Flight Scientist Report
Thursday 12/9/2021 ACTIVATE RF97

Flight Type: Statistical Survey Flight
Flight Route: KLFI ATLIC ZIBUT 3924N06724W ACK KOQU
Special Notes: This is the first flight of a 2-part refueling flight with a stop in Quonset State Airport (Rhode Island). Really nice cloud conditions with transitions between open/closed cells. Extra dropsondes to characterize differences across the cloud field.

King Air
Pilot report (Wusk):
Cooperative flight with HU-25; first flight of a two flight day. First ACTIVATE flight to attempt a refueling stop in New England. Planned KLFI-ATLIC-ZIBUT-3924N06724W-JENYY-ACK-KOQU. Take off Runway 08 ~5 minutes ahead of HU-25. Forward FOD door opened only with assist by researcher. Uninterrupted climb on course to ATLIC and FL280. 5x dropsondes deployed at ETMEY, SQUAD, (immediately prior to turn), 1/2 way between turn and ACK, & ACK. Maintained FL280 until final dropsonde before ACK. Uneventful recovery to KOQU runway 34. HU got about 17nm behind B200 on EB leg due to strong tailwinds at altitude. HU passed B200 on NW leg and ended up about 30nm ahead. HU completed a 360 turn to get back to better spacing. The Gas n Go at FlightLevel Aviation FBO at KOQU went well. Total turn time was just over an hour. Landed with #1000 lbs.

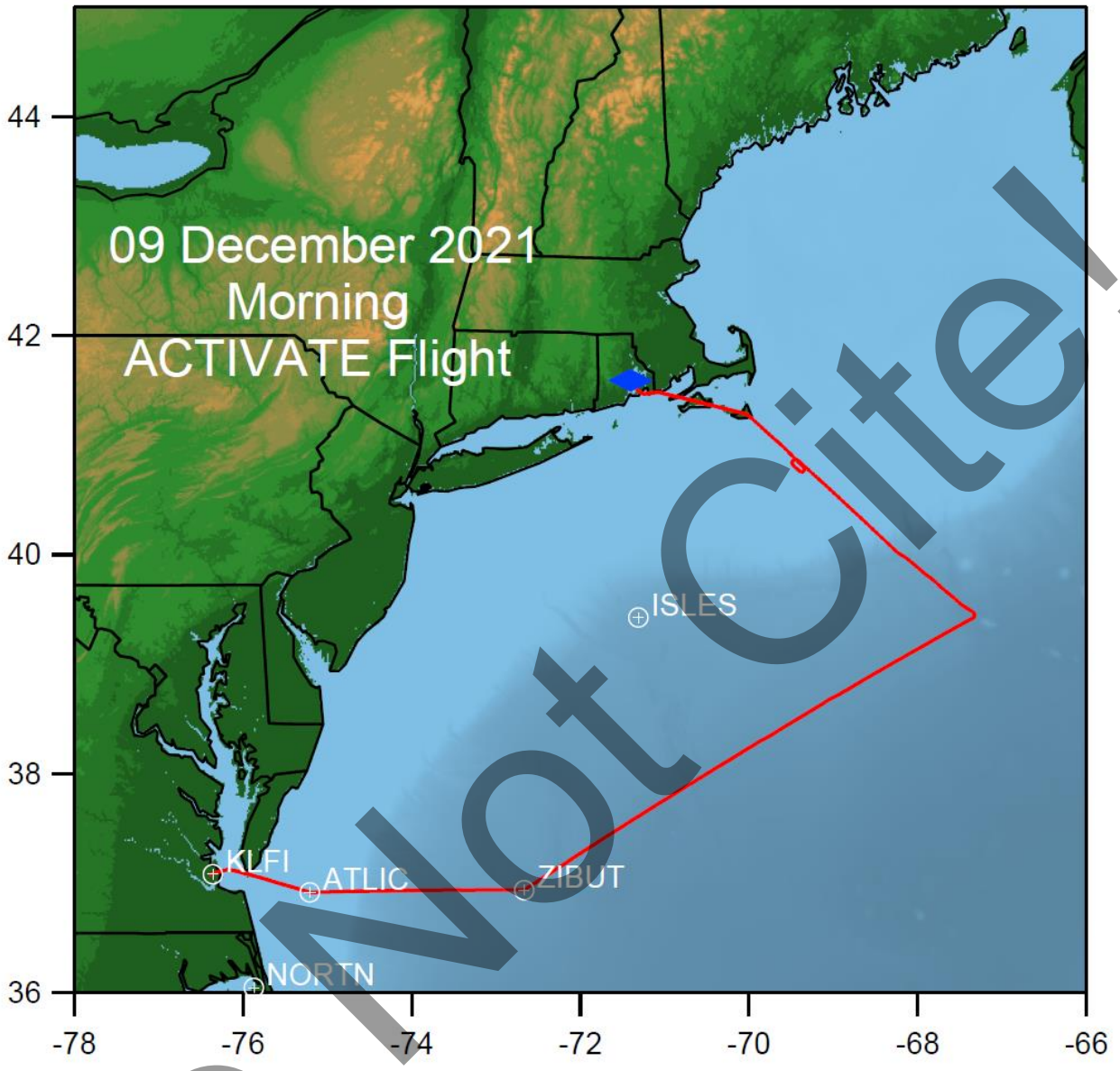
Flight scientist report (Shingler):

