

SHOUT Research Flight 4 – 20160831 -Hermine

Shift 1 Mission Scientists: Rosimar Rios-Berrios, Peter Black

Shift 2 Mission Scientists: Jason Dunion, Gary Wick

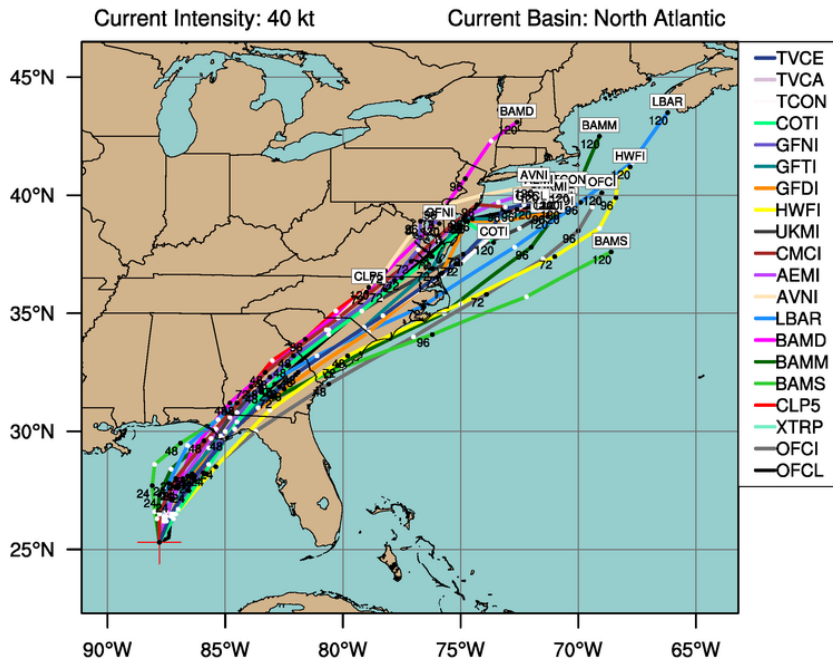
Shift 3 Mission Scientists: Scott Braun, Darren Jackson, David Ryglicki

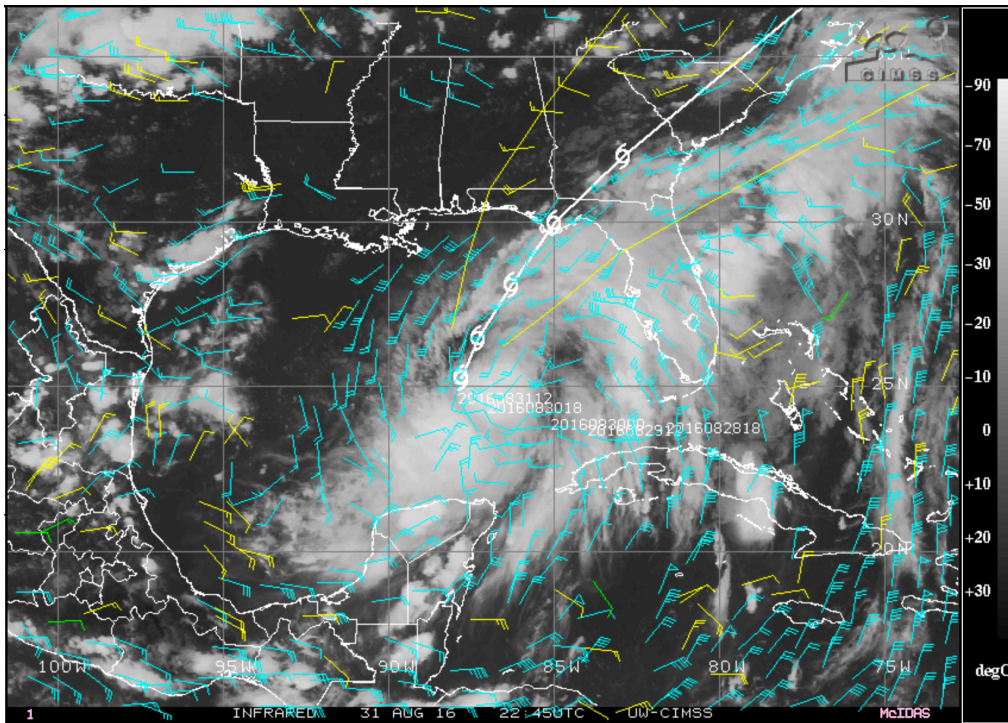
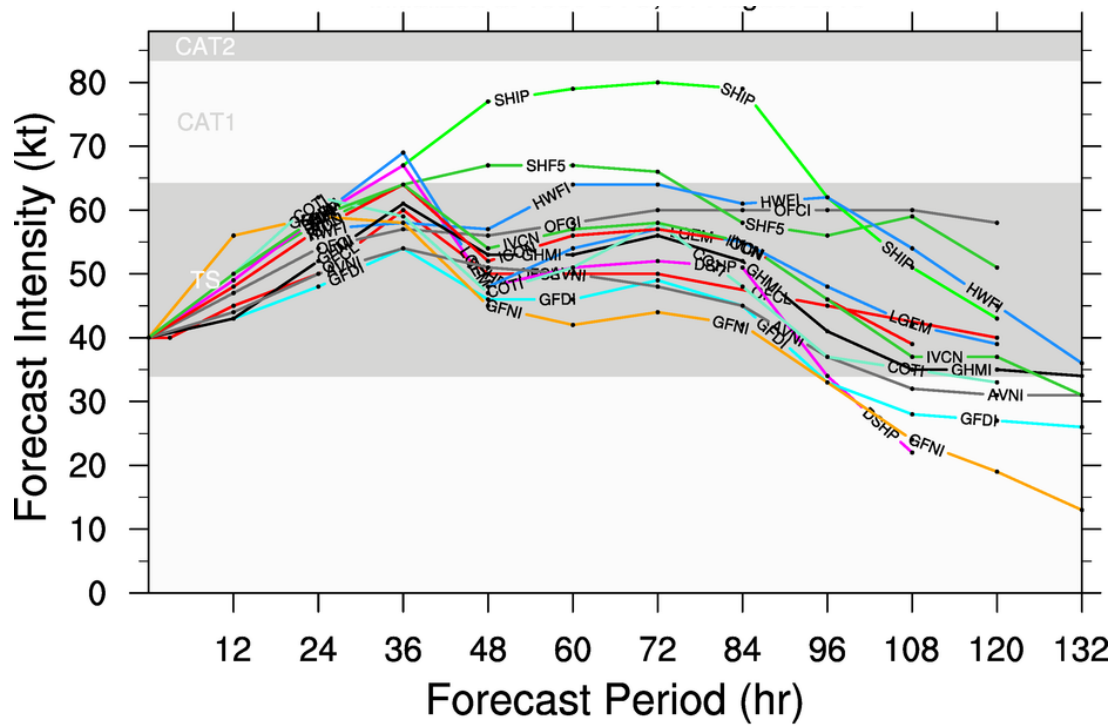
Log initiated by S. Braun

The second flight for now TS Hermine in the Gulf of Mexico. At 8 pm EDT, Hermine had an intensity of 45 kt, 1001 mb. It was located at 25.5N, 87.4W, moving NNE at 7 kt. The 18Z forecast has the tracks largely in agreement with initially NNE and then NE movement, with landfall in about 48 hours. The tracks largely stay inland along the coast, emerging back over water off of the Mid-Atlantic states in about 72-96 hours. The intensity is generally expected to stay in the TS range, although SHIPS wants to intensify the storm into a Cat 1 hurricane.

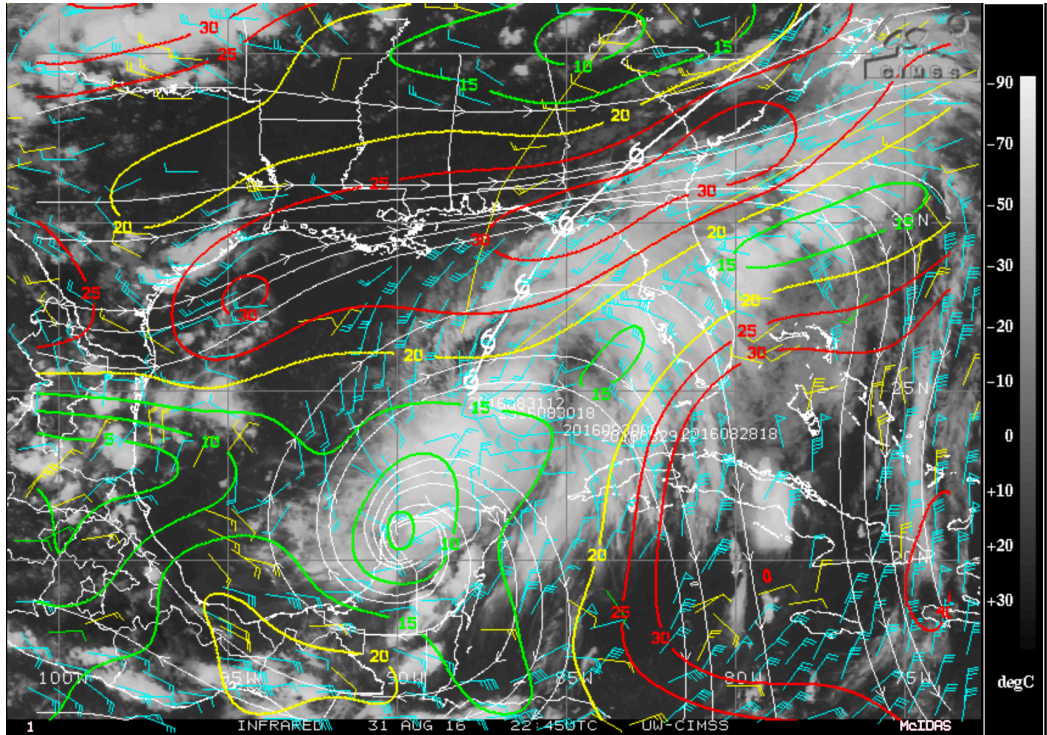
TROPICAL STORM HERMINE (AL09)

Early-cycle track guidance initialized at 1800 UTC, 31 August 2016

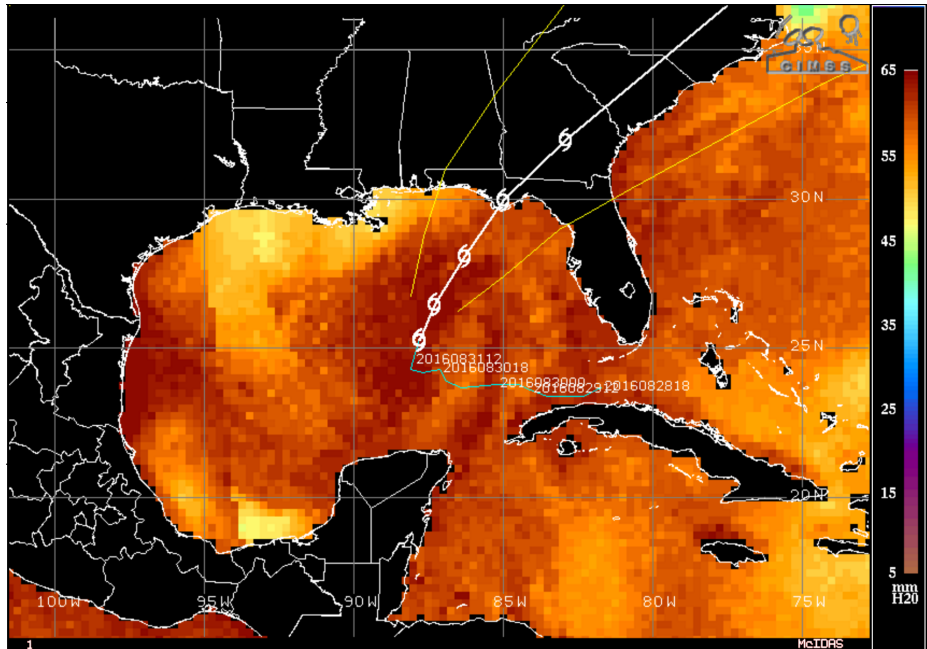




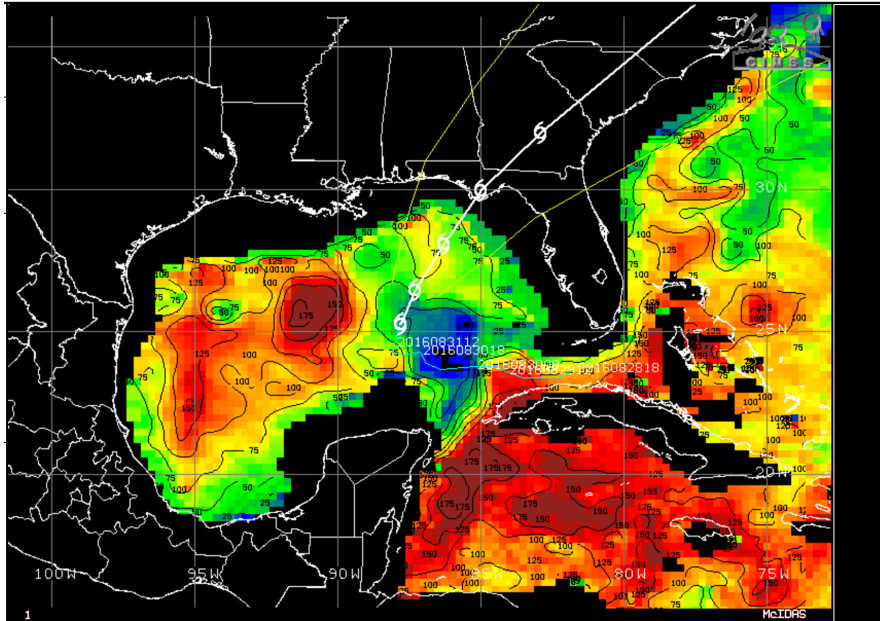
The 2245 UTC GOES image shows the coldest tops east and SSW of the center, with some rainbands on the east side near the coast of Florida apparently associated with a diurnal pulse. Well defined anticyclonic outflow layer is established, with the flow apparently linking up to the convection off the coast of the SE U. S.



Vertical shear is strong along the northern edge of Hermine, with peak values exceeding 30 kt. The SHIP model diagnostics suggest sharply rising shear over Hermine in 36 to 48 hours as it gets closer to the coast.



TPW quite high in Hermine, with dry air to the NW fairly far removed, but may come into play as shear increases.



OHCs are very low E and SE of Hermine, but will increase some as the storm approaches the coast. Intensification may depend on the battle between high moisture and increasing OHCs versus increasing shear to the north.

Most recent vortex-messages:

URNT12 KWBC 312342

VORTEX DATA MESSAGE AL092016

A. 31/23:12:48Z

B. 25 deg 16 min N

087 deg 10 min W

C. 850 mb 1443 m

D. 15 kt

E. 234 deg 14 nm

F. 307 deg 12 kt

G. 227 deg 11 nm

H. 1001 mb

I. 20 C / 1546 m

J. 22 C / 1545 m

K. 16 C / NA

L. NA

M. NA

N. 12345 / 8

O. .01 / 4 nm

P. NOAA3 1009A CYCLONE OB 40

MAX OUTBOUND AND MAX FL WIND 55 KT 087 / 28 NM 23:20:25Z

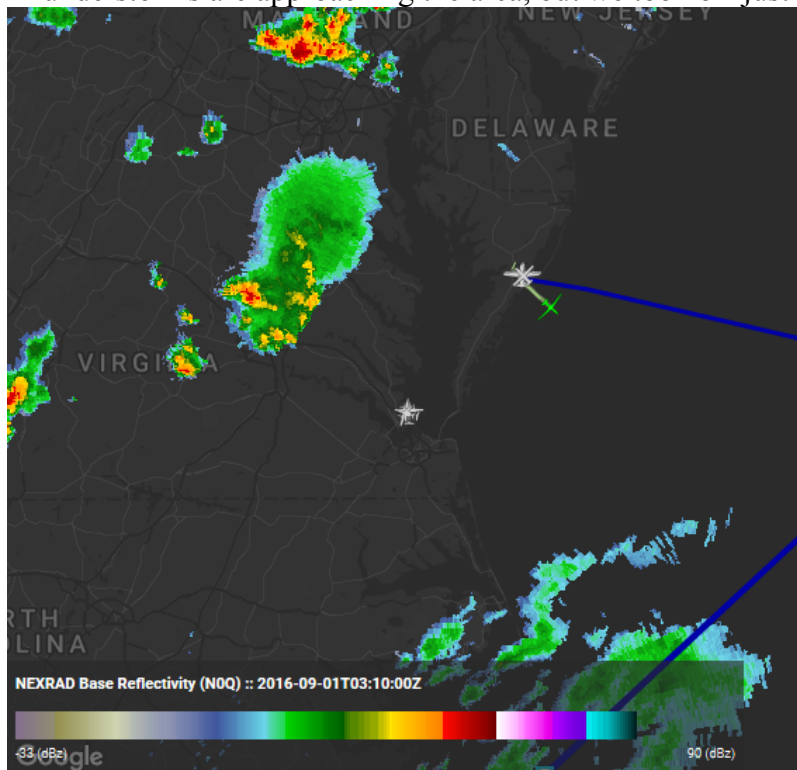
MAX OUTBOUND SFC WIND 52 KT 088 / 15 NM 23:17:10Z

CNTR DROPSONDE SFC WIND 125 / 08 KTS

CONVECTION SE OF CENTER

0039 UTC: Instrument's powered up -- waiting for Pin Pull
0103 UTC: Ku is on, ready for taxi
0107 UTC: Power up, taxing
0113 UTC: Takeoff delayed due to antenna issues
0131 UTC: Still delayed, Inmarsat is down
0149 UTC: We're still delayed. The crew has tried multiple things to no avail. Trying to change satellites now.
0154 UTC: Aircraft crew is gonna recycle the plane; power down, power up. New estimated take off is 0300 UTC.
0230 UTC: Engine getting ready for restart.
0237 UTC: Engine start.
0243 UTC: Inmarsat is good.
0251 UTC: Getting ready for pin pull.
0253 UTC: Pin pull, Ku up, all instruments and aircraft ready
0300 UTC: Ready for taxi
0301 UTC: Ready for takeoff
0303 UTC: Power is up, vehicle is moving
0304 UTC: We're airborne

Thunderstorms are approaching the area, but we took off just in time:



TROPICAL STORM HERMINE DISCUSSION NUMBER 14
NWS NATIONAL HURRICANE CENTER MIAMI FL AL092016
1000 PM CDT WED AUG 31 2016

Data from NOAA and Air Force Reserve Hurricane Hunter aircraft this

afternoon and evening indicate that Hermine has continued to strengthen, based on maximum 850-mb flight-level winds of 57 kt and peak SFMR surface winds of 52 kt. A recent dropsonde in the center of Hermine measured a pressure of about 998 mb, which is a decrease of 6 mb from the previous advisory.

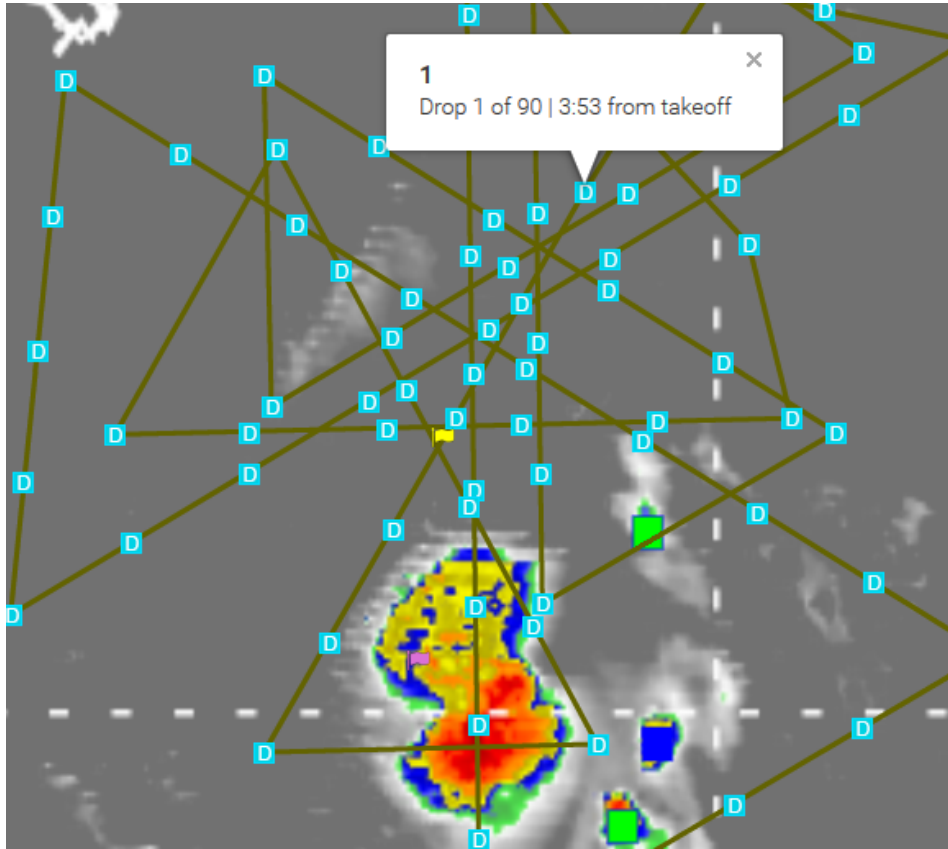
Recon fixes over the past 4 hours indicate that the estimated motion is north-northeastward or 025/09 kt. An approaching mid-tropospheric trough located over the southeastern United States and extending southward into the north-central Gulf of Mexico is expected to gradually lift out Hermine to the north-northeast tonight and Thursday, and then northeastward after 24 hours. The NHC model is in very good agreement on this developing steering flow pattern. Later in the forecast period, significant uncertainty in the track forecast remains, depending on how much the post-tropical cyclone interacts with a mid-latitude cutoff low that develops over the northeastern United States. The new NHC forecast track has been shifted slightly to the east of the previous advisory track, primarily due to the more eastward initial position determined from recent recon fixes, and lies just to the left of the consensus model TVCN.

The vertical wind shear is forecast by the GFS and the ECMWF models to shift from the current west-northwesterly direction to southwesterly by 18-24 hours at about 5 to 10 kt. SSTs are expected to be near 30C. The intensity consensus IVCN again brings Hermine to hurricane strength prior to landfall and the official forecast follows this guidance, forcing the issuance of a hurricane warning with this advisory. The predicted extratropical transition of the system is based on the global model guidance, which show the cyclone becoming embedded within a frontal zone over the eastern United States by 72 hours.

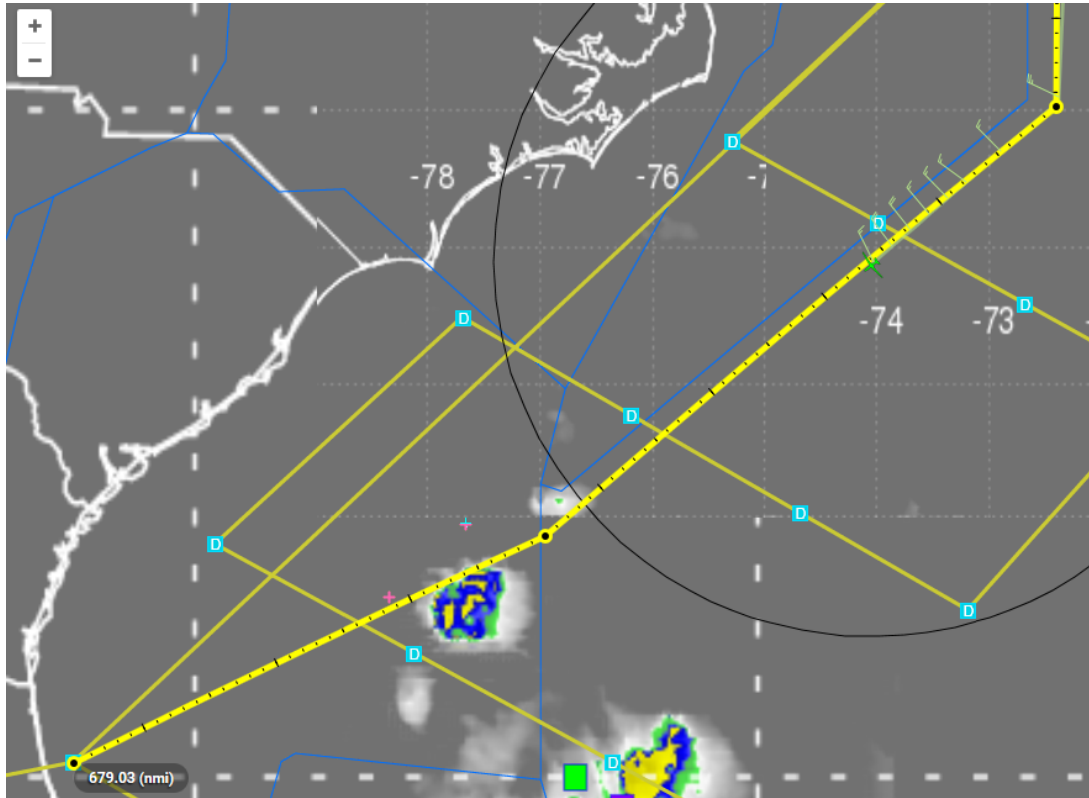
FORECAST POSITIONS AND MAX WINDS

INIT	01/0300Z	25.8N	87.0W	50 KT	60 MPH
12H	01/1200Z	26.9N	86.4W	55 KT	65 MPH
24H	02/0000Z	28.7N	85.4W	65 KT	75 MPH
36H	02/1200Z	30.7N	83.8W	60 KT	70 MPH...INLAND
48H	03/0000Z	32.8N	81.4W	45 KT	50 MPH...INLAND
72H	04/0000Z	37.0N	76.3W	40 KT	45 MPH...POST-TROP/INLAND
96H	05/0000Z	39.0N	74.0W	45 KT	50 MPH...POST-TROP/EXTRATROP
120H	06/0000Z	39.0N	71.0W	45 KT	50 MPH...POST-TROP/EXTRATROP

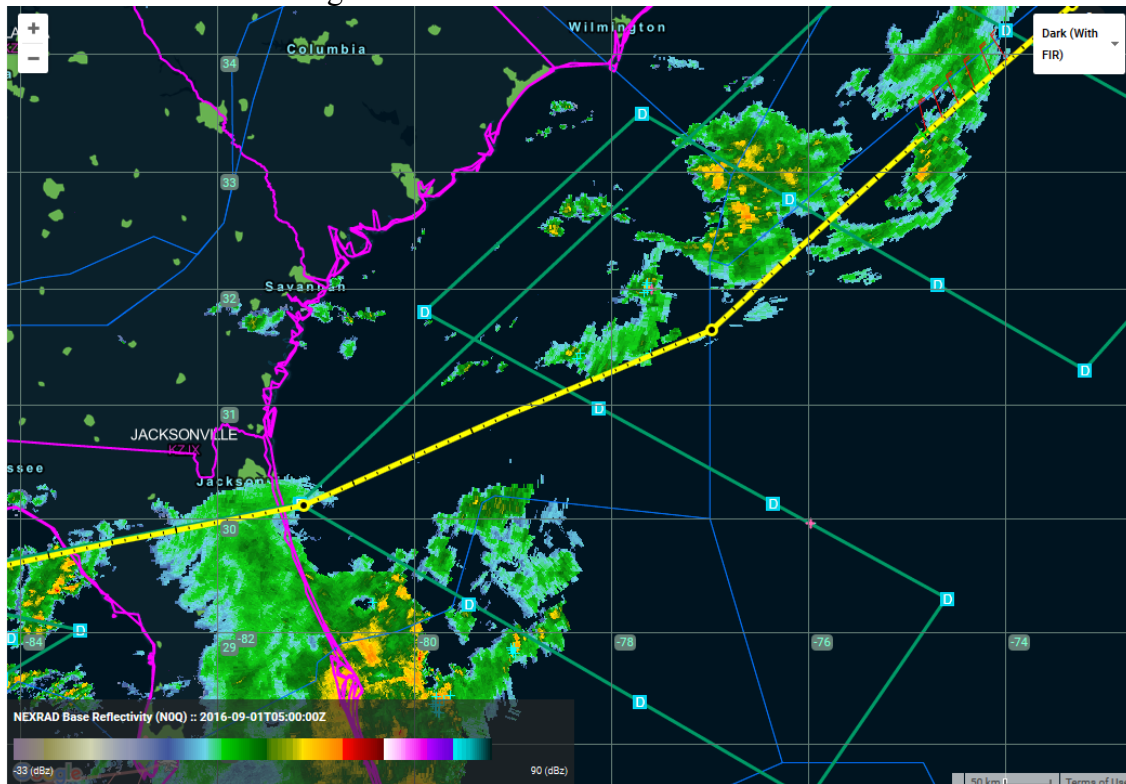
0333 UTC: Our estimated center position for 0630 UTC (yellow flag below) indicates that our current flight plan should take us right into the center of Hermine. Cloud top heights may be a challenge, but we will monitor.



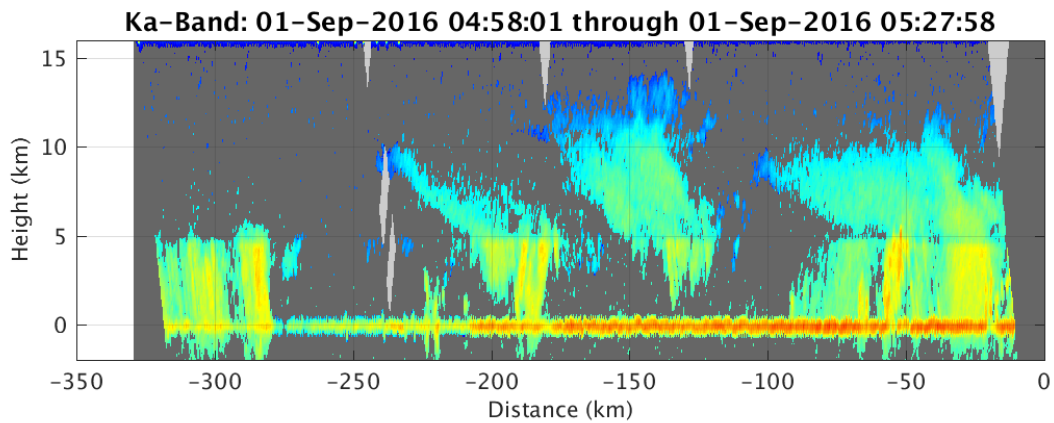
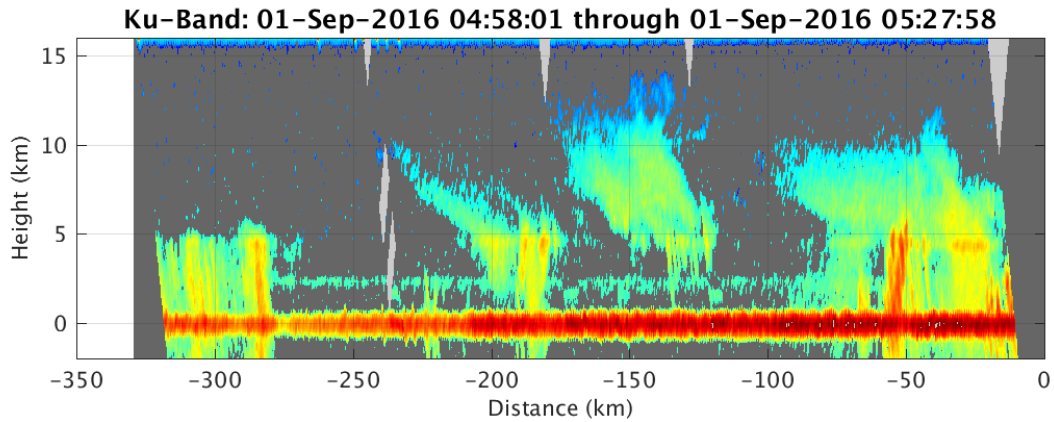
0452 UTC: We're monitoring a region of lightning and concerning cloud top heights along the planned transit (yellow lines below). We've alerted the mission director, and suggested diverting south. No update has been submitted to MTS because this part of the flight track is already different from what the planned flight shows. NOTE FOR FUTURE MISSIONS: The route going towards Florida usually follows these waypoints: W-386, OKONU, LEXAD, PAEPR, GALWY, HANRI. You can see these points using the "IFR-HIGH" overlay from the top right drop down menu.



