ACARE Workshop on Certification AIRBUS Overview

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AGENDA

How can Research and Innovation contribute to improving the process and cost & time efficiency of certification?

- Certification Concerns (EIA)
- Virtual Hybrid Testing Framework concerns (EZM)
- Flight/Ground Test concerns (EV)

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Innovation is the key to success!

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- But.....

INNOVATION MUST BE CERTIFIED

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Today.....

- Rulemaking is primarily aimed at preventing known catastrophic events or identified environmental conditions.

- Technology is not a regulatory driver

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Innovations & new technology.....

Key considerations for certification are:

- SAFETY RECORD: NO ADVERSE IMPACT
- PRECEDENCE: EXISTING or NEW
- AGENCY POLICIES
- PUBLIC PERCEPTION
- LEGAL IMPLICATIONS
- CONFIDENCE IN THE COMPLIANCE DEMONSTRATION

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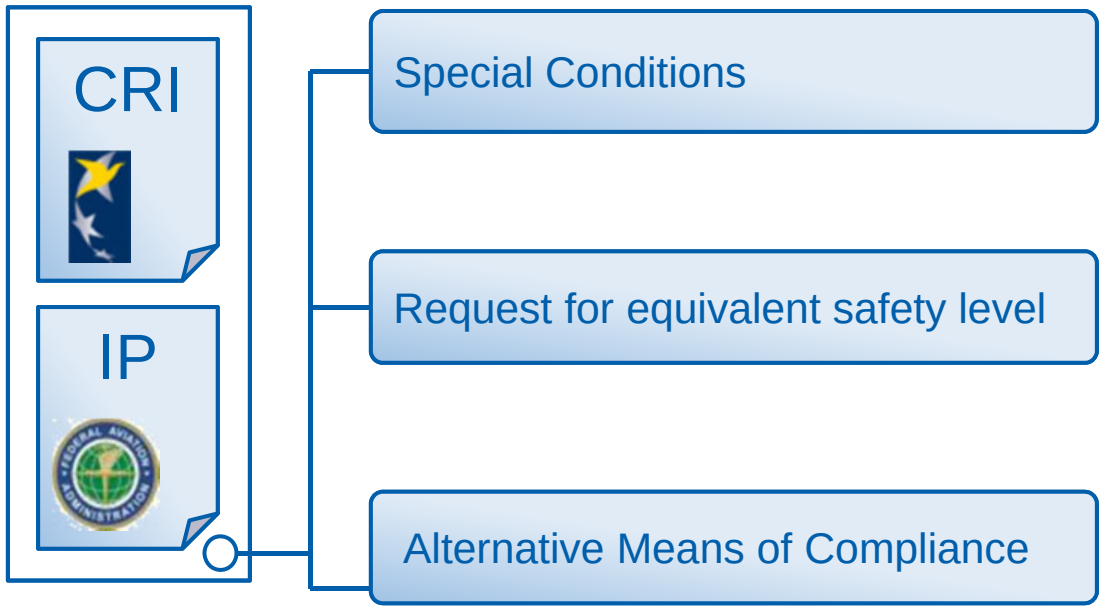
So how is innovation certified?

BY USING THE FLEXIBILITY WITHIN THE REGULATORY SYSTEM TO CREATE OR ALTER THE REGULATIONS OR MEANS OF COMPLIANCE ACCORDING TO THE PRODUCT DEFINITION



Certification **R**eview **I**tem (***CRI***)
Issue **P**aper (***IP***)

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INNOVATION MUST BE CERTIFIED

- And.....

CERTIFICATION MUST INNOVATE!

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Virtual Hybrid Testing to foster R&T & Operational innovation V&V

- And.....

CERTIFICATION MUST INNOVATE!

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Virtual Hybrid Testing to foster R&T & Operational innovation V&V

- And.....