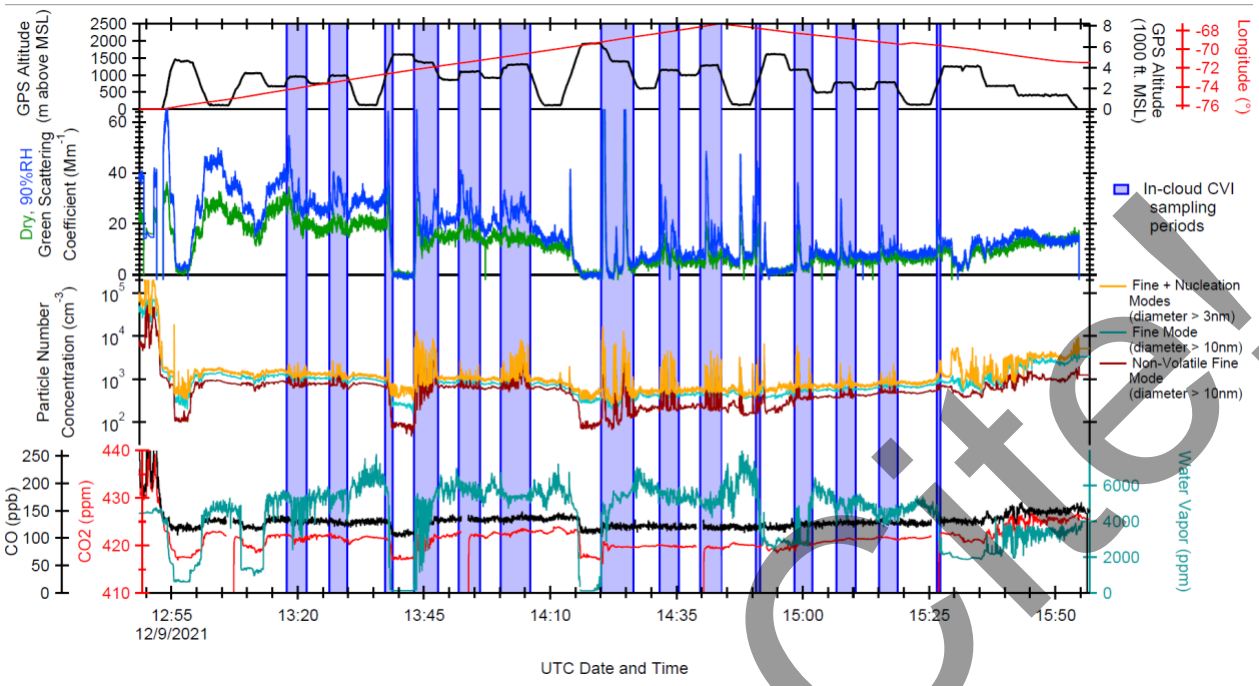
We had a fairly consistent low level cloud deck with clear skies above the whole time. About 2/3 of the way from ZIBUT to NE turn, the clouds started to thin a little bit and become more pocketed. 5 Sondes dropped along the route just before ZIBUT, 1/3 along track, at outbound crossing, corner, coast.

