26th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
Interactive Presentations:26th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (IP)

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FLIGHT SOFTWARE DEVELOPMENT USING CORE FLIGHT SYSTEM (CFS) FOR THE LUNAR ICECUBE MISSION

Abstract

Lunar IceCube is a 6U CubeSat mission launching on EM-1 to study volatiles on the lunar surface. Morehead State University is leading the mission in partnership with NASA's Goddard Space Flight Center, IVV, JPL, and the Busek Company. The mission profile includes maneuvers and activities beginning with deployment through to lunar capture and science operations in lunar orbit. The flight software applications will provide autonomous closed loop attitude control of the spacecraft in addition to fault management, telemetry output, and command ingest. The tradeoff to developing flight software that satisfies a wide range of mission requirements, while maintaining a lightweight footprint and resource efficiency, is development cost. Lunar IceCube seeks to reduce the cost of developing flight software for a lunar mission by building software on top an already existing, tested, and qualified codebase. The approach is to utilize Core Flight Systems (cFS) for the Lunar IceCube mission. The cFS platform provides a set of mission independent, reusable, core flight software services, applications, and operating environment. In addition to a standardized flight software library, cFS provides an infrastructure for adding mission specific applications, which utilize these core services and applications. This solution minimizes development costs and is scalable and adaptable to a variety platforms and missions.