AVIATION STRATEGY AND CONSULTING

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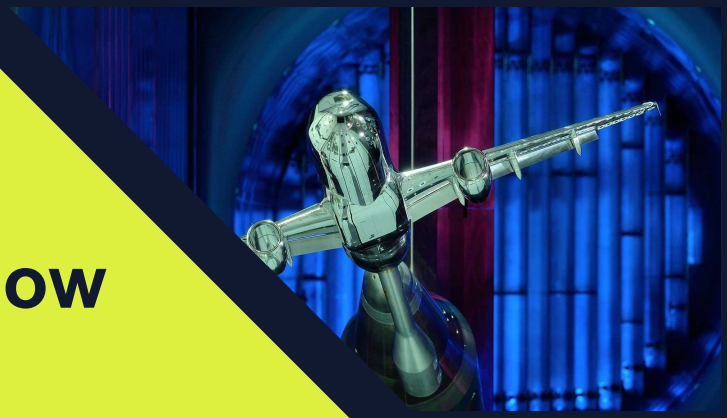


EASA Aviation
Safety Conference

Utilising Technologies, Maintaining the Technology Flow

Rolf Henke

Budapest 30 October 2024

The core subject of our panel:

Technologies to enhance safety in aviation

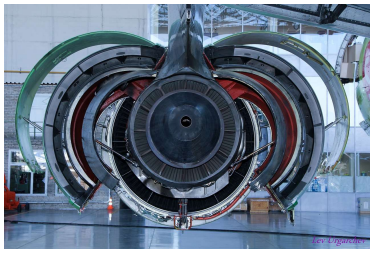
Vehicle

E.g.: Gust Sensor / GLA

Operation

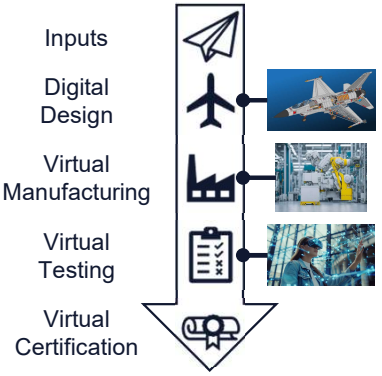
E.g.: Sectorless ATC

Lifecycle/MRO



E.g.: SHM for MRO and Circ.Aviat.

Certification



E.g.: Simulation based Certif.

System

E.g.: Cyber Sec. as part of MaaS

Technologies are needed for efficiency, reliability, seamlessness, safety, security.
This asks for a multi-purpose, i.e. a broad level design, not for a peak design and system architecture.
This may result in degradation in one aspect for the sake of the balance; managements and politics have to allow for that.

Take an even broader approach

From an aviation system-of-system to a society system-of-systems

The **Security System**: People, Infrastructures, Food & Health, ...

The **Welfare System**: Education, Jobs, Health, Pensions, …

Prevention, Detection, Counteraction, …

Door-2-Door, Impact, Service, Pricing, …

Sites, Requirements, Logistics, Security, …

Engines, Energy Storage on Ground and Airborne, Supply Chain, …

The **Aviation System**: Vehicles, Operation / MRO, EoL

The **Mobility System**: Use Options / Impact; Vehicles, Passengers & Cargo; Infrastructures, …

The **Energy System**: Energy / Electricity / Heat for Industry, Mobility, Housing; Storage, Infrastructure, …

Quote from ACARE / EC Aviation Vision „Fly the Green Deal“: „The **aviation system-of-systems** is increasingly being seen as one indispensable, embedded **part of a broader system-of-systems** providing mobility as a service. While presenting new opportunities, these developments **raise new safety and security challenges**.”

Just two issues on our path to the future

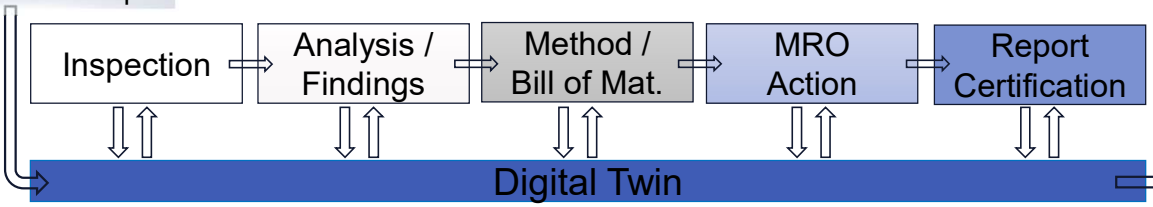
Example 1: The „digital thread“ in MRO

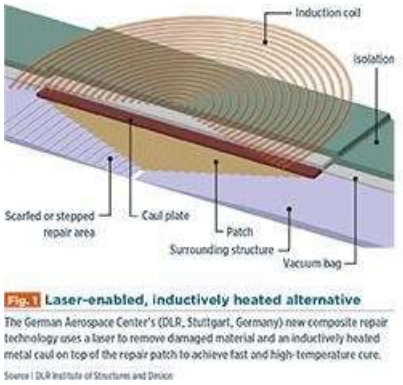
Beispiel: Eurofighter Speedbrake ©DLR

Weighing up:
CO2 reduction through digitalisation (configuration) vs.
CO2 increase through digitalisation (data centres)

