

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

**FLIGHT LOG -- 20210817H1**

<b>MISSION PLAN</b>			
<b>FLIGHT ID</b>	20210817H1	<b>STORM</b>	AL07 / GRACE
<b>MISSION ID</b>	0807A	<b>TAIL NUMBER</b>	NOAA42
<b>TASKING</b>	EMC	<b>PLANNED PATTERN</b>	Butterfly
<b>MISSION SUMMARY</b>			
<b>TAKEOFF [UTC]</b>	0757	<b>LANDING [UTC]</b>	1514
<b>TAKEOFF LOCATION</b>	Lakeland	<b>LANDING LOCATION</b>	Lakeland
<b>FLIGHT TIME</b>	7.3	<b>BLOCK TIME</b>	7.6
<b>TOTAL REAL-TIME RADAR ANALYSES (Transmitted)</b>	3 transmitted (AWIPS files not created for last analysis though)	<b>TOTAL DROPSONDES (Good/Transmitted)</b>	14 (14/14)
<b>OCEAN EXPENDABLES (Type)</b>	None	<b>sUAS (Type)</b>	None
<b>APHEX EXPERIMENTS / MODULES</b>	None		
<b>HRD CREW MANIFEST</b>			
<b>LPS ONBOARD</b>	Aberson	<b>LPS GROUND</b>	Wadler
<b>TDR ONBOARD</b>	Aberson	<b>TDR GROUND</b>	Fischer, Reasor
<b>ASPEN ONBOARD</b>	None	<b>ASPEN GROUND</b>	Dunion
<b>NESDIS SCIENTISTS</b>	None		
<b>GUESTS (Affiliation)</b>	None		
<b>AOC CREW MANIFEST</b>			
<b>PILOTS</b>	Abitbol, Stateler, Shaw		
<b>NAVIGATOR</b>	Utama, B. Richards		
<b>FLIGHT ENGINEERS</b>	Sanchez, Stokes, Greene		
<b>FLIGHT DIRECTOR</b>	Lundry		
<b>DATA TECHNICIAN</b>	T. Richards		
<b>AVAPS</b>	Warnecke		

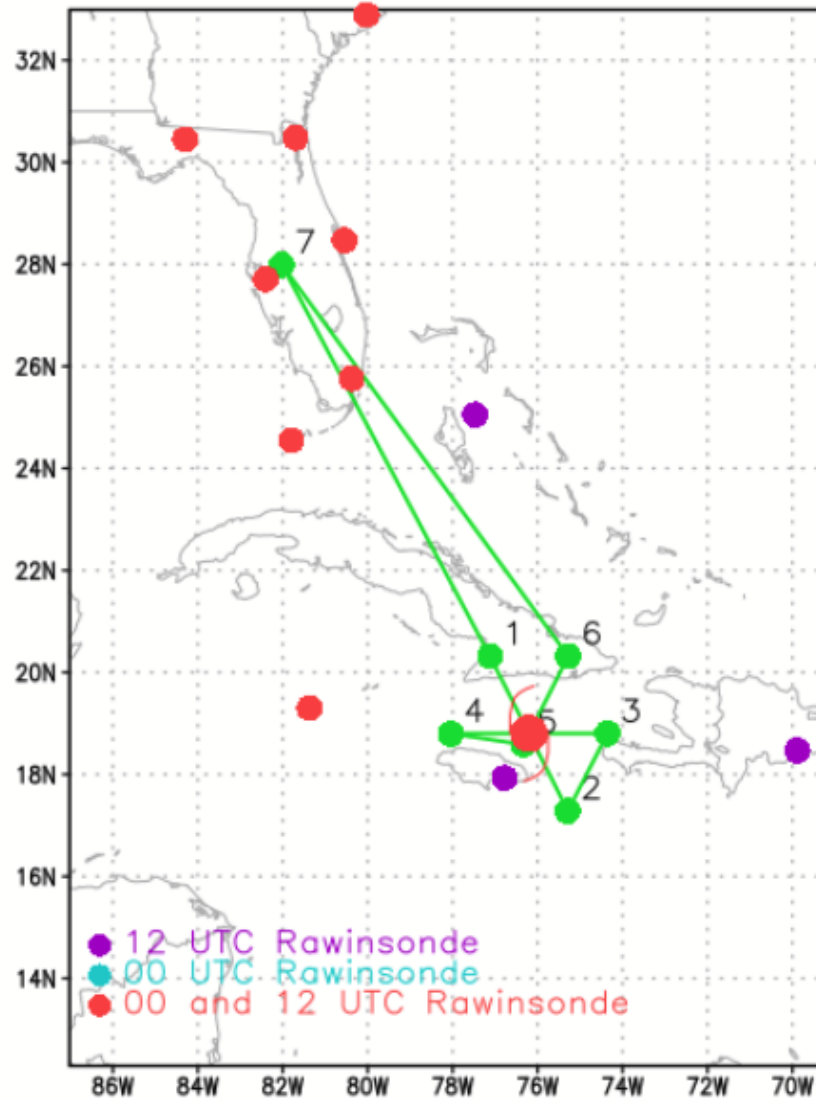
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PRE-FLIGHT

