

**Aura Validation Experiment
Science Flight #4 Summary Report
November 5, 2004**

Flight Objective:

Provide remote sensing observations of TES “step & stare” observational points in a latitudinal profile from Texas to Nebraska along sub-orbital track. TES observational points are 5x8 km fields of view that are spaced every 31 km directly along the flight track. Make vertical profiles at MLS points (165 km east of sub-orbital track) on return leg.

Flight Summary:

This flight was arranged to coincide with an Aura track segment that extended from Louisiana to Nebraska. The close track enabled us to execute an aircraft flight plan that addressed validation objectives for each of the Aura instruments. The northbound track was along the suborbital track, the prime viewing areas for the TES and OMI nadir retrievals. The skies were largely cloud-free along the track. At the northern end of the flight track, the aircraft turned east to be situated along the track of retrieval points for the MLS instrument. Several profiles between high (about 55 kft) and low (29 to 37 kft) altitudes were conducted as the aircraft moved southeast along the MLS track.

Preliminary analyses indicate that all instruments worked for most of the flight. Accordingly, we expect that this flight will result in valuable comparisons between MLS, TES, OMI, and the aircraft instruments.

Weather information is available in Figures 2-4.

Flight Profile (see Figure 1)

Takeoff: 11:35CST

Landing: 16:43CST

Duration: 5.2 hrs

Point 3: N30° 28', W94° 01'

Point 5: N41° 16', W97° 08'

Point 6: N40° 00', W95° 07'

Point 9: N37° 03', W94° 13'

Point 13: N34° 06', W93° 22'

Point 17: N31° 08', W92° 33'

Aircrew: Andrew Roberts, Pilot, and Brian Barnett, Backseater

WB-57 Flight of 2004-11-05

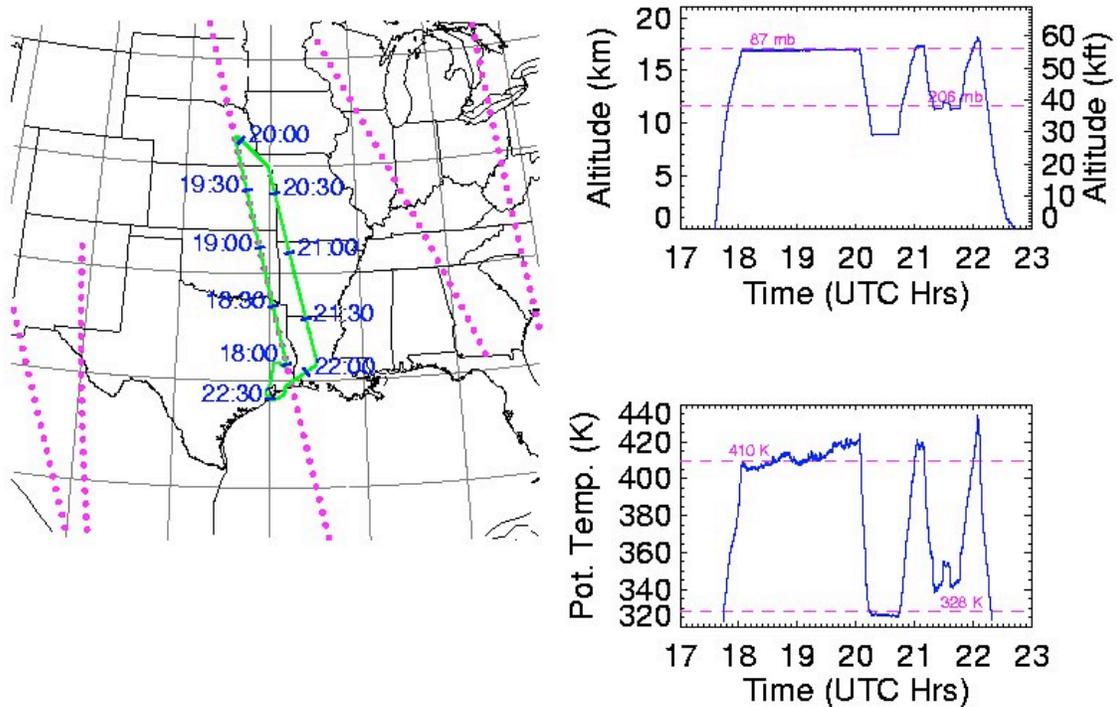


Figure 1 – Flight Profile

- (Left) Map of WB-57F flight track (in green) with every half-hour marked. Aura nadir (faint cyan points) and MLS tracks (magenta points) are indicated.
- (Upper Right) Plot of pressure altitude vs. time with the principal pressure levels of the flight marked.
- (Lower Right) Plot of potential temperature vs. time with the principal theta levels of the flight marked.

