Hurricane and Severe Storm Sentinel (HS3) Mission

HS3 2013.09.25-26 Flight Report: GLOBAL HAWK AV-1 mission convection near Florida and then transit back to Dryden

Mission Scientists:
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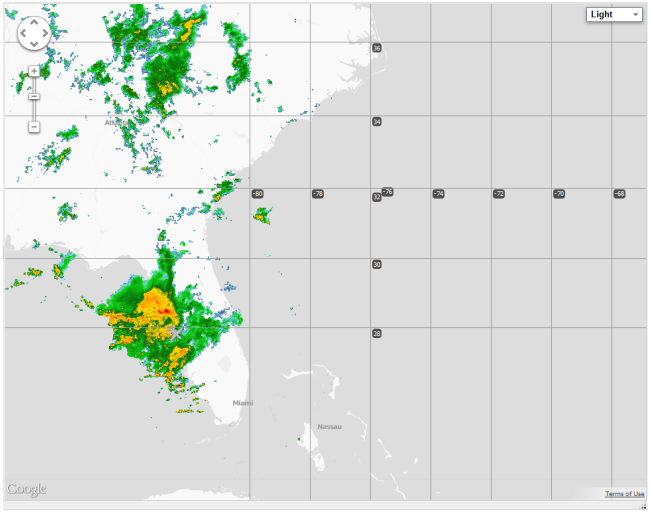
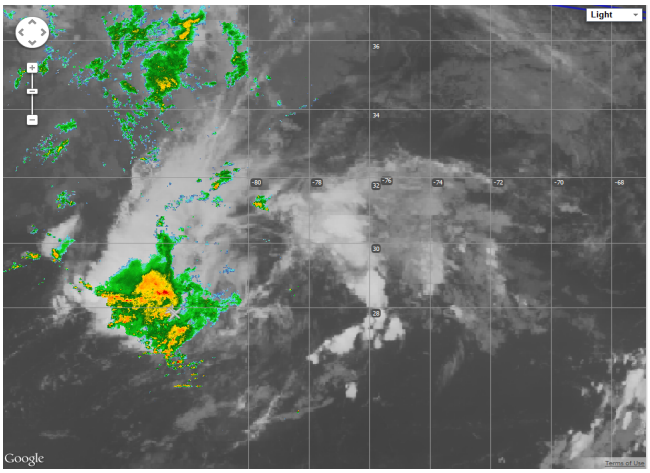
Shift 2 (1900-0400 UT): Paul Newman

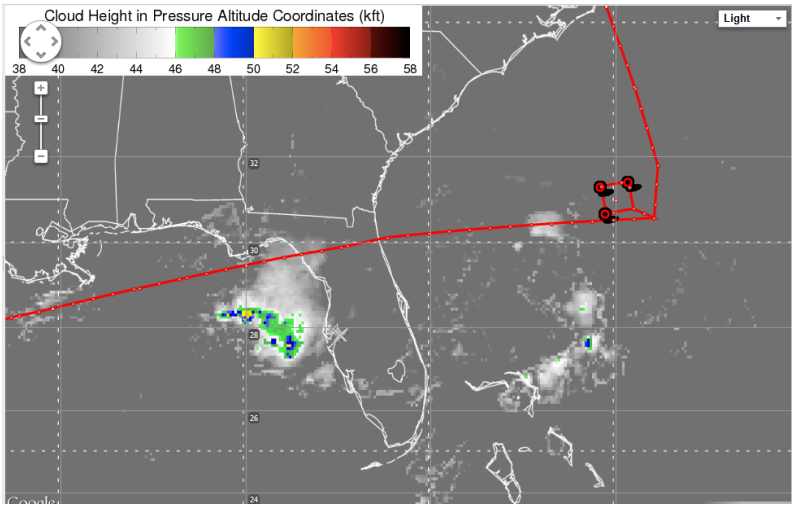
Mission goal: Transit of AV-1 back to Dryden. We will do a coordinated flight with the NOAA P-3 (NOAA 43) for HIWRAP (GH) and IWRAP (P-3) comparisons as well as HIRAD (GH) and SFMR (P-3) comparisons. The target for today is an area of precipitation along the tail end of a large-scale frontal system. Most of the precipitation was expected to be east of Florida, but at engine start, the most prominent convection was on the west coast of Florida. However, given AV-1 altitude concerns, the eastern target is preferable because of the lower cloud-top heights.



Radar at 12UTC shows heavy convection along the west coast of Florida.



Radar with GOES IR shows a narrow rainband off the east coast of Florida, but outside the radar range.



CIMSS Cloud-top heights (CTHs) at 1132 UTC show cloud tops in the western precipitation exceeding 46 kft over a somewhat wide area, with some tops >50 kft. The eastern band of precipitation has tops generally <46 kft, with just a few small areas with tops >46-48 kft.

