

**NOAA / AOML / Hurricane Research Division
Hurricane Field Program
Advancing the Prediction of Hurricanes Experiment (APHEX)**

FLIGHT LOG - 20210905N1

MISSION PLAN			
FLIGHT ID	20210905N1	STORM	AL12 / LARRY
MISSION ID	WA12A	TAIL NUMBER	NOAA49
TASKING	HRD	PLANNED PATTERN	Survey + Circumnav
MISSION SUMMARY			
TAKEOFF [UTC]	0851	LANDING [UTC]	1604
TAKEOFF LOCATION	St. Croix	LANDING LOCATION	St. Croix
FLIGHT TIME	7.2	BLOCK TIME	7.4
TOTAL REAL-TIME RADAR ANALYSES (Transmitted)	3 (3)	TOTAL DROPSONDES (Good/Transmitted)	38 (36/36)
OCEAN EXPENDABLES (Type)	None	sUAS (Type)	None
APHEX EXPERIMENTS / MODULES	Mature Stage Experiment: TC Diurnal Cycle		
HRD CREW MANIFEST			
LPS ONBOARD	None	LPS GROUND	Dunion, O'Neill, Wing
TDR ONBOARD	None	TDR GROUND	Reasor, Gamache
ASPEN ONBOARD	Parrish	ASPEN GROUND	None
NESDIS SCIENTISTS	None		
GUESTS (Affiliation)	None		
AOC CREW MANIFEST			
PILOTS	Mansour, Varwig		
NAVIGATOR	None		
FLIGHT ENGINEERS	None		
FLIGHT DIRECTOR	Kalen, Parrish		
DATA TECHNICIAN	Defeo		

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AVAPS	Greene
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PRE-FLIGHT

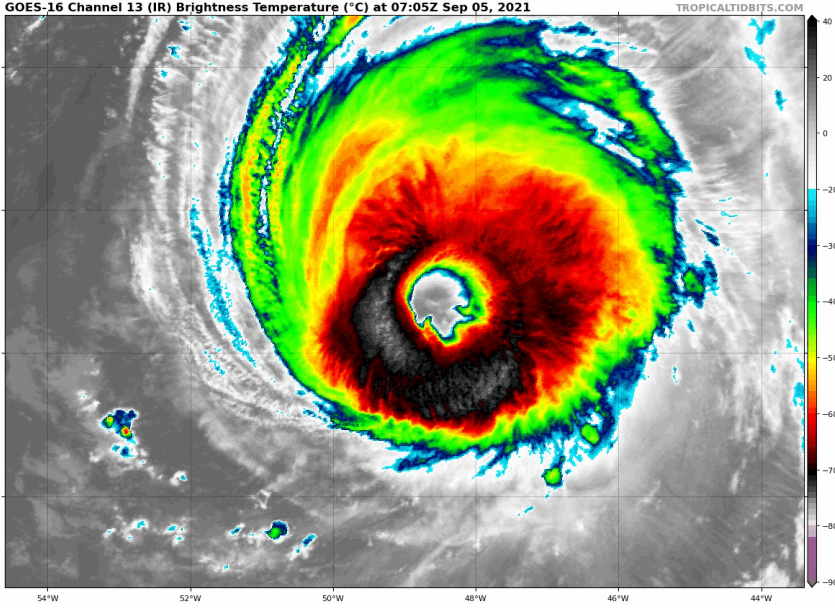
Flight Plan	
Expendable Distribution	Dropsondes released at all of the green points in the above plan
Preflight Weather Briefing	As of the 5 AM EDT NHC advisory, Hurricane Larry is located near 18.8N / 49.0W, has a maximum sustained wind of 105 kt, MSLP of 958 mb, and is moving NW at 14 mph. The storm appears to be maintaining a fairly steady state intensity, although some westerly wind shear seems to be impacting the structure somewhat as the precipitation on the western side is more confined than the eastern side.
Instrument	None

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Notes	
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IN-FLIGHT	
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Time [UTC]	Event
0851	Takeoff from St. Croix
0925	GOES-16 IR: 0705-0925 UTC 
0900	NHC Intensity: 105 kts
0920	CIMSS TCDC imager shows early staged of the TC diurnal cycle

