

AEEC, AMC, and FSEMC: Aviation Industry Activities Organized by ARINC

▶ Value Proposition

- Cooperatively develop shared technical solutions and establish technical standards that no one organization could accomplish independently
- Resulting standards and solutions improve cost effectiveness, increase productivity, and reduce life cycle costs
- Value created for airlines; aircraft and flight simulator manufacturers; avionics suppliers; and aviation maintenance, training, and communication service providers

▶ ARINC-Organized Activities

- **AEEC**: Avionics and cabin equipment standards
- **AMC**: Avionics maintenance
- **FSEMC**: Flight simulation and cabin training



Aviation Industry Activities Organized by ARINC

**Aeronautical Radio, Inc.
Board of Directors**

AEEC
(Airlines Electronic
Engineering Committee)
Established 1949

AMC
(Avionics Maintenance
Conference)
Established 1949

FSEMC
(Flight Simulator Engineering
& Maintenance Conference)
Established 1994

ARINC Industry Activities

AEEC•AMC•FSEMC
Aviation Industry Activities

- ▶ Aviation Industry Activities Established by ARINC Board With Approved Terms of Reference
- ▶ Collectively the Leadership of the Industry Activities Includes 60+ Members from 24 Airlines and 15 Aviation Organizations With ARINC Staff as the Secretariat

AEEC•AMC•FSEMC Leadership Committees

- ▶ AEEC•AMC•FSEMC Leadership Committees
 - AEEC Executive Committee
 - AMC Steering Group
 - FSEMC Steering Committee
- ▶ Leadership Committees
 - Guide the work of their respective activity
 - Formulate and implement policies and procedures consistent with Terms of Reference
 - Develop documented procedures for leadership committee membership and elections
 - Authorize and review the organization technical work program and rule on the initiation and adoption of proposed ARINC Standards
- ▶ AEEC, AMC, and FSEMC Chairmen Are Elected From Leadership Committee Representatives
- ▶ Leadership Committees and ARINC Secretariat Collaborate in Developing Budget and Reviewing Membership Fees

Value Created by AEEC (Airlines Electronic Engineering Committee)



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AEEC•AMC•FSEMC
Aviation Industry Activities

- ▶ Airline Driven Standards for Avionics Throughout Aircraft
 - Standardized Solutions to Reduce Acquisition and Modification Costs and Improve Current and Future Operations
 - Standardized, Lower-Cost Infrastructure for New Aircraft
- ▶ Many AEEC Projects and ARINC Standards Address Avionics Issues Independent of and Beyond LRU Interchangeability
- ▶ Forums Enable Economic Solutions to Technical Issues
- ▶ AEEC Strength—A Cooperative Approach in Consensus Process

ARINC
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AEEC Conducts Technical Investigations and Evaluations and Develops ARINC Standards

- ▶ ARINC Standards Developed With Broad Participation by Airlines, Airframe Manufacturers, Avionics Manufacturers, Service Providers, and Other Companies & Organizations
- ▶ AEEC Members from Airlines in U.S., Europe, Asia, and Business Aviation; Responsible to
 - Identify and direct accomplishment of technical projects that provide the greatest benefit to aviation community
 - Reviews and approves project scope, benefits, schedules
 - Adopts ARINC Standards developed by AEEC
- ▶ ARINC Standards
 - Characteristics: Avionics form, fit, function, and interfaces
 - Specifications: Packaging, data communication, data bases, other
 - Reports: Guidelines and best practices often related to maintenance

ARINC Standards Create Value on New Aircraft and Retrofits to Existing Aircraft

	New Aircraft (including B787, A380)	Existing Aircraft (e.g., B767, B737, A330/340, A320)
CNS	<ul style="list-style-type: none"> ▶ Nav database (424) ▶ Transponder (718A) ▶ Traffic computer 	<ul style="list-style-type: none"> ▶ FMC, MMR (702A, 755) ▶ VHF/HF radio (750, 719) ▶ MCDU (739)
Networks & Security	<ul style="list-style-type: none"> ▶ Ethernet (664) ▶ Security (811) ▶ Wireless LAN (822) 	<ul style="list-style-type: none"> ▶ Data Link Security (823) ▶ Cabin/seat networks (628) ▶ Avionics bus (429)
Cabin & Galley Systems	<ul style="list-style-type: none"> ▶ 3GCN (808) ▶ Galley Inserts (812 ,813, 814) ▶ Network Server (821) 	<ul style="list-style-type: none"> ▶ Seat integration (628 P2, P5) ▶ File Server (763) ▶ Cabin telephone unit (746)
System Architecture and Interfaces (SAI)	<ul style="list-style-type: none"> ▶ APEX (653) ▶ Avionics Ethernet (664 P7) ▶ Cockpit Display (661) 	<ul style="list-style-type: none"> ▶ FDR/CVR (747, 757, 777) ▶ TAWS (762) ▶ EFB Interface (828)
Data Link	<ul style="list-style-type: none"> ▶ Satcom (781) ▶ HFDDL (636) ▶ AOC messages (633) 	<ul style="list-style-type: none"> ▶ ACARS (618, 619, 620, 724B) ▶ Satcom (741, 761) ▶ Printer (744)

