

SHOUT RF03– 20150905 – Fred
Mission Summary

Mission scientists:

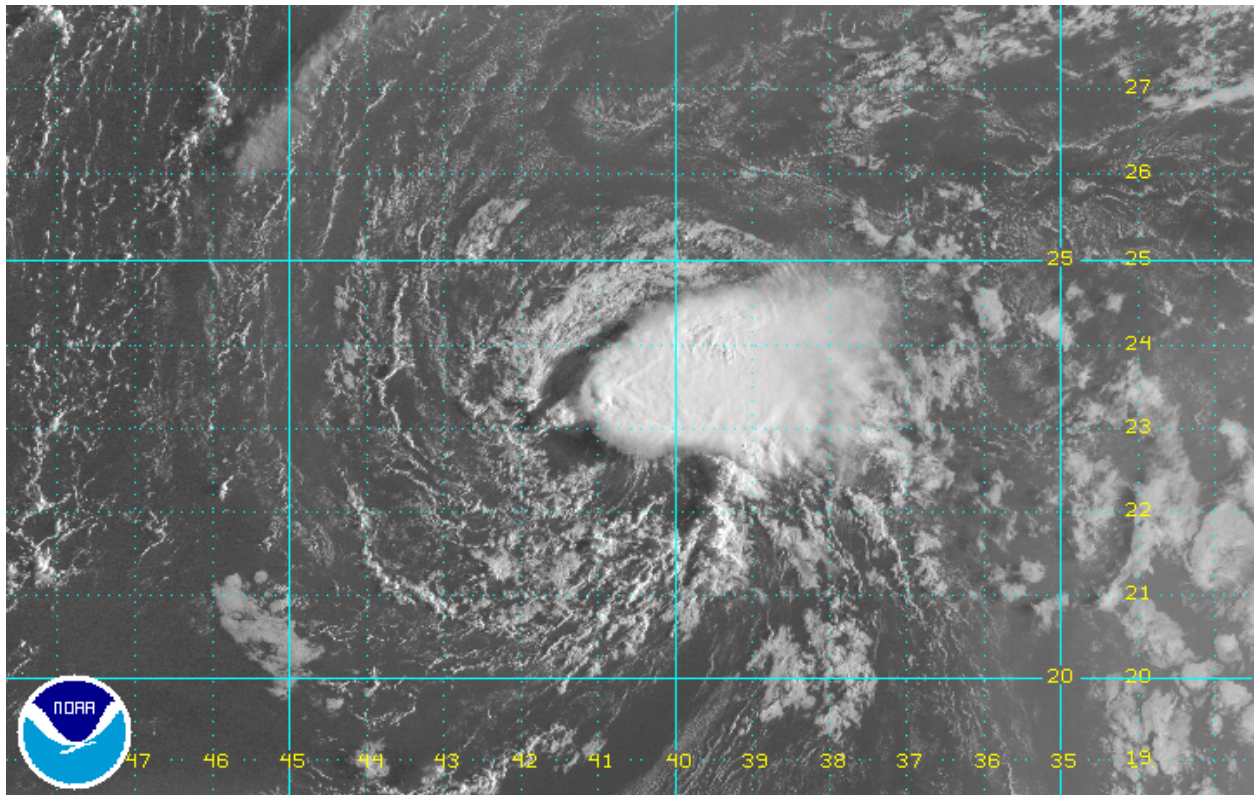
- Shift 1: Gary Wick, Paul Newman, Michael Black
- Shift 2: Derrick Herndon, Pete Black, Chris Velden
- Shift 3: Jason Sippel, Darren Jackson
- Shift 4: Paul Newman

Mission objectives are to sample Tropical Storm Fred and the surrounding environment to help address forecast uncertainty regarding its potential reintensification. While Fred had been downgraded earlier on Friday, NHC listed Fred as a Tropical Storm again in their 2300 EDT discussion on Thursday night. It was still listed as a tropical storm in the 0500 EDT NHC discussion though it was forecast to possibly degrade to a remnant low in the next 24-36 hours.

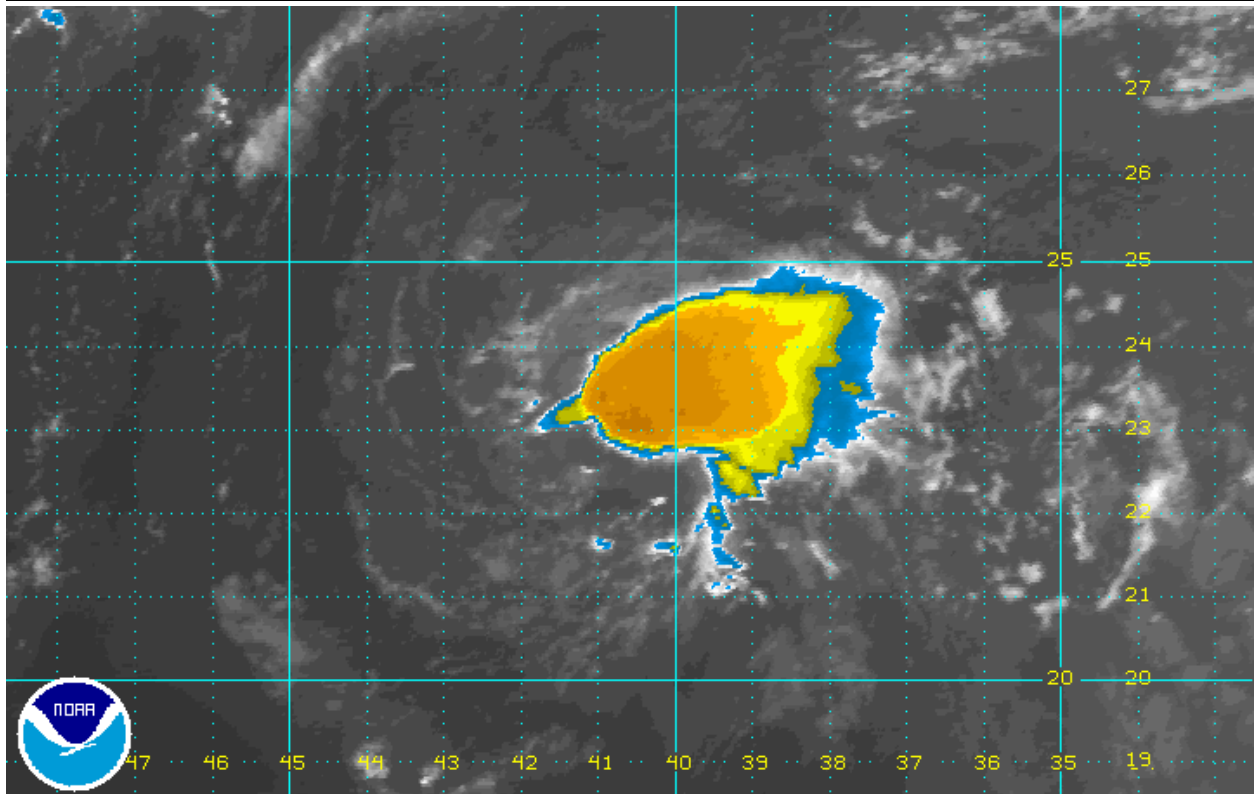
From the 0500 EDT Forecast discussion:

“The intensity forecast is low in confidence due to several possible scenarios. First, although it is not explicitly forecast, Fred could become a remnant low at any time during the next 24 to 36 hours due to continued shear and dry air entrainment, followed by regeneration to a tropical cyclone when the shear subsequently decreases. Second, the dynamical models have two scenarios for Fred as it interacts with the above-mentioned trough and surface low after recurvature. One possibility, supported by the GFS and the ECMWF, is that a relatively weak Fred gets absorbed into the baroclinic low and dissipates earlier than currently forecast. Another possibility, supported by the UKMET and Canadian models, is that Fred stays farther away from the baroclinic low and intensifies more than is currently forecast. Given the uncertainty, the new intensity forecast is similar to the previous forecast in calling for slight weakening early in the forecast period followed by slight intensification after 36 hours”

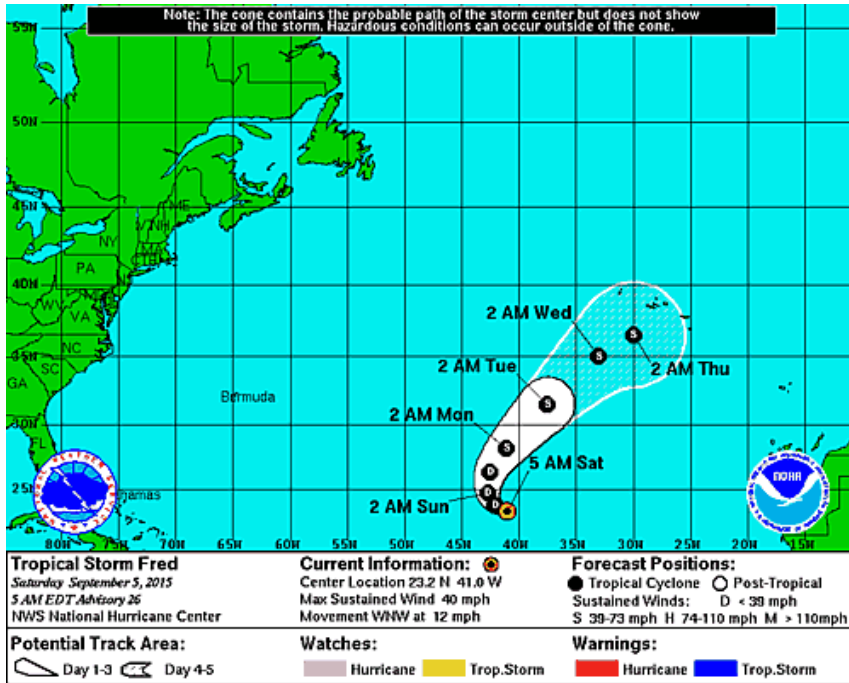
Convection overnight had been spotty. Decision to list again as a tropical storm was based largely on an overnight ASCAT pass. Even this morning there are still some signs of new convection as shown in the visible image below.



