

AIR FRANCE INDUSTRIES CASE STUDY

THE PROBLEM

- ▶ Reduce aircraft down time.
- ▶ Keep to the standards and environments of every aircraft manufacturer.
- ▶ Harmonize designs around a consistent set of electrical design and management tools.
- ▶ Manage the product life cycle from end to end and ensure traceability.

THE SOLUTION

- ▶ A software chain that combines ELECTRE for electrical diagrams and SmarTeam for data management.
- ▶ Import/export gateway in CGM format to retrieve and send electrical data.
- ▶ Project Group to validate the solution and organize the working procedures.
- ▶ Long-term investment in an integrated PLM solution.

BENEFITS

- ▶ Handling and comprehensive management of Airbus and Boeing environments.
- ▶ Highly significant time savings thanks to the automatic production of design, manufacturing and maintenance files.
- ▶ Production of documentation compliant with ATA standards.
- ▶ Design productivity, protection of experience and traceability.

WHY CHOOSE THIS SOLUTION

- ▶ A response to every requirement thanks to ELSYS-DASSAULT SYSTÈMES's joint approach.
- ▶ Compliance of the electrical diagrams with ATA standards and with Airbus and Boeing practices.
- ▶ ELSYS expertise in electrical diagrams, electrical engineering and PDM integration.
- ▶ CGM Import-Export software.
- ▶ Responsiveness and expertise of the ELSYS teams in finding effective solutions.



MEETING THE QUALITY AND COMPETITIVENESS TARGETS

For more than 75 years, AFI has put its expertise and excellence at the service of aircraft maintenance for the AIR FRANCE KLM fleet, as well as for the fleets of civil or military clients which have chosen to outsource the maintenance or modification of their aircraft. Besides the core maintenance business (servicing and operational maintenance), AFI devotes a significant part of its activities to the design and realization of commercial, VIP or military designs. This might be to improve the comfort of the passengers and crew (galleys, seats, rest area, medical area, etc.) or to improve the avionic systems (IFE, communications, TV, Internet, integrated telephones, etc.). One of the most important aspects of this field is electrical systems, whether to meet the new requirements in terms of entertainment or communication, or to adapt to the challenges set by the advances in navigation systems.

It was for this design activity that in 2005 AFI began to look for an overall solution that could cover its electrical and engineering requirements by supplementing or replacing the Autocad-based solutions being used at the time. Above all, these solutions had to meet AFI's quality and competitiveness targets:

- Optimization of aircraft down time,
- Ease of retrieving aircraft manufacturer electrical diagrams and production of documents compliant with the ATA standards in force,
- Automated production of modification, manufacturing and maintenance files,
- Detailed management of electrical information and traceability of designs,
- Construction of a consistent set of high-performance and forward-looking electrical design and management tools in order for expertise to be capitalized on and experience to be reused.

The Air France industries Project Group tackled these overall problems, with contributions from the ELSYS consultants specializing

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in electrical designs and the PDM teams from Dassault Systèmes. The objective was to define, test and implement a consistent and integrated electrical design processing chain in line with AFI's quality and competitiveness requirements: retrieval of manufacturer data, harness diagrams and drawings, manufacturing files, electronic data and document management within the company PDM, paving the way for implementing digital mock-ups.

AN OVERALL SOLUTION THAT MEETS THE CHALLENGES AND PROTECTS THE FUTURE

As part of a bidding process, the solution presented jointly by ELSYS and Dassault Systèmes convinced AFI on account of the clear analysis of AFI's problems and the overall handling of the electrical requirements through effective shared cooperation.

The selected solution relies on a combination of products provided jointly by Dassault Systèmes and ELSYS. It is mainly based on the natural complementary of the ELECTRE and SMARTELECTRE electrical engineering solutions from ELSYS and the ENOVIA/SmarTeam data management tools from Dassault Systèmes. Upgrades to digital mock-up and electromechanical integration via CATELECTRE and CATIA have also been planned as part of a medium-term requirement.

The solution includes:

- CGM import of manufacturer information and automated production of electrical diagrams to the ELECTRE standard,
- Electrical studies with ELECTRE and production of design, manufacturing and maintenance files to ATA, Boeing or Airbus standards,
- Document, drawing and electrical parts list management in SMARTEAM via the SMARTELECTRE integration platform and multi-criteria reuse of designs (project level, document level, part number level),
- Export of modified reference data for the manufacturer or client in CGM format.
- Electromechanical integration of electrical designs into the CATIA 3D digital mock-up via the CATELECTRE integration platform is planned for a later date.

