AIRBUS

MyTest, Major enabler for A350XWB structural tests

Context

In the framework of new aircraft certification, the structural test campaign is on the critical path, and in particular to secure the 1st flight. Any issue during test campaign may have a critical impact on certification scheduling.

For A380 and A400M structural test campaign, Airbus used various heterogeneous tools.

The issues were:
- Very heavy configuration and verification loops for instrumentation preparation
- Very low flexibility of monitoring tool
- Low test cell configuration management (repairs, reinforcements, …)

A350XWB
Shaping efficiency

A350XWB
Major Static Test (ES)

AIRBUS

The challenges of A350XWB structural test campaign for Airbus were:

- Worldwide context and RSP (Risk Shared Partners of Airbus) involvements
- Number of load cases per week significantly increased
- Increased use of complex FE models for structural analysis

These experiences highlighted the need for new advanced capabilities to manage structural test campaign.

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One single end-to-end application for A350XWB static tests

In 2009, Airbus launched the development of MyTest software application by choosing Intespace. The main objective was to provide one single end-to-end application for the various actors of A350XWB major structural tests (Airbus, RSP, Test labs). Airbus requires a flexible set of tools to facilitate and harmonize the process for instrumentation (creation, validation, installation and maintenance) and to improve test monitoring by advanced features like correlation in real-time test results with forecast data.

The main target was A350XWB major structural tests.

Instrumentation and monitoring tools

MyTest software application, designed with Airbus by Intespace, integrates two COTS « Commercial On The Shelf » products:

- **DynaWorks®**, edited by Intespace, provides the database management system and the monitoring tool.
- **EasySensorManager®**, edited by Global Vision Systems, provides the instrumentation tool.

DynaWorks® is the only software product that has both database management system with visualization tools integrated and a large data processing test library. This database management system, developed by Intespace is optimized for the specific problem of storage of test data and calculations. Unlike other database solutions that manage the measures in separate files, it can store data files of the tests and calculations directly in the form of objects. This mechanism allows DynaWorks® to provide the most efficient solution of the market for network exchanges like extended enterprise, for the display on the client and the space taken on the disc.

EasySensorManager is a collaborative software solution for instrumentation management. Built on the DynaWorks® database, it enables easy real-time access to all sensors information and manages the complete instrumentation lifecyle from creation to maintenance. EasySensorManager provides also a powerful 3D digital mock-up visualization by importing 3D CAD file. The user is able to manage all sensors directly on the 3D visualization.

MyTest is organised in 4 modules:

Admin Tool Module	DMU Import Module
Instrumentation Module	Monitoring Module
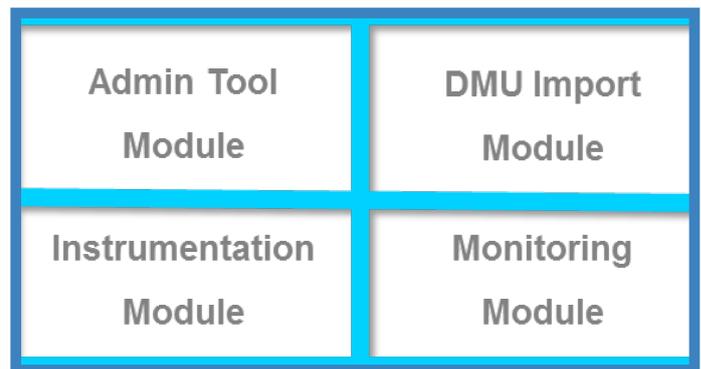
Only one database for collaborative work with DynaWorks server product

The complex network of actors is taken into account in MyTest application by the roles, profiles and users rights management with Admin Tool module. To answer to the collaborative way of working requirement, all instrumentation and measurement data are stored into a centralized DynaWorks® server. This server is located in Toulouse with a worldwide access through Airbus extended network. A local server is dedicated for each test lab, then a synchronization with the centralized server is done after each test.

> «   What   MyTest   application development with Intespace has given us is above all unprecedented reliability   when   it   comes   to measurements.»

