



Delcam's Aerospace Heritage

With over 30 years CAD/CAM experience and now the world's largest specialist supplier of machining software, Delcam plc provides aerospace solutions for civil, military, rotary and space customers.

Delcam's aerospace solutions enable customers to develop more fuel-efficient engines, to manufacture airframe components more effectively, and even design more comfortable and innovative interiors – such as the Airbus A380. Delcam customers are involved in a wide variety of projects, from component manufacture for UAVs and helicopters, to the production of engines and airframes for the largest passenger and transport aircraft.

Delcam also supports a large number of MRO operations. By reducing design and manufacturing times whilst guaranteeing the highest levels of quality, Delcam's aerospace solutions enable customers to complete repairs or replace damaged components quickly and easily, minimising Aircraft on Ground (AOG) time.

Our goal is to exceed the highest levels of quality and consistency demanded by customers in the aerospace industry, enabling cost-effective production in the shortest possible delivery times by providing either stand-alone solutions to enhance existing systems, or a complete turn-key solution.

Headquartered in the United Kingdom, Delcam plc comprises subsidiaries in North America, Asia and Europe and employs over 700 people. Supported by 350 Sales Partner offices, Delcam plc serves more than 30,000 customers worldwide.



Take your business to new heights



Powering your
productivity

Software

Delcam's aerospace CAD solutions provide complete flexibility for all your design needs.

Design

Built on over 25 years of expertise serving manufacturing industries, Delcam's powerful CAD software provides a vast array of tools to assist in the design of components for the aerospace industry. Dedicated routines exist for the design of tooling (assembly jigs, machining fixtures and lay-up tooling), as well as key component design for:-

- Blades
- Blisks
- Fuselage structures
- Pump bodies

Design for Manufacture

Whether the part is manufactured directly, by machining, or is moulded, pressed or cast, all the tools you need are available. When components need to be converted into tooling, Delcam's aerospace solutions provide routines specifically developed to help streamline the design process, including:-

- Import of 3D data from *any* third party CAD system
- Repairing faults in third party models
- Capping holes for manufacture
- Split-line and surface generation
- Identification of radii too small to machine

Libraries of standard components (clamps, bolts and pins) are made instantly available to assist in the assembly of more complicated designs.

Re-Engineering

Delcam's reverse engineering aerospace solution does far more than simply allow you to reproduce aerospace parts for which CAD data does not exist. Working with a wide range of data capture devices (including optical, contact and non-contact), Delcam's comprehensive range of tools allow you to capture the intent behind the design, not just the existing shape of a used blade, blisk, rib or other component which may be worn, damaged, or incomplete. This lets you not only reconstruct old parts, but improve or re-engineer them in light of new material technologies or manufacturing methods.

Integrated CAD/CAM

Delcam's aerospace solutions streamline the machining process without causing interruption in the drawing office. CAM programmers have access to a comprehensive suite of CAD tools from within their CAM environment. These tools have been specifically developed with machining activities in mind and allow the creation of additional geometry needed for specialist machining operations.

Delcam's market leading aerospace CAM solutions provide a modular approach to meet your machining expectations.

Multi-axis and Swiss-type Lathes

Delcam's technical expertise offers you a complete range of innovative and complementary solutions, such as automated programming of multi-axis lathes with live tooling and Swiss-type lathes. This machine-centric approach prevents machine down time, costly machine collisions and lost productivity. Precise 3D simulation programs help you reliably and accurately manufacture:-

- Hydraulic spools
- Manifolds
- Connectors
- Turn buckles
- Valves

Turn and Turn/Mill

Delcam also provides first class turn and turn/mill solutions for the aerospace industry. Feature recognition and knowledge-based technologies streamline programming to increase productivity when manufacturing parts such as:-

- Fuel management units (FMUs)
- Electronic engine controls (EECs)
- Vane pumps
- Fuel pumps

High-speed and 5-axis Machining

Professionally validated high speed 3-axis machining and high efficiency 5-axis techniques have been developed specifically to meet your aerospace manufacturing needs. Advanced toolpath editing gives you complete control over the machining of complex metallic materials such as aluminium alloys, titanium and nickel-alloys, as well as the latest developments in inconel and carbon composites. This improves the quality of manufacturing parts such as:-

- Wing ribs
- Turbines
- Fuselages
- Blades
- Blisks
- Impellers



Delcam offers a complete solution for the inspection of high value aerospace components at key stages in their production life cycle.

Used for civil and military aircraft projects across the world, Delcam's aerospace solutions ensure that you can benefit from On Machine Verification (OMV) technologies. Delcam's pioneering OMV methods assist throughout the production process, removing the need for lengthy traditional 'clocking up' processes, taking minutes rather than hours. This saves money and production time, even complete shifts in some instances.

