ESI presents its Composites Simulation Solution 2015 at JEC Europe

Enabling the simulation of the complete manufacturing chain, from the initial composites plies to the final product

Paris, France – March 10, 2015 – ESI Group, pioneer and world-leading solution provider in Virtual Prototyping for manufacturing industries, announces the release of ESI's Composites Simulation Solution 2015. The new solution will be presented at JEC Europe, the world's largest composites conference and trade show, which takes place in Paris, France from March 10 to 12, 2015. Amongst the many software solutions available on the market, ESI's Composites Simulation Solution 2015 is the only Finite Element (FE) simulation solution allowing for the virtual simulation of the complete composites manufacturing chain, starting with simple composite plies and concluding with the final product. The solution represents a key asset for all manufacturers using composite materials, whether in the automotive, aerospace or energy sectors. ESI's Composites Simulation Solution 2015 empowers industrial clients to deliver on quality and to deadlines, while controlling their costs.

Jean-Luc Macret, Senior Manager, Research and Technology Projects at Airbus, comments: *"Definitely, simulation is the capability we need to reduce our global costs. […] But for reducing the industrial costs, we also need to dig into the processes and all the manufacturing activities, which is now the trend."*

Striving to meet these expectations, ESI's Composites Simulation Solution 2015 allows for the definition and optimization of process parameters that minimize manufacturing defects and increase final product quality, taking into account each step of the manufacturing chain. The solution's product/process design approach ensures that every manufacturing result can be transferred into the structural analysis so the model reflects the product 'as built' and not only 'as designed'. This aspect is crucial as it enables manufacturers to truly rely on Virtual Prototyping to minimize design margins and reduce weight.

Composites Simulation Solution 2015 includes PAM-FORM, PAM-RTM and PAM-DISTORTION. For the first time, these leading composites manufacturing applications are released in one single package. The three applications, which can be also used individually, now communicate with one another by transferring material information and history (including Shearing, Temperature and Degree of cure), from one stage of the process to another. The applications also benefit from a common user environment, ESI's Visual-Environment that offers convenience, reliability and substantial time-savings.

PAM-FORM is used to simulate the preforming process of dry textiles or the thermoforming of pre-pregs made of thermoset or thermoplastic resins. Processes covered include stamping, rubber pad forming, thermoforming and diaphragm forming. By predicting defects such as wrinkles, thickness defects, bridging, strains, stresses (shearing and in fibers) and fiber orientation, PAM-FORM can help users correct and optimize all process aspects (kinematics, temperature and pressure cycle, clamping conditions and forces, initial flat pattern). All of these results are available at ply level, instead of only at laminate level and therefore provide for, as an example, the prediction of internal wrinkles. Furthermore, Composites Simulation Solution 2015 includes major enhancements and new functionalities with a focus on the thermoforming of Organo Sheet materials.

PAM-RTM is used to simulate the injection or the infusion of a resin in a preform and can also assist in analyzing the curing of thermoset composites parts. Processes that can be modeled include mold pre-heating, Resin Transfer Molding (RTM), Vacuum Assisted Resin Infusion (VARI), Compression RTM (C-RTM) and the curing of thermoset parts. Defects such as dry zones or porosity can be corrected by virtually fine-tuning parameters including the location and shape of the injection gates, the vents and vacuum ports, the position and type of flow media, the heating of the mold and parameters related to the curing cycle.

Thanks to its unique high performance solver and adapted graphical interface, PAM-RTM can deal with extremely large numerical models using shell or solid elements. This is essential when addressing both the large component size required in the wind industry and the extreme detail of small components for the automotive industry.

PAM-DISTORTION is used to compute residual stresses and geometrical deformations, such as spring-in and warping, induced by the manufacturing process. It accounts for strains generated by the modification of material properties due to the phase transformations during curing. PAM-DISTORTION allows for the development of recommendations for process parameters in order to minimize the shape distortions of complex composites parts upfront in the development process, before cutting any tools. It is also used to generate a compensated mold, based on computed distortions in order to obtain a final part geometry within the specified tolerance.

Meet ESI at JEC Europe!

ESI will be located at booth Q58, hall 7.3. For more info, to book a product demo or a personal appointment, please visit our dedicated web page.

You can also join ESI's free seminar on Composites Manufacturing Simulation which will take place on Wednesday, March 11th at 3pm.

Recent research lead by the Chair "Centrale Nantes – ESI" in France will be presented by **Dr. Christophe Binetruy**, from Centrale Nantes' Materials, Processes and Composites department. The paper, entitled "Advanced modeling approach for SMC high performance process" will be presented during the 'Automotive: High Performance Applications' session on Wednesday March, 11th at 3.55pm.

Image: Composites Simulation Solution 2015 enables the modeling and optimization of the different steps involved in manufacturing a structural composite part.

For more information about the Composite Simulation Solution, please visit http://www.esi-group.com/software-services/virtual-manufacturing/composites

To watch the video interview of **Jean-Luc Macret**, Senior Manager, Research and Technology Projects at Airbus, please visit the related page on ESI's YouTube channel.

For more ESI news, visit: www.esi-group.com/press

ESI Group – Media Relations
Céline Gallerne
+33 6 22 74 69 67

For additional information, please feel free to contact our international communications team:

North America	**Germany, Austria, Switzerland**	**South America**
Natasha Petrous	Alexandra Lawrenz	Daniela Galoflo
+1 248 3818 661	+49 6102 2067 183	+55 11 3031 6221
United Kingdom	**Italy**	**Japan**
Hannah Amiss	Maddalena Marinucci	Nozomi Suzuki
+44 1543 397 905	+39 051 633 5577	+81 363818486
France	**Spain**	**South Korea**
Gaëlle Lecomte	Monica Arroyo Prieto	Gyeong Hee Lee
+33 4 7814 1210	+34 914840256	+822 3660 4507
Eastern Europe	**Russia**	**China**
Lucie Sebestova	Natalia Nesvetova	Jin Bai
+420 511188875	+7 343 311 0233	+86 18618146267

About ESI Group

ESI is a world-leading provider of Virtual Product Engineering software and services with a strong foundation in the physics of the materials of which products are built.

Founded over 40 years ago, ESI has developed a unique proficiency in helping industrial manufacturers replace physical prototypes by virtually replicating the fabrication, assembly and testing of products in different environments. Virtual Prototyping enables ESI's clients to evaluate the performance of their product, and the consequences of its manufacturing history, under normal or accidental conditions. By benefiting from this information early in the process, enterprises know whether a product can be built, and whether it will meet its performance and certification objectives, before any physical prototype is built. To enable customer innovation, ESI's solutions integrate the latest technologies in high performance computing and immersive Virtual Reality, allowing companies to bring products to life before they even exist.

Today, ESI's customer base spans nearly every industry sector. The company employs about 1000 high-level specialists worldwide to address the needs of customers in more than 40 countries. For further information, visit www.esi-group.com.

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