

# SHOUT Research Flight 1 – 20150826 - Erika

Shift 1 Mission Scientists: Gary Wick, Paul Newman, Jason Dunion

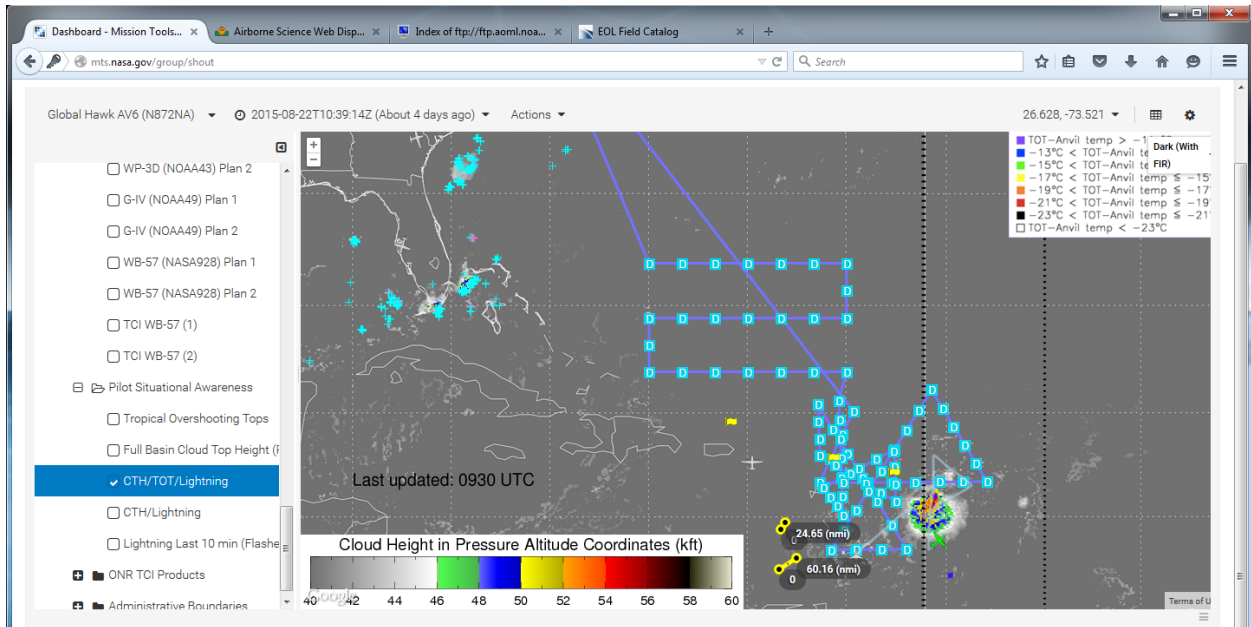
Shift 2: Michael Black, Pete Black, Natalie Laudier

Shift 3: Anthony Didlake, Sarah Griffin, Kathryn Sellwood, John Walker

Shift 4: Gary Wick, Paul Newman

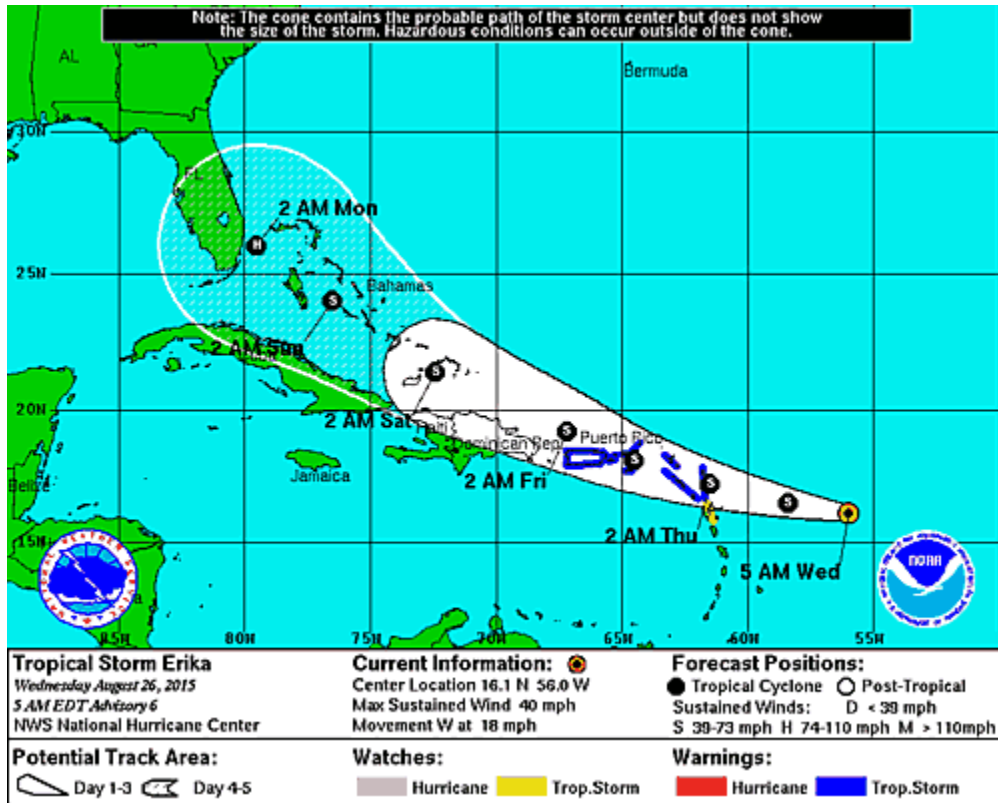
Log initiated by G. Wick

First research flight of the SHOUT mission. Objective of flight to sample Tropical Storm Erika and the region around it to assess the impact of the Global Hawk payloads on forecasts of track and intensity. Flight plan incorporates a large butterfly, small butterfly, and lawnmower segments. Large butterfly will be flown first to try and catch storm before it reaches the islands. Small butterfly next to to sample near circulation center.



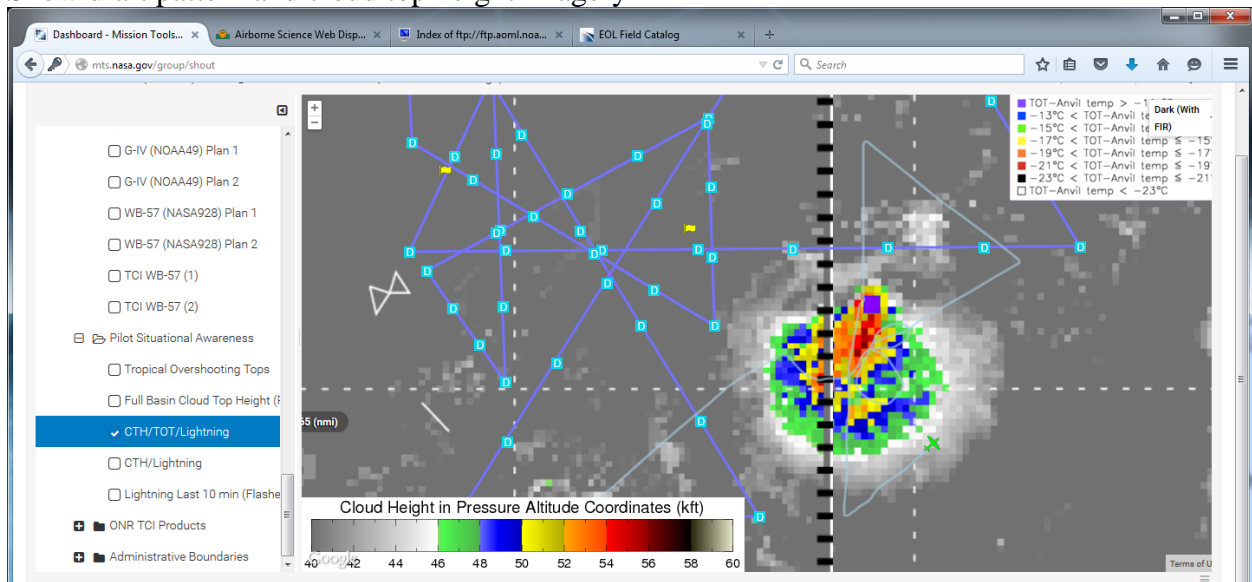
NHC forecast track at time of engine start





0959Z: Engine Start

Show draft pattern and cloud top height imagery



1023Z: Instruments coming up

1026Z: Ready for pin pull 1026Z

Doing Taxi prep

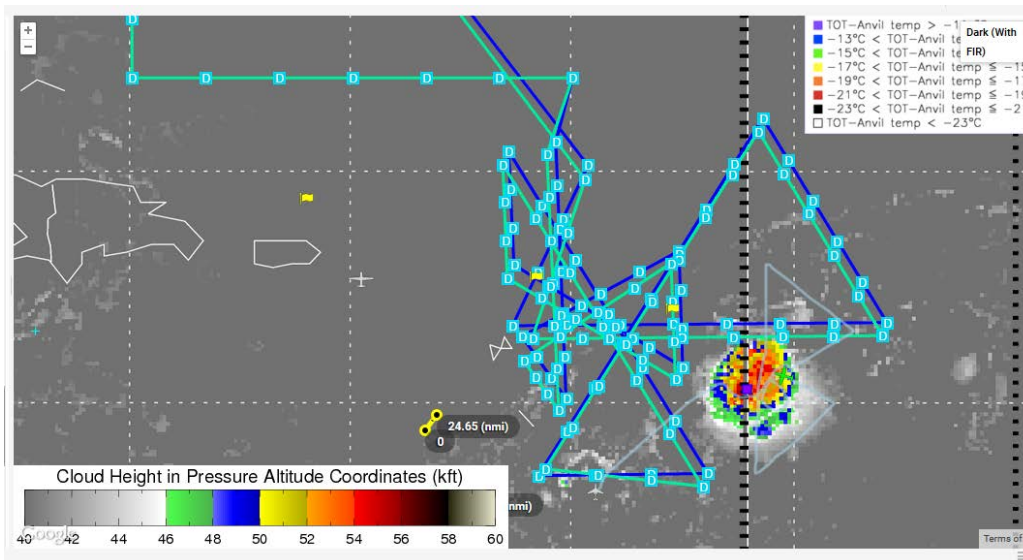
1031Z: Pin pull

1031Z: Ku enabled

1032Z: Chase taking off

1035Z: Ku up

J. Dunion has reworked initial flight track but not yet uploaded. Is visible in N42 plan 1. Adjusted a couple of tracks and made some small changes to avoid islands.



1055Z: Taxi start

1059Z: Cleared for takeoff

1100Z: Takeoff

From HRD Chat channel

11:00:32

Well from you flight track you can surely see there is no well defined center at flight level

11:00:44

T.O. at 1100 Z

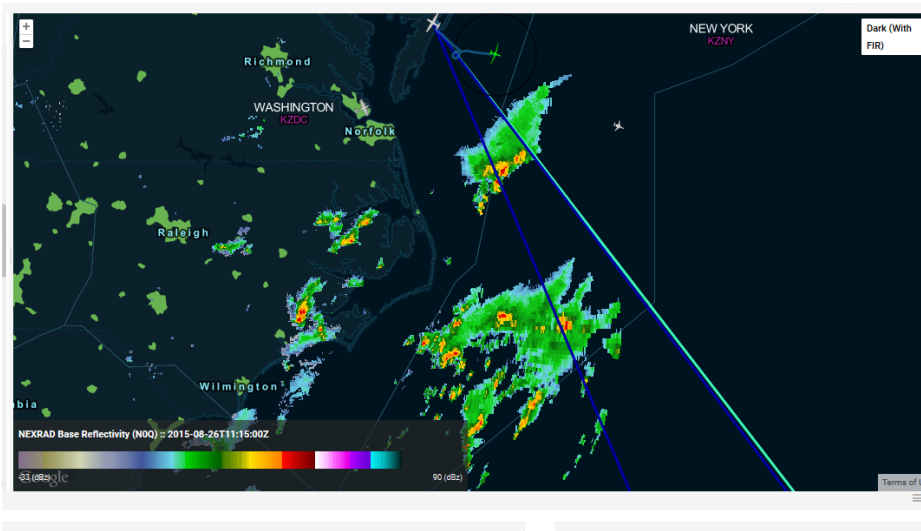
11:01:32

Data from analysis 2 arriving at NWS gateway

11:01:37

its pretty messy Gamache\_Home

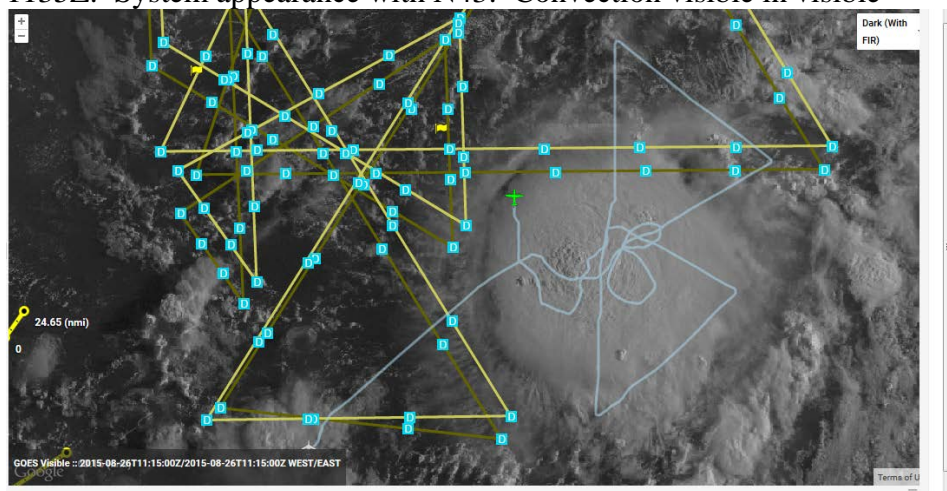
1113Z: Some lightning and radar echoes offshore along track due to front offshore



Mission director reports that they see and pilots are aware.

1134Z: Pilots report Above 45000 ft, heading east

1135Z: System appearance with N43: Convection visible in visible



DC-8 inbound visible if zoom out just slightly

1202Z: New plan uploading now

1203Z: Daylight camera updating in MTS



1206Z: Latest plan uploaded – under GH Plan 1. E-mailed to pilots

The screenshot displays the NASA Mission Tools dashboard for Global Hawk AV6 (N872NA). The main panel shows a satellite image with a flight path overlaid. The path is marked with time points: 2:00 AM Sat EDT (Winds: 50 Gusts: 60 Kts), 2:00 AM Mon EDT (Winds: 45 Gusts: 55 Kts), 2:00 PM Thu EDT (Winds: 45 Gusts: 55 Kts), and 2:00 AM Fri EDT (Winds: 45 Gusts: 55 Kts). A green shaded area indicates a specific region of interest. The dashboard includes a left sidebar with various product categories like 'Lightning Products', 'Satellite Products', and 'GOES Visible'. A chat window at the bottom left shows messages from users like dfratell, mblack\_hrd, and jasond\_hrd. A 'DayLight' panel on the bottom right shows a satellite image with the text '26 08 2015 12:25:38 UTC' and 'Science 1, AV-6 Daylight 75.2° F'.

0830Z: Science meeting

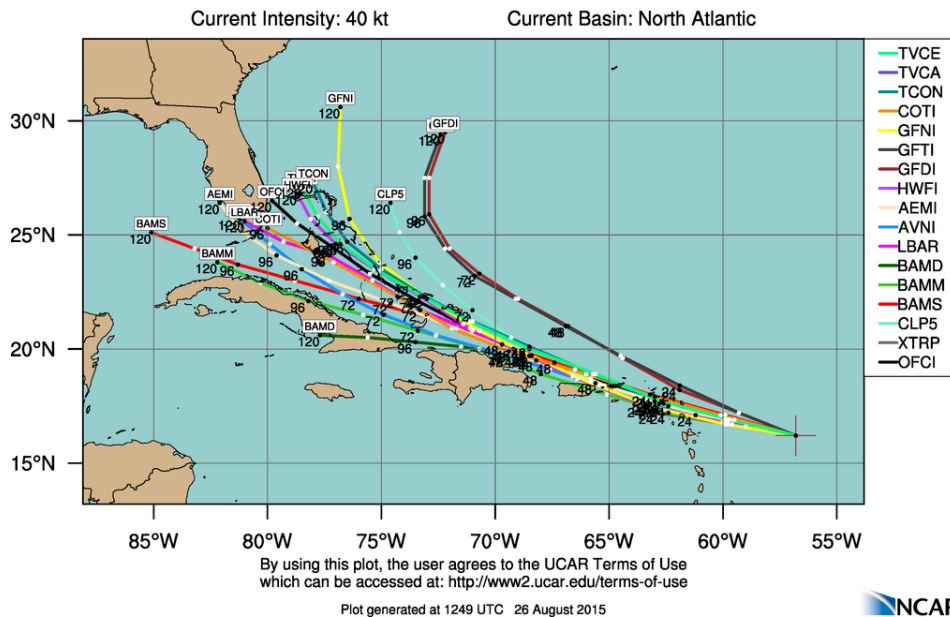
NOAA Flight this am had trouble finding the center. Active convection – suggestion that storm might be creating new center. Formation of a new center could impact later forecasts

In IR, have been some very cold cloud tops and some overshooting tops. Healthy today in comparison to yesterday. Discussion of diurnal cycle, however, suggests may be at or near peak and could see less convection through center of day. May pick up again for third shift and be an issue for hazard avoidance.

