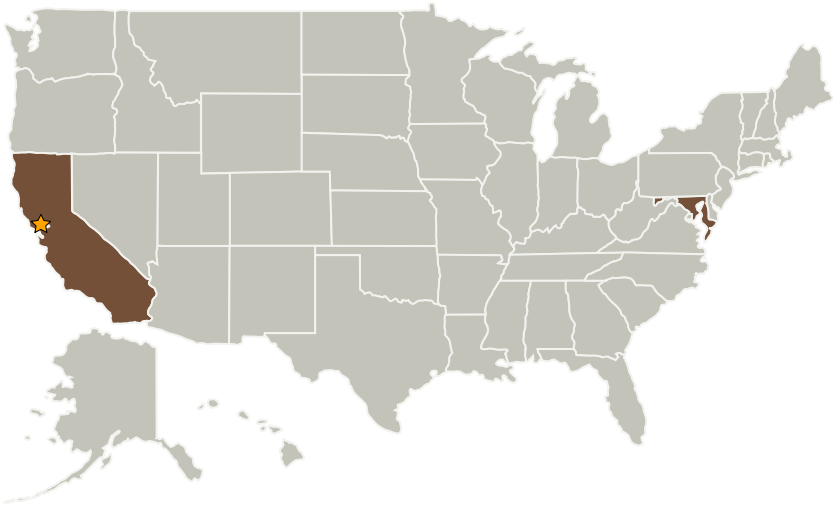
Autonomous Collaborative Agents for Onboard Multi-Sensor Re-Targeting, Phase I

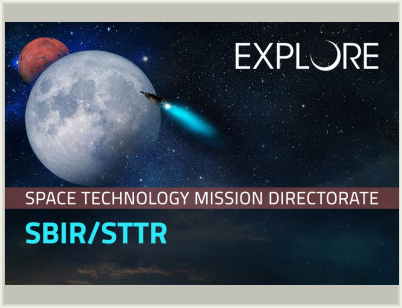
Completed Technology Project (2005 - 2005)

Project Introduction

Technologies that support the configuration of sensors and satellites, and allow the reconfiguration or retargeting of sensors in response to user demand or significant events require mechanisms to autonomously understand the type and current state of on-board resources and to re-task these resources in such as way that the system achieves its global objectives. Here we propose the development of an integrated framework for onboard dynamic sensor (re)configuration, discovery and classification of data, based on SensorML (Sensor model language). We also model each satellite as a multi-criteria multi constraint optimization problem to optimize the usage of resources in response to significant events without adversely affecting the normal operations. This is achieved through negotiation among various satellites that have overlapping sensing capabilities so that globally optimal solutions can be found by computing joint plan qualities resulting due to sharing of resources. We propose to use IAI's propriety Cybele agent platform (www.cybelepro.com) that provides capability to model and simulate such complex distributed systems. DIVA a case tool developed by IAI would be employed to design and implement negotiation protocols among satellite agents to demonstrate the collaborative global optimization of autonomous planning process for multi-sensor retargeting.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Intelligent Automation, Inc.	Supporting Organization	Industry	Rockville, Maryland

Primary U.S. Work Locations	
California	Maryland

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Goutam Satapathy

Technology Areas

Primary:

- TX16 Air Traffic Management and Range Tracking Systems
  └ TX16.4 Architectures and Infrastructure