AEEC Work Program Summary

Technology Area	AEEC Groups (See Acronym List on Last Chart)
Communication	AGS, DLK, DLK Users, AOC
Navigation	ADB, NDB
Cabin	CSS, 3GCN, GAIN
Network/ Infrastructure	ADN, ANFS, FOWG, CDS, DVE, DAD, HUD, ISS
Systems & General	AEEC, SAI, APEX, DFDR, FRED, SDL, SEC

- AEEC Meetings Deliver Almost 5,000 Engineering Staff-Days of Collaborative Technical Effort
- AEEC Leverages Supplier Resources: Five Supplier Participants for Each Airline Participant or IA Staff Member

Boeing and Airbus are AEEC Member Organizations



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Airbus A-320 Copyright © 2001 The Smithsonian Institution

- ▶ Participate in AEEC because it provides a means to work cooperatively with the aviation industry to develop appropriate standards that add value to their products and reduce costs to their customers.
- ▶ Global Air Traffic Management will require CNS enhancements in new aircraft and CNS retrofits in older aircraft. AEEC plays a key role in developing timely standardized CNS solutions—especially for aircraft that fly globally.

Airline Value Created by AMC (Avionics Maintenance Conference)



- ▶ Promotes Reliability and Reduced Operating Costs in Avionics by Improving Maintenance Through Cooperation
- ▶ Conducts Annual Avionics Maintenance Conference With Over 700 Attending
 - More than 65 airlines
 - Nearly 200 other organizations
- ▶ Numerous Service Bulletins Issued in Response to AMC Questions
- ▶ Sponsors Subgroups for Specific Issues
 - Electronic Distribution of Software
 - Loadable Software Standards
 - Test, Tools, Parts, and Materials Equivalency
 - Lead Free Solder

Representative Airline-Specific Benefits From Recent AMCs

- ▶ Airline Reported Benefits of AMC Participation
 - Direct savings
 - Potential future gains
 - Resolution of ongoing problems
 - Industry contacts and knowledge
- ▶ One airline reported that repairs to 757 Flight Control Computer power supplies were costing them \$100,000 annually. After discussion at AMC, service bulletin issued correcting problem
- ▶ Other Airlines Report Substantial Cost Avoidance from AMC
 - Major U.S. Airline \$500,000 for a single year
 - Major European Airline \$300,000 for a single year
- ▶ Tooling and Test Equivalence program described in ARINC Report 668 results in lower cost implementation and is readily accepted by regulatory authorities.
- ▶ According to one major airline: *“AMC is the most important annual event for avionics shop managers and engineers... to build essential networks... and solve technical problems.”*

Airline Value Created by FSEMC

(Flight Simulator Engineering and Maintenance Conference)



- ▶ Provides Real, Immediate, and Cost-Effective Solutions to Simulator Operational and Maintenance Problems
- ▶ Creates Simulation Standards That Increase Simulator Readiness and Reduce Operational Costs
- ▶ Building on a Decade of Success That Has Made the FSEMC a Premier Annual Event in Simulation
- ▶ Increasing Emphasis on Integrated Systems, Software, Product Support, Data Packages, and Intellectual Property Considerations

ARINC Standards Developed by AEEC•AMC•FSEMC Create Value for the World's Airlines

Representative Examples

Does your airline currently or plan to —	If Yes	Then Your Airline Benefits from ARINC Standards Developed by AEEC•AMC•FSEMC
Use an FMS to plan and execute flight legs?	<input type="checkbox"/>	<ul style="list-style-type: none"> • ARINC 424 is the language of navigation database • ARINC 702A is the characteristic for interchangeable FMS avionics
Use ACARS for AOC?	<input type="checkbox"/>	<ul style="list-style-type: none"> • ARINC 618, 619, 620 define ACARS protocols and messages • ARINC 724B, 739, 740 define base data link avionics • ARINC 750, 753, 761, 781 define VHF, HF and satcom radio systems for ACARS
Accept data link departure and oceanic clearances?	<input type="checkbox"/>	<ul style="list-style-type: none"> • ARINC 623 defines these messages
Operate the latest generation aircraft from Airbus and Boeing?	<input type="checkbox"/>	<ul style="list-style-type: none"> • ARINC 653 defines a real-time operating system interface becoming the basis for both multiple application platforms (e.g., integrated surveillance, common core) and dedicated, single-function processors (e.g., autopilot) • ARINC 665 P7 defines deterministic full-duplex Ethernet avionics bus structure • ARINC 808 defines cabin networking architecture • ARINC 811 and 812 define modular galley architecture • ARINC 746 defines HUD architectures
Use broadband IP for company applications with appropriate security measures?	<input type="checkbox"/>	<ul style="list-style-type: none"> • ARINC 811 defines a process framework for evaluating information security needs in the context of airline operations

