Lunar analog facilities and energy projects at EAC

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Outline

- Introduction
- LUNA project
- FLEXHab project
- Energy project
Introduction

ESA and EAC

- Established in 1990;
- Home base of ESA astronauts;
- Training Centre for ESA flight elements and payloads of the International Space Station;
- Space Medicine Centre for astronaut medical support;
- Training Centre for ground controllers.
Introduction
Spaceship EAC

- **Energy Production & Storage**: Fuel cell + Stand Alone Power System (SAPS)
- **ISRU, Materials & Additive Manufacturing**: 3D printing with regolith
- **Simulation, VR & Analogue**: LUNA & FlexHab VR studies + VR robotic training
- **Radiation Shielding**: ISRU shielding
- **Robotics & Human Factors**: Human-robotic operations studies
- **Exercise & countermeasures**: Lunar gym
LUNA project

Current status (VR rendering)

External view

Internal view
FLEXHab project

Current status

- Future Lunar EXploration Habitat (FLEXHab);
- 1-day mission: crew size up to 4 people;
- Rack system with exchangeable experiments;
- Evolvable concept;
- More-COTS architecture.
Energy projects

Stand Alone Power System (SAPS) development

- Cooperation among commercial, research and institutional actors;
- Demonstrate and promote such an energy supply system;
- Provide a platform for studying operational and system aspects;
- In-house simulators development for analysis and real operations.
Energy projects

Concept for a lunar surface base

![Diagram of a lunar energy project cycle, showing the transition between shadow and light periods, with processes for hydrogen and oxygen production, water management, and power output and input through photovoltaic plants.](diagram.png)
Energy projects

Implementation at Cologne site
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