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FRAMES : A new research project focused on thermoplastic manufacturing solutions for complex geometries.

A consortium of European companies initiated by ESTIA-Compositadour is joining forces to develop advanced knowledge and manufacturing solutions for a full-scale thermoplastic aircraft rear end demonstrator.

The fuselage of the next generation of large passenger aircrafts will certainly rely on the benefits of thermoplastic composites. Greater toughness, recycling potential and faster production cycles enable the capacity to meet future aviation sector challenges.

In fact, even if this kind of materials are being increasingly used in aerospace industry, as they contribute to lighter aircrafts and consequently to fuel consumption reduction, there are still some issues to be overcome until this becomes a reality. The manufacturing of complex forms of aircraft rear end section with continuous fibre-reinforced TP still poses a considerable challenge: high processing temperatures, raw material costs, complex temperature-controlled tooling and evolutive cross sections.

To support a Clean Sky 2 initiative focused on developing concepts and enabling technologies for an optimum rear fuselage and empennage, ESTIA-Compositadour initiated a European consortium with Heraeus Noblelight Ltd. (UK), Xelis (Germany) and Cero (France) into a 2.5 year applied research project FRAMES : Fibre reinforced thermoplastics manufacturing for stiffened, complex, double curved structures.

FRAMES main objective is to validate and assess a manufacturing approach of an integral thermoplastic rear end with critical design features. Key technologies developed within FRAMES will be used into a mid-scale advanced rear end demonstrator manufactured by the Deutsches Zentrum für Luft- und Raumfahrt (DLR), part of a Clean Sky 2 technology platform for large passenger aircrafts.

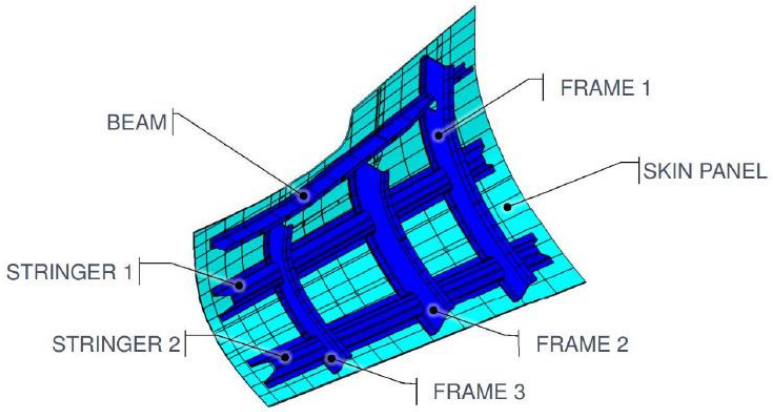

Figure 1 : Full thermoplastic Advanced Rear End demonstrator

By combining their forces and knowledge, the consortium is looking to bring reliable and competitive industrial solutions for intelligent heating systems for automated lay up, efficient stiffeners production process and advanced heated tooling. Three work packages will support enabling key technologies :

Heraeus Noblelight will lead the development of a combined optical-thermal simulation model for fibre placement with xenon heating device such as humm3®, enabling fast skin lay up.

Xelis will undertake the development of robust manufacturing process for complex thermoplastic stiffeners with a proven high production rate capability

Cero will take charge of delivering a self-heating tooling solution enabling a skin-stiffeners co consolidation process in one shot,

ESTIA-Compositadour will lead the project, perform fibre placement trials and support DLR during manufacturing and delivery of rear end demonstrator.

FRAMES project kick off on end of July and will publish regular updates on progress. For more information, you can contact Guillaume Fourage, g.fourage@estia.fr

Clean Sky JOINT UNDERTAKING

DLR Deutsches Zentrum für Luft- und Raumfahrt German Aerospace Center

Heraeus XELIS Plasturgie et outillages cero COMPOSITADOUR COMPOSITES & ROBOTICS SOLUTIONS