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Author: Ms. Agata Mintus
Space is More, Poland, agata.mintus@gmail.com

Mr. Leszek Orzechowski
Space is More, Poland, orzechleszek@gmail.com

Mrs. Natalia Cwilichowska
Wroclaw University of Science and Technology, Poland, n.cwilichowska94@gmail.com

Ms. Joanna Jurga
Space is More, Poland, joannakjurga@gmail.com

DESIGN OF HYGIENE MODULE USING CLOSED GREY WATER CYCLE FOR LUNARES
RESEARCH STATION – MAIN ASSUMPTIONS AND APPLICATIONS**Abstract**

LunAres Research Station is an analog habitat located in Pila, Poland. The facility focuses on conducting medical and psychological studies on isolated teams up to 6 analog astronauts. The infrastructure of the habitat consists of isolated 250 square meter Extra-Vehicular Activity Area and 176 square meter habitat with eight modules including office, biological and chemical laboratory, mechanical workshop, gym, kitchen and storage, sleeping pods, common area, and a hygiene module.

In recent years during constant work on the improvement of the LunAres facility the decision was made to put emphasis on sustainable development. As a result a new hygiene module was designed and built. New installation allows for collecting grey-water as well as it's treatment and re-use according to ongoing researches. The module also includes a dry toilet that produces compost. The toilet is primed with a substrate for initiating composting – coconut husk fibres. This allows for extended collection pre usage in a hydroponic system. Installation is located in a 30m² mobile sea container equipped with basic hygiene installations and designed with reduced mobility users in mind. Additionally, there is an experimental space included, which can be separated from hygiene rooms to maintain specific conditions for potential hydroponic (or other growing systems) laboratory compatible with the water system in the module. All installations in the container are accompanied by separated flow meters for detailed monitoring of water usage.

The paper includes results from testing current facilities during new analog campaigns in LunAres. Grey-water module will be tested for water consumption levels as well as the psychological and physical impact on the crew members and potential impact of treated grey water on plants in hydro, aero and aquaponic systems.