

SPACE EXPLORATION SYMPOSIUM (A3)
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O'SOL, FranceO'MOON: PROPOSING AN ARCHITECTURE AND APPLICATIONS FOR A LUNAR MODULAR
POWER INFRASTRUCTURE**Abstract**

While no manned missions have gone beyond Low Earth Orbit since the end of the Apollo Program, recent years have seen a renewed interest in manned exploration, and in permanent settlements in space. Companies and space agencies from around the world are now trying to reach the Moon again, with the aim of establishing a permanent presence. Notable examples include ESA's Moon Village proposal and the private teams competing in the Google Lunar X Prize.

The O'Moon project aims to provide one of the technological building blocks needed to establish and sustain such a permanent presence. It proposes the use of mobile, autonomous and deployable solar generators which will land on the lunar surface and automatically connect to each other in order to create a smart power network. This power infrastructure will then be available for use by subsequent robotic or crewed missions.

This paper provides an overview of the concept and the long-term view of the project with the aim of providing recommended next steps towards its implementation. It proposes a case study based on ESA's proposal to set up a base on a lunar pole and highlights several key aspects of the O'Moon architecture, including technical aspects of the generators but also organisational, program, business and legal aspects.

This paper discusses potential applications in the short term, such as exploration missions, and in the long term, such as resource extraction and utilisation. In doing so, this paper gives an assessment of the potential profitability of a business based on the utilisation of the O'Moon infrastructure as a utilities service.

This paper also discusses the benefits which some long-term applications could have for space exploration. These applications include using a future Moon base as a communications relay, monitoring space debris from the Moon, and tracking and mitigating Near Earth Objects from the Moon.

Ultimately, this paper aims to serve as an overview of the O'Moon project and a roadmap towards its implementation. It discusses some of the key technological enablers, some considerations regarding the timeline of the project's implementation, and its potential benefits for society and as a business venture. This paper is part of the O'Moon Youth Research Program, which led a series of studies centered on some of the key aspects of the project and including engineering, business, legal and organisational aspects of the project. It draws upon these studies to provide an overview and derive conclusions.