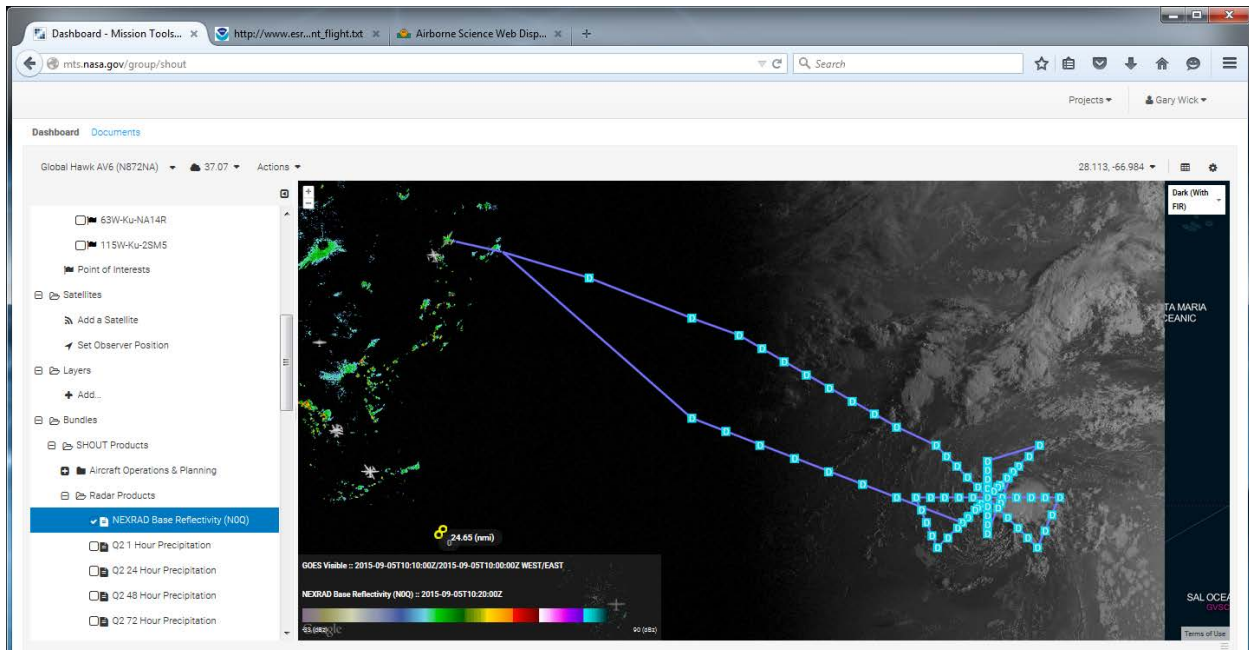
1 GOES-FLOATER VISIBLE - SEP 5 15 09:45 UTC McIDAS

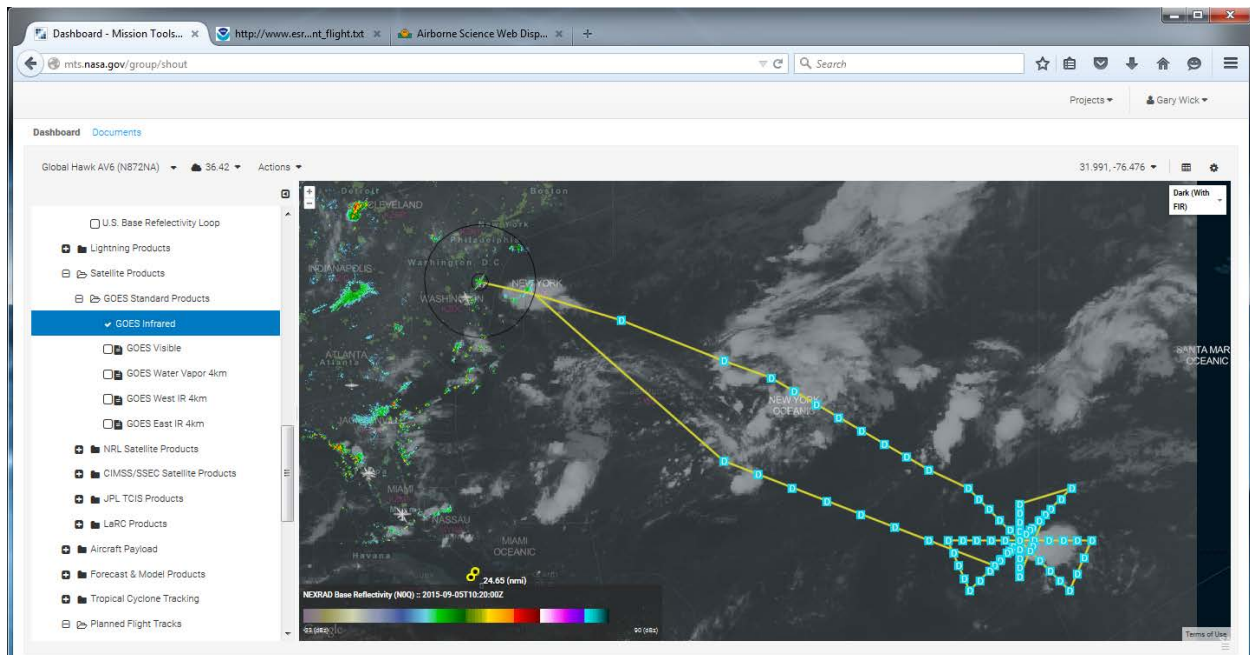


2 GOES-FLOATER AVN COLOR IR - SEP 5 15 09:45 UTC



Flight plan as filed with visible and IR imagery





0959Z Engine start

1005Z Powering up payloads

1019Z AVAPS dispenser getting power

1024Z Ready for pin pull

1025Z Pin pull

1027Z Ku up

1035Z Ready for taxi

1045Z Taxi

1049Z Takeoff commanded - Airborne

HDVIS: Working now.... As visible in next images

HVis 09Sep15 105211
SHOUT Science #3 Temp 540°C



HVis 09Sep15 105453
SHOUT Science #3 Temp 535°C



Daylight camera - heading out



1130Z Diverted north of OKONU for weather - see below

A screenshot of a NASA mission dashboard. The top part shows a browser window with the URL "mts.nasa.gov/group/shout". Below the browser is a weather map of the Pacific region, showing a storm system. The map includes labels for "NEW YORK", "WASHINGTON", and "OKONU". A green line indicates a flight path. The left sidebar contains a list of product categories, including "GOES Infrared", "GOES Visible", "GOES Water Vapor 4km", "GOES West IR 4km", "GOES East IR 4km", "NRL Satellite Products", "CIMSS/ISSEC Satellite Products", "JPL TCIS Products", "LARG Products", "Aircraft Payload", "Forecast & Model Products", "Tropical Cyclone Tracking", and "Forecasted Tracks". Below the map is a chat window with the following messages:

mblick_bud @11:19:04
yes ok - but I think the storm position is quite a bit off - will look at when I get to WFP.

mblick_bud @11:19:16
has quit... Quit: This computer has gone to sleep

plemyl @11:28:07
has quit... Quit: Client has disconnected.

plemyl @11:30:00
has joined the conversation.

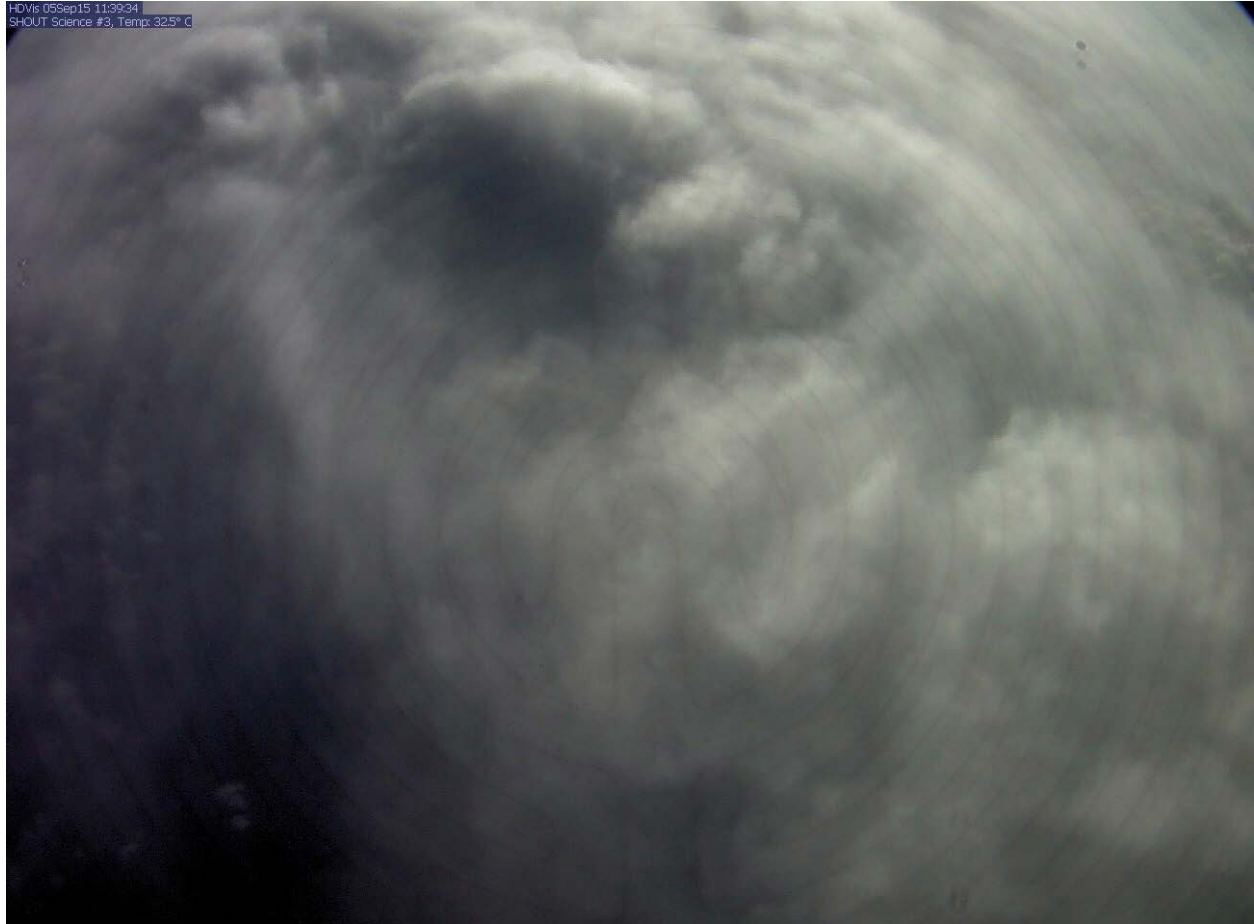
Newman_MS @11:34:34
Diverted a bit north of OKONU because of Wx. Some lightning and high tops.

At the bottom right, there is a "DayLight" header and a small image of the DayLight camera's view, with the text "HOVIS HEADER DayLight TimeStamp 2015-09-05T11:35:01.000Z Latitude".

1135Z Spoke with Tom and he is hoping to just file a region centered around the storm to optimize flexibility for our changes. He didn't see need to do wholesale changes at this point in the flight. Plenty of time to make the changes later in flight.

Scheduled flight time is only on the order of 21+ hours, so we have additional time over the storm to explore features. Want to avoid returning too early.