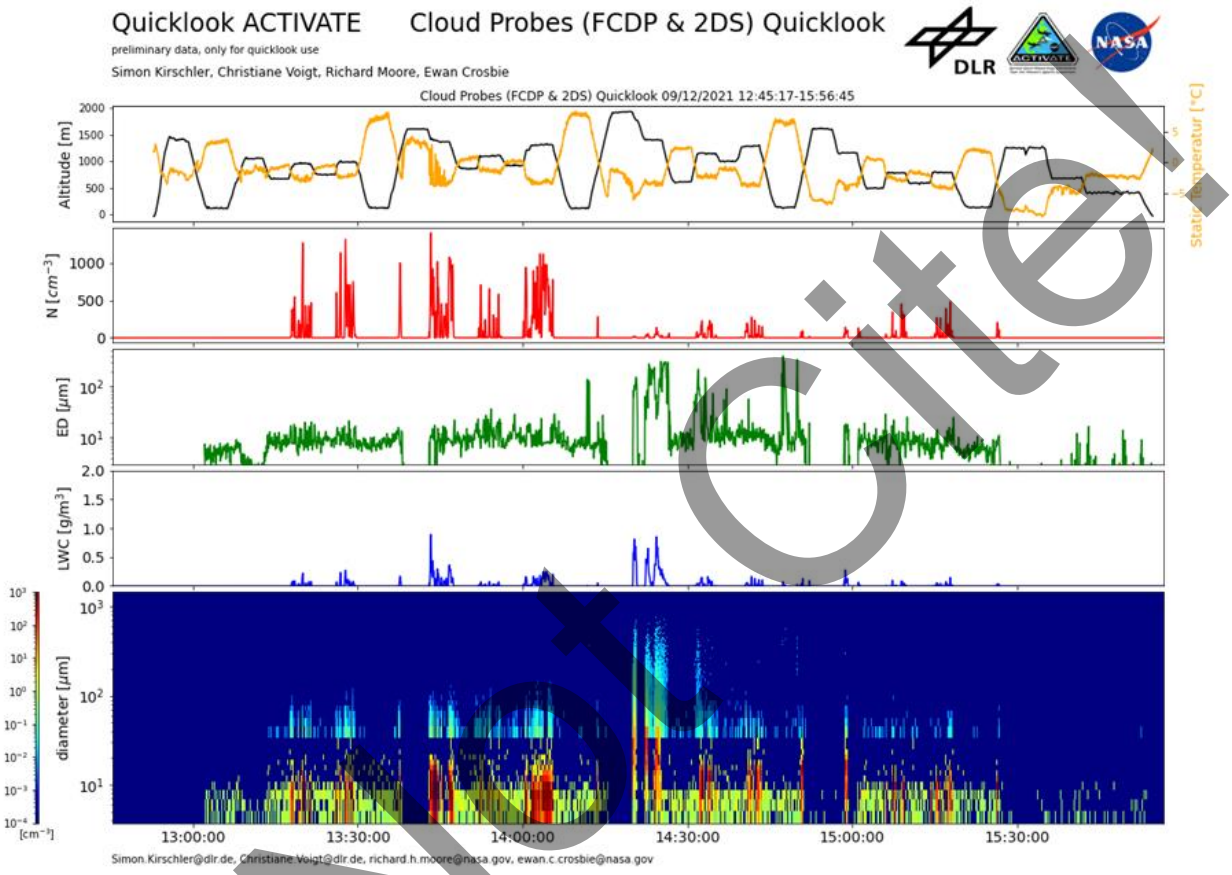
Falcon
Pilot report (Thorson):

