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Development of Flapping-Wing Unmanned Air Vehicles

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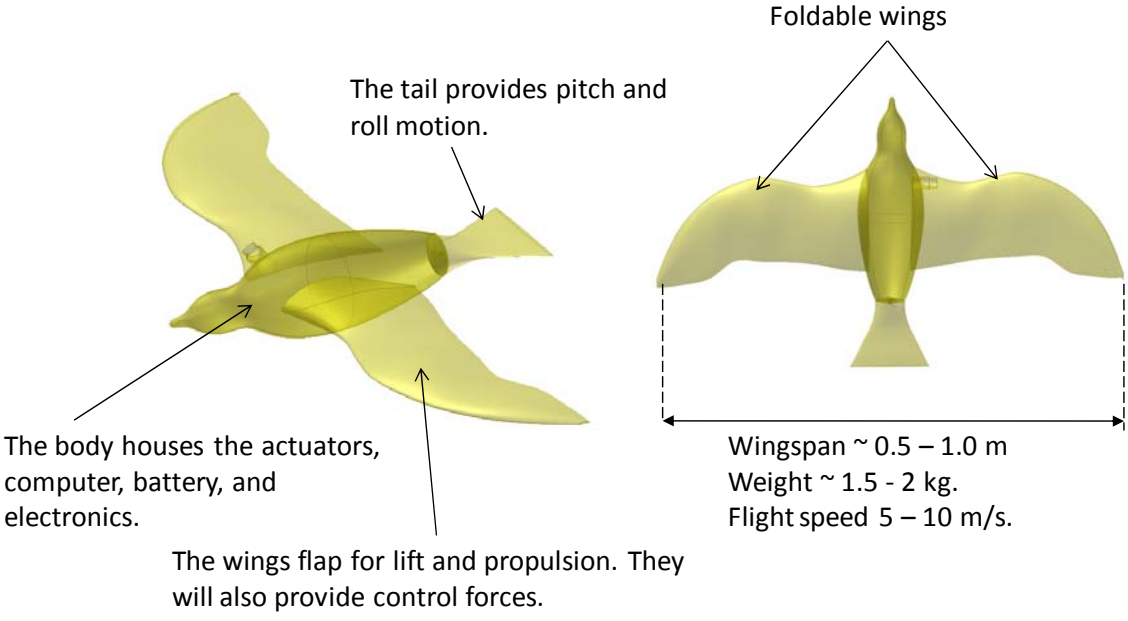
The fundamental objective of this research project is to design flapping-wing Unmanned Air Vehicles (UAVs). The UAVs will be fully autonomous, able to take-off and land by themselves, have high maneuverability, and be able to carry a lightweight payload.



The development of the first UAV is underway and its wingspan will be approximately 0.5-1.0 m (similar to a seagull). Future UAVs will be smaller in size, with wingspan less than 15 cm, normally called Micro Air Vehicles (MAVs). This research project is rather large and will require contributions from several students and post-docs. Here are some example projects:

- **Aerodynamics and structures**:
  Develop design tools for aerodynamic and structural analysis, addressing both steady and unsteady flight. This will involve both numerical modeling and experimental testing in a wind tunnel.
- **Control theory**:
  Develop methods for the control of flapping-wing UAVs. This will involve numerical modeling and wind tunnel testing.
- **Multidisciplinary design optimization**:
  Develop a computational design framework which couples together aerodynamics, structures, and controls.