

16th IAA SYMPOSIUM ON SPACE DEBRIS (A6)
Interactive Presentations - 16th IAA SYMPOSIUM ON SPACE DEBRIS (IP)

Author: Dr. Alessandro Vananti
Astronomical Institute University of Bern (AIUB), Switzerland, alessandro.vananti@aiub.unibe.ch

Prof. Thomas Schildknecht
Astronomical Institute University of Bern (AIUB) / SwissSpace Association, Switzerland,
thomas.schildknecht@aiub.unibe.ch

ASSOCIATING SHORT-ARC RANGE AND ANGLE MEASUREMENTS OF OBJECTS IN LEO.

Abstract

Observations of space debris objects in Low Earth Orbit (LEO) regime are usually conducted with radars. The observations may consist of sequences of range and angle measurements, so-called tracklets, usually covering only short arcs of the orbit. The association of two or more sequences is necessary to calculate an initial orbit of the observed space object with sufficient accuracy. Orbits can be derived from observations in a single short arc and can be associated according to an orbital matching criterion. In this work the association of more than two short-arc tracklets is studied. A multiple hypotheses approach is compared to a global approach based on a genetic algorithm. Different aspects related to initial orbit determination and orbital matching are also analysed. In particular, for the latter the Euclidean metric is applied to vectors in the orbital element space.