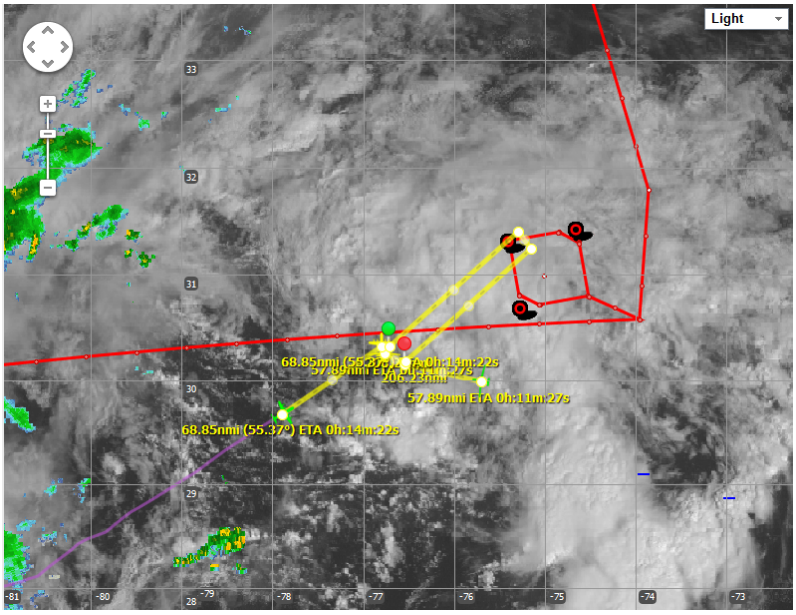
1156 UTC Engine start

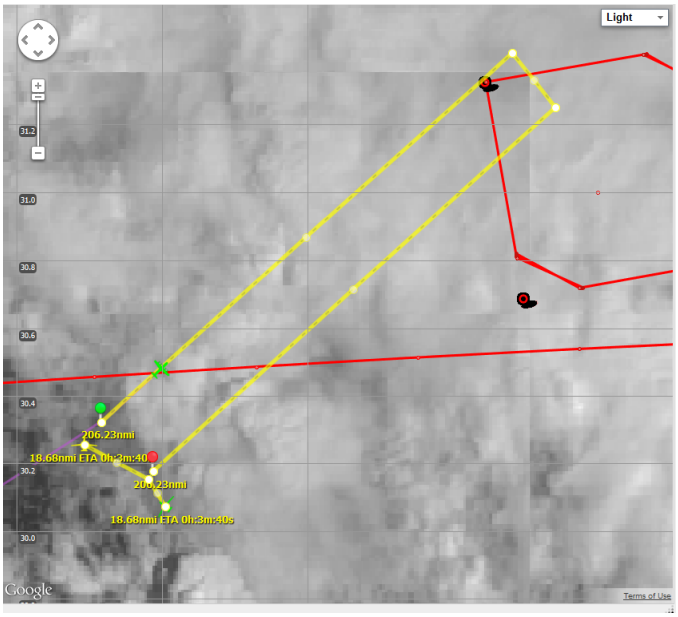
1210 Apparent conflict with the Navy in the R6604 airspace. Being worked with the tower and Navy to try to deconflict.

1218 UTC Conflict resolved.

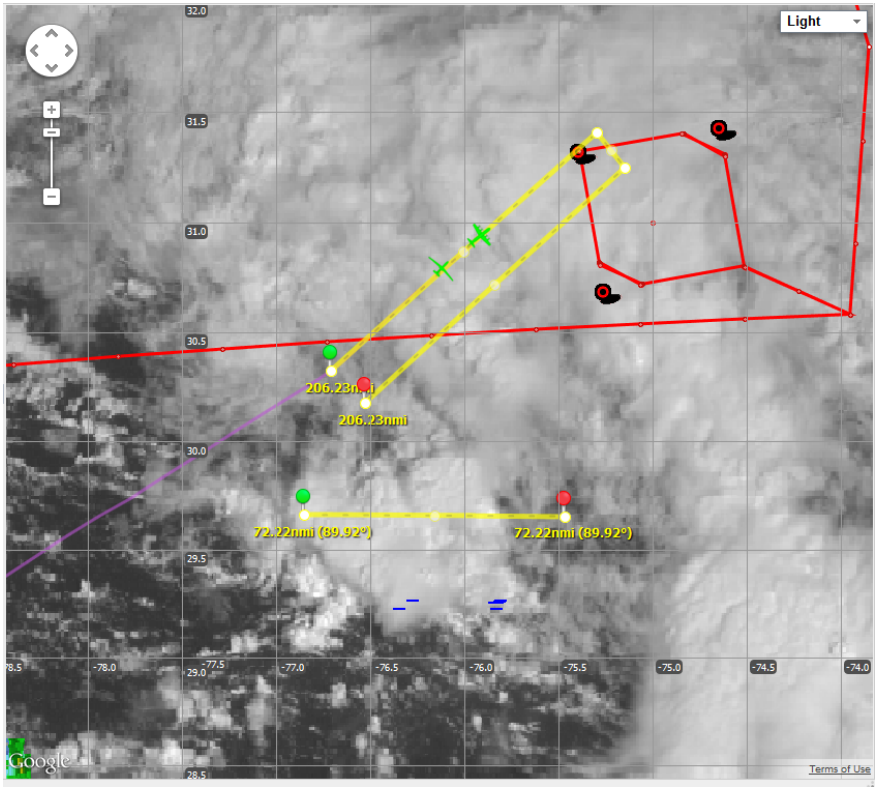
1300 Takeoff

1513 Both aircraft converging on initial point (see below). We will delay at the start point (green marker in the image) by about 9 minutes to allow the P-3 to get about 4 minutes ahead of us along the leg to the northeast.

