

Assessing GEO Close Encounter Warnings for Spacecraft Operations

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Safe operations in the near-Earth orbit environment require spacecraft operators to have access to reliable and actionable information regarding potential collisions between their spacecraft and other objects. Developing hardware and software to meet this requirement is one of the major goals of the Space Environment Research Centre (SERC) Ltd. One of the underlying challenges in the field are that the position and velocity of inactive objects can only be determined using ground- or space-based sensors which are limited in their accuracy. Correctly conveying the uncertainties in each object's state and in the collision likelihood estimates is fundamental to providing useful or actionable results.

The paper starts out with an outline of the methods used to perform close approach predictions by SERC. For operations, it is necessary to present this information in a manner that allows spacecraft operators to quickly obtain a comprehensive picture of a predicted close approach. The capabilities and underlying principles of a stand-alone tool which is being developed with the spacecraft operators' mission in mind are then described. The paper closes by exemplifying the tool's capabilities based on close approaches described in the literature.