Flight Scientist Report
Wednesday 6/24/2021 ACTIVATE RF87

Flight Type: Statistical Survey Flight
Flight Route: KLFI-ATLIC-ZIBUT-ISLES-ZIBUT-ATLIC-KLFI
Special Notes: Flight began as one to go to Providence to test out a secondary base, but then changed it to an out-and-back flight due to a generator issue with the UC-12 aircraft issue.

King Air
Pilot report (Wusk):
Take-off 1223Z
Landing 1553Z

Total 3.5 hours.

Planned as a UC-12 double flight day; cooperative flight with the HU-25. Planned route: KLFI ZIBUT KENDA JENYY ACK KPVD. Planned as a check on remote refueling ops. UC12 takeoff from runway 08 after HU-25. Good ATC departure and climb to FL280. During the climb the aircraft generators showed signs of significant load sharing fluctuations (problem has been noted on previous flights). At several points the left generator actually dropped to zero and the right generator warning light came on (an indication that the rt Gen Control Unit is dropping the rt generator offline to project the system). Discussions regarding contingency planning started immediately. The system continued to fluctuate for a while then eventually stabilized to acceptable levels (as it has done in recent flights). This allowed a decision to continue the research mission but based on the increased severity of fluctuations and the several drops, the decision was made to not continue with the planned refueling stop at KPVD. A amended clearance for ZIBUT ISLES ZIBUT ATLIC KLFI was requested and given. ISLES instead of KENDA was a research request. Profile up to ISLES and back to ZIBUT was nominal. Approaching back toward ZIBUT ATC advised that Tanker operation in W-387 would preclude transit at FL280. We were offered FL290 or FL260. We chose FL260 based on the presence of Cirrus clouds near ZIBUT which looked to be around FL290. Once handed to Giant Killer, we were told to descent to FL250 then FL240 then FL180 due to tanker ops. During the descent we requested and were given a clearance into W-72 allowing us to remain at FL240. The HU25 hugged the W-72/W-387 boundary. We had some discussion with Giant Killer on the miscommunications between them and NY. GK did a nice job of treading us through the rest of W-72 and out at ATLIC at FL240 allowing for the best research profile under the circumstances. Aircraft coincidence good throughout the flight (Offset laterally during the W-72 leg). About 30 kt headwind headed west so HU25 pulled slightly ahead on return leg. Proceeded to ATLIC for the final sonde drop and the descent into Langley. ATC gave north and west vectors for a visual approach to Runway 08. Normal landing at KLFI runway 08. 4x dropsondes deployed; Zibut EB, ISLES turn point, 1/2 to ZIBUT WB, ATLIC. Crew was Jamison, Wusk, Shingler. Second flight of day scrubbed to allow for aircraft troubleshooting.

Flight scientist report (Shingler):

Scattered shcu between coast and ATLIC on the way out. Clouds became more stratified and formed a second layer between ATLIC and OUTES with CTHs at 3 kft and 6.5 kft. CTHs dropped to approx 3.5 kft approaching ZIBUT and cirrus formed overhead. Highly variables tops (between 6-12 kft) and multiple layers were seen between ZIBUT and ISLES. A similar scene was sampled on the return trip to ZIBUT with a thunderstorm developing East of ZIBUT. The UC12 was vectored south into W72 to avoid tanker traffic in AR9. Between ZIBUT and ATLIC on the return, the CTHs were again variable between 2-8 kft with strong lidar returns (not penetrating to the surface). A total of four sondes were dropped along the route (ZIBUT, ISLES, mid point between ISLES and ZIBUT, and at ATLIC). All instruments were operational.

