

# DEORBITSAIL

## De Orbiting of Satellites using Solar Sails

### TAKING SPACECRAFT HOME

Historical practice of abandoning satellites at the end of their lifetime has left 8,500 tones of space waste in Low Earth Orbit. In the future, this practice must change. DEORBITSAIL proposes an innovative system, allowing the safe de-orbiting of spacecraft at the end of their lifetime.

Increasingly, space debris poses a risk for spacecraft. Hundreds of old satellites and thousands of pieces of space junk orbit Earth. Such debris collide, which in turn increases the amount of debris, as pieces of old satellites break off when hit by pieces of other retired spacecraft. Indeed, without a change of practice and the establishment of effective systems for safe de-orbiting of spacecraft at the end of their lifetime, it is estimated that the number of debris particles will grow with a growth rate in the order of 5 percent per year – a percentage which would raise over time as the number of possible collisions increase.



Satellite in orbit © Terry Morris - Fotolia.com

**DEORBITSAIL develops and tests a novel device for de-orbiting of Low Earth Orbit spacecraft.**

The DEORBITSAIL project addresses this challenge, as it is set to develop a novel low cost low risk de-orbiting device for smaller spacecraft with a mass less than 500 kg that circulate Earth in Low Earth Orbit less than 900 km above us.

DEORBITSAIL proposes to develop a 25 square metre Solar Sail, which would weight no more than 3 kg. Upon the end of its lifetime, the retired spacecraft would deploy this sail. Within 25 years, the solar wind would drive the spacecraft downwards, taking the spacecraft home into Earth's atmosphere, where it would burn off safely.

The 25 year de-orbiting period adheres to established recommendations by the European Space Agency (ESA), and deployed on all new small size spacecraft, the proposed concept has the potential to reduce future debris by 70 percent.



**VAIOS LAPPAS**  
IS PROJECT COORDINATOR

### QUESTIONS & ANSWERS

#### What do you want to achieve with this project?

The DEORBITSAIL project is a low cost end-to-end space mission, which will demonstrate satellite deorbiting through the deployment of an ultra light 5x5m sail, which will fit in a 3 kg cubesat nanosatellite platform.

#### Why is this project important for Europe?

DEORBITSAIL will be the first comprehensive European space mission to demonstrate the ability to deorbit space junk using a low cost, ultra light solar sail as a drag sail, bringing debris closer to Earth so they can eventually burn up through friction in Earth's atmosphere.

#### How does your work benefit European citizens?

DEORBITSAIL will demonstrate a unique capability to deorbit space junk in Low Earth Orbit, thus protecting astronauts and European space assets from space collisions, and protecting the environment. It will also contribute towards reducing the number and mass of debris in orbit.

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## LIST OF PARTNERS

- University of Surrey, United Kingdom
- California Institute of Technology, U.S.A.
- Astrium S.A.S. , France
- Deutsches Zentrum für Luft und Raumfahrt e.v., Germany
- Stellenbosch University, South Africa
- University of Patras, Greece
- Athena Research and Innovation Center in Information Communication & Knowledge Technologies, Greece
- Middle East Technical University, Turkey
- Surrey Satellite Technology Limited, United Kingdom
- Innovative Solutions In Space BV, Netherlands

## COORDINATOR

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## CONTACT

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## PROJECT INFORMATION

De Orbiting of Satellites using Solar Sails (DEORBITSAIL)

Starting date: 01/02/2011

Duration: 36 months

EU Contribution: € 1.997.342

Estimated total cost: € 2.830.721

