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 titanium fluid-cell forming

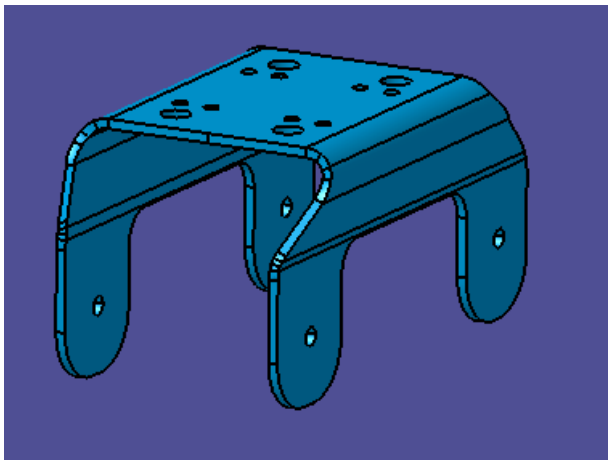
The aerospace industry is constantly looking for new and improved ways to design more fuel-efficient aircrafts, and the material characteristics of titanium provide the required level of strength and durability without adding excess weight.

However, to maintain and grow the current supplier’s (Aerosud) value proposition to original equipment manufacturers (e.g. Airbus), continuous cost reduction is the primary deciding element.

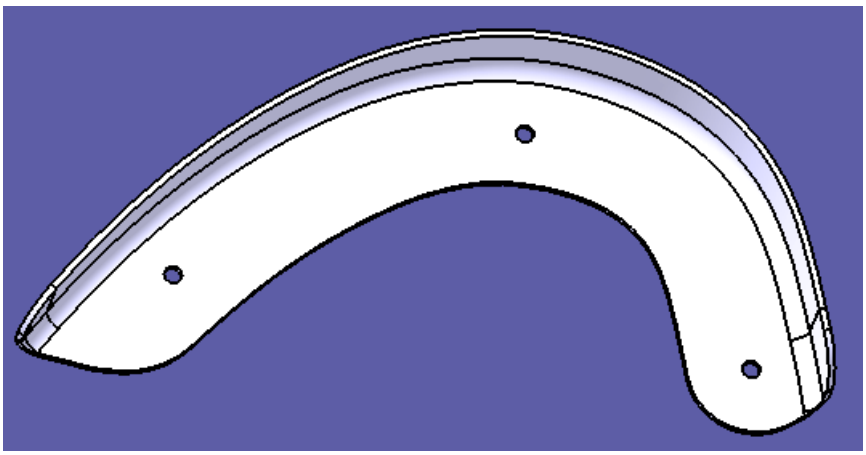
Titanium and its alloys are extremely attractive because of the galvanic compatibility with carbon-based composites and strength-to-weight ratio. This metal is also very expensive, emphasising the importance of demonstrating the capability to manufacture complex shapes from sheet as opposed to expensive machining.

This project will develop and demonstrate a capability to design a complete process chain for the manufacture of titanium sheet-based products, using hydroforming for aviation applications.

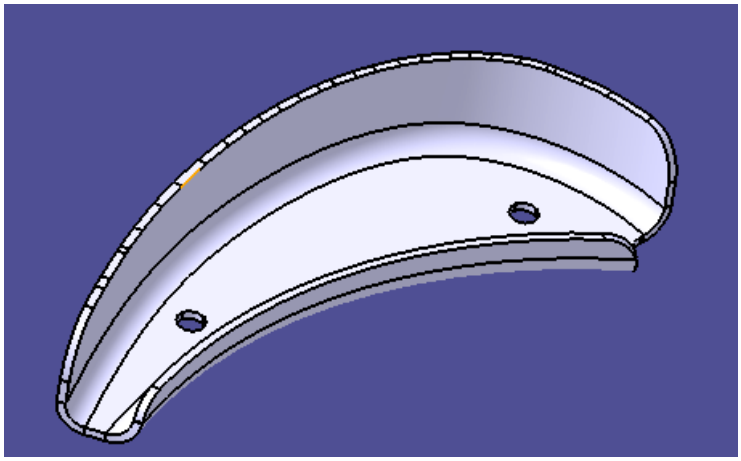
Hydroforming or fluid-cell forming utilises a process that uses high pressure fluid to form metal into the required shapes.



Demonstrator part bracket



Demonstrator part small riblet



Demonstrator part skin