

Airbus, February 2013: Ubiquitous IT (Manufacturing Information Pipeline, MIP) and the Philosophy of the Extended Enterprise

Airbus designs, sells, builds and supports the most modern and comprehensive aircraft family in the world all of which have been developed with unrivalled flexibility in response to customer needs. With 52,000+ employees around the world, Airbus has a global network of over 320 customers and 337 operators. To date, Airbus has received 11,860 orders with 7447 deliveries and 6931 aircrafts in operation.

Complex web of ICT landscape

Airbus is always posed with various challenges which involve environmental and market law complexities such as globalisation, strategic partnership with suppliers, competition pressures, regulatory constraints and increasing environmental policies. There are also technical challenges like product complexity, technology innovation, multidisciplinary systems and duality (civil/military) programmes. All these factors add up to the global business constraints complexity. Due to these on-going and increasing intricacies, Product Lifecycle Management (PLM) has become a core part and a strategic enabler of the Airbus industrial system. PLM in Airbus is not just confined to 3D design but also covers many other key competencies like:

- Managing and controlling what is being developed
- Quality assurance throughout the lifecycle of a product
- Programs for periods over and above 20-30 years
- Development of new products, re-engineering of existing aircrafts and 'continuous improvement'
- Supply chain management which involves 70% outsourced to external suppliers
- Integration and management of complex outsourced projects on a global basis
- Development of 'Services Solutions' that enhance customer profitability and performance.

Airbus ICT (Information and Communication Technology) is the IS-Partner to Airbus business, sharing common targets and goals and driving strategic change using innovative processes, technologies and solutions.

ICT Challenges

The ICT managed PLM landscape generates huge sets of data to manage every day. But at a programme level (Ex: A350 XWB), the primary challenges are:

- Reduced development lead time
- Production ramp up
- Work sharing with suppliers.

Meeting these challenges requires a set of new ways of working supported by PLM and a 3D collaboration environment also called digital mock-up. This leads ICT to focus more on internal harmonisation of processes, methods and tools at an aircraft programme level. As a result, a real concurrent design that includes Risk Sharing Partners (RSP) with early visibility of design and changes has evolved as shown below:

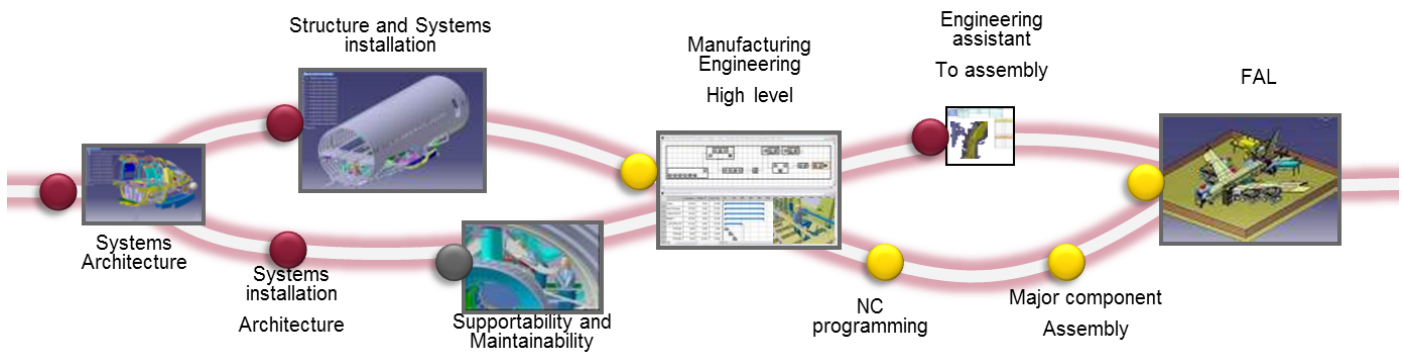


Figure 1: The concurrent process

Today, Airbus has two different approaches. One approach is dedicated to engineering design with a CAD authoring tool, a digital mock-up environment and Product Data Management (PDM). The other approach is dedicated to manufacturing engineering, with a process authoring tool, a Product/Process/Resource manager and Enterprise Resource Management (ERP). Both approaches are integrated. Future aircraft programmes will simplify, improve and disseminate these concepts within Airbus and its supply chain. The final vision is to develop the efficiency of the overall aerospace manufacturing industry and in particular optimize:

- **Cost & quality:** the manufacturing process is designed in coherence with an up to date engineering product, including the use of different kind of simulations. So the cost and quality is discussed and optimized between the different factors.
- **Quicker design of new products:** by accessing the preliminary engineering design (with maturity levels), the manufacturing engineer can start to work as early as possible. 3D simulations also provide ways to qualify the product and the process, ensuring that the first product and process are of high quality.
- **Accelerated ramp up of human competence:** 3D simulations are also used for demonstrations, communication, training and risk analysis.
- **Program monitoring:** real time business intelligence and collaboration means the extended enterprise is supporting the program and ramp-up follow up
- **Flexibility to unforeseen events:** use of standards and 3D simulations help to implement a fallback process in case of an unforeseen event. They also help to easily integrate new IT means in a manufacturing line.

