Development of an Open-Architecture Mission Operations System to Support Multiple Small Spacecraft Missions

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Proposal Summary

The goal of the proposed work is to develop a comprehensive open set of software tools designed to support the operations of one or more small spacecraft missions. This set of tools operates within an architecture named COSMOS (Comprehensive Open-architecture Space Mission Operations Support). COSMOS will particularly be suited for small operations teams with a very limited development and operations budget, such as universities. The COSMOS tools will initially be installed in two mission operation centers at the University of Hawaii (UH) and NASA Ames Research Center (ARC); and used in support of three satellites being developed by UH and ARC.

Major components of COSMOS are the visualization tools, support tools, and underlying programs that produce and manipulate the data needed by the rest of COSMOS. Our basic philosophy is that its elements will be easy to port to a new location and to modify for operating with new satellites, even for students. This is enabled by being an 'open architecture' which means not only that the source code of its major elements and structure are available, but also that it is designed to accept external modules as plug-ins through standard, well-defined interfaces.

The results of the proposed work will also benefit SOMD as HSFL, in partnership with the ARC, will use COSMOS to create a functional mission operations test bed, capable of evaluating evolutionary techniques and technologies. The modular nature of COSMOS allows additional elements and functions to be rapidly integrated, evaluated, and potentially incorporated into planning, scheduling, and control and command systems. Knowledge developed through experimentation using the COSMOS system can then contribute to the development and operation of next generation mission operations systems and techniques. It is anticipated that COSMOS will be packaged and made available to universities, NASA, and other qualified users.