NASA SBIR 2015 Phase I Solicitation

S1.07 Airborne Measurement Systems

Lead Center: GSFC

Participating Center(s): ARC, GRC, JPL, KSC, LaRC, MSFC, SSC

Measurement system miniaturization and/or increased performance is needed to support for NASA's airborne science missions, particularly those utilizing the Global Hawk, SIERRA-class, Dragon Eye or other unmanned aircraft. The subject airborne instruments are intended as calibration/validation systems - the proposers should demonstrate an understanding of the measurement requirements and be able to link those to instrument performance. Linkages to other subtopics such as S3.04 Unmanned Aircraft and Sounding Rocket Technologies are encouraged. Complete instrument systems are desired, including features such as remote/unattended operation and data acquisition, low power consumption, and minimum size and weight. Desired sensors include:Â

- Miniaturized, high performance instrument suites for multidisciplinary applications.
- Spectrally resolved absorption and extinction of atmospheric aerosols (0.1 to 10 micron).
- High accuracy and precision atmospheric measurements of Nitrous Oxide, Ammonia, and Formaldehyde (>1 Hz).
- Novel measurement approaches for measurement of Carbon Dioxide (>1 ppm), Methane (5 ppb accuracy, 10 ppb precision), and Water Vapor (>0.5% precision).
- Small (<100 lbs) hyperspectral imagers: 350 to 2500 nanometers with signal to noise > 300 to 1.
- Sulfur based chemistry such as Sulfur Dioxide, Dimethyl Sulfide, Carbonyl Sulfide, Sulfate Aerosols.
- Precipitation - multiphase (0.1 mm to 20 mm with 5 % accuracy in three dimensions).
- Surface snow thickness (5 cm resolution).
- Aerosols and cloud particles (0.01 micron to 200 micron with 10% accuracy).
- Sun photometry measurements with accuracies of <1%.
- Volcanic ash (0.25 to 100 micron with 10 % accuracy).
- Three-dimensional wind measurement (1 mps accuracy/resolution at 10 Hz sampling).
- Miniature (< 7 lb) mass spectrometer with measurement range of 1 to 150 atomic mass units (amu) and resolution of 1 amu, able to detect molecular gas species of He, H_2, H_2O, N_2, O_2, Ar, CO_2, SO_2, OCS, H_2S, CH_4, NH3 with sensitivity of 1 ppm.