Flight Plan

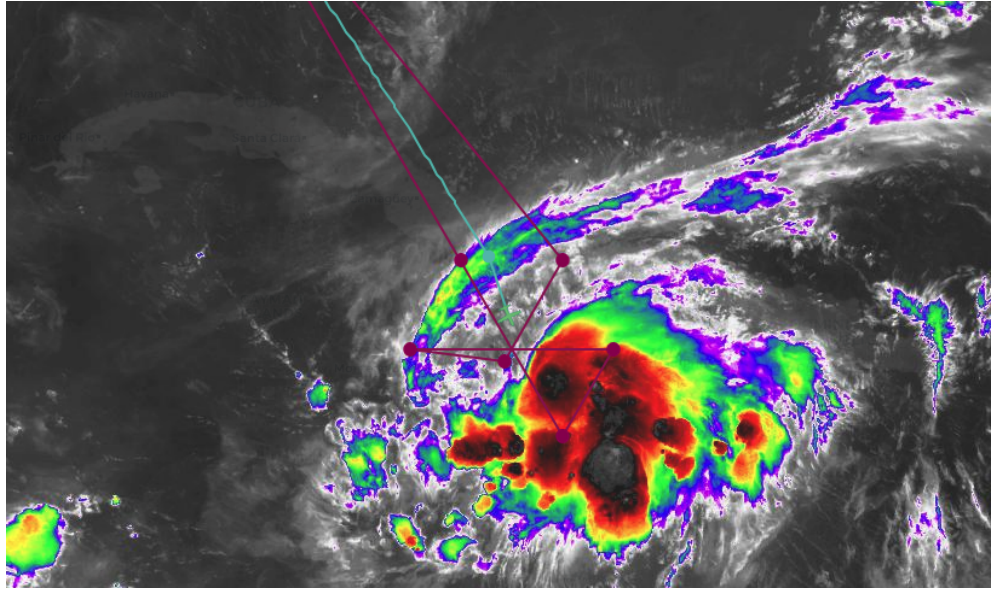
Timing of the pattern is to be on-station for EMC data collection for the 1200 UTC assimilation window between 0900 UTC and 1500 UTC. Flight altitude originally at 10 kft. Changed at pre-flight brief to 12kft due to mountains. Pattern rotated 10 degrees to avoid land.



