Engineered Underwater Vehicle for Ocean Litter Mapping

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This project explores the possibilities of pairing an autonomous underwater vehicle (AUV) with a deep-learning computer vision model for marine debris mapping. A cost effective, 3D-printed AUV with a motorized ballast system was designed to collect underwater footage continuously at various depths for several weeks. A simulated underwater environment using hardware-in-the-loop (HIL) procedures was used to test and evaluate the AUV. A trash detection machine learning model was developed to analyze the footage for underwater litter. To assess the accuracy and capabilities of the trash detection model, footage from various underwater vehicles was compiled and run through the model, yielding five areas of highly concentrated ocean debris at depths of 500-800 meters below the surface. This study highlights how many pieces of marine debris - undetectable by satellite data – can be mapped and categorized with the proposed AUV and trash detection model.

Awards Won:
Third Award of $1,000
International Council on Systems Engineering - INCOSE: Certificate of Honorable Mention, a 1-year free student membership to the INCOSE, and free virtual admission to the 2022 International Symposium of the INCOSE