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Assuring a Safe, Secure and Sustainable Environment for Space Activities (4)

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THE MISSING PIECE OF SAFETY IN ORBIT - A PRACTICAL EXAMPLE OF NEWSPACE
COLLABORATIVE EFFORTS FOR TACKLING PRESSING SPACE DEBRIS ISSUES

Abstract

With the increasing congestion in space there is a real threat that in the medium-to-long term our orbits will become unusable. As 8 billion people on the planet depend on space-based services every day, it becomes evident that keeping space-based services up and running is in the interest of individuals, governments and the private sector altogether. Addressing these risks requires international cooperation on all levels and as stated in the UN COPUOS's LTS guidelines, special emphasis on future space activities will thus have to go towards "Improving accuracy of orbital data on space objects and enhancing the practice and utility of sharing orbital information on space objects". This paper will present how two NewSpace entities collaborate to address this challenge. In the first part, an operational framework developed by Vyoma that relies on multi-sensor data and machine-learning is explained. This framework allows, for instance, users to seamlessly visualize the geometries of any conjunction events (once a warning has been generated), screen a satellite against a full object catalog to detect collisions, book ground-based (and in the future space-based) sensors for dedicated tracking of conjuncting objects and events of interest. Finally, the planning of manoeuvres (collision avoidance or other) is also supported. In the following, the Shared Satellite Services of EnduroSat is introduced, which offers the simplest, shortest and safest path to deploying various types of payloads to orbit. There is no need to reengineer satellite hardware, as EnduroSat's unique software-flexible NanoSat architecture allows for multiple sensors to operate together reliably on a single platform, resulting in fewer satellites in orbit, used with much higher efficiency, shared as a common resource in space. The second part will provide an end-to-end use case on how the framework supports, in reality, day-to-day satellite operations activities of a satellite fleet, showcasing how the fleet can be managed automatically, with minimal human intervention, and enabling the end users of the fleet to receive their data for the whole duration of the mission, without having to worry once about the satellite operations. Deriving from the real use case presented, in the conclusion, a list of low-level stakeholder requirements for adoption across the industry (service providers and users, i.e., shared satellite owners), classified in terms of complexity, scope and timeline/importance will be presented. This requirements roadmap can serve to bridge the current status quo with an improved space traffic management within the next three years.