DMU as master

The Airbus slogan «DMU as master» promotes the high innovation of the solution. The complete test specimen is managed by design office under CATIA CAD software. As the design is completed, the CATIA files are imported as a simplified 3D Digital Mock-up into the Instrumentation database through the DMU Import module. All design changes are managed by CATIA and by updating the simplified DMU into MyTest database. The inconsistencies on the current instrumentation, due to DMU changes (for example: part deleted or modified) are indicated in the 3D Model tree of Instrumentation module by a symbol on the sensor name.

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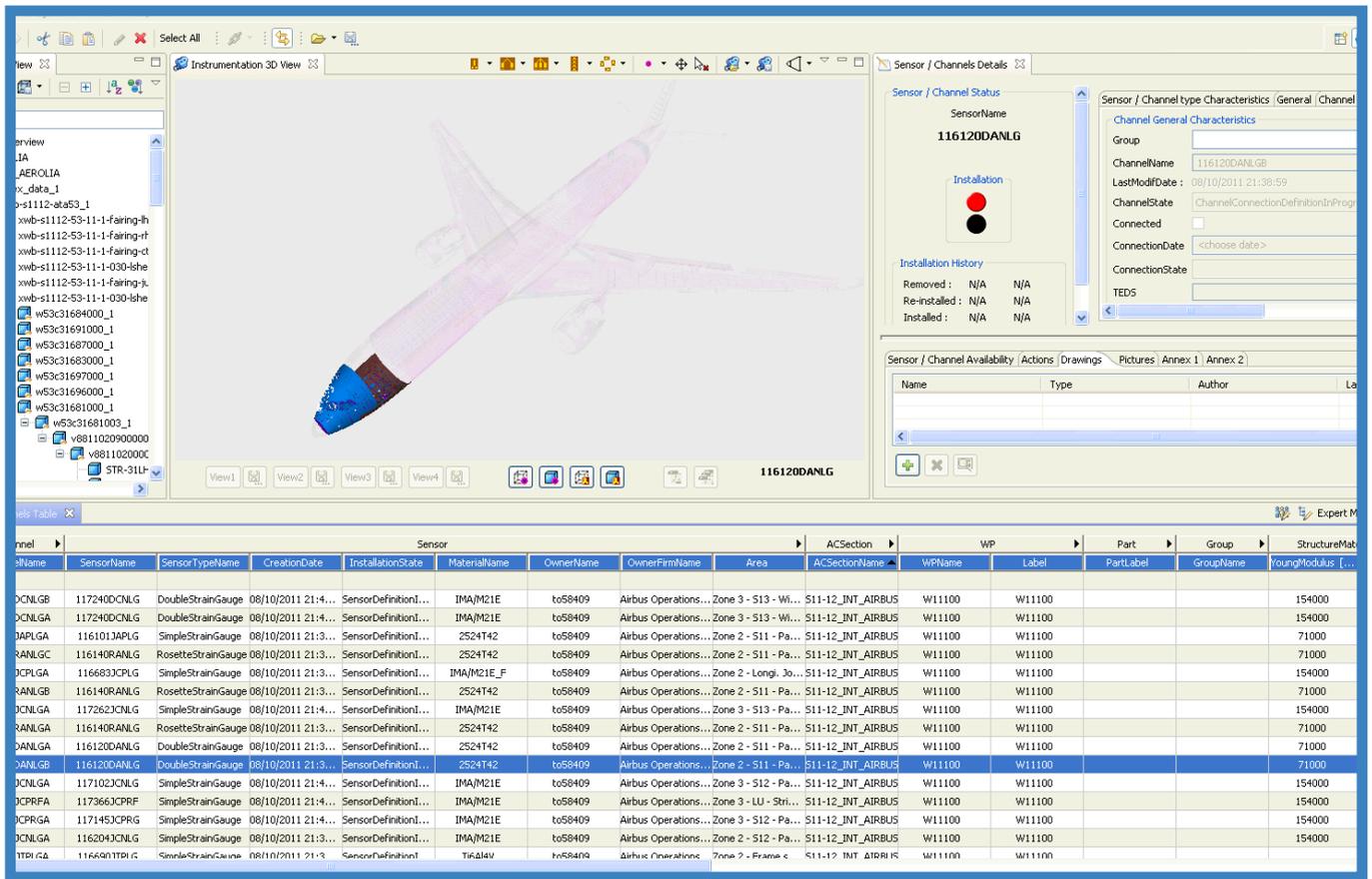
Instrumentation module

