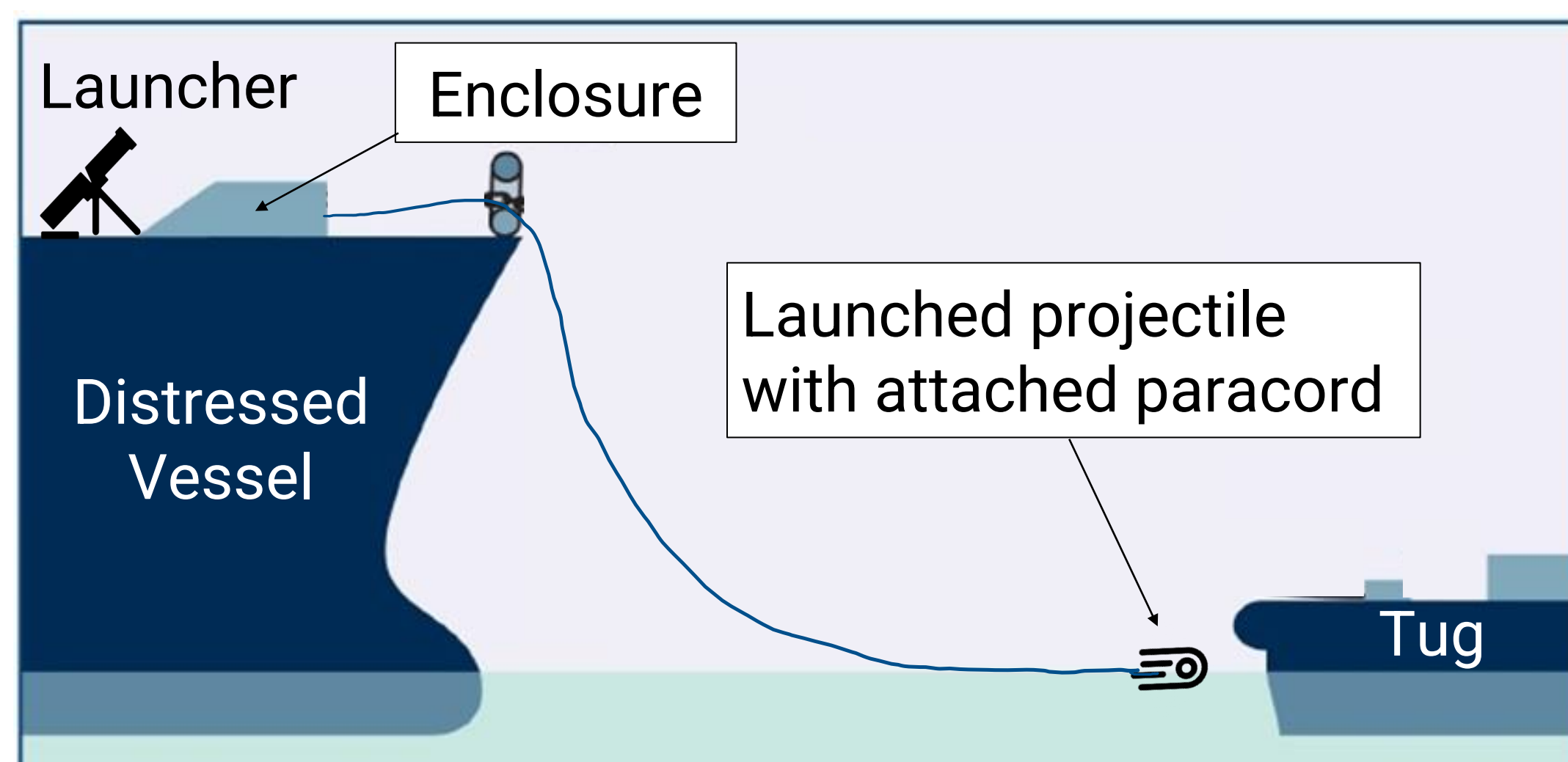


# Marine Automatic Emergency Towing System (MAETS)

## Background

### Company Objective

- MHOPEG is developing an emergency towing system (ETS) designed to rescue distressed vessels.
- MHOPEG is working to build an ETS that is automatic, requiring no manual setup, thus increasing system safety and reliability. The system is designed to launch a projectile attached to a towline so an emergency tugboat can safely regain control of the vessel.
- MHOPEG's current system only achieves 80 meters which falls short of the SOLAS<sup>1</sup> requirement of 230 meters.



