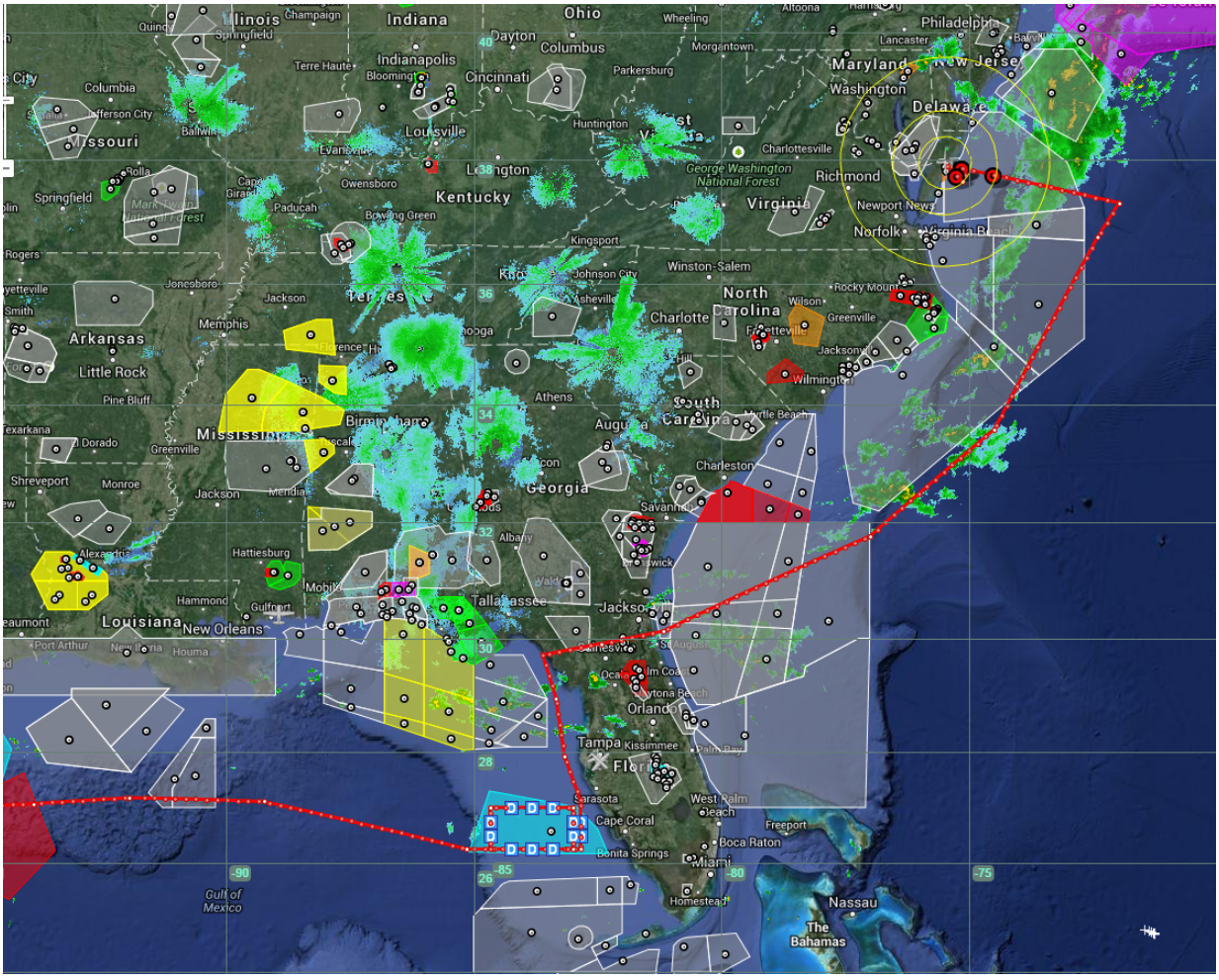
Hurricane and Severe Storm Sentinel (HS3) Mission

HS3 2014-09-28 Flight Report: GLOBALHAWK AV-6 Transit from WFF to AFRC

Flight Scientist shifts:

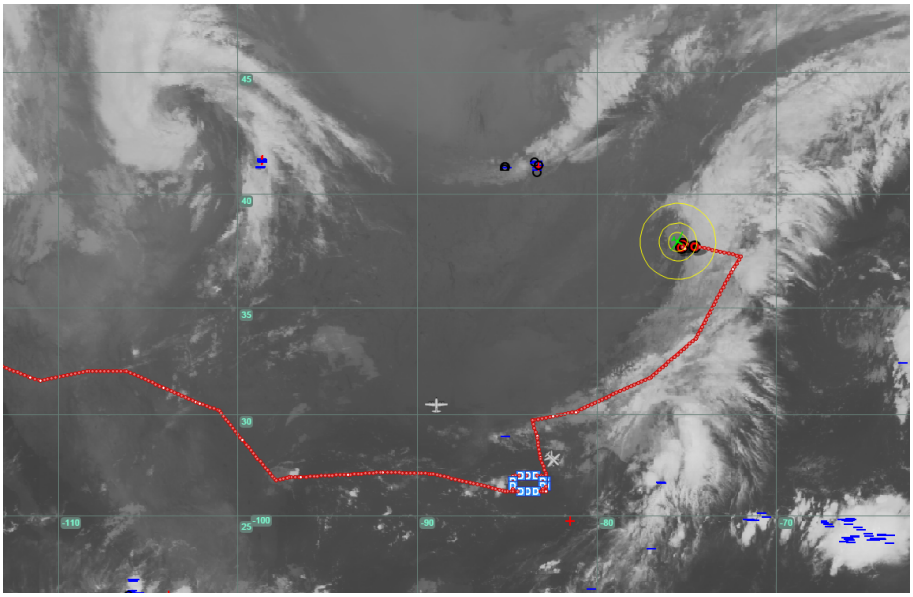
Name	Time
Braun	1000-1600 UTC
Newman	1500-1800 UTC
Black	1800-2200 UTC

Mission goal: Transit back to AFRC with G-IV intercomparison in the warning area (W-168) southwest of Tampa. The goal of the intercomparison is to provide data so that the G-IV can make sure their flight level winds are correct and to provide additional validation data for the GH sondes.

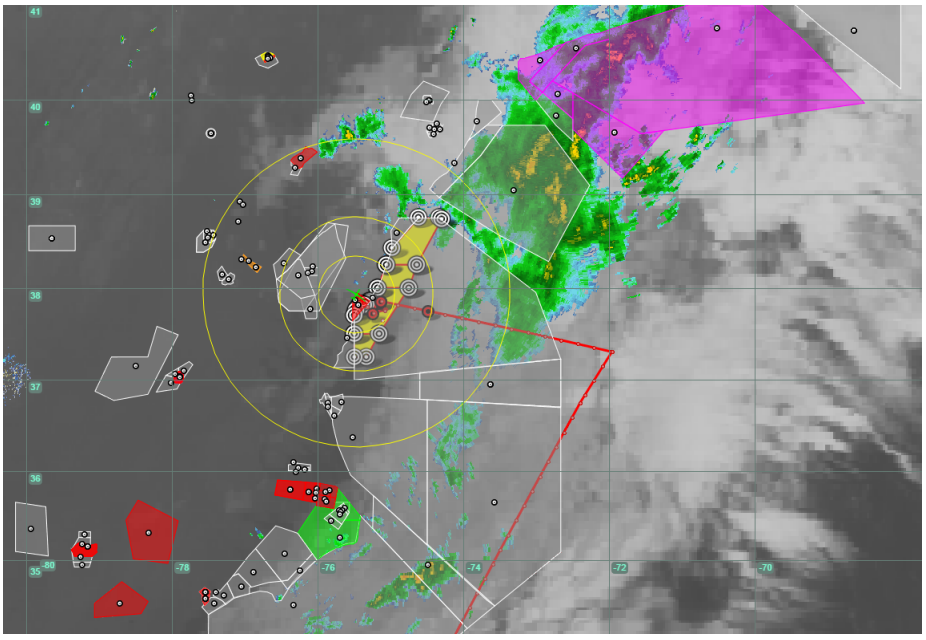


1037 Engine start

1049 Pin pull



1052 GOES IR image shows that the first part of our track will pass over the frontal region off the East Coast.

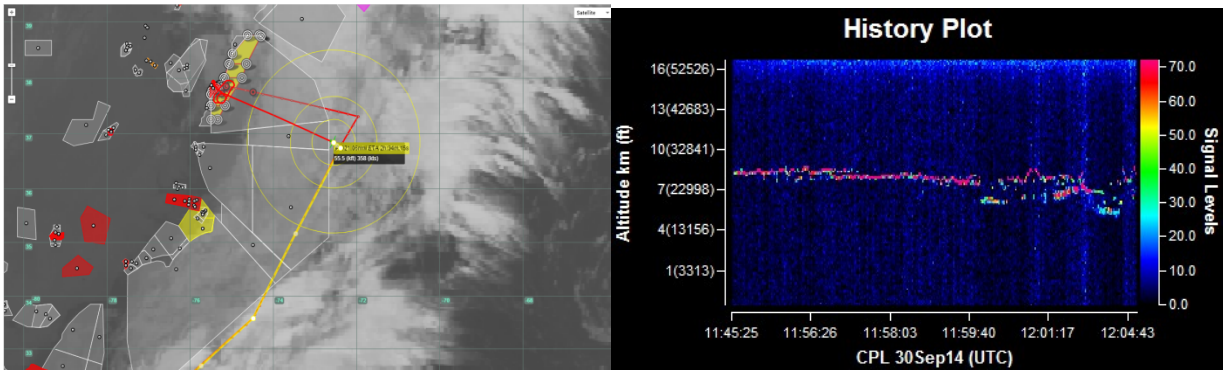


1056 The warning areas and VACAPES test tracks are shown above with GOES IR and NEXRAD radar. We will be ascending in the region just west of the deeper clouds and precipitation associated with the front.

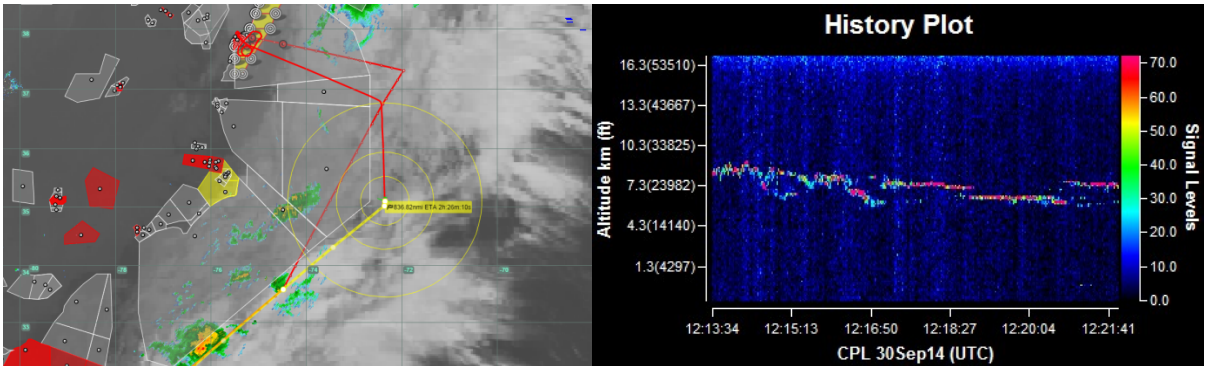
1059 Go for taxi

1107 Takeoff—Approximately 3h40m to the G-IV intercomparison region (W-168).

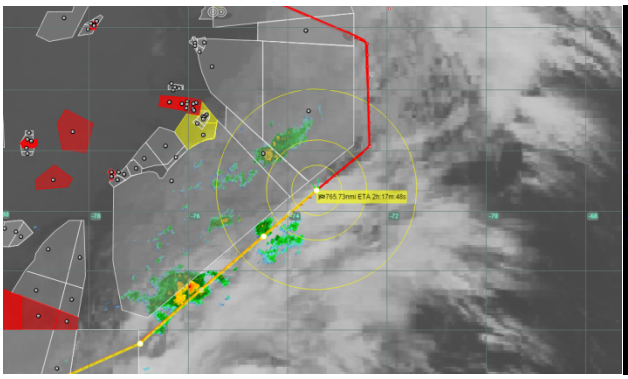
Daylight camera working for this flight. This is an image a short time after takeoff.

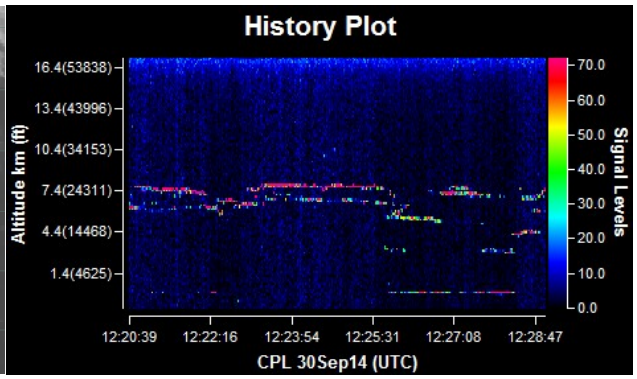


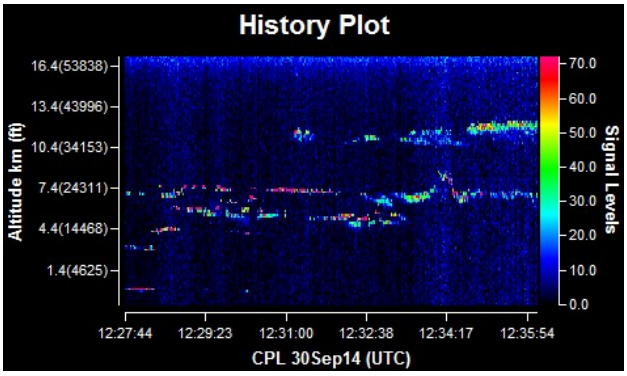
1207 CPL image shows the fairly uniform stratiform cloud deck at a height of 26-27k ft along the ESE bound leg from the test track. Beginning the southbound turn toward Florida. Currently at 55k ft pressure altitude.



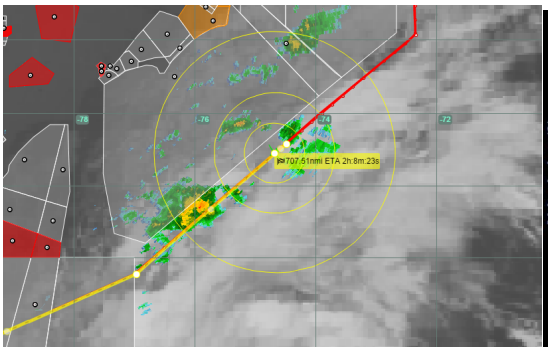
1222 Beginning turn to the SW. CPL shows slightly lower cloud deck than previous leg.

