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Author: Ms. Olivia Maria Joikits
WIA-Europe, Austria

INTERCONNECTING ECONOMIES: METHODOLOGIES FOR ADAPTING EARTH INFRASTRUCTURE FOR SPACE INDUSTRY REQUIREMENTS

Abstract

The burgeoning space economy presents an unprecedented opportunity to leverage existing Earth infrastructure towards supporting and enhancing the future of space travel and commerce. This abstract outlines a proposed methodology for connecting existing Earth infrastructure with the infrastructure demands of the emerging space economy, while also emphasizing the importance of researching sustainable infrastructure on both Earth and in space. The methodology involves a comprehensive assessment of existing infrastructure, particularly airports, considering several critical factors: regulatory and legal frameworks governing airspace and space travel, weather patterns affecting the operation of space-bound and returning flights, and the physical and technological capabilities of airports to support space vehicles, as well as social and environmental factors. This evaluation aims to identify airports with the potential to support the incoming and outgoing flights of spacecraft, thereby acting as terrestrial gateways to the space economy, while facilitating their adjacent communities access to the new economy. In addition to focusing on terrestrial infrastructure, this paper will also delve into sustainable infrastructure development in space. This includes the study of space stations, habitats, and other facilities that support commercial, mining, research, and exploration activities. The goal is to ensure that space infrastructure development is conducted in an environmentally responsible and sustainable manner, minimizing the impact on celestial bodies and the space environment. The approach includes an analysis of ongoing projects and spacecraft designs to ensure compatibility between terrestrial infrastructure and spacecraft requirements. It also involves examining local markets and companies engaged in the space economy, identifying potential synergies and opportunities for infrastructure utilization and economic growth. Legislative frameworks will be scrutinized to understand how they can be adapted or evolved to support this integration between Earth and space infrastructures. A critical component of this methodology is the creation of a stakeholder map for each case study, addressing the socio-economic and environmental impacts of adapting existing infrastructure for space economy purposes and the development of sustainable space infrastructure. This map will guide the engagement process, ensuring that all relevant parties are considered in the planning and implementation phases. Interconnecting Earth and space infrastructures requires a systematic and thoughtful approach that respects existing laws, addresses technological and operational challenges, considers broader societal impacts, and prioritizes sustainability. By following the proposed methodology, countries can position themselves as integral parts of the space economy, opening new frontiers for innovation, economic growth, exploration, and sustainable development in both terrestrial and extraterrestrial environments.