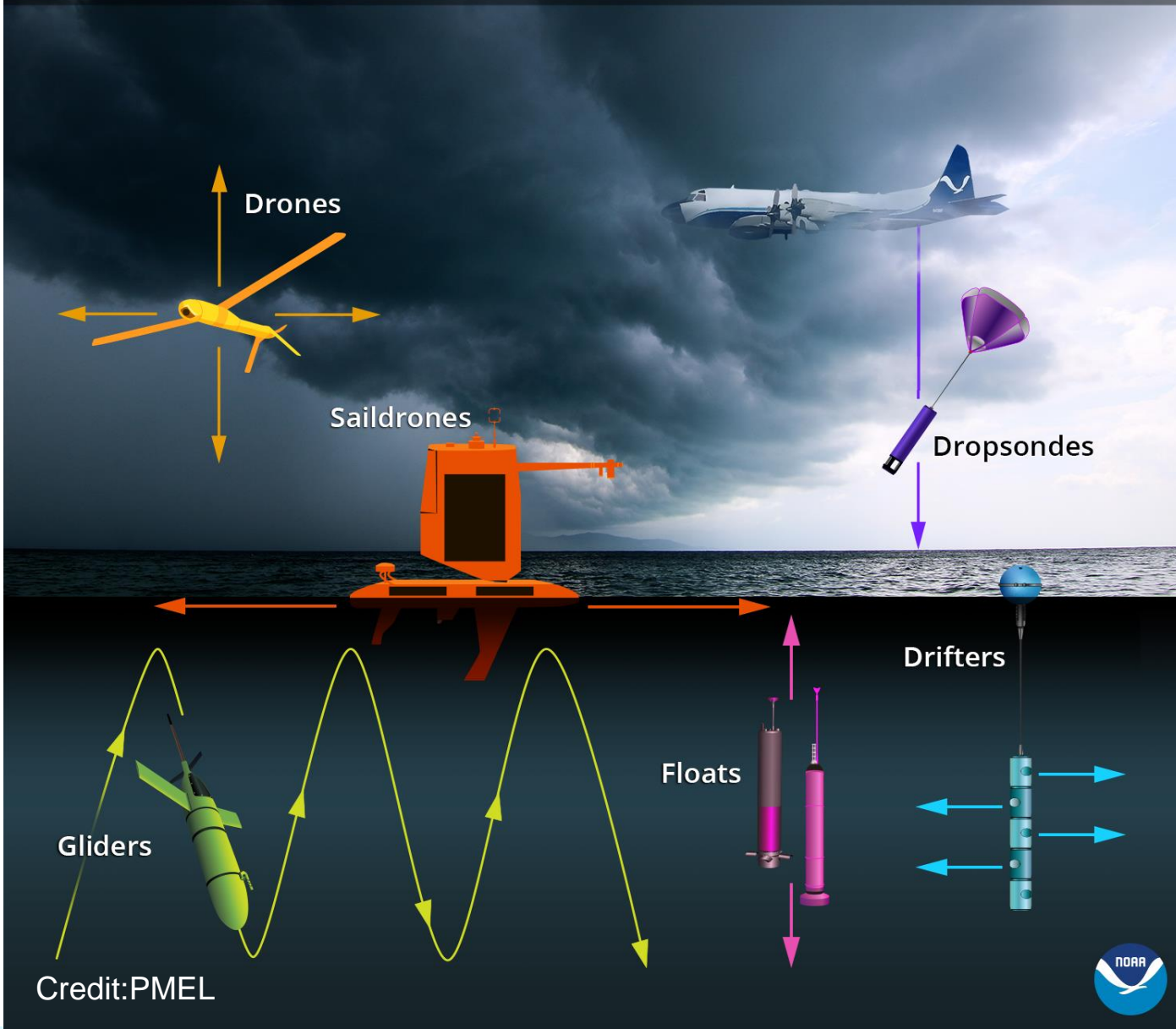




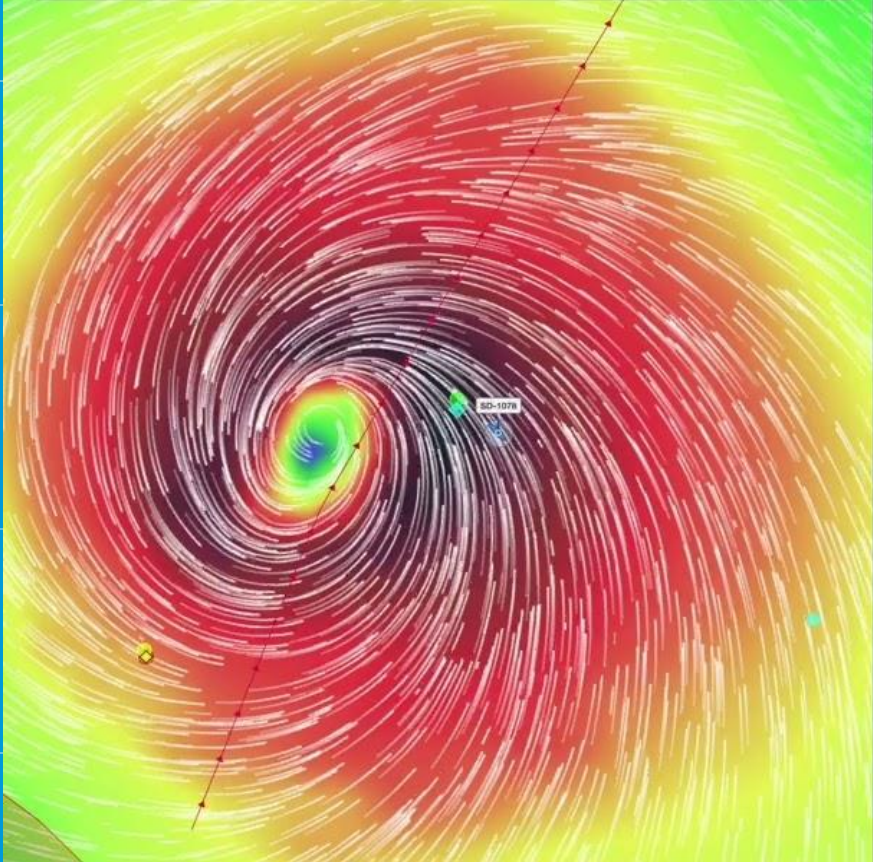


Upon release, the uncrewed aircraft deployed its 8-foot wingspan and acquired a center fix on the eye of the hurricane at 4,500 feet. It then dropped to 3,000 feet within the eye to collect temperature, pressure, and moisture values. The crew then directed it into the eyewall where it completed a series of circumnavigations at different altitudes. At less than 2300 feet above the sea surface the UAS recorded winds over 187 kts (216 mph), and at one point even descended to as low as 200 feet.

UNCREWED SYSTEMS TO IMPROVE HURRICANE PREDICTION



SD 1078 near the eye of Category 4 Hurricane Fiona at 1411 UTC on Sept. 22, 2022, as shown by the Saildrone Mission Portal and POV video from the vehicle



SAILDRONE



Captured by SD 1045's onboard camera during
Category 4 Hurricane Sam, Sept. 30 2021



SAILDRONE



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