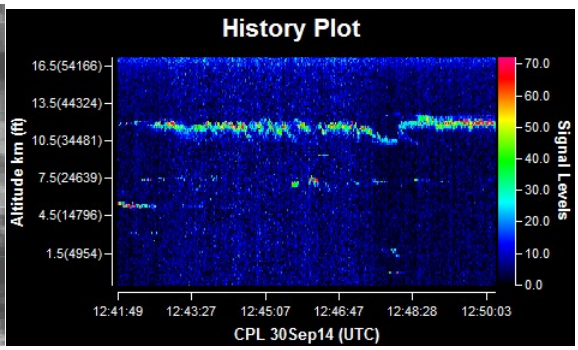




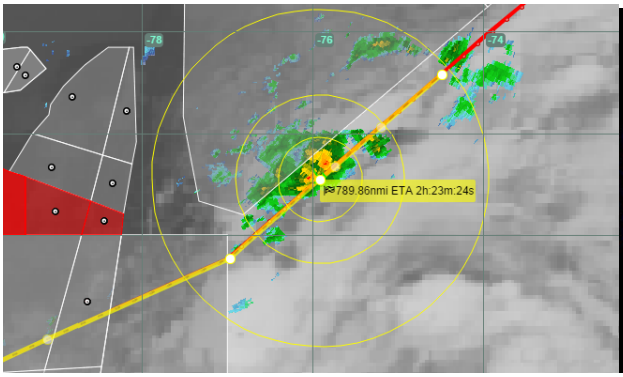


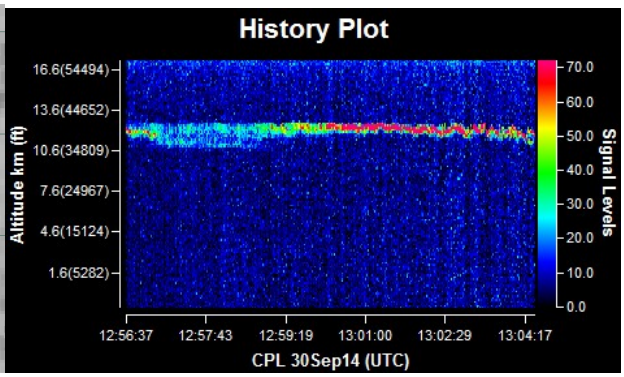
1235 Transition in cloud deck to more broken deck, multiple layers visible in CPL image.



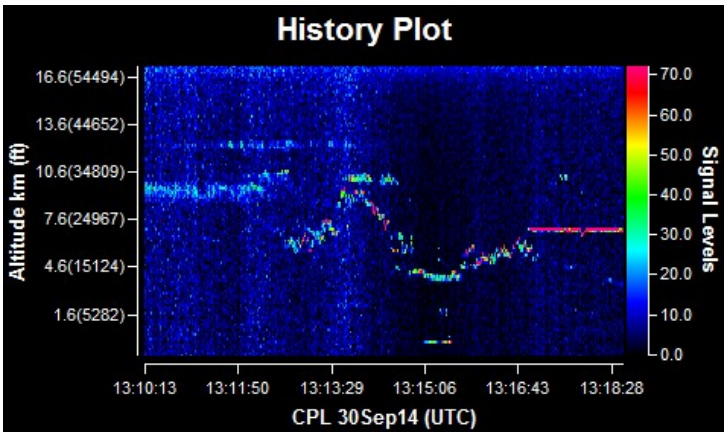


1251 Just passed over a region of light precipitation. CPL shows cloud tops near 39k ft. Daylight camera view is taken after passing over the feature. Approaching a more intense precipitation region. Cloud top height product shows no tops above 40k ft for this precipitation feature.

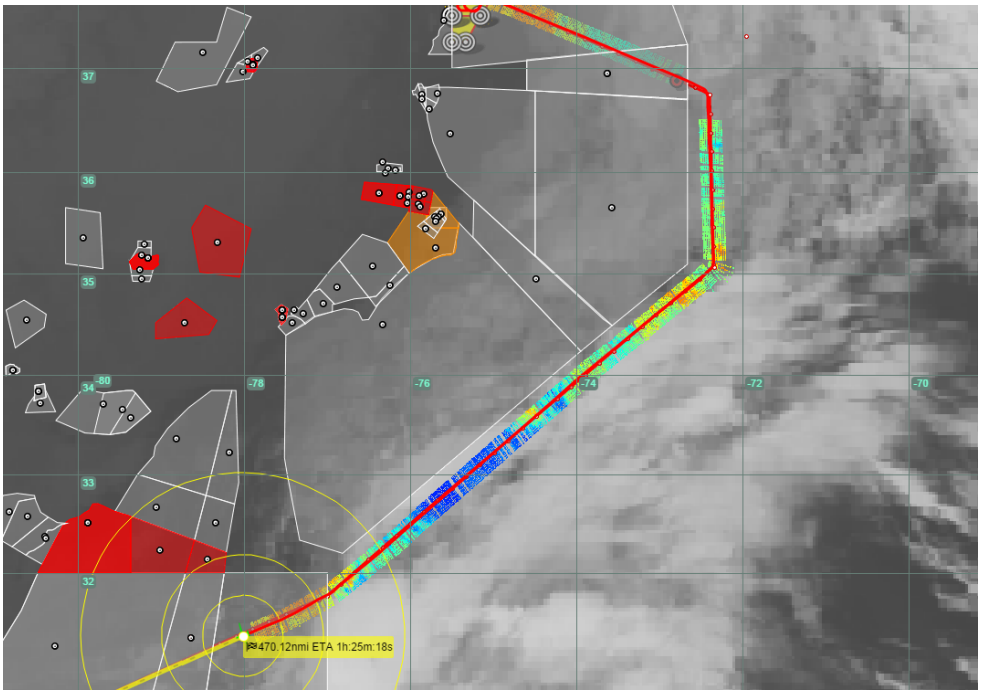




1305 Passing over area of heavier precipitation. CPL shows solid deck at 40k ft. Daylight camera views are for times when directly above (left) and just south of the precipitation region. Looks like a significant break in the clouds ahead.



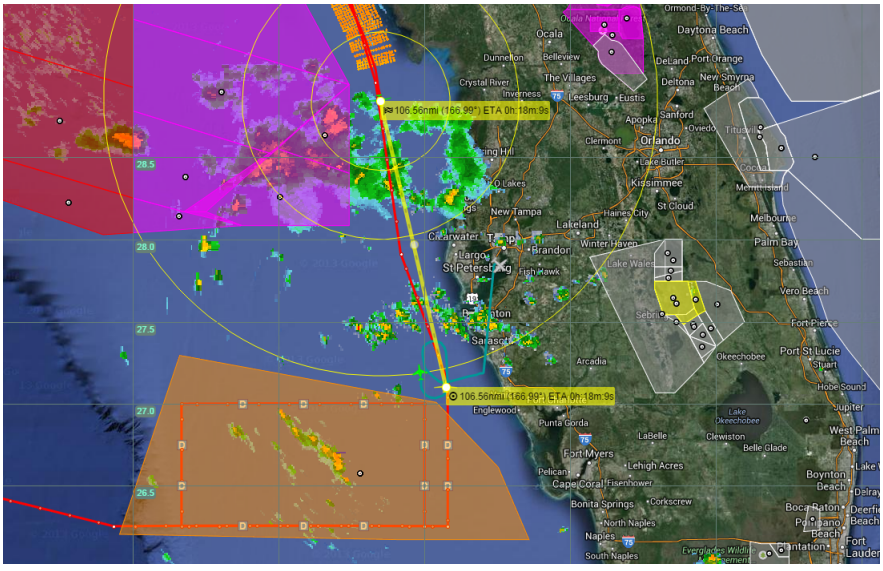
CPL image in the approximate region seen in the second daylight camera above.



1329 S-HIS 895-905 brightness temperatures over the more intense precipitation feature.

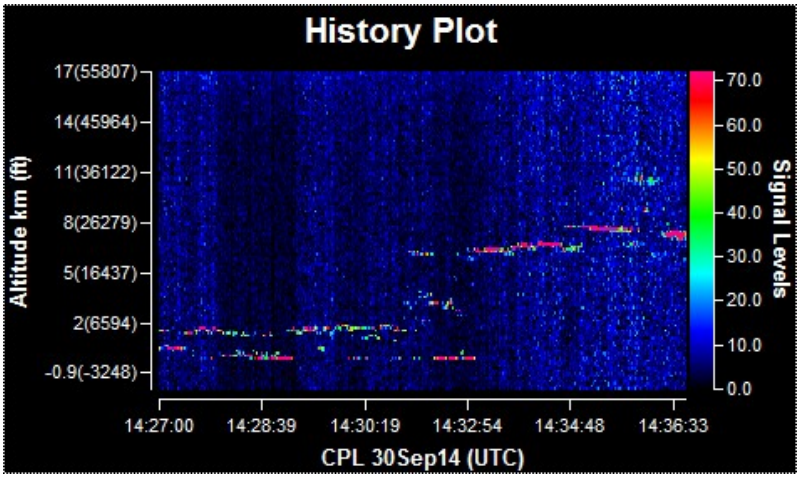
1402 Just crossed east coast of Florida south of Jacksonville. 52 min out from W-168.

1422 Feet wet in the Gulf

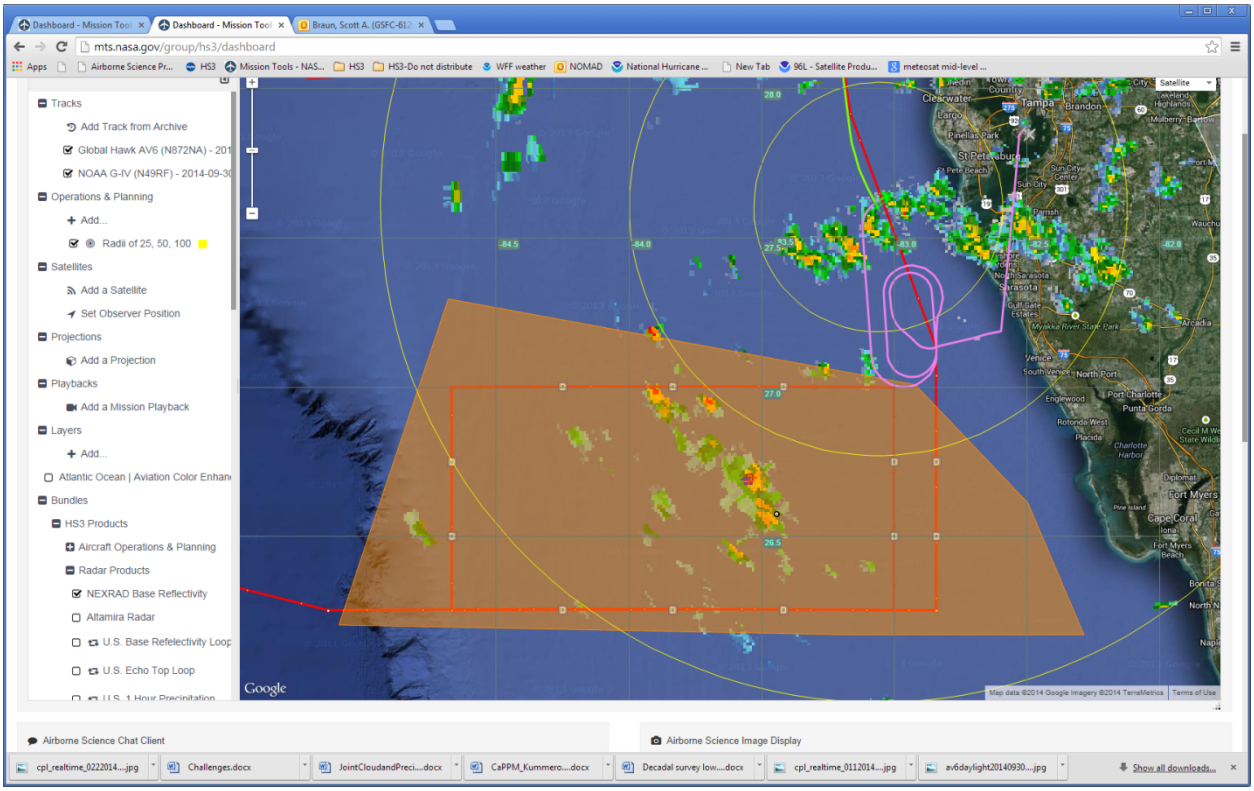


1432 About 18 min from rendezvous point with G-IV. The G-IV is in the area, currently about 37k ft.

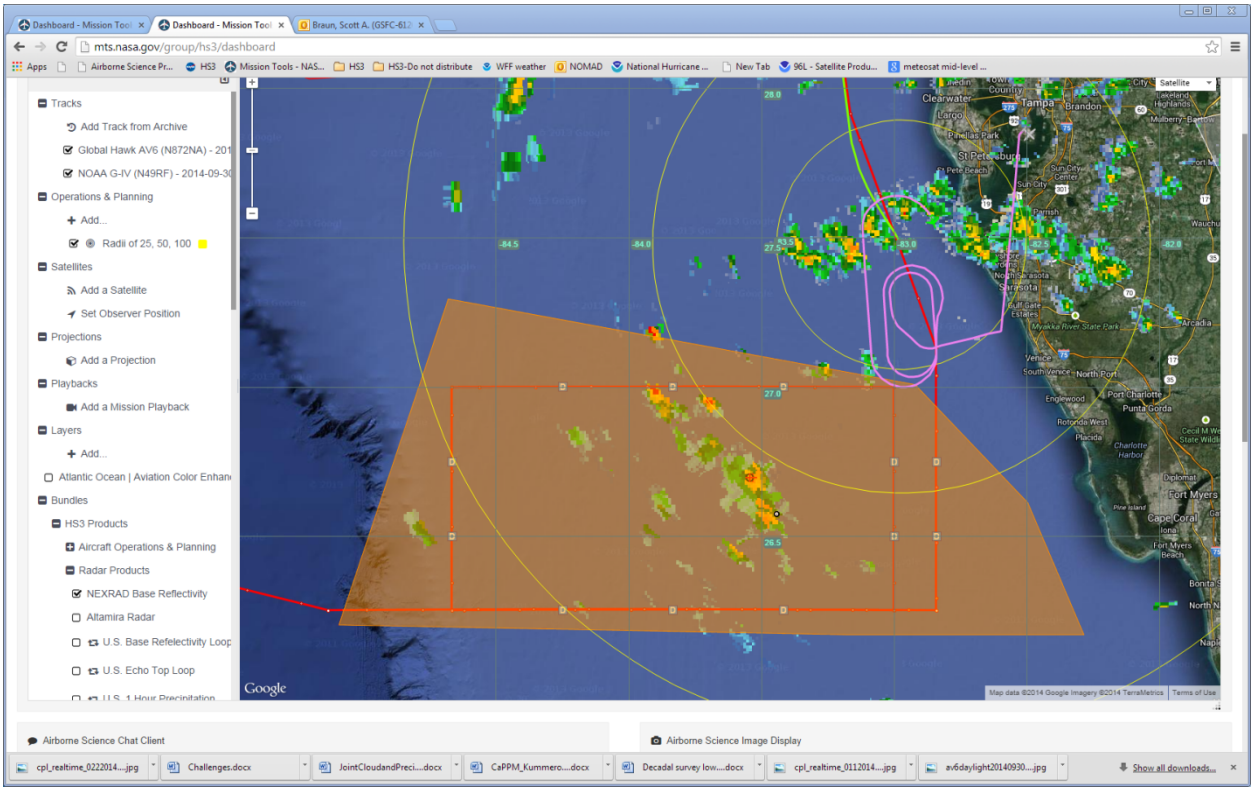
1438 GH ETA at BAGGS (rendezvous point) at 1051, G-IV at 1049.



