There are new platform systems that have the potential to benefit Earth science research activities. To capitalize on these emerging capabilities, proposals are sought for the development of in situ instruments for use on radiosondes, dropsondes, tethered balloons, kites, Unmanned Aerial Vehicles (UAVs), Unmanned Surface Vehicles (USVs), or Unmanned Underwater Vehicles (UUVs). Both miniaturization of current techniques, as well as innovative new methods that lead to compact and lightweight systems are important. Details of complete instrument systems are desired, including data acquisition, power, and platform integration. Instrument performance goals such as resolution, accuracy, and response time should be discussed. A plan for commercial production and marketing should be included as well. Technology innovation areas of interest include:

- Atmospheric measurements including temperature, humidity, solar radiation, clouds, liquid water, ice, precipitation, chemical composition (carbon dioxide, methane, reactive gases and radicals, dynamical tracer species), and aerosol properties;

- Three-dimensional wind measurements near the Earth’s surface, and within the troposphere and lower stratosphere;

- Oceanic measurements including inherent and apparent optical properties, temperature, salinity, chemical composition, nutrient distribution, and currents.

The calibration/validation of the Orbiting Carbon Observatory (OCO - 2008) is a target application. Science campaigns to be conducted within the Sub-Orbital Science Program are also a high priority – the Tropical Composition, Cloud and Climate Coupling (TC4) is such an example: [http://www.espo.nasa.gov/tc4/](http://www.espo.nasa.gov/tc4/), as is the Arctic Research of the Composition of the Troposphere from Aircraft and Satellites (ARCTAS): [http://www.espo.nasa.gov/arctas/](http://www.espo.nasa.gov/arctas/). Systems to enable field studies aimed to research fundamental processes are also of interest.