

SPACE DEBRIS SYMPOSIUM (A6)
Space Surveillance and Space Situational Awareness (5)

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PRELIMINARY TELESCOPE DESIGN ANALYSIS FOR THE OPTICAL SPACE SURVEILLANCE
SUBSYSTEM

Abstract

The European Space Agency (ESA) is developing an independent system for Space Situational Awareness (SSA). One component of the draft architecture of the system foresees a network of optical telescopes for observations in the MEO/HEO/GEO region. The telescope network will survey and track all objects above a certain diameter and will deliver data to allow the collection of accurate orbits and possibly information on the object properties. Major design drivers are the requirements on the limiting object size, the timeliness for particular events such as fragmentations or maneuvers, and the orbit accuracy for cataloguing. For the optical sensors these requirements translate into wide FOV's and large apertures. In this work, different design options for the optical telescope assembly are evaluated and a trade-off analysis in terms of capability and costs is given. The identification of key telescope parameters according to the required sensitivity and tracking requirements is discussed. Among the various design aspects, especially the trade-off's between aperture and focal ratio, FOV and detector size, as well as pixel size and readout time are treated. As a result of the analysis a possible telescope design for the SSA optical network is presented.