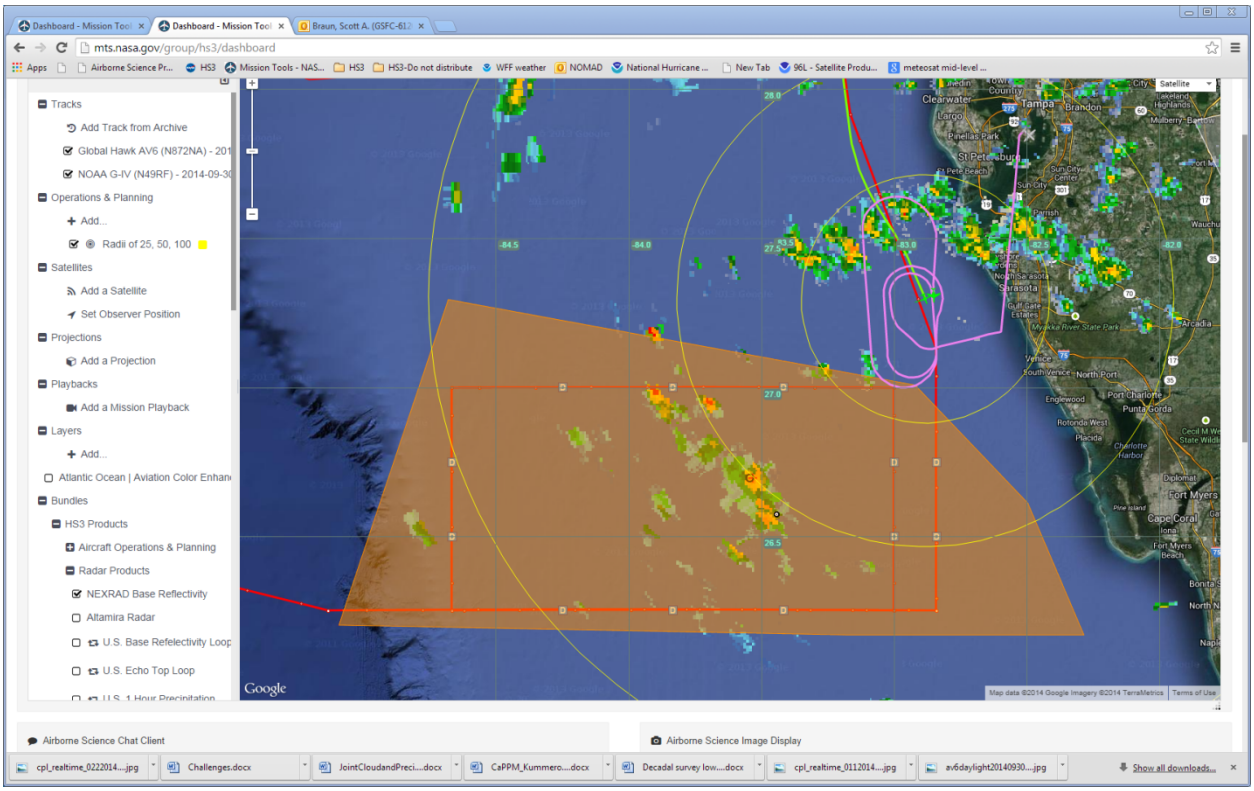
CPL pass over showers NW of Tampa.