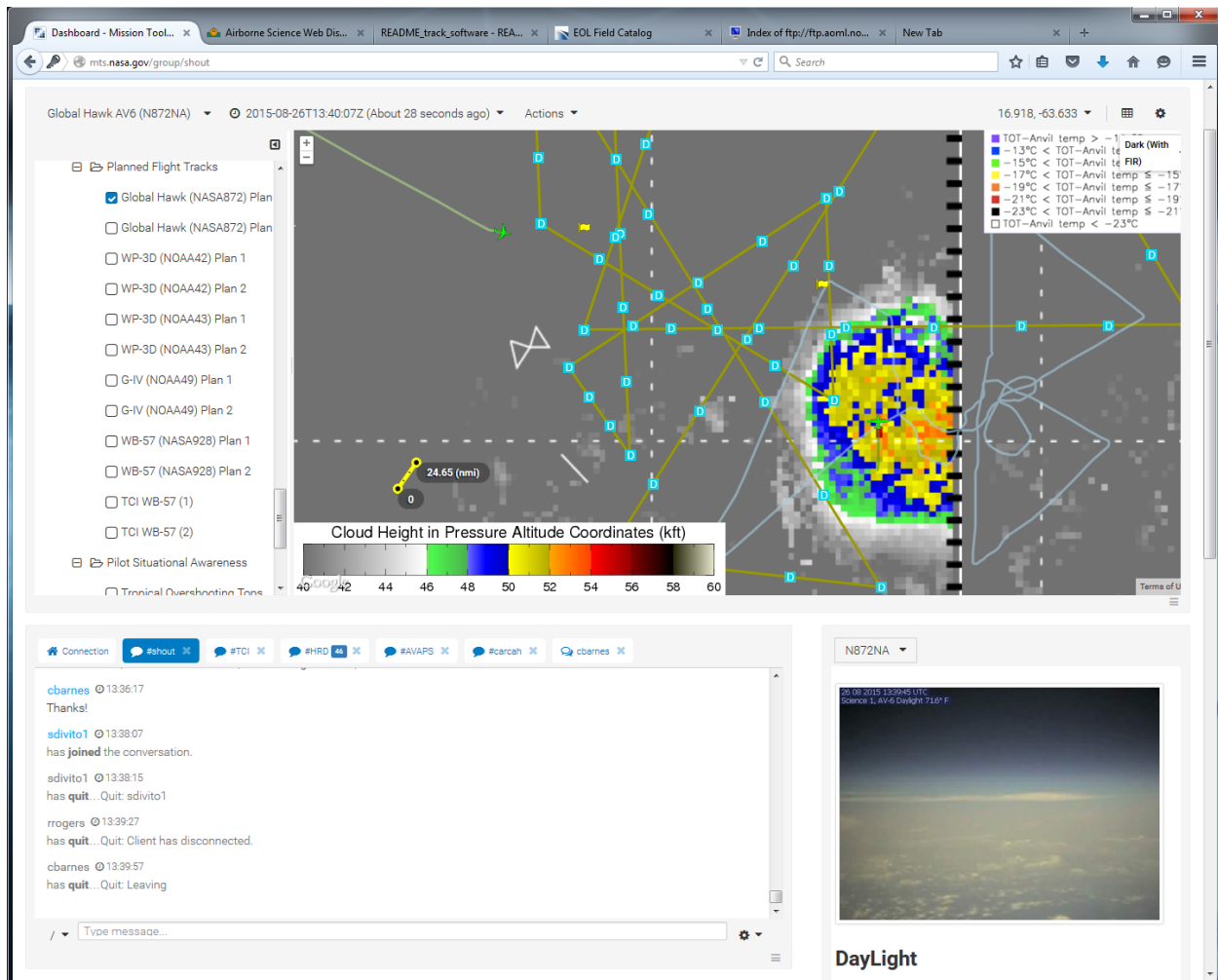
GFS is still killing off system. HWRF intensifies and takes toward South Florida. J Sipple reports that assimilation of TDR data from yesterday has helped lead to a downward intensity trend

## TROPICAL STORM ERIKA (AL05)

Early-cycle track guidance initialized at 1200 UTC, 26 August 2015







1345Z: Box for Fri/sat has been filed and removed from MTS. Our active flight plan has been copied over to GH plan 1. Plan 1 will remain static and any future updates should be loaded into Plan 2.

1359Z: J. Dunion reports just flew over SAL. Get really hazy viz camera image



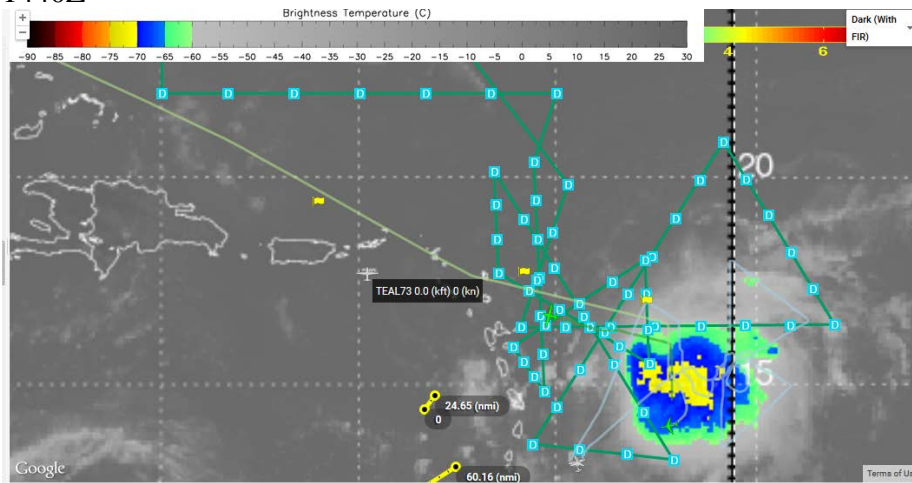


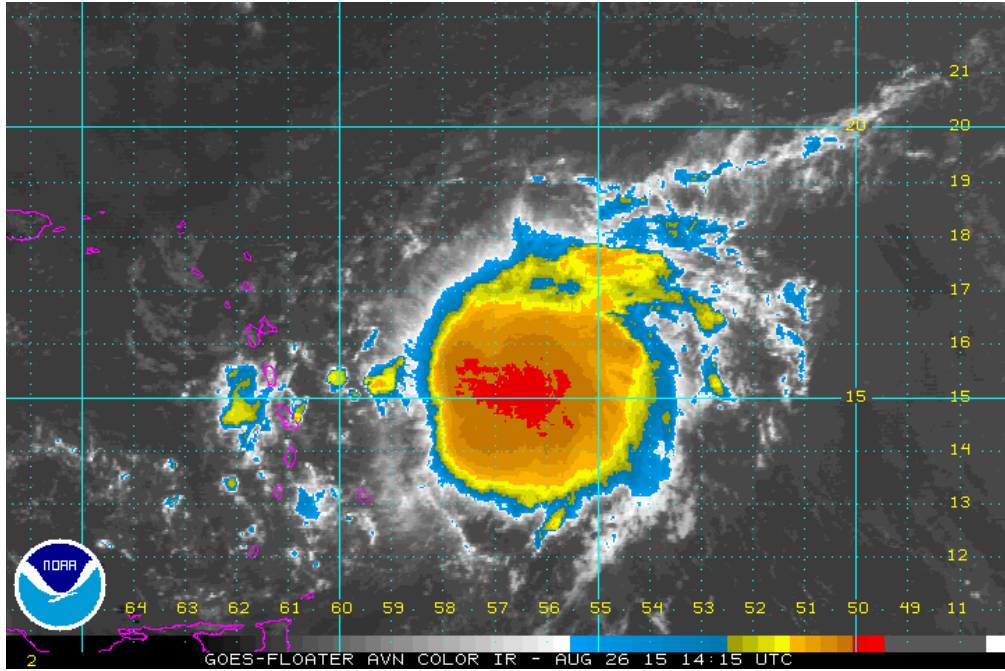
1400Z: HDVIS out of focus. Will be unusable throughout flight

1400Z: HAMSRS reports that all caught up and all duration tracks reporting in MTS. 60 min track is still the one that is processed most rapidly

Estimating about 1:25 to first drop

1440Z





1444Z: Above screen grab (IR satellite image valid for 1415Z)

Global Hawk AV6 (N872NA) 2015-08-26T14:44:19Z (About 30 seconds ago) Actions 17,116, -58,909

- G-IV (NOAA49) Plan 1
- G-IV (NOAA49) Plan 2
- WB-57 (NASA928) Plan 1
- WB-57 (NASA928) Plan 2
- TCI WB-57 (1)
- TCI WB-57 (2)
- Pilot Situational Awareness
- Tropical Overshooting Tops
- Full Basin Cloud Top Height (f
- CTH/TOT/Lightning
- CTH/Lightning
- Lightning Last 10 min (Flashe
- ONR TCI Products
- Administrative Boundaries

CTH/TOT/Lightning Legend:

- TOT-Anvil temp > -13°C
- 13°C < TOT-Anvil temp < -15°C
- 15°C < TOT-Anvil temp ≤ -17°C
- 17°C < TOT-Anvil temp ≤ -19°C
- 19°C < TOT-Anvil temp ≤ -21°C
- 21°C < TOT-Anvil temp ≤ -23°C
- TOT-Anvil temp < -23°C
- Dark (With FIR)

Cloud Height in Pressure Altitude Coordinates (kft)

24.65 (nmi)  
0.16 (nmi)

Connection: #ahou, #TCI, #HRD, #AVAPS, #carah, cbarnes

arrateh @ 14:28:30 has quit... Quit: Client has disconnected.

cbarnes @ 14:31:04 has quit... Quit: Leaving

stan\_hrd @ 14:37:18 has joined the conversation.

stan\_hrd @ 14:37:27 has quit... Quit: Client has disconnected.

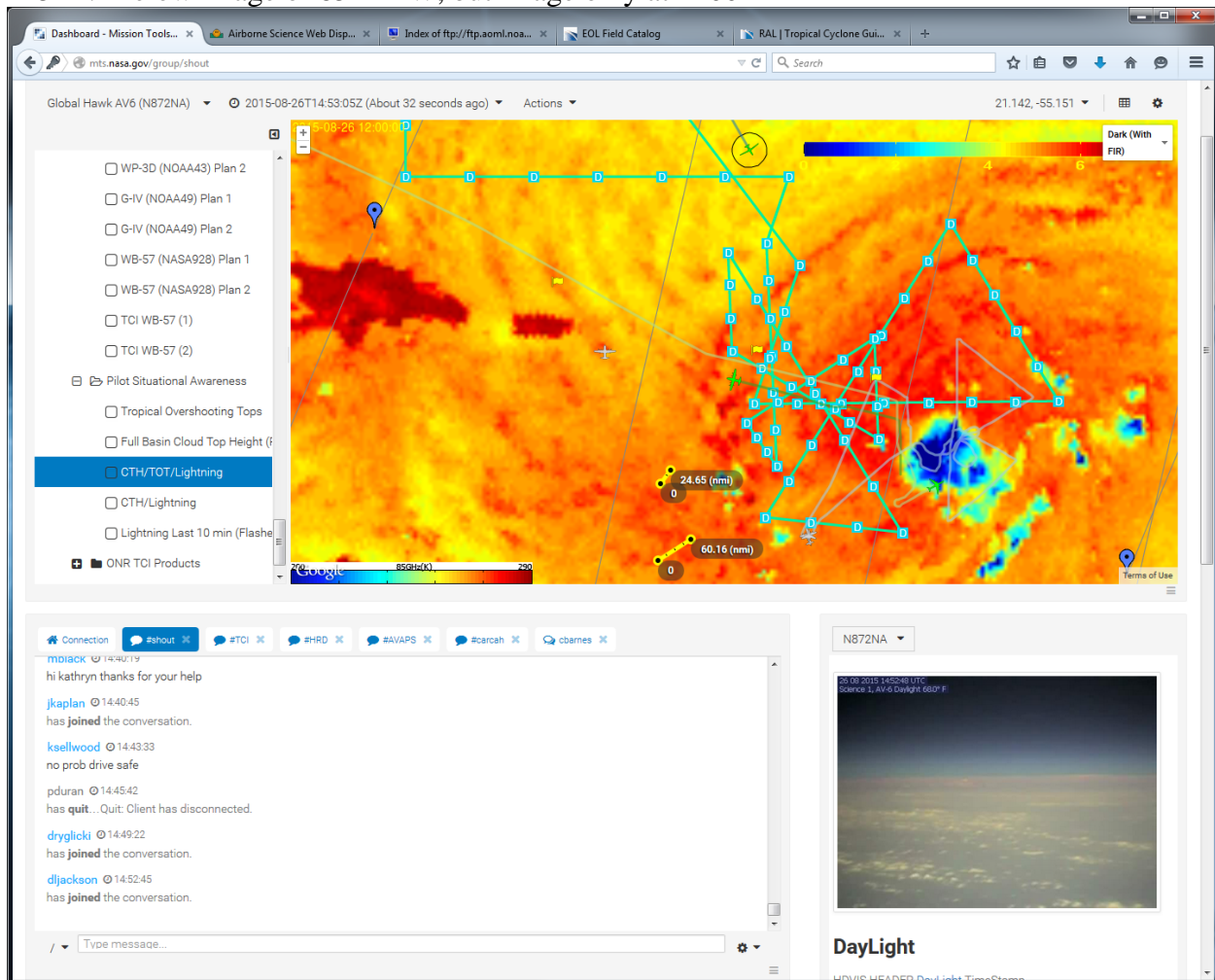
bluna @ 14:37:32 has quit... Quit: Client has disconnected.

mblack @ 14:38:26 has joined the conversation.

N872NA

08/26/2015 14:44:06 UTC  
Science 1, AV-6 Daylight 68°F

1452Z: Below image of 85H MW, but image only at 1200Z



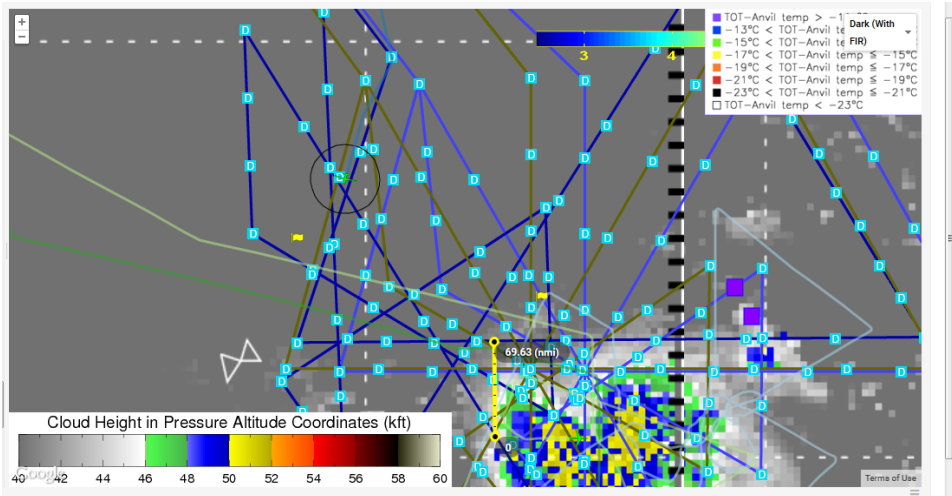
1523Z: First sonde loaded

Dropping after the turn onto line

1528Z: Drop 1. Good release. Later observe that potential telemetry issues with data near bottom of drop

1540Z: Drop 2. Good release

1540Z: Updated plan shifting east-west line to the South to pass over recent center estimate. New plan loaded under track 2. Old visible under track 1 in below. New points take effect from point 5 to point 17



1552Z: Drop 3 – good release

Exchange a little late on new flight lines. Points did not come up right away

When switch over to new plan on track 2, Robert switch to point 2 and lost points prior to our desired change. We told that old were still back on track 1. From this point we will need to alternate between track1 and track2 so that both the current and the new one are visible.

1607Z: AVAPS Report issue on load of sonde 4. Hearing that sonde might have missed carriage and Nick is moving carriage around to try and figure out where sonde is.

Missed drop location 4 (point 5S on the track)

1612Z: Following image...

The screenshot displays a NASA mission dashboard with the following components:

- Browser Tabs:** Dashboard - Mission Tools..., Airborne Science Web Disp..., README\_track\_software - REA..., EOL Field Catalog, RAL | Tropical Cyclone Gui...
- Address Bar:** mts.nasa.gov/group/shout
- Left Panel (Legend/Tools):**
  - WP-3D (NOAA42) Plan 2
  - WP-3D (NOAA43) Plan 1
  - WP-3D (NOAA43) Plan 2
  - G-IV (NOAA49) Plan 1
  - G-IV (NOAA49) Plan 2
  - WB-57 (NASA928) Plan 1
  - WB-57 (NASA928) Plan 2
  - TCI WB-57 (1)
  - TCI WB-57 (2)
  - Pilot Situational Awareness
  - Tropical Overshooting Tops
  - Full Basin Cloud Top Height (f)
  - CTH/TOT/Lightning** (checked)
  - CTH/Lightning
  - Lightning Last 10 min (Flashe)
  - ONR TCI Products
  - Administrative Boundaries
- Main Map:**
  - Cloud Height in Pressure Altitude Coordinates (kft) scale: 40 to 60.
  - Temperature scale: 3.5, 4, 4.5.
  - Legend for TOT-Anvil temp:
    - TOT-Anvil temp > -13°C
    - 13°C < TOT-Anvil temp ≤ -15°C
    - 15°C < TOT-Anvil temp ≤ -17°C
    - 17°C < TOT-Anvil temp ≤ -19°C
    - 19°C < TOT-Anvil temp ≤ -21°C
    - 21°C < TOT-Anvil temp ≤ -23°C
    - TOT-Anvil temp < -23°C
  - Map labels: 24.65 (nmi), 60.16 (nmi), 69.63 (nmi).
- Chat Window:**
  - Connection: #shout, #TCI, #HRD, #AVAPS, #caroah, #cbarnes
  - bluna @ 16:11:16 has quit... Quit: Client has disconnected.
  - bluna @ 16:11:20 has joined the conversation.
  - sbgoldenberg @ 16:11:24 has quit... Quit: Client has disconnected.
  - sbgoldenberg @ 16:11:26 has joined the conversation.
  - mblack @ 16:11:41 Test
  - ejustice @ 16:11:50 I see your test
- Image Viewer:**
  - Image: N872NA
  - Metadata: 03/09/2015 16:12:18 UTC, Science\_1\_AV6\_Daylight 66.2°F

1618Z: Missed drop 5 (6I)

