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ANALYSIS OF LIRIS INFRARED IMAGERY FOR ACTIVE DEBRIS REMOVAL MISSIONS

Abstract

In 2014, Laser Infrared Imaging Sensors (LIRIS) experiment had been conducted during Rendezvous and Docking (RvD) operations of ESA's last Automated Transfer Vehicle (ATV) mission. The setup aimed to provide sample data on Visible, Infrared and Laser Imagery to be exploited for Space RvD missions. The use of Infrared imagery for Non-cooperative rendezvous is an area which is not well studied and therefore LIRIS data is a valuable source to be investigated. Although there are some Infrared simulation tools which can give an idea about the space environment in Infrared band, they are mainly designed for terrestrial applications and need to be verified for space. The presented analysis provides insights to the image characteristics of the actual space RvD mission such as noise figures, LongWave Infrared (LWIR) signatures of spacecraft coatings under varying thermal conditions. In addition, the challenges of LWIR imagery for Space RvD mission is given to provide a guideline for computer vision algorithms to be embedded in a future rendezvous sensor used for relative navigation.