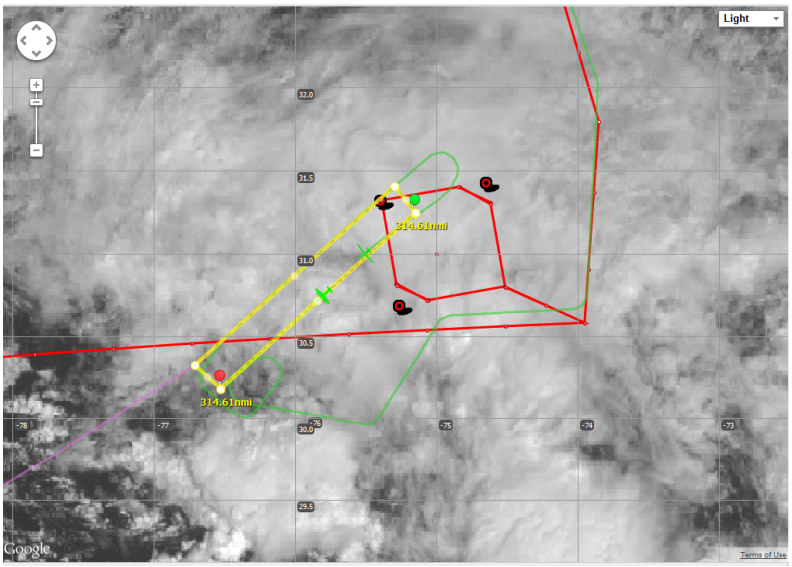




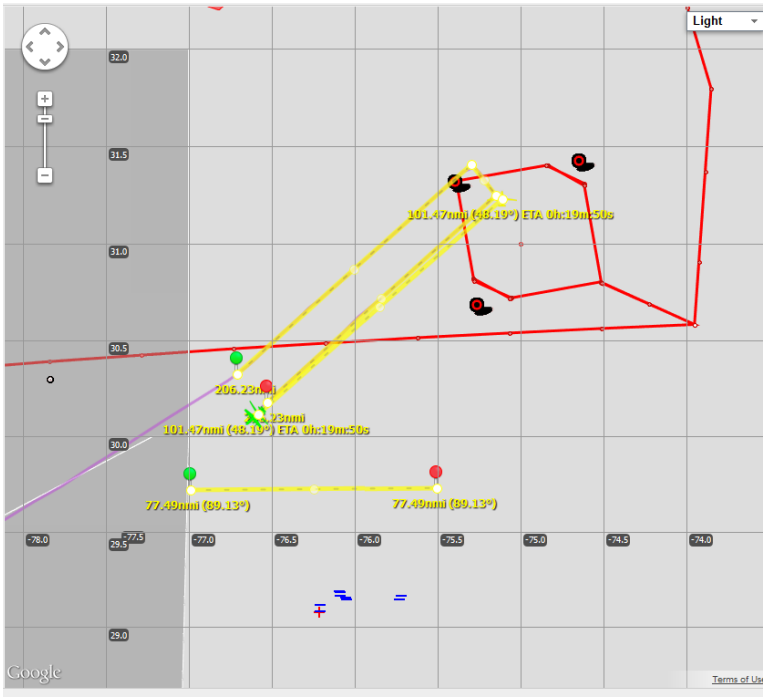
1532 P-3 has begun the leg to the northeast. The GH is about 3 minutes out from point, but after turn should be about 4-5 min behind the P-3. We would then overtake them near or just after the midpoint of the leg.



