European Union Aviation Safety Agency

EASA-FAA Industry-Regulator AM Event

virtual event

EASA -

Organised by: FAA

Event Type: Workshop

Date:

08 Nov 2021 to **12 Nov 2021**

Daily 15:30 - 19:30 CET (UTC +1)

Event Materials

Documents

Presentations 2021 EASA-FAA Industry-Regulator AM Event

Description

Further to the FAA-EASA Industry-Regulator annual AM Event, hosted in 2020 by the FAA, this annual harmonised event (run since 2018) will be hosted by EASA in 2021. This will be the 4th joint EASA-FAA Additive Manufacturing Workshop will continue to build on the outcomes of the successful 2015-2020 workshops, while striving to offer new coverage and technical insights based on the most recent developments in the area of Q&C for AM.

Due to remaining Corona restrictions we will hold this year’s meeting via WebEx running for 3.5-4 hours each day in the afternoons from 15:30 – 19:30 hrs (CET)

In response to the industry's interest and rapid expansion in the use of Additive Manufacturing (AM) methods in aviation products, in 2015 FAA began offering annual workshops focused on qualification and certification (Q&C) of AM parts in order to promote the technical dialogue and knowledge sharing between the key stakeholder groups, including government agencies, industry, public standards organizations and academia. The first three workshops were produced in partnership with the United States Air Force (USAF) and the Air Force Research Laboratory (AFRL). The European Aviation Safety Agency (EASA) started offering workshops on Q&C of AM as well in about the same timeframe. As a part of this process and in response to industry requests, FAA and EASA have been increasingly working together, resulting in

collaboration and alternate hosting of an annual aviation AM event by FAA and EASA respectively, previous events having been hosted by FAA in Wichita in 2018, by EASA in Cologne in 2019, and then by FAA virtually in 2020. The presentations and outputs from such events, and associated publications, are readily available (see Event proceedings section).

Based upon ‘lessons learned’ from previous Industry – Regulator Events, and noting the large number of AM industry events which are organized globally each year, EASA and FAA intend this developing series of annual Events to be focused more upon immediate regulatory related issues than other industry events, whilst also recognizing the need to remain aware of potential maturing technical issues which are of industry interest. This approach is intended to add value by complimenting other industry activities and by minimising redundant process. Furthermore, noting that development of emerging themes requires frequent engagement between WG members in order to create value, and that the need and duration of WG activity does not conveniently align with annual Event scheduling and workforce availability, the intention is for WGs to be increasingly active throughout the year and to exist as long as needed. It may be noted that WG1, 2, and 3 definitions for the 2021 Event demonstrate this intent to some extent relative to previous Events.

Organizing Committee

- Dr. Simon Waite, Senior Expert for Materials, EASA (co-organizer and host)
- Dr. Michael Gorelik, Chief Scientific and Technical Advisor (CSTA) for Fatigue & Damage Tolerance, FAA (co-organizer)
- Dr. Rollie Dutton, Director, Materials and Manufacturing, ARCTOS (workshop facilitator)

WORKING GROUPS

- **Working Group 1: Qualification of AM Parts of No, or Low, Criticality (for use in Certified products)**

Cochairs: S. Waite (EASA), M. Rife (Delta)

Description: AM offers to the aviation industry many potential opportunities, including those associated with applications of no, or low, criticality (being of no, or minimal, safety concern either at aircraft or passenger level), e.g. as may be of interest to some cabin interiors supplier organisations, MROs etc.

The emergence of AM technologies in the aviation industry is coincident with regulators moving towards performance-based regulations and regulatory intent to engage with industry to an extent proportionate to criticality, novelty, and complexity. Therefore, regulators need to ensure that change does not adversely impact safety, while not imposing unnecessary burden on the industry and maintaining a "level playing field."

Noting the many challenges associated with producing a repeatable AM product, as previously presented by many of the world's leading aviation organisations, the industry has been largely exercising a careful and deliberate approach in gradually increasing AM parts complexity and criticality. Therefore, following frequent communications with industry regarding parts of no, or low, criticality, the regulators consider it to be appropriate to engage with the industry now regarding its intent for such applications, including consideration of qualification aspects, design substantiation methods, test and analysis protocols, quality controls etc.

The intent of this breakout session is to build upon initial 2020 Event discussions, including developing European Aviation AM Industry Regulator Group (EAAMIRG) Actions*, and further amendments to the recently released EASA AM CM-S-008 revision.

*EAAMIRG Actions, i.e. ‘Part Classification and Authority Engagement’ (LoI etc), ‘Standardisation: understanding and use of ‘standards’

- The recent CM revision added content which may benefit from further discussion and development by interested parties, e.g. MROs, interiors organisations etc, relating to themes including:
- development of common industry standards regarding expectations for potential compliance data, e.g. statistics, testing etc., for parts of ‘no criticality’
- simple common data presentation protocols for the purposes of certification of parts of ‘no criticality’
- develop better understanding and definition of thresholds distinguishing parts of ‘no criticality’ from those of ‘low criticality’, including associated additional expectations for the latter, e.g. minimal supporting fatigue data, point design strategies etc
- sharing of examples of certification or planned certification of parts of no or low criticality
- improved standardization and awareness of criticality
- improved use of standards
- sharing of examples
- potential associated regulatory guidance development, e.g. content for EASA CS-STAN

Further to the above, EASA would intend to use progress to develop future CM revisions, supporting a ‘step by step’ approach to AM certification and encouraging improved certification efficiency via appropriate standardization.