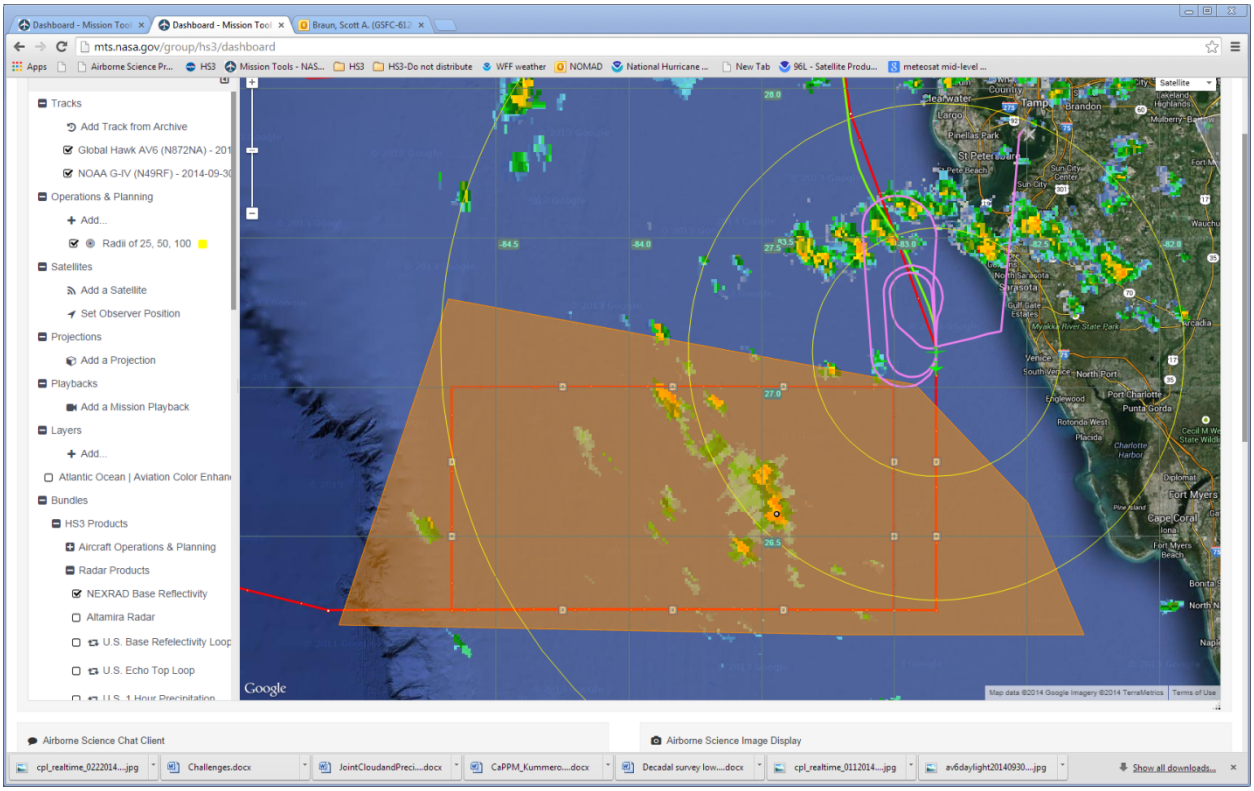
1445 Meeting up north of BAGGS



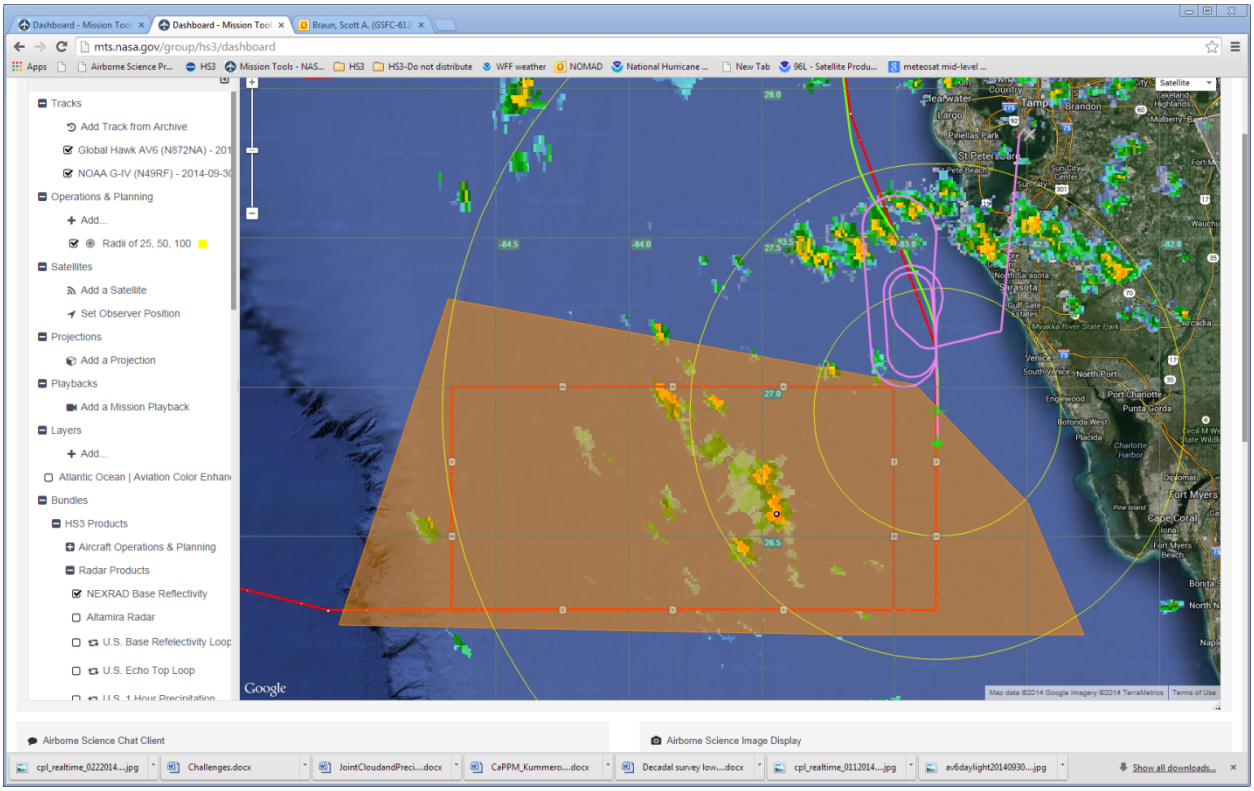
1447



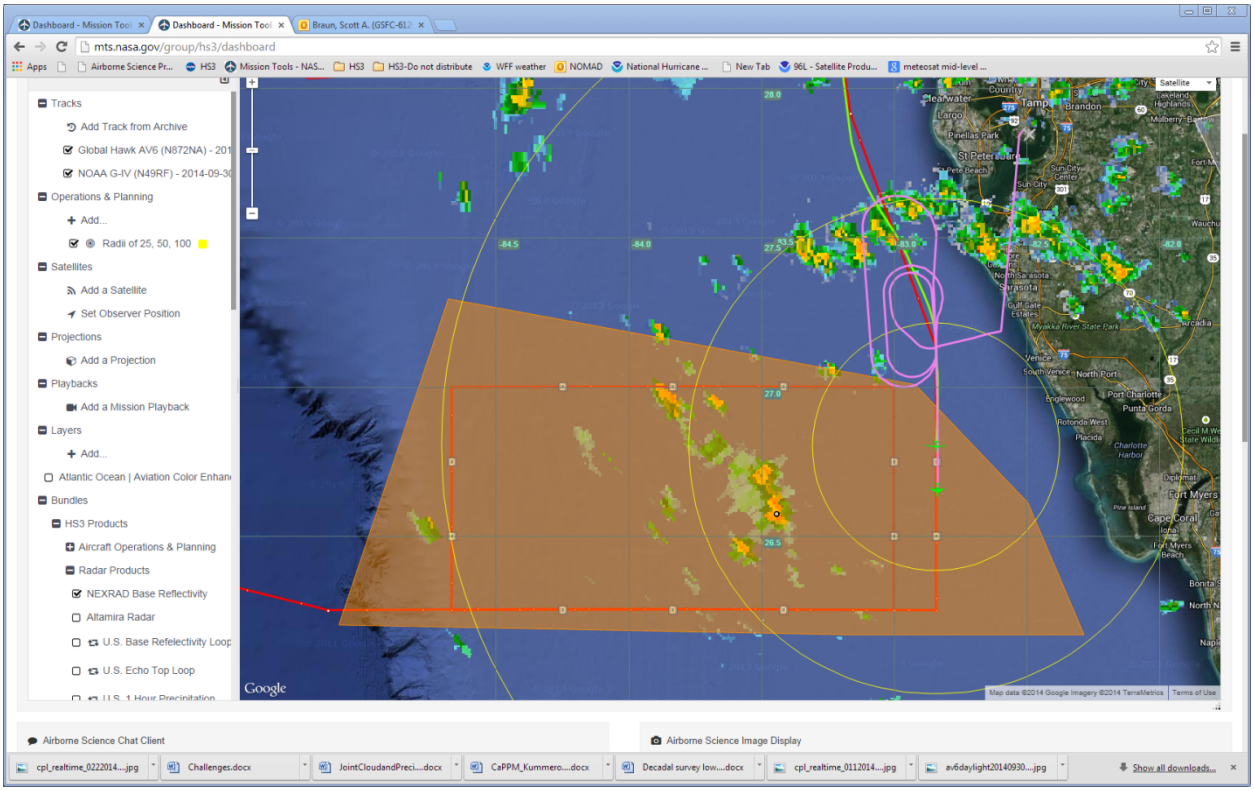
1449 Lining up for approach to BAGGS



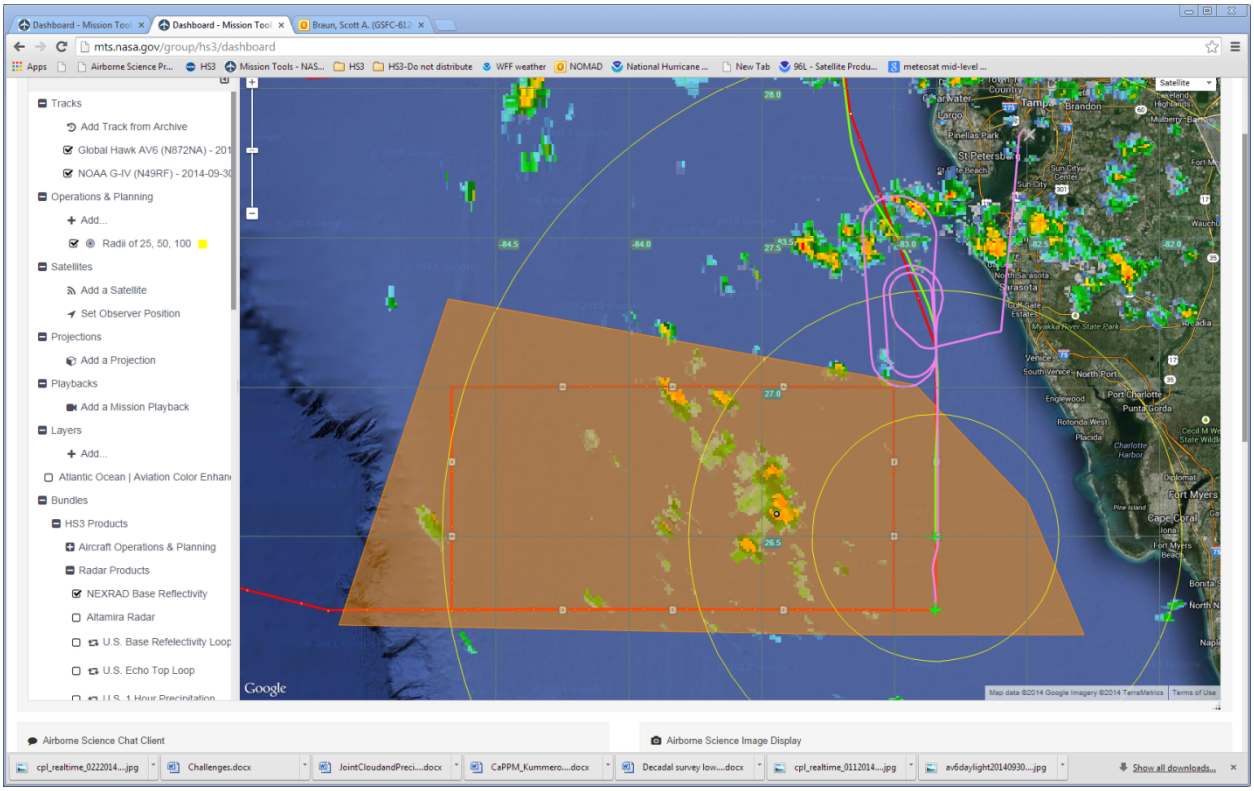
1451



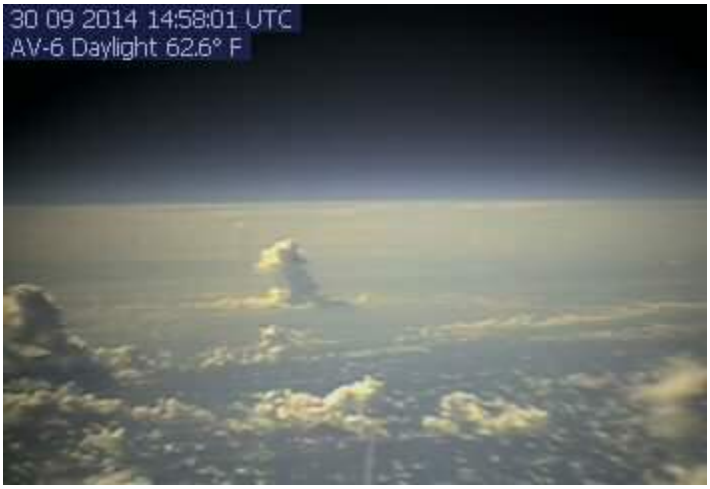
1453 1 min to first drop



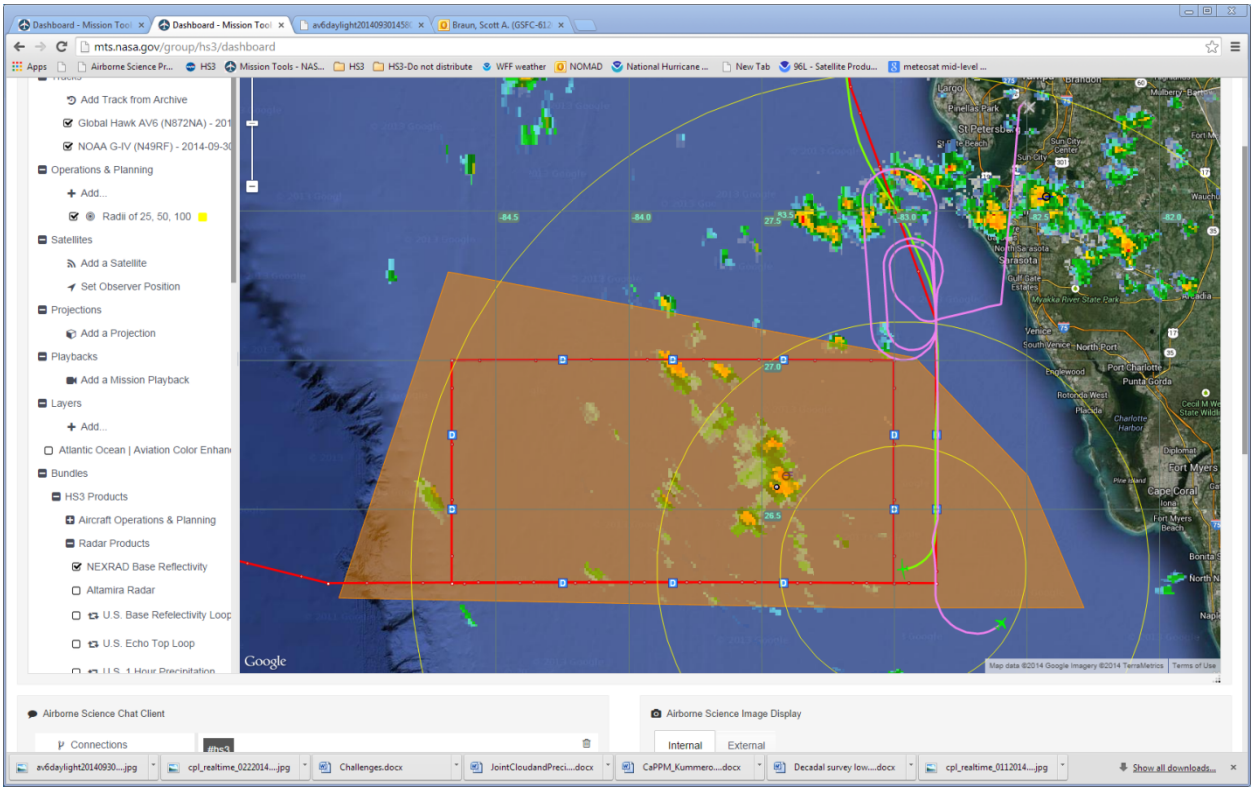
1454 Drop D01 (#01) released (image is just before drop). G-IV sonde released at 1453



1457 Drop D02 (#02) released. G-IV sonde at 1455

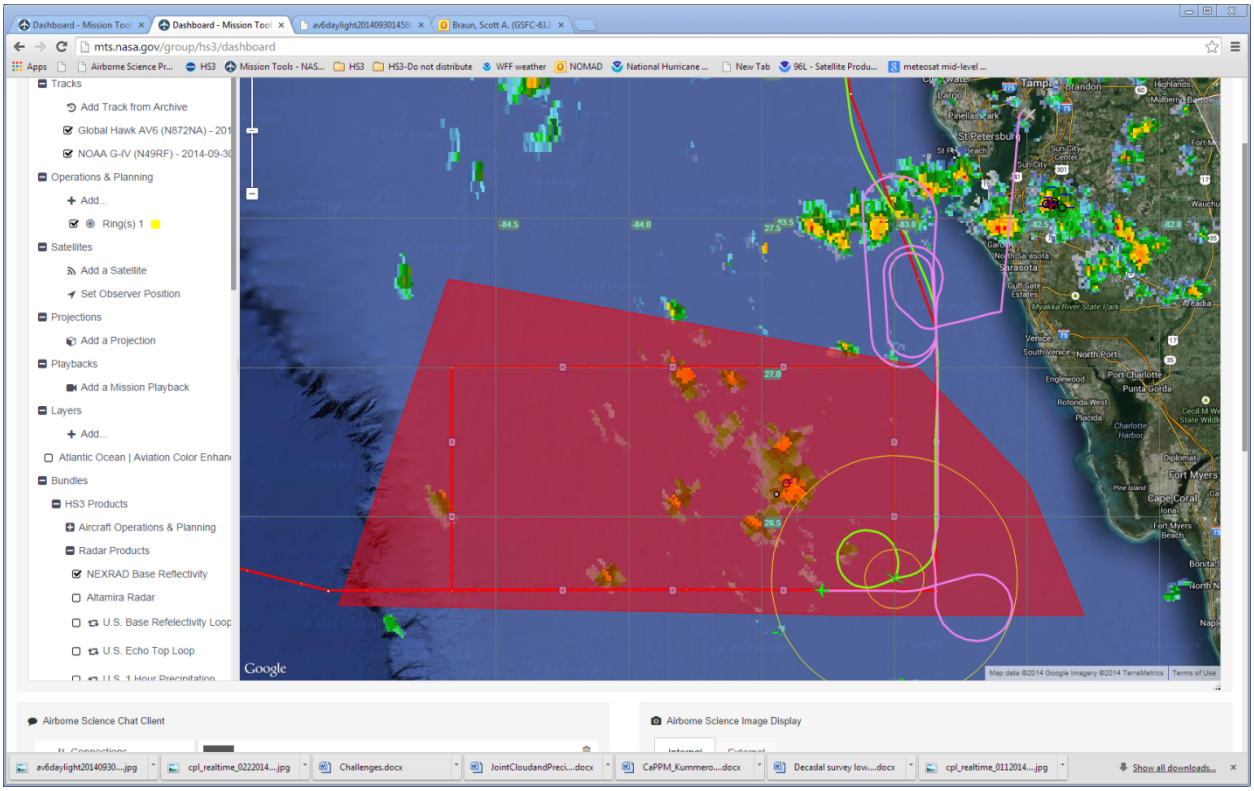


G-IV contrail visible in daylight camera

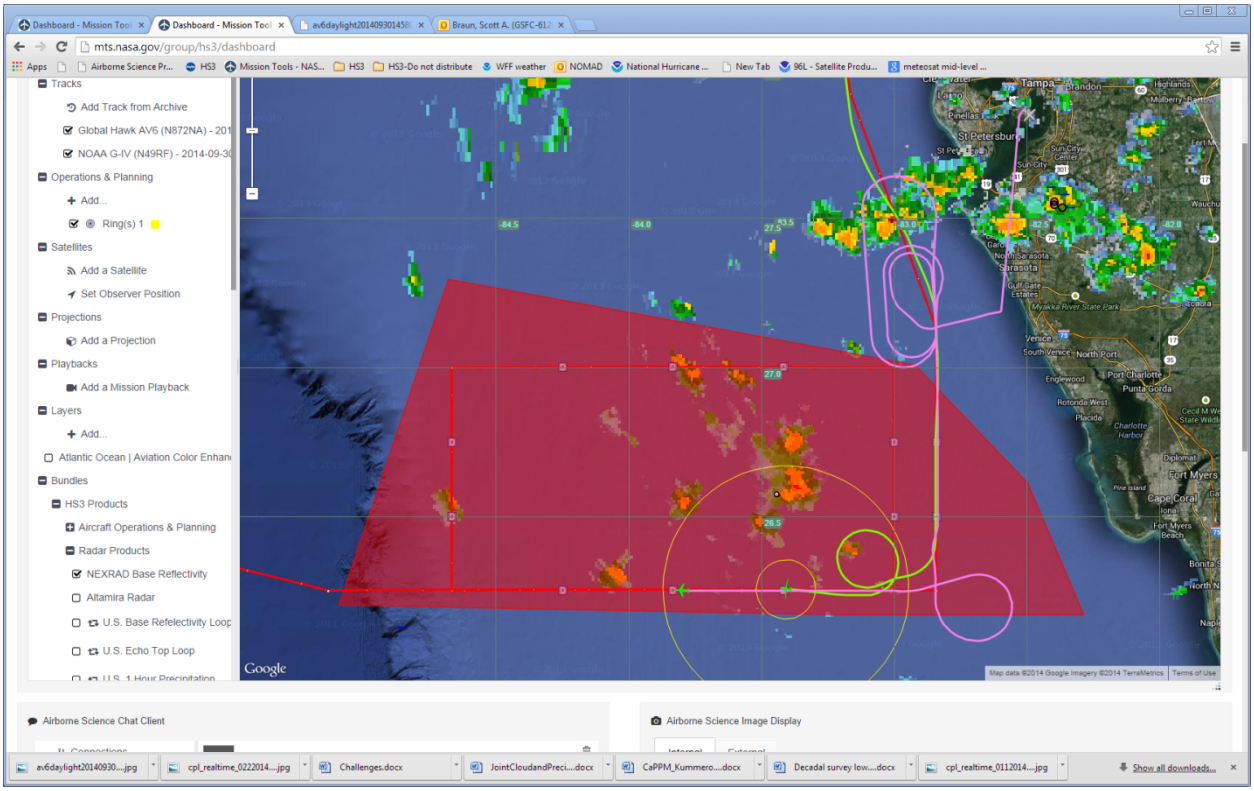


1500 G-IV did a wide turn. We are likely to beat them to the next drop point. GH will do small racetrack to let G-IV catch up.