Falcon

Pilot report (Baxley):
Takeoff (Z): 1220 / Land: 1540

Science flight for the HU-25 in support of ACTIVATE Campaign #4, conducted cooperatively with the UC-12. Route of flight planned for KFLI-ATLIC-ZIBUT-KENDA-JENYY-ACK-KPVD, but changed inflight to KLFI-ATLIC-ZIBUT-ILSLES-ZIBUT-ATLIC-KLFI due to a maintenance issue with the UC-12. Departed Rwy08 direct to ATLIC climbing to 5k ft MSL for initial transit, then descending to 1000' MSL approximately 15 nautical miles north of KLFI. Winds were moderate (<25 kts) out of the west throughout the flight, with clouds throughout most portions of the route from 1000' – 10'000' MSL. During the return leg the HU-25 made a 270^0 turn at ZIBET to close spacing with the UC-12 from 18 nmi to 8 nmi, and a 360^0 turn at OUTES to again close the separation between aircraft. Unplanned tanker operations in W-387 on the return leg required the UC-12 to offset south into W-72, therefore the HU-25 also offset south and was able to keep the flight paths within 7 lateral miles of each other. Time coordination with the UC-12 was always within 10 minutes, and usually less than 5 minutes. All objectives were achieved and with no discrepancies noted.

Pilots: Delaney/Baxley
QNCs: Crosbie/Winstead

Flight scientist report (Crosbie):

Significant cloudiness was associated with a low pressure that was developing along a frontal boundary that had recently moved across the region. The clouds included significant stratiform cloud from 6000-12000ft that was connected to embedded cumulus. There was widespread precipitation both in the sub-cloud environment and observed aloft originating from these detraining layers. The cloud base was

around 1000ft in places. At the northern extent, the turn was made in relatively clear conditions that were at the edge of the cloudy region. The was still some residual stratiform layers but no observed boundary layer cumulus in that northern extreme, however on the return leg, the cumulus were observed to restart within perhaps 20nm of the turn. These quickly built/thickened and precipitation was observed shortly thereafter. The extensive precipitation challenged the ability to achieve sub-cloud aerosol sampling in many locations. Beyond ZIBUT, there was a marked shift in the appearance of the clouds with a more extensive and thick stratiform that appeared to be more coupled with the surface. There was still widespread precipitation and in some places it was not possible to reach the sub-cloud layer, the tops were also quite variable despite the stratiform appearance (4 full cloudy, 1 part cloudy)

