KU LEUVEN

LMSD Mecha(tro)nic System Dynamics

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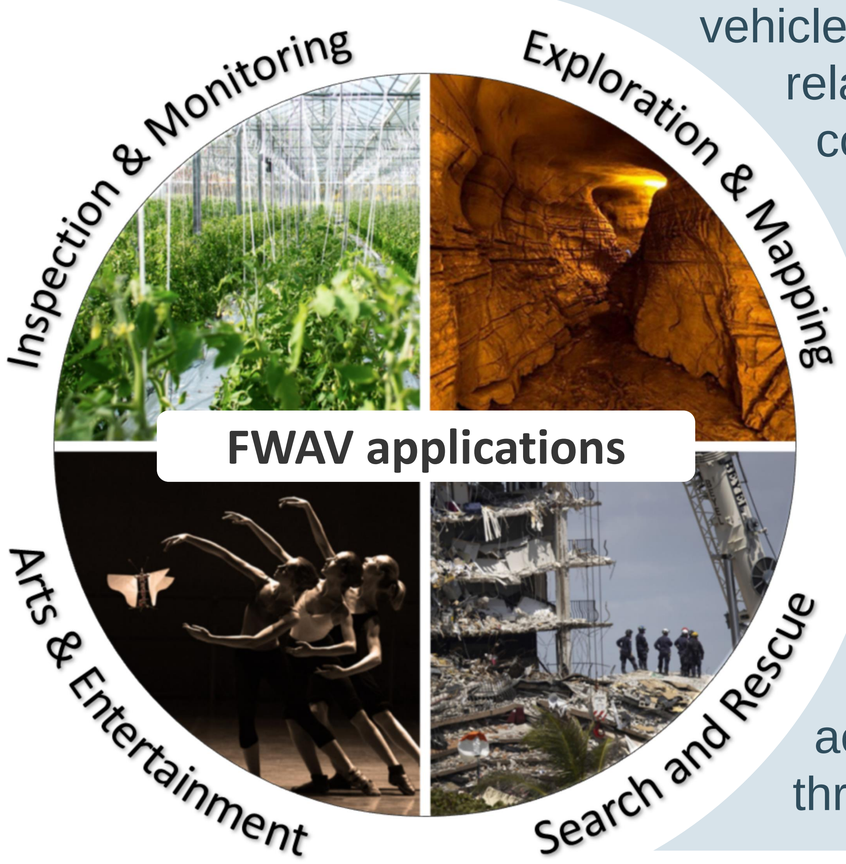
STAR Smallsat Technology & Aerospace Research

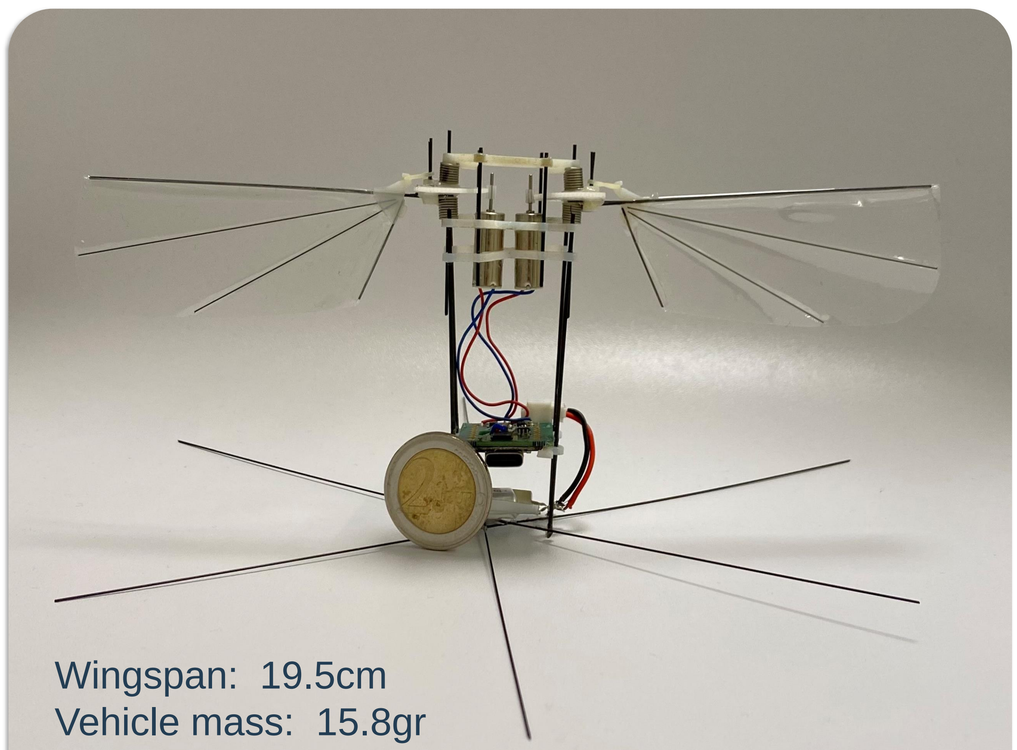
KUlibrie: A bio-inspired flapping wing aerial vehicle