1504 G-IV slowing so as to not get too far ahead.

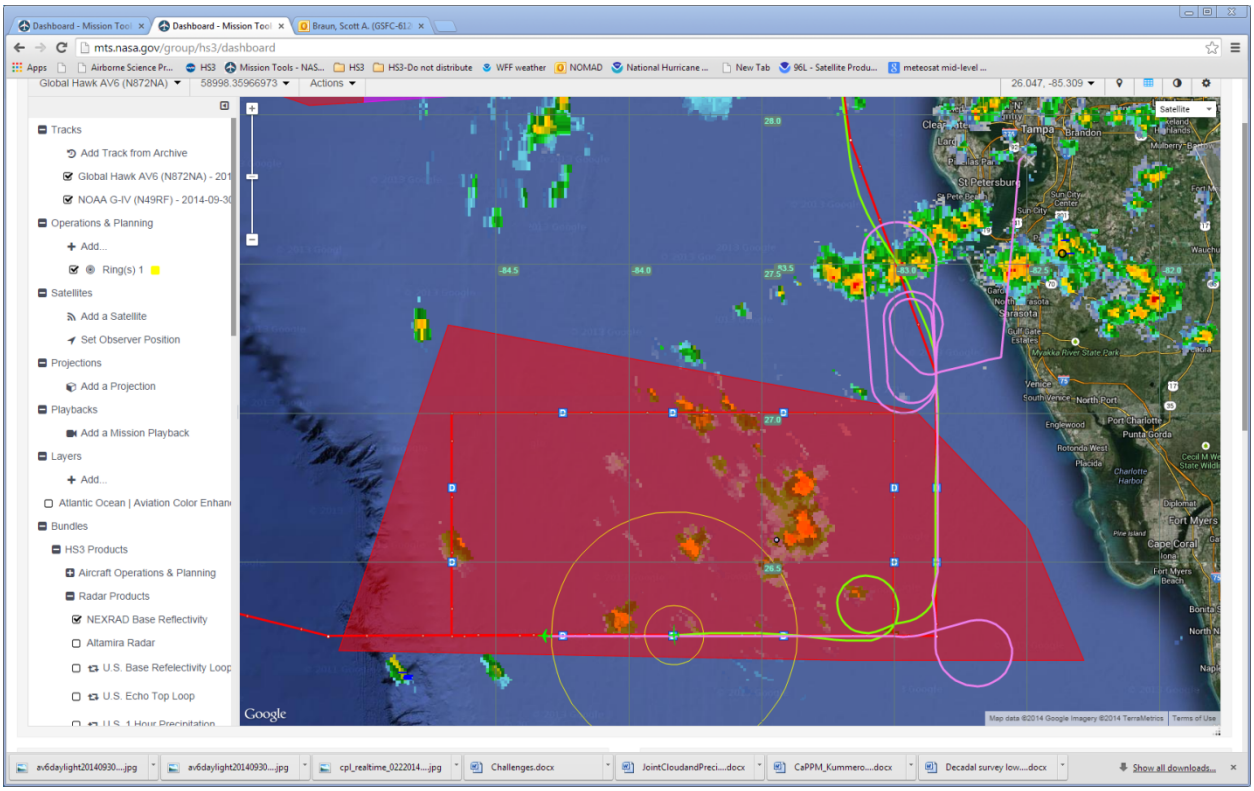


1507 Getting lined up for next drop. We will be about 3 min behind them.

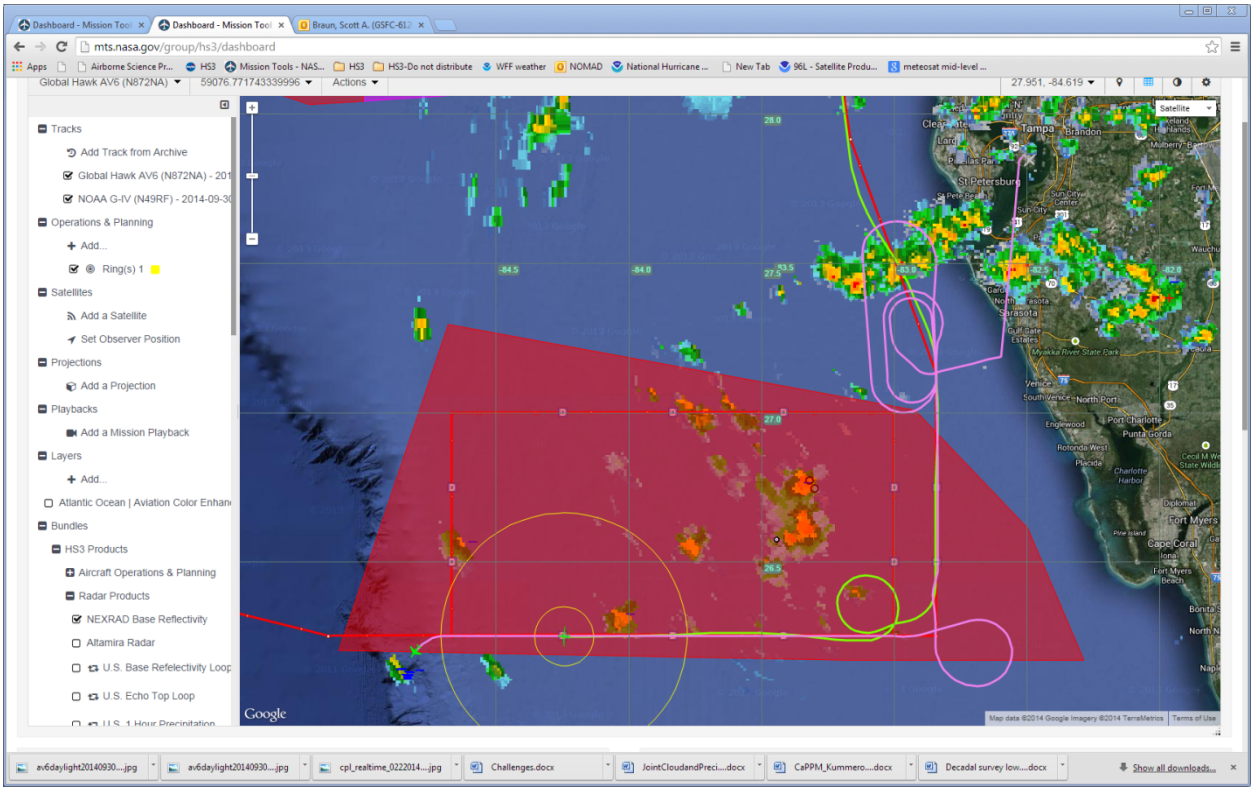


1511 Drop D03 (#03) released. G-IV sonde at 1508

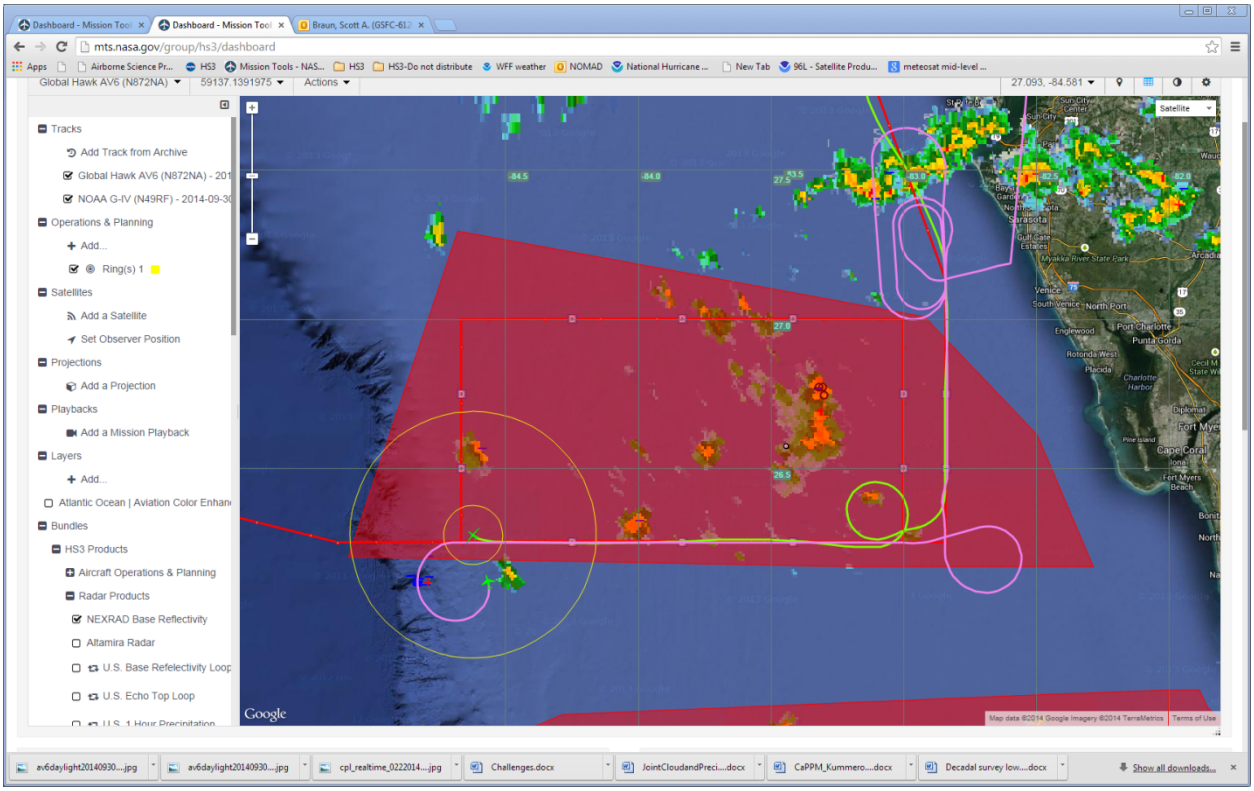
G-IV contrail, or shadow of contrail, on this E-W leg.



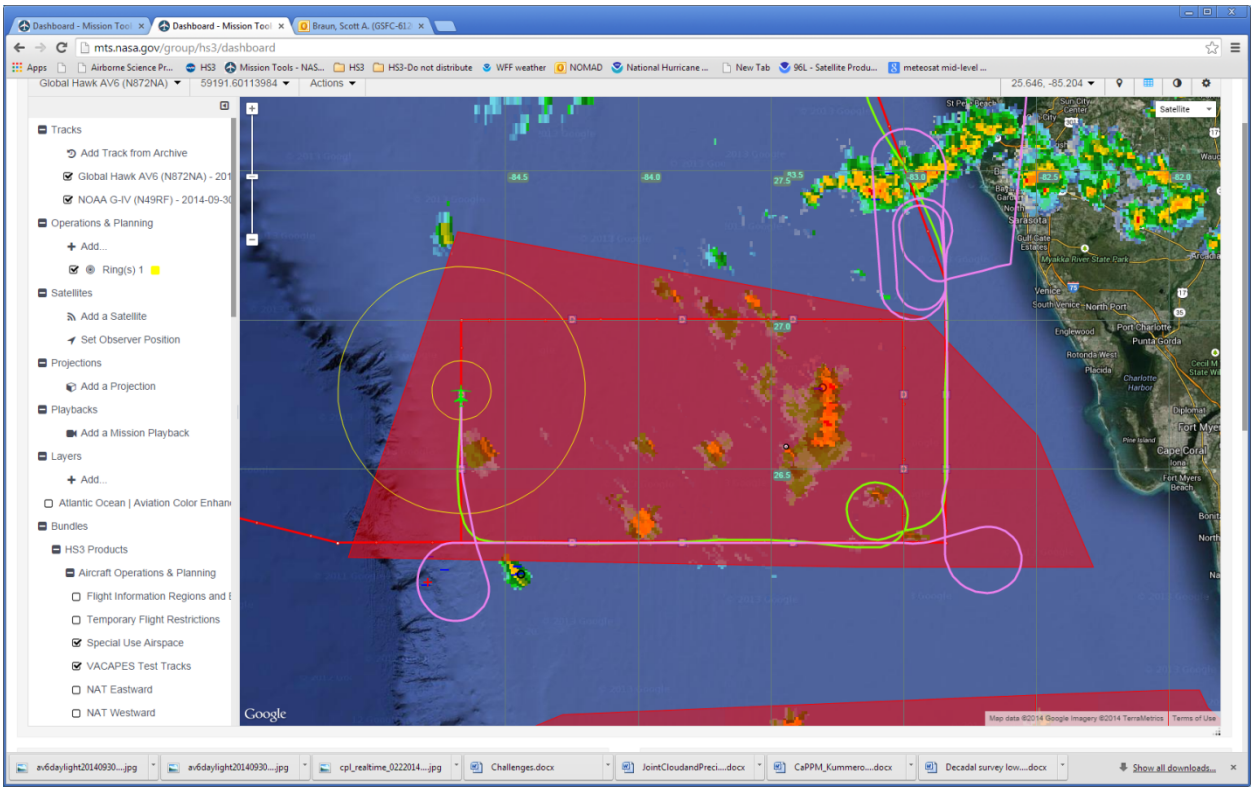
1515 Drop D04 (#04) released. G-IV sonde released 1511



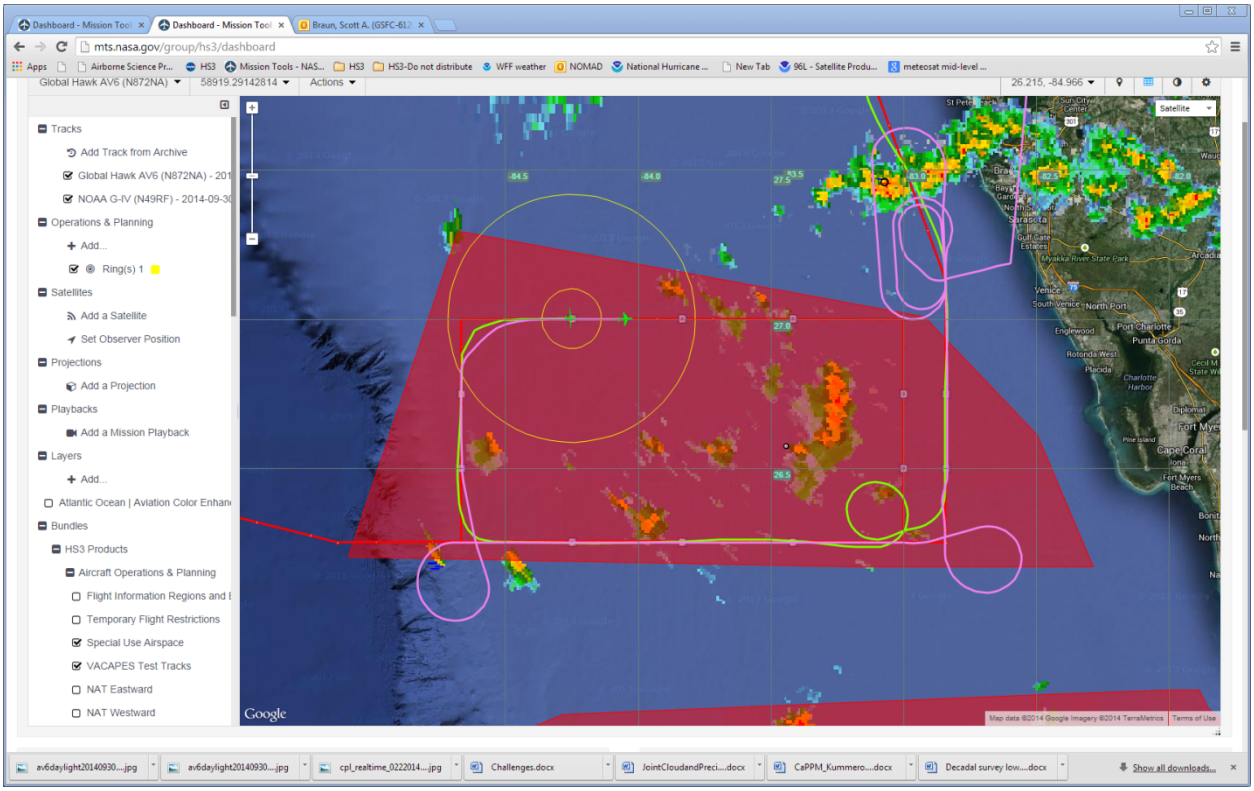
1519 Drop D05 (#05) released. G-IV sonde released at 1515.



