

ABSTRACT

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BACKGROUND & MOTIVATION

In Louisiana, we are acutely aware of the devastation that hurricanes can inflict on communities. We have witnessed the tragic circumstances where individuals are left stranded in their homes for hours or even days, unable to be reached by rescuers.

In response to this pressing issue, we sought to develop a solution that could help save lives and instill hope in those facing dire situations. We anticipate that the implementation of this technology will lead to a greater number of individuals being rescued during critical moments, ultimately reducing fatalities during major storms.

The proposed approach to our project will provide a structured roadmap to success, ensuring we remain focused on our objectives. Our concept involves developing a 3D-printed remotely operated vehicle (ROV) equipped with advanced sonar capabilities, allowing for the detection of individuals who are trapped or making noises through sound wave detection. Additionally, the ROV will incorporate acoustic imaging technology, enabling the operator to search for those who may have perished in the tragedy.

Our mission is to save as many lives as possible, while also recognizing that some individuals may not survive. In such unfortunate cases, we aim to provide comfort to their families in the midst of their loss. We will commence the project with detailed drawings of a base ROV designed to carry and operate essential components, including the donor device and camera. As a team, we have evaluated the current technologies available and analyzed the foundational structures of similar machines.

We employed artificial intelligence to design a robot tailored to our specific requirements. This remotely operated vehicle (ROV) is equipped with high-definition cameras, powerful LED lights, and the ability for 360-degree rotation. Additionally, it features sonar sensors, thrusters to navigate strong currents, and a wireless configuration complemented by a backup tether for deeper underwater exploration. The ROV also includes a robotic arm capable of moving debris and delivering supplies, enabling it to access areas that are beyond the reach of divers.



The primary objective of this remotely operated vehicle (ROV) is to locate individuals who may be trapped following major storms or other natural disasters. This ROV will be equipped with advanced vision and auditory capabilities, as well as mobility features that enable it to navigate through strong currents and locate individuals using various methods. Its impact would extend beyond my personal interests, benefiting both my community and the entire state, particularly given our familiarity with hurricanes. This ROV has the potential to assist in rescuing loved ones who may become trapped in the aftermath of a storm.

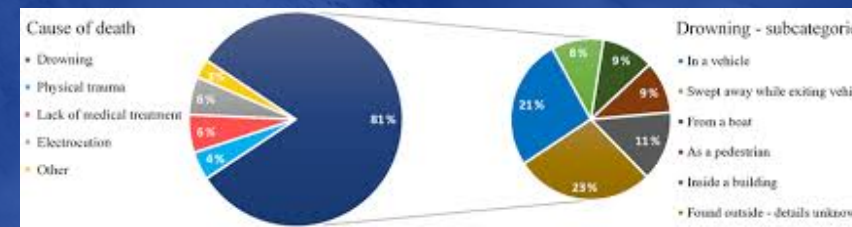
The next step in our design process involves creating a 3D model using Tinkercad. This model will provide a realistic visualization of our remotely operated vehicle (ROV), serving as a foundation for constructing the physical prototype with actual components. We believe that the majority of the ROV should be constructed from robust metal to withstand the forces exerted by currents and any debris it may encounter while searching for survivors.

Once we have assembled the ROV, it will undergo a series of tests in various environments. Initially, we will conduct tests in a pool utilized for our SeaPerch practice. Following this, we will evaluate its performance in a deeper pool to ensure it can endure the pressure of the water. Finally, we will test the ROV in nearby creeks, where we will simulate a rescue scenario by having a person underwater produce noise. This will allow us to assess the ROV's ability to detect the sound, locate the individual, and navigate around any obstacles in its path.

We chose this project because, as residents of Louisiana, we have all experienced the profound impact of major hurricanes, even at a young age. Many of us lived through Hurricane Laura in 2020, which had devastating effects on our health, environment, and community. We faced the harrowing experience of being confined in our homes while the storm approached.

This personal connection to hurricanes has driven our team to conduct extensive research on other significant storms that have affected the tri-state area, including Hurricanes Harvey and Katrina. These disasters left many individuals stranded in their homes, on rooftops, or separated from their families. Additionally, we witnessed the effects of the Guadalupe flood in 2025, which resulted in widespread displacement and loss of life.

Our goal is to develop technology that can provide rapid assistance during such critical situations when water levels rise dramatically.



ACKNOWLEDGEMENTS

We extend our heartfelt gratitude to our coach for her invaluable guidance in developing a remotely operated vehicle (ROV) that has the potential to save countless lives in the future. Her expertise in navigating artificial intelligence—an unfamiliar technology for us—was instrumental in our success.