Eddie:
Takeoff: 12:20:52

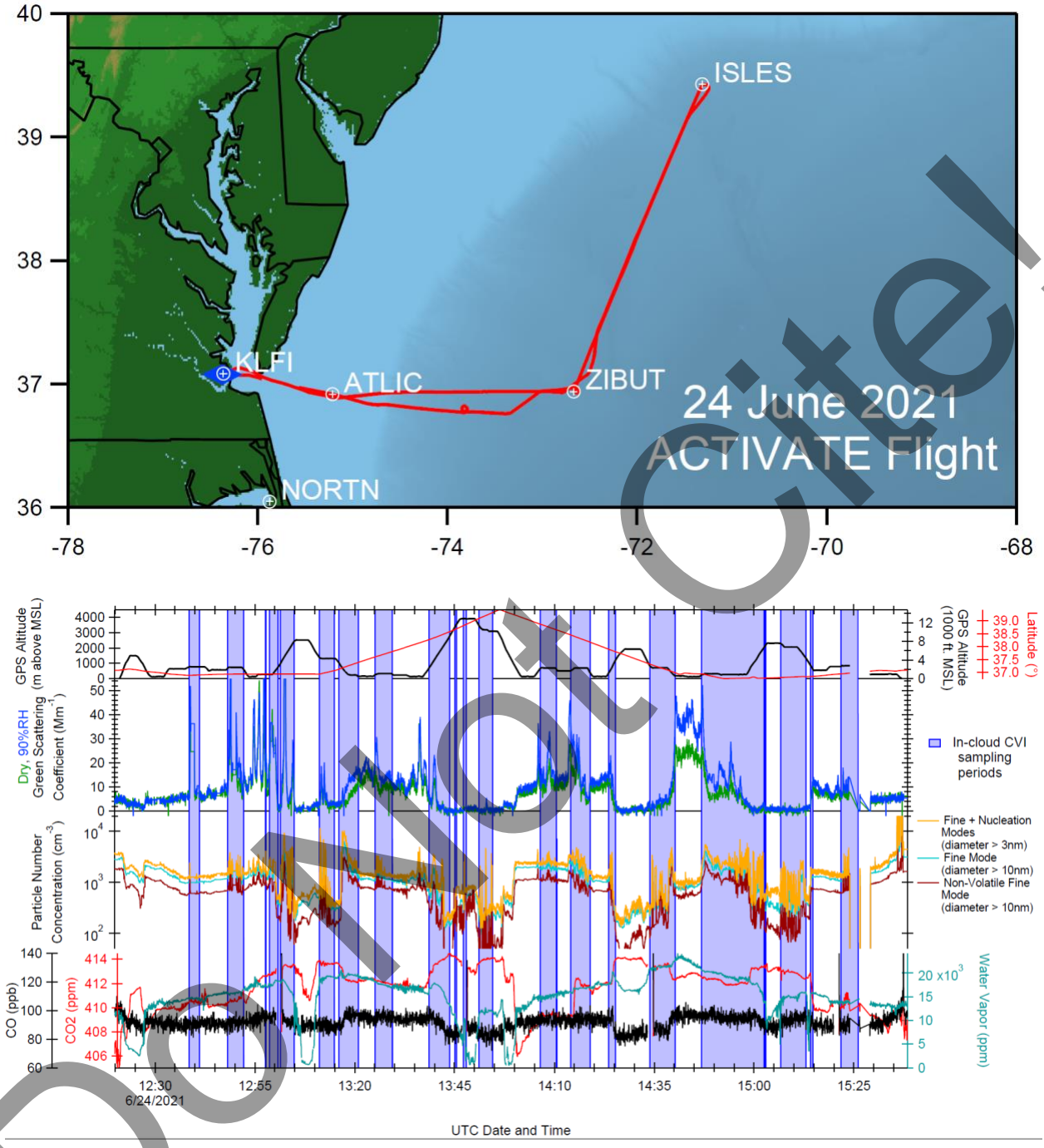
12:57 In & out of clouds @ 1000 ft.