Radar offshore cells along GH track inbound to IP. Arrival at center still ~0715Z.



Great HIWRAP- verifies overshoot clout top product: tops 38-40 K ft

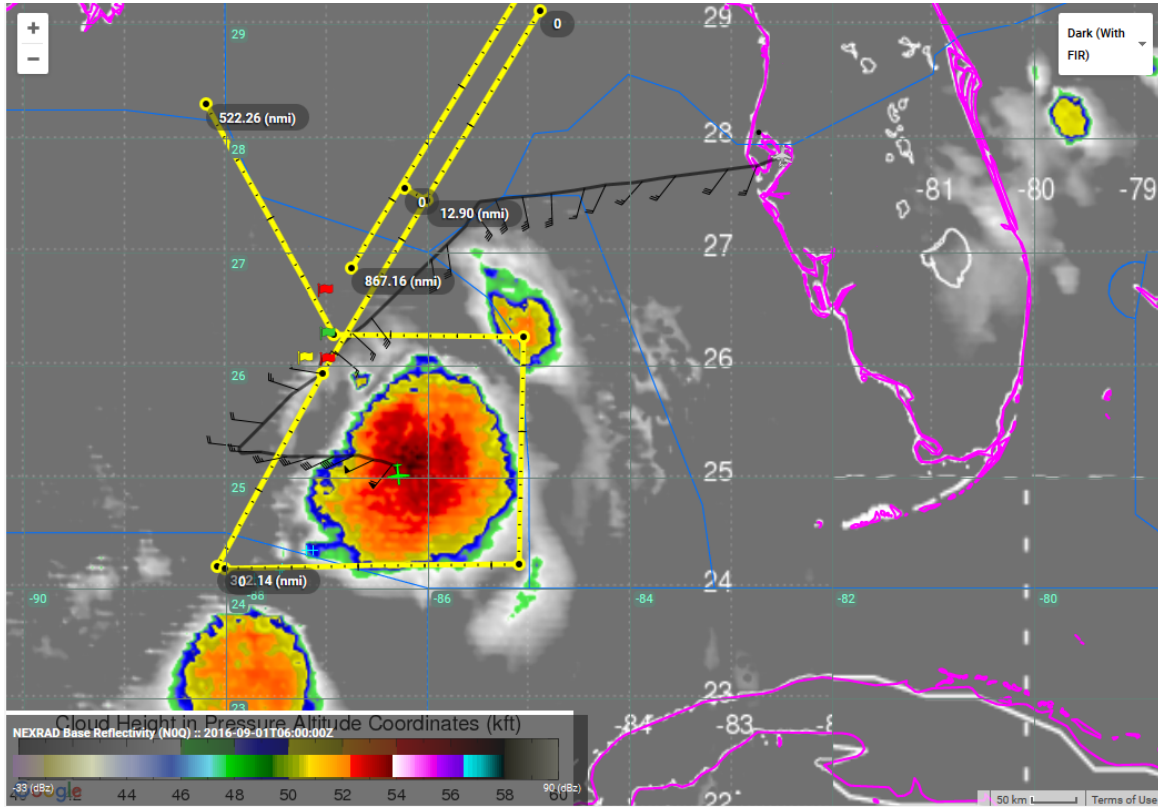


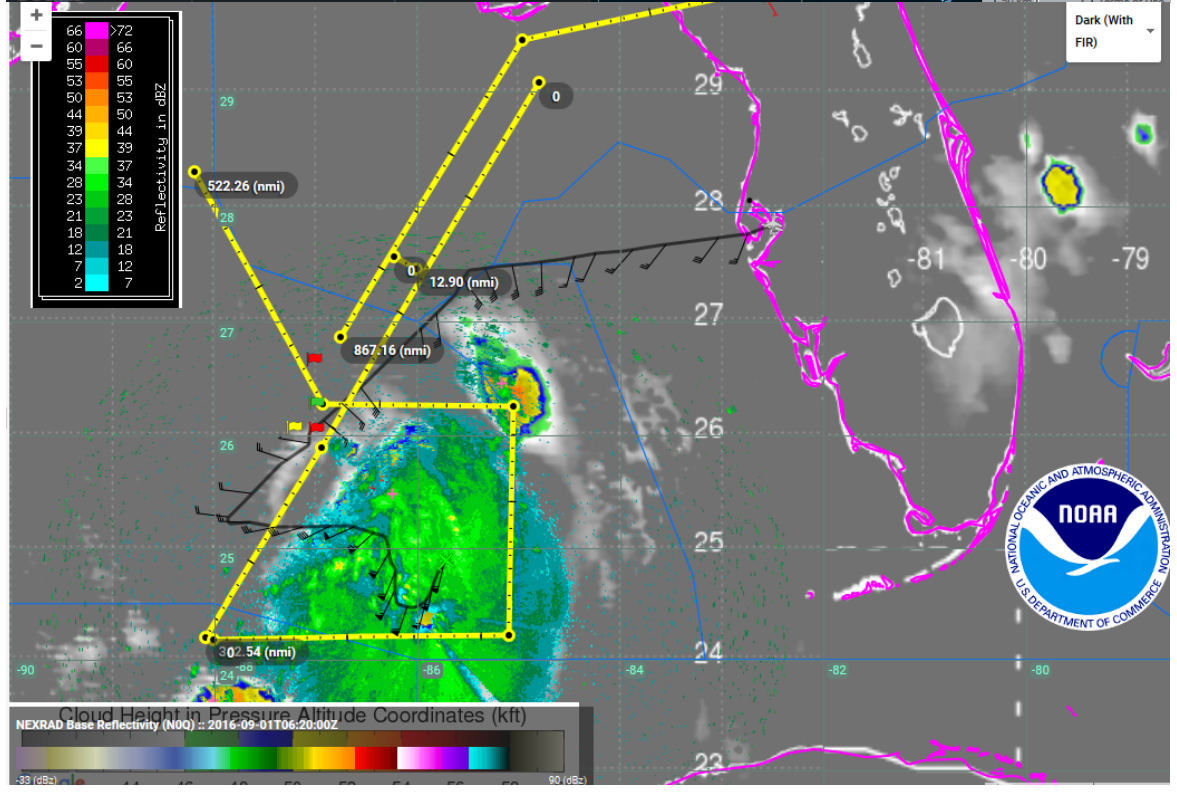
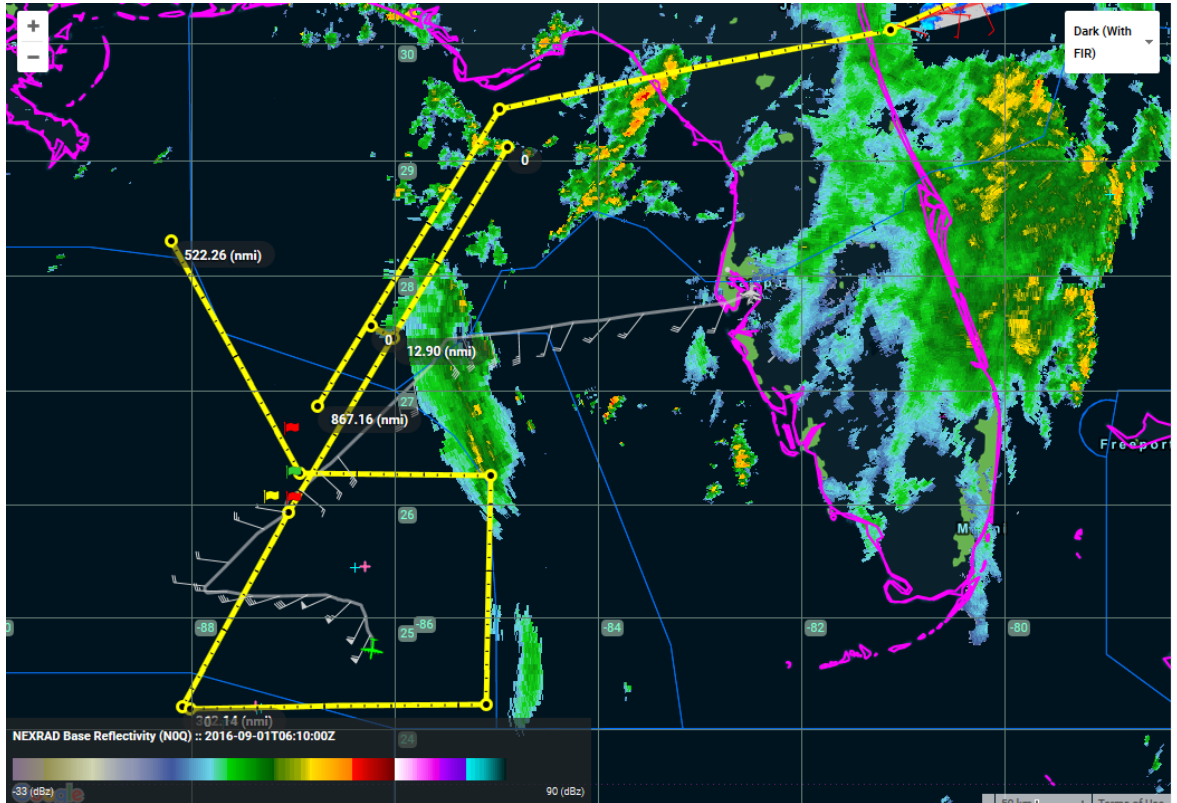
Revised inbound flight track based on N43RF position:

Most recent vortex message

URNT12 KWBC 010607
 VORTEX DATA MESSAGE AL092016
 A. 01/05:27:42Z
 B. 25 deg 56 min N
 087 deg 04 min W
 C. 850 mb 1432 m
 D. 44 kt
 E. 044 deg 38 nm
 F. 166 deg 43 kt
 G. 044 deg 72 nm
 H. 999 mb
 I. 19 C / 1514 m
 J. 23 C / 1525 m
 K. 17 C / NA
 L. NA
 M. NA

N. 1345 / 8
O. 0.1 / 2 nm
P. NOAA3 1209A HERMINE OB 09
MAX FL WIND 43 KT 044 / 72 NM 05:08:13Z
CNTR DROPSONDE SFC WIND 175 / 07 KTS





0612 UTC: Update 1 to the flight plan has been uploaded to MTS under GH Plan 2 (Active track).

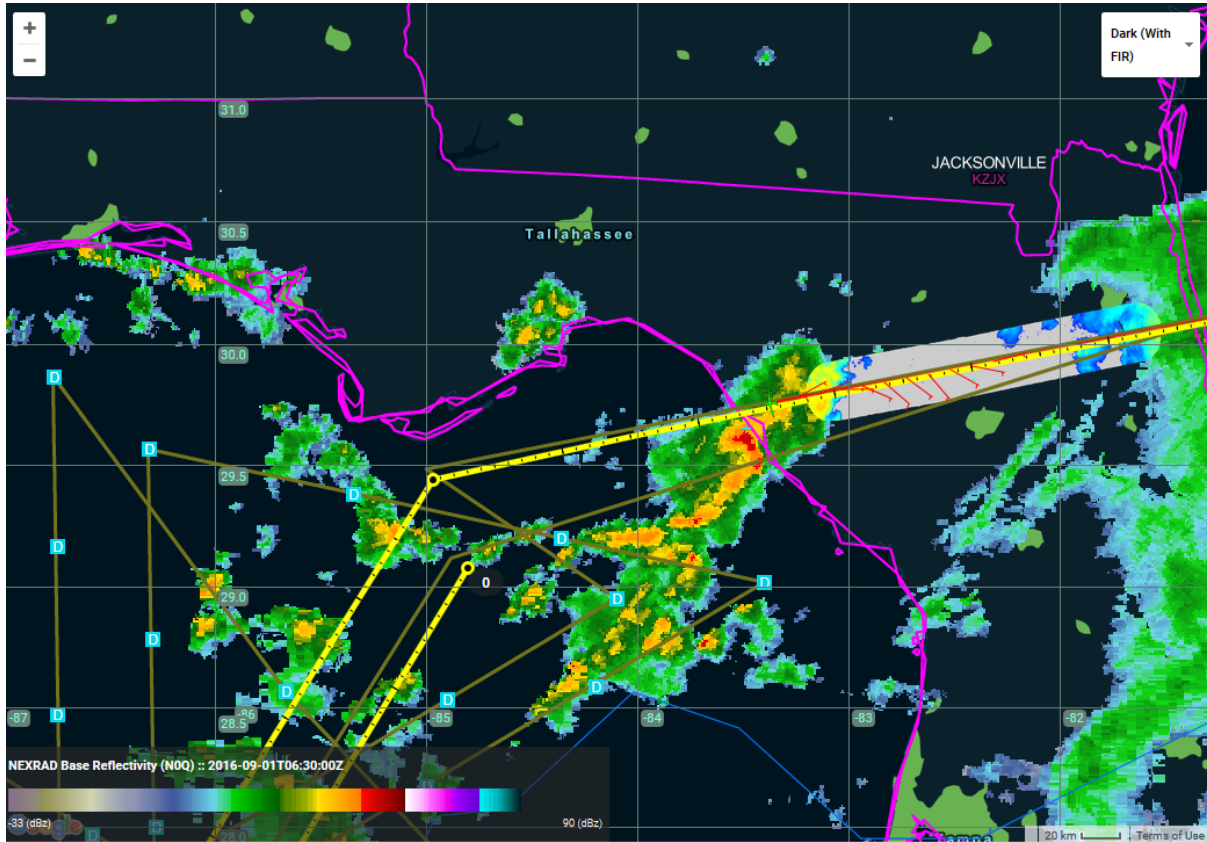
Changes: adjusted the track to get closer to the storm center.

1. Moved sondes 1-6 approximately 13 nmi SE of the original location.

This change above was made to get closer to the center position provided by the NOAA P3 mission. This update did not include an adjustment to fly around the active convection because we would like to wait until we get closer to the storm to design a new flight track.

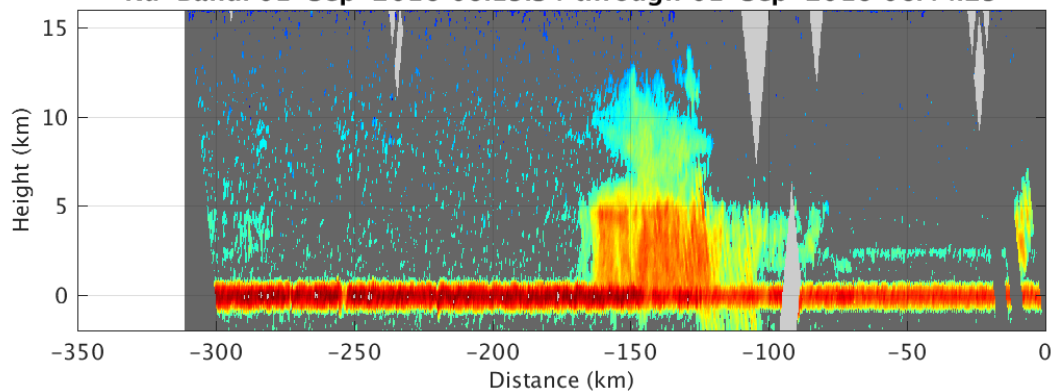
0629Z low light image of overshooting top 50 dbz on radar just inland from FL west coast:



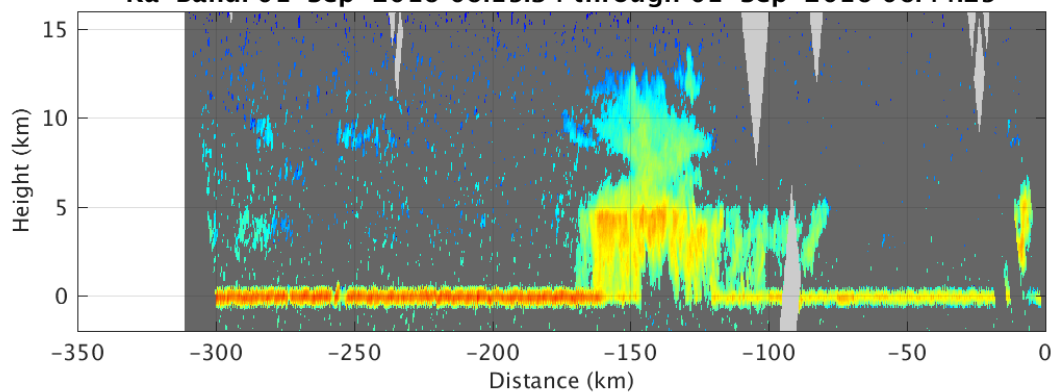


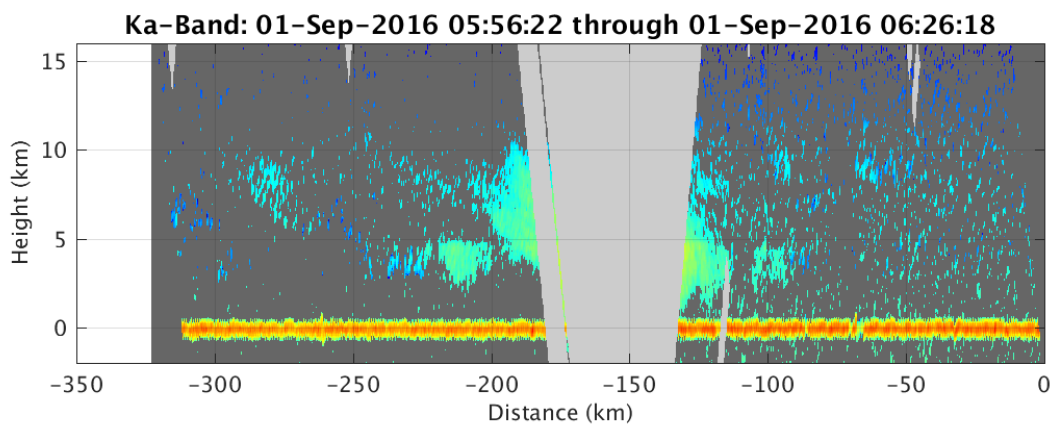
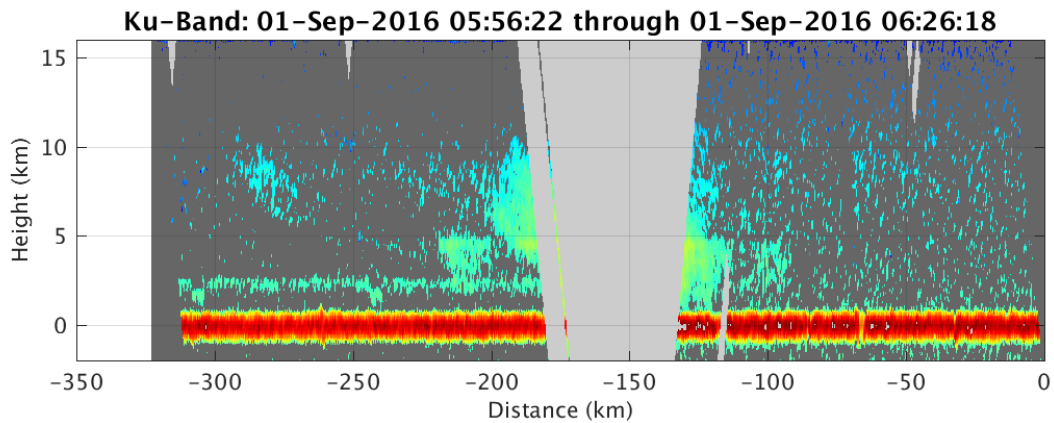
HIRAD indicates tops at 40K ft

Ku-Band: 01-Sep-2016 06:15:34 through 01-Sep-2016 06:44:25



Ka-Band: 01-Sep-2016 06:15:34 through 01-Sep-2016 06:44:25



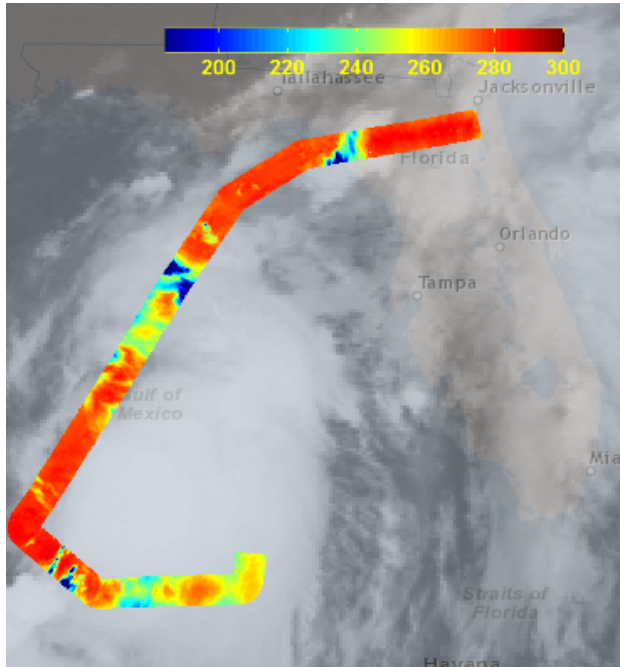


BULLETIN
TROPICAL STORM HERMINE INTERMEDIATE ADVISORY NUMBER 14A
NWS NATIONAL HURRICANE CENTER MIAMI FL AL092016
100 AM CDT THU SEP 01 2016

...HERMINE CRAWLING NORTHWARD...

SUMMARY OF 100 AM CDT...0600 UTC...INFORMATION

LOCATION...26.0N 87.0W
ABOUT 280 MI...450 KM SSW OF APALACHICOLA FLORIDA
ABOUT 295 MI...475 KM WSW OF TAMPA FLORIDA
MAXIMUM SUSTAINED WINDS...60 MPH...95 KM/H
PRESENT MOVEMENT...N OR 10 DEGREES AT 6 MPH...9 KM/H



MINIMUM CENTRAL PRESSURE...999 MB...29.50 INCHES

WATCHES AND WARNINGS

CHANGES WITH THIS ADVISORY:

None.

SUMMARY OF WATCHES AND WARNINGS IN EFFECT:

A Hurricane Warning is in effect for...

- * Suwannee River to Mexico Beach

A Hurricane Watch is in effect for...

- * Anclote River to Suwannee River
- * West of Mexico Beach to Destin

A Tropical Storm Warning is in effect for...

- * Anclote River to Suwannee River
- * West of Mexico Beach to Destin

A Tropical Storm Watch is in effect for...

- * Marineland Florida to South Santee River

Interests along the United States east coast elsewhere in the Carolinas should monitor the progress of this system.

For storm information specific to your area, including possible inland watches and warnings, please monitor products issued by your local National Weather Service forecast office.

DISCUSSION AND 48-HOUR OUTLOOK

At 100 AM CDT (0600 UTC), the center of Tropical Storm Hermine was located near latitude 26.0 North, longitude 87.0 West. Hermine has been moving slowly toward the north near 5 mph (9 km/h) during the past couple of hours, but should begin to move toward the north-northeast with an increase in forward speed soon. On the forecast track, the center will be near the Florida coast in the warning area Thursday night.

Preliminary reports from the NOAA Hurricane Hunter aircraft indicate that maximum sustained winds remain near 60 mph (95 km/h) with higher gusts. Some strengthening is forecast during the next 24 to 36 hours, and Hermine is expected to be a hurricane by the time landfall occurs.

Tropical-storm-force winds extend outward up to 125 miles (205 km) from the center.

The minimum central pressure just reported by a NOAA Hurricane Hunter aircraft is 999 mb (29.50 inches).

HAZARDS AFFECTING LAND

WIND: Hurricane conditions are expected to reach the coast within the warning area beginning Thursday night. Winds are expected to first reach tropical storm strength by Thursday afternoon, making outside preparations difficult or dangerous. Preparations to protect life and property should be rushed to completion. Tropical storm conditions are possible in the tropical storm watch area by Friday.

STORM SURGE: The combination of a dangerous storm surge and the tide will cause normally dry areas near the coast to be flooded by rising waters moving inland from the shoreline. There is a danger of life-threatening inundation within the next 36 hours along the Gulf coast of Florida from Aripeka to Indian Pass. For a depiction of areas at risk, please see the Prototype National Weather Service Storm Surge Watch/Warning Graphic. Persons located within these areas should take all necessary actions to protect life and property from rising water. Promptly follow any instructions, including evacuation orders, from local officials.

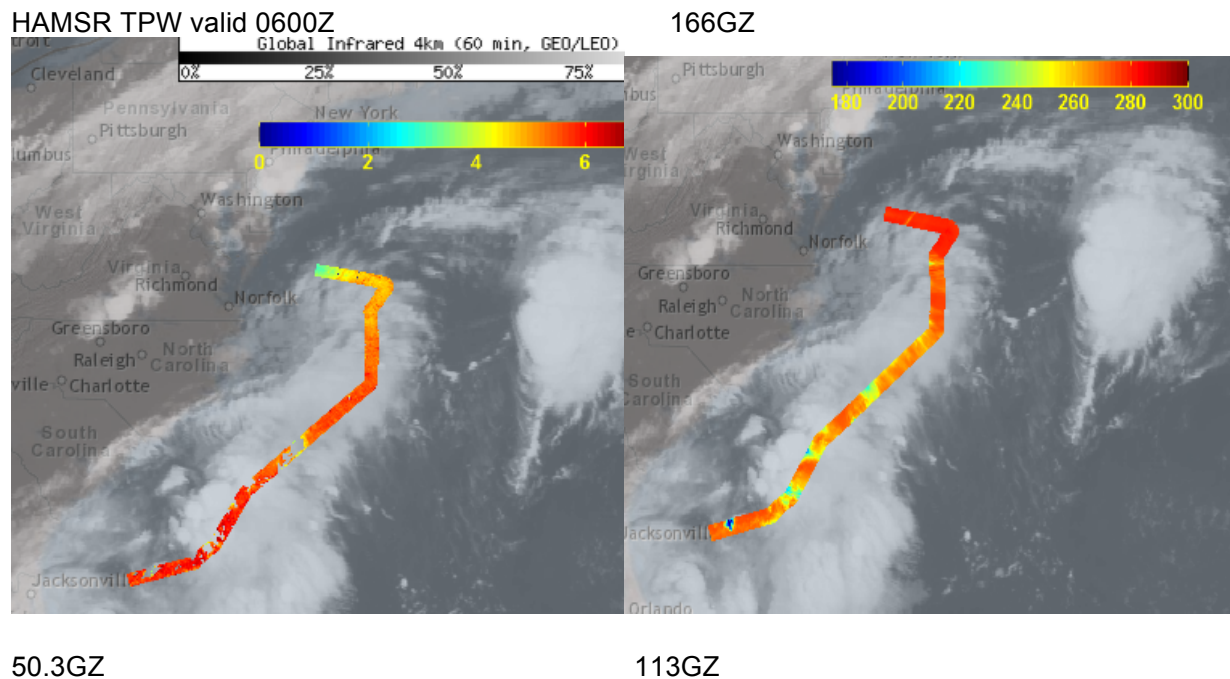
The water could reach the following heights above ground if the peak surge occurs at the time of high tide...

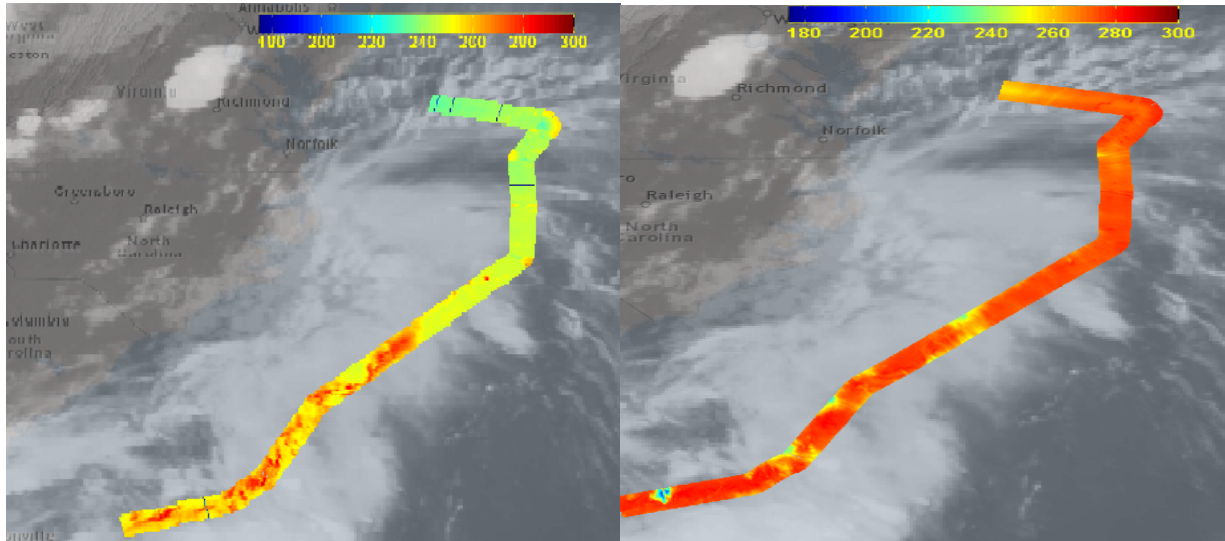
Destin to Indian Pass...1 to 3 feet
Indian Pass to Chassahowitzka...4 to 7 feet
Chassahowitzka to Aripeka...2 to 4 feet
Aripeka to Bonita Beach...including Tampa Bay...1 to 3 feet
Florida-Georgia line to Cape Fear...1 to 3 feet

The Prototype National Weather Service Storm Surge Watch/Warning Graphic is a depiction of areas that would qualify for inclusion under a storm surge watch or warning currently under development by the National Weather Service and planned for operational use in 2017. This prototype graphic is available at www.hurricanes.gov/graphics_at4.shtml?wsurge

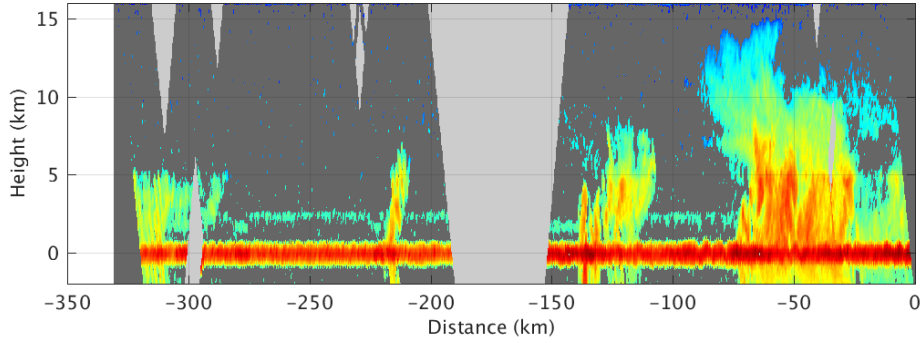
RAINFALL: Hermine is expected to produce storm total rainfall amounts of 5 to 10 inches over portions of northwest Florida through Friday, with isolated maximum amounts of 20 inches possible. Rainfall totals of 4 to 8 inches are expected across portions of the southeastern United States from southeast Georgia, central to eastern South Carolina and eastern North Carolina, with local amounts of 10 inches possible through Saturday. These rains may cause life-threatening flash flooding.