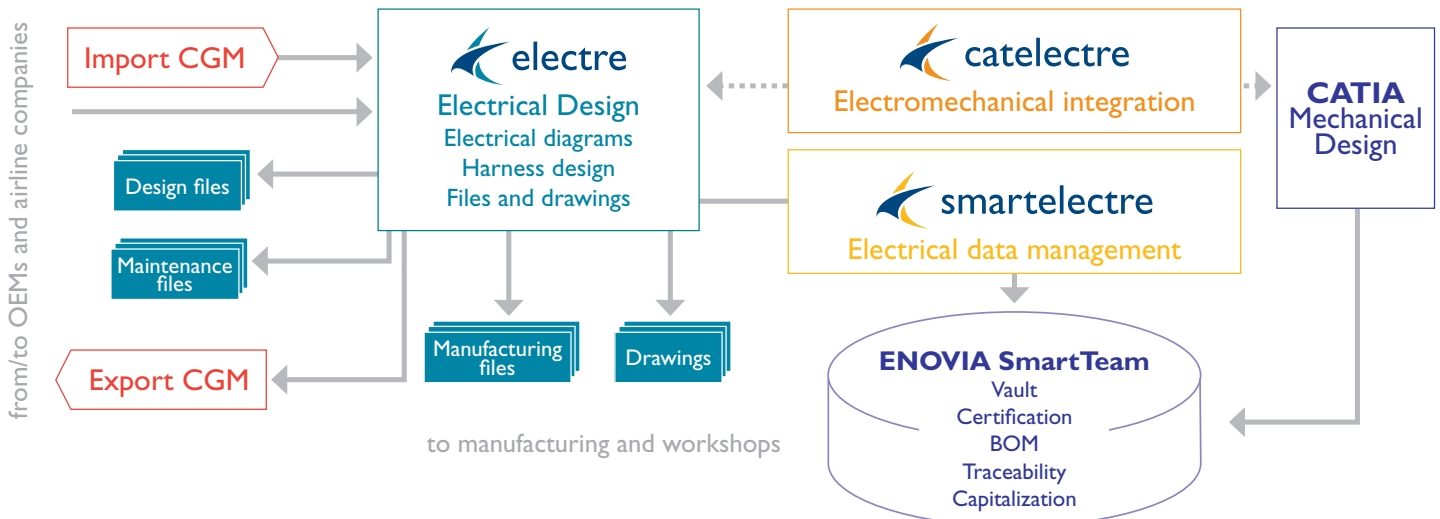
In total, the installation consists of 40 CATIA V5 licenses, 40 ENOVIA SmarTeam licenses, 30 ELECTRE licenses, 30 SMARTELECTRE licenses and 1 CATELECTRE license. These are being or will be rolled out on the Roissy, Orly and Toulouse sites.

GUARANTEEING RESULTS WHILE KEEPING ON COURSE

AFI does not have an easy task and its teams have to deal with sometimes contradictory limitations and requirements.

THE NEED TO COMPROMISE WITHOUT BECOMING COMPROMISED

AFI's electrical design business is to make something new from what already exists. The paradox is that only paper-



based information or manufacturer-based information is available. Specialized data import tools were therefore required to guarantee the automated retrieval and formatting of the input data, which is precisely what the CGM interface developed by ELSYS provides.

QUALITY OF SERVICE AND RESPONSIBILITY

In addition, the general ATA standards governing the representation of electrical diagrams vary according to the manufacturers and it is essential to adapt to each of them, with regards to both reading their drawings and supplying, in return, the reference or maintenance files. AFI must of course comply with the ATA 100 general standards as well as all the manufacturer standards. This creates a degree of complexity that must be properly managed, as AFI takes responsibility for the aircraft modifications that must be documented and integrated into the aircraft manufacturer's reference documentation: ELECTRE's support of multiple forms of the ATA standards and the ability to export documents in CGM format are key for AFI.

DIFFERENT BUT CONSISTENT VISIONS

The requirements related to the production of the manufacturing file (specific to AFI) and the requirements concerning the maintenance file (transmitted to the aircraft manufacturer) are not the same: ELECTRE's ability to generate these two visions guarantees consistency and makes a direct contribution to AFI's overall quality objective.

