



**Blisk Machining** Solutions

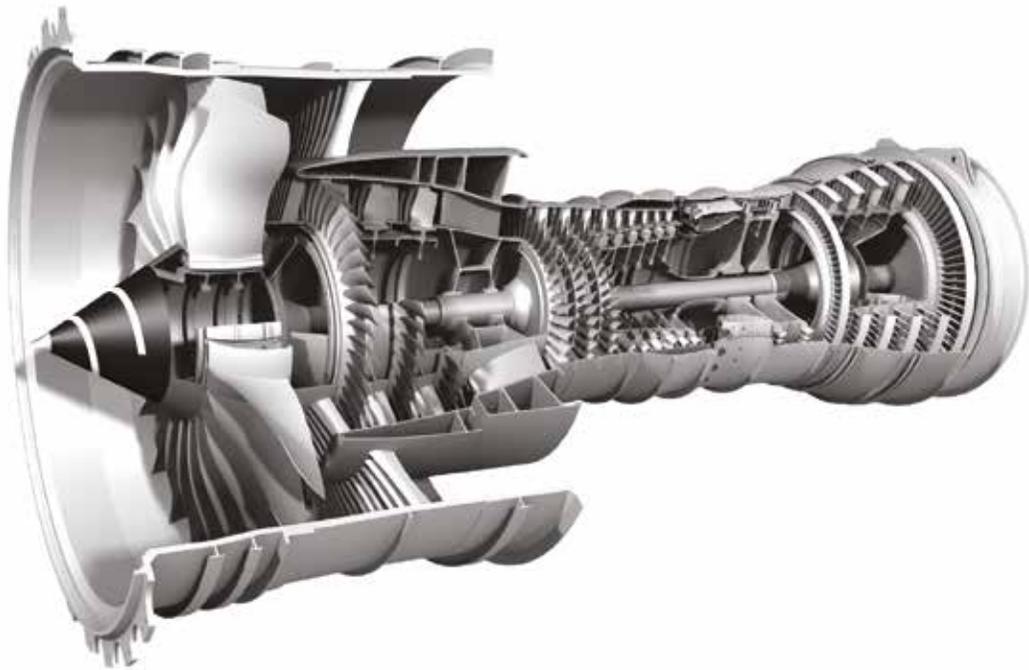


# Bliskful Thinking

Technicut and Delcam have partnered to revolutionise blisk machining efficiency, delivering remarkable savings in both time and cost.

Manufactured from titanium and nickel, these highly complex and critical components are becoming more common due to the advantages of weight, efficiency and through-life servicing.

Technicut and Delcam have collaborated on new tooling concepts and toolpath development to significantly reduce the time it takes to machine a blisk from start to finish, with innovative tooling solutions and application strategies for the roughing, semi-finish and finish machining of all integrally bladed rotors.



# Case Study

**Spindle:** HSK63  
**Coolant:** Houghton HOCUT 795-B  
**Material:** Ti6-4 Forging

**Blisk Diameter:** 804mm  
**Total no. of Blades:** 31  
**Blade Height:** 120mm  
**Blade Length:** 84mm  
**Root Radius:** 4mm  
**Finish Milled Scallop Height:** 10 $\mu$ m

**Milling Cycle Time (hrs):** 35  
**Milling Cost:** £1,217 GBP  
\$1,852 USD  
€1,670 EUR

**Total Tools Used:** 18



## Saving you time and money

### Cycle Time



**51%**

cycle time reduction

### Milling Cost



**45%**

milling cost reduction

# **Serious** about blisk machining?

Tooling and strategies for the most complex blade and blisk geometries, optimised for your chosen machining platform.

## **Features & Benefits**

- Patented cutting tool technology
- Optimised machining strategies for highly complex shapes and closer blade spacing
- Significantly reduced cycle times through near-net-shape roughing
- World-leading Delcam PowerMILL CAM software for optimal 5-axis machining efficiency
- Excellent component finish and surface quality
- Stable and repeatable process with unmatched component consistency
- Low heat input for minimised distortion and improved dimensional conformance
- Non machine tool specific with low spindle loads
- Low-vibration machining



# Productivity Solutions

Our focus is to continually enhance your competitiveness through the supply of optimised tooling and application methodologies.

## Our productivity solutions include:

- Recommendation of best cutting technologies
- Generation of innovative application methodologies
- Provision of 5 axis part programming & machining
- Provision of 1st part prove off

## Barrel Ripper

Near-net-shape blade semi-rough profiling, minimising finishing time with greater effective cutting.

