

## Leonardo in race for the Moon

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**We are returning to the Moon to stay there and get closer to Mars.** The goal is to establish an operational activity on the lunar surface. Both robotic and human, the activity will allow the development of space exploration to more distant destinations, such as Mars. However, it will also find resources and knowledge that is useful for life on Earth. But what does it mean to create a **permanent and sustainable human base** on the Moon?

For the great lunar adventure, **infrastructure, artificial intelligence, robotics, connectivity, services and operations** are needed, all skills that Leonardo can make available.

On the infrastructure front, **Thales Alenia Space** (Thales 67%, Leonardo 33%) is at the forefront to contribute to the construction of the **Lunar Gateway**, the lunar space station of the **NASA Artemis** programme, with the task of providing various pressurised modules where astronauts will be able to live and conduct their activities (HALO, first housing module to be launched in 2024; I-HAB, international housing module; ESPRIT communications and refuelling module). **Orion**, the spacecraft for astronauts, will be powered by photovoltaic panels and electronic units for power distribution supplied by Leonardo, while Thales Alenia Space is responsible for the creation of critical systems for the European ESM (European Service Module), in addition to the structure of the same. Thales Alenia Space has also launched a series of studies for the creation of an ecosystem suitable for hosting humans on the Moon: from habitats for the surface, both permanent and mobile, to modules for transport and logistics.

**Leonardo's robotic systems**, equipped with **advanced algorithms and artificial intelligence**, will also be able to provide great support for the creation of a sustainable "village" on the Moon. **Robotic arms and drills** will help build structures, but also dig and extract resources from underground. Leonardo holds a leadership role in space robotics, having already developed the drills for the Rosetta missions, ExoMars2022, and now PROSPECT for the Luna27 ESA-ROSCOSMOS mission, and designing complex robotic arms for the Mars Sample Return programme.

Finally, **Telespazio** (Leonardo 67%, Thales 33%), at the helm of an international consortium, has been recently selected by ESA for the study of an infrastructure for **telecommunications and lunar navigation**, to guarantee the constant contact of astronauts and robotic systems with the control centres, as well as a correct and precise positioning on the surface. The project is part of the Lunar Communications and Navigation Services (LCNS) initiative of the Moonlight programme and, among requirements, will analyse the possibility of making the system interoperable with LUNANET, the infrastructure that NASA is developing to support the Artemis programme.

**Leonardo**, a global high-technology company, is among the top world players in Aerospace, Defence and Security and Italy's main industrial company. Organized into five business divisions, Leonardo has a significant industrial presence in Italy, the United Kingdom, Poland and the USA, where it also operates through subsidiaries that include Leonardo DRS (defense electronics), and joint ventures and partnerships: ATR, MBDA, Telespazio, Thales Alenia Space and Avio. Leonardo competes in the most important international markets by leveraging its areas of technological and product leadership (Helicopters, Aircraft, Aerostructures, Electronics, Cyber Security and Space). Listed on the Milan Stock Exchange (LDO), in 2020 Leonardo recorded consolidated revenues of €13.4 billion and invested €1.6 billion in Research and Development. The company has been part of the Dow Jones Sustainability Index (DJSI) since 2010 and has been named as sustainability global leader in the Aerospace & Defence sector for the second year in a row of DJSI in 2020.