

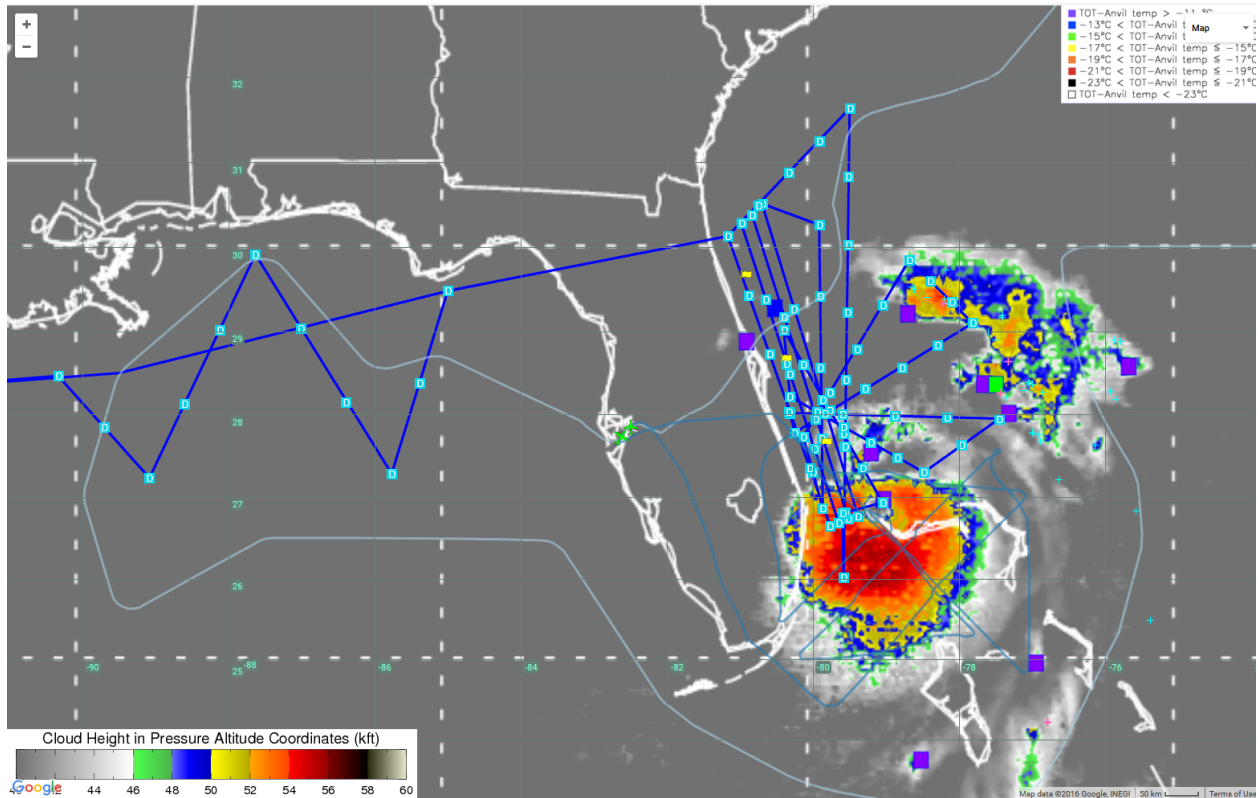
## SHOUT Research Flight 8 – 20161007 - Hurricane Matthew

Shift-1 Mission Scientists: Jason Dunion, Trey Alvey, Chris Velden

Shift-2 Mission Scientists: Jon Zawislak, Derrick Herndon, Sarah Griffin

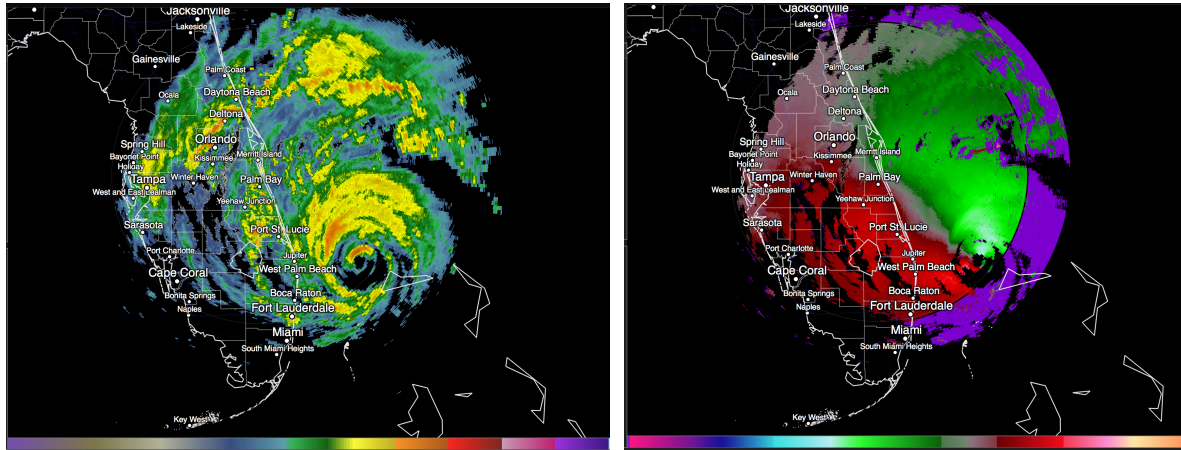
Shift-3 Mission Scientists: Rosimar Rios-Berrios, Peter Black, Alan Brammer

Log initiated by J. Dunion



Global Hawk flight track for Hurricane Matthew mission (Update 1). Track adjusted shortly after take-off to better align the pattern on the storm and to add a sawtooth pattern to sample HWRF and ECMWF targets in the Gulf of Mexico..

Take-off at 0224 UTC



Radar reflectivity and velocities Oct 07 0140Z. Peak velocities in northern eyewall are 110 knots.

0300 UTC NHC Advisory / Discussion (public website down):  
SUMMARY OF 1100 PM EDT...0300 UTC...INFORMATION

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LOCATION...27.1N 79.2W

ABOUT 50 MI...80 KM NNW OF FREEPORT GRAND BAHAMA ISLAND

ABOUT 125 MI...200 KM SE OF CAPE CANAVERAL FLORIDA

MAXIMUM SUSTAINED WINDS...130 MPH...215 KM/H

PRESENT MOVEMENT...NW OR 325 DEGREES AT 13 MPH...20 KM/H

MINIMUM CENTRAL PRESSURE...939 MB...27.73 INCHES

HURRICANE MATTHEW DISCUSSION NUMBER 36

NWS NATIONAL HURRICANE CENTER MIAMI FL AL142016

1100 PM EDT THU OCT 06 2016

The satellite appearance of Matthew has improved during the past several hours, with an eye embedded within a more circular central dense overcast and an increase in the outer banding. Reports from a NOAA Hurricane Hunter aircraft and coastal radar data show the presence of centric eyewalls with diameters of about 8 and 60 n mi respectively. The NOAA aircraft earlier reported a minimum pressure of 937 mb, and an Air Force Reserve Hurricane Hunter just reported estimated surface winds of 109 kt from the SFMR and a pressure of 939 mb. Based on these data, the initial intensity is 115 kt.

The initial motion is 325/11 kt. For the next 24-48 hours, Matthew should move around the western end of the subtropical ridge, with the motion gradually turning northward and then northeastward. During this time, the center of the guidance envelope and the various consensus models have shifted a little to the east. However,

the ECMWF, GFS, and UKMET continue to suggest the possibility of the hurricane making landfall in Florida and then moving near the coasts of Georgia and South Carolina. This part of the forecast is nudged a little to the east and lies between the model consensus and the previous forecast. After 48 hours, a mid- to upper-level ridge is forecast to build north and west of Matthew, and the track guidance forecasts a southeasterly to southerly motion in response. While there is still a large spread, the GFS, ECMWF, and UKMET are in better agreement that Matthew should move south between the ridge and Hurricane Nicole to the east. This part of the forecast follows this guidance and lies between the GFS and ECMWF.

During the next 12-24 hours, Matthew will likely weaken a little as it undergoes an eyewall replacement cycle. After that time, it is expected to encounter strong southwesterly vertical shear, and later in the forecast period dry air is likely to entrain into the cyclone. This combination should cause steady weakening, and Matthew is forecast to drop below hurricane strength by 72 hours. The new intensity forecast is in best agreement with the SHIPS model.

#### FORECAST POSITIONS AND MAX WINDS

INIT	07/0300Z	27.1N	79.2W	115 KT	130 MPH
12H	07/1200Z	28.5N	80.2W	110 KT	125 MPH
24H	08/0000Z	30.3N	80.8W	105 KT	120 MPH
36H	08/1200Z	31.8N	80.2W	90 KT	105 MPH
48H	09/0000Z	32.6N	78.7W	75 KT	85 MPH
72H	10/0000Z	31.5N	75.5W	60 KT	70 MPH
96H	11/0000Z	29.0N	75.5W	50 KT	60 MPH
120H	12/0000Z	27.0N	77.0W	40 KT	45 MPH

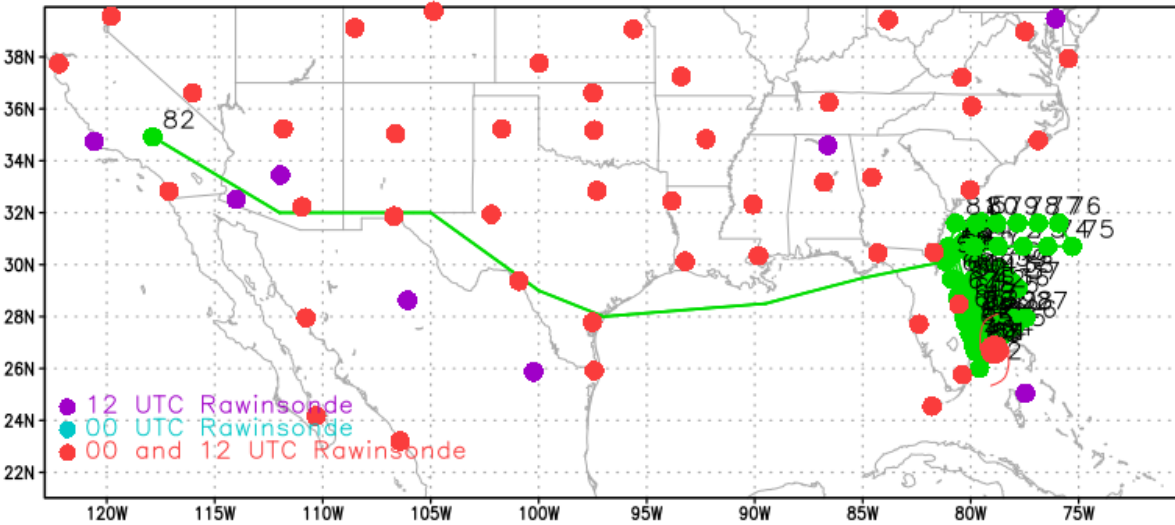
0310 UTC: Rosimar Rios-Berrios and Peter Black ready to take over MS at AFRC.

0347 UTC: Update #1 to the flight plan was submitted to MTS by Jason Dunion.

Changes:

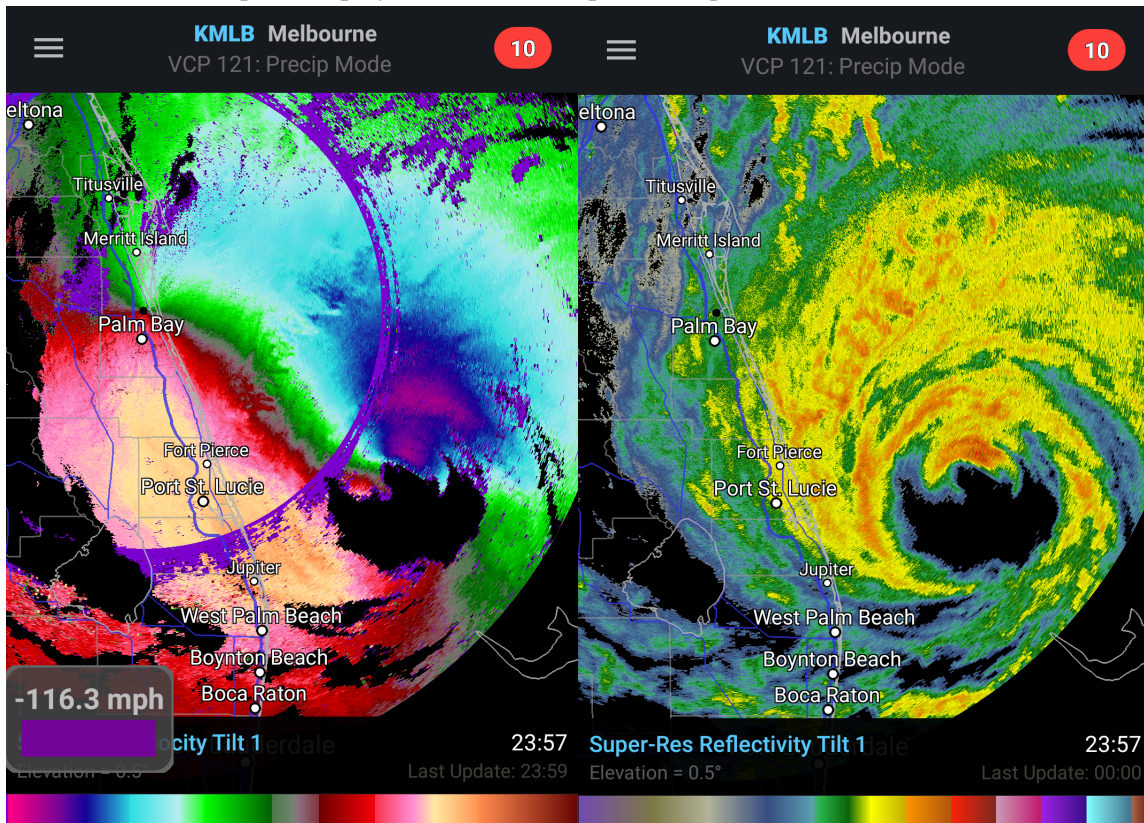
- shifted the entire over storm pattern to adjust for the latest storm position & motion
- added 2 E-W legs NE of the storm to sample the outflow

Image:



0400UTC NHC update:  
 LOCATION...27.3N 79.4W  
 Winds, central pressure and motion not updated.

0400UTC: Radar velocity and reflectivity (screen cap from radarscope).  
 Max winds picked up by radar of ~115 mph in NE quad.



0500 UTC: Update from NHC

HURRICANE MATTHEW TROPICAL CYCLONE UPDATE  
NWS NATIONAL HURRICANE CENTER MIAMI FL AL142016  
100 AM EDT FRI OCT 07 2016

...1 AM EDT POSITION UPDATE...

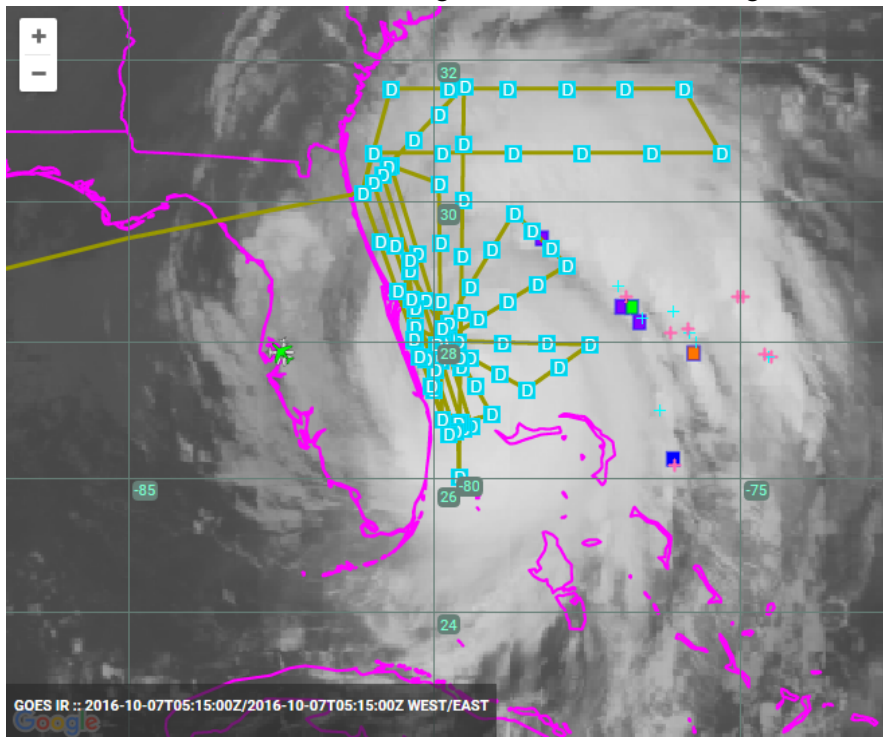
...SUSTAINED TROPICAL-STORM-FORCE WINDS OCCURRING ALONG THE FLORIDA EAST COAST...

During the past hour, a sustained wind of 44 mph (70 km/h) and a gust of 62 mph (100 km/h) were reported at Vero Beach, Florida.

SUMMARY OF 100 AM EDT...0500 UTC...INFORMATION

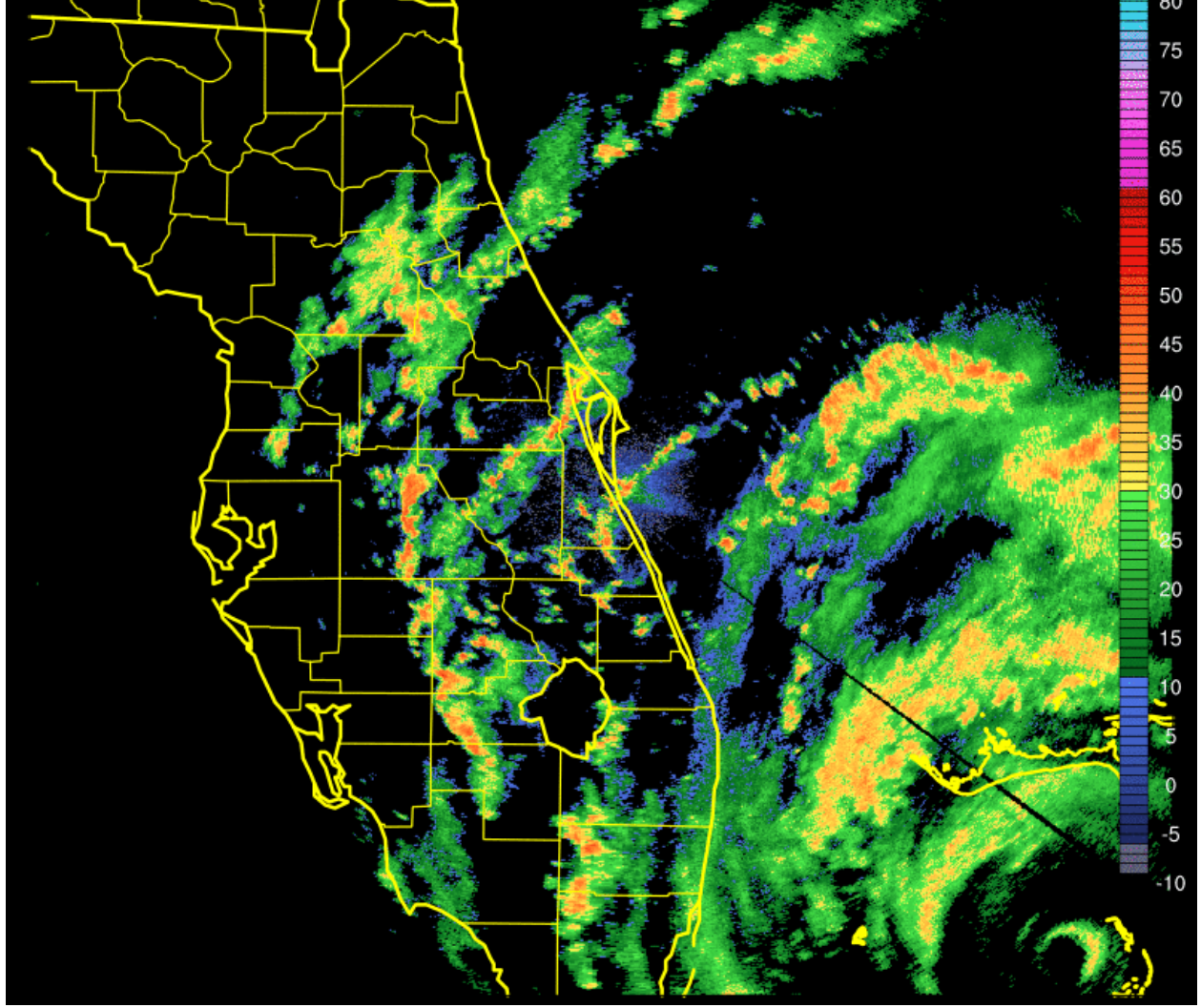
-----  
LOCATION...27.5N 79.6W  
ABOUT 50 MI...100 KM ESE OF VERO BEACH FLORIDA  
ABOUT 90 MI...140 KM SE OF CAPE CANAVERAL FLORIDA  
MAXIMUM SUSTAINED WINDS...130 MPH...210 KM/H  
PRESENT MOVEMENT...NW OR 325 DEGREES AT 13 MPH...20 KM/H  
MINIMUM CENTRAL PRESSURE...939 MB...27.73 INCHES

