Wallops Island, VA to Walvis Bay, Namibia Transit **Mission Report**

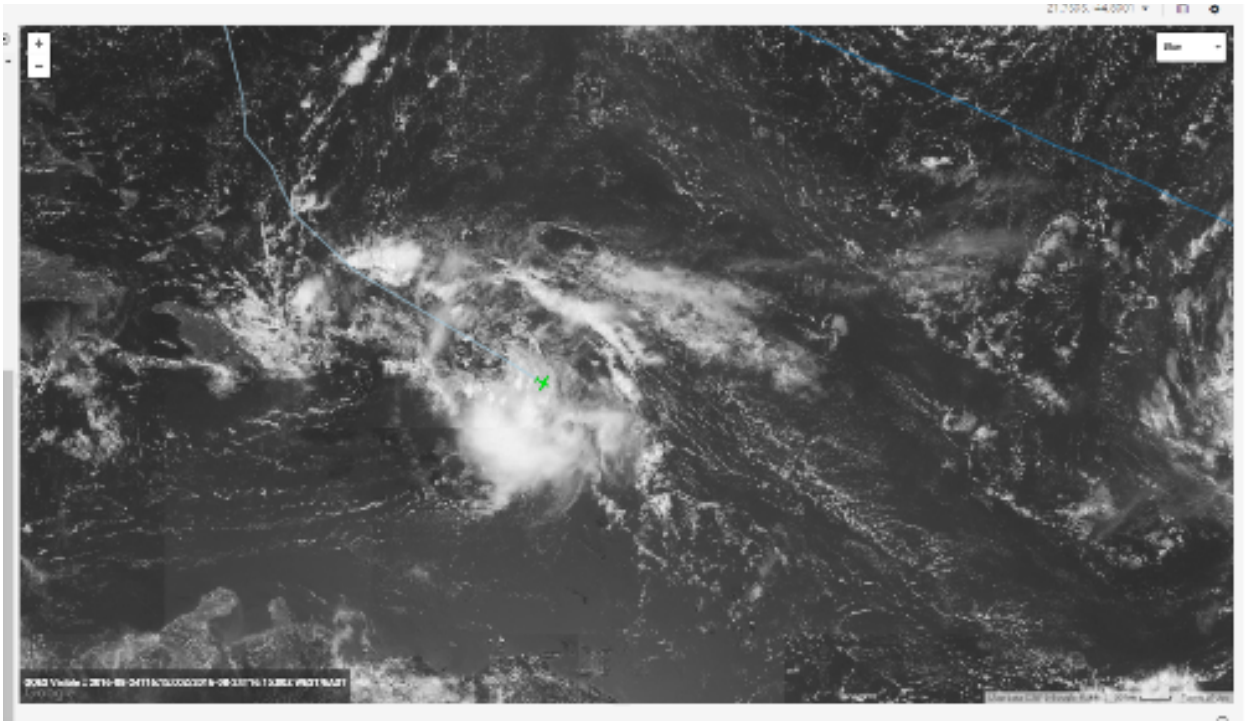
Written by Paquita Zuidema with input from Sam Le Blanc's transit notes

Transit Schedule:
Wallops FF August 23 one-day delay to repair a fuel leak
Wallops FF -> Barbados August 24 TO 11:51:25 land: 17:41:47. 5.8 hour duration
Barbados -> Ascension August 25 TO 10:46:18 land: 20:15:42 9.48 hour duration
Ascension August 26 crew rest
Ascension -> Walvis Bay August 27 TO 7:55:42 land: 14:29:09 6.6 hour duration

Pilot/Crew Manifest: Mike Singer, Mark Russell, Mike Terrell, Brad Soeder, Brian Yates, Todd Brophy, William Chapman, John Valliant

Scientist Manifest: Amie Dobracki [HiGEAR], William Chun [APR3], Steve Durden [APR3], Patrick Hamblock [AMPR], Steve Howell [HiGEAR], Nikolai Smirnow [HiGEAR], Sam Le Blanc [4STAR], Joe O'Brien [cloud probes], Jim Podolske [COMA], Art Sedlacek [PTI], Sebastian Schmidt [SSFR], Eric Stith [data], Lee Thornhill [winds], Paquita Zuidema

August 24:
Instrumentation status: all instrumentation with the exception of the CCN and water isotopes kept on.
The transit occurred at 20-23 kft, passing near a tropical depression before Barbados.