TORNADOES: A tornado or two is possible overnight near the central Florida coast. The tornado risk will increase through Thursday and spread into north Florida and southeast Georgia.

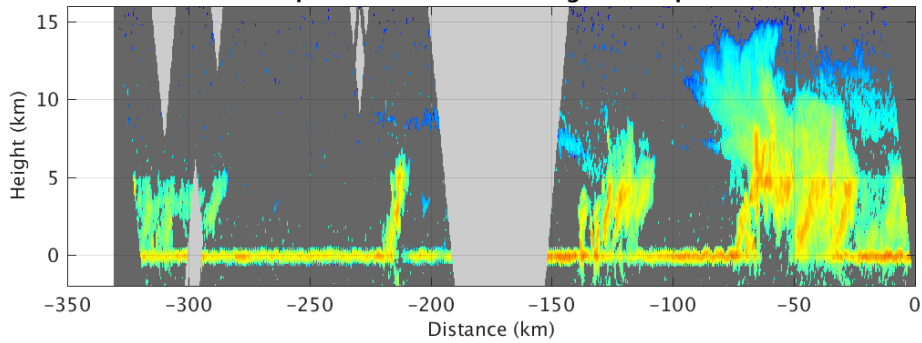


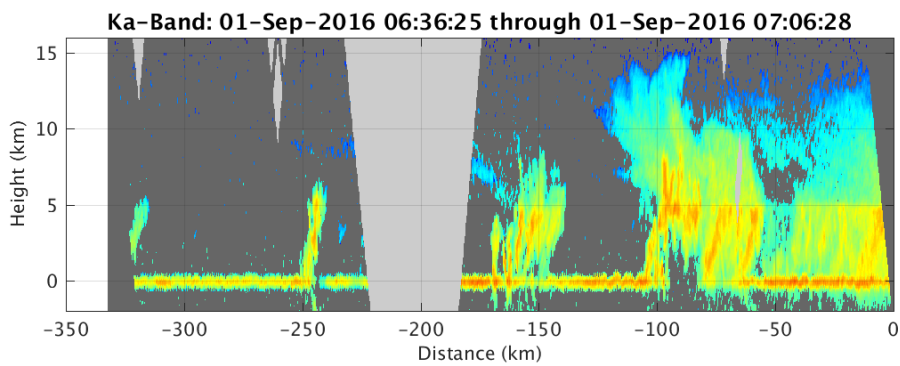
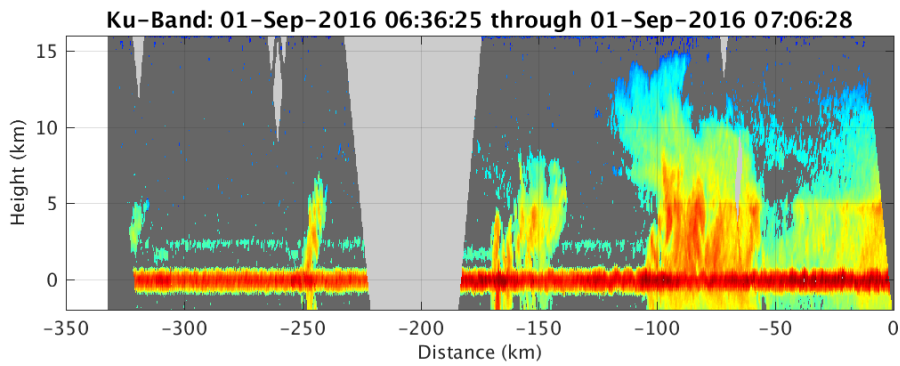


Ku-Band: 01-Sep-2016 06:33:33 through 01-Sep-2016 07:03:33



Ka-Band: 01-Sep-2016 06:33:33 through 01-Sep-2016 07:03:33

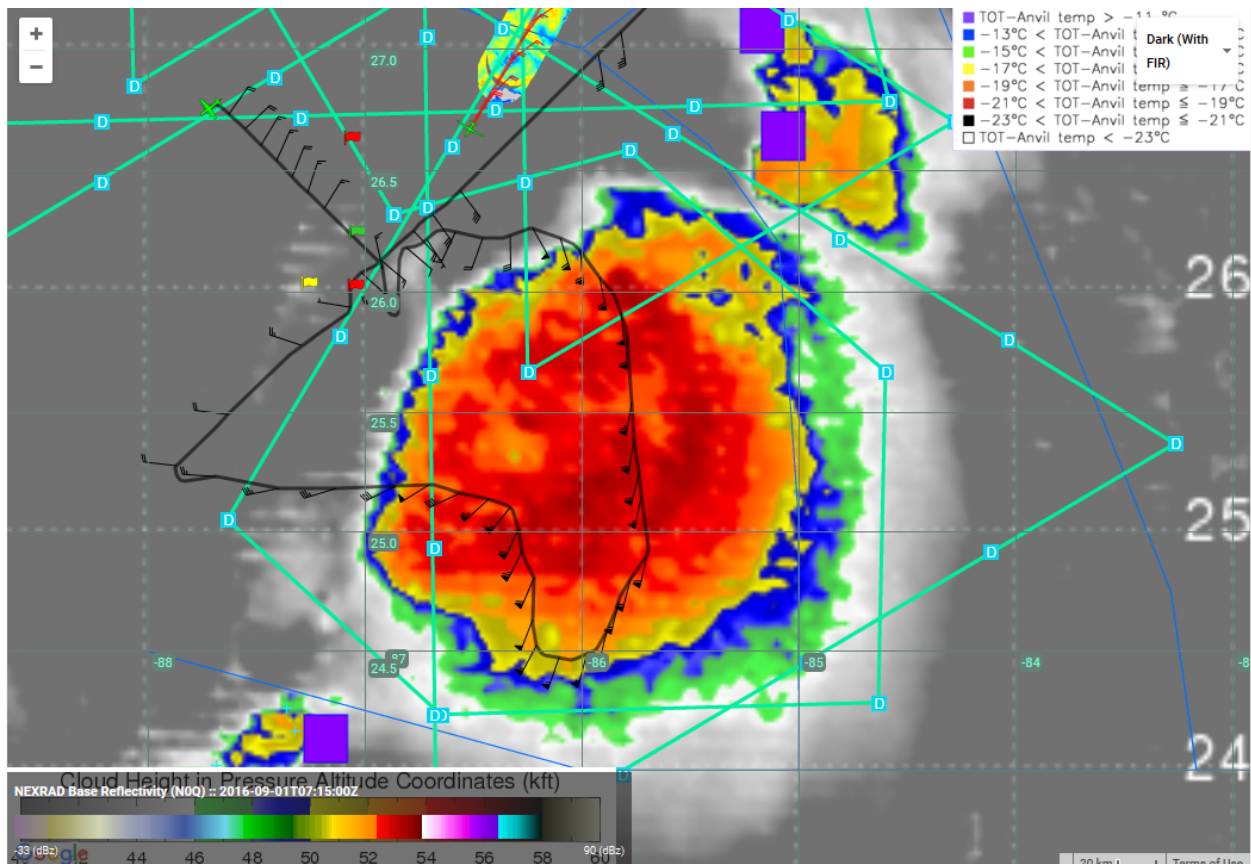




0700 UTC: Sonde #1 released at location 1. Good drop.

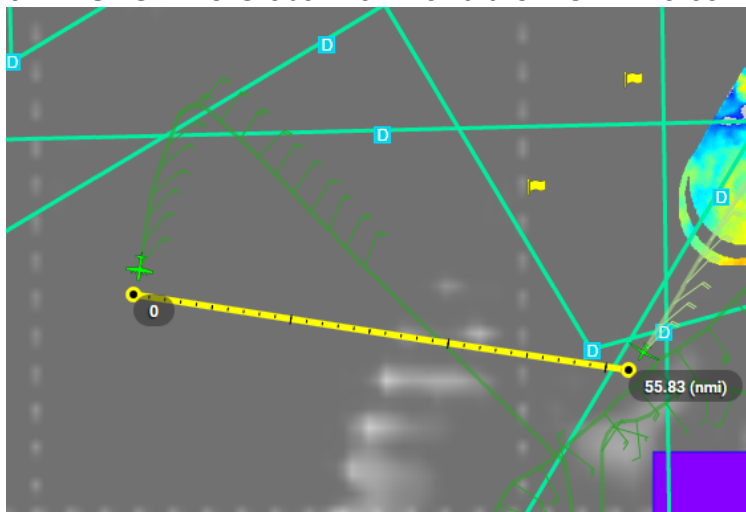
0709 UTC: Sonde #2 released at location 2. Good drop.

Diverting around giant circular supercell with hexagonal box pattern: center, around cell to SE and back to center:

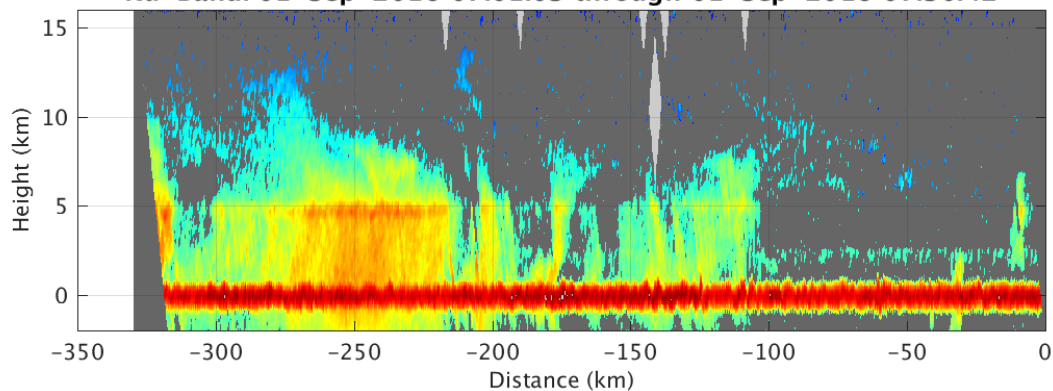


0718 UTC: Sonde #3 released at location 3. Good drop.

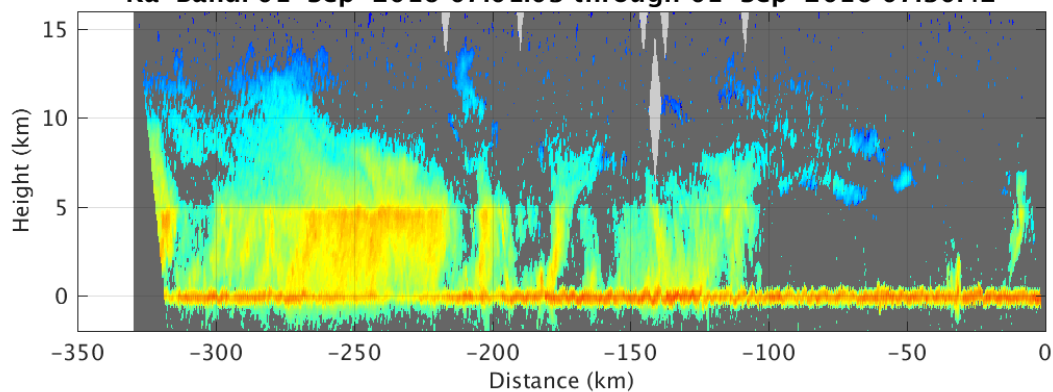
0722 UTC: The Global Hawk and the NOAA P3 come to close proximity

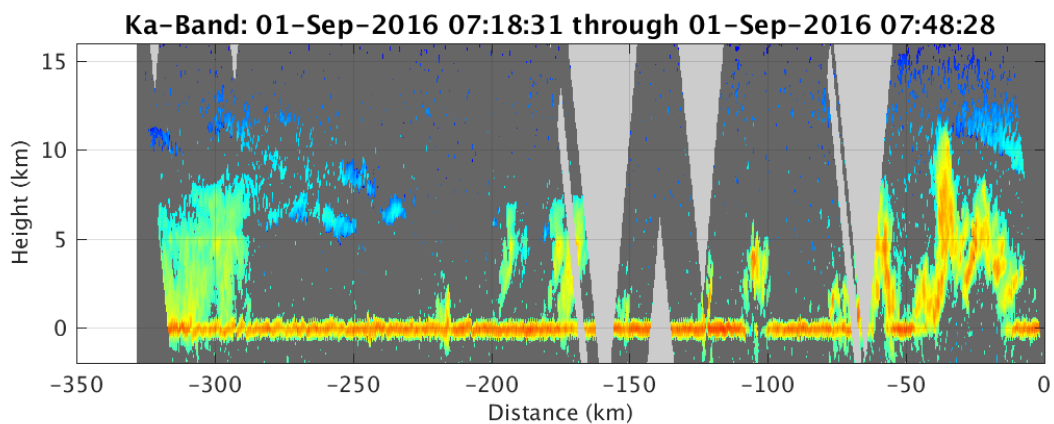
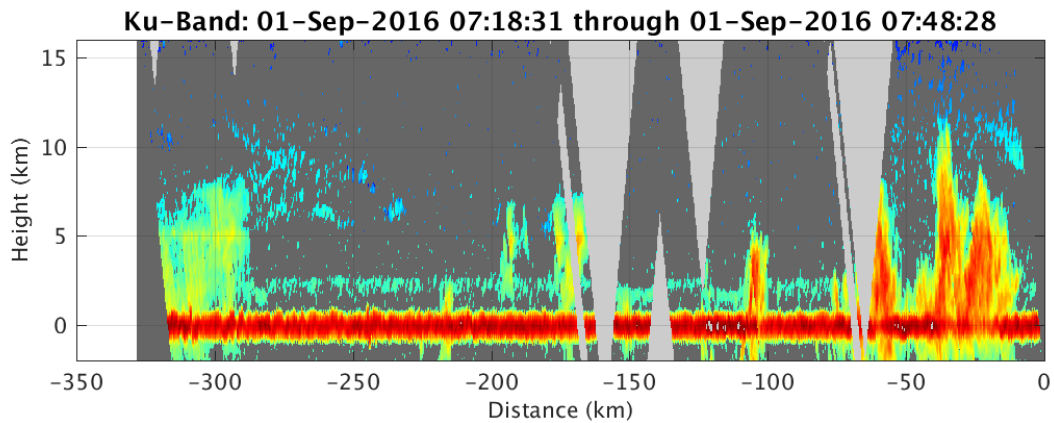


Ku-Band: 01-Sep-2016 07:01:03 through 01-Sep-2016 07:30:42



Ka-Band: 01-Sep-2016 07:01:03 through 01-Sep-2016 07:30:42



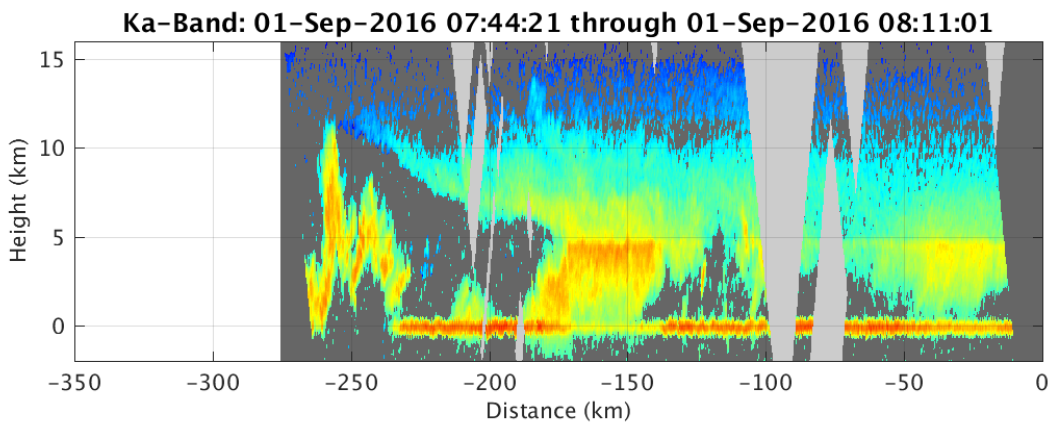
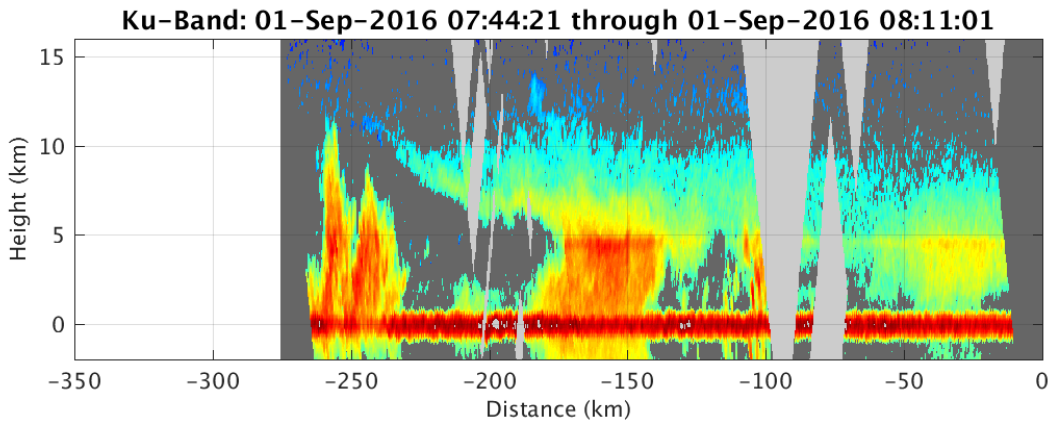


0718 UTC: Sonde #3 released at location 3. Good drop.
 0727 UTC: Sonde #4 released at location 4. Good drop
 0738 UTC: Sonde #5 released at location 5. Good drop
 0751 UTC: Sonde #6 released at location 6. Good drop.

Latest Vortex Message

000
 URNT12 KWBC 010809
 VORTEX DATA MESSAGE AL092016
 A. 01/07:45:12Z
 B. 26 deg 20 min N
 086 deg 37 min W
 C. 850 mb 1418 m
 D. 19 kt
 E. 257 deg 63 nm
 F. 343 deg 24 kt
 G. 256 deg 47 nm
 H. 998 mb
 I. 21 C / 1534 m
 J. 20 C / 1534 m
 K. 16 C / NA
 L. NA
 M. NA

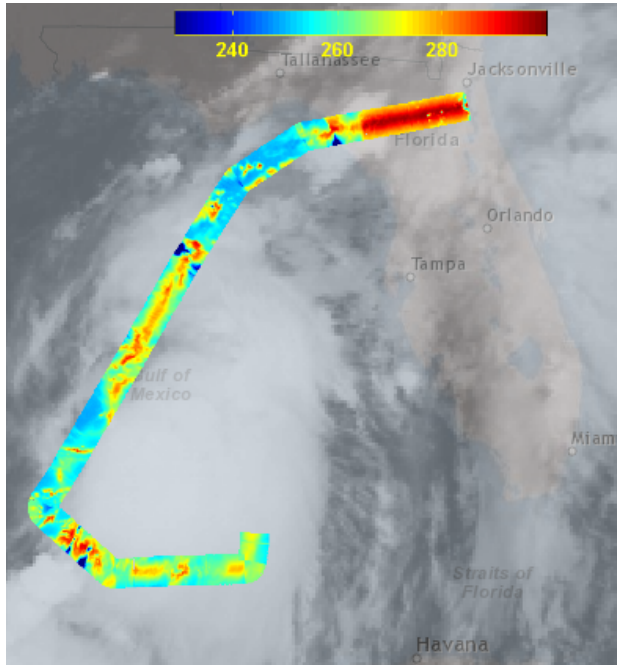
N. 12345 / 8
O. 0.1 / 2 nm
P. NOAA3 1209A HERMINE OB 22
SPIRAL BANDING WRAPPING INTO CTR
MAX FL WIND 66 KT 131 / 81 NM 06:28:15Z
MAX OUTBOUND FL WIND 62 KT 076 / 36 NM 07:54:49Z
MAX FL TEMP 24 C 254 / 38 NM FROM FL CNTR
CNTR DROPSONDE SFC WIND 125 / 25 KTS



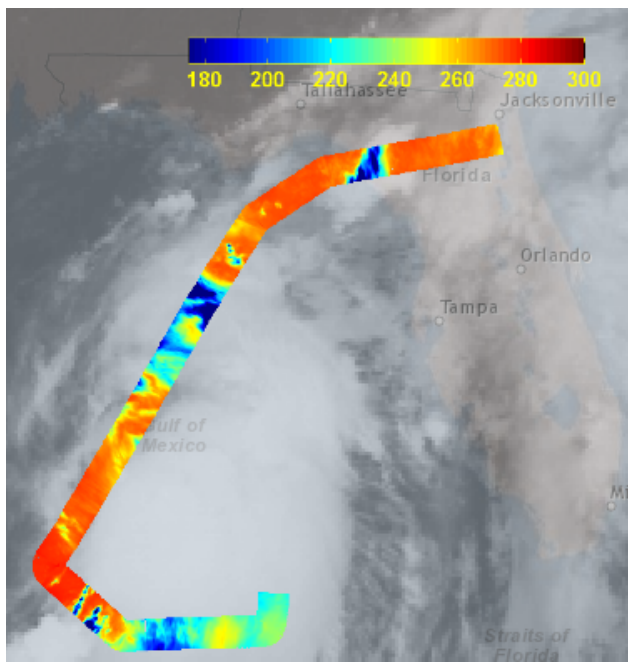
0813 UTC Sonde #7 released at location 7. Good drop.

HAMSR valid 0700Z
50.3GZ

113GZ

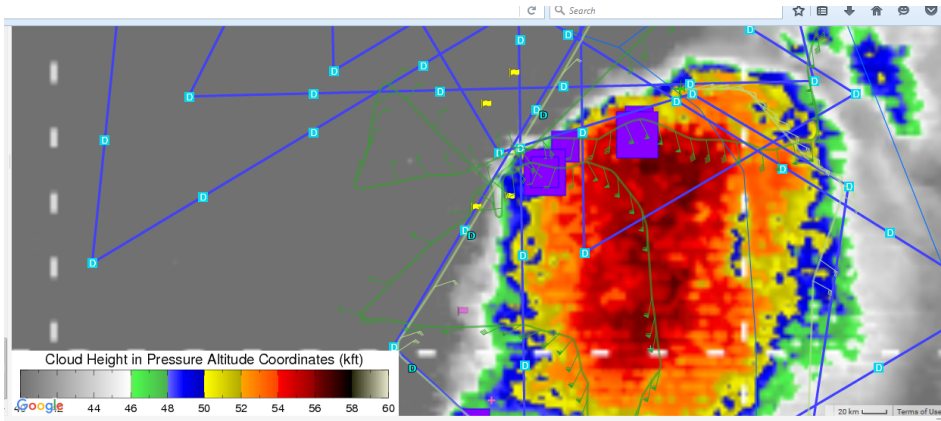


166GZ



0826Z: Gary Wick replacing Rosimar

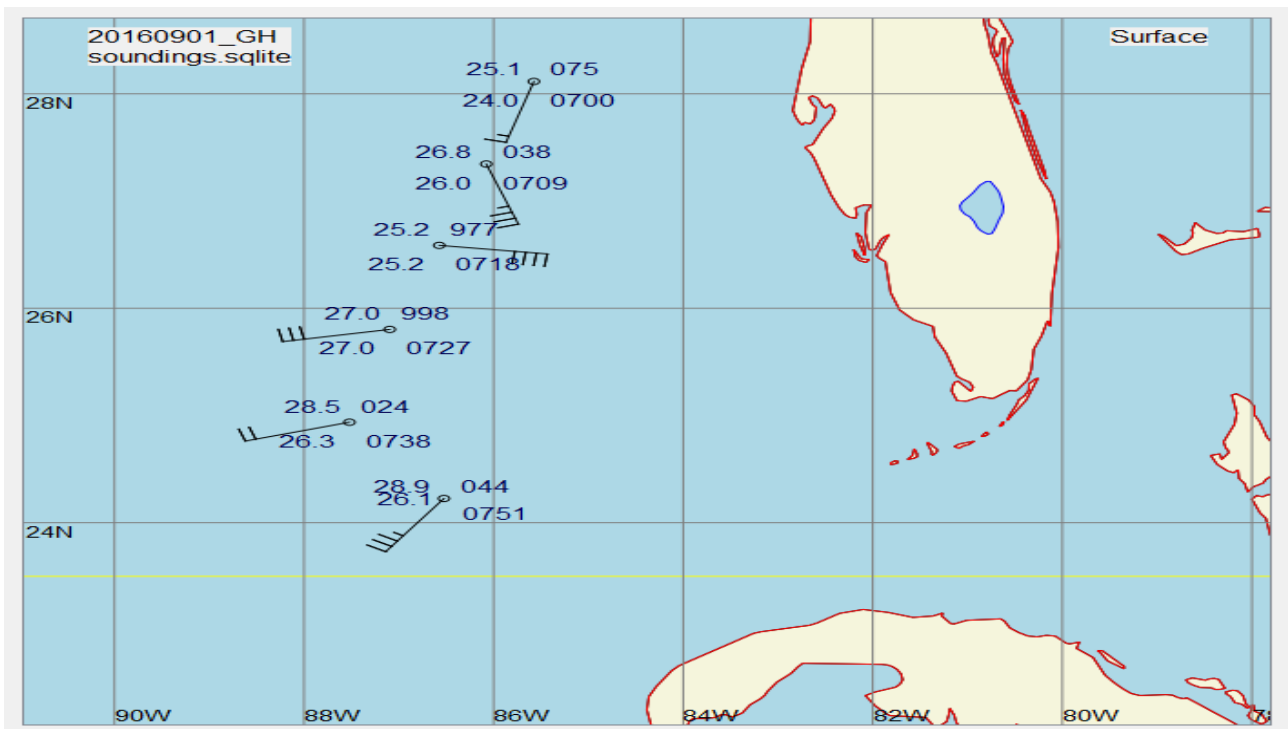
0831 UTC Sonde #8 released at location 8. Good drop



0840Z: Directed pilots to deviate further NE of track to avoid the spreading of convection. Seeing TOTs also along the the northern edge of the convection. Pilots continuing west for a bit to continue to skirt around the edge. Flew this WSW line a bit north of track to avoid cloud tops. Will pick up line to the NW further up track and drop once resume on track.

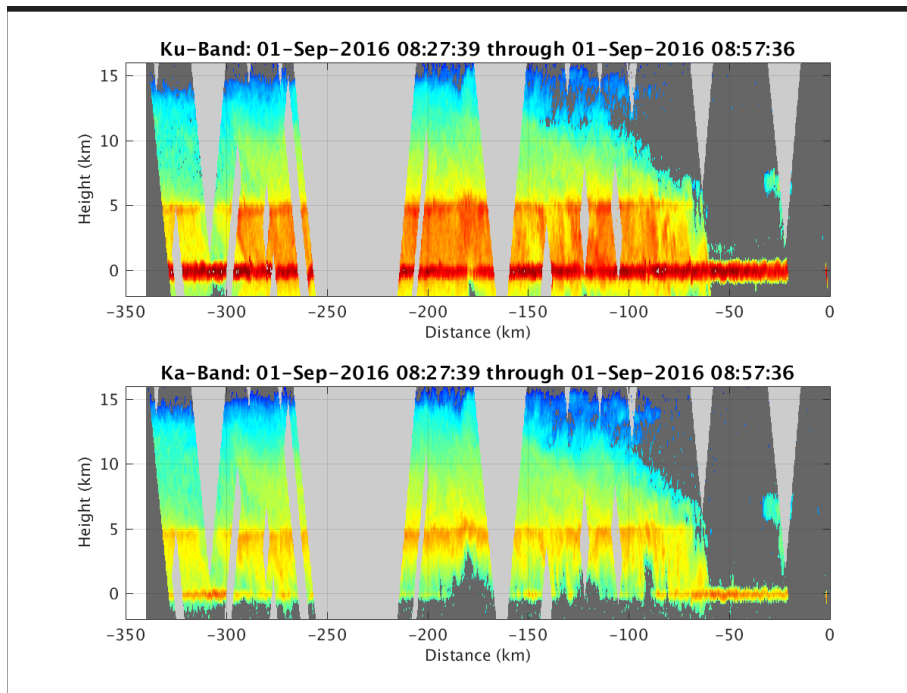
0842 UTC Sonde #9 released at location 9. Good drop. Rosimar suggests might see strong winds on this sonde - strongest winds have been on this side of the storm

DROPS 1-6 surface data



0857 UTC Sonde #10 released at location 10. Good drop.

0902Z: HIWRAP after last pass on North side of convection. See very consistent cloud tops and convection along entire portion of track.

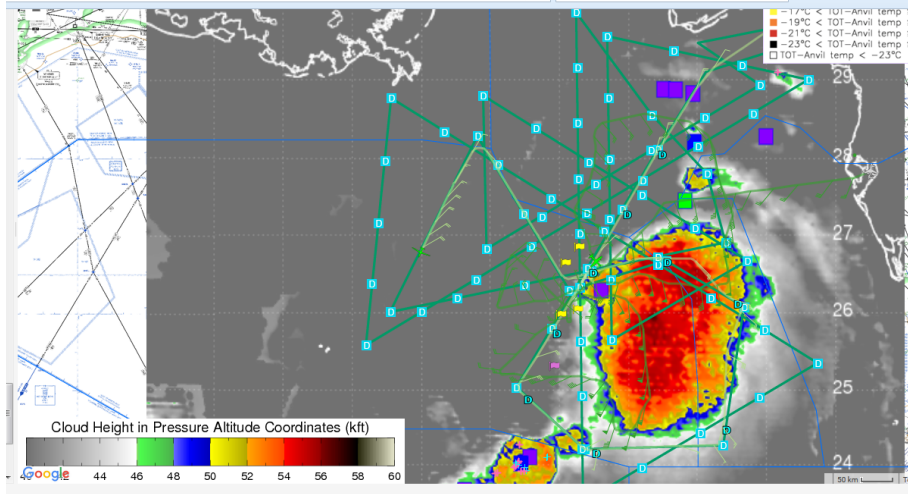


Chat from Rich-N43 at 0903Z: CARCAH_Warren, please pass to forecaster that our TDR analysis shows the 5 km vortex is now within 10 km of the 2 km vortex (displaced about due east....090 from 2m ctr to 5 km ctr)

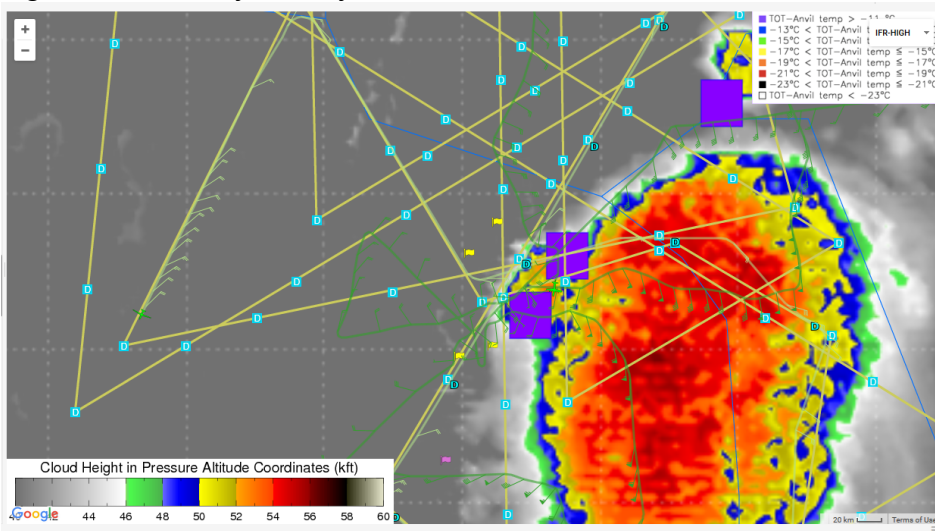
0906 UTC Sonde #11 released at location 11. Good drop.

