Robotic Iceberg Sentinels (RISE)

Mingxi Zhou and Chris Roman

Graduate School of Oceanography, University of Rhode Island

Project website: https://soslab.wordpress.com/rise/

URI Ocean Robotics Group GitHub: https://github.com/uri-ocean-robotics

Abstract

The RISE project seeks to develop a multi-robot systems for mapping floating icebergs and surrounding water properties. The project will advance the fronts in robot navigation, path planning and coordination. For scientific impact, this project will provide critical measurements for correcting and validating iceberg melting and drift models, which could be utilized to project large scale impacts (e.g., sea-level rise and ecosystem changes) posed by icebergs originated from ice shelves.

Key problems:

- System development for sustained usage
- Localizing surface and underwater robots in a moving frame
- Iceberg following autonomy
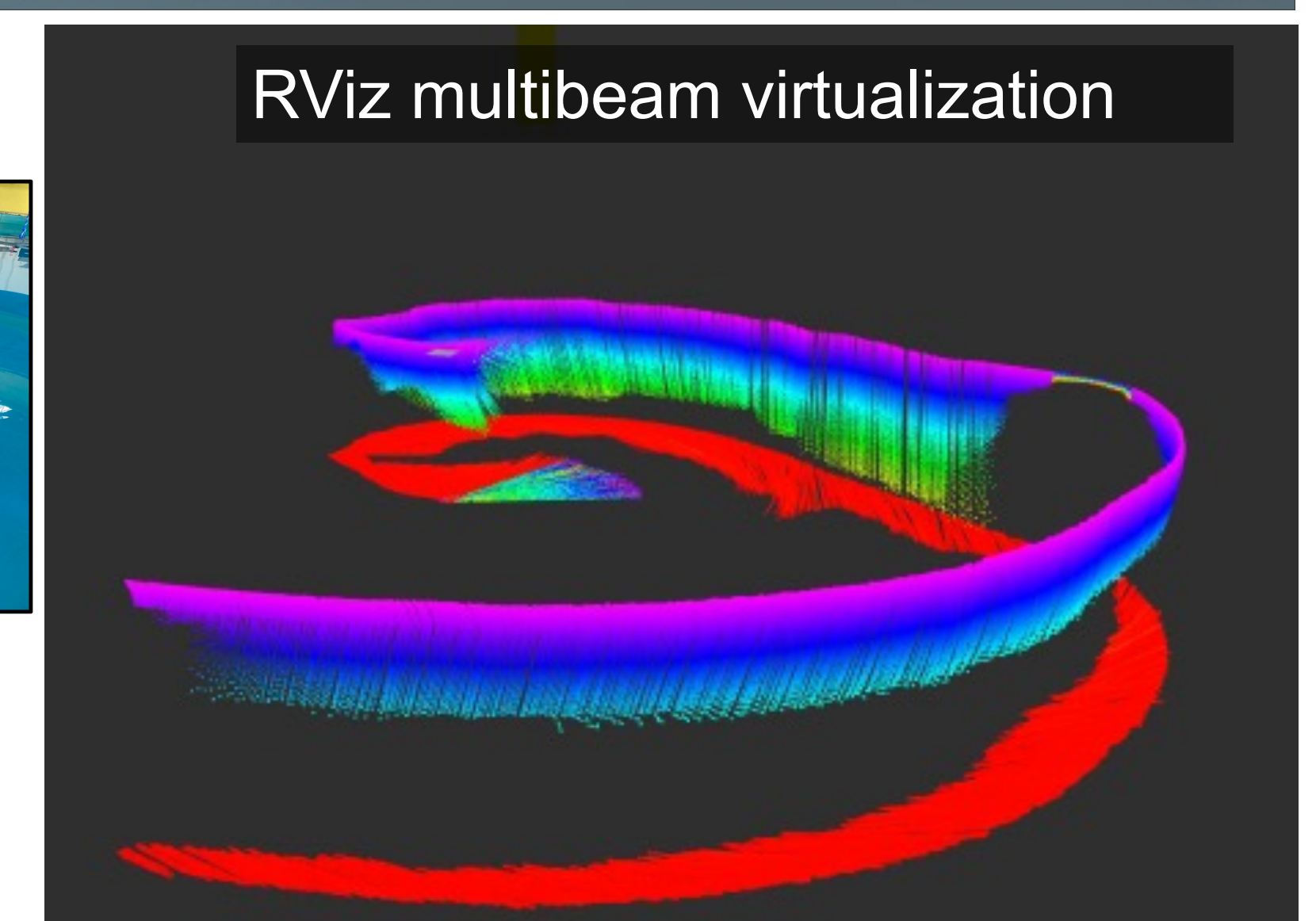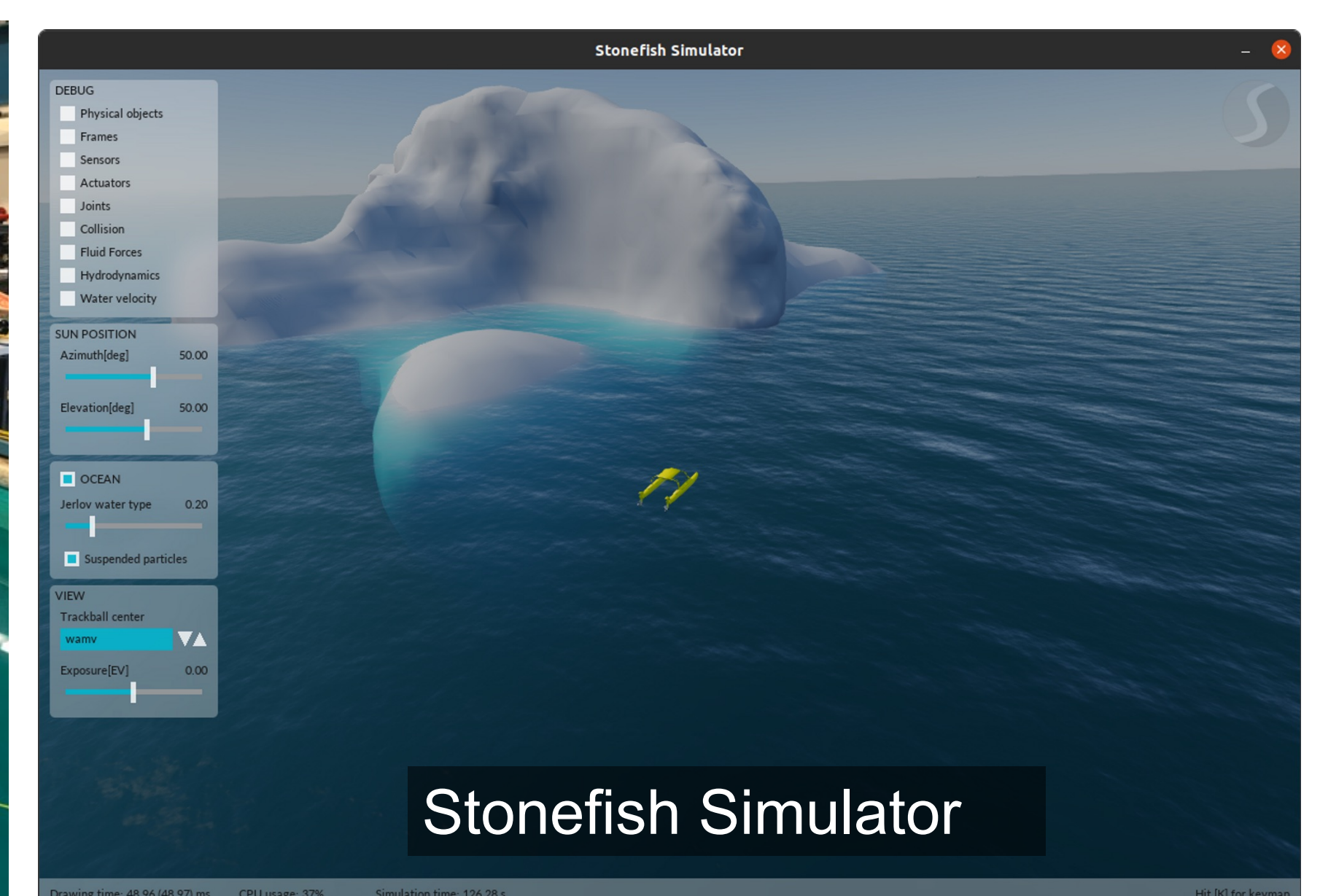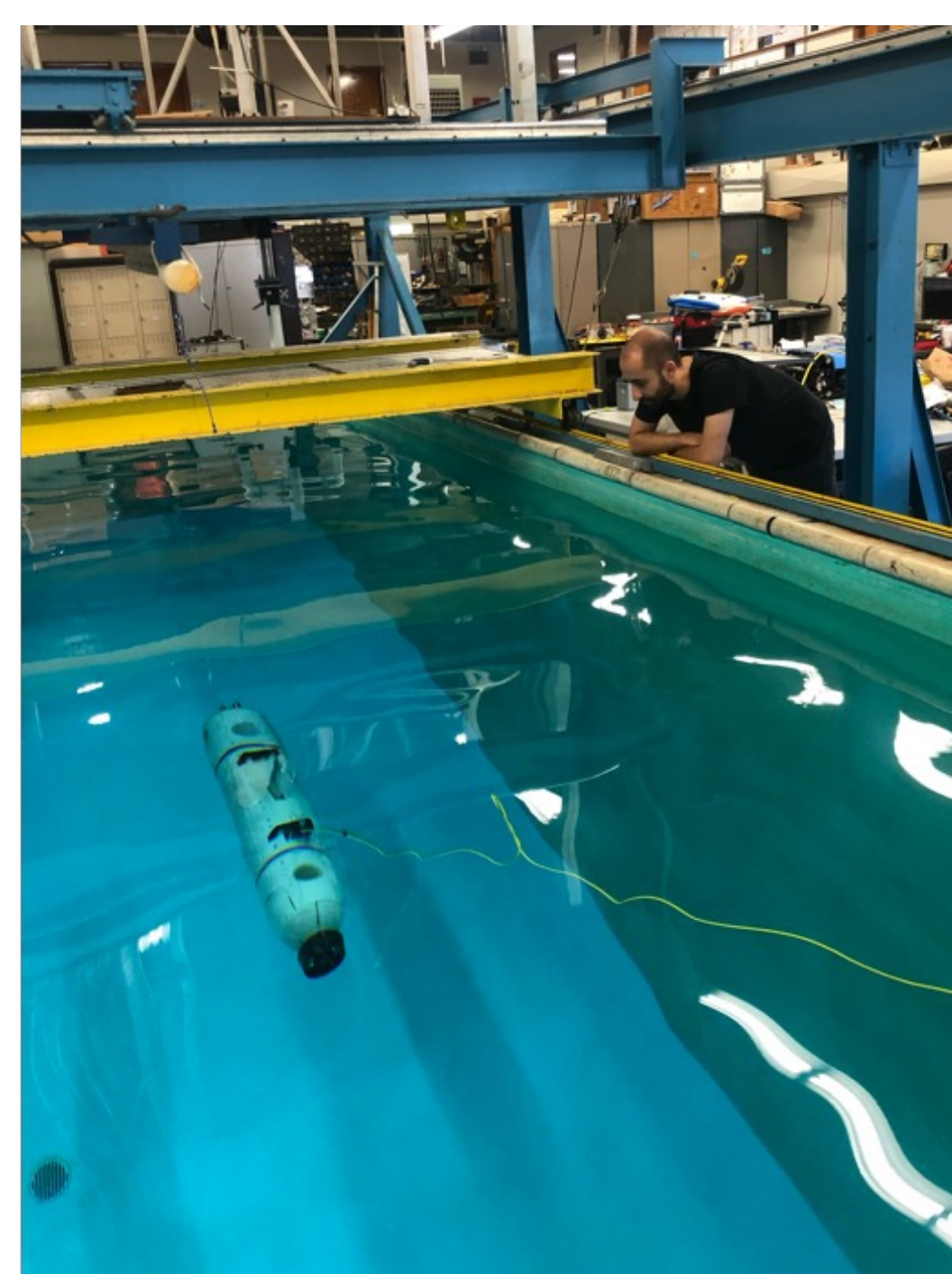- Inter-vehicle coordination

