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CHALLENGES IDENTIFYING NEWLY LAUNCHED OBJECTS

Abstract

Whenever satellites are launched, one of the first challenges is to find and track all the objects associated with that launch. This process must be performed as expeditiously as possible, to support early-orbit operations and safety of flight (conjunction assessment). That tracking task normally falls to the Joint Space Operations Center (JSpOC), which must rely on radar or optical observations from the Space Surveillance Network and those observations do not include positive identification of the objects.

Large satellite operators often operate their own independent tracking networks, which can generate orbits with positive identification. Many small satellite operators—particularly cubesat operators—do not have an independent means of positively tracking their satellites. And even if they do, as the number of payloads per launch increases, the challenge of associating operator orbits with JSpOC orbits becomes more complicated—delaying the positive identification of all objects.

While those operators with independent tracking are able to perform early orbit operations, those that do not have independent tracking are at risk of losing their satellites, because they may not be able to locate them to perform vital early orbit tasks in time. In addition, since most conjunction assessment is performed using some JSpOC data, it may be impossible to screen for conjunctions (if the data has not been released), impossible to know which satellites are affected by a particular close approach (if the orbital data is available but the objects are unidentified), or simply create conflicting assessments of the true situation.

This paper discusses a simple technique which quickly assesses all available operator orbital data against the latest TLE data available from JSpOC. Results from this technique for the Indian PSLV-C37 launch with 104 payloads are compared to the tracking and identification performance from the PSLV-C34 launch with 20 payloads.