Instrumentation tool for sensor lifecycle with EasySensorManager product

Within the Instrumentation module, a simplified worklfow manages all the lifecycle of the instrumentation process, according the profiles of the different actors.

« This application covers the complete process: MyTest is used by dedicated engineers and technicians for sensor definition, installation, connection, and maintenance.
Measurements follow the same data flow, without ever being altered.”

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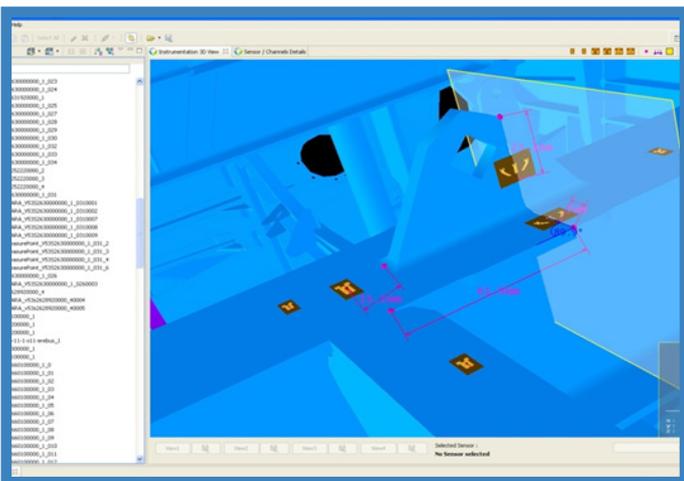
Drawing editions

The sensor requestor defines the position of sensors directly on the DMU of the test specimen with the intuitive user interface of Instrumentation module. Drawings are automatically created according several Airbus templates.


A request for installation is sent through the validation process. The sensor installer uses the drawings and 3D mockup to check the real situation versus the virtual.

Several dashboards for instrumentation give a quick overview of the sensor status and are accessible by all profiles with different access rights for each role. All information of sensors is stored in the centralized database: sensor characteristics, position, installation and connection status, physical parameters, maintenance information. External files like photos, videos, 2D drawings can be attached to each sensor.

Physical actions linked to test calendar

The test schedule manager uses the event scheduler view for creating, visualizing and managing events and tests. Each sensor is declared as «needed» or «not needed» for each event. At a glance, the schedule manager knows which sensors are operational or not for a dedicated test. Before starting a test,
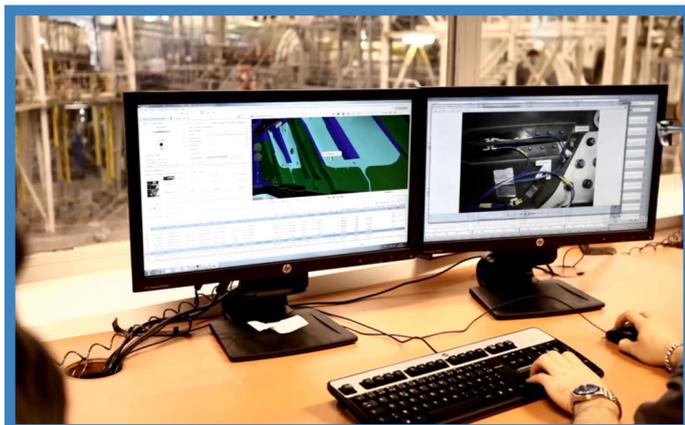
a snapshot of instrumentation could be done in order to manage the history of instrumentation for each test.