0919 UTC Sonde #12 released at location 12. Good drop.

0930Z Implemented update 4 pushing former W-E butterfly line slightly south onto a ENE heading to try and catch center position while keeping to the north of the



0940Z Elevated cloud top heights continuing to expand to the north onto the projected flight line. Will try to stay on until reach center and then deviate north of track

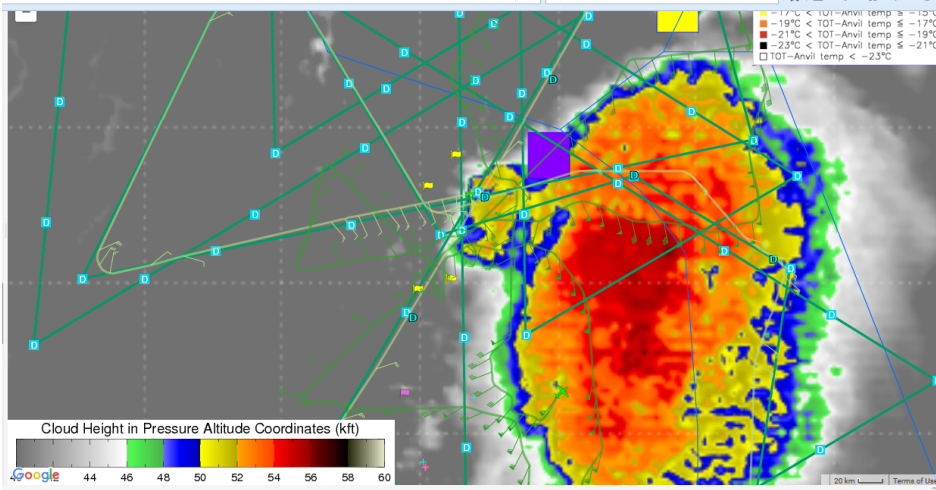


0943 UTC Sonde #13 released at location 13. Good drop.

0950 UTC Sonde #14 released at location 14. Good drop.

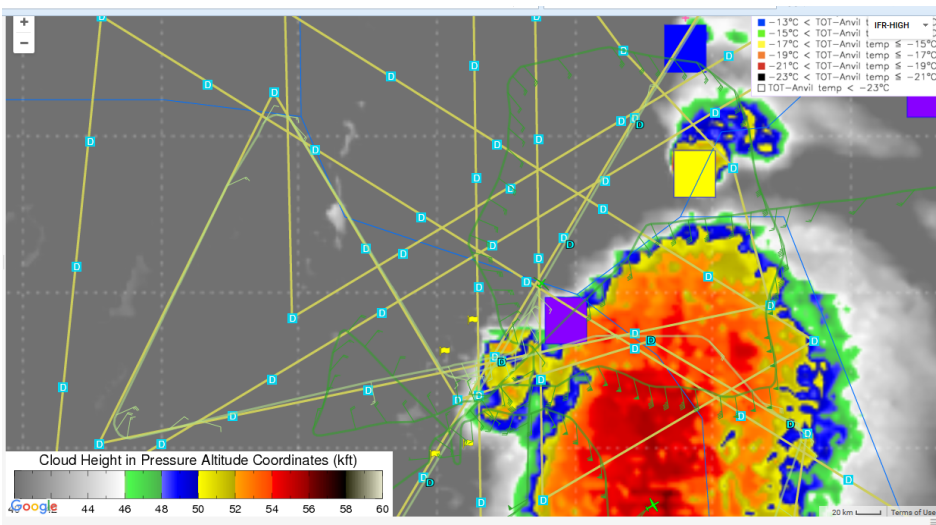
1000 UTC Sonde #15 released at location 15. Good drop.

1002 UTC: Current leg takes us toward cloud tops above 55 kft. Have talked with pilots and plan is to proceed to next drop point and then deviate north around the tops. The convective area has become much more elliptical with a N-S orientation than when we came on shift. The convection is still located to the East of the storm center.

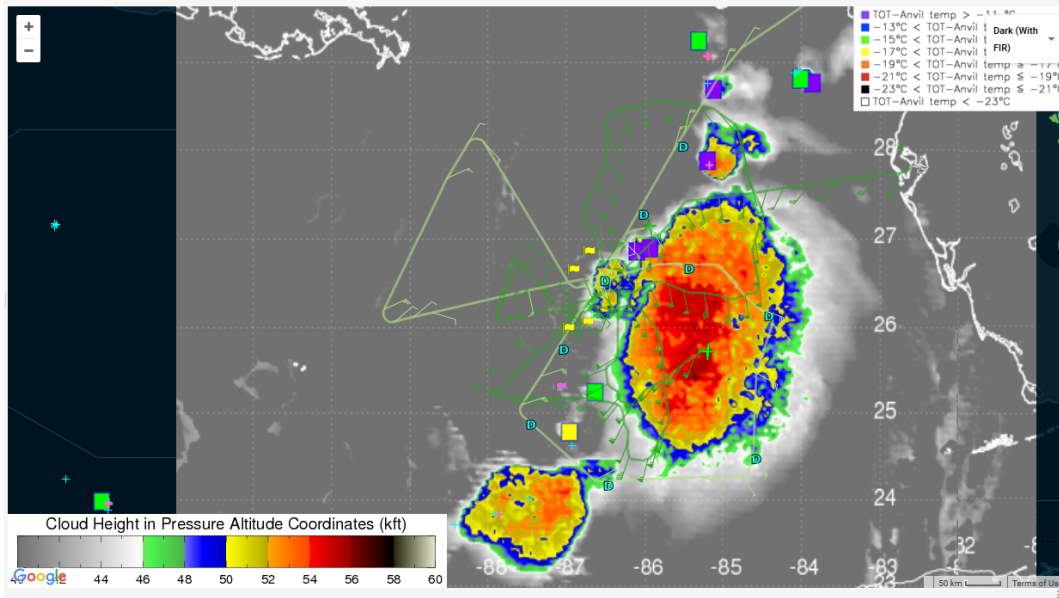


1010 UTC Sonde #16 released at location 16. Good drop.

1011 UTC: Pilots beginning deviation to the north of convection and TOT. Pilots deviated to the NNE to just north of the TOT as shown in the image below. Now turning to parallel track to the ENE and will do drops at comparable position along track



1019 UTC: Cleaner screen grab with cloud top heights showing bigger picture. Cloud tops have extended notably to the north as indicated by the track line of the previous crossing from the east to the west.



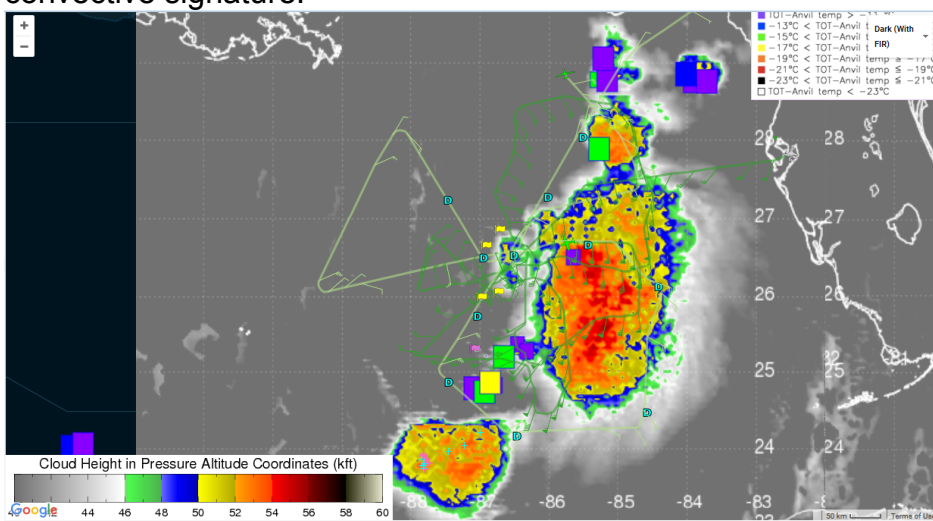
1022 UTC Sonde #17 released at location 17 (on parallel track to N). Good drop.
 From stan: Sonde 17 (1022Z) sent to ESRL & GTS--1000.4, 46 kts sfc, 62 kts MBL

1033 UTC Sonde #18 released at location 18 (displaced to N). Good drop.

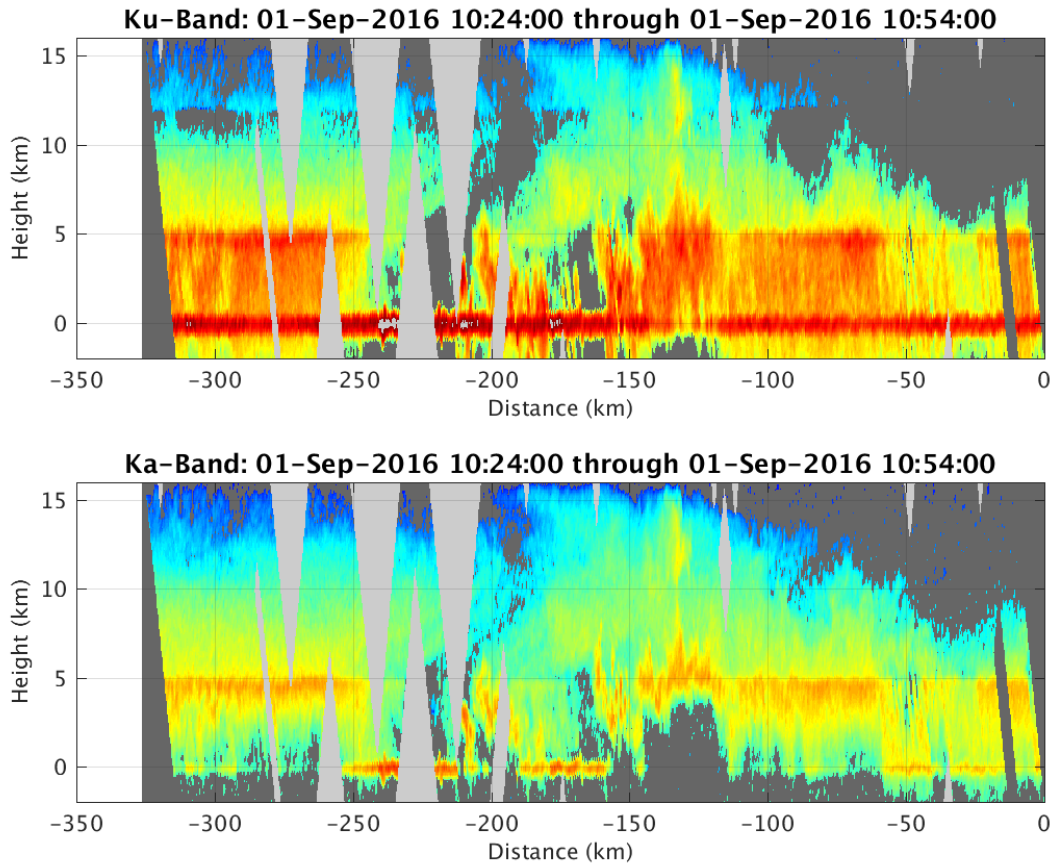
1036 UTC Sonde #19 released at location 19. Good drop.

1047 UTC Sonde #20 released at location 20. Good drop.

1050 UTC: Big picture as we head to long N-S butterfly line. Line planned to cross through center of system and currently looks to pass just to the west of the main convective signature.



1057 UTC: HIWRAP section from pass over last smaller convective cell to the north of the main convection



1103 UTC Sonde #21 released at location 21. Good drop.

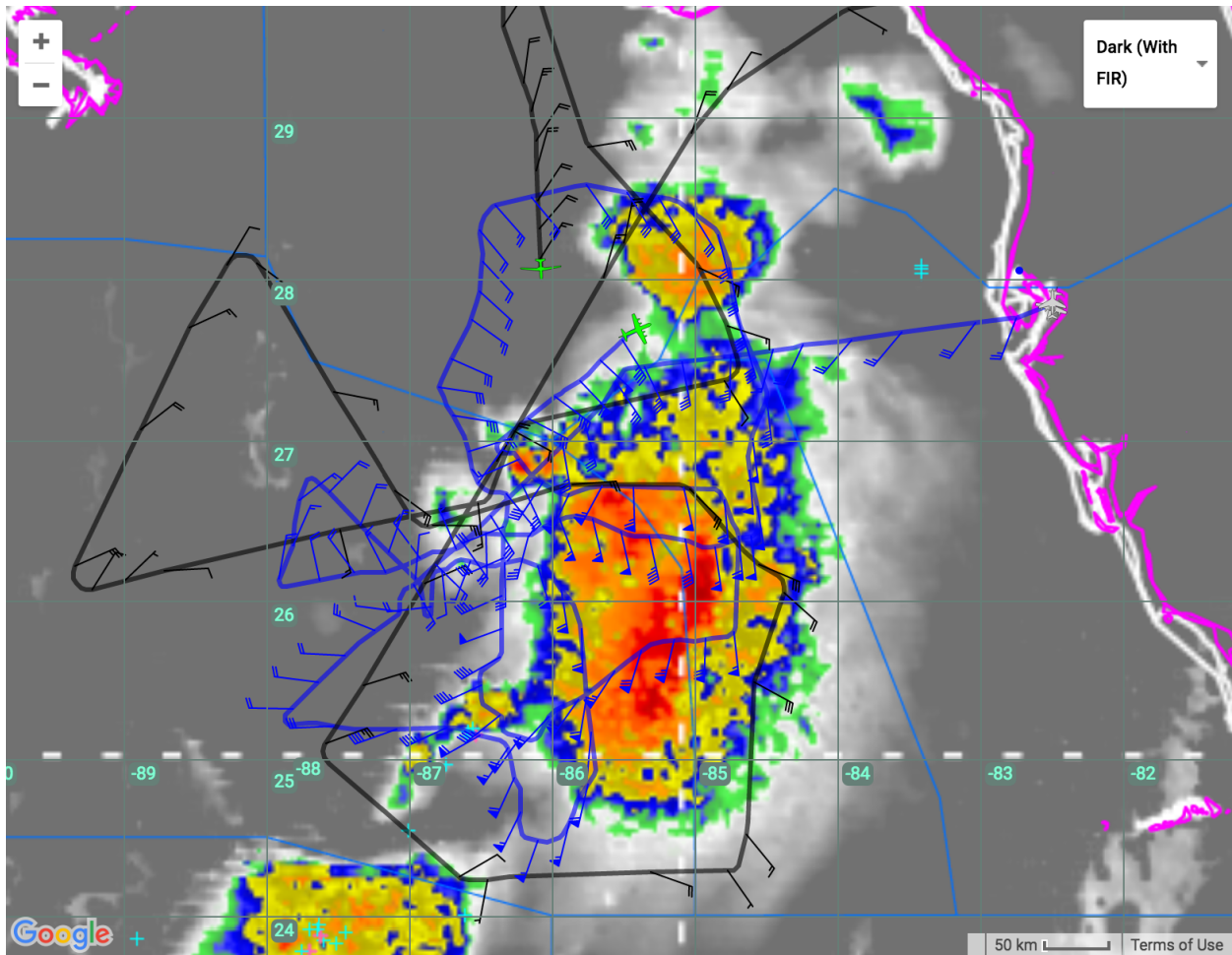
1109 UTC Sonde #22 released at location 22. Good drop.

1116 UTC Sonde #23 released at location 23. Good drop.

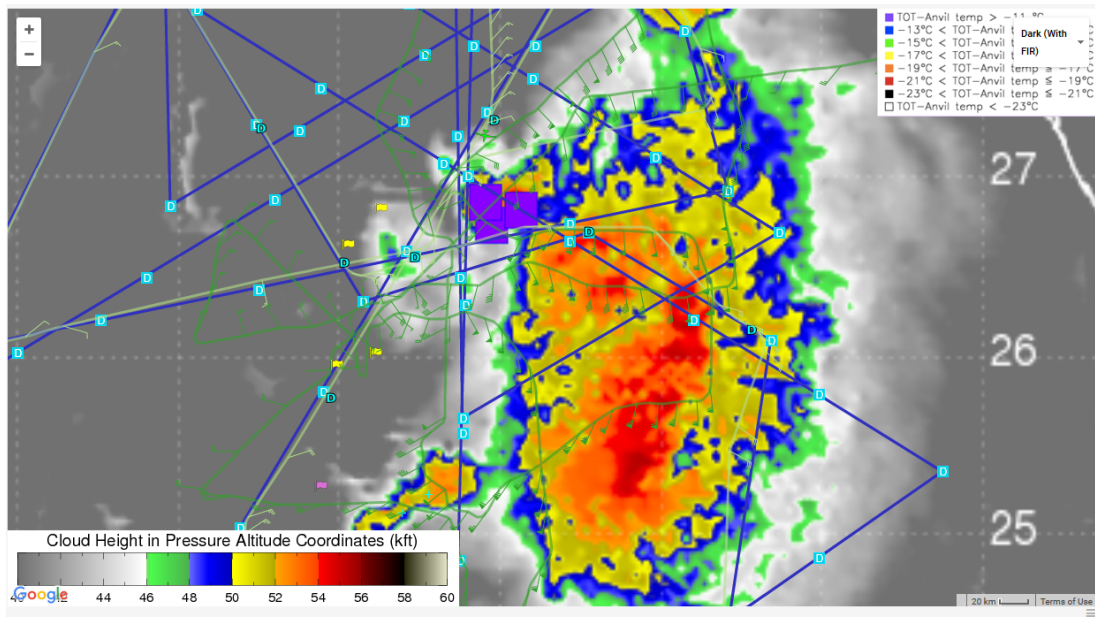
1123 UTC Sonde #24 released at location 24. Good drop.

Have implemented update 6 which just pushes the southern end of this line a bit to the west to better catch the last reported center position. Global Hawk will adjust track to the new line as able.

1124- P3 and GH flight tracks wrt convective bursts:

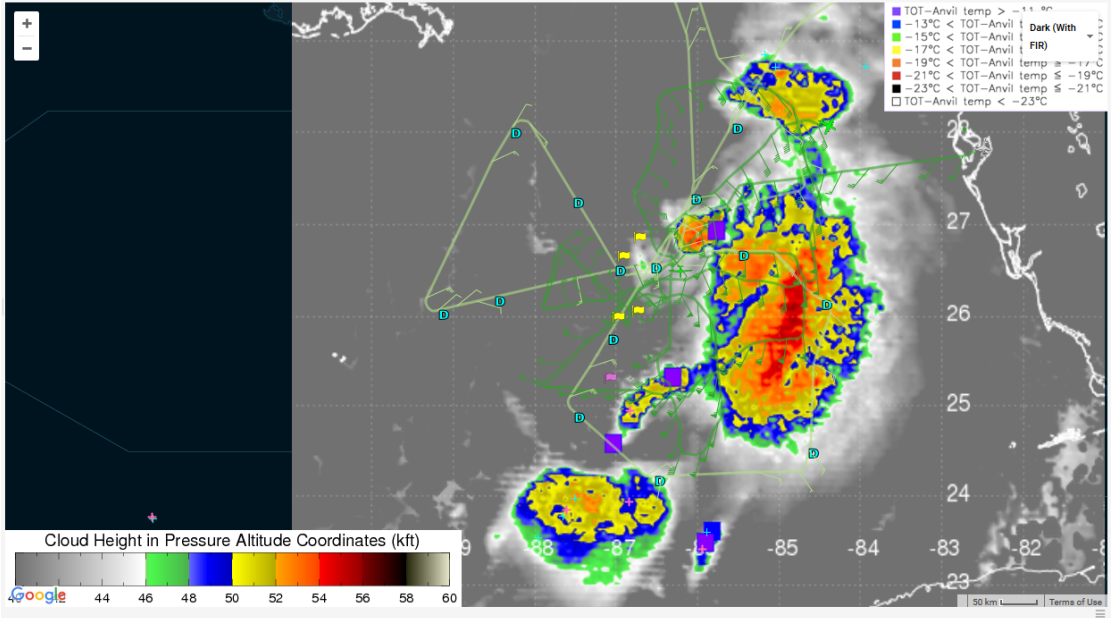


1129 UTC Beginning shift to revised southerly track. Drop will be just to the west of a convective area with TOT



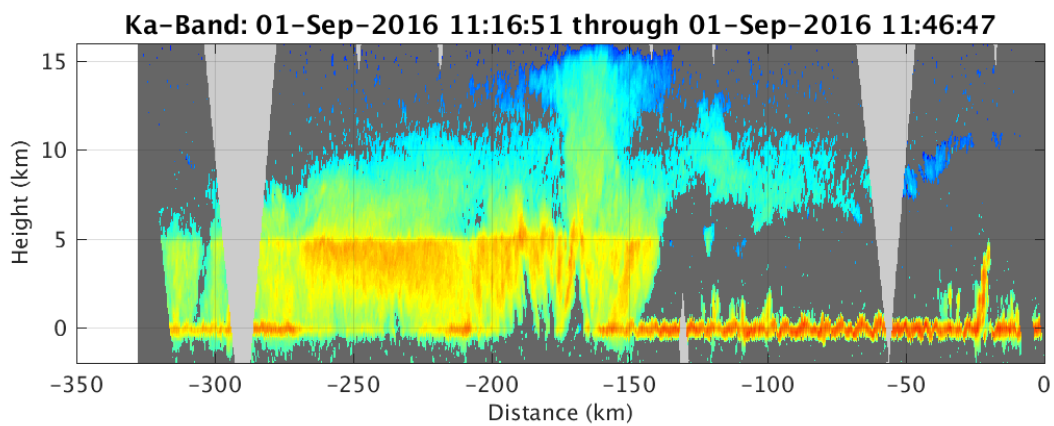
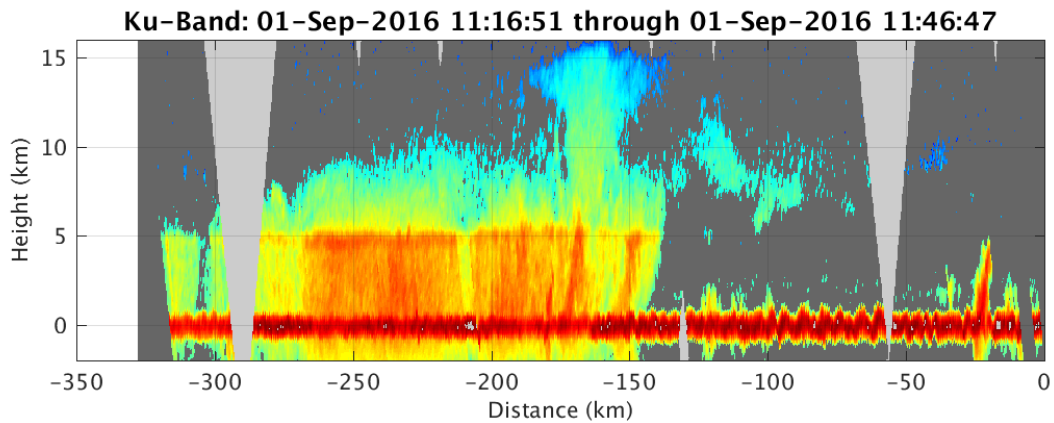
1131 UTC Sonde #25 released at location 25. Good drop.

1137 UTC: Big picture cloud top height image just after attempted center crossing on southern track. Highest cloud tops now confined to a primarily N-S axis along largest region of convection. Extent of convection appears to be shrinking relative to what observed a bit earlier.



1139 UTC Sonde #26 released at location 26. Good drop.

1146 UTC: HAMSRS from center crossing piece of N-S line. Estimated center was just north of small region of convection



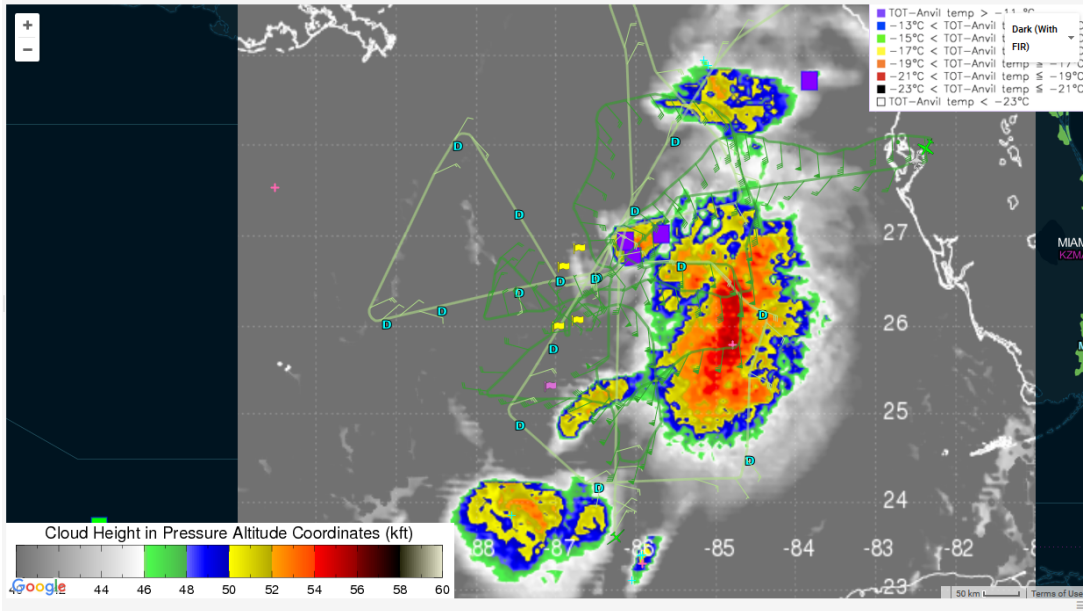
1147 UTC Sonde #27 released at location 27. Good drop.

1154 UTC Sonde #28 released at location 28. Good drop.

~1200 UTC: Called Mathias from HAMSAR to check on data transfer status

1202 UTC Sonde #29 released at location 29. Good drop.

1205 UTC: Convection definitely shrinking now. Jason reports right on the clock. Should be beneficial for next major butterfly line which would pass over convection



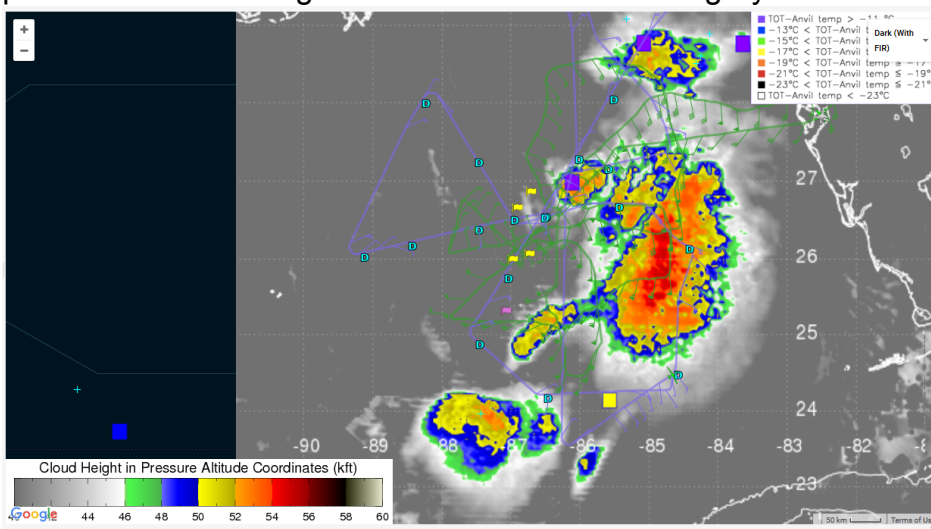
1209 UTC Sonde #30 released at location 30. Good drop.

1216 UTC Sonde #31 released at location 31. Good drop.

Uploaded Update 7: Just applied slight southeast shift of the end waypoint (drop location 42) of the long butterfly NW oriented line. Convection along proposed track appears to be decreasing and hope to be able to pass over.