HD-Vis as diverting North of OKONU



1145Z Screen grab below

Dashboard - Mission Tools... | hdvix-20150905-113934144148... | http://www.es...nt_flight.bt | Airborne Science Web Disp... | mti.nasa.gov/group/shout

Global Hawk AV6 (N872NA) | 52,679.13 | Actions | 37,626, 71,280 | Dark (With RGB)

- U.S. Base Reflectivity Loop
- Lightning Products
- Satellite Products
- GOES Standard Products
 - GOES Infrared
 - GOES Visible
 - GOES Water Vapor Airm
 - GOES West IR 4km
 - GOES East IR 4km
- NRI, Satellite Products
- CIMSS/SSFC Satellite Products
- JPL TCG Products
- LARO Products
- Aircraft Payload
- Forecast & Model Products
- Tropical Cyclone Tracking
- Forecasted Tracks

235 nm

NEW YORK

GOES Visible - 2015-09-03T11:38:02Z(15-09-03T11:38:02 WEST/EAST)

MEXRAD Base Reflectivity (dBZ) - 2015-09-03T11:40:00Z

Connection | status | #70 | #62 | #300 | #3405

ejatice @ 11:38:38
If I make an ocean del run for breakfast anyone in the QHOC interested?

Newman_MS @ 11:37:49
Sure A b-fast burrito

ejatice @ 11:38:13
I'll come on over to take orders

Alang_PMT @ 11:41:45
has joined the conversation

Alang_PM @ 11:41:45
has quit...Quit: Client has disconnected.

N872NA

20150903 114031 UTC
SHOUT Science #3

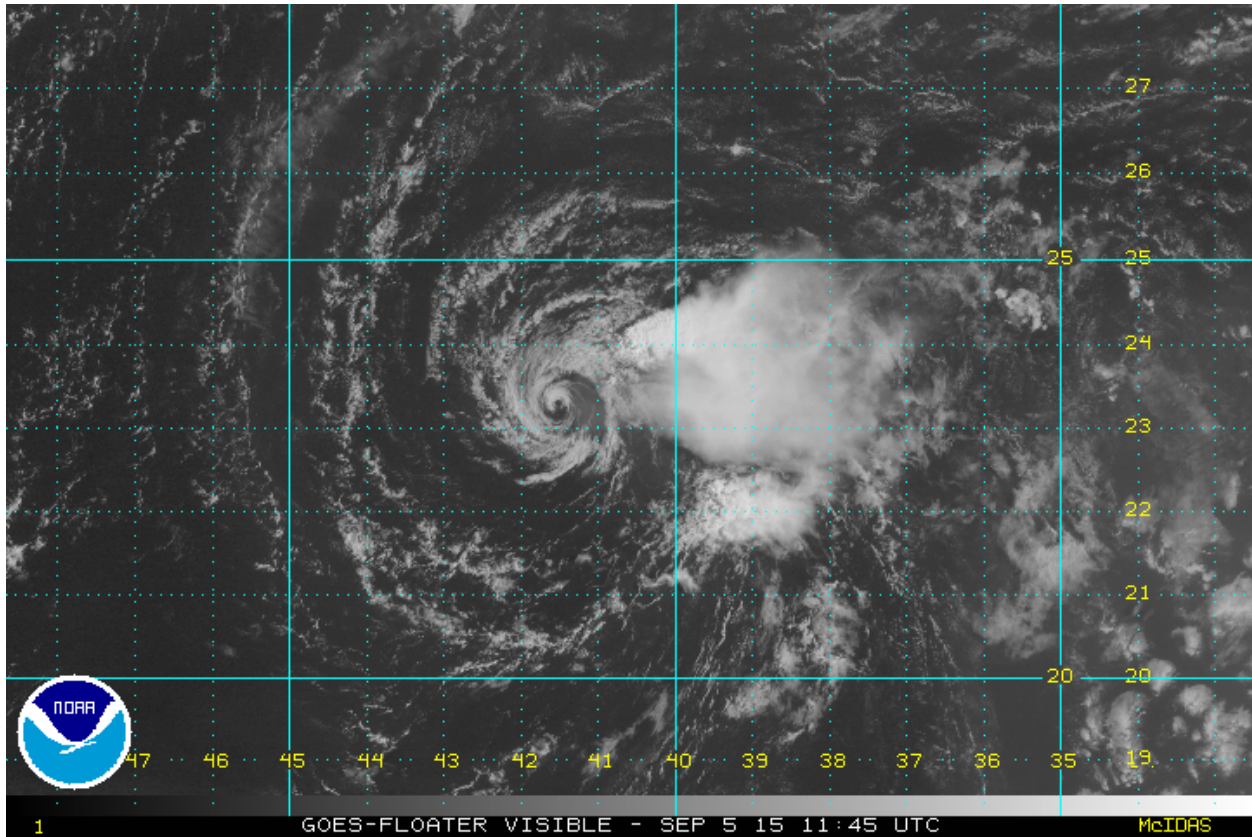
Dark (With RGB)

Dark (With RGB)



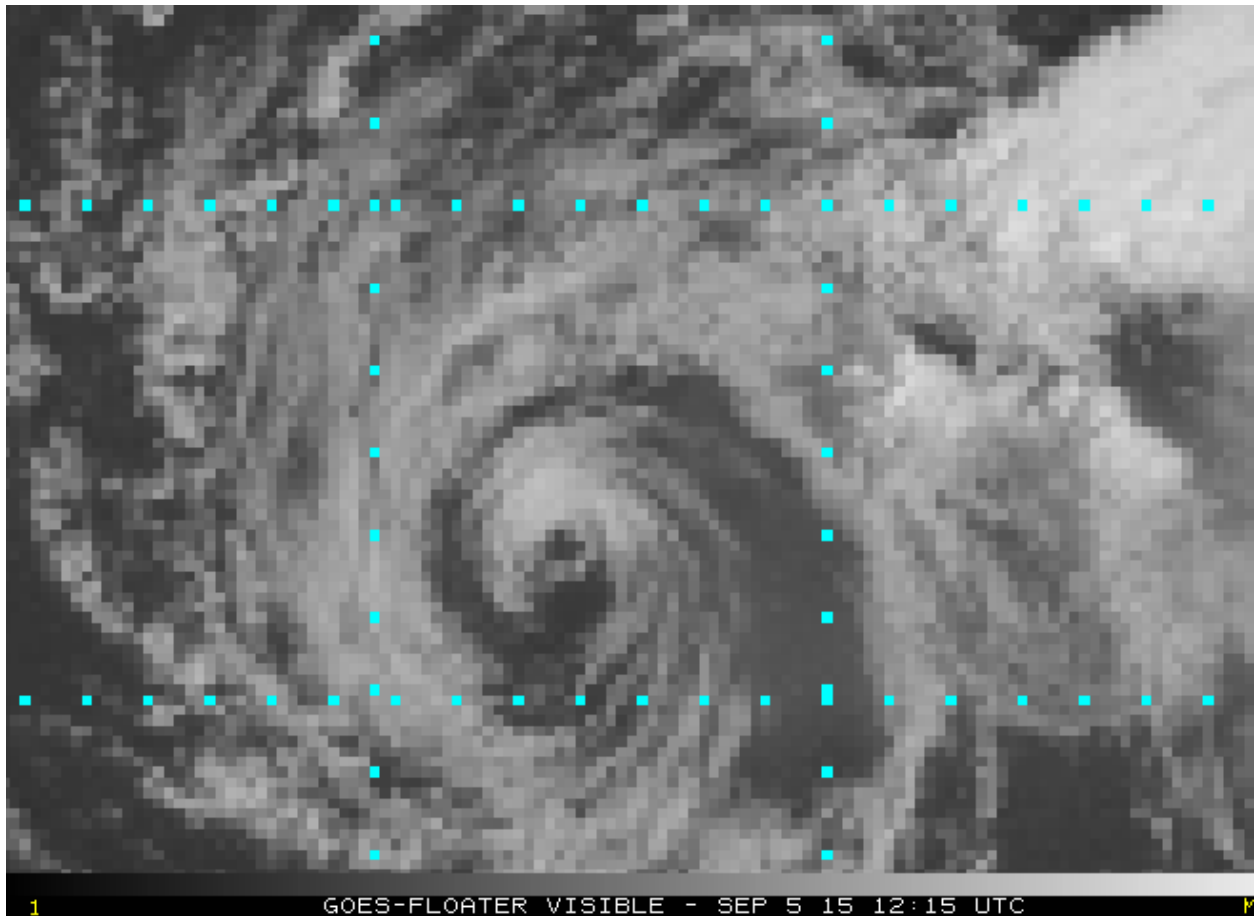
1214Z About 10 min to first drop

Visible image shows very well defined center. Less convection around center than earlier



1219Z Loading first sonde. Will make turn at waypoint then drop after

1225Z Drop 1 at location 1



1252 GOES 1215 UT shows a low level center at 41.6W, 23.3N

1319Z Sonde 2 loaded

1323Z Drop 2 at location 2

1340Z HIWRAP is cycling power - having issues

Added extra drop (11 on plan, and a corresponding new waypoint 7) to catch region between existing line and the start of the pattern.

1351Z Drop 3

DayLight 05Sep2015 13:52:59 UTC
SHOUT Science #3



1404Z Drop 4 - Good launch

1414Z Loading Sonde 5

1419Z Drop 5 - good launch

Ku and iridium issues at time of launch

1433Z Drop 6 - good launch

Nick made comment that "one of his commands went through"

Uploaded update 2 to flight track to alter first large SE center crossing and the following NE butterfly short segment

DayLight 05Sep2015 15:37:00 UTC
SHOUT Science #3



1443Z Loading for drop 7
AVAPS having issue with load
going to miss precise location

Nick reports that had a double load. Sonde is loaded in tube but not active. Need to eject before can start a good load.

Will wait until location 8 and try to get both bad sonde and new good sonde out. Now hearing that there is a passing 777 and we won't be able to release at location 8 at all.

From the 11 EDT NHC Fred Discussion:

Fred has been decapitated again by strong westerly wind shear. However, the low-level circulation continues to be vigorous. The initial intensity remains at 35 kt, based on satellite estimates and continuity. I will not speculate any more about the convection redeveloping or not. The NHC forecast calls for little change in intensity during the next 36 hours. If resilient Fred survives the next day or so, there is a chance of slight re-intensification as indicated by the SHIPS/GFS and SHIPS/ECMWF intensity guidance.

