



Virtual hybrid testing. Perspectives concerning research activities and research infrastructures



INTA

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INTRODUCE

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13 years test engineer on INTA
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Test engineer SW F18, C295, T21, HD21

PM Meteor environment test

PM I+D RADAR Test (ARGOS)

PM IRIS T Surveillance test

PM Meteor container test

PM Solar tracker Test



AGENDA

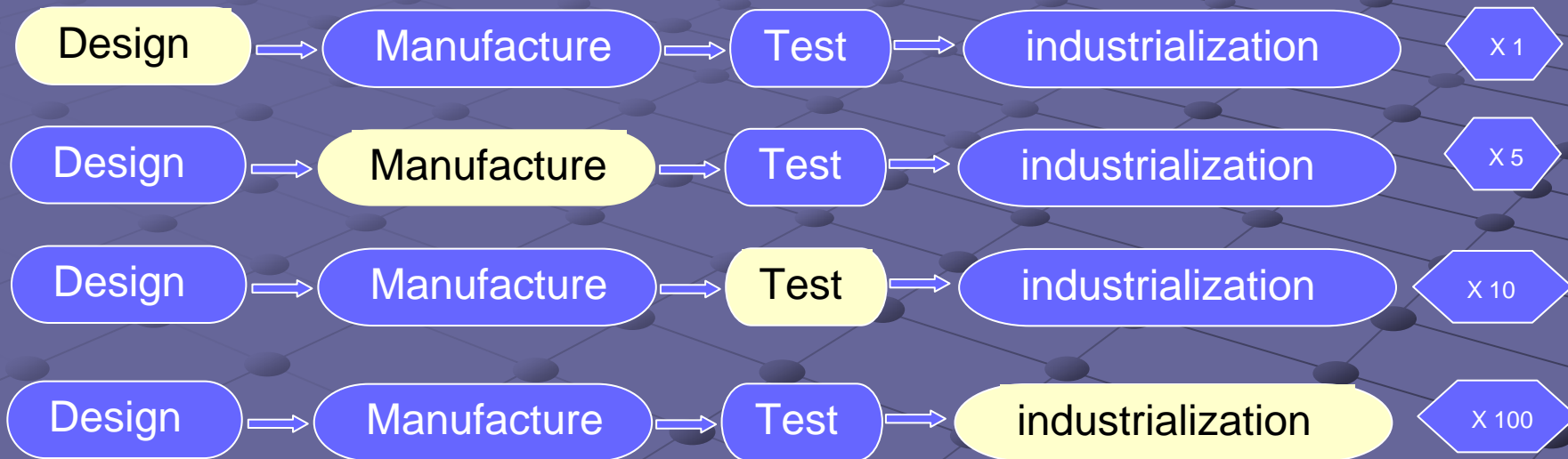
- Virtual Hybrid Test Definitions
- Virtual Hybrid Test Influence
- Research Activities and Infrastructures
- Perspectives Research Activities and Infrastructures

Virtual Hybrid Test definitions

- **Live Testing:**
 - Structured use of a final product based processes to critically demonstrate its behaviour against high level objectives and requirements in its operational environment.
- **Real Testing:**
 - Structured use of prototype and facility based processes to critically evaluate a real product behaviour in a configuration against specified requirements in a test environment
- **Virtual Testing:**
 - Structured use of modelling and simulation based processes to critically evaluate a real product behaviour in a configuration against specified requirements in a test environment
- **Virtual Hybrid Testing:**
 - Structured mix of virtual testing and real testing to evaluate a product against behaviour in a specific environment

