Using Intelligent Agents to Form a Sensor Web for Autonomous Mission Operations

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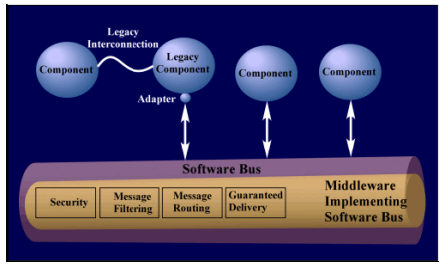
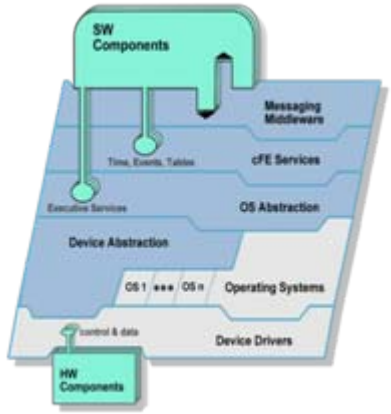
Objective

We will develop an architecture which shifts sensor web control to a distributed set of intelligent agents versus a centrally controlled architecture. Constellation missions introduce levels of complexity that are not easily maintained by a central management activity. A network of intelligent agents reduces management requirements by making use of model based system prediction, and autonomic model/agent collaboration. The proposed architecture incorporates agents distributed throughout the operational environment that monitor and manage spacecraft systems and self-manage the sensor web system via peer-to-peer collaboration. The intelligent agents are mobile and thus will be able to traverse between on-orbit and ground based systems.





GMSEC and CFE/S features include Plug-and-Play Components, and Standard Messages implementing a software Information Bus.

Approach

Our team will develop and integrate these technologies: Model Based Operations, Intelligent Agents, Software Bus Architectures, and Sensor Webs.

EO-1 and ST-5 have successfully demonstrated that model based operations can support autonomous control of a satellite mission. The next step is to connect the autonomous operations that take place on the platform to those happening on the ground.

Co-I's/Partners

- Al Underbrink / Sentar Inc.
- Daniel Mandl / GSFC

Key Milestones

• Initial Architecture Document	Feb/2007
• Bus-Bus bridge and CHIPS demonstration	April/2007
• Mobile agent demonstration	Nov/2007
• Basic framework report capability	July/2008
• Updated architecture documentation	August/2008
• Final architecture document	June/2009
• Comprehensive demonstration	August/2009

TRL_{in} = 3

ESTO Earth Science Technology Office