MANAGING DATA, CAPITALIZING ON EXPERIENCE

In terms of PDM, AFI originally wanted to develop a totally customized management tool that would organize and manage the working methods, controlling and integrating both the electrical and mechanical designs. The complexity of such a system and the difficulty of establishing unique and stable management rules led the project managers, using the SMARTELECTRE integration platform, to set up more standard management of the electrical data within the PDM/EDM chain built on ENOVIA Smarteam. This pragmatic approach naturally means that all the standard management tasks (vault, validation, traceability, etc.) are provided. It also fits into AFI's strategic drive to capitalize on and make full use of their experience by providing specification and multi-criteria search services at project, document, sub-assembly, object, etc. level.

PROTECTING AMBITION, MAKING THE FUTURE POSSIBLE

Lastly, AFI's ambition in terms of digital engineering comes up against the fact that it is currently impossible to access the manufacturers' initial 3D models. For AFI's designers, rebuilding these 3D models is not economically viable, but through the acquisition of CATIA modeling tools and CATELECTRE electromechanical integration tools, AFI now has the resources to meet the challenges of winning new business opportunities and to develop its design capabilities on new markets.



« The ELECTRE solution that has been implemented saves us an enormous amount of time and totally meets the manufacturers' standards. It covers almost 100 % of our requirements ».

« The complementarity of the electrical CAD products from ELSYS and the data management products from Dassault Systèmes is excellent. With the SMARTELECTRE integration platform, it means we can manage the life cycle of electrical products from end to end. This advanced solution makes a major contribution to our 100 % quality objective ».

« I have great confidence in ELSYS - they're very honest people. They are proactive, customer-focused and always find the solution. With them you can say that it's possible, it's quick and it's not expensive! CGM Import-Export is a prime example of this. »

- FRÉDÉRIC SPEYER, IT PROJECT MANAGER, EDP SUPPORT,
AIR FRANCE INDUSTRIES, ROISSY CHARLES DE GAULLE

ADVANTAGES IN STEP WITH INDUSTRIAL BENEFITS

Such a project cannot be implemented without the committed support of the suppliers. In partnership with Dassault Systèmes, ELSYS fully understood this requirement and over time has been able to contribute its skills and expertise in terms of both electrical engineering and PDM integration to the AFI project team. In AFI's own opinion, when working with the ELSYS teams, they always proved to be very cooperative and responsive, with efficient solutions. The development of the CGM interface and the customization of SMARTELECTRE to AFI's requirements are prime examples of this.

The benefits for AFI are fundamental and match the objectives:

- Highly significant time savings, thanks to the automated production of design, manufacturing and maintenance files,
- Outstanding management of both the Boeing and Airbus environments,
- Effective integration of the requested customizations allowing almost 100 % coverage of AFI requirements so far,
- Design productivity, protection of experience and traceability as a result of capitalizing on data within a single management system.

A FORWARD-LOOKING IMPLEMENTATION

Asked about future prospects, the project managers proved to be pragmatic and confident:

First of all, effective implementation of CGM import/export within the relationship with manufacturers in order to further save time, to make the product totally reliable (for example by integrating functionalities that make intelligent use of retrieved drawings or produce documentation automatically) and to develop trust and confidence in the digital relationships between OEMs / AFI.

Also being considered is an automatic tool for producing physical harness manufacturing drawings directly from the full options diagram, which would result in significant performance improvements at assembly. Similarly, making up «kits» (a sort of sub-assembly of equipment and wires) would make it possible to improve procurement management and prepare assembly procedures.

Lastly, continuous improvement of the productivity and relevance of the teams is considered. They could be given new tools for capitalization, making it possible to protect experience and make full use of previous work, thereby improving AFI's competitiveness.

«KEONYS, the former Dassault Systèmes' Sales Division for France and Benelux, played a key role in building and integrating the solution for AFI. Working closely together, ELSYS and KEONYS have demonstrated their commitment to match AFI objectives and produce a coherent PLM solution covering every requirement, with a focus on the future. This integrated approach is one of KEONYS' key assets and the fruit of 20 years of experience and knowledge in software product integration and implementation. The ELSYS-KEONYS partnership gives customers strategic value, ultimately helping them to become more competitive using PLM.»

- FRANCK EICHENBERGER,
DIRECTOR, REGIONAL SALES, KEONYS



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