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Author: Mr. Bernd M. Weiss
Luleå University of Technology, Sweden, bernd.weiss@ltu.se

Prof. Rene Laufer
Luleå University of Technology, Sweden, rene.laufer@ltu.se
Prof.Dr. Anna Ohrwall Ronnback
Luleå University of Technology, Sweden, anna.ohrwall.ronnback@ltu.se

ENABLING SPACECRAFT REUSABILITY: AN OVERVIEW OF REQUIREMENTS FOR
REUSABILITY AS OBSERVED IN OTHER INDUSTRIES.

Abstract

A push towards circular material flows in the space industry and for the reuse of materials and components of spacecraft can be observed. Spacecraft reusability can help to mitigate space debris risks, lower overall mission cost, and positively impact the environments in space and on Earth. Technologies to reuse components of spacecraft are not commercially available, nor reliably tested, but recent advancements are promising. However, the yet-to-develop technologies are not the only puzzle piece for reusability to be viable and feasible. Spacecraft are typically built with a one-mission objective, and the reuse of components is not intended. Therefore, to enable spacecraft reusability, a paradigm change seems to be necessary.

This paper aims to expand knowledge of spacecraft reusability and how it can be achieved. It investigates industries with implemented and working concepts of circularity, reusability, or remanufacturability, like the heavy machinery and equipment industry, automotive industry, aviation, and information technology, with the goal to identify their individual requirements, approaches, and best practices. A literature search will be complemented by interviews with representative experts of each industry. The goal for this paper is to have an overview on product changes that can be necessary in order to enable reusability, as observed in other industries.