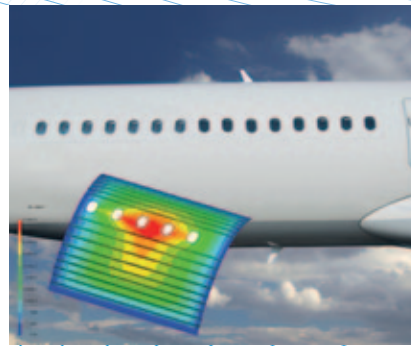
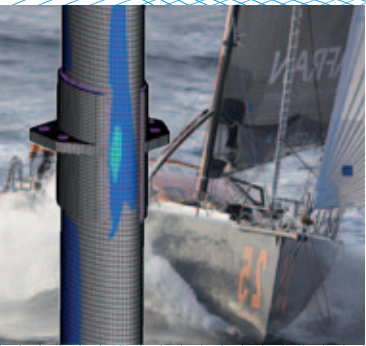


Composites Simulation Suite

Virtual design, testing and manufacturing of composite materials



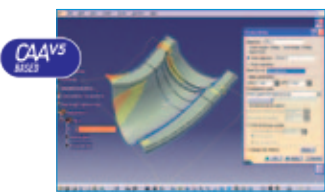
ESI's Composites Simulation Suite offers a wide range of dedicated industrial software to simulate the design, performance and manufacturing of composite parts. It is supported by Visual-Composite Materials, a collaborative user environment allowing you to manage multi-domain composite material data.

COMPOSITES MANUFACTURING

PAM-QUIKFORM *Draping*

PAM-QUIKFORM is a powerful geometric solver offering up front composite parts feasibility assessment

→ Ease your decision-making by eliminating bad design choices.

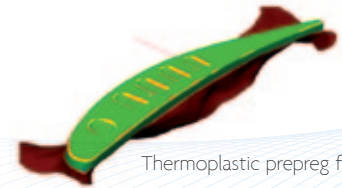


Draping of a representative aeronautical part

PAM-FORM *Composites Forming*

PAM-FORM enables prepregs (thermosets and thermoplastics) forming and textile pre-forming simulation.

→ Select the most appropriate material, the right tooling design and the best process parameters to get it right the first time!

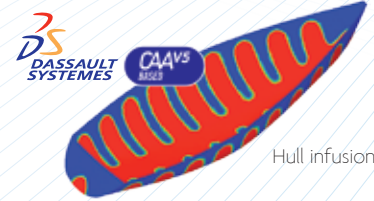


Thermoplastic prepreg forming

PAM-RTM *Liquid Composites Molding*

PAM-RTM enables resin injection or infusion of dry reinforcements simulation

→ Define and optimize ports and media locations, minimize the risk of producing defective parts and master tool design and process parameters

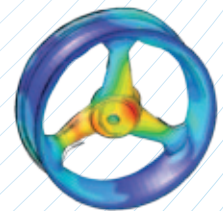


Hull infusion

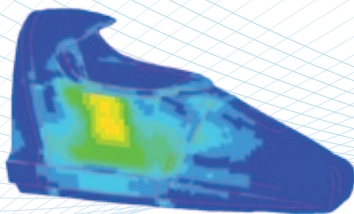
SYSPLY *Curing and Composites Shape Distortion*

SYSPLY simulates curing and shape distortion due to manufacturing effects

→ Take into account thermo-mechanical and chemical shrinkage during your manufacturing process.



Distortion of a carbon fiber wheel



Loading analysis of a FI offshore boat



VIRTUAL PERFORMANCE SOLUTION *Composites Analysis & Performance*

Virtual Performance Solution allows the mechanical assessment of composite structures through realistic and predictive numerical simulation.

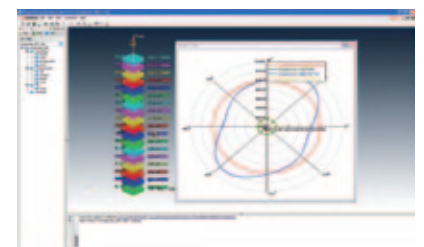
→ Design and optimize your composite structure, taking into account manufacturing effects:

- Static loading analysis
- Impact and crash loading analysis
- NVH strength analysis