1507Z Continuing with cross track issues. Unclear on AVAPS status

Will need to skip next location as well (location 9)

Nick now reports that thinks can talk to the sondes, but requires turning off AVAPS. Sondes will have to terminate (no D-files) and then will have to restart AVAPS to treat remainder normally. Thinking better to get the two sondes out in rapid succession to allow time to reset system before progressing too far into the heart of Fred

Paul Newman reports low level center at 23.41N, 41.60W at 1445Z GOES Vis
Over last hour this is a 9 kts @305 heading

1526Z Air traffic issues continue and will not be able to drop at point 10 either

1537Z

1540Z Next drop in 6 minutes. Will not be a D-file for this drop due to previous load issues

1545Z Sonde 7 released

1546Z next sonde loaded (sonde 8)

1547Z Sonde 8 also released and clear

Sondes 7 and 8 will need to splash before AVAPS can be reset for normal operations

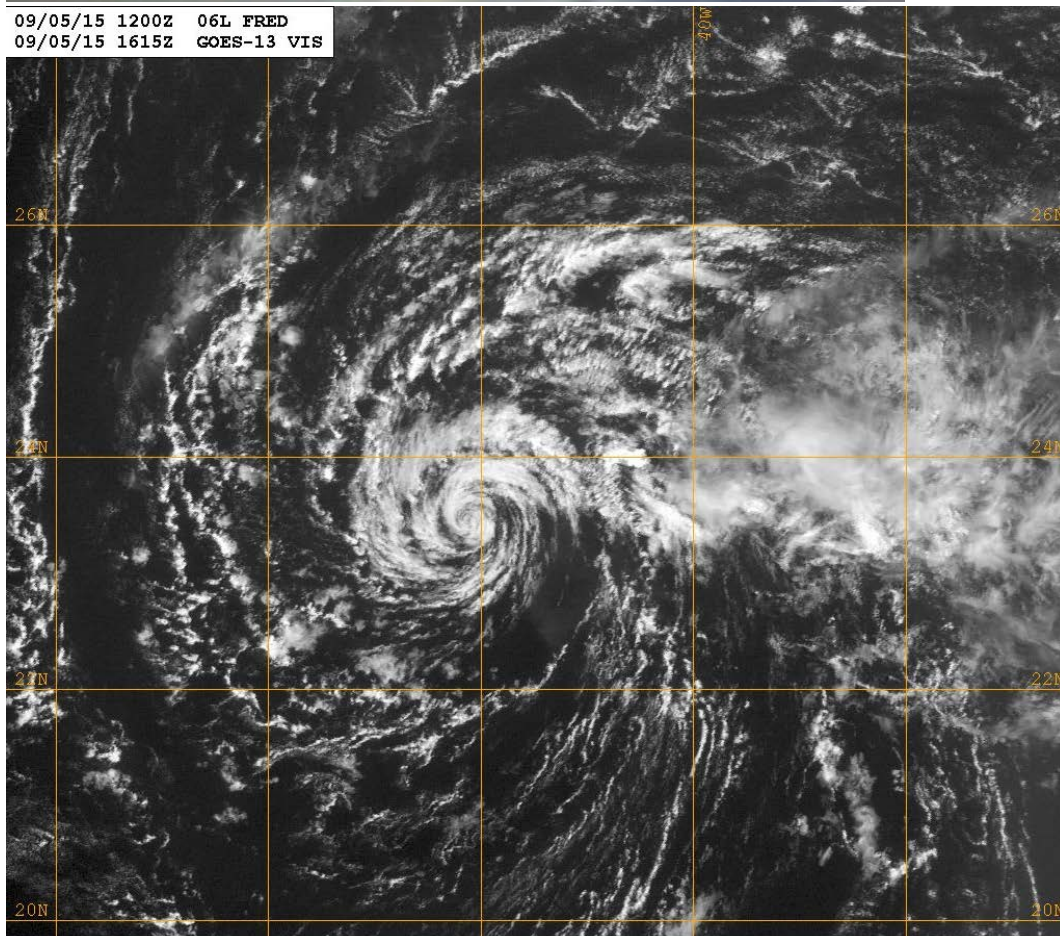
1615Z Sonde 9 released - good launch

1619Z Daylight camera:

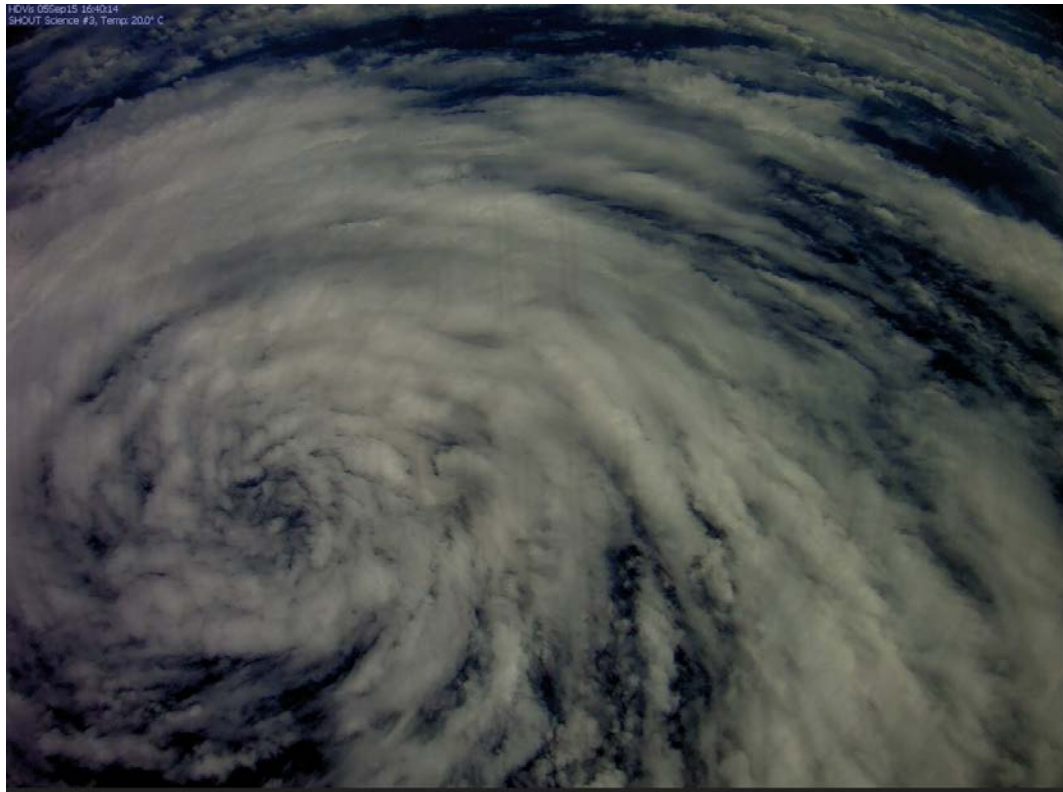
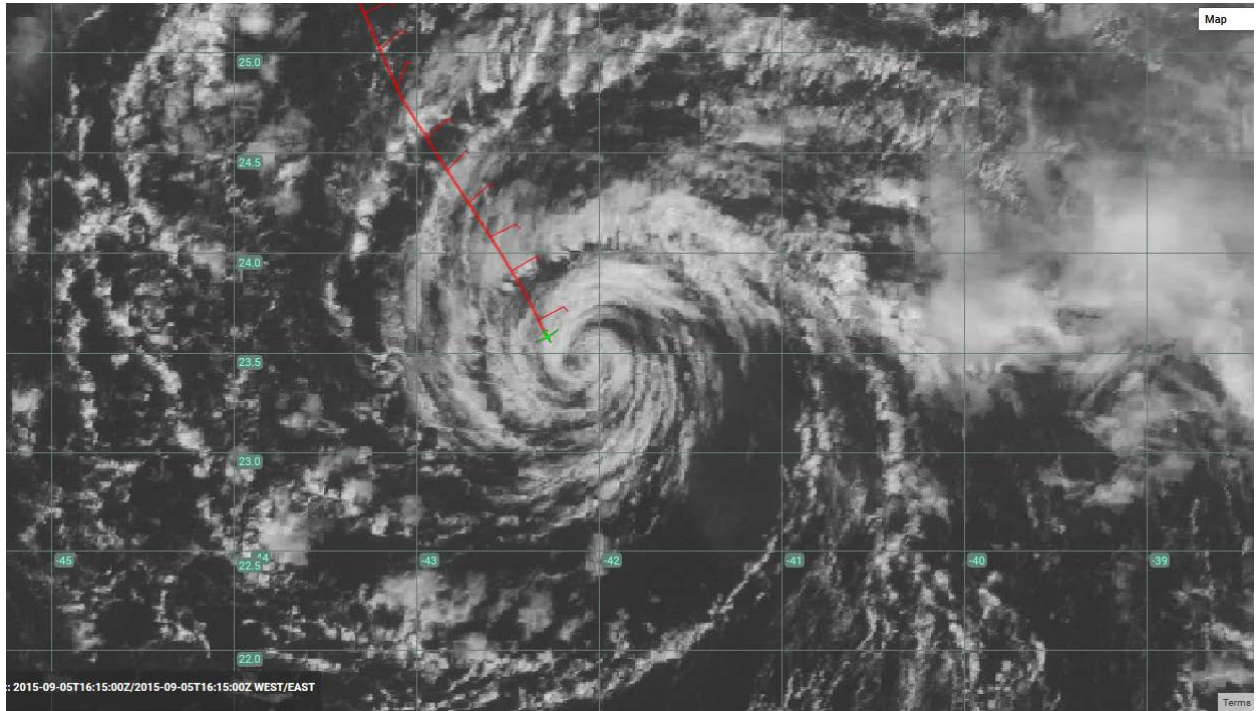
DayLight 05Sep2015 16:19:24 UTC
SHOUT Science #3

