simulation systems integration

EHPOC

High Performance Environment
for Optimization and Design

A step forward in managing data consistency through a complex turbine blade development process

THE CHALLENGE

A leading aircraft manufacturer provided the EHPOC project with an effective, well designed but complex multidisciplinary turbine blade design and simulation process. The product and process complexity presented several concerns:

· Maintaining data consistency throughout the process and across the teams involved,

· Coordinating team efforts while helping them execute their best practice process,

· Verifying that the correct process is followed.

THE SOLUTION

Combining ESI's Simulation Systems Integration modules Vdot™ and Visual*DSS* allow to **model and execute** the iterative simulation driven design process across different domain teams. The teams are able to follow their best practices with a consistent thread of related data items and **complete visibility for management.**

The software easily manages the simulation content of each domain team in a common environment, including the data relationships between simulation domains and between simulation and CAD.

"This kind of solution efficiently pilots the design cycle (real time status, avoid delays due to chasing after the data…) and manages the storage of the simulation data and the traceability of the CAD-CAE links."

EHPOC high-technology aircraft equipment partner

ESI's software solutions for Simulation Systems Integration demonstrated their ability to solve industrial challenges in the EHPOC project (High Performance Environment for Optimization and Design). The main goal of EHPOC, a 16M€ project funded by the French government and industrial partners, was to deliver "industrial platforms, multi-scale and multi-physics software dedicated to global design in order to produce best in class numerical design tools…", to be a "corner stone for industrial innovation and competitiveness, design and development cycles reductions, productivity improvement."

A high-technology aircraft equipment partner provided a complex turbine blade development process involving multiple physics domains and teams for each domain. In addition to general time and cost reduction goals, the industrial partner had three specific concerns:

1. How to keep track of dependencies in the distributed data?

2. How to archive the design project data?

3. How to save the history of the modifications?

The process was well thought out and proven to produce good results. The teams did their domain work in a nested loops process. The outer loop dealt with shaping and performance, inner loops handled structural and thermal failure criteria.

Data had to be managed by each team in their loop and then passed on correctly to the next domain team. The inner loops might show an outer result to be ok, or find a problem requiring another iteration in the outer loops. As the design passed back and forth between the teams / loops, the data consistency challenges were most severe.

Visual*DSS* provided a place to manage the simulation content, maintaining relationships between design and simulation, between simulation domains, and managing 3rd party data related to both.

Vdot™ easily captured the process, allowing it to be executed with visibility for management and team members alike, and to ensure a consistent thread of data by automatically linking to **Visual*DSS*** as needed.
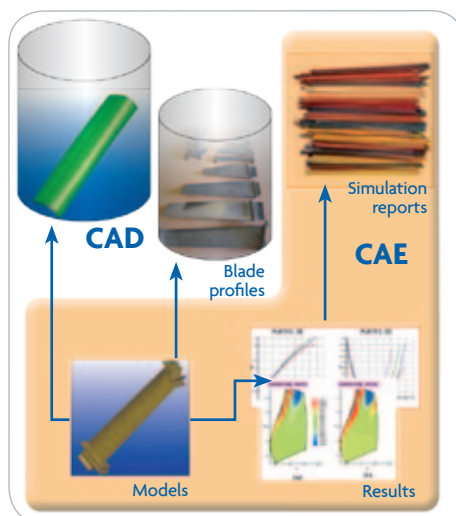

Consistency between distributed data

Follow best practice with consistent data flows in Vdot™
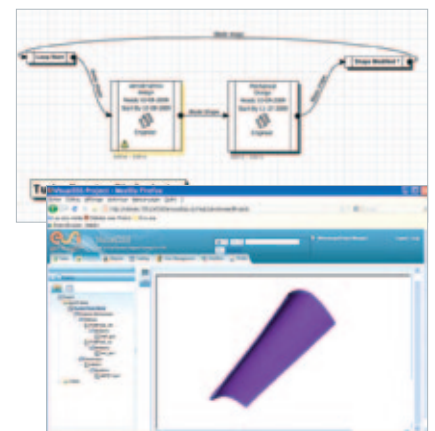
Manage simulation content in Visual*DSS*