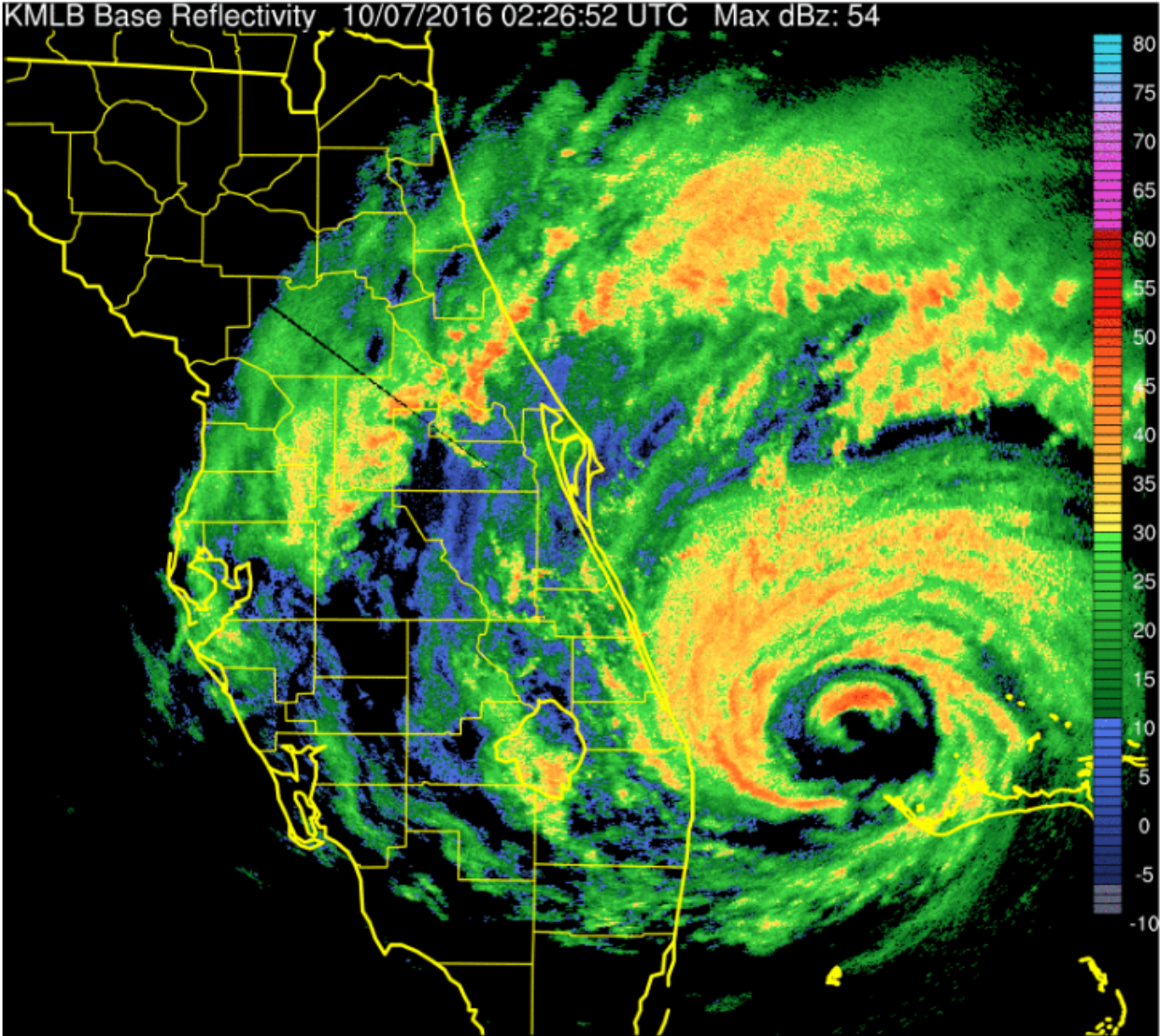
0530 UTC: Zoomed-in version of flight track and latest IR image



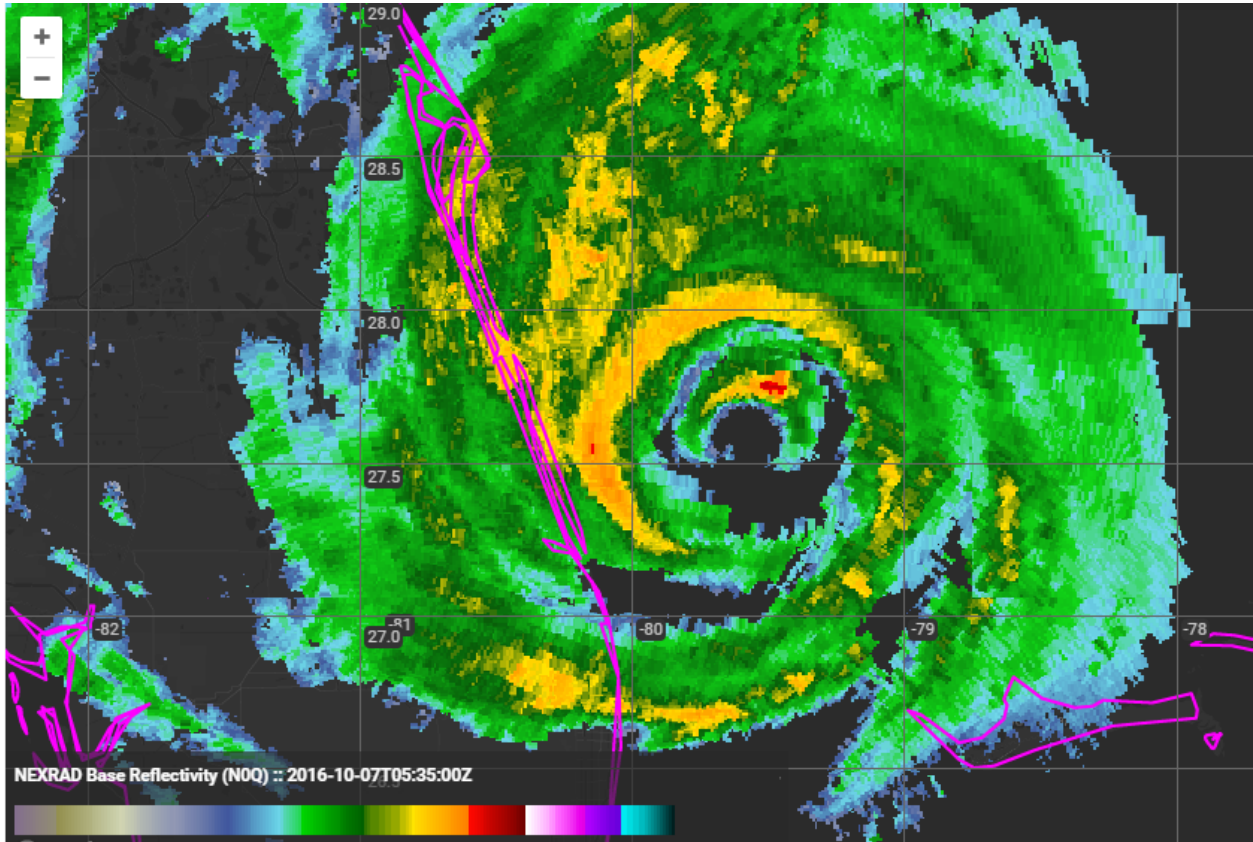
0530 UTC: Latest radar loop from Melbourne radar (image courtesy of Patrick Duran, UAlbany: <http://www.atmos.albany.edu/student/pduran/tcradar/2016/matthew/matthew.html>)

KMLB Base Reflectivity 10/06/2016 18:05:49 UTC Max dBz: 58.5

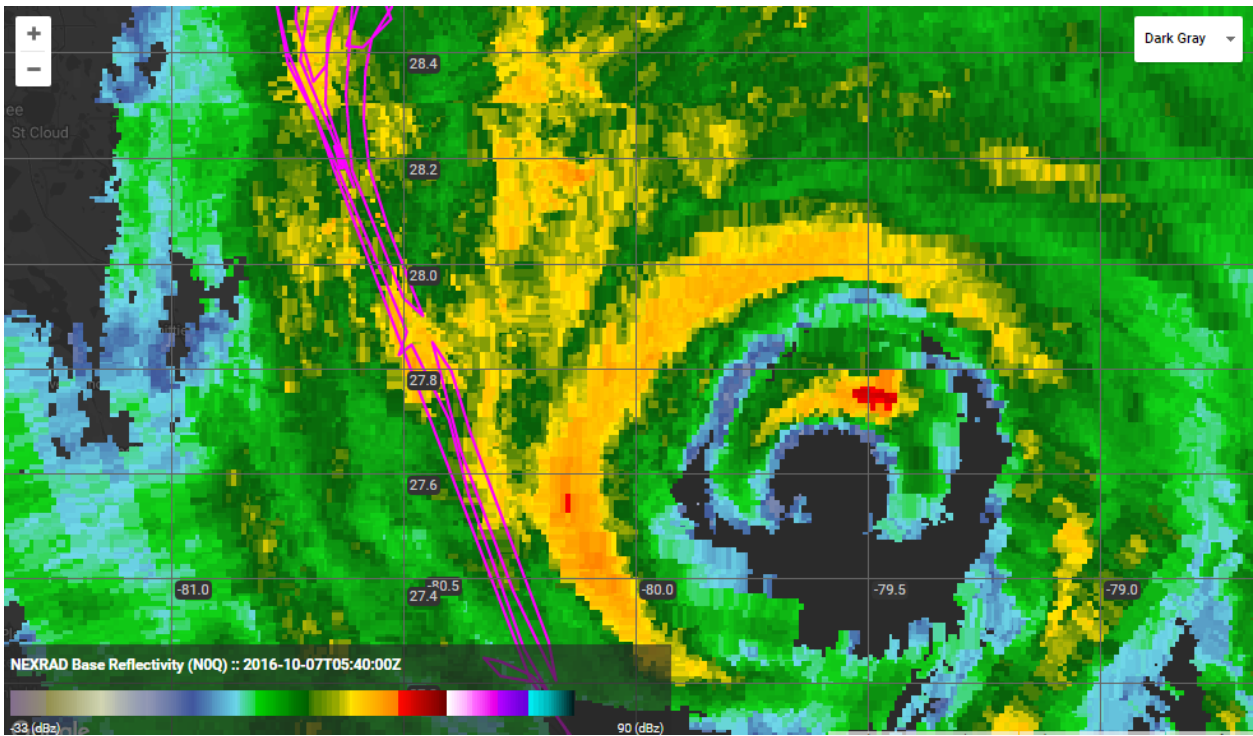




MLB radar from SUNYA at 0226Z



MLB radar from NWS MLB at 0535Z. Outer eyewall stronger, only 10 nm off the beach. Inner eye hanging in there- pulsing convection.





0600 UTC: NHC Intermediate advisory:

BULLETIN

HURRICANE MATTHEW INTERMEDIATE ADVISORY NUMBER 36A

NWS NATIONAL HURRICANE CENTER MIAMI FL AL142016

200 AM EDT FRI OCT 07 2016

...EYE OF EXTREMELY DANGEROUS HURRICANE MATTHEW MOVING CLOSER TO THE EAST COAST OF FLORIDA...

SUMMARY OF 200 AM EDT...0600 UTC...INFORMATION

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LOCATION...27.6N 79.7W

ABOUT 45 MI...70 KM E OF VERO BEACH FLORIDA

ABOUT 80 MI...125 KM SE OF CAPE CANAVERAL FLORIDA

MAXIMUM SUSTAINED WINDS...120 MPH...195 KM/H

PRESENT MOVEMENT...NW OR 325 DEGREES AT 14 MPH...22 KM/H

MINIMUM CENTRAL PRESSURE...938 MB...27.70 INCHES

DISCUSSION AND 48-HOUR OUTLOOK

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At 200 AM EDT (0600 UTC), the eye of Hurricane Matthew was located by NOAA Doppler weather radars and an Air Force Reserve Hurricane Hunter aircraft near latitude 27.6 North, longitude 79.7 West. Matthew is moving toward the northwest near 14 mph (22 km/h). A turn toward the north-northwest is expected later today, and a turn toward the north is expected tonight or Saturday. On the forecast track, the center of Matthew will be moving near or over the east coast of the Florida peninsula through tonight, and near or over the coasts of Georgia and South Carolina on Saturday.

Maximum sustained winds have decreased to near 120 mph (195 km/h) with higher gusts. Matthew is a category 3 hurricane on the Saffir-Simpson Hurricane Wind Scale. Although some additional weakening is forecast during the next 48 hours, Matthew is expected to be a powerful category 3 hurricane as it moves near the coast of Florida.

Hurricane-force winds extend outward up to 60 miles (95 km) from the center and tropical-storm-force winds extend outward up to 185 miles (295 km). During the past hour, a wind gust to 70 mph (113 km/h) was reported at Vero Beach, Florida, and a gust to 60 mph occurred at Melbourne, Florida.

The latest minimum central pressure reported by the reconnaissance aircraft was 938 mb (27.70 inches).

0700 UTC NHC update:

HURRICANE MATTHEW TROPICAL CYCLONE UPDATE  
NWS NATIONAL HURRICANE CENTER MIAMI FL AL142016  
300 AM EDT FRI OCT 07 2016

...3 AM EDT POSITION UPDATE...

...SUSTAINED HURRICANE-FORCE WINDS OCCURRING JUST OFFSHORE OF THE FLORIDA EAST COAST...

During the past hour, a sustained wind of 49 mph (80 km/h) and a gust of 71 mph (115 km/h) were reported at Vero Beach, Florida, while a sustained wind of 45 mph (72 km/h) and a gust of 63 mph (102 km/h) were reported at Melbourne, Florida.

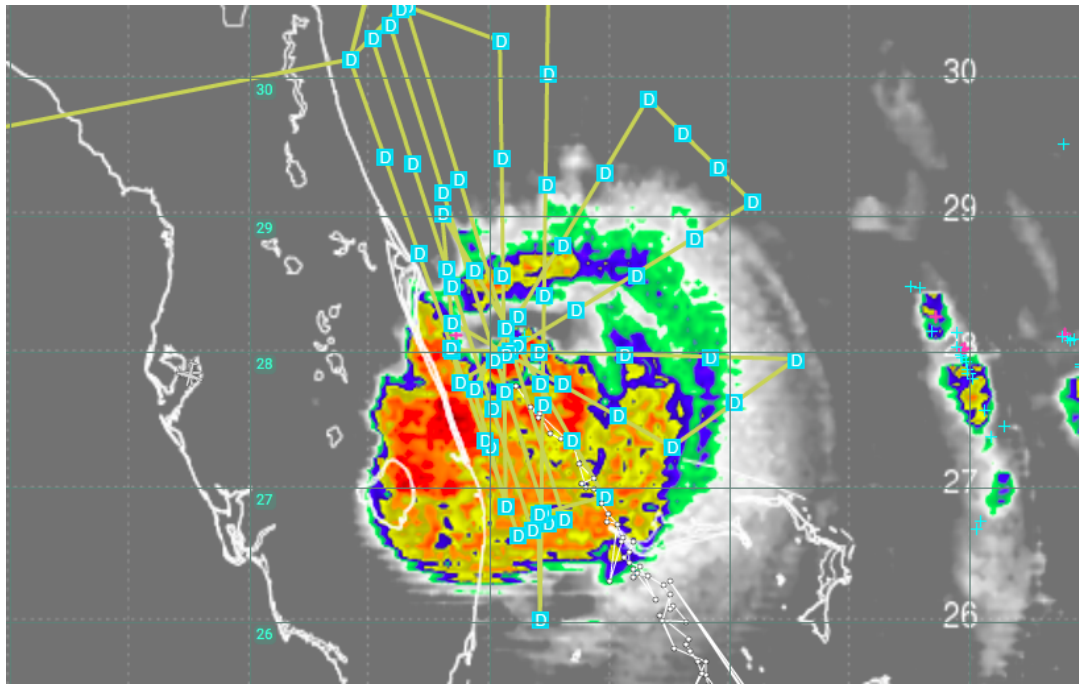
SUMMARY OF 300 AM EDT...0700 UTC...INFORMATION

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LOCATION...27.8N 79.8W  
ABOUT 55 MI...90 KM ESE OF MELBOURNE FLORIDA  
ABOUT 65 MI...105 KM SE OF CAPE CANAVERAL FLORIDA  
MAXIMUM SUSTAINED WINDS...120 MPH...195 KM/H  
PRESENT MOVEMENT...NW OR 325 DEGREES AT 14 MPH...22 KM/H  
MINIMUM CENTRAL PRESSURE...938 MB...27.70 INCHES

0728UTC:

GH over central Gulf, still about 2.5 - 3hrs from overpass over system. CTH around Matthew relatively uniform around 52-54 kft. Lightning is mostly non-existent around the center of the system, outer band

shows some activity but is far away from track with low CTH.



0800UTC NHC Position Update:

...WESTERN EDGE OF MATTHEW'S EYEWALL APPROACHING CAPE CANAVERAL...

