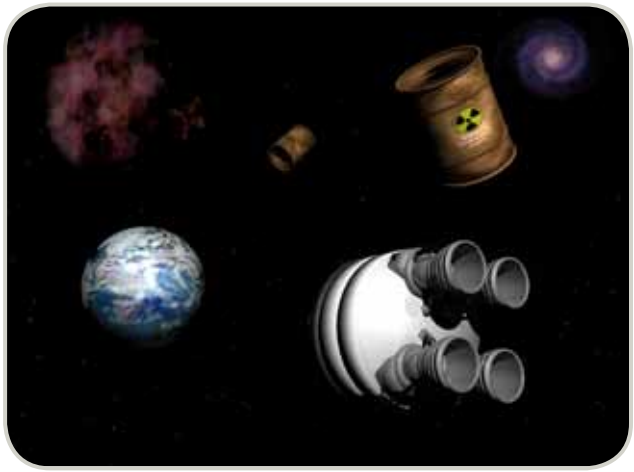
SIDER

Radiation shielding of composite space enclosures

BETTER PROTECTION AGAINST RADIATION

Radiation is a risk for satellites and humans in space, and shielding against such radiation is a cost. SIDER addresses this challenge with research into improved composite structures for better and lighter radiation shields.

Depending on mission altitude and inclination, and the dose rating of electronics, the thickness of aluminium necessary for shielding can substantially exceed that required for structural strength, resulting in significant weight penalties.



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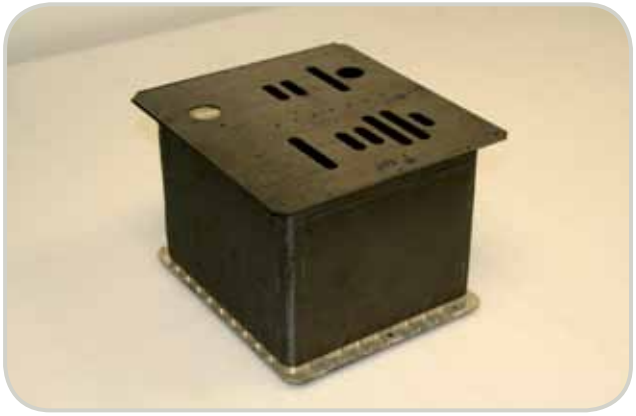

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Electronic housings are a massive part on the spacecraft. New concepts for lightweight satellites show the possibilities of using advanced designs based on composite housings. However, conventional graphite epoxy composites are not as efficient radiation shielding materials as aluminium - composites provide 30 to 40 % less radiation attenuation, which is considered a primary design driver. The SIDER project aims at paving the way for such lighter radiation shields by developing the technologies and tools required to obtain lightweight, safe, robust and reliable composite structures.

In doing so, the project is set to evaluate the protective potential of alternative materials such as tungsten layers and nano-conductive materials.

Potential benefits from succeeding in this endeavour are numerous. Further to making lighter spacecraft possible that may travel further into deep space on future space exploration missions, the European satellite industry might also profit from the development of better composite structures, sustaining Europe's global leadership on the market for communication satellites.

Moreover, better radiation protection directly benefits people on Earth, since such technology may be transferred into domains outside the space sector, in particular at the benefit of improved health care technology.

Indeed, potential SIDER discoveries hold a great potential for commercial exploitation well beyond the space sector.

GARBIÑE **ATXAGA**
IS PROJECT COORDINATOR

QUESTIONS & ANSWERS

What do you want to achieve with this project?

Organic composite materials are a promising solution to many space applications, where mass is really a concern. Nevertheless, these materials provide a poor radiation shielding. This project intends to solve this issue understanding and improving composite structures' behaviour.

Why is this project important for Europe?

This study will allow surpassing the last obstacle to get a broad use of composite materials in space applications. The developments will benefit commercial and utilitarian space missions thus generating a very significant impact on Europe's capability to access and exploit space.

How does your work benefit European citizens?

Findings and results obtained in the SIDER project could also be transferred to other sectors and markets such as the nuclear and pharmaceutical industry. Technologies and tools are essential to increase the European market, offering opportunities for the employment of skilled professionals.

SIDER proposes to improve the radiation shielding behaviour of composite structures and develop improved composite structures to protect against radiation in space.

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LIST OF PARTNERS

- TECNALIA, Spain
- Aalto-Korkeakoulusaation, Finland
- Anturikeskus OY, Finland
- Yuzhnoye Design Office named after Mikhail Yangel, Ukraine
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PROJECT INFORMATION

Radiation shielding of composite space enclosures (SIDER)
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EU Contribution: € 1.067.329
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SPACE WEATHER