Flight Scientist Report
Friday 08/28/2020 ACTIVATE RF29

Flight Type: Statistical Survey Flight & CALIPSO underflight – ZIBUT to northeast for underflight
Flight Route: KLFI ATLIC OUTES ZIBUT 36.7378/-70.3225 37.3389/-70.5008 37.9398/-70.6812 38.5405/-70.8639 39.1409/-71.049 39.339/-71.111 ZIBUT OUTES ATLIC KLFI

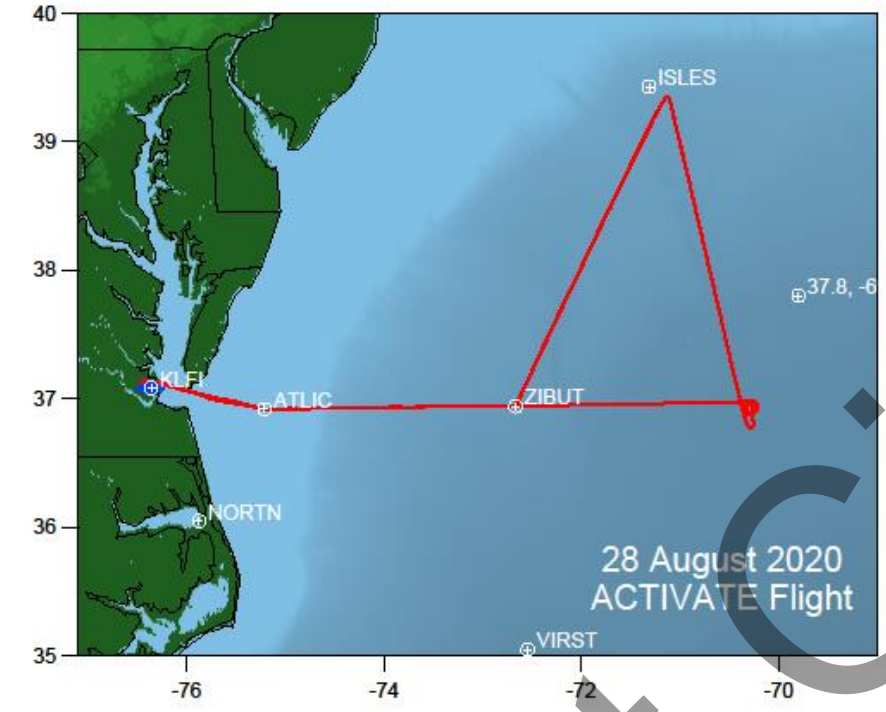
Special Notes:
This is forecasted to be a clear day with potentially smoke influence and with a CALIPSO underflight in an area mostly cirrus-free. To save fuel and to account for a later take-off time (~1230-1245; temperature limitations at takeoff), the plan is to have the Falcon transit out at high altitude until the southern point of the CALIPSO underflight, to then spiral down and start its ensembling in clear air to the north point of the underflight and to specifically end at the min-alt. The King Air is aiming to drop 6 sondes along the underflight track to enhance data quality and to get surface conditions that the Falcon cannot owing to its 500 ft limitation. Will aim to do 2 additional dropsondes on the way to Langley from the northern point as the Falcon does its ensembling back to Langley.