FoFdration Perspectives

The FoFdration project is one of the research subjects within Airbus for the realization of a part of its vision, especially in the areas of PLM integration/services orientation, Factory of Future and extended enterprise federative platform. The FoFdration project is an enabler towards the goal of a ubiquitous factory.

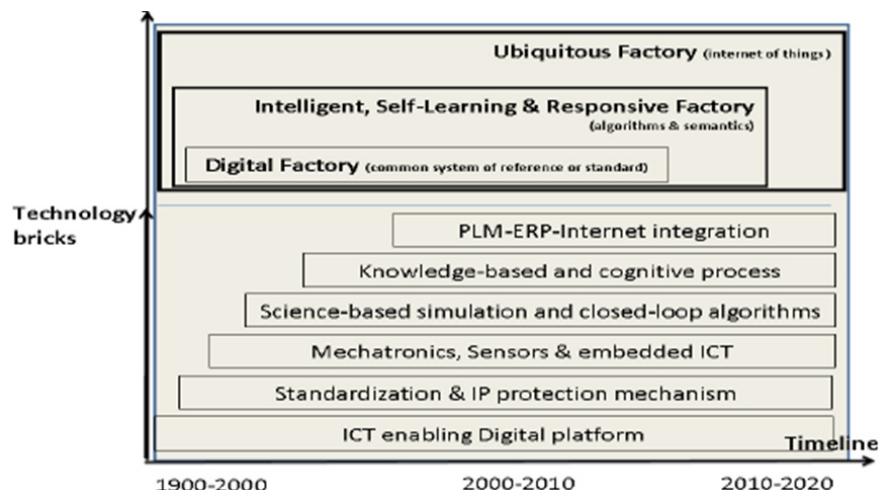


Figure 2: The ubiquitous factory

Also, some of the Airbus manufacturing top challenges can be met with FoFdation capabilities such as:

- **Model:** reduce shop floor growing diversity and complexity
- **Integration:** seamless integration between MES, PLM and SAP
- **Manufacturing Information Pipeline:** interoperability of IT functional bricks to improve extended enterprise support and supplier management
- **Dashboard and KPI:** global supervision and execution (including sustainability)
- **Others:** supply chain cost reduction due to flexibility in supplier management systems.

Manufacturing systems driven by FoFdation technology will be optimized for the mass customization production that will be enabled by the “first part correct and fast” (quality improvement) and “plug and produce” (reduction of time for deployment and implementation). It will also allow down time reduction during product exchange by enabling a better integration between process planning and execution.

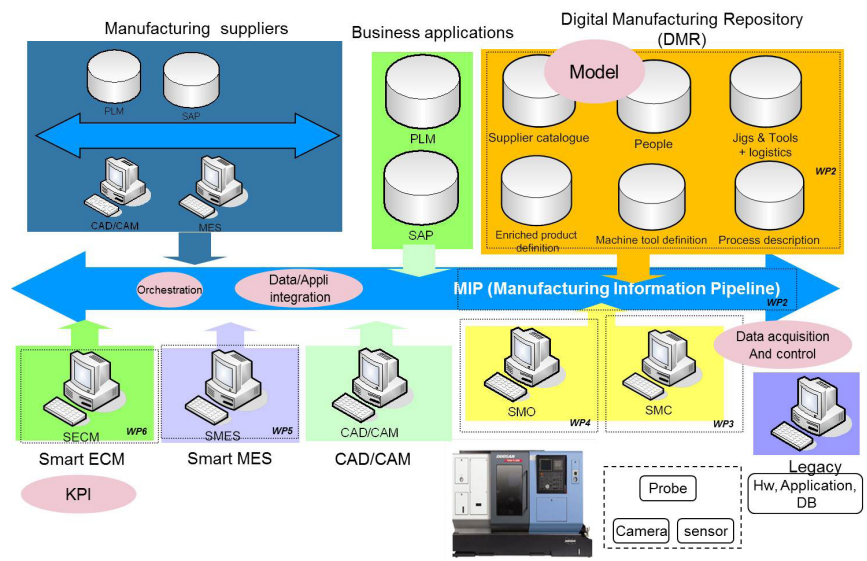


Figure 3: FoFdation capabilities

FoFdation will also enable new business trends towards open technology platforms and products-services integration, thus bringing positive impacts on productivity of SMEs and their competitiveness in the global economy, while supporting established European brand names to adopt new business models with the open and sustainable technology environment.

The Manufacturing Information Pipeline (MIP) of FoFdation will enable enhanced extended enterprise support by following a standardized data model which contains all the 3D data, manufacturing processes, jigs and tools, and quality requirements transferred via MIP as a service. The supplier will have all the flexibility in choosing PLM/ERP systems irrespective of Airbus internal tools and processes, thus achieving massive cost savings and seamless data exchange.

Nevertheless, the goal of the Factory of Future is to facilitate a sustainable world and fair trade with all factories sharing data seamlessly, to enable them to design and produce anywhere with less pollution, less waste to clean, and less smoke to destroy leading to a green planet, which are only a few steps away from being reality.

For more information about the FoFdation project visit <http://www.fofdation-project.eu> and the project's social media pages, including Facebook (#fofdationproject) and Twitter (@FoFdation).

Acknowledgements:

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