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.