

September 19, 2023
E202177 GeoCollaborate Instance
CHAOS Field Campaign Support -
Active
1:40pm ET (1740Z) Update

- Hmo1 1740Z Sandwich
edited
- N43 dropsonde data feed not
updating
- Drifter 1801797 deployed
and working
- N41a operating
- Turned on N43b, N42 Live
tracking
- N43 N42 FH Plan Posted for
20230919

HRD Max Discussion - 12:30pm ET

Flight Track

Write track for flight 2023091901 with
mission ID of WA156 N102L

Parameter	Value
Storm ID	81332023
Start Time	2023-09-19T13:10:00Z
End Time	2023-09-19T15:00:00Z
File Last Updated	

Zoom to

Supporting NOAA's 2023 Hurricane Field Campaign with GeoCollaborate

Extreme Events Ocean Observing Task Team



SBIR Phase III Technology Implementation
Improving Hurricane Forecasts



HFIP Monthly Seminar
Wednesday March 13, 2024



GeoCollaborate is funded under a SBIR Phase III sole source justification contract through NOAA GOMO.

[NOAA Technology Partnership notification](#)

PRESENTER

Dave Jones, CEO
StormCenter Communications, Inc.
dave@stormcenter.com

September 19, 2023
E202177 GeoCollaborate Instance
CHAOS Field Campaign Support -
Active
1:40pm ET (1740Z) Update

- Hw01 1740Z Sandwich edited
- N43 dropsonde data feed not updating
- Drifter 1901797 deployed and working
- K12B operating
- Turned on N43B N42 Live tracking
- N43 N42 FH Plan Posted for 20230919

HRD Max Discussion - 12:30pm ET

Flight Track

Flight track for flight 2023091901 with mission ID of WA156 H02L

Parameter	Value
Storm ID	41322023
Start Time	2023-09-19T13:10:00Z
End Time	2023-09-19T15:00:00Z
File Last Updated	

Zoom to

16 Years

IOOS Association | Caraid Award
Tuesday March 12, 2024



NOAA
GLOBAL OCEAN
MONITORING & OBSERVING

GeoCollaborate is funded under a SBIR Phase III sole source justification contract through NOAA GOMO.

[NOAA Technology Partnership notification](#)

PRESENTER

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dave@stormcenter.com

Unifying Disparate Trusted Datasets

In a collaborative environment

- Ditar 300,797 deployed and working
- N43A operating
- Turnout on N43B, N42 Live Tracking
- N43 N42 PI Plan Posted for 20230019

GOES Image Viewer

National Weather Service

NATIONAL HURRICANE CENTER and CENTRAL PACIFIC HURRICANE CENTER

STAR JPSS

USGS

Fire Detection GIS Data

CDC Centers for Disease Control and Prevention

GeoCollaborate®

InstaShare

Find address or place

Real-Time Trusted Data Dashboard

Sensitive Information Sharing Environment (SISE)

OPERATIONAL SPECIAL COVID-19 STATUS

Simple Display controlled by ON/OFF switch

Many websites offering pieces of information

Cross platform interoperability enables any device to participate collaboratively



Cross Line Office Coordination & Immediate Collaboration

LEADER

TS
Tammy

TS

FOLLOWERS

Exchange Leads
Share trusted data

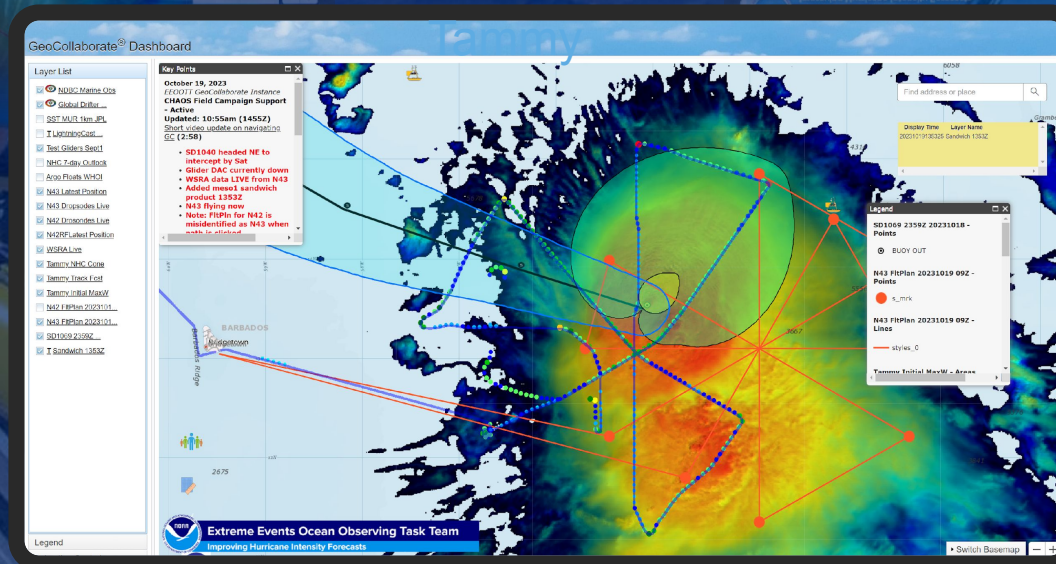
TS

COLLABORATIVE DASHBOARD

Geographic location
(Area of Interest & Data Layers)
can be selected by
individual user

OGC compliant data formats for rapid interoperability

*Satellite, drones, models, observations, reports, pictures
Output from AI, ML – data driven decision making



Rapid Test During Tropical Storm 'Nate'

Friday October 6, 2017



Non-Tasked Research Mission (Nate)



NOAA2 - Miss. #WB - Atlantic

High Density (6), Dropsonde (51), Recco (non-tropical) (6), Radar (1)

Geopotential Height: 7,430 meters (24,377 feet)

Static Air Pressure: 409.2 mb

Location: 94 statute miles (151 km) to the E (98°) from Cancún, Quintana Roo, Mexico.

Example of setting up a data sharing session with no advanced planning.

How Cancun, Quintana Roo, Mexico:
Location: 94 statute miles (151 km) to the E (98°)

2017 Rapid TS 'Nate' Test

- Datasets:**
- GOES-16 Meso Sector
 - GOES-16 FD Visible
 - TDWR
 - Hand Drawn Sketches



Dr. Jon Zawislak,
HRD NOAA-42
In-Flight



Dave Jones, Severna
Park, MD



Dr. Frank Marks, HRD
Miami

2017 Rapid TS 'Nate' Test



GOES-16 FD
Band3

Reload Dashboard

Layers

- FullDiscVis-Band3
- NESDIS-SST
- Band10-WVenH
7.3mcrons
- State & County
Boundaries
- World Boundaries
File-Esri
- NESDIS GHE
HourlyRainfall Est
- Latest NHC
WindPob Fcst
- Meso2 Bnd04
1.37mcrons
- Meso2 Nate Bnd03-
Vis
- TDR-NOAA2-
20171006-135804
18.828968N-
84.003700W
- TDR-NOAA2
2017-10-06-143316
21.335085N
85.424446W

Key Points

Test of GeoCollaborate(R)-HRD Mission
NOAA P3
Friday October 6, 2017
Dashboard & Rt Collaboration

Investigating: NATE

Testing data sharing environment

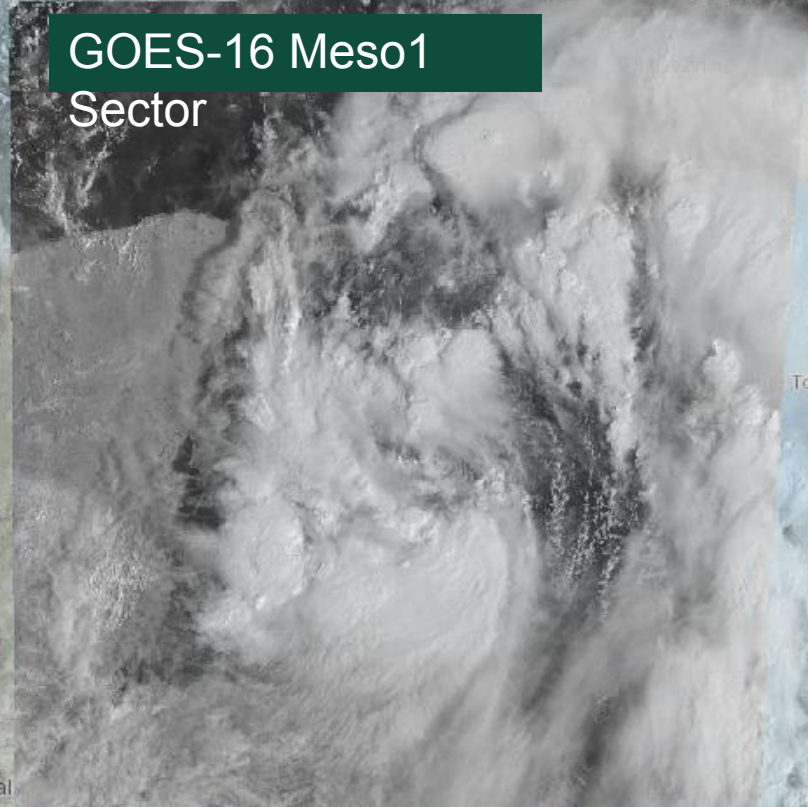
- Drag map around
- Click on layers to turn on/off

NOAA2-TDR Test: Navigation of kml file
may be slightly off. Turn on layer to see.