LOCATION...28.0N 79.9W

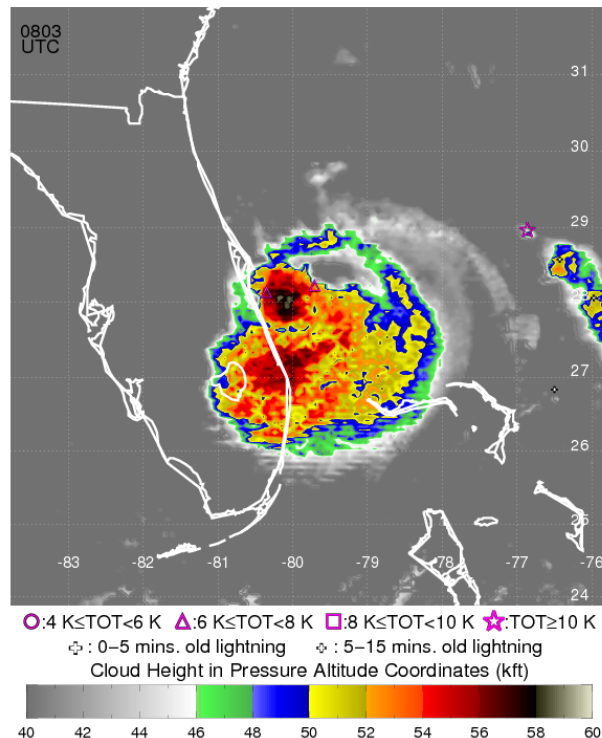
ABOUT 45 MI...75 KM E OF MELBOURNE FLORIDA

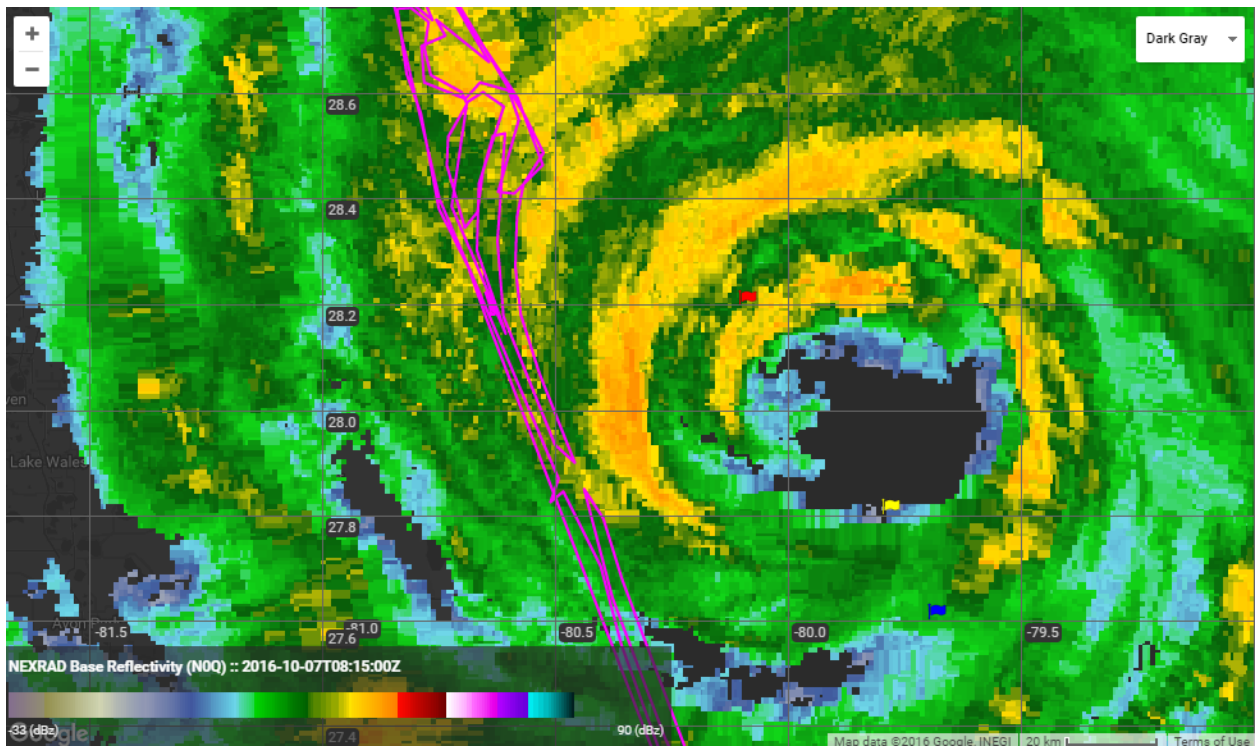
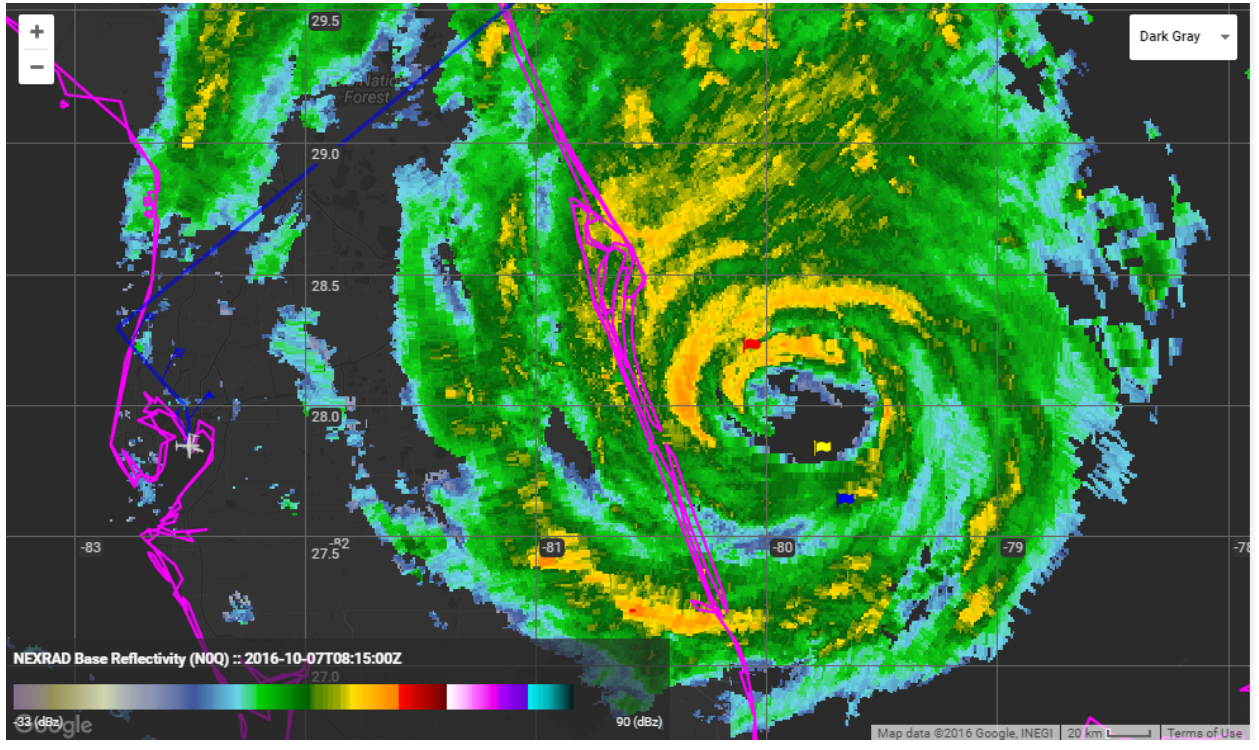
(center is almost due east of Melbourne at this time)

Lightning & Aircraft on 20161007 at 0806 UTC  
ACHA CTH & TOTs at time listed

0806UTC: CTH and TOT update.

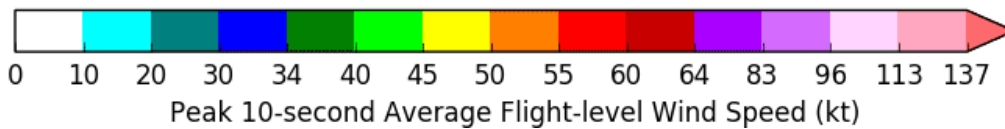
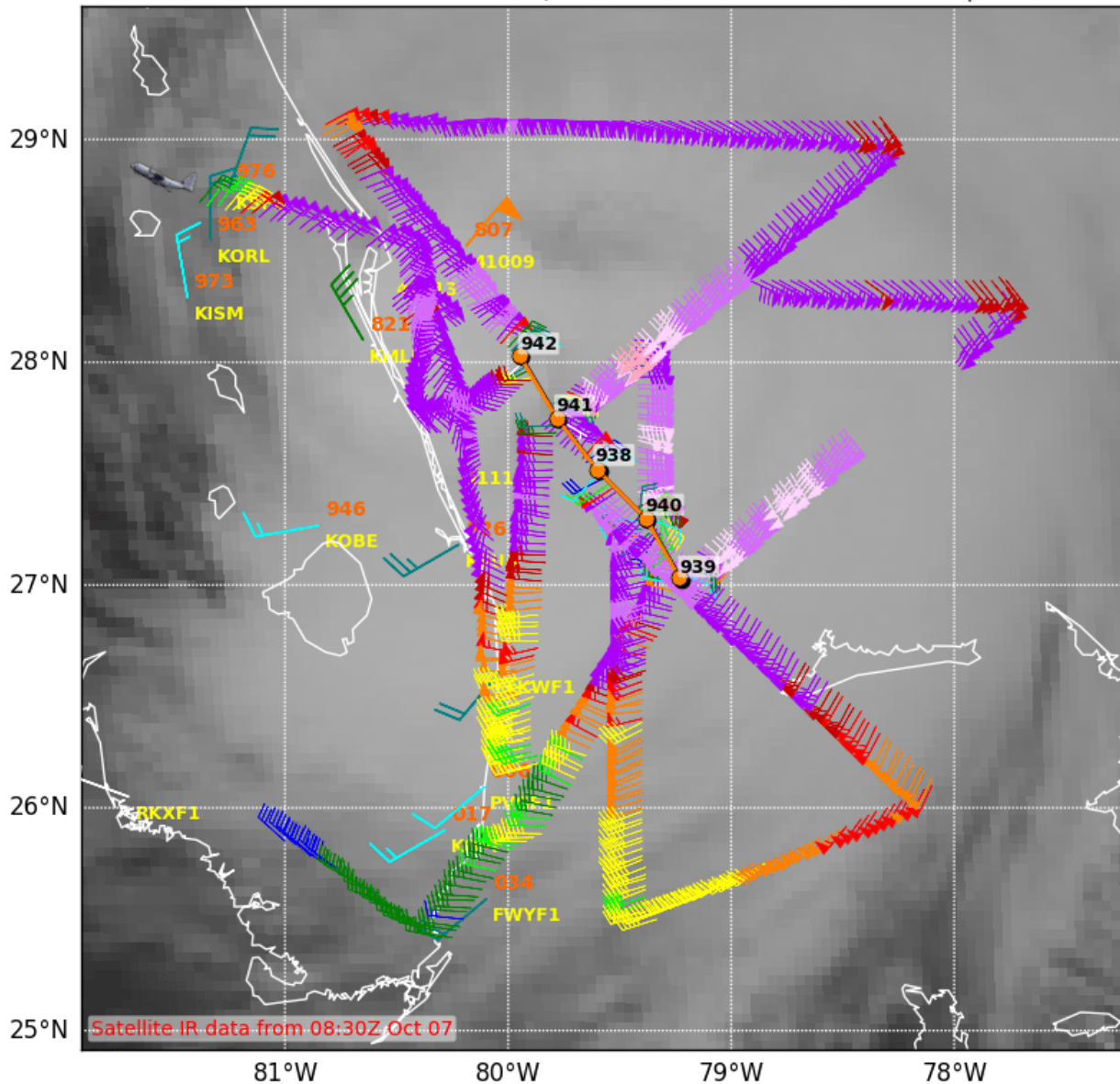
Whole CDO has deepened and expanded over the past 60 minutes. Deep burst originally to the north has now moved round to the west of the center. Broad area of deep convection to the SW has also gained some altitude with tops touching around 56-58 kft. Lightning is still very quiet and TOTs have been restricted to the smaller region to the north - northwest.





AF307 Recon Obs as of 08:42Z Oct 07, 2016

Levi Cowan - tropicaltidbits.com



Four fixes from AF recon at one-hr intervals. Last at 0812Z. Matthew clearly moving parallel to coast, not aiming for landfall. Outer eyewall remaining 10 nm offshore as track nudges closer to shore, but outer eyewall is contracting. Clearly and eyewall replacement is in full swing. Inner eye is shrinking and decaying as outer eyewall contracts. Pmin is rising slightly from 938 mb to 942 mb in 2.5 hr. GH due to arrive at first drop point at 0920Z. Outer eye contracted from 48 nm dia at 04Z to 36 nm at 09Z.

0847 UTC: Update #2 submitted to MTS. Goals of this update: adjust N-S leg to get closer to TC center based on latest TC positions, and adjust following two legs to stay ~15 nmi away from land

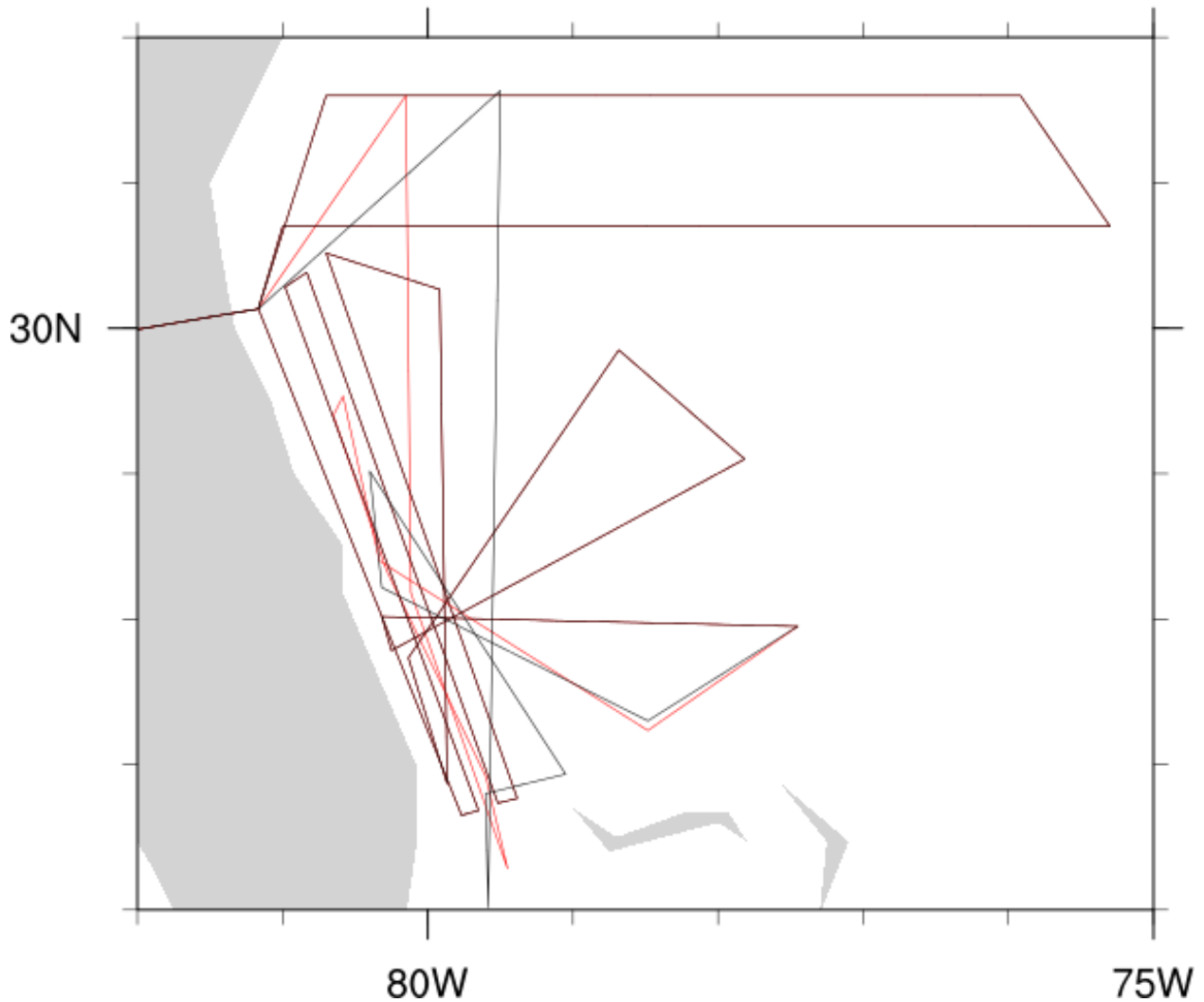
Changes:

- adjusted N-S leg to account for updated storm position (drops 5-12)
- adjusted sondes 9-20 to stay ~15 nmi from land (changed this portion of butterfly pattern for racetrack pattern)
- moved sondes 21-25 to account for track changes above

Comparison of previous plan (update #1, black) and updated plan (update #2, red)

## 20161007 GH Matthew

Update #2 (red) & Update #1 (black)



0924 UTC: Sonde 1 released at location 1. Good drop.

0927UTC:

Update 3 to the flight plan has been uploaded to MTS under GH Plan 2 (Active track).

Changes:

removed 1 sonde between sondes 1-5 and added the sonde roughly at the expected location of secondary eyewall north of the storm center

removed 1 sonde between sondes 9-12 and added the sonde roughly at the expected location of primary eyewall north of the storm center

adjusted position of sonde 9 to try to hit the storm center

0930 UTC: Sonde 2 released at location 2. Good drop.

0936 UTC: Sonde 3 released at location 3. Good drop.

0945 UTC: Sonde 4 released at location 4. Good drop.

0948UTC:

Update 4 to the flight plan has been uploaded to MTS under GH Plan 2 (Active track).

Changes:

removed 3 sondes that appeared twice at the same location

added 1 sonde between sonde 4 (turn) and sonde 5 (secondary eyewall)

0956UTC:

Update 5 to the flight plan has been uploaded to MTS under GH Plan 2 (Active track).

Changes:

added 1 sonde between sondes 5 and 6

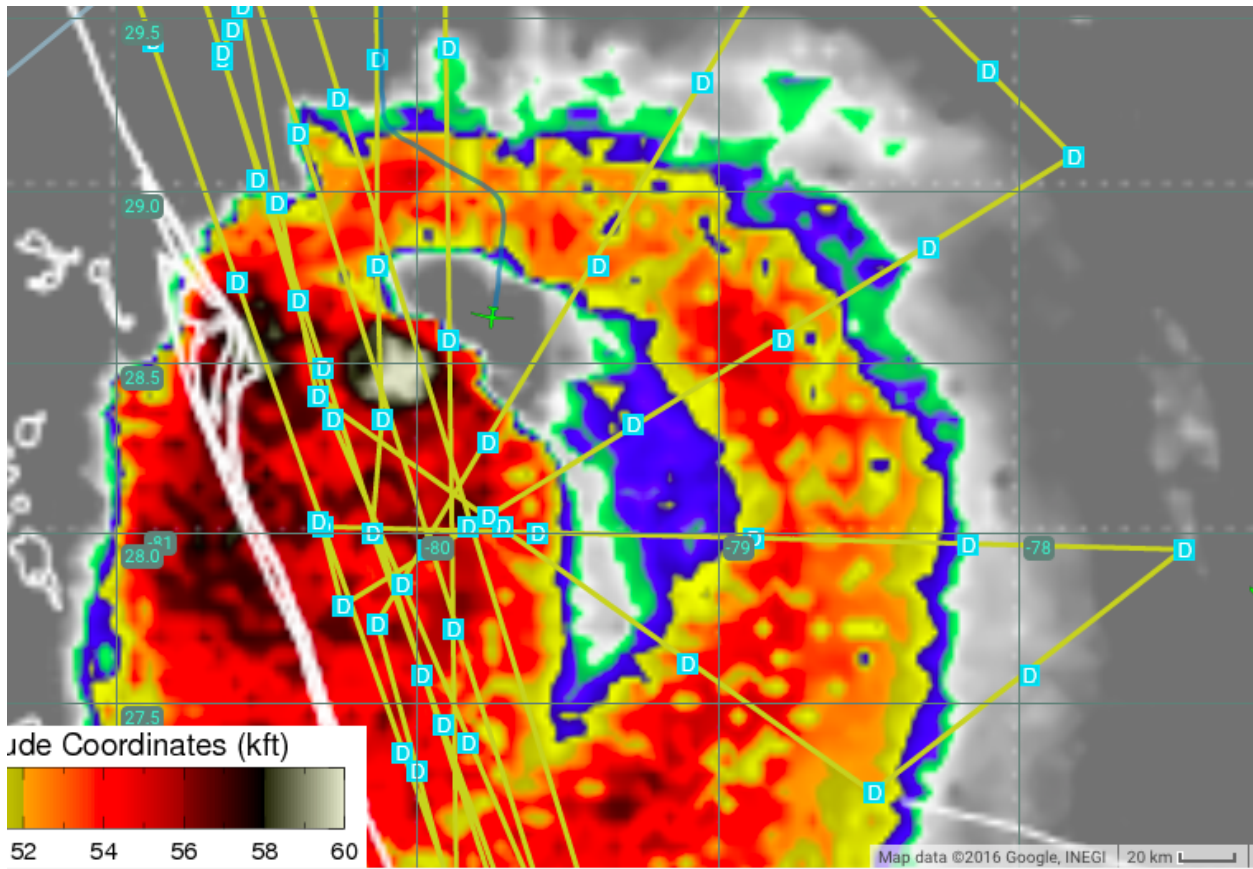
moved sonde 6 (targeting at the secondary eyewall) slightly north

0956 UTC: Sonde 5 released about 10-15 km east of location 5. Good drop.

1007 UTC: Sonde #6 released at location 6. Good drop.

1015UTC:

Track diversion on approach on storm, area of extreme CTH popped up on the NW side of the center (east of our track).



1017 UTC: Sonde #7 released off track due to tall cloud top heights. Location: 28.711,-79.732. Good drop.  
 1022 UTC: Sonde #8 released off track due to tall cloud top heights. Location: 28.299, -79.606. Good drop.  
 1027 UTC: Sonde #9 released off track due to tall cloud top heights. Location: 27.913,-79.395. Good drop.

1030UTC:

Update 6 to the flight plan has been uploaded to MTS under GH Plan 2 (Active track).

