

Tech Talk

Robotic Submersion

► by Henry North

Welcome to the very first segment of Tech Talk, where we will take a look at one of the many technologically inclined clubs on our campus and see what they get up to outside of class. The first club that we met with was the Autonomous Underwater Vehicle (AUV) Team, headed by their president, Albert Cheng, a senior in the Electrical Engineering Technology major. Joining him in our discussion on the team was the acting Software Lead, Vinh Nguyen, who is a Mechanical Engineering major in his junior year. The AUV Team represented the university this summer in the 2016 International RoboSub Competition.

Henry North: What exactly does the AUV team do?

Albert Cheng: The main focus of the team is to get people interested in robotics in general and, in addition to that, to actually further students' abilities to apply teachings learned in the classroom. Learning theory is great, but if you don't know how to apply those theories, it doesn't help. The AUV team is here to be that source for applying what you've learned in class.

Vinh Nguyen: I can actually provide evidence that that has happened. On the second day of the competition, I was staring at all of the guys assembling the sub and then, all of a sudden, it hit me that



this was what I had just learned in Circuits I, and I was watching that knowledge being applied right in front of me. It just blew my mind.

HN: What are some of the experiences you've had or skills you've gained from being on this team?

AC: The team has helped me with developing leadership skills. While I've been the president, it's really built my self-confidence up. With being able to actually have and lead a group and organize events, I think the AUV team gave me the confidence to know I'm able to handle more leadership roles in the future.

VN: I joined this club in about May of 2016 and the competition was in late July, so during those three months they threw me into the software team and went through the steps to code a robot from nothing, to use a basic camera, and to be able to

program the vectors that the motors used. It was a gigantic learning curve for me, especially since I do not have a background in coding.

HN: Tell me more about that competition you went to.

AC: Our competition was in San Diego, California and had somewhere from 42 to 48 teams entered. It's an international competition that focuses on underwater robotics. Underwater robotics is more difficult compared to ground-based or air-based robotics. You're very limited to where and how you can test. Water isn't really the greatest medium to work with when it comes to electronics, so it adds a layer of engineering that you don't generally see elsewhere. Our sub has to be completely waterproof, not water-resistant or repellant. You can't get water inside the sub or else you don't have electrical systems anymore and you don't have computers.

The overall competition consists of us doing different missions, and one of the primary missions that less than half of the teams normally complete is going through the start gate. You have to go through the gate and track buoys and stuff like that. The competition revolves around acquiring points and the more points you get, the higher your chances are of getting moved to the semifinals and finals. We ended up around 22nd place with the resources that we have.

HN: Looking around the workshop, I can see many banners related to different events, so is it safe to assume the team has been to previous competitions?

AC: Yeah, the current team has been to three. The first competition we didn't actually enter, we just sent scouts to see how the competition worked. The following year is when we actually started competing, and this year is when the team really

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started to grow. The first year we had about 2-3 people on the team, the second year was about 7-8 and this year, we had 15 people. As we get more interest in underwater robotics, I can see the team growing in future competitions. Hopefully, in the future, we'll be able to do not just underwater robotics, but other robotics competitions as well.