Data acquisition system configuration and measuring channels connection are managed by using specific views linked to the specific measurement chain of A350XWB structural tests.

Test monitoring in real-time with DynaWorks realtime product

For test monitoring, Intespace has developed a Monitoring module based on DynaWorks® realtime product. This DynaWorks® product is designed to monitor real-time measurements in the case of "slow" acquisition. It allows, for example, to manage and analyze the results measurements of the thermal or climatic tests and mechanical quasi-static long-term tests. With this product, it is possible to ensure:

- Real-time monitoring and processing
- All of the data from prediction and tests under a single database

Since 20 years, DynaWorks® Real time edition is operational within Intespace test center for Astrium Satellites, in Thales Alenia Space Cannes, and in European Space Agency test center for thermal tests monitoring. The main objectives of this product are to get a better understanding of the thermal behavior: 3D Model displaying, predictions/Tests comparison and to secure the test monitoring by alarm management.

«User-focused 3D-interface display has also been well received, fostering the quality of information.»
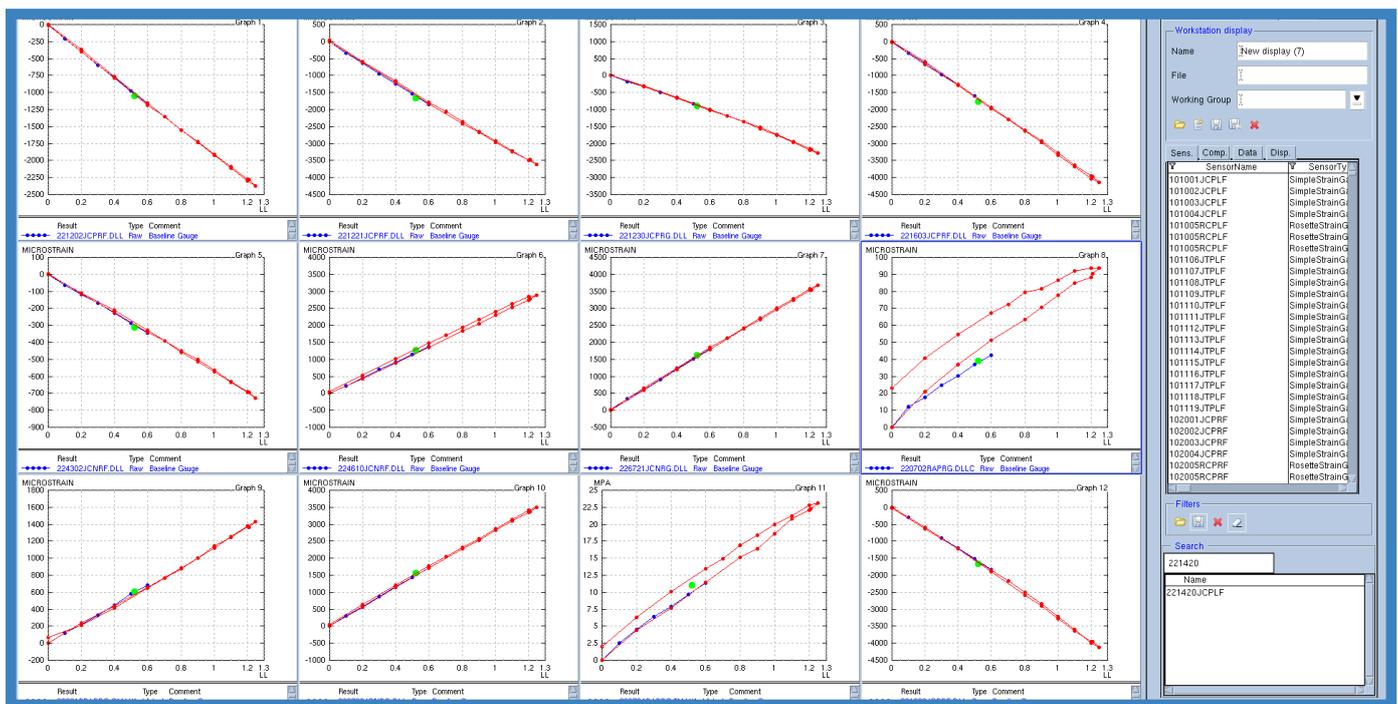
Monitoring module

High performance and fexible tool for measurement analysis

This reliable and efficient solution allows to manage high volume data and is compliant to Airbus high performance requirements: 120 people to monitor in real time 12000 sensors.

