Advanced manufacturing gives AISI-Aerosud partnership welcome lift

In line with its vision of helping the local aeronautics and related sectors to improve their global competitiveness, the Aerospace Industry Support Initiative (AISI) and global aviation leader Aerosud are employing advanced manufacturing capabilities to drive down costs and weight of components.

The AISI is an initiative of the Department of Trade and Industry (**the dti**) and is hosted and managed by the Council for Scientific and Industrial Research.

Marié Botha, AISI Manager, says, “Continuous cost reduction while maintaining world-class quality and safety standards is of increasing importance to this sector. Our work with Aerosud involves exploring manufacturing technologies that will allow it to reduce costs on existing and future materials and processes. Cost and weight reduction to promote efficiency and ultimately achieve reduced cost is critical.”

The project detailed below illustrates how advanced manufacturing is being industrialised in the South African aerospace industry.

Process design of continuous fibre-reinforced thermoplastic (CFRTP) joining methods

The process design of CFRTP joining methods is one of the technologies that will enable Aerosud’s participation in the international CFRTP market.

Within the context of this research project, which started in 2007 and was co-funded by the Department of Science and Technology’s Advanced Manufacturing Technology Strategy, a CFRTP stamp-forming process was developed. Subsequently, an industrial process was developed with AISI support. This led to the successful implementation of manufacturing processes for 1 800 frame clips per month for the Airbus A350 programme.

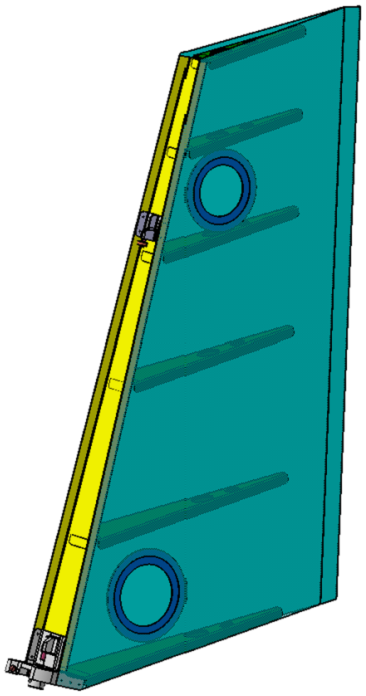
Joints between metal components and CFRTP structures were investigated as an integral part of major assemblies. A complete assembly for installation on aircraft will be produced and tested to ensure that the full process design cycle is understood and tested.

Aerosud Research and Technology Director, Wouter Gerber, explains, “These frame clips are made for the centre fuselage of the aircraft. They are class 1 primary parts and secure the fuselage skin panels to the fuselage structural framework. For example, there are more than 470 types of frame clips produced by Aerosud for the A350, and more than a 1 000 Aerosud frame clips in each A350.”

After the clips are formed at Aerosud, they are shipped to Spirit Aerostructures in the US where the clips are assembled to the aircraft frames and skins using rivets and bolts. The assembled panels are fed into the Airbus assembly lines in France where they are mounted onto the aircraft.

Gerber adds, “This research project has allowed Aerosud to understand the complexity of the technology better; we have not found the answer to all the questions yet but we have found the right questions at least.

“One of the most relevant achievements is the formation of a coherent multidisciplinary development group that can perform all the functions relevant in the lifecycle of the product – from design and analyses to tool design, manufacture, assembly and structural verification. Our next step is to package the rest of the questions that we discovered into logical work packages and start developing solutions that will fit our environment.”



CAD model of rudder to be manufactured using CFRTP methods