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Company/ Organization Name:	The Johns Hopkins University/Applied Physics Laboratory
Paper Title:	<b>S2Ops, an Autonomous CubeSat Ground System</b>
Abstract:	<p>The Johns Hopkins University Applied Physics Laboratory (JHU/APL) has developed an easy to use and highly automated satellite ground system for operating small satellites. ORS Tech 1 and Tech 2 are two 3U cubeSats developed by JHU/APL as a multi-mission bus demonstration. The satellite ground system, S2Ops (SmallSat Space Operations), is based upon the SciBox uplink pipeline used on the Messenger mission to Mercury, and runs 24x7 autonomously enabling the user to directly task the spacecraft without detailed knowledge of the intricacy of the spacecraft and ground system. Once the user has scheduled a task, the system will execute the task autonomously without manual intervention. S2Ops will automatically generate the commands for upload to the spacecraft and payload and will also automatically control the ground antenna in real-time to track the spacecraft for uplink and downlink activities. Barring any external interruption, the system requires no other attention. It performs self-maintenance activities to update the latest ephemeris data, to generate reports for archiving, and to clean internal obsolete resources. When data is downloaded to the ground, an SMS/email summarizing the download data is sent out to registered users. The system was successfully delivered to the customer in Jun of 2014. Since that time, the customer has operated S2Ops with minimum effort, and without JHUAPL personnel involvement. This paper will also discuss using S2Ops to operate a constellation of small satellites with a distributed ground network.</p>

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