The Multi-agent Architecture for Coordinated, Responsive Observations

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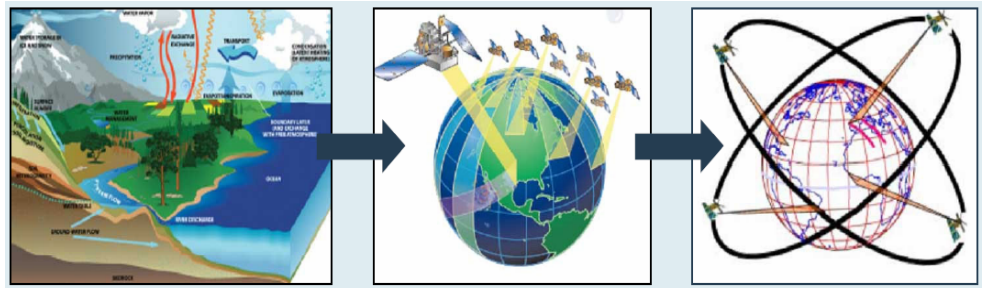
Objective

The Multi-agent Architecture for Coordinated, Responsive Observations (MACRO), an extension of our current work on the Adaptive Network Architecture (ANA) is a natural technology for enabling the deployment and operation of a sensor web. We will focus on the following main topics that provide significant value to NASA's Earth science missions:

- Incorporation of self-describing sensor, processing, and measurement models
- Collaborative observations between agents via on-board planning, scheduling, and resource management
- Validation on a representative hardware testbed with multiple demonstrations of a disaster management Earth science scenario



A Sensor Web Operational Concept for Earth Science involves in situ and remote sensor platforms

Approach

The realization of MACRO requires research and development in several Technology Elements to both address limitations of the existing ANA work and add capabilities required for the deployment and operation of Smart Sensors. These Technology Elements include the incorporation of standards for sensor and processing models and the development of a rigorous framework for collaborative observations. The Technology Elements are verified, validated, and tested via a hardware-in-the-loop demonstration of a subset of the disaster management scenario presented in the Applicability to Earth Science Missions Section.

Co-I's/Partners

- Co-I : Adam Howell / Lockheed Martin
- Partners: Douglas Schmidt, Gautam Biswas / Vanderbilt Univ.

Key Milestones

• Standards for sensors and processing models	11/2007
• Planner (SA-POP) and RACE design extensions for distributed planning	11/2007
• MACRO agent design and implementation, preliminary system integration	05/2008
• Weather forecasting simulation integration, refinement of disaster management scenario	08/2008
• Preliminary coordinated observation capability, initial system demonstration	11/2008
• Extended coordinated observation capability	05/2009
• Final End-to-End Demo	11/2009

$TRL_{in} = 4$

ESTO Earth Science Technology Office