

Team NYCU's Unmanned Surface Vehicle Mission Surpassed Expectations and Earned a Well-deserved Third Place in the 2022 Maritime RobotX Challenge, thanks to Their Innovative Approach and Meticulous Planning

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Team NYCU participated in the 2022 Maritime RobotX Challenge held in Australia from November 11-17, 2022. The competition, organized by the international unmanned system association, RoboNation, and co-sponsored by the Australian Department of Defense, attracted 20 universities from around the world. The Office of Naval Research (ONR) of the United States Navy initiated the competition in 2012 and continued to sponsor the 2022 event. Team NYCU showed excellent on-site performance and mastery of the new tasks in the finals, standing out from the other finalists, and achieving a remarkable third place.



The Maritime RobotX Challenge is a biennial competition. In 2018, Team NCTU from National Chiao Tung University delivered an outstanding performance, achieving fifth place and receiving the award for the best single-day performance. In 2022, a team from National Yang Ming Chiao Tung University participated in the competition once again. Led by Associate Professor Hsueh-Cheng Wang from the Department of Electrical Engineering and the Institute of Electronics, a cross-disciplinary team of 14 students from the Department of Electrical Engineering, Institute of Electronics, and Robotics Program completed autonomous surface missions using the software and hardware design of unmanned surface vehicles and drones.

All teams participating in the competition were required to use unmanned aerial vehicles and unmanned surface vehicles to complete various tasks. These tasks included passing through entrance and exit gates, taking off and landing on platforms, capturing waterborne targets, using hydrophones to confirm the location of underwater sound sources, following paths accurately and crossing floating buoys to enable the vessel to enter from a designated location and successfully complete the mission.

During the competition, both unmanned aerial vehicles and unmanned surface vehicles must pass strict safety checks before each takeoff and launch. Completing the designated tasks qualifies teams to enter the semi-finals. In the finals, all sub-tasks must be completed within the specified time frame to earn points. Apart from the practical tasks, teams must also present their system design through written and oral reports. The final ranking is based on the accumulation of all points.

Assoc. Prof. Hsueh-Cheng Wang expressed that taking part in the competition is an ongoing learning process that equips students with skills that are not easily gained in the classroom. He added that students learn how to establish objectives, tackle challenges, cooperate in large teams, and adapt to unexpected situations. Before the contest, he inquired about his students' expectations. Initially, they lacked confidence, but during the competition, they consistently emerged as frontrunners. Wang believes that the most significant benefit of participating in such contests is learning how to develop confidence while working with international teams.

The team members have mentioned that the preparation schedule before the competition was rigorous, requiring them to work overtime on weekends. During the contest period, everyone worked diligently, resulting in less than 5 hours of sleep each day. Despite the difficulties encountered, the team members aided each other and found solutions, leading to the discovery of more effective strategies. Ray, the team leader, expressed his satisfaction with their joint effort, saying, "It feels fantastic to work together! Our emotions fluctuated with the progress of the competition, from the uncertainty before departure, the nervousness in the initial stages of the contest, the thrill of entering the finals, to the gratification of completing the competition. However, our determination to do the best we can remained constant.

Team NYCU would like to sincerely express our appreciation for the support provided by our alumni, Dr. Kuan-Ting 'Peter' Yu at XYZ Robotics, Lungteh Shipbuilding Co., and K-Best Co., who generously donated funds towards our travel expenses.

More details: <https://www.youtube.com/watch?v=Tw5rHTJ2Mac>