

## Improvements and Expanded Capabilities in GMD Aircraft-Based Aerosol Measurements

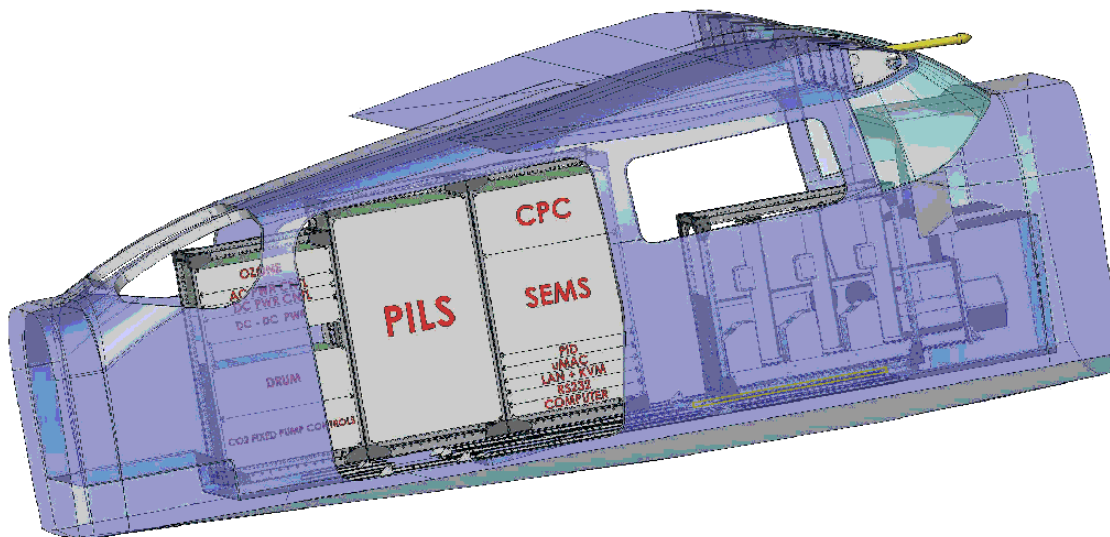
P.J. Sheridan<sup>1</sup>, J.A. Ogren<sup>1</sup>, E. Andrews<sup>2</sup>, A. Jefferson<sup>2</sup>, R. Albee<sup>1</sup>, J. Wendell<sup>1</sup>, and J. Mallett<sup>1</sup>

<sup>1</sup>NOAA Earth System Research Laboratory, GMD, 325 Broadway, Boulder, CO 80305; 303-497-6672, Fax: 303-497-5590; E-mail: [patrick.sheridan@noaa.gov](mailto:patrick.sheridan@noaa.gov).

<sup>2</sup>Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, 80309

It is well known that unlike the major long-lived gases, aerosols are not distributed uniformly in the troposphere. In order to estimate global aerosol radiative forcing and the effects of aerosols on the global climate, measurements of the aerosols are being made by GMD at many surface locations. Very few long term measurement efforts, however, have been made at altitude. Over the past year, GMD conducted a major upgrade to an ongoing light aircraft sampling program sponsored by the US Department of Energy (DOE). The current light aircraft sampling program, conducting regular vertical aerosol profiles over the DOE Cloud and Radiation Testbed (CART) site in Oklahoma since early 2000, was expanded to include several new measurements, including trace gases and an improved measurement of aerosol hygroscopic growth. The aircraft platform was changed from a Cessna 172 to a larger TU206F model to accommodate the increased payload and desire to sample higher altitudes. A new inlet system permits the efficient sampling of significantly larger particles than the previous system, which should permit better comparisons with surface- and satellite-based column measurements.

In a second aircraft measurement program, the NOAA Office of Global Programs funded GMD scientists to develop a similar platform to conduct regular vertical profiles of aerosol properties over a site in the central US. The same inlet, rack, and power systems, along with a very similar Cessna T206H aircraft, were acquired and developed for this platform. The payload for the NOAA aircraft is slightly different than for the DOE Cessna. Aerosol optical, microphysical, and chemical properties will be measured continuously on the NOAA aircraft, as well as trace gases; Figure 1 shows the current design. Both of these aircraft measurement programs will use standard GMD sampling protocols and the normal suite of instruments, making measurements from both platforms directly comparable with each other and with the GMD surface stations.



**Figure 1.** Three-dimensional schematic of the new NOAA Airborne Aerosol Observatory, showing orientation of inlet and major measurement systems.