

# Design and Development of a Sensor Payload for Low-Altitude Rocket Deployment

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Figure 1: Payload before 120 meter drop test for mechanical development

## Project Overview

This sensor payload design featured:

- Autonomous descent and separation from rocket deployment at 650 meters.
- Contra-rotation descent control system of science vehicle.
- Fin stabilization of payload body.
- Collection of a broad range of sensory data.
- Transmission of telemetry to team-developed ground station.
- Designed for CanSat 2015 Competition.

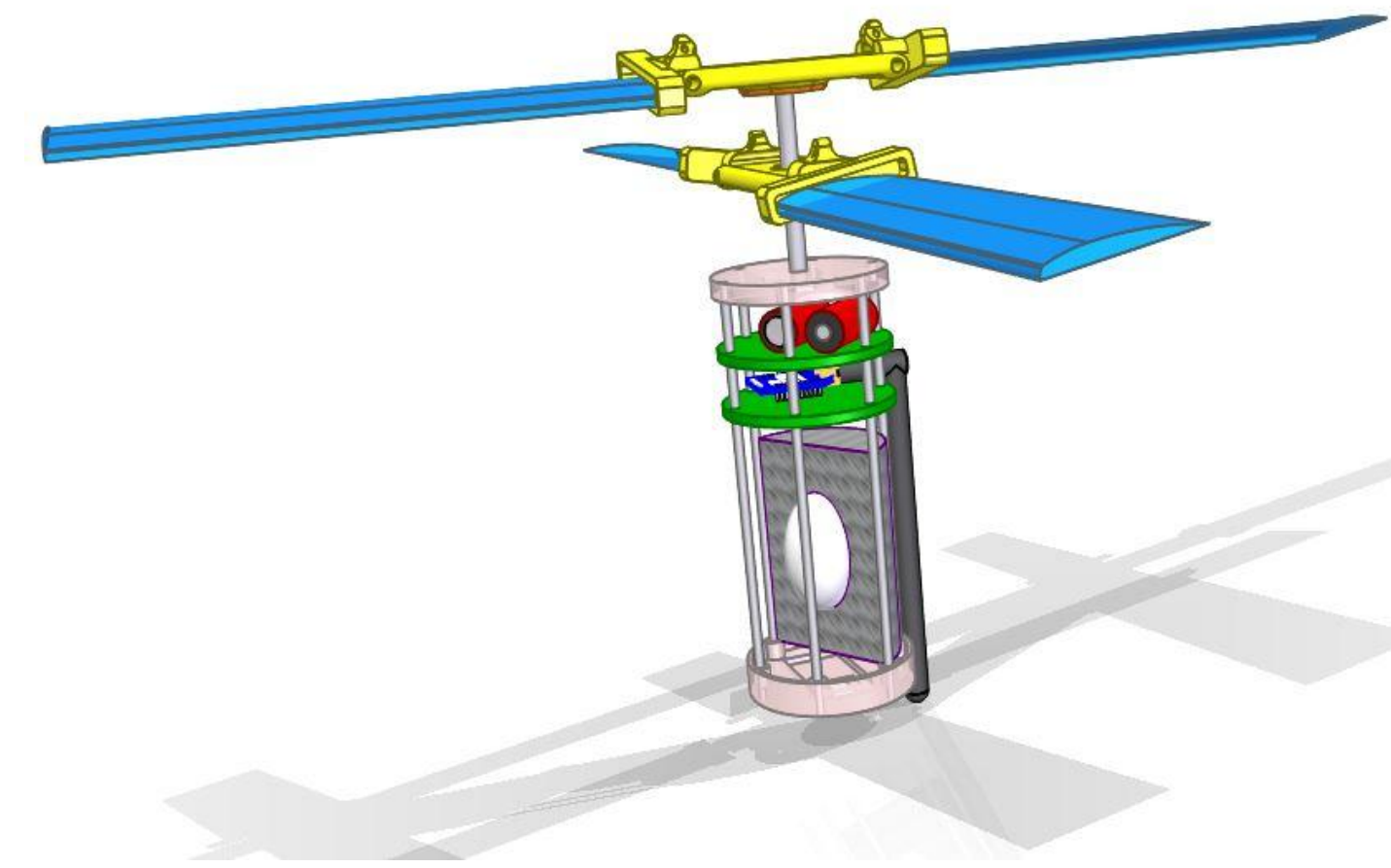


Figure 2: Isometric CAD model

## Outcomes

The major subsystems of the project were developed, tested, and integrated into their respective roles of the payload by 6/13/2015, the competition flight day. Of over 60 teams to start competition, this design placed 11<sup>th</sup> internationally. Team members plan to continue improving designs for a future launch.