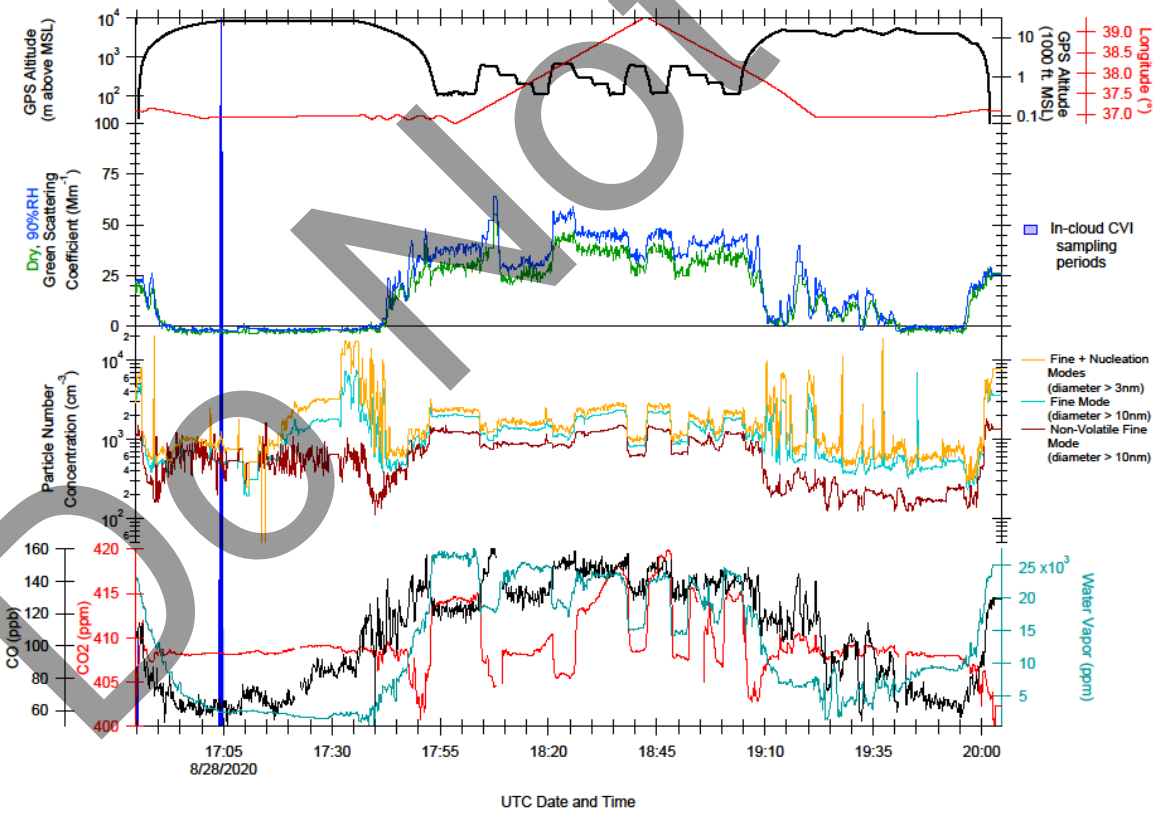
In execution, everything went well as planned above and the Falcon did 3 full clear modules and a so-called "unicorn aerosol module" where Falcon did a spiral in clear air with King