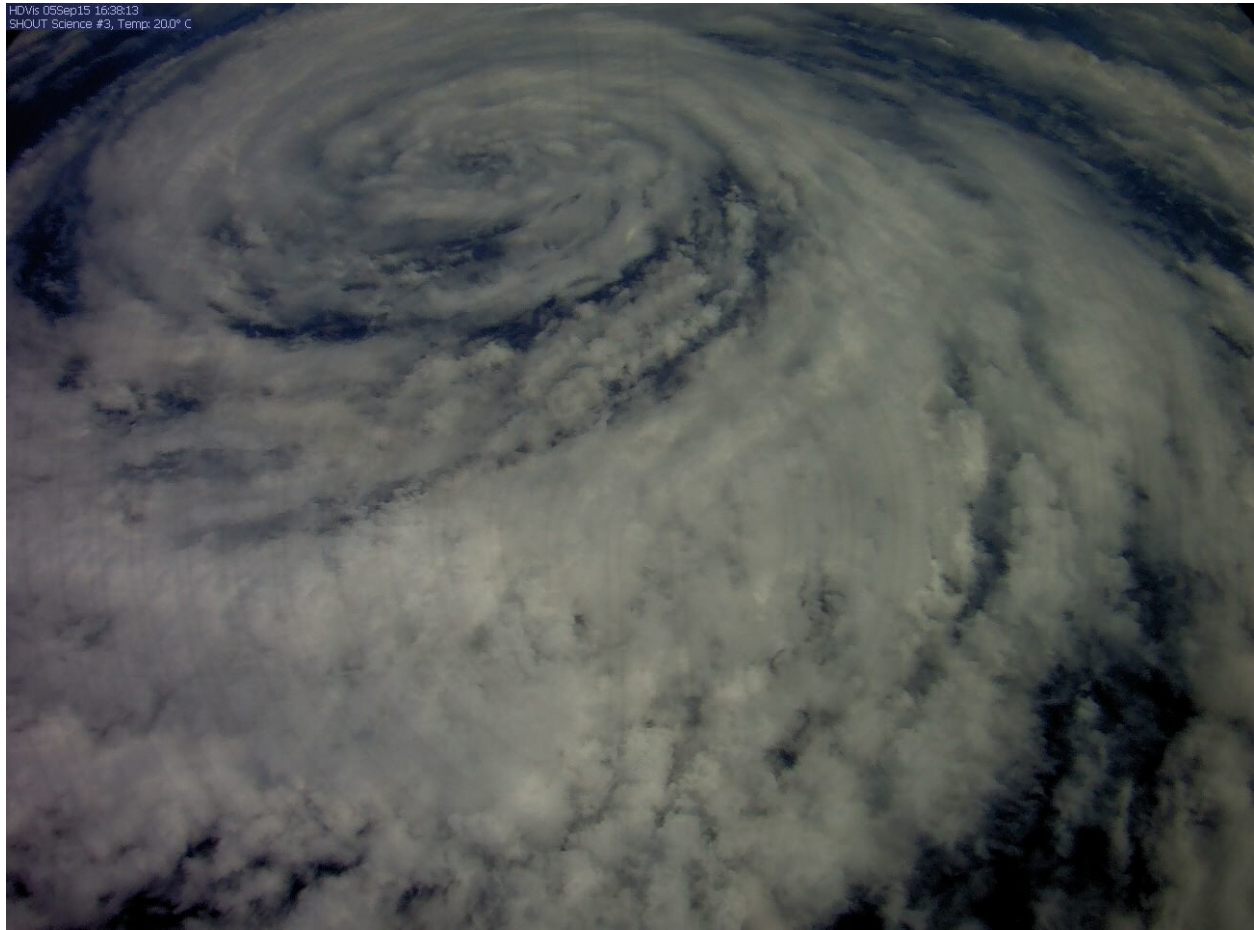


1624Z Drop 10



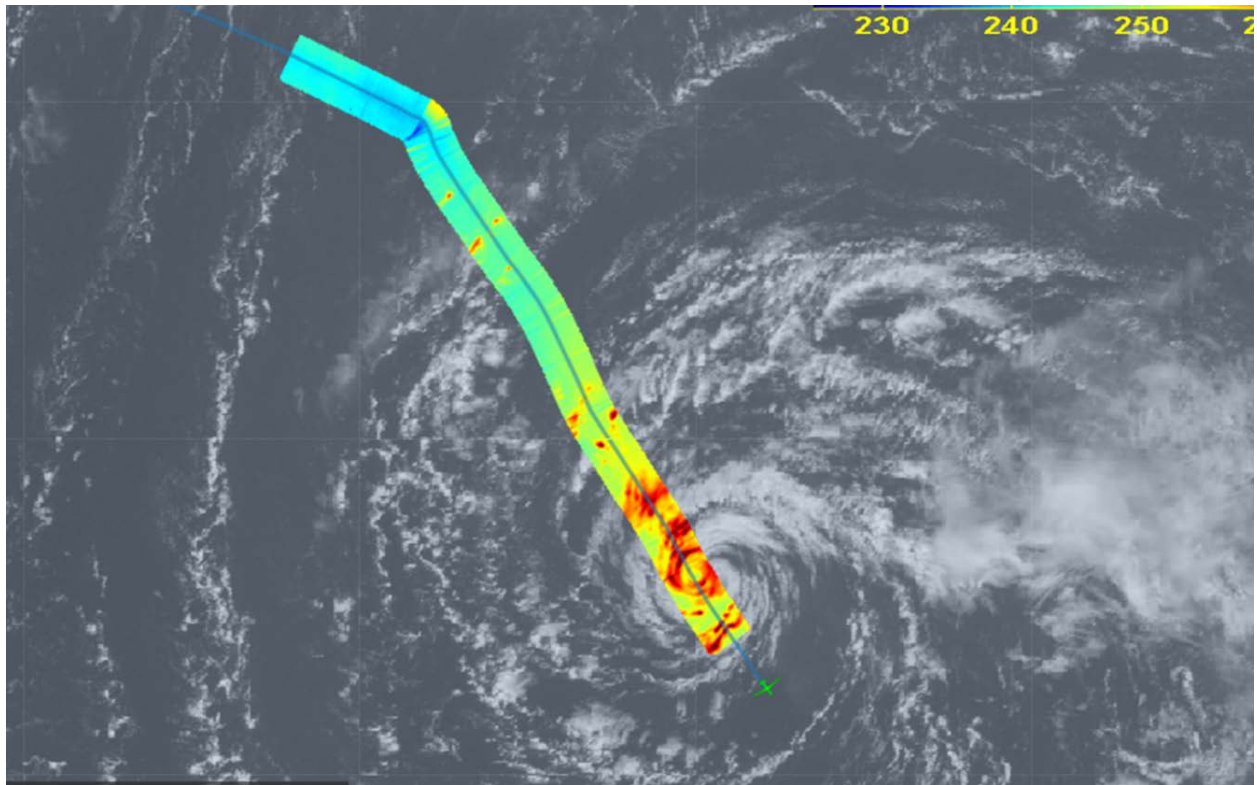
1632Z Drop 11





1639Z

HAMSr image from first pass over center below:



1726Z- AVAPS system failure. Same problem as for Erika flight. Sondes jammed in dispenser. 2+ hr spent in diagnosis and efforts to free up mechanism. No luck. flight pattern redrawn to fly over convective targets, which are few.

1800- HIWRAP GPS failure prevents real-time data software from functioning. Data recorded for post flight, but no real-time images. Matt created make-shift vertical display for real time viewing of Ka and Ku targets.

HDVls_05Sep15_2015_38
SHOUT Science #3, Temp: 20.0° C



2015Z

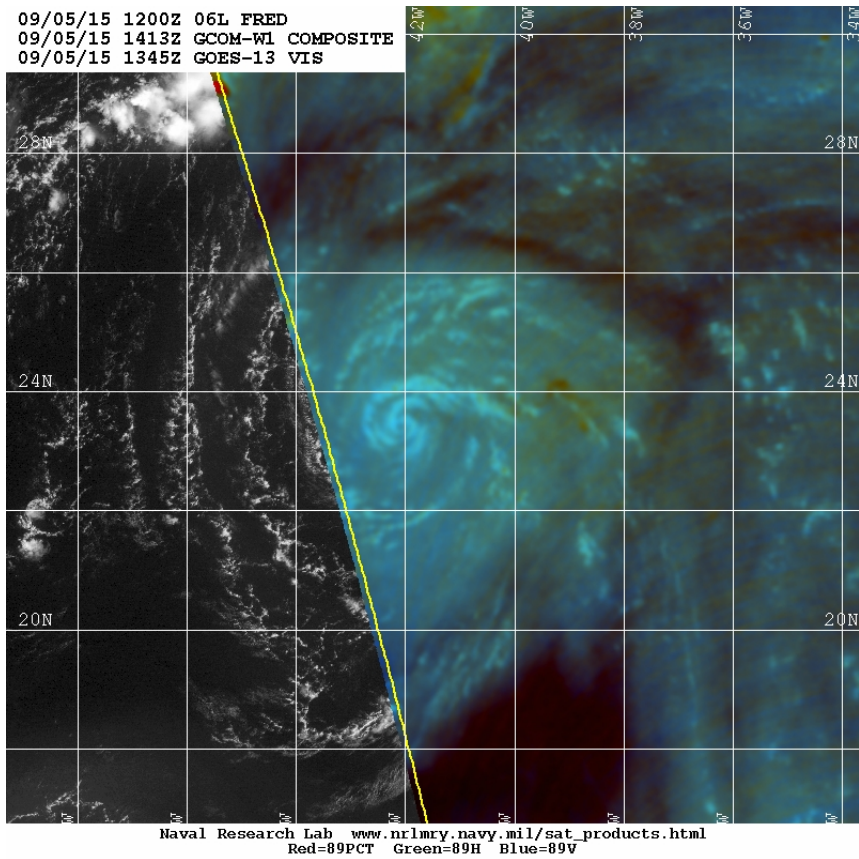
HDVls_05Sep15_2016_19
SHOUT Science #3, Temp: 20.0° C



