NASA SBIR 2004 Phase I Solicitation

B5.01 Telescience and Flight Payload Operations

Lead Center: MSFC

Participating Center(s): ARC

NASA has interest in the development of science and experiments that support strategic aspects of exploration, as well as to develop the technologies to extend humanity’s reach to the Moon, Mars, and beyond. Preparing for exploration and research will require the acceleration of the development of new technologies that will be imperative to future telescience and payload operations. It is important that the space missions and experiments for biological and physical research be managed using new tools, models, and procedures that improve telescience and flight payload operations. In addition, NASA wants to make available data and information associated with microgravity research investigations and results.

The ability for developers to access existing and new tools and collaborate in the design, simulation, modeling, building, and testing will be crucial to the success of NASA’s new initiative. New methods of computing, accessing disparate data spread over wide geographical areas will require new approaches to computing, data storage and communications.

There are many potential users for NASA services and data located throughout the U.S. There are three general types of users of these services and data. The first type is the principal investigator (PI)/payload developer (PD) who is responsible for the payload, experiment, and attendant science, and who commands the payload or experiment. The second type is the secondary investigator(s) who participates in analysis of the science and its control, but does not send commands. The third type is the educational user, from secondary school students up to graduate students. These users will receive either data processed by the PI or unprocessed data. Commercial investigations require the ability to receive, process, and display telemetry, view video from science sources, including the ISS, and interact with NASA concerning the science and operations. To conduct or be involved in general science activities, including the ISS science operations, a user will require various services from the Payload Operations Integration Center (POIC) located at the Marshall Space Flight Center near Huntsville, Alabama, or from other control centers located at various NASA facilities. These services are required to enable the experiment to be controlled using the inputs from various video sources, telemetry, and the crew. The input allows the experimenter to send to his/her payload or experiment commands to change various experiment operations. Before an experiment can get underway, an experimenter must participate in the payload planning process to schedule onboard services such as power, crew time, and cryogenics. This planning process is integral to the entire payload/carrier operation and requires the PI/PD or his/her representatives to participate via voice or video teleconferencing. To enable a user to operate from his/her home base, whether located in a laboratory, office, or home; these services (commensurate to the level of operation) must be provided at the user’s location at a
reasonable cost. Costs include both the platform upon which these services will run, and the communications required to provide these services to the experimenter's location.

Proposals are sought for innovative ideas and efficiencies for systems to better effect communication and handling of data and information for scientific and commercial research on the International Space Station payloads and on manned exploration missions, and at the same time, for general use as applicable.