# FSEMC
### Together "We Set the Standard."

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|---|---|---|---|
| **To** | Emerging Technologies Working Group | **Date** | January 28, 2022 |
| **From** | Scott L. Smith<br>smitty@sae-itc.org<br>tel +1 443-221-8372 | **Reference** | 22-999/SMA-264 lth |

**Subject**   **Meeting Announcement**
**Emerging Technologies Working Group**

**Group Leads**   Marc Cronan, Collins Aerospace
Shane Carroll, Airbus

**Secretary**   Scott Smith
Executive Secretary and Program Director, FSEMC
SAE ITC, ARINC Industry Activities

**When**   **February 17, 2022**

| Date | Meeting Times | US Pacific | US Eastern | Central European |
|---|---|---|---|---|
| | Start | 0700 | 1000 | 1600 |
| | Adjourn | 1000 | 1300 | 1900 |

**Host**   This meeting will be 100% virtual. Details to be provided to those who register.

**Instruction**   Please notify ARINC Industry Activities of your intention to attend by registering online at: *http://www.aviation-ia.com/events/.*

The meeting is open to all interested parties. Individuals requesting time on the agenda should contact Scott Smith. Any material to be circulated prior to the meeting should be submitted via e-mail to Scott Smith by **February 15, 2022.**

A detailed agenda will be provided one week prior to the meeting.

**Activity Scope**   The Emerging Technologies Working Group's (EmTech WG) objective is to evaluate several new technologies that will affect the simulation industry in the future. The airlines and FSTD operators will be the end users of any technology and the applicable training facilities, devices, and support equipment.

The FSEMC will determine industry need and may develop applicable standards for the benefit of all stakeholders involved.

**Meeting Objectives**

The FSEMC invites the participation of all interested parties in support of developing this guidance and asks for your virtual attendance at the first meeting of the EmTech WG chartered under the Future Concepts for Simulators Subcommittee of FSEMC.

In response to growing industry interest in emerging technologies such as:

- Virtual Reality (VR)
- Mixed Reality (MR)
- Augmented Reality (AR)
- Artificial Intelligence (AI)
- Urban Air Mobility (UAM)
- Unmanned Aerial Vehicles (UAV)
- Vertical Takeoff and Landing (VTOL)
- Electric Vertical Takeoff and Landing (eVTOL)
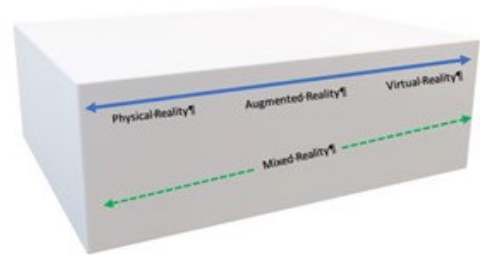


The application of these technologies to manned and unmanned aircraft pilot training, the Flight Simulator Engineering and Maintenance Committee (FSEMC) is pleased to announce an industry initiative to develop and publish guidance on the use of these technologies in training applications.

At this meeting we will review and update the draft ARINC IA Project Initiation/Modification (APIM) for the working group, with the intent to submit the final draft to the FSEMC Steering Committee for approval to proceed with the standardization efforts. The draft APIM is included as Attachment 1 to this announcement.

**Industry Coordination**

The EmTech Working Group will liaise with the SAE G-35 Modeling, Simulation, and Training (MST) for New Emerging Technologies and Concepts Committee to exchange knowledge across disparate engineering disciplinary specialties.

Interaction with regulatory agencies will also be encouraged to participate and help the EmTech shape the industry through best practices and standardization.

**Potential Deliverables**

In preliminary talks, two ARINC documents come to mind that could benefit from an update with new material focused on near-term work of the EmTech WG.

