# Auto-gyro Rotary Recovery System for Model Rockets

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**How can I design an alternate recovery system for model rockets in order to slow the decent rate and provide a low-impact landing?**

## Impact

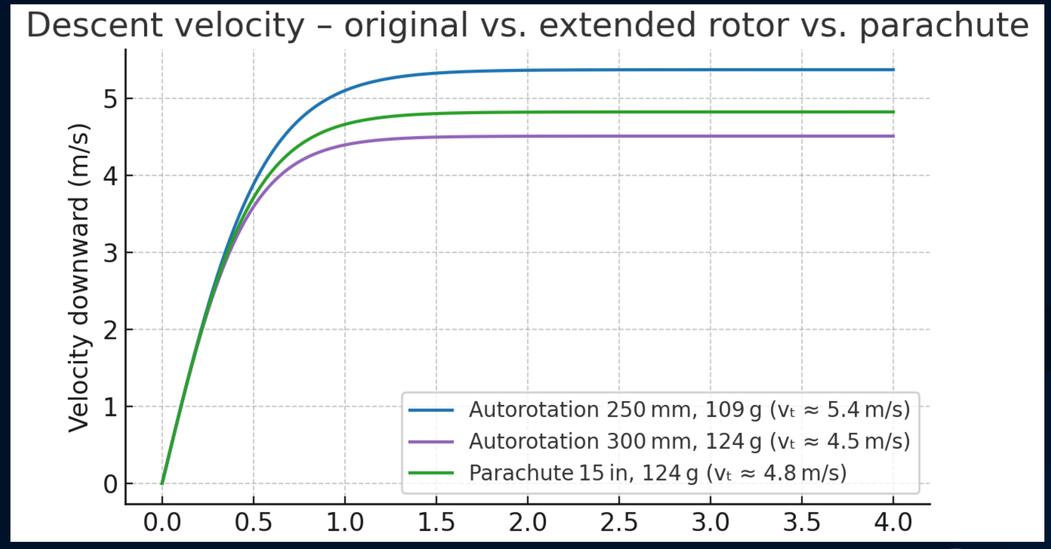
This project will be beneficial to the model rocket community as well as potentially scaling this to the commercial rocket industry. Since this alternative is reusable, it saves money on buying new parachutes, and the expenses if the rocket were to get damaged from descending too fast. This will also impact the environment as well because there won't be parachutes getting caught on trees or falling in the water.

## Next steps

In the future, my solution could potentially be profitable and I would be able to sell this to model rocket users. After this, I could get my Level 1 rocket certification allowing me to launch with higher motors and test my designs with more powerful rockets and potentially create more.

## Purpose

A common problem with model rocket launches is the parachute not deploying, and difficulty to prepare properly. My solution offers a controlled and stable descent. This is extremely crucial when working with more expensive rockets because it prevents damage from a high-impact landing and provides a more accurate landing zone. This project aims to explore the effectiveness of a rotary style recovery and a more dependebale and reuseable method.




## Data Analysis

This graph compares the times to reach terminal descent, my original design, the improved design and the parachute recovery. The original design reached a terminal descent of around 5.4 m/s, and the new design with the extended rotor drops the terminal speed to around 4.5 m/s which is less than the parachute recovery at 4.8 m/s. The larger rotor within the hobby-rocket stays within the safe window without needing a bigger parachute.

## Summary

This project explores designing an alternative recovery system to parachutes called the auto-gyro rotary recovery system which works in a similar way to a helicopter. This system will use autogyro-style blades that deploy using the parachute charge build into all model rockets after peak altitude, and spin, providing lift and controlled descent. It relies on lift produced to counteract the force of gravity to slow the rockets land. I will design and prototype various rotor blade configurations and test them by performing small-scale drop tests and comparing this to the parachute recovery system. This research contributes to safer and more efficient recovery methods in rocketry.