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<h2 style="margin: 0;">Tropical Cyclone 12L</h2>	
<div style="display: flex; justify-content: space-between; align-items: center; margin-bottom: 5px;"> <div style="font-size: 8px; text-align: center;"> Cooperative Institute for Meteorological Satellite Studies / University of Wisconsin-Madison NOAA / AOML / Hurricane Research Division </div> </div> <h3 style="margin: 0;">Tropical Cyclones - TC Diurnal Cycle</h3> <div style="display: flex; justify-content: space-around; font-size: 10px; margin-bottom: 5px;"> <div style="text-align: center;"> Current IR Image <i>Storm Centered Cloudtop Enhanced</i> </div> <div style="text-align: center;"> Current 6-hr IR Temperature Trends <i>(Yellow to Red Shading: IR Cooling Trend) (Blue to Purple Shading: IR Warming Trend)</i> </div> </div> <div style="display: flex; justify-content: space-around;"> </div> <div style="text-align: center; margin-top: 10px;"> <h4 style="margin: 0;">TC Diurnal Cycle Clock (24-hr)</h4> <p style="font-size: 8px; margin: 0;">*Indicates expected arrival time (LST) of the TC diurnal pulse at various TC radii*</p> </div>	
0955	CIMSS VWS: shows fairly high SE-NW gradient in VVWV, but a lot of shear to the NW looks to just be associated with UL outflow from the storm. Is the shear to the NW not as high as it looks?

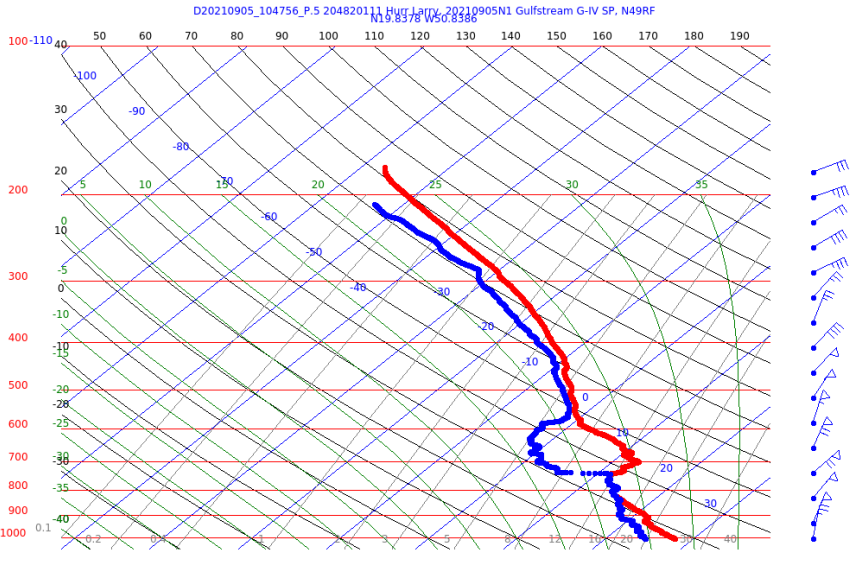
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	<p style="text-align: center; font-size: small;">TROPICAL CYCLONE FORMATION/INTENSIFICATION IS GENERALLY: FAVORABLE/NEUTRAL/UNFAVORABLE GOES-EAST UTM0 -SHEAR (KTS) 0600 UTC 08SEP21 UN-C11MS3/NEED15</p>
1038Z	Flight crew says "Lgt chop here, touching the CDO. VFR up till now."
1045	<p>Interesting cloud shelf ~62 n mi W of the center. These are the mysterious cloud shelves that occasionally get talked about on the tropical storms list. AOC Flight Director Jack Parrish took a photo of it during N49's closest approach near drops 10 and 11.</p>
1047z	Interesting Skew T at WP 11 (inner circumnav NW of the center). Almost an