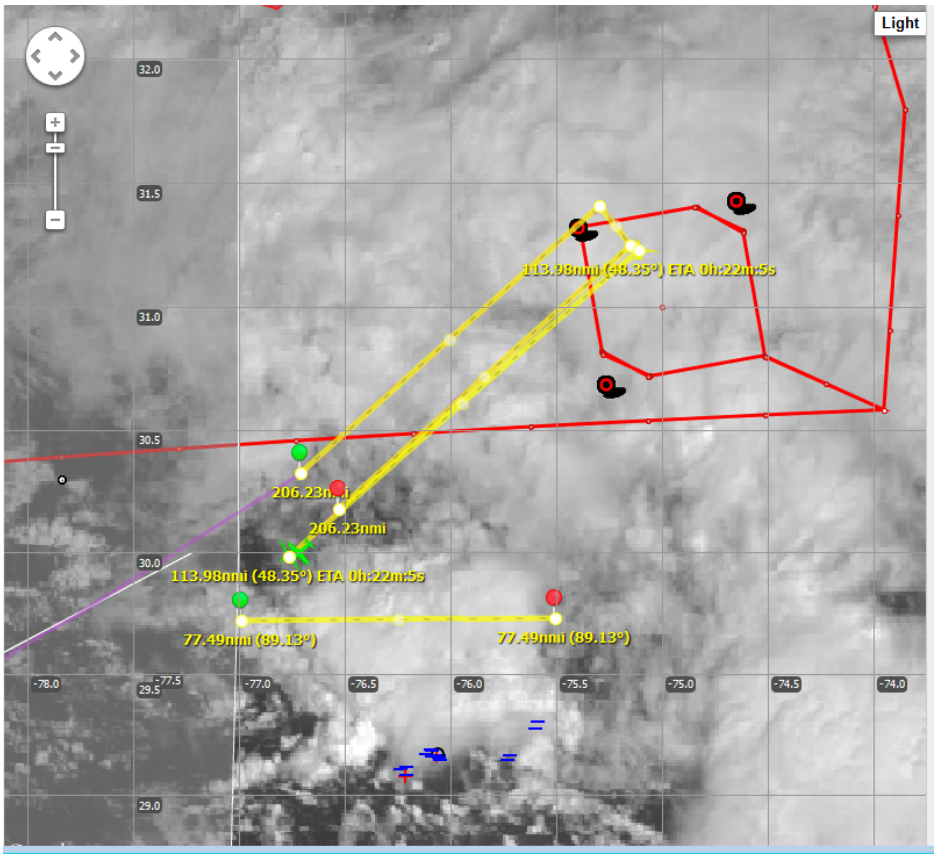
1543 GH catching up to P-3. This part of the cloud system is mostly weaker stratiform now, so we are considering setting up a west-to-east leg across some convection to the south of the current racetrack for when the racetrack is completed.



1607 GH catching up to P3 on second leg of pattern.

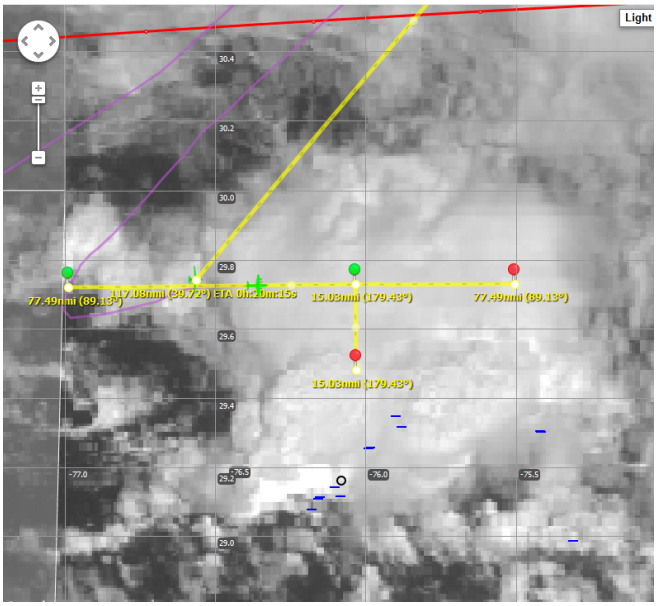


A west-to-east leg has been set up to the south of the racetrack. The western point is right on the edge of the special use airspace, so it will need to be moved eastward just a bit.