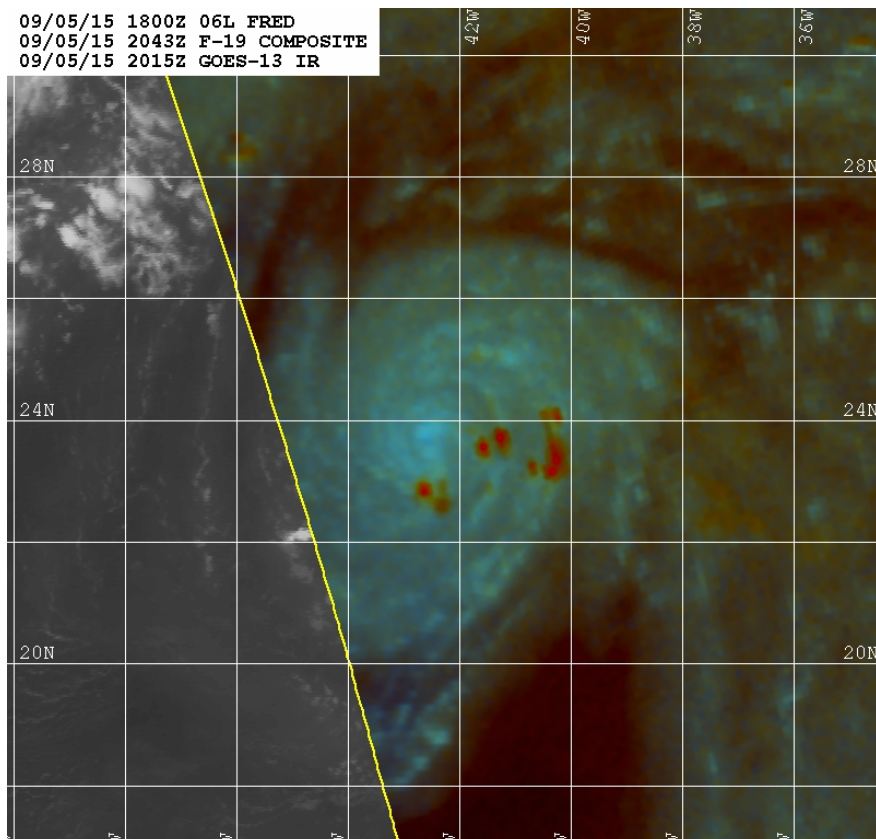
2016Z



2017Z



09/05/15 1800Z 06L FRED
09/05/15 2043Z F-19 COMPOSITE
09/05/15 2015Z GOES-13 IR

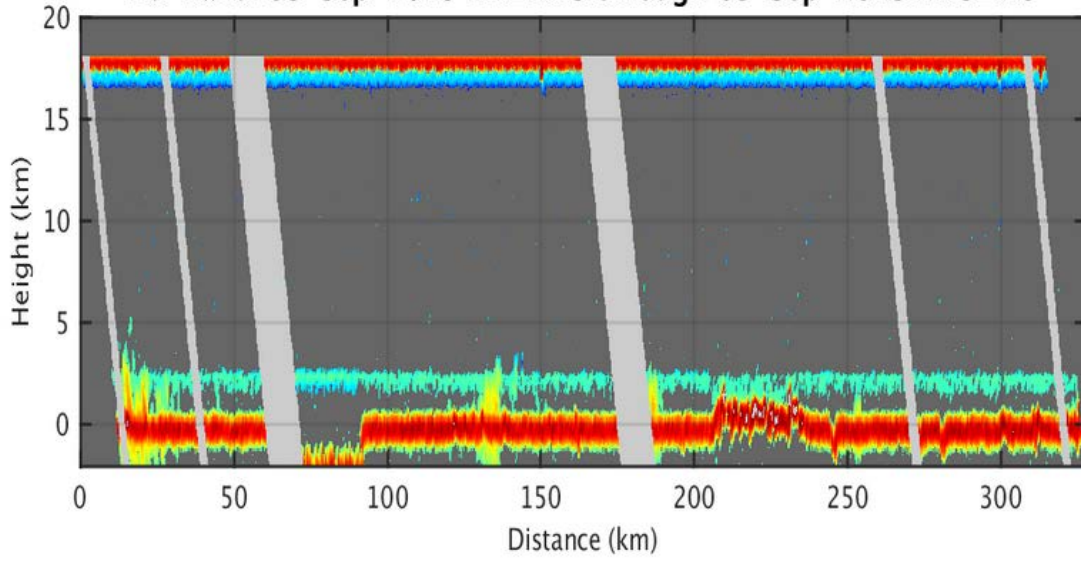


Naval Research Lab www.nrlmry.navy.mil/sat_products.html
Red=91PCT Green=91H Blue=91V

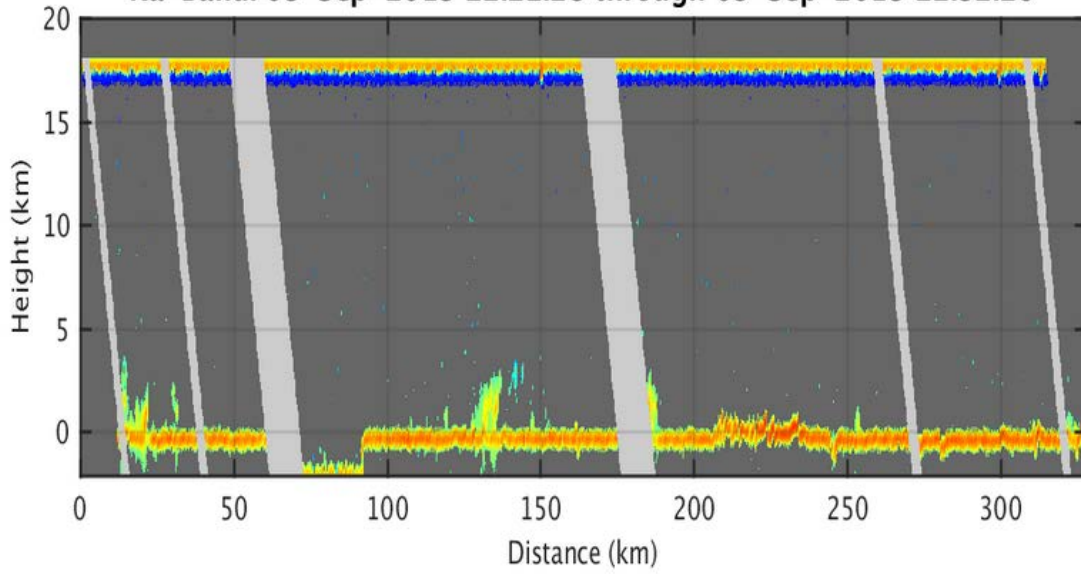
Series of small Fig 4 patterns introduced in the hopes of capturing convective events and documenting shallow towering Cu.

Have been able to get some HIWRAP imagery from Matt

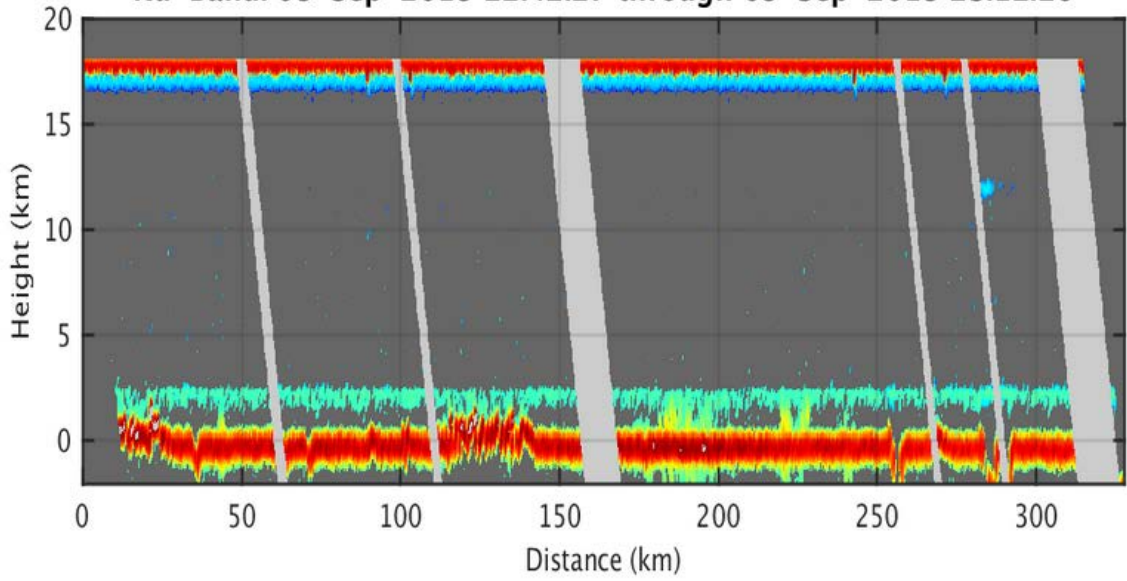
Ku-Band: 05-Sep-2015 22:22:28 through 05-Sep-2015 22:52:26



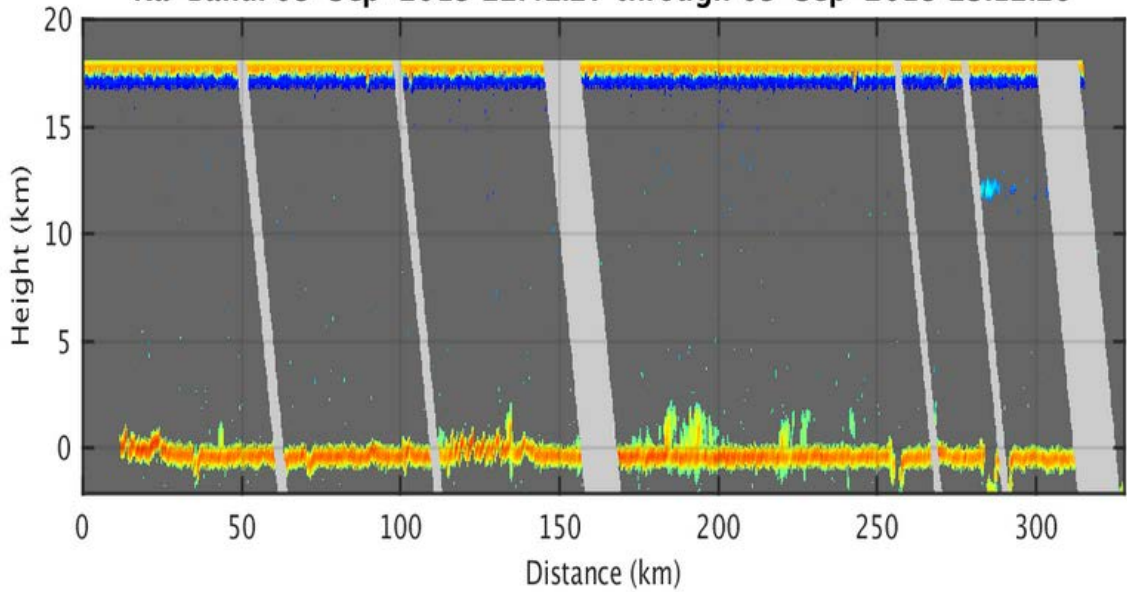
Ka-Band: 05-Sep-2015 22:22:28 through 05-Sep-2015 22:52:26