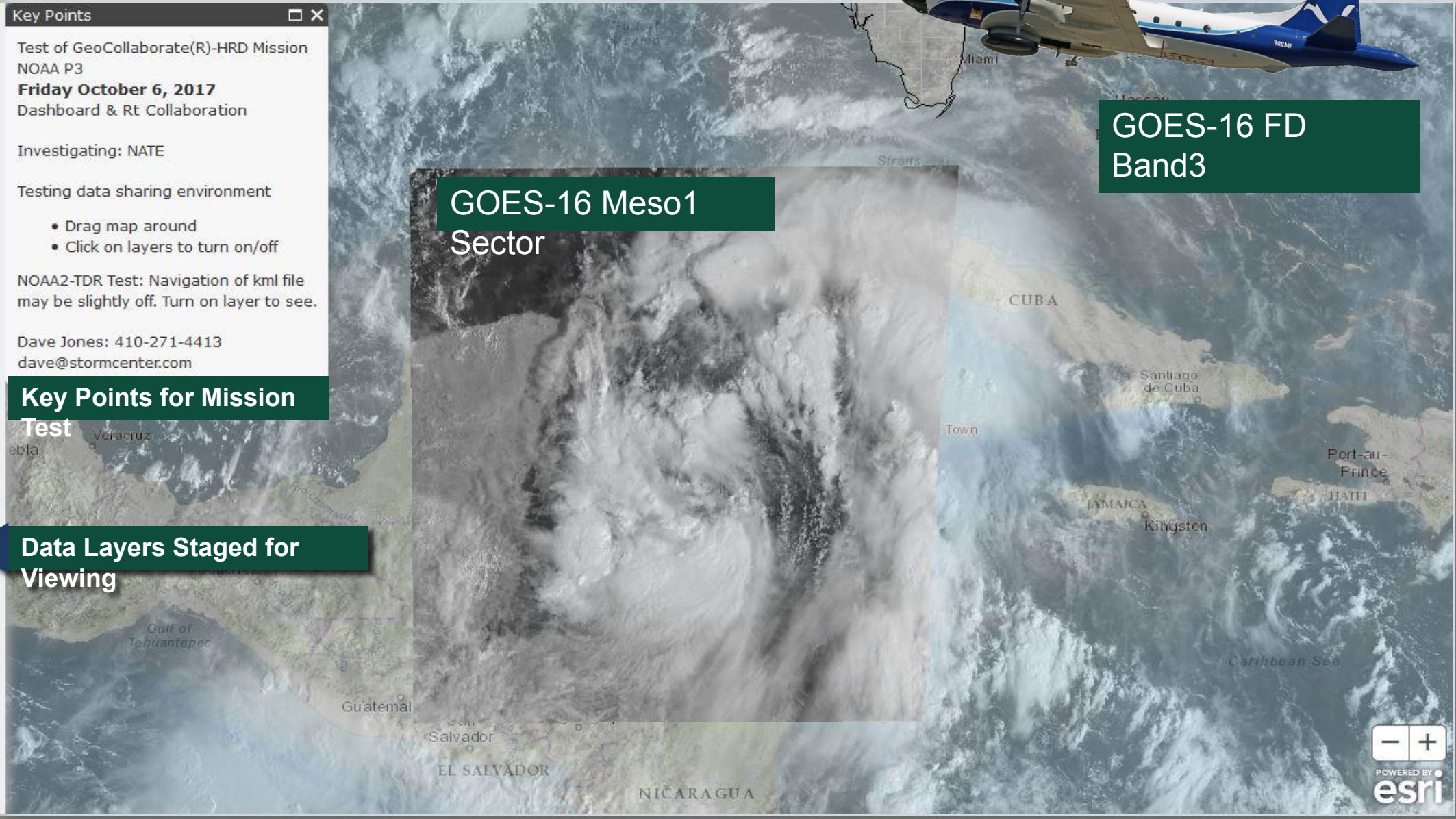
Dave Jones: 410-271-4413
dave@stormcenter.com

Key Points for Mission
Test

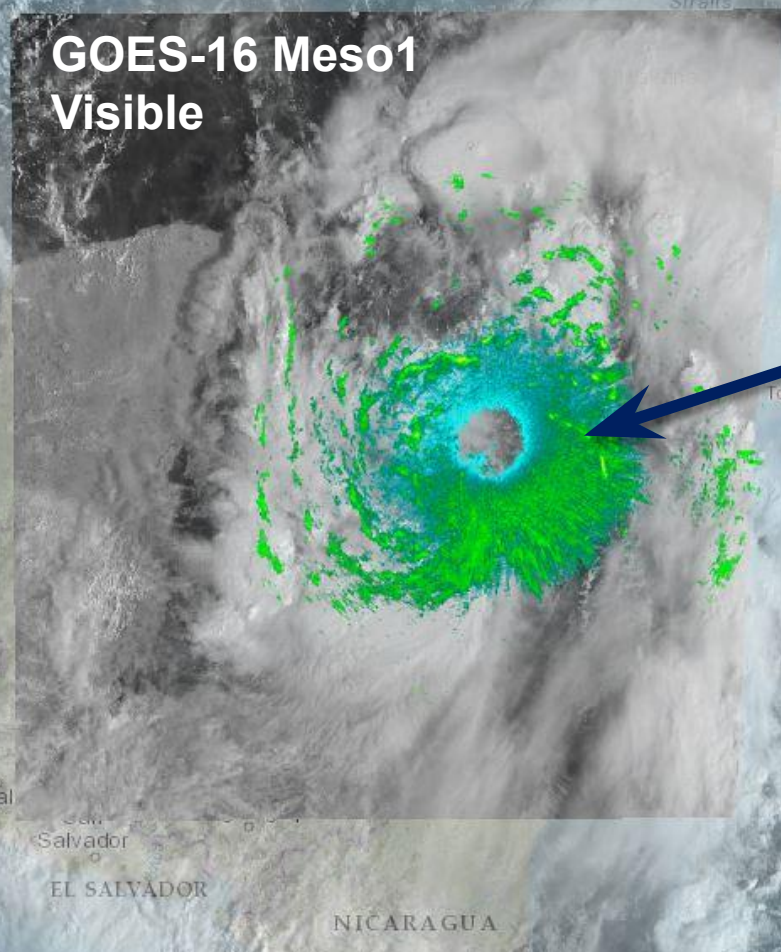
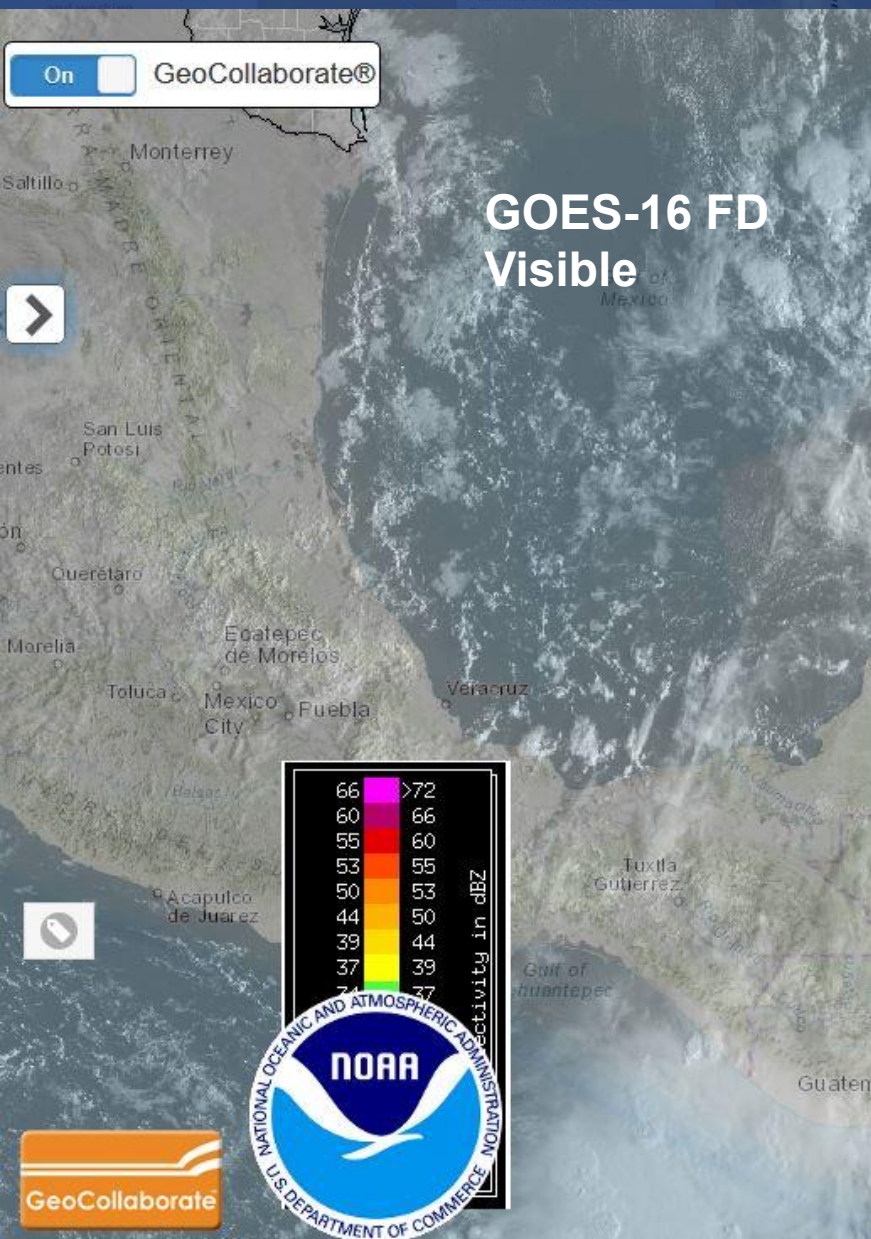
Data Layers Staged for
Viewing



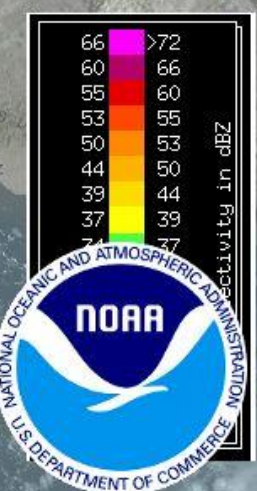
GOES-16 Meso1
Sector



2017 Rapid TS 'Nate' Test



NOAA P3 TDR Data
(Center circle is where the plane is located, not the center of the storm)



2017 Rapid TS 'Nate' Test



Time: 10/6/2017 11:56:09 AM

On GeoCollaborate®



Drawing (Green Lines)
produced by Dr. Frank Marks at
HRD
Lead passed to HRD from
Maryland

Lead: Frank Marks
• Freehand
Draw
Highlighting
'Band' of interest

Key Points

Test of GeoCollaborate(R)-HRD
Mission NOAA P3
Friday October 6, 2017
Dashboard & Rt Collaboration

Investigating: NATE

Testing data sharing environment

- Drag map around
- Click on layers to turn on/off

GOES-16 (non-operational) Meso2
sector-1min updates

NOAA2-TDR Test: Navigation of kml
file may be slightly off. Turn on layer
to see.