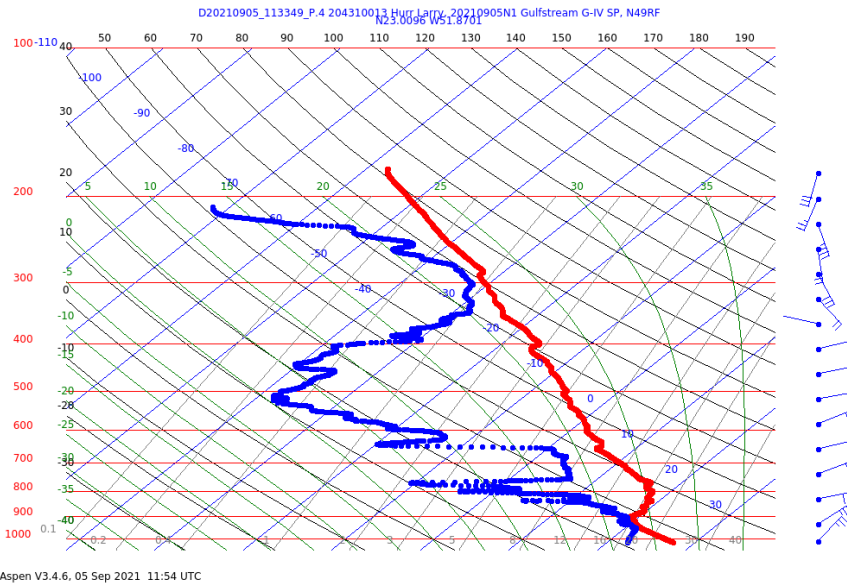
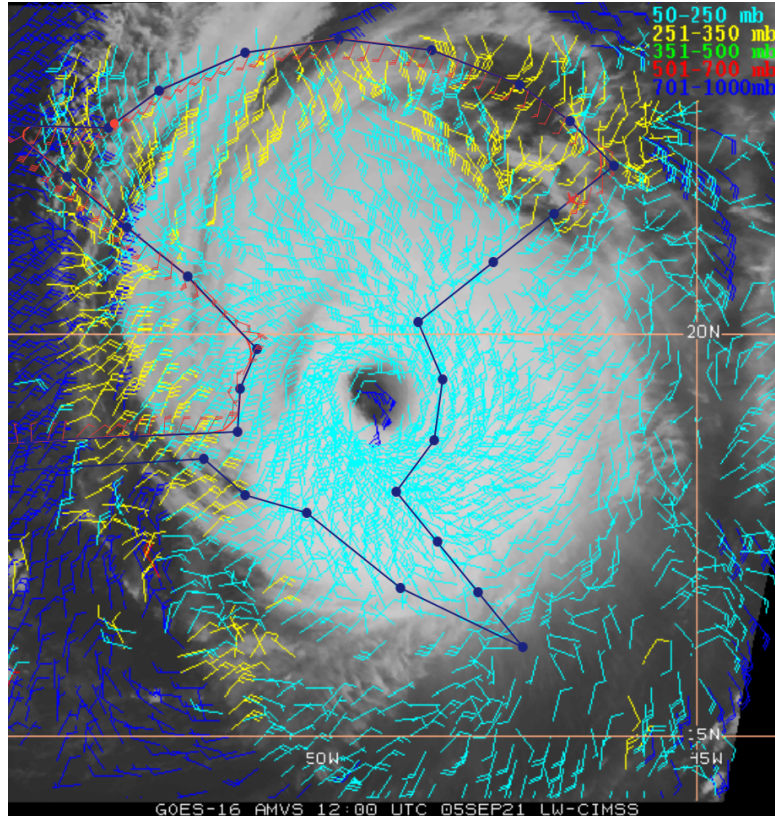
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	<p>onion sounding with a 125 mb thick (~600-725mb) dry layer.</p> 
<p>1133z</p>	<p>22.83695° -52.02576° Flight level winds at 170 mb 20 kts from SW. Atmospheric motion vector (AMV) 50-250 m said 25-30 kts from S. Sonde 17 (below) seems to match AMV better than flight level (FL). Flight level winds have seemed consistently biased low</p>

