CPS - Custom Printed Submarine: A Community Based Approach to Designing Unmanned Underwater Vehicle Systems Using 3D Printing and Widely Available Production Methods

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Because of the fact that underwater vehicle systems [underwater drones] require advanced manufacturing techniques, they are not easily available for technology enthusiasts and tinkerers. The CPS - Custom Printed Submarine project aims to solve this problem by developing alternative solutions, which utilize technologies widely available for the consumer market. The 3D printing technology is not capable of producing watertight parts by default. By introducing innovative post processing methods, involving epoxy filling, covering and heat treatment, this quality can be achieved. Furthermore, this technology allows for rapid prototyping and decreasing production cost for custom solutions. In order to prove the viability of this claim, we have produced two prototypes of a basic model of the submarine, in the production of which, methods above were used. This drone has the ability to measure its depth and motion parameters using a built-in barometer and inertial measurement unit, while being very maneuverable underwater. An operator is also able to see high quality underwater footage recorded by the camera of the drone by streaming the footage to a mobile device. The CPS project is open source, meaning that everyone has full access to the documentation of our designs. As a result, the community constantly works to evolve the project by sharing their improvements, ideas for development and suggestions. We therefore concluded that CPS project can help in the development of naval technologies by popularizing it among aspiring engineers and technology enthusiasts.

Awards Won:
China Association for Science and Technology (CAST): Award of $1,200