Dave Jones: 410-271-4413



2017 Rapid TS 'Nate' Test



Reload Dashboard

Layers

- FullDiscVis-Band3
- NESDIS-SST
- Band10-WVenh
7.3mcns
- State & County
Boundaries
- World Boundaries
File-Esri
- NESDIS GHE
HourlyRainfall Est
- Latest NHC
WindPob Fcst
- Meso2 Bnd04
1.37mcns
- Meso2 Nate Bnd03-
Vis
- TDR-NOAA2-
20171006-135804
18.828968N-
84.003700W

Key Points

Test of GeoCollaborate(R)-HRD
Mission NOAA P3
Friday October 6, 2017
Dashboard & Rt Collaboration

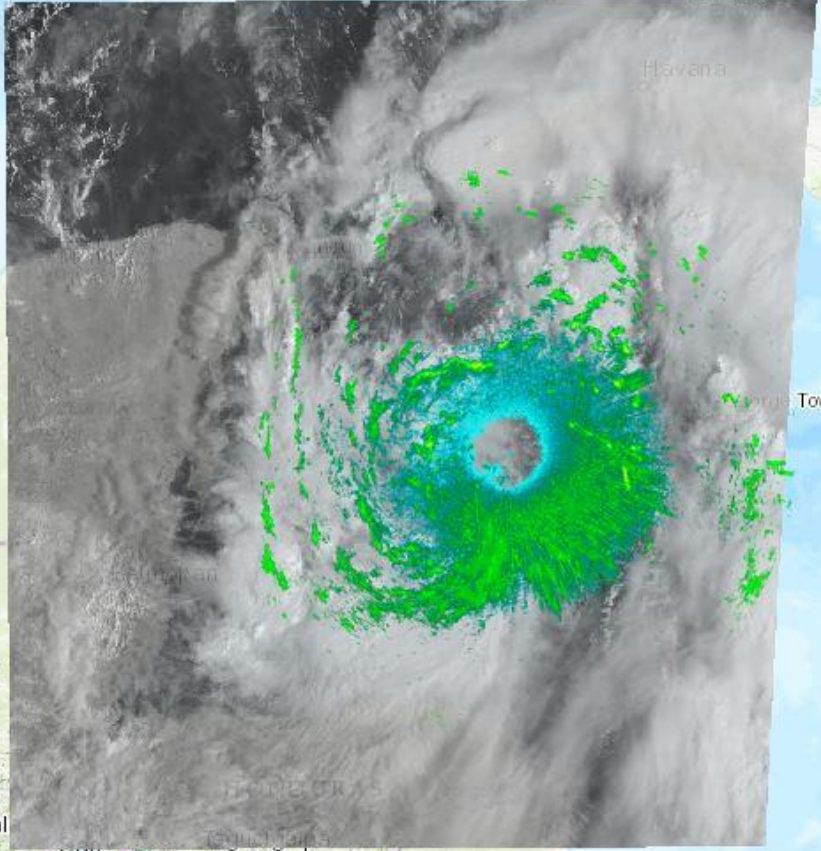
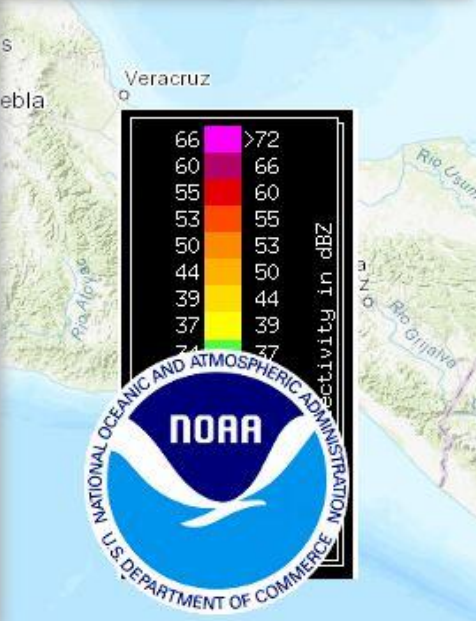
Investigating: NATE

Testing data sharing environment

- Drag map around
- Click on layers to turn on/off

GOES-16 (non-operational) Meso2
sector-1min updates

NOAA2-TDR Test: Navigation of kml
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to see.



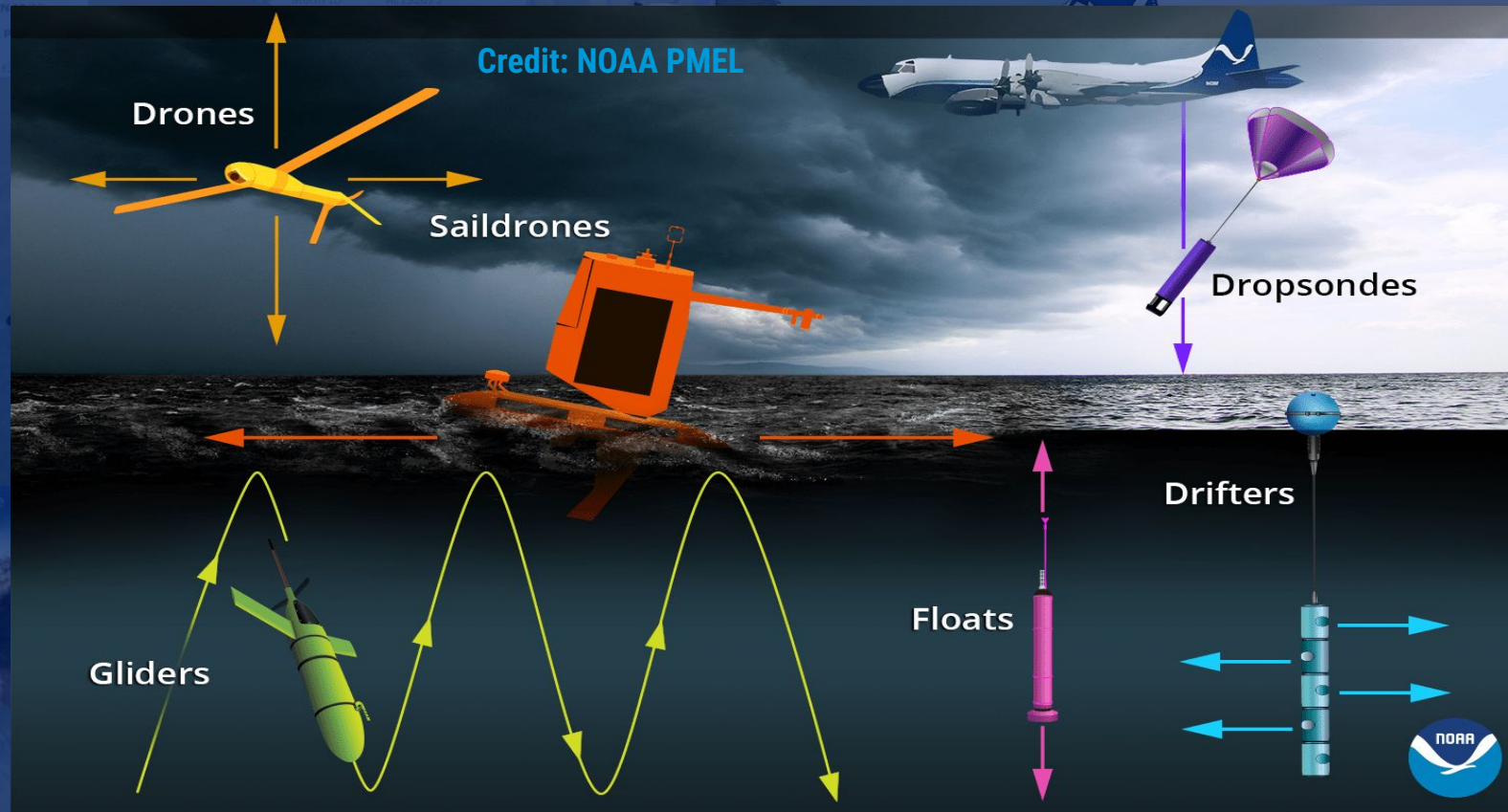
**Data layers can be turned on/off
in the Dashboard by any
participant**

**Unlimited number of followers
with the Dashboard**

**Enabling much broader
participation in analyzing data
collected during the mission**



CHAOS: Coordinated Hurricane Atmosphere-Ocean Sampling



Science Team: J., Zhang, J. Wadler, J. Rudzin, J. Cione, N. Shay, C. Zhang, G. Foltz, L. Looney, S. Howden, K. Martin, T. Miles, K. Bailey, S. Jayne, A. Gonzalez, P. Robbins, P. Chang, Z. Jelenak, J. Sapp, L. Centurioni, M. Schonau, H-S Kim, M. Le Henaff, H.S. Kang, L. Gramer, C. Stienbarger

Goal: deploy and operate a coordinated suite of ocean-atmosphere observing instruments and facilitate colocated observations of the air-sea transition zone.

- Improving observations of essential ocean features and ocean representation in coupled models
- Elucidating upper ocean and lower atmosphere processes that impact TC intensity through new and established observing systems

CHAOS By the Numbers

4 Hurricanes: Idalia, Lee, Nigel, Tammy

Expendables & Remote Sensing:

- 5 A-sized directional wave spectra drifters (A-DWSD)
- 40 dropsondes
- 4 small uncrewed aircraft systems (sUAS)
- Numerous Ka-band Interferometric Altimeter (KaIA) & Imaging Wind and Rain Airborne Profiler (IWRAP) overflies of other assets (drifters, saildrone, gliders)

In Situ Ocean Obs:

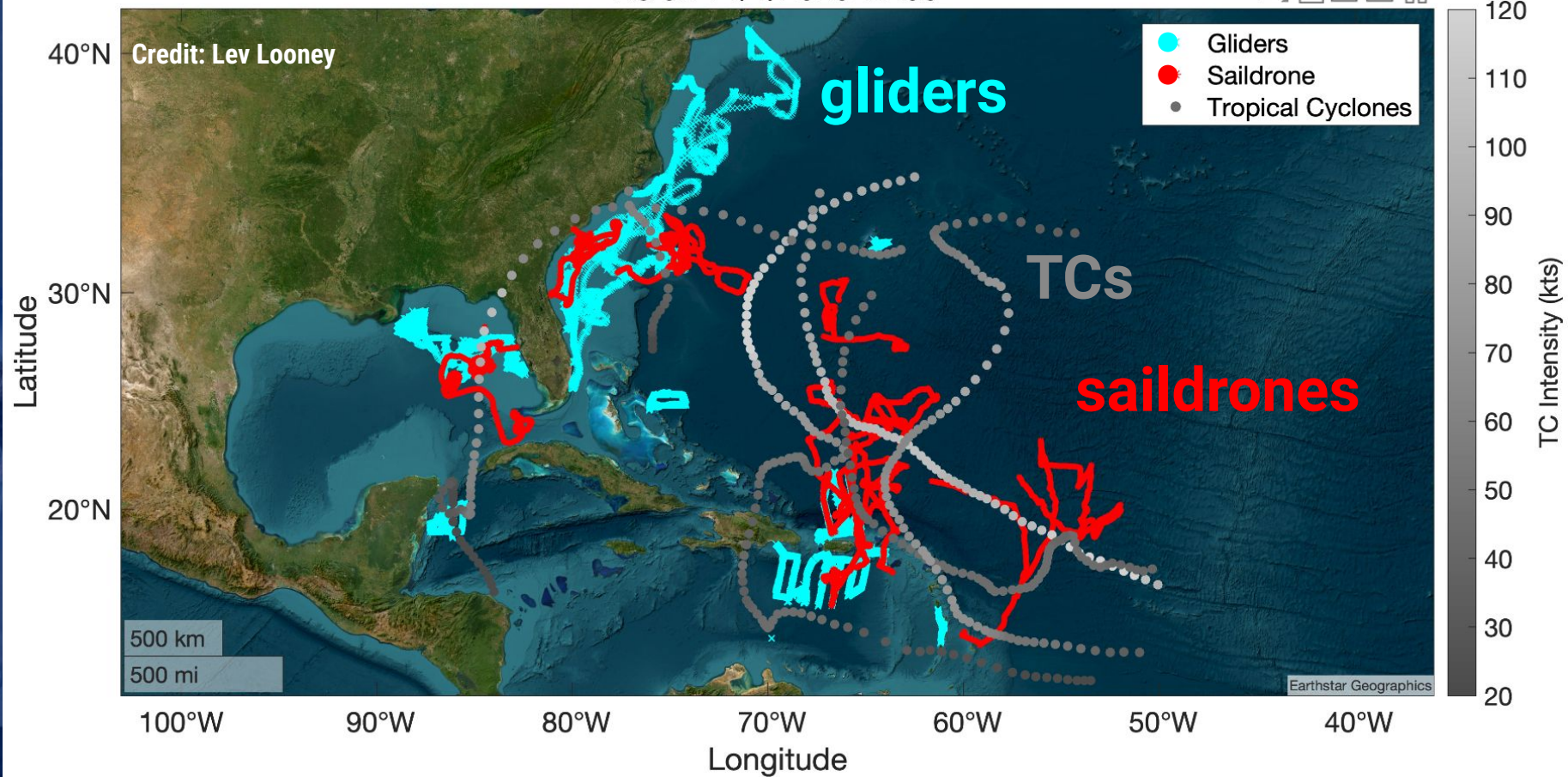
- 2 gliders fitted with Acoustic Doppler Current Profilers (ADCPs)
- 5 rapid cycling Argo floats
- 19 unique saildrone hurricane/tropical storm encounters
- 114 AXBTs (Ocean Survey Exp + operational missions)