1225 UTC Sonde #32 released at location 32. Good drop.

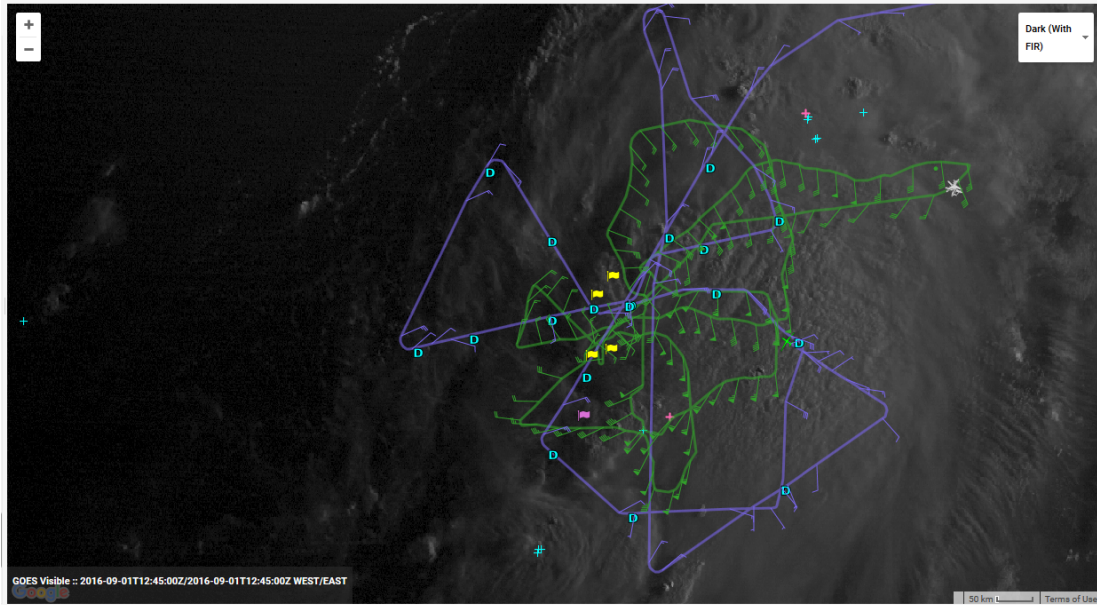
1227 UTC: Seeing continued decrease in convective activity in cloud top height product. Still awaiting arrival of visible GOES imagery



1234 UTC Sonde #33 released at location 33. Good drop.

1244 UTC Sonde #34 released at location 34. Good drop.

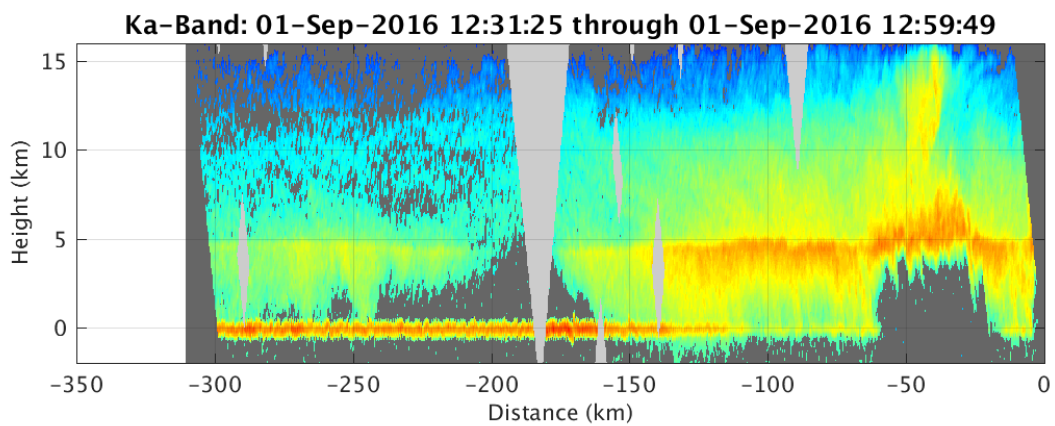
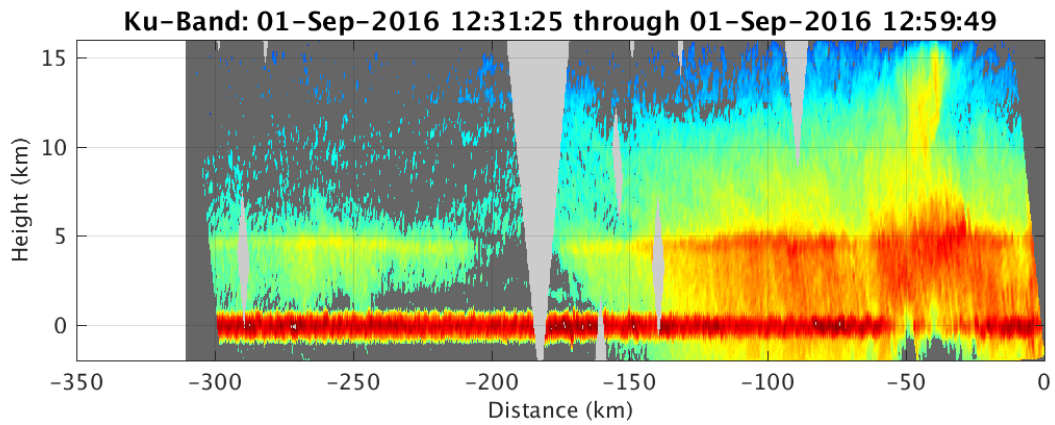
1245 UTC: Just starting to get visible imagery:



1251 UTC Sonde #35 released at location 35. Good drop.

1300 UTC Sonde #36 released at location 36. Good drop.

1302 UTC: HIWRAP vertical section of ongoing pass over main convective area. Was first time we were able to pass through the main convection as we climb and the convection decreases. Gerry reports: Tops are up around 52kft possibly slightly higher in HIWRAP data.



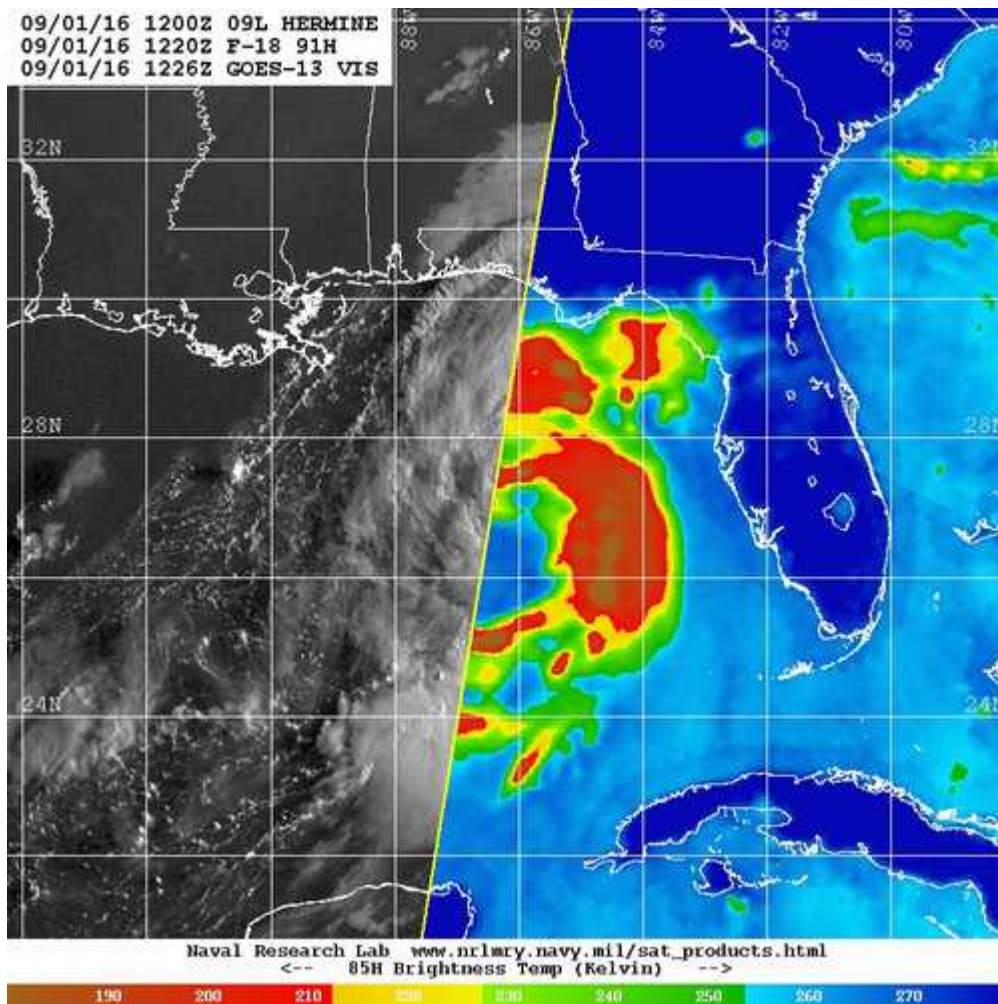
1308 UTC Sonde #37 released at location 37. Good drop.

1317 UTC Sonde #38 released at location 38. Good drop.

~1320: Implemented update 8: Shifted the southwest to northeast large butterfly line to the south to cross over center

1325 UTC Sonde #39 released at location 39. Good drop.

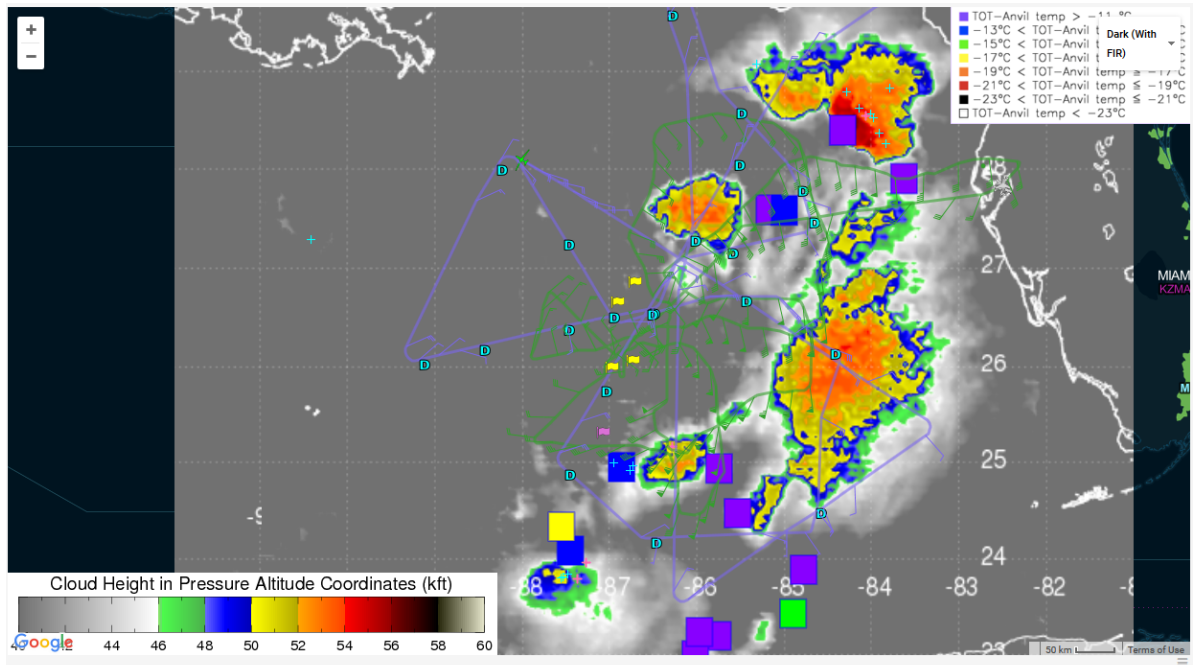
MW SSMIS Image from 1200 UTC:



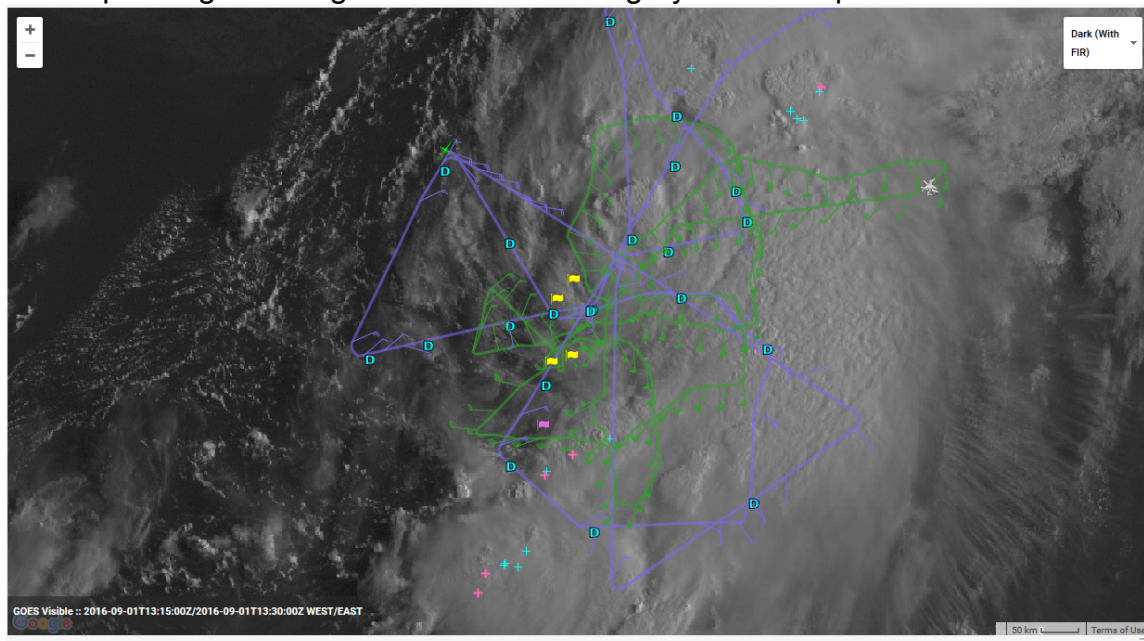
1333 UTC Sonde #40 released at location 40. Good drop.

~1330 UTC: Mathias from HAMSAR came back. Reports that this time the problem appears to be on the processing side (as opposed to the data transfer) - Shannon will have to fix. He is up and should be working.

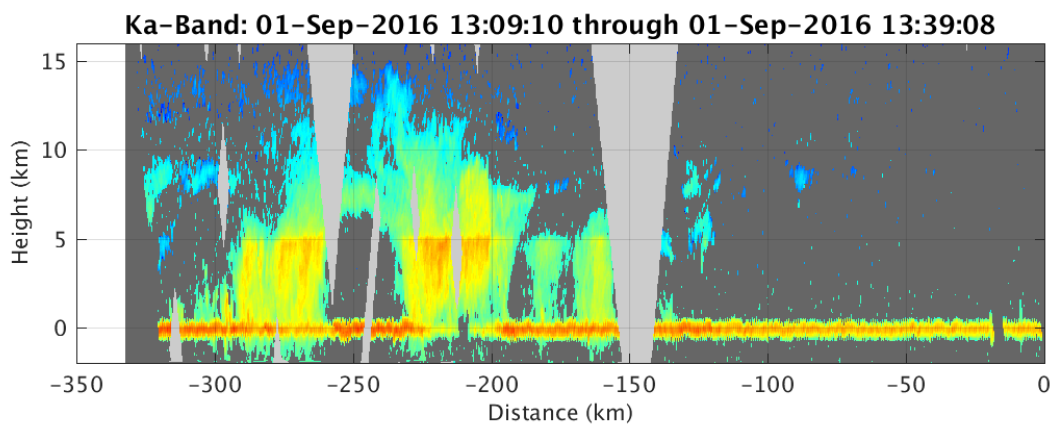
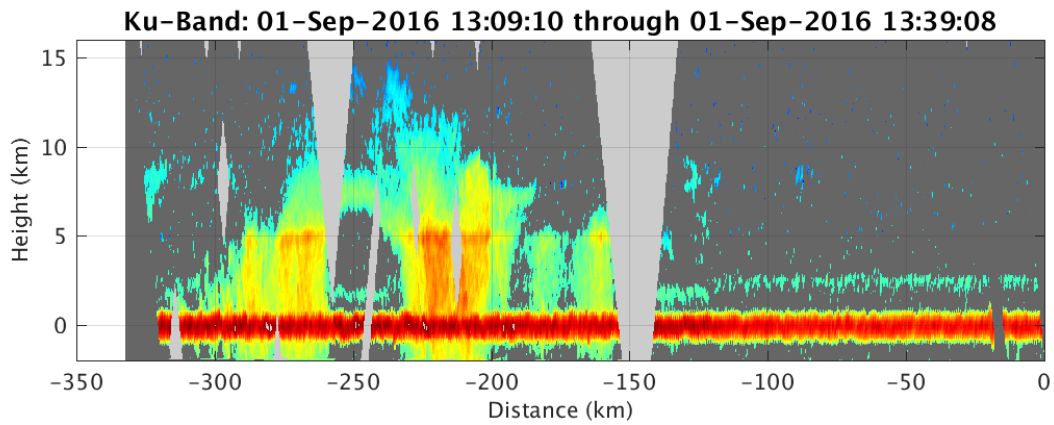
1335 UTC (1319 imagery): See how convection has continued to break down and is now scattered in several different regions. Biggest convection is now in the region to the NE closest to the FL coast



Corresponding screen grab from visible imagery time stamped at 1330



HIWRAP section from further along this long butterfly line:

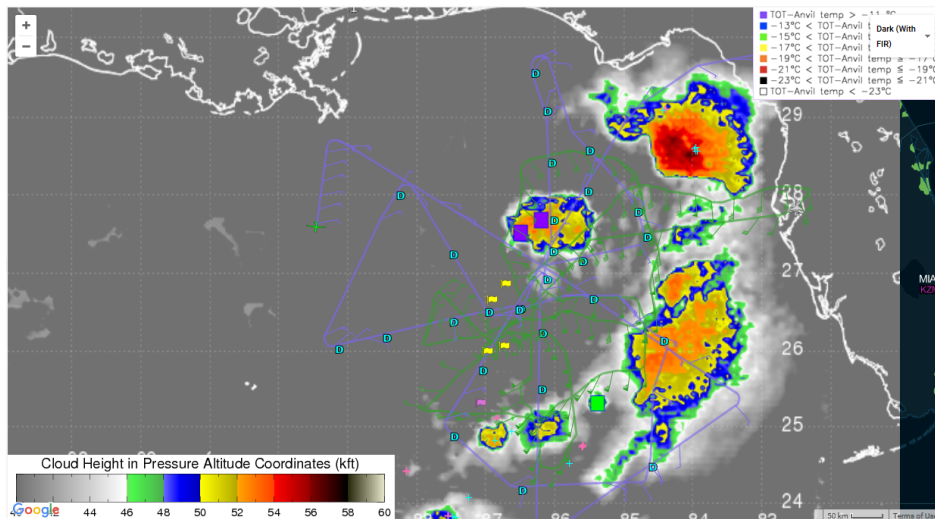


1341 UTC Sonde #41 released at location 41. Good drop.

1350 UTC Sonde #42 released at location 42. Good drop.

1357 UTC Sonde #43 released at location 43. Good drop.

1401 UTC: Remains of previous convection has pushed out away from the expected center. Seeing a small region of new convection closer to (north of) current center



1406 UTC Sonde #44 released at location 44. Good drop.

1414 UTC Sonde #45 released at location 45. Good drop.

1425 UTC Sonde #46 released at location 46. Good drop.

1428 UTC: Entered into long SW to NE butterfly leg. Convective cell at end of line has increased in activity and lightning is active. Alerted pilots that we will watch end of line and may need to cut short and turn to north to avoid being pinched in.

1430 UTC: Have lost position updates in MTS. No signal from MPCS - last load did not go through.

1433 UTC: Approaching drop point 47 but no sat comms - will likely miss drop point - sonde not loaded. Passing point 47.

1436: Mission reports links coming back - clear to load

1443 UTC: Sonde #47 released at location 48. Good drop.

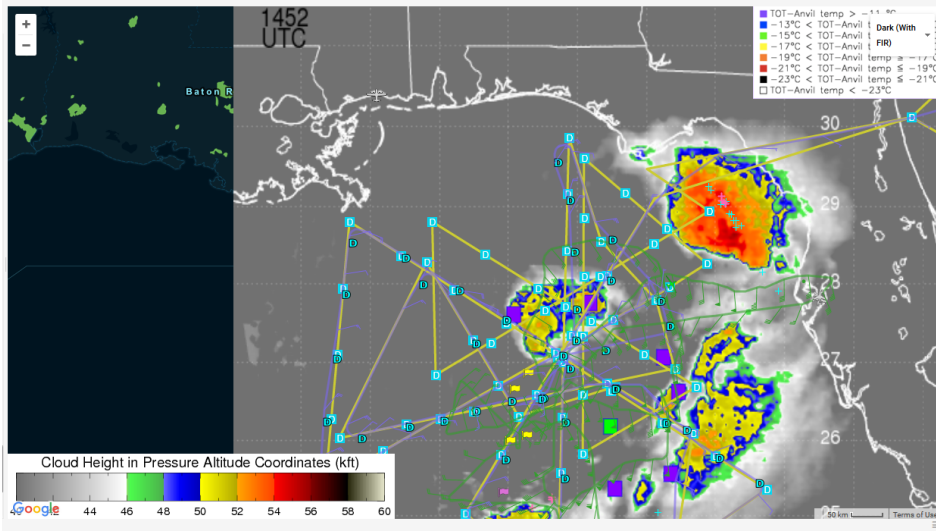
1453 UTC: Sonde #48 released at location 49. Good drop.

1500 UTC: uploaded update 9 that cuts this long butterfly leg short

1502 UTC: Sonde #49 released at location 50. Good drop.

1512 UTC: Sonde #50 released at location 51. Good drop.

1520 UTC (1452 image time): Cloud top height showing convection along the FL coast and the revised track which turns short of the convection. The line then joins up with the North-South line of the small butterfly



1512 UTC: Sonde #50 released at location 51. Good drop.

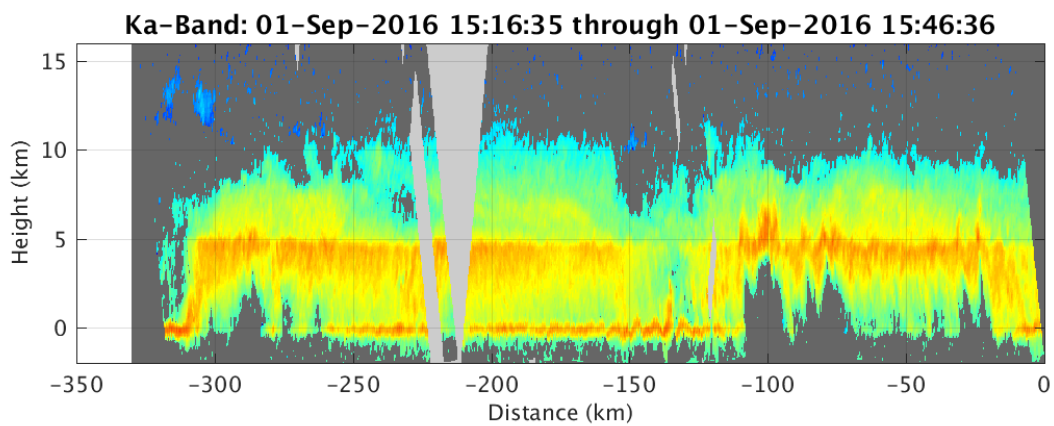
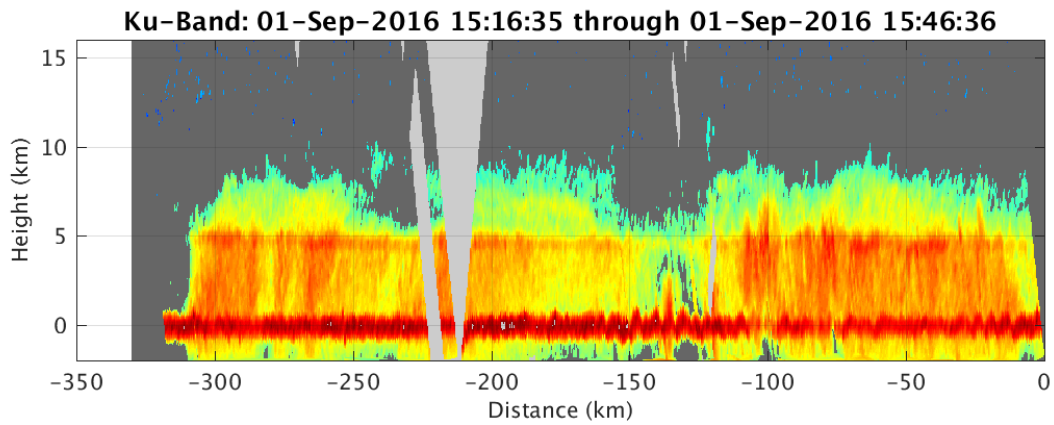
1521 UTC: Sonde #51 released at location 52. Good drop.

1529 UTC: Sonde #52 released at location 53. Good drop.

1534 UTC: Sonde #53 released at location 54. Good drop.

1541 UTC: Sonde #54 released at location 55. Good drop.

1548 UTC: HIWRAP from the SE to NW small butterfly leg paralleling convection off FL. Nice stratiform rain noted by Scott.



1550 UTC: Sonde #55 released at location 56. Good drop.

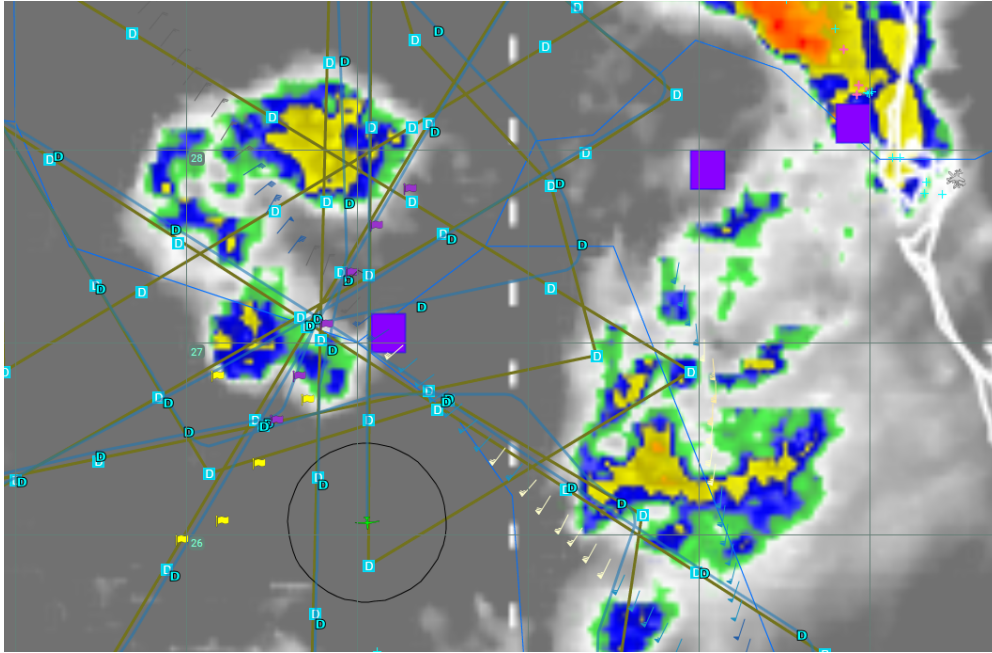
1557 UTC: Sonde #56 released at location 57. Good drop.

1605 UTC: Sonde #57 released at location 58. Good drop.

1613 UTC: Sonde #58 released at location 59. Good drop.

Scott Braun and Darren Jackson taking over for Jason and Gary

1621 UTC: Sonde #59 released at location 60. Good drop.



1629 UTC After the turn, we will add a drop in the middle of the leg heading NE.

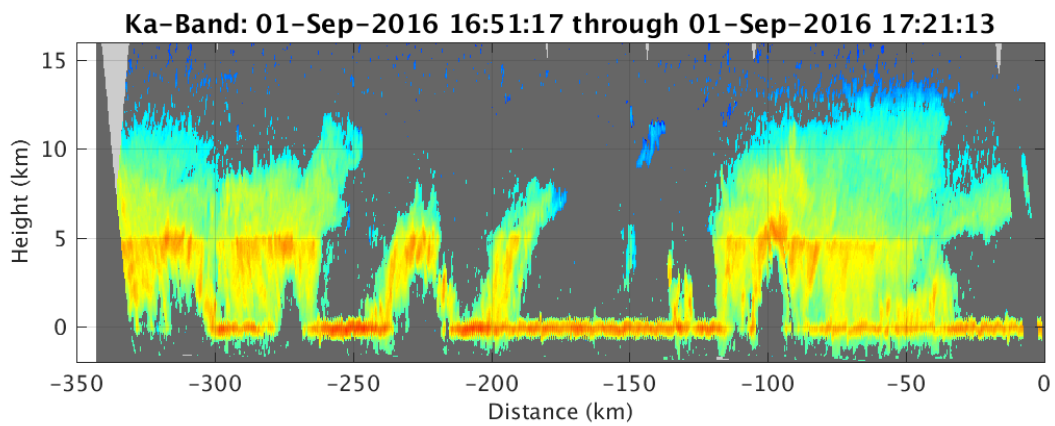
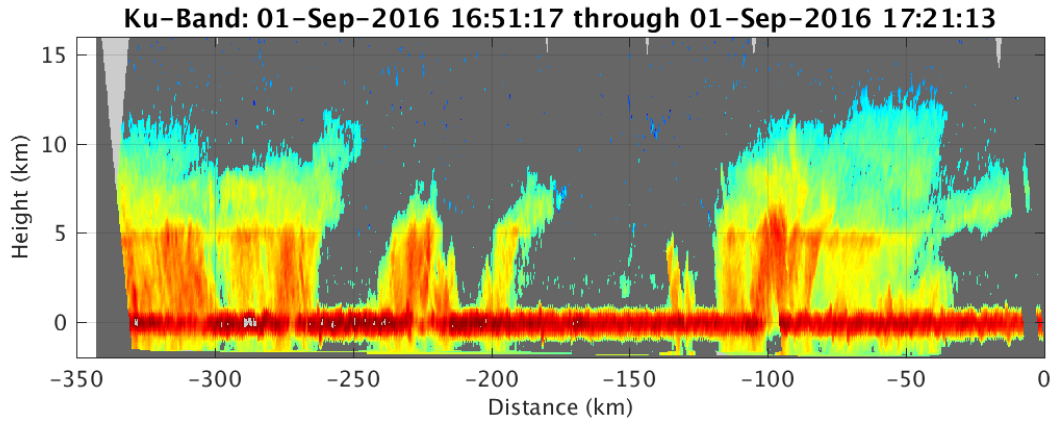
1630 UTC: Sonde #60 released at location 61. Good drop.

1640 UTC: Sonde #61 released between 61 and 62. Good drop.

1652 UTC: Sonde #62 released at location 62. Good drop.

1658 UTC: Sonde #63 released at location 63. Good drop.

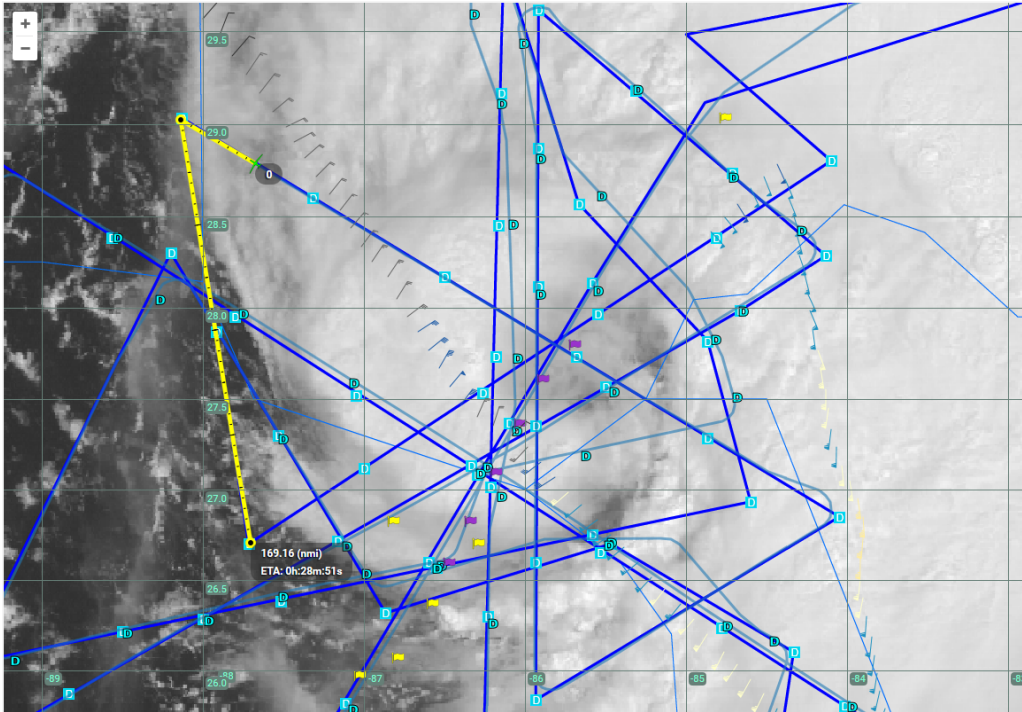
1707 UTC: Sonde #64 released at location 64. Good drop.



HIWRAP Reflectivities on pass from SE to NW (drops 62-67). Location of the eye between X=-140 to -190 km.