Figure 7: Final Configuration



Figure 3: Launch Configuration

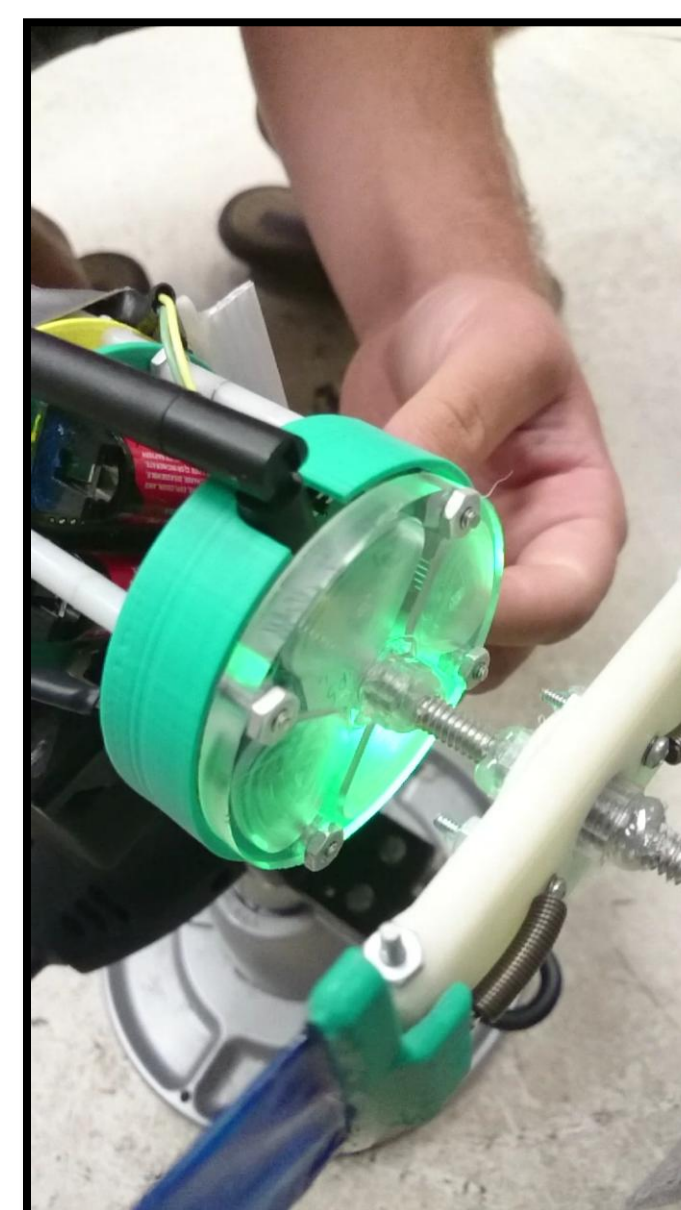
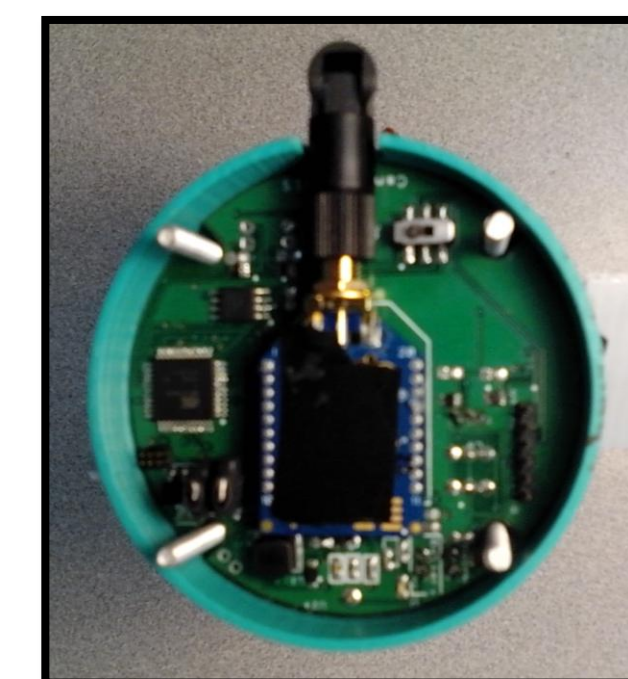