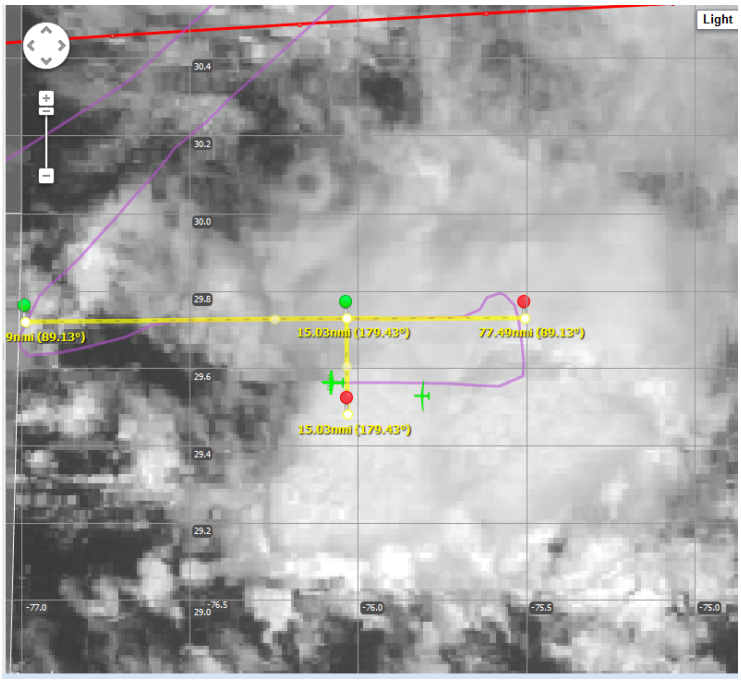


1625 Here is the same scene but with the visible image.

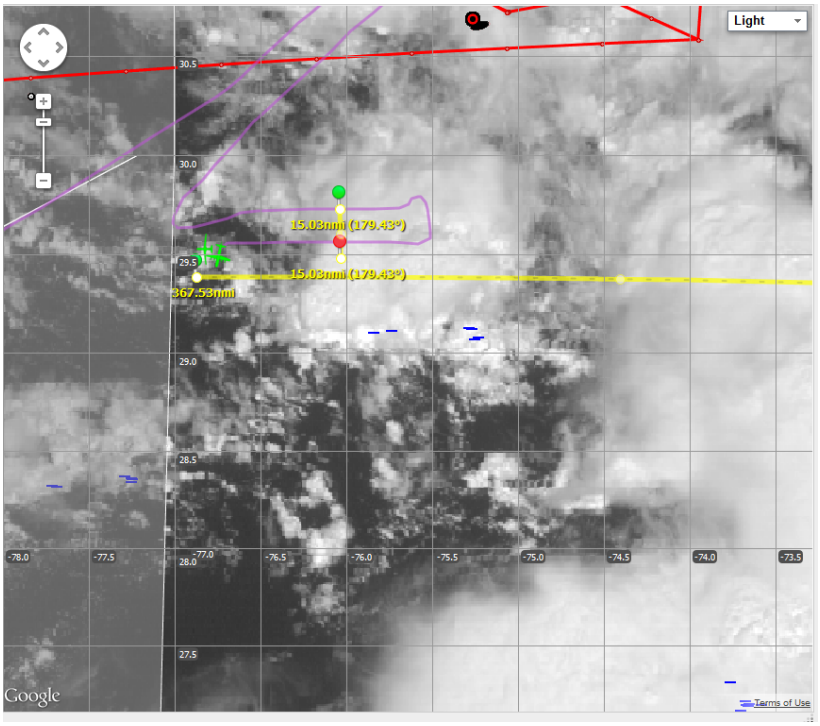
1635 P-3 reports that they could see us from below.



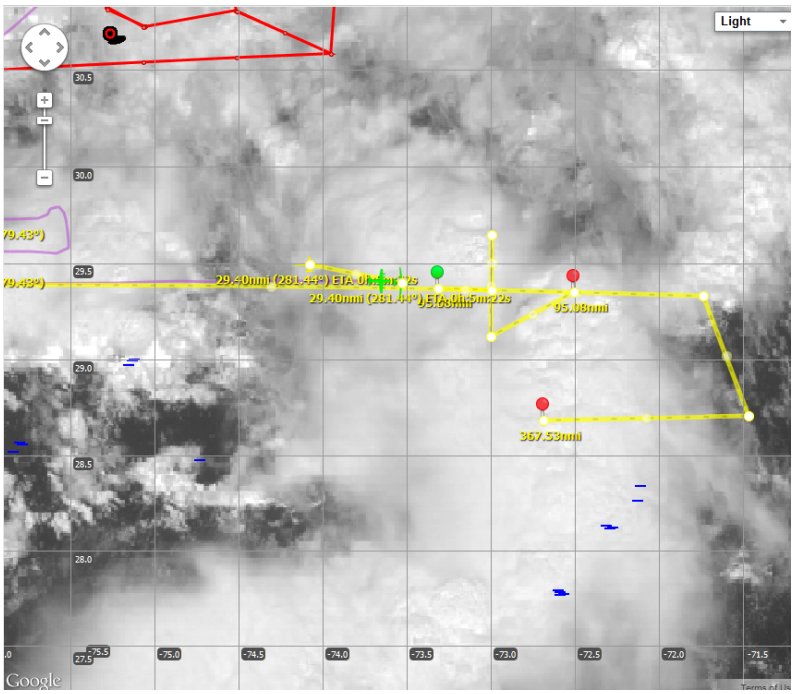
1640 GH lined up behind the P-3 after doing a 360 deg turn to delay about 4 minutes and let the P-3 get ahead of us. Deeper convection to the south, so will set up next let 12 nmi farther south.