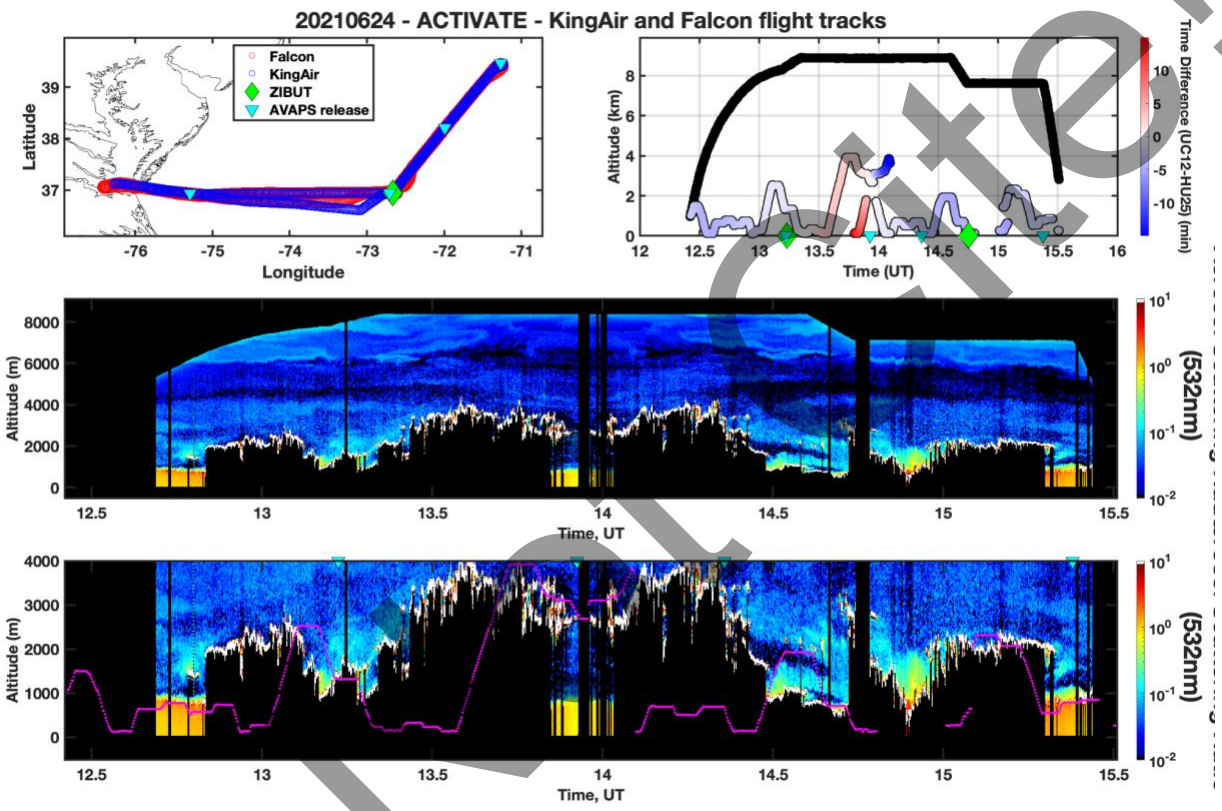
15:24 Lost Reveal; Restarted DAQ, but REVEAL did not come back. Restarted WINDS computer, but still no REVEAL. DAQ & WINDS computer both shut off at same time. Winds computer started first and then DAQ software.

15:29 REVEAL now back.