September 15, 2023
 232317 SeaSurfaceTemp Instance
 CHAOS Field Campaign Support - Active
 1:40pm ET (1740Z) Update
 - N43 1740Z SeaSurfaceTemp updated
 - N43 drupevents updating
 - Drifter 1801792 and working
 - N43 operating
 - Turned on N43 N42 Live tracking
 - N43 N42 FH Plan Posted for 20230919
 HRD New Discussion

Saildrone-Glider Colocated Observations

2023 Saildrone-Glider Coordination

As of: 11/4/2023 17:59



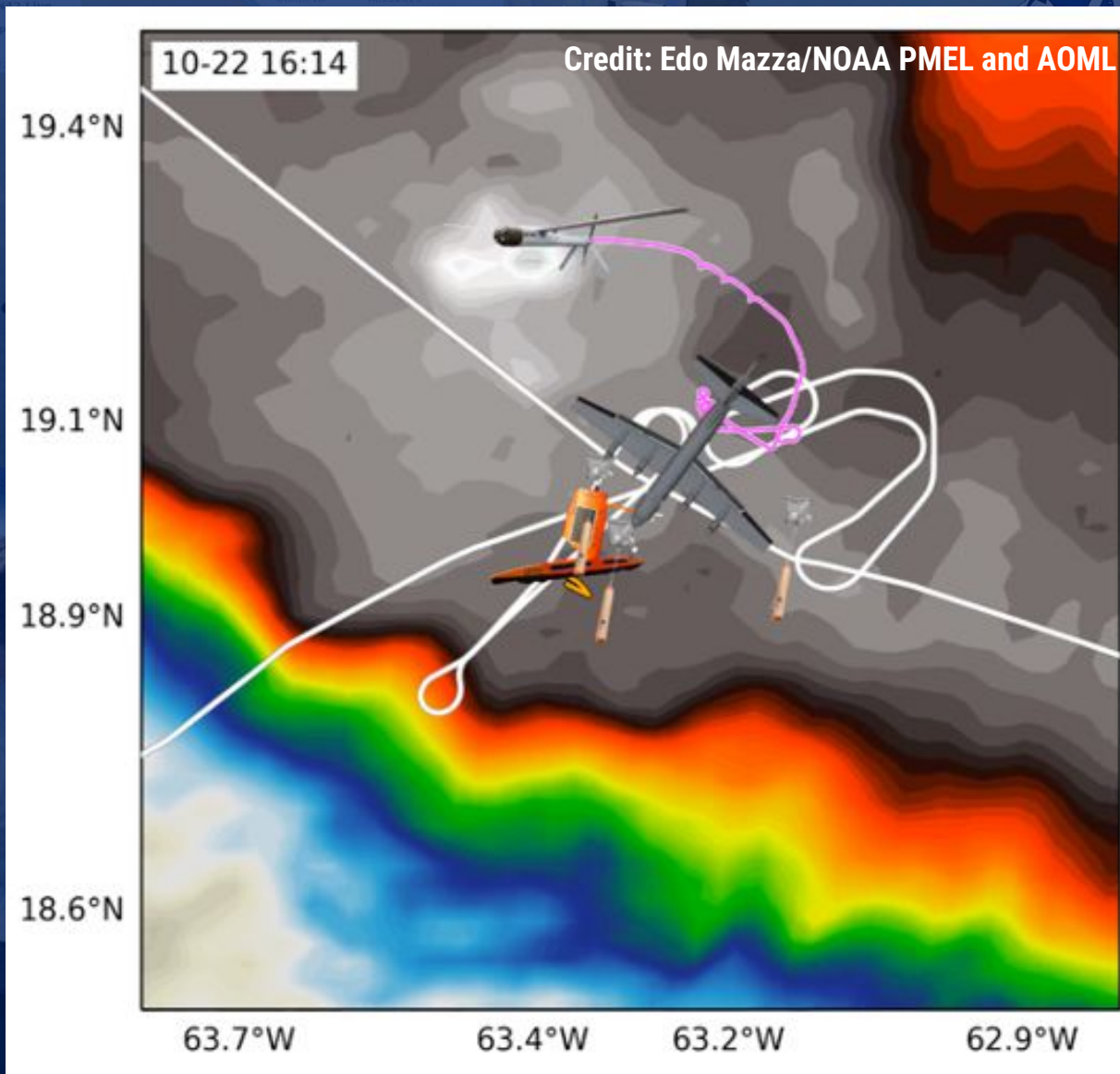
Credit: Rutgers, MARACOOS, UVI



Saildrone, Inc.



Coordination of sUAS & Other Expendables



- **Expendable coordination** in Hurricane Tammy: deployed 1 dropsonde, 1 IR sonde, 1 AXBT over the Saildrone
- Deployment of 2 Altius 600 and 2 S0 drones
- **Co-located winds, temperature, pressure, and humidity** from sUAS, dropsondes, saildrone

Select Examples of CHAOS Support

Will briefly discuss

6
Innovation

Applications during CHAOS

• Drifter 3001797 deployed and working
• N42A operating
• Turned on N43B N42 Live tracking
• N43 N42 PH Plan Posted for 20230919
HRD Max Discussion - 12:30pm ET

Parameter	Value
Mission ID of WA156-1102L	
Parametric	Value
Storm ID	AL332023
Start Time	2023-09-19T13:10:00Z
End Time	2023-09-19T16:00:00Z
File Last Updated	
Zoom to	

