Paper ID: 26362
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SPACE DEBRIS SYMPOSIUM (A6)
Poster Session (P)

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MARKET FOR HIGH PRECISION DEBRIS DATA

Abstract

Debris objects in Earth orbits constitute 95% of the published catalog and are responsible for most conjunctions with operational satellites. It is generally recognized that the accuracy of published two-line element (TLE) data is not sufficient for conjunction analysis, and that much more precise data is needed to ensure the safety of commercial and civil spacecraft. National surveillance networks have more precise data on certain objects, but it is typically restricted and not readily available. It is also limited in scope because of limited coverage of particular networks. Sharing of precise data between national catalogs is not easily achieved because it could reveal capabilities of military sensors. Besides tracked debris objects, there are also many debris fragments that are not tracked by national surveillance networks, but can disable spacecraft. They need to be discovered and tracked.

A number of new tracking methods, technologies, and systems have been developed recently and more are in development by the industry. It has been shown that impressive accuracies can be achieved even with small telescopes, resulting in state vector estimations up to two orders of magnitude more accurate than derived from TLE data. Traditionally, commercial players will be attempting to sell these technologies and systems to their governments. Some of them will be absorbed by national surveillance networks, and data produced by the new instruments will become restricted, as dictated by the defense functions of these networks.

Debris data, however, has a much wider market. This market was essentially created when NORAD started publishing TLE data, but it is still overlooked. Cued by TLE data, commercial entities can produce very precise orbital data on debris, which dominates the published catalog. There is no inherent reason why debris data obtained by commercial instruments outside surveillance networks may need to be restricted, and all national space agencies will benefit greatly from having such data, because they do not have comprehensive sets of high precision debris data at this time.

Thus, we have potential interested buyers and potential capable sellers. What is missing is a legitimate trading floor for high precision debris data. The debris threat is indiscriminate, and spacefaring nations can recognize neutrality and utility of this solution and find a suitable form of its implementation. This will be a potent measure for debris threat mitigation. IADC could lead the way, or the industry could take the lead.