15:31 WCM & Humidifier turned off for landing

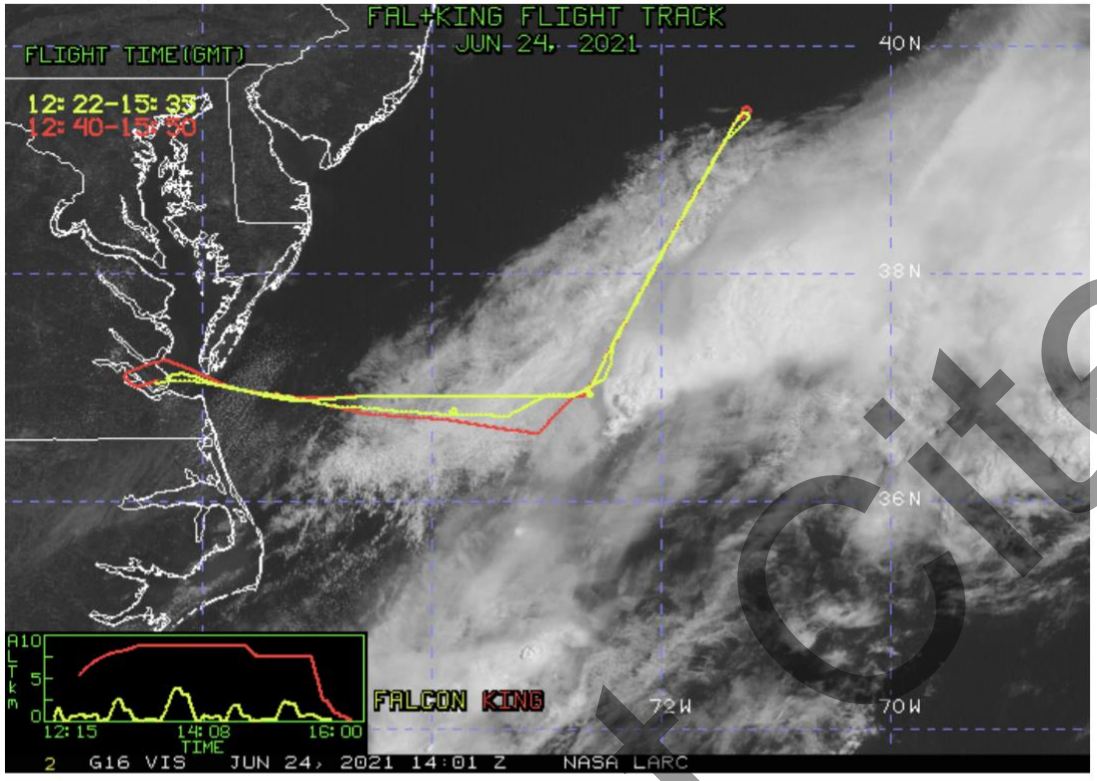
15:37:15 Landed


ISLES
KLFI
ATLIC
ZIBUT
NORTN
24 June 2021
ACTIVATE Flight
40
39
38
37
36
-78
-76
-74
-72
-70
-68
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)
Latitude (°)
Water Vapor (ppm)
In-cloud CVI sampling periods
Fine + Nucleation Modes (diameter > 3nm)
Fine Mode (diameter > 10nm)
Non-Volatile Fine Mode (diameter > 10nm)
12:30
6/24/2021
12:55
13:20
13:45
14:10
14:35
15:00
15:25
UTC Date and Time