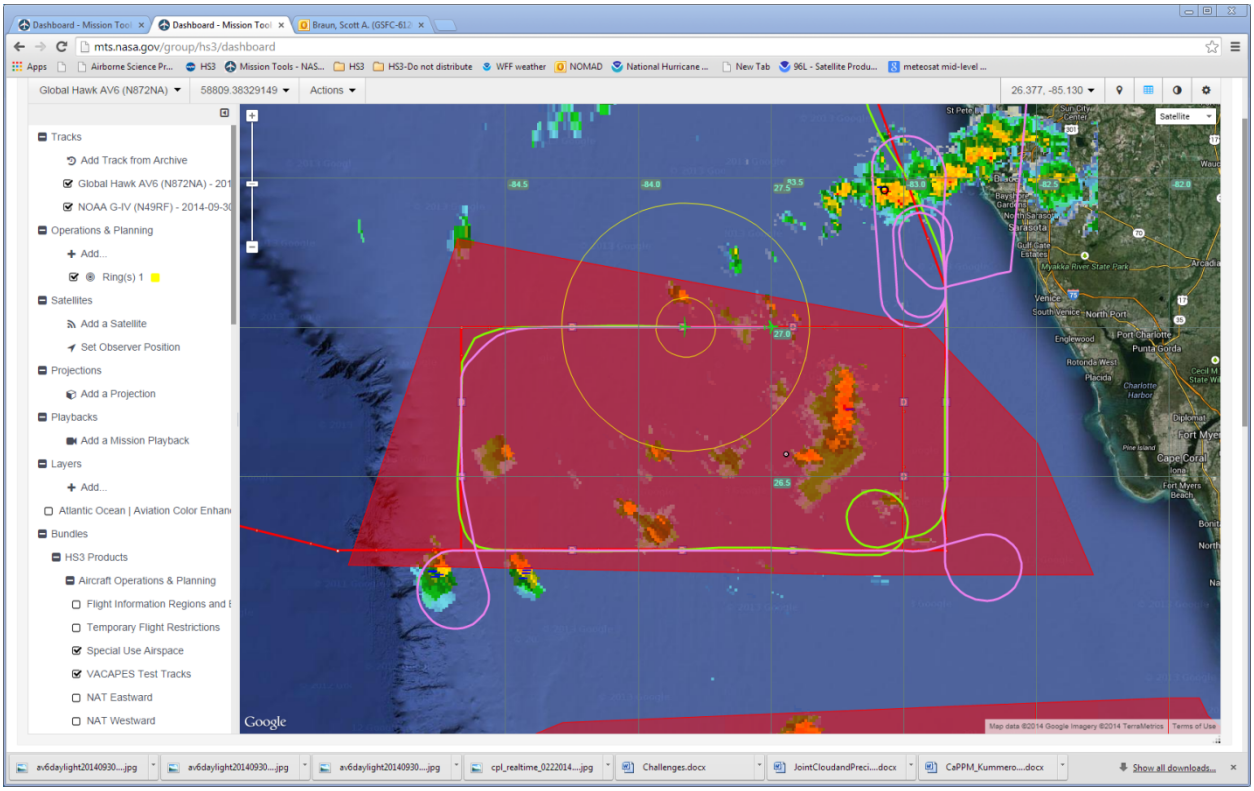
1523 G-IV turn wide again, only going 400 kt. They are speeding up (now 445 kt), but we may beat them to the drop point. Will hold until they get ahead of us. On the next turn, they will do just a 90deg turn.



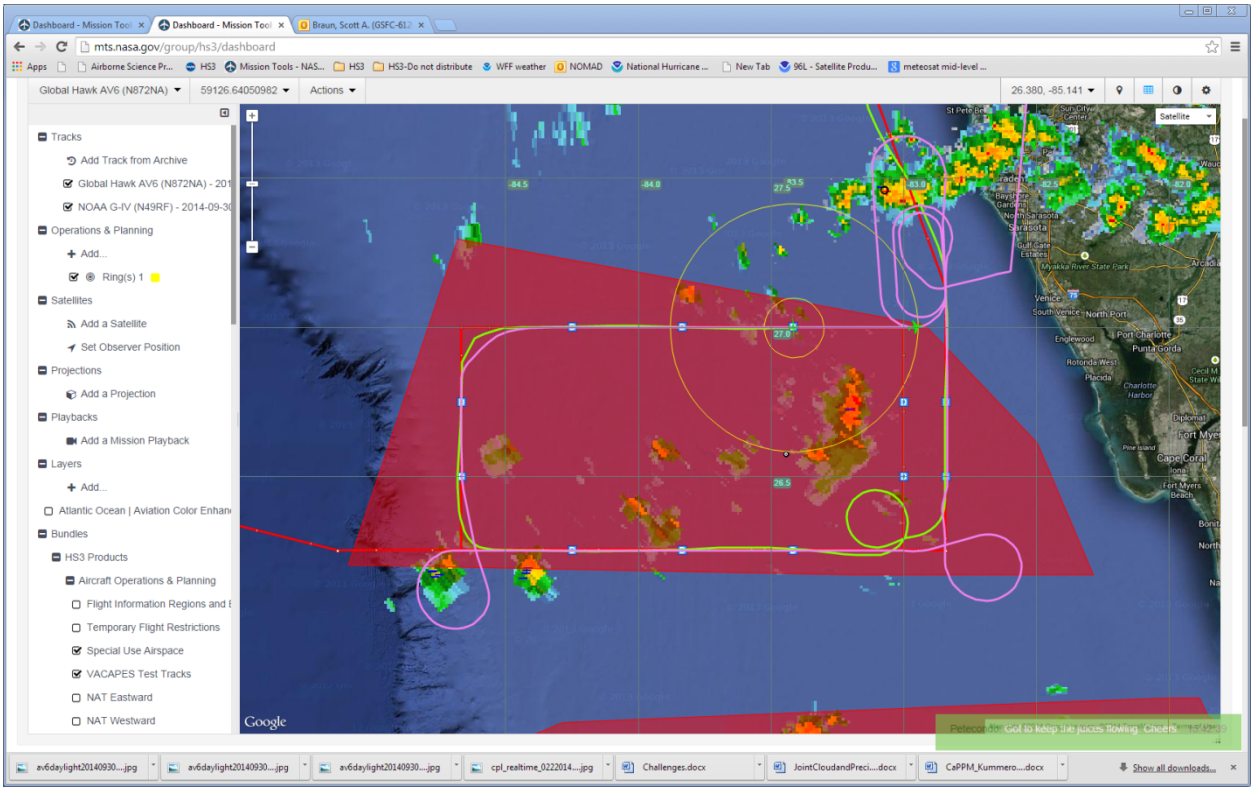
1528 Drop D07 (#06) released (#06 skipped because G-IV was behind us). G-IV released at 1528 too (they dropped at D06 as well at 1527).



1534 Drop D08 (#07) released. G-IV sonde released at 1533.

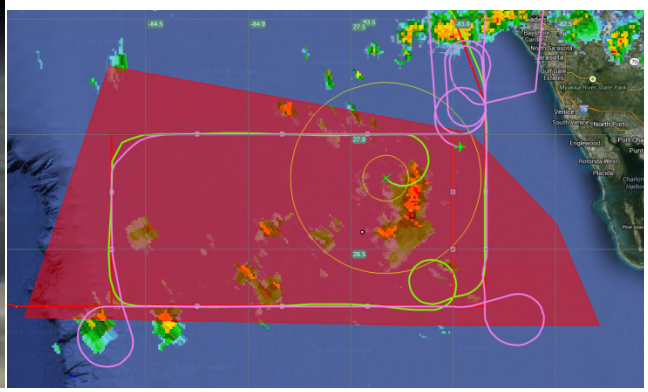


1538 Drop D09 (#08) released. G-IV sonde released at 1536.



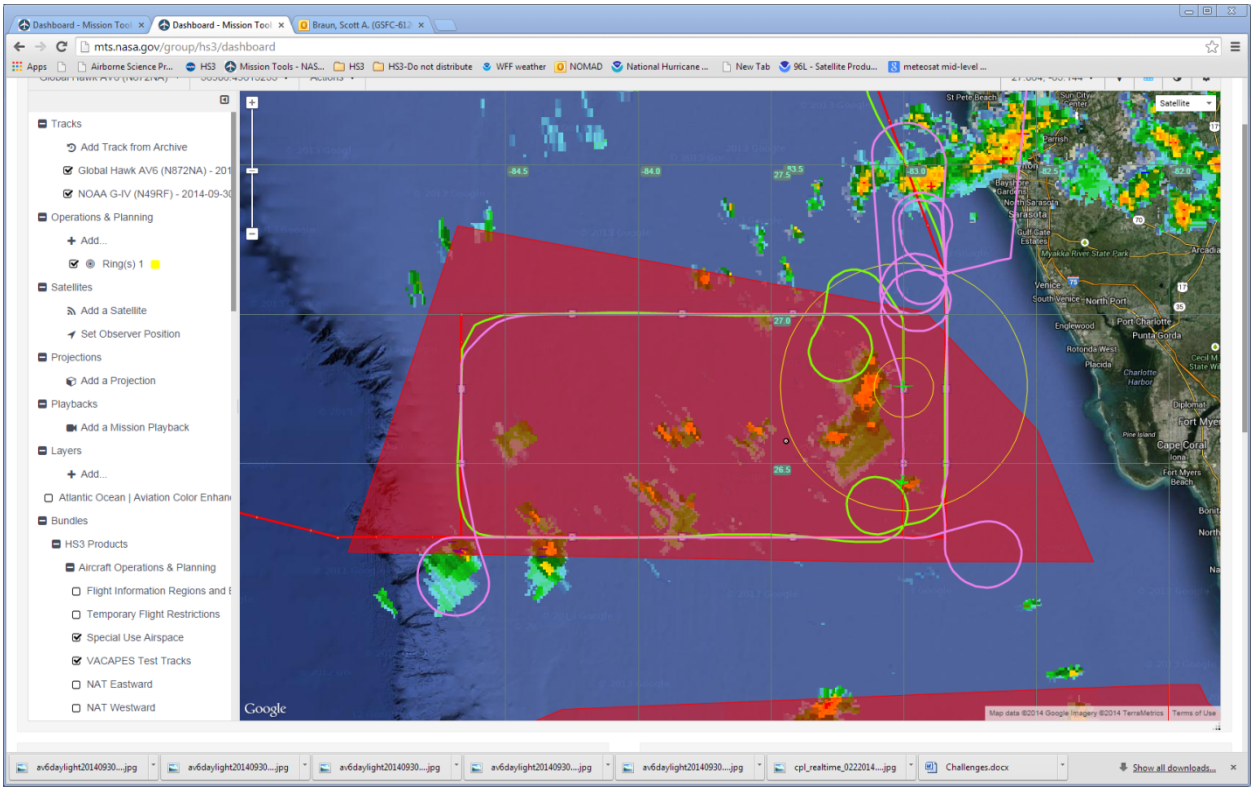
1542 Drop D10 (#09) released. G-IV sonde released at 1539.

G-IV out of frequencies, so need to let sondes reach surface before more drops done. Both aircraft will hold positions before continuing.

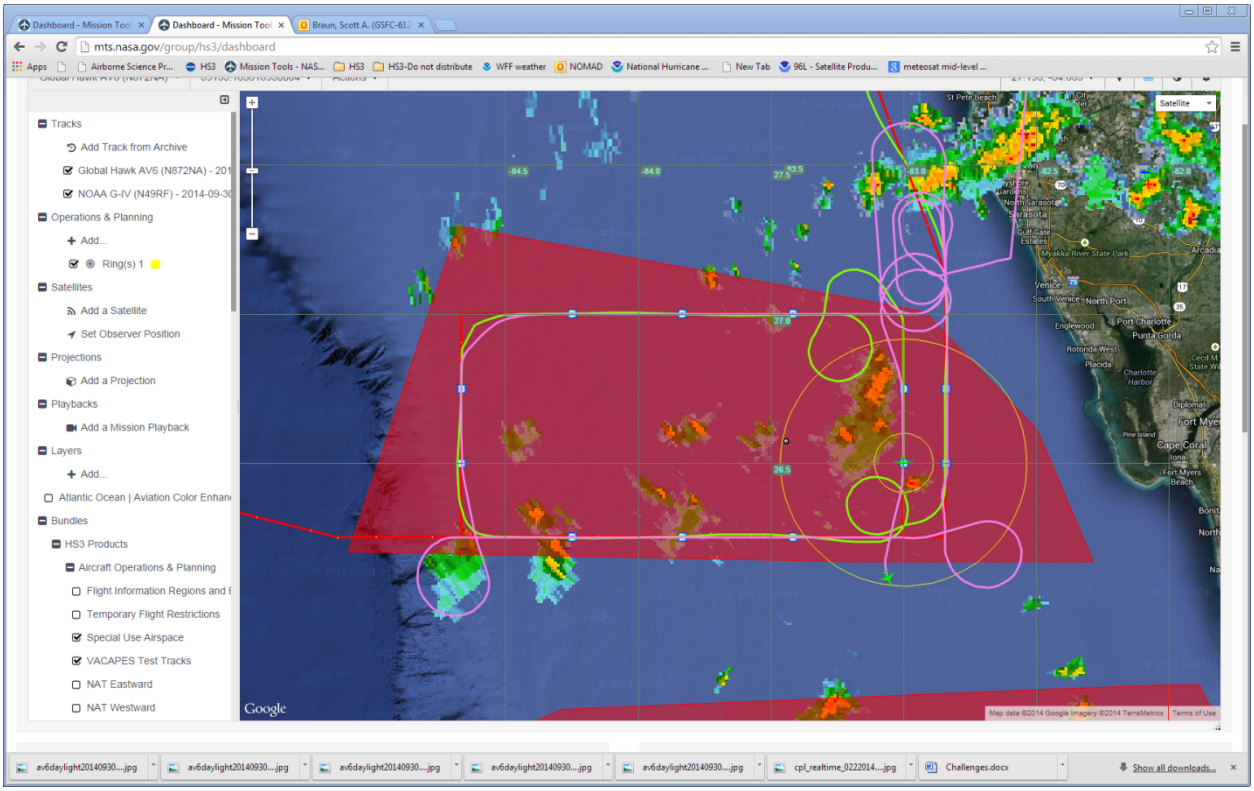


A view of the deeper convection ahead of us (the above image screen grab was for a time shortly afterward) as we do a 360deg hold.