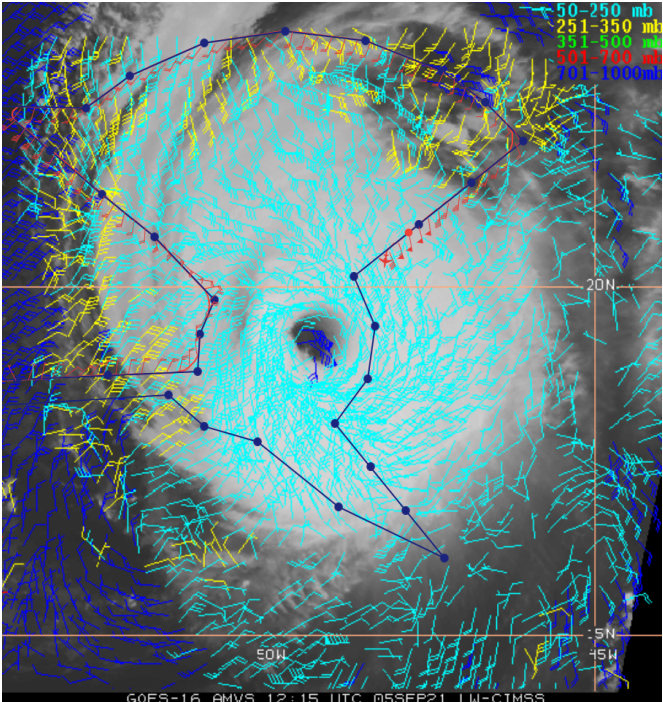
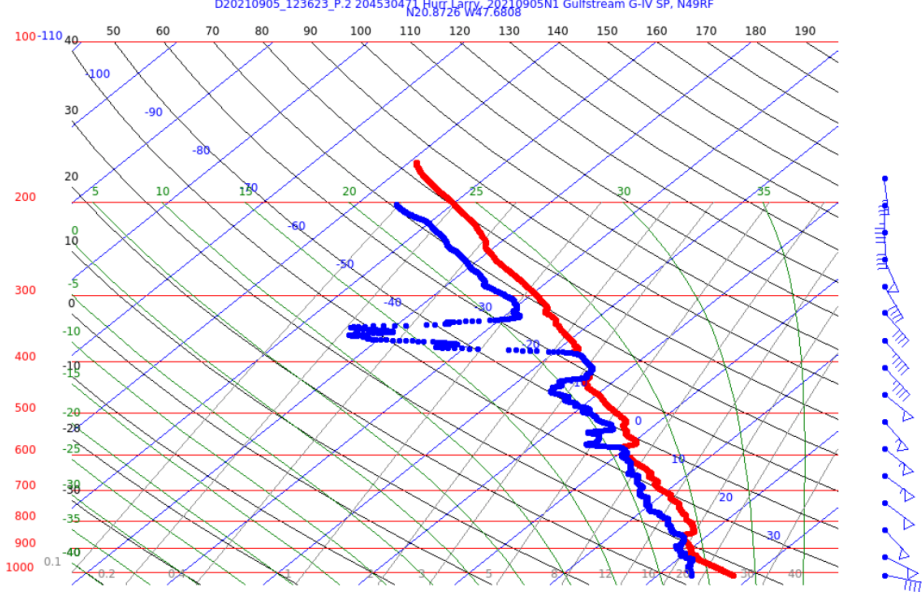
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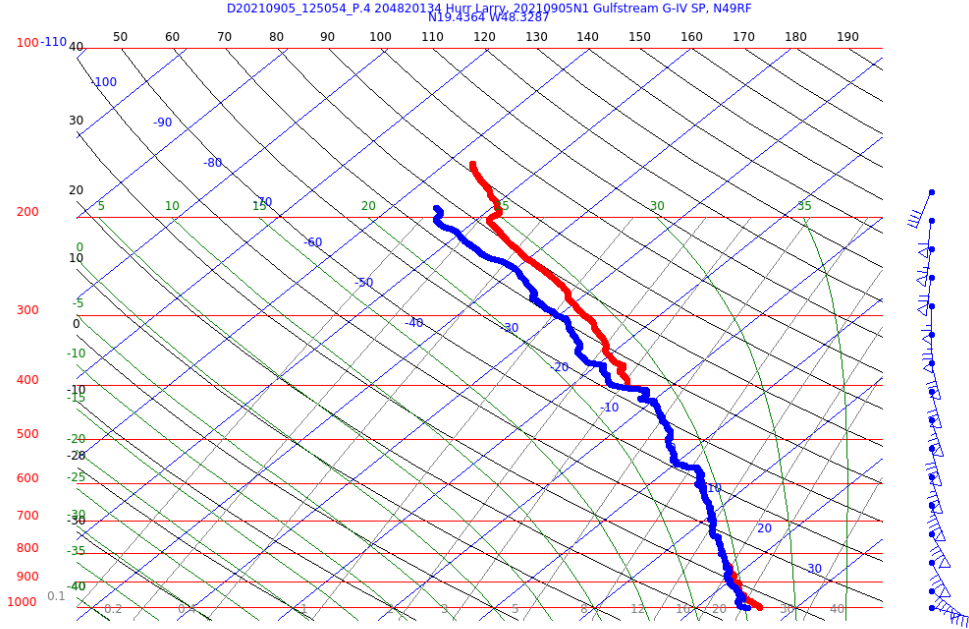
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1135Z	Flight crew notes “CDO height difference the far side of that arc cloud”, confirmed by satellite visual imagery
1239Z	<p>FL (163 mb) winds 50 kts 20.87934° -47.66968°, sonde 25 says 35 kts</p>  <p style="text-align: center; font-size: small;">GOES-16 ANVIS 12:15 UTC 05SEP21 WPC/IVSS</p> <p style="text-align: center; font-size: x-small;">D20210905_123623_P.2 2045304711 Wpt Lrry_20210905N1 Gulfstream G-IV SP, N49RF 12:08:26 W47.66968</p> 

