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Agenda Item 2: Timely and safe use of new technologies
2.2: Addressing safety risks related to evolving aviation technologies

UNMANNED AIRCRAFT SYSTEMS (UAS)/ADVANCED AIR MOBILITY (AAM) DATA SHARING AND "RIGHT SIZED" SAFETY MANAGEMENT SYSTEM

(Presented by Flight Safety Foundation)

EXECUTIVE SUMMARY

This paper emphasizes the critical need for enhanced data sharing among advanced air mobility (AAM) vehicles and unmanned aircraft systems (UAS) operators to promote Safety Management Systems (SMS). There are unique challenges and opportunities presented by UAS and AAM vehicles within the aviation community, stressing the importance of integrating robust safety practices tailored to these technologies while acknowledging the current stage of market maturity.

1. INTRODUCTION

1.1 Over the past decade, unmanned aircraft systems (UAS) operations have grown significantly in aviation, surpassing traditional piloted flights in some regions. This growth underscores the necessity of adapting Safety Management Systems (SMS) to suit the distinct characteristics of UAS and their generally low-risk operations. Frameworks have evolved that recognized the unique operating environments and technologies that help mitigate risk and enable flights to take place that would otherwise not occur. These frameworks — the Specific Operational Risk Assessment (SORA) in Europe and safety case–based, beyond visual line-of-sight (BVLOS) waivers under Part 107 in the United States — indicate that SMS will work with other emerging advanced aviation vehicles.

1.2 Tailoring SMS involves developing frameworks that cater specifically to UAS operational dynamics and organizational structures. Central to this adaptation is the establishment of effective and seamless operational data-sharing practices that are institutionalized and non-competitive.

1.3 ICAO and its Member States play a pivotal role in providing guidance on data-sharing to support the UAS, aiming to optimize SMS to enhance aviation safety and strike a balance between innovation and safety.

2. DISCUSSION

2.1 UAS offer extensive opportunities for gathering safety-related operational data, enabling operators to track, monitor, and analyse diverse datasets crucial for hazard prediction, risk assessment, safety enhancement, and making informed business decisions.

2.2 There remains a lack of structured, non-competitive mechanisms for sharing UAS data for societal benefit, primarily due to concerns over proprietary information protection and fears of misuse. These concerns must be alleviated to realize the collective safety benefits.

2.3 The *Safety Management Manual (SMM)* (Doc 9859) highlights the importance of a reporting culture within organizations, emphasizing its role in effective hazard reporting, collaborative root-cause analysis, and risk mitigation.

2.4 The concept of "right-sizing" SMS is essential, ensuring that safety management systems are proportionate to operational risks and organizational capacities. Overly burdensome safety regimes can hinder safety culture development without meaningful safety improvements.

2.5 UAS operations differ significantly from traditional aviation in terms of operational environments and technological characteristics. This necessitates tailored safety approaches and regulatory frameworks that support diverse UAS applications, such as delivery operations and BVLOS flights.

3. CONCLUSION

3.1 ICAO and its Member States have a pivotal role in defining the types of data to be shared (including, but not limited to, operational data that is routinely collected digitally, incident/accident–related data, and human narrative incident reports), establishing principles for data-sharing, while advocating for data-driven safety cultures in UAS and AAM sectors.

3.2 Collaboration with regulators is essential to adapt and streamline safety programs based on operational performance and risks. This approach aligns with existing frameworks like European Union Aviation Safety Agency (EASA)’s risk-based approach and Federal Aviation Administration (FAA)'s performance-based regulations, fostering standardized safety cultures and data-sharing practices globally.

3.3 There are significant opportunities for ICAO to develop a comprehensive vision for digitally enabled data-sharing, to facilitate the development of safety analysis separate from more traditional incident reporting, and to advocate for proportionate safety culture and data-sharing requirements based on operational risks, while emphasizing the application of “right sized” SMS tailored to data-rich UAS operations.

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