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Title: Lessons Learned Developing Lunar Flashlight Flight Software using the F Prime Product Line

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NASA’s Lunar Flashlight (LF) CubeSat mission was launched on December 11th, 2022 and is on its way to the Moon. LF is a six-unit (6U) low-cost secondary payload CubeSat that will map the lunar South Pole for volatiles and demonstrate several technological firsts, including the first planetary CubeSat mission to use green propulsion, and the first mission to use lasers to look for water ice.

LF flight software is based on the open-source F Prime Flight Software Product Line developed by JPL. F Prime utilizes a reusable component-based architecture with typed ports that can be interconnected to form a topology. Also, F Prime includes a set of auto-coding tools used to generate components and topologies that can be deployed for various mission specific applications. The Sphinx C&DH board, developed at JPL with a commercialized variant provided by Cobham, is used on LF as the hardware platform for executing the software deployment. F Prime provides a highly modular and reusable framework enabling flight software development for the Sphinx avionics platform that is adapted for mission specific use on LF. This presentation provides an overview highlighting development of LF flight software, facilitated by use of the F Prime product line, along with lessons learned from the development and operation of flight software for the CubeSat mission.