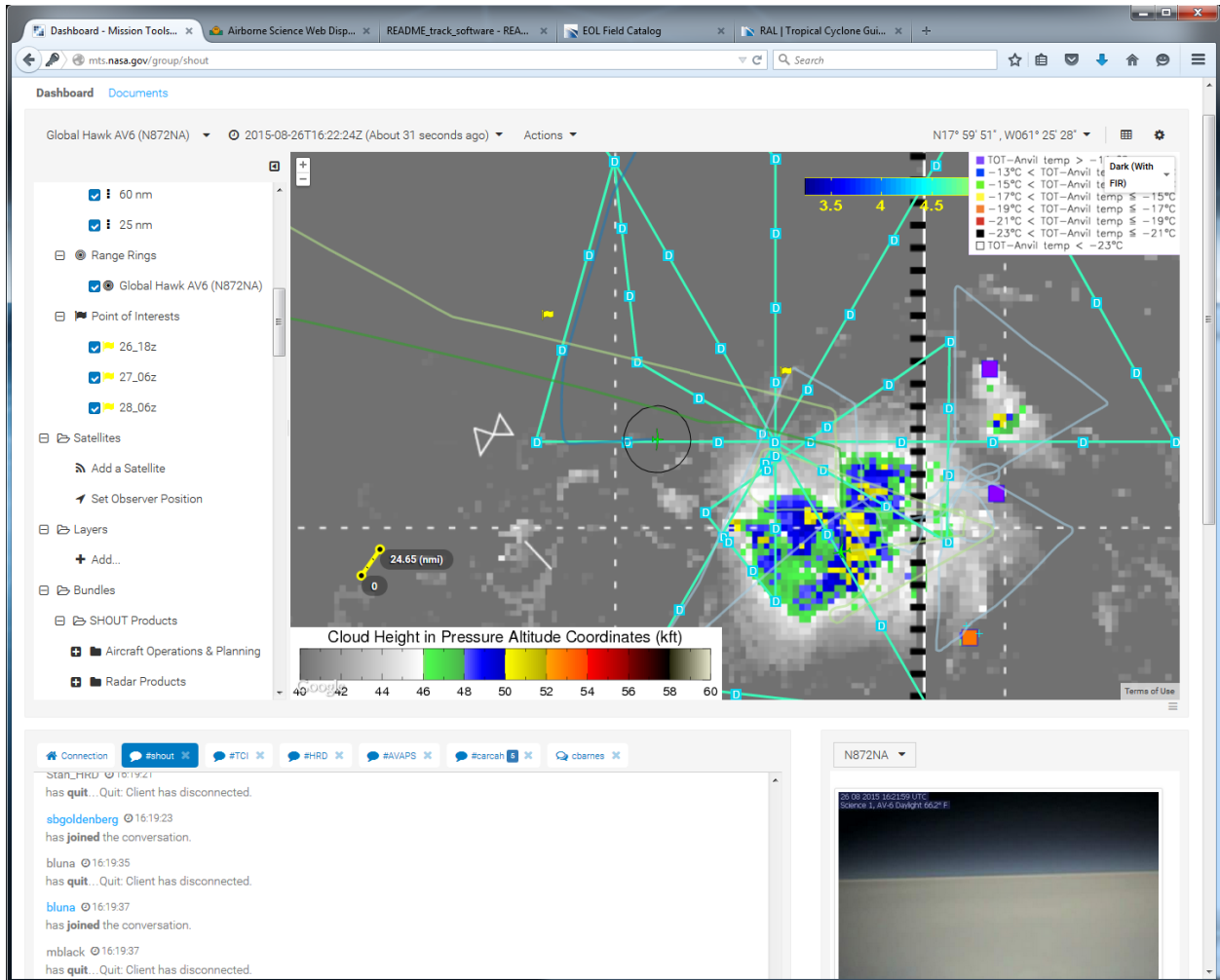
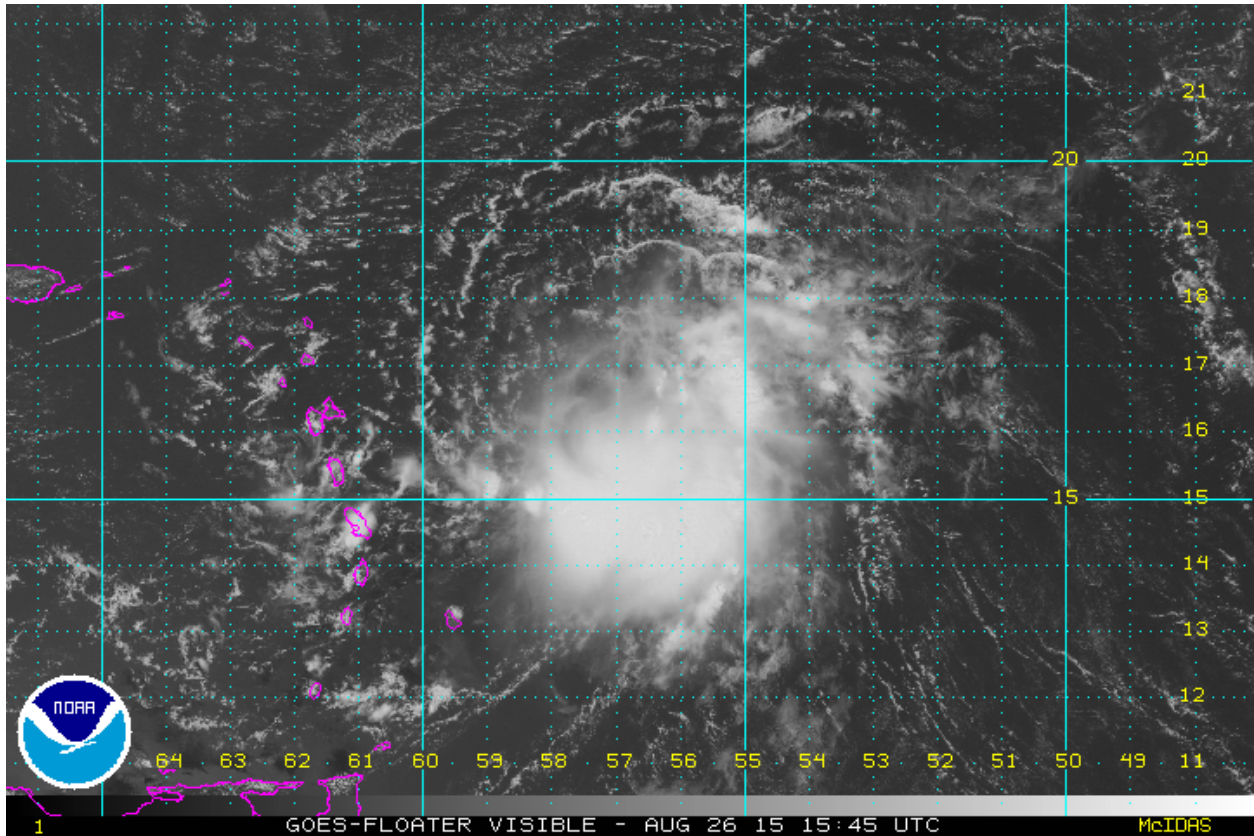
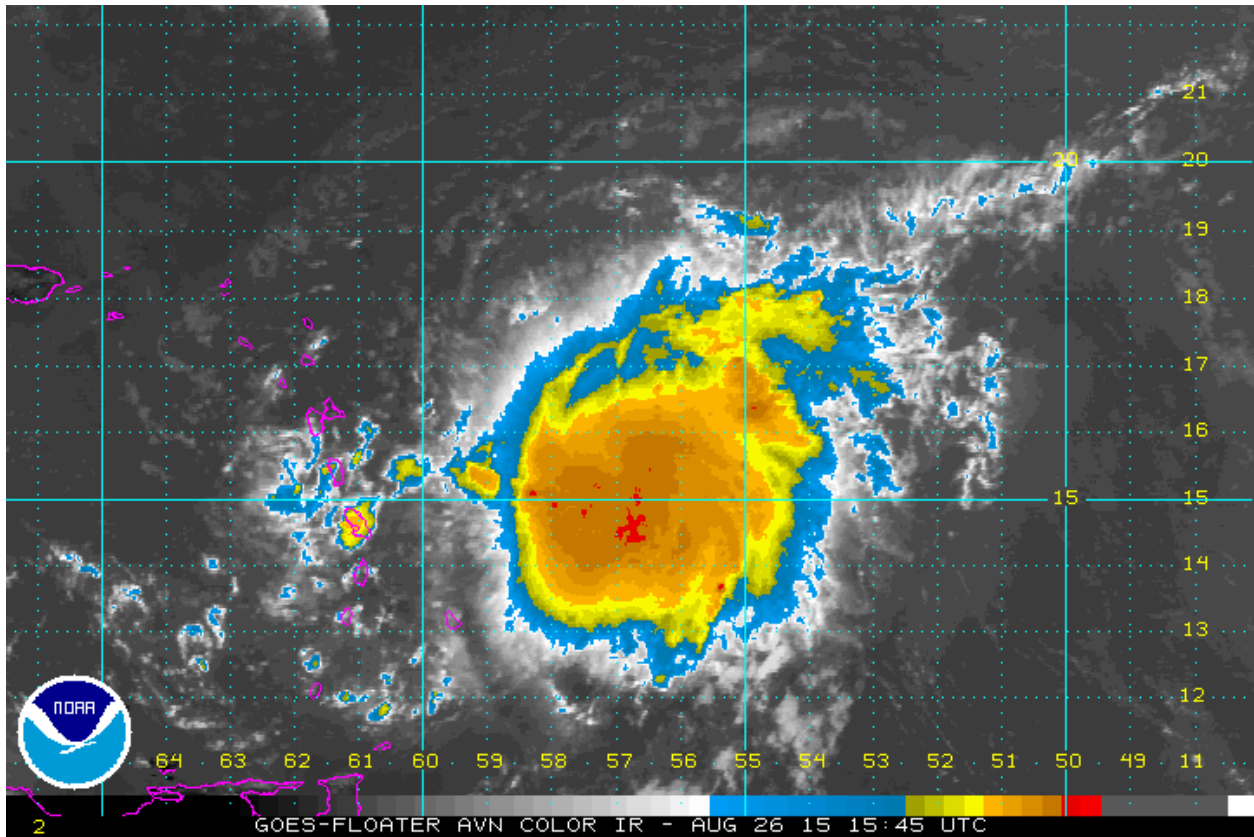


Image above grabbed at 1623Z. IR below



1627Z: AVAPS thinks things okay. Loading another sonde now.

1628Z: Did not load properly – still seeing issue.

1630Z: Missed Drop 6 (7I)

1632Z: Daylight camera – Flying over Cirrus shield



1633Z: Convection really dying as day goes on



Dashboard - Mission Tools... x Airborne Science Web Disp... x README\_track\_software - REA... x EOL Field Catalog x RAL | Tropical Cyclone Gui... x

mts.nasa.gov/group/shout

Dashboard Documents

Global Hawk AV6 (N872NA) 2015-08-26T16:33:45Z (About 33 seconds ago) Actions N17° 28' 28", W057° 35' 25"

Add Track from Archive

- NOAA WP-3D
  - NOAA WP-3D (N43RF): 2015-4
  - NOAA WP-3D (N43RF): 2015-4
- Global Hawk AV6
  - Global Hawk AV6 (N872NA): 2
- DC-8
  - DC-8 (N817NA): 2015-08-26T
- USAFR WC-130J
  - USAFR WC-130J (TEAL74): 20
- HU-25C Falcon
  - HU-25C Falcon (N525NA): 20
- Gulfstream G-3
  - Gulfstream G-3 (N2NA): 2015

Payload

View Status

Operations & Planning

Cloud Height in Pressure Altitude Coordinates (kft)

24.65 (nmi)

Legend:

- TOT-Anvil temp > -1°C
- 13°C < TOT-Anvil temp < -1°C
- 15°C < TOT-Anvil temp < -13°C
- 17°C < TOT-Anvil temp < -15°C
- 19°C < TOT-Anvil temp < -17°C
- 21°C < TOT-Anvil temp < -19°C
- 23°C < TOT-Anvil temp < -21°C
- TOT-Anvil temp < -23°C

Dark (With FIR)

Connection #shout x #TCI x #HRD x #AVAPS x #carcah x cbarnes x

mblack @ 16:23:15 has quit... Quit. Client has disconnected.

mblack @ 16:25:18 has joined the conversation.

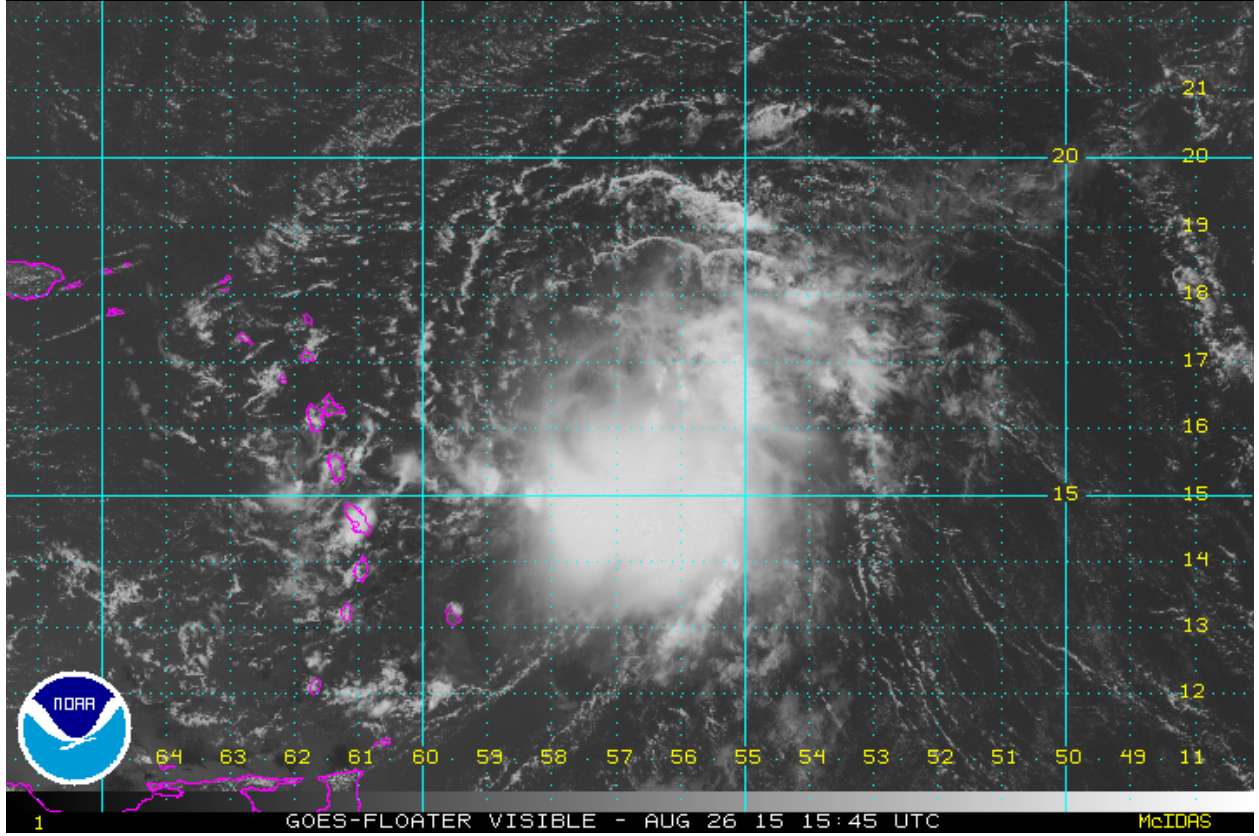
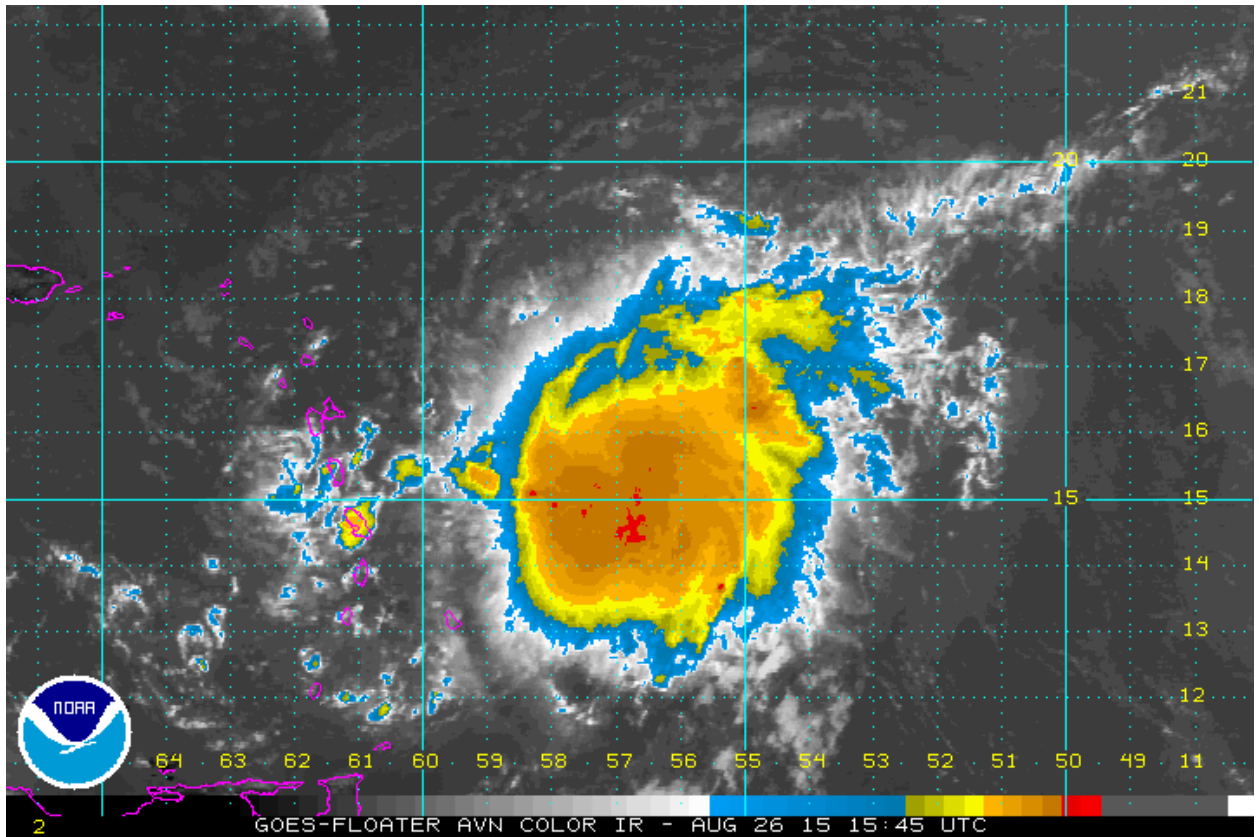
gwick\_GHOC @ 16:26:34 Working issues with AVAPS. No ETA to next drop

ejustice @ 16:27:36 has quit... Ping timeout

trmoes @ 16:29:45

N872NA

08-26-2015 16:33:00 UTC Science 1, AV-6 Daylight 55.3°F



AVAPS Carriage moves freely. Thinks something may be in tube wrong way. They are going to try to just force sonde out manually. Will try to do at next drop point.

Approaching drop point 7 and will try to manually exercise ejection motor

1644Z: Cleared to release...

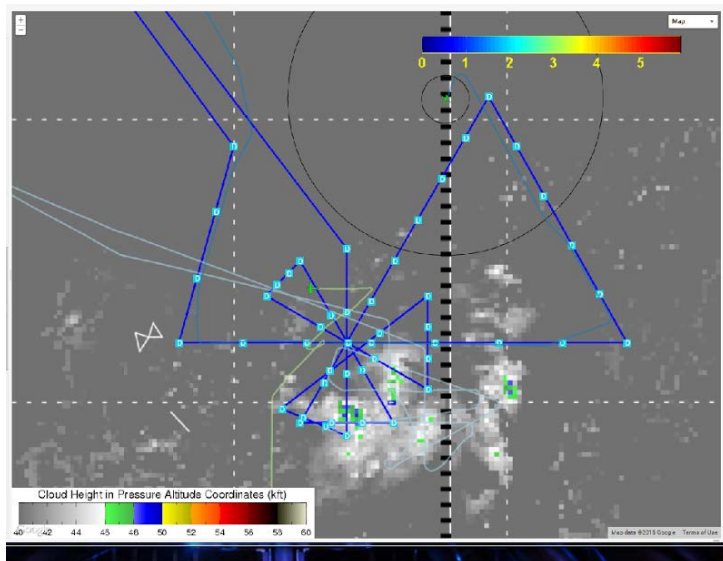
Still unable to deploy

1700Z:

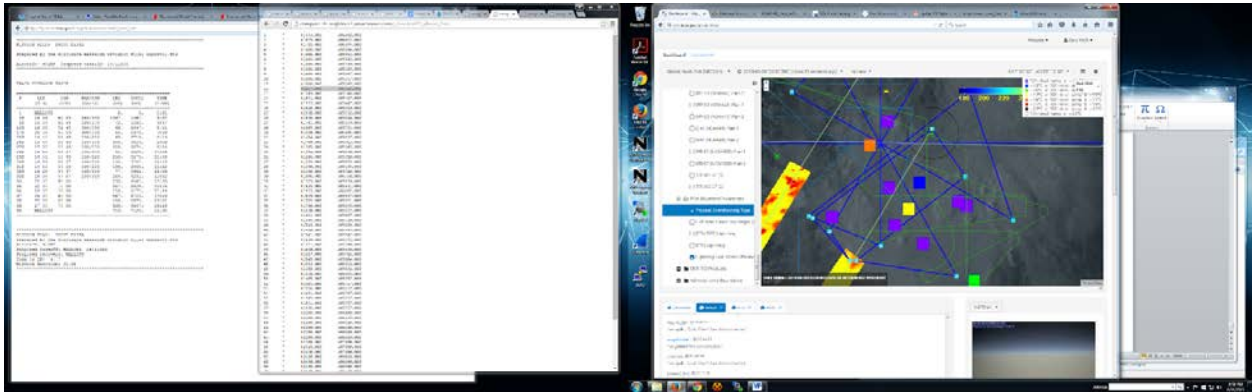
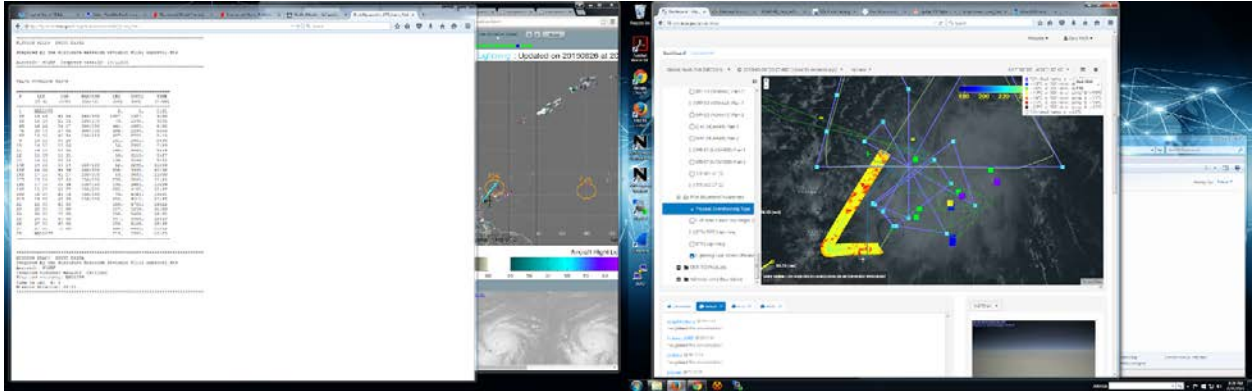
Shift 2 Mission Scientists: Michael Black, Pete Black, and Natalie Laudier

1710Z: Are pursuing option of a direct return now. Land before dark so that we preserve an adequate maintenance window and set up for a Friday flight. Unable to do early return due to crew rest issues with chase plane coming from Langley.

