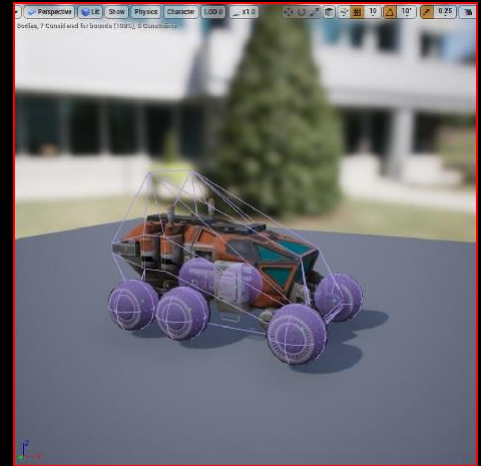




# Virtual Space Airlock Project

This project aims at developing 3D objects that will be part of an airlock used in virtual reality (VR) Moon-like environment.

<b>Laboratory:</b>	SKIL, IIG, ENAC School
<b>Number of students:</b>	1
<b>Section:</b>	All (Strong coding skills)
<b>Status:</b>	Available (Spring 2022)



## Global description

Asclepios aims at organizing a simulated space mission in an existing infrastructure for an inhabited base. Therefore, by design, the mission will take place on Earth, where many parameters are different than on other celestial bodies. Among the tasks performed in a space base, astronauts must leave the base for Extravehicular Activities (EVA). This project will utilize VR in combination with physical objects to improve the realism of the airlock and EVA procedures. It will allow the analog astronauts to experience the constraints of extraterrestrial environments in greater realism during the Earth-based simulation.



## Project goal

The Airlock is a key element of an extraterrestrial base as it is the transition space between the inside of the base and the outer environment. This project will focus on the development and design of an airlock with the goal of simulating as realistically as possible the different base operations required for the human exploration of the Moon or Mars. VR will be used in conjunction with the physical objects in the airlock such as the airlock door. The VR simulation should simulate the appearance of the moon and allow astronauts to train with different scenarios, such as nominal pressurization and depressurization of the airlock, emergency depressurization, or other failure scenarios. Other basic scenarios such as the opening and closing of the physical door onto the surface of the Moon could be implemented while the mechanical mechanisms such as pumps could be displayed in virtual reality. Finally, in collaboration with the SKIL, the simplified construction of specific elements, systems or part of the airlock will be required to manipulate real objects that coincide with the virtual reality.

## Description of the student's work and mission

1. State of the art on the use of Virtual Reality in a simulated space mission.
2. State of the art of the protocols used in the airlock (decontamination, (de)pressurization), already existing airlocks, physiology and safety requirements.
3. Choose an airlock allowing for ease of building
4. Choose elements to be implemented in the VR simulation taking into account real objects to be made
5. Realization of the virtual Airlock and its real parts, interaction of the astronaut with the different systems, extra scenarios and failures
6. Protocols describing the interactions needed with the system in case of failure or designed situations
7. Practical evaluation
8. Clear description of the different step and procedures
9. Preliminary presentation and final report.

**In order to conduct this project, the student will need to have strong coding skills (C, C-sharp), be curious and autonomous, and be able to work in a team.**

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