

24th IAA SYMPOSIUM ON HUMAN EXPLORATION OF THE SOLAR SYSTEM (A5)
Human Exploration of the Moon and Cislunar Space (1)

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DEVELOPING THE INFRASTRUCTURE TO SUSTAIN LUNAR EXPLORATION: THE THALES
ALENIA SPACE VISION

Abstract

Astronauts will return on the Moon surface after more than 50 years and this time to stay. This mission statement includes the desire to begin an adventure where the final goal will be the establishment of the needed infrastructure to support the life of humankind on the Earth' satellite and the generation of a circular economy recovering and exploiting available in-situ resources. But before the infrastructure is in place, there will be a transition phase from the first landing, where the activities will be more pioneeristic oriented to surface exploration, search of resources, and initial outpost development.

In this phase, that probably will last several years, the humankind will learn how to survive in the hostile lunar environment and to make use of local resources. Main objectives will be to establish good communications with Earth and build-up a logistic support capability.

The number of crew members will increase and the permanence on the Moon will increase from few days up to longer periods of time.

The long distance from Earth and the high costs to transport material from our planet will require a careful attention on how the future Moon bases will be constructed. The realization of infrastructures on the Moon will be based on criteria of modularity and preparation for growth capability to reduce transfer of materials from Earth and waste proliferation.

This paper will provide the vision of Thales Alenia Space on the development of the initial lunar infrastructure. Not only how the Moon outpost will evolve from a shelter capability to a village of pressurized elements required for living, perform experiments, produce food, travel on surface, but also what infrastructures will be needed to produce power and exploit Moon resources.