

Proposed Fully Automated Multi-Mission Uplink Sequence Generation Tool Suite

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Abstract – Planetary flight operations as carried out at the Jet Propulsion Laboratory has undergone major changes during the past decade. A significant number of these changes emphasize automation of tasks that were, in the past, performed manually. Several JPL managed projects have contributed to this new way of doing business including Mars Global Surveyor, Mars Odyssey, Genesis, Stardust, Cassini, Mars Pathfinder, and others. These missions' contributions have resulted in an uplink system that is now capable of fully automated generation of routine housekeeping sequences for spacecraft in flight.

During the early 1990s the Mars Surveyor Operations Project (MSOP) implemented a command and sequence generation capability called the Automated Sequence Processor (ASP). This set of tools was developed and prototyped by the MSOP team in response to drastically reduced operations budgets with no commensurate decrease in operations requirements. The ASP made possible high efficiency uplink operations, including during periods when the Sequence Team was not present. The ASP was eventually absorbed into the JPL multi-mission uplink tools and is a standard capability provided to new projects.

During the intervening years the MSOP was replaced by the Mission Management Office (MMO). As part of the MMO charter the MMO team would be responsible for operating a varied mix of spacecraft in various phases of development and operations. The MMO Sequence Team was tasked with operating the Mars Odyssey spacecraft. This spacecraft required the use of background sequences for routine activities with special event sequences being overlaid onto the background sequence. The generation of the background sequences was a perfect process to be automated and the MMO Sequence Team began development of such a set of tools. The resulting processor has been called "Autogen" and has been in use by the MMO team since 2001.

With the above two processors now developed and in use, the time has come when a high efficiency, high reliability, and resource saving uplink tool suite can be assembled. This tool suite will provide fully automated uplink operations for missions requiring routine housekeeping sequences as well as for missions with simple, repetitive operations strategies. This paper will discuss the concept behind this proposed tool suite and the advantages of its use in flight operations for planetary missions.

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