Air above it. The cloud probes revealed different cloud phases during the flight (see notes below by those figures).

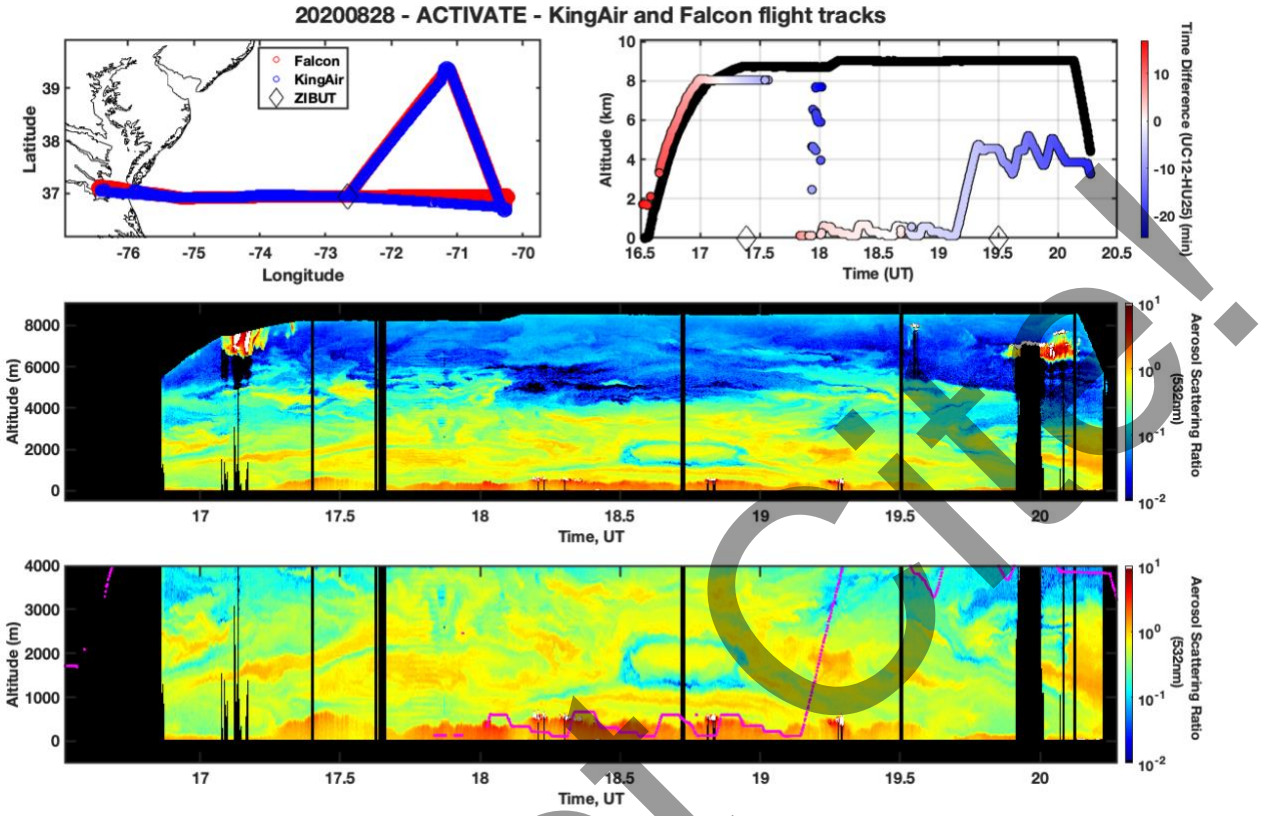
King Air
All things went well. Did the planned total of 8 sondes.