Virtual Hybrid Test influence

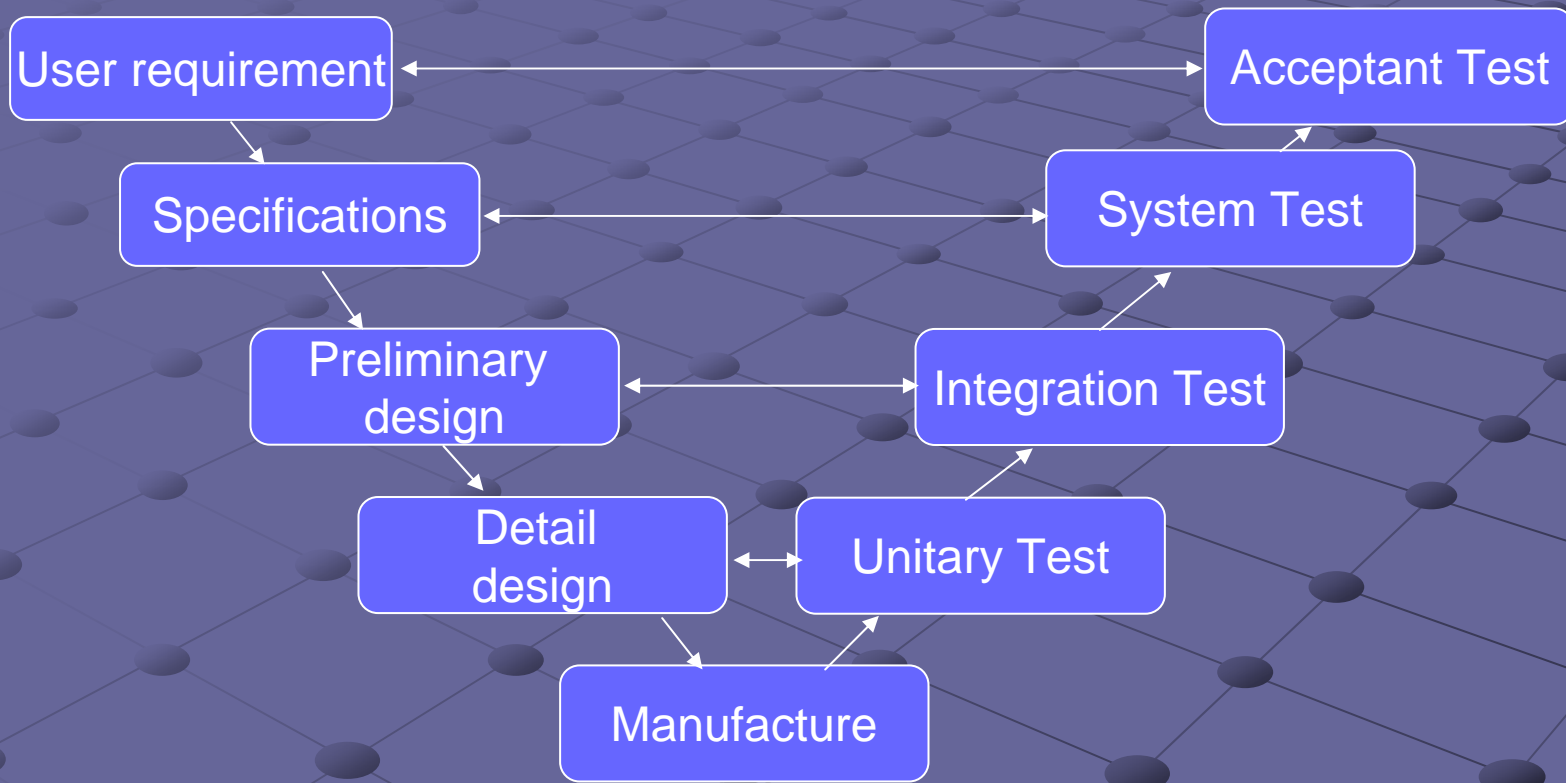
Evaluate as soon as possible



Late changes – Negative influence (cost, flexibility, quality...)

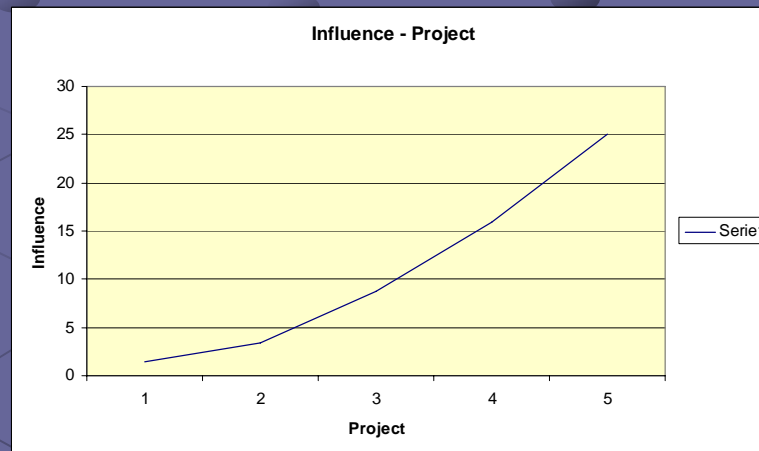
Virtual Hybrid Test influence

● Virtual hybrid test **MUST BE** planned



Virtual Hybrid Test influence

- Virtual hybrid Test typologies Vs development influence
 - Virtual environment - real prototype
 - Minimum virtual - maximum real prototype
 - Maximum virtual – real piece