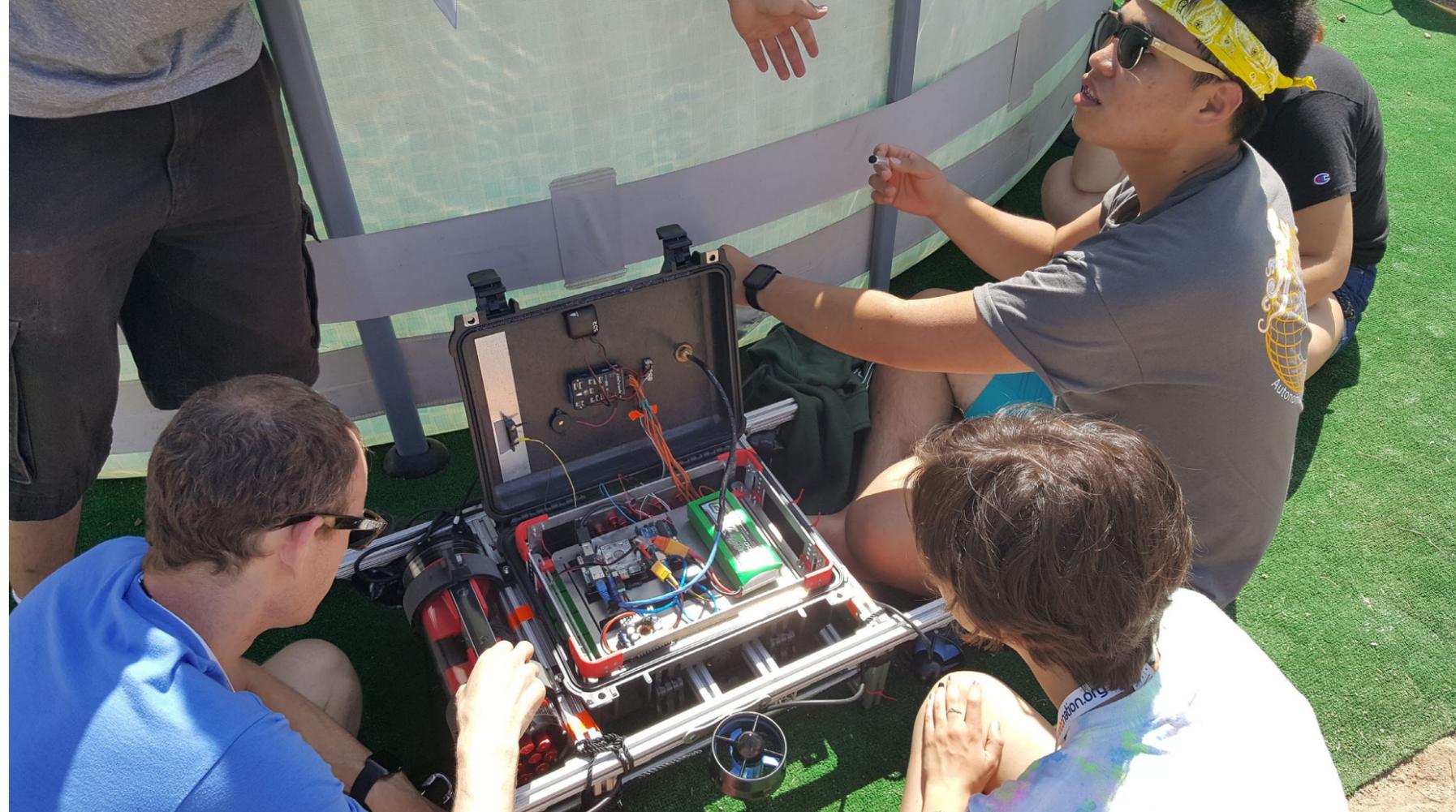
HN: Is there a minimum or maximum limit to the number of people who can participate in the competition?

AC: No, there isn't a fixed number that the competition limits you to or requires you to have. The team can be as big as we need it or want it. In the future, I'm hoping we can take

as many people as we can to this competition because it's very interesting and very intriguing. When you have nothing to focus on but a competition for a whole week, you get a lot accomplished in that small timeframe. You learn a lot and you're able to talk to so many different teams from so many places, like Russia, China, and Singapore. The competition is very academic and open; everyone is willing to help each other.

HN: How many vehicles can a team enter in a competition?

AC: Everybody assumed in prior years that you could only enter one vehicle in the entire competition. That's not the case; in our rules,



there is no limitation to how many vehicles you can enter. As long as each one can pass the primary task of passing through the gate, then that vehicle counts as a vehicle for your team. However, if any one of those vehicles float to the surface, then your run is over and your points are null. This was the first year that a team entered two vehicles, and that was Cornell University.

HN: What are some real-world applications of an Autonomous Underwater Vehicle?

AC: Say someone needed to do surveying or underwater research - this vehicle should be able to accomplish that. If someone wanted to count the number of fish in a pond, the vehicle should be able to track the task that you give it. Search and rescue is another option where AUVs can be applied, like with the Malaysian flight crash that happened a couple of years ago. AUVs were

sent out to search for people and debris.

VN: The same logic used for AUVs can be applied to drones, particularly for going into space. Elon Musk is trying to get into space to mine asteroids, without human interaction. That's another potential application.

HN: How would one go about joining the AUV team?

AC: The team's primary focus is to build leadership skills and to further develop engineering skills, but we aren't just limited to engineers. We are open to all types of majors, to all students who want to learn about robotics. One way of joining us is looking us up on OwlLife.

HN: Do you have any extra advice for anyone interested in joining the team?

VN: Just come in and say hi. The best way to get into it is to come in and

get acquainted with everybody.

AC: Don't be afraid that if you don't know anything you won't be able to join one of these kinds of teams. You can come in knowing nothing. That's how I did it three years ago when I first started. I didn't know anything about AUVs or robotics or how electronics work in general. Yes, my classes have helped, but you have to take that first step, you can't be afraid. You'll learn a lot, not just logical and applicable skills, but also social skills. You'll build a bond with your teammates.

HN: Well, thank you. This was great.

AC: Thanks for meeting with us.

Want to know more about the Autonomous Underwater Vehicle team, or interested in joining them? Look them up on OwlLife or check out their Facebook page at KSU AUV Team.