Pushing the Limits of In-Situ-Resource-Utilisation for In-Orbit Activities: Solar for Ice to Thrust - S4I2T

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The increasing number of satellite launches, the rise of In Orbit Servicing (and the necessity for Active Debris Removal (services require long term, reliable, affordable, and scalable solutions for in space mobility Utilizing solar energy and space resources offers the potential to create a renewable and self sustaining mobility infrastructure, providing significant benefits for European satellite owners and enhancing the strategic autonomy of the European Union It is crucial to identify and develop innovative Solar Electric Propulsion (systems that can effectively use advances in Solar Energy Harvesting (to reduce propellant and spacecraft mass, enhance in space mobility, and thus lower costs.

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As shown in Fig 1, these propulsion systems must be environmentally friendly and overcome the challenges associated with using in space solar energy harvesting for innovative propulsion

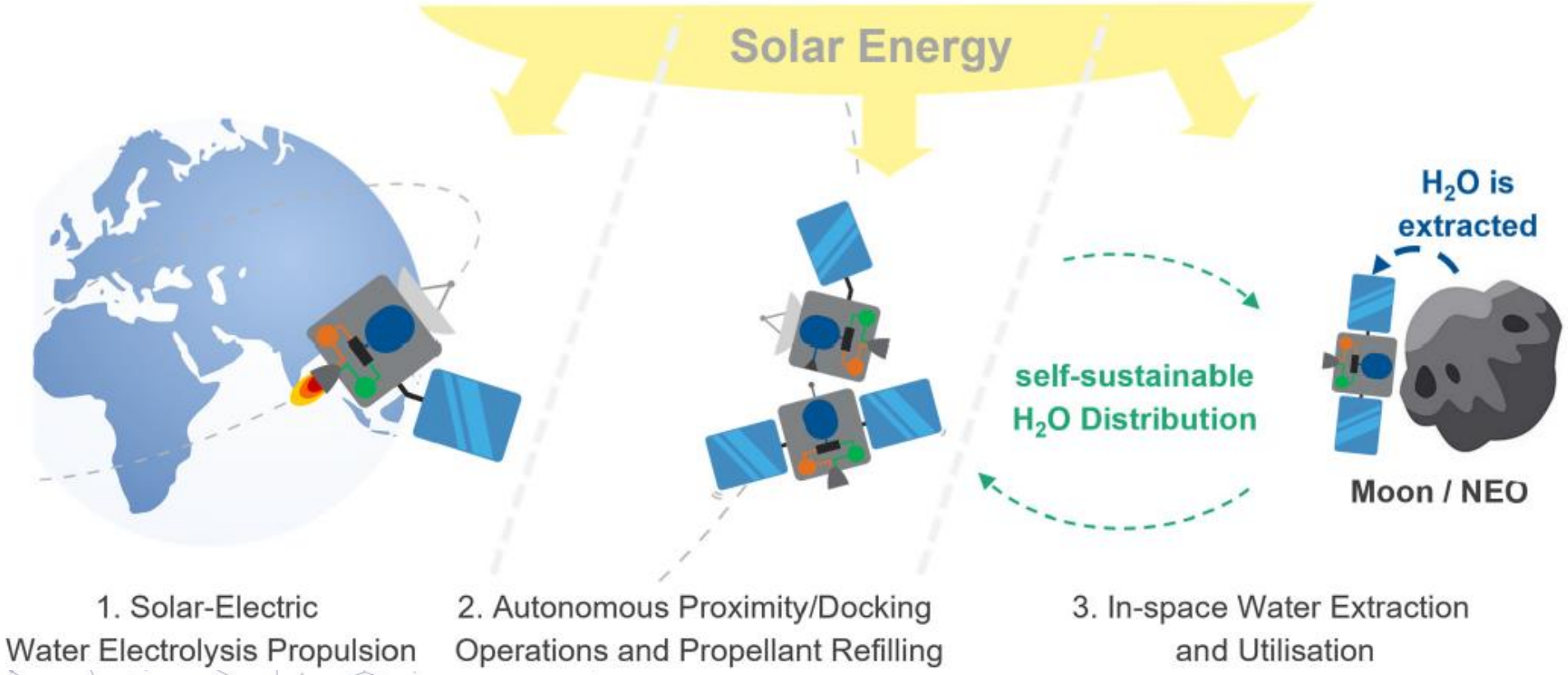

Fig. 1: S4I2T Vision of self staining mobility enabled by solar energy harvesting and water as propellant

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What we aim:

-Providing a comprehensive idea, a plan for execution, and a strategy for commercialization of a sustainable space mobility infrastructure independent of Earth.

-Laboratory validation of the inaugural environmentally friendly, storable propulsion system surpassing traditional.

-Proof of concept of autonomous docking and propellant refilling procedures using hardware in the loop (testing, verification and validation steps.

-Showcasing the first ever global demonstration of an end to end In Situ Resource Utilization (technology chain under realistic conditions as described in Fig 2.

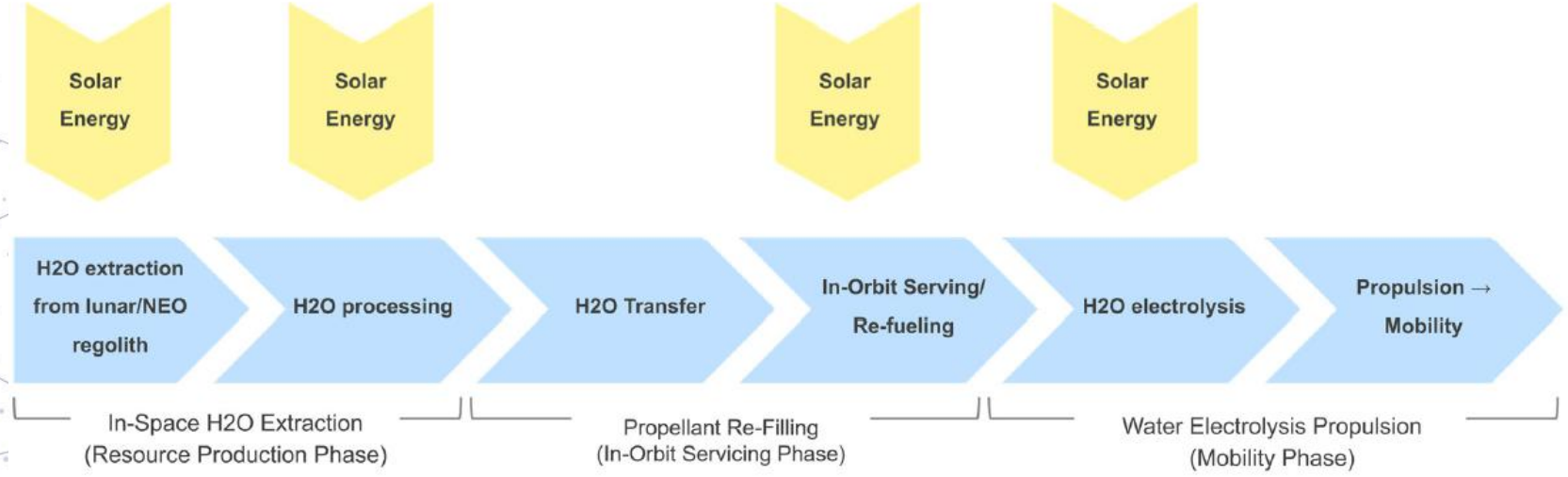

Fig. 2: S4I2T chain of processes relying on solar energy