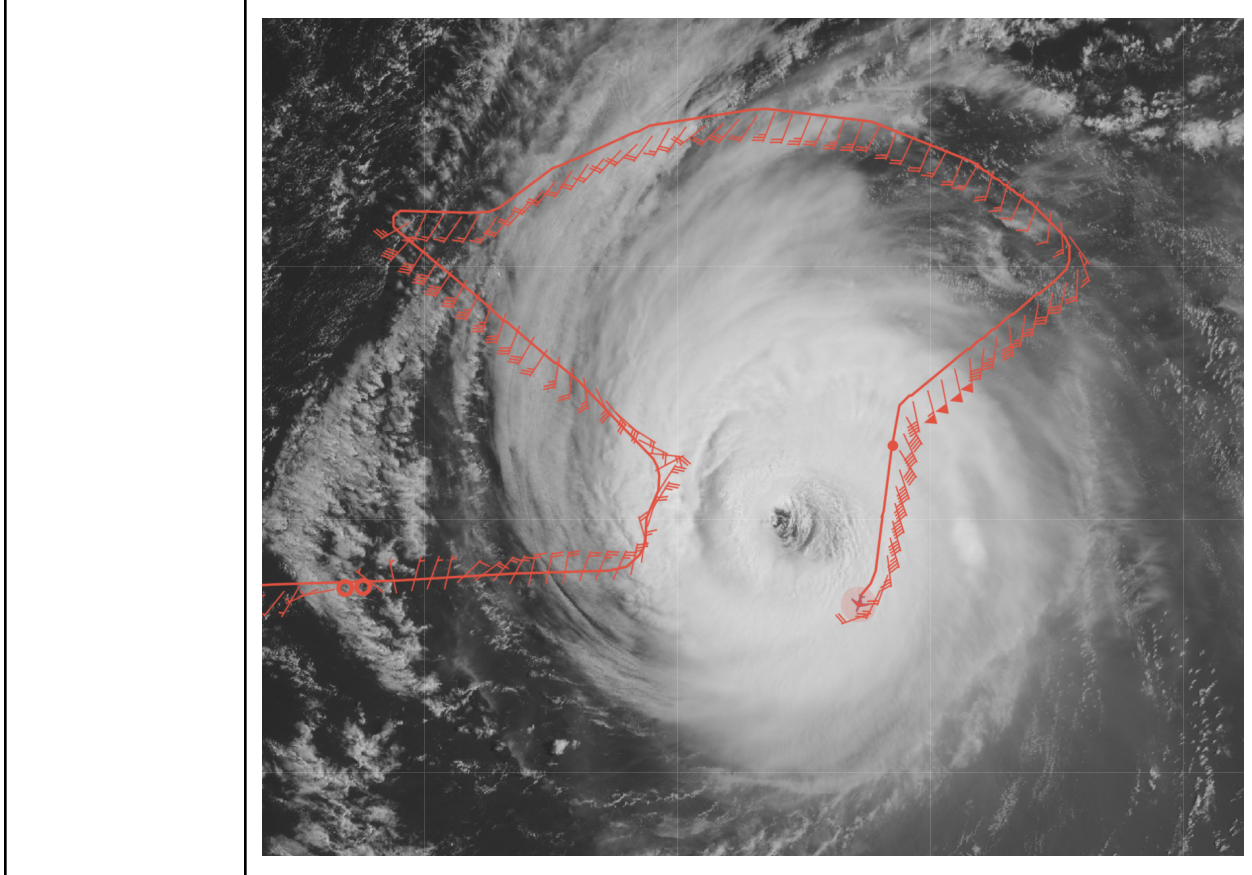
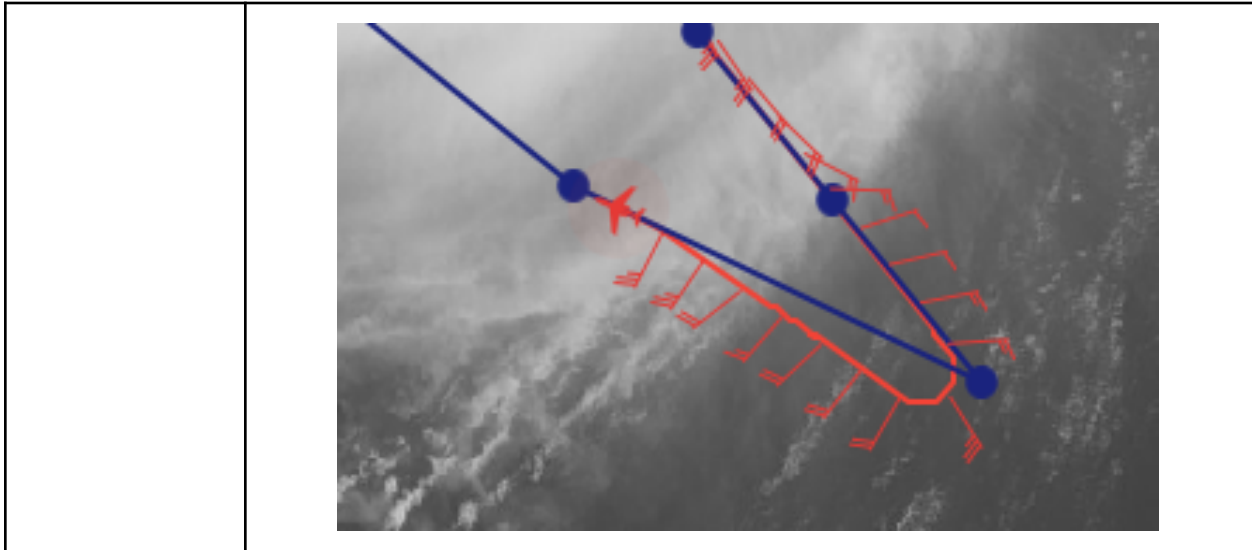
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1240Z	Bumping WP 26 NE to 20.40N 48.30W (to avoid getting jammed into the NW eyewall).
1250Z	<p>Sonde 27 saturated, 75nmi to eye</p> 
1304Z	AOC FD: some converging bands near Pt 29, so turned just a bit early for Pt 30
1335Z	Suspicious flight level winds

