

CALCULATION OF PHYSICAL PROPERTIES
OF SPACE DEBRIS IN THE LAPLACE PLANED. Casanova,¹ E. Lacruz,² F. Hernández-Pérez,³ J.
J. Downes,⁴

Since the beginning of the space age to the present, large amounts of space debris (SD) are in orbit around the Earth, which have been generated due to launch events, intentional and non-intentional collisions, as well as explosions, and finally clustered in three main regions of spatial activities: Low Earth Orbit (LEO), Medium Earth Orbit (MEO) and Geostationary Orbit (GEO). Particularly, there are SD in the GEO with a resonance 1:1 with the Earth, that are located in an orbital plane approximately 7.3° from to GEO plane, named the *Laplace plane*.

An important intrinsic physical feature of the SD is their area-to-mass ratio (A/m). This value is strongly related with the temporal evolution of the objects as well as the joint action of conservative and non-conservative forces, that produce changes in the resonance. For this reason, is fundamental to know the value of the A/m which allows the precise determination of the dynamics of the SD. In this work, we present a methodology to estimate the A/m of the SD located in the Laplace plane of the GEO region, through two main tools: the use of precise coordinates calculated from astrometric observations and the use of an analytical propagator for SD orbits.

¹ Centro Universitario de la Defensa Zaragoza, CUD, Ctra Huesca s/n, CP 50090, Zaragoza, España.(casanov@unizar.es).

² Centro de Investigaciones de Astronomía, CIDA, La Hechicera, Apdo. Postal 264, 5101, Mérida, Mérida, Venezuela.

³ Universidad de Los Andes, La Hechicera, Apdo. Postal 264, 5101, Mérida, Mérida, Venezuela.

⁴ Centro Universitario Regional del Este - Universidad de la República, Rocha 27000, Uruguay.