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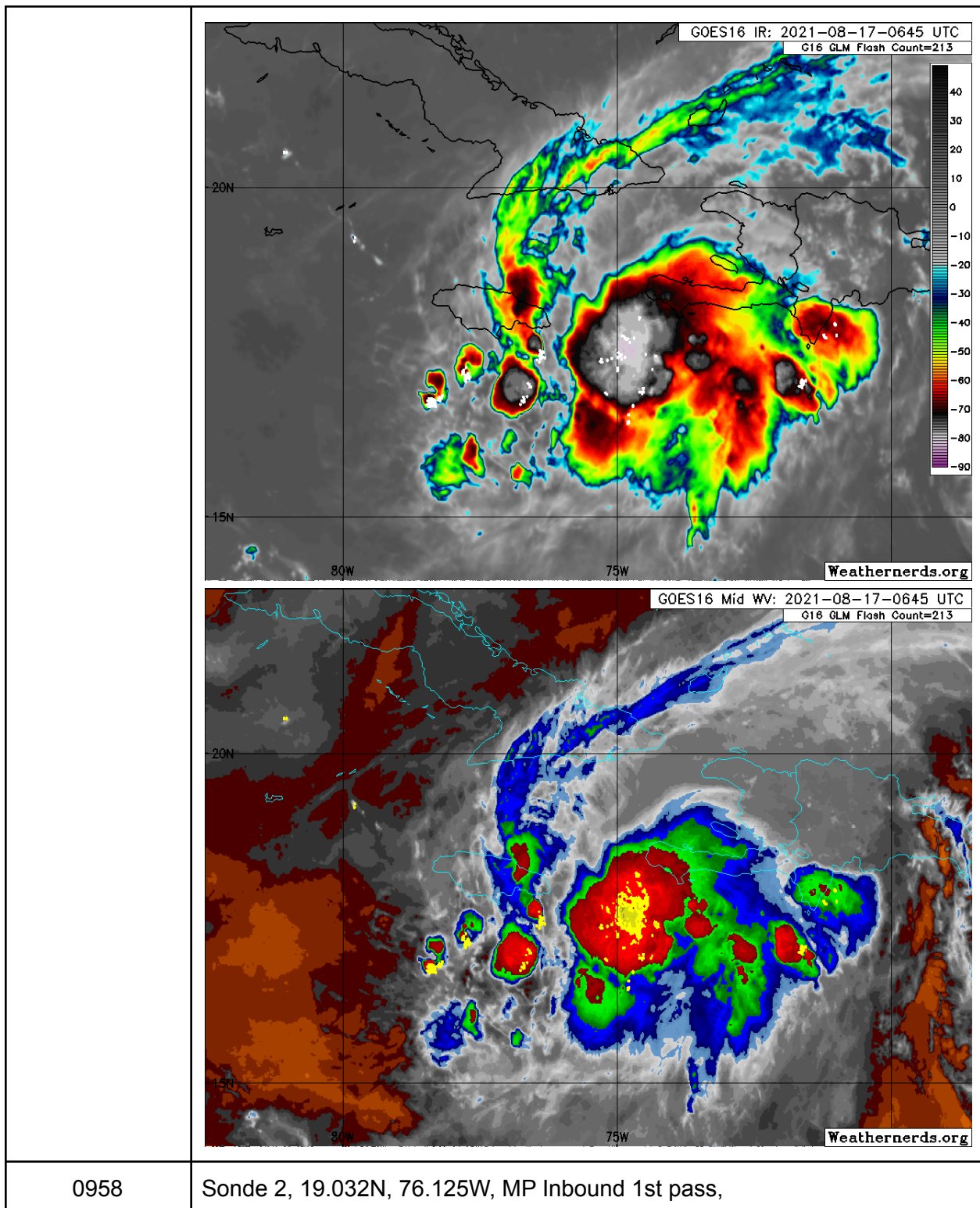
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<b>Expendable Distribution</b>	Sonde releases at endpoints (EP), midpoints (MP), and center (ctr) of each pass.
<b>Preflight Weather Briefing</b>	
<b>Instrument Notes</b>	CRL is operating

IN-FLIGHT	
Time [UTC]	Event
0757	Takeoff
0941	Over Cuba. Beginning descent into pattern.
0946	<p>IP sonde released, 19.823N 76.430W, nothing noticed on MMR or TDR for determining start time for radar analysis. All convection is on the east side</p> 