New methods but also New collaborative ways of working together (partners, EASA) to improve certification processes

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Virtual Hybrid Testing and Certification

Virtual Testing (VT) Structured Modelling & Simulation processes to critically evaluate (V&V) a virtual product (model of ≠ maturity) configuration/scenario against specified/specific requirement/behaviour in a M&S environment

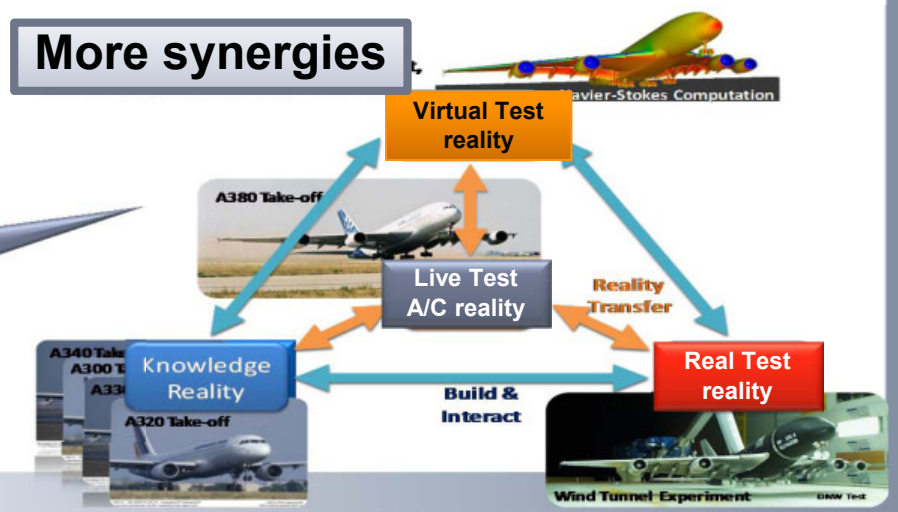
Virtual Hybrid Testing (VHT) Structured mix/coupling of VT and Real Testing to evaluate a product (models/prototypes) against behaviour in a specific (virtual/real) environment

Means of Compliance Production is 1 of the targets of VHT

VHT requirements ← Targeted Maturity (A/C & VHT) evaluation purposes & Impacts
→ Refine VHT Projects Typologies depending on required hybridization

Several MoC Alternatives definition

Several successful Airbus examples in each hybridation



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Virtual Hybrid Testing Framework

Continuous improvement / development on M&S, VT and RT capabilities
VHT is already used successfully as certification MoC in some A/C areas

BUT

VHT Development/Confidence: long & need huge investments
VHT Acceptance processes & practices: not enough harmonised
Not the same level of VHT capability everywhere

OUR TARGET: OVERALL ENTREPRISE VHT CAPABILITY ARCHITECTURE

From a patchwork To a Federated Approach
Collaborative Aircraft V&V MoC backbone (R&T, authority, partners)
Enhance & Ease VHT, foster maturation/confidence
From document To model centric processes

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Synchronisation of Technology and VHT MoC

R&T maturation process of New Technology

A/C program use of New Technology

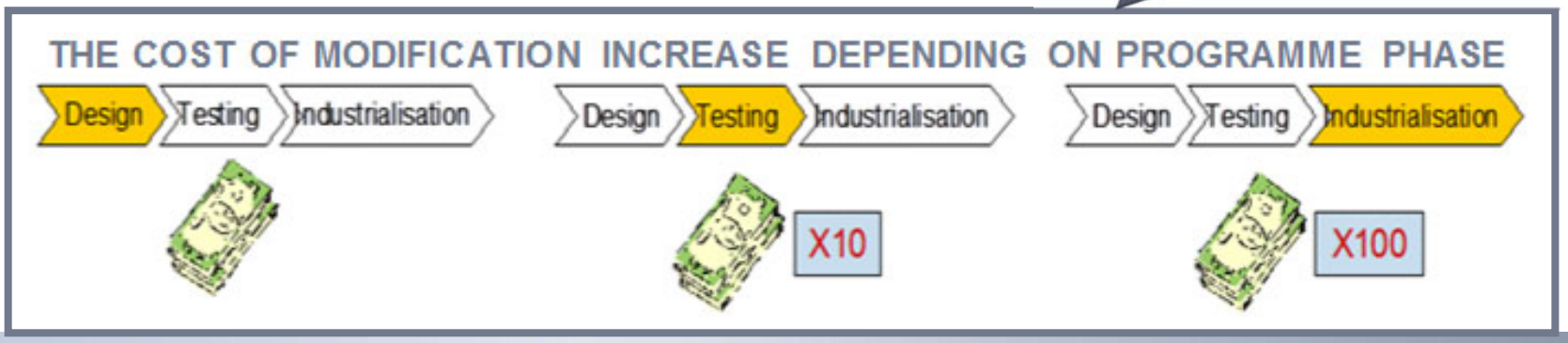
R&T dev of new VHT to produce MoC for a Technology