- **ARINC Project Paper 449:** *Optimizing Simulator Continuing Qualification using Profile Testing*
- **ARINC Specification 450:** *Flight Simulator Design and Performance Requirements*

Other ARINC Standards beneficial to the flight simulation industry include:

- **ARINC Report 432:** *Training Requirements for Flight Training Equipment Support Personnel*
- **ARINC Report 433:** *Standard Measurements for Flight Simulator Quality*

- **ARINC Report 434:** *Flight Simulation Training Device (FSTD) - Life Cycle Report*
- **ARINC Report 435:** *Guidelines for Cabin Training Devices*
- **ARINC Report 436:** *Guidelines for Electronic Qualification Test Guide*
- **ARINC Report 437:** *Guidelines for Training Facilities*
- **ARINC Report 438:** *Guidelines for Acceptance of Flight Simulation Devices*
- **ARINC Specification 439B:** *Simulated Air Traffic Control Environments in Flight Simulation Training Devices*
- **ARINC Report 440:** *Guidelines for the Provisioning and Support of Training Equipment Data*
- **ARINC Report 441:** *Guidelines for the Supply of Binary Format Software for Training Purposes*
- **ARINC Report 442:** *Guidelines for the Supply of Source Code/Electronic Block Diagrams for Training Purposes*
- **ARINC Report 443:** *Data Collection for Visual Databases*
- **ARINC Report 444:** *Overview of Export Control Issues for Flight Training Devices*
- **ARINC Report 445:** *Guidelines for the Configuration and Control of Loadable Software Aircraft Parts in FSTDs*
- **ARINC Report 446:** *Guidance for Flight Training Device Documentation Structure, Content, and Maintenance*
- **ARINC Specification 450:** *Flight Simulator Design and Performance Requirements*
- **ARINC Report 610C:** *Guidance for Design of Aircraft Equipment and Software for use in Training Devices*
- **ARINC Report 674:** *Standard for Cost Effective Acquisition for Aircraft Lifecycle Support*

The main objective of the meeting i**s** to better identify and understand the various challenges for all stakeholders and identify required steps to implement guidelines.

**Meeting Participants**

We are seeking diverse representation (in number and global/regional coverage) of the different stakeholders to capture overall industry challenges and determine collaboration means between TDMs, OEMs, suppliers, and FSTD operators to address such challenges. The meeting is open to the following stakeholders:

- FSTD users, airlines, and training centers
- TDMs and integrators
- Aircraft Manufacturers
- Regulatory agencies
- Simulator software suppliers
- All others concerned

**cc**   FCS, FSEMC, FSEMC Steering Committee

# Attachment 1

# ARINC IA Project Initiation/Modification (APIM)

## Name of proposed project                    APIM #:  21-201

*Establishment of a working group to provide industry guidance on the application of Emerging Technologies (VR/MR/XR, etc.) to aviation training tasks.*

*The group shall be known as the ETWG or Emerging Technologies Working Group.*

## Suggested Subcommittee assignment

*FSEMC Emerging Technologies (EmTech) Working Group*

## Project Scope

*The emergence of a new class of technologies such as virtual, mixed, and augmented reality, collectively known as Cross-Reality (xR), has the potential to revolutionize the aviation training industry.*

*While still in the early stages of development, advancement in these technologies is outpacing the aviation training industry's rate of adoption due to:*

- *A wide variety of the types of technology being developed*
- *Unclear application of the technology*
- *Reluctance to change*
- *Absence of regulatory guidance*

*The objective of this working group is to address these gaps with the objective of accelerating the rate of adoption of these technologies, in the interest of reducing training costs using more cost-effective training equipment and increasing pilot task proficiency through the appropriate application of the technology.*

*In addition to its direct application to conventional pilot training tasks, it is envisioned that xR technologies will be widely used for pilot/operator training in the emerging fields of Urban Air Mobility (UAM) and Advanced Air Mobility (AAM) employing manned and unmanned Electric Vertical Takeoff and Landing (eVTOL) aircraft.*

*FSEMC, through its charter to develop consensus standards and guidance for the betterment of the aviation simulation industry, and through its extensive history, experience and established processes developing standards such as the recent **ARINC Specification 439B:** Simulated Air Traffic Control Environments in Flight Simulation Training Devices, make it ideally suited to develop this same training-focused guidance for these emerging fields as well.*

*However, FSEMC cannot accomplish this alone and must rely on the support of AAM specific expertise found outside the traditional FSEMC expertise boundaries. FSEMC acknowledge the recent formation of the SAE-ITC G-35 Technical Committee and intend to work collaboratively with G-35 on ETWG activities.  In support of this, the ETWG shall appoint a working group member as liaison between the two groups.*