Key innovations:

- Sustain and open AUV (hardware and software)
- New localization fusing multi-vehicle perception
- Two new inter-vehicle coordination strategies under constraints
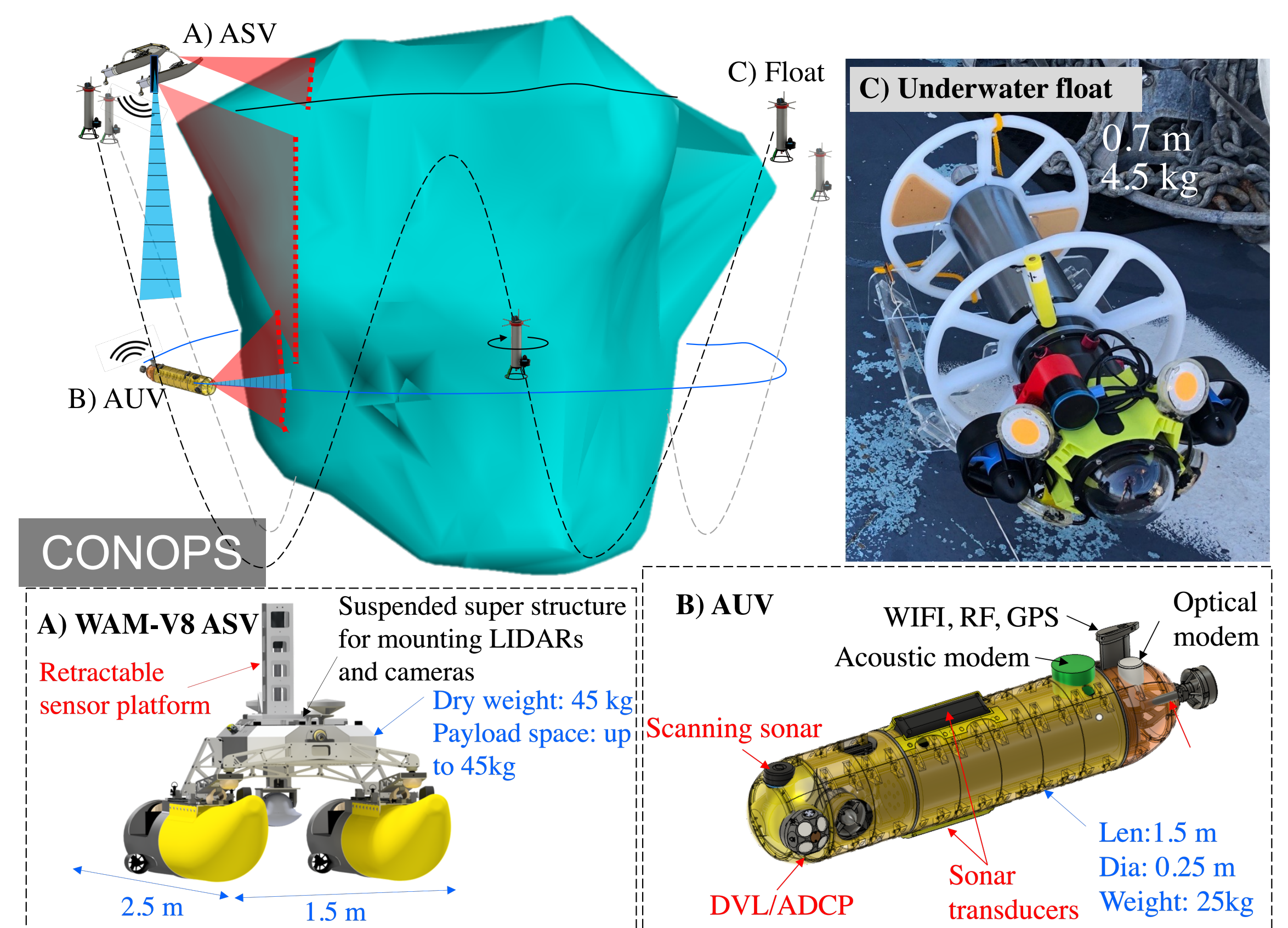