Lunar Outpost Sustaining Human Space Exploration by Utilizing In-Situ Resources with a Focus on Propellant Production

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Introduction

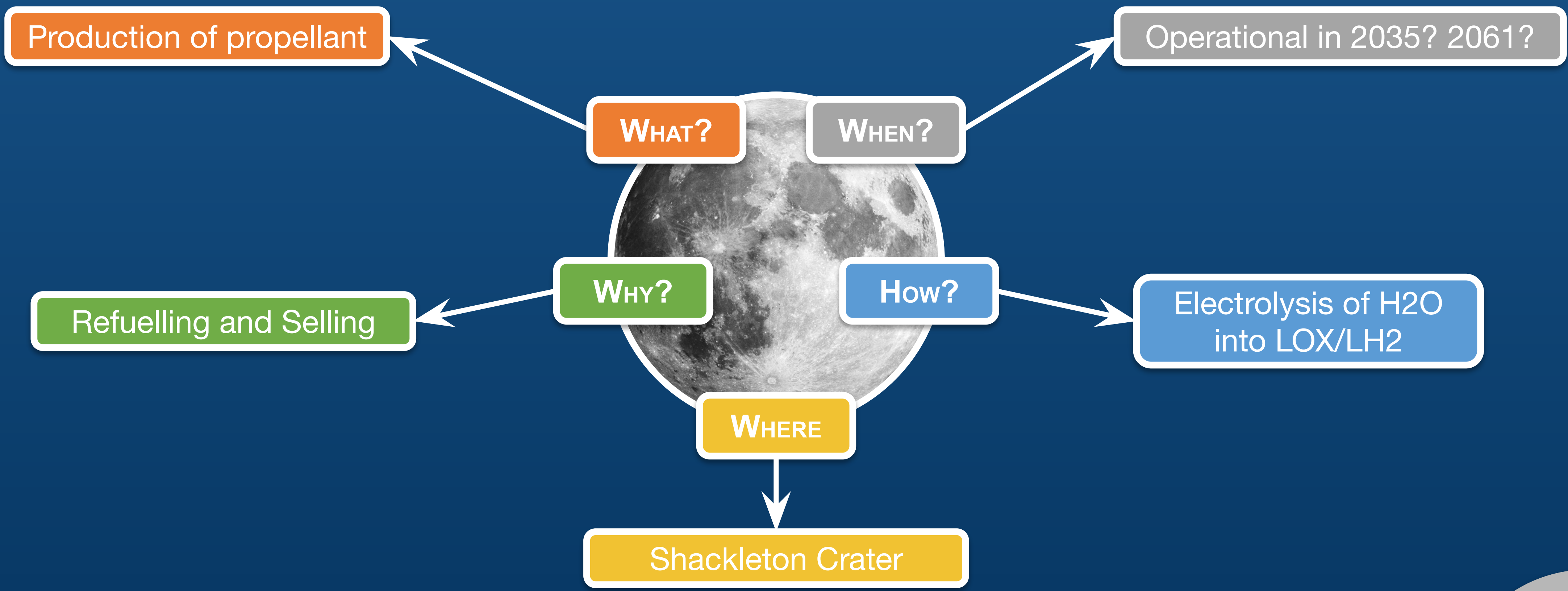
Turin → Toulouse → Leicester

- 3 universities
