

Initial user-driven framework for developing trade-off scenarios for space debris removal services

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Satellite owners, operators, space agencies and commercial players owning the mega-constellations (e.g. Starlink, Amazon Kuiper, OneWeb, etc.) will need to find economically viable ways to inspect, refuel, augment, extend and manage the lifetime of their satellites. Satellite owners are bound to face the challenge to choose the most reliable and profitable on-orbit satellite servicing solution for extending the capabilities of their satellites and in an effort to keep customers on board.

Satellite owners will need to develop trade-off scenarios in order to choose from the rich spectrum of on orbit satellite services or the launch of a new satellite. Some of the emerging trends taking place in the space industry are on orbit satellite servicing, active debris removal services and end-of life services. With the technology demonstrations on orbit of MEV-1, MEV-2 and ELSA-d missions.

The presentation proposes an initial user-driven framework presenting the elements that could be taken into account when developing trade-off scenarios for on-orbit satellite services, active debris removal services and recycling of satellite components. For example space agencies should consider collision risks, technology innovations and costs for active debris removal services when choosing services, while satellite operators ought to look at satellite profitability, continuation of the customer base, cost-savings, time to market, launch and insurance costs.

It is important to understand the factors influencing the end-user choice for on-orbit servicing or active debris removal services because that will help satellite owners and operators develop their trade-off scenarios. Service provider companies will also be able to develop optimistic, realistic and pessimistic market scenarios for their business models, which will facilitate their process of attracting private investors and offering competitive prices during the different market development phases of their on-orbit satellite servicing activities.

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