18 UTC on 5 November, 2004 at 206.0 mb

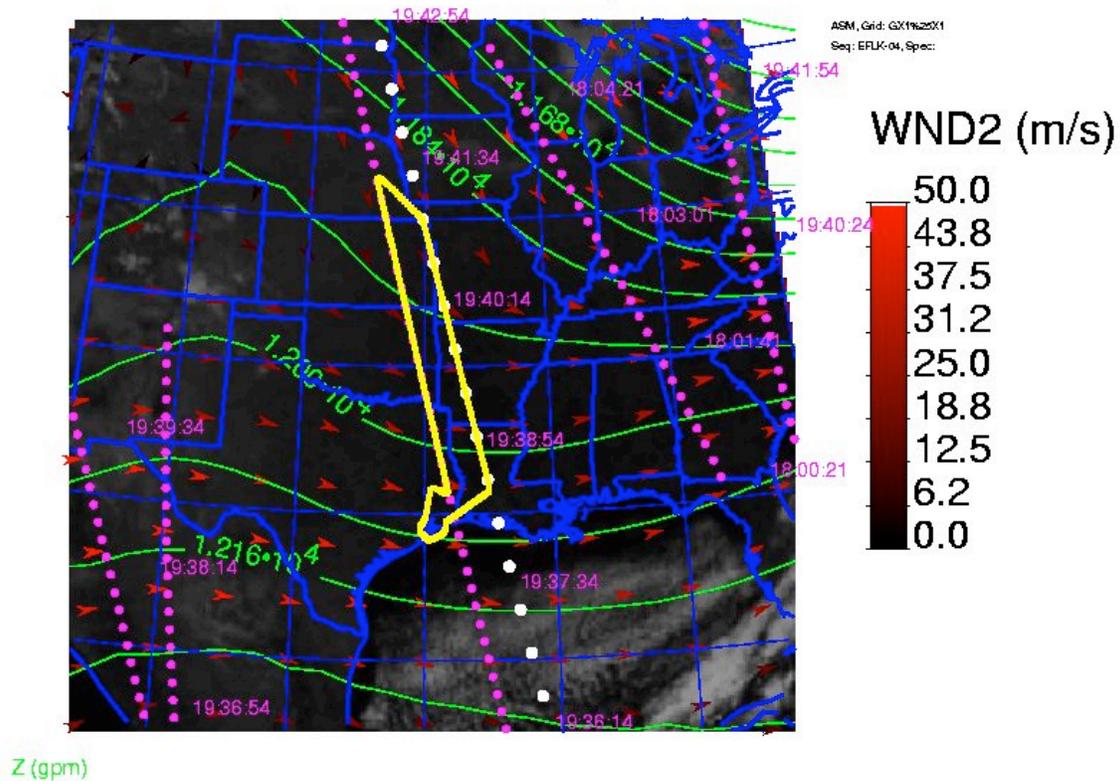


Figure 2 – GOES Visible Image

Flight track (yellow line) superimposed on meteorological fields. The grayscale image is the GOES-12 visible channel satellite image. The red arrows and green lines are the winds (WND2) and the geopotential heights (Z) at the principal pressure level at which the aircraft spent the most time. Values are from the GSFC GMAO assimilation analyses. The Aura nadir (cyan) and MLS tracks (magenta) are shown, with times along the ground track indicated.

