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Quality and Safety, always a beginning! (1)

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THE CONTRIBUTION OF THE PORTUGUESE SST NETWORK SYSTEM TO THE SPACE
SECURITY

Abstract

The growing number of active constellations and the expected growing number of space debris are becoming a huge challenge and a potential threaten to the more than 2.000 active satellites, not only due to their economic value, but also due to their enormous operational value. This represents a growing need to predict and correct the orbits of the active satellites, avoiding collisions with other inactive satellites or debris, and guarantee the satellites and the orbits long-term operational use. Notwithstanding the different approaches and inherent comprehension of the Space Situational Awareness (SSA) concept, the common European concept is a holistic approach towards the main space hazards, encompassing collision between satellites and space debris, space weather phenomena, and near earth objects. “Space Hazards” are in the frame of any Space Surveillance and Tracking (SST) program. At European level, there has been a growing interest to improve knowledge, autonomy and exploit space situational awareness data (more specifically, SST data). In this context, Portugal, through the Portuguese Ministry of Defence – Armaments Directorate has been investing to build an autonomous capability, obtaining relevant SST data and producing derived SST information and services from it. Such information is aimed to contribute to an international common effort of maintaining a free and long-term use of the Earth orbits, with clear benefits to the well being and prosperity of humanity. In order to achieve these objectives, an initial network of state-of-the art space debris optical sensors and a National Control Centre (NOC) has been set up. The optical sensors allow extremely high throughput of Earth-orbiting MEO/GEO object data. Their location is spread in the Portuguese territories, namely mainland and overseas Northern Atlantic territories (Azores and Madeira), separated by more than 1000kmt far from each other sites, which allows to have, almost permanently, an observation capability. These locations are the western locations in Europe, far beyond Europe mainland (by means of the Azores and Madeira territories), allowing to extend the capability of the SST network to access some extreme GEO longitudes from European outermost territories. The NOC includes a complete SST suite, including the tasking of sensors, an autonomous SST catalogue, conjunction screening and evaluation, re-entry analysis, fragmentation detection and monitoring capabilities. Cataloguing function includes initial orbit determination, routine orbit determination and correlation, and enables the autonomous build-up of a catalogue with no information from outside the Portuguese network. This paper describes the capabilities and versatility of the new Portuguese SST network, and provides samples and discussions on the data products obtained and made available.