Falcon
Spiraled down at a more aggressive rate to 15 kft and then slowed the spiral rate below that.
Split off third clear module at north end of CALIPSO track to make sure we get a minalt at the north end.
APU was successful this flight in keeping temperatures in cabin lower than previous days
One of the CPC's got some butanol in it

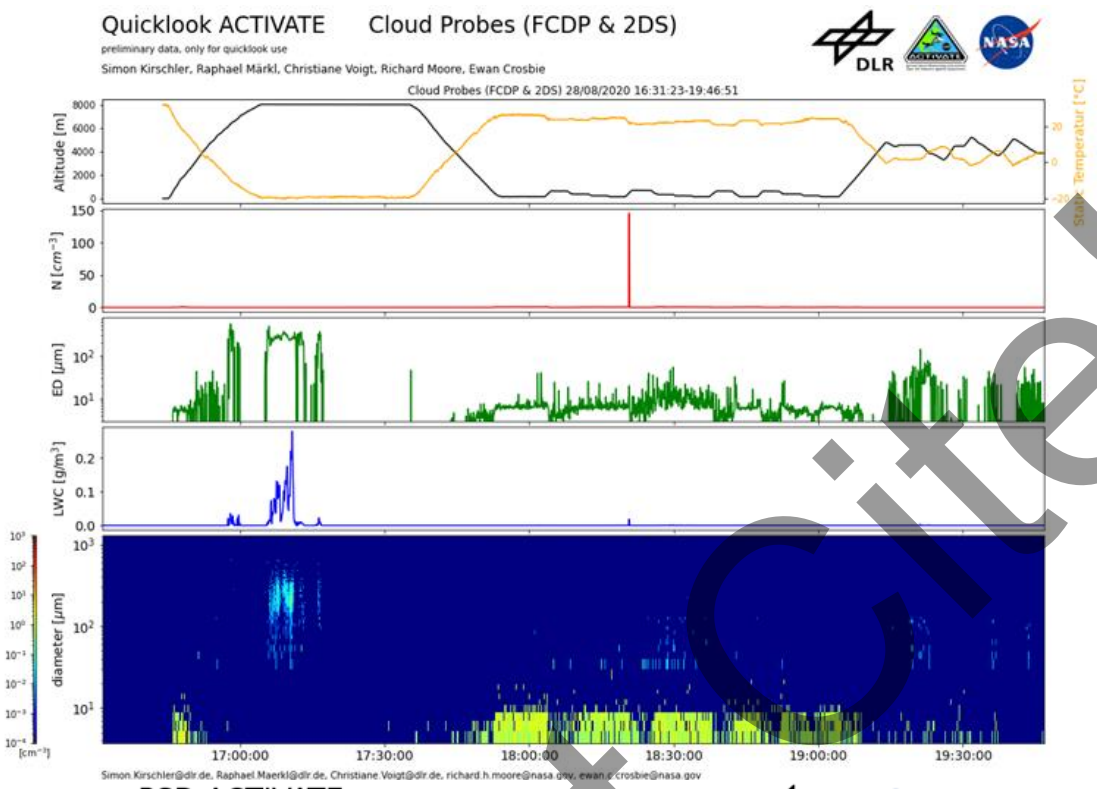
Rich Moore Quicklook Images:

