

Initiation à la recherche: SAUC'E challenge

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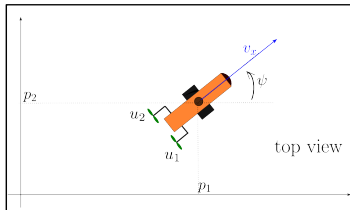
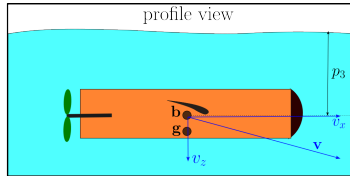
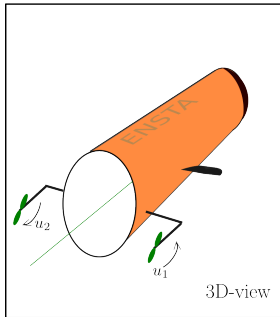
1. SAUC'E

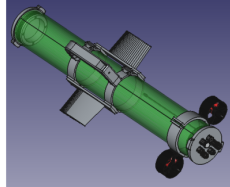
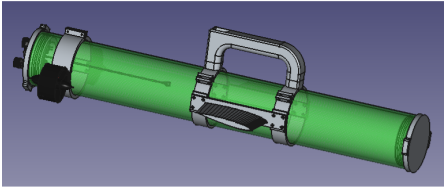


SAUC-E <https://de.wikipedia.org/wiki/SAUC-E> stands for “Student Autonomous Underwater Challenge – Europe”.

- It is a competition for university student teams across Europe
- Autonomous underwater vehicles (AUVs) operate underwater without remote control or human steering
- Push forward capabilities in underwater autonomy, sensing, navigation, mapping
- The competition was held annually in active years and was hosted at various locations
- A journal paper has to be proposed for each team

2. Subsurface





Mechanics

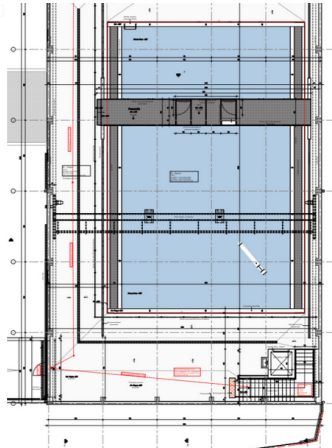
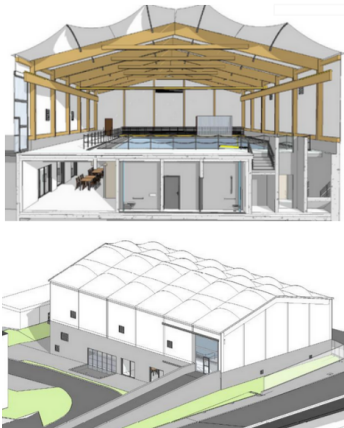
- The robot has two actuators, here propellers to move forward or turn horizontally
- The robot has a positive buoyancy, meaning that the resultant of the Archimedes force and the weight is a constant vertical force f_a oriented upward
- Two wings located laterally exert a force downward
- The center of gravity $\mathbf{g}$ is just below the center of volume $\mathbf{b}$.

Sensors

The robot has

- a GPS available in the pool
- A pressure sensor
- An IMU (magnetometer, gyro, accelerometer)
- A camera ?

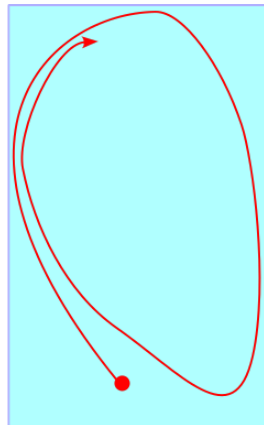
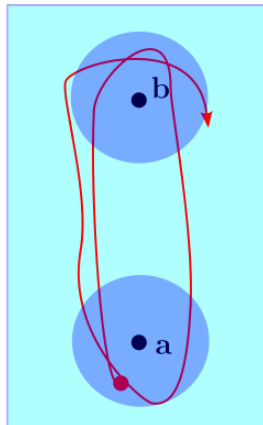
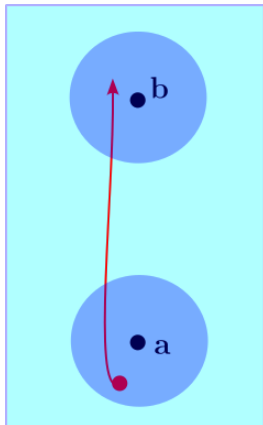
3. Challenge



Bassin robotique

All missions have be done autonomously.

- **Challenge 1.** Immersion and surface. The robot has to start at the surface point **a**, dive 1 meter deep and then has to come back to the surface at **b**
- **Challenge 2.** Go from **a** to **b**, then from **b** to **a**, and repeat as many times as possible. Between **a** and **b**, the robot should be underwater.
- **Challenge 3.** Perform a stable cycle, underwater. No GPS can be used. Magnetism could help.



Challenges 1,2 and 3



<https://www.google.com/maps/@48.283553,-4.4182596,288m/>