

IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Launch Services, Missions, Operations, and Facilities (2)

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ENVIRONMENTALLY FRIENDLY PRODUCTION AND OPERATION OF SPACE
TRANSPORTATION SYSTEMS

Abstract

As the scientific knowledge on the effects of human activities on the earth's climate increases and the attention is increasingly being drawn to the global ecologic footprint of human endeavours, the sustainability of space-related activities, including elements such as the use of rare materials and/or environmental impact of launch activities shall be investigated in detail.

Within the ESA "NESTS" Studies, a wide vision of end-to-end Space Transportation Systems and Services for the required missions to-, in-, and from space has been developed for the period between 2030 and 2050. Building on these results, as well as lessons learned from current Ariane 6 industrial production processes, specific technical elements for more sustainable Space Transportation in 2030+ shall be further investigated and potential for improvement will be identified. Key aspects and design choices for greener space transportation systems will be presented.

Since ground phases (manufacturing...) have been identified as the largest contributors of launch system environmental impact, special attention will be put on these operations. Ways to reduce the carbon footprint as well as the overall resource and energy consumption of space transportation will be discussed. Focus is to elaborate on the main drivers and to propose measures to achieve greener production and operation of space transportation systems. Specific examples will be presented and the positive impact of potential measures on the overall ecologic footprint of space transportation will be demonstrated.