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THE S5S ONLINE PLATFORM FOR IMAGE ANALYSIS AND ORBIT DETERMINATION

Abstract

The standard procedure in terms of debris monitoring always involves the orbit determination analysis as one of its final steps. In fact, the data collecting and analysis chain is mainly composed of the initial debris observation followed by the derivation of its celestial coordinates (e.g. from the tracklet centroid) and the final orbit reconstruction. These procedures are mostly aimed at performing a follow up of the object. Eventually, in case the target is an uncontrolled satellite or a spent rocket whose tracking is of high priority for a matter of space security, the lightcurve observation is included in the chain to reconstruct the debris attitude. Some of these procedures are usually performed by visually examining the image. Considering the space debris monitoring activity has grown significantly in the very last years, the lack of automation and standardization, the heterogeneous development of tools and softwares to address some of the previously described tasks and moreover the fact that most of these procedures are completed by an operator, surely represent a large limit to the expansion of such activity. Being one of the oldest Italian space debris community members, and also participating to the IADC campaigns; the S5Lab research team, hosted by the University of Rome "La Sapienza", is now offering an alpha service to ease and speed up the whole process. Indeed, an online portal called S5S (Sapienza Space System and Space Surveillance Server), on which the final user can benefit from some of the tools aimed at automatically identify the debris tracklet and coordinates, calibrate those measurements with the known Two-Line Element (TLE) and consequently reconstruct or improve the orbital parameters accuracy, has recently been published. The system purpose is mainly to guarantee the capability of the users to perform their own follow-up measurements also through an accurate dynamic modeling of the orbit without needing to develop their own tools. The described services are offered for free to the final users, without restricted priority, after their registration to the platform has been accepted. This paper will describe how the web-based system has been conceived and is structured as follows: the standard procedure in terms of debris monitoring

is presented; the tools developed by the S5Lab are then briefly presented with particular attention to the user-friendly interface and the website overview; finally the platform current progress status, potential and future developments are explained taking the community needs into account.