Thomas Roelandt, Jeroen Vanpoucke, Dirk Vandepitte

Flapping wing aerial vehicles

Flapping wing micro and nano aerial vehicles (**FWMAV** and **FWNAV**) are a group of small, lightweight drones with a propulsion method inspired by that of natural fliers such as insects, bats and birds. These vehicles showcase **agile flight manoeuvring** and **high collision resilience**. Compared to rotary wing vehicles, the wing tips move at relatively low speeds. The combination of these traits makes FWAVs suitable for safe operation inside of **confined spaces.**





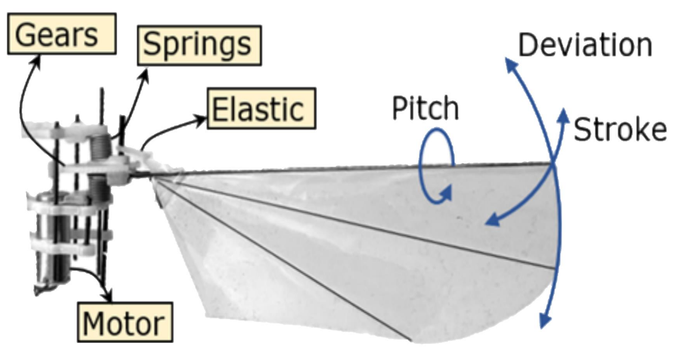
Wingspan: 19.5cm
Vehicle mass: 15.8gr
Stroke frequency: 20Hz

FWAV research at KU Leuven

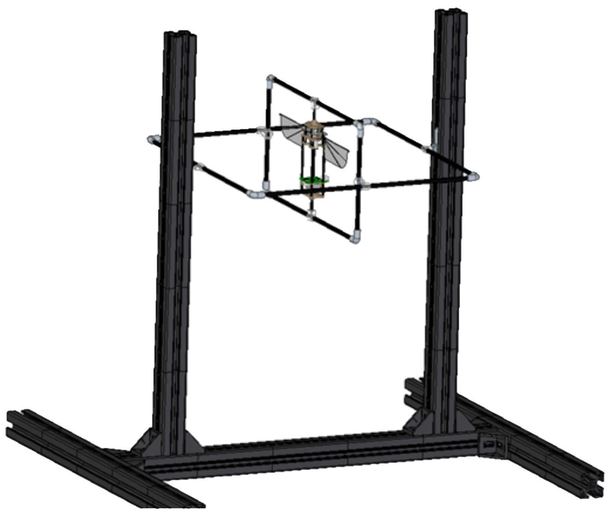
The KUlibrie project centres around the research and development of a **hummingbird-inspired** flapping wing drone **capable of hover**. Since 2011, our research group investigates the complex wing motion and aerodynamic phenomena that make **highly efficient** flapping flight possible, through a broad scope of computational studies and experimental campaigns.