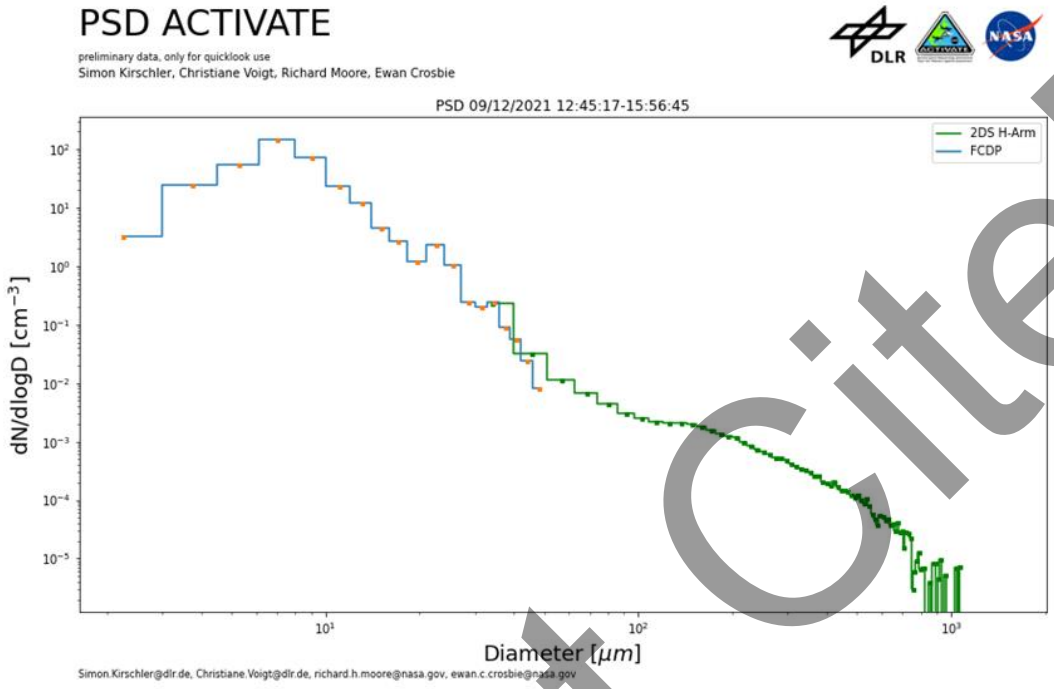
Flight scientist report (Crosbie):
Remote Landing at Quonset State Airport. Upon departure from KLFI, we initiated stat survey modules early just after the CBB. Clouds started to appear quite quickly offshore within approximately 40km/25miles. There was a marked top to the boundary layer with enhanced

