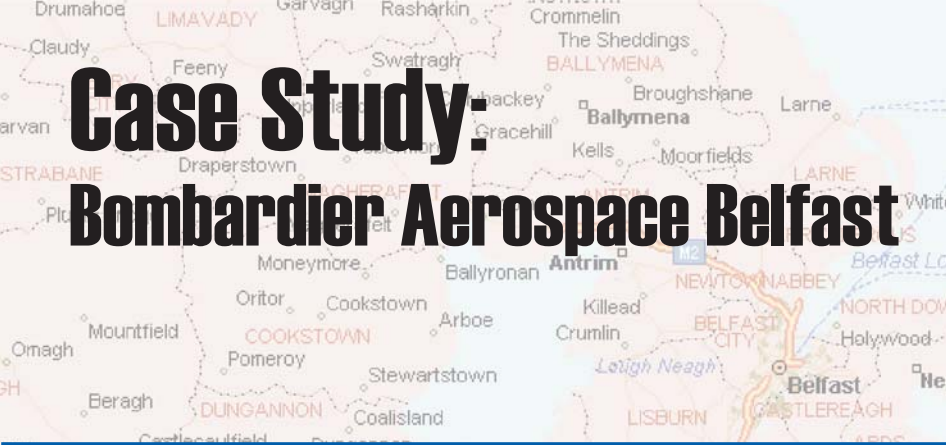


Case Study: Bombardier Aerospace Belfast



Software: JETCAM Expert Premium
Free form high performance nesting and MRP modules

Machines: Trumpf 260 BFZ CNC Router
Shoda TR CNC Router
Trumpf 240R CNC Punch Nibbler
Trumpf TC200R CNC Punch Nibbler

At a glance:

- ❖ Replaced UNIX-based system that was expensive to upgrade
- ❖ Programming time reduced by up to 90%. Complex parts are now programmed in under two minutes
- ❖ 10%-15% material saving
- ❖ Enhancement received under maintenance reduced manufacturing time by 30 seconds per part, equating to a potential 166 hour saving across all parts
- ❖ Programming twice the number of machines with a 30% reduction in programming resources
- ❖ Initial technical support requirement 60% less and now minimal
- ❖ Annual support cost is now 50% lower than for previous system

Bombardier Aerospace Belfast, Northern Ireland was originally founded in 1908 as Short Brothers, which secured the UK manufacturing rights to the Wright Flyer aeroplanes, thus making it the first manufacturer of aircraft in the world. Shorts was acquired by Bombardier Inc of Canada in 1989 and the Bombardier Group today employs some 65,000 staff across 5 continents. As one of the leading manufacturers of aircraft and components for the aerospace industry, the company is constantly looking for opportunities to streamline all facets of its operations.

The CNC routing machines in Belfast were driven by a US-based CAM system. This had limitations but the cost quoted for enhancing it was prohibitive. In addition, a new Shoda TR Stack Router was being tested to work in conjunction with their existing high speed CNC routing cell, and the additional cost of a new post processor and the required machine support was also expensive for the old system. Bombardier decided, therefore to examine the possibility of replacing it with an up-to-date alternative that could provide the required features. In 2002, after evaluation, the company

selected JETCAM Expert, in particular because of its ease of use and its excellent graphical representation. This made the programming function very simple. Another benefit was that of material utilization. Between 10-15% savings on material have been achieved.

The system was installed in 2003, with batch processing, Automatic Free Form Nesting and JETCAM provided a direct link to Bombardier's Production Control system to allow orders to be input electronically.

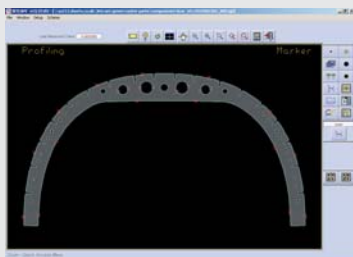
The immediate benefit was a very significant reduction in programming time through the automation features provided. Complex parts that used to take ten minutes were generated in under two, with NC codes immediately available for both machines rather than just one as previously due to the system's ease of use and the programmer's ability to learn the system quickly.

