

16th IAA SYMPOSIUM ON SPACE DEBRIS (A6)  
Post Mission Disposal and Space Debris Removal (2) (6)

Author: Dr. Philipp Voigt  
Airbus DS GmbH, Germany

Mr. Cornelius Vogt  
Airbus DS GmbH, Germany

Prof.Dr. Roger Förstner  
Universität der Bundeswehr München, Germany

Mr. Konstantinos Konstantinidis  
Universität der Bundeswehr München, Germany

Mrs. Alexandra Wander  
Universität der Bundeswehr München, Germany

Dr. Monica Valli  
D-Orbit SpA, Italy

Mr. Simone Brilli  
D-Orbit SpA, Italy

Prof. Anders Kristensen  
Aalborg University, Denmark

Prof. Craig Underwood  
Surrey Space Centre, University of Surrey, United Kingdom

Mr. Leonardo Ghizoni  
GomSpace ApS, Denmark

Ms. Laura León Pérez  
GomSpace ApS, Denmark

Dr. Hedley Stokes  
PHS Space Ltd, United Kingdom

Mr. Tobias Lips  
Hypersonic Technology Göttingen, Germany

Ms. Lesley Jane Smith  
Germany

Mr. denis bensoussan  
United Kingdom

Dr. Malcolm Macdonald  
University of Strathclyde, United Kingdom

Ms. Emma Kerr  
University of Strathclyde, United Kingdom

TESER – TECHNOLOGY FOR SELF-REMOVAL – STATUS OF A HORIZON 2020 PROJECT TO  
ENSURE THE POST-MISSION-DISPOSAL OF ANY FUTURE SPACECRAFT

**Abstract**

One major source of new space debris are spacecraft (S/C) which are not removed after the end of

their operational lifetime. Many regulations (e.g. ISO 24113) require the removal of S/C at the end of operation (known as Post-Mission-Disposal (PMD)) with a compliance rate of 90% to ensure that S/C do not become a new source of space debris. An analysis performed by ESA shows that the success rate of PMD in 2013 was in the range of about 50%-60%.

The goal of TeSeR (Technology for Self-Removal) is to take the first step towards the development of a cost-efficient, but highly reliable PMD module. This PMD module is to be attached to the S/C on ground and it shall ensure the PMD of the S/C at the end of the operational lifetime. This PMD module shall be scalable and flexible, thus, enabling the PMD of any future S/C in an Earth orbit. Ultimately, the gap between the required 90% PMD success rate and the current success rate can be closed.

The technological enhancements and developments required for successful PMD are addressed and analysed in TeSeR. The project's primary aims are

- to develop, manufacture and test an on-ground prototype of the PMD module

- to develop three different removal subsystems (solid propulsion, electro-dynamical systems and deployable structures) for easy plug-in/plug-out implementation to the PMD module

This is the first step to demonstrate the main aspects of such a PMD module and the required main technologies. The technical activities are supported by non-technical tasks, e.g. investigation of legal issues relating to a PMD module, execution of a market study and consideration of this technology as a leverage to advance ISO norms. This double tracked approach ensures that the technological developments are embedded into the needs of the space community right from the start.

Up to now the prototypes of the three removal subsystems have been developed, manufactured and tested with a common interface for implementation into the PMD module prototype. The PMD module prototype will be manufactured until summer 2018. Afterwards the removal subsystems will be integrated via the same interface.

Airbus is the coordinator (and potential launch customer) of TeSeR. The project is conducted together with 10 notable institutes and companies from all across Europe with experts who have been working in the space debris issue for many years.

The presentation describes the project status in greater detail.