

IAF SPACE OPERATIONS SYMPOSIUM (B6)
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Author: Ms. Ella Herz
Orbit Logic, United States

Ms. Isabel Martinez
Orbit Logic, United States

Mr. Alex Herz
Orbit Logic, United States

OPTIMIZED CONTACT SCHEDULING FOR NOAA SEARCH AND RESCUE

Abstract

The National Oceanographic and Atmospheric Administration (NOAA) operates the Search And Rescue Satellite Aided Tracking (SARSAT) system to detect and locate distress signals around the world. The SARSAT system consists of several NOAA and Global Positioning System (GPS) satellites in low-earth and geostationary orbits, which are then used to relay distress signals from the emergency beacons to a network of ground stations. In order to have the best chance of finding the distress signals, the SARSAT system's space to ground contacts schedule must be optimized to maintain a low Dilution of Precision (DOP) over the US Area of Regard (AOR). Orbit Logic has recently completed work on a software suite to optimize scheduling contacts between NOAA's ground terminals and the SARSAT satellites. The software suite used Analytical Graphics Incorporated's (AGI) STK to compute the DOP and accesses, STK Scheduler for schedule creation and optimization, as well as additional code to rank access opportunities based on how well they contribute to decreasing the DOP. Orbit Logic tested the software suite using varying numbers of satellites, ground stations and different sizes of AORs to ensure that the overall computing time maintained a certain level of performance while also providing a low DOP with the output contact schedule. Orbit Logic's software suite was able to generate a contact schedule in 2 minutes that maintained an average DOP of 1.8 throughout the entirety of a 24-hour schedule for the US AOR. The software suite proved capable of optimizing a contact schedule for the challenge presented by the NOAA SARSAT system. Orbit Logic's work on this project could potentially be applied to other systems for the purposes of optimizing DOP or similar calculated metrics.