

CASE STUDY

3D Modelling, Printing & Scanning Composite Bullet Fairing Ply Location Aids



/ Task Objectives

AFD was engaged by Teledyne CML Composites to provide design and manufacturing expertise for the supply of composite ply location aids.

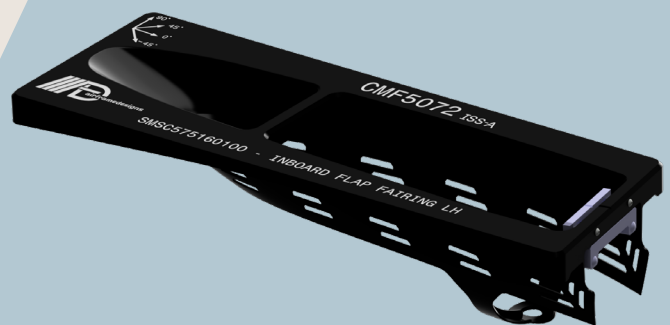
The requirement was to create some new manufacturing aids (tools) for the placement and positioning of individual plies during the manufacture of Dassault business jet bullet fairings.

AFD demonstrated its capacity for innovation and creativity by developing unique solutions for lightweight, cost-effective, and agile tooling. These innovations effectively addressed a persistent manufacturing challenge.

Reverse Engineering Process

The design process for each of the ply location aids began by reverse engineering the associated mould tool surface using our hand-held laser scanner.

This task was carried out on-site, with the customer, to avoid any interruption to the production of parts, and the technology employed played a critical role in reducing the lead time.



Design Process

Using the scanned surface geometry, the evolution of the new ply location aid was formed and a design was created within CATIA, one of our aerospace CAD tools.

A key driver of the design was to provide adequate strength and stiffness of the product side walls in order to deliver a robust and accurate manufacturing aid.

Inspection Process

Each 3D printed part was rigorously inspected post-manufacture, to compare the printed geometry with the design intent (CAD model).

A combination of Verisurf and Siemens NX software was utilised to create an inspection report that included a visual display of the tolerances achieved for the part versus acceptance criteria.

Conclusion

The scanning, design, and manufacturing of the ply location templates was completed in accordance with customer requirements and within the allocated timeframe.

We thrive on providing bespoke solutions engineered and crafted specifically to help our customers reduce their project lead times and improve their cost-effectiveness.

Providing high quality solutions to complex engineering and manufacturing challenges is what exemplifies AFD.

Manufacturing Process

The additive manufacturing approach was aimed at providing a low-cost manufacturing solution for an effective and lightweight manufacturing aid, with agile turn-around for both design and manufacturing.

The ply location aids were manufactured using advanced large format FDM 3D-printing machines, with tough PLA thermoplastic filament.

Tough PLA is an affordable (low-cost) material offering enhanced durability and greater resistance to impact damage compared to regular PLA material.



// "We engaged with AFD because we heard about their scanning capabilities and ability to 3D print lightweight tooling. The programme in question required an agile and cost effective solution, and AFD delivered on time, to cost, and exceeded our expectations in terms of the technical response." //

Head of Production

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