Instrument Payload for the NOAA -PMEL Manta during the CICCI - STADS 2015 Mission:

The instrument payload provides in-situ measurements of aerosol chemical, physical, and optical properties in order to tie changes in surface albedo to atmospheric aerosols. The instrument payload consists of the following:

- A filter system with an 8 position sampling carousel. A pump pulls sample air at 2.5 liters per minute through filters that can be analyzed after the mission for chemical constituents. The filter flow can be commanded from the ground station to start and stop. Also, the sample flow can be switched to any filter in the sampling carousel by command from the ground at any time during the flight.
- A mixing condensation particle counter, MCPC, that measures the total number concentration of particles with sizes greater than 5 nanometers in diameter. This instrument provides data at a one second rate.
- An aerosol absorption photometer that uses the decay of red, green and blue (624, 525, and 450 nm) light transmission to calculate aerosol light absorption. This instrument provides data at a one second rate.
- A printed optical particle spectrometer (POPS) that uses a 405 nm diode laser to count and size individual particles in the size range 140 – 3000 nm. The data system is able to analyze every detectable particle in air arriving at a rate less than 10,000 particles s^{-1}.
- A miniature sun photometer that makes continuous almucantar scans to measure solar irradiance and sky radiance in four wavelength bands set by interference filters (460, 550, 670, 860 nm). A full azimuth revolution is made in about 30 s and measurements are made every 30 ms.
- As part of the flow control for all of the above instruments the payload also measures the ambient pressure. The air temperature and relative humidity (RH) are measured with a probe that extends below the main body of the aircraft and the data were recorded at a one second interval.

All data are stored onboard the UAS. A subset of the data are sent in real time to the ground station through the RF link and iridium satellite link to monitor instrument performance and to provide information to adjust the flight track.

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