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DEVELOPMENT OF THE ITALIAN OBSERVATORY NETWORK FOR SPACE SURVEILLANCE

Abstract

The need to improve observation capabilities in monitoring and cataloguing space debris is constantly increasing, due to the continuous growth of number of operative satellites in both GEO (Geostationary Earth Orbit) and LEO (Low Earth Orbit) regions. Italy is developing a fully dedicated network for orbital debris monitoring based on a mid-latitude and an equatorial observatory. The presented paper highlights the enhancements of using two telescopes located at mid and equatorial latitude, for space debris detection and tracking in terms of surveying volume, object identification, and orbit determination accuracy. The improvement in the orbit determination accuracy, derived from the enhanced observation conditions, is evaluated in several configurations and is quantified through the covariance matrix estimation. After the description of the of the whole network system, an overview of the EQUO (Equatorial Observatory) On-Ground Observatory is presented. The observatory is installed at Broglio Space Center (BSC) in Malindi (Kenya) and it has been developed in the framework of the Italian Space Agency (ASI) – University of Rome "La Sapienza" Agreement for scientific cooperation at the BSC. Moreover, a description of the scheduler developed by Sapienza Space Systems and Space Surveillance Laboratory (S5Lab) research group is given. The software is a custom instrument coordinator tool for orbital debris observations used to allocate visibility windows to the sensor and solve the priority conflict of optical sensor scheduling tasks depending on the targets at different kinds of orbits and the different observing strategies (tracking, beam park and follow-up).