- 6 months: full-time split into 3 phases
- 39 students

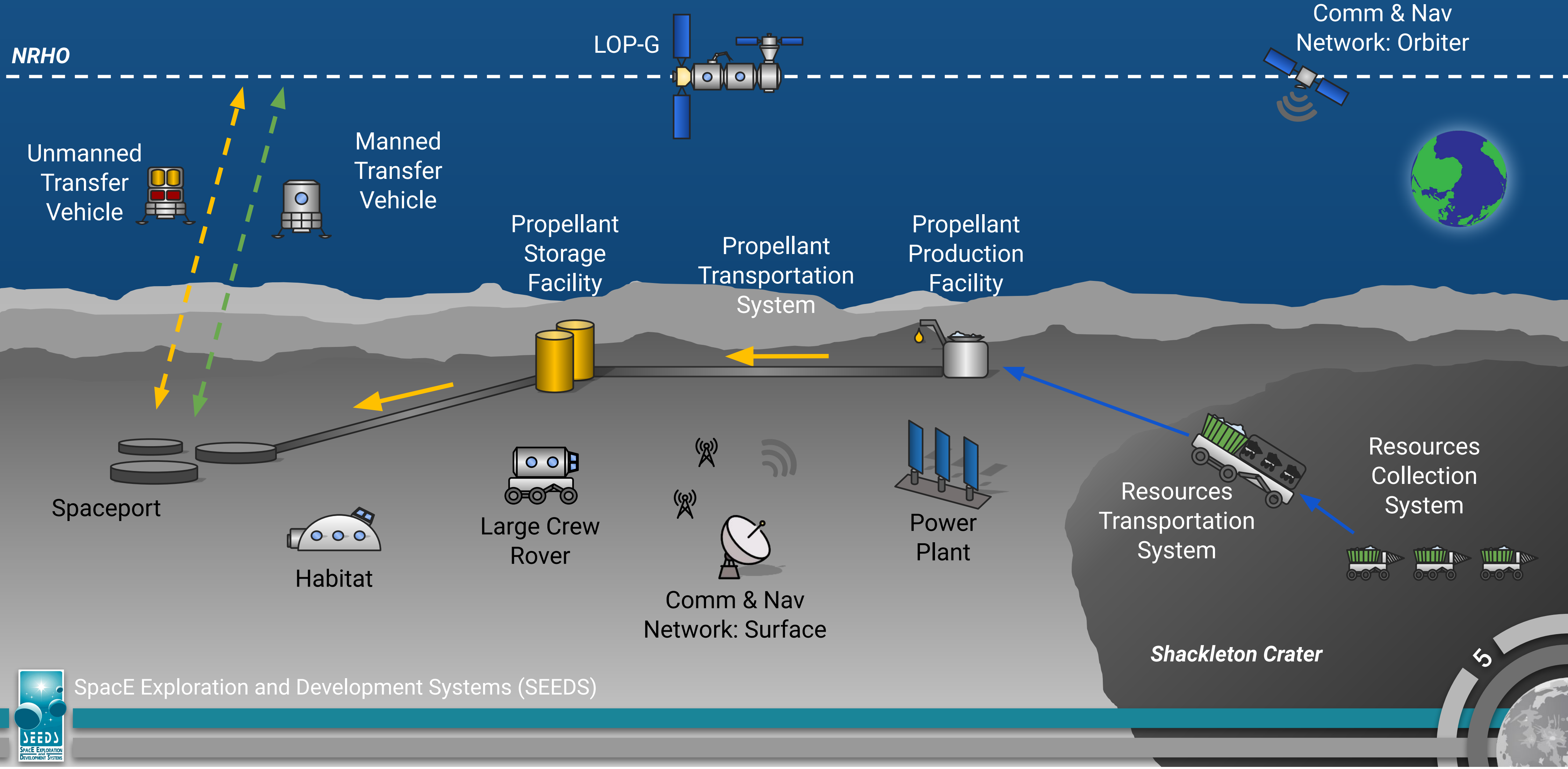
Introduction

"To produce propellant by exploiting lunar in-situ resources and utilising pre-existing systems, providing the propellant to support future human space exploration"

