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Launch and Recovery for Ship-Deployed Autonomous Underwater Vehicles

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Autonomous underwater vehicles (AUVs) are increasingly being used for underwater survey and exploration missions. The expanding mission scope for AUVs highlights the need for a long-endurance operational capability, which mainly depends on propulsion efficiency and battery capacity. For most deployments, AUVs are launched and recovered from a mothership. While the launch process is relatively straightforward and automated, the recovery process is more risky and conventionally involves man-in-the-loop intervention to ensure that the AUV can be recovered safely. The use of submerged docking stations permitting battery recharge, data transfer and vehicle recovery offer a means of enabling persistence while also reducing associated deployment/recovery costs and risks. Autonomous docking with a submerged dock towed behind a ship is however complicated by the presence of currents, wave action, propeller wash and by the tow behaviour, all of which combine to cause disturbances that create misalignments in pose between the dock and the incoming vehicle. A robust docking guidance system is identified as a core and crucial component for ensuring successful AUV docking. This paper proposes an efficient and universal docking guidance framework that can help to address the limitations of existing docking guidance solutions.

Primary author: Prof. SAMMUT, Karl (Flinders University)

Presenter: Prof. SAMMUT, Karl (Flinders University)

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