Changes:

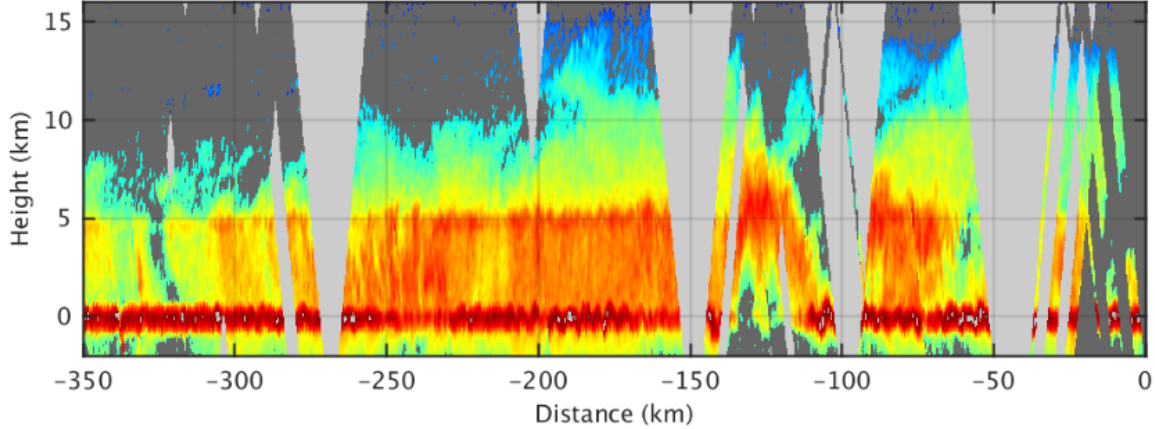
adjusted the track to avoid tall cloud tops

removed SE-NW racetrack due to deep convection

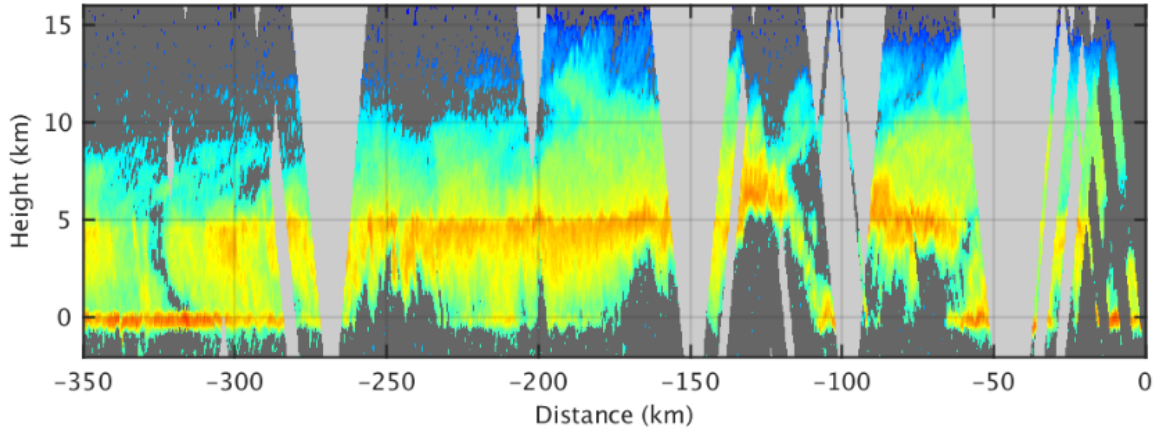
1031 UTC: Sonde #10 released off track due to tall cloud top heights. Location: 27.671,-79.071. Good drop.



**Ku-Band: 07-Oct-2016 09:45:36 through 07-Oct-2016 10:28:51**



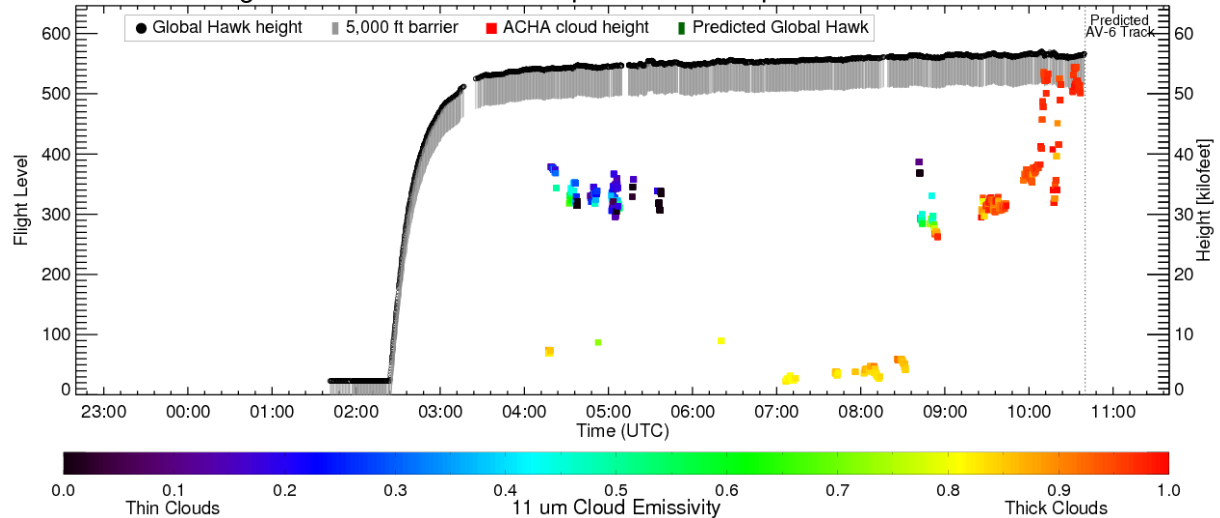
**Ka-Band: 07-Oct-2016 09:45:36 through 07-Oct-2016 10:28:51**



East bound east of center 1033Z

Good agreement between HIWRAP returns and CTH product, tops around 52.5 kt (16km):

**ACHA cloud height and AV-6 altitude comparison: Last updated at 1040 UTC on 20161007**



1036UTC: drop 3 (0936) sent to esrl and nws

1040 UTC: Sonde #11 released off track due to tall cloud top heights. Location: 27.251,-78.328. Good drop.

1045 UTC: Sonde #12 released at location 11. Good drop.

1056 UTC: Sonde #13 released at location 12. Good drop.

1056UTC:

Update 7 to the flight plan has been uploaded to MTS under GH Plan 2 (Active track).

Changes:

adjusted the track to avoid tall cloud tops

eliminated small butterfly leg west of the storm center

added an early turn towards the northeast triangle of the big butterfly

1103 UTC: Sonde #14 released at location 13. Good drop.

1109 UTC: Sonde #15 released at location 14. Good drop.

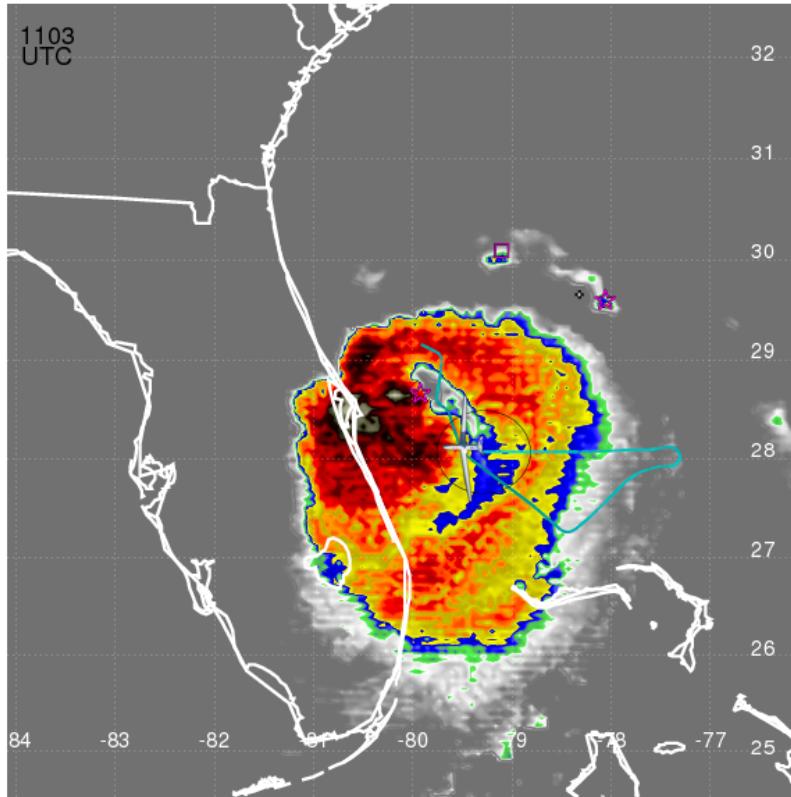
1126 UTC: Sonde 18 released at location 17. Good drop.

- 
- 1132 UTC: Sonde 19 released at location 18. Good drop.
- 
- 
- 11:44:18
- 1140 UTC: Sonde 20 released at location 19. Good drop.
- 
- 
- 11:44:30
- 1143 UTC: Sonde 21 released at location 20. Good drop.

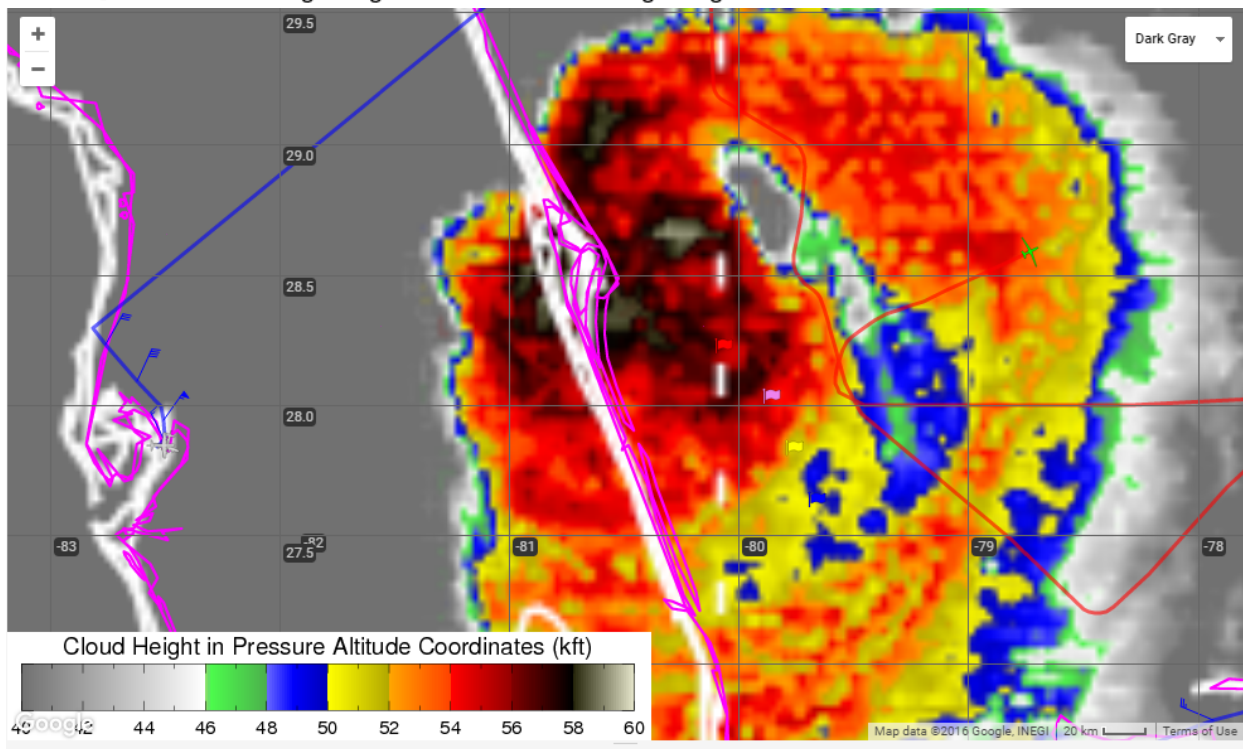
1112UTC: CTH, TOTs and lightning:

GH about to turn to NE for butterfly leg over less active region. GH still at around 58 kft, so center is active convection with tops higher than plane currently.

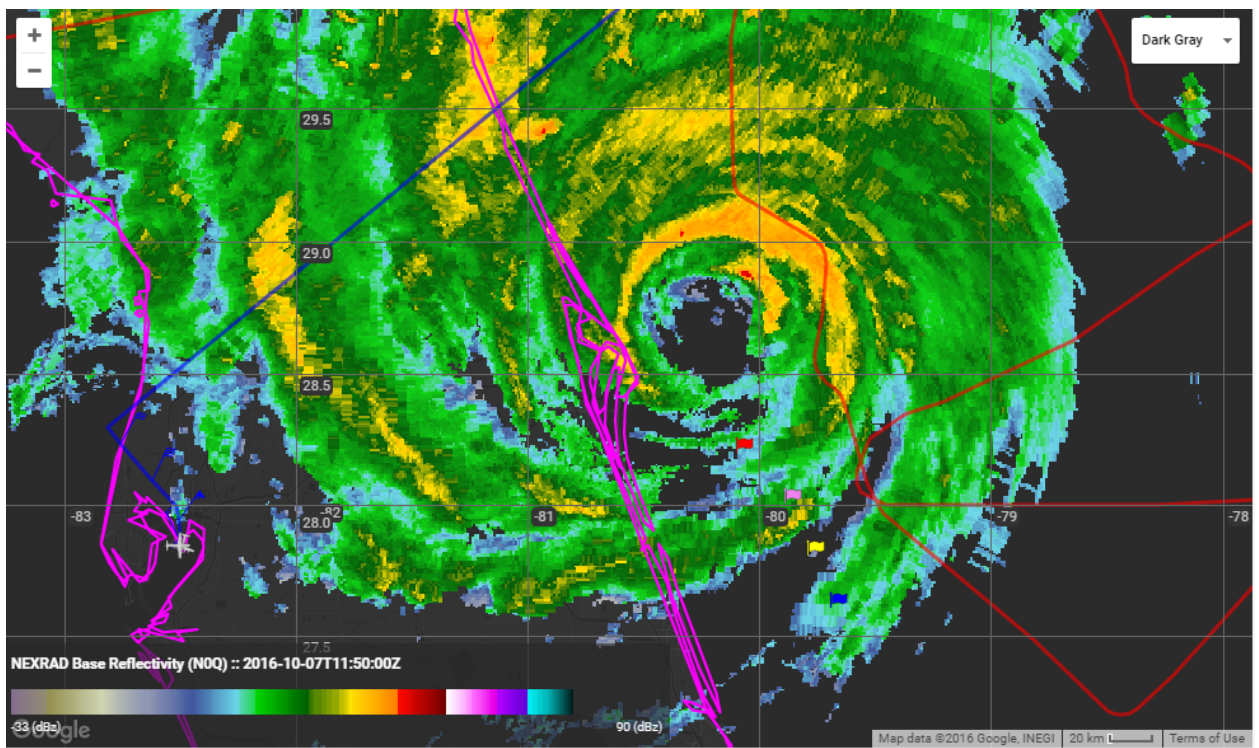
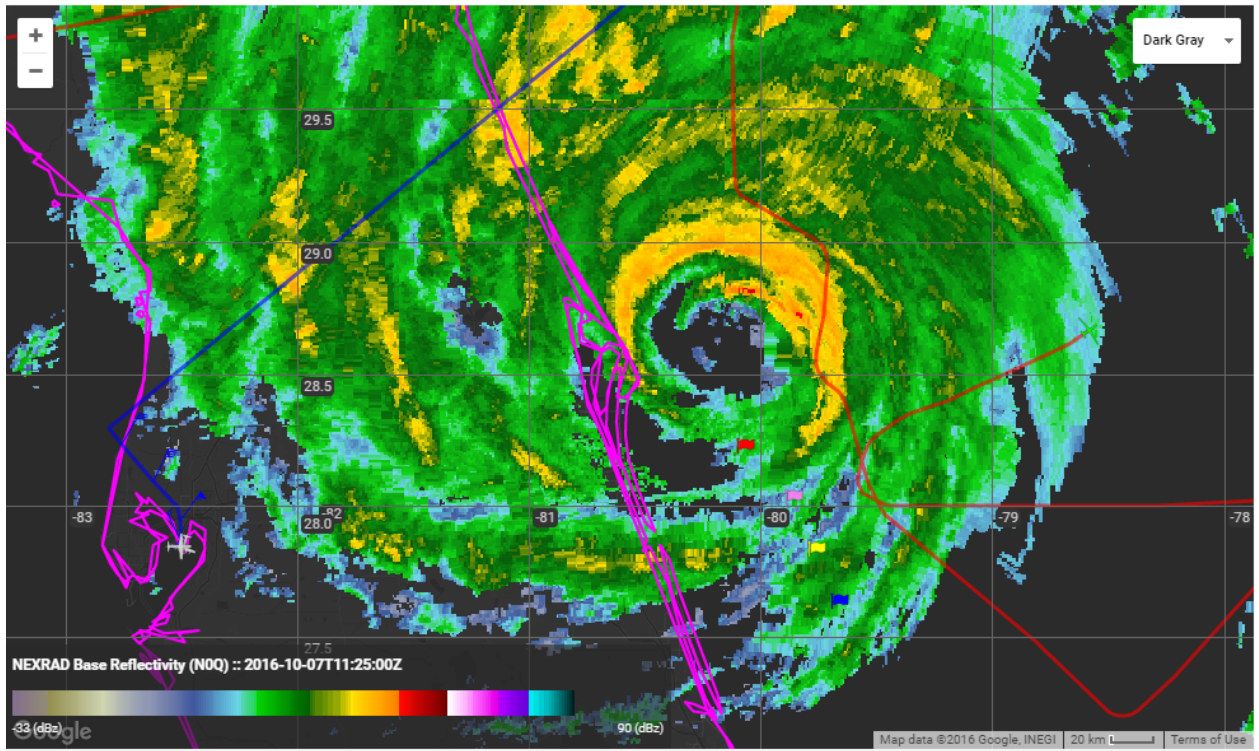
# Lightning & Aircraft on 20161007 at 1112 UTC ACHA CTH & TOTs at time listed



○ : 4 K ≤ TOT < 6 K    △ : 6 K ≤ TOT < 8 K    □ : 8 K ≤ TOT < 10 K    ☆ : TOT ≥ 10 K  
 ⚡ : 0-5 mins. old lightning    ⚡ : 5-15 mins. old lightning



1117 UTC: Sonde #16 released at location 15. Good drop.  
1121 UTC: Sonde #17 released at location 16. Good drop.



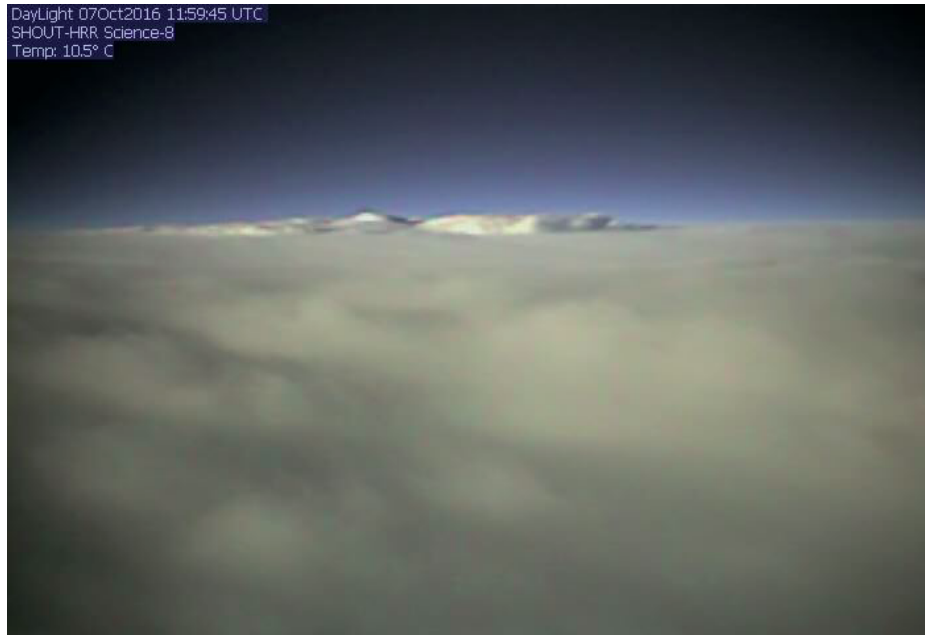
\*\* sonde 18 - 21 not in log.\*\*

1146 UTC: Sonde 22 released at location 21. Good drop.

1152 UTC: Sonde #23 released at location 22. Good drop.

1156 UTC: Sonde 24 released at location 23. Good drop.

1200UTC: Elevated CTH over eye ahead of GH on NW - SE approach:



Drop 7 looks like good eyewall drop -- 968.6mb, 52.8m/ssfc, 55m/s mb (Is this strongest sfc winds for GH drop ever?)

11:53:50

We were going for secondary eyewall w/ drop 6 and primary eyewall w/ drop 7

1152 UTC: Sonde #23 released at location 22. Good drop.

11:55:55

wow pretty sweet picture from the daylight camera

11:56:50

umm yeah- we dont want to fly into that :)

11:56:55

Drop 8 has 976.2mb, 52m/s mbl (no sfc wnd)

11:56:56

i spy some overshooting tops

11:57:18

1156 UTC: Sonde 24 released at location 23. Good drop.

11:57:39

jasonD u copy those TOTs ahead??

