NASA SBIR 2017 Phase I Solicitation

S1.08 Surface & Sub-surface Measurement Systems

Lead Center: ARC

Participating Center(s): GSFC, JPL, LaRC, MSFC, SSC

Technology Area: TA8 Science Instruments, Observatories & Sensor Systems

Surface & Sub-surface Measurement Systems are sought with relevance to future space missions such as Active Sensing of CO_2 Emissions over Nights, Days, and Seasons (ASCENDS), Orbiting Carbon Observatory 2 (OCO-2), Global Precipitation Measurement (GPM), Geostationary Coastal and Air Pollution Events (GEO-CAPE), Hyperspectral InfraRed Imager (HyspIRI), Aerosol, Cloud, and Ecosystems (ACE, including Pre-ACE/PACE). Early adoption for alternative uses by NASA, other agencies, or industry is desirable and recognized as a viable path towards full maturity. 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., motion stabilized disdrometer for shipboard deployments).
- Aquatic suspended particle concentrations and spectra of mineral and biogenic (phytoplankton and detritus) components.
- Miniaturized, stable, pH sensors for ocean applications to support validation of OCO-2 that can be used in the ARGO network.
- Miniaturized gas sensors or small instruments for carbon dioxide, methane, etc., only where the sensing technology solution will clearly exceed current state of the art for its targeted application.
- Miniaturized air-dropped sensors, for ocean surface and subsurface measurements such as conductivity, temperature, and depth.
- Multi-wavelength, LIDAR-based, atmospheric ozone and aerosol profilers for continuous, simultaneous observations from multiple locations. Examples include three-band ozone measurement systems operating in the UV spectrum (e.g., 280-316 nm, possibly tunable), or visible/infrared systems with depolarization sensitivity for aerosols and clouds.
- Portable, robust, ground based LIDAR system for 3D scanning of winds, temperature, density, and humidity with ability to scan horizontally and vertically with a range of up to 10 km.
- Miniaturized, novel instrumentation for measuring inherent and apparent optical properties (specifically to support vicarious calibration and validation of ocean color satellites, i.e., reflectance, absorption, scattering), in-situ biogeochemical measurements of marine and aquatic components and rates including but not limited to nutrients, phytoplankton and their functional groups, and floating and submerged aquatic plants.
- Novel geophysical and diagnostic instruments suitable for ecosystem monitoring. Fielding for NASA's Applications and Earth Science Research activities is a primary goal.