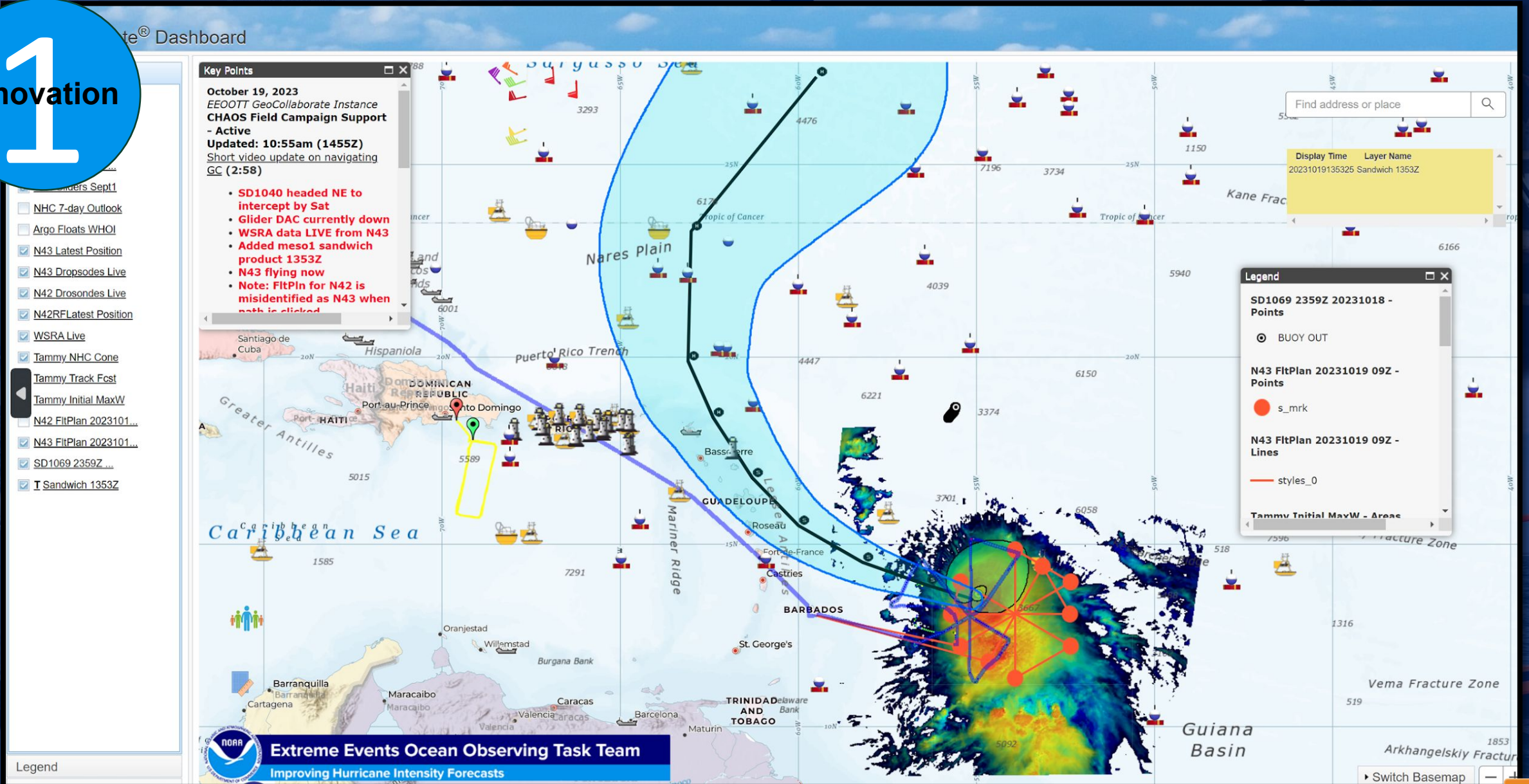


Extreme Events Ocean Observing Task Team



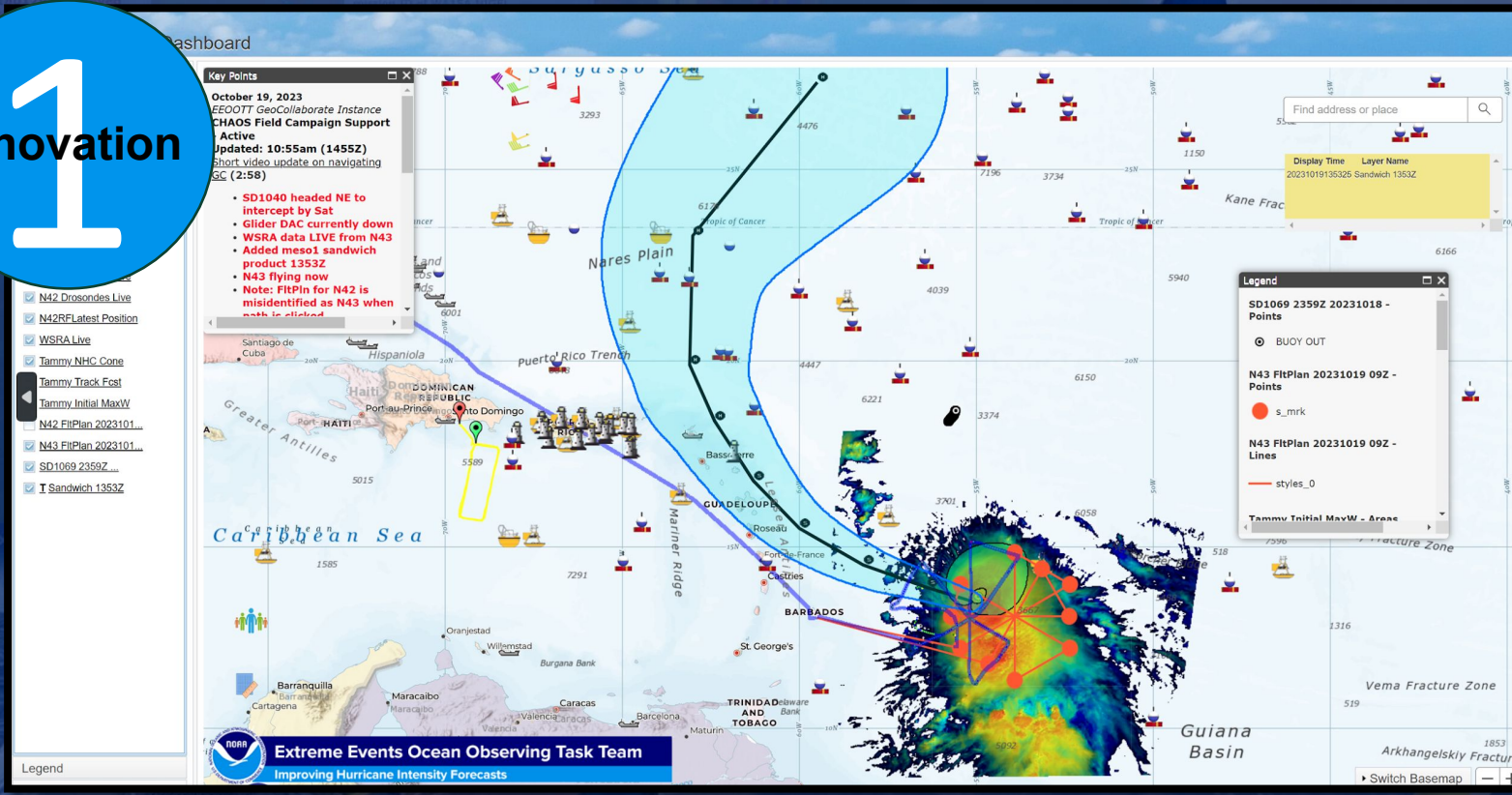
Overall Situational Awareness

1 Innovation



Overall Situational Awareness

1
Innovation



- Overall situational awareness for each TC research mission
- Flight plans & planning
- LIVE flight tracking
- Position of ocean obs assets
- NESDIS Satellite Imagery
- NHC Forecasts
- HRD Map Discussion Link
- Key Points updated frequently

Ocean Obs Assets

Gliders | Drifters | Saldrones | ARGO Floats | NOAA NDBC | Ships

Overall Situational Awareness

1
Innovation



- Overall situational awareness for each TC research mission
- Flight plans & planning
- LIVE flight tracking
- Position of ocean obs assets
- NESDIS Satellite Imagery
- NHC Forecasts
- HRD Map Discussion Link
- Key Points updated frequently

Ocean Obs Assets

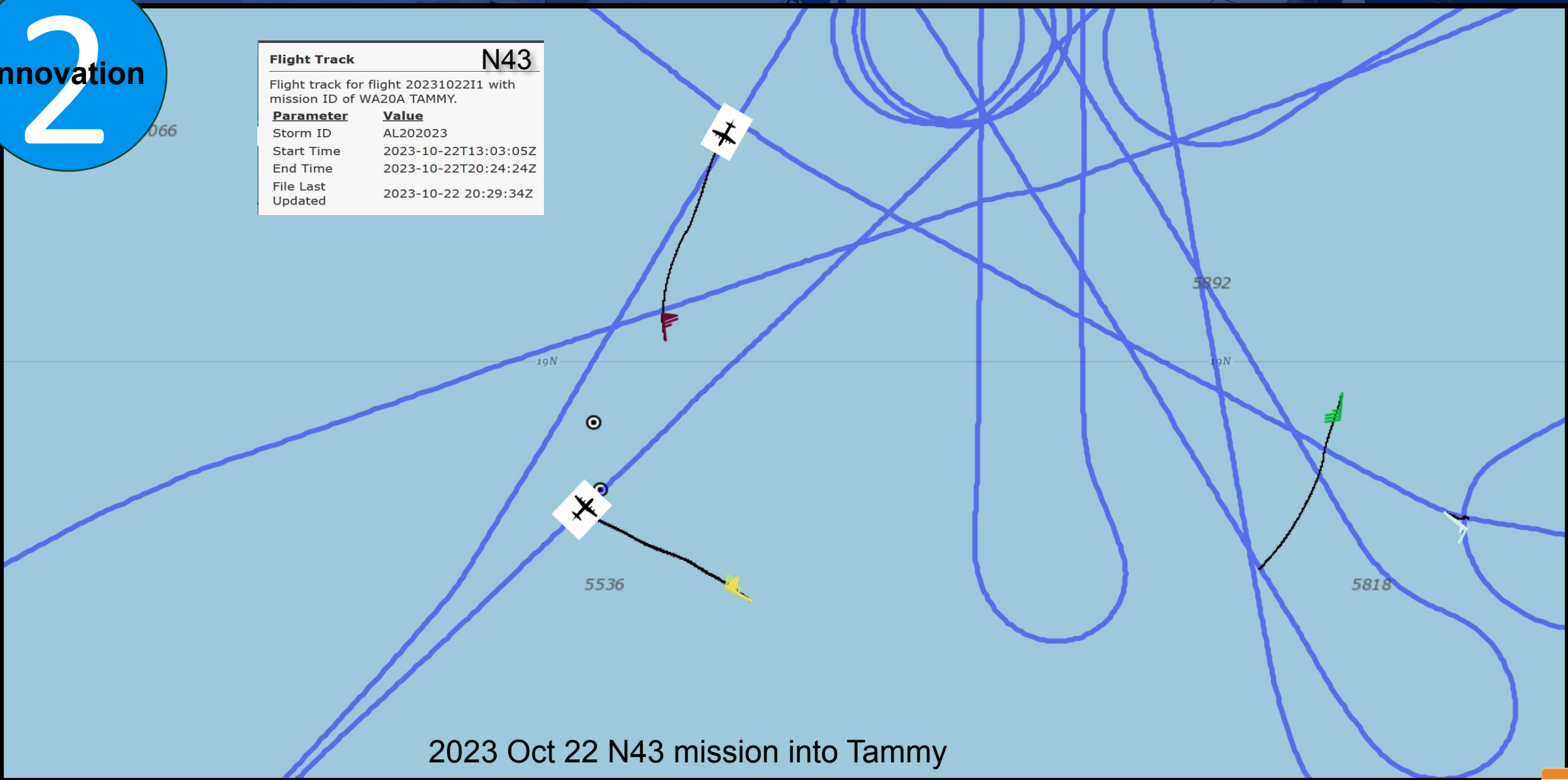
Gliders | Drifters | Saildrones | **ARGO Floats** | NOAA NDBC | Ships

ARGO Floats indicate when last ob was reported and when next ob is expected
Plus links to the data for each ARGO Float

Aircraft Tracking | Dropsonde Release, Track & Pre-Splash Obs

Innovation
2

Flight Track		N43
Flight track for flight 20231022I1 with mission ID of WA20A TAMMY.		
Parameter	Value	
Storm ID	AL202023	
Start Time	2023-10-22T13:03:05Z	
End Time	2023-10-22T20:24:24Z	
File Last Updated	2023-10-22 20:29:34Z	