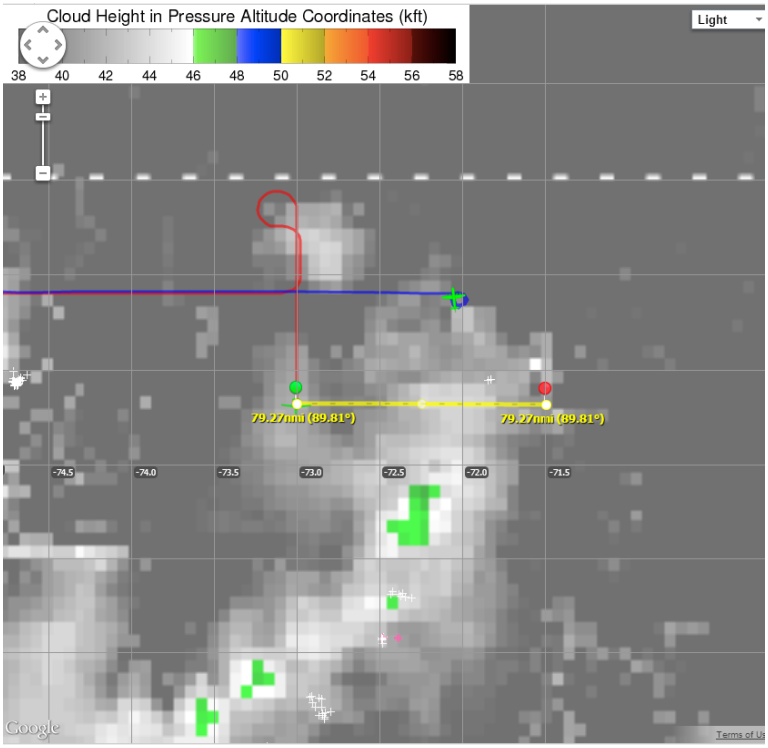
1702 Slight offset, with GH a bit farther south than the P-3. Storms moving eastward faster than anticipated, so we turned too early on the last leg. Will adjust next eastbound leg to go farther east and a bit farther south.



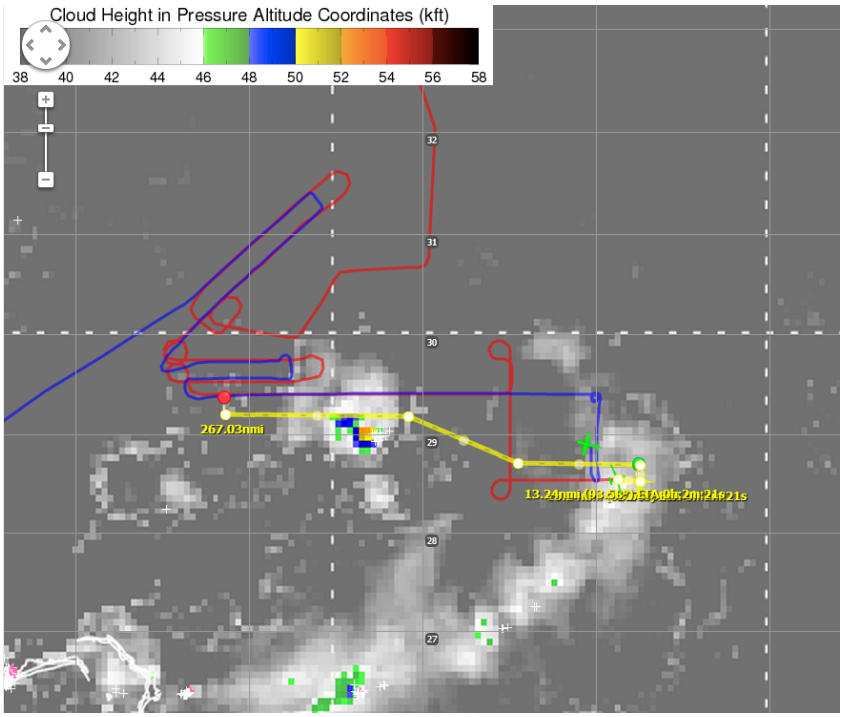
1713 P-3 turning south to go along 29.4N. GH will turn north to add in a delay and then turn south to also go along 29.4N.



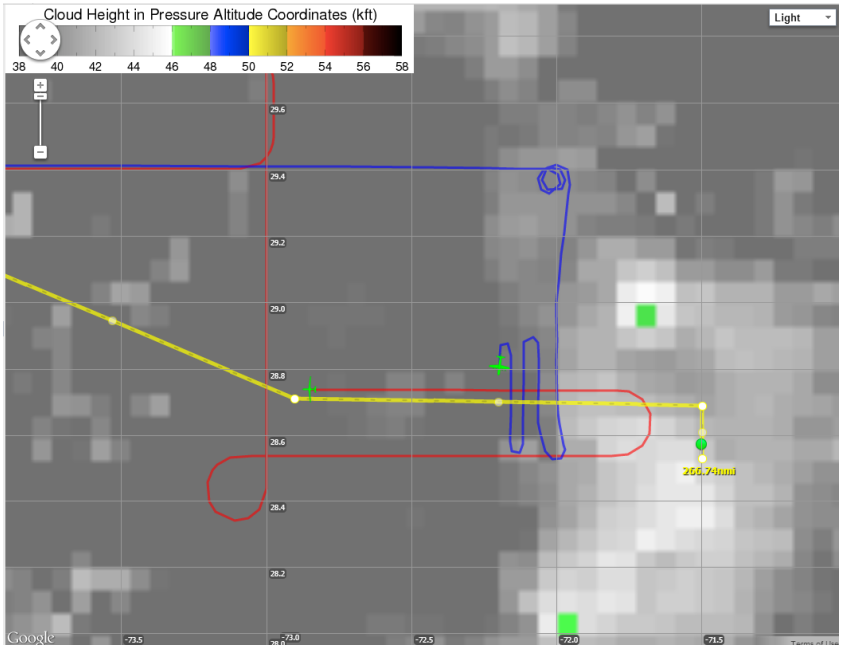
1750 Set up a quick figure 4 to get an orthogonal crossing with the P-3.



