S6.04 Data Analyzing and Processing Algorithms

Lead Center: GSFC

This subtopic seeks technical innovation and unique approaches for the processing and analysis of data from NASA's space and Earth science missions. Analysis of NASA science data is used to understand dynamic systems such as the sun, oceans, and Earth's climate as well as to look back in time to explore the origins of the universe. Algorithms are used to consider data over time, at various energy ranges, and at different points in space. Complex algorithms and intensive data processing are needed to understand and make use of this data. What novel discoveries can be made with existing NASA data? What applications would benefit from the combination of NASA data with additional information and processing?

NASA seeks to exploit spatial tools in order to increase the utility of scientific research data, models, simulations, and visualizations. Of particular interest are innovative computational methods to dramatically increase algorithm efficiency and thus performance. Interpolation, clustering, and registration algorithms are examples of the type of algorithms of interest in this area, as well as real-time visualization and simulation algorithms. Tools to improve predictive capabilities, to optimize data collection by identifying gaps in real-time, and to derive information through synthesis of data from multiple sources are needed. The ultimate goal is to increase the value of data collected in terms of scientific discovery and application. Data analysis and processing must relate to advancement of NASA's scientific objectives.

We are soliciting proposals for software tools which access, fuse, process, and analyze image and vector data for the purpose of analyzing NASA's space and Earth science mission data. Tools can be plug-ins or enhancements to existing software or on-line services. Tools and products might be used for broad public dissemination or for communicating within a narrower scientific community. Tools can be new stand-alone applications or web services, provided that they are compatible with most widely-used computer platforms and exchange information effectively (via standard protocols and file formats) with existing, popular applications. The Phase 1 contract should demonstrate the feasibility of the approach. The Phase 2 contract should provide prototype software that can be demonstrated at the company and a prime contractor or NASA. It is desirable to have the development lead to software that is commercialized or infused into NASA program use.
To promote interoperability, tools shall use industry standard protocols, formats, and APIs, including compliance with the ISO, FDGC, and OGC standards as appropriate. For example, a tool may manipulate XML of various types, such as GML, SensorML, KML; or use standard services, such as WSDL and UDDI. Applications may subset, filter, merge, and reformat existing spatial data; provide links to attribute data; or visualize results. Combining NASA research data with popular geospatial services is encouraged.