

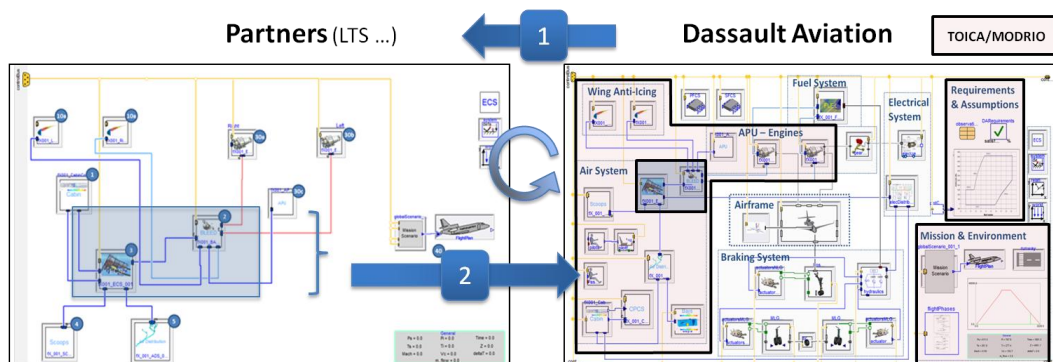
# Towards Enhanced Process and Tools for Aircraft Systems Assessments during very Early Design Phases

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The paper deals with an improved process for early to detailed design phases of complex Aircraft systems. It is based on experience of Dassault Aviation (DASSAV) and Liebherr Aerospace Toulouse (LTS) in aircraft system design, and on works carried out within several R&D projects, in particular within current FP7 TOICA project (Thermal Overall Integrated Conception of Aircraft [1]), where new process are developed to tackle assessments of architectures composed of many heterogeneous and interconnected sub-systems using simulation. This new process described in the paper involves open standards like Modelica and FMI.

Architectures trade-offs require different kinds of analysis, in particular behavioral assessments. The purpose of this paper is to define vehicle system architectures, investigate the current performance assessment process and propose an improved process based on models exchanges and simulations, applicable during preliminary design phases like RFI (Request For Information) or RFP (Request for Proposal)



**Figure 1.** Exchange of models for Architecture Trade-offs.

In the current process, the aircraft architects ask suppliers to provide models for multi-systems assessments into Aircraft integrator office. This process has two drawbacks. It is difficult to assure that models will run in integrator's facility, and this request can't be currently handled efficiently during very early phases like RFI or RFP phases.

The new process, based on model exchanges using a Modelica framework, allows more efficiency and flexibility. As demonstrated, the workflow for architecture and sub-system assessment is straightforward compared to current one. It may more deeply imply partners/suppliers in assessment success, and may allow finding more innovative solutions by opening up aircraft requirements.

The process and associated tools are based on current powerful capabilities of Modelica and FMI which continue to improve to be able to manage heterogeneous models required for Aircraft systems assessment; in particular within current ITEA2 MODRIO project [2], which brings new capabilities that will be used within TOICA.

## References

- [1] FP7 TOICA project: <http://www.toica-fp7.eu/>
- [2] ITEA2 MODRIO project: [www.ITEA2.org/Modrio](http://www.ITEA2.org/Modrio)