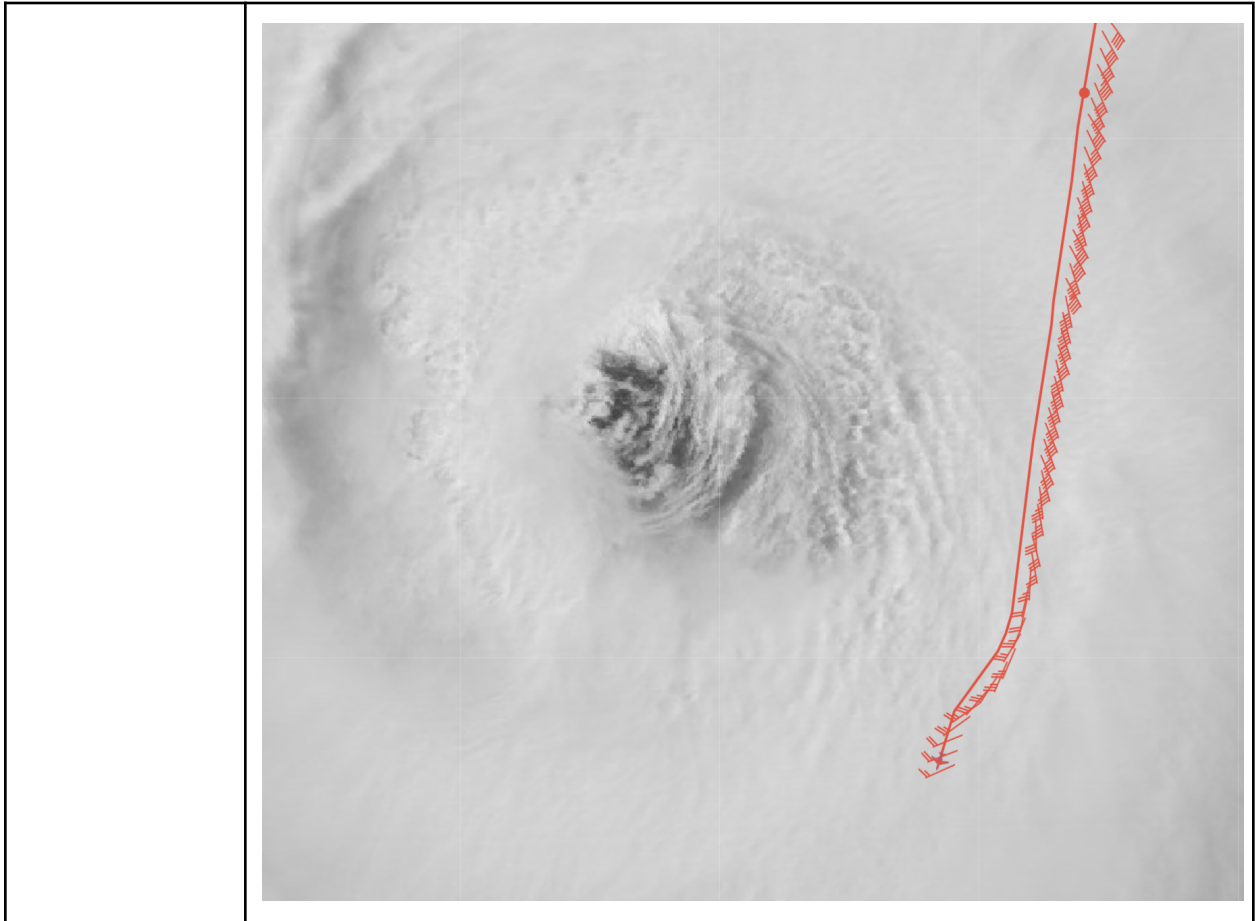
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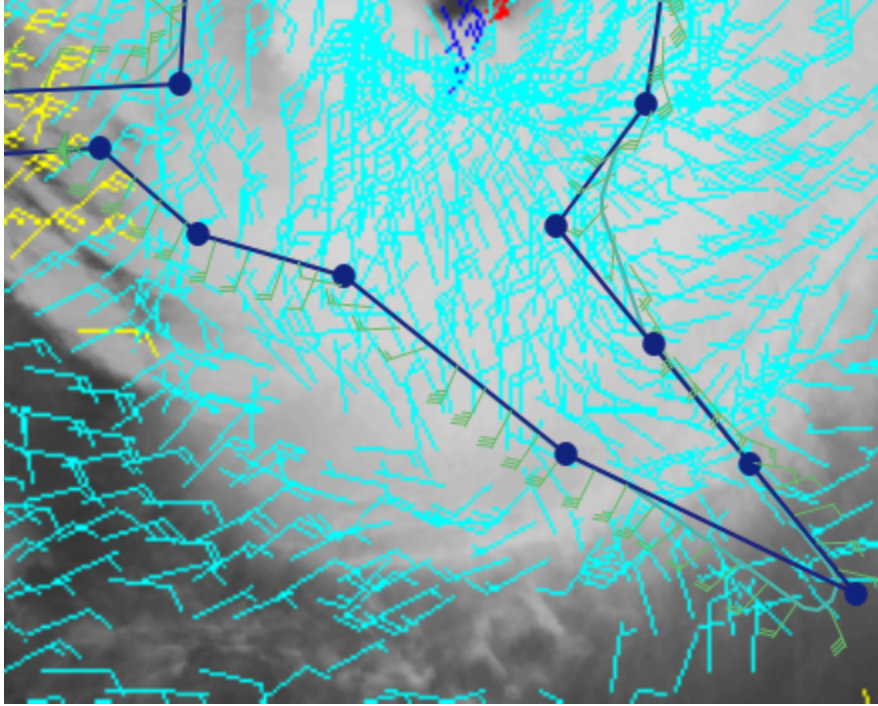
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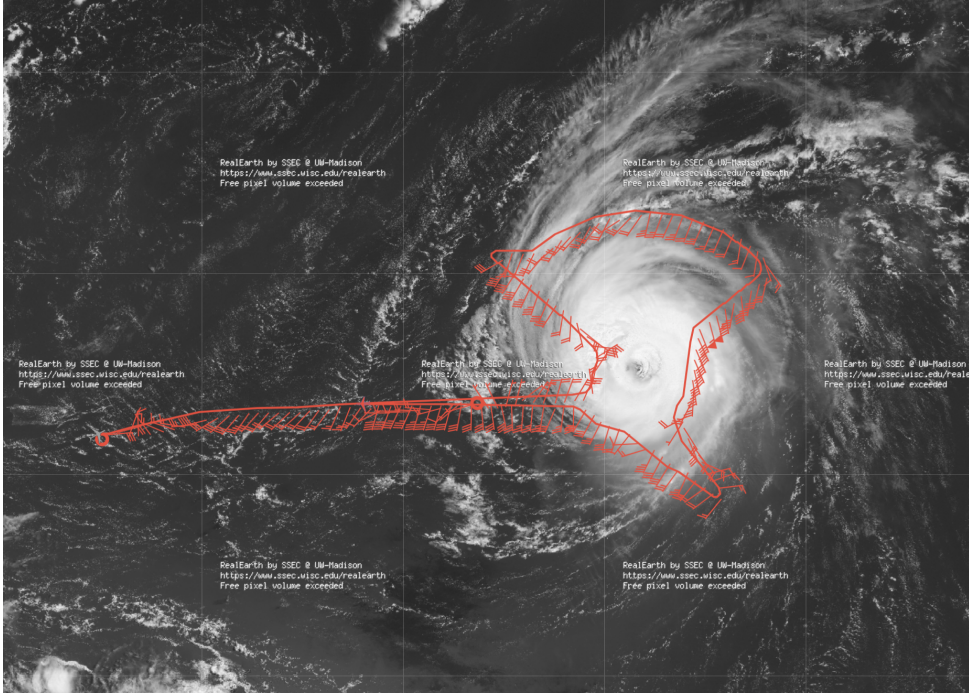
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1403	Continued surprising (potentially wrong) flight level winds 
1130	Ob 17 (113402z) dropsonde is a backup. First sonde had no GPS initially, but started reporting data at ~15 Kft. Might be some useful data there.
1401	Last sonde (Ob 36)

POST-FLIGHT	
Mission Summary	38 dropsondes deployed, 36 sent to the GTS (dropsonde account charges: 25 STAN, 13 HRD)
Actual Standard Pattern Flown	Survey + Circumnave
APHEX	<i>Mature Stage Experiment: TC Diurnal Cycle</i>

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Experiments / Modules Flown	
Plain Language Summary	
Instrument Notes	
Final Mission Track	 <p>The image shows a satellite view of a hurricane with a red flight track overlaid. The track starts from the left, moves horizontally across the middle, then curves around the hurricane's eye and extends into the right side. The hurricane's eye is visible in the center-right. The image is a grid of smaller satellite images, each with a watermark: "RealEarth by SSEC @ UM-Hadison", "https://www.ssec.wisc.edu/realearth", and "Free pixel volume exceeded".</p>

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