NASA SBIR 2005 Phase I Solicitation

S9.01 Automation and Planning

Lead Center: ARC

Participating Center(s): GSFC

The Automation and Planning subtopic solicits proposals that allow either spacecraft or ground systems to robustly perform complex tasks given high-level goals with minimal human direction. Areas of interest include all aspects of data collection, processing analysis, and decision making. NASA wants to go from specifying "how" something is done to specifying "what" is needed and letting the system figure what data and resources best meet the high-level goals under a set of constraints (e.g., cost, time, etc.).

Technology innovations include, but are not limited to: 1) automation and autonomous systems that support high-level command abstraction; 2) efficient and effective techniques for assembling and processing large volumes of data (commonly available on the Internet) into useful information; 3) intelligent searches of large, distributed data archives, and data discovery through searches of heterogeneous data sets and architecture; and 4) automation of routine, labor intensive tasks that either increase reliability or throughput of current process. Specific areas of interest include the following:

Search agents that support applications involving the use of NASA data; The Automation and Planning subtopic solicits proposals that allow either spacecraft or ground systems to robustly perform complex tasks given high-level goals with minimal human direction. Areas of interest include all aspects of data collection, processing analysis and decision making. NASA wants to go from specifying "how" something is done to specifying "what" is needed and letting the system figure what data and resources best meet this high level goals under a set of constraints (e.g. cost, time and etc).

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- Search agents that support applications involving the use of NASA data;
- Methods that support the robust production of data products given a set of high-level goals and constraints;
- Autonomous data collection including the coordination of space or airborne platforms while adhering to a set of data collection goals and resource constraints;
- Autonomous data logging devices (software, or hardware and software) supporting a variety of weather and climate sensors, capable of ground-based operation in a wide variety of environmental conditions; such systems would probably be solar powered with accurate time stamping;
- Planning and scheduling methods related to Earth Science Mission objectives;
- System and subsystem health and maintenance, both space- and ground-based;
- Distributed decision making, using multiple agents, and/or mixed autonomous systems;
- Automated software testing;
- Verification and validation of automated systems;
- Automatic software generation and processing algorithms; and
- Control of Field Programmable Gate-Arrays (FPGA) to provide real-time products.

Problems address must be relevant to Earth and Solar Sciences including space weather.