



NASA SBIR 2008 Phase I Solicitation

S4.04 Reusable Flight Software

Lead Center: ARC

Participating Center(s): GSFC

There is a need to rapidly develop and deploy small satellites and easily adapt new payloads in a cost effective manner. The cost of flight software, including algorithms and data management, is continuing to increase and multiply in complexity.

Spacecraft software applications are typically customized, however, development costs can be driven down and a plug-and-play capability can be fostered through repeated use of reusable software and functional libraries that are developed once and updated only to enhance performance or correct deficiencies.

Small satellites can be effectively designed for multiple uses of the same nominal hardware set to perform multiple missions. Interfaces between differing payloads are anticipated to be "plug-and-play", where the interface between hardware elements is transparent across the interface. This implies that and allows the software to be reusable from mission to mission. An analogy would be a reusable core executive operating system that controls central satellite functions. Each payload or special hardware element will have subservient applications, written by the element developed that provides special needs. In order to be most economical, the subservient applications should be capable of utilizing an extensive library of modules.

This subtopic calls for the definition and development of a common core executive software and library modules that can be utilized repeatedly for many small satellite missions. The software shall be portable between several types of core processors. The executive and libraries shall provide robust functionality, based on open standards that can be utilized by specialized payload and component developers. In this manner, a minimum amount of custom software, limited to basic functional control of certain hardware elements, will be required. Library functions within the reusable core executive shall be capable of performing computation intense work. The intent is to not modify the reusable core executive except as experience dictates from previous missions.

The Reusable Flight Software subtopic encourages offerors to utilize open source software and hardware solutions to be utilized for other actors, including entrepreneurial and university teams, for reusability.

Research should be conducted to demonstrate technical feasibility during Phase 1 and show a path toward a Phase 2 hardware and software demonstration, and when possible, deliver a demonstration unit or software package for NASA testing at the completion of the Phase 2 contract.

Phase 2 emphasis should be placed on developing and demonstrating the software technology under relevant test conditions. Additionally, a path should be outlined that shows how the technology could be commercialized or further developed into space-worthy systems.

Proposals should show an understanding of one or more relevant science needs, and present a feasible plan to fully develop a technology and infuse it into a NASA program.