12:02:04

the hiwrap quick look isn't updating...

12:02:24

jsippel, still not updating

12:02:35

has **quit**...Quit: Client has disconnected.

12:02:47

The quick look in MTS?

12:02:58

yeah

12:03:08

jasond\_GHOC, pls copy awareness of upcoming TOTs?

12:03:37

jasond\_GHOCE, pls copy awareness of upcoming TOTs?

12:03:39

cveldon that's probably the black area on the CTH

2:04:19

right but current track heads right into that

12:04:33

cvelden: curtain is updated. issue was the predicted path was assuming a take-off time of 02Z (based on drops text file) but we took off at 0224Z

12:04:52

you think the pilots will fly over that? i bet not :)

12:05:44

we're over the eyewall

12:06:04 CV

check predicted CTH---pls ack GHOCE

12:07:11

Drop 9 -- 976.2mb, 51.8m/s mbl still eyewall stuff

12:08:32

nice maneuvering :)

12:09:07

we're currently in a TOT box fwiw

12:09:11

Not sure why HIWRAP updates are so slow but haven't seen anything above 50kft.

12:09:12

whew

12:09:21

shhh don't tell anyone

12:09:37  
overflying TOT now

12:09:41  
nice view from hdvis

12:11:26  
have the pilots mentioned anything about turbulence on these passes?

12:12:41  
drop 7 had intense winds (~100 kts) all the way to 400mb!

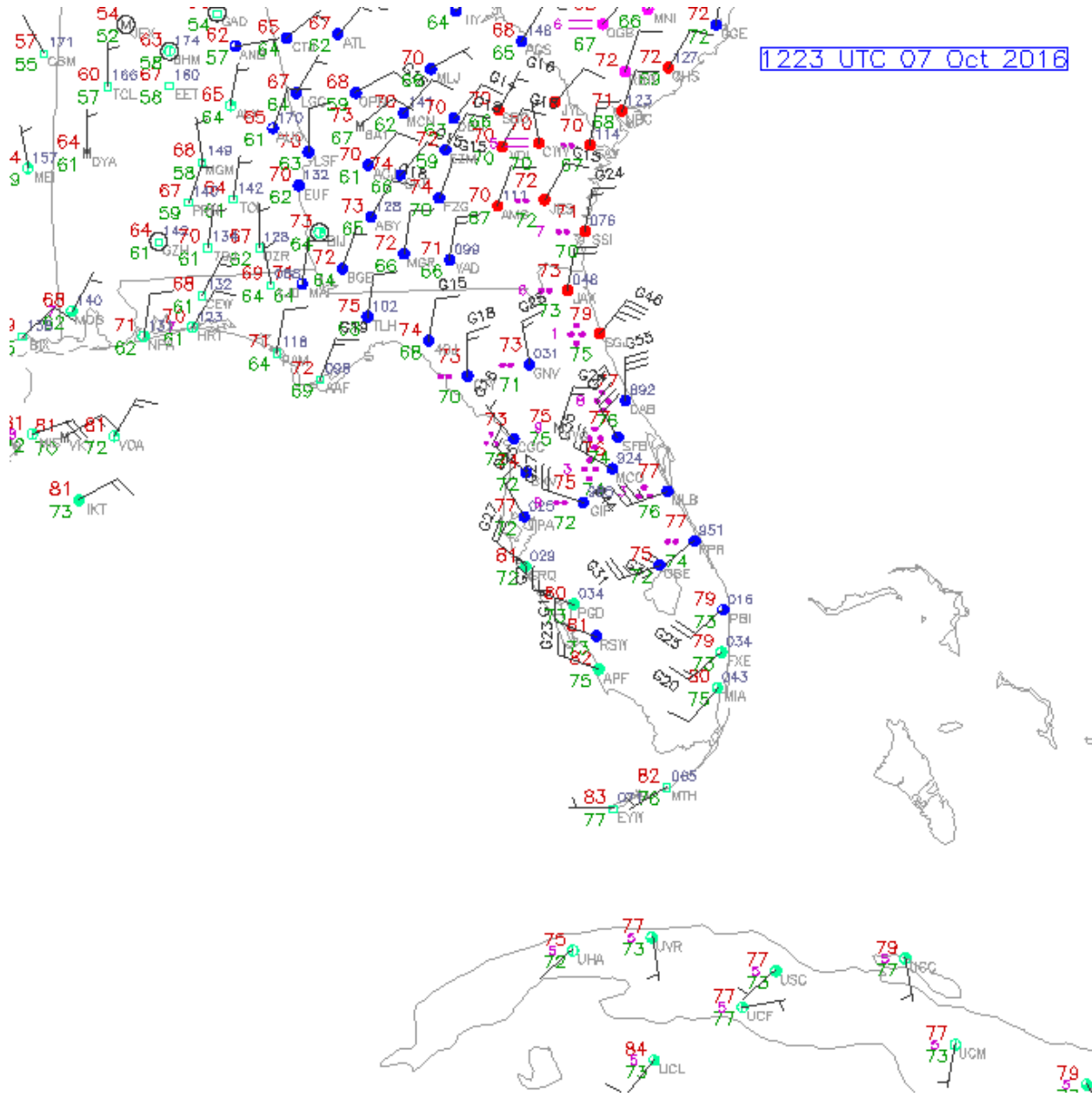
Drop 27 was a bad sonde after turn south on long leg to 25.9N. Dropping another and this one is good.

Turned a bit soon to the south to avoid cloud tops. Currently about 10 nm east of planned track (drops 27-28)

12:23 HAMSR showing nice warm core imagery, about 7K on the last pass



1223 UTC 07 Oct 2016



File Edit View History Bookmarks Tools Help

Yahoo wi3comp... Surface d... NWS ... AV-6 Altitude... Dashboar... SHOUT\_R... http...html National ... recon\_AF... Airline TL... MOSAIC... CIMSS Tropic... WHITE PAPE...

radar.weather.gov/radar.php?rid=mlb&product=NCR&overlay=11101111&loop=no

# Melbourne, FL Radar

Go to:  Local Weather Forecasting City, St" City, St Go

## Composite Reflectivity

NWS Melbourne, FL

National Weather Service WSR-88D Image from: MLB 10/07/2016 12:34 UTC ( 8:34 AM EDT)

Adjacent Radars:

Short Range Images

Reflectivity: CompositeLoop Base Loop

Velocity: Storm Loop Relative Base Loop

Rainfall: 1-Hour Loop Total Storm Loop Total

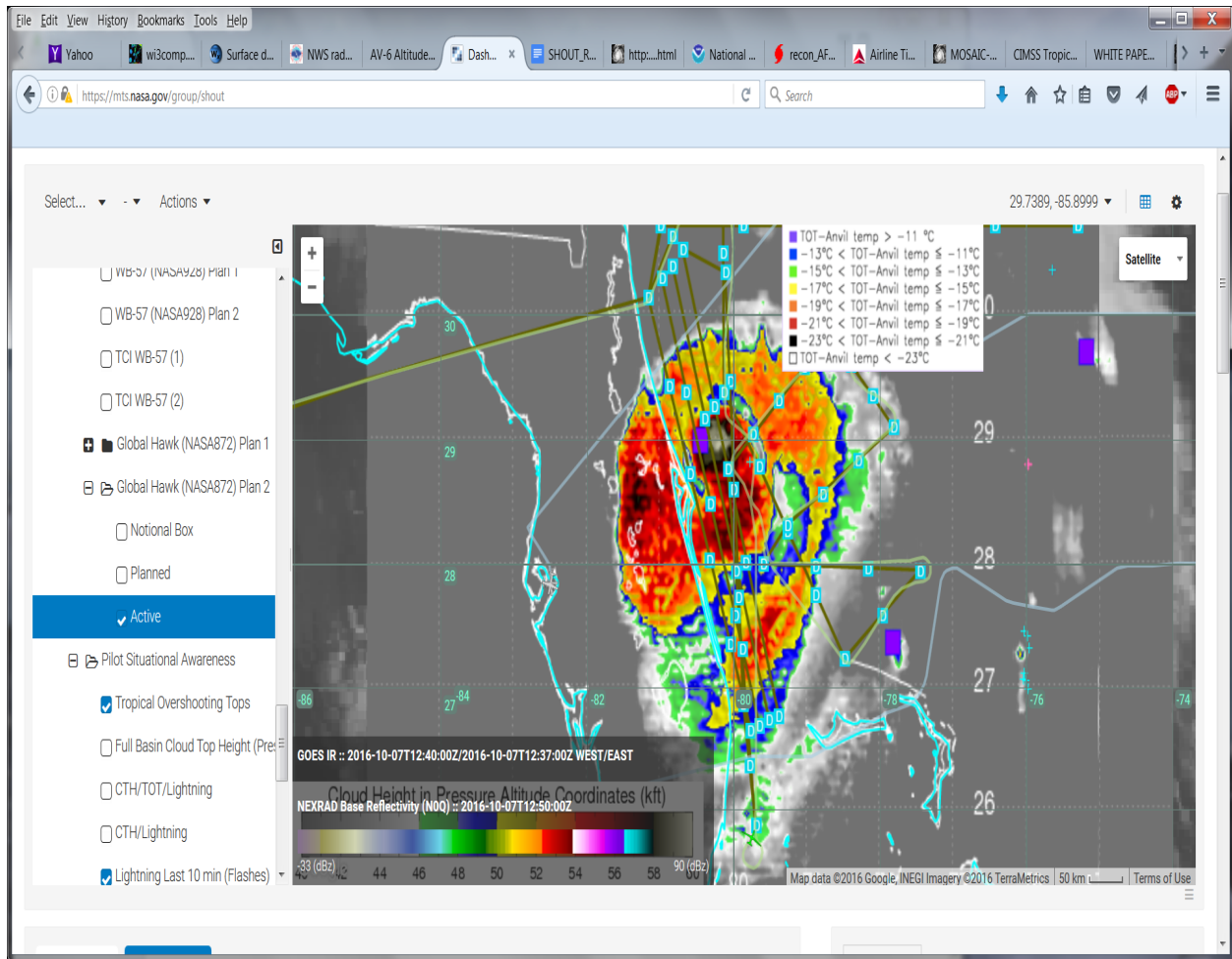
MouseOver Off

Long Range

National Weather Service - Since 1870

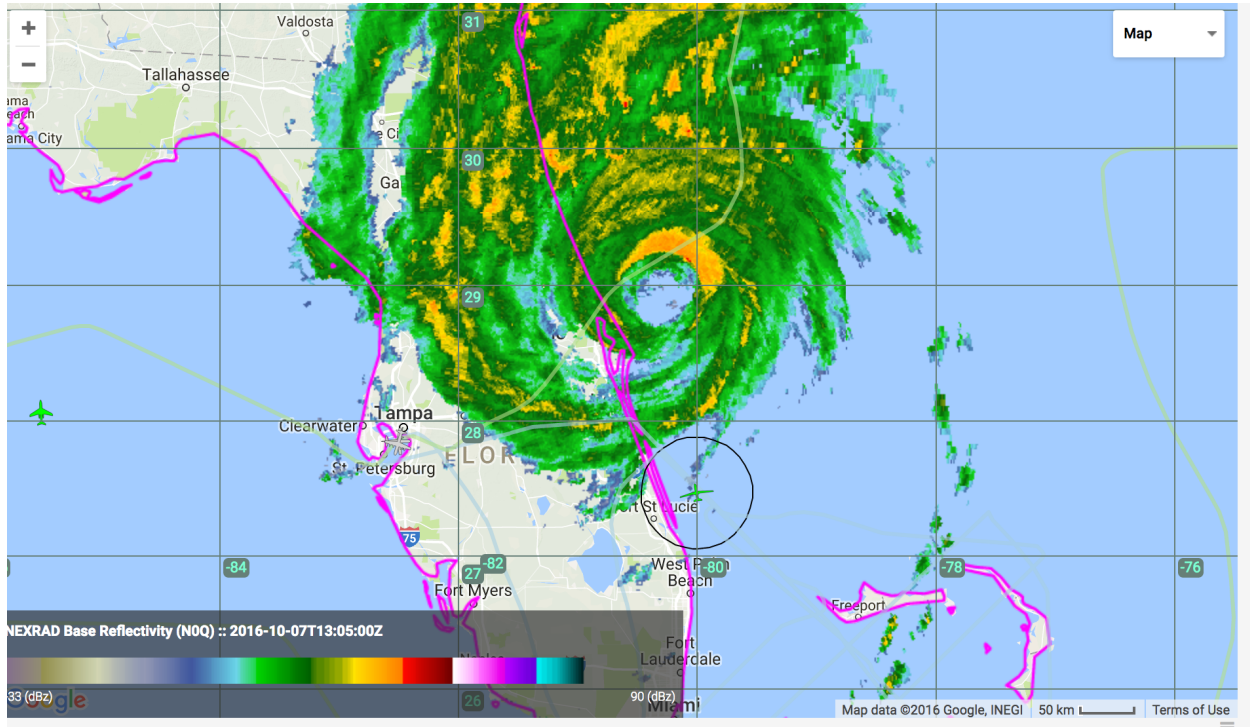
Unread: 0 Total: 22249 Today Pane

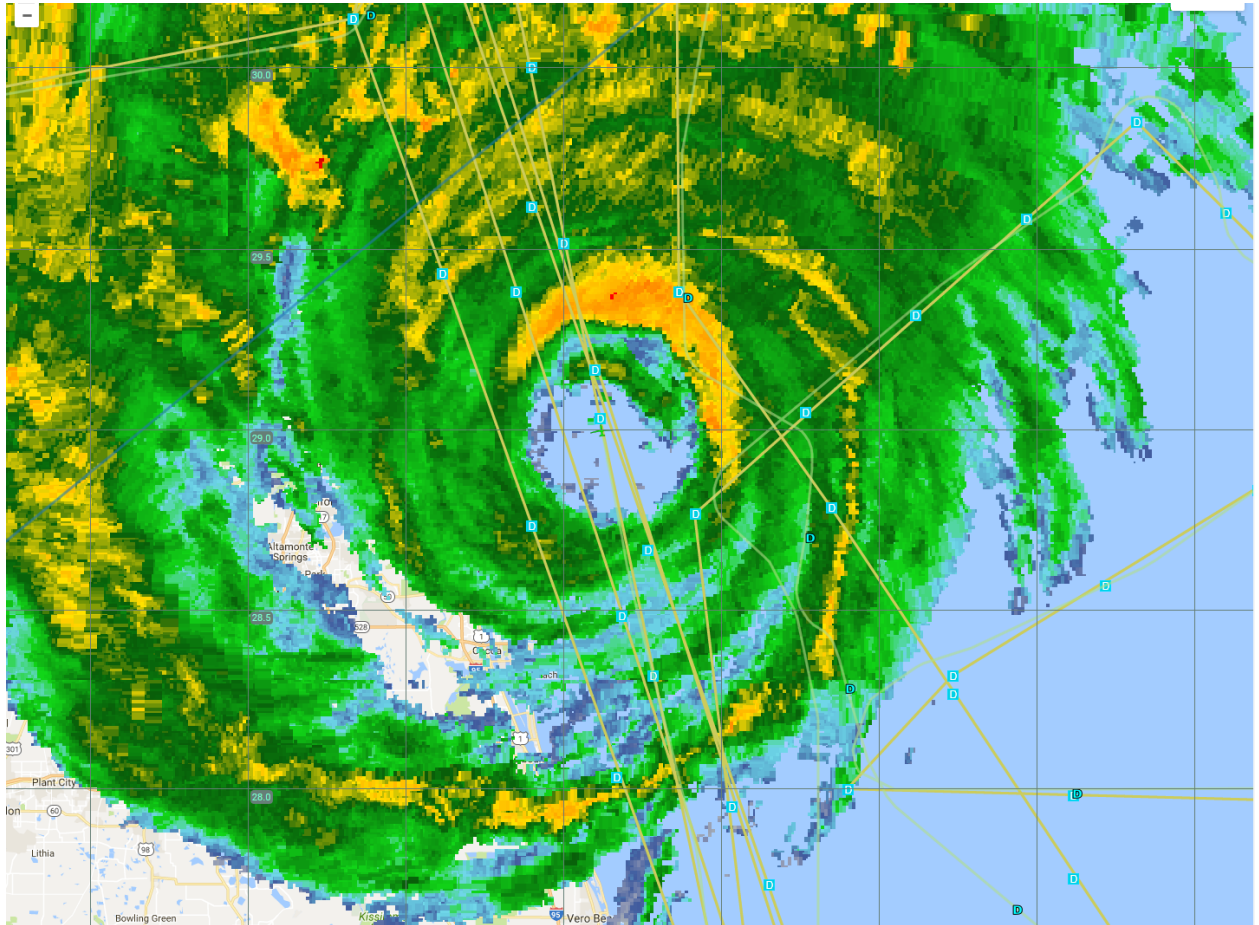
7:46 AM 10/7/2016



12:50 UTC screen capture above.

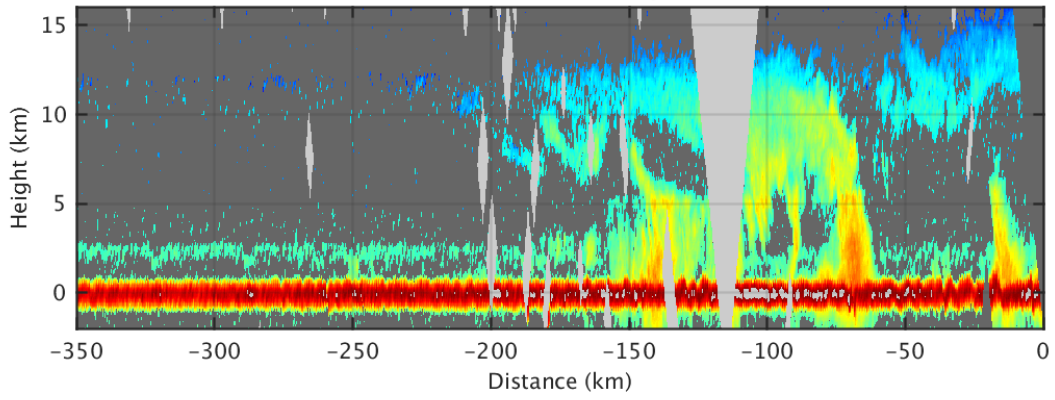
Approaching center on long leg north from 25.9N Some OTs have shown up in the north eyewall but nothing at the moment.