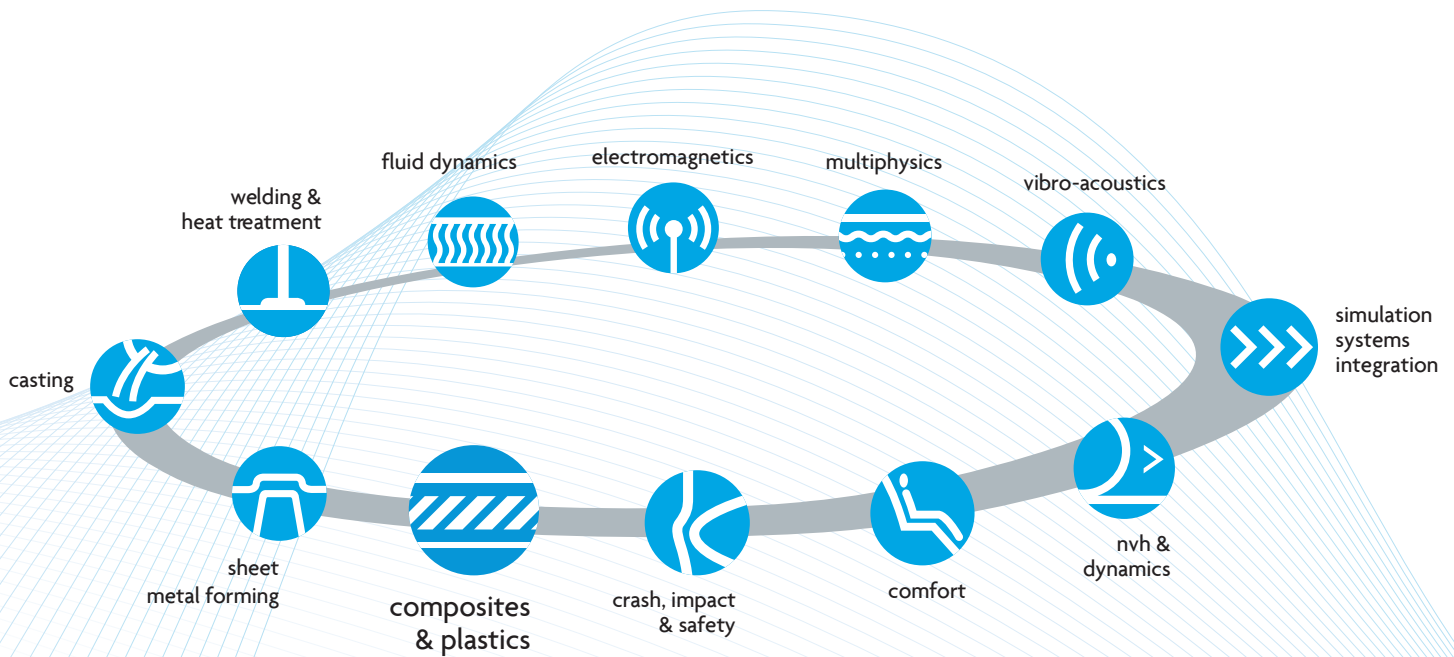
COMPOSITES TESTING

BENEFITS

- Reduce tooling and process costs
- Minimize material waste
- Improve overall product quality
- Save time with a fully integrated solution



Laminate definition within Visual-Composite Materials



CUSTOMER REFERENCES

Industrial: Aston Martin, BIAM, Boeing Research & Technology Australia (BR&TA), Bombardier Transport, BMW, CCAT, CEA, Chengdu Aircraft, CRC-ACS, Dassault-Aviation, DOW, EADS, Eurocopter, GE, Hexcel, Letov Letecká Vyroba (Groupe Latecoere), Luca Olivari, M-Torres, ONERA, Pôle de Plasturgie de l'Est (PPE), Siemens Wind Power, Snecma and Snecma Propulsion Solide (SAFRAN Group), Volkswagen, VZLU...

Academic: Ecole des Mines, Ecole Polytechnique de Montréal, KU Leuven, Shanghai Jiaotong University, TU Clausthal, TU Delft, TU Dresden, University of Cranfield, Université Le Havre, Wichita State University...

"The composite simulation solution from ESI Group is very attractive to us. The Resin Transfer Molding (RTM) process will have a good future in China. As ESI Group has such a wide scope of composite simulation solutions, I am confident that ESI's solutions will benefit BIAM and LAC, and will leverage China's aeronautics composite simulation level."

Dr. Yi Xiaosu, Director of the Science Technology Committee at Beijing Institute of Aeronautical Materials.

"PAM-RTM can handle a variety of RTM process variations (matched mold, VARTM, resin film infusion). CCAT saw value in demonstrating this approach to industrial companies to help them reduce trial-and-error iterations when designing a new process. CCAT has engaged with several organizations to exercise PAM-RTM on a variety of parts, providing insight to issues such as runner design, filling time and pressure distribution."

Gregory Hasko, Applications Engineer, Composites Manufacturing, Connecticut Center for Advanced Technology (CCAT).

For more information on ESI's Composites Simulation Suite please visit:

www.esi-group.com/composites

or contact your local distributor

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ABOUT ESI GROUP

ESI is a pioneer and world-leading provider in virtual prototyping 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 over 750 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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