

IAF SPACE OPERATIONS SYMPOSIUM (B6)
New Space Operations Concepts and Advanced Systems (2)Author: Dr. Mirue Choi
Planet, Germany

CLOSING THE SATELLITE OPERATIONS LOOP WITH AUTOMATION VIA AUTOBOT

Abstract

Pushing against the traditional approach of maintaining a large 24/7-monitoring team, Planet has instead opted to build a robust, automated Mission Control system and tools infrastructure on which the hundreds of Dove satellites perform their nominal operations without any direct intervention from an operator. This approach of software-based automation-driven operation allows our small distributed operations team of 9 engineers, 5 located in San Francisco, USA and 4 in Berlin, Germany, to successfully manage and maintain the existing constellation of satellites under nominal conditions.

However during the course of operating the early generation Dove satellites, it became apparent that many of the persistent anomaly conditions faced by the fleet are simple to identify and resolve, but due to the sheer number of satellites that are being managed by the small number of people, some issues can remain undiscovered for days until found either by chance or due to an investigation triggered by an issue further down the pipeline. Ideally, such well-known anomalies could be handled via dedicated automation - built to detect specific issues, send out appropriate alerts and even perform recovery actions. However, building such a dedicated system comes with significant development overhead costs, which can become unsustainable quickly as more anomalies are discovered and new satellites are launched.

Autobot was created in order to tackle this issue. It provides a base architecture on which automation scripts can be built upon, with particular focus on anomaly detection and resolution. It is built such that its users are provided the means to access various APIs to Planet's system, as well as a base automation system that allows user-defined periodic execution of the automation contents. It effectively allows an operator to code up a task that he or she was performing manually and with less development overhead than if it had to be built from scratch. The automation can then be set to execute at a set interval for as long as desired until it becomes obsolete, at which point it can be disabled or removed with minimal impact to the existing operation. Overall, Autobot enables rapid deployment of new automation tasks with little overhead.

This paper will describe the Autobot system as a whole and the role it takes within the existing Dove Mission Control system. A couple of sample automations implemented for Autobot will be presented, with results showing the efficacy of having the automation in place of human operators.