



# SHIPWRECK EXPLORATION BY ROV

A Conceptual ROV - Team ASA-SeaNation, West Mesa NJROTC, Albuquerque, New Mexico

## OVERVIEW

Our conceptual SeaPerch ROV is designed for the safe exploration and documentation of sunken ships. Shipwrecks contain valuable historical, structural, and environmental information, but many are unsafe for divers due to depth, debris, and low visibility. This ROV is designed to navigate tight spaces, capture video, and inspect wreck conditions without disturbing the site.

## DISCUSSING & REASONING

Each design decision was based on the challenges of real-world shipwreck environments. A smaller frame improves access to confined spaces while reducing the chance of entanglement. The 4-thruster configuration was selected over simpler designs to provide better control and stability, which is critical for detailed inspections. Lighting was added to address low visibility, a common issue in underwater environments, while propeller guards reduce sediment disruption and protect both the ROV and the wreck. Neutral buoyancy allows the ROV to maintain position with minimal input, improving precision and reducing operator fatigue.

Overall, the design focuses on balancing control, safety, and preservation, ensuring effective exploration without causing damage.



## APPROACH

The ROV would be designed with a focus on maneuverability, stability, and visibility in confined underwater environments. A compact frame would allow the vehicle to navigate through openings such as doorways and damaged hull sections.

A 4-thruster propulsion system would enable precise control, including forward movement, turning, and stable hovering near structures. The ROV would also include a forward-facing camera and LED lighting systems to improve visibility in murky or low-light conditions. Additional features such as propeller guards and neutral buoyancy would help prevent disturbance of sediment and reduce the risk of damaging fragile wreck components during operation.

## BACKGROUND & RATIONALE

Sunken ships play an important role in marine archaeology, historical preservation, and ecosystem development, often acting as artificial reefs. However, human exploration is limited by depth, poor visibility, unstable structures, and diver safety risks. These limitations make many wrecks difficult or dangerous to study.

Our concept addresses this problem by providing a low-cost, remotely operated solution that allows for safer and more consistent exploration. By reducing the need for divers and minimizing physical contact with the wreck, the ROV helps preserve fragile structures while still allowing for data collection and observation.

## NEXT STEPS

If we were to turn our ROV into a functional prototype, we plan to:

1. Create a scaled 3D model using CAD software.
2. Prototype the frame using sustainable materials and test buoyancy in a controlled pool.
3. Simulate sensor data using Raspberry Pi-based mockups.
4. Engage with marine researchers to gather feedback and refine design.
5. Explore funding or mentorship through STEM innovation programs or conservation groups

### CONCEPTUAL SEAPERCH ROV FOR SUNKEN SHIP EXPLORATION

*Safe • Precise • Non-Invasive Exploration*

- COMPACT FRAME**  
Narrow profile for access through tight wreck openings.
- BUOYANCY FOAM**  
Achieves neutral buoyancy for stable, efficient operation.
- 4-THRUSTER VECTORED SYSTEM**  
Provides precise control, turning, and stable hovering.
- FRONT CAMERA**  
Captures high-definition video and images.
- PROPELLER GUARDS**  
Protect ROV and wreck; reduce sediment disturbance.
- LED LIGHTING**  
Improves visibility in murky, low-light environments.

**MISSION GOALS**

- Explore and document shipwrecks
- Inspect structural conditions
- Preserve fragile historical sites
- Reduce risk to human divers

**KEY FEATURES**

- HD Camera
- LED Light Bar
- 4 Thrusters
- Propeller Guards
- Neutral Buoyancy

**CONCEPTUAL SPECIFICATIONS**

Dimensions	~ 18 in (L) x 12 in (W) x 10 in (H)
Weight	~ 5-7 lbs (excluding tether)
Thrusters	4 x SeaPerch Motors
Camera	HD 1080p
Lighting	LED Light Bar
Buoyancy	Neutral (Foam + Frame Design)
Tether	Standard SeaPerch Tether

**TOP VIEW - THRUSTER LAYOUT**

4-thruster vectored configuration for full control and precise maneuvering in confined spaces.

**SIDE VIEW - BUOYANCY**

Neutral buoyancy enables stable hovering and reduces operator effort.