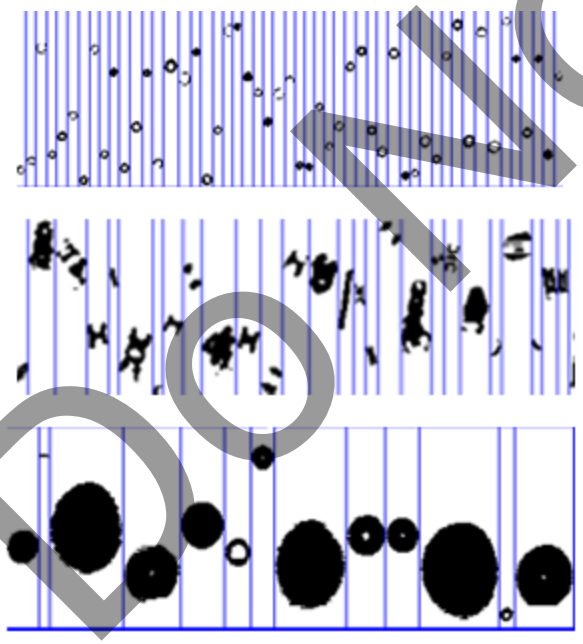
aerosol and clean conditions aloft. The aerosol in the PBL contained enhancements of SO4, ORG and NO3. Strong mixing was "felt" in the PBL typical of high surface flux, cold air advection conditions. Further offshore, the clouds thickened and became more laterally extended under the capping inversion although still remained the appearance of fair weather Cu. After ZIBUT, clouds became more spreadout forming a Sc deck. The clouds appeared coupled to the surface and were becoming progressively thicker. Further north, the capping inversion weakened and the ACT temperature was lower. In places, cloud tops were penetrating some distance upwards into this layer. Around this time, penetrations through thicker clouds revealed significant mixed phase precip, at temperatures around -5C. The cloud scene became somewhat more complex with much of the Sc layer dissipating and regions were found which contained only ice precip. Further north still, the conditions abruptly resorted to fair weather Cu. The bases were lower and the clouds were not vertically capped as they were west of ZIBUT. The clouds had a distinctly different appearance. During the inbound leg to the coast, the cloud base varied somewhat but clouds remained Cu-like and not very deep. There was some ice detected, but mostly droplets. An abrupt end of the marine clouds was observed near Nantucket with some very small Cu puffs observed over land. Aerosol conditions at the North end were cleaner than the VA-ZIBUT section but there was still an observed gradient with offshore distance. 4 full cloud modules completed (last leg of module 4 was after cloud end)


09 December 2021
Morning
ACTIVATE Flight
ISLES
KLFI
ATLIC
ZIBUT
NORTN
44
42
40
38
36
-78
-76
-74
-72
-70
-68
-66


GPS Altitude (m above MSL)
Dry, 90%RH Green Scattering Coefficient (Mm-1)
Particle Number Concentration (cm-3)
CO (ppb)
CO2 (ppm)
GPS Altitude (1000 ft. MSL)
Longitude (°)
Water Vapor (ppm)
In-cloud CVI sampling periods
Fine + Nucleation Modes (diameter > 3nm)
Fine Mode (diameter > 10nm)
Non-Volatile Fine Mode (diameter > 10nm)
12:55
12/9/2021
13:20
13:45
14:10
14:35
15:00
15:25
15:50
UTC Date and Time


Quicklook ACTIVATE
Cloud Probes (FCDP & 2DS) Quicklook
preliminary data, only for quicklook use
Simon Kirschler, Christiane Voigt, Richard Moore, Ewan Crosbie
Cloud Probes (FCDP & 2DS) Quicklook 09/12/2021 12:45:17-15:56:45
Altitude [m]
N [cm⁻³]
ED [µm]
LWC [g/m³]
diameter [µm]
[cm⁻³]
13:00:00
13:30:00
14:00:00
14:30:00
15:00:00
15:30:00
Simon.Kirschler@dlr.de, Christiane.Voigt@dlr.de, richard.h.moore@nasa.gov, ewan.c.crosbie@nasa.gov

