

# Method and system for evaluating a structural integrity of an aerial vehicle, especially UAVs

Reference No: B79031

## CHALLENGE

The inventors identified that a largely neglected but growing field of technology in the context of **structural integrity monitoring** relates to smaller and currently mostly **unmanned aerial vehicles (UAVs)**. For these aerial vehicles, e.g. multi-copters and vertical take-off and landing vehicles (VTOLs), the **commonly used damage detection techniques** for aircraft are **economically not viable or even unsuitable** due to these smaller aerial vehicles' compact construction with an emphasis on composite materials and an increased sensitivity to additional weight of incorporated actuation and monitoring systems.

## INNOVATION

The invention provides an **effective method** and system for **evaluating the structural integrity** of small aerial vehicles by driving the aircrafts' engine/s with a selective vibrational pattern and recording the vibrational response. The **recorded modal parameters** of said vibrational response, and the shift of the recorded parameters versus the pre-determined baseline modal parameters of said aircraft are **related to the damage** of the vehicles' structure. Both the extent of the damage and its location can be determined.

## COMMERCIAL OPPORTUNITIES

- ✓ Applicable to (at least) all electrically driven UAVs, preferably multi-copters
- ✓ Reliable integrity monitoring of load bearing (fibre composite) structures
- ✓ Paying safety feature for professional drones and costly payloads
- ✓ All system components on board are easy to integrate with no additional weight and costs
- ✓ Method has the potential to be established as a technical standard
- ✓ Structural damage and e.g. loose screw connections can be distinguished

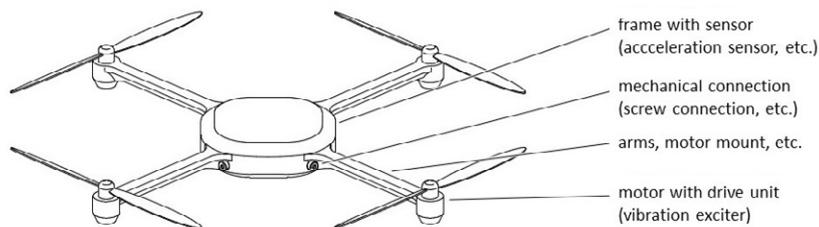


Figure: Schematics of a typical drone.



Figure: System warns of detected structural damage.

## DEVELOPMENT STATUS

Proof of concept has been provided on original carbon composite copter structures in the laboratory. Field trials with an airworthy copter will be the next step.