

SPACE DEBRIS SYMPOSIUM (A6)
Modelling and Risk Analysis (2)

Author: Mr. Benjamin Bastida Virgili
European Space Agency (ESA), Germany, benjamin.bastida.virgili@esa.int

Dr. Tim Flohrer
European Space Agency (ESA), Germany, tim.flohrer@esa.int
Mr. Stijn Lemmens
European Space Agency (ESA), Germany, stijn.lemmens@esa.int
Dr. Holger Krag
European Space Agency (ESA), Germany, holger.krag@esa.int
Dr. Klaus Merz
European Space Agency (ESA), Germany, klaus.merz@esa.int
Prof.Dr. Heiner Klinkrad
European Space Agency (ESA), Germany, H.Klinkrad@tu-braunschweig.de

SUPPORTING CONJUNCTION EVENT ASSESSMENT BY ACQUIRING TRACKING DATA

Abstract

ESA's Space Debris Office provides an operational service for conjunction event detection and collision risk assessment. In Low-Earth Orbit this service currently covers ESA's Envisat, Cryosat-2 and ERS-2 (until the end of this mission in September 2011). When a high risk conjunction event is identified, the processing of additional tracking data acquired from various sensors has proven to be an efficient way to improve the knowledge on the orbit of the chaser object and to reduce the related uncertainties. The improved information helps to make a potential collision avoidance decision more reliable. Acquiring additional tracking data also allows validating information on conjunction events provided by external services, such as the Conjunction Summary Messages provided by the US Joint Space Command. We simulate different sensor architectures to acquire such supporting tracking data. Radars and optical telescopes at different sites are considered with different acquisition strategies, with parametric analyses of track length, track geometry, time interval between tracks and number of tracks. The quality of the orbit determination compared to a reference orbit is used as a metric for a recommendation of an optimal tracking network. To support the simulations of this parametric study, we review selected past conjunction events where additional tracking data has been acquired.