AEEC, AMC, & FSEMC Strategic Planning

- ▶ Airlines and Aviation Industry Participants Stated That They Obtain Substantial Value from AEEC, AMC, & FSEMC
- ▶ Airlines Concur That Change Is Needed to Meet New Realities of Airline and Aviation Industries
- ▶ Aviation Community Concurred That Airlines Need to Retain a Leading Role in Directing AEEC, AMC, & FSEMC
- ▶ Until Now, U.S. Major Airlines Provided Majority of Funding and Had the Dominant Role in Directing Activities
- ▶ Continued Success of AEEC, AMC, and FSEMC Requires Participation and Broad Funding By Airlines and Aviation Industry
- ▶ Future Funding and Direction of the Activities Must Be Fairly Distributed Among All Participants
- ▶ Membership and Corporate Sponsor Business Model Selected; Expanded AEEC, AMC, & FSEMC Governance

Benefits for Members

- ▶ **Primary Benefit. Ensure the Continued Viability And Success of AEEC, AMC, & FSEMC**
 - Active participation and financial support provided by Members are the critical factors that enable the AEEC, AMC, & FSEMC to create value.
 - Members benefit from the information exchange among participants and the ARINC Standards and other technical deliverables that result from the work of these activities.
- ▶ **Executive Committee:** Members are eligible to vote for companies to serve on the executive committee for each activity and are eligible to be elected to the committees.
- ▶ **Electronic Documents:** Members receive unlimited downloads of ARINC standards, meeting reports, and other documents at no additional charge.

For More Information – www.aviation-ia.com



Aviation Committees

Electronic Distribution
Membership / Sponsorship
Information
Acronym List
Events Calendar

▶ [AEEC](#)

▶ [AMC](#)

▶ [FSEMC](#)

▶ [ARINC Standards](#)

Aviation Committees - AEEC • AMC • FSEMC: Creating Value for Aviation Through Collaboration



[AEEC](#), [AMC](#), and [FSEMC](#) are aviation industry activities organized by ARINC to establish consensus technical standards, known globally as ARINC Standards, and develop shared technical solutions that no one organization could accomplish independently.

[ARINC Standards](#) and collaborative solutions improve cost effectiveness, increase productivity, and reduce life-cycle costs for airlines and their partners in the avionics, cabin system, and flight simulation and training segments of the aviation industry.

AEEC, AMC, and FSEMC are global technical activities comprised of airlines and other organizations eligible to be Member Organizations with additional support provided by Corporate Sponsors. Find out more about [AEEC, AMC, and FSEMC Memberships and Corporate Sponsorships](#).

Each activity operates under the leadership of aviation industry committees elected by the AEEC, AMC, and FSEMC Member Organizations in accordance with their respective

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AEEC, AMC, & FSEMC — *Creating Value for Aviation Through Collaboration in Avionics and Flight Simulation*



- ▶ Benefits of AEEC, AMC, & FSEMC Are Clear and Compelling
- ▶ AEEC, AMC, & FSEMC Are Changing with the Times
- ▶ AEEC, AMC, & FSEMC Require Continued Commitment and Support from the Entire Aviation Community
- ▶ Your Involvement Is Critical to Ensure that the Cooperation Fostered by AEEC, AMC, & FSEMC and the Value Created Will Endure and Thrive

Acronyms

▶ 3GCN	3rd Generation Cabin Network	▶ FMS	Flight Management System
▶ ADB	Airport Data Base	▶ FRED	Flight Recorder Electronic Documentation
▶ AND	Aircraft Data Network	▶ GAIN	Galley Inserts
▶ AGCS	Air-Ground Communication Systems	▶ HUD	Head-Up Display Systems
▶ ANFS	Aircraft Network and File Server	▶ ISS	Integrated Surveillance System
▶ AOC	AOC Messages	▶ LFE	Lead-Free Electronics
▶ APEX	Application/Executive Software	▶ MPP	Materials, Processes and Parts
▶ ASVI	Avionics Serial Video Interface	▶ NDB	Navigation Data Base
▶ CDS	Cockpit Display Systems	▶ NIC	New Installation Concepts
▶ CSS	Cabin Systems Subcommittee	▶ OMS	Onboard Maintenance System
▶ CTD	Cabin Training Devices	▶ SAI	Systems Architecture and Interfaces
▶ CTU	Cabin Telecommunications Unit	▶ SDL	Software Data Loader
▶ DAS	Digital Audio Subcommittee	▶ SEC	Aircraft Information Security
▶ DFDR	Digital Flight Data Recorder	▶ SMR	Simulator Maintainability and Reliability
▶ DLK	Data Link Systems	▶ TDF	Training Device Facility Requirements
▶ DLK Users	Data Link Users Forum	▶ TIF	Traffic Information File
▶ eQTG	Electronic Qualification Test Guide	▶ VDL	VHF Digital Link
▶ ESDS	Electrostatic Discharge and Soldering	▶ XPDR	Transponder
▶ FCM	Future Concepts for Maintenance		
▶ FCS	Future Concepts for Simulators		
▶ FOS	Fiber Optics Subcommittee		