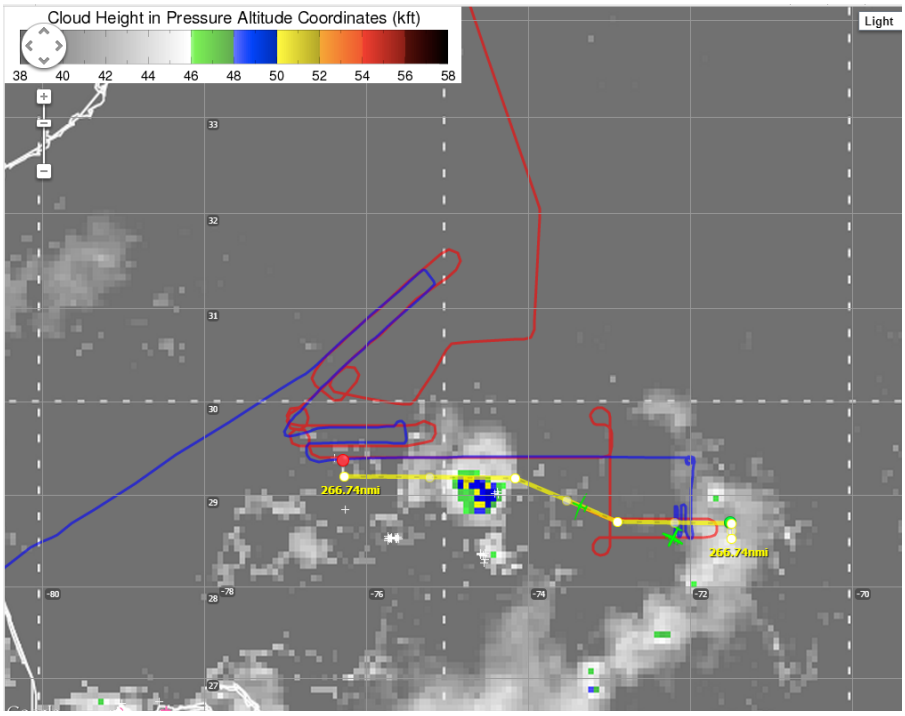
1816 (time corresponds to aircraft location; CIMSS image is usually about ½ hr old) Continued south from first figure-4 and will turn due east along 28.5N to set up another orthogonal crossing with a southbound P-3.



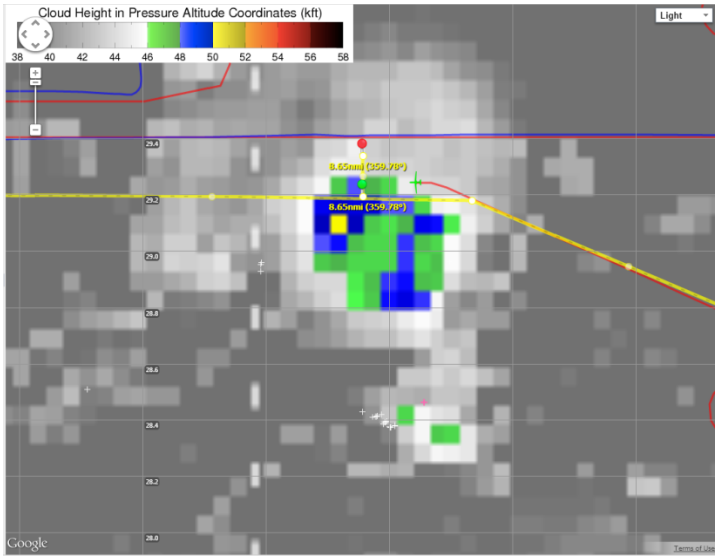
The P-3 turned a bit early compared to our pattern, but that is probably because we ended up going farther southward than planned (and communicated to them). Not sure why we had gone farther southward, but it got us into somewhat heavier precipitation, which was good. We had to turn northward earlier than planned on the eastward leg because we reached the eastern extent of our filed circle.