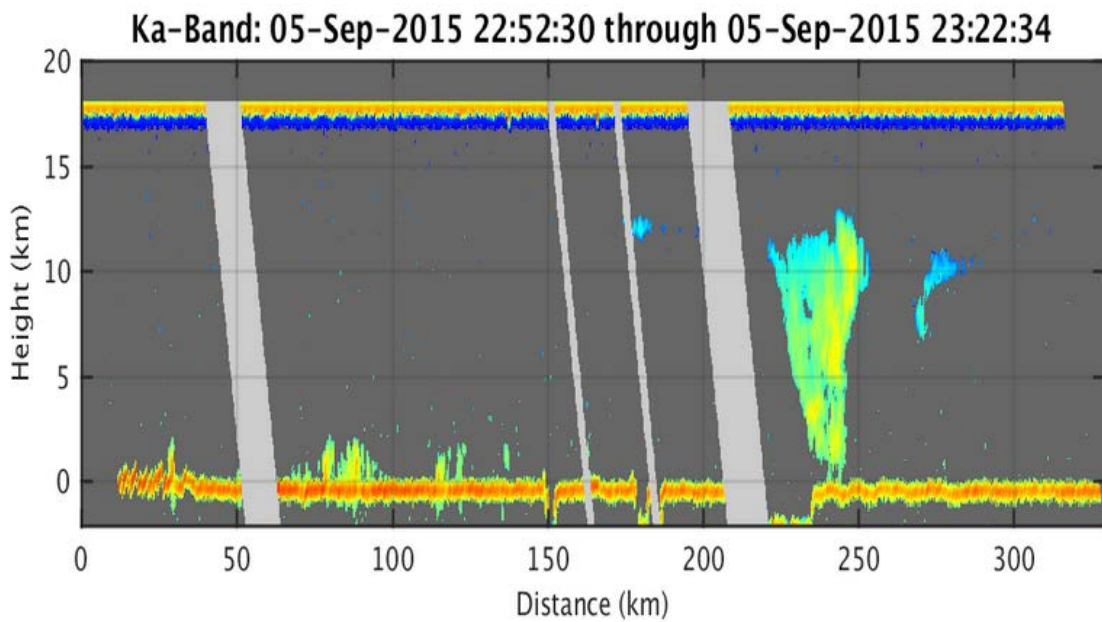
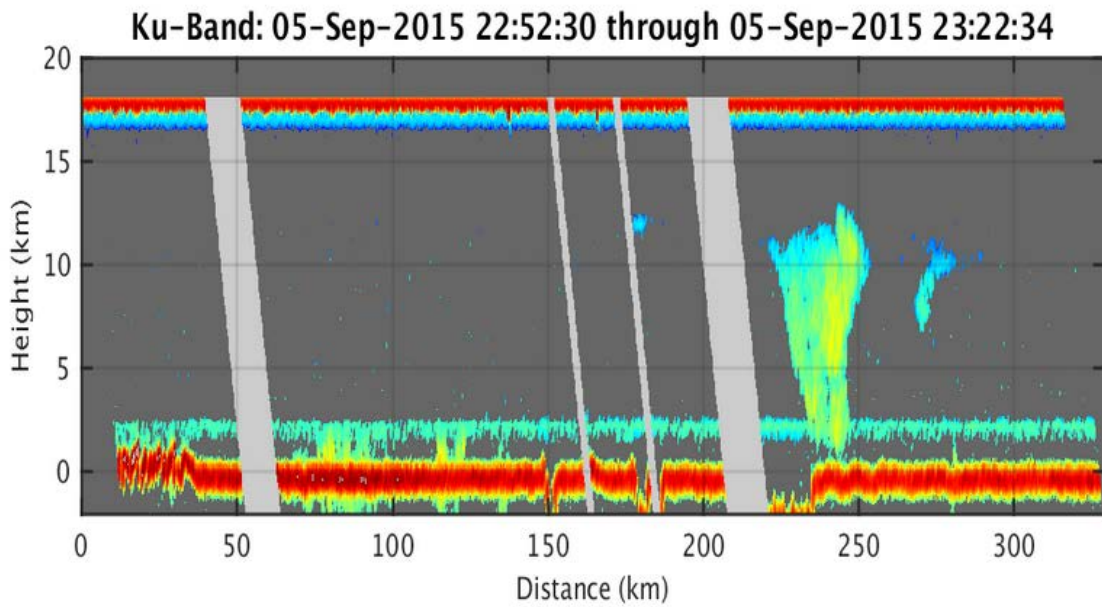


Ku-Band: 05-Sep-2015 22:42:27 through 05-Sep-2015 23:12:26



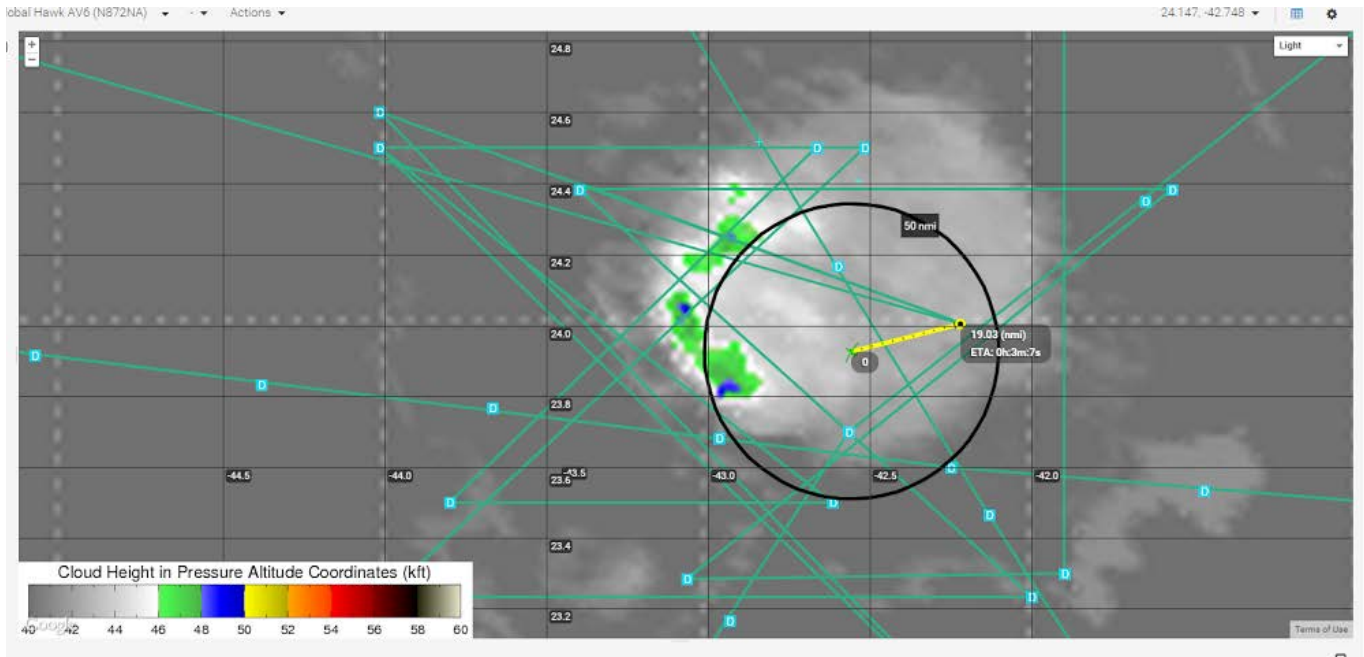
Ka-Band: 05-Sep-2015 22:42:27 through 05-Sep-2015 23:12:26





02:20Z

Diverted to convection north of center. After racetrack pattern put in place, plane was diverted to the north of the convection due to cloud tops exceeding 55 kft and frequent lightning. Image below shows convection after its peak and the plane on it return to the NW through the remaining convection.



02:28Z

HIWRAP is down. Performing a power cycle of the system. Unfortunately missed main part of convection during the power cycle. However, one more race track pattern will be done before we leave this region.

02:50Z

Here is 11pm NHC discussion on Fred

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WTNT41 KNHC 060245

TCDAT1

TROPICAL DEPRESSION FRED DISCUSSION NUMBER 29
 NWS NATIONAL HURRICANE CENTER MIAMI FL AL062015
 1100 PM AST SAT SEP 05 2015

After being devoid of convection for about the past 12 hours, a new burst of thunderstorms has begun near the center of Fred. Cirrus clouds motions suggest that shear remains fairly strong near the center of Fred, although seemingly less than this time yesterday. The initial intensity will remain 30 kt, in line with the TAFB satellite estimate. Shear is expected to diminish in about a day, which could allow the cyclone to reintensify around that time while it moves over warm waters. However, any intensification is expected

to be short-lived with marginal water temperatures and increasing shear likely by Wednesday. The NHC forecast is close to the previous one through 48 h, and is reduced a little bit at long range to reflect the less favorable conditions.

Fred is moving northwestward at about 9 kt into a break in the subtropical ridge. The depression should turn to the north and then northeast during the day on Sunday while the cyclone moves on the northwestern side of the ridge, with that motion expected to continue for a couple of days. Model guidance is generally faster during this time, and the new official forecast is faster than the previous one. The cyclone could turn then eastward and southeastward on days 4 and 5 due to ridging building over the northeastern Atlantic. The track forecast is of low confidence at long range due to considerable uncertainty about the strength of the tropical cyclone and the evolution of the ridge. There have not been any big changes to the model consensus, so the official forecast is basically an update of the previous one at 96 and 120 hours.

FORECAST POSITIONS AND MAX WINDS

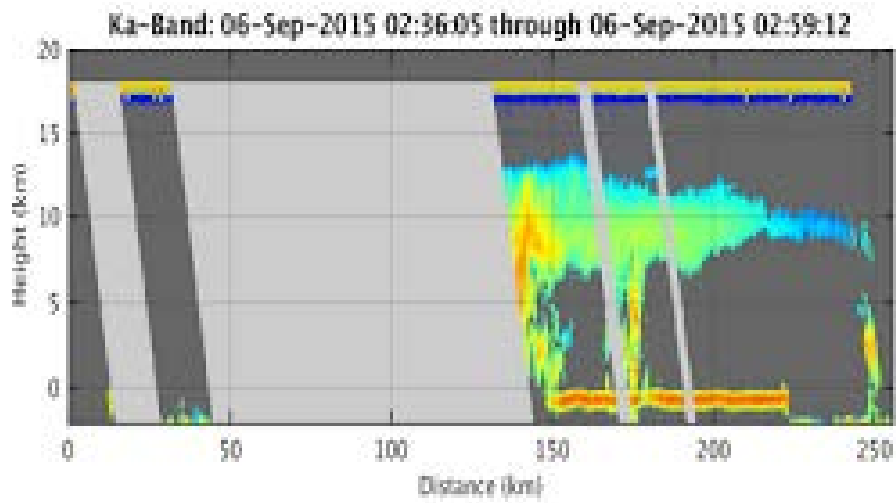
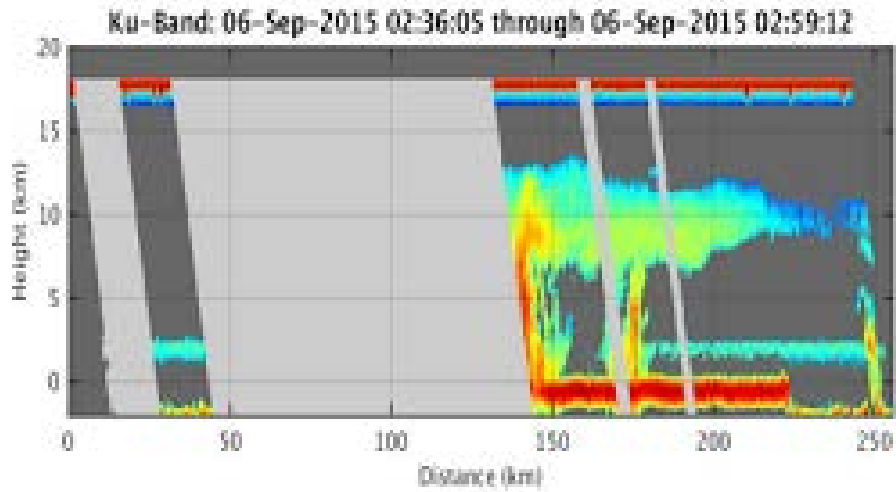
INIT	06/0300Z	24.1N	43.1W	30 KT	35 MPH
12H	06/1200Z	24.8N	43.3W	25 KT	30 MPH
24H	07/0000Z	26.4N	42.5W	25 KT	30 MPH
36H	07/1200Z	28.0N	41.0W	30 KT	35 MPH
48H	08/0000Z	29.5N	39.2W	35 KT	40 MPH
72H	09/0000Z	32.0N	36.0W	35 KT	40 MPH
96H	10/0000Z	32.5N	33.0W	35 KT	40 MPH
120H	11/0000Z	31.5N	31.5W	35 KT	40 MPH

\$\$

Forecaster Blake

02:57Z

Will continue racetrack pattern over convection for one more trip around. HIWRAP is producing the following results.



