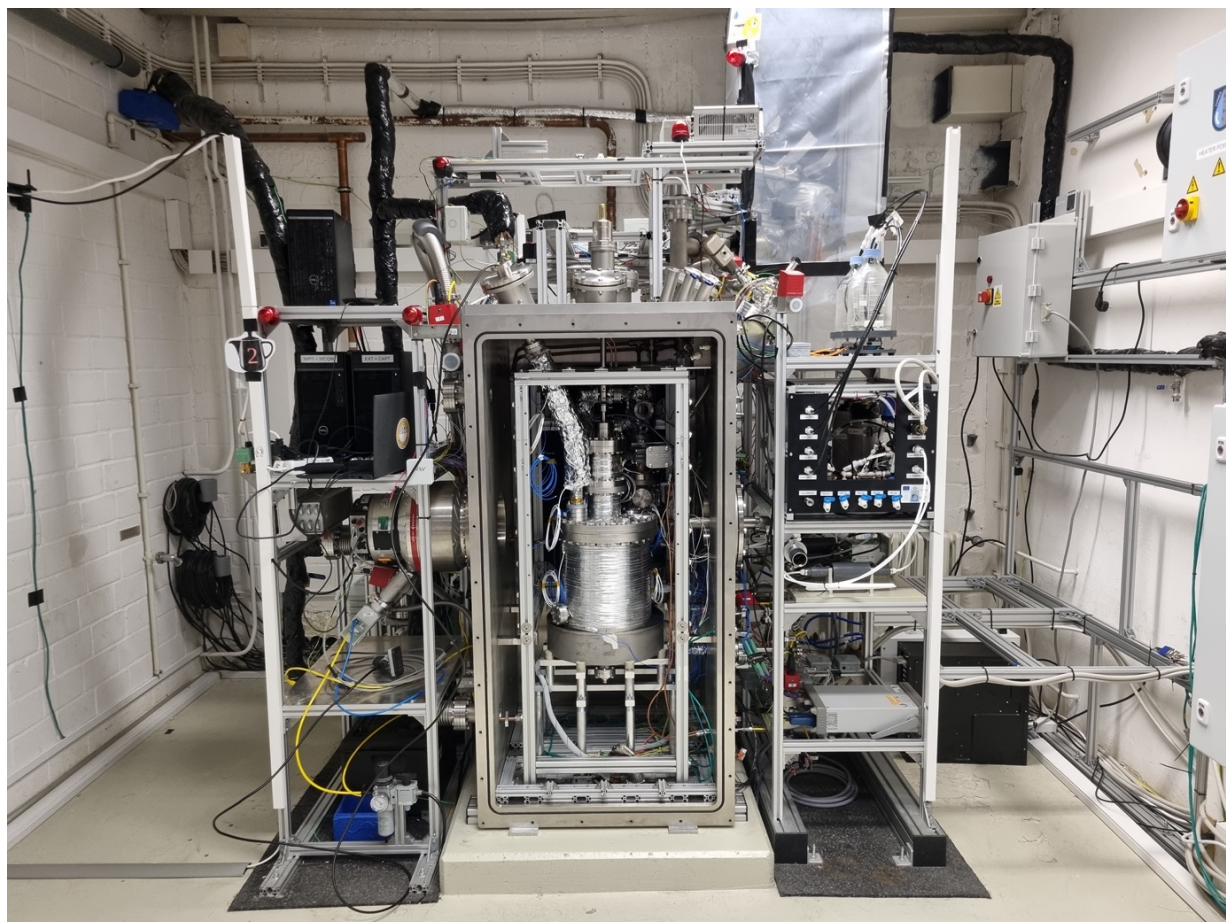




European project tests groundbreaking water extraction from lunar dust for the first time.

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LUWEX laboratory, TU Braunschweig, photo: LUWEX consortium

LEADING THE WAY

European Union-backed project LUWEX develops a pioneering system that enables the extraction of water from lunar regolith, a crucial step in advancing space exploration and sustaining human presence on the Moon.

Under the lead of the German Aerospace Center Bremen, LUWEX has engineered a comprehensive process that not only extracts water from icy regolith but also purifies it to supply rocket fuel and drinking water for astronauts stationed on the lunar surface.

These groundbreaking tests will unfold at the TU Braunschweig, specifically at the Institute of Geophysics and Extraterrestrial Physics. Central to these tests is a meticulously implemented laboratory setup that mirrors the conditions found in the shadowed regions of the moon's south pole using icy lunar regolith simulant. This material is not real lunar regolith but synthesized on earth and resembles lunar dust to a very high degree.



The laboratory setup includes both components inside a vacuum chamber as well as components placed outside, depending on their expected operational environment.

- Inlet for moon-like regolith: the experiment uses regolith simulant with a 5% ice content.
- Ice and Regolith Separation Crucible: water ice is separated from regolith through stirring and heating, water ice is converted into water vapour and can escape from the regolith.
- Dry Regolith Removal: the remaining regolith without the ice is being removed and stored for further resource usage such as mineral extraction or for building habitats.
- Cold Trap: the water vapour is cooled and frozen again into water ice to capture it.
- Liquefaction: water ice is being heated up again to provide liquid water.

The components outside the vacuum chamber include:

- Water purification outside the vacuum chamber: water is being cleaned and monitored so it is safe to drink.

What was once a conceptual idea has now been transformed into a fully operational demonstrator system, thanks to the collaborative efforts of six European partners from Germany, Italy, Poland, and Austria.

SUMMARY

LUWEX, short for Validation of Lunar Water Extraction and Purification Technologies for In-Situ Propellant and Consumables Production, represents a significant milestone in space exploration. Funded under the EU's Horizon Europe framework program and led by the German Aerospace Centre, Bremen this initiative pioneers the whole process chain to extract water from lunar regolith simulant and thus revolutionizes our understanding of lunar resource utilization.

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LUWEX Control room, TU Braunschweig, photo: LUWEX consortium



PARTICIPANT ORGANISATIONS AND CONTACTS

Deutsches Zentrum für Luft- und Raumfahrt, Germany

- Dr. Paul Zabel, paul.zabel@dlr.de, +49421244201273
- Luca Kiewiet, luca.kiewiet@dlr.de

Technische Universität Braunschweig, Germany

- Christopher Kreuzig, c.kreuzig@tu-braunschweig.de, +495313915198
- Johanna Noria Brecher, j.brecher@tu-braunschweig.de, +495313915198
- Gerwin Meier, gerwin.meier@tu-braunschweig.de, +495313915198
- Christian Schuckart, c.schuckart@tu-braunschweig.de, +495311398516
- Prof. Jürgen Blum, j.blum@tu-braunschweig.de, +495313915217

LIQUIFER Systems Group, Austria

- Dr. Barbara Imhof, barbara.imhof@liquifer.com, +43121885-05

Thales Alenia Space, Italy

- Cinzia Marcanio, cinzia.marcanio@thalesaleniaspace.com

Wroclaw University for Science and Technology, Poland

- Karol Leluk, karol.leluk@pwr.edu.pl, +48 668 378 732

Scanway sp. z o. o., Poland

- Szymon Krawczuk, s.krawczuk@scanway.pl, +48 71 733 62 64
- Mikolaj Podgorski, m.podgorski@scanway.pl