



NASA SBIR 2009 Phase I Solicitation

S1.08 In Situ Airborne, Surface, and Submersible Instruments for Earth Science

Lead Center: GSFC

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

New, innovative, high risk/high payoff approaches to miniaturized and low cost instrument systems are needed to enhance Earth science research capabilities. Sensor systems for a variety of platforms are desired, including those designed for remotely operated robotic aircraft, surface craft, submersible vehicles, and balloon-based systems (tethered or free). Global deployment of numerous sensors is an important objective, therefore cost and platform adaptability are key factors.

Novel methods to minimize the operational labor requirements and improve reliability are desired. Long endurance (days/weeks/months) autonomous/unattended instruments with self/remote diagnostics, self/remote maintenance, capable of maintaining calibration for long periods, and remote control are important. Use of data systems that collect geospatial, inertial, temporal information, and synchronize multiple sensor platforms are also of interest.

Priorities include:

- Atmospheric measurements in the troposphere and lower stratosphere: Aerosols, Cloud Particles, Water, and chemical composition: Carbon Dioxide ($^{12}\text{CO}_2$ and $^{13}\text{CO}_2$), Carbon Monoxide, Methane, Reactive and Trace Gases, Radicals, Ozone, Three-dimensional Winds and Turbulence.
- Oceanic, coastal, and fresh water measurements including inherent and apparent optical properties, temperature, salinity, currents, chemical and particle composition, sediment, and biological components such as phytoplankton, harmful algal blooms, fish or aquatic plants.
- Instrument systems for hazardous environments such as volcanoes and severe storms.
- Instrument systems for difficult to access areas such as sub-glacial waters.

Instrument systems to support field studies of fundamental processes are of interest, as well as for satellite measurement calibration and validation. Applicability to NASA's Airborne Science, Atmospheric Composition and Radiation Sciences, Ocean Biology and Biogeochemistry, and Applied Sciences programs is a priority. Support of

the Integrated Ocean Observing System (IOOS) and regional coastal research is also desired.

Proposals should show an understanding of one or more relevant science needs, and present a feasible plan to fully develop a technology and infuse it into a NASA program.