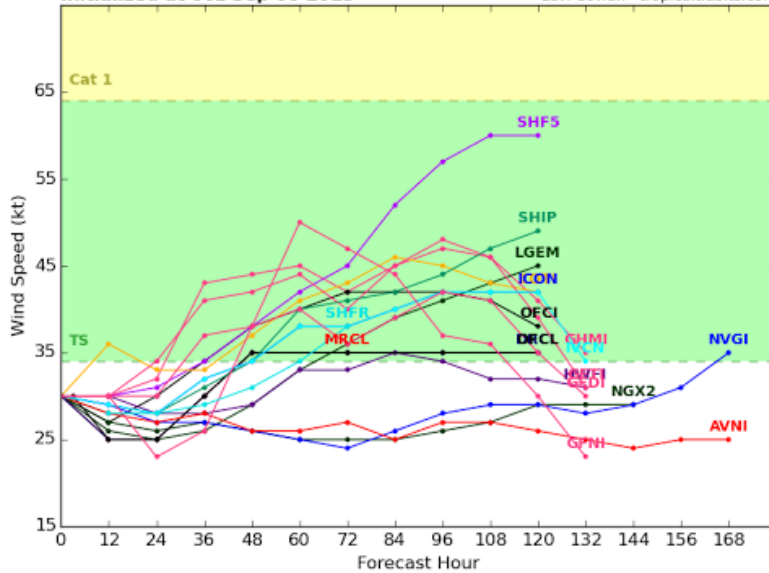
03:18Z

Here is the latest intensity guidance and model track forecasts for Fred

Tropical Depression 06L Model Intensity Guidance

Initialized at 00z Sep 06 2015

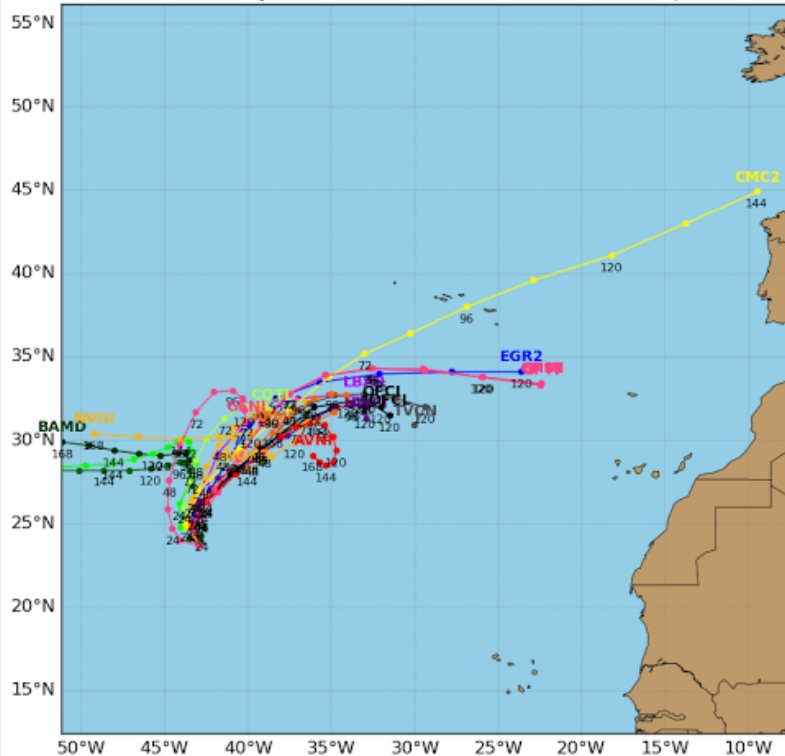
Levi Cowan - tropicaltidbits.com



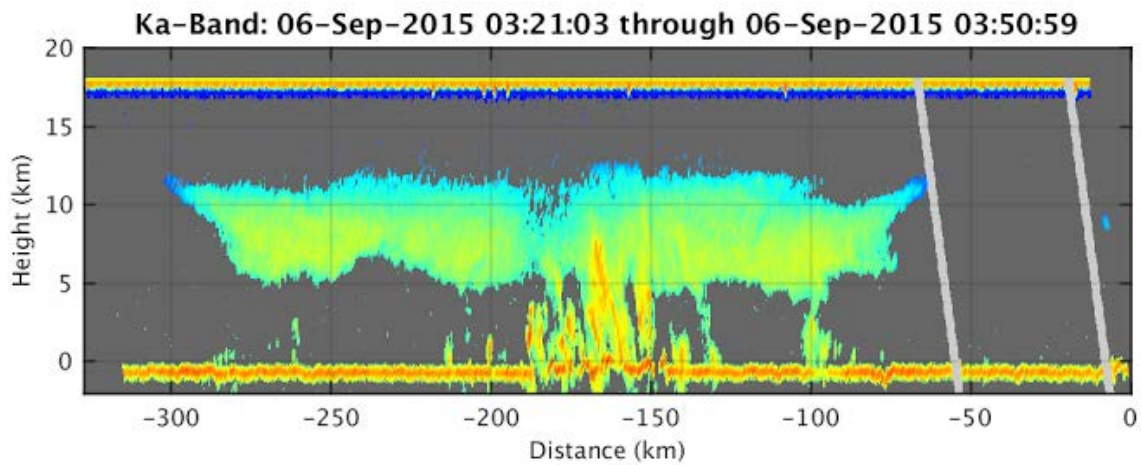
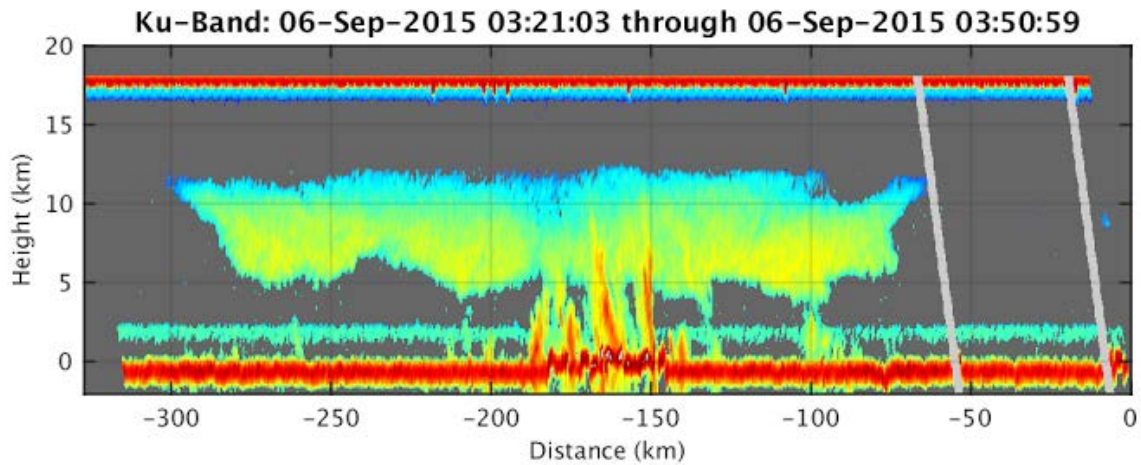
Tropical Depression 06L Model Track Guidance

Initialized at 00z Sep 06 2015

Levi Cowan - tropicaltidbits.com



03:46Z More HIWRAP data from last pass over convective region just northeast of center. Note that distance units have been changed from previous images. Zero on the right indicates the most recent radar returns.



03:55Z

Making one more racetrack pattern around convective region. Pilots are assessing fuel to determine if this is our last trip around the convection.

04:17Z

Lost comms with aircraft since 4:05Z so plane is moving away from the racetrack pattern to the southeast.

04:27Z

Still no communication with aircraft.

04:37Z

Plane is turning but appears no comms with the aircraft.

05:07Z

Ku automatically turned off around 04:50Z. Plane returning to LostLink point.

05:47Z

A summary from Dave F. on the aircraft comms problem. Currently instruments have power but Ku remains shut down.

- 05:38:55
- OK, here's what's happening here... at around 0414 all Iridium and the Inmarsat connections dropped with the aircraft and payloads. Troubleshooting indicates the problem is with local analog phone lines from the GHOC-E to the respective Satellite Gateways. 30+ minutes later the GH executed a Lost-link RTB course reversal, as seen on the MTS display. At 0450 the Payload MPCS shut down all Interlock's (per it's own
- [dfratello1](#) 05:38:56
- "lost link" programming) which shut down the Ku SMA unit, terminating Payload KU from the aircraft. When that happened aircraft position reporting on MTS halted.
- [dfratello1](#) 05:40:51
- The Aircraft Inmarsat has a local satellite terminal capability, not needing phone connections, and that has reconnected the Front Room to the aircraft -- pilots have control of the aircraft. We still have no Iridium connections on the Payload site -- Dodie is working options to use the AFRC GHOC Iridium modems to connect.
- [dfratello1](#) 05:41:43
- Summary - aircraft appears healthy, heading home. Payloads are up and operating, with exception of HIWRAP Radar which was disabled when the Interlock's went off.
-

07:19Z

For the descent, the plan is to turn off power to instruments and descend all the way to 12 kft rather than to 45 kft. Not sure if power can be restored to instruments with current comms issues so to prevent cold soak of instruments at 45 kft, the plane will descend to the lower altitude.

There is possible issue with local weather. Clouds and rain are occurring offshore just to the SE of Chincoteague Island and moving slowly toward WFF.

0813Z NASDAT just came up, so the aircraft position updated. the aircraft is about 800 nm out to sea. Hence, expect landing around 6:30-7AM if local WX remains good.

Had 4 links up, but were still missing remaining two for MPCs. Ron Walsh confirmed that had been a phone issue off base. Dodie working to try and regain MPCs.

0925 380 nm offshore right now. A bit of convection off the mouth of the Chesapeake, but seems to be falling off.

1005 Approaching W-386. Plan remains to initiate descent as soon as enter. Will descend all way to 12000 ft

1010Z Able to power down HIWRAP and payloads directly rather than an all off. Didn't regain Ku, but more graceful than all off

1012Z All off. Ready for descent.

1014Z Clearance to descend to 12000

1028Z Mission reports about 2 minutes from gear drop

1032Z Gear down, at 12000 ft. Starting power up of payloads. Took about 20 minutes for descent

1034Z LIP on. Go for landing

Touchdown at 1049Z.