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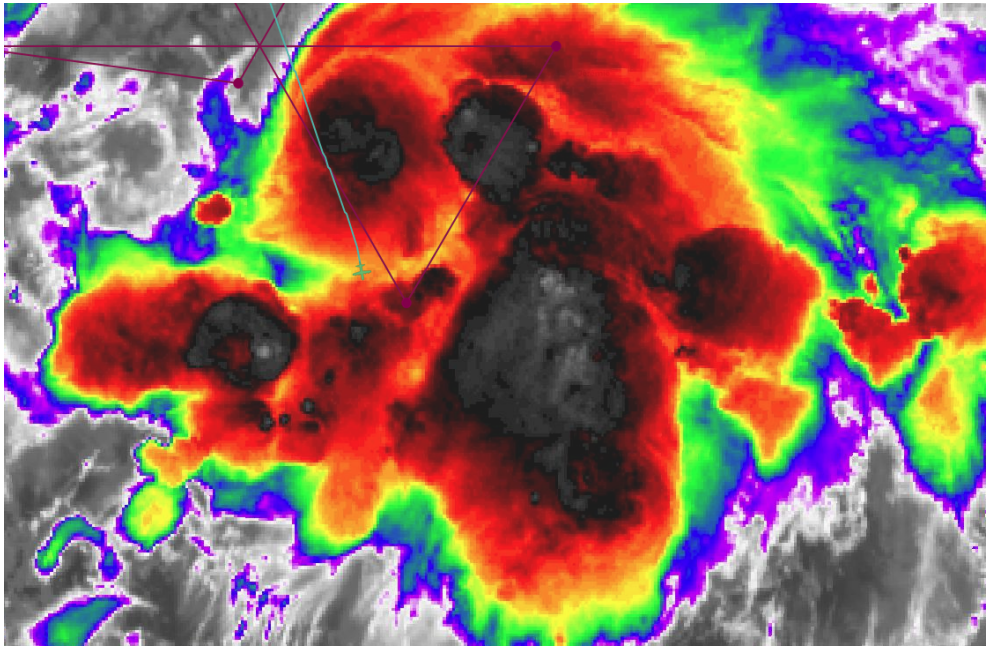
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1005	From Sim: Looks like we'll miss the center about 10-15 nmi to our east. Looks like a tight comma on radar																																																				
1012	<p>Sonde 3, 18.056N, 75.756W, center, pass 1. Low-level winds at surface, but not marked center.</p> <div style="text-align: right; font-size: small; margin-bottom: 5px;">TROPICALTIDBITS.COM</div> <table border="1" style="font-size: x-small; margin-top: 10px;"> <thead> <tr> <th>Level</th> <th>Height</th> <th>Temp</th> <th>RH</th> <th>Wind</th> </tr> </thead> <tbody> <tr> <td>700 mb</td> <td>3118 m</td> <td>9.4 °C</td> <td>83%</td> <td>NNW at 16 kt</td> </tr> <tr> <td>850 mb</td> <td>1474 m</td> <td>18.4 °C</td> <td>60%</td> <td>WNW at 10 kt</td> </tr> <tr> <td>925 mb</td> <td>741 m</td> <td>22.4 °C</td> <td>81%</td> <td>WNW at 6 kt</td> </tr> <tr> <td>1000 mb</td> <td>57 m</td> <td>26.0 °C</td> <td>80%</td> <td>W at 6 kt</td> </tr> <tr> <td>1006 mb</td> <td>0 m</td> <td>26.4 °C</td> <td>78%</td> <td>WSW at 5 kt</td> </tr> </tbody> </table> <p style="font-size: x-small; margin-top: 5px;">Table 1. Mandatory Level Data</p> <table border="1" style="font-size: x-small; margin-top: 10px;"> <thead> <tr> <th>Level</th> <th>Wind</th> </tr> </thead> <tbody> <tr> <td>700 mb</td> <td>NNW at 16 kt</td> </tr> <tr> <td>734 mb</td> <td>NNW at 13 kt</td> </tr> <tr> <td>850 mb</td> <td>WNW at 10 kt</td> </tr> <tr> <td>883 mb</td> <td>WNW at 13 kt</td> </tr> <tr> <td>889 mb</td> <td>W at 12 kt</td> </tr> <tr> <td>925 mb</td> <td>WNW at 6 kt</td> </tr> <tr> <td>930 mb</td> <td>WNW at 5 kt</td> </tr> <tr> <td>954 mb</td> <td>W at 8 kt</td> </tr> <tr> <td>1000 mb</td> <td>W at 6 kt</td> </tr> <tr> <td>1006 mb (surface)</td> <td>WSW at 5 kt</td> </tr> </tbody> </table> <p style="font-size: x-small; margin-top: 5px;">Table 2. Significant Wind Data Below 700 mb</p> <p style="font-size: x-small; margin-top: 5px;">Drop Location in Storm: Unknown Mean Wind in Lowest 500 m: W at 6 kt Mean Wind in Lowest 150 m: W at 6 kt Max Wind in Sounding: N/A</p>	Level	Height	Temp	RH	Wind	700 mb	3118 m	9.4 °C	83%	NNW at 16 kt	850 mb	1474 m	18.4 °C	60%	WNW at 10 kt	925 mb	741 m	22.4 °C	81%	WNW at 6 kt	1000 mb	57 m	26.0 °C	80%	W at 6 kt	1006 mb	0 m	26.4 °C	78%	WSW at 5 kt	Level	Wind	700 mb	NNW at 16 kt	734 mb	NNW at 13 kt	850 mb	WNW at 10 kt	883 mb	WNW at 13 kt	889 mb	W at 12 kt	925 mb	WNW at 6 kt	930 mb	WNW at 5 kt	954 mb	W at 8 kt	1000 mb	W at 6 kt	1006 mb (surface)	WSW at 5 kt
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1017-1018	5 deg turn to right followed by another 5 deg turn to right to avoid strong cells. Sim says the cell looks to have a mesovortex																																																				