1815Z: AVAPS down and will continue troubleshooting. Will continue entire flight but modifying flight pattern.

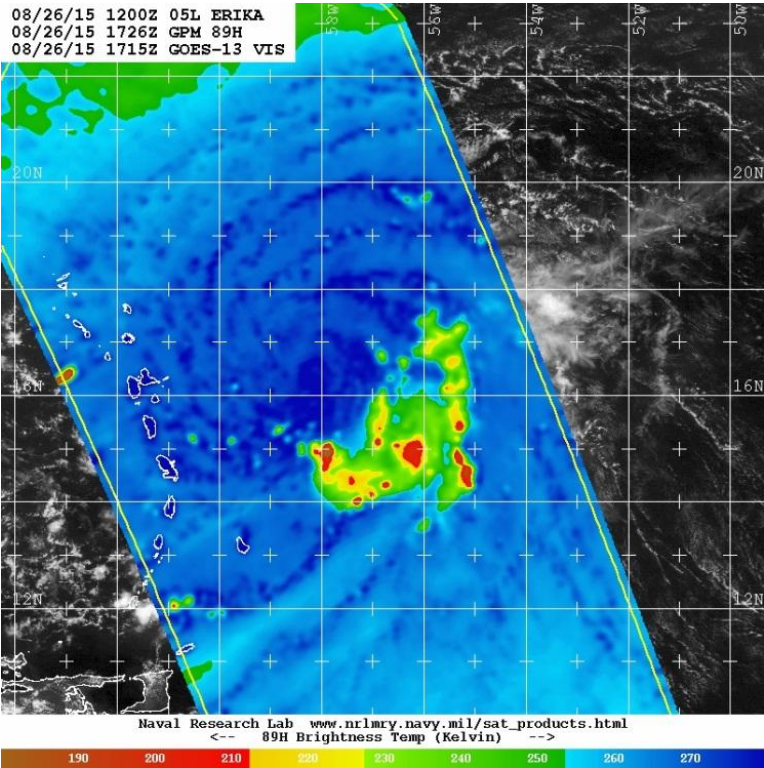
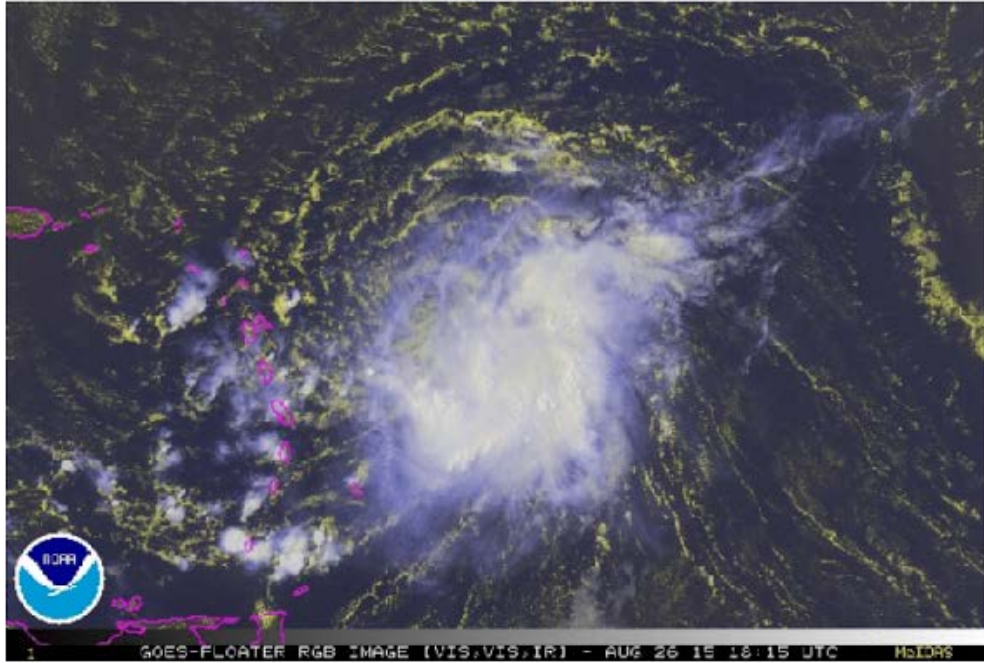


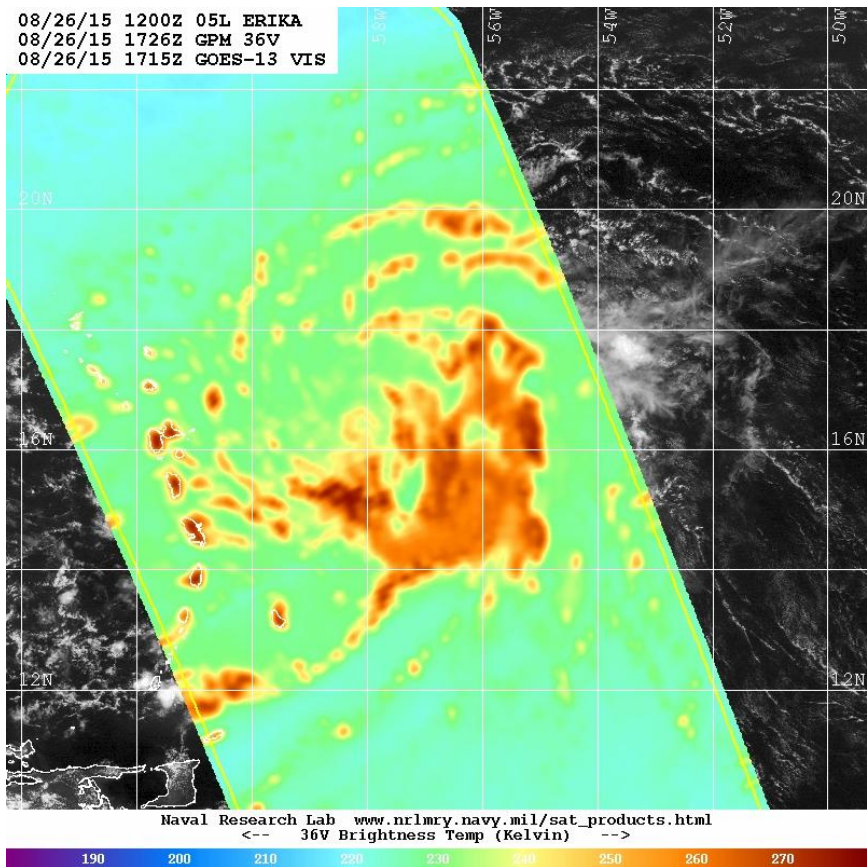
Large gap in this file + reworking flight plans- AVAPS has been done  
New plan call for smaller butterfly, convective burst module (box on SE side) and keeping the lawnmower pattern NW of Erika for now.



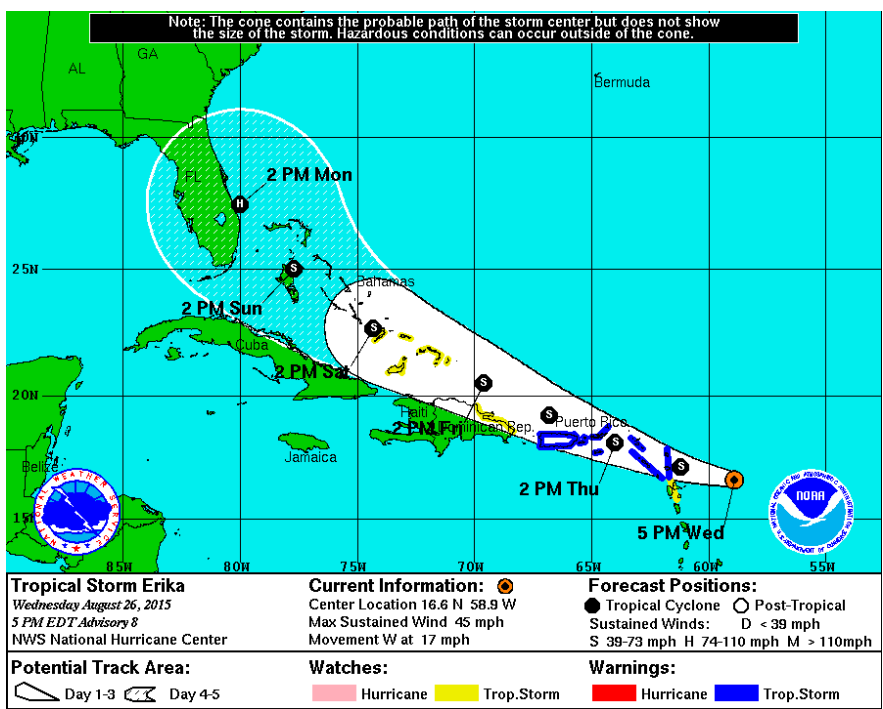
# Erika Short Floater - RGB Color Imagery Loop

- Lat/Lon
- Cnty
- Road
- Coast Pts
- S/V Pts
- Radar
- WTCH/WRNG
- Str PR
- Temp
- Dewpt
- Wind
- Gust
- RH
- Ill
- MSLP
- Lmts
- Hcpr6
- SSI
- HDW L
- HDW M
- HDW H
- FW
- U





1835Z: Erika appears sheared, minimal deep convection, low level circulation is exposed.



**Weather Analysis Software Interface**

**Table 1: Data from the left-hand table**

Time	Wind	Temp	Humidity	Pressure	Clouds	Visibility
00	10	55	95	30.00	0	10
01	10	55	95	30.00	0	10
02	10	55	95	30.00	0	10
03	10	55	95	30.00	0	10
04	10	55	95	30.00	0	10
05	10	55	95	30.00	0	10
06	10	55	95	30.00	0	10
07	10	55	95	30.00	0	10
08	10	55	95	30.00	0	10
09	10	55	95	30.00	0	10
10	10	55	95	30.00	0	10
11	10	55	95	30.00	0	10
12	10	55	95	30.00	0	10
13	10	55	95	30.00	0	10
14	10	55	95	30.00	0	10
15	10	55	95	30.00	0	10
16	10	55	95	30.00	0	10
17	10	55	95	30.00	0	10
18	10	55	95	30.00	0	10
19	10	55	95	30.00	0	10
20	10	55	95	30.00	0	10
21	10	55	95	30.00	0	10
22	10	55	95	30.00	0	10
23	10	55	95	30.00	0	10
24	10	55	95	30.00	0	10
25	10	55	95	30.00	0	10
26	10	55	95	30.00	0	10
27	10	55	95	30.00	0	10
28	10	55	95	30.00	0	10
29	10	55	95	30.00	0	10
30	10	55	95	30.00	0	10

**Table 2: Data from the right-hand table**

Time	Wind	Temp	Humidity	Pressure	Clouds	Visibility
00	10	55	95	30.00	0	10
01	10	55	95	30.00	0	10
02	10	55	95	30.00	0	10
03	10	55	95	30.00	0	10
04	10	55	95	30.00	0	10
05	10	55	95	30.00	0	10
06	10	55	95	30.00	0	10
07	10	55	95	30.00	0	10
08	10	55	95	30.00	0	10
09	10	55	95	30.00	0	10
10	10	55	95	30.00	0	10
11	10	55	95	30.00	0	10
12	10	55	95	30.00	0	10
13	10	55	95	30.00	0	10
14	10	55	95	30.00	0	10
15	10	55	95	30.00	0	10
16	10	55	95	30.00	0	10
17	10	55	95	30.00	0	10
18	10	55	95	30.00	0	10
19	10	55	95	30.00	0	10
20	10	55	95	30.00	0	10
21	10	55	95	30.00	0	10
22	10	55	95	30.00	0	10
23	10	55	95	30.00	0	10
24	10	55	95	30.00	0	10
25	10	55	95	30.00	0	10
26	10	55	95	30.00	0	10
27	10	55	95	30.00	0	10
28	10	55	95	30.00	0	10
29	10	55	95	30.00	0	10
30	10	55	95	30.00	0	10



26 08 2015 21:05:44 UTC  
Science 1, AV-6 Daylight 60.8° F



26 08 2015 21:10:12 UTC  
Science 1, AV-6 Daylight 60.8° F



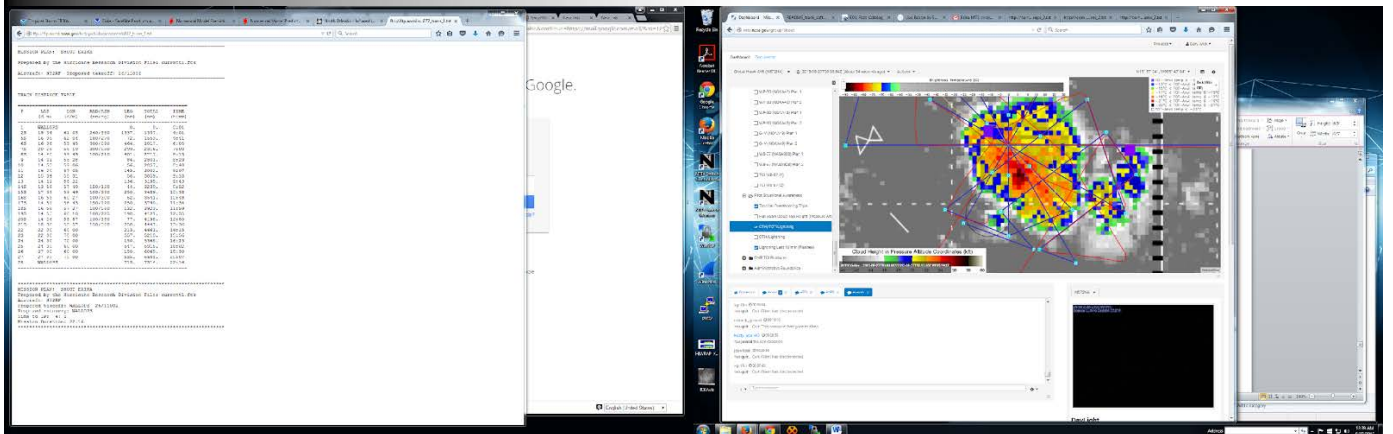
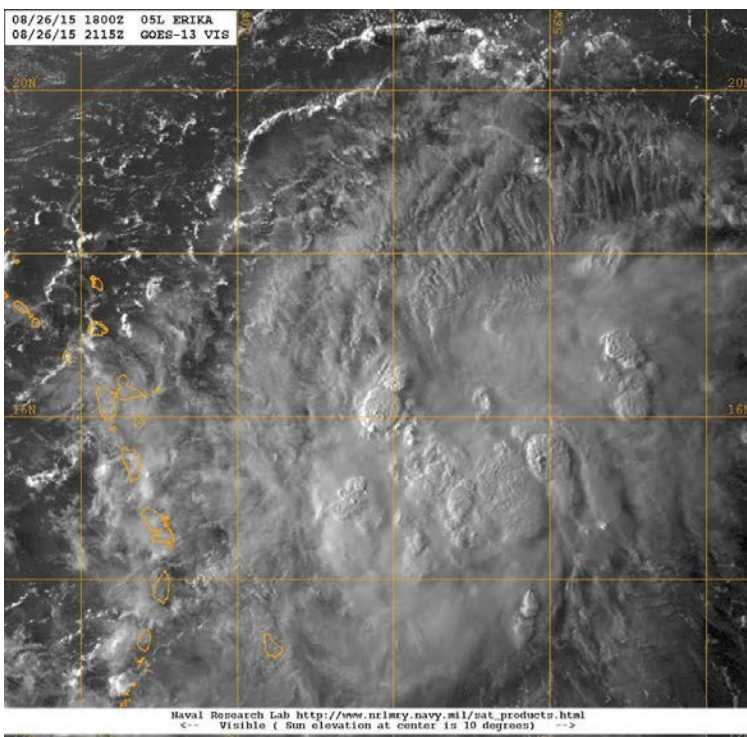
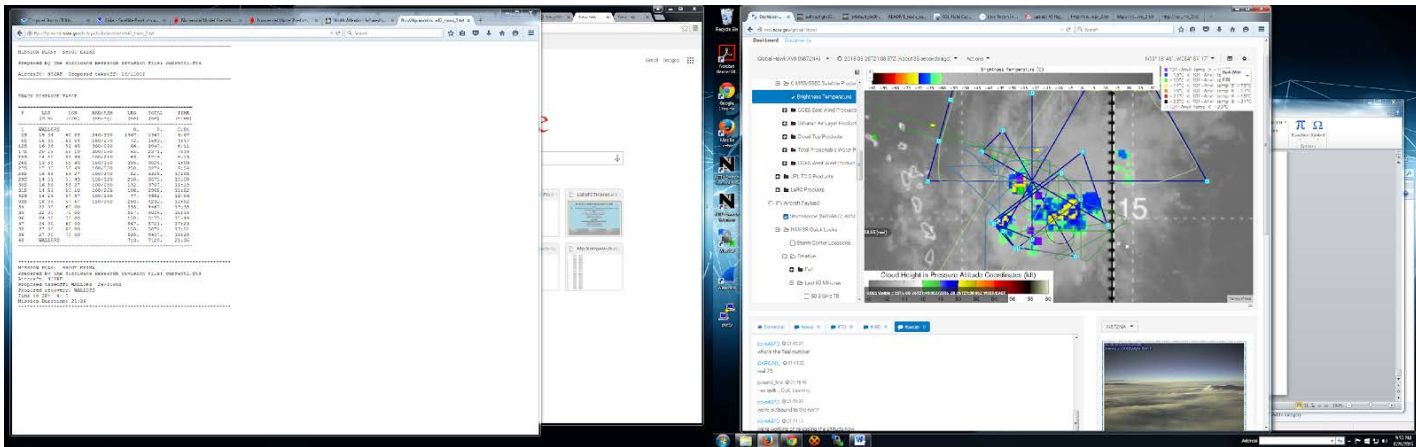