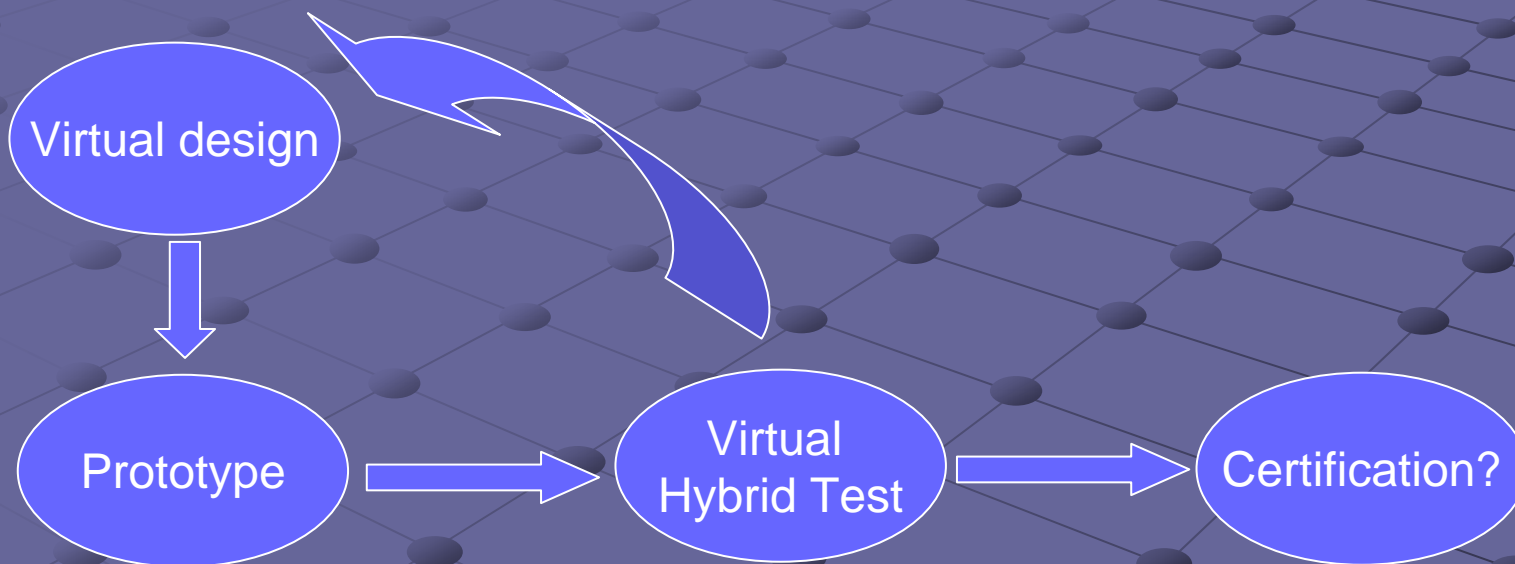


Virtual Hybrid Test influence



Research Activities and Infrastructures

Actual methodology



Research Activities and Infrastructures

- Continuous improvement. Used successfully in different areas

PROBLEMS

- Confidence. Not enough confidence at the moment.
- Not harmonised. Uncertainty about practice, development and capability.
- Not re-use
- Acceptance
 - Defence
 - I+D
 - Civil certification

Research Activities and Infrastructures

SOLUTIONS?

- Confidence
- Harmonised
- Same Acceptance
- Collaborate industries and authorities to approach a virtual hybrid test architecture framework.

Perspectives

● Validation virtual hybrid test:

- Assess evidences of correctness and credibility of modelling (comparatives results Vs modelling).
- Accredited, improvement models, calibration, confirmation test the modes, performance, sensitivity.
- Historical assessment facilities effective
- Appropriate verification and validation documentation
- Integrate verification in process
- Accurate risk assessment for prioritizing.

