Media release

EPFL Space Center joins Net Zero Space initiative

Lausanne, 10 November 2022: eSpace - the EPFL Space Center has joined the Net Zero Space Initiative of the Paris Peace Forum, which is convening a global multi-stakeholder group united by the common goal of realizing a sustainable use of the space environment by 2030.

An important milestone

A steadily increasing number of satellites have been launched in recent years into already congested orbits. At the same time, not enough spacecrafts are being de-orbited at the end of their functional lives. This has led to growing concerns about the necessity to design and deploy sustainable solutions to preserve the long-term, fair and equitable use of the space environment. As the 5th edition of the Paris Peace Forum takes place on 11-12 November 2022, the eSpace - EPFL Space Center is pleased to contribute to the Net Zero Space Initiative, which calls on all space actors to take concrete actions to urgently address the intricate challenges raised by the proliferation of space debris.

eSpace has pledged to strengthen its ongoing commitment to sustainability by:

1. Educating students, researchers and the general public globally about the challenges and opportunities offered by space sustainability;
2. Developing and leading research on space sustainability; and
3. Supporting the Space Sustainability Rating (SSR), which promotes sustainable behavior in space by quantifying the impact of space missions and operations on the environment.

Joining the Paris Peace Forum's 'Net Zero Space' initiative alongside several leading players in the space ecosystem is an important milestone for eSpace - the EPFL Space Center.

"At the EPFL Space Center, we believe that safeguarding the resources offered by the space environment in the long-term can only be achieved through collaborative action involving all space actors," says Professor Jean-Paul Kneib, Academic Director of the EPFL Space Center. "By joining the Net Zero Space initiative, we demonstrate our unwavering commitment to support the global space community in promoting and protecting space sustainability for future generations."

Projects for sustainability in space

To this end, eSpace has a number of projects that will help realise this vision of a safe and sustainable space environment. On the educational side, eSpace hosts the Space Situational Awareness (SSA) student team, which works at tracking space debris to create a catalog that will be used to send alerts to space operators when their assets are at risk of collision with a trackable

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debris. A research project focused on implementing life cycle assessment (LCA) in the early design phase of future space transportation vehicles is also currently in development.

eSpace is the main contractor leading the development of the Green Space Logistics - Assessment and Comparison software (ACT) that will support ESA Future Launch Preparatory Program to perform life cycle assessments of space transportation vehicles. The tool aims at highlighting environmental hotspots and recommending actions for eco-design and reduced environmental impacts of future launchers. The software will also be used as an environmental module (assessment of impacts, eco-design options trade-off, space debris risk mitigations, etc.) in the eSpace concurrent design facility (CDF).

With the DAWN project on space logistics optimisation, eSpace is working on future space logistics use cases, in particular an Active Debris Removal (ADR) mission as a service and constellation deployment scenario. The Technology Combination Analysis Tool (TCAT) uses current and future space transportation vehicle design and performances to optimize the mission profile of a use case. The cost of a mission is traded off with its duration using different models of propellant consumption based on the user inputs. The eSpace vision is to combine those tools (ACT and TCAT) with other existing ones to offer an open-source, comprehensive end-to-end space logistics assessment software.

The Space Sustainability Rating (SSR), hosted by eSpace, is an initiative to foster voluntary action from space actors to safeguard the long-term sustainability of the space environment. Initiated by the World Economic Forum in 2016, the SSR relies on a robust methodology developed by experts from the European Space Agency (ESA), the Space Enabled Research Group at the Massachusetts Institute of Technology (MIT), the European Space Agency (ESA), the University of Texas at Austin, and BryceTech to enable space operators to assess the level of sustainability of their space missions and operations. The SSR is also developing new modules to increase the rating system scope and consider the challenges and trends for the space environment: dark and quiet skies (impacts on astronomical observations), life cycle assessment, and potentially developing a Launch Vehicle Sustainability Rating (LVSR).

About eSpace – EPFL Space Center

eSpace is an interdisciplinary hub, working with students, academic institutions, international space agencies and industry partners, with an overall mission to promote space related research and education at EPFL. Its three-fold mission is to inspire the new generation of students in space-related projects and activities, develop novel space science and technology research topics in partnership with EPFL labs and beyond, and foster innovative space initiatives. eSpace achieves its mission through three key areas: education; fundamental research; and innovative development projects. Please visit the eSpace website to learn more about the center's activities.

About the Paris Peace Forum

At the occasion of the 4th edition of the Paris Peace Forum, actors from all over the world concerned by the long-term sustainability of outer space have launched the "Net Zero Space" initiative. From satellite operators to launchers, from space agencies to academia and the civil society, all these stakeholders gathered to call for achieving sustainable use of outer space for the

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benefit of all humankind by 2030 by taking concrete actions so as to tackle the pressing challenge of reducing debris orbiting Earth.

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