Team Overview

-University of Northern Colorado-
“To provide a method for institutions to utilize a deployable and recoverable payload for future Rocket SAT-X missions. With this, we can greatly increase the amount of data recovered from a mission by eliminating the need to transmit restricted amounts of data to the ground.”
Overall Mission Objective:
Build a reentry platforms that can be used to understand and characterize the reentry process.
Deploy from the Rocket Body:

In order to collect reentry data, the ReX capsule must first be ejected from the rocket.

This involves:

• Establish a reliable, detachable umbilical with the rocket that is used to initialize the capsule.

• Avoid capsule tumbling and collisions with the rocket after ejection.

• Establish a reliable radio connection between rocket and capsule for data transfer.
Mission Overview
- Theory and Science -

ReX focused on two parts of reentry:

**Air Resistance:**

\[ F_{\text{air drag}} = \frac{1}{2} \cdot \rho(h) \cdot v^2 \cdot C_d \cdot A \]

Velocity of reentry vehicle under certain conditions
ReX focused on two parts of reentry:

**Heat Buildup:**

\[ W_{\text{air friction}} = \int F_{\text{air friction}} \cdot ds \]

Power generated by heat buildup from air friction
Results - Testing -

Orientation & IMU Testing
NASA’s Wallops Flight Facility, VA
Results

- Post-Launch -

**Deployment**
- Successful deployment from the rocket body
- Video record of relative flight stability

**Data**
- Violent reentry destroyed hard data
- Failed telemetry due to unknown causes
Results - Future Plans -

RAPTR SAT-X

• Mission shelved for later UNC Rocket SAT-X teams

• Takes advantage of successful deployment and focuses on data collection and sensor accuracy
Acknowledgments

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