

Cooperative underwater glider operations supported by ASVs

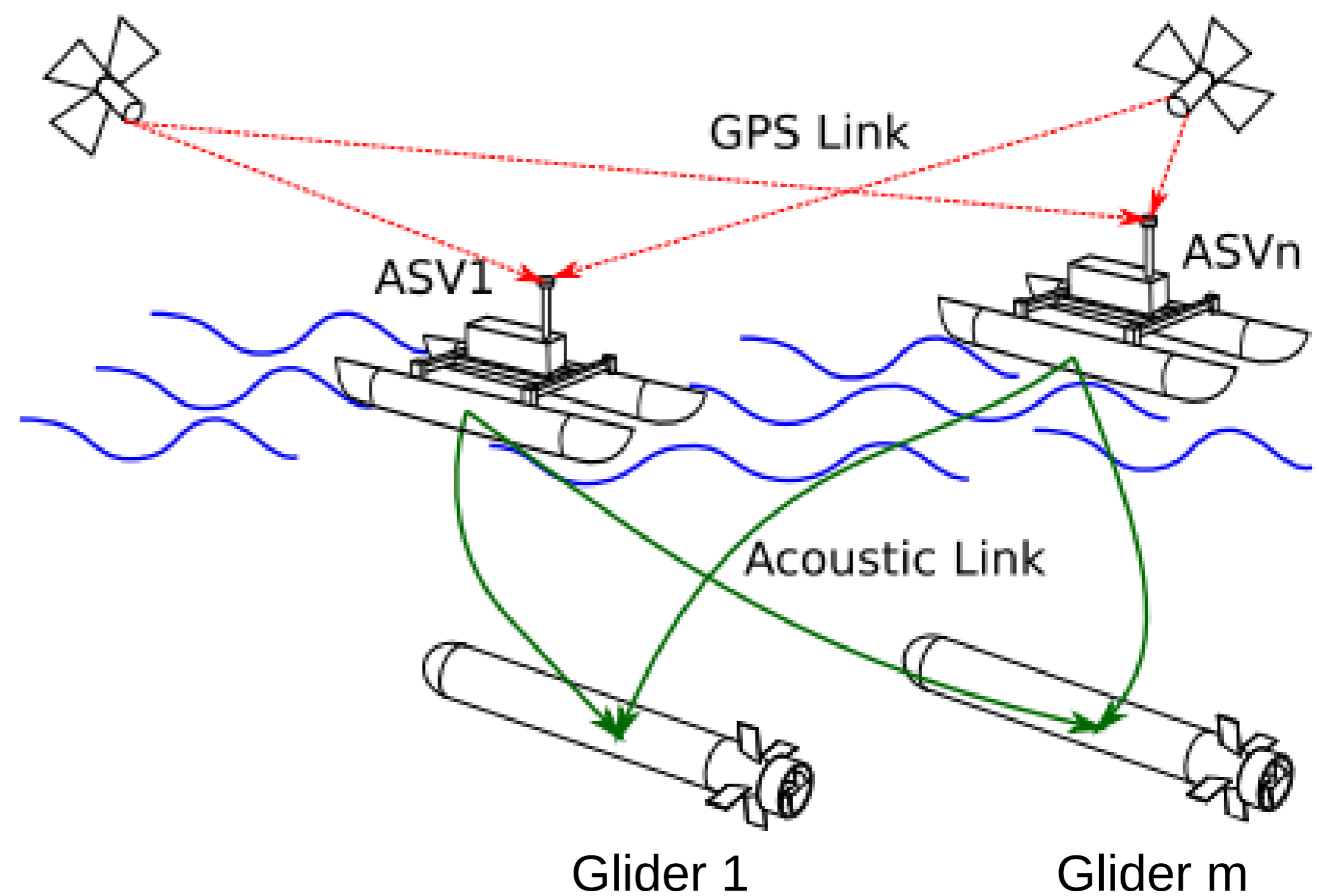


Sergei Chashnikov

Instituto Superior Técnico Lisboa – Université de Toulon

CONTEXT AND MOTIVATION

- Underwater gliders are extremely useful tools for **ocean exploration and monitoring**
- Using a **group of gliders** significantly increases their efficiency
- To maintain the required relative positions, gliders should be able to **locate themselves precisely** in space
- One of the ways to provide glider positioning is to use **multiple ASVs capable of measuring glider bearing angles**
- The accuracy of the measurements **depends greatly on the trajectories of the ASVs**



PROPOSAL

1. Develop **optimal cooperative path planning algorithm** (wrt gliders motion measurements) for ASVs. Methods from estimation theory and reinforcement learning will be verified
2. Develop **cooperative path following algorithm** for gliders
3. Run **HIL simulations**
4. Run **field tests** in a protected environment

REFERENCES

1. Daniel L. Rudnick, Ocean Research Enabled by Underwater Gliders, Annual Review of Marine Science, vol. 8, pp. 519-541, 2016
2. M. Fernandes & S. R. Sahoo & M. Kothari, Cooperative Localization for Autonomous Underwater Vehicles - a comprehensive review, arXiv, 2307.06189, 2023
3. Zhou, Xinyuan & Wu, Peng & Zhang, Haifeng & Guo, Weihong & Liu, Yuanchang, Learn to Navigate: Cooperative Path Planning for Unmanned Surface Vehicles Using Deep Reinforcement Learning, IEEE Access, pp. 1-1. 10.1109/ACCESS.2019.2953326, 2019