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# Integration of Structural Health Monitoring Systems into Unmanned Aerial Systems - Challenges and Opportunities

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There is a simple reason for the dramatic growth in use of Unmanned Air Systems (UAS). Today's operations with strict rules of engagement create an insatiable appetite for intelligence, surveillance and reconnaissance (ISR) in particular in the form of live video-streams, imagery and signal intelligence. In this mission spectrum, UAS platforms offer appealingly low sustainment costs. The challenges and limits of UAS must be seen as opportunities. Defining the margin of UAS effectiveness is the first step toward identifying where manned or unmanned systems are the better solution.

The big question is whether the UAS market will continue its rapid growth and whether we can develop the right technology in time and cost. It will be essential to verify and validate the more complicated level of UAS autonomy and predictable through life support costs. Open system architecture coupled with enhanced health monitoring, embedded diagnostics and prognostics leading to automated decision support are key technologies of the R&T roadmap to support the development of UASs. All these technologies will have a main contribution to meet the certification requirements.

SHM is seen as a sub-system within a UAS Integrated System Health Management where information from a variety of sources is gathered in order to generate a component Health Assessment and estimate the component Remaining Useful Life for prognostic purposes.

This paper presents two main elements of the UAS R&T roadmap which are:

- the Design for Service (DfS) approach to secure predictable through life support costs;
- the certification / verification and validation framework aspects of SHM technologies.

**Ключевые слова:**

**Содержание.**

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