Inspection by specialist

Digital Twin before repair





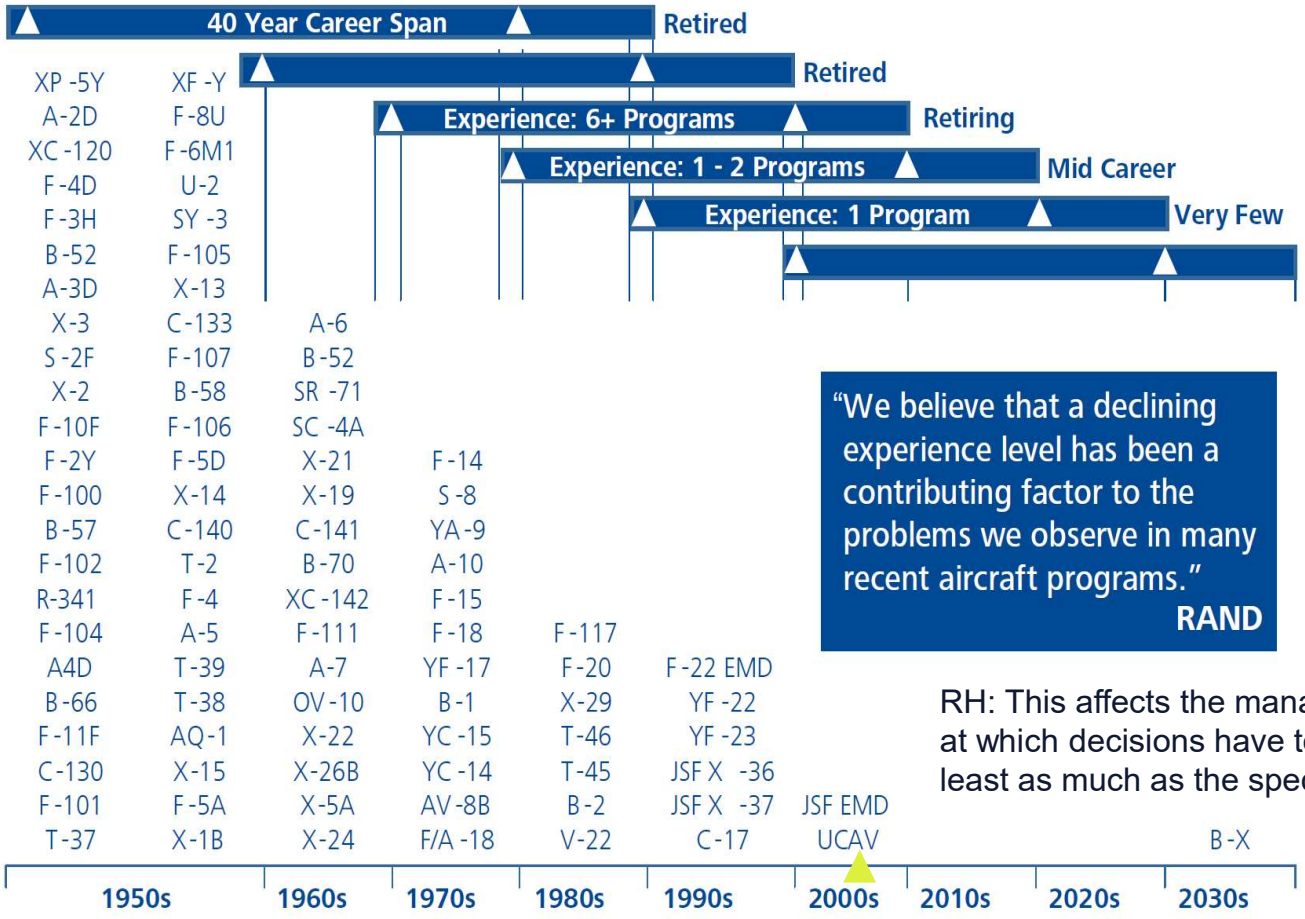
Repair method tbd

Digital Twin after repair

Every change to the digital twin must be traceable, secure, authorised by authorities, owners, TC holders → **Blockchain**

Just two issues on our path to the future

Example 2: New paths without guides?

