

Structural integrity detection system for drones

The patented technology enables reliable integrity monitoring of load bearing (fibre composite) structures. Hence, it is a paying safety feature for professional drones and their costly payloads. All system components on board are easy to integrate with no additional weight and costs. As an example, the method even allows to distinguish loose screw connections from structural damage.

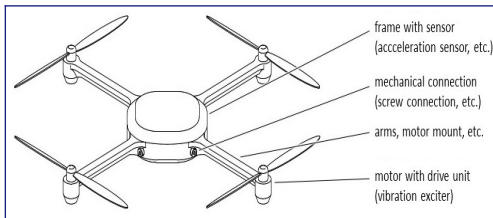


Higher safety level for larger multi-copters

Due to its simplicity and the significant gain in safety the method has the potential to be established as a technical standard.

- 01 Increased safety through automated pre-flight, in-flight and post-flight checks
- 02 No additional on-board equipment necessary – full payload available

- 03 Detecting and interpreting of (invisible) structural damage by modal analysis
- 04 Proof of concept has been provided on original carbon composite copter

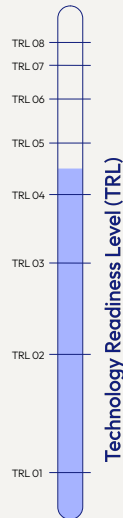


CHALLENGE

For UAVs, 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.



01 Basic principles observed · 02 Technology concept formulated · 03 Experimental proof of concept · 04 Technology validated in lab · 05 Technology validated in relevant environment · 06 Technology demonstrated in relevant environment · 07 System prototype demonstrated in operational environment · 08 System complete and qualified



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