SAE INTERNATIONAL

PHM SOCIETY 201 EDUCATION & STANDARDS PANEL

Standards Organization Perspective

Logen Johnson
SAE Aerospace Standards

ABOUT SAE

- Not for profit, non-lobbying technical society
- Global, industry-managed, industry-led programmes
- Standards Development Organisation (SDO)
- Wealth of engineering knowledge in books, standards, papers, online content
- Technical conference provider
- Engineering training provider
- Offices in North America, Asia, Europe:
  - World Headquarters – Warrendale PA, USA
  - ARINC HQ – Bowie, MD, USA
  - Aerospace Standards – Washington DC
  - Asia – Shanghai, PRC
  - Aerospace Standards Europe – London, Brussels

THE SAE PORTFOLIO

A Global Association of More Than 140,000 Engineers and Related Technical Experts

SAE HISTORY – AND FUTURE

1905

SAE formed in 1905 to promote safety and common practices for the emerging automobile market.

SAE charter expanded in 1916 to incorporate aeronautics

1st SAE Aerospace Standard, 1917

SAE member Elmer Sperry created the term “Automotive” - from Greek autos (self), & Latin motivus (of motion) to represent any form of self powered vehicle

Electronic publishing, 1980s

Opened offices in Washington DC, London, Shanghai

100 year anniversary of the 1st aerospace standard, 2016

SAE PHM RELATED ACTIVITES

SAE COMMITTEES WITH HEALTH MANAGEMENT ROLES

- S-18: Aircraft and Systems Development and Safety Assessment
- HM-1: Integrated Vehicle Health Management Committee
- E-32: Aerospace Propulsion Systems Health Management
- G-11: Reliability, Maintainability/Supportability and Probabilistic Methods Group
- AISCSHM: Aerospace Industrial Steering Committee on Structural Health Monitoring
- AS-3: Fiber-Optics and Applied Photonics
- A-6: Aerospace Actuation, Control and Fluid Power Systems
- AE-5: Aerospace Fuel, Oil and Oxidizer Systems Steering Group
- A-5 Aerospace Landing Gear Systems
- **SAE Reliability, Maintainability, and Health Management Systems Group**

SAE RELIABILITY, MAINTAINABILITY, AND HEALTH MANAGEMENT SYSTEMS GROUP

- G-11M: Maintainability, Supportability and Logistics
- G-11PM: Probabilistic Methods Technology
- G-11R: Reliability
- AISCSHM: Aerospace Industrial Steering Committee on Structural Health Monitoring
- E-32: Aerospace Propulsion Systems Health Management
- HM-1: Integrated Vehicle Health Management (IVHM)

SAE IS ENABELING THE DIGITIZATION OF AEROSPACE

Systems Management Council (SMC)

- Life Cycle Logistics and Supportability Data
- Configuration Management Data
- System Engineering Data

Integrated Vehicle Health Management (IVHM)

- Prognostics and Health Management
- Preventative Maintenance and Maintenance Credits

Digital and Data Steering Group

- Digital Twin and Digital Thread
- Data Governance and Security
- Blockchain Applications
- Big Data and Artificial Intelligence

SYSTEMS MANAGEMENT COUNCIL

Formed in 2017, the Systems Management Council is a sector agnostic council comprised of several standards committees. The committee's activities include the development and maintenance of system and enterprise level standards used by the US DoD and suppliers, and a growing number of commercial companies such as Boeing commercial.

SMC

- Enterprise Information Data Management
- Configuration Management
- Reliability
- Lifecycle Logistics Supportability
- EMI/EMC
- Human Systems Integration
- Systems Engineering
- Systems Safety
- Position, Navigation, and Timing

BIG DATA AND PREDICTIVE ANALYTICS

HM-1 Health Management Committee

- **ARD6888 (Published)** Functional Specification of Miniature Connectors for Health Monitoring Purposes
  - This specification will be used to study the feasibility of developing a dedicated connector standard.
- **ARP5783 (Published)** Health and Usage Monitoring Metrics, Monitoring the Monitor
- **ARP6904 (WIP)** Data Interoperability for IVHM
- **AIR6915 (WIP)** Implementation of IVHM, Human Factors and Safety
- **AS5393 (Published)** Health and Usage Monitoring System, Blade Tracker Interface Specification
- **JA6268 (Published)** Design & Online Communication Standards for Health Ready Components
- **AS5394 (Published)** Health and Usage Monitoring System, Advanced Multipoint Interface Specification
- **AS5395 (Published)** Health and Usage Monitoring System Data Interchange Specification

NEW SAE ETA COMMITTEE - PURPOSE

Serve as a forum to gather develop, record, and publish expert information in the discipline of electronic transactions for aerospace, enabling trust in the following attributes:

The electronic exchange and scalability of data

A decentralized source for data

The security of data

The accuracy of data

The traceability of data

The provenance of data

The integrity of data

The prevention of unauthorized changes to the data

The reliability of access to and long-term retention of data

The use of data is compliant with aviation regulations and policies

The protection of intellectual property (IP) associated with data

The measured value and cost of electronic data exchange

OBJECTIVES OF THE ETA COMMITTEE

Review industry experience and the “state-of-the-art” in aerospace electronic transactions and publishes documents known as SAE Aerospace Standards (AS), Aerospace Recommended Practices (ARP), Aerospace Information Reports (AIR), and Aerospace Resource Documents (ARD) which cover the discipline of electronic transactions for aerospace.

Specifically, the committee will:

- Develop and publish SAE Technical Reports for improving digital solutions to store, move, and access product lifecycle data and streamline technical supply chain data.
- Act as a key forum for enabling global adoption and implementation of technologies that meet the desired attributes listed above.
- Enable the ability of different authorized components, systems, IT, software, applications and organizations to securely communicate, exchange data, interpret data, use the information and derive consistent insight from the data that has been exchanged to derive value.
- Enable the data transfer necessary to support maintenance, logistics, operation and engineering.
- Maintain an ongoing dialogue with the automotive sector counterparts to reduce duplication in efforts.

SCOPE OF THE ETA COMMITTEE

The following classes of air vehicles and related equipment and platforms may be considered either separately or grouped as appropriate for the specific purpose:

Civil fixed and rotary wing air vehicles

Military fixed and rotary wing air vehicles

Unmanned fixed and rotary wing air vehicles

Space vehicles

Data processing equipment, systems and software

Air vehicle maintenance platforms

The scope of the committee is to accumulate and disseminate aerospace electronic transaction system techniques and experience relating to the above groups.

ETA COMMITTEE CORNERSTONE DOCUMENT “USE CASES” DOCUMENT SPONSORS: RAVI RAJAMANI, MARTIN WHITFIELD

Certification: Completing Certification Process and Maintaining Type Certification (TC) records

Supply Chain Traceability / Parts Provenance:

Vehicle Maintenance – as-maintained BOM

Incidence Investigation: maintaining regulatory data records.

Aircraft Coins/Tokens: Use of Digital currencies in aircraft leasing

Interest from the FAA:

- Use Blockchain to replace the Form 8130-3 Authorized Release Certificate, Airworthiness Approval Tag

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