- **Working Group 2: F&DT and NDI Considerations for Metal AM**

Co-chairs: M. Gorelik (FAA), A. Fischerworring-Bunk (MTU)

Fatigue and damage toleration (F&DT) related qualification considerations and related certification requirements have historically presented more significant challenges for structural components produced using process-intensive manufacturing technologies, and additive manufacturing (AM) is no exception. While all the key tenets of the certification requirements apply to AM, there is a number of material system specific considerations that need to be

understood and properly accounted for, including inherent material anomalies and their effect on fatigue life, residual stresses, non-destructive inspection (NDI) challenges, effects of post-processing, etc.

The need for developing a good understanding of these factors is further elevated by the expected near-term introduction of high-criticality AM parts in Civil Aviation that will be subject to F&DT regulatory requirements.

The intent of this working group is to discuss the most recent developments in these technical areas, while building on the outcomes of the F&DT and NDI breakout sessions from the 2019 and 2020 AM Workshops, and to further develop considerations for aviation application of AM. The desired outcomes of this working group and the corresponding breakout sessions during the 2021 AM Workshop include:

- - Formulating recommendations for standards development organizations (SDOs) / industry working groups as to which AM-specific F&DT and NDI topics should be addressed by public standards or specifications, and to develop initial technical considerations to seed such discussion
  - To develop recommendations for supporting R&D work (specific research topics)

- **Working Group 3: AM Machine Makers and End Users – Key Process Parameters (KPPs), Qualification, Requalification, and the Ideal 'End State'**

Co-chairs: R. Mellor (Rolls Royce), D. Godfrey (SLM)

The 3D printing of metal components for aviation and space is advancing. Companies are identifying more applications and many of those new applications demand more advanced technology from the machine makers. Printing technology will always evolve to be faster and safer with new alloys to print components that were not possible to produce just a couple of years earlier. These evolutions and improvements in technology require the need to implement rigid change control processes to ensure machine upgrades do not result in adverse influences with regard to part quality.

The European Aviation Safety Authority (EASA) and the Federal Aviation Association (FAA) established Working-Group 3 with the charter of how to (1) manage machine improvements / upgrades and (2) how best to manage / improve machine process monitoring.

WG-3 is working on how to best manage machine upgrades based on a 3-tiered "risk-based" system focused on technology improvements that influence the printing process. Those three tiers are low, medium and high. The team is working on expanding the identification of changes that might influence the printing process and where they might fit in the tiered system.

With regard to Process Monitoring, the Team is looking at identifying what machine parameters are most important, what should a final report look like and how can that report be attached to

an ERP Routing.

The European Aviation Safety Authority (EASA) and the Federal Aviation Association (FAA) are working together to encourage collaboration between 3D machine makers and companies under the regulations of these two agencies to work together to develop the best way for machine makers and users to collaborate, manage and implement technological advancements from machine OEMs with regard to component quality and flight safety when they release machine upgrades to meet increasing customer requirements

---

Agenda

AM event Agenda 2021

Registration

This event is intended for individuals directly representing organisations engaged in aviation related AM supply chain processes, including material suppliers, AM Machine Manufacturers, R&D, design, production, and continued airworthiness organisations.

Although a virtual event, experience suggests that the effectiveness and logistics of such meetings benefits from some reasonable limitations in participant numbers. Therefore, for the effectiveness of this workshop, participation will be based primarily upon invitation. If your organisation is not already represented and is nevertheless interested in a specific session(s), then you can always send a request for participation to the following e-mail: andrea.kalski [at] easa.europa.eu (andrea[dot]kalski[at]easa[dot]europa[dot]eu) stating your name, company, position and reason for participation. EASA and FAA will consider all such requests and will try to accommodate them on a “first come, first served” basis; however, we appreciate the understanding of your organization if unable to do so.

Upon completion of the event, the proceedings will be made available to the public under Event proceedings below on this page.

Note: 2021 has a busy meeting schedule, including meetings associated with AM. The EASA and FAA strived to avoid scheduling conflicts with other AM meetings as much as practical, and sincerely appreciate your support to make this meeting possible the week of 8-12th Nov. We hope that the travel time and effort saved resulting from a virtual meeting format will offset any inconvenience.

There is no fee to attend this virtual event.

Contact

Dr. Simon Waite
EASA Senior Expert – Materials
simon.waite [at] easa.europa.eu

Related Content

2020 FAA–EASA AM Workshop Report and Proceedings (please use the following link to request access: 2020 AM Workshop - Home (faa.gov))

2019 EASA–FAA AM Workshop Proceedings

2018 FAA–EASA AM Workshop Report and Proceedings Joint FAA—EASA Workshop on Qualification & Certification of Metal Additively Manufactured Parts