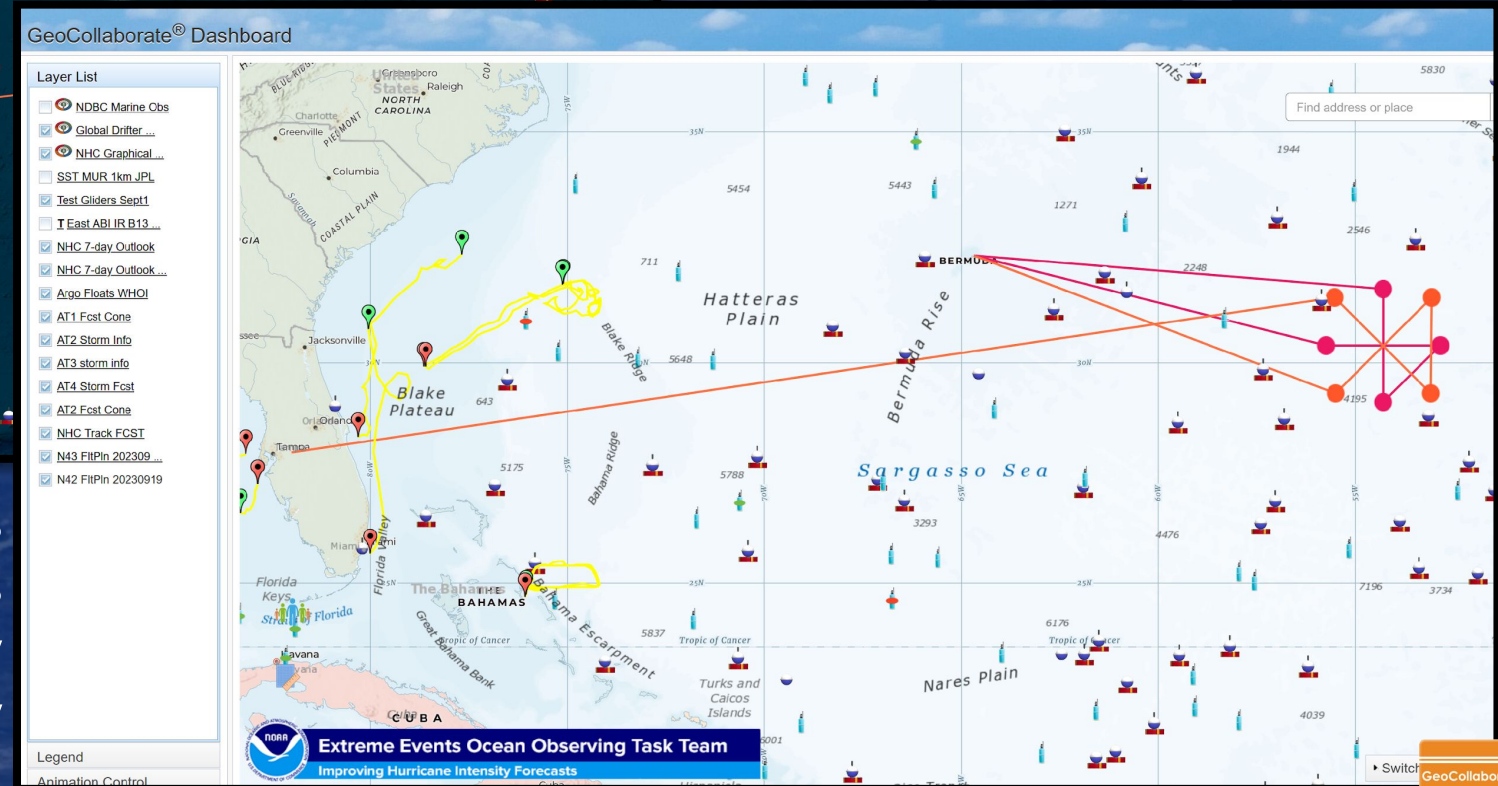
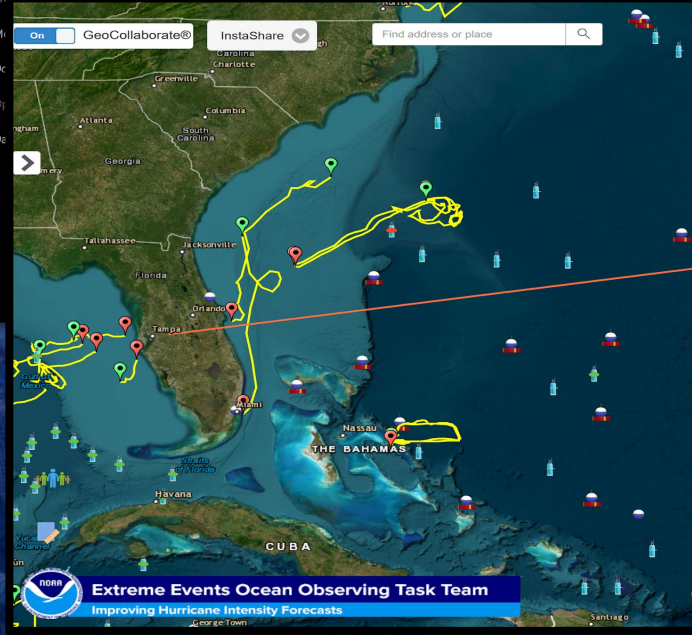
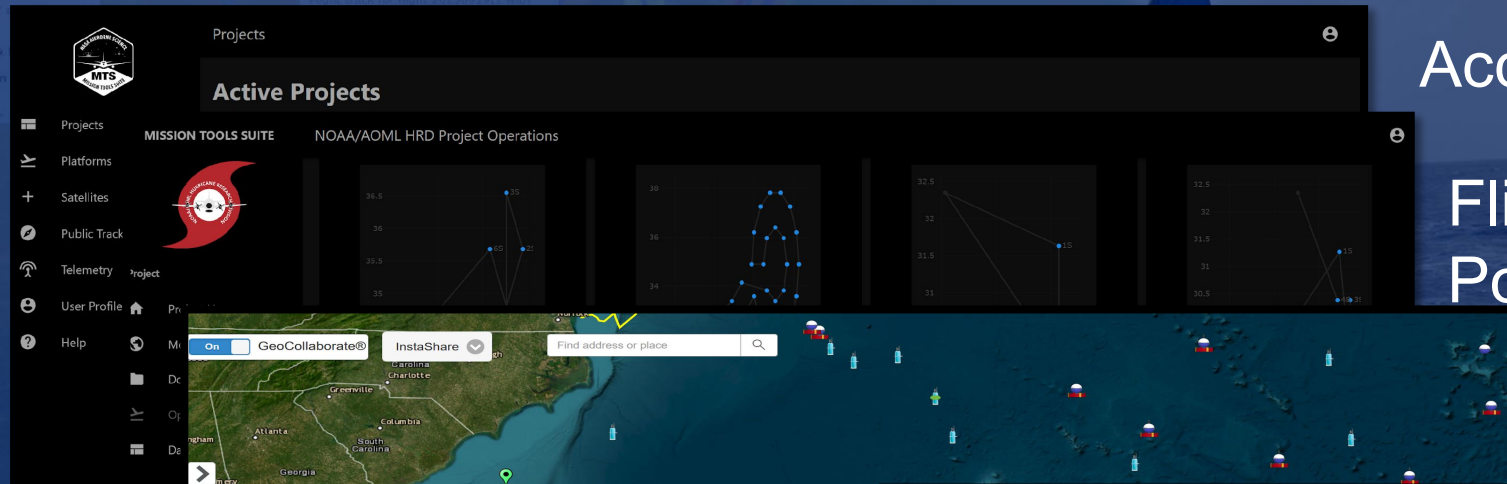
2023 Oct 22 N43 mission into Tammy

Flight Plan & Coincident Measurement Planning

Access to  MTS

Flight Plan KML Generated when
Points Uploaded, chat

KML Loaded into GC



3
Innovation

All Participants Across
All Line Offices
See Flight Plan Automatically
Assess coincident drops Interactively

WSRA & KaIA Data Visualization | Drifter measurements

Wide Swath Radar Altimeter | Ka-band Interferometric Altimeter

4
Innovation

NIGEL

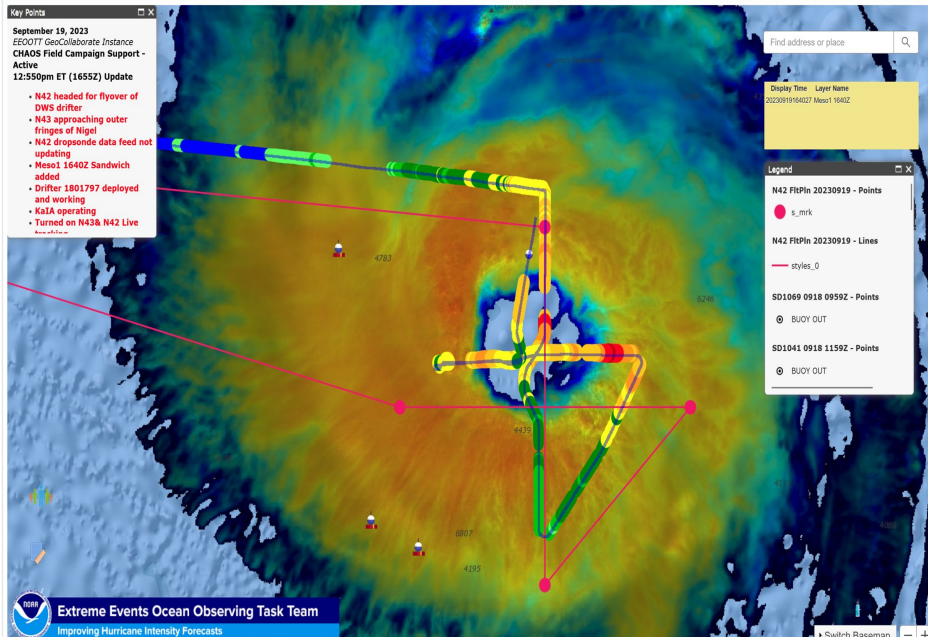
Sept 19-20, 2023

HURRICANE NIGEL



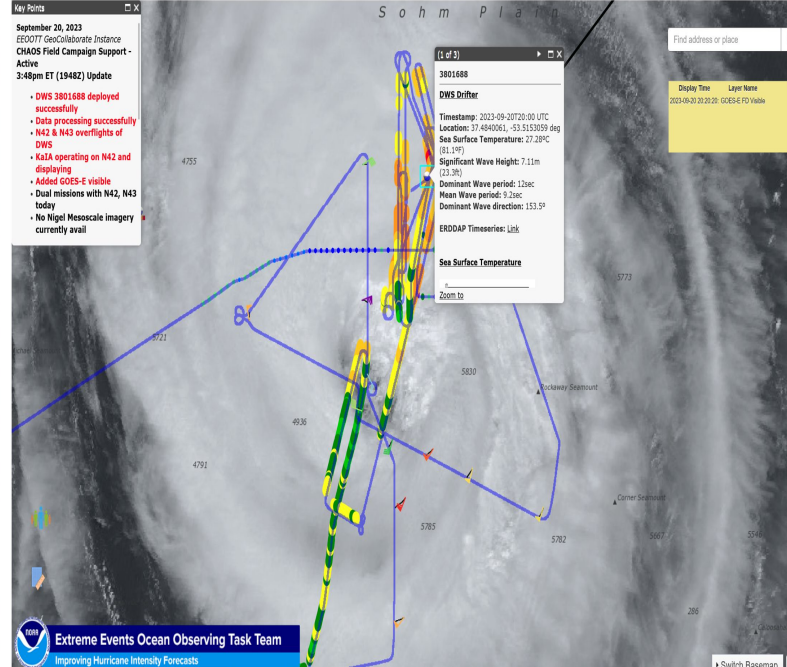
1st Deployment of ADWSD by N42

September 19 - 40 mi ahead of eyewall



2nd Deployment of ADWSD by N42

September 20 - NE of eyewall



Successes

- Short turn-on time
- Great work on GeoCollaborate
- Significant wave heights peak - 9.5 m / 8.2 m

- Multiple fly-overs by N42 (and a few by N43)
- Thanks Zorana, Joe, Paul, Casey and NESDIS team!

N42 drops ADWSD*
40mi ahead of eyewall
Turns around to fly over
Drifter activated in 20-25min
Shows up in GC
Flyover multiple times
Data appears in all instances of GC NRT

*A = A-size fits down A-size chute that sonobuoys use on P-3

WSRA & KaIA Data Visualization | Drifter measurements

4
Innovation

NIGEL

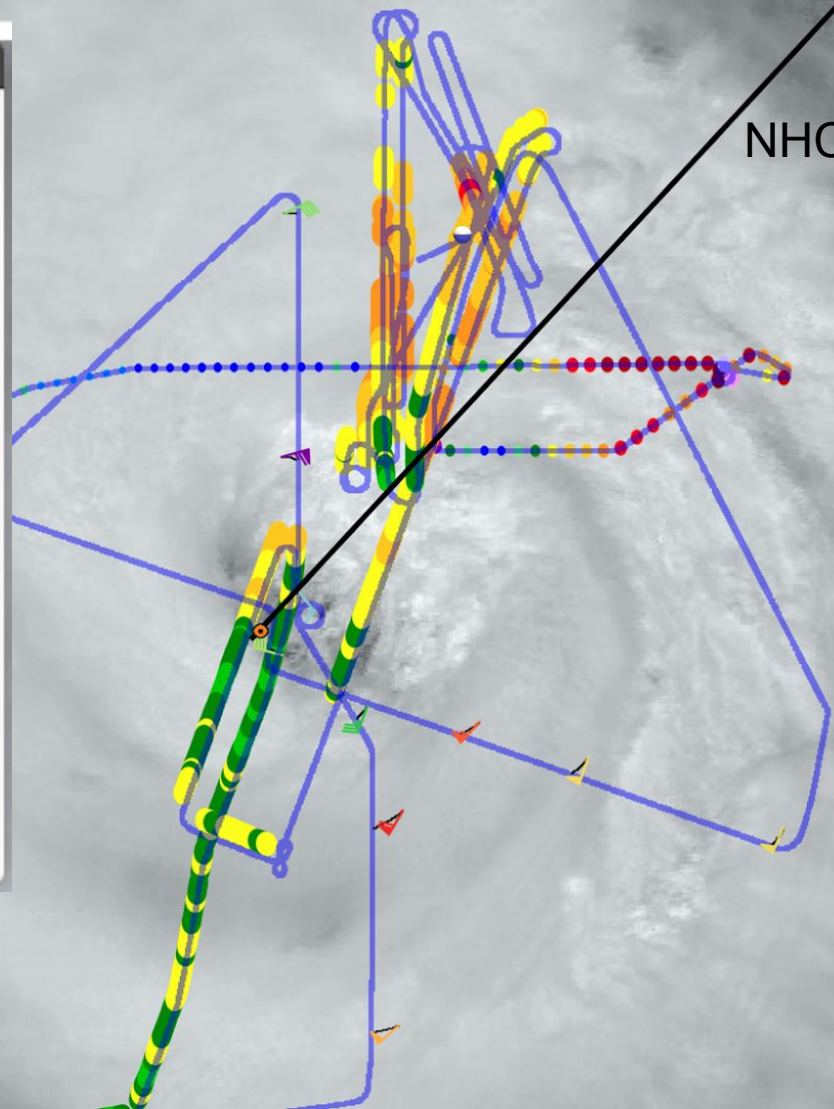
Display Time	Layer Name
2023-09-20 20:20:20	ES-E FD Visible