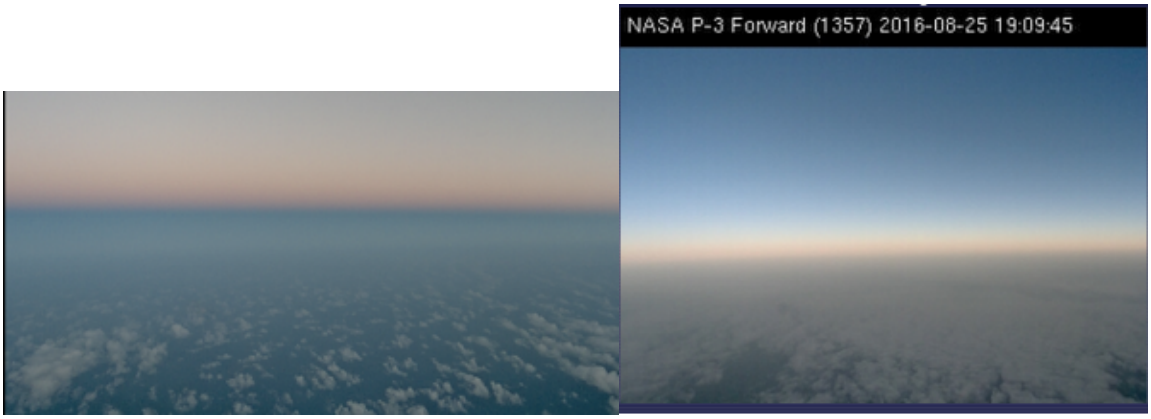
August 25:

Instrumentation status: most instrumentation turned on. Most worked well. Notables: CAPS not working; CCN not turned on; PTI experiencing a communication issue w/ the data card. PDI on. Data time server not exactly locked to the GPS.

Overcast convective conditions after leaving Barbados, becoming clear. SSFR detected asymmetry in its response about the equator, useful for calibration. descent into Ascension measured peak aerosol at 12 kft, island micropulse lidar revealed aerosol layer up to 3km. cleaner air near surface. Relatively thick low cloud at ascension. Sunset at approximately 19:10, descent begun 40 minutes later, landing in darkness at 20:15.

11:11

13:15



August 26: crew rest day at Ascension. Accomodations were at
ascension aaf base lodging, 45th operations group,detachment 2, ascension auxialary air field
Scientist visit to DOE AMF1 site. Significant drizzle experienced on Ascension that night.

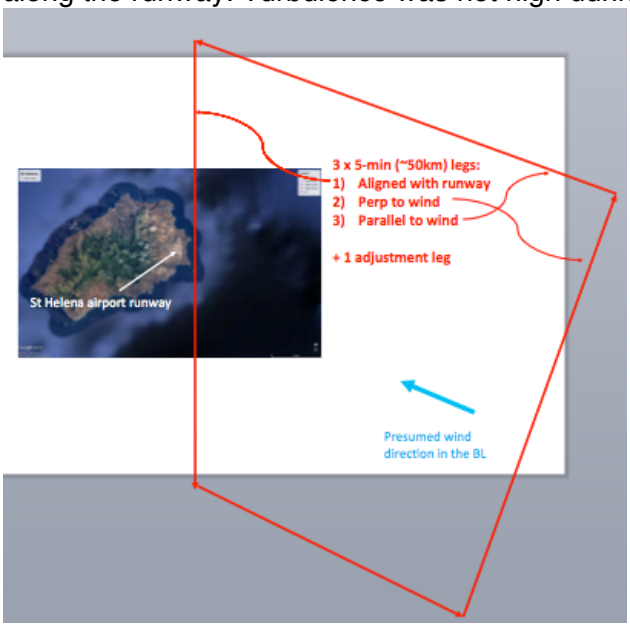
Morning view:

August 27:
Instrument status: aircraft problem with O2 regulator, one will be shipped to Namibia. Headset problem at cockpit flight scientist station noted. 4STAR worked, issue with dirty window; AMS down; DMA had some unspecified issues, HiGEAR worked otherwise. AMPR worked, testing with APR3 during transit to test mitigation strategies for K-band interference, was able to send data to ground; RSP booted up 1 hour into flight; APR3 Wband disk drive problem resolved in-flight; K bands worked. Cloud probes worked including CAPS. CAPS overheating problem. PTI 2 system crashes, possible issues with data acquisition card. PDI, vertical winds, isotopes, COMA fine. SSFR worked well unti SHI, where turbulence shook zenith light collector out of alignment. Data time servers still loosing lock with GPS after a couple of hours. CCN off.

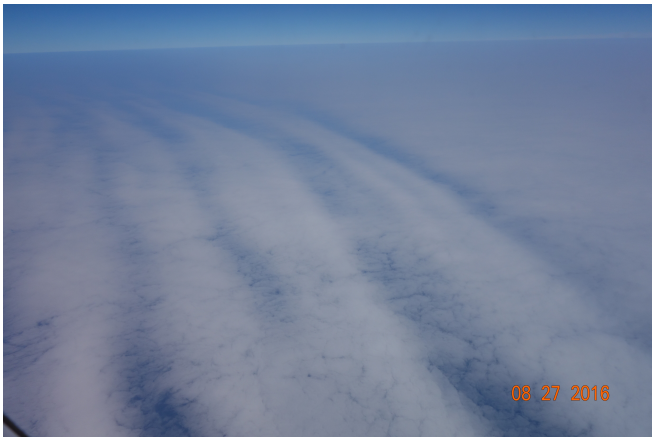
Science notes:
Initial ascent out of Ascension up through dense low cloud, aod of 0.6 above. Aerosol above cloud evident during entire transit to St. Helena, reducing to aod of 0.4 at St. Helena.

LH photo after departure. RH nadir photo shows clear gravity wave structure upon underlying cloud top.

Six missed approaches of the St. Helena runway were systematically done from 10:06 to 10:46, sequentially at 500, 200, 100, 300, 100 and 500 ft above the runway. A triangular flight plan (+adjustment leg) intended to measure turbulence along and across the mean wind as well as along the runway. Turbulence was not high during flyovers, on-board experience comfortable.



view of cloud waves at cloud/clear interface upon approaching Namibia



Progress towards Science Objectives during Ascension-Namibia transit: expectation-based estimates need further analysis.
green-success likely red-success uncertain

Direct Forcing

SO1-1 evolution of BBA properties with transport: ~ 0.33 **hours (Asc,SHI profiles)**
SO1-2 spectral radiative fluxes **~ 0.5 hour** (some information in profiles+above-BLcloud @SHI)
SO1-3 factors that control seasonal variation of aerosol ~ **0.33 hours**

Semi-Direct Effect

SO2-1 relative aerosol-cloud vertical structure ~**0.33 hours (Asc, SHI descent/ascent)**
SO2-2 constrain aerosol heating rates **~0.5 hour** (some information in profiles+above-BLcloud @SHI)
SO2-3 cloud microphysics ~**0.33 hr (**profiling at Asc, SHI, note all level legs at SHI below cloud base**)**

Indirect Effects

SO3-1 aerosol-BL mixing **~0.33 hour** (@SHI, Ascension ascent/descent)
SO3-2 aerosol-BLcloud microphysics ~**0.33 hour**
SO3-3 precipitation susceptibility ~**0.33 hour**