1715 UTC: Sonde #65 released at location 65. Good drop.

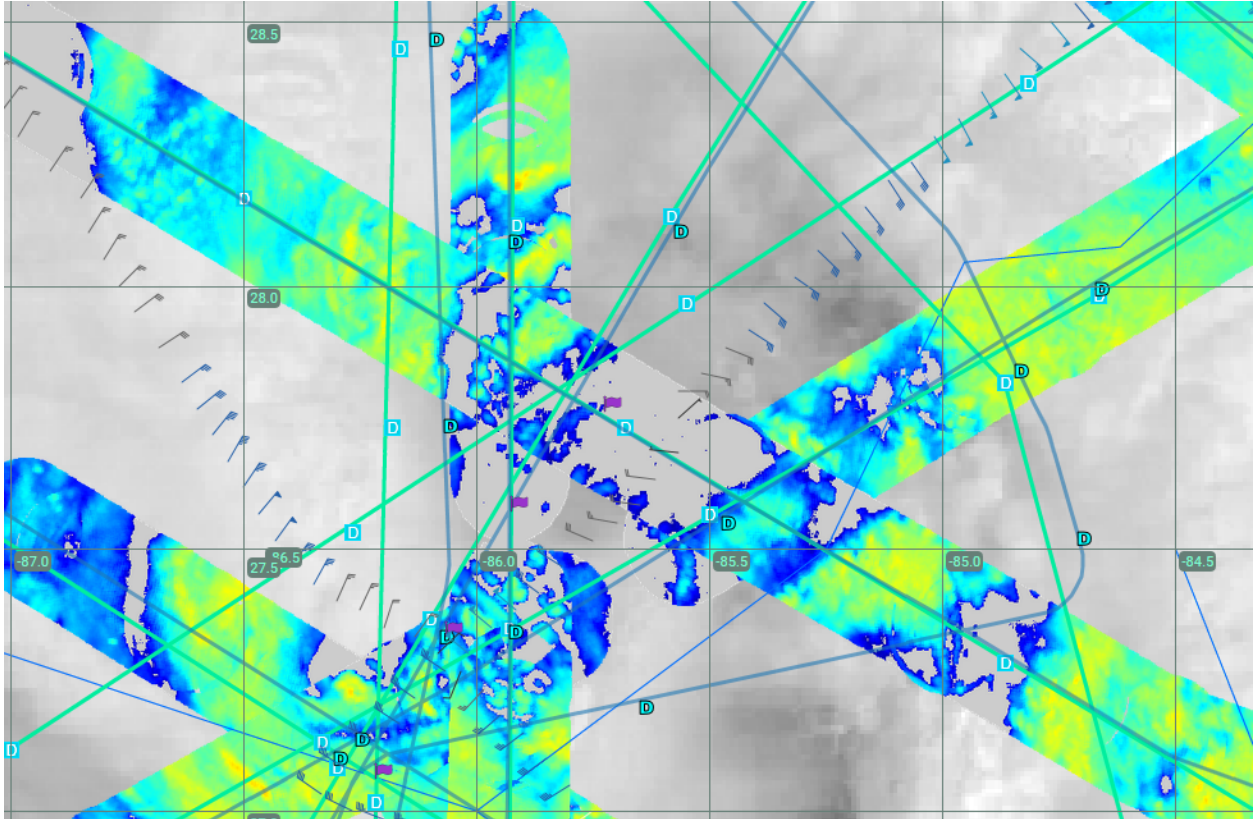
1724 UTC: Sonde #66 released at location 66. Good drop.



1715 visible image now shows convection starting to completely surround an eye. Widespread precipitation from SE around to the NNW.

1733 UTC: Sonde #67 released at location 67. Good drop. This drop was after the turn. We have added another drop between 67 and 68. The new drop will become the new 68 and all subsequent drops are incremented by 1.

1743 UTC: Sonde #68 released at location 68. Good drop.

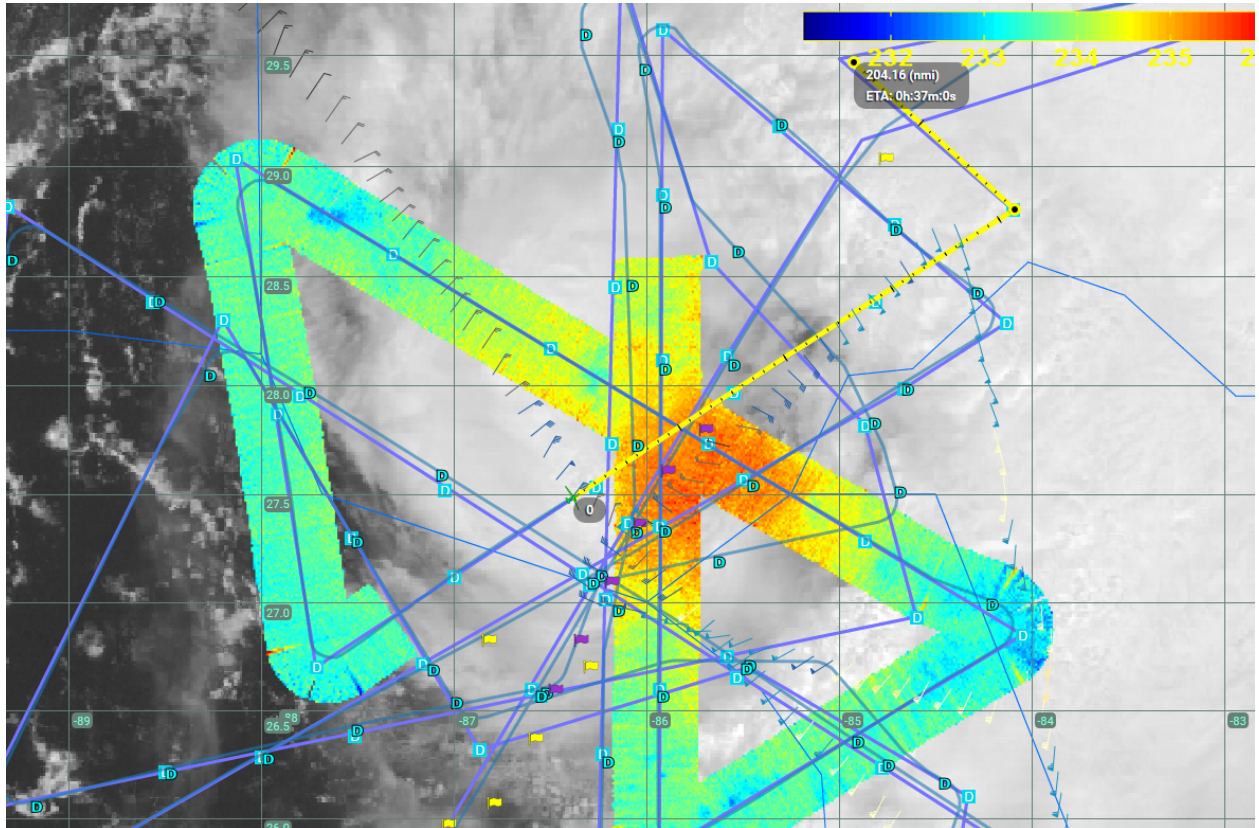


The image above shows HIWRAP Ku data at 2 km during the last pass from SE to NW (plus earlier times). Overlaid are winds from AF C-130. A wind shift with very weak winds occurs in the reflectivity-free area, so the overpass appears to have captured the center well.

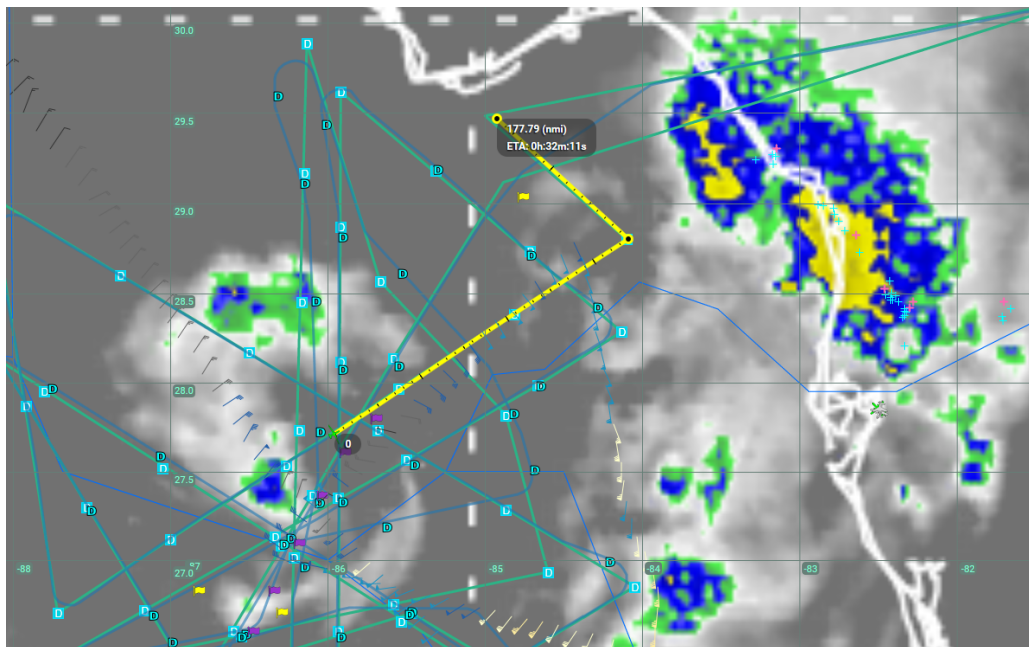
1757 UTC: Sonde #69 released at location 69. Good drop.

1804 UTC: Sonde #70 released at location 70. Good drop.

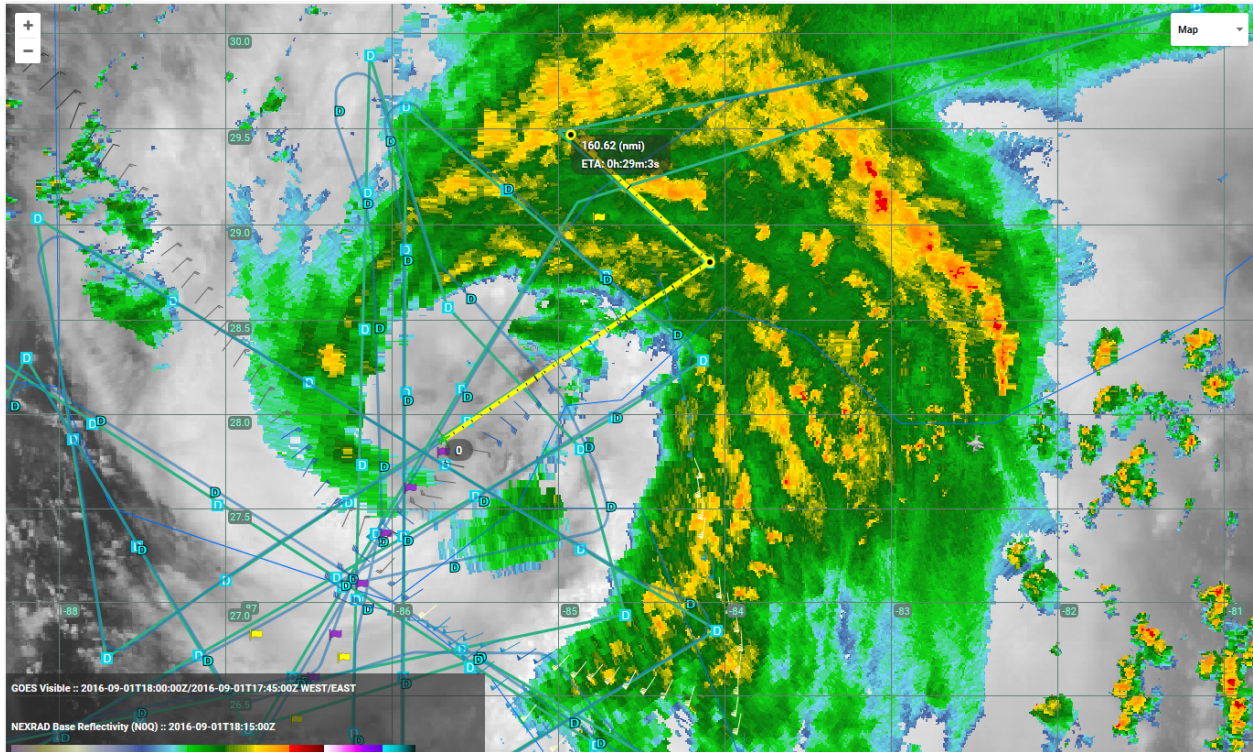
1812 UTC: Sonde #71 released at location 71. Good drop.



1812 UTC Image shows HAMSr 54.94 GHz relative temperature. Nicely captures the warm core of Hermine. GH approaching the center.



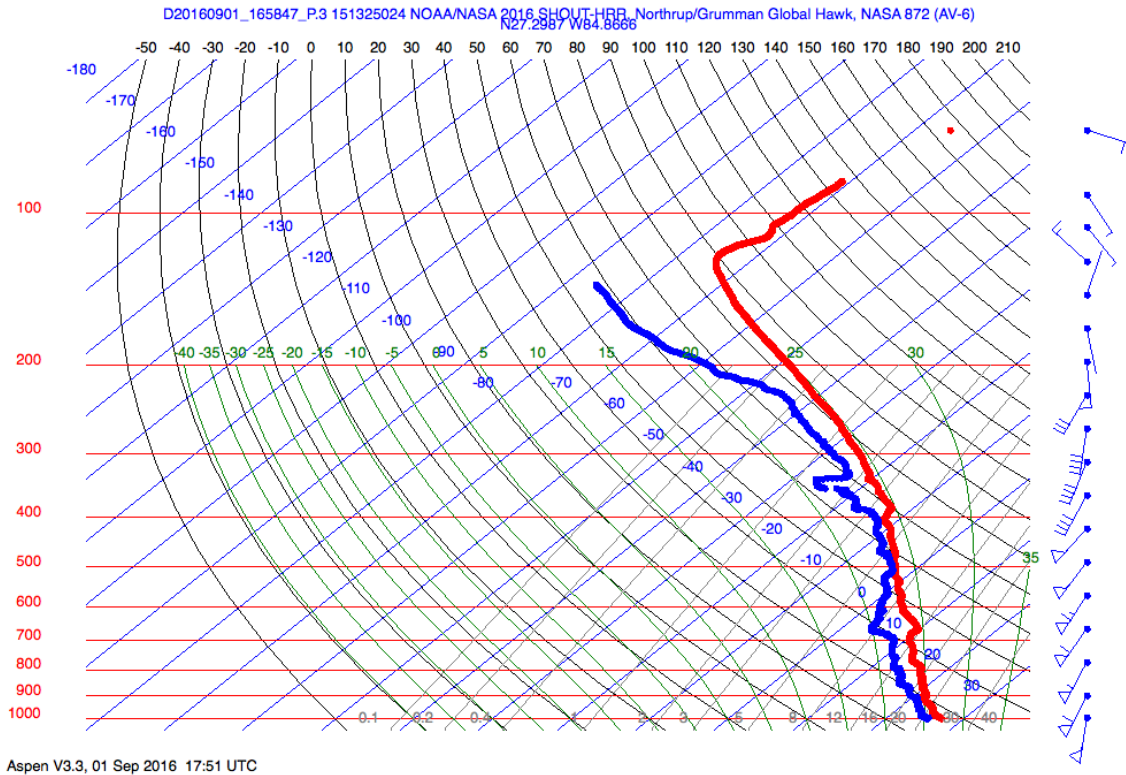
1737 UTC CTH image shows that cloud tops to the NE near the transit back across Florida and decreasing, so not expecting problems for the crossing.



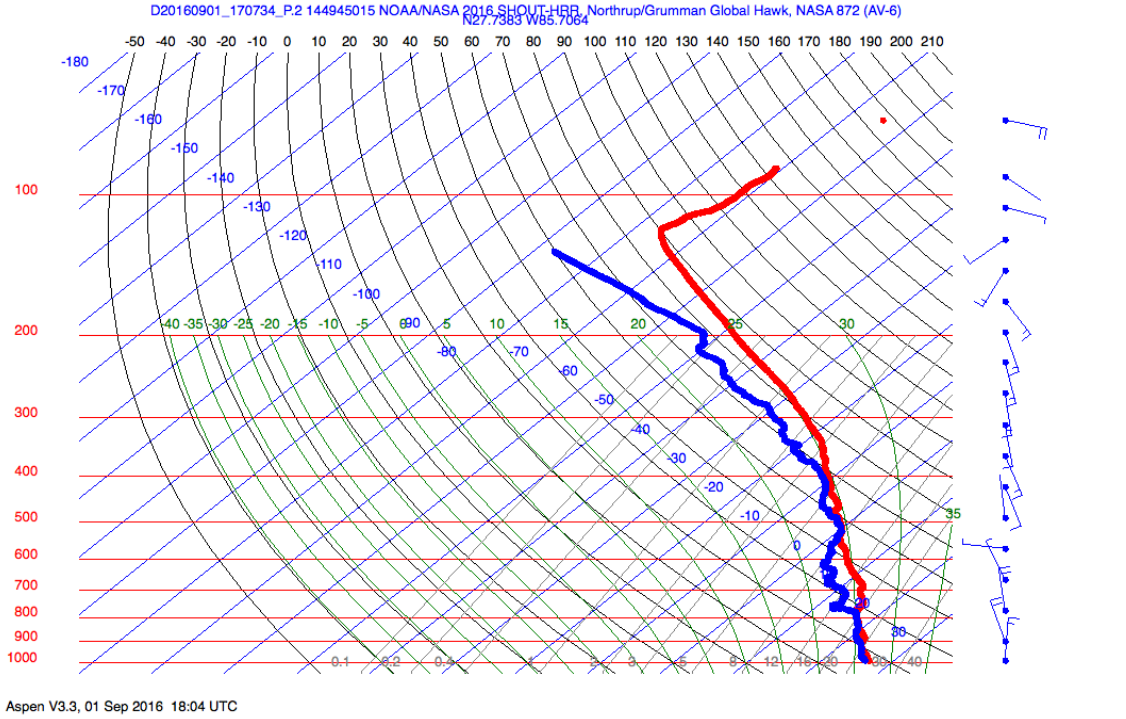
1815 UTC radar image as the GH is nearing the center of the storm. Large eye, extensive rainfall east and north of center.

1821 UTC: Sonde #72 released at location 72. Good drop.

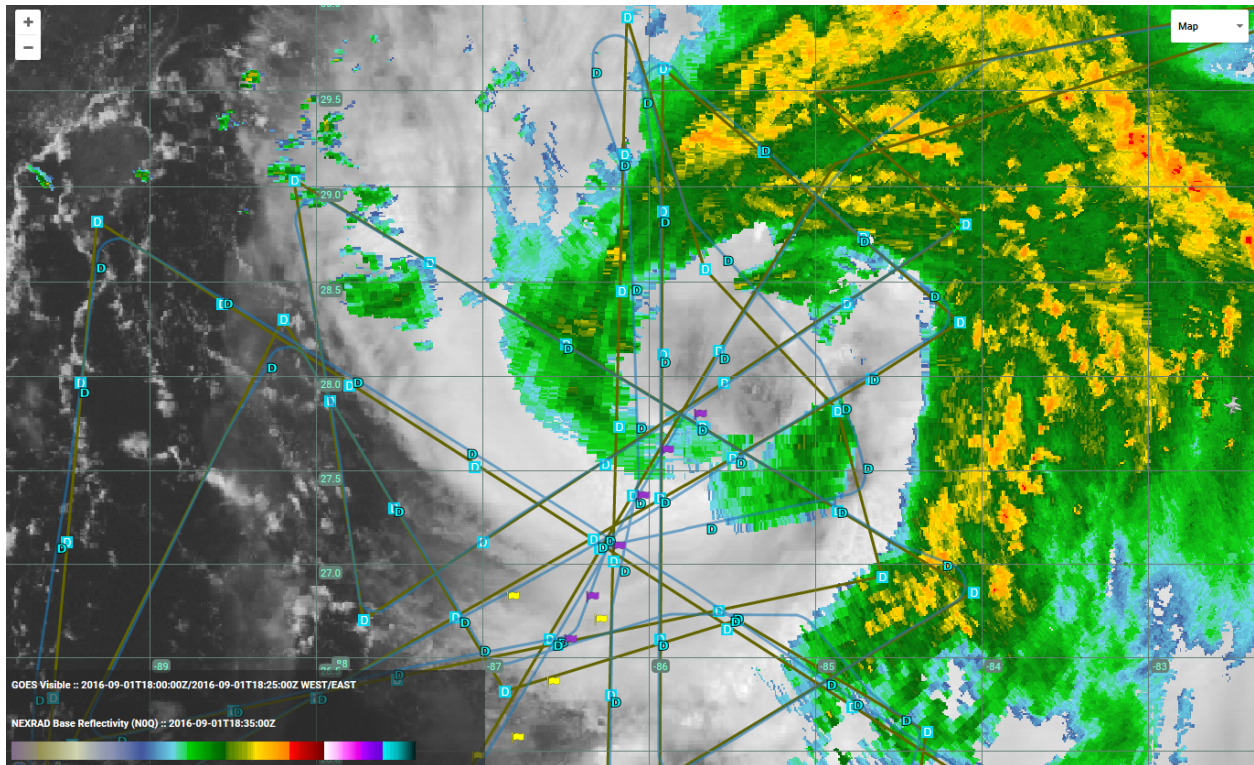
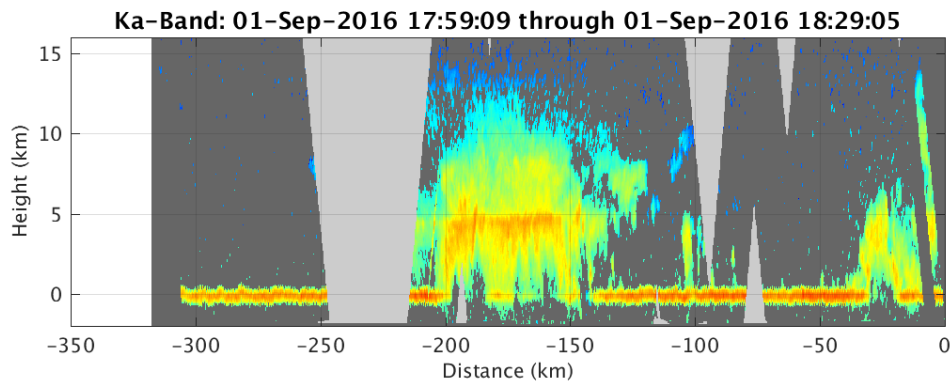
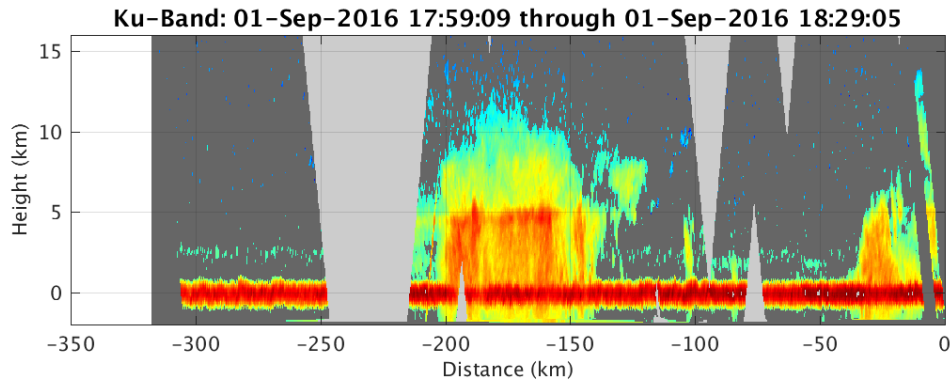
1829 UTC: Sonde #73 released at location 73. Good drop.



Skew-T for drop 63 just SE of the center. Sfc winds near 50 kts from the south.



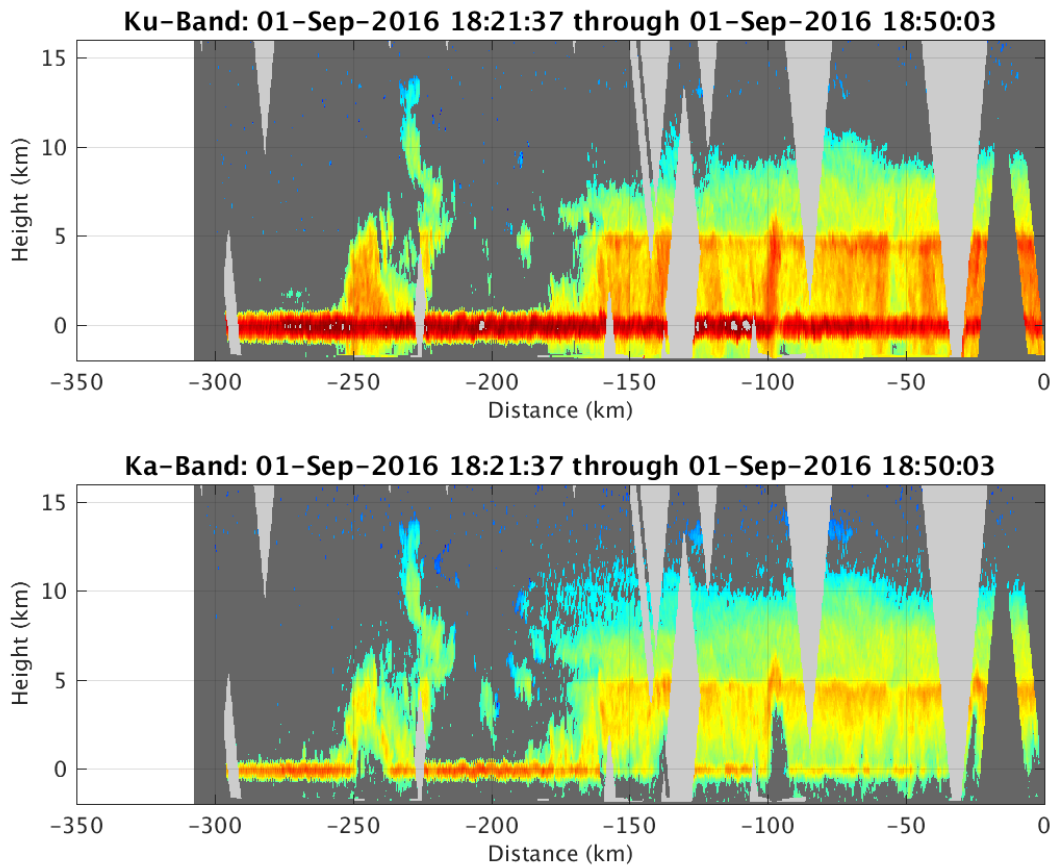
Skew-T at drop 64 just past west of the center. Sfc winds about 15 kts from the north.



The images above show the final pass across the center. There is a very broad eye between the region of stratiform rain ($x=-150$ to -200 km) and the precipitation on the eastern side, just beginning on the right side of the image.

1838 UTC: Sonde #74 released at location 74. Good drop.

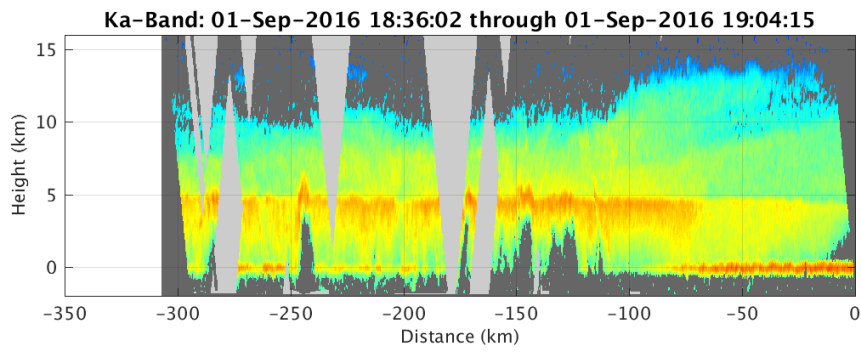
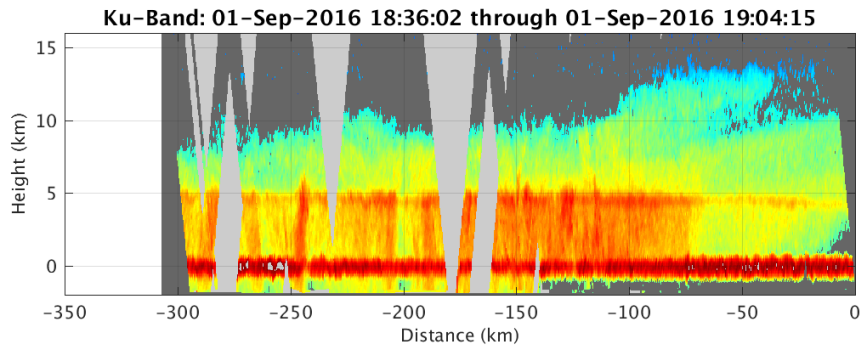
1854 UTC Pilots tell us we won't be cleared for the drop near Jacksonville due to air traffic. May miss a few others as well closer to the coast.



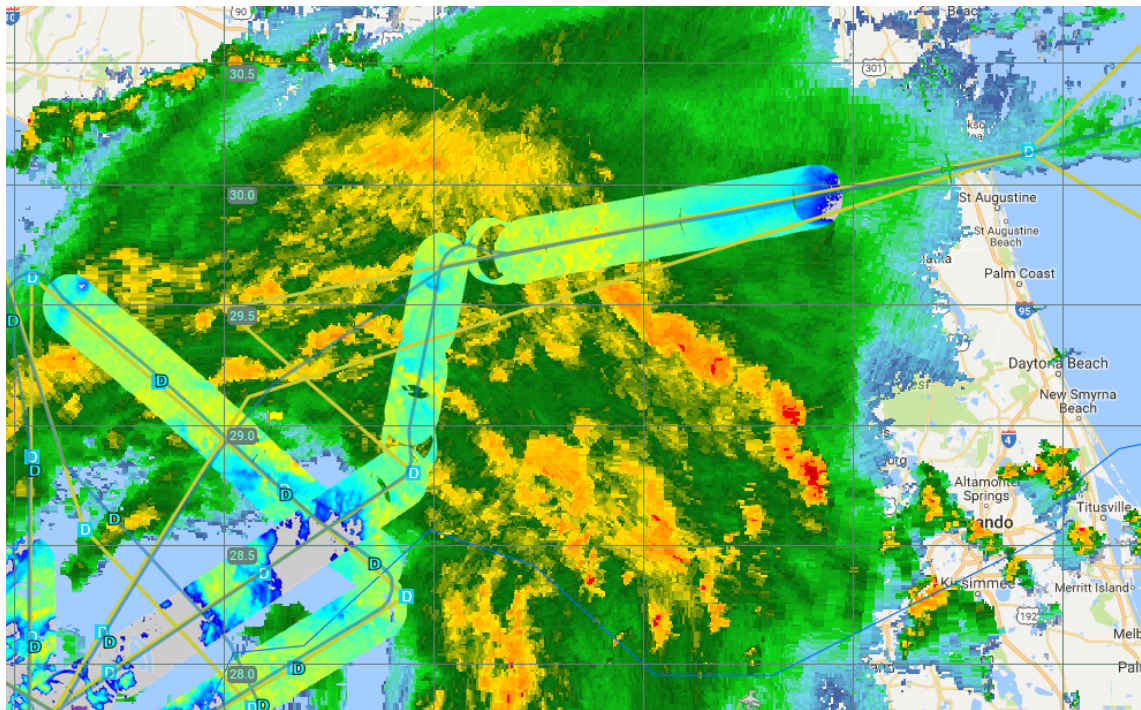
HIWRAP image shows the heavy precipitation on the eastern side of the storm and beginning of the crossing over Florida.

