

## Laser spectroscopy as a payload for space applications

### Development status

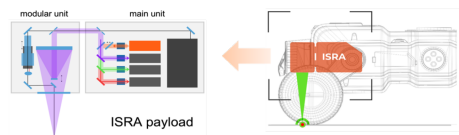
#### Phase 2

**Feasibility study.** There is a realistic design of the technology and the initial tests in the laboratory are leading to the specification of the technology requirements and its capabilities.

### IP protection status

### Partnering strategy

*Collaboration, licensing*



### Institution



### Challenge

With the gradual advancement of human technologies for space exploration and the increasing presence of humans in space, there arises a need for various resources, leading to the creation of new markets. This opportunity is defined by progress in celestial body exploitation, particularly in the upcoming colonization of the Moon. The rising number of lunar robotic missions is designed to enhance and expand the utilization of In-Situ Resource Utilization (ISRU), specifically for the localization of water (through the detection of volatile elements), and metals for further production. Therefore, in-situ exploration is gaining increasing interest, with a rover equipped with analytical instruments complementing remote exploration conducted by passing satellites.

### Description

The main goal of the project is to develop an analytical system based on Laser-Induced Breakdown Spectroscopy (LIBS) to address the challenge of in-situ geological exploration of celestial bodies. LIBS technology has already demonstrated its capabilities as a payload on Mars rovers, and its use on Lunar rovers is anticipated. The research team at CEITEC VUT, in collaboration with Lightigo Space and its research and development team, is actively involved in developing state-of-the-art laboratory equipment based on LIBS. This equipment will enable LIBS simulations under lunar atmospheric conditions. The development of the payload follows the successful use of LIBS systems for remote analysis in industrial processes. The project will allow us to focus on further payload development for lunar regolith exploration.

### Commercial opportunity

The successful development of the payload in collaboration with industry partners will open up opportunities for commercialization, not only for space exploration purposes but also for terrestrial applications, such as the mining industry. These activities will be addressed during the payload development process, and a detailed market study will be conducted to define potential commercial uses and assess business

feasibility.