The stress engineer is able to customize the data to be displayed in each workstation. This configuration can be saved as Excel file and then imported before each test or during the test.

Real time test results, with forecast and extrapolated data can be displayed with a previous test results to facilitate the analysis and the decision in test monitoring.

During the test, the user can access to all instrumentation information by just a click on «go to sensor» from the Monitoring tool. At any time, the user can display the location of sensor on the DMU, the characteristics of the sensor and the photos in order to check the consistency of the sensor measurement.

In case of failure or a doubt on the result, the stress engineer can declare a maintenance on the sensor.

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The benefits for Airbus

More than 20 load cases are achieved for A350XWB structural tests from March 2013 with MyTest.

The benefits of MyTest for Airbus are important:

- **Same way of working:**
Harmonised instrumentation management for all major tests.

- **Data sharing & traceability:**
All data are centralized in the same database A350 structure tests accuracy:
Advanced monitoring features facilitate the decision making to avoid structural failure.

- **Time saving:**
A quick access to latest instrumentation and acquisition chain status reduces the time of test preparation.

A recognized innovation

In July 2013, the project MyTest has been selected to compete at Airbus Corporate level in the «Drive Improvement and Innovation» category.
With this success, Airbus and Intespace decided to promote this product within EADS and major companies in the aerospace industry.
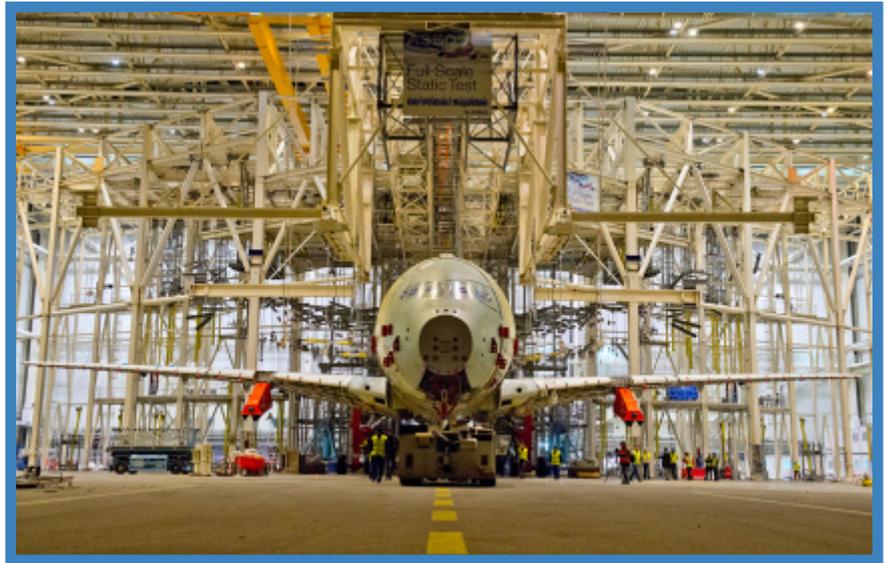
About Intespace

INTESPACE is a service and engineering company which addresses all complex challenges at all stages of the life cycle of products, from design to removal from service.
It is organized in three complementary areas of activity in the domains of aeronautics, space, defense and others:

- Environmental tests: mechanical, thermal, climatic, electric supporting by technical support, studies, training and metrology
- Dynaworks®: for data analysis and management
- Engineering: of test centers, test facilities and test benches

Our success comes not just from our technical expertise, but from close cooperation with our customers, understanding their goals, and delivering services on time and on budget. As an expert and innovator in this market, Intespace provides its partners with a competitive edge.

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