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RESEARCH REPORT

Unsettled Topics Concerning Airworthiness Cybersecurity Regulation

Aharon David

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About the Editor

Aharon David is a co-founder and partner of AFUZION-InfoSec, a global services, consulting, and training company specializing in aviation cybersecurity certification. He is also a speaker and trainer on aviation cybersecurity certification for organizations such as SAE International, AIAA, IEEE, Aerospace-Tech Week, and others. He is a member of all US and European standard-making committees for aviation safety-critical electronic systems, cybersecurity, artificial intelligence (AI), and unmanned aircraft systems (UAS), including SAE's S-18, G-32, and G-34; RTCA's SC-216 and 228; European Organisation for Civil Aviation Equipment's (EUROCAE) WG-72, WG-105, and WG-114; and others.

For the last decade, he has been an advisor to Israeli government authorities, such as the Civilian Air Authority of Israel (CAAI), on subject matters such as UAS, avionics software, cybersecurity, and more.

As an aerospace engineer and an Information Systems/Technology Management MBA with nearly four decades of hands-on engineering management and executive experience with the Israeli Air Force (IAF), Israeli Ministry of Defense (MoD), CAAI, and others, he held such positions as the commander of the IAF's Avionics & Control Software Centre (ACSC) and head of the Israeli Missile Defense Organization's (IMDO) System Engineering & Interoperability Department-among others.

He combines perspectives from technology, business, management of large organizations, civilian and defense, and passenger and UAS aviation development and certification.

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Unsettled Topics Concerning Airworthiness Cybersecurity Regulation

Abstract

The certification process of the Boeing 787, starting in 2005, marked a watershed for airworthiness regulation. The "Dreamliner," the first true "flying data center," could no longer be certified for airworthiness ignoring "sabotage," like the classic safety regulation for commercial passenger aircraft. Its extensive application of data networks, including e.g., onboard external digital communication, forced the Federal Aviation Administration (FAA), for the first time, to set "Special Conditions" for cybersecurity.

In the 15 years that ensued, airworthiness regulation followed suit, and all key rule-, regulation-, and standard-making organizations weighed in to establish a new airworthiness cybersecurity superset of legislation, regulation, and standardization. The resulting International Civil Aviation Organization (ICAO) resolutions, US and European Union (EU) legislations, FAA and European Aviation Safety Agency (EASA) regulations, and the DO-326/ED-202 set of standards are already the de-facto, and soon becoming the official, standards for legislation, regulation, and best practices, with the FAA already mandating it to a constantly growing extent for a few years now—and EASA adopting the set in its entirety in July 2020. This emerging superset of documents is now carefully studied by all relevant actors—including industry, regulators, and academia—as the aviation ecosystem moves forward with DO-326/ED-202 set training, gap analysis, and even with certification itself.

This report suggests a deeper analysis of these sets of regulatory documents and their effects on the aviation sector as they gradually become the law of the land, starting with their expected effect on the aviation ecosystem, the issues they pose to supply chains, and the challenges they present to the airworthiness certification process itself. Then, this report examines the major DO-326/ED-202 set gaps, inherent dilemmas, and methodological uncertainties. For each such unsettled domain, six aspects are reviewed. Finally, practical solution-seeking processes are proposed, and some specific potential frameworks and solutions are pointed out whenever applicable. It is the intention of this report that these insights and observations would assist regulators, applicants, and standard makers through, at least, the 2020s with accommodating this new regulation and start adjusting it to emerging realities.

NOTE: SAE EDGE™ Research Reports are intended to identify and illuminate key issues in emerging, but still unsettled, technologies of interest to the mobility industry. The goal of SAE EDGE™ Research Reports is to stimulate discussion and work in the hope of promoting and speeding resolution of identified issues. SAE EDGE™ Research Reports are not intended to resolve the challenges they identify or close any topic to further scrutiny.

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