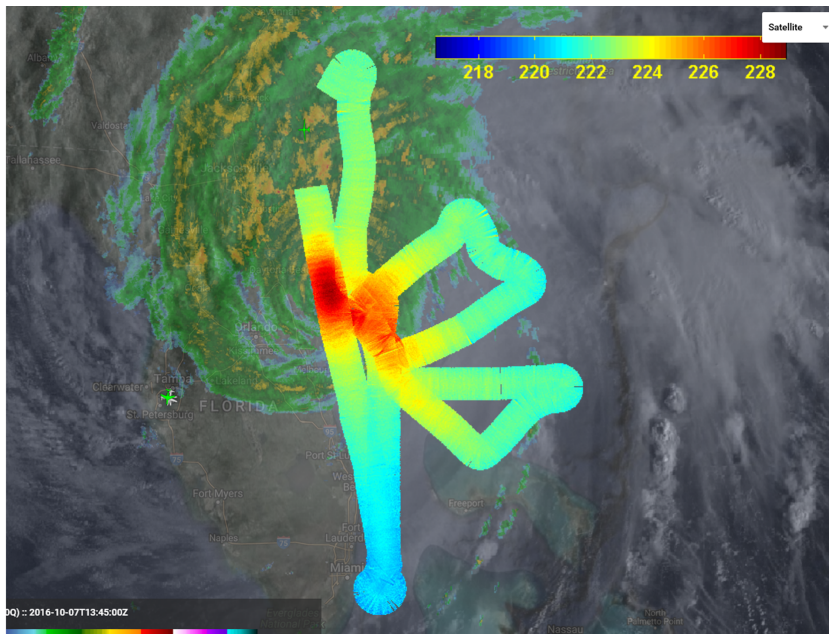
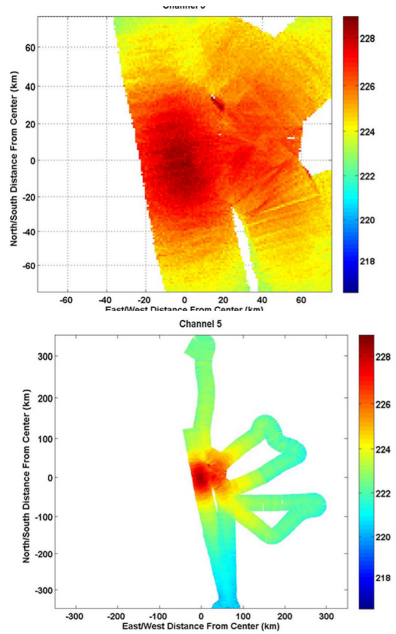
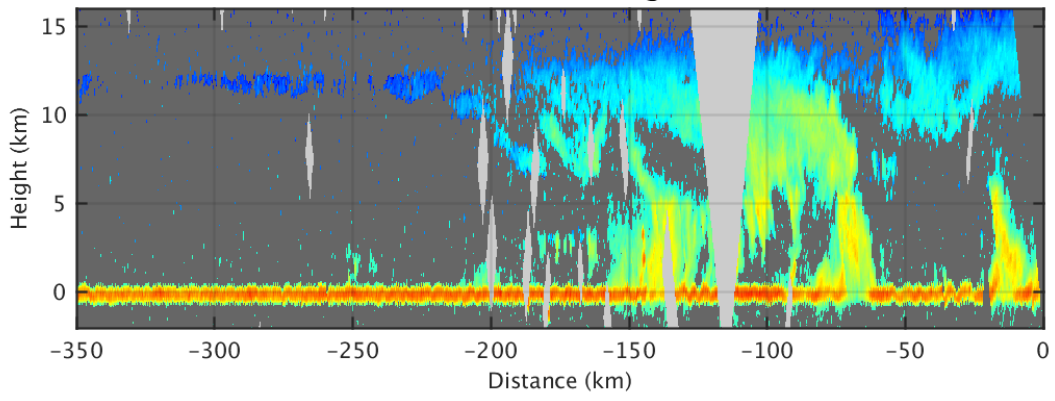


Center drop: 1327 UTC

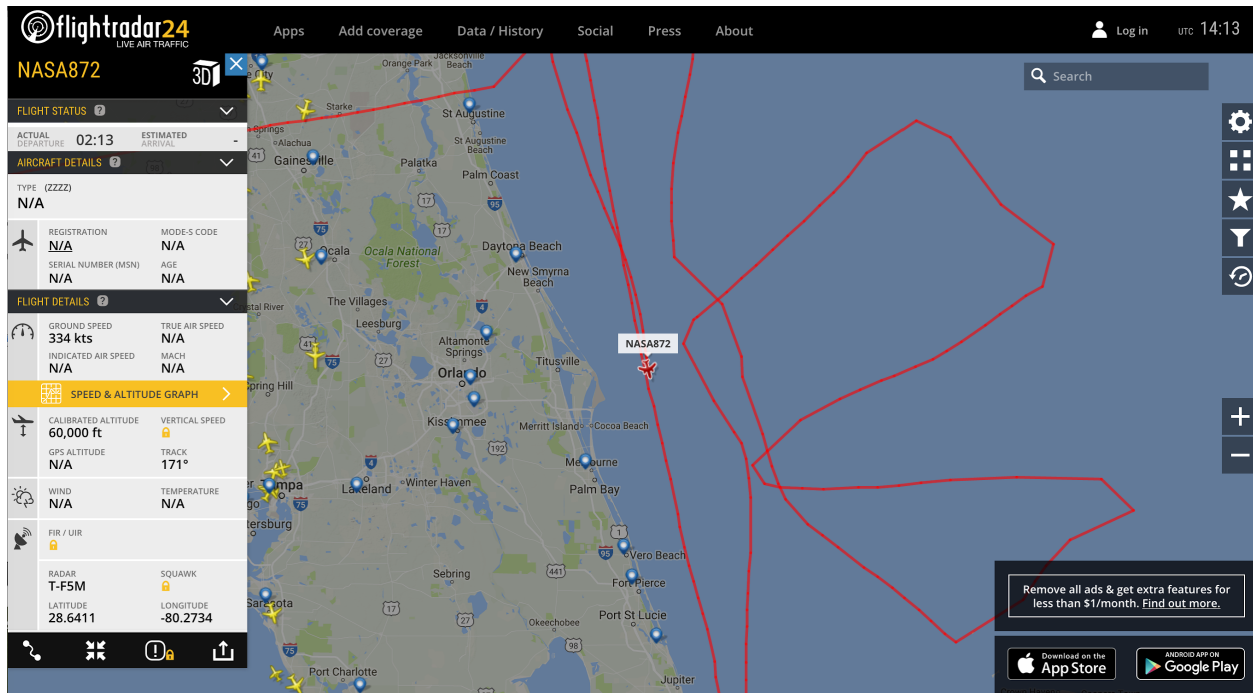
**Ku-Band: 07-Oct-2016 12:46:12 through 07-Oct-2016 13:28:06**



**Ka-Band: 07-Oct-2016 12:46:12 through 07-Oct-2016 13:28:06**



13:40 8K warm core at 150mb, last pass was right on center

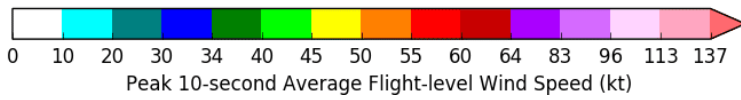
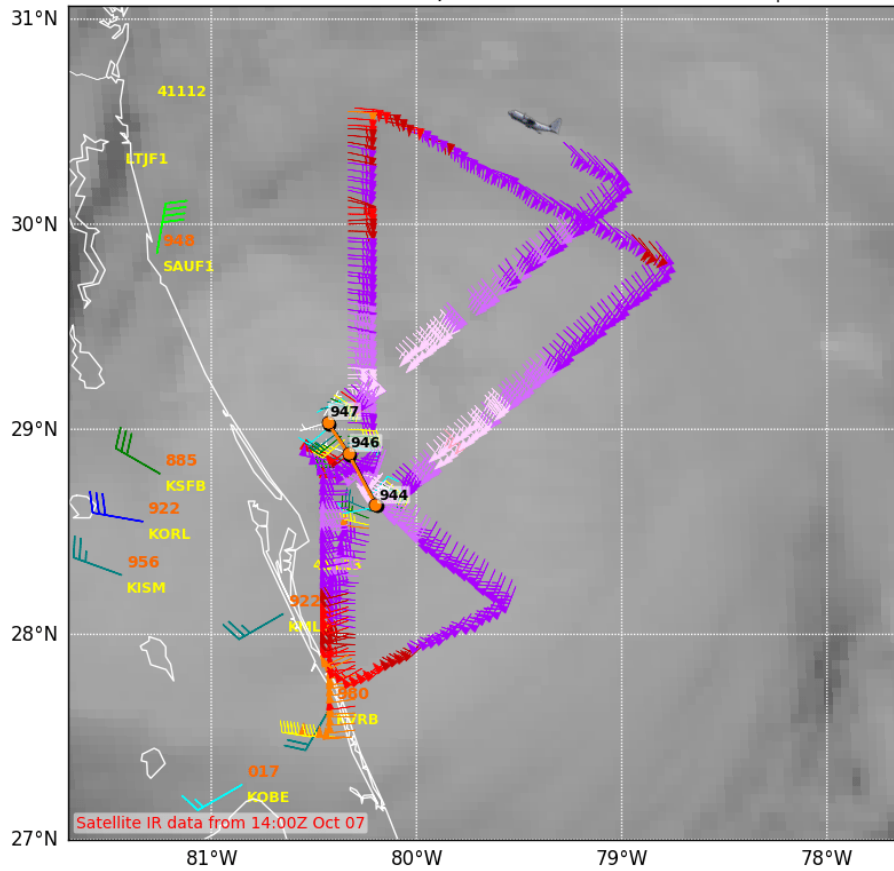


No ATC issues with surrounding aircraft of this flight.

Pressures are slowly rising in Matthew. Still evidence of relict eye interacting with outer eyewall

AF301 Recon Obs as of 14:15Z Oct 07, 2016

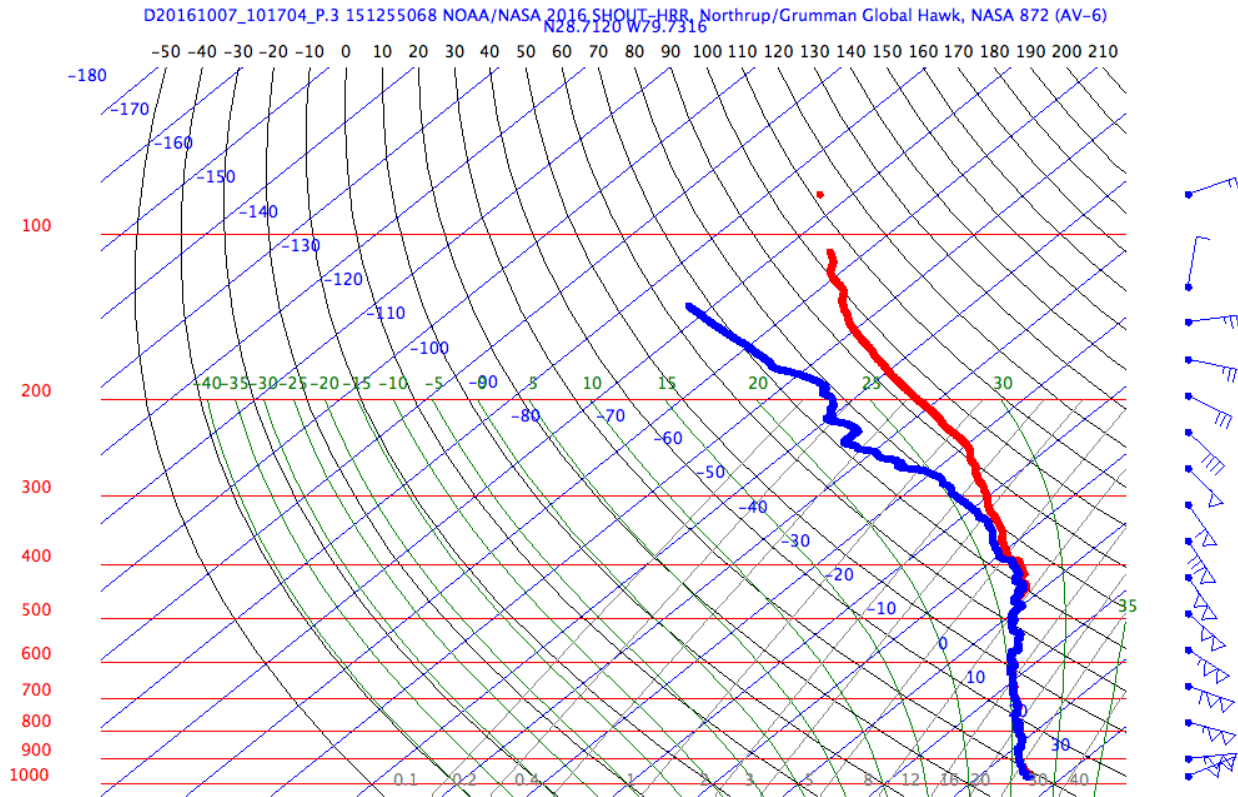
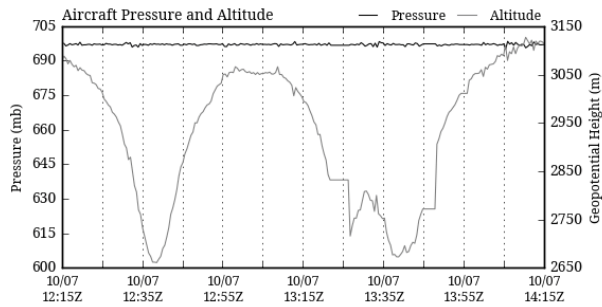
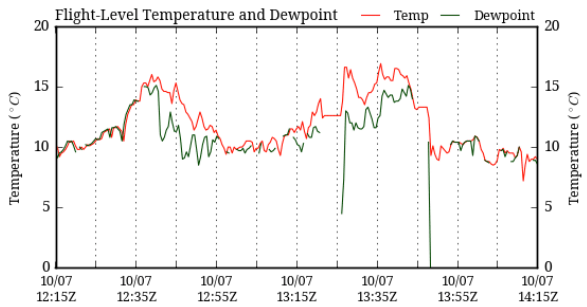
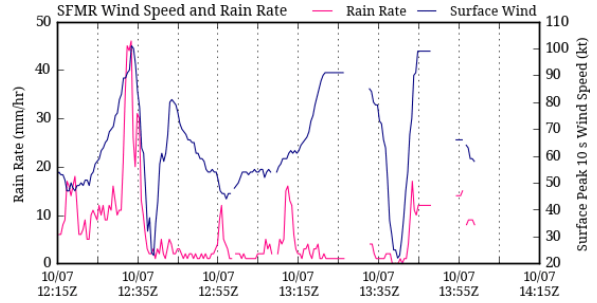
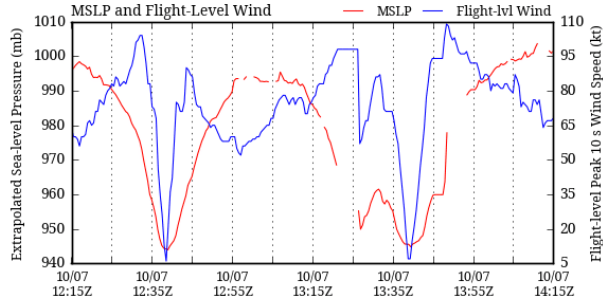
Levi Cowan - tropicaltidbits.com





# Recon Aircraft Observations

Mission ID: AF301 3314A MATTHEW Levi Cowan - tropicaltidbits.com



Aspen V3.3, 07 Oct 2016 11:46 UTC

Earlier dropsonde (1017 UTC) indicates a 100-kt surface wind.

14:38 avaps is down right now. last drop was 1351z

Update 11 to the track. Replaced one of the racetracks with a butterfly. Change starts after drop 46 at 30.62N 80.91W

HURRICANE MATTHEW DISCUSSION NUMBER 38  
NWS NATIONAL HURRICANE CENTER MIAMI FL AL142016  
1100 AM EDT FRI OCT 07 2016

The satellite presentation has degraded during the past several hours, and the eye is not very distinct. However, the SFMR and flight-level wind data from an Air Force reconnaissance plane indicate that the initial intensity is still 105 kt.

Matthew is expected to change little in intensity during the next 6 to 12 hours, but it should begin to weaken at a faster pace in 24 hours while the shear increases, and by the end of the forecast period, Matthew is expected to become a tropical depression.

Fixes from a reconnaissance plane indicate that Matthew is moving toward the north-northwest or 345 degrees at 10 kt. Matthew is reaching the northwestern edge of the subtropical ridge and encounter the mid-latitude westerlies. This flow pattern should steer the hurricane northward and then northeastward during the next 36 hours. After that time, the flow pattern is forecast to change again and a weakening Matthew should then turn southward and southwestward. The NHC forecast is a little bit to the north from the previous one during the first 24 to 36 hour period following the multi-model consensus. After 72 hours, models continue to vary the flow pattern and the confidence in the track forecast is low.

#### KEY MESSAGES:

1. We have been very fortunate that Matthew's category 3 winds have remained a short distance offshore of the Florida Coast thus far, but this should not be a reason to let down our guard. Only a small deviation to the left of the forecast track could bring these winds onshore. The western eyewall of Matthew, which contains hurricane-force winds, is expected to move over or very near the coast of northeastern Florida and Georgia today.
2. Hurricane winds increase very rapidly with height, and occupants of high-rise buildings in the Jacksonville area are at particular risk of strong winds. Winds at the top of a 30-story building will average one Saffir-Simpson category higher than the winds near the surface.
3. The water hazards remain, even if the core of Matthew remains offshore. These include the danger of life-threatening inundation from storm surge, as well as inland flooding from heavy rains from Florida to North Carolina.
4. The National Hurricane Center is issuing Potential Storm Surge Flooding Maps, and Prototype Storm Surge Watch/Warning Graphics for Matthew. It is important to remember that the Potential Storm Surge Flooding Map does not represent a forecast of expected inundation, but rather depicts a reasonable worst-case scenario -- the amount of inundation that has a 10 percent chance of being exceeded.

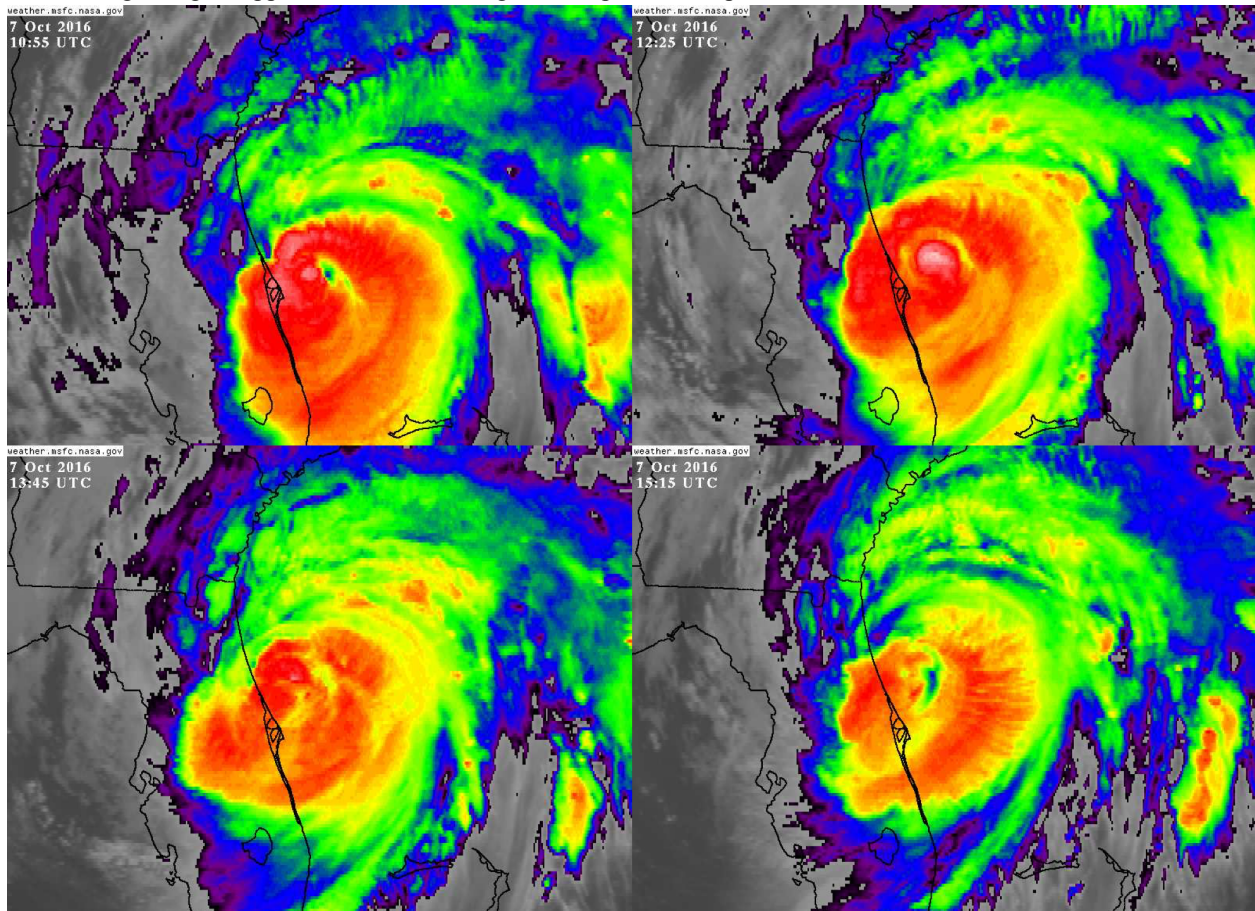
FORECAST POSITIONS AND MAX WINDS

INIT 07/1500Z 29.4N 80.4W 105 KT 120 MPH  
12H 08/0000Z 30.8N 80.7W 100 KT 115 MPH  
24H 08/1200Z 32.5N 79.9W 85 KT 100 MPH  
36H 09/0000Z 33.5N 78.1W 75 KT 85 MPH  
48H 09/1200Z 33.5N 76.0W 60 KT 70 MPH  
72H 10/1200Z 32.0N 74.0W 50 KT 60 MPH  
96H 11/1200Z 28.0N 75.0W 35 KT 40 MPH  
120H 12/1200Z 27.0N 76.0W 30 KT 35 MPH