Figure 4: Body/Hub Configuration

## Impacts

Students learned about:

- Mechanical System Prototyping
- Autorotation descent control
- Integrated Circuits Design
- MCU Programming in C
- Composites and Prototyping
- Control Systems

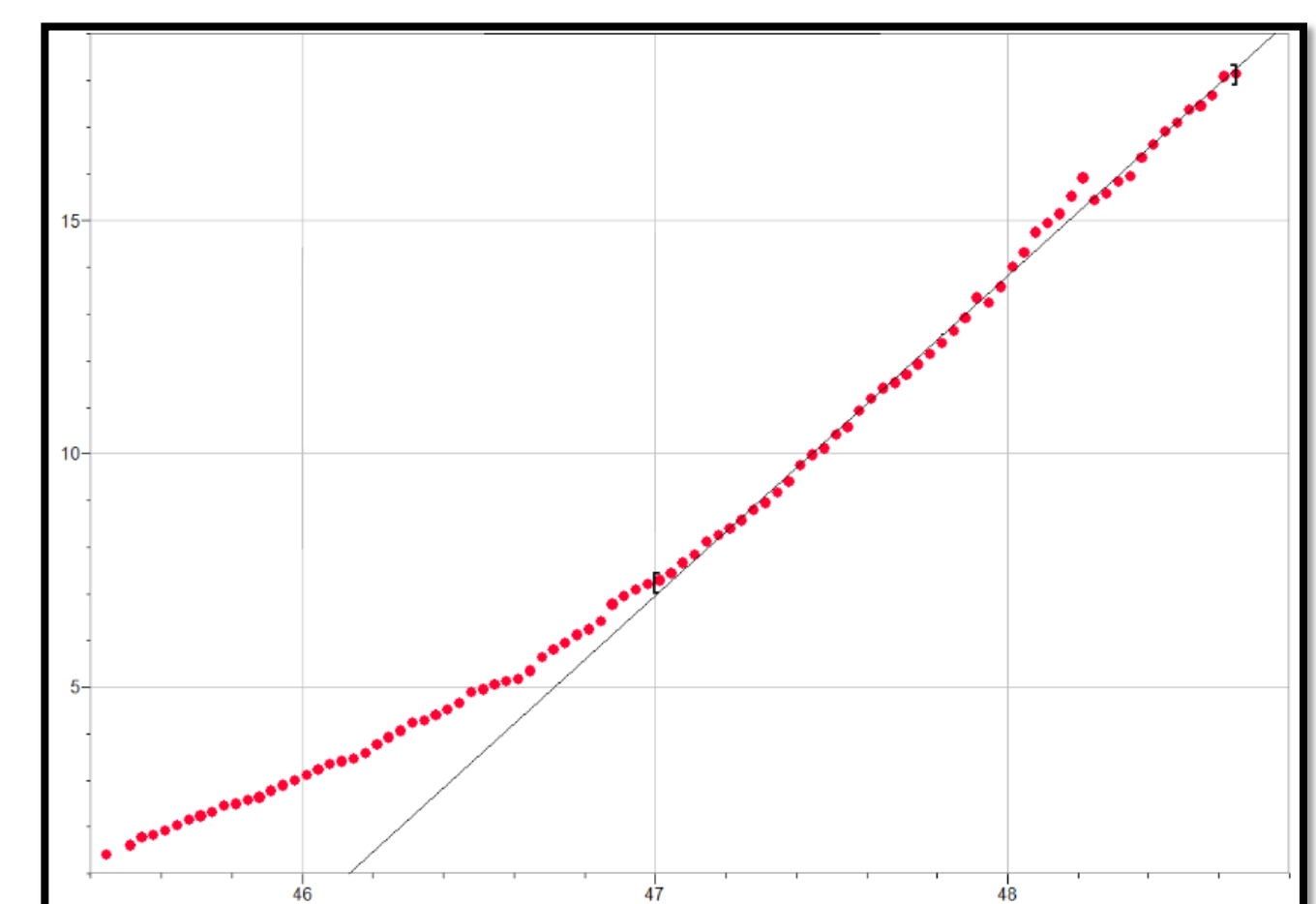


Figures 5 & 6 (Above): Team Developed PCB's

## Conclusion

This project served as an excellent challenge for engineering students, teaching them the design process – from mission concept realization through