

SPACE OPERATIONS SYMPOSIUM (B6)
Mission Operations, Validation, Simulation and Training (3)

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MISSION OPERATIONS SYSTEMS ENGINEERING DEVELOPMENT AND EXECUTION ON THE
SOIL MOISTURE ACTIVE PASSIVE MISSION

Abstract

The Soil Moisture Active Passive (SMAP) Mission is a three-year NASA mission developed by the Jet Propulsion Laboratory (JPL) and Goddard Space Flight Center (GSFC) in response to the National Research Council's Decadal Survey to study global soil moisture and freeze/thaw levels using an active L-band Synthetic Aperture Radar (SAR) and a passive L-band Radiometer. It successfully launched on January 31, 2015 from Vandenberg Air Force Base aboard a Delta II launch vehicle. The SMAP Flight Operations Team (FOT) played an important role in preparing the spacecraft for launch and assuring its success after launch. Prior to launch, FOT Systems Engineers were responsible for developing the software tools, processes, and procedures for operating the spacecraft and for conducting operational readiness tests for key spacecraft activities and phases. After launch, the spacecraft entered into a ninety-day commissioning phase during which the spacecraft was checked out, the Reflector Boom Assembly was deployed and spun up to 14.6 rpm, the spacecraft was maneuvered into its final science orbit, and the instruments were tested and calibrated. During this time FOT Systems Engineers led the key spacecraft activities, responded to anomalies and rapidly changing knowledge of the spacecraft, and modified tools and processes based on this evolving knowledge. A key aspect of the Systems Team efforts was to prepare SMAP for lean and efficient staffing and automated operation during the Science phase. This paper examines the plans and execution of these efforts, including ground station scheduling, automated telemetry evaluation and notification, uplink product development, and contingency planning and recovery during the Commissioning Phase, as well as the transition to much leaner staffing for the Science Phase.