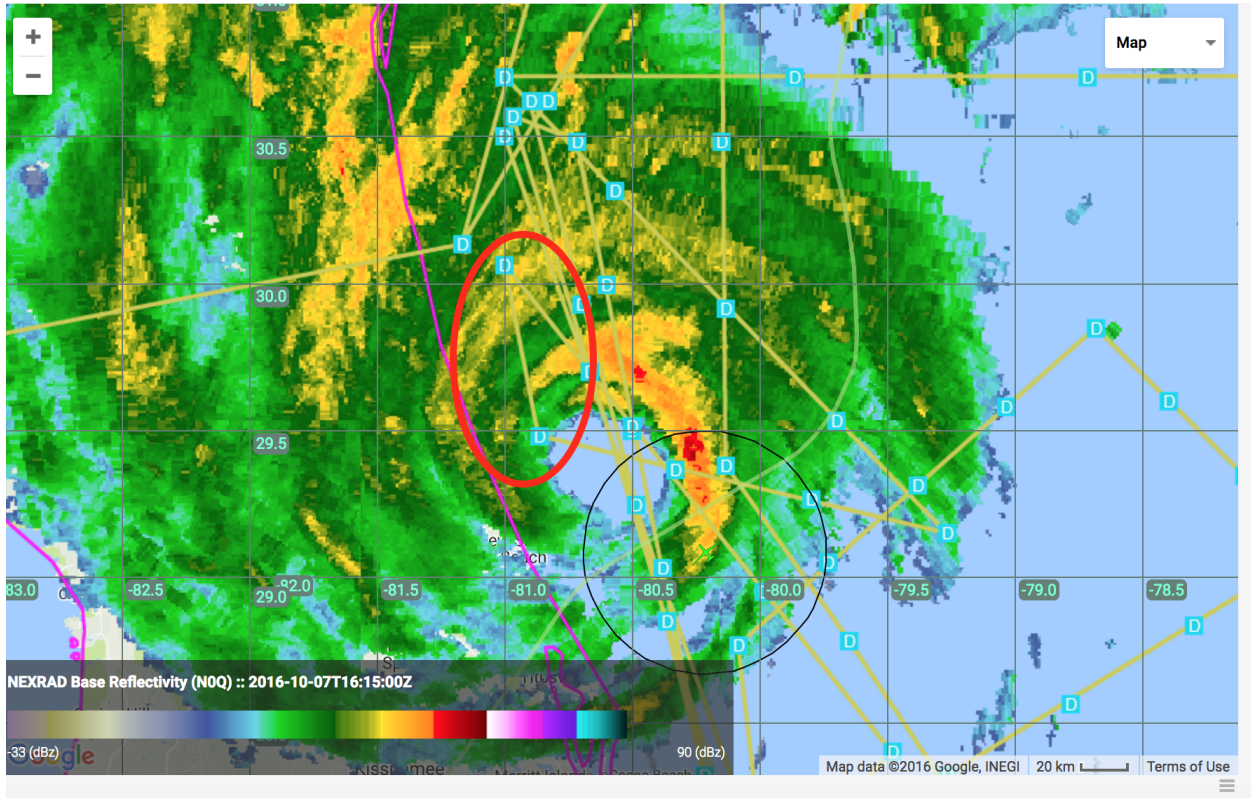
\$\$

Forecaster Avila

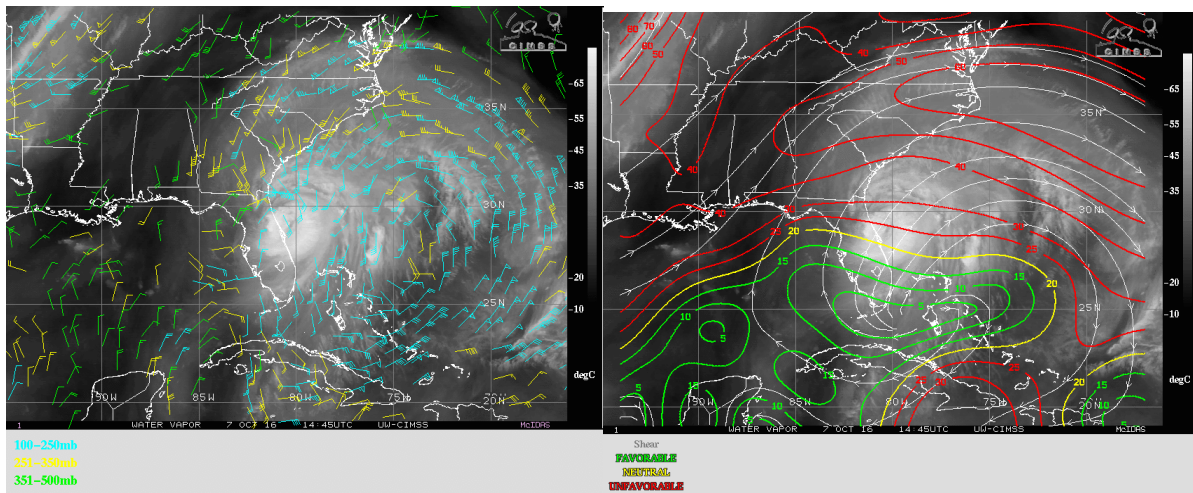
15:30 - Degrading IR appearance and warming cloud tops over the past ~4 hours



Update 12 to track to move the westernmost leg that goes south from drop 53 to 54 north about 15 nm per request from JSippel (highlight in red). AVAPS is still down so focusing on transects for HIWRAP and HAMSRS.

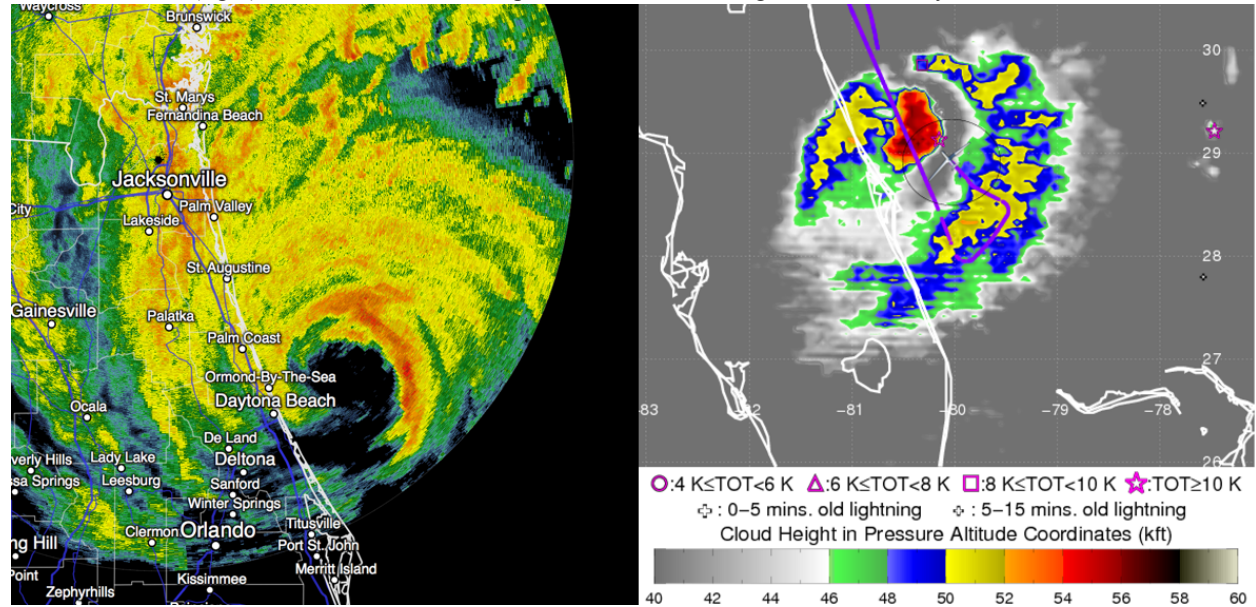


Water vapor shows some drying on the western side of the circulation with increasing sw shear.



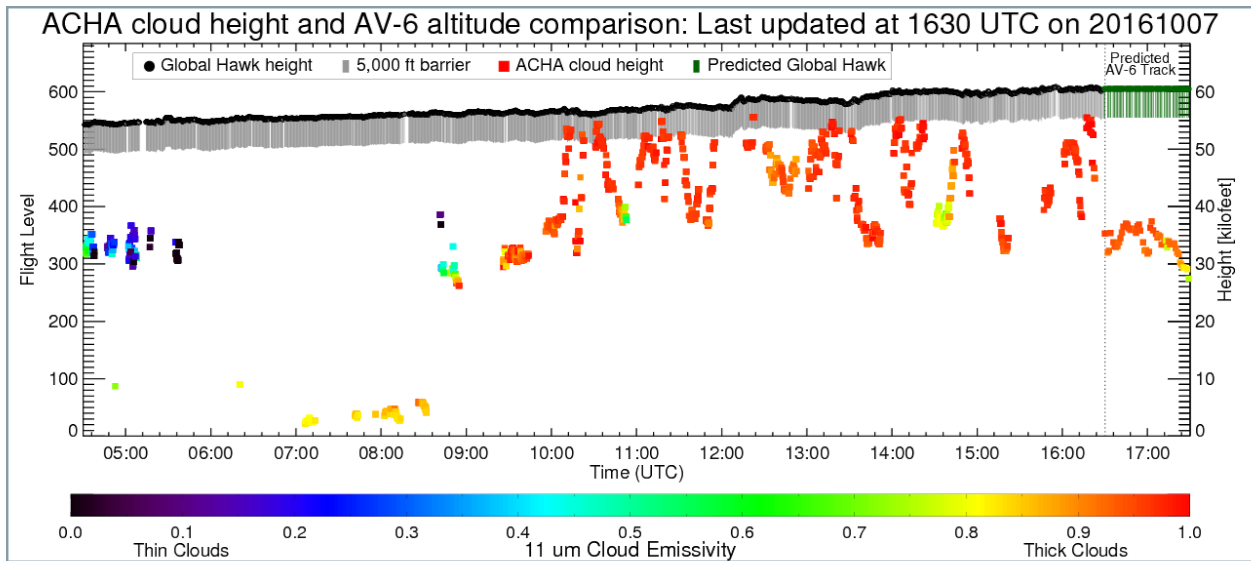
100-250mb  
 251-350mb  
 351-500mb

1603 UTC CTH (right) and KJAX Radar - Deep convection increasing in the eastern eyewall

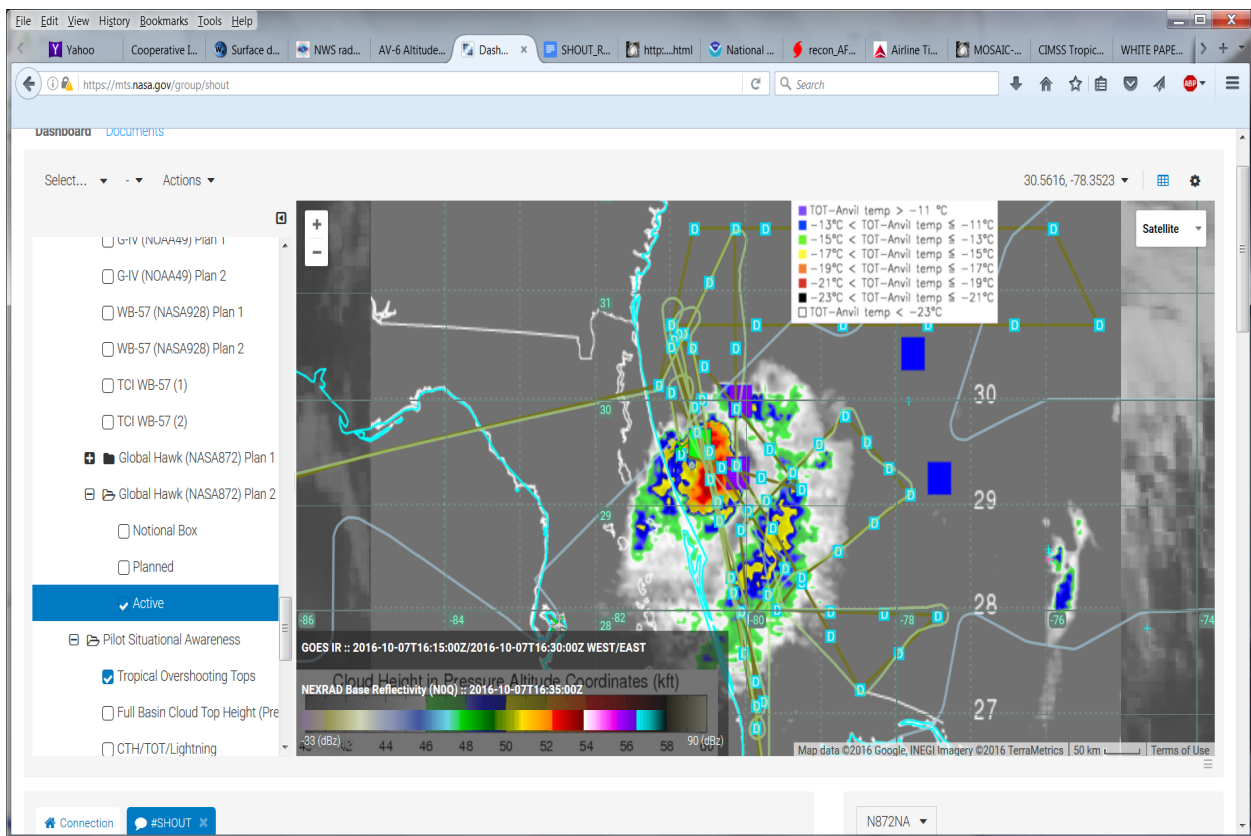


Eastern eyewall approach:





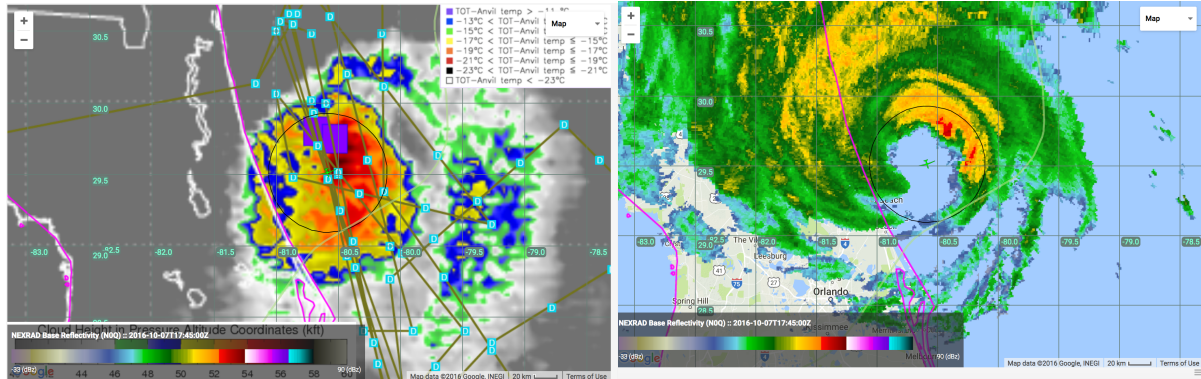
Couple of instances of flying within the cloud-top height barrier, but so far smooth flight based on current knowledge.



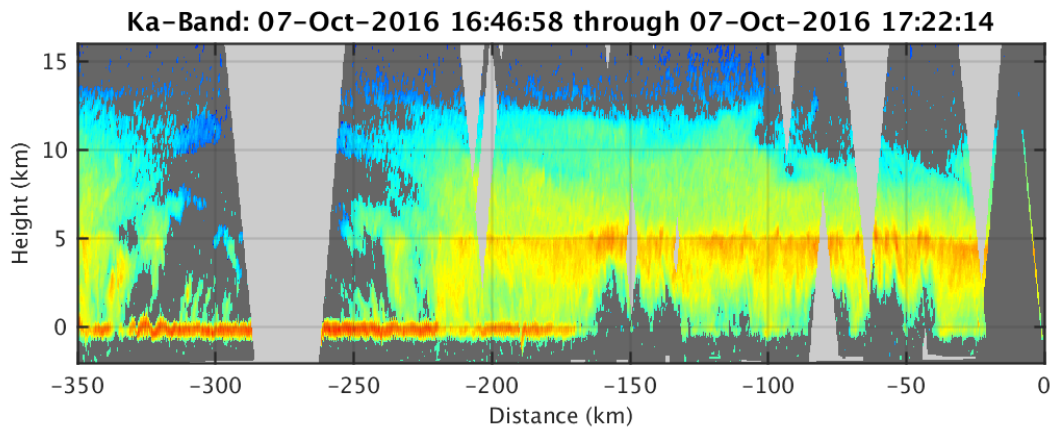
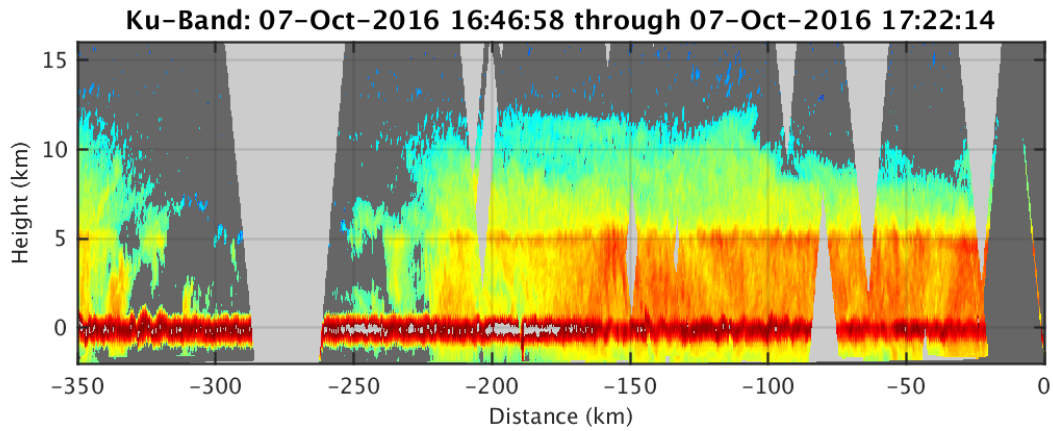
From 1639Z (above)

Track update # 13 to eliminate the east to west racetrack legs north of 30N. AVAPS is still down so no need to fly these legs that were designed to sample the outflow region up here. Replaced them with north to south racetracks with one through the center then final leg north through the eastern part of the eyewall then exit to return home

Just passed a few OTs on the left side in the eastern eyewall that has been active all day. Strongest radar returns are in this area and some lightning.



Overshooting tops 1730Z with radar at 1745Z

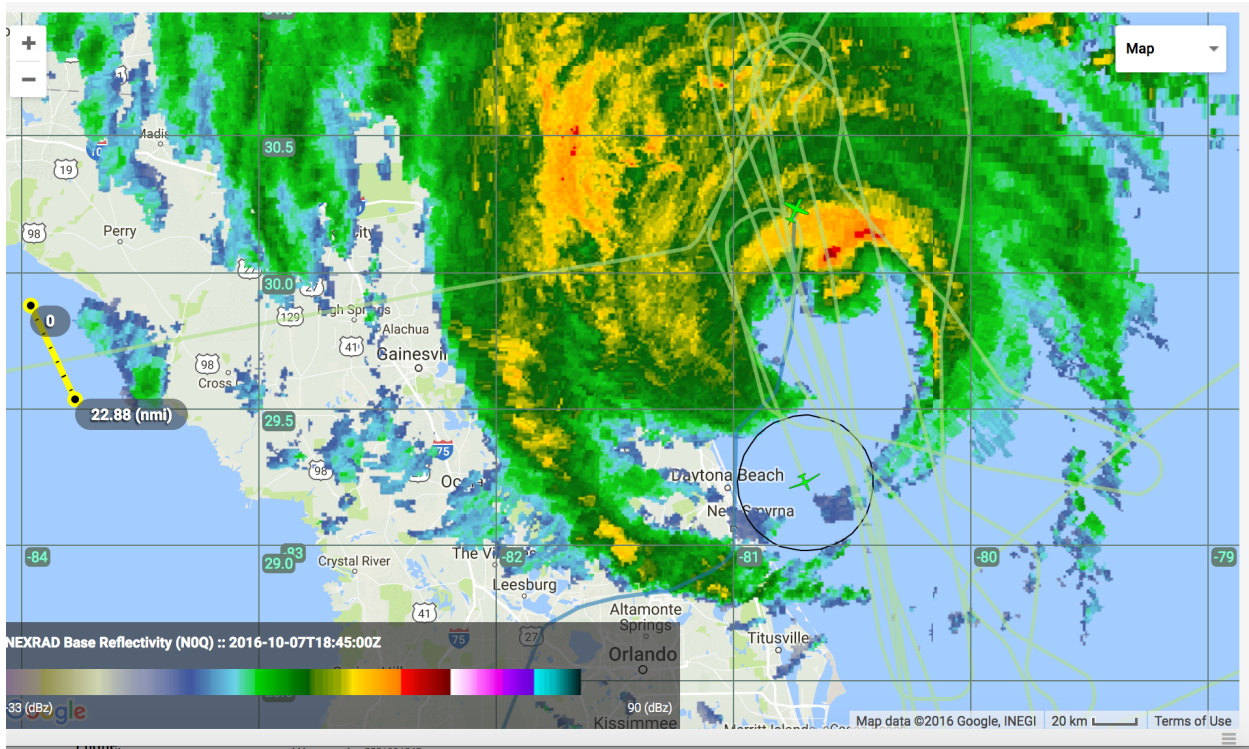


cloudsat overpass of Matthew yesterday:

[http://cswww.cira.colostate.edu/dpcStatusQLviewer.php?file=2016280173439\\_55552\\_CS\\_1A-AUX-FL\\_GRANULE\\_P\\_R05\\_E00\\_1AA.htm](http://cswww.cira.colostate.edu/dpcStatusQLviewer.php?file=2016280173439_55552_CS_1A-AUX-FL_GRANULE_P_R05_E00_1AA.htm)

Track change 14 yet another request from JSippel a short jaunt just off the coast then back.