flight day. Projects teaching students real-world application of integrated systems are invaluable to the future of the American aerospace industry.

Figure 8: Absolute Vertical Displacement vs Time Descent Control Drop Test



Average Tested Descent Rate:  
6.86 m/s

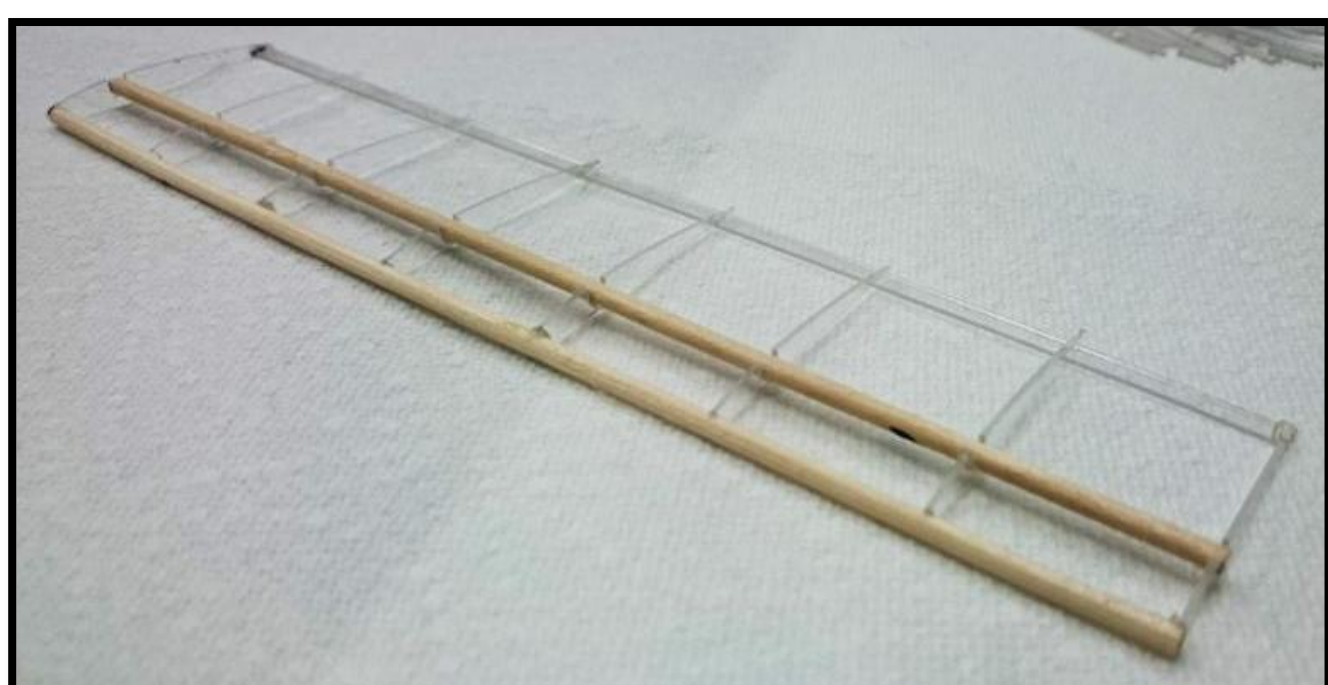


Figure 9: Blade Frame Design, NACA 4412

## Acknowledgements

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\*\*CAD renderings developed by Will Hill, Mechanical Lead