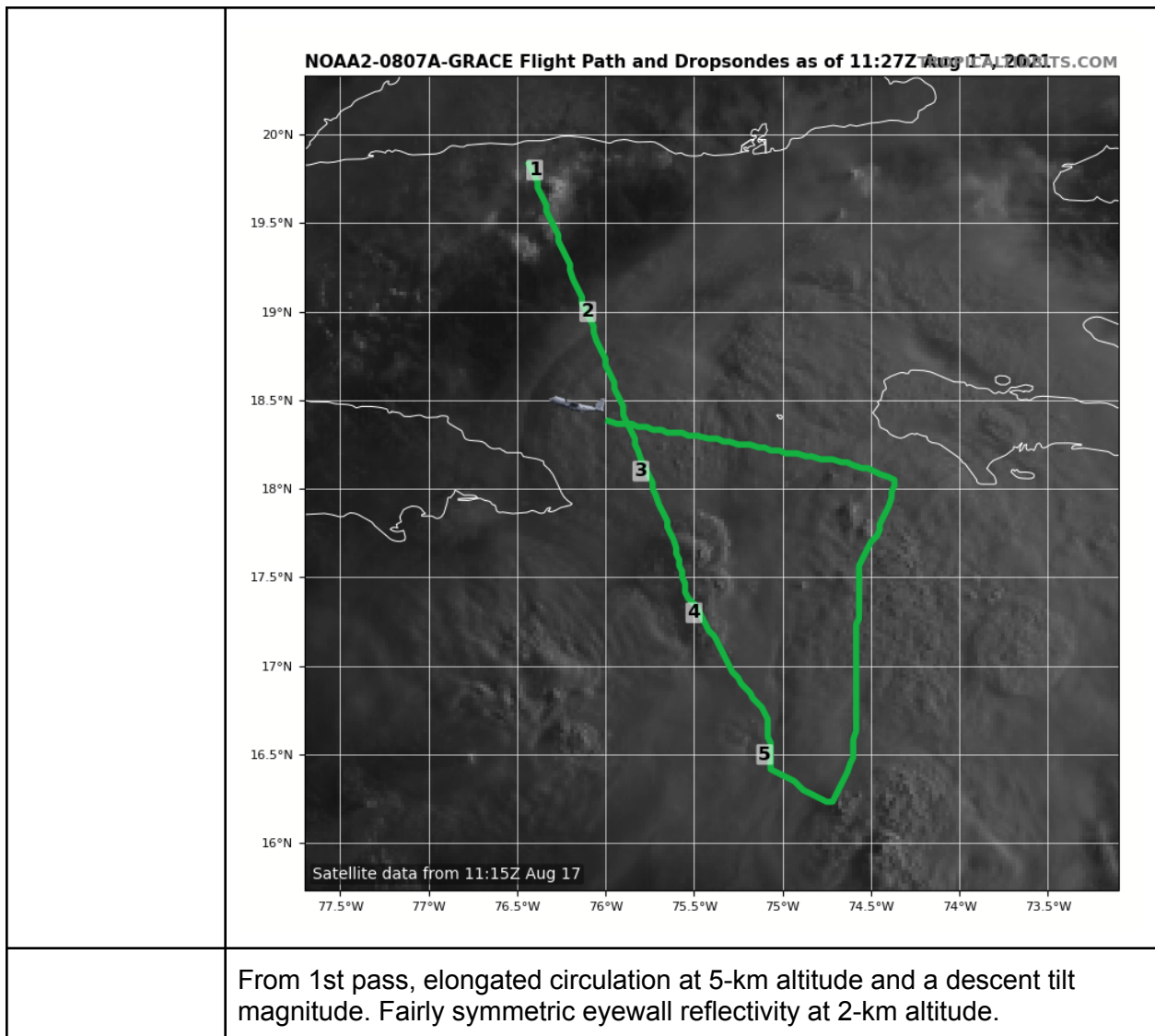
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1022	Sonde 4, 17.349N, 75.506W, outbound MP, pass 1....A bumpy ride!
1028	7 deg left turn to avoid convection
1035	Sonde 5, 16.519N, 75.079W, outbound EP, past 1, turn downwind...visible imagery starting to come up