Find address or place

Key Points

September 20, 2023
EEOOTT GeoCollaborate Instance
CHAOS Field Campaign Support - Active
12:54pm ET (1654Z) Update

- **DWS 3801688 deployed successfully**
- **Data processing successfully**
- **N42 & N43 overflights**
- **KaIA operating on N42 and displaying**
- **Added GOES-E visible**
- **Dual missions with N42, N43 today**
- **No Nigel Mesoscale imagery currently avail**
- **No flight plan avail for N42, N43**



NHC Track Forecast

Coincident Measurements | Saildrone & Dropsondes

Flight Track N43

Flight track for flight 20231022I1 with mission ID of WA20A TAMMY.

Parameter	Value
Storm ID	AL202023
Start Time	2023-10-22T13:03:05Z
End Time	2023-10-22T20:24:24Z
File Last Updated	2023-10-22 20:29:34Z



Anegada Ridge

(1 of 4)
Lat=18.9842976, Lon=-63.3567168
Saildrone Atlantic 2023 Hurricane Monitoring Surface Data, drone 1040
Data courtesy of Saildrone
latitude = 18.9842976 degrees_north
longitude = -63.3567168 degrees_east
time = 2023-10-22T16:02:00Z
trajectory = 1040.0
WIND_FROM_MEAN = 115.6 degree
WIND_SPEED_MEAN = 19.38 m s-1
TEMP_AIR_MEAN = 26.34 degree_C
RH_MEAN = 96.88 percent
BARO_PRES_MEAN = 994.08 hPa
WAVE_DOMINANT_PERIOD = 9.85 s
WAVE_SIGNIFICANT_HEIGHT = 4.991 m
TEMP_SBE37_MEAN = 29.5644 degree_C
SAL_SBE37_MEAN = 35.0471 1
Zoom to

Dropsonde traveled 4.05 miles

SD1040 position at 1602Z

N43 drop at 1559Z

4.2 miles

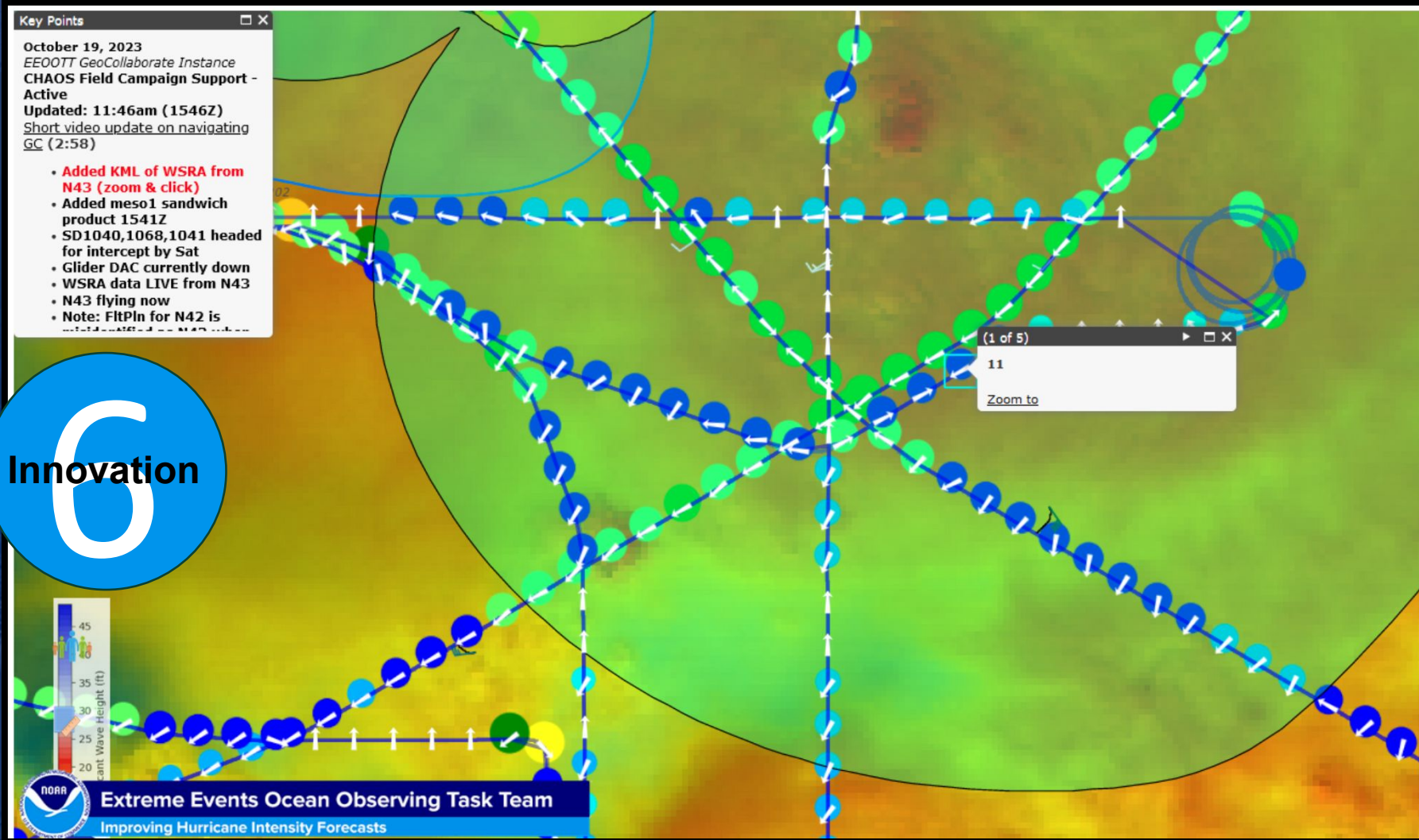
Dropsonde traveled 3.36 miles

Splash at 1602Z

(1 of 4)
Dropsonde splashing at 2023-10-22 16:02:36Z
Parameter Value
Flight ID 20231022I1
Sample Time 2023-10-22 16:02:36
Launch Time 2023-10-22 15:59:16
Altitude above MSL (m) 13.75
Latitude (degree) 18.93760871887207
Longitude (degree) -63.315731048583984
Horizontal Wind Speed (m/s) 24.7
Horizontal Wind Speed (knot) 48.02
Zoom to

NIGEL

WSRA Interactive



6
Innovation

NIGEL

WSRA data from N43

Sig Wave Hgt KML from Ivan (ProSensing) layered onto color coded wave heights

Combined product is interactive in GC

SBIR/STTR
SMALL BUSINESS INNOVATION RESEARCH
SMALL BUSINESS TECHNOLOGY TRANSFER

WSRA, KaIA & GeoCollaborate are SBIR Technologies !

Challenges



Funding of GeoCollaborate use in 2024 season to support missions and build upon innovations in 2023 



Direct access to Saildrone data feed (KML) would make a huge difference for ensuring coincident observations. (Currently ~2-hr delay via ERDDAP)



Easily determining which ARGO Floats would be surfacing near any missions to coordinate planned drops



Aircraft bandwidth is a challenge. GeoCollaborate could be used easily with bandwidth improvements and improve efficiencies



Adding additional ocean observations that can contribute to the mission

Summary – Future Applications



Get more ocean observations, satellite and model data into NHC easily prior to AWIPS-II integration. [Help set priorities]



Coordinate research & ops flight plans (HRD, NHC, CARCAH, AOC, ONR)

Partners



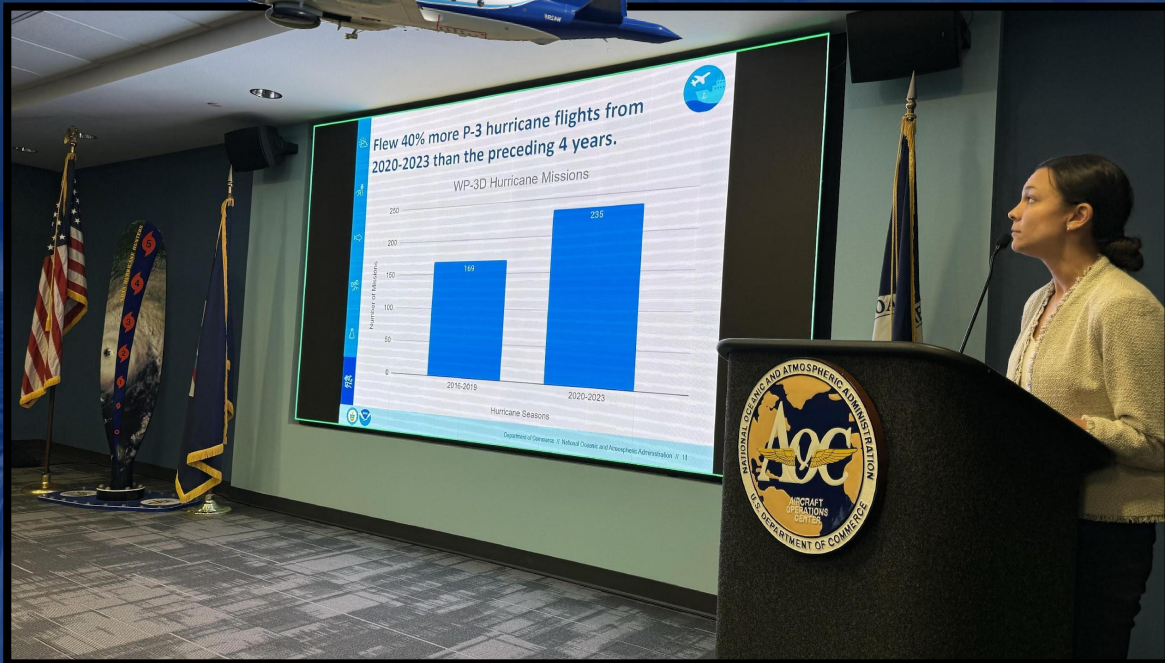
Hurricane & Ocean Testbed (HOT) Potential