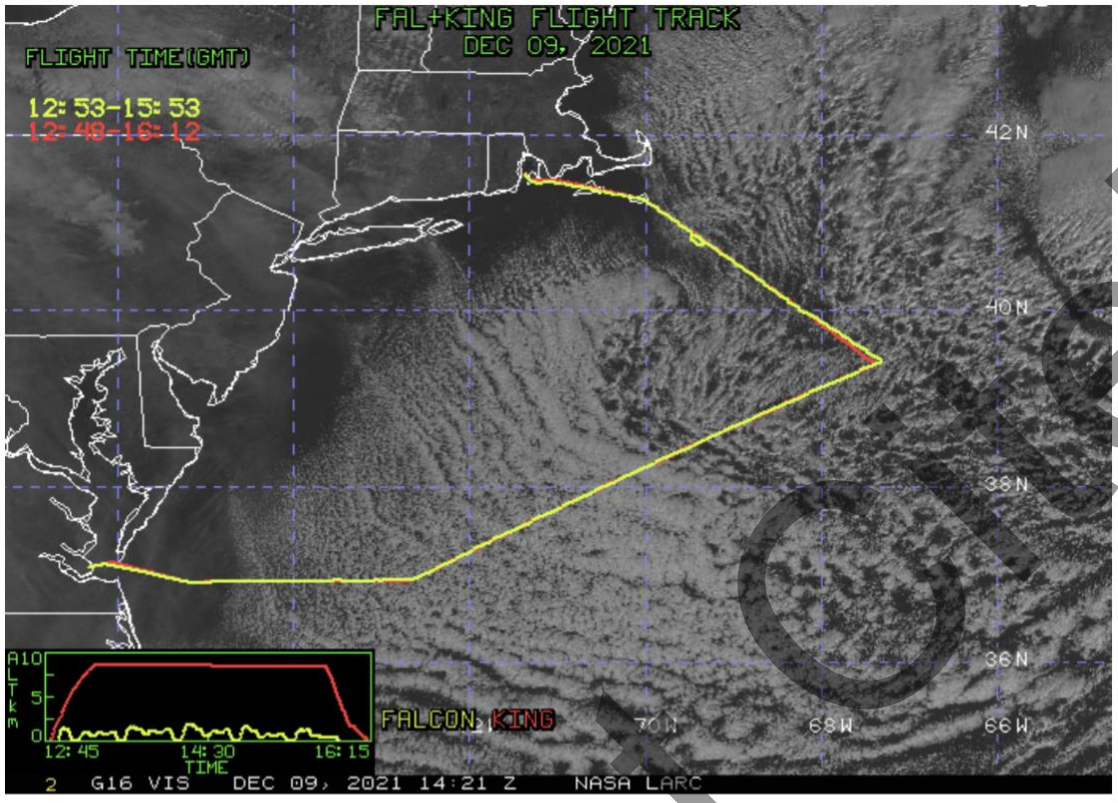




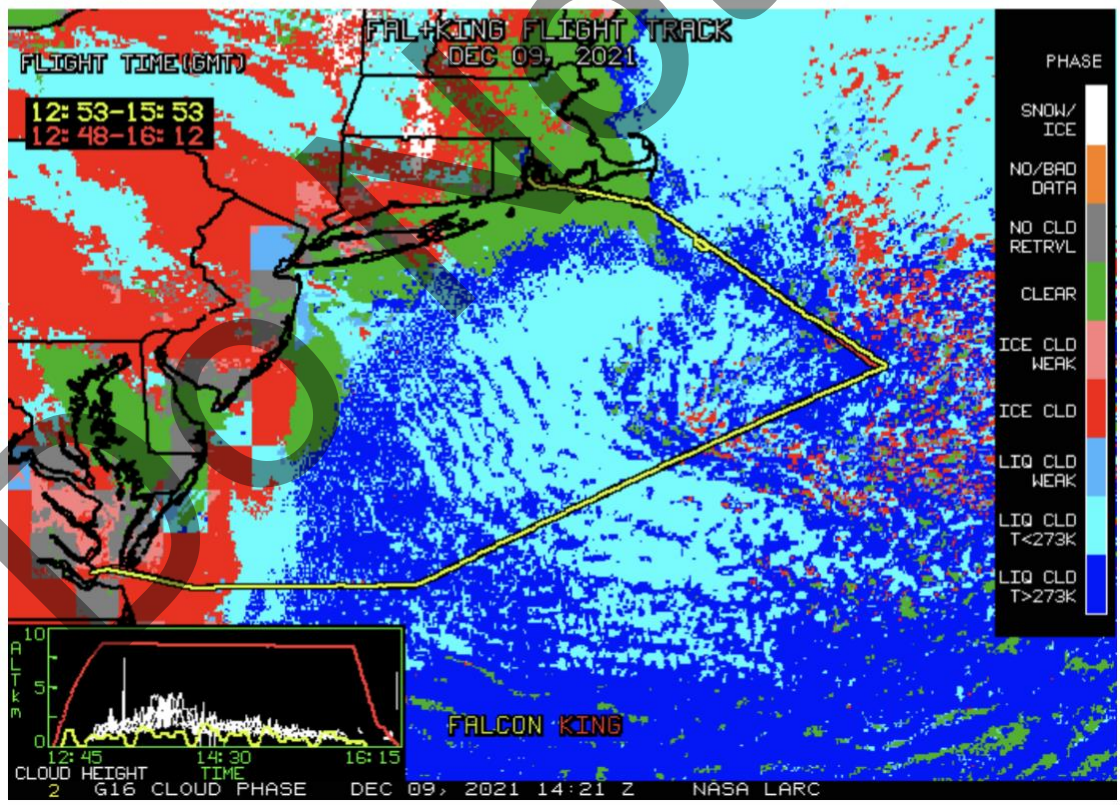
Mixed phase clouds and precipitation

NASA-LaRC Clouds Group GOES-16 Quicklook Images for