1856 UTC: Hermine is pulling itself together in an increasing shear gradient.

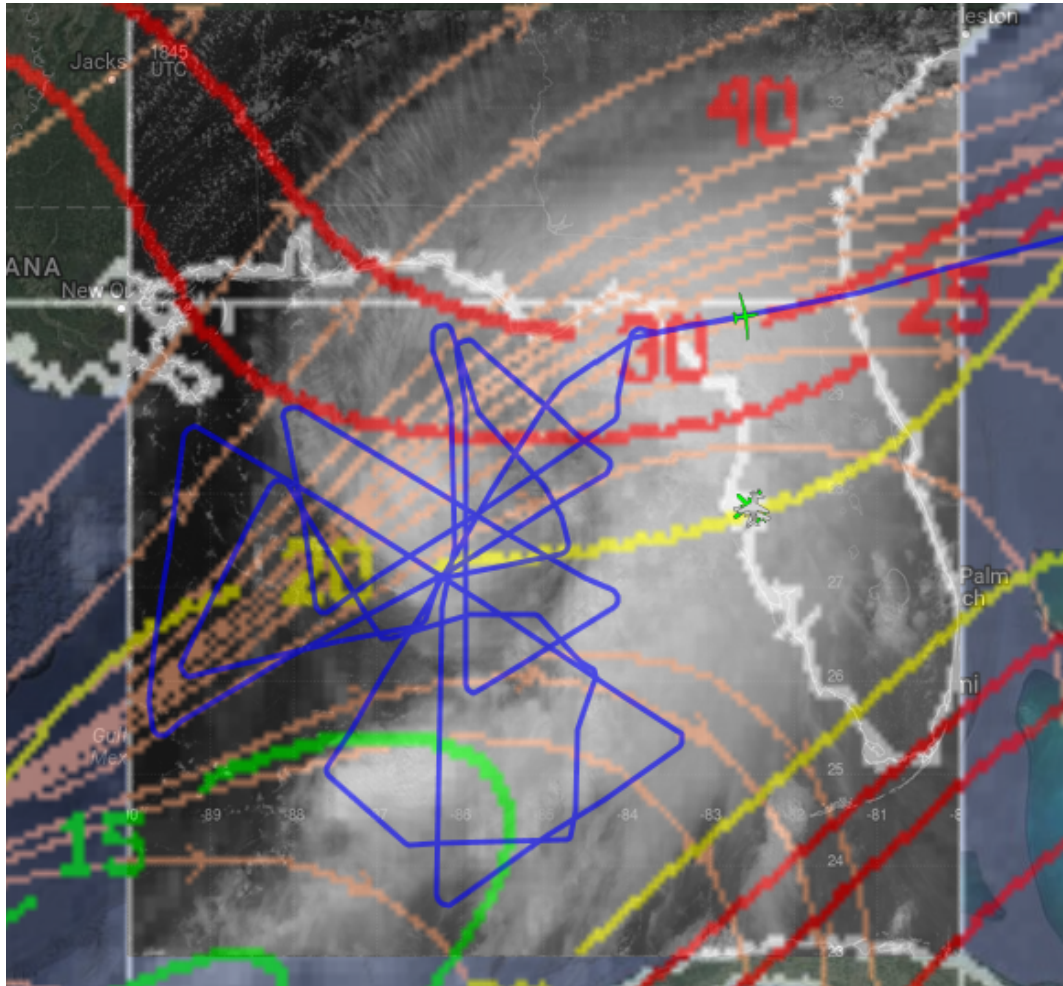
1900 UTC Hermine now a hurricane with 65 kt winds based on aircraft winds.



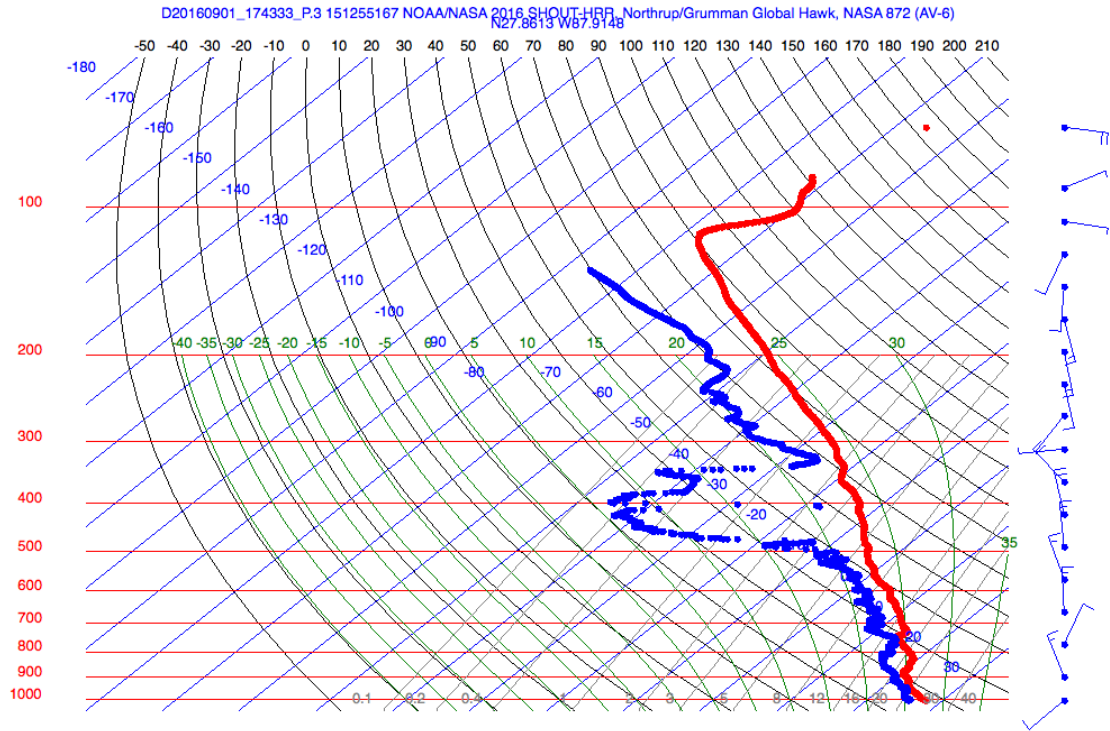
HIWRAP data above is for the entire precipitation region on the eastern side of Hermine and across northern Florida.



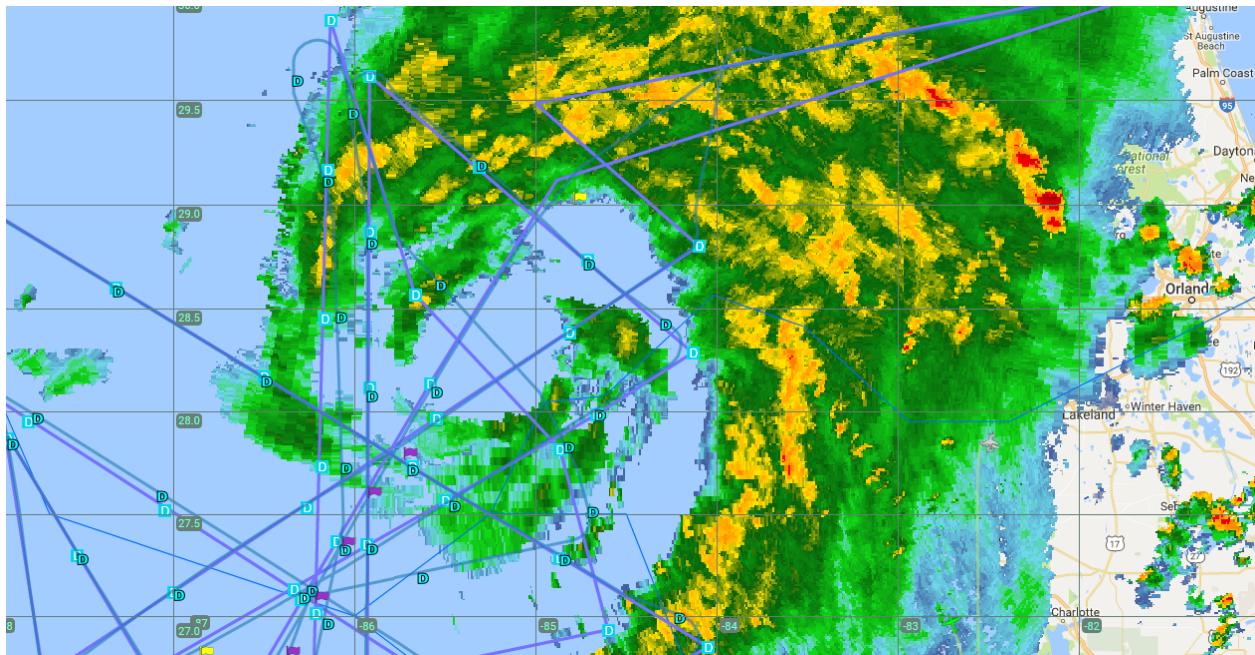
HIWRAP 2-km Ku reflectivity overlaid on NEXRAD reflectivity.



Track overlaid on CIMSS shear calculations. Hermine moving into 20-25 knot shear, still became a hurricane.

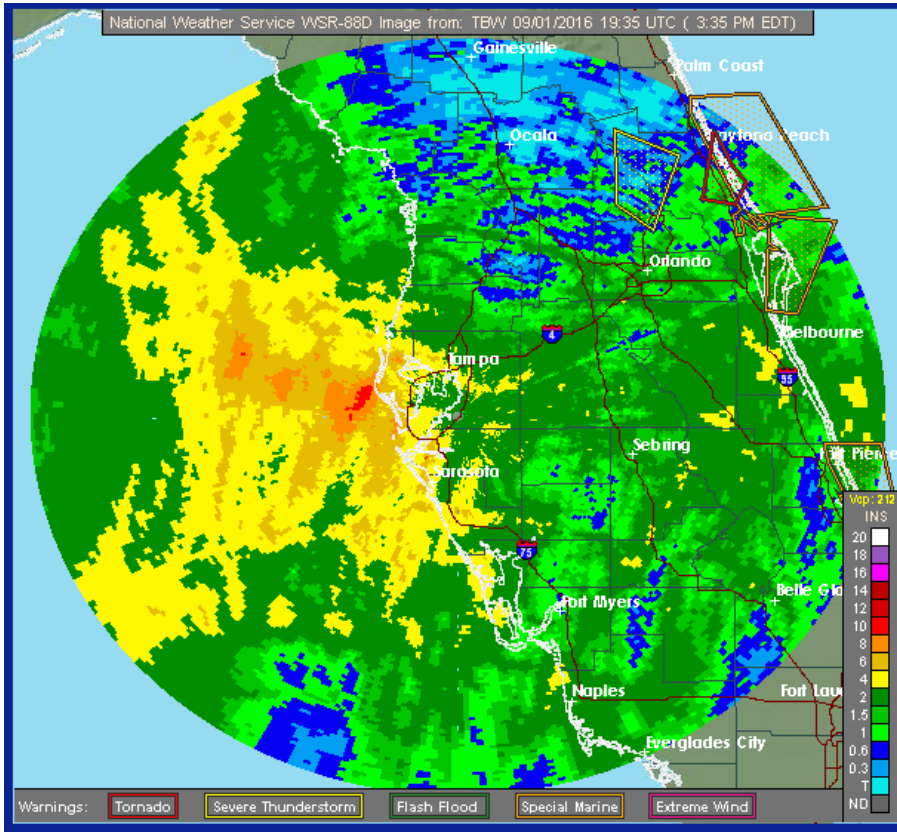


Very dry layer at 400 mb due west of the storm. Also, prominent shift from storm (northerly at 400 mb) to environment (southerly at 250mb).

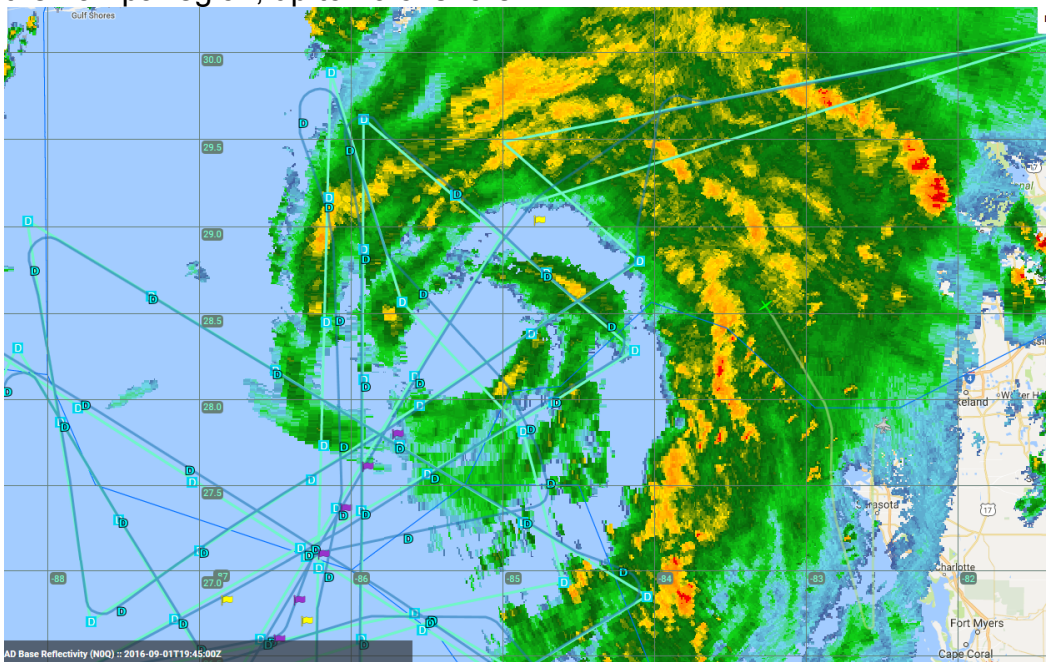


1929 UTC Hermine looks like it is attempting to form an inner eyewall.

1934 UTC Drop 75 released at location 76. Good drop.



Radar derived rainfall totals as of 1935 UTC from the Tampa radar. About 4 inches in the Tampa region, up to 10 offshore.

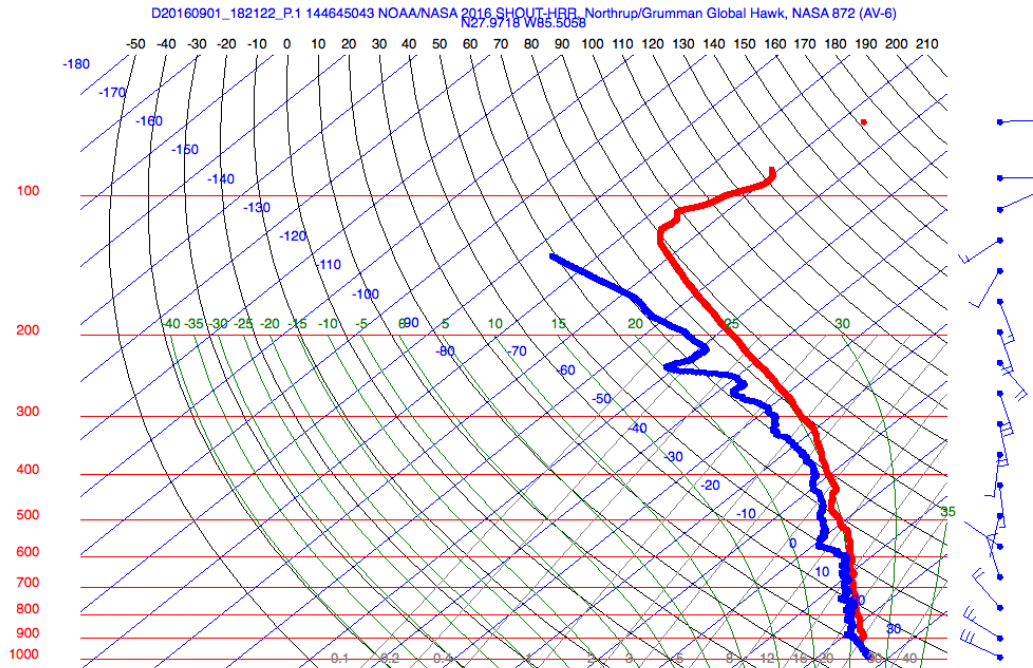
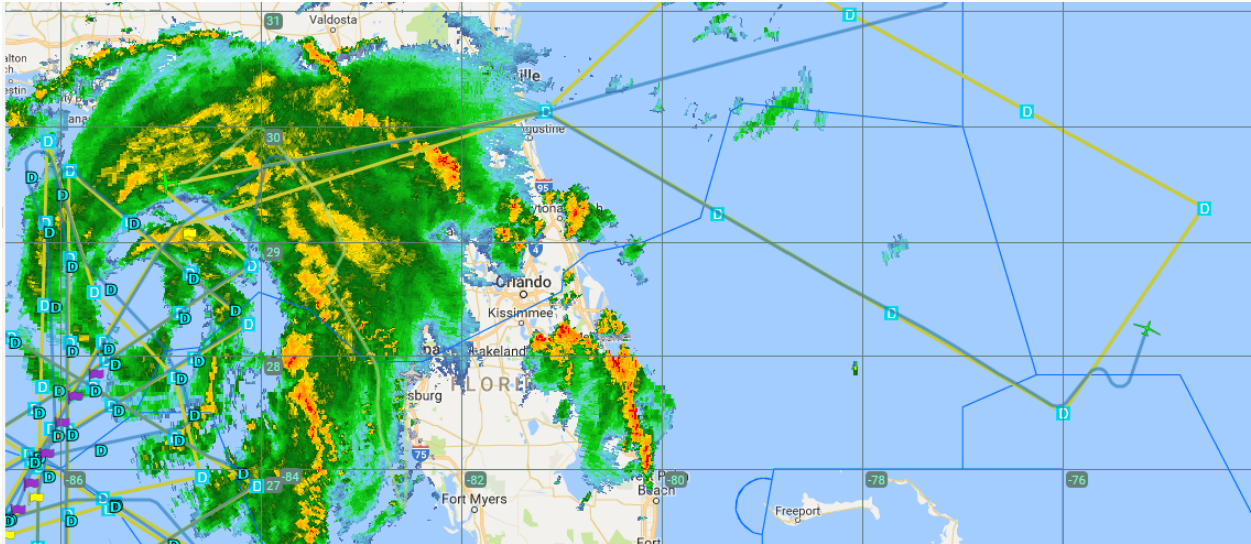


1945 UTC radar. Eyewall continues to become more well defined. These reflectivities are at fairly extended range, so probably coming from midlevels.

1950 UTC Drop 76 released at location 77. Good drop.

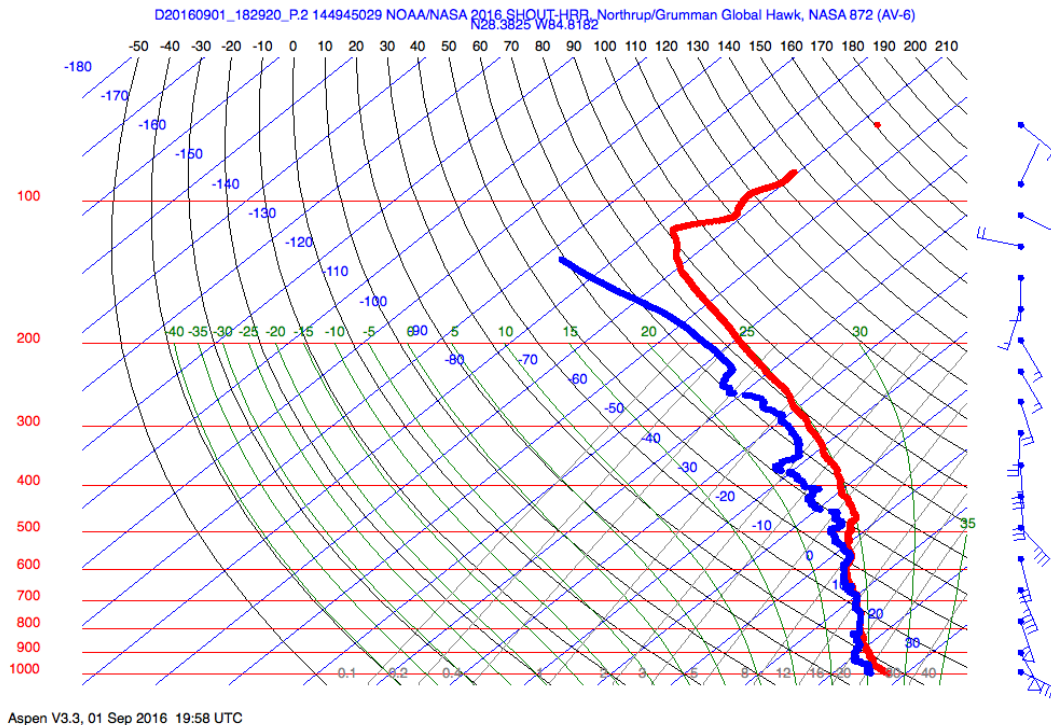
2008 UTC Drop 77 released at location 78. Good drop.

NY Oceanic briefly prevented us from entering their region, but now heading back NE. Deviation in flight track can be seen below.



Aspen V3.3, 01 Sep 2016 19:45 UTC

1821 UTC drop, probably the closest to the center during the last pass across the center. 30 kt winds near the surface, interesting wind shift above 800 mb from WNW to S.



The next sonde just past the center shows stronger winds, 40 kt at the surface, 55 kt just above.

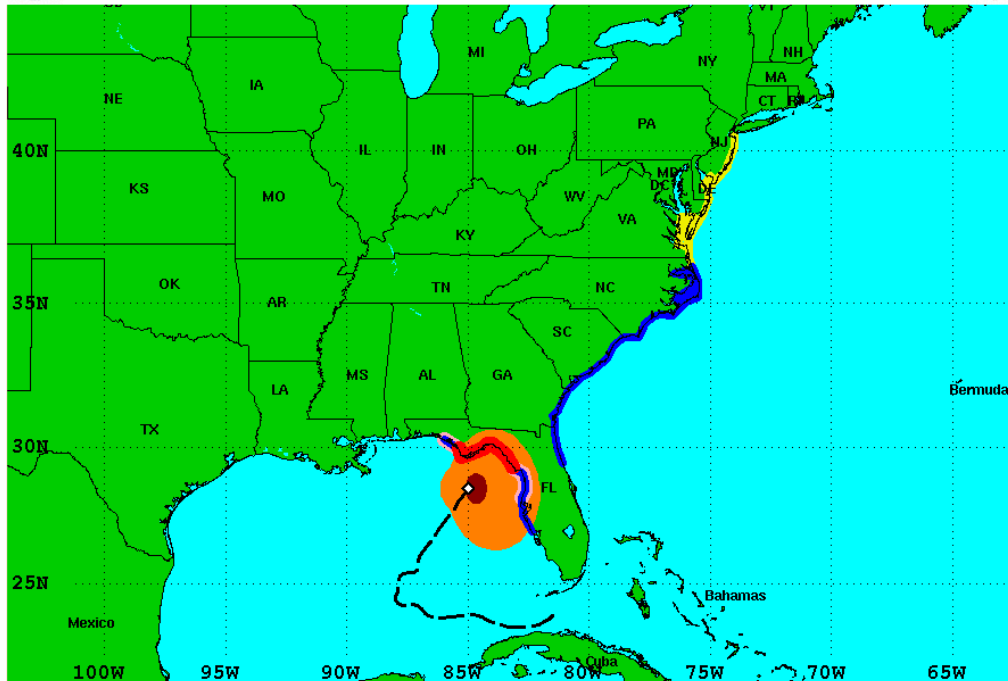
FAA (NY Oceanic) wouldn't let us drop at location 79 even though it looked like there was little traffic (only one plane could be seen in the vicinity on FlightRadar24.com).

We've gotten permission for the next drop at location 80.

2054 UTC Drop 78 released at location 80. Good drop.



Surface Wind Field of Hurricane Hermine
Sustained Winds as of 400 PM CDT Thu Sep 1, 2016 Advisory Number 18



Watches:	Warnings:	Sustained Winds:	Position:
Hurricane Watch	Hurricane Warning	Hurricane Force	Center as of 400 PM CDT
Tropical Storm Watch	Tropical Storm Warning	Tropical Storm Force	Past Track

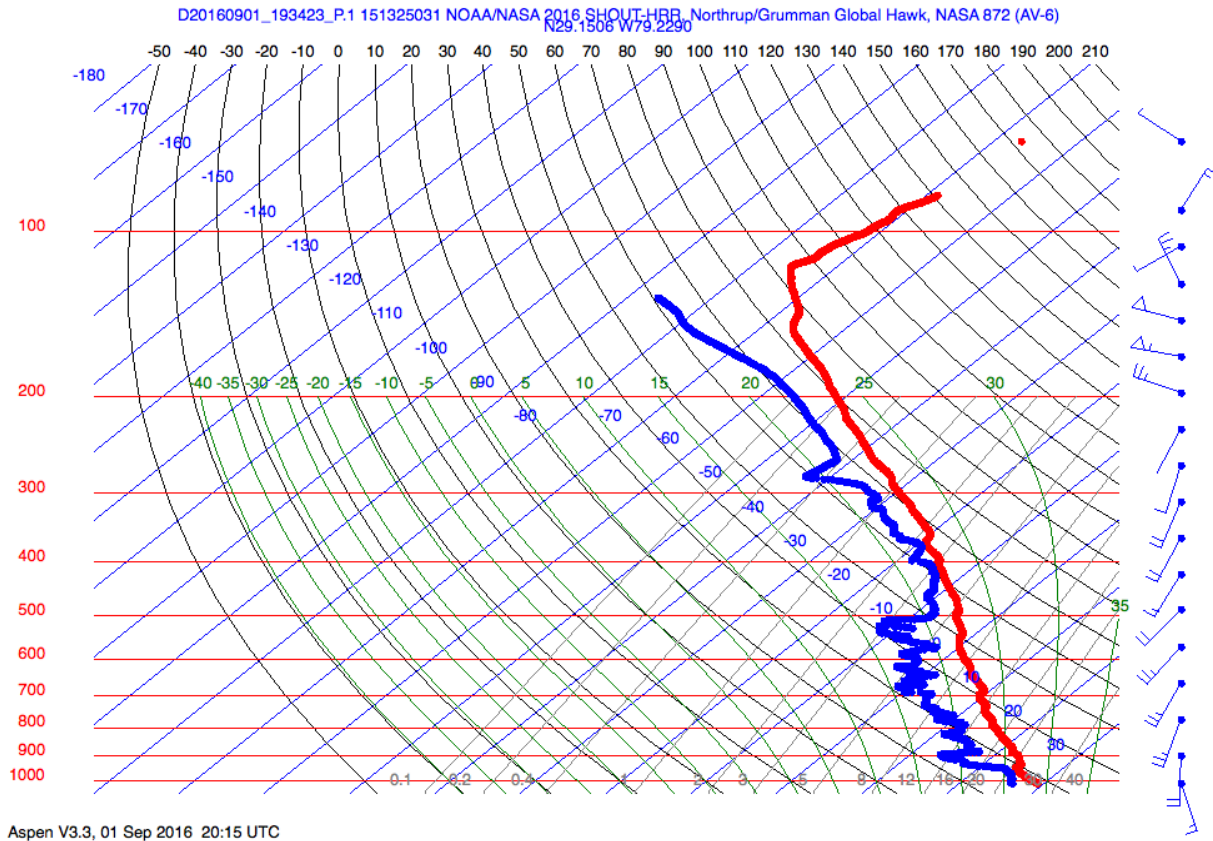
Wallops under a tropical storm watch!

Too much air traffic at drop location 81, so no drop.

2128 UTC While it looks like there should be space on flightradar24, no drop at location 82. Likely also no drop at 83 due to traffic into and out of Wilmington.

2133 Better late than never. Drop 79 released after passing location 82. Good drop.

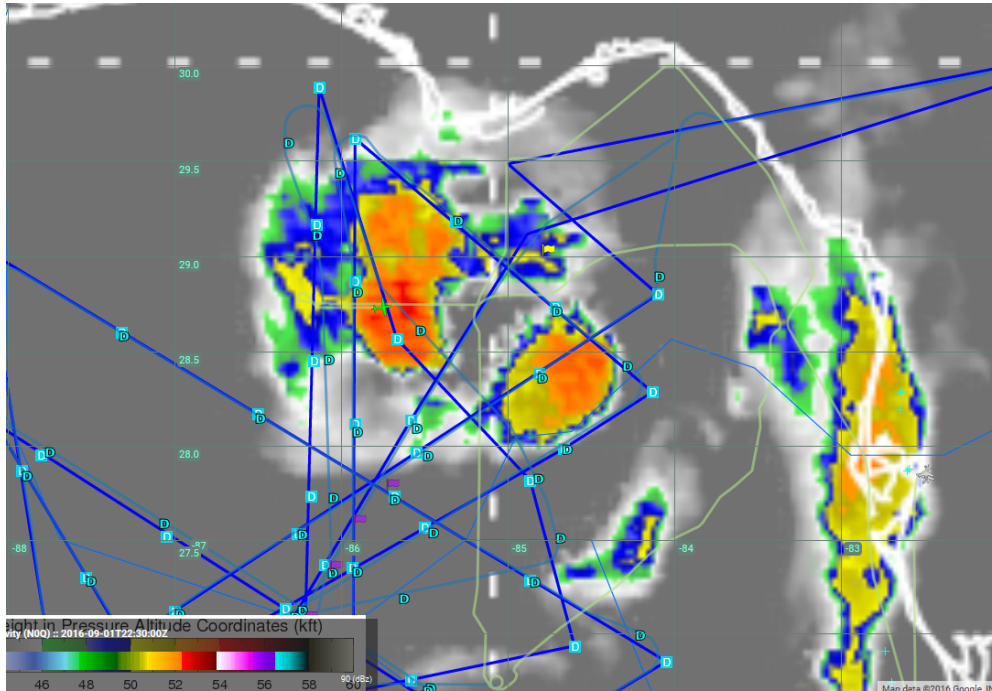
2153 Drop 80 released just before location 83. Good drop.



Drop at 2015 UTC (77?) out over Atlantic, east of Hermine, shows very nice outflow jet peaked at 55 knots limited to 200-150 mb layer.