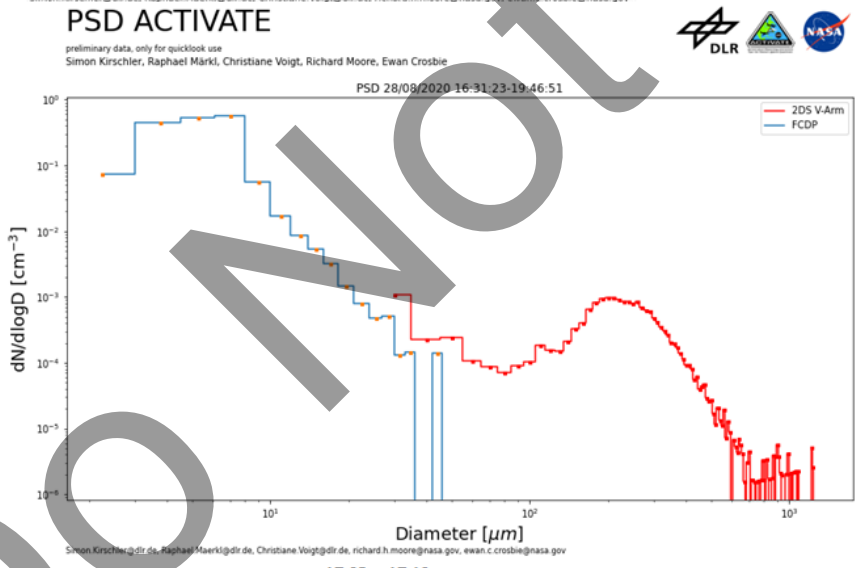


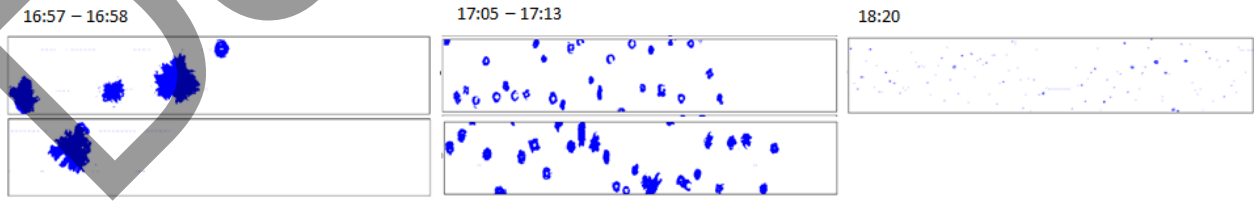


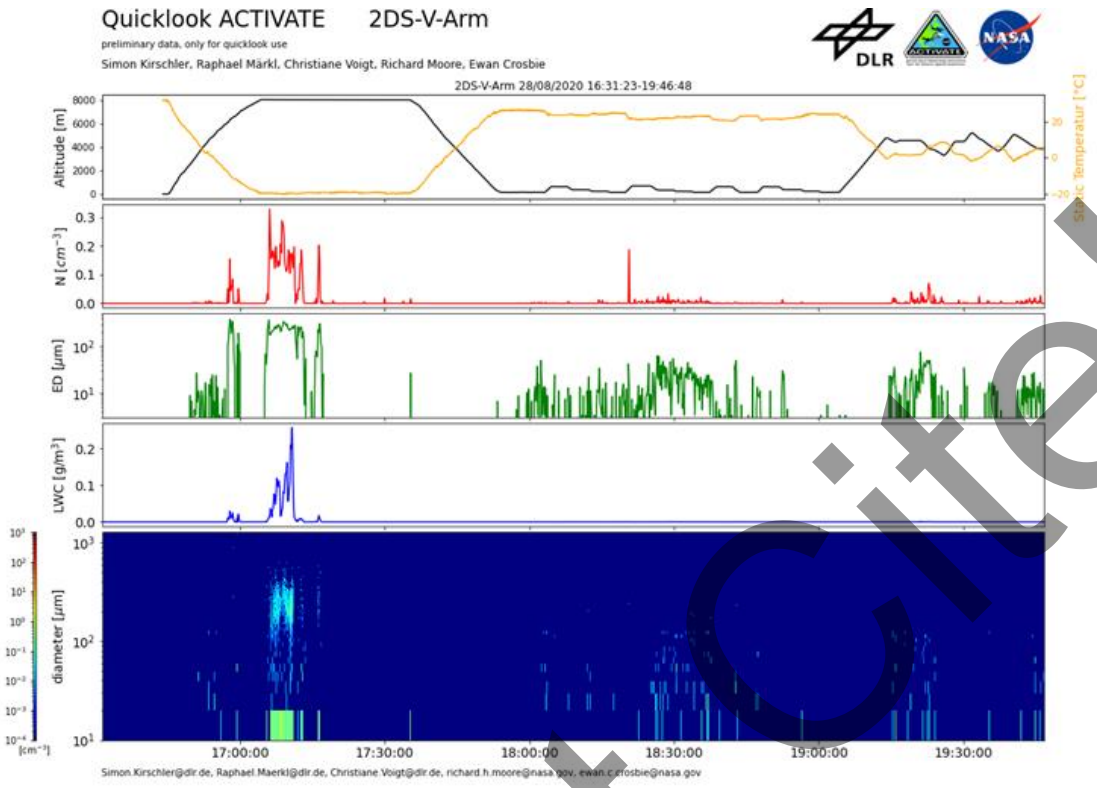


From Raphael: The number concentration obtained from the FCDP is hard to see due to the sharp peak around 18:20. I have therefore added another quicklook just representing the 2DS v-arm data on the last slide. The PSD also looks interesting this time and the 2DS images clearly show different phases at different times. I would interpret the images from 16:57-16:58 as ice, while 17:05-17:13 showed a relatively high number concentration of what could be mixed phase clouds. Finally, the images around 18:20 show small, probably liquid droplets.


Quicklook ACTIVATE Cloud Probes (FCDP & 2DS)
preliminary data, only for quicklook use
Simon Kirschler, Raphael Märkl, Christiane Voigt, Richard Moore, Ewan Crosbie
Cloud Probes (FCDP & 2DS) 28/08/2020 16:31:23-19:46:51
Altitude [m]
Static Temperatur [°C]
N [cm⁻³]
ED [µm]
LWC [g/m³]
diameter [µm]
17:00:00
17:30:00
18:00:00
18:30:00
19:00:00
19:30:00
Simon.Kirschler@dlr.de, Raphael.Maerkl@dlr.de, Christiane.Voigt@dlr.de, richard.h.moore@nasa.gov, ewan.c.crosbie@nasa.gov