18 UTC on 5 November, 2004 at -94.7 Longitude

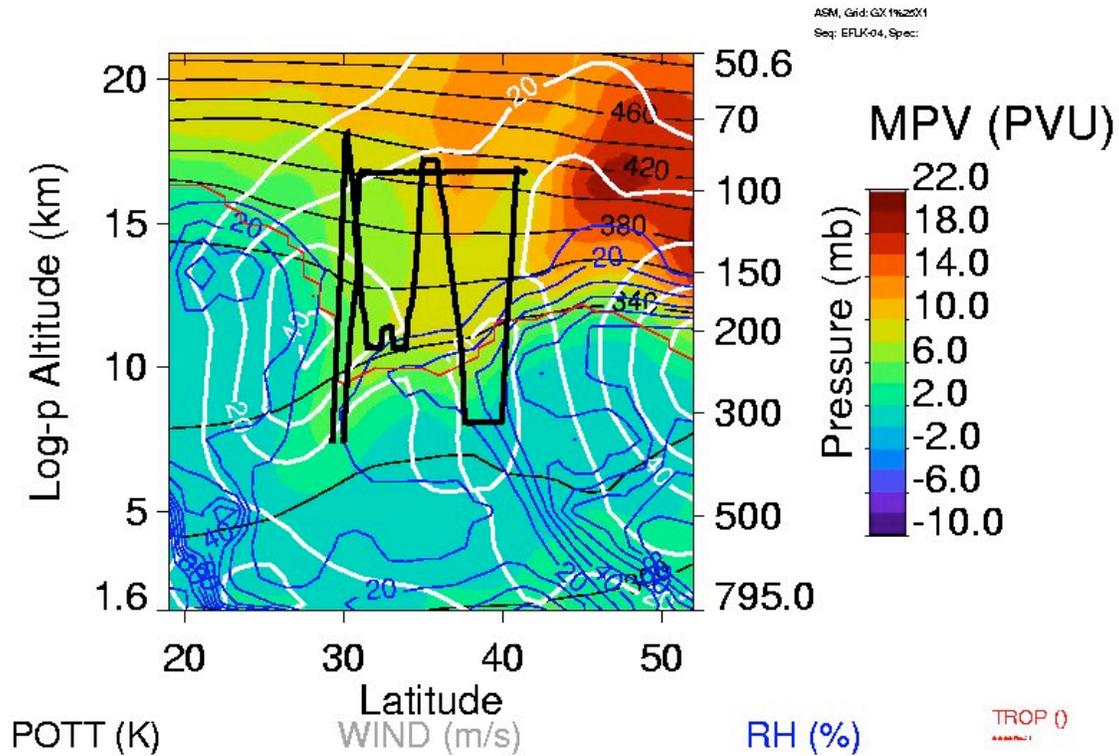


Figure 3 – Latitude Height Cross Section

Latitude-pressure cross-section of meteorological fields during the flight. The colored image represents modified potential vorticity (MPV); also shown are potential temperature (POTT) (thin black lines), wind speed (WIND) (white lines), relative humidity (RH) (blue lines), and the PV tropopause (TROP) (red line). The thick black lines mark the aircraft position and the vertical lines mark the positions of nearby MLS profiles.

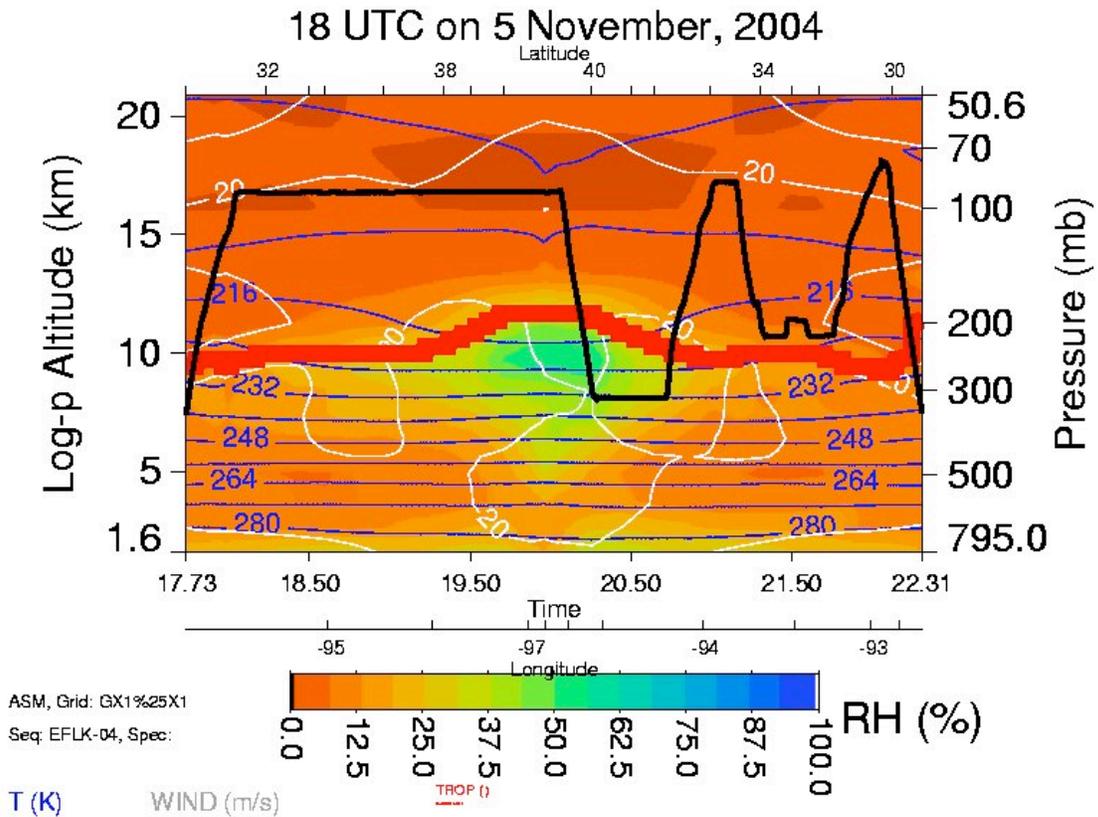


Figure 4 – Curtain Plot

Time-pressure "curtain" plot of meteorological vertical profiles along the flight track. The colored image represents relative humidity; also shown are temperature (T) (blue lines), wind speed (WIND) (white lines), and the PV tropopause (TROP) (red line). The thick black lines mark the aircraft position and the vertical lines mark the positions of nearby MLS profiles.