Research activities

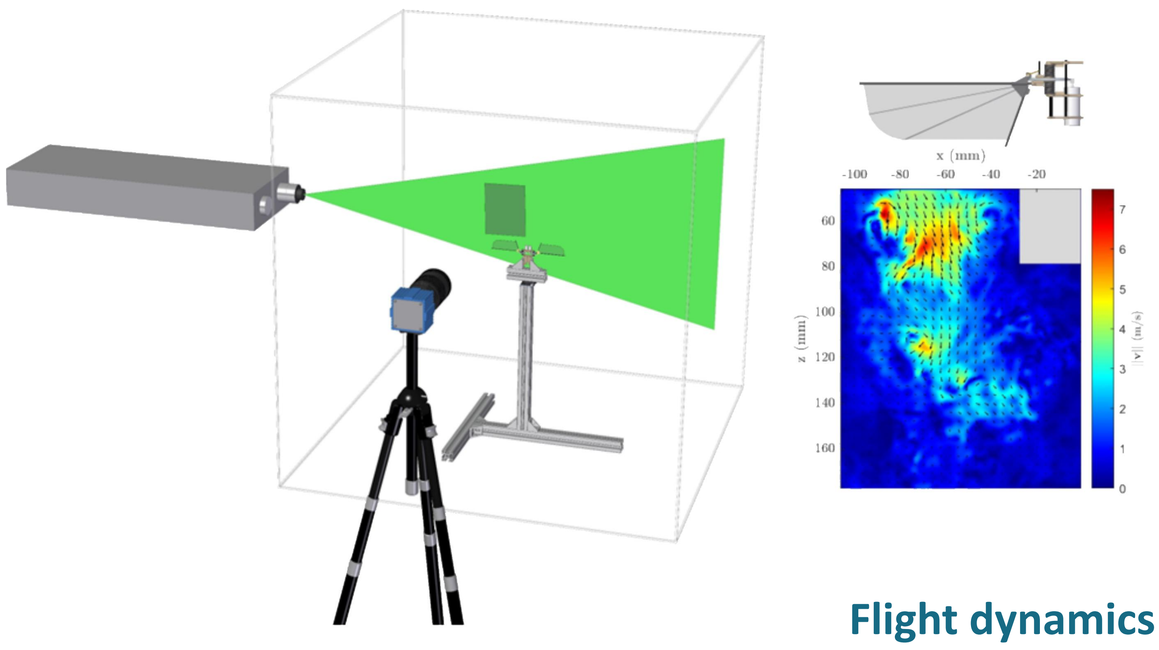
Design and prototyping



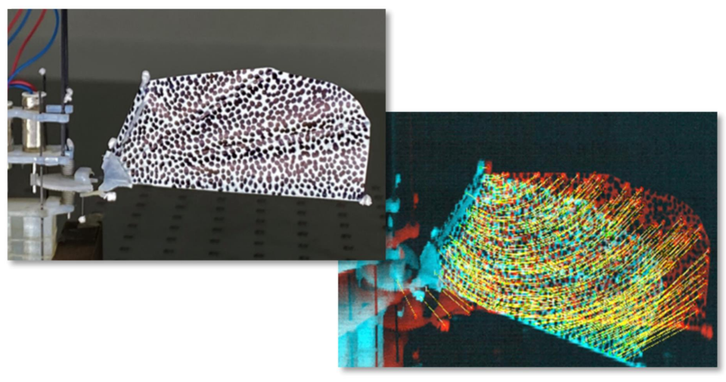
Flight controller development



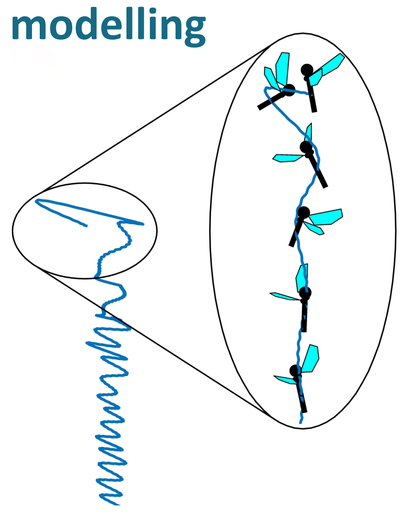
Aerodynamics measurement



Structural deformation & Kinematics measurement



Flight dynamics modelling



More information

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