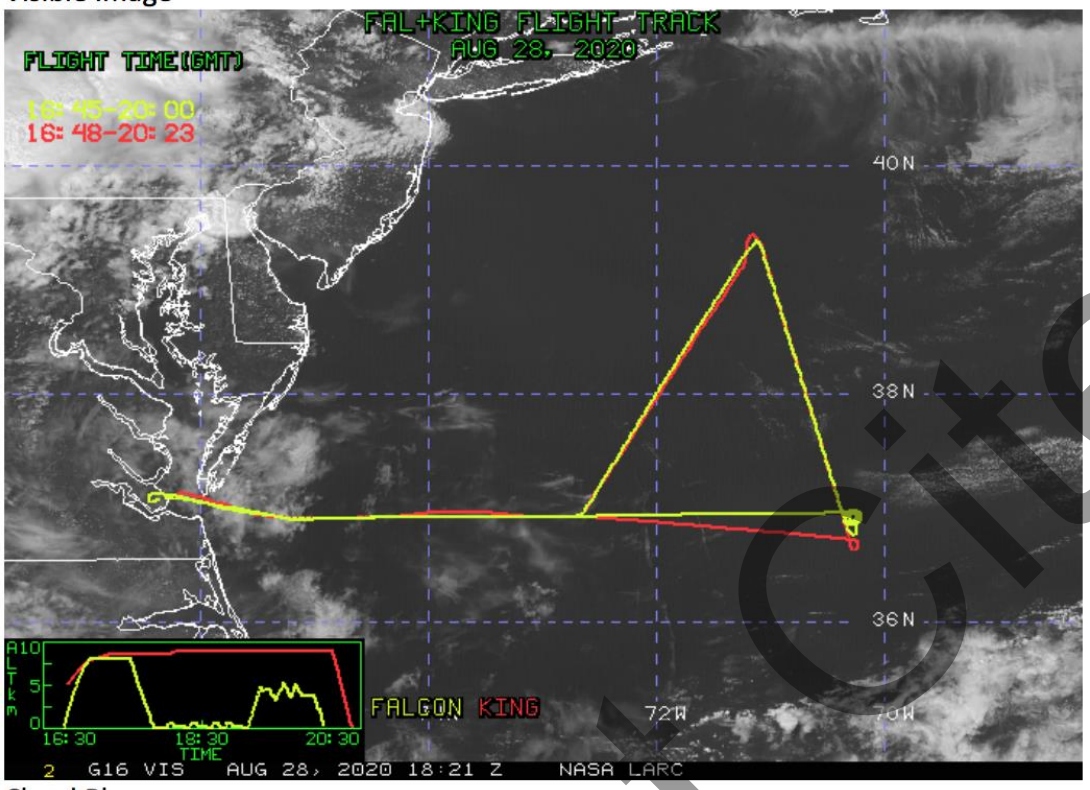

PSD ACTIVATE
preliminary data, only for quicklook use
Simon Kirschler, Raphael Märkl, Christiane Voigt, Richard Moore, Ewan Crosbie
PSD 28/08/2020 16:31:23-19:46:51
2DS V-Arm
FCDP
dN/dlogD [cm⁻³]
Diameter [µm]
Simon.Kirschler@dlr.de, Raphael.Maerkl@dlr.de, Christiane.Voigt@dlr.de, richard.h.moore@nasa.gov, ewan.c.crosbie@nasa.gov