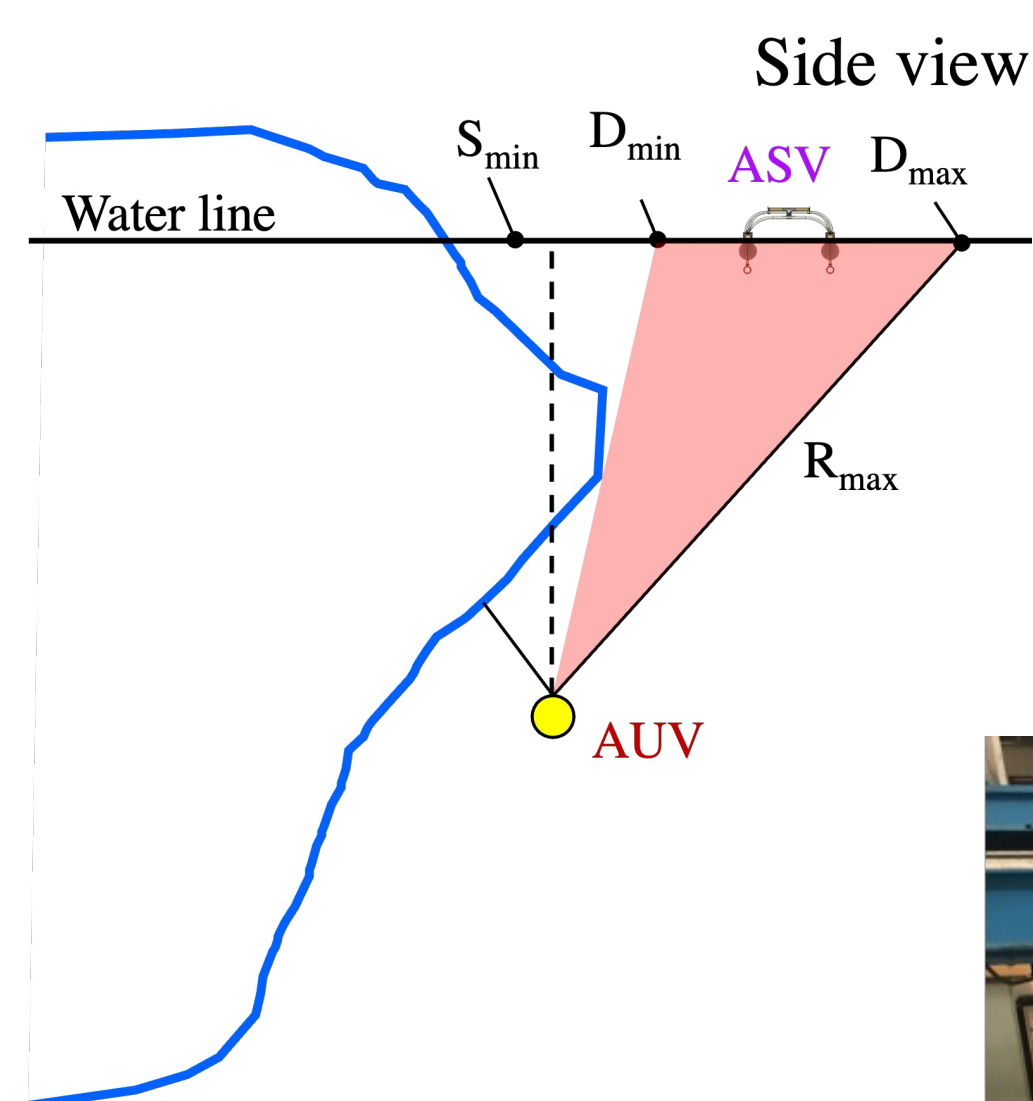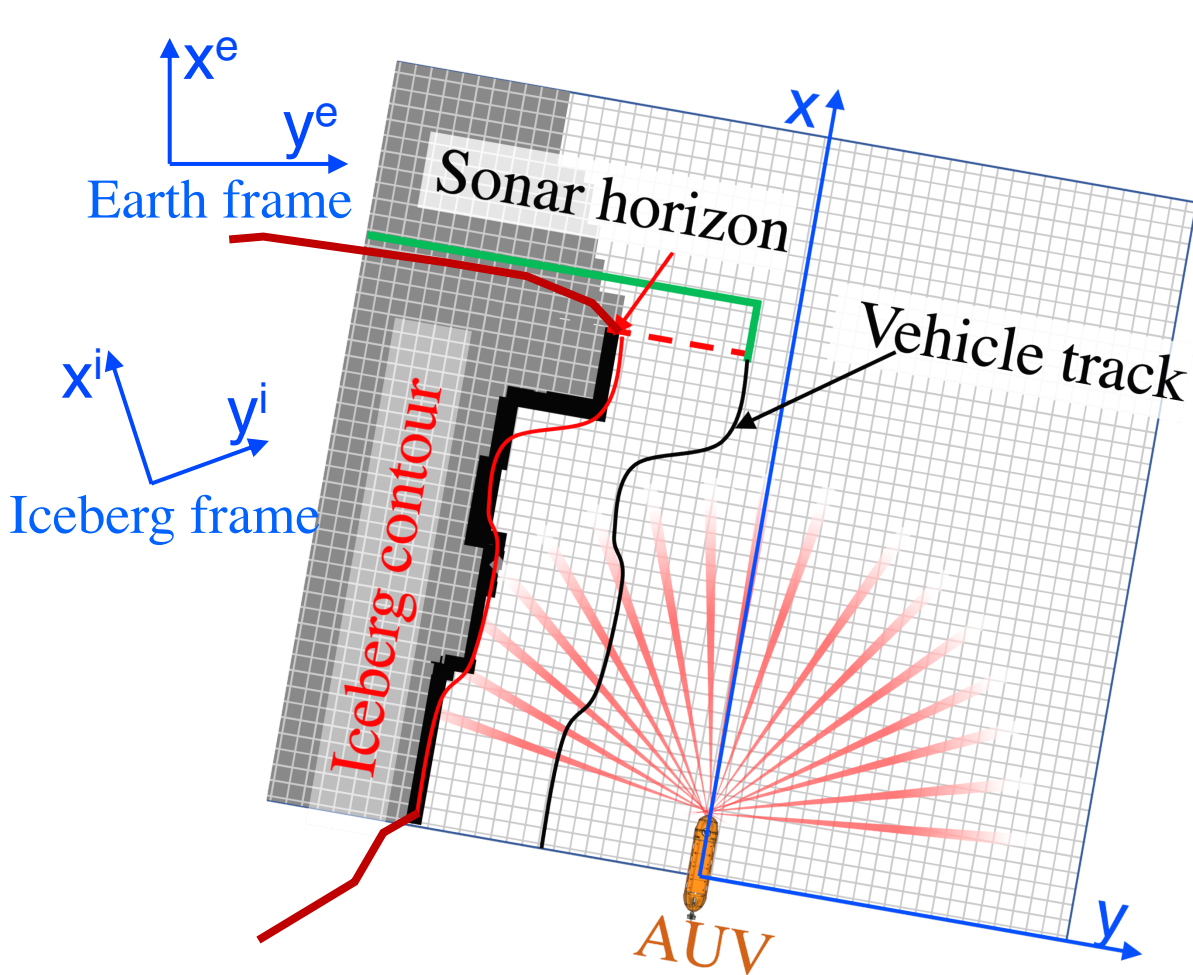
Key progress in 2022:

- System development
- Virtual environment setup
- Coverage mapping path planner
- Recruiting

Stonefish Simulator

Broader Impacts:

- 2 undergraduate students
- 2 graduate students and 1 postdoc
- 2 early-career faculties
- 2000 visitors in Science Saturday
- High school marine robotics workshop

Outreach setup

Small ASV outdoor test

RViz multibeam virtualization