

Amera-based Tracking for Rendezvous and Proximity Operation of a Satellite

This paper focuses on vision-based detection and tracking of a region of a satellite for rendezvous and proximity operation at very close range. For this purpose, on-board cameras can provide an effective solution in accuracy and robustness during the approach. However, the illumination conditions in space are especially challenging, due to the direct sunlight exposure, and to the glossy surface of a satellite. We propose an efficient tracking method that can be realized on standard processor, robustly dealing with the above issues exploiting model and image edges. The algorithm has been validated at the facility of the European Proximity Operations Simulator of DLR, using a ground simulation system that is able to reproduce sunlight conditions through a high power floodlight source, satellite surface properties using reflective foils, as well as complex motion trajectories with ground truth data.