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Space Economy Session – A focus on in-space operations and their potential to stimulate economic development (3)

Author: Mr. Bernd M. Weiss
Luleå University of Technology, Sweden

Prof. Rene Laufer
Luleå University of Technology, Sweden
Prof.Dr. Anna Ohrwall Ronnback
Luleå University of Technology, Sweden
Mr. Bernd M. Weiss
Astromerge, United States

CIRCULAR SPACE ECONOMY: ON THE WHY AND HOW TO ACHIEVE CIRCULAR MATERIAL FLOWS IN SPACE.

Abstract

The circular economy aims to redefine economic growth, focusing on positive social, environmental, and economic benefits. In contrast to the linear economy, which follows a "take-make-dispose" model, a circular economy seeks to use products, components, and their materials at the highest value. This can be achieved through strategies such as designing for durability and assembly/disassembly, remanufaturability, and at end-of-life, with recovering and regenerating the resources. The circular economy is seen as a promising approach to challenges humanity is facing today, including resource depletion, increased waste and pollution, and climate change.

The circular space economy is an emerging concept that, in basic terms, extends the circular economy to activities in space. It stems from the point of view, that the spacecraft launched into space are valuable resources and therefore should not be wasted. It also recognizes that space resources are can and should be considered equally finite as resources on Earth.

The aim of this research paper is to explore the potential for applying circular economy principles to the space industry. By examining selected circular economy practices from other industries, this paper will identify key strategies and opportunities for implementing circularity material flows in space. A literature review will be complemented by interviews with circular economy, circular design, circular business model, and product development experts.Through this analysis, the paper seeks to demonstrate the feasibility and benefits of adopting circular economy principles in space and highlight the potential for creating a more sustainable and efficient space economy. In addition, it will provide an overview of known changes in business operations, organization, and products that seem to be necessary in order to enable reusability.