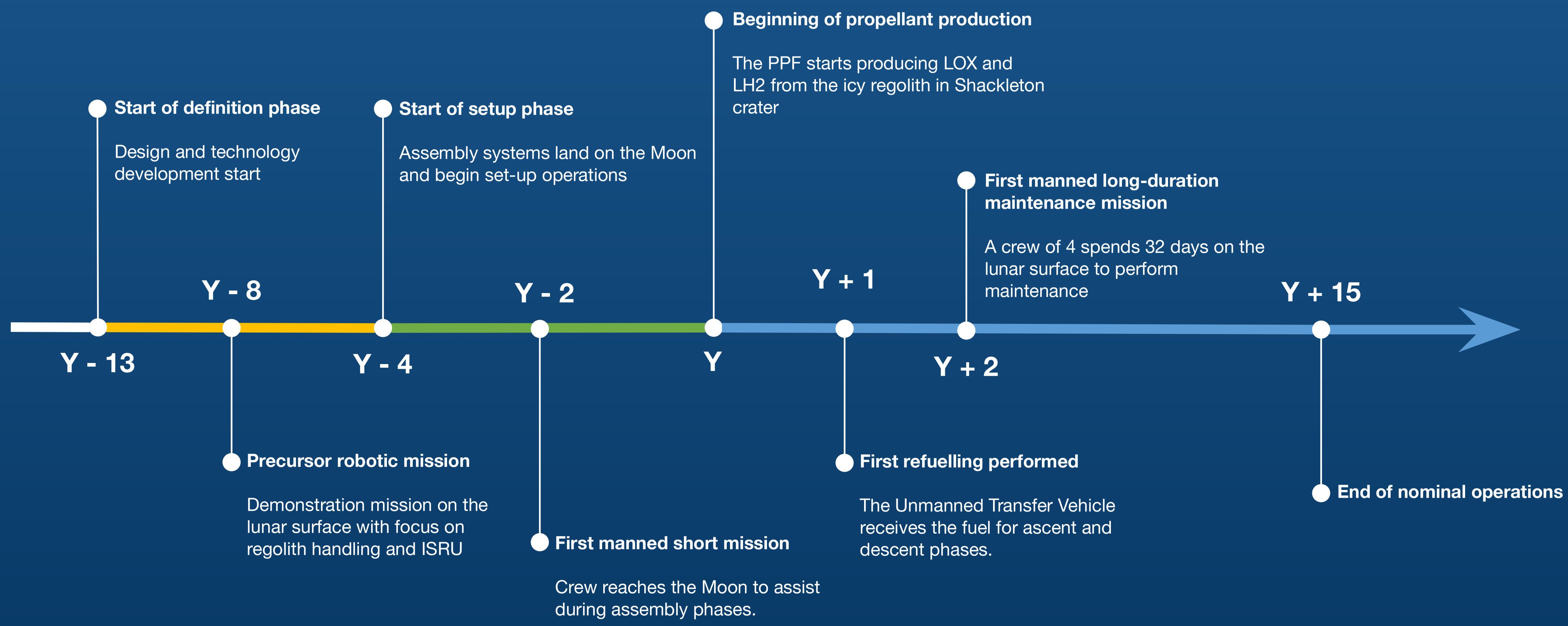
Mission context



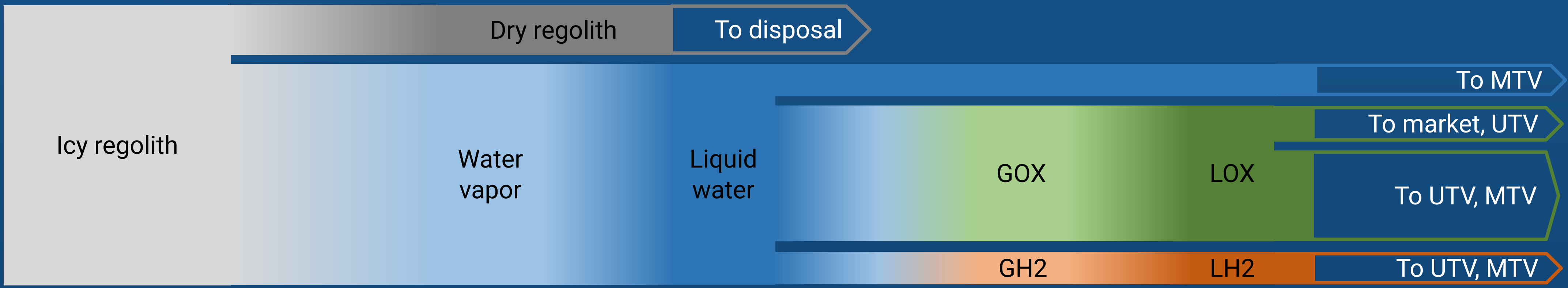
System of Systems Architecture



LUPO timeline

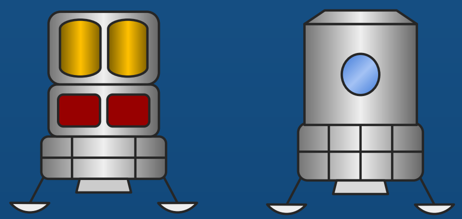


ISRU process

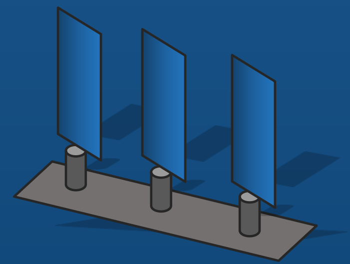


Collection and transport	Heating and separation	Condensation and filtering	Electrolysis	Cryocooling and storage	Transport
32 t/day 10 cm layer in Shackleton PSR	Rotating tube Solar concentrator T up to 400K	High power demand Remove regolith traces	120 kg/d H2O 110 kg/d H2 930 kg/d O2	LH2 @ 20K LOX @ 90K	Lines to Storage Facility and to Spaceport

Technology Developments



Propulsion and Landing Technologies and Support



Power Generation and Management

Large Scale ISRU Technologies for LOX/LH2

Robotic Systems and Automatisation

Conclusions

Enhancing
Human Space Exploration

Lunar services
Mars missions

Technology Development
Profitability

Thank you for your attention!