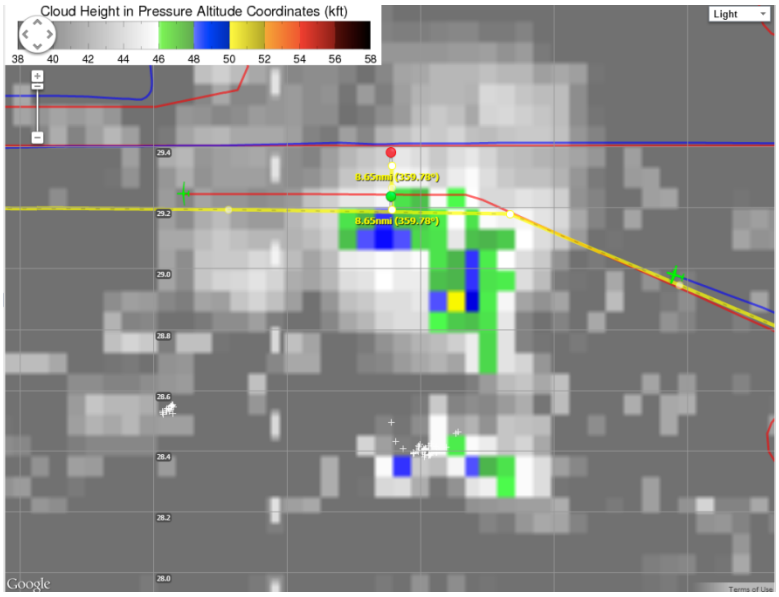
1852 Heading westward. P-3 is doing short north-to-south legs that should provide good comparison data for HIRAD and HIWRAP. Their purpose was to get IWRAP data across the swath of HIWRAP.



Above is a broader view of the coordinated flights. Westward path will take us just north of an intense cell with tops ~50 kft.

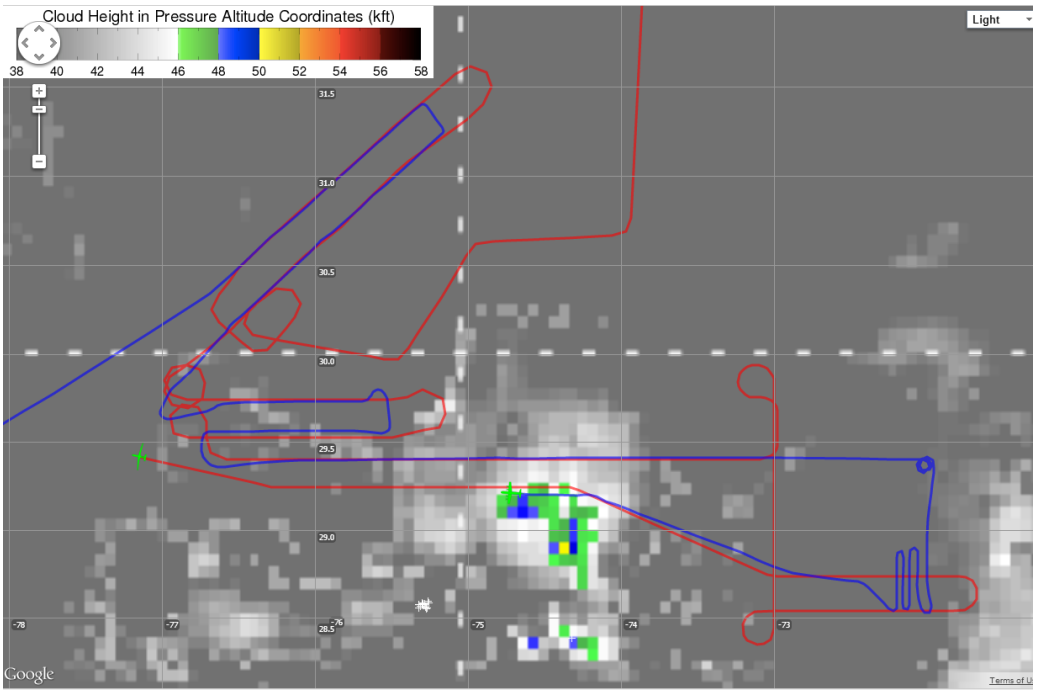


1908 Passing by a deep cell. Flight altitude ~54.6 kft, so pilots want some clearance around the 50 kft pixel.



1918 Subsequent CIMSS cloud top product (1902 UTC) shows decrease in cloud heights near flight track. HIWRAP (Ka band) saw tops near 50 kft. The P-3 can be seen well behind us, but following our track.

1927 Reached our final science waypoint on westbound leg, now heading home to Dryden.



1936 The image above provides a good summary of the coordinated effort with the P-3.

2022 On the way back to DFRC, and now crossing Florida. Almost no weather enroute. Should have some kicking winds on landing along with possible moderate turbulence.

2044 Possibly an issue with the cold temperatures on the way back to DFRC. May create a red-fault on the TT4.

2302 Feet dry over Texas. Nothing to report. TT4 seems to be doing well -> no temperature red fault.

0029 Nothing to report. No convection, no nothing.

0258 In complex at FL450. Surface winds marginal for landing, but trend is down.

0326 Orbiting while waiting for winds to die down.

0350 Bringing payload down.

0407 Landed.