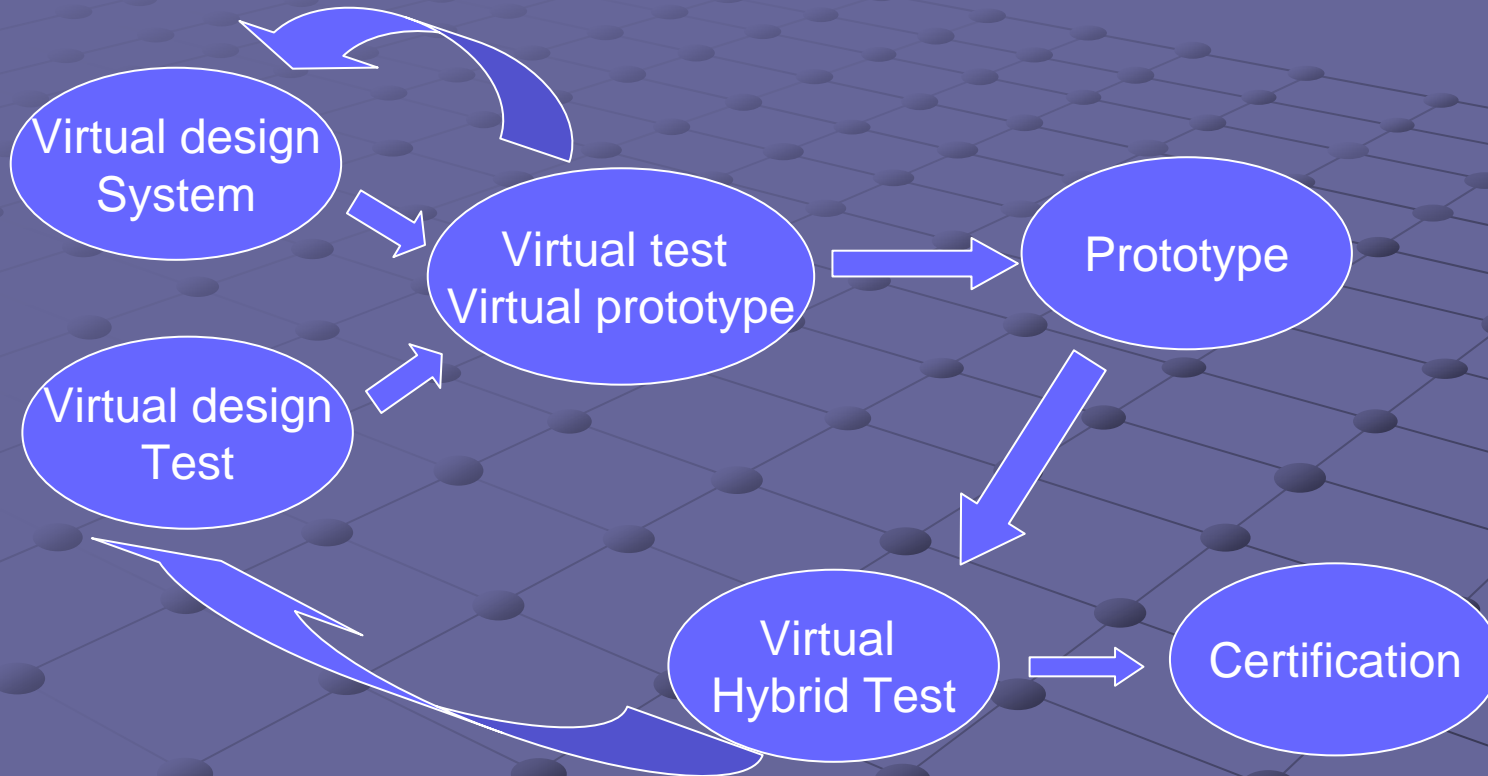


Perspectives

● Virtual improvement:

- Instrumentation
- Environment simulation (comms, buses).
- Confidence
- Accuracy and precision
- Test Tools

Perspectives





Conclusions

- Virtual Hybrid Test increase every year.
- Improve confidence and accuracy.
- Modification old infrastructures or new facilities including new systems.
- Plan Virtual Testing.
- Test Tools needs budget and resources (cost today save money tomorrow).



Thanks for your attention

Question?

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