Researching Data Ownership & Trust
SAE AIR 6904 working group
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Expected data volumes in aircraft data

By 2026, overall fleet of nearly 20,000 aircraft will generate 98 Exabytes/year.

Source: Oliver Wyman Fleet & MRO Forecast, www.planestats.com/betterinsight
The BIG question from last meeting:

Who owns the data?

- Operator Context & Maintenance Experience
- Algorithm Development
- Digital Twin
- Aviation Authorities
- Aircraft System
- OEM System Knowledge

Data Ownership Discussion

Oliver Wyman: Consensus that airline operators own the data

Business Benefits
- Maintenance Planning
- Aircraft Dispatch Planning

System and Network Engineering
Sharing data as means to obtain a common benefit

Enabling sharing of data assets between different organizations to achieve a common benefit no single organization can reach on its own will need:

- Clearly defined and agreed common benefit(s) (defining group identity)
- Common group rules governing use, access and benefit sharing.
- Organizing trust amongst group members as means to reduce risk
- Infrastructure supporting implementation of trust, whilst ensuring member autonomy.
Common benefit: our SAE example

Enable the development of (certified) digital twins, capable of estimating an aircraft systems airworthiness credit:
- Each time when the digital twin obtains the most recent data from its physical twin.
- Airworthiness credit estimates can be obtained from 0 hours onwards.

allowing improvements to air safety, passenger experience and cost reductions by:
- avoiding unplanned maintenance
- increasing maintenance planning flexibility
- moving from fixed interval planning to maintenance when indicated
- less AOG’s
Algorithm development

Algorithm development will need contributions from multiple parties:

- Operational data collected from physical systems, based on aircraft operator agreement (that may inherently require pilot consent*)
- Data & engineering knowledge from manufacturer
- Data & repair experience from certified maintenance organizations
- Data & operational knowledge from operators.
- Flight context (weather, geologic factors, environment,..)
- Etc.

allowing the development of powerful solutions operators can choose from.

Consequently: sharing data, experience and knowledge across multiple organizations to enable such algorithm development will carry risks.

Trust between organizations must therefore be arranged and implemented first

*) The EU General Data Protection Regulation not only applies to organisations located within the EU but it will also apply to organisations located outside of the EU if they offer goods or services to, or monitor the behaviour of, EU data subjects (see www.eugdpr.org).
Trust as a means to reduce risk

Risk:
- Compliancy (privacy*, anti-trust,..)
- Liability
- Unwanted disclosure (competition)
- Loss of ownership (value)
- Revealing Intellectual Property
- Enabling additional oversight (cost)
  etc., etc...

Means:
- Trust and power are both means capable of reducing risk

How to organize trust and power? -> The Secure Digital Market Place concept

*Art. 22 GDPR: The data subject shall have the right not to be subject to a decision based solely on automated processing, including profiling, which produces legal effects concerning him or her or similarly significantly affects him or her.

System and Network Engineering
Secure Digital Market Place Research contributing to AIR 6904

- National Law & Regulations
- Market rules
- Member admission
- Algorithm supplier(s)
- Data supplier(s)
- Agreement
- Deployment Models
- Deployment Specification
- Marketplace infrastructure
- Parameterization & authorizations
- Future Internet Research Testbeds
- Registry
- Customer(s)
- Dispute Resolution
- Accounting & Auditing
UvA/KLM and NSF Pacific Research Platform Testbed

As foundation of the National Research Platform

prp.ucsd.edu

Note: this diagram represents a subset of sites and connections.
Steps to establish Digital Market Places based on generic principles

Evangelizing
Establish a common benefit
SAE HM-1 Work on IVHM

Research & Experiment
Way of Business based on consensus
SAE HM-1 ARP 6904 Document

Requirements
Institutionalize as Membership Organisation
Airline Consortium

Technology & Service providers
DMaaS
Equinix as constructor of digital market place Infrastructures as a service available to any organisation
Operational Market place Owned by Airline Consortium

Current actions in airline context >>
Establish a common benefit
Way of Business based on consensus
Institutionalize as Membership Organisation
DMaaS
Equinix as constructor of digital market place Infrastructures as a service available to any organisation
Operational Market places Each owned by Consortia