## Project Benefit

*The activities of the ETWG shall be consistent with the FSEMC Mission Statement and will benefit the FSEMC constituency through the development of guidance that will accelerate the industry adoption of this technology.*

*Cost savings are expected to be realized through broader adoption of lower cost training devices and through the avoidance of duplication of effort across businesses by working through consensus-developed standards.*

*Improvements in safety are expected to be realized through broader application of these technologies to specific training tasks, allowing for greater concentration of training with reduced dependency on full flight simulators.*

## Companies Supporting This Issue

*Feedback received by FSEMC during conferences, technology workshops and other activities suggest strong, industry-wide support for this effort.*

*Specific companies supporting the activity include the FSEMC Steering Committee member organizations, plus other companies outside FSEMC including xR technology companies and other consumers of aviation training.*

*Specific companies expressing their support thus far are:*

- *Collins Aerospace*
- *Airbus*
- *Flight Safety International*
- *L3 Harris*
- *Lufthansa Aviation Training*
- *Moog, Inc.*
- *Cathay Pacific Airlines*
- *Istanbul Flight Training Center*
- *Muller Simulation*
- *FedEx*
- *Mark Dransfield – Sim Ops*
- *Varjo*

**Issues to be worked**

> *The pace of advancement in xR technology is driven in part by gaming technology, consumer markets and other forces outside the flight training industry. As such it would be difficult, perhaps inappropriate, to focus entirely on specific technology concerns. While these do need to be taken into consideration to the extent that standards or guidance would not need to be re-written every 6 months, the primary emphasis of the ETWG shall be focused application of these technologies to specific training tasks.*
>
> *Potential specific topics for consideration include the following, subject to the collective decision making of the ETWG:*
>
> - *Standards for Usability (re. the discussion item on Health & Safety during virtual FSEMC 2021)*
> - *Standards for objective and subjective assessment in an FSTD context (general requirements, validation tests, functions and subjective tests)*
> - *Considerations linked to the rapidly changing technology (for instance enable changing the HMD on a device without a heavy qualification process) + make something future proof (monofocal, varifocal, lightfield, holograms, etc)*
> - *Considerations regarding interaction with the cockpit (eye tracking, hand tracking, haptic feedback, etc)*
> - *Considerations regarding transport delay in the case of VR, MR, AR*
> - *Instructor related requirements*

**Examples of problem areas to be resolved:**

> *See above paragraphs.*

**Recommended Coordination with other groups**

> *As described above regarding SAE G-35, as well as coordination with the Royal Aeronautical Society (RAeS) Flight Simulation Group, EASA, FAA, CAAC and others as may be appropriate to meet the objectives of the ETWG.*

**Projects/programs supported by work**

> *The ETWG activities shall compliment and support other FSEMC subcommittees and working groups that may be active at the same time. Duplication of effort shall be avoided.*

**Timetable for projects/programs**

> *In the interest of moving quickly and to provide maximum benefit to the industry, initial ETWG output shall be targeted for the end of calendar year 2022.*

**Documents to be produced and date of expected result**

> *The ETWG anticipate producing an ARINC Guidance document on the application of emerging technologies to training tasks.*

**Comments**

*None*

**Meetings**

*The following table identifies the number of meetings and proposed meeting days needed to produce the documents described above.*

| Activity | Mtgs | Mtg-Days | Docs |
|---|---|---|---|
| ETWG | Virtual only (2022) | One, 2-3 hour virtual meeting held quarterly, plus intermediate meetings as required to support completion of action items and document development tasks. | TBD |

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## *For IA Staff use*

**Date Received:**                    **IA Staff Assigned: Scott Smith**

**Potential impact:**

*(A. Safety      B. Regulatory        C. New aircraft/system        D. Other)*

**Forward to committee(s) (AEEC, AMC, FSEMC): FSEMC      Date Forward:**

**Committee resolution:**

*(0 Withdrawn  1 Authorized   2 Deferred     3 More detail needed  4 Rejected)*

**Assigned Priority:          Date of Resolution:**

   **A.** – High (execute first)      **B.** – Normal (may be deferred for A.)

**Assigned to SC/WG: Staff Activity and Steering Committee**

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