Aircraft: DC-8 - AFRC (See full schedule)

Flight Number: 130610

Payload Configuration: SEAC4RS2013

Nav Data Collected: Yes

Total Flight Time: 7.7 hours

Submitted by: Frank Cutler on 08/22/13

Flight Segments:

From: KEFD
To: KEFD
Start: 08/21/13 14:35 Z
Finish: 08/21/13 22:17 Z

Flight Time: 7.7 hours

Funding Source: Hal Maring - NASA - SMD - ESD Radiation Science Program

Purpose of Flight: Science flight (convective weather inflow study) Aircraft Status: Not airworthy after ingestion of bird in #1 engine upon landing at Ellington. Bore scope of engine required to clear for flight. Sensor Status: SEAC4RS instrument payload; all instruments operated except SPEC HVPS instrument. RPI stopped collecting data prior to end of flight due to filled hard drive. Significant Issues: None Accomplishments Round robin flight out of Ellington Airport, TX. Initial climb to FL250 initially headed north and then east to waypoint A4A (northwest of Alexandria, LA). Descend at 1512Z to boundary layer conditions but at times having to climb to higher altitudes due to overcast conditions while headed east/northeast passing Meridian, MS at 1611Z. Arrive at Muscle Shoals fix and enter holding pattern initially at 4000ft MSL at 1728Z (this was the location for the convective weather study in cooperation with the SPEC Lear and ER2). Fly box pattern on south/southwest side of building storm system flying at various altitudes from 2,700ft MSL to FL380. At 1847Z descend to FL370 and head north over storm toward Saint Luis, MO. Descend to boundary layer altitudes while flying northwesterly course towards Buffalo, MO where a data wall was executed on a north/south line starting at 1942Z flying altitudes of 1500ft AGL and 9000ft MSL. Complete data wall at 2020Z. Descent to boundary layer altitudes while headed south towards Houston and fly profiles between 1000ft AGL and ~ 8000ft MSL. Complete profiling pattern at 2148Z Climb to mesh with traffic at 13000ft MSL and fly at various altitudes on return to Houston. Land at Ellington Airport, Houston. Takeoff time: 233 14 35 03 Landing time: 233 22 17 04

Flight Hour Summary:

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### Flight Reports

Flight Reports began being entered into this system as of 2012 flights. If there were flights flown under an earlier log number the flight reports are not available online.

### Related Science Report:

**SEAC4RS - DC-8 08/21/13 Science Report**

#### Mission:
SEAC4RS

#### Mission Summary:

The Aug. 21 DC-8 flight was primarily devoted to study of biogenic emissions and chemistry over the Southeastern US, their interactions with urban pollutants, and transport to UTLS in a convective environment. Other objectives included coordinating activities with the Lear Jet and the ER-2 to investigate cloud physics in the vicinity of a developing cloud cell and support remote sensors on the ER-2. Both planned and actual flight tracks are attached.

This was intended to be primarily a boundary layer (BL) flight with sampling near surface and above the BL. From Ellington the DC-8 headed east at 24 Kft (O3-60 to 80 ppb; CO-80-90 ppb) and quickly descended to lower altitudes (5-6 Kft) with the hope of descending to surface air. There was excessive cloudiness in the area with very low cloud bases that prevented pilots to descend to the surface (1000 ft) until point P3 (near Centerville), which was relatively cloud free.

The BL was sampled for an extended time period with typical isoprene values of 2-3 ppb (HCHO-2-3 ppb; methacrolein-1.5 ppb) under fairly clean conditions (O3-20 ppb; NOy-0.5 ppb) before climbing to 7 kft heading north east to point P4. Repeated requests to descend into the boundary layer were not successful and we stayed at 4-5 Kft flying in and over clouds. There were few indications of the Birmingham urban plume. The DC-8 met up with the Lear Jet at Muscle Shoals and both DC-8 and LJ sampled a cloud system extensively. The DC-8 was not able to sample below cloud base but was able to penetrate the cloud 1-2 Kft above cloud bases climbing to 35 Kft about 7Kft above cloud tops and sampling an Anvil along the way. LJ sampled the cloud extensively below the DC-8 and ER-2 passed over this system several times remotely sensing the scene below. After the cloud experiment the DC-8 sampled the UT region between 38K and 25K ft and encountered some convective signatures. The DC-8 descended to near surface (1.5 Kft) prior to way point 8 to sample the lower troposphere over Ozarks. High isoprene and formaldehyde levels of nearly 6 ppb each were registered at the north end of the flight track. Although the surface HCHO remained high (4-6 ppb) through out the southerly leg of the track isoprene levels were relatively low (1-2 ppb). Terpenes were expected to be elevated over the region of the Louisiana-Texas border.
but largely remained below 0.25 ppb.

All objectives were met and interesting data collected. Nearly all instruments performed well and collected data. Boundary layer sampling during the southerly leg was made difficult due to low clouds but these did not prevent us from achieving our objectives.

Instrument status:

All instruments were up and running and collected data. RPI may have lost some data after their storage disk was full. SPEC had difficulties with one of their 4 probes.

Prepared by HBS