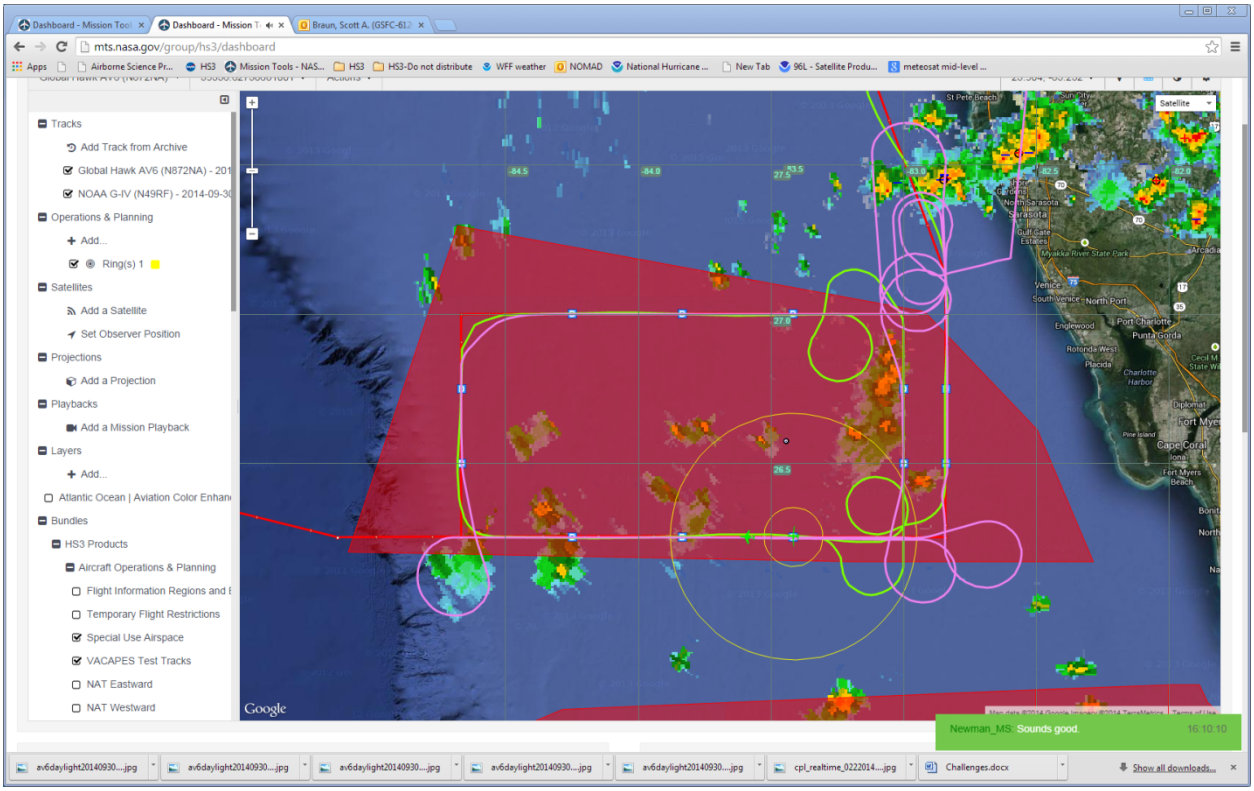
1552 Getting ready to line up again for southbound leg.



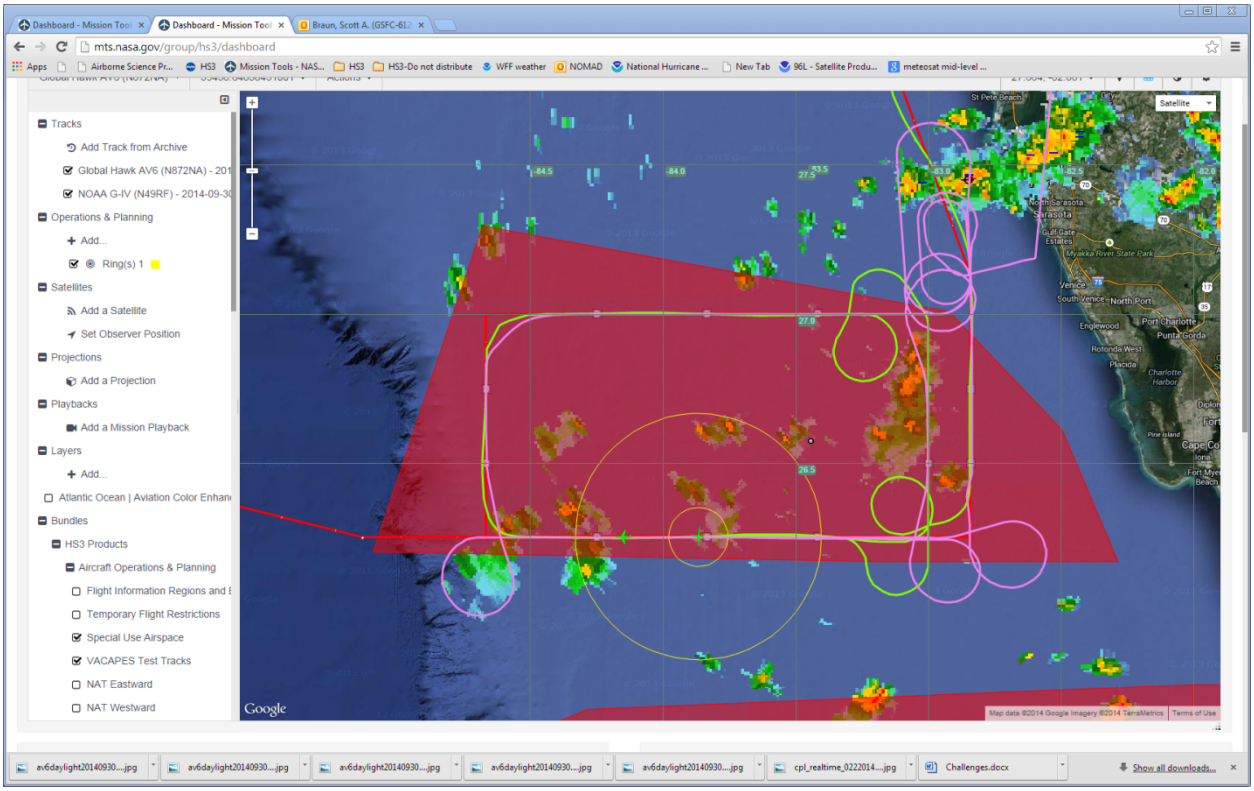
1558 Drop D11 (#10) released. G-IV sonde released at ~1555.



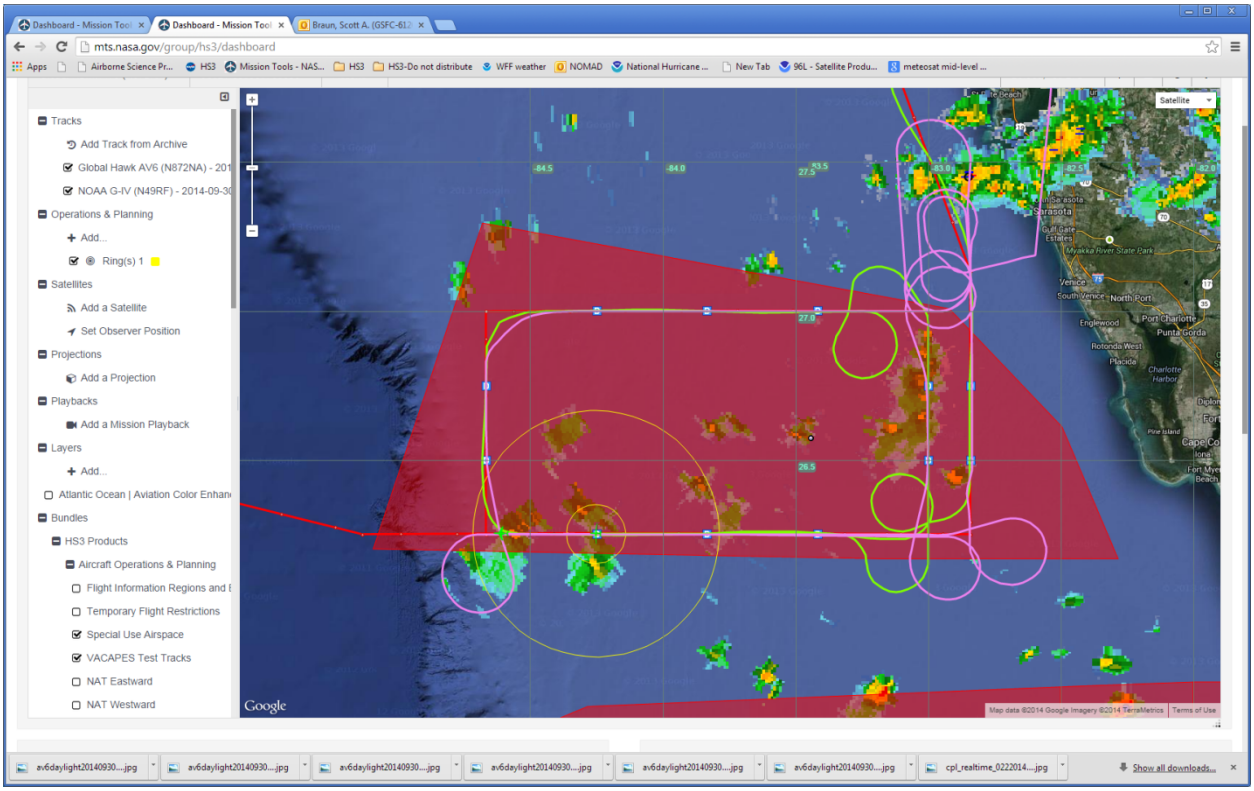
1601 Drop D12 (#11) released. G-IV sonde released at 1558.



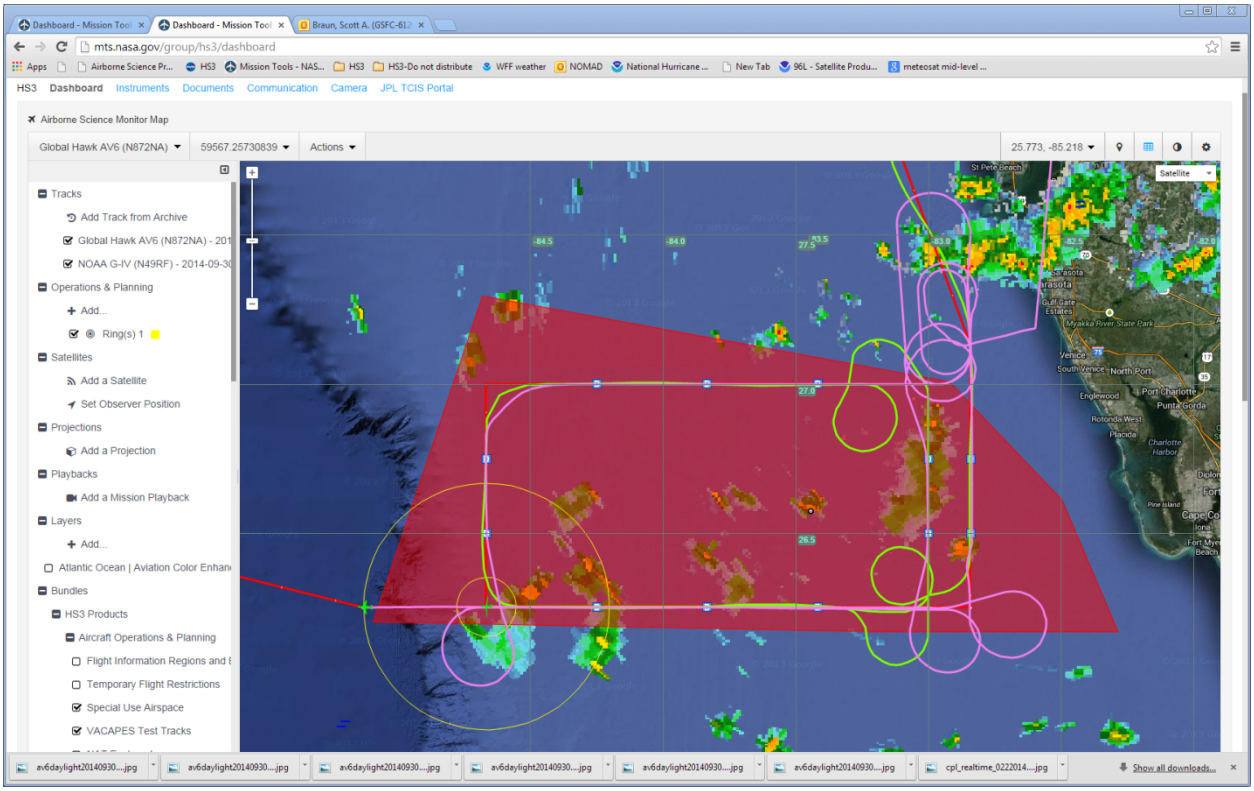
1610 Drop D13 (#12) released. G-IV sonde released at 1609.



1614 Drop D14 (#13) released. G-IV sonde released at 1612.



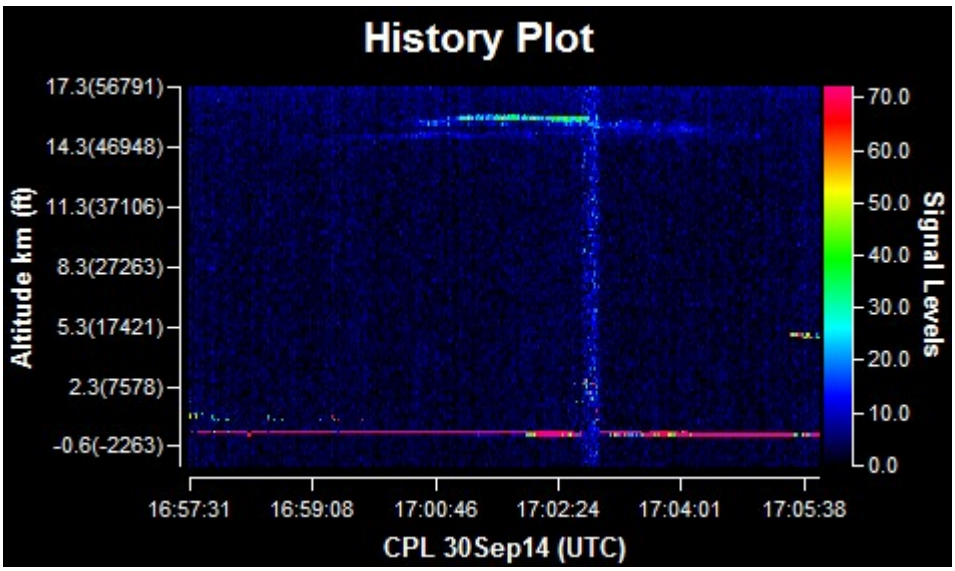
1618 Drop D15 (#14) released. G-IV sonde released at 1615.



