

SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND  
DEVELOPMENT (D3)

Systems and Infrastructures to Implement Future Building Blocks in Space Exploration and Development  
(2)

Author: Dr. Nathan Going  
OpenLuna.org, Canada, nathan.owengoing@gmail.com

Mr. Paul Graham  
Kepler Shipyards, United States, paul@openluna.org

A PROPOSED OPENLUNA ANALOGUE AQUAPONICS MODULE FOR SUSTAINABLE MOON  
MISSIONS

**Abstract**

An OpenLuna (OL) Analogue Aquaponics Module (AAM) concept has been developed, and an initial prototype will be built in early to mid-2014. The concept involved adapting current knowledge in commercial aquaponics to fit an opaque semi-cylindrical structure approximately 4m by 10m with functionality in a lunar environment. Initial concept considerations included type of aquaculture and hydroponics systems to use, kinds of fish and crops to utilize, microgravity and low pressure environments, organization of internal space and building materials to use. Tilapia and catfish are candidates for aquaculture. Lettuce, tomatoes, and peas are candidates for hydroponics.

This concept and supporting structural build will offer a range of opportunities for the practical application of new and developing technologies targeted to overcoming the challenges of growing of food on the moon and Mars. The module will be tested outdoors in cold weather. Data will be gathered on crop yield, fish survival, and bacterial proliferation. Lessons learned from the Analogue Aquaponics Module will guide the design of its lunar counterpart.