



# Miniature Autonomous Submarine

Innovation Challenge Team 37

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## Problem Statement

The project aims to design and manufacture an Autonomous Underwater Vehicle (AUV) that can detect and evaluate corrosion for an underwater metallic structure using AI and Computer Vision techniques with real-time image processing and no human intervention.

## Project Impact

- Reduction in operational risks associated with manual underwater inspections
- Potential cost savings through optimized inspection procedures
- Reduce the time needed to perform underwater corrosion evaluation
- Contribution to the safety and sustainability of underwater structures

## Conclusion

All specifications were met after several design iterations. The AUV is capable of navigating environments and detecting corrosion with no human intervention. Future improvements will focus on enhanced data processing after being exposed to challenging real-life environments.

## Constraints

- Maximum dimension of 50 cm in all directions
- Operating depth of up to 3 meters
- Carry a minimum of 0.5 kg of scientific instruments or cameras for data collection
- Capable of operating in seawater of salinity  $37 \frac{g}{dm^3}$
- Budget less than SR 10000

## Target Specifications

| Specification           | Target    | Prototype |
|-------------------------|-----------|-----------|
| Weight                  | < 7 kg    | ~3.8 kg   |
| Maximum speed           | > 1 m/s   | 3 m/s     |
| Maximum flow resistance | < 0.5 m/s | > 0.5 m/s |
| Maximum rise/fall speed | > 0.5 m/s | 1 m/s     |
| Communication range     | > 10 m    | 500 m     |
| Battery life            | > 1 hour  | 1.19 hour |
| Image resolution        | > 4 MP    | 12 MP     |

## Prototype Design and Validation

