DECEL training poster – Team Chenonceau

Underwater objects detection and form recognition through US system

Enrico Rizzi(UFE), Jaime Leal(UAH), Jiacheng CHEN(UT), Jorge Pais(UP)

Abstract
An FPGA (RedPitaya board) based US(UltraSonic) acquisition system has been developed with a HW-SW application in order to enhance the measurements. The US sensor is attached to the servomotor and moving in a radial way. A high-level Python based UI (User Interface) has also been implanted to simplify the control.

Project context and objectives

Create a US based system to detect underwater objects
Obtain dimension and position of the object
Distinguish materials with different acoustic impedance
Design a high-level Python User Interface

Measurement example:
An air bubble exists inside the water balloon, which creates an air-water interface with different acoustic impedance. The results below show that we have well detected the air bubble. The correction algorithm also allows us to locate the position.

Challenges
Setting proper sampling frequency
Applying correction algorithm (angles, distance, threshold)