- Testing and evaluating promising new datasets, models
- Fostering iterative interactions among researchers, operational forecasters and data users / decision makers
- Building a culture of interdisciplinary collaboration and innovation to advance the NOAA mission
- Engaging early career professionals in real-time data collaboration environment
- Putting more IOOS data to work to improve services to decision makers at all levels
- Advancing cross line-office collaboration and engagement

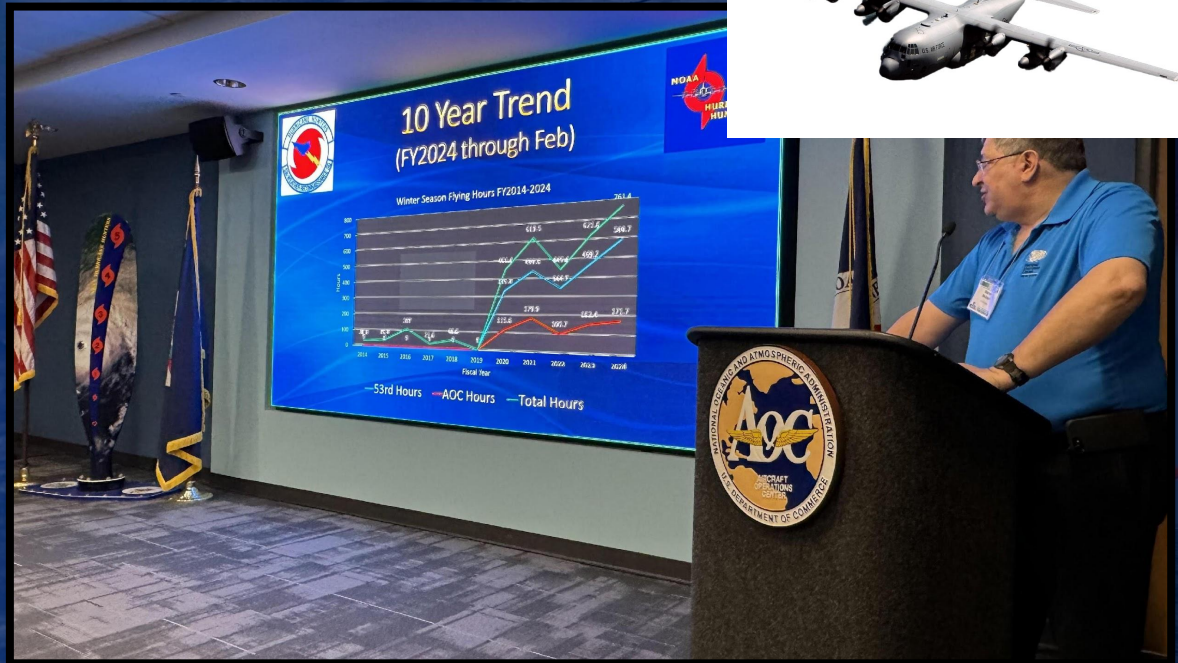
Last week | TCORF meeting Lakeland, FL

1:40pm ET (1740Z) Update
• Miss 1 1740Z Sandwich
• N43 dropsonde data feed not updating
• Driver 35
• who work
• N43 2018
• Turned on
• N43 N42
• 20230211
• 1740Z
• 1740Z

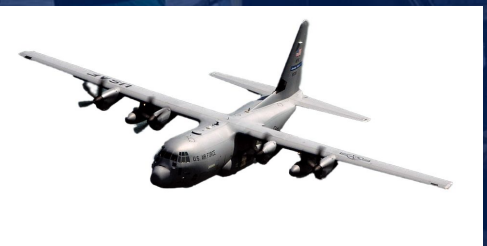
BIG concern about upcoming hurricane season and resources available | Recon (Both NOAA AOC and USAF Reserve 53rd Wx Squadron)



NOAA Aircraft Operations Center



US Air Force Reserve 53rd Weather Squadron



Why are observations important?



PRESENTER
Dave Jones, CEO
StormCenter Communications, Inc.
dave@stormcenter.com

Last week | TCORF meeting Lakeland, FL

1:40pm ET (1740Z) Update
• Plans 1-1740Z Sandwich
• NWS dropsonde data feed not updating
• D-Linker 3.0
• WFO work
• WFO work
• Training on
• NWS NWS
• 20230211
• 20230211



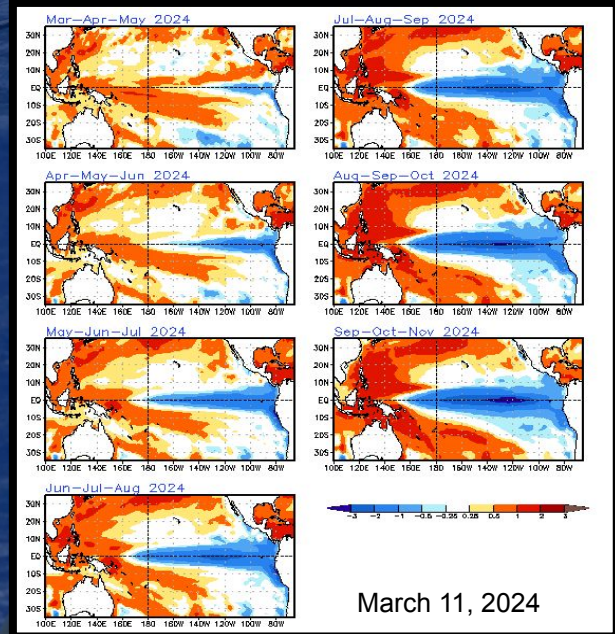
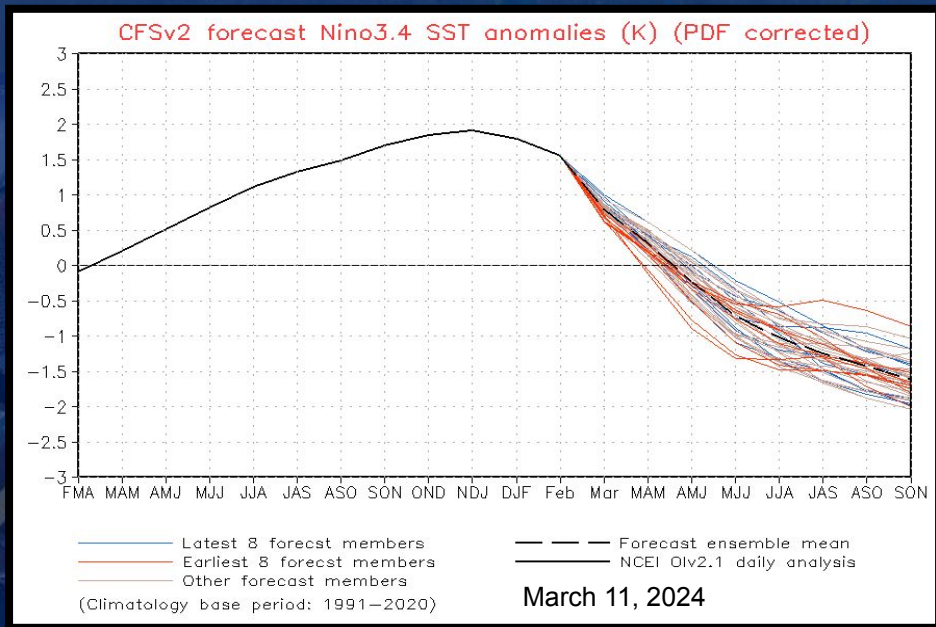
BIG concern about upcoming hurricane season and resources available | Recon (Both NOAA AOC and USAF Reserve 53rd Wx Squadron)



SSTs at their highest level in more than 45 years in MDR | Could signal very active season



NOAA CPC predicts shift to La Nina conditions in Tropical Pacific



Why are observations important?



PRESENTER

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dave@stormcenter.com

Summary – Future Applications



Coordination & Deconfliction of airspace between DoD 53rd USAF Reserve & NOAA (extend to sUAS flights)



Coordination of operational and research flights | missions, planned drops coincident with ocean obs platforms



Accelerating R2O through cross-Line Office (LO) collaboration and data sharing | Advancing OAR WPO goals and objectives

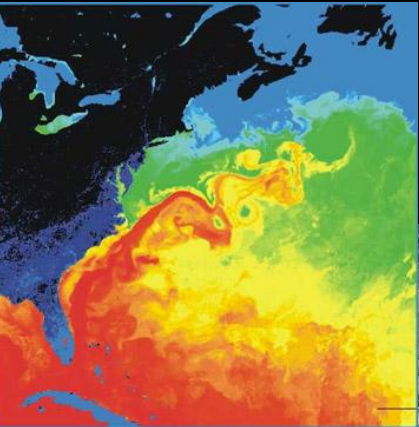


Getting more data into hands of operational forecasters | GC is a NASA & NOAA funded technology with approval across entire agency for GC acquisition on sole source basis (SBIR Phase III)

Coming in the Fall 2024

***Megalodons, Mermaids, and Climate Change:
Answers to your ocean and atmosphere questions***

Columbia University Press
Ellen Prager, Ph.D. and Dave Jones
@elprager, @stormcenter410



HURRICANE FORECAST IMPROVEMENT PROGRAM

HFIP MARCH SEMINAR 2024

- Drifter 3001797 deployed and working
- N42A operating
- Turned on N43B, N42 Live tracking
- N43 N42 FH Plan Posted for 20230919

Message ID: WATSA 11001
Parameter Value
Storm ID: A132024
Start Time: 2023-09-19T13:11:00Z
End Time: 2023-09-19T13:11:00Z
File Last Updated: 2023-09-19T13:11:00Z

This presentation was produced as part of the NOAA GOMO Extreme Events Ocean Observing Task Team (EEOOTT) 2023 CHAOS Hurricane Field Campaign

4 minute video describing GeoCollaborate use
Can be seen at this link:

<https://youtu.be/SR1Br6CY5iM>



NOAA
GLOBAL OCEAN
MONITORING & OBSERVING

GeoCollaborate is funded under a SBIR Phase III sole source justification contract through NOAA GOMO. [NOAA Technology Partnership notification](#)



Dave Jones, CEO
StormCenter Communications, Inc.
dave@stormcenter.com

HURRICANE FORECAST IMPROVEMENT PROGRAM

HFIP MARCH SEMINAR 2024

MARCH 13 2024

- Drifter 3001797 deployed and working
- N42A operating
- Turned on N43B, N42 Live tracking
- N43 N42 FH Plan Posted for 20230919

mission ID of WATN 11001	Value
Parameter	41332024
Start Time	2023-09-19T13:13:00Z
End Time	2023-09-19T13:13:00Z
File Last Updated	
Zoom to	



NOAA GLOBAL OCEAN MONITORING & OBSERVING

Thanks to

cheyenne.stienbarger@noaa.gov

TOPS and Extreme Events Program Manager

GeoCollaborate is funded under a SBIR Phase III sole source justification contract through NOAA GOMO.

[NOAA Technology Partnership notification](#)



Dave Jones, CEO
StormCenter Communications, Inc.
dave@stormcenter.com