### Project Scope

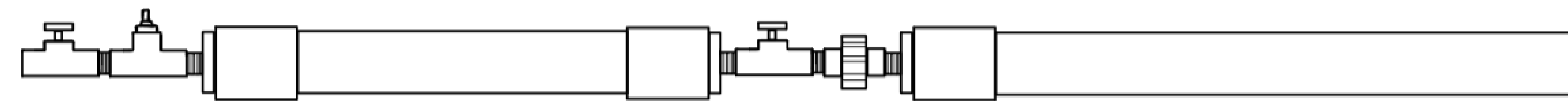
- This project aims to design and build a **projectile launcher** that can be deployed without manual setup, as well as an **enclosure** that houses the messenger and towline. A **release mechanism** for smooth payout of the lines is also required.

### Requirements

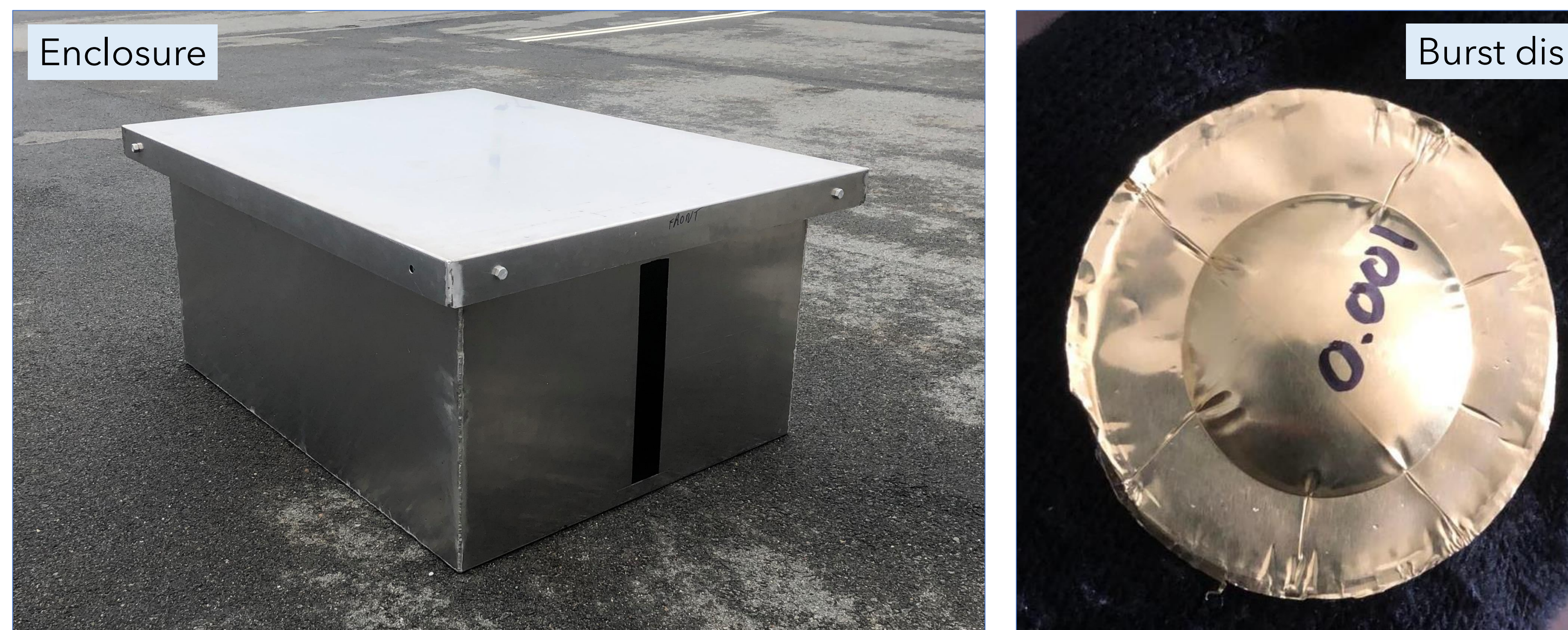
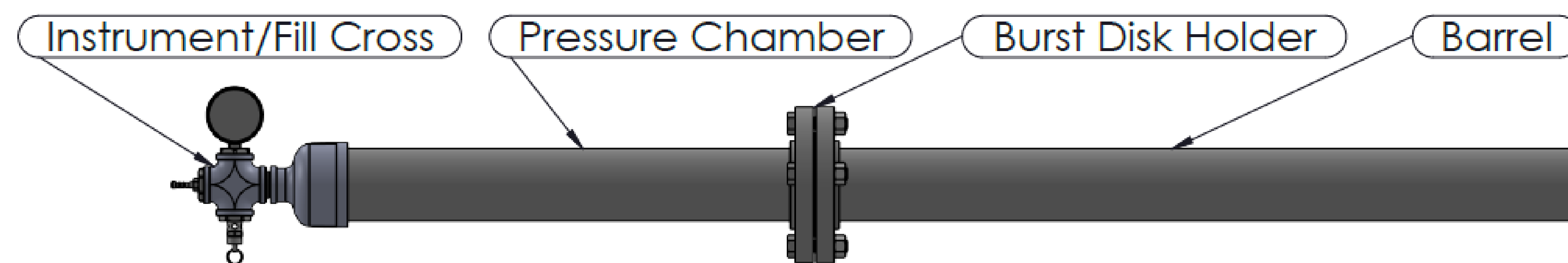
- Launcher shall achieve a launch distance of 230 meters
- Launch sequence shall be initiated by a remote signal
- Enclosure shall facilitate storage, protection, and release of 400 ft of messenger line and 250 ft of towline
- Enclosure release mechanism shall enable line to be payed out at 0.5 m/s without jamming