Flight 97, 14:21 UTC Dec 09, 2021

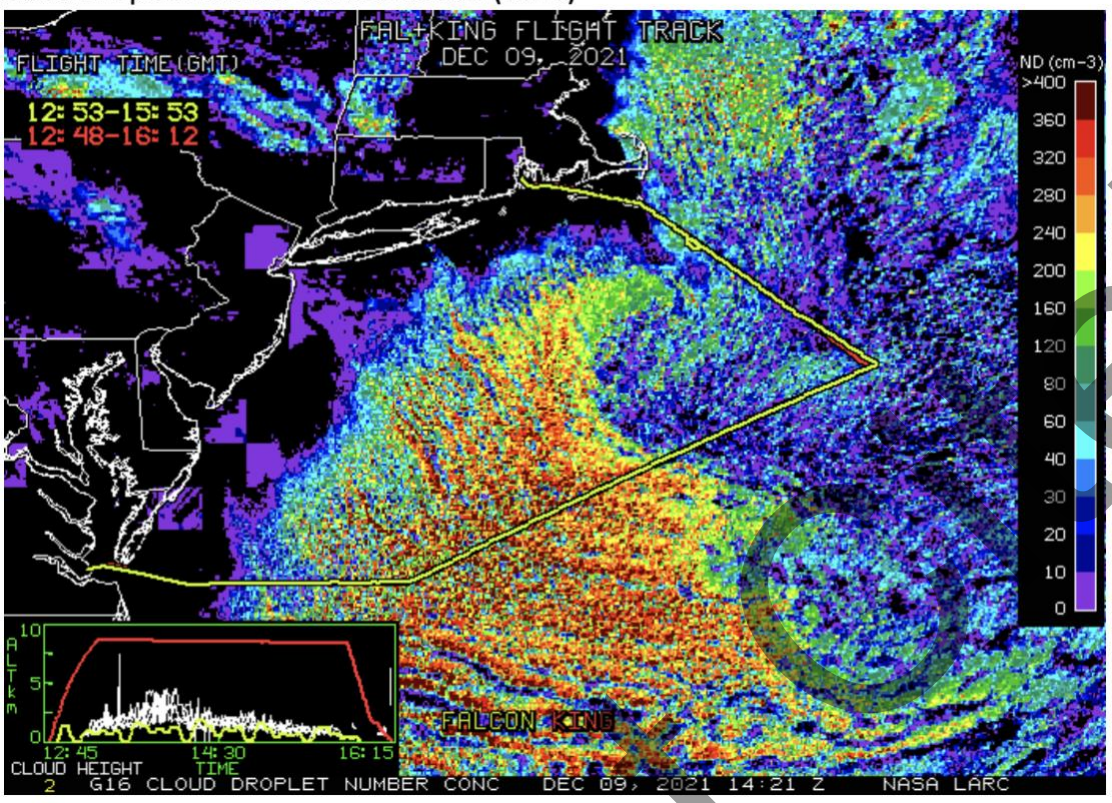
Visible Image



Cloud Phase



Cloud Droplet Number Concentration (cm-3)



Cloud-Top Height (Kft-ASL)