IT industrialisation of the new VHT

A/C program use of New MoC

R&T Authority Techno & VHT MoC Pre-acceptance Criteria ?

Avoid non expected late issues on Technology AND MoC Acceptance



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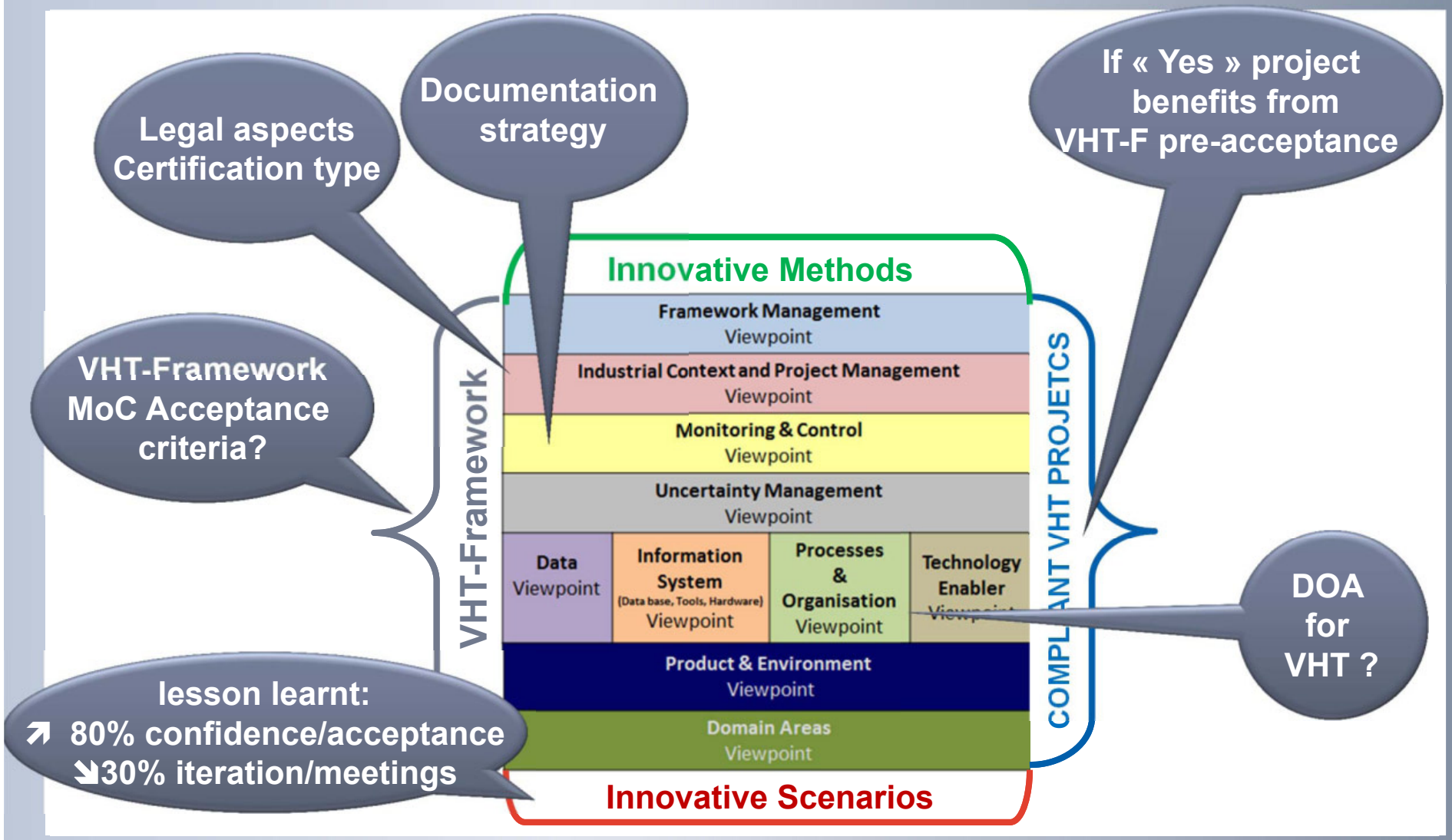
VHT Thematic and certification concerns example



