

PROBLEM OF ANGULAR MOTION CONTROL OF A NON-COOPERATIVE ON-ORBIT SERVICE OBJECT

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The realization of existing projects of on-orbit servicing and the development of new ones is a steady trend in the development of space technology. In many cases, on-orbit service clients are objects that exhibit an undesired rotary motion, which renders their servicing difficult or impossible. The problem of on-orbit service object motion control determines the topicality of studies aimed not only at the refinement of methods and algorithms of controlling both the translational and the rotary motion of an object, but also at the development and refinement of methods of onboard determination of the object – service spacecraft relative motion parameters. This paper overviews the state of the art of the problem of object motion parameter determination in on-orbit servicing tasks and existing methods of object motion control and angular motion damping and specifies lines of further investigations into the angular motion control of non-cooperative service objects. Based on the analysis of publications on the subject, the applicability of onboard means for object motion parameter determination is characterized. The analysis of the applicability of methods of remote determination of the parameters of an unknown non-cooperative object from a service spacecraft shows that they are at the research stage. The input data for the verification of methods proposed in the literature were simulated or taken from ground experiments or previous missions. Contact and contactless methods of angular motion control of non-cooperative on-orbit service objects are considered. From the state of the art of investigations into the contactless motion control of on-orbit service objects it may be concluded that the most advanced contactless method of motion control of an on-orbit service object is a technology based on the use of an ion beam directed to the object from an electrojet engine onboard a service spacecraft. Lines of further investigations into non-cooperative object motion control are proposed.

Keywords: *non-cooperative on-orbit service object, onboard means of motion parameter determination, methods of angular motion control of objects, overview of the state of the art of a problem, lines of investigations.*

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