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Author: Dr. Yu Liu
Aerospace System Engineering Institute ShangHai, China, liuyu_pq@163.com

Mr. Jianming Huang
China, jinyong-qiang@126.com
Dr. Xiangquan Wei
China, Weixiangquan@163.com
Mr. Yongqiang Jin
China, yongq.jin@gmail.com

RESEARCH ON THE MEASUREMENT OF RELATIVE POSITION AND POSE BETWEEN TWO
NON-COOPERATIVE SPACECRAFTS

Abstract

Abstract: With the development of space technology, proximity operations have become more and more important in many space-related applications, such as on-orbit servicing to satellites of losing control, debris removal, etc. The measurement technology of relative position and pose between two non-cooperative spacecrafts in close range must be solved in order to complete on-orbit servicing and debris removal missions. Currently, the site for the identification and arrest of non-cooperative spacecraft includes the docking ring of satellite and rocket, apogee engine nozzle, solar panels, ground communications antenna brackets, etc. A method for measuring the relative position and pose is proposed to the targets with clear space feature such as the docking ring for satellite and rocket, engine nozzle, etc. Firstly, the two-dimensional projection of space circle is detected and identified based on binocular vision. Then, it can solve the exclusive position and pose by the binocular fusion to the projection equation of space circle. Finally, the simulation results of the target of engine nozzle are given. It does not require any priori information, and it can not only eliminate the ambiguous attitude, but also has good robustness and high accuracy.

Keywords: non-cooperative spacecraft; space service; engine nozzle; measurement of relative position and pose