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Architecture Framework Approach

Not only a structure by VHT Thematic

Ground foundation of a Multi View-Point (VP) framework definition

Standards and best practices to develop a Framework

US Departement ofDefense Architecture Framework Version 2.0; Volume 1: Introduction, Overview, and Concepts; Manager's Guide; 2009

Survey of Frameworks

Manage Complex task, information or Product in a certain environment
E.g. Military operations, coms, Enterprise, IT, System Architecture
E.g. DoDAF, MoDAF, TOGAF, NAF…

VHT Orchestration supported by a Framework considers & meets efficiently

All the VHT stakeholder concerns & requirements for a given V&V purpose

It organise and secure coherency/interfaces of the overall information by VP

It ensures we will met all steps and final A/C global & local objectives

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VHT framework targets all workshop sub-groups

BUT

- Scope is large: imply all stakeholders – define integrated strategic/priority axis
- Need to make Business cases analysis with all stakeholders
- VHT-F definition & structure review and agreement of all partners stakeholders
- Big step change in system engineering, strategy, processes, methods & tools, skills

Example of priority:
Flight/Ground Test Improved Avionics' Simulation Platforms for Virtual Hybrid Integration

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Avionics' Simulation Platforms for VH Integration

Advanced VH integration

- Develop suppliers VT capability in a multi system and representative environment, Improve test platform Interoperatility, Increase system maturity
- VT before RT: detect & fix anomalies early to minimize program impacts/risks

Optimize Hybrid test strategy and improve overall VT/RT synergies/coverage

- VT before RT to validate RT configuration/procedures and increase RT performances
- Use of Multi system Virtual integration tests to limit real test benches use

=> interface with certification activity (MOC4)

- Increase VHT coverage: VT /RT replay Flight Test configuration(s) to Reduce Flight

=> interface with certification activity (MOC6)

Real testing

Virtual Testing

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Key aspects to adress

- Model of system functions integrated on Virtual test platform with adequate fidelity & representiveness
- Optimum balance between test objectives, representativeness, cost & time
- Contractual & IP negotiations with partners
- Model/Real system functions development synchronized all along V-cycle

- Models available at the right time (before real equipment or SW standard delivery) and must be regularly updated.

- VT and RT platforms on Airbus & Suppliers side have standardized interfaces allowing the functions or tool plug & play (interoperability)

- Certification constraints related to VT must be identified/negotiated and considered at the right time of the development Process

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Conclusions

INNOVATION MUST BE CERTIFIED and CERTIFICATION MUST INNOVATE!

- Airbus experience on VHT: VHT WORKS and is used as MoC !!
- Collaborative innovative scenarios to certify innovation: not only methods but way of working together with all partners & certification actors
- Develop associated regulatory material (e.g. Ease the possibility to use all VHT typologies as acceptable MoC and classify VHT typo/MoC type)

SCOPE IS LARGE

- We need to analyse / select the most valuable priorities / area
- And Work on it together (CSA, EU project …)

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Thanks for your attention

QUESTION ?

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