

14TH IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND
DEVELOPMENT (D3)

Space Technology and System Management Practices and Tools (4)

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Science & Technology, United StatesBUILDING BLOCKS OF A ROBUST ECONOMY IN EARTH'S ORBIT: THE MACHINERY OF
COMMERCIALIZATIONS**Abstract**

By definition, economy is a term referring to the set of interrelated production and consumption activities relying on a careful management of available resources. The space resources upon which a robust economy in Earth's orbit can be created are: "infinite" cold, "infinite" vacuum, "infinite" solar power, reduced gravity, data, remote sensing. Three pillars: technical, economic and policy with their corresponding responsibilities and ethics will be discussed. Several concepts - from allowing incorporation in Earth's orbit (.leo) to creating a currency from mining solar power data centers as well as encouraging future growth through standardization and smart use of "touch of space" branding will be proposed. Discussion will also focus on the type of approaches (new insights, processing and reprocessing in space to manufacturing and assembly) that could be used to return the value of space to Earth for economic growth and public benefit. Lessons learned from past commercialization efforts will be reviewed. Traditionally results have been categorized based on fundamental scientific or engineering disciplines, approach effective at highlighting research in a given field. It however often results in discipline level stove-piping and is counterproductive to commercialization. To overcome this limitation, the concept of Microgravity Verticals is introduced where existing microgravity results have been binned across multiple disciplines based on their relevance to a sector of private industry. The Microgravity Verticals are developed to capture in a compressed manner a mix of very diverse values (knowledge, processing) of the microgravity environment through companies who have self identified their interest or intent to mature those technologies for commercial applications and extend the Verticals into the future via microgravity-based solutions relevant to a sector of the private industry aligned with current industry specific roadmaps. A new scale, the Economic Readiness Level (ERL) is proposed that merges on the same scale technology and investment considerations to bridge between supply, demand and capital. To advance on the Economic Readiness Level scale, the technology itself may not necessarily need to mature but the understanding of its economic potential does. Building on these new concepts of Microgravity Verticals and the Economic Readiness Level, this paper further captures and describes key aspects and elements of the machinery of commercialization that ultimately leads to the creation of pathways for infusion of private capital that could harvest the resources of space through a robust economy in Earth's orbit and beyond and return value to Earth.