

CUSTOMIZING THE JPL MULTIMISSION GROUND DATA SYSTEM
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The Multimission Ground Data System (MGDS) at NASA's Jet Propulsion Lab has brought improvements and new technologies to mission operations. It was designed as a generic data system to meet the needs of multiple missions and avoid re-inventing capabilities for each new mission and thus reduce costs. It is based on adaptable tools that can be customized to support different missions and operations scenarios. The MGDS is based on a distributed architecture, with powerful UNIX workstations, incorporating standards and open system architectures. The distributed architecture allows remote operations and user science data exchange, while also providing capabilities for centralized ground system monitor and control. The MGDS has proved its capabilities in supporting multiple large-class missions simultaneously, including the Voyager, Galileo, Magellan, Ulysses, and Mars Observer missions.

As the paradigm shifts to smaller/cheaper/faster missions, JPL is now challenged to provide low-cost ground data systems being operated by small, autonomous flight teams. Can our advanced MGDS be adapted for use within this new paradigm?

The Operations Engineering Lab (OEL) at JPL has been leading Customer Adaptation Training (CAT) teams for adapting and customizing MGDS for the spacecraft operations teams of the Mars Observer and Galileo missions. These CAT teams have typically consisted of only a few engineers who are familiar with operations and with the MGDS software and architecture. Our experience has provided a unique opportunity to work directly with the spacecraft and science operations teams and understand their requirements and how the MGDS can be adapted and customized to minimize their operations costs. As part of this work, we have developed automation tools and integrated user interfaces at minimal cost that have significantly improved productivity. We have also proved that these customized data systems are most successful if they are focused on the people and the tasks they perform and if they are based upon user confidence in the team resulting from daily interactions.

This paper will describe techniques, successes, and lessons learned in adapting JPL's MGDS to fly the Voyager, Galileo, and Mars observer missions. We will explain how powerful, existing ground data systems can be adapted and packaged in a cost effective way for operations of small planetary missions. We will also describe how the MGDS was adapted to support operations within the Galileo Spacecraft Testbed. The Galileo testbed provided a unique opportunity to adapt MGDS to support command and control operations for a small autonomous operations team of a handful of engineers flying the Galileo Spacecraft flight system model.