

SPACE DEBRIS SYMPOSIUM (A6)
Measurements (1)

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A TELESCOPE PAYLOAD FOR OPTICAL DETECTION OF SPACE DEBRIS FROM LOW-EARTH
ORBIT**Abstract**

As part of an assessment study funded by the European Space Agency, RAL Space has developed a telescope suitable for use as a secondary payload for the detection of space debris from a low-Earth orbit. We give an outline of the design of a demonstration mission using the payload and describe the process of capturing the requirements. We explain the construction of a radiometric model which enables the detection signal-to-noise ratio to be calculated for typical debris objects. A number of candidate optical designs are traded, leading to the selection of a three mirror anastigmat telescope. The design choices for the opto-mechanical design are explained, with an emphasis on the construction of a highly stable optical system. We contrast the use of CCD and CMOS detector technologies and explain the advantages offered by CMOS in this application. We describe the use of a passive thermal design to maintain the structure and detector at the required temperatures. Strategies for calibration of the payload are explored. We report the results of a study into the accommodation of the payload on candidate spacecraft. Finally, we summarise the expected performance of the system.