Engineers were surprised at the short duration of the training, which testified ease of use benefits. This also meant that staff were up and running immediately, once training was completed. Due to the

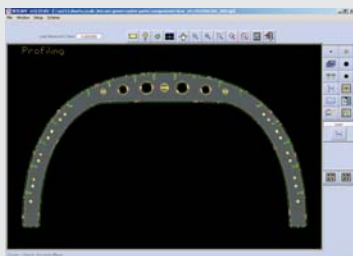
Case Study: Bombardier Aerospace Belfast



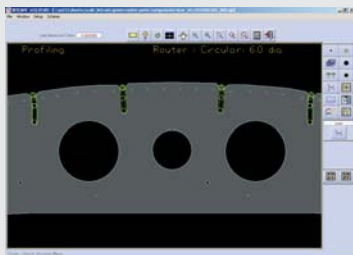
Walkthrough



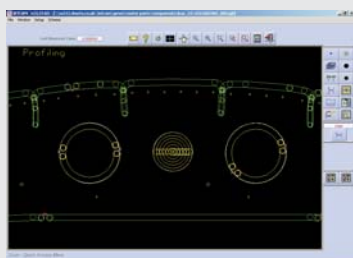
Part is submitted to JETCAM ready for programming. The markers are points identified in CAD system for automatic placement of microtabs.



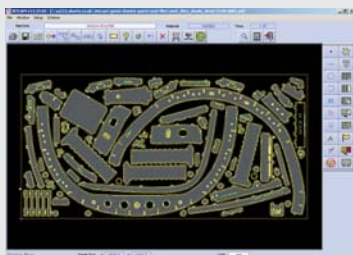
Programming has now been executed. JETCAM time to program this part: 1 minute for two machines. Previous system took 20 minutes



Auxiliary paths have been placed automatically.



Auxiliary paths and internal destruction applied to internal holes.



Component nested using JETCAM's powerful free-form nesting module.

automated features of JETCAM Expert, such as the automatic internal destruct of apertures and the automatic placement of auxiliary paths, the software proved simple to learn.

For any company embarking on a project of this size, there is never an off the shelf package to fit all of their requirements, so a degree of bespoke development is a necessity. An implementation plan was agreed on an ongoing basis while the software was in operation. All of the enhancements requested have exceeded expectations, and especially in the area of automatic auxiliary routing.

The software delivered automatic auxiliary routing, and also ensures that auxiliary paths are not placed around tooling tabs. Due to this upgrade, a saving of 30 seconds per part is being realized which equates a potential saving of 166 hours when the total number of parts is taken into consideration.

Support is also a major factor for any production line that relies on software and a noticeable drop in the support requirement was noted. The level of technical calls placed on JETCAM in the initial 6 months was low. Many of the processes within the software are automated, including automatic rivet insertion and the rivets being linked to the individual part geometry. Calls were also less complex in nature and were quickly resolved.

JETCAM regularly releases new versions of the software, with new features covering every cutting technology.

The company subscribed to an annual maintenance contract, which has continued to yield additional savings.

The contract delivered a further benefit that allowed the company to analyse each individual machining operation. Tool data can be broken down which allows the company to target cost reduction exercises. For example, one such exercise involved an assessment on the amount

of auxiliary routing carried out and whether its elimination would provide a significant benefit. The clarity of this feature allows the company to carry out a detailed analysis on each nest produced. Due to the lower cost of maintenance, the company is making considerable savings.

Bombardier Aerospace Belfast is continuing to improve and update its manufacturing processes, and the software is planned for use for a future installation. The company is now programming for two machines compared to one with a 30% reduction in the programming resource, bolstered by additional material savings.

JETCAM's expertise in CNC machining as well as software programming greatly assisted in troubleshooting any problem that arose.

