

BUSINESS INNOVATION SYMPOSIUM (E6)  
Entrepreneurship and Investment for Commercial in-Space Activities (2)

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THINK DIFFERENT – GENERIC ECONOMIC MODELS FOR ON-ORBIT SERVICING (OOS) AND  
SPACE DEBRIS REMOVAL

**Abstract**

The evolution of space activities since the moon landing is impressive. However, major steps in the context of nextgen space endeavors, in particular exploration and large space infrastructure will have to make use of approaches involving onorbit servicing (OOS), on-orbit assembly (OOA), based on modularized concepts using standardized subsystems and components. A major subset of OOS is unmanned satellite servicing using robotics and automation technologies. To date various concepts for on-orbit servicing of satellites have been developed and investigated, mostly driven by the technological challenges involved. Associated economics have not been fully understood, why government support measures as well as private sector funding remained absent, at least sub-optimal. Now, activities seem to have a renaissance, recently also stimulated by intensified discussions on space debris removal and avoidance. Particularly life extension of GEO telecommunication satellites and space debris removal missions are being promoted by various actors around the globe, both government and private sector. However, no OOS business, nor space debris removal are either operational or commercially successful yet. This paper provides an overview of generic commercial models, with traditional and innovative or creative elements to best serve government and private stakeholders alike sand to counter-encourage those. As space projects come in different flavors with regards to their timeframe, cost, risk, commercial potential and organization, etc., and therefore differ significantly by nature and scope, synthetic and simplified cases elaborate on basic issues related to government support and private sector involvement in space projects, especially with regards to equity finance as a basis for leveraging on financial, strategic, managerial and cultural assets. Backgrounds of the findings presented are experiences made by the author for 25 years involvement in space projects, venture capital, education, international partnerships and strategy on global level.