NASA SBIR 2012 Phase I Solicitation

S1.09 Surface & Sub-surface Measurement Systems

Lead Center: GSFC

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

For ground-based surface vehicles, and submerged systems. Systems that are ultimately intended for flight or mobile platforms that will provide near-term benefit in a ground-based application are in scope, as this step will aid in maturation of new concepts.

Relevance to future space missions such as Active Sensing of CO₂ Emissions over Nights, Days, and Seasons (ASCENDS), Orbiting Carbon Observatory (OCO-2), Global Precipitation Measurement (GPM), Geostationary Coastal and Air Pollution Events (GEO-CAPE), etc., is important, yet early adoption for alternative uses by NASA, other agencies, or industry is recognized as a viable path towards full maturity. Additionally, sensor system innovations with significant near-term commercial potential that may be suitable for NASA’s research after full development are of interest:

- Precipitation (e.g., stabilized disdrometer).
- Particles: mineral, biogenic, nutrients.
- Gases; carbon dioxide, methane, etc.
- Air and water quality.
- Water and ice flow rates.
- Seismic monitoring.
- Autonomous sample collection and/or analysis systems.
- Air-dropped sensors for surface and subsurface measurements such as conductivity, temperature, and depth. Miniature systems suitable for penetration of thin ice are highly desirable.
- Multi-wavelength lidar-based atmospheric ozone and aerosol profilers for continuous, simultaneous observations from multiple sites. Examples include three-band ozone measurement systems operating in the UV spectrum (e.g., 280-316 nm, possibly tunable), combined with visible or infrared systems for aerosols. Remote/untended operation, minimum eye-hazards, and portability are desired.
- Oceanic, coastal, and fresh water measurements including inherent and apparent optical properties for calibration and validation of satellite ocean color radiometric data, temperature, salinity, currents, in situ biogeochemical and chemical particle composition, sediments, and biological or ecological properties of aquatic environments including but not limited to nutrients, phytoplankton and their functional groups, harmful algal blooms, fish or aquatic plants and animals.
- Novel geophysical and diagnostic instruments suitable for ecosystem monitoring. Fielding for NASA’s Applications and Earth Science Research activities is a primary goal. Innovations with
future utility for other NASA programs (for example, Planetary Research) that can be matured in a Earth science role are also encouraged.