2211 UTC Drop 81 at location 84. Good drop.

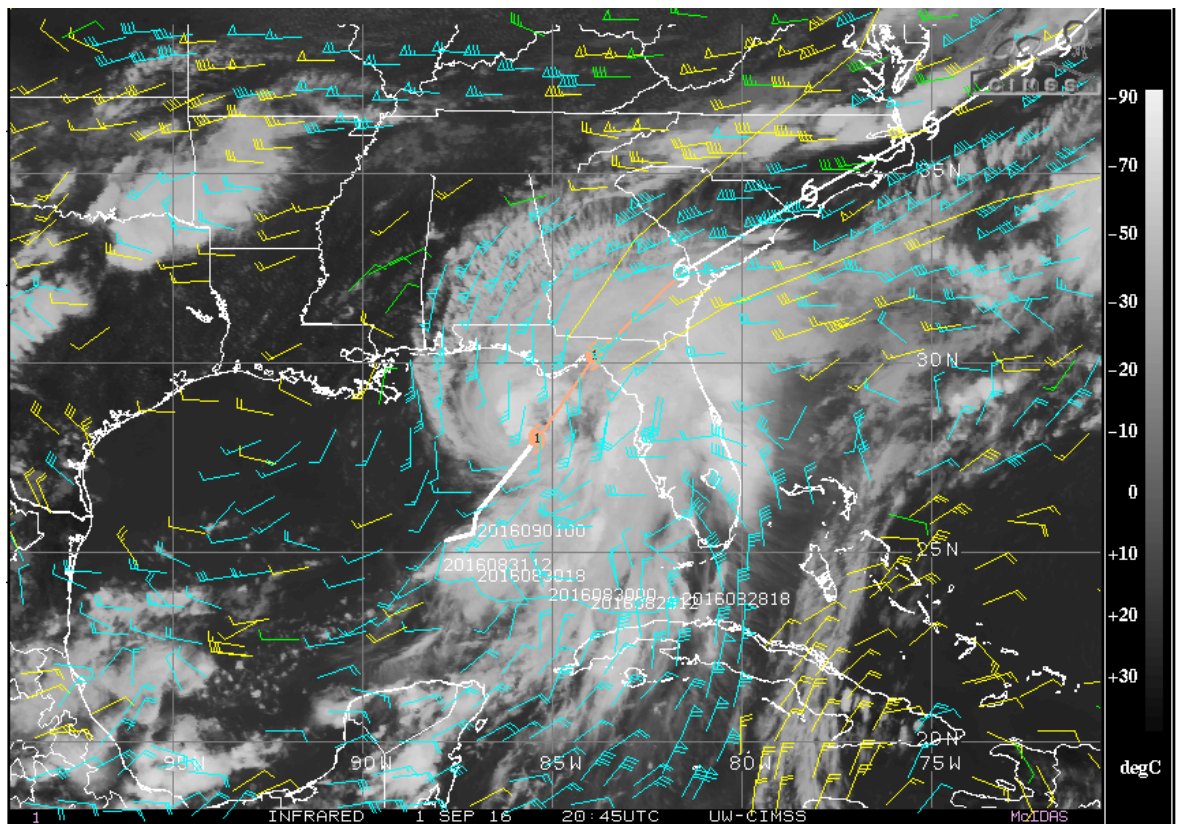
2226 UTC Drop 82 at location 85. Good drop.



2228 UTC Report of a P-3 dropsonde measured 986 mb central pressure for Hermine. The 2207 UTC CTH image above shows new bursts of convection on the NW and SE sides of the center. The P-3 is currently flying into the NWern convection.

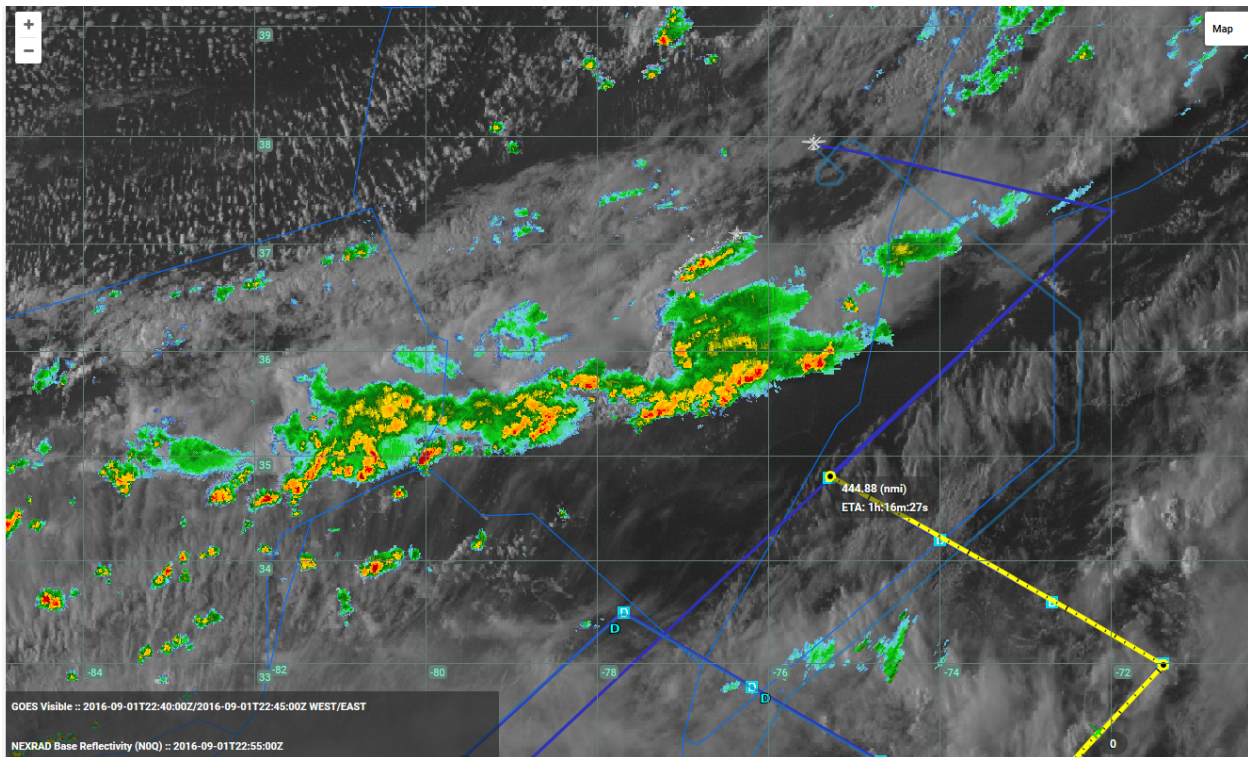


Meanwhile, back near the GH lawnmower, nothing too exciting. Little air traffic likely for the rest of the pattern, so we should get off the next 5 dropsondes for a flight total of 87.



2245 UTC IR image and upper-level winds shows well-defined outflow regions to the north and south of the storm.

2240 UTC Drop 83 at location 86. Good drop.

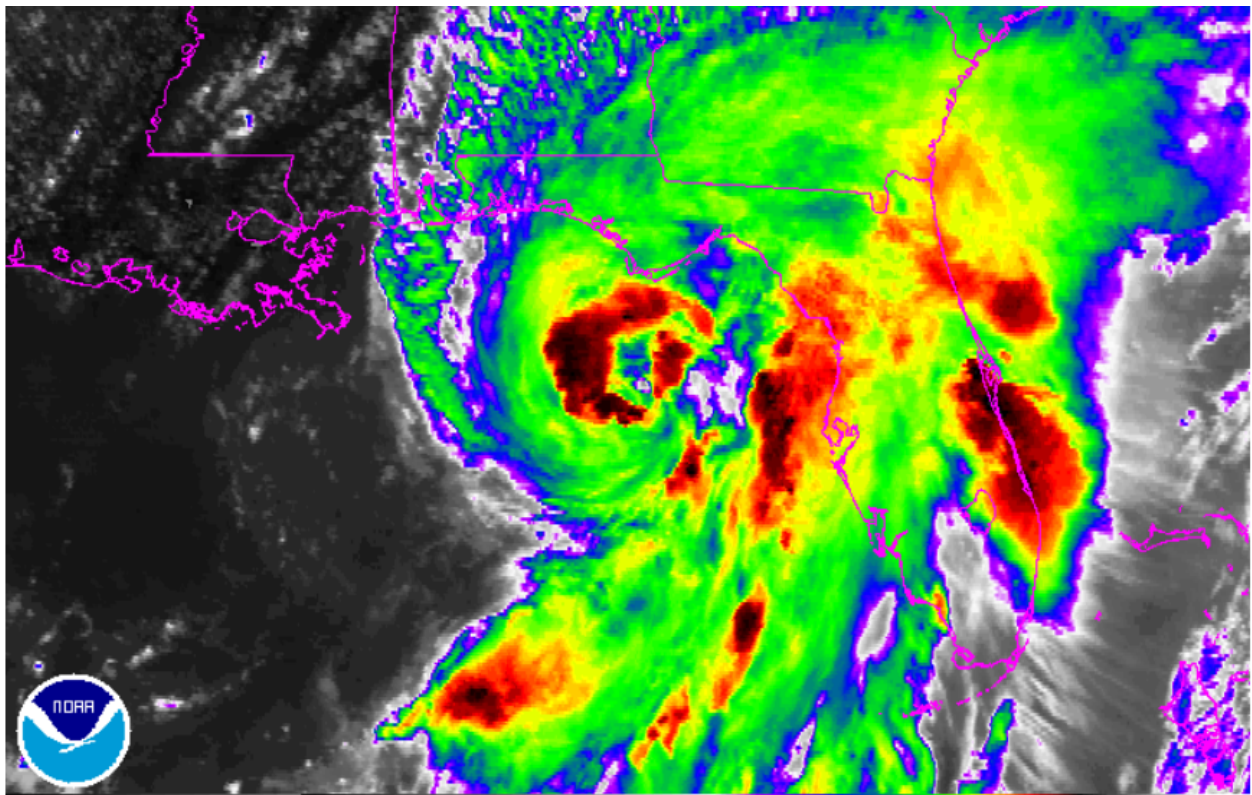


2245 UTC A view to the trip back home. Significant frontal convection over North Carolina, but tops do not exceed 40 kft. Weather in VACAPES region shows only weak showers at best, mostly low to midlevel clouds.

2304 UTC Drop 84 at location 87. Good drop.

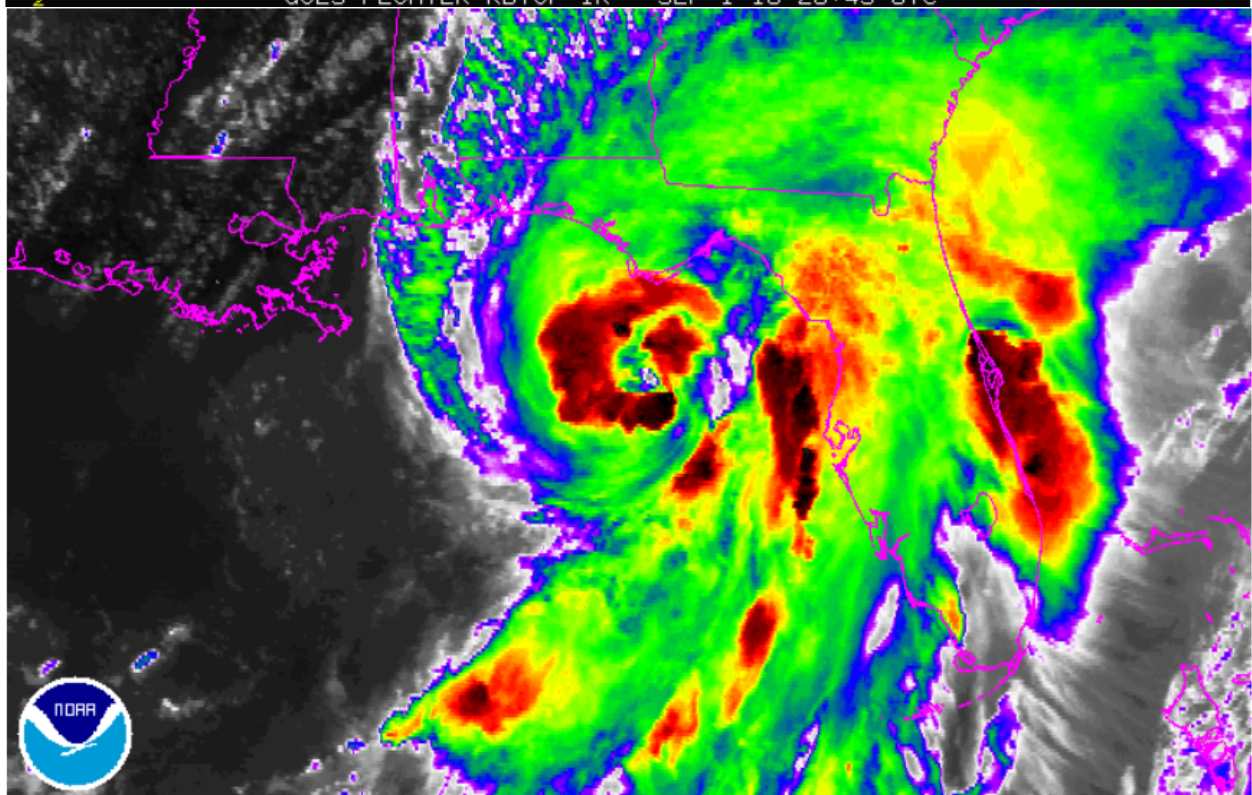
2318 UTC Drop 85 at location 88. Good drop.

The series of IR images below from 2045-2245 UTC show the formation of a much smaller eye in the cloud tops.



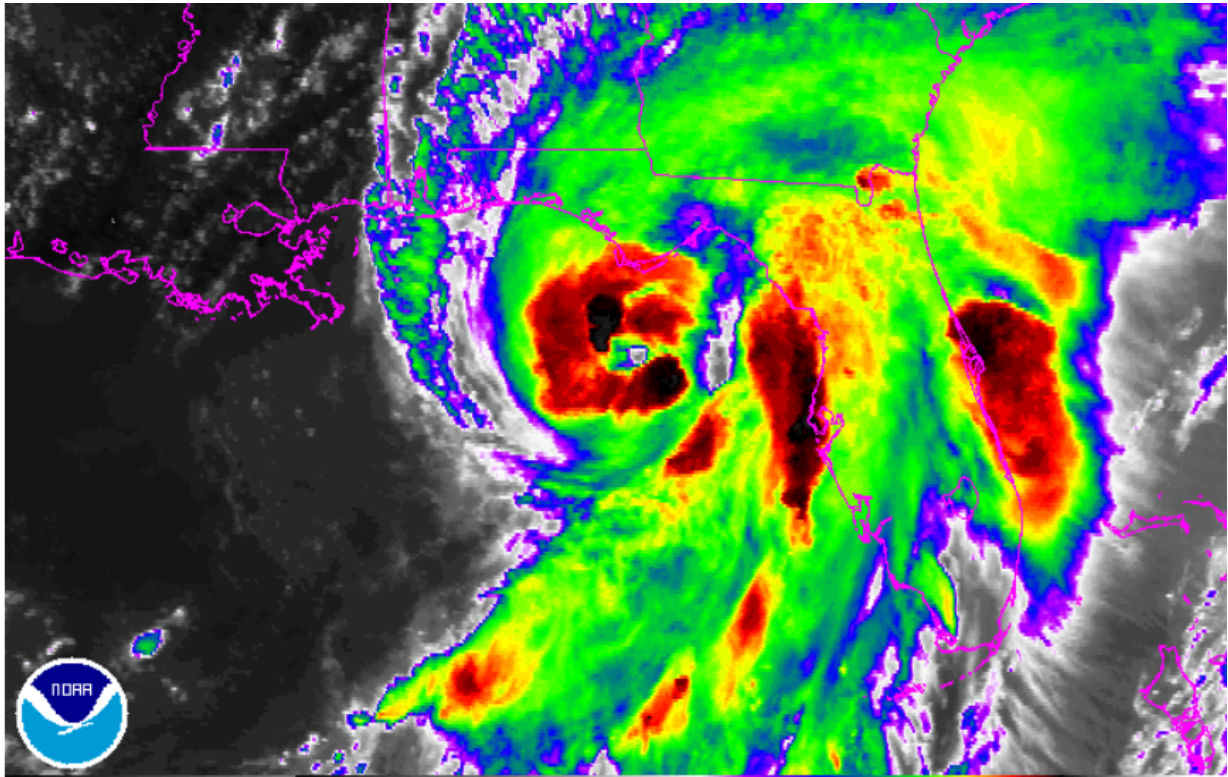
2

GOES-FLOATER RBTOP IR - SEP 16 20:45 UTC

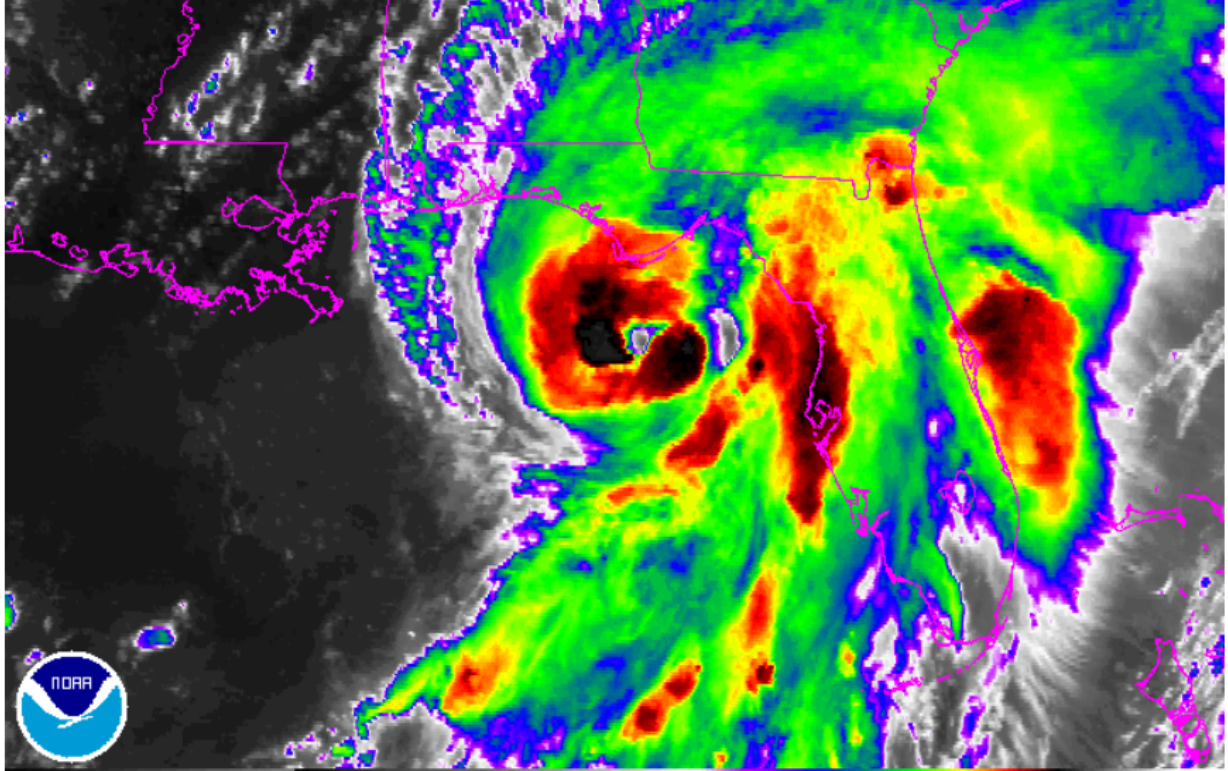


2

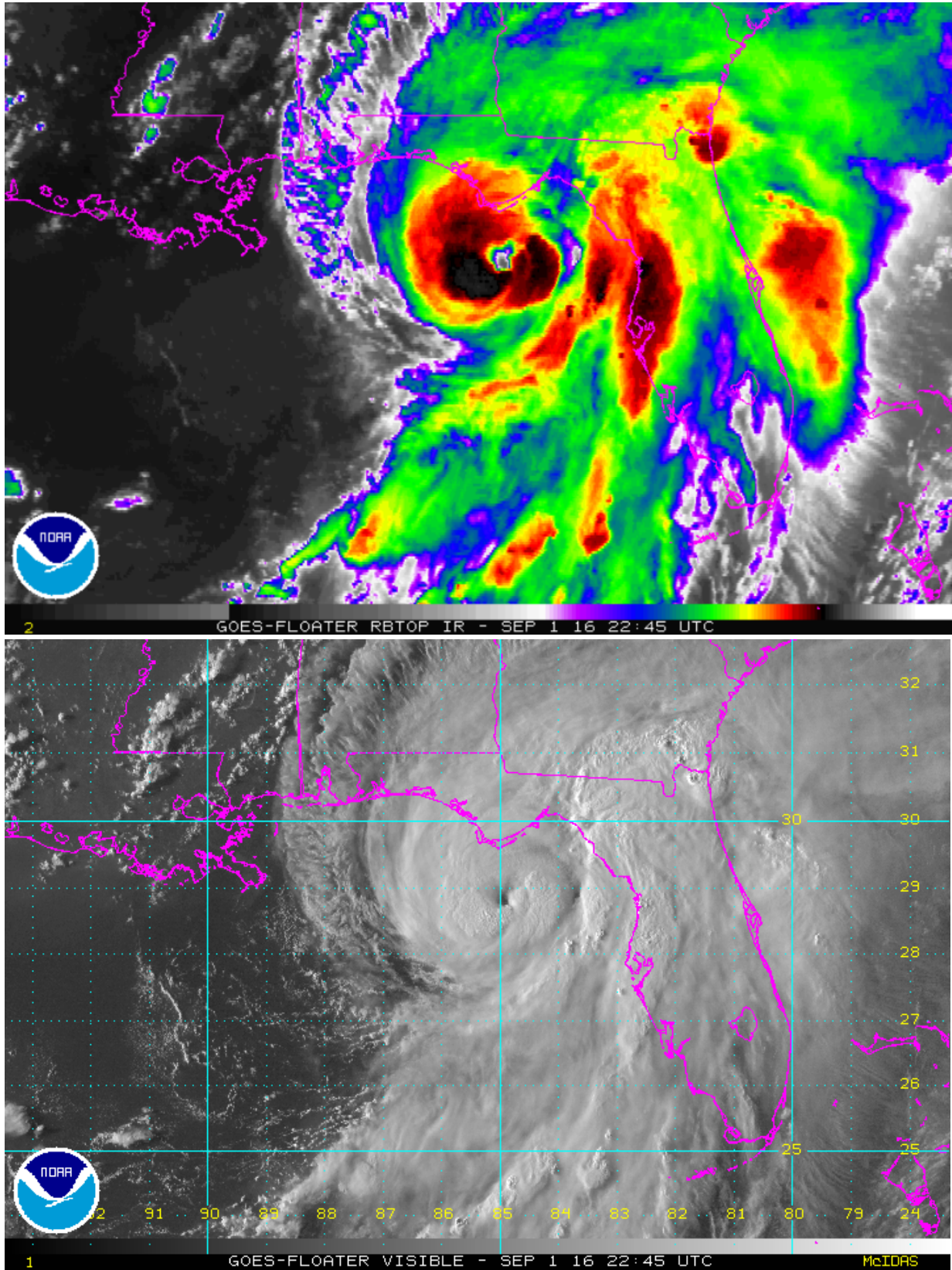
GOES-FLOATER RBTOP IR - SEP 16 21:15 UTC



2 GOES-FLOATER RBTOP IR - SEP 16 21:45 UTC



2 GOES-FLOATER RBTOP IR - SEP 16 22:15 UTC

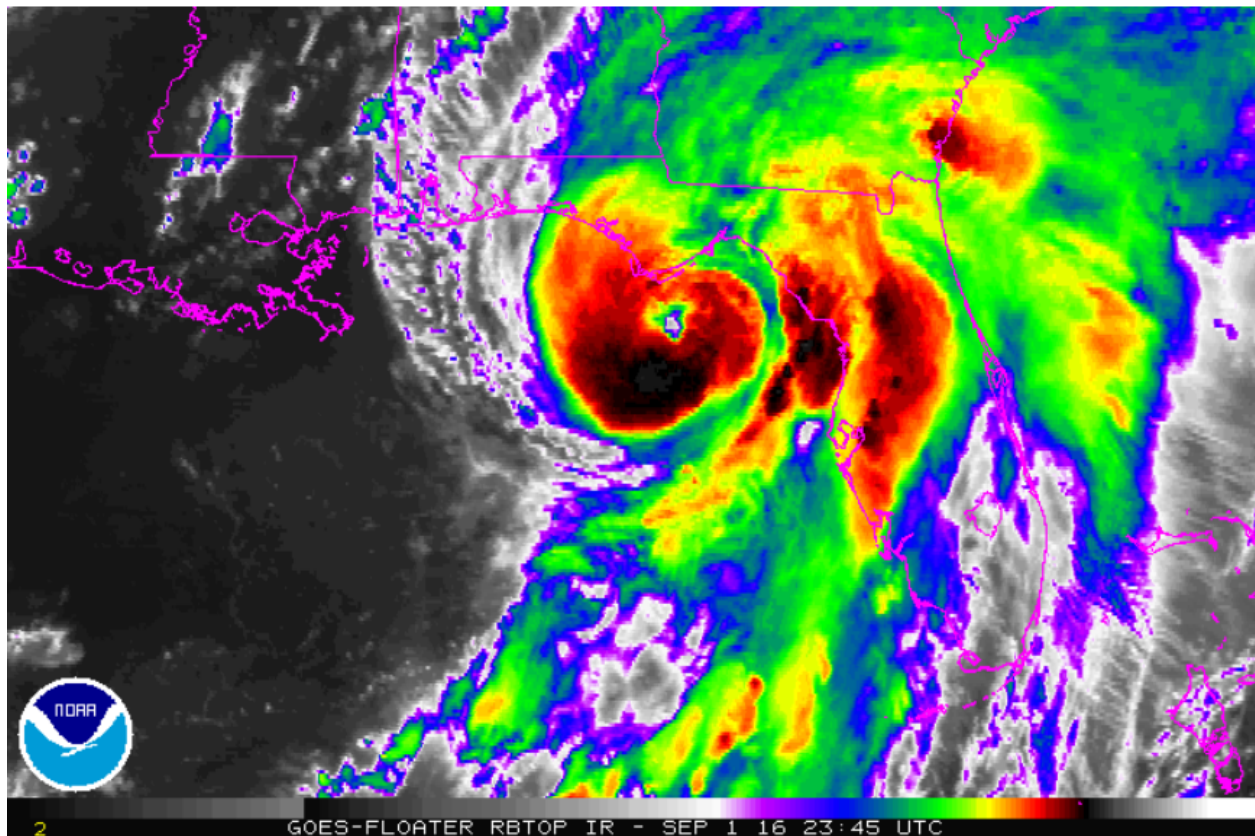


Above is the corresponding 2245 UTC visible image.

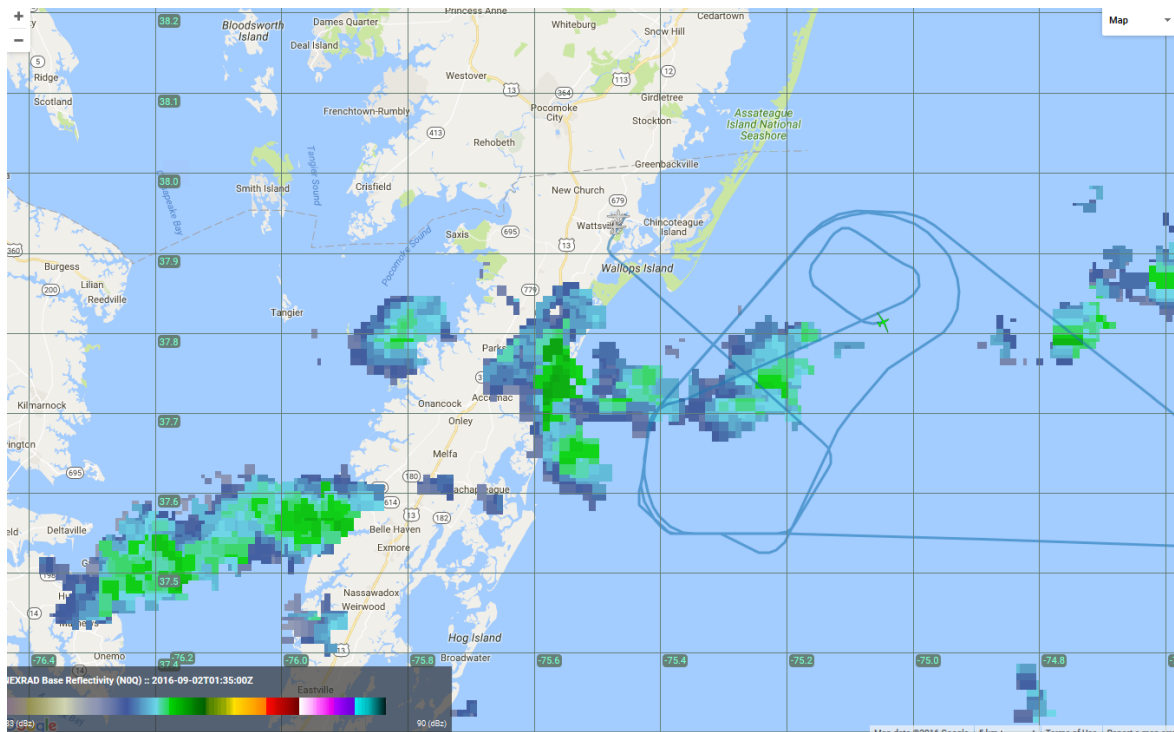
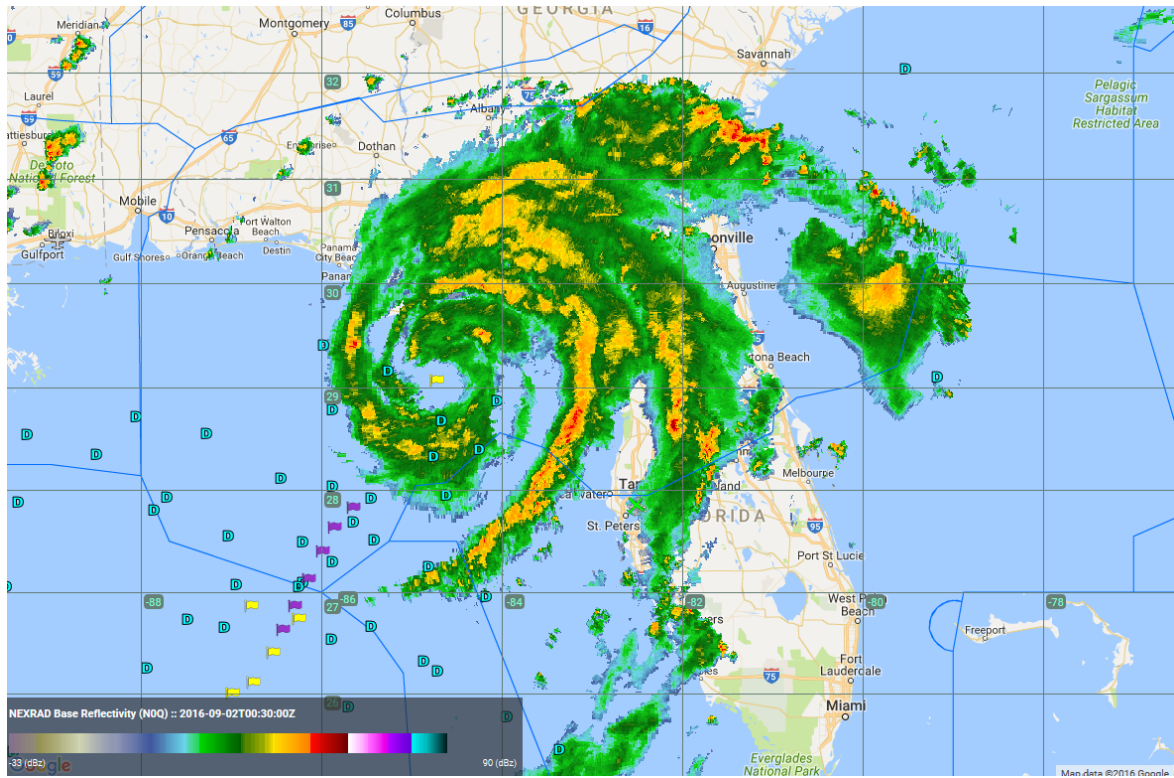
2325 UTC HIWRAP has asked to do some engineering tests. Since there is no precip expected for a while, if at all, ahead, they were given permission to do the tests.

2330 UTC Drop 86 at location 89. Good drop.

2340 UTC Drop 87, the final drop, at location 90. Good drop.



A final set of images before closing out the log before landing. (Above) 2345 UTC IR image. (Below) 0030 UTC radar composite.



0138 UTC A few showers just south of WFF. GH continuing descent in small loop to the east.

Landing at 0154 UTC.