

SPACE DEBRIS SYMPOSIUM (A6)
Space Debris Detection and Characterisation (6)

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STUDY ON DEBRIS DETECTION, IDENTIFICATION AND ORBIT RECONSTRUCTION USING
GROUND AND SPACE BASED TELESCOPES.**Abstract**

The Group of Astrodynamics of University Sapienza (GAUSS) of Rome is involved from years in observation of space debris. This paper will focus on the detection and identification of objects along sun-synchronous orbits and on the development of a software tool to simulate an observation from satellite. The ARCA (Automation Robotics and Control for Aerospace) Group of Sapienza University of Rome has designed a high-fidelity software to simulate the satellite orbits and the relative observations from a point in space or on ground. The simulated orbital observations will be validated through on-ground observations with a telescope of the GAUSS observatory. The work will concern in a observation campaign with two telescopes, with diameters of 30 cm and 40 cm, equipped with CCD and moved by robotic mounts. The 40 cm telescope is a Cassegrain-like configuration, modified to get a shorter focal length (focal ratio: f/1.8) allowing a wide field of view and a good stability on the mount in order to get fast LEO objects tracking. The design of optical tube is completely manufactured by the GAUSS Group. One of the main concepts of the study is using optical devices to make observations and orbit determination with the use of a telescope mounted on satellites and ground based observatories taking pictures of the same area from different locations. The telescopes have to be time-synchronized in order to reconstruct the position of the object from the pictures with higher accuracy. The simulation will be conducted using single passage with multiple pictures and multiple passages. The paper finally presents the results of the comparison among ground-based observations, simulated space-based observations and combined ground-space observations.