

Title of Investigation:

Goddard Exploration Testbed for Information Technology (GetIT)

**Principal Investigator:**

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Other Investigators/Collaborators:

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Initiation Year:

FY 2004

Purpose of the Investigation:

There are multiple organizations, both within and outside of NASA, who are working on advancing the state of robotic hardware. This project is directed not at physical robotic hardware, but at assisting in the advancement of the state of the art in intelligent robotic control software. The objective of this investigation is to develop the Goddard exploration testbed for Information Technology (GetIT) ExoTerrain. We envision NASA, university, and industry partners using the GetIT to demonstrate advanced software control concepts for robotic missions. These concepts include:

- o Goal and event driven automation
- o Advanced automation through predictive modeling
- o Self organizing systems
- o Multi-agent collaborative systems
- o Optimal path planning and fleet management.
- o Learning systems
- o Data management (mining, fusion)

Accomplishments to Date:

Since receiving funding through the 2004 DDF Supplemental Call, the research collaboration with Carnegie Mellon University (CMU) has been established. The original plan to purchase 5 Personal Exploration Rovers (PERs) was modified due to the decreased funding, so 2 PERS will be provided and we will share a third with the Visitor's Center. A detailed plan for the building of the terrain in the building 23 courtyard, now know as the Multipurpose Exoterrain for Robotic Studies (MERS), has been developed, and the adaptation of the fleet management software to the terrestrial environment to demonstrate this technology using the PERs has begun.

Numerous meetings to discuss other uses for MERS have been held. Scientists from both Code 600 and 900 have been consulted and significant interest has been expressed in using MERS to test various robotic concepts (see Justification for Extension for uses).

Key Points Summary:

MERS will make GSFC a focal point on the East Coast for demonstration of advanced robotic technology. It will encourage the development of advanced information system and mechanical system concepts, and provide a reasonable test environment to assess the viability of these concepts as they relate to the Exploration Initiative. We will be able to use the testbed to do trade studies to assess different approaches for these advanced concepts in order to determine which will work most efficiently and effectively. The lab will build core competencies in advanced software engineering for multi-robot systems here at GSFC. It will also build strategic partnerships with CMU and other leaders in the field of robotic research.