World Academy of Science, Engineering and Technology
International Journal of Aerospace and Mechanical Engineering
Vol:12, No:05, 2018

Managing Uncertainty in Unmanned Aircraft System Safety Performance Requirements Compliance Process

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Abstract : System Safety Regulations (SSR) are a central component to the airworthiness certification of Unmanned Aircraft Systems (UAS). There is significant debate on the setting of appropriate SSR for UAS. Putting this debate aside, the challenge lies in how to apply the system safety process to UAS, which lacks the data and operational heritage of conventionally piloted aircraft. The limited knowledge and lack of operational data result in uncertainty in the system safety assessment of UAS. This uncertainty can lead to incorrect compliance findings and the potential certification and operation of UAS that do not meet minimum safety performance requirements. The existing system safety assessment and compliance processes, as used for conventional piloted aviation, do not adequately account for the uncertainty, limiting the suitability of its application to UAS. This paper discusses the challenges of undertaking system safety assessments for UAS and presents current and envisaged research towards addressing these challenges. It aims to highlight the main advantages associated with adopting a risk based framework to the System Safety Performance Requirement (SSPR) compliance process that is capable of taking the uncertainty associated with each of the outputs of the system safety assessment process into consideration. Based on this study, it is made clear that developing a framework tailored to UAS, would allow for a more rational, transparent and systematic approach to decision making. This would reduce the need for conservative assumptions and take the risk posed by each UAS into consideration while determining its state of compliance to the SSR.

Keywords : Part 1309 regulations, risk models, uncertainty, unmanned aircraft systems
Conference Title : ICUAS 2018 : International Conference on Unmanned Aircraft Systems
Conference Location : Amsterdam, Netherlands
Conference Dates : May 10-11, 2018

Open Science Index, Aerospace and Mechanical Engineering Vol:12, No:05, 2018 publications.waset.org/abstracts/76947.pdf