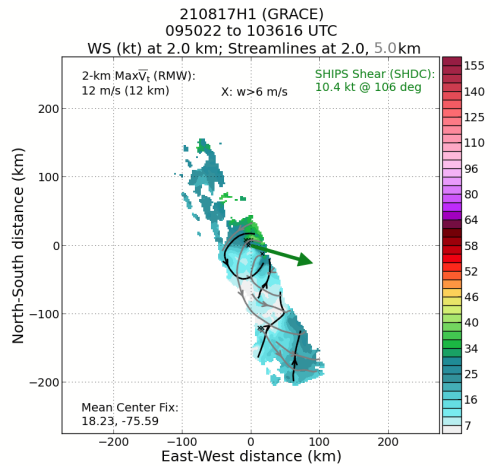
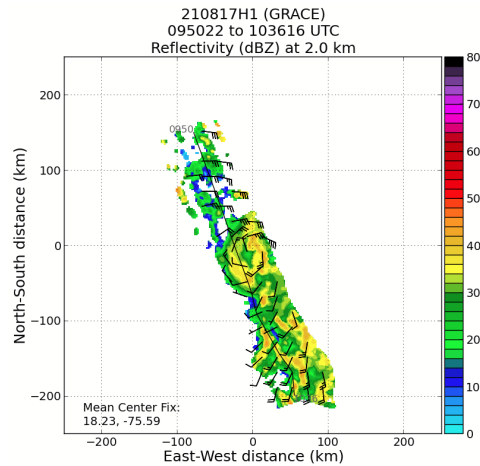
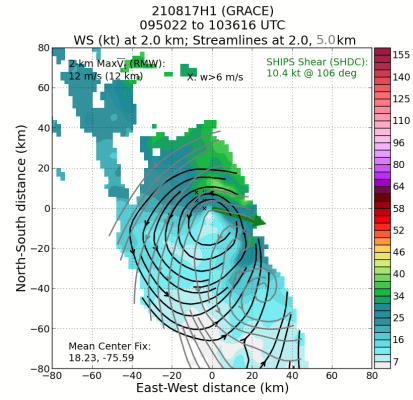
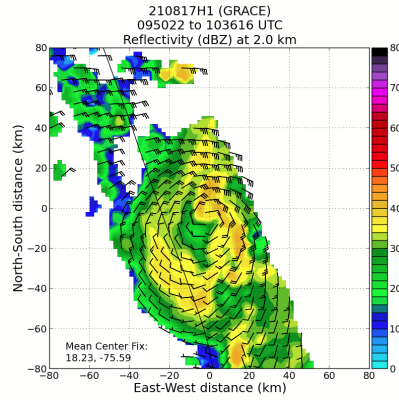
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Potentially the tilt is related to the mid-level shear to the west of the storm as pointed out by Michael Fischer, during the mission.



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1045	Turn more to north, From Sim: FL winds showing all sorts of mesovortices along this downwind leg
1108	Sonde 6, 18.108 N, 74.506 W, IP leg 2.
1122	Sonde 7, 18.321 N, 75.597 W, MP inbound leg 2
1127	From Sim: Looks like the center is 8 nmi to the south during this (2nd) pass. Not as clear on radar this time. Since they missed it, no center drop.
1143	Discussion about the next leg, avoiding Jamaica and maximizing radar coverage. From Sim: inbound will be two straight lines around Jamaica with an outbound to the NE

