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## CT collaborated in the R+D Keelbeman project to design and manufacture a keel beam section for the Airbus A320

- The KEELBEMAN project successfully concluded at the end of February 2020. Funded by the European Commission through the Clean Sky 2 Joint Undertaking under the EU Horizon2020 program, the goal of this project was the complete design and manufacture of a thermoplastic composite keel beam section for an Airbus A320-type aircraft to validate the technology at technology readiness level 3 (TRL3).

**CT, a leader in providing technological and innovative engineering solutions for the entire product life cycle**, carried out the keel beam redesign from metal to composite with no rivets, starting from the metallic baseline defined by Clean Sky 2 topic manager Airbus (Toulouse, France) and defined the architecture and thickness according to calculations from structural and manufacturing process analysis.

“The main challenge of the project was to understand the do's and don'ts of thermoplastic processes and associated induction welding and to propose a technical solution that would have the least possible negative effect on manufacturing and assembly capacities. As for the lessons learned, we gained new skills in materials and processes related to thermoplastics, and we focused on improving manufacturability in order to find a balance between performance and cost”, explains Matthieu Merle.

To successfully complete this project, CT collaborated side by side with EURECAT, as project coordinator, CETMA, an R&D center highly specialized in composite processing and characterization and SOFITEC, a leading Spanish TIER 2 supplier for aerostructures. The multidisciplinary consortium addressed the design and manufacture of a full component via a keel beam section demonstrator, using thermoplastic matrix resin reinforced with carbon fiber. The use of manufacturing technologies with significant potential for automation has been explored and selected combinations have been demonstrated at TRL3.

CETMA was responsible for manufacturing the skins and the stringers of the keel beam section, by using a novel and fast continuous compression molding (CCM) process, one of the most promising for manufacturing very long thermoplastic composite parts. Stiffening ribs were produced using more conventional non-isothermal compression molding by the project coordinator EURECAT. Skins, stringers and ribs were assembled using CETMA's patented induction welding technology.



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On the other side, SOFITEC, a leading Spanish TIER 2 supplier for aerostructures, focused on the detailed definition and implementation of ultrasonic non-destructive inspection (NDI) of coupons, subcomponents and the final demonstrator, based on Airbus standards and the particularities of welded thermoplastic composite structures.

#### **About CT**

*CT provides engineering services in the aeronautical, naval, automotive, rail, energy, industrial plants, architecture and construction sectors. CT covers the entire life cycle of the products, from product design engineering, manufacturing engineering to post-sales support engineering. CT has more than 1,700 employees and a network of offices in Spain, France, Germany, Portugal, the United Kingdom, India and Brazil. CT is a supplier of engineering services in design, manufacturing, assembly and*

*maintenance phases for the civil and military sector. CT is the only Spanish supplier of product engineering (E2S) and manufacturing (ME3S) for Airbus in the world and a preferred supplier of engineering for Navantia. Other relevant works stand out, such as the participation of the CT Architecture division in the La Sagrada Familia project or the Automotive Engineering division in the Medina-Mecca AVE.*

#### **For more information:**

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