The project we worked on is an unmanned aerial vehicle (UAV). The purpose was to autonomously land the UAV on an unmanned surface vehicle (USV). The main engineering focus was the autonomous flight and the challenge of landing on a moving vehicle. We expected to accomplish this using RTK-GPS (real time kinematic).

The objective of this project was, working with ThayerMahan engineers, to identify the obstacles to reliably land a UAV on a USV. We had examined alternative homing methods and selected one for further development. This included the determination of the necessary hardware and software for the UAV to autonomously fly a plotted course and land precisely on the USV. Our goal was to utilize an RTK GPS based system to navigate and coordinate with the USV.

**Location Technology**
- RTK GPS (Real Time Kinematics)
  - ~3cm accuracy vs traditional GPS ~3m

**Flight Controller and Microprocessor**
- Pixhawk flight controller was chosen for its known reliability and abundance of resources
- Raspberry Pi chosen due to its compatibility and computational ability
- Ardupilot software suite used as reference for autonomous control

**Hardware Design**
- We chose to use a Tarot 690 hexacopter frame over a quadcopter for additional stability and increased thrust
- 620 KV motors were chosen for higher torque, providing more thrust and greater efficiency
- For power, two 6000mAh batteries were connected in parallel to provide redundancy and additional flight time
- 13.5” propellers
- Thrust vs Weight
  - Minimum 2:1 ratio actual ~3:1
- Expected flight time ~20min