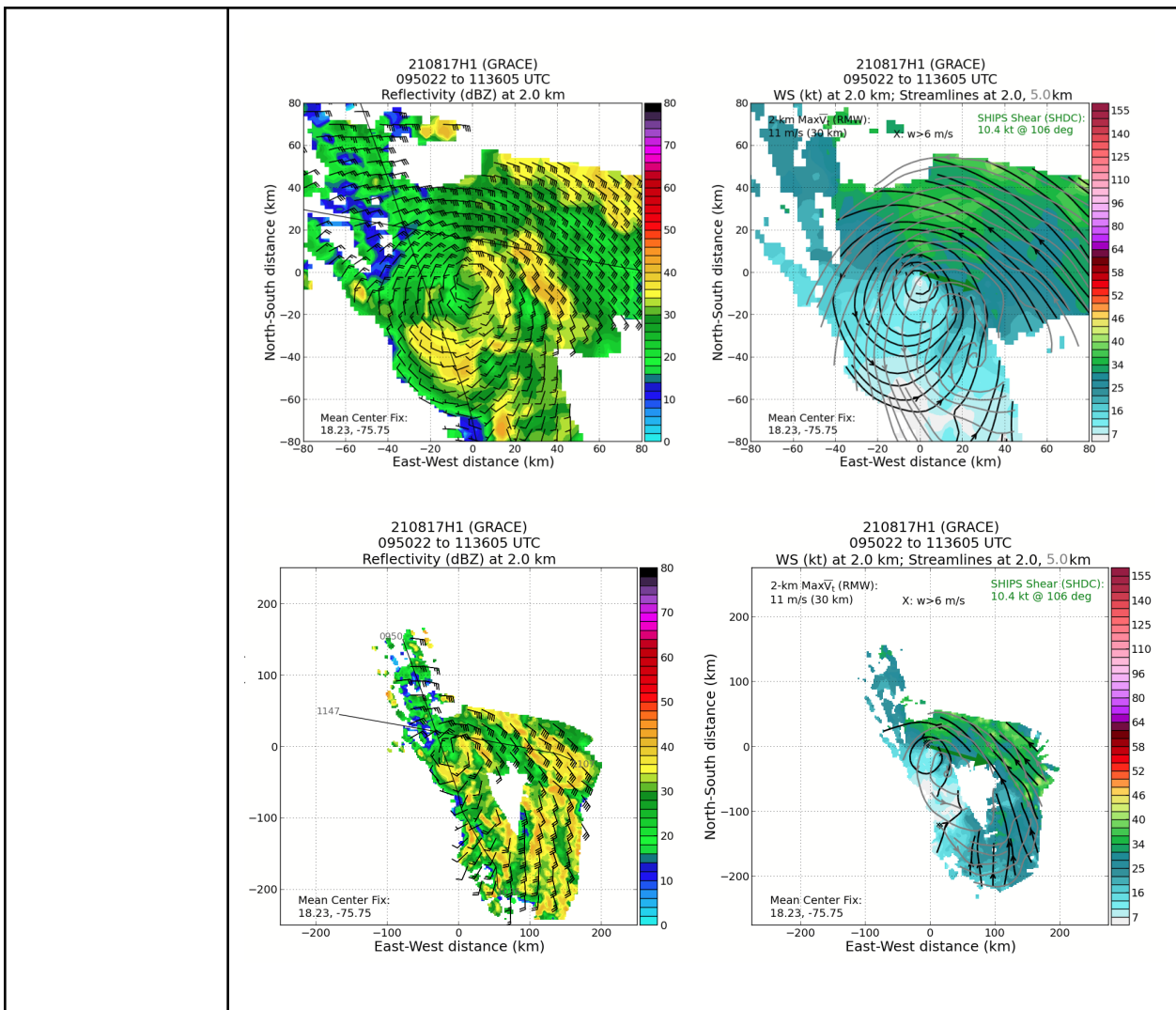
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1145	Sonde 8, 18.587 N, 77.165 W, MP outbound leg 3
1153	Sonde 9, 18.687 N, 77.951 W, EP outbound leg 3, turning to round Jamaica

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1210	Turn inbound (no drop)
1212	Comms went out shortly. TDR analyses is taking extra time because of the comms outage, but everything is ok.
1225	Sonde 10, 17.249 N, 77.335 W, IP leg 3
1246	Sound 11, 17.786 N, 75.916 W, MP inbound leg 3
1251	Sonde 12, 18.073 N, 76.152 W, center leg 3 (not marked center)
1309	Sonde 13, 18.975 N, 75.906 W, MP outbound leg 3
1318	Sonde 14, 19.505 N, 75.429 W, EP leg 3, turned towards NW

