

## Flight Report: DISCOVER-AQ Science Flight #1

From: KPMD To: KPMD

Start: 01/16/13 15:47 Z Finish: 01/17/13 00:09 Z

Flight Time: 8.4 hours

Log Number: 13P201 PI: James Crawford

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

Official report logged at:

[http://airbornescience.nasa.gov/flight\\_reports/P-3\\_Orion\\_01\\_16\\_13\\_-\\_01\\_17\\_13](http://airbornescience.nasa.gov/flight_reports/P-3_Orion_01_16_13_-_01_17_13)

| Flight                 | Date    | Duration | Cumulative Hours | DISCOVER-AQ Hours remaining | PODEX Hours remaining |
|------------------------|---------|----------|------------------|-----------------------------|-----------------------|
| <i>Total Allocated</i> |         |          |                  | 100                         | 21                    |
| ECF                    | 1/10/13 | 1.1      | 1.1              | 98.9                        | 21                    |
| ECF -2                 | 1/10/13 | 0.6      | 1.7              | 98.3                        | 21                    |
| PCF                    | 1/10/13 | 2.1      | 3.8              | 96.2                        | 21                    |
| Transit                | 1/14/13 | 8.3      | 12.1             | 87.9                        | 21                    |
| Science Flight - 1     | 1/16/13 | 8.4      | 20.5             | 79.5                        | 21                    |

Comments: This was the first science flight for DISCOVER-AQ. Clear skies and high PM2.5 levels reported at the ground sites over previous days created ideal conditions for starting the campaign. To allow the pilots to get acquainted with the terrain, the first circuit was done without including the missed approaches. Measurements from the P-3B indicated that aerosol and trace gas pollution was restricted to altitudes below 1800 feet with extremely clean conditions in the overlying free troposphere. Gradients from the aircraft at ~1000 feet down to the surface were dramatic in the early morning. For example, reactive nitrogen levels were reported to be in excess of 100 ppbv at the ground, but only about 10 ppbv was observed from the aircraft. In later passes, missed approaches did not reveal such extreme gradients, suggesting vertical mixing although the depth over which pollution was observed remained at 1800 feet. The flight was slightly long, suggesting that the altitude of the spirals should be slightly reduced to accommodate a full set of missed approaches on the next flight.