

**LUNAR EXPLORATION AND SCIENCE IN ESA.**

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ESA seeks to provide Europe with access to the lunar surface, and allow Europeans to benefit from the opening up of this new frontier, as part of a global endeavor. This will be best achieved through an exploration programme which combines the strengths and capabilities of both robotic and human explorers.

ESA is preparing for future participation in lunar exploration through a combination of human and robotic activities, in cooperation with international partners. Future planned activities include the contribution of key technological capabilities to the Russian led robotic missions, Luna-Glob, Luna-Resurs orbiter and Luna-Resurs lander. For the Luna-Resurs lander ESA will provide analytical capabilities to compliment the already selected Russian led payload, focusing on the composition and isotopic abundances of lunar volatiles in polar regions. This should be followed by the contributions at the level of mission elements to a Lunar Polar Sample Return mission.

This partnership will provide access for European investigators to the opportunities offered by the Russian led instruments on the missions, as well as providing Europe with a unique opportunity to characterize and utilize polar volatile populations. Ultimately samples of high scientific value, from as of yet unexplored and unsampled locations shall be made available to the scientific community.

These robotic activities are being performed with a view to enabling a future more comprehensive programme in which robotic and human activities are integrated to provide the maximum benefits from lunar surface access. Activities on the ISS and ESA participation to the US led Multi-Purpose Crew Vehicle, which is planned for a first unmanned lunar flight in 2017, are also important steps towards achieving this. All of these activities are performed with a view to generating the technologies, capabilities, knowledge and heritage that will make Europe an indispensable partner in the exploration missions of the future.

We report on the current status of the European elements in this cooperative scenario, with an emphasis on the investigations to be performed at the lunar surface. These investigations should generate knowledge that can be enabling for exploration in the future, and should also have a significant fundamental scientific return.