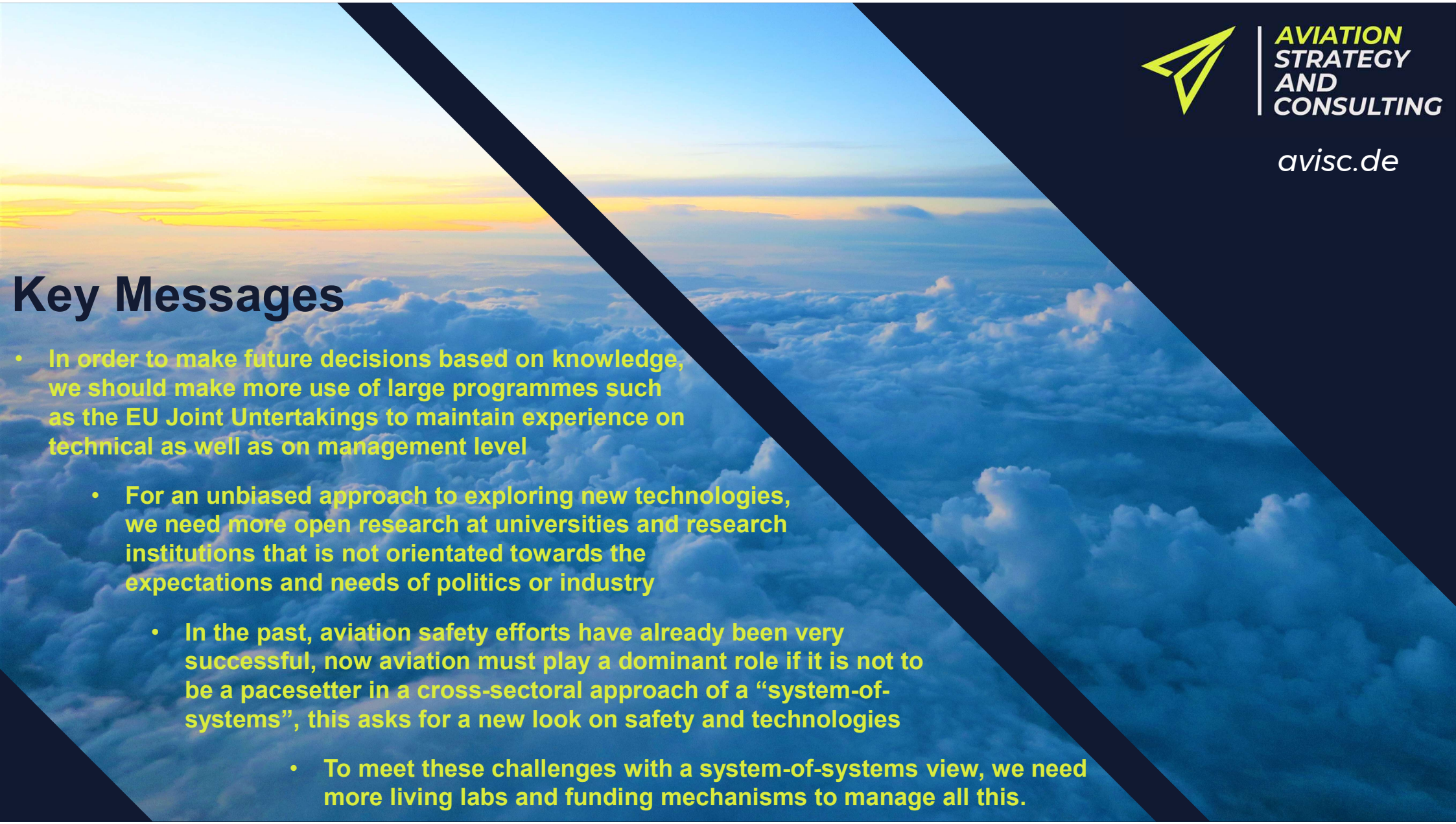


"We believe that a declining experience level has been a contributing factor to the problems we observe in many recent aircraft programs."
RAND

RH: This affects the management levels at which decisions have to be made at least as much as the specialist level

RAND Corp. © Study 2006

'Game Changer' - certification requirements will be enormous...



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Key Messages

- In order to make future decisions based on knowledge, we should make more use of large programmes such as the EU Joint Untertakings to maintain experience on technical as well as on management level
  - For an unbiased approach to exploring new technologies, we need more open research at universities and research institutions that is not orientated towards the expectations and needs of politics or industry
    - In the past, aviation safety efforts have already been very successful, now aviation must play a dominant role if it is not to be a pacesetter in a cross-sectoral approach of a “system-of-systems”, this asks for a new look on safety and technologies
      - To meet these challenges with a system-of-systems view, we need more living labs and funding mechanisms to manage all this.