

Category: Materials, Coatings & Processes

Reference: TD-DE-1026

Wall#E – Integration of energy storage functionalities into fiber reinforced spacecraft structures

The idea behind Wall#E involves integrating energy storage functions into the support structures of spacecraft, which will significantly reduce the mass and volume of satellites without sacrificing performance.

To this end, the project utilizes fibre-reinforced structures infiltrated with innovative solid-state battery materials. While the project's initial focus is on satellites, the underlying concept can easily be adapted to launch systems, space stations, and ground-based e-mobility applications. Spin-off potentials do exist in various fields, such as automotive industry, mobile devices, or medical research.



Expertise behind the offer bases on the research of the working group which encompasses satellite technology, satellite operation, and exploration. The technology provides the opportunity to the integration of battery materials in spacecraft structures. This efficient space usage of material may lead to a volume reduction of up to 25 %.

Innovative Aspects:

The idea involves integrating energy storage functions into the support structures of spacecrafts, which will significantly reduce the mass and volume of satellites without sacrificing performance. To this end, the project utilized fibre-reinforced structures infiltrated with innovative solid-state battery materials.

Thus, there would be a sufficient energy density without compromising the structural integrity of the components. While this project's initial focus is on satellites, the underlying concept can easily be adapted to launch systems, space stations, and e-mobility applications.

Application Areas:

The mass of satellites is decreasing. More compact and less complex designs are made possible. This leads to reduced costs for development and launch of mass and volume efficient components. In addition, the complexity of the overall system is reduced through function integration (energy storage and load-bearing function) and enables the local extraction of energy and data.

These advantages for space applications can also be transferred to other terrestrial application areas. Outside of space applications, the areas of application are in aeronautical engineering, in transportation, in the automotive industry and generally in electromobility, e.g. for electric bicycles.

Cooperation:

There is interest in adapting the structures for other applications.