16:57 – 16:58
17:05 – 17:13
18:20

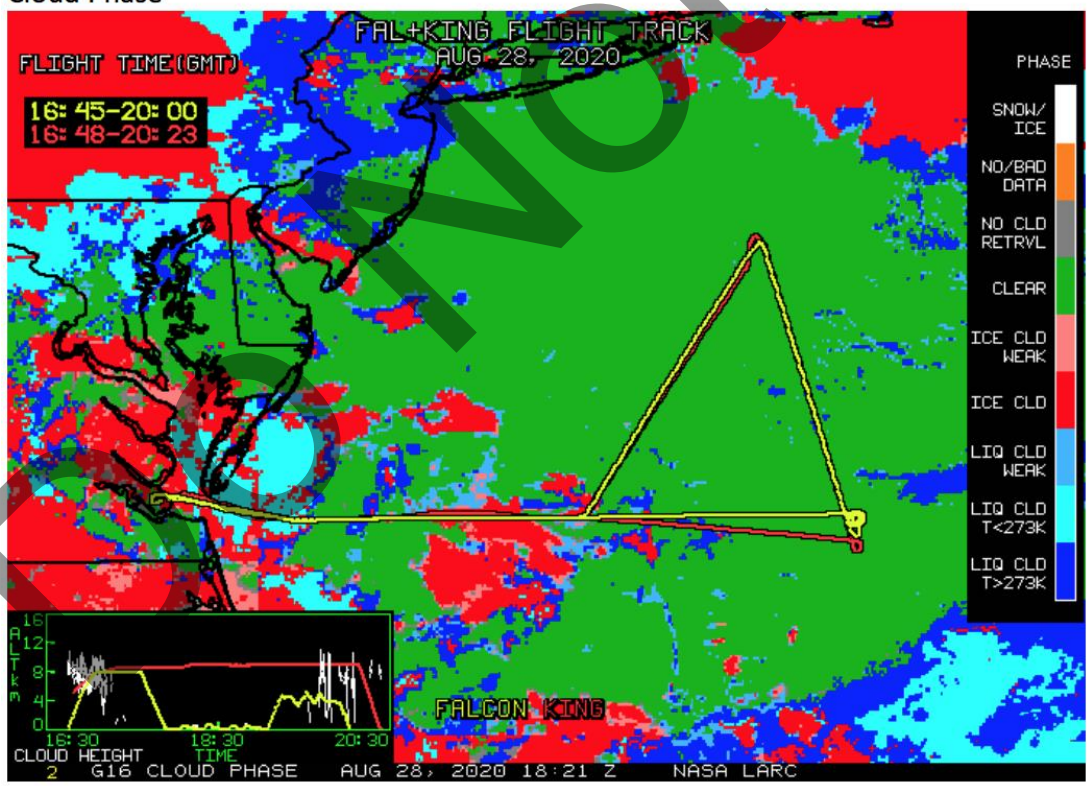


NASA-LaRC Clouds Group GOES-16 Quicklook Images for Flight 29, 18:21 UTC Aug 28, 2020

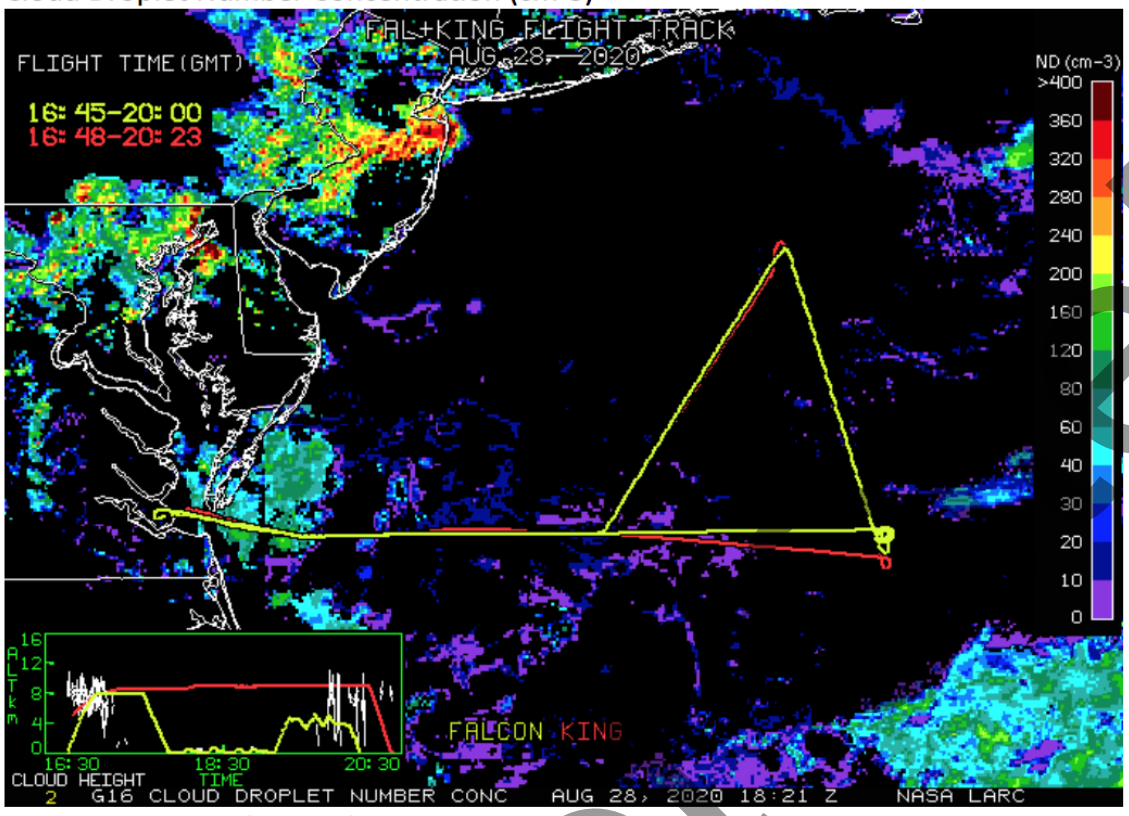
Visible Image



Cloud Phase



Cloud Droplet Number Concentration (cm-3)



Cloud-Top Height (Kft-ASL)