AVAPS is online again! Good drops done manually.



Flying over the dry slot in the southern eyewall 1845Z

..

Vis loop during today's flight:

<http://tropic.ssec.wisc.edu/archive/data/stettner/Matthew/MATTHEW-07OCT2016.html>

Approaching TOT 19Z



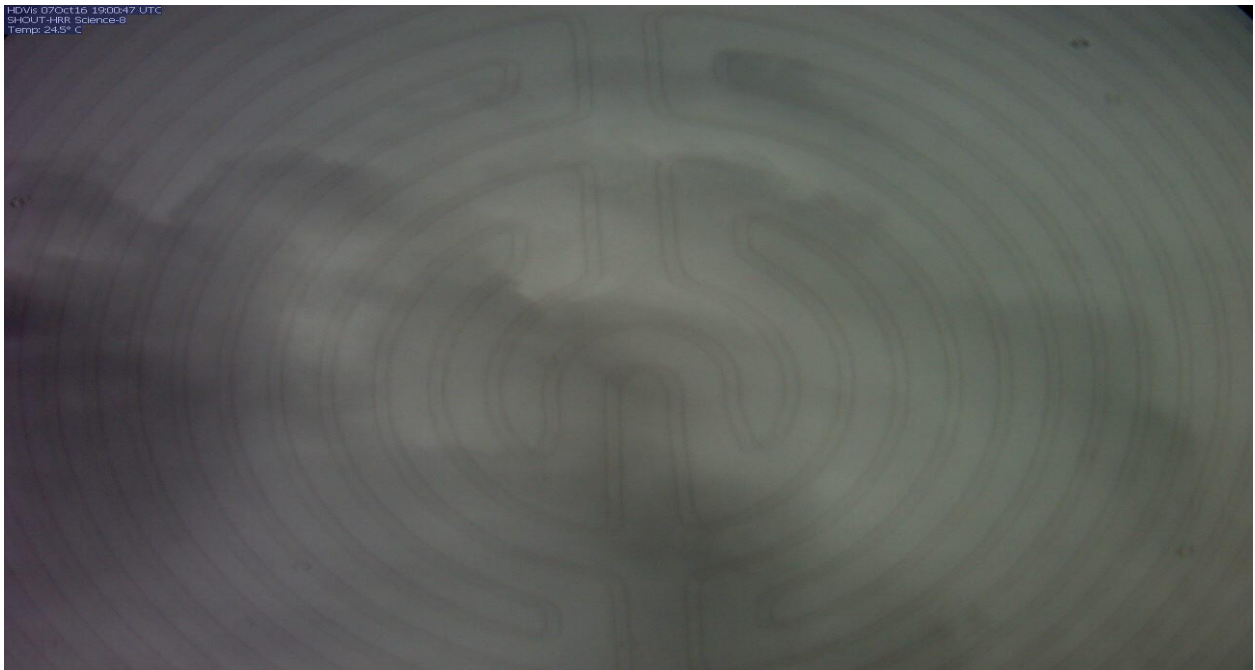


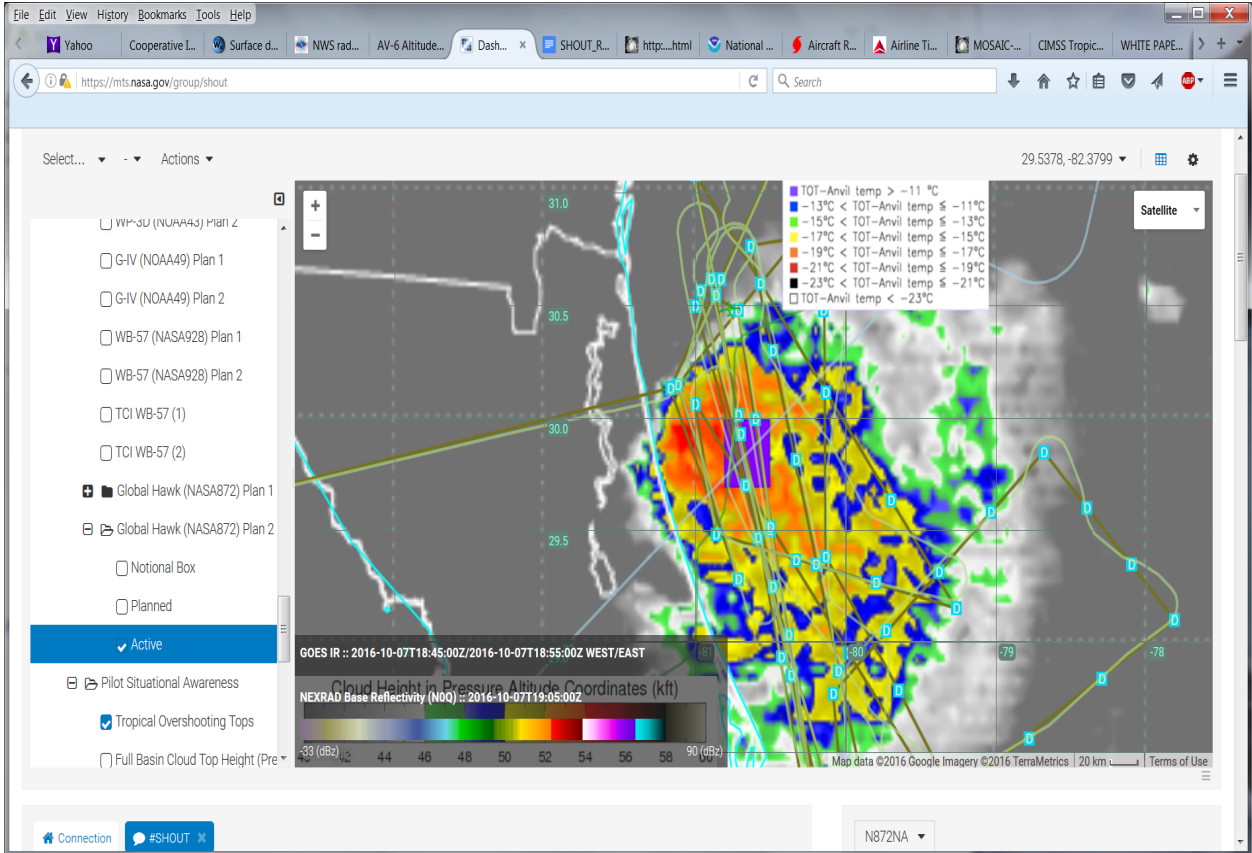
DayLight 07Oct2016 18:59:02 UTC  
SHOUT-HRR Science-8  
Temp: 13.5° C



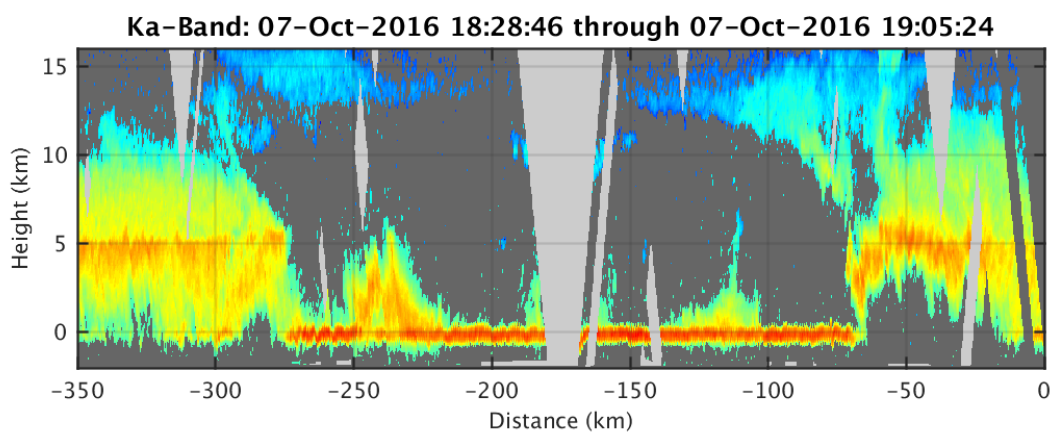
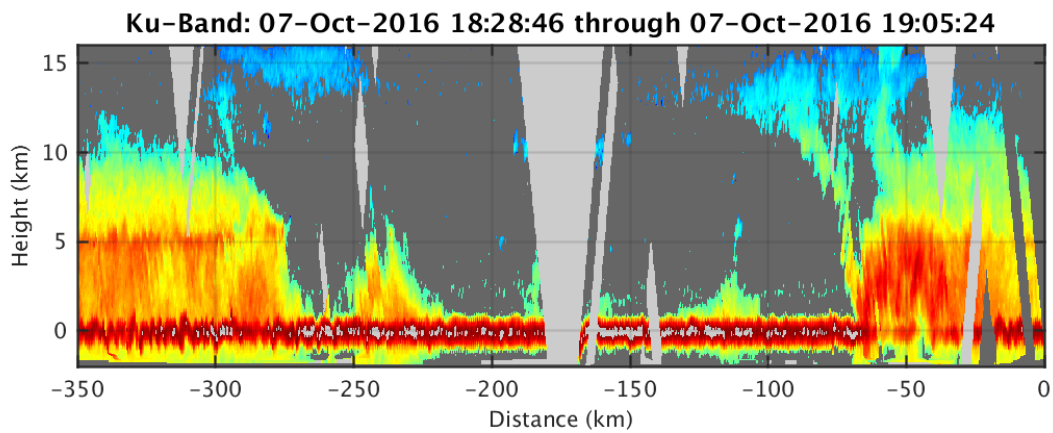
TOT at 1900UTC...ahead (above), and over it (below)

HDV6 07Oct16 19:00:47 UTC  
SHOUT-HRR Science-8  
Temp: 24.5° C

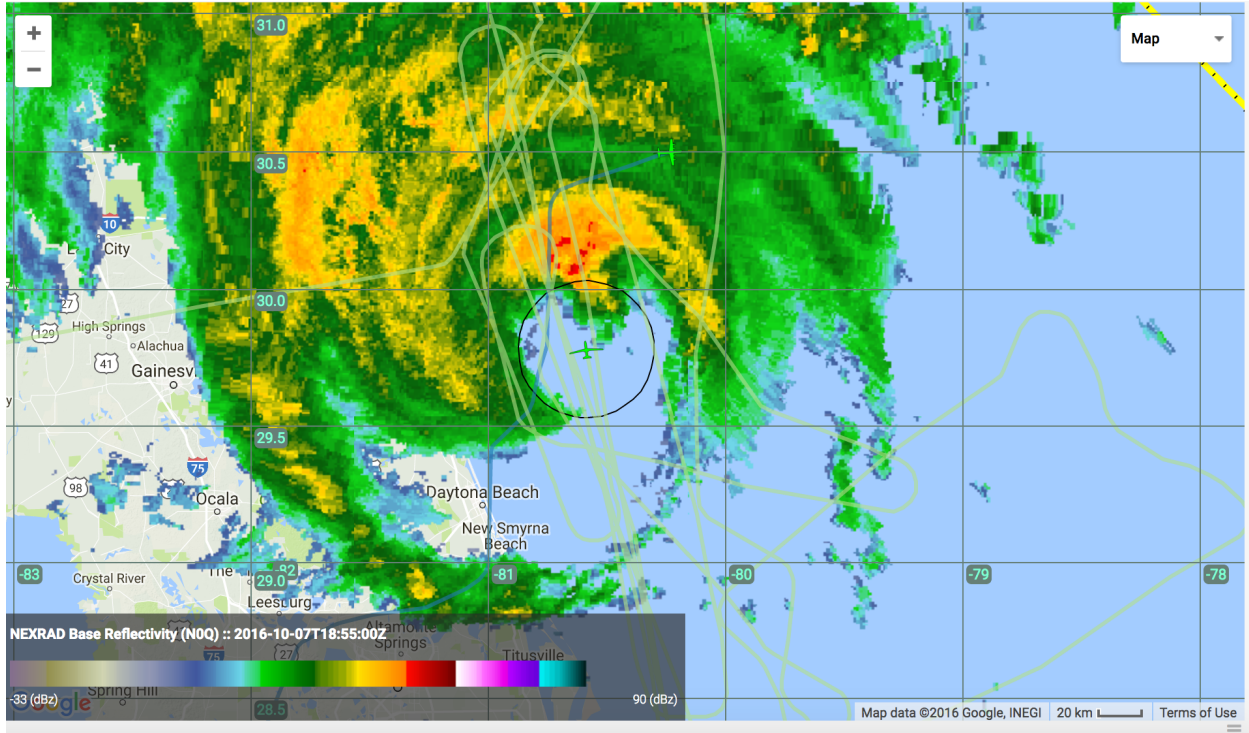




And above is the cimss TOT analysis--nailed it! :-)  
TOT was analyzed at 59.6kft!

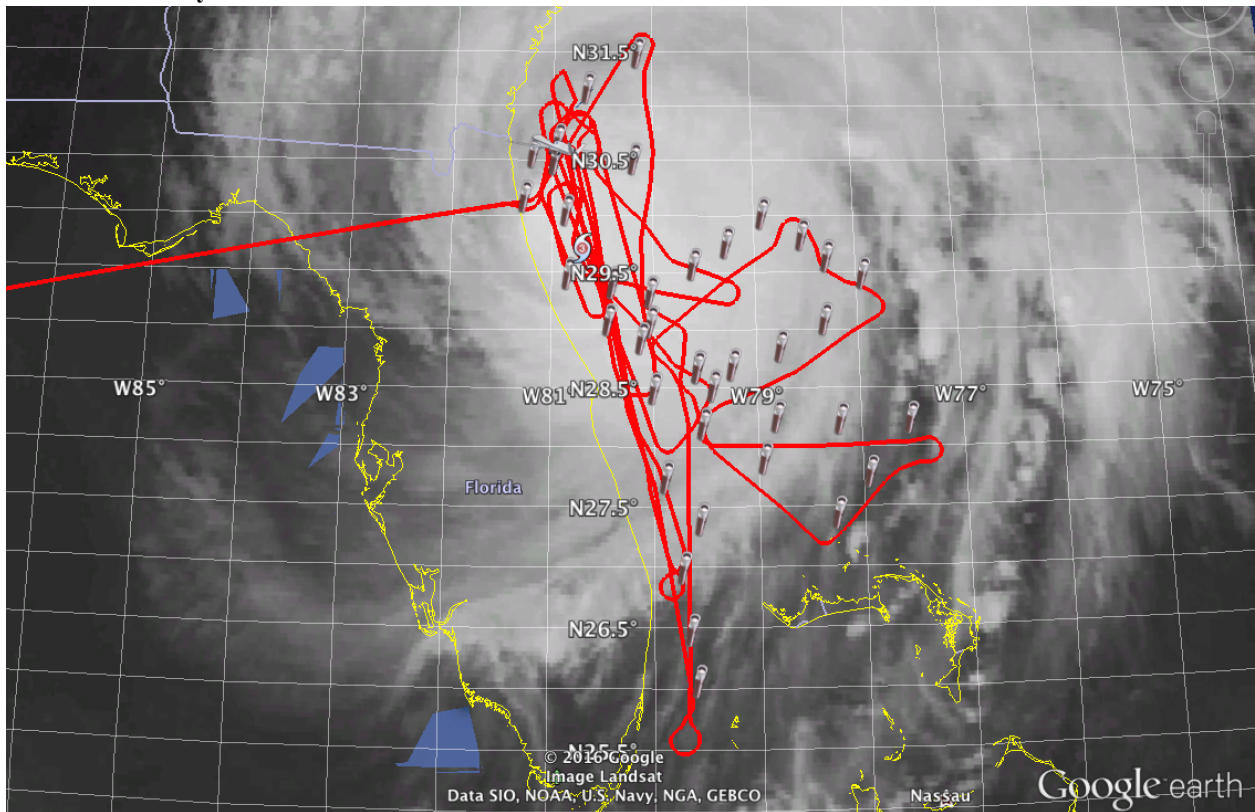


HIWRAP showing eye of Matthew with relict shallow eye and the overshooting top (right side of image)

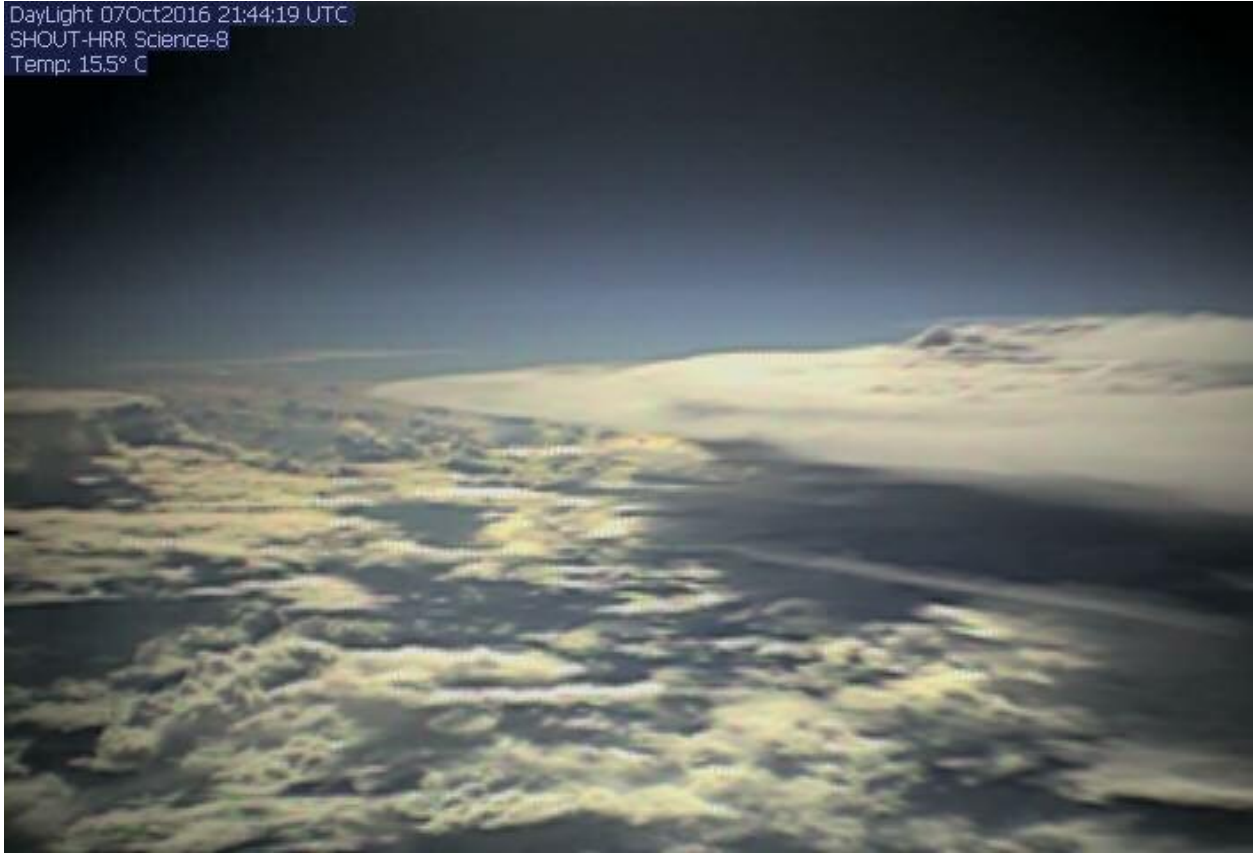


Eye drop at 1855 Z

**Mission summary:**



DayLight 07Oct2016 21:44:19 UTC  
SHOUT-HRR Science-8  
Temp: 15.5° C



Global Hawk captures the edge of an anvil on the flight over Texas.