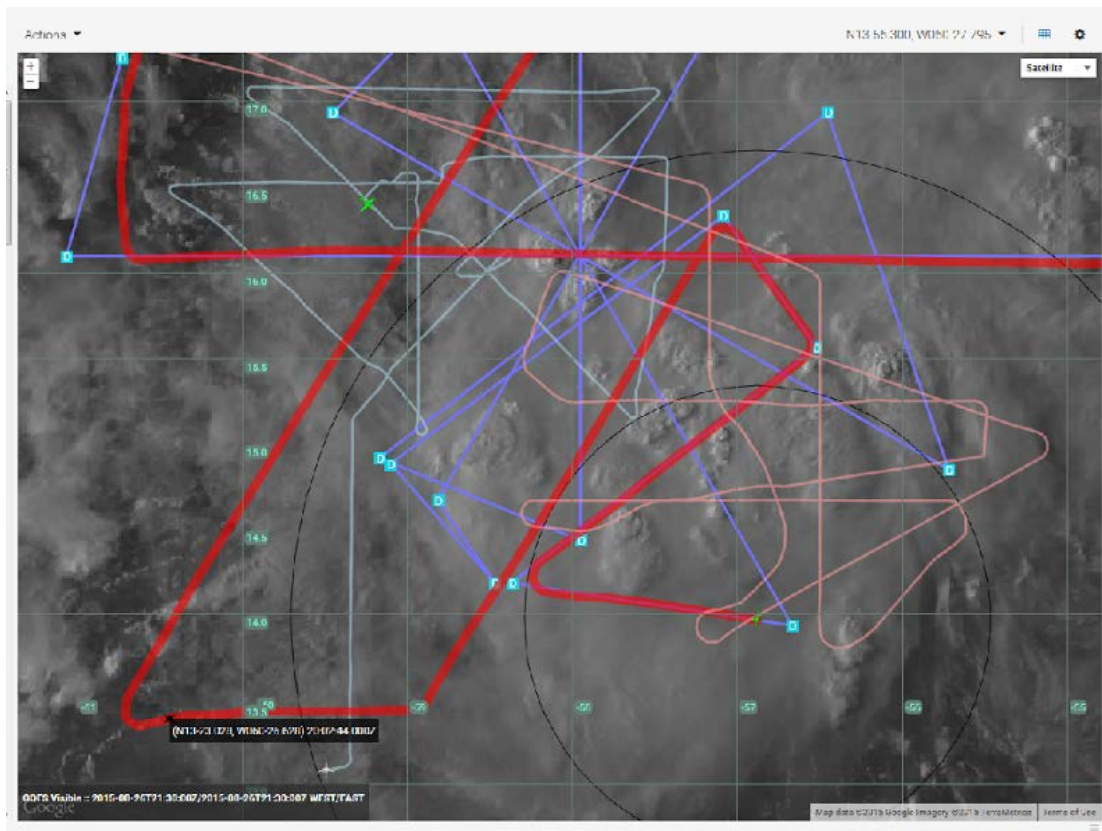
26 08 2015 21:11:57 UTC  
Science 1, AV-6 Daylight 60.8° F



26 08 2015 21:12:43 UTC  
Science 1, AV-6 Daylight 60.8° F

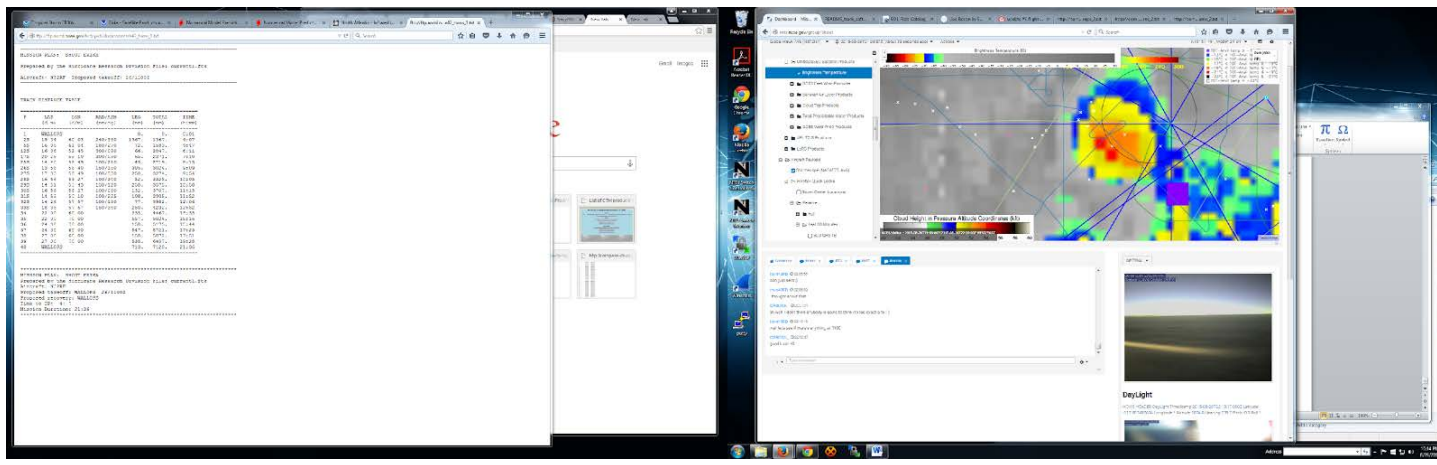


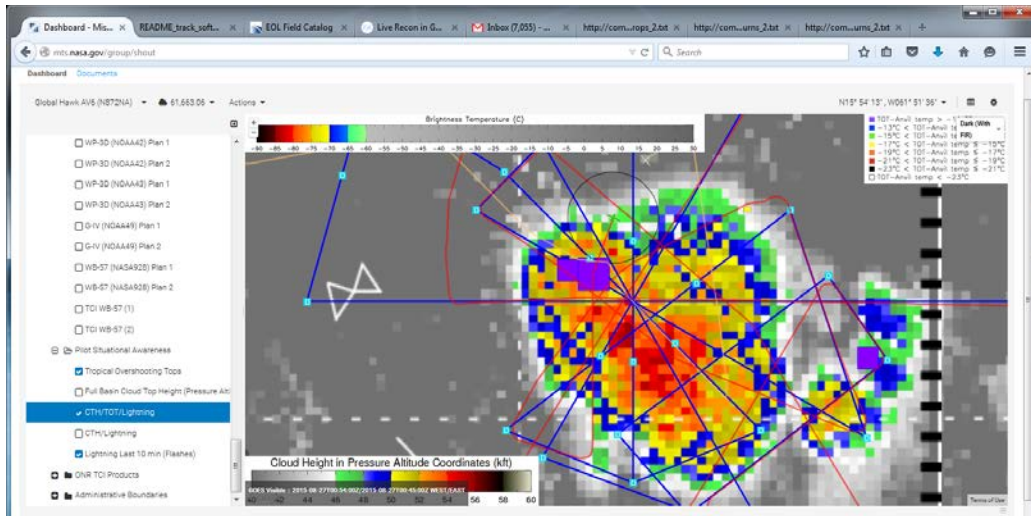




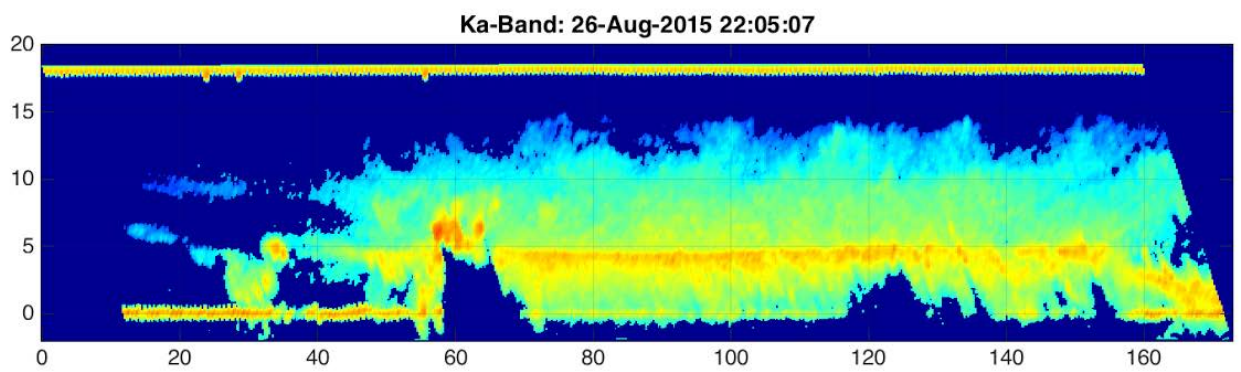
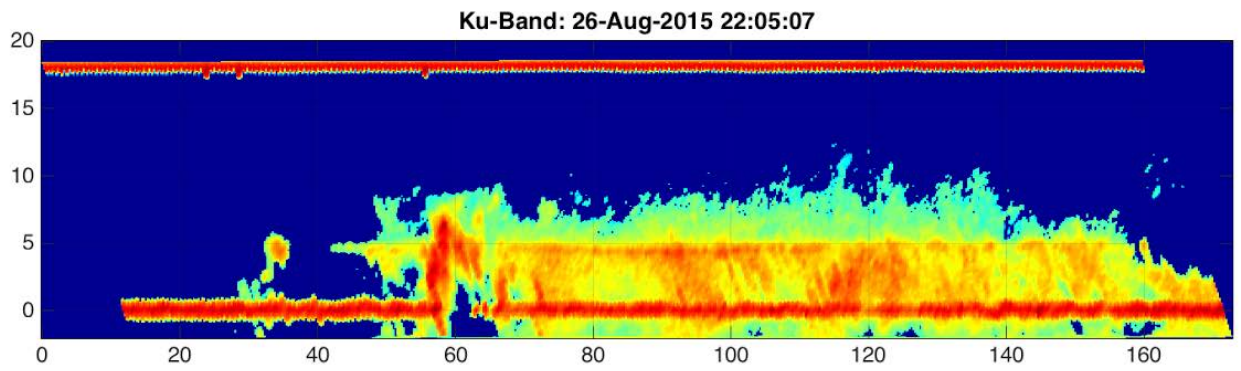
2145Z: GH flight track is in red.

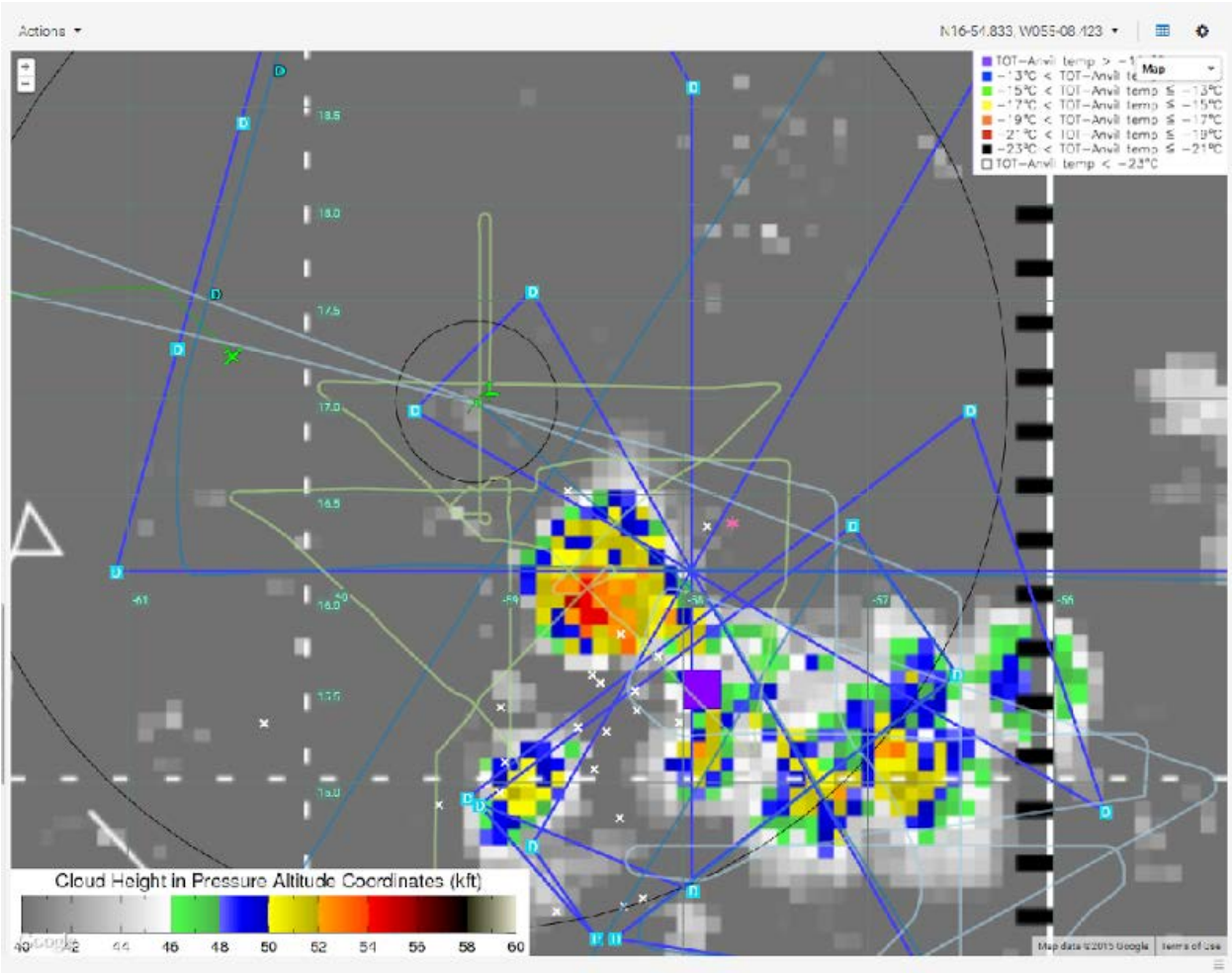






2205Z: Valid time for far right side (latest) of above HIWRAP vertical section display





2226Z: GH and P3.

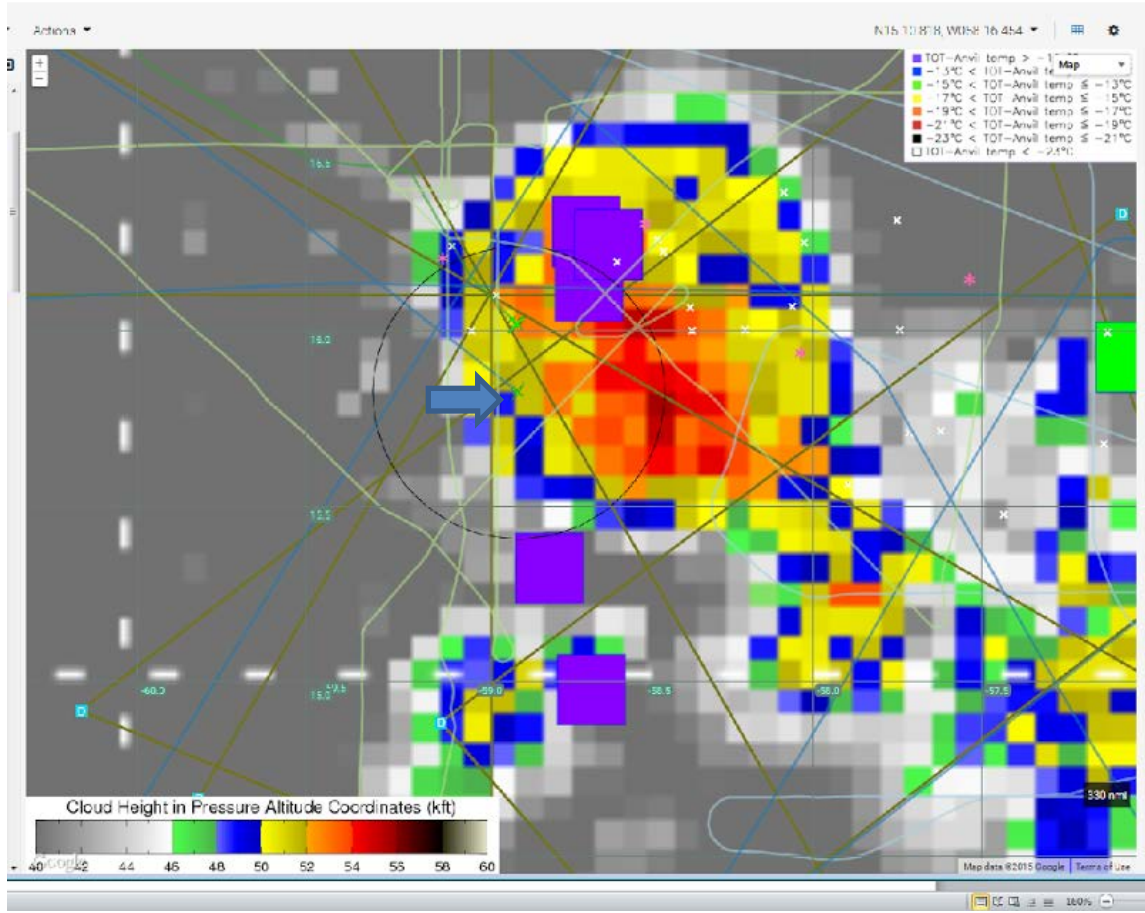


2258Z: AVAPS trying to drop again – will try a drop near Erika ctr at 2302z

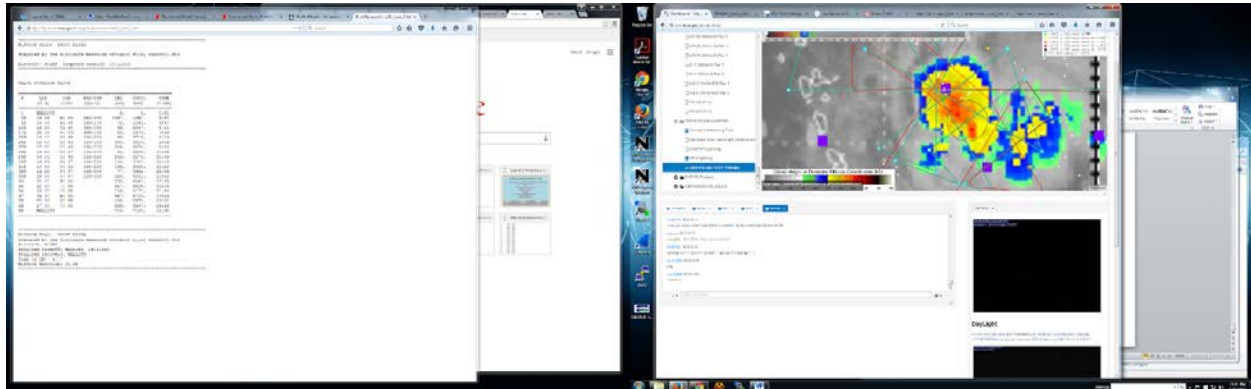
2302Z: Dropping a sonde (Drop 4) at at 15.5 56.7 near center... Drop successful.

