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ISAE-SUPAERO's "Collaborative Rover and Drone" project, facilitating the exploration of the Moon

While Thomas Pesquet launched on April 22 as part of the Alpha mission, one of humanity's biggest challenges remains even further away than the ISS, 400,000 km from Earth: the establishment of a lunar base. But before being able to settle on the Moon in a prolonged way to exploit its resources or as a logistic support for future exploration missions further away, an exploration work is necessary. The use of autonomous robotic systems would allow mapping of dangerous or hard-to-reach areas from space, before eventually deploying infrastructure such as a spaceport or human habitation.

Faced with this exploration challenge, the Space Advanced Concepts Laboratory (SaCLaB) of ISAE-SUPAERO in Toulouse and a team of students from the Institute are developing the Collaborative Rover and Drone (CoRoDro) project to study navigation and autonomous operations for space robotic systems. This scientific study is one of 12 university technology projects selected in 8 different countries as part of the IGLUNA* 2021 initiative supported by the European Space Agency (ESA)

The concept of CoRoDro is to develop the interaction of a drone and a rover. In concrete terms, the drone locates and maps its environment, which it transmits to the rover so that the latter can analyze it and choose the most relevant points to move around and conduct scientific experiments. Thanks to the cartography made by the drone, the rover is able to choose the shortest path and to determine the possible obstacles, which allows to shorten each exploration mission.

The objective of this project is to see up to what point it is possible to trust the work of robots to move and make decisions in total autonomy, and to determine what level of decision making is attributed to the human to react in particular to unforeseen events. In the perspective of a lunar installation, the robots would intervene in support of critical activities.

The CoRoDro project allows to gain knowledge and to test in real size multiple theories concerning the servitude of the future space station, the exploitation of the resources of the Moon, or the analysis of the collaboration between the crew and the robots for the critical and dangerous activities

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