**From Concept to Prototype: The Development of a Tilt-Rotor VTOL Drone**

Vertical take-off and landing (VTOL) aircraft have seen an increase in usage and development because of their unique flight characteristics. The goal of this project is to combine the benefits of a quadcopter and a fixed-wing aircraft by designing a tilt-rotor VTOL drone, allowing us to use it as a testing platform as we design and build an upscaled version of the project. Some of the advantages of a VTOL platform include not needing a runway to take off, gaining a stable stationary platform to use other mechanisms while in mid-flight, and increasing our flight range and cruise speed by transitioning to forward flight.

We began our project researching types of VTOL aircraft looking for a simple yet effective solution that included the following factors: weight, robustness, and reliability. We then used computer-aided design (CAD) software to design and prototype our aircraft. By using traditional subtractive and newer additive manufacturing technologies, we were able to quickly manufacture and assemble the prototype. We revised the parts as needed after identifying design flaws that occurred in the design phase or manufacturing. This presentation will review the testing phase of the project, which will include verifying the drone's hovering and transitioning capabilities, as well as a full-flight demonstration. The testing phase provides valuable insights that will improve future project iterations.