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IAF SPACE SYSTEMS SYMPOSIUM (D1)
Innovative and Visionary Space Systems (1)

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SPACE SERVICING: STRATEGY AND LOGISTICS

Abstract

Many space missions have been failures because of technical problems. When satellites run out of fuel or do not manage to deploy their solar panels, missions fail and milliards of dollar are lost. Nowadays, many of the artificial satellites that have been launched into orbit around the Earth are no more operational and greatly increase the "space garbage". What about a reliable way to physically fix and re-fuel satellites in orbit ? Development of autonomous techniques for on-orbit satellite servicing will revolutionize space sector. The maintenance of satellites by the Space Repair Module (SRM) looks attractive to extend the spacecraft's life. Indeed, the satellite operations depend on a large number of critical elements, replacement and repairs will extend the mission's life duration. Our project aims at developing safe concept to perform autonomous spacecraft servicing techniques (such as repairs and refueling). The main goal would be to replace objects, improve the mission objectives and life duration. Our idea is to design satellites that will circle the globe repairing broken space robots. These satellites will change the way of thinking space missions and satellites design. Indeed, being able to perform repairs and re-fueling will change the conception phase protocol as todays' satellites are not designed to be repaired. Our project focus on two main points: the design of both types of satellites: the ones that will need to be repaired of refueled and the ones that will perform these operations; the operational strategy to perform these operations efficiently, developing mission objective and the corresponding mathematical and logistical models. We believe that, for future development of space missions, our project would be extremely valuable for the entire space area and will benefit the long-life satellites and future missions.