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Advances in CubeSat Sails and Tethers

Guest Editors:

Dr. Andris Slavinskis
Space Technology Department, UT Tartu Observatory, Observatooriumi 1, 61602 Tõravere, Tartu Maakond, Estonia

Dr. Pekka Janhunen
Finnish Meteorological Institute, Erik Palménin aukio 1, 00560 Helsinki, Finland

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Message from the Guest Editors

Spacecraft size and propulsion are major limiting factors in space mission design. Chemical and electric propulsion require the spacecraft size to be several orders of magnitude larger than CubeSats. The CubeSat Standard in conjunction with the New Space movement have revolutionized the space industry and scientific exploration. CubeSats consist of one or multiple 10×10×10 cm units stacked together in order to achieve the desired mission objectives. With a typical CubeSat mass in the range of 1–10 kg, their propellant storage capabilities are extremely limited if available at all.

Propellantless propulsion systems use an external force to propel the spacecraft, instead of on-board propellant. This can be photon pressure and solar wind originating in the Sun, as well as magnetic field originating in a planet's core or atmospheric particles dragging the spacecraft to a lower altitude. We can employ physical lightsails to reflect photons and travel the Solar System. A similar dragsail can be used in low Earth orbit (LEO) for orbital debris mitigation with deorbiting. Virtual electromagnetic sails can also be generated:

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Editor-in-Chief

Prof. Dr. Konstantinos Kontis
School of Engineering, University of Glasgow, James Watt Building South, University Avenue, Glasgow G12 8QQ, Scotland, UK

Message from the Editor-in-Chief

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Contact Us

Aerospace Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland

Tel: +41 61 683 77 34
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𝕏@Aerospace_MDPI