

Virtual International Workshop on Engineering for Rotorcraft Safety, 7- 9 April 2021

Abstract: Rotorcraft Safety Roadmap and regulatory perspective on safety improvements by design.

The safety records and the public perception of the safety performance of helicopter operations are playing a role in the sustainability of the helicopter industry. The EASA reviewed European and worldwide rotorcraft safety data and initiated an ambitious plan to further reduce the number of helicopter accidents. Currently, there is on average one non-fatal rotorcraft accident per week, and 1.3 fatal accidents per month in Europe. A group of external experts from NAAs and industry developed with EASA a Rotorcraft Safety Roadmap with proposals to achieve the following vision and ambitious safety objective. The roadmap focuses on transversal issues and include training, operations, initial and continuing airworthiness and innovation. EASA released the Rotorcraft Safety Roadmap in December 2018. The vision is to achieve a significant safety improvement with a growing and evolving aviation industry. The main objective is to improve the overall Rotorcraft safety records by 50% within the next 10 years. The metrics retained is the number of Rotorcraft accidents in Europe for all types of EASA Operations with at least a fatality or a serious injury.

Based on the accident data, the priority was set on small rotorcraft and small operators as well as on Training. The other objectives are to make positive and visible changes to Rotorcraft safety trends within the next 5 years and for this to develop performance-based and proportionate solutions to help maintain competitiveness and the sustainability of European industry.

After having introduced the Roadmap, the presentation will provide a short summary of the ongoing activities by the Agency. The presentation will then focus on one work-stream of the Roadmap which is the design safety improvements and the strategy to facilitate the introduction of equipment and systems having operational safety benefits.

It is expected that the introduction of new functions (systems and equipment) in the current fleet of helicopters will improve the overall safety of helicopter operations. The Agency is currently working on the subject. The Agency reviewed the technologies that are available on the market that may bring operational safety benefits to helicopters. The review was based on the NLR Study 1 "*The potential of technologies to mitigate helicopter accident factors*". The study analysed 145 different safety technologies and applied them to a matrix along with their applicability to the safety issues, Technology Readiness Level, and relative cost of implementation. It was complemented by online research and direct exchanges for equipment and system manufacturers. In addition, direct discussions with manufacturers highlighted the most critical regulatory blocking point that prevent or limit the deployment of new technologies. The Agency decided to develop a policy called the Net Safety Benefit that aims at considering the potential safety benefit of a system/equipment in addition to the potential failures and balance the risks and benefits. Historically, the safety assessment of applications for airworthiness approval have focussed on risks associated with malfunctioning or failing systems and equipment installed on the aircraft. In this process, the operational use of the systems and equipment was assessed, but generally, no credit was provided for the operational safety benefits that the installation of such systems and equipment would provide. This policy will be published as a Certification Memorandum. The purpose of this policy will

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be to provide an approach to the demonstration of compliance to certain CS 27 specifications that is in line with reference standard guidance as adapted to installation of system/ equipment that provide operational safety benefit. This is achieved by introducing credits in the determination of the Functional Development Assurance Level (FDAL).

Learning from the application of the Net Safety Benefit and the proportionate approach already used in setting the safety objectives from small aeroplanes, a rulemaking activity has been initiated on small Rotorcraft CS27. The aim is to introduce proportionality in initial airworthiness certification and the safety objectives for design that are contained in CS27.1309 are currently being reviewed for revision. This may result in the definition sub-classes of small helicopters and proportionate safety objectives for each sub-class.

To promote the voluntary retrofit and installation of systems and equipment having safety benefits, the Agency developed and published several targeted communications. For example, an EASA communication of the benefit of FDR. EASA [article Flight Data Recorders for Light Helicopters](#), accompanying the [EASA Safety Information Bulletin \(SIB\) 2019 15 R1 Flight Recorders on Small Rotorcraft](#). A Workshop on Technologies with Safety Benefits was organised as part of the EASA Rotorcraft & VTOL Symposium 2019. An [Article on Technologies with Safety Benefits](#) published on the EASA Safety Promotion website.

Finally, the Agency is providing support to the industry in looking for the possibility to finance the retrofit of these equipment. For example the executive agency for innovation and networks ([INEA](#)) financed the retrofit of equipment/functions in the European aircraft fleet. A reviewed was performed and published.

Further, the Agency calls the research community to focus on addressing the safety risks identified in the EASA Annual Safety Review and mention the link or expected contribution to the Rotorcraft Safety Roadmap when answering Call for Proposals for European funding. More specifically, see how the technology can support safety improvement as one elements of a wider approach.

Clément Audard, VTOL Safety Coordinator, EASA