BEFAV

BIOINSPIRED
ENVIRONMENTALLY FRIENDLY
AERIAL VEHICLE

MISSION & REQUIREMENTS

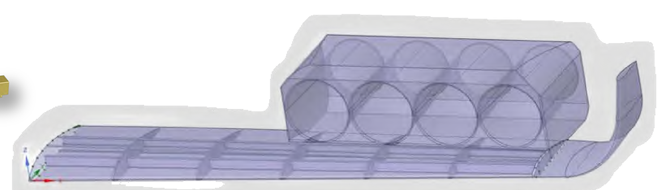
BEFAV is a **fully electric** and autonomous aircraft intended to assist with the reduction of transport emissions by carrying organic goods from rural farms to metropolitan areas. Through the incorporation of **bio-inspired design**, it is intended to blend in with natural surroundings and minimize disruptions.

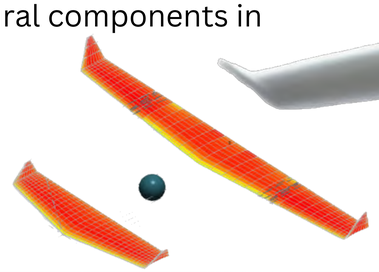
- **300 km operating range with divert range of 10 km, from onboard battery power only**
- **100-200 kts cruise airspeed capability**
- **3000 kg MTOW**
- **Nominal Cruise at 1500 m AGL, Service Ceiling 3000 m ASL**
- **Fully electric, battery powered propulsion**
- **-40°C to 50°C operating temperature range**
- **VTOL capability on unprepared surfaces such as gravel, dirt, snow, smooth ice, or pavement**

STRUCTURES

Bio-inspired design of structural design of wing structures, landing, fuselage structures, cabin layout, and mechanical integration.
Analyze structural loads at different stages of flight using software such as **ANSYS workbench** and MATLAB

Optimize the structural mass with respect to the strength of the airframe components and layout while maintaining a safe design CAD of structural components in CATIA and other suitable CAD software.

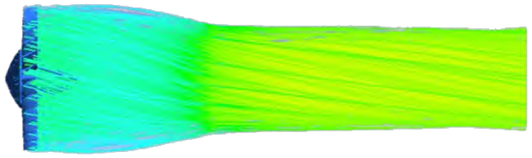




AERODYNAMICS

Implement bio-inspired ideas in context of the full body aerodynamics that support the **blended wing body** design.

Design, analyze and optimize the electric ducted fans with a focus on performance, aerodynamics and aeroacoustics using **CFD.**



Design, analyze and optimize the aerodynamics of the primary and secondary wings.

AVIONICS & CONTROLS

Develop the guidance, navigation, and control system for an autonomous battery-vehicle. Design the **communication** and the data processing systems of the aircraft.

Evaluate the electrical power distribution system to independently supply all operational power to MANTA during the flight envelope. Design the electrical-mechanical systems interface for **autonomous operation**.

Carleton University