Delcam's OMV technologies also reduce the reliance on traditional co-ordinate measuring machines (CMMs). By removing the need to transfer parts from CNC machine to CMM for inspection mid-way through the process, you can benefit from:-

- Significantly lower cycle times
- Fewer setup errors
- Reduced costs

Machine Tool Verification

Delcam's OMV technology for aerospace applications offers many other benefits. By using Delcam's inspection solution in conjunction with our machine tool verification software, you can quickly and efficiently detect errors in the accuracy of the machine setup and build. Delcam's machine tool verification software can also automatically correct these errors, ensuring inaccuracies are not passed onto the components being machined. This enables complete process control and maintenance of part quality and repeatability.

Electronic Fixturing

Delcam's aerospace solution enables you to precisely locate components on the machine tool with alignment from measured reference features or surfaces. This offers a range of benefits, including:-

- Huge reduction in setup times and errors
- Reduced variation of part quality
- Less need for expensive fixtures

Adaptive Manufacturing

New weight-reduction production technologies in the aerospace industry often pose real problems when it comes to maintaining acceptable levels of component accuracy, quality and consistency. Delcam's Adaptive Manufacturing Solution builds upon the strengths of Electronic Fixturing and OMV technology to allow pre-defined, and certified, manufacturing processes to compensate for undesirable process variables.

Common examples of customers using Delcam's Adaptive Manufacturing solution include:-

- Adaptive machining of inconsistent castings
- Adaptive trimming of flexible composite parts
- MRO of damaged blades, vanes and blisks

Unrivalled precision



Partnerships that defy gravity





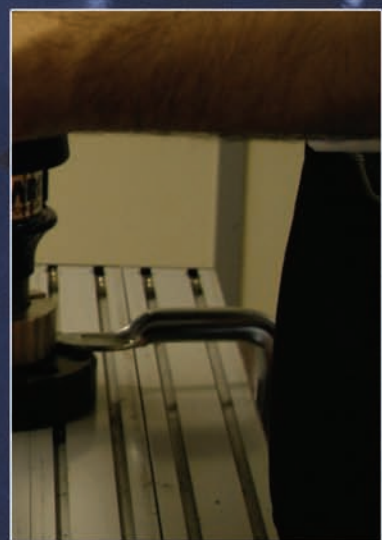
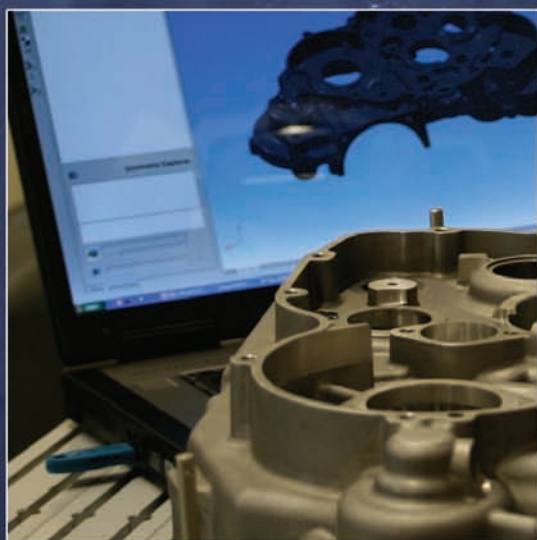
Delcam Professional Services Group

Many companies in the aerospace industry find that their engineering resource is needed to maintain their existing operations with little capacity to develop new processes. Delcam's Professional Services Group offer a range of services to help these organisations. Support varies from providing extra design and programming resources when your existing workforce is overloaded, through to developing completely new turn-key processes for the manufacture of novel designs.

The Group co-operates closely with aerospace clients to enhance their existing design and manufacturing processes, often using a combination of Delcam's software and bespoke solutions to increase efficiency, improve quality and reduce delivery times. Delcam Professional Services Group offers a range of technical and commercial skills to support customers in improving their productivity and profitability. In addition, the Group works with a network of technology suppliers, including machine tools, cutting tools and inspection equipment, to ensure that a complete solution can be provided.



Plane experience



Delcam is the only international CAD/CAM company operating an in-house manufacturing facility for production-scale machining and inspection.

As well as allowing thorough validation of all software before its release, Delcam's manufacturing facility provides an opportunity for aerospace companies to test new processes or to produce short runs of prototype parts without any disruption to their day-to-day operations. Delcam's manufacturing facility contains a wealth of aerospace knowledge and expertise, having produced landing gear, front bearing housings, wing heater panels and FMUs for leading aerospace OEMs.

Facilities include 5-axis and high-speed machine tools up to 12 metres in length, plus a three-metre mill-turn machine. All equipment is fitted with Renishaw probing systems to ensure accurate set-up and to allow on-machine verification of the components being produced. It is complemented by a range of inspection equipment used for checking production work and for supporting customers that require an independent verification of their products.

Having a state-of-the-art manufacturing facility on-site gives Delcam's staff a unique knowledge of the problems faced by their customers, allowing the development of solutions that are both powerful and practical.



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