MSLP from drop Of 1004.7mb ... slightly lower than NHC reported minimum pressure of 1006mb

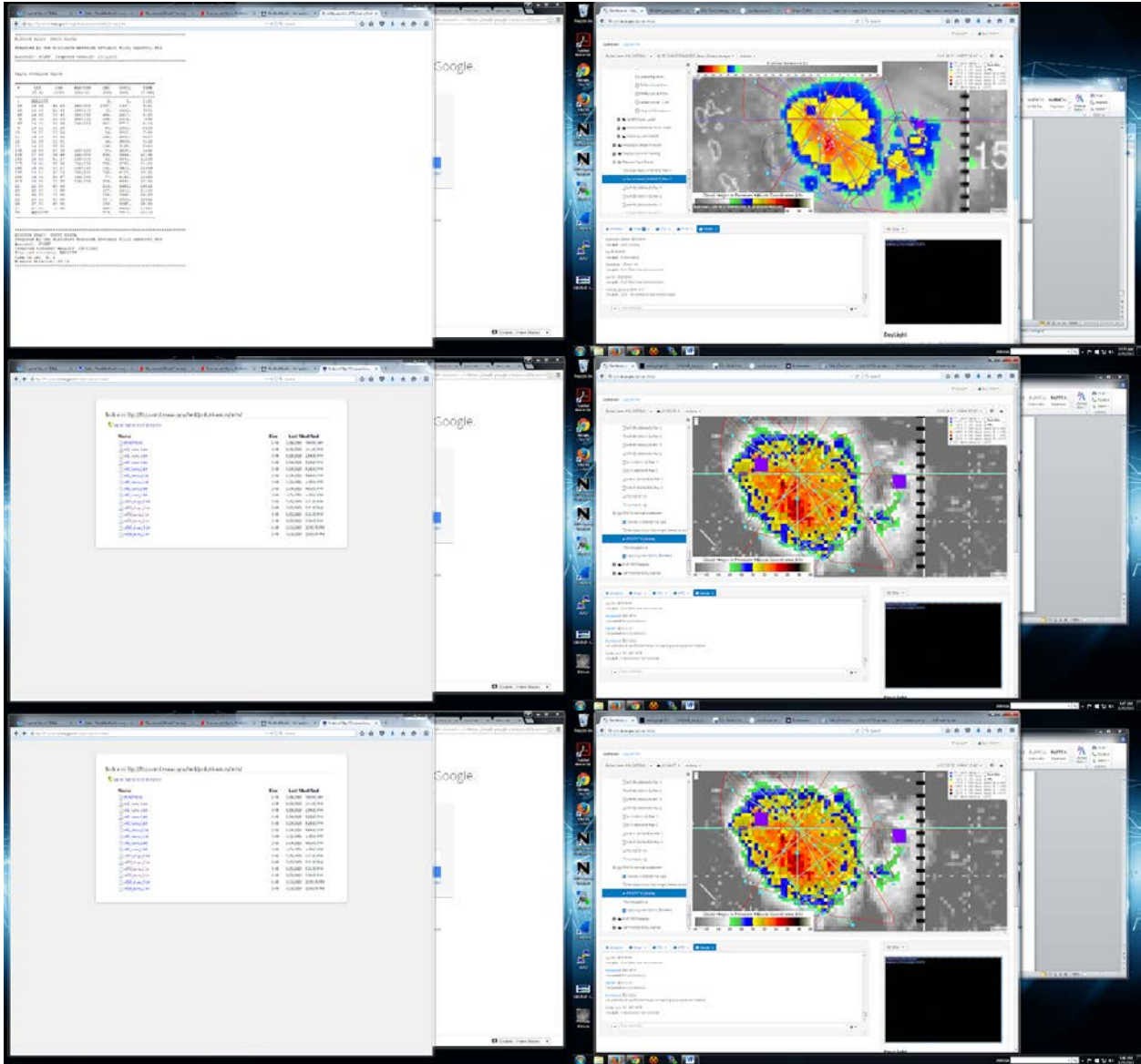
2324Z: 1 Dropsonde bin operational with 8 sondes. Working on a new drop pattern.



Location of drop with cloud tops.

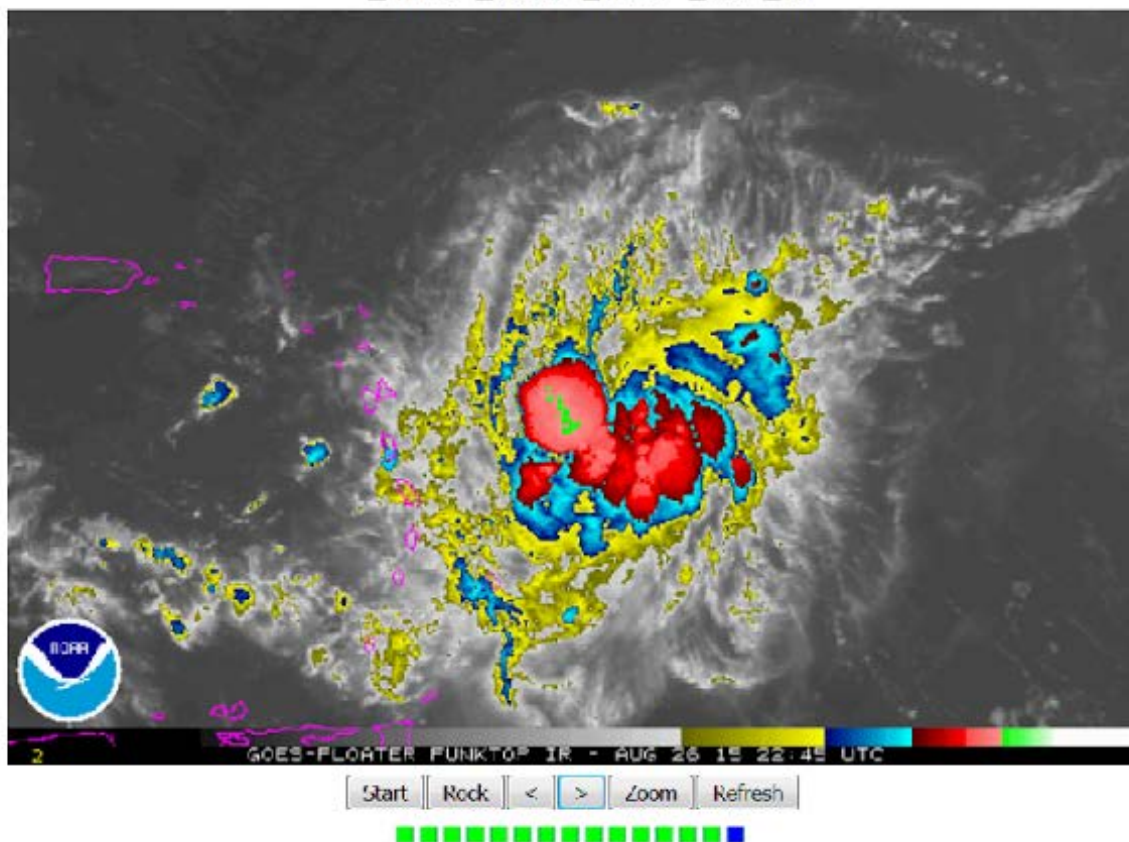




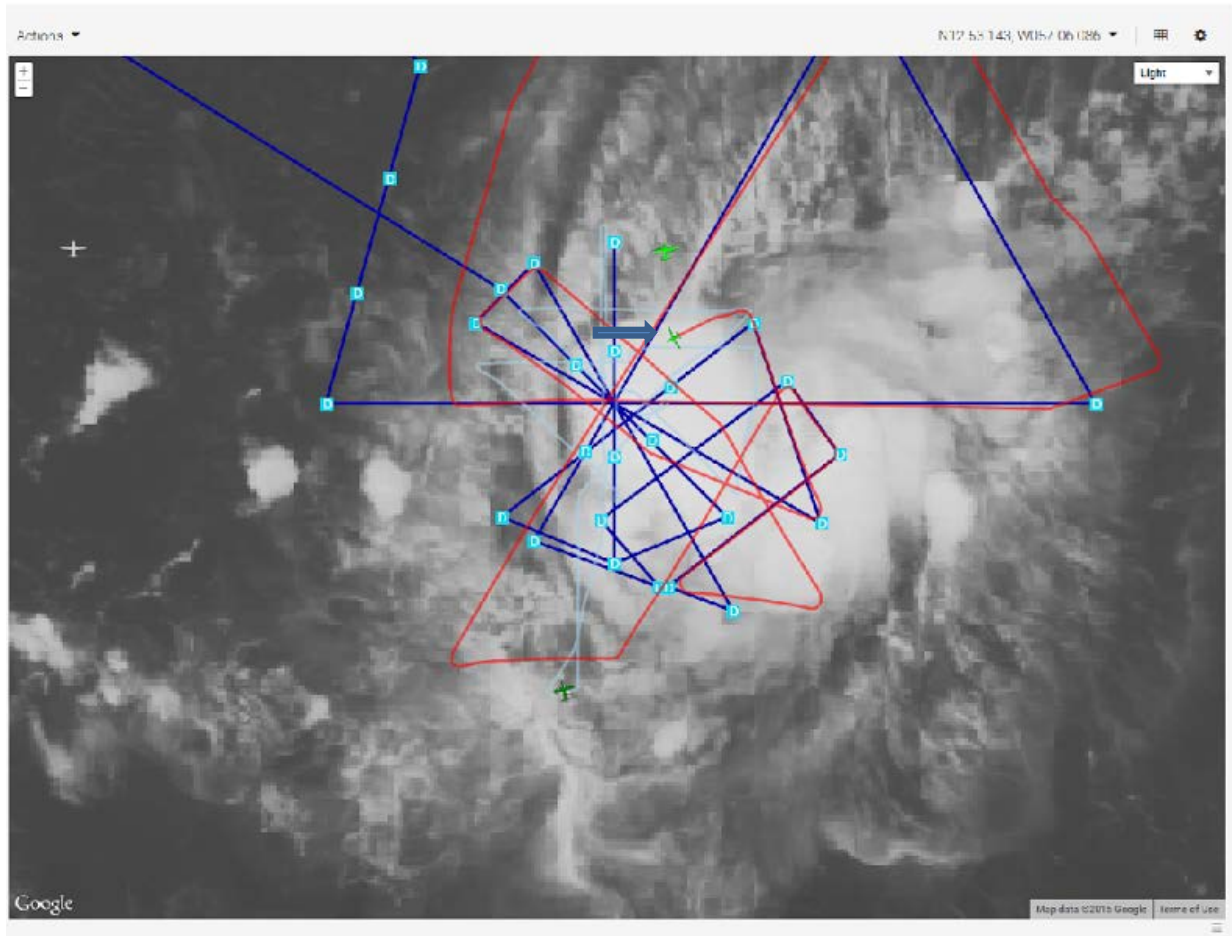


## Erika Long Floater - Funktop Color Imagery Loop

Lat/Lon  IR Temp  Crty  Road  Fcst Pts  SAE Pts  Radar  WTCWWRNC  
 Str Pk  Temp  Dewpt  Wind  Gust  RI  II  MSLP  Fmts  Pcp-6  SST  
 HDW L  HDW M  HDW H  PW  LI



0001Z: Sonde launch confirmed.

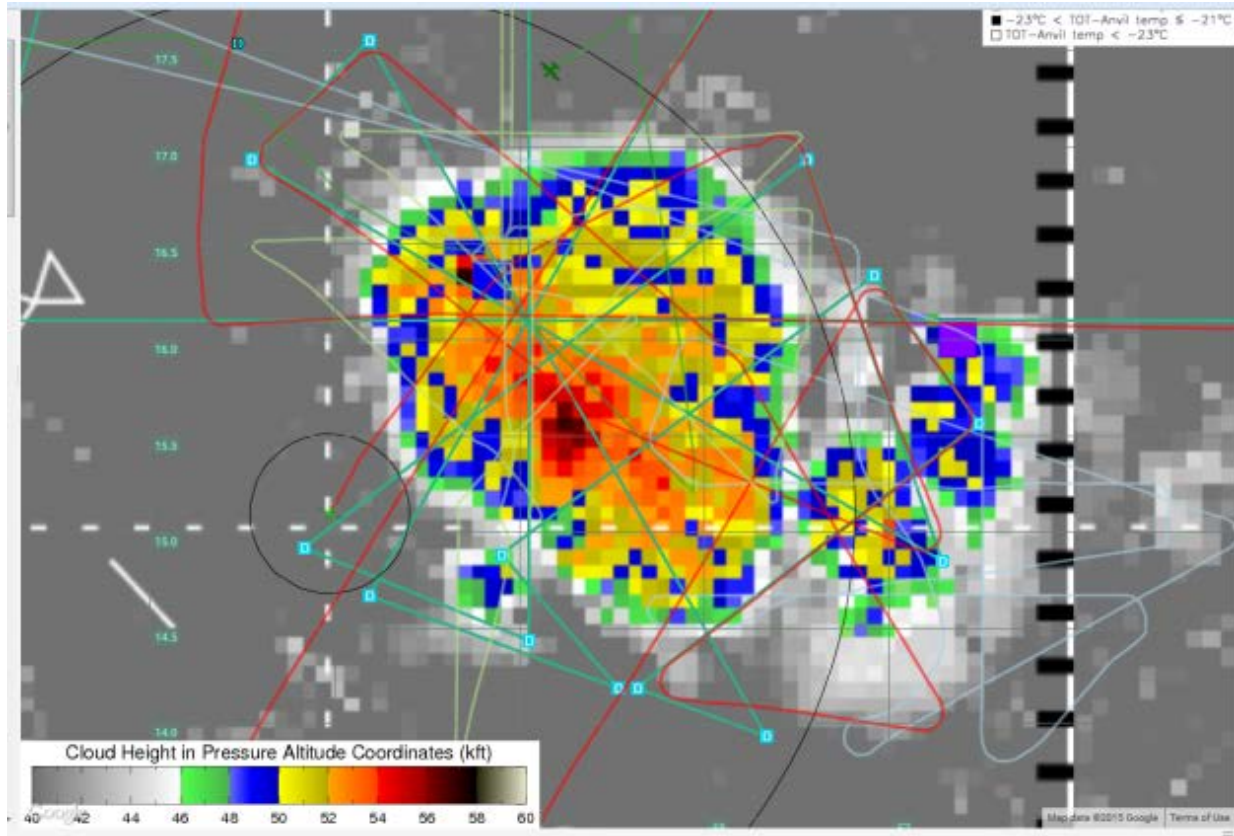


Launch point on red track.

0007Z: Sonde deployed.

0014Z: Sonde deployed.

0020Z: Sonde deployed.



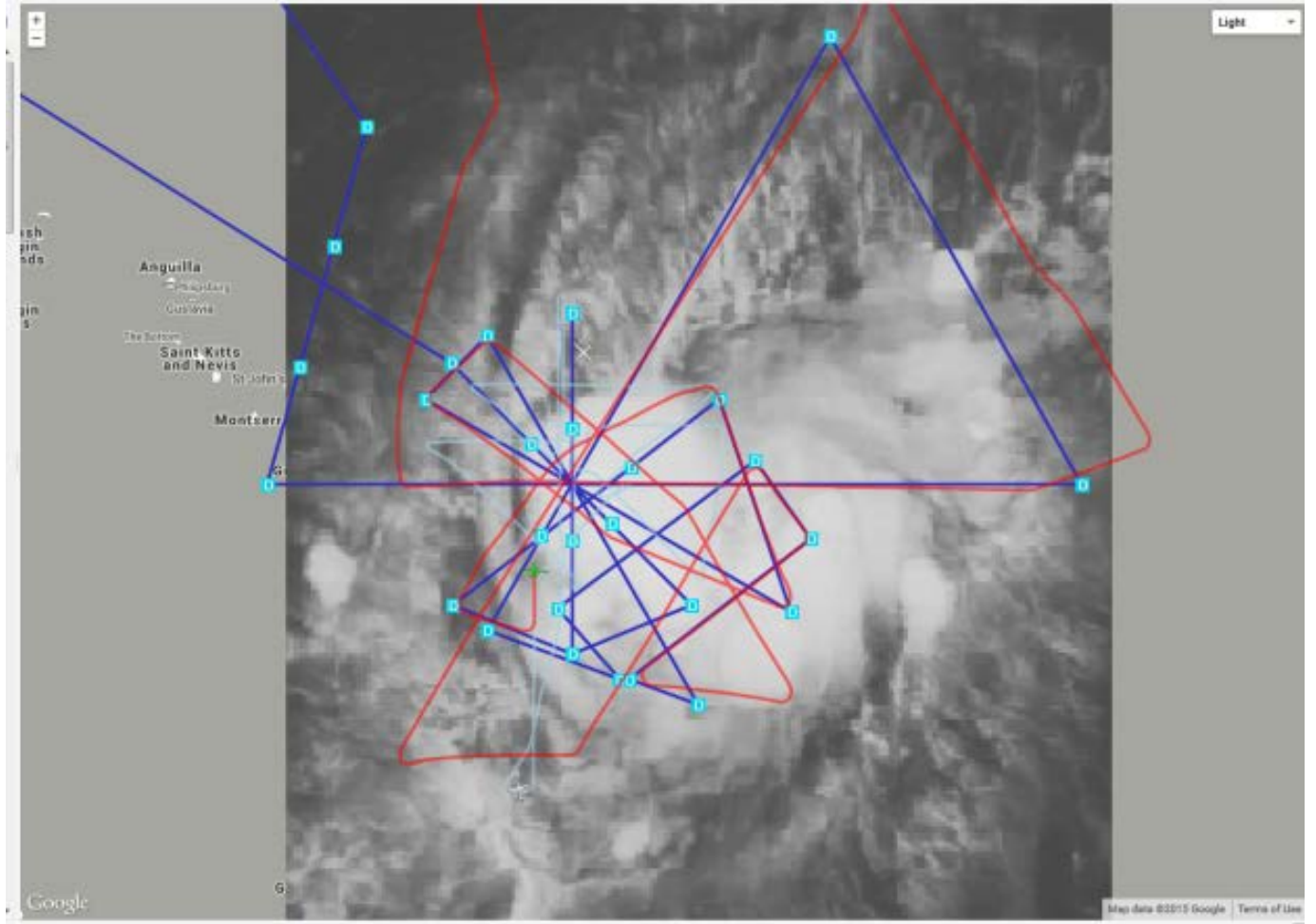
0027Z

0042Z: Sonde deployed.