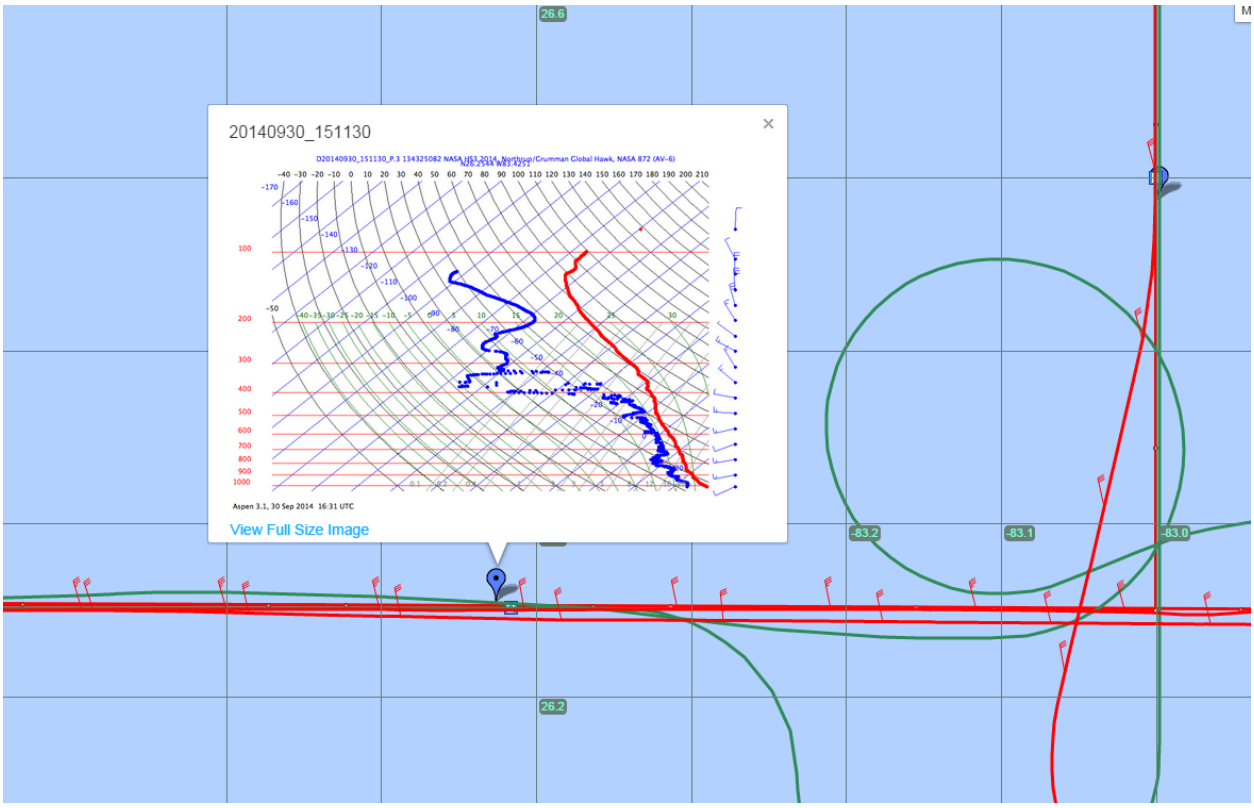
1622 Drop #15 released at southwest corner of the box. G-IV sonde released at 1619.

1654 Weather for the transit looks benign. Nothin poking above 40kft along the track, although it's still early in the day.

1707 GH in cruise climb across the Gulf. Noting too exciting about the path. A bit of sub-vis cirrus. See CPL below.



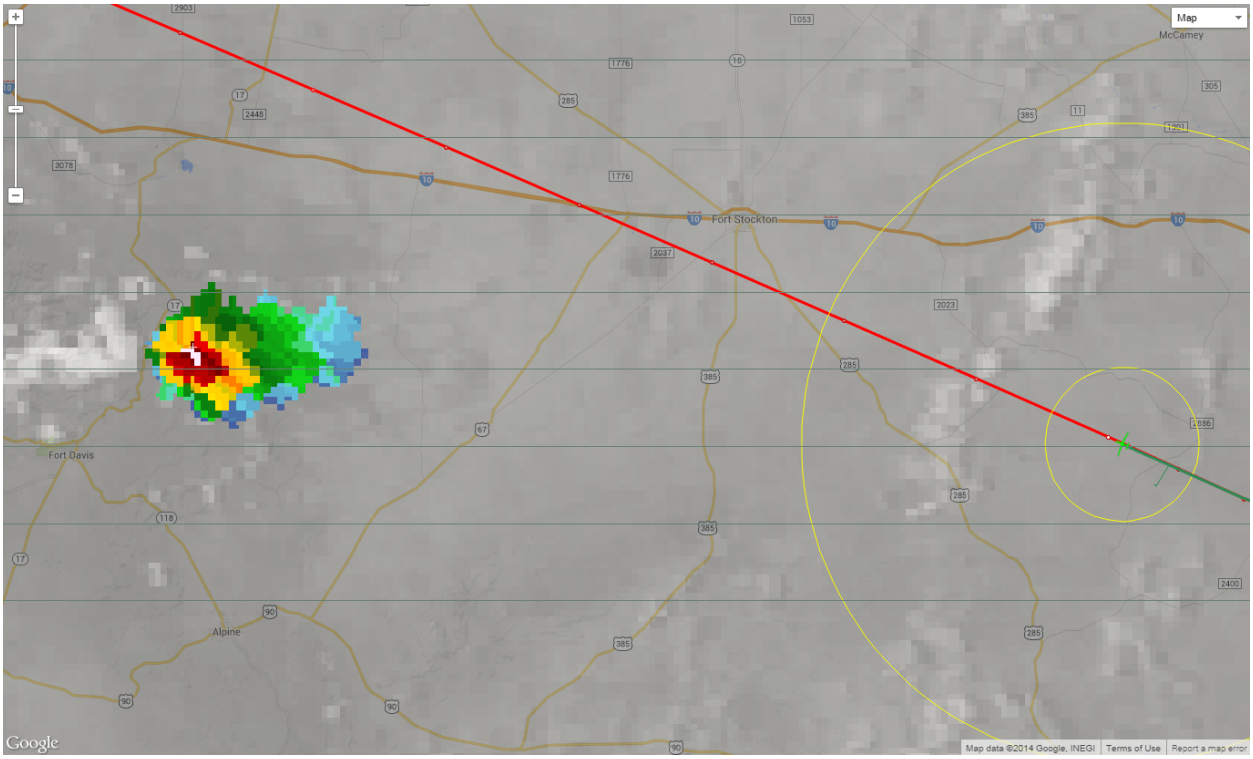
1757 Some of the sondes have been processed, and the comparison of the reported flight levels winds for the G4 look good in comparison to the dropsondes. The G4 was in the low 40kft range (somewhat above 200 hpa). In the attached image, AVAPS winds are 20 kts NNW, as is the same from the G4 reported winds.



1800 Still feet wet over the Gulf. About 20 min from the TX coastline. A couple of isolated Cbs along our track, but nothing much of interest.

1900 Newman signing off, Pete Black taking over as MS.

Lone CB in entire SW US this afternoon complete with overshooting top:



2055Z Dry as a bone severe clear continues

Landing ~2250Z

AVAPS Status Summary

HS3 Return Transit/G-IV Intercomparison, 20140930

15 sondes were loaded and successfully deployed during the coordinated intercomparison with the NOAA G-IV aircraft conducted while the Global Hawk was transiting back to AFRC. All 15 sondes were launched as desired and in proximity of G-IV drops which occurred first as the G-IV proceeded ahead of the Global Hawk. Data from the GH sondes were worked up in near-real-time by Michael Black but were not transmitted to the GTS gateway. No immediately obvious data issues were observed in the GHOC during the soundings and we expect the data should support a useful second intercomparison of the Global Hawk and full-size dropsondes. Data from the G-IV dropsondes will be obtained following their flight.

S-HIS Summary for AV6 Return Transit and Science Flight #11, September 30 2014

J. Taylor; SSEC, University of Wisconsin-Madison

AV-6 successfully transited back to NASA AFRC from NASA Wallops during this flight. A box pattern that included 15 AVAPS dropsondes was included over the Gulf of Mexico and drops were coordinated with the NOAA G-IV. A photo from the daylight camera in which the G-IV contrail is visible at the bottom of the image is shown in Figure 1 (taken during the first N-S leg). The flight pattern for the dropsonde box, with planned dropsonde locations is shown in Figure 2.

The S-HIS instrument operated nominally throughout the flight.

Figure 1: A photo from the AV-6 daylight camera in which the G-IV contrail is visible at the bottom of the image.

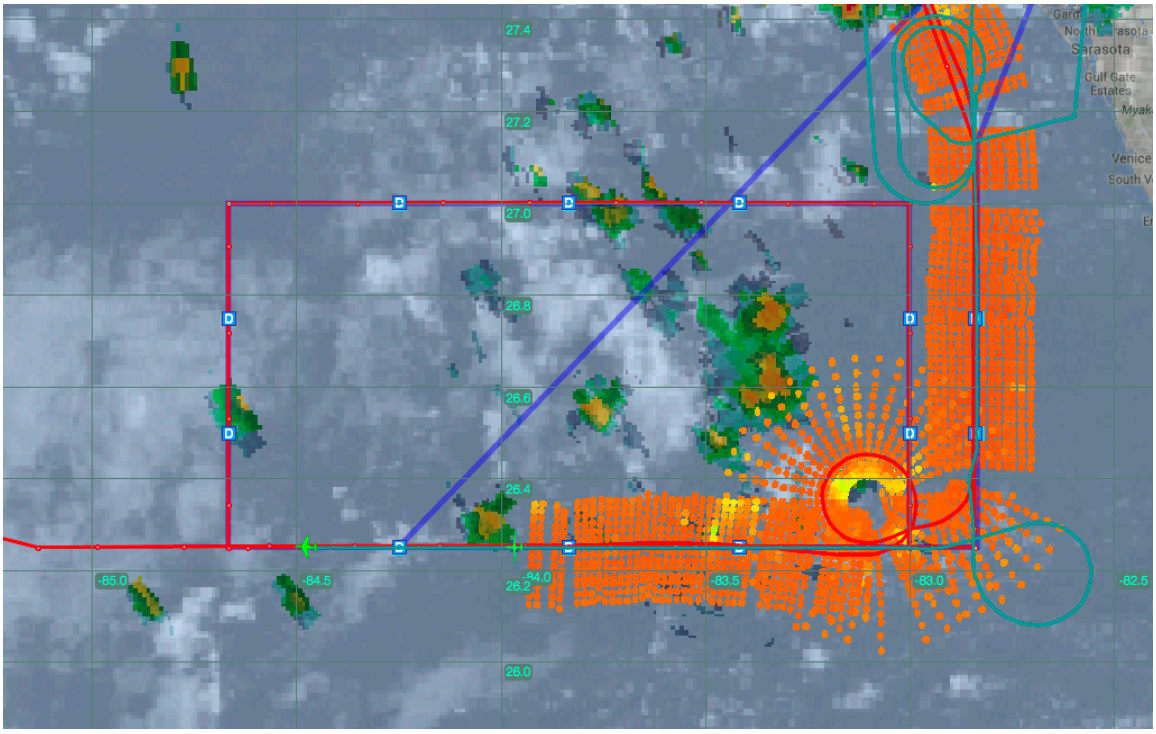


Figure 2: The flight pattern for the dropsonde box, with planned dropsonde locations. The S-HIS 895 – 900 cm^{-1} brightness temperature footprints are also shown.

Instrument Summary

The Scanning-HIS operated very well throughout the flight. No instrument power cycles were required, and the detector temperature remained at the setpoint for the duration of the flight. The detector temperature plot is provided in Figure 3.

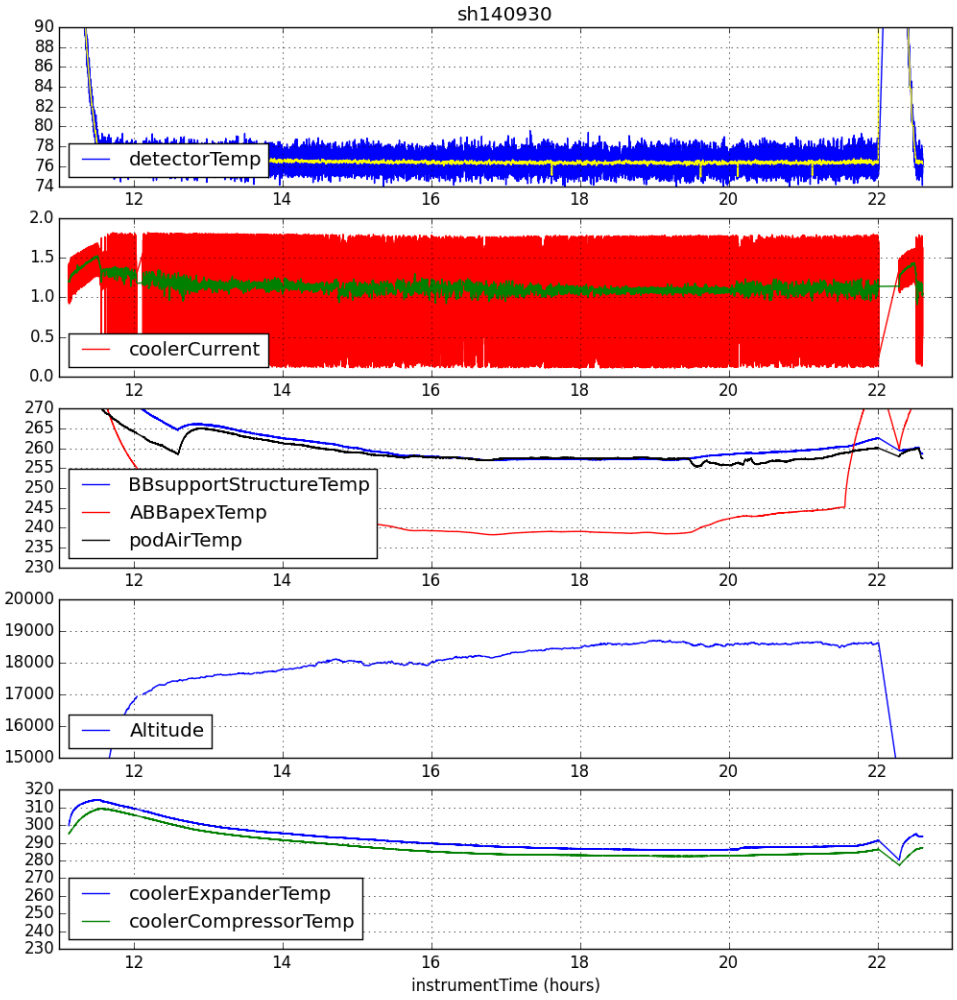


Figure 3: Scanning-HIS detector temperature plot produced in real-time during the flight.