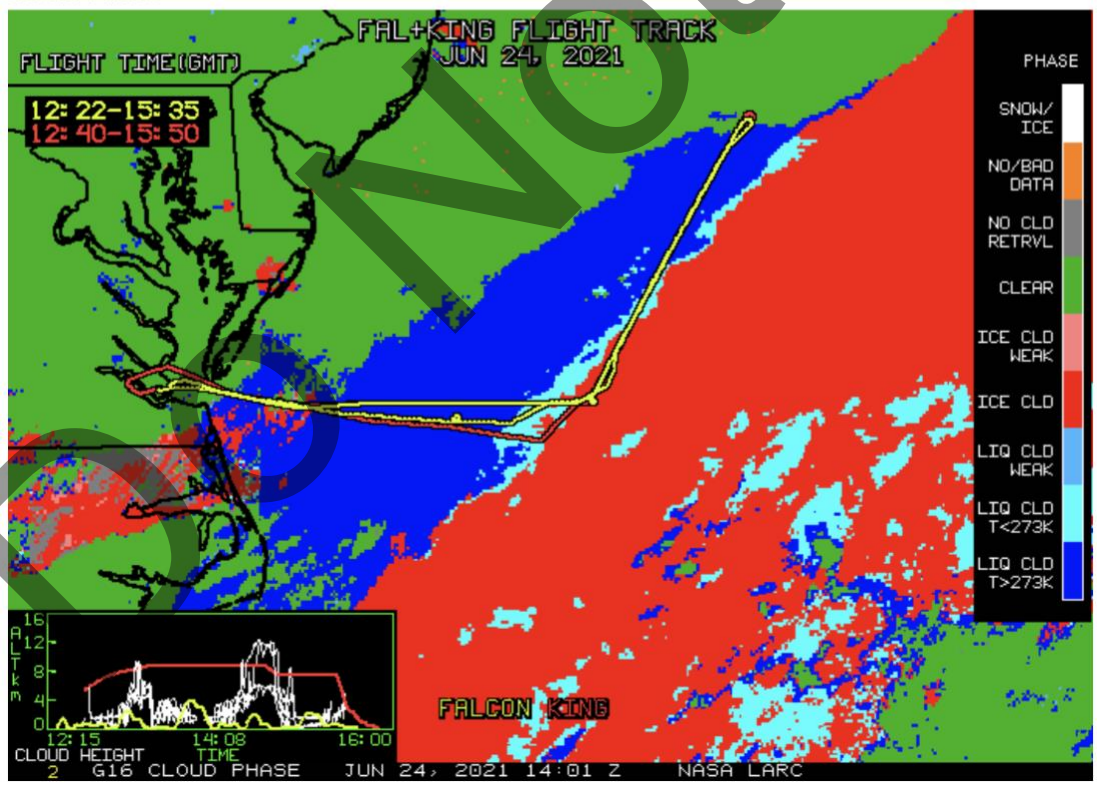

20210624 - ACTIVATE - KingAir and Falcon flight tracks
Falcon
KingAir
ZIBUT
AVAPS release
Latitude
Longitude
Altitude (km)
Time (UT)
Time Difference (UC12-HU25) (min)
Altitude (m)
Time, UT
(532nm)

NASA-LaRC Clouds Group GOES-16 Quicklook Images for Flight 87, 14:01 UTC Jun 24, 2021

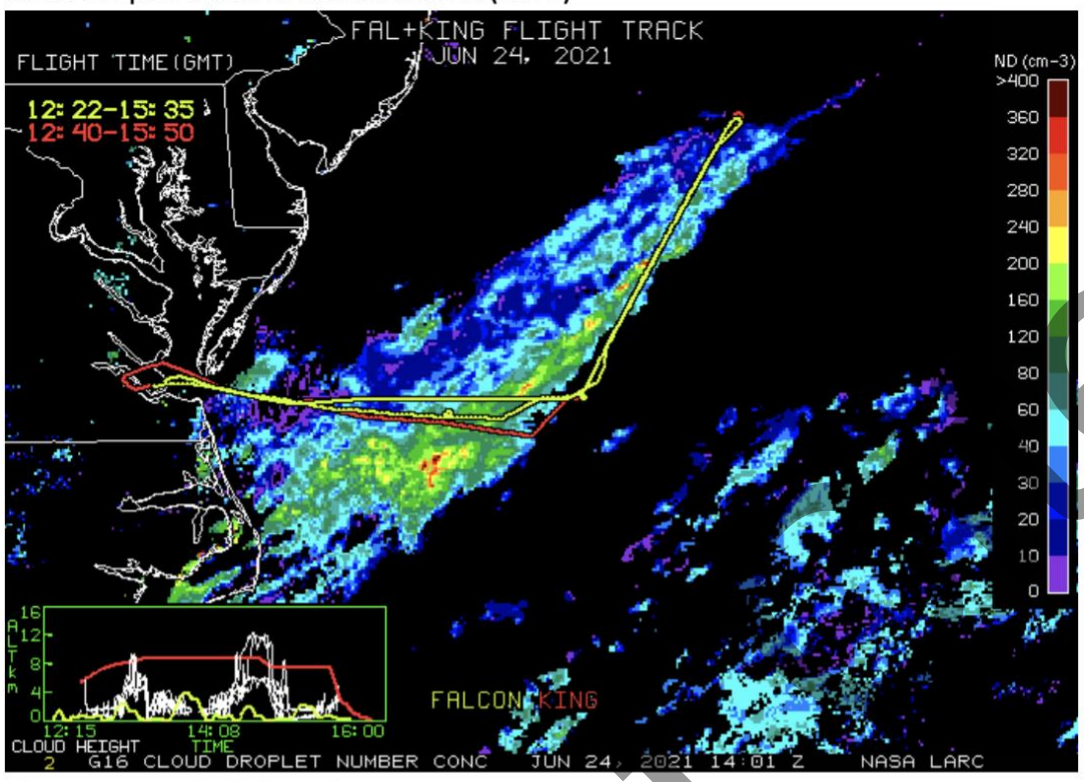
Visible Image



Cloud Phase



Cloud Droplet Number Concentration (cm-3)



Cloud-Top Height (Kft-ASL)