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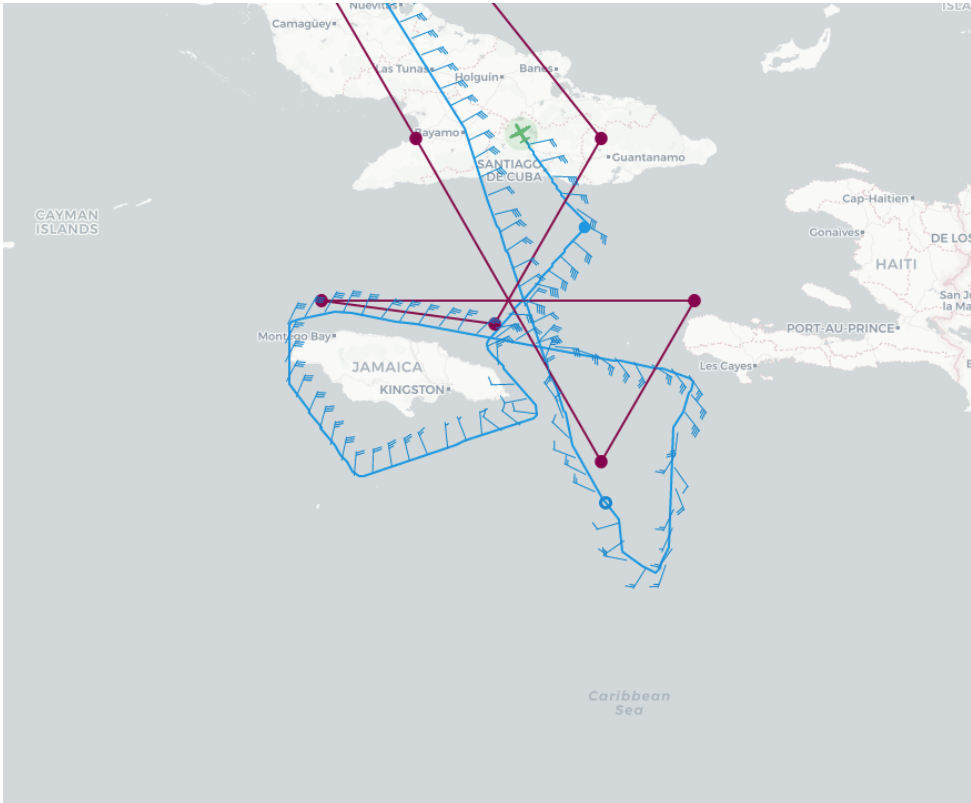
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1403	<p>Full level 1 radar data not created for the last pass on the SEB due to timing issues</p> <pre>[09:59:55] reasor_hrd Sim_HRDWS, it looks like the 3rd analysis files got removed at seb ... and now they're being re-transmitted [10:00:47] reasor_hrd This is a first for me ... I've never seen this happen. Ever. [10:00:51] Sim_HRDWS They seem to have finished. [10:00:54] mfischer :( [10:01:04] Sim_HRDWS It now says no new jobfiles. [10:02:45] mfischer I gotta head out now, but reasor_hrd will finish things [10:02:57] mfischer thanks Sim_HRDWS and Todd_N42Data for the support today [10:03:16] *mfischer has quit (Quit: Leaving)</pre>
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POST-FLIGHT	
<b>Mission Summary</b>	<p>An EMC mission into Tropical Storm Grace. The original pattern had to be rotated 10 degrees to avoid land and the altitude of the mission was raised to 12 kft. Straight legs were maintained, so the P-3 did not search for the center on each pass. Overall, there was good radar coverage. The only modification is that the P-3 went around Jamaica before the last radial pass.</p> <p>TDR data indicates that TS Grace is still tilted, with relatively strong mid-level shear to the west of the storm. However, there is a fairly symmetric ring of precipitation around the eyewall and the storm has tropical characteristics. While the storm will immediately interact with the island of Jamaica, there are fairly favorable conditions for intensification afterwards including a very deep and warm ocean.</p> <p>14 dropsondes were released for NWS.</p>
<b>Actual Standard Pattern Flown</b>	Butterfly
<b>APHEX Experiments / Modules Flown</b>	Data collection will be relevant for <i>Early Stage Experiment: AIPEX</i> , as well as was an ONR TCRI collaborative flight
<b>Plain Language Summary</b>	This flight sampled Tropical Storm Grace and provided valuable data for numerical models and forecasters at the National Hurricane Center. We found that the circulation was getting much better organized than previous flights. However, the future interaction with Jamaica and the structure of

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	the storm likely mean the storm will not immediately intensify. The data collected during this flight will also help with future research studies.
<b>Instrument Notes</b>	All instruments worked well.
<b>Final Mission Track</b>	

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