

PRESS RELEASE

Tekniker will develop the first-ever wind turbine generator for Mars

- *The Tekniker technology centre will lead the HORACE project whose ultimate goal is to develop the first-ever wind turbine generator to be used in the future on Mars as a secondary power source*
- *This initiative, scheduled to start in January 2021, will be funded by the European Space Agency (ESA) and will support future exploratory actions on the red planet*

[\[Eibar, 9 December 2020\]](#) – One of the main constraints of exploratory missions on Mars is associated with extreme environmental conditions on the red planet where storms can rage non-stop for six months. Due to such adverse meteorological conditions, it is crucial to develop systems that deliver energy constantly and reliably to explore Mars properly and build energy-sustainable settlements for humans in the future.

It is in this context that the **Tekniker** technology centre, a member of the Basque Research and Technology Alliance (BRTA), will be responsible for leading and developing the HORACE project (Triboelectric Energy Harvesting for Mars Exploration). This initiative, scheduled to start in January 2021, will be funded by the **European Space Agency (ESA)**. Its main objective consists in developing the first-ever wind turbine generator for Mars to be subsequently built and tested for use in future space missions. An international landmark that will not only boost the Basque Country's and Tekniker's outer space technological capabilities but also reinforce the role played by Basque firms and the **BRTA** in this new space race.

The project intends to make the most of environmental conditions on Mars to transform wind into electricity and use it as a source of energy in addition to conventional solar panels deployed in expeditions on the red planet whenever the latter cannot produce power due to severe Martian storms.

An alternative to electromagnetic generators

More specifically, Tekniker, an organisation with extensive experience in the field of space technology and the design, development and manufacture of complex mechatronic systems in addition to significant expertise related to materials and tribology, will manufacture a demonstrator for a triboelectric generator (TENG). This innovative technology uses a triboelectric effect and electrostatic induction to transform mechanical energy into electricity. It is an alternative to conventional electromagnetic generators (EG) whose use in planetary explorations of this kind is limited by weight and higher launching costs.

As explained by Borja Pozo, a researcher and coordinator of space technology at Tekniker, “a distinctive feature of this system is that it will operate based on a triboelectric generator instead of using conventional electromagnetic generators to reduce weight and costs”.

The researcher also states that “in order to build a demonstrator that can operate efficiently under harsh environmental conditions on Mars, advanced triboelectric materials shall be developed to combine excellent performance parameters in terms of tribology (low friction and wear), mechanics (shock resistance), triboelectric properties (triboelectrification and interface conductivity) and energy generation density under extreme conditions”.

Tekniker, moreover, will design and put together a prototype based on a vertical wind turbine generator to facilitate the integration of the system’s elements.

Finally, prototype operations shall be verified and validated under different atmospheric conditions inside the Martian chamber at the University of Aarhus (Denmark). Therefore, it will be possible to develop a low-cost and efficient wind turbine demonstrator to support space explorations on Mars.

Conclusions from laboratory tests will produce a road map for industrialisation purposes and suggest potential improvements and limitations. It will also be possible to establish system scalability parameters for future developments involving large energy generators.

This project is scheduled for completion in June 2022 and is focused on exploratory actions on Mars as per the guidelines established by the ESA, The Basic Technology Research Programme (TRP), The Mars Robotic Exploration Preparation (MREP) and Human Exploration and Transportation.

Concerning Tekniker

Tekniker is a technology centre specialised in Advanced Manufacturing, Surface & Product Engineering, and ICTs for manufacturing. Its mission is geared towards fostering growth and wellbeing through R&D&I actions aimed at society and enhancing competitiveness in the business fabric in a sustainable manner. Tekniker is a member of the Basque Research and Technology Alliance (BRTA).

Concerning the European Space Agency

The European Space Agency (ESA) is Europe's gateway to outer space. Its mission is to foster Europe's outer space capabilities simultaneously ensuring that all investments will produce further benefits for citizens in Europe and the rest of the world. The HORACE project forms part of the Open Space Innovation Platform (OSIP), i.e., an ESA platform by means of which companies, organisations and individuals from all over the world can submit their ideas to advance in the field of research and outer space technology and boost the leadership role played by European industries in this field.

Further information:

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