# Enabling Deep Space Small Satellite Missions Using NASA AMMOS Products and Services

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As the interest in using small satellites in deep space has grown, the related complexity of operations for small satellites has also increased thus driving the need for a highly-capable set of ground system tools.

Advanced Multi-Mission Operations System (AMMOS) is a set of multi-mission products and services that are common to deep space and planetary missions, and has a long history of supporting 50+ projects in development and flight operations. Recent developments have provided configurations that can be easily used by low-cost missions, such as cubesats. AMMOS for Cubesats enables ground system engineers to quickly deploy, configure, and operate a ground data system that is compatible with the NASA Deep Space Network. AMMOS provides missions with products and services in support of mission design and navigation, mission planning and sequencing, spacecraft health and performance analysis, mission control and flight system monitoring, information and data management, and instrument data processing.

For smaller missions, such as cubesats, we selected a limited set of AMMOS products and services configured to meet small satellite mission needs. In the area of mission design and navigation, the AMMOS services available support orbit determination, trajectory propagation, maneuver analysis and design, and SPICE kernel production and data archiving.

In the area of mission planning and sequencing, the AMMOS products available include MPS Editor software, sample files, and corresponding documentation that would allow a small mission to create syntactically correct commands and sequences. Also, as part of mission planning, we provide scheduling services for the Deep Space Network (DSN) to ensure that your activities will have tracking coverage.

For mission control and flight systems monitoring functions, our AMMOS Mission Data Processing and Control System (AMPCS) is a flexible, real-time mission control application available for testbed and flight operations environment and is compatible with CCSDS formatted frames and/or packets.

For science data processing, we have tools available that excel in instrument telemetry processing (including early-phase development & test), instrument operations, science data system interfaces, mission operations process workflow, data distribution and science product archiving. Smaller, cost-constrained projects, such as cubesats, can easily carry those tools through operations.