

SPACE EXPLORATION SYMPOSIUM (A3)
Interactive Presentations (IP)

Author: Mr. Clément Leclerc
ISAE-Supaero University of Toulouse, France

ENERGY, ISRU AND FOOD PRODUCTION MODULE FOR MOONVILLAGE

Abstract

Expansion is part of the human nature so the next step is the Moon. However, establishing a colony out of Earth is a very dangerous and complex mission, that's why the Moon Village's plan is divided in many steps: Moon mapping, resource tracking, robot deployments, village construction, human permanent presence in small scale such as research groups, and in large scale as colonization.

As for all space missions, oxygen, solar radiation, and threat of vacuum are serious problems. However space agencies demonstrate their capacities to handle them. Because of the 384 400 km between the Earth and the Moon, it's difficult to resupply the Moon Village as often as the ISS. Moreover each supply cargo costs millions of dollars, so each cargo must be lighter as possible. So the principle problem of the Moon Village is its resources independence, such as energy and food. In this context, if we consider a group of maximum 10 people and only few exchanges with the Earth, finding a way to maintain the energy production sufficient and feeding the lunar settlers are the new difficulties that space agencies will encounter. That's why this work proposes to evaluate the different consumption pole in energy of the Moon Village just as the food one.

This project also studies different way of production to solve these problems, using a combination of some in situ resources and Earth supply. So this work proposes the concept for energy production and different plants raising at the start of the lunar colonization.