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 aircraft’s 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

**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.