Manage Simulation Content

ESI's Simulation Systems Integration software makes engineers more effective by managing the relationships between CAD, simulation models, and results. With traceability between design and simulation, engineering teams efficiently perform the right tasks with the right data at the right time. Management and the teams themselves enjoy real-time functional and project status visibility.
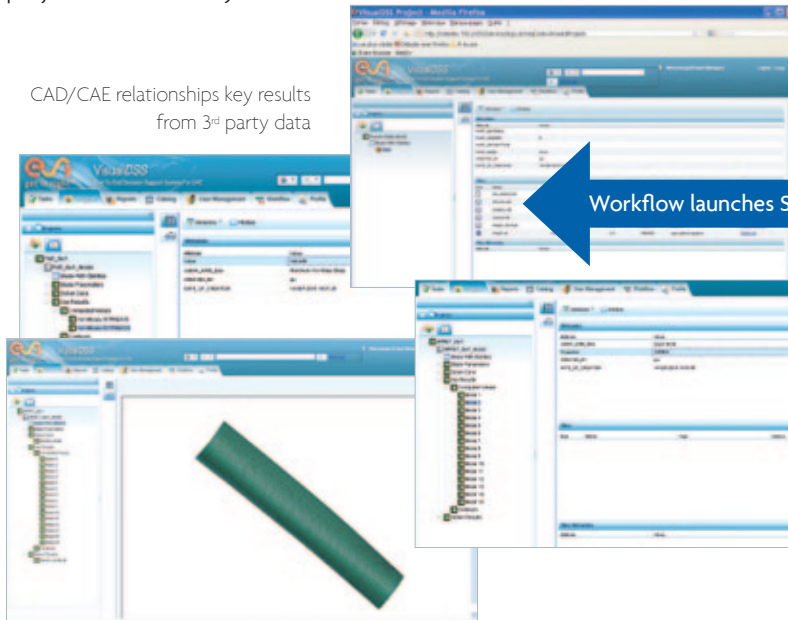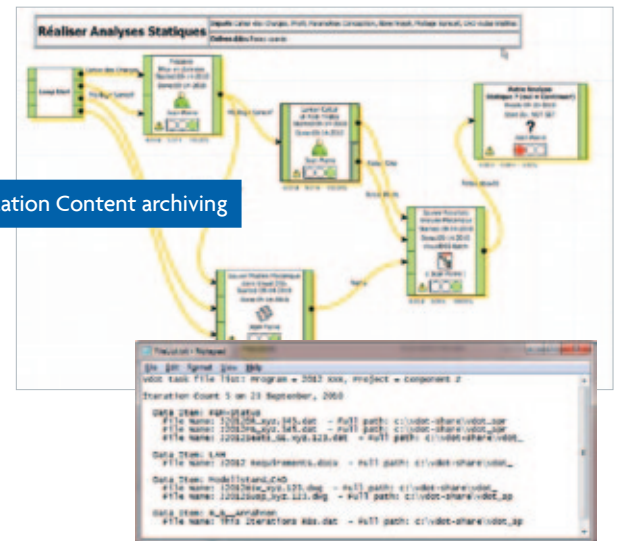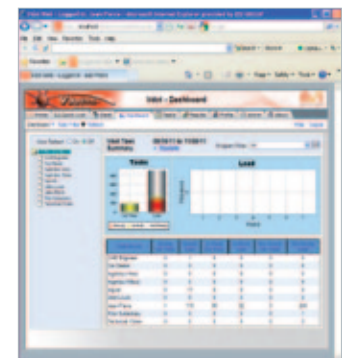
Manage Best Practices

The solution enabled to manage the simulation content between the simulation domains and CAD. In addition, as part of the EHPOC project, ESI developed customizations to interface with other 3rd party data, enabling management and archiving of more content in the common environment.

Ensure Consistent Information Flow

The software ensured the right data flowed between the teams while maintaining a "run history" of each design or simulation cycle and keeping everything linked to the content management environment. It also automatically provided real-time status during execution (process state, projections, workloads, ...).

CAD/CAE relationships key results from 3rd party data

Workflow launches Simulation Content archiving

Design cycle data history report
(developed post-EHPOC)

Real-time status dashboards

To find out more about ESI's Simulation Systems Integration solutions, please visit: www.esi-group.com/ssi

ABOUT ESI GROUP

ESI is a pioneer and world-leading provider in virtual prototyping for manufacturing industries that takes into account the physics of materials. ESI has developed an extensive suite of coherent, industry-oriented applications to realistically simulate a product's behavior during testing, to fine-tune manufacturing processes in accordance with desired product performance, and to evaluate the environment's impact on performance. ESI's solutions fit into a single collaborative and open environment for End-to-End Virtual Prototyping, thus eliminating the need for physical prototypes during product development. The company employs about 850 high-level specialists worldwide covering more than 30 countries. ESI Group is listed in compartment C of NYSE Euronext Paris. For further information, visit www.esi-group.com.

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