0053Z: Sonde deployed - data cut of at 950mb

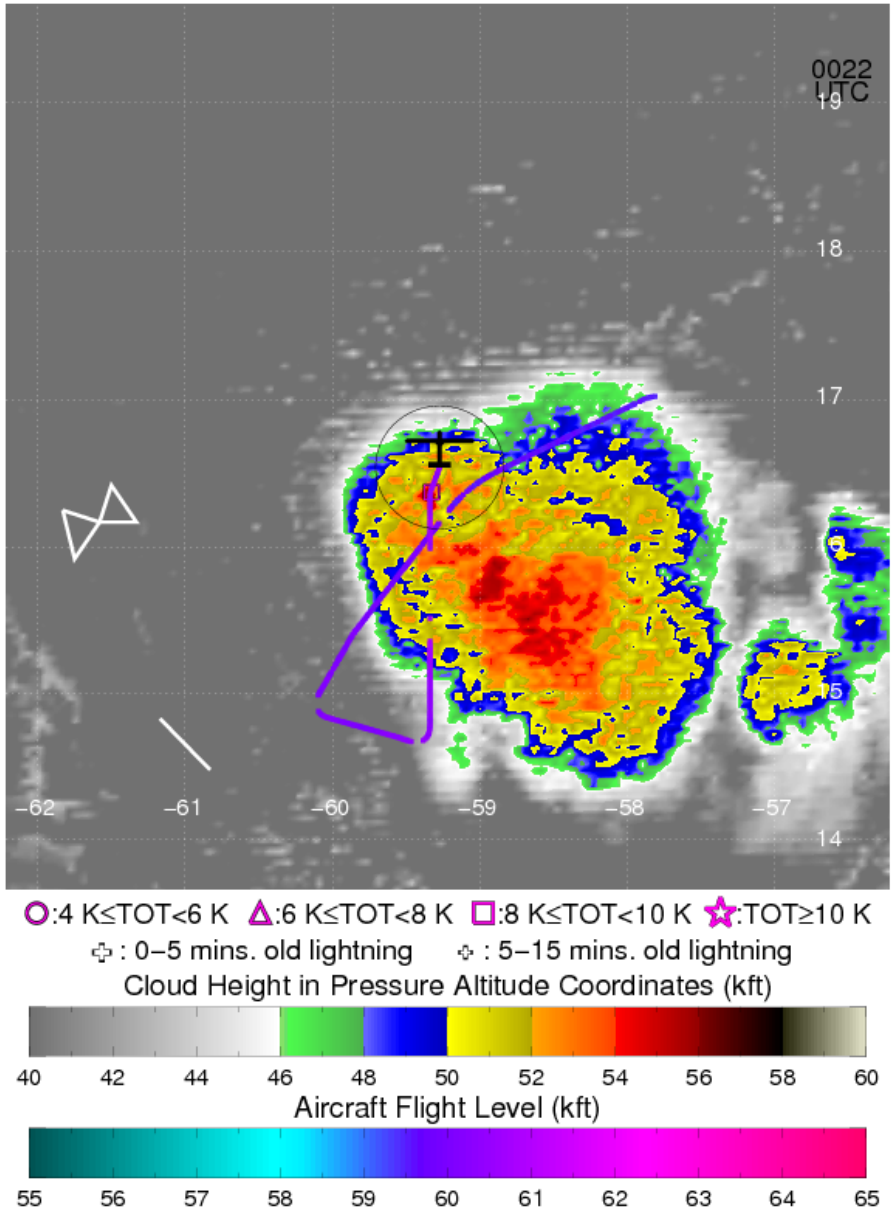
0058Z: Sonde deployed - good drop

0130Z: Sonde deployed - no data below 200mb



0042Z

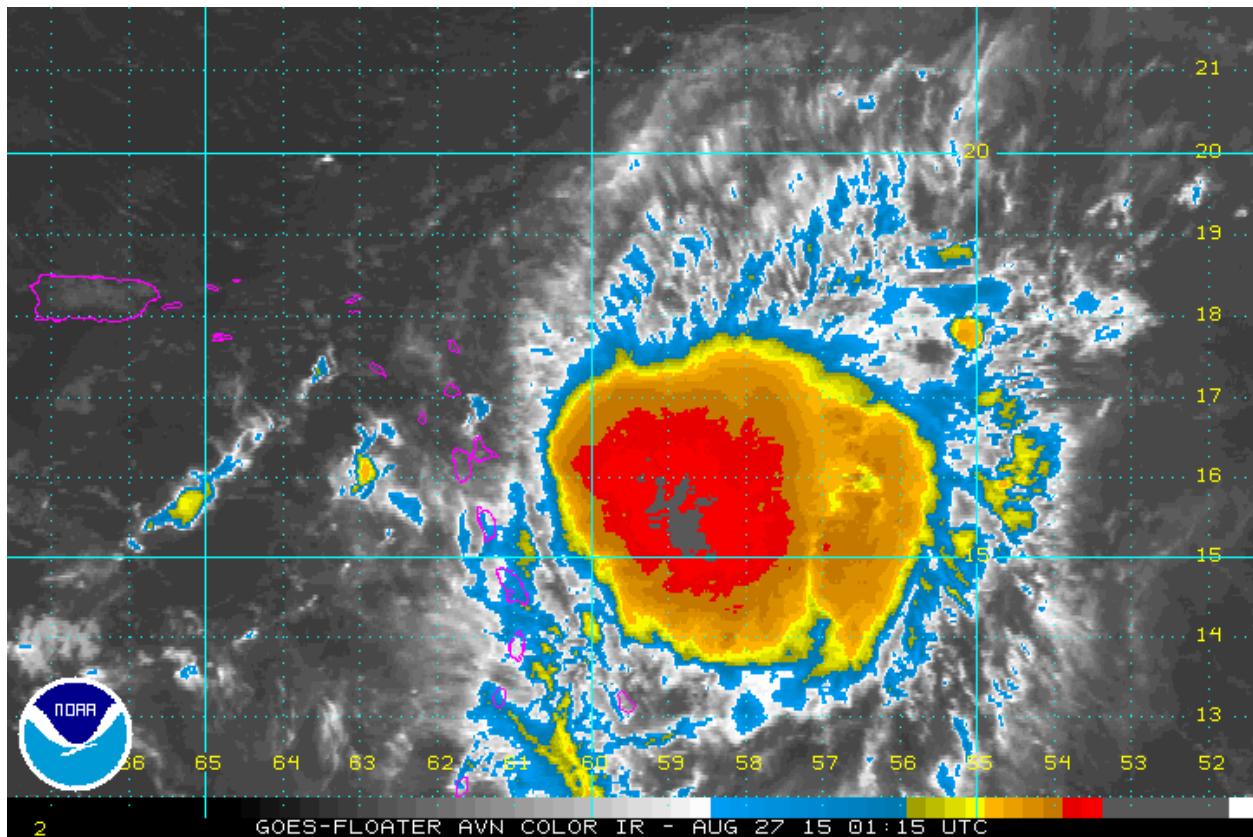
Lightning and AV-6 on 20150827 at 0056 UTC  
 ACHA CTH & TOTs at time listed



0056Z: GH appears to fly over an overshooting top while maintaining a 5000 ft vertical separation.

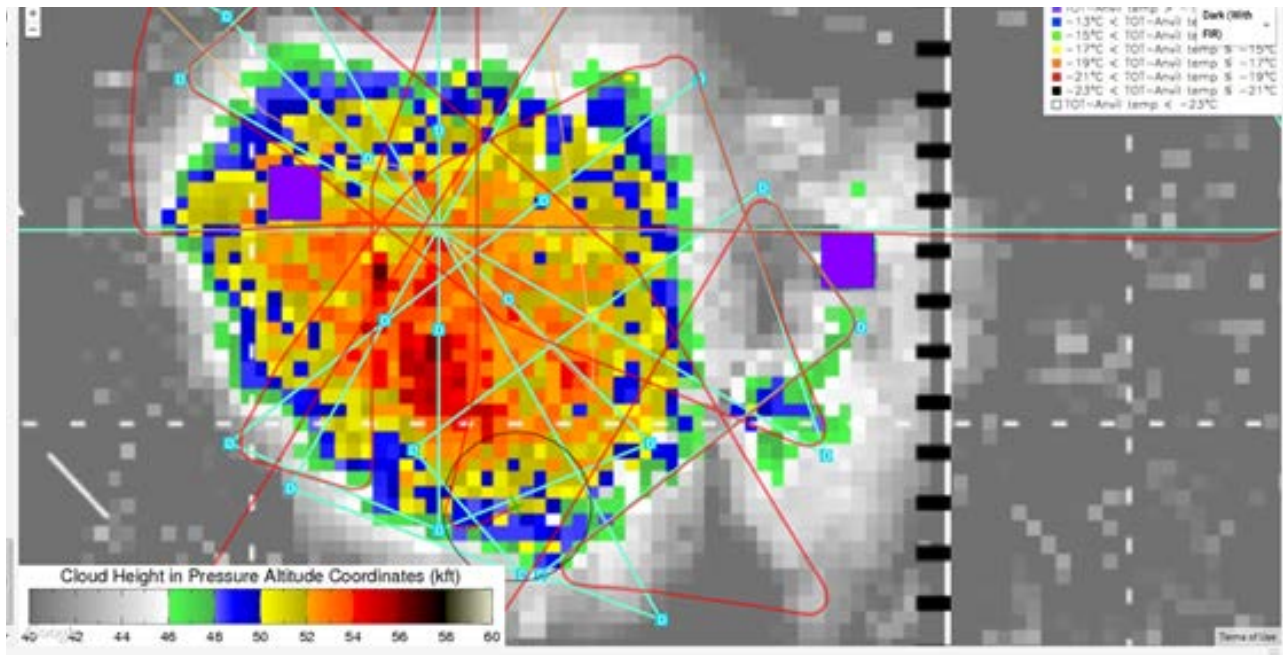
0100Z:

Shift 3 Mission Scientists: Anthony Didlake, John Walker, Kathryn Sellwood, and Sarah Griffin

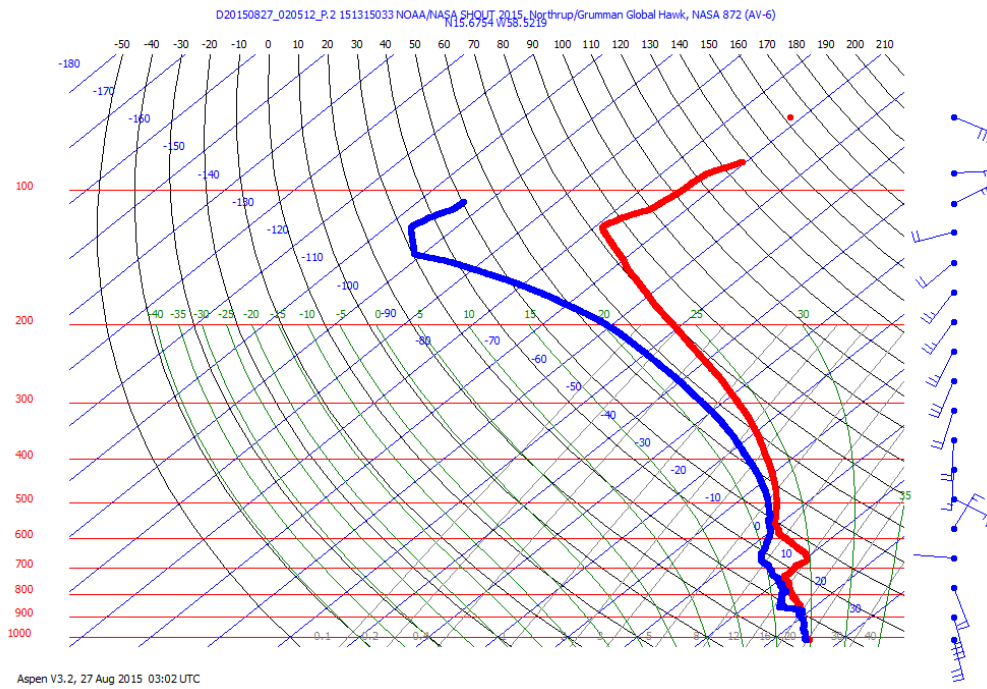


0115Z: IR Satellite imagery, showing deepening convection on south side of storm

~0200Z: Despite previous issues, AVAPS team believes there may be around 8 more sondes available for release for the remainder of this science flight. The mission science team agrees that it would be best to save most of them for the data sensitive region to the northwest of Erika, which was previously set to be sampled through a lawnmower pattern.

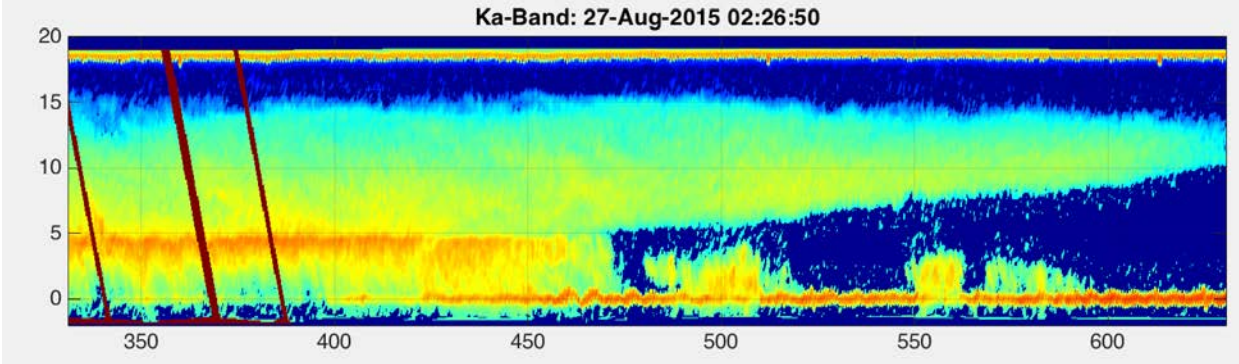


0147Z

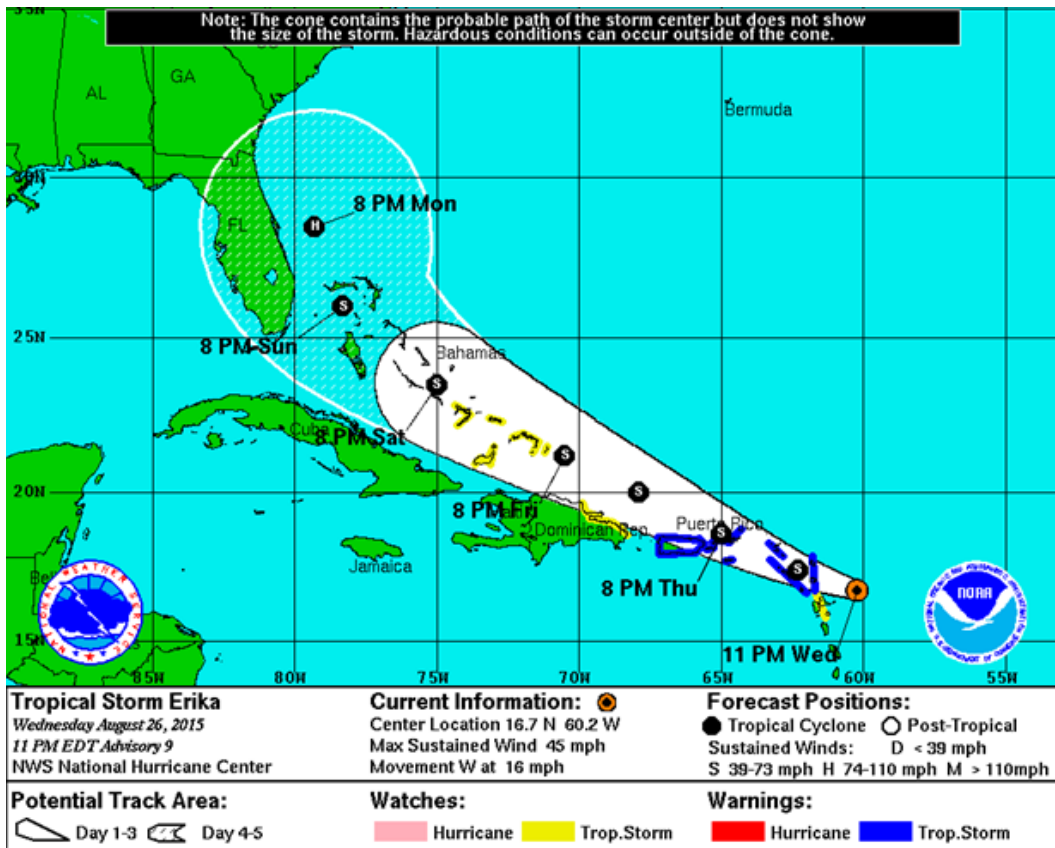


0205Z Sounding for last leg through the storm.

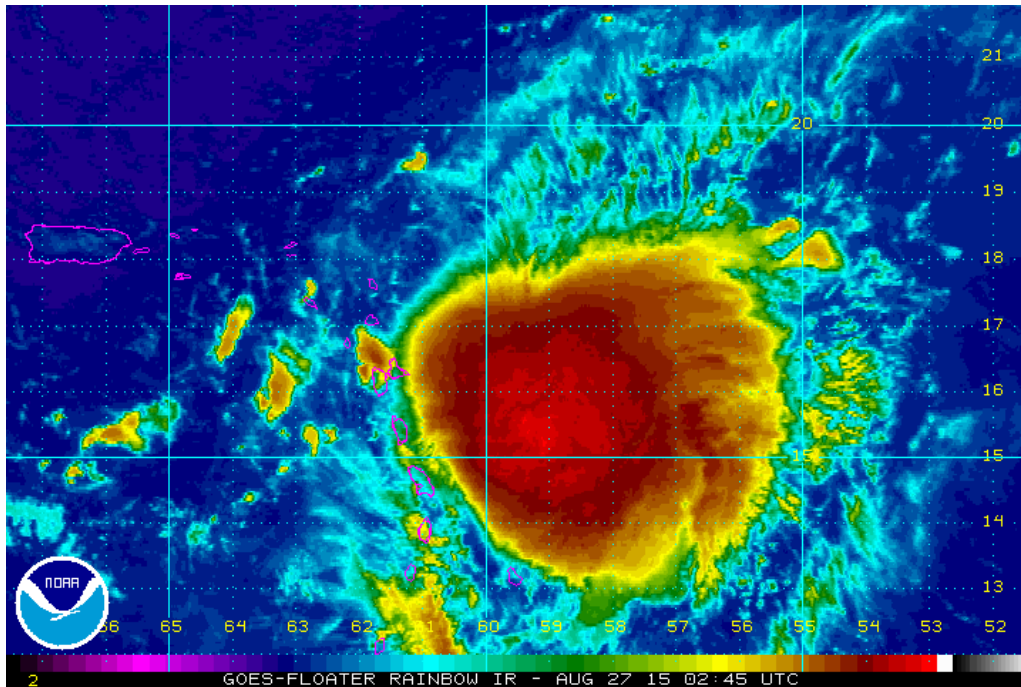




0205Z--0226Z: Twenty-minute display of HIWRAP reflectivity (above). Nice stratiform rain and anvil deck.



0300Z: 11pm NHC advisory still shows Erika at 45 mph, now with a greater curve away from Florida.



0300Z: Impressive anvil shield from the convective burst that we rerouted around.

SHOUT Chat:

03:30:47 - Mike Black

hey didlake\_GHOC-E all is well for rest of flight?

03:33:15 - Anthony Didlake

Hey Mike, yep everything is good. We've got the drops up on MTS for the lawnmower legs. Just waiting to get there now

03:34:36 - Mike Black

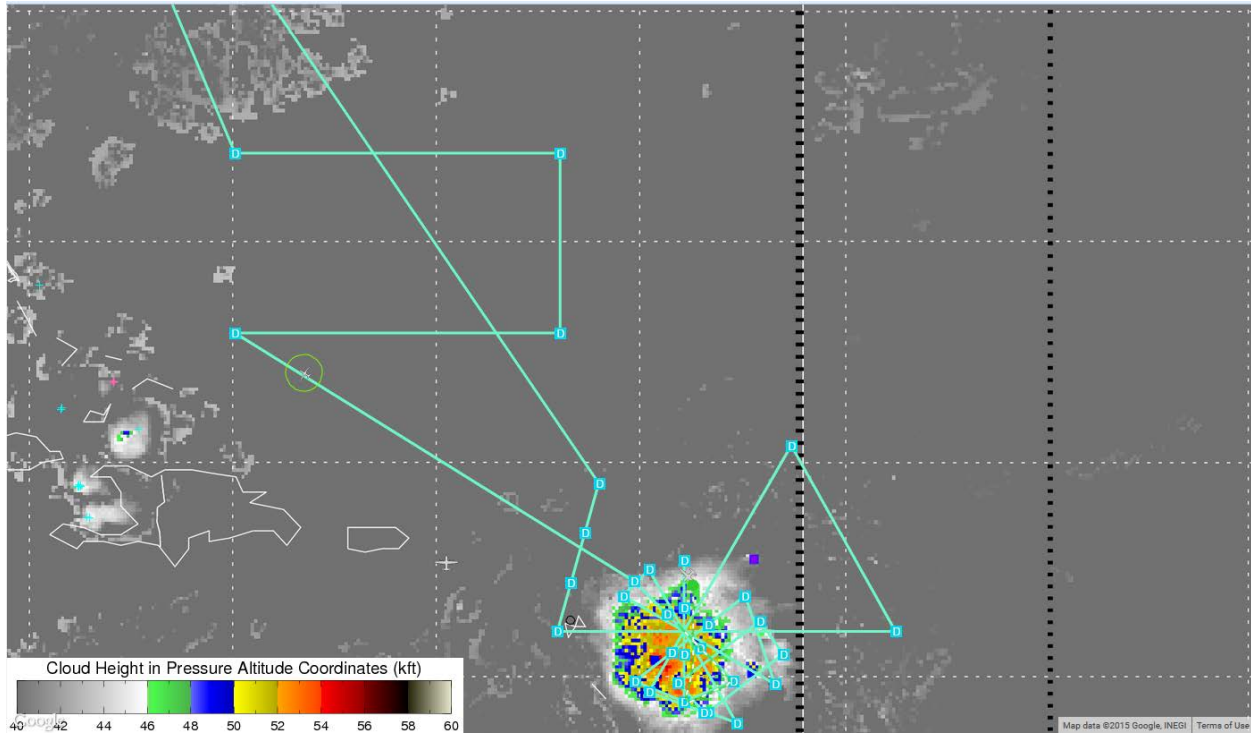
ok, great - I'm talking with CARCAH now about the tempdrops - are you seeing skew-ts on MTS?

03:35:25 - Anthony Didlake

Yep! they weren't there a few minutes ago, but the skew-ts are up now

03:37:08 - Mike Black

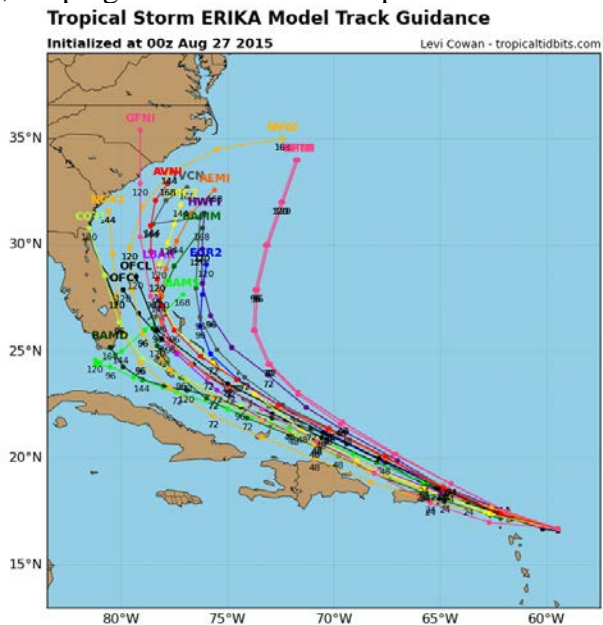
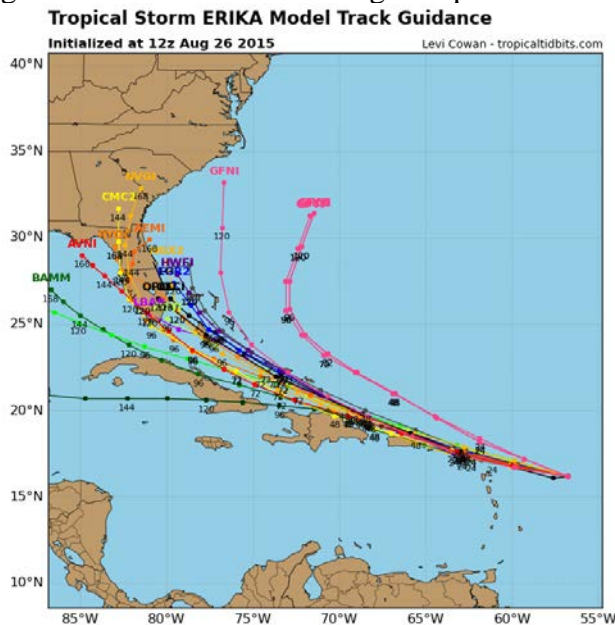
great, thanks



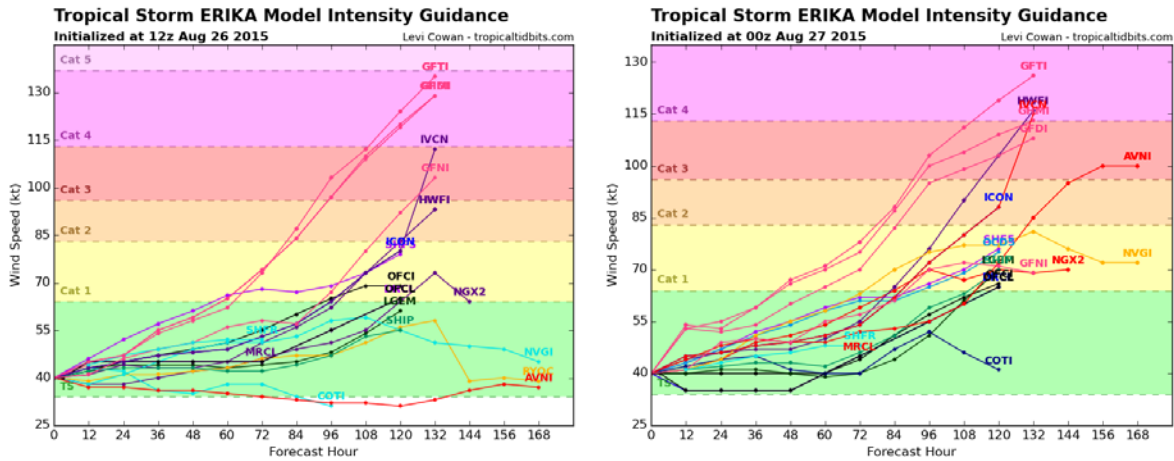
0400Z: AV6 about to enter lawnmower pattern in data-sensitive regions on return back to WFF from over-storm flight. Will be making use of ~8 remaining dropsondes that were determined by AVAPS team to possibly be available, despite earlier instrument issues.

0407Z: In approach to first lawnmower pattern AVAPS sonde launch, AVAPS team has encountered a loading malfunction.

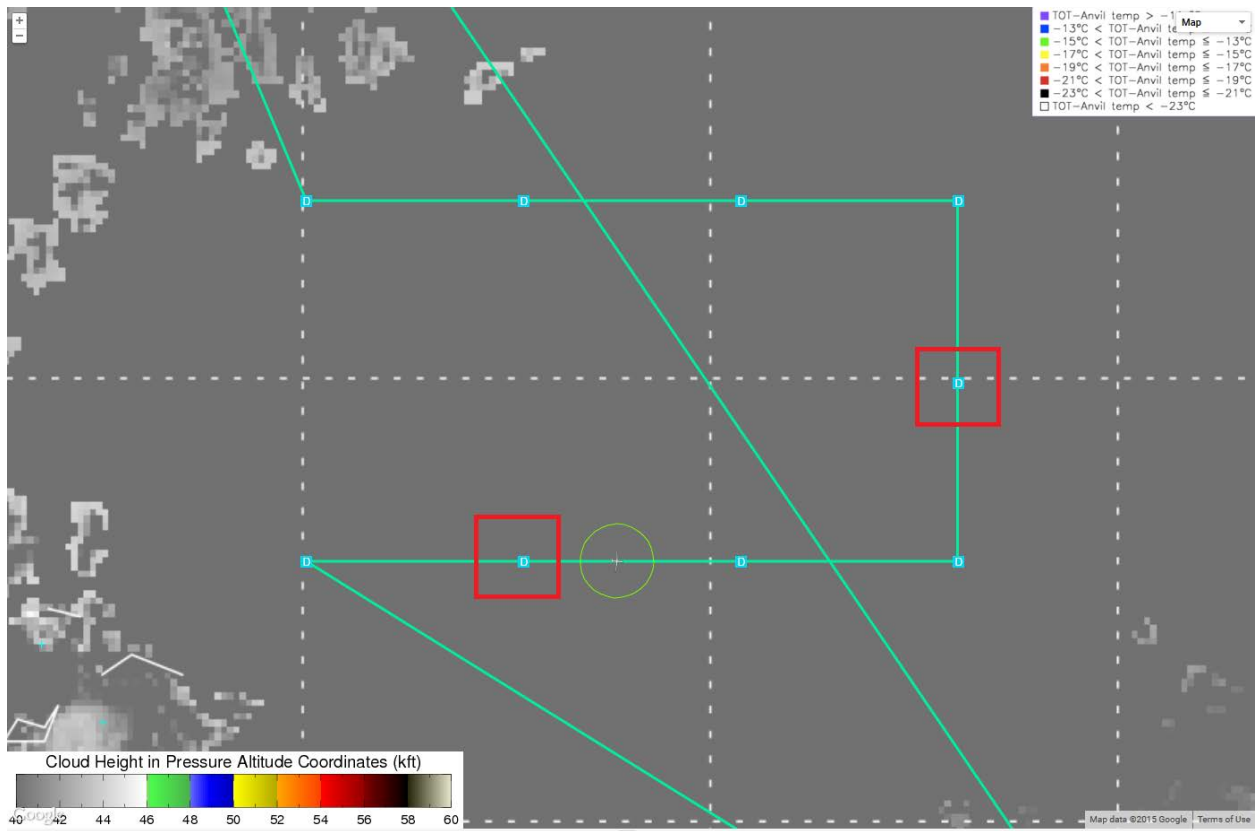
0410Z: Comparison of 12z (08/26) and 00z (08/27) model run suite, showing that most of the guidance has shifted to the right of previous runs, keeping Erika out over the open waters.



0410Z: Comparison of 12z (08/26) and 00z (08/27) model run suite, showing that several of the models that had maintained strength or shown only moderate intensity increase before are now forecasting a stronger storm.



0431Z: Sonde took a bit to load so we missed planned dropsonde at start of lawnmower pattern. Adding the new drop on the northward leg in the middle of the lawnmower.



0440Z: With eight new sondes potentially available for deployment, due to quick work and trouble-shooting from AVAPS team, the lawnmower pattern to the northwest of Erika was updated. The first point entering this pattern was missed due to a malfunction in loading. However, there was a successful drop at the 2nd planned drop point (left red box) and one additional point was added in the north-south leg of this pattern (right red box).

0507Z: AVAPS malfunction... Missed next drop point in lawnmower pattern. Working to resolve and add in an additional drop point somewhere downstream in pattern.

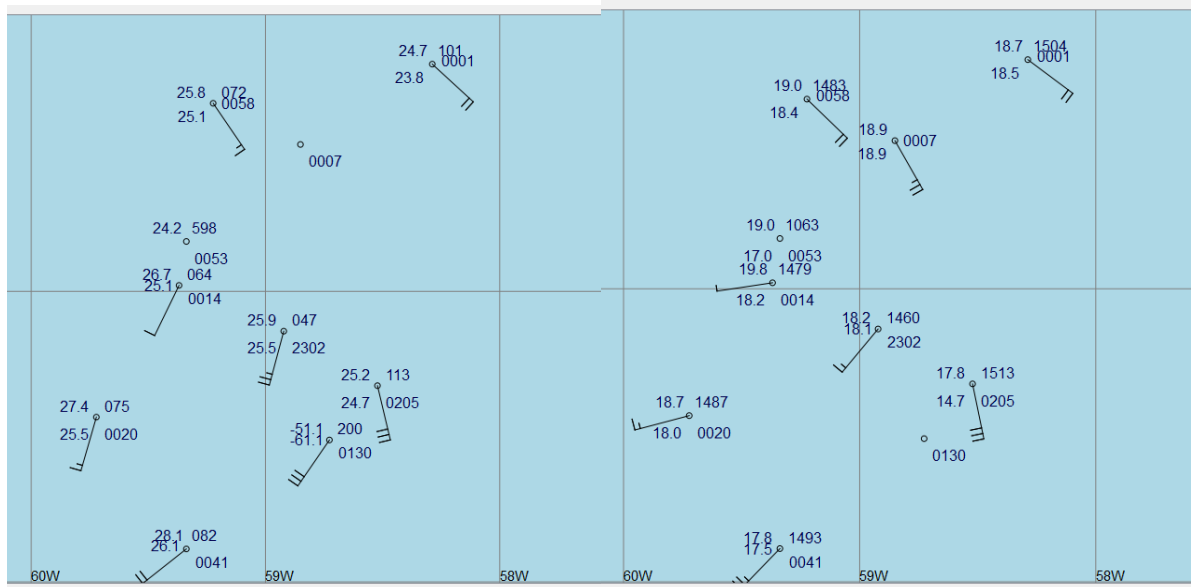
0520Z: Due to continued AVAPS malfunction, it was determined that there will be no more drops during the remainder of this science flight.

0527Z: Last drop transmitted over the GTS, all drops were processed and 13 were transmitted. Skewt plots are accessible through MTS.

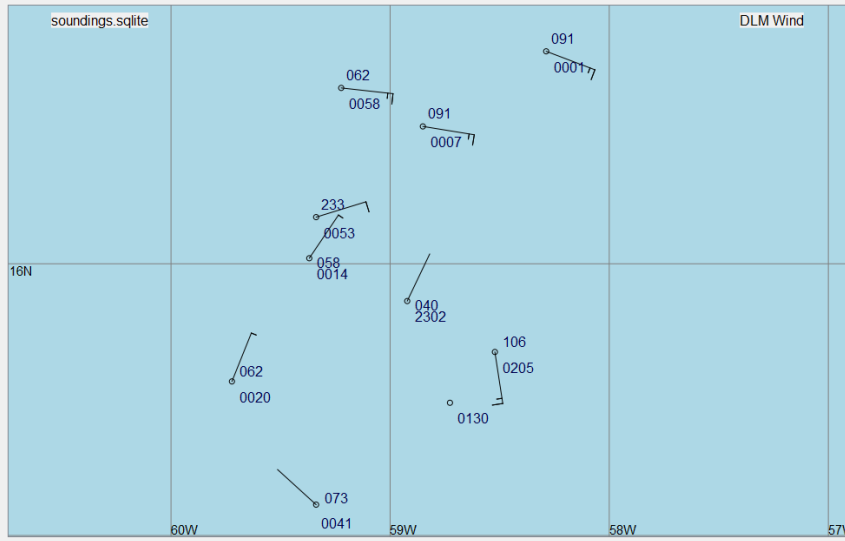
Dropsonde level data:

Surface

850mb

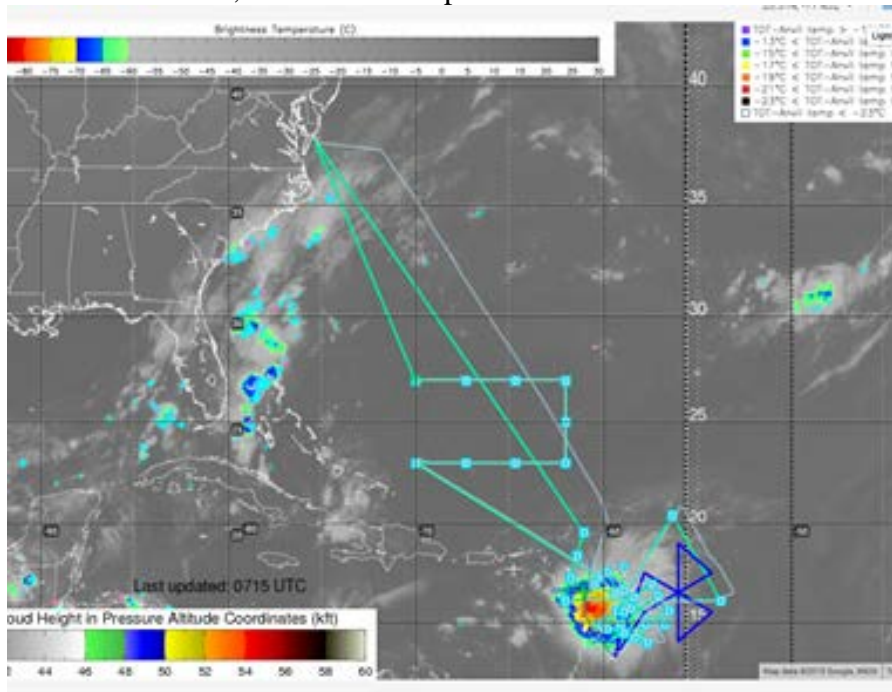


Deep layer mean



0636Z: NOAA3 vortex message reports a 1004mb surface center at 16.5N 60.9W with maximum wind speeds close to the center of 56kt from SFMR.

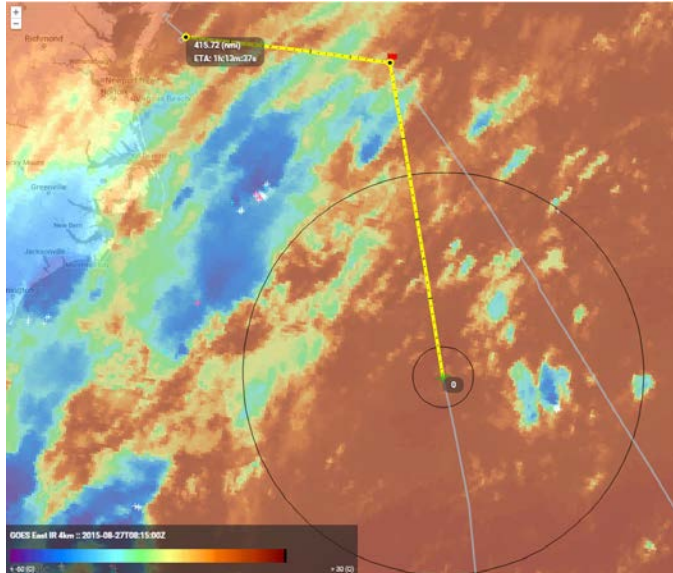
0734Z: Final turn, return to Wallops



0800Z: Shift 4 Wick and Newman

HIWRAP having issues with Ku band. Also need time on aircraft to debug.

0836Z: Inbound to WFF. Proceeding NNW. Image below shows the stalled front to the south of WFF off of the Outer Banks. Some fairly hefty convection here, but we're avoiding. ETA of about 0640 Local (1040Z).



0842Z: HIWRAP has a communication problem through Ku to their instrument. They believe it is a relay problem but will need to diagnose this on the ground. Full functionality stopped about 14 hours into flight

0922Z: Arrived OKONU. Inbound to W386. Still expected to land at 0640.

0931Z: Entering Warning area; will begin descent in 15 min. Preparing for instrument power down

0934Z: In W386. Powering down payload prior to descent.

0938 Payload off, ready for descent.

0942 A bit of confusion about turning off Ku before descent, since pilots need the Ku VOIP for talking to center.

0950 At FL450, bringing payload back-up.

0957 Will remain at FL450 until about 1008Z in order to warm payload prior to landing.

1014Z: Descending from FL400 to FL120

1023Z Ready for gear extension

1043Z Landing