

April 2026



AMRC / Tier 1 Aerospace Case Study

From Days of Machine Prove-Out to Sub-2 Hour Decisions,
Eliminating Costly Trial-and-Error at ~£5,000/Day

For complex aerospace components, critical machining decisions are still made through physical trials on the machine. Each iteration consumes high-value capacity, introduces cost, and delays progression from programme to production.

Working with the Advanced Manufacturing Research Centre (AMRC), DigitalCNC enabled a Tier 1 aerospace supplier to predict real machine behaviour before cutting metal, shifting decision-making upstream and removing the need for repeated machine-led iteration.

Key Outcomes

- Cycle time decisions in under 2 hours, replacing multi-day machine-led prove-out loops
- 3–5 days of machine capacity freed per optimisation decision, equivalent to £15,000–£25,000 avoided machine cost
- Cycle time prediction accuracy improved from >4x error to within ±5%
- Significant reduction in machine-led iteration during prove-out (typically reducing 3–5 trial cycles to 1–2)
- Improved confidence in delivery timelines and programme execution

The Challenge

For complex aerospace components, critical machining decisions are still made through physical trials on the machine. In this case, a toolpath segment programmed at 40 seconds took over 3 minutes to execute – a 4.5x error. Resolving this required multiple machine trials, each consuming:

- High-value machine time (~£5,000 per day)
- Skilled operator input
- Material and setup cost

More importantly, this was not an isolated issue. These discrepancies occur repeatedly across parts, toolpaths, and programmes – compounding into:

- Delays in NPI
- Unreliable delivery commitments
- Increased cost per part
- Heavy reliance on individual experience rather than repeatable process

Where CAM Breaks Down in Production

CAM systems define programmed intent, not actual machine behaviour.

In production:

- Machine kinematics and controller behaviour alter feedrates and cycle times
- These deviations are often 20–50%+
- Problems only surface during physical trials

This means issues are discovered on the machine, where:

- Each iteration consumes ~£5,000 per day in machine time
- Delivery timelines are pushed out
- Engineers rely on trial-and-error rather than repeatable process

The Approach

AMRC deployed DigitalCNC to simulate real machine behaviour before execution. Instead of relying on programmed values or post-process assumptions, engineers were able to:

- Evaluate actual feedrates and cycle times in seconds
- Identify constraints and performance bottlenecks early
- Test and compare alternative strategies without cutting material

What previously required multiple machine iterations could now be resolved digitally, upstream.

“The accuracy sold them on the trustworthiness of the software.”

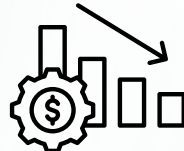
The Results



Decision time reduced from days to under 2 hours



3–5 days of machine prove-out eliminated per optimisation decision



£15,000–£25,000 avoided per optimisation decision, compounding across programmes



Faster progression from programme to production



Greater confidence in delivery timelines

Across a typical programme, where this pattern repeats across multiple parts and toolpaths, the cumulative impact is significant:

- £15,000–£25,000 avoided per optimisation decision, compounding across programmes into six-figure annual impact
- Faster progression from programme to production
- Greater confidence in delivery timelines

These improvements reduce direct machine cost, free up high-value capacity, and improve confidence in meeting delivery timelines on complex parts.

Business Impact

By shifting problem-solving upstream, DigitalCNC fundamentally changes where decisions are made. Instead of consuming machine time to discover problems:

- Issues are identified and resolved before execution
- High-value machine capacity is freed up for production
- Quoting becomes more accurate and defensible
- Programme risk is reduced, particularly on first-off parts

For aerospace manufacturers, this translates directly into:

- Machine capacity used for production, not trial-and-error
- More accurate and defensible quoting
- Reduced risk on first-off parts and new programmes
- Lower cost per part and improved throughput without additional capital investment

AMRC Perspective

“DigitalCNC removes the need to ‘learn on the machine’. We can validate strategies upfront, avoid days of trial-and-error, and make better decisions earlier — which directly reduces cost and de-risks the programme.”

Tom McCready, Head of Machining Group

Key Takeaway

- **CAM shows what should happen**
- **DigitalCNC shows what will happen**
- **That shift moves decision-making upstream — reducing reliance on machine trials, freeing up capacity, and removing avoidable cost and risk from every programme.**