

SPACE DEBRIS SYMPOSIUM (A6)
Space Debris Removal Concepts (6)

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AN CONCEPTUAL DESIGN FOR A SPACE DEBRIS REMOVAL SPACECRAFT

Abstract

The increasing space debris have threatened the development of the man-kind aerospace industry. Active removal spacecraft of space debris has arisen global attention. This article brings forward a novel space debris removal spacecraft, and its general design thoughts, detailed scheme, the feasibility and the future applications are also analyzed. The space debris removal spacecraft is composed of compound detection system, guidance and control system, monitoring and communication system, power system, electrical system, the structure system and the space debris capture system. The most important system and also the different system with other spacecrafts is the space debris capture system. We consider of two kinds of capture systems: the claw system and the attachment system. Comparing with other removal methods, such as electric drive rope and laser burning method, the capture mode is much more adaptable and it can remove the various scales of space debris in different orbits. Small satellite will be the suitable carrier for the capture system and the measurements and capture technique of disoperative objects, the actuator design technique, high efficient orbit transfer technique and the on-board computer technique will be key techniques. The space debris removal technique has broad applications in the future. It would offer a clean and safe space environment, in the mean while, it would protect the space station and help the failed aircraft reentry the orbit. The removal technique is still under theoretical research and experimental phase, there is a long way to achieve the goals in practice.