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DATA FUSION OF MULTIPLE ORBITAL DATA SOURCES FOR OPTIMUM COLLISION
AVOIDANCE SERVICES AT EUSST

Abstract

Over the last few years, the space debris population in orbit has dramatically increased. The risk of collision for satellite missions is a problem more and more targeted thoroughly by all agents involved in SSA. The European Space Surveillance and Tracking (EUSST) provides Collision Avoidance (CA) service to European users on a hot redundancy scheme involving the French and Spanish Operation Centres (FR-SSA and S3TOC, respectively). One of the main objectives of the EUSST is to provide the best CA service based on all the available information, and attending to the specific user requirements.

The available data might come from the well-known external sources (CDMs published by the 18th SPCS, orbital information from the Special Perturbations catalogue, and public operator orbits, among others) as well as from internal sources to the EUSST: registered operator orbits and the data provided by the European Space Surveillance and Tracking Sensor Network (EUSSTSN), a continuously growing network of sensors providing thousands of measurements that are shared through the EUSST DB on a daily basis. Based on this data, the French and Spanish Operation Centres of the EUSST -in order to provide safer, increasingly accurate and robust CA services.

FR-SSA and S3TOC are capable of generating enhanced CA products (CDMs based on refined 18th SPCS CDMs), EUSST autonomous CDMs, and even mixed types through Data Fusion of the different orbital data sources. In addition, the CA service provided by EUSST is adapted to the particular needs by orbital regime, type of secondary object (debris or active) and primary spacecraft characteristics (GNC, propulsion system). Thus, the challenge is to manage all these sources of information in the most optimum manner, tailored to each user. An adequate assignment and evaluation of the priority of each type of CDM results in the most reliable source of data. Presenting only the relevant information to the s/c operators, prevents an overload of information at times when decisions need to be made within a few hours. A brief summary of the most interesting cases found in operations by the FR-SSA and S3TOC operation centres will be presented illustrating the added value of the EUSST CA services fusing multiple orbital data sources.