## Design Process

- A pneumatic, burst-disk, solenoid-activated launcher design was selected based on research, matrix evaluations, and budget. A PLA projectile was designed with a bottom cut-out to account for the paracord in the barrel.
- A PVC prototype was built to test burst-disk concept and determine pressure input versus range output.



## Details of Final Design

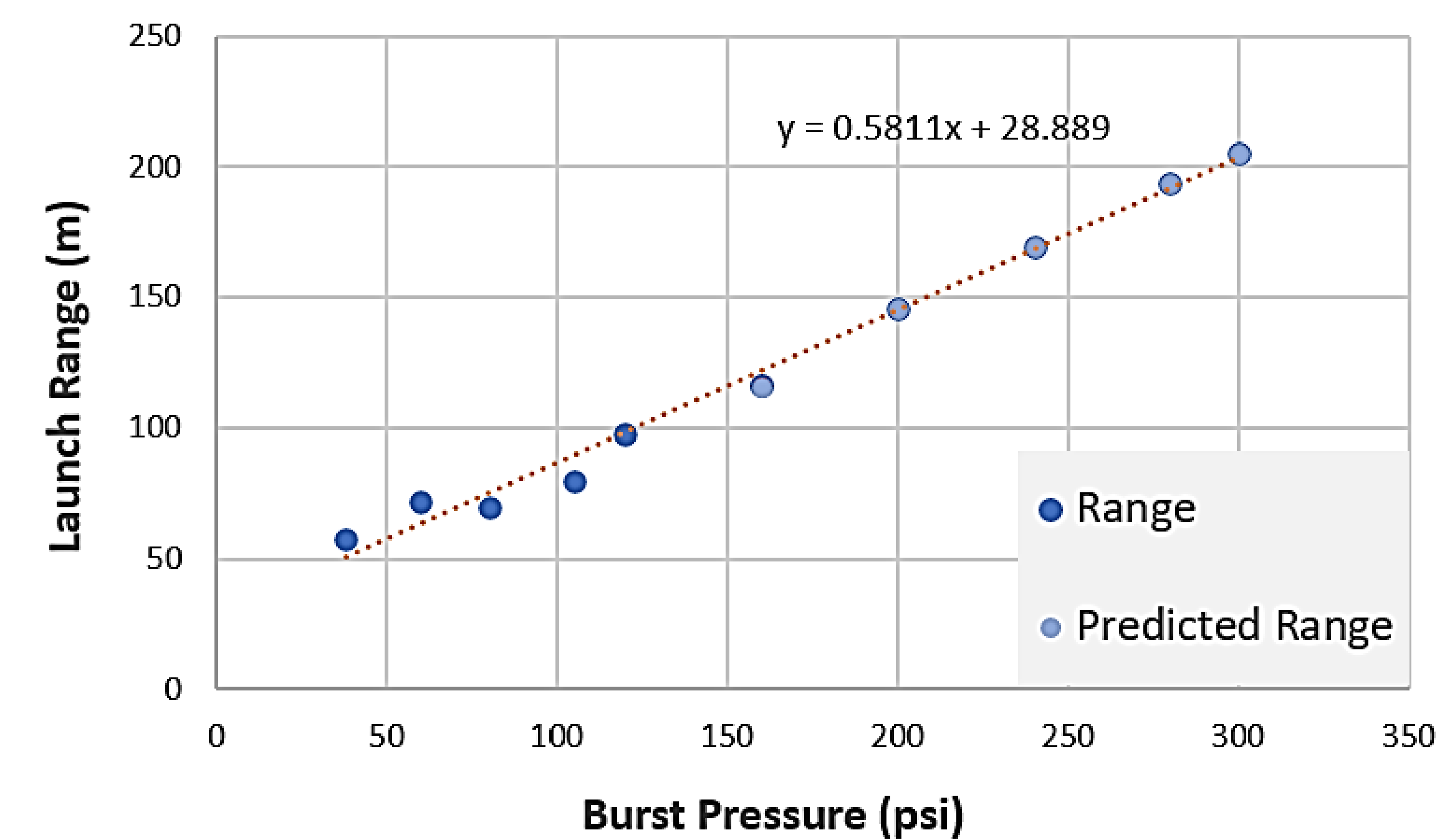


## Conclusion and Recommendations

### Testing Results

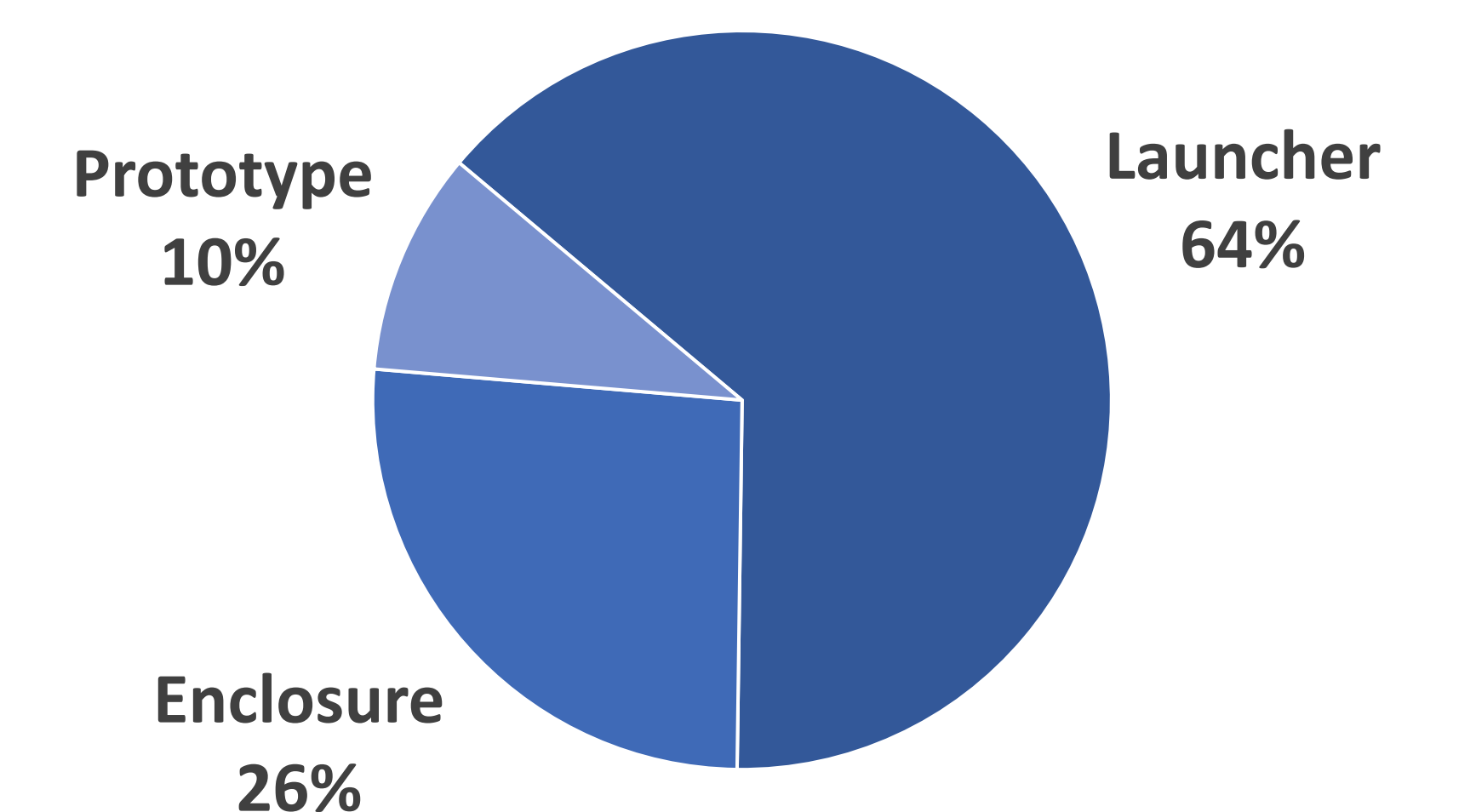
- Burst-disk concept was verified with dry and launch tests
- Achieved a range of 80+ meters at 105+ psi burst pressure
- Predicted model from test data suggests a launch range of 205+ meters at roughly 300 psi
- Continued testing at higher pressures planned in near future to achieve desired range and meet requirements

### Predicted Launch Range using Test Data



### Budget Expenditure

- Used 68% of overall budget to develop all components



### Recommendations

- Optimize aerodynamic efficiency of the projectile
- Reduce rope drag inside the barrel to increase range
- Design light-line storage to optimize system footprint
- Test remote signal activation in coordination with ISL team as part of a new scope

### References

- <sup>1</sup> SOLAS Treaty Section 7.1 – Life Saving Appliances Code