

## IAF SPACE SYSTEMS SYMPOSIUM (D1)

Lessons Learned in Space Systems: Achievements, Challenges, Best Practices, Standards. (5)

Author: Dr. Andrew Ross Wilson  
University of Strathclyde, United Kingdom

Ms. Sara Morales Serrano  
ESA - European Space Agency, The Netherlands  
Dr. Keith Baker  
Glasgow Caledonian University, United Kingdom  
Mr. Haroon Oqab  
Space Canada Corporation, Canada  
Mr. George B. Dietrich  
Space Canada Corporation, Canada  
Prof. Massimiliano Vasile  
University of Strathclyde, United Kingdom  
Mr. Tiago Soares  
European Space Agency (ESA), The Netherlands  
Mrs. Luisa Innocenti  
ESA - European Space Agency, France

FROM LIFE CYCLE ASSESSMENT OF SPACE SYSTEMS TO ENVIRONMENTAL  
COMMUNICATION AND REPORTING

**Abstract**

Over the last decade, the application of life cycle assessment (LCA) as a method for assessing environmental impacts of space missions and technologies has been growing in importance amongst European industrial stakeholders and national agencies. To date, space-specific LCA studies have predominantly been used to scientifically quantify and reduce adverse impacts, rather than for comparative assertions. However, LCA results may eventually become part of external business communication within the sector. For this reason, it is important that an appropriate mechanism is put in place to promote accurate and verifiable impact quantification for regulatory and economic purposes, thereby avoiding greenwashing and other false environmental claims. To tackle this issue, the European Green Deal states that “companies making ‘green claims’ should substantiate these against a standard methodology”.

In this regard, the European Commission product environmental footprint (PEF) and environmental product declarations (EPDs) provide standardised methods for declaring environmental impacts of products over their entire life cycle, based on LCA calculations. Their applicability towards space systems should, therefore, be properly investigated as a means for ensuring high standards of transparency and accountability in environmental reporting. At a minimum, this would require the production of a harmonised set of guidelines to regulate services and programmes in the context of the execution and preparation of space-specific PEFs or EPDs.

As such, the purpose of this paper is to present a potential pathway for space-specific environmental communication and reporting. The paper outlines the results of a scoping exercise designed to map the specificities of the space sector against the ISO 14025:2006 standard on environmental labels and declarations. This was based on a literature review conducted to obtain the current state of knowledge within the space industry whilst drawing upon the procedures and experiences of other sectors, with particular con-

sideration to Product Environmental Footprint Category Rule (PEFCR) development. The findings from this activity have been used to formulate a harmonised framework for environmental communication and reporting purposes in the context of the European space sector. The framework provides a comprehensive set of voluntary operating procedures which intend to act as preliminary guidance for European industrial stakeholders and national agencies. The paper goes on to discuss potential future framework refinements and provides a list of recommendations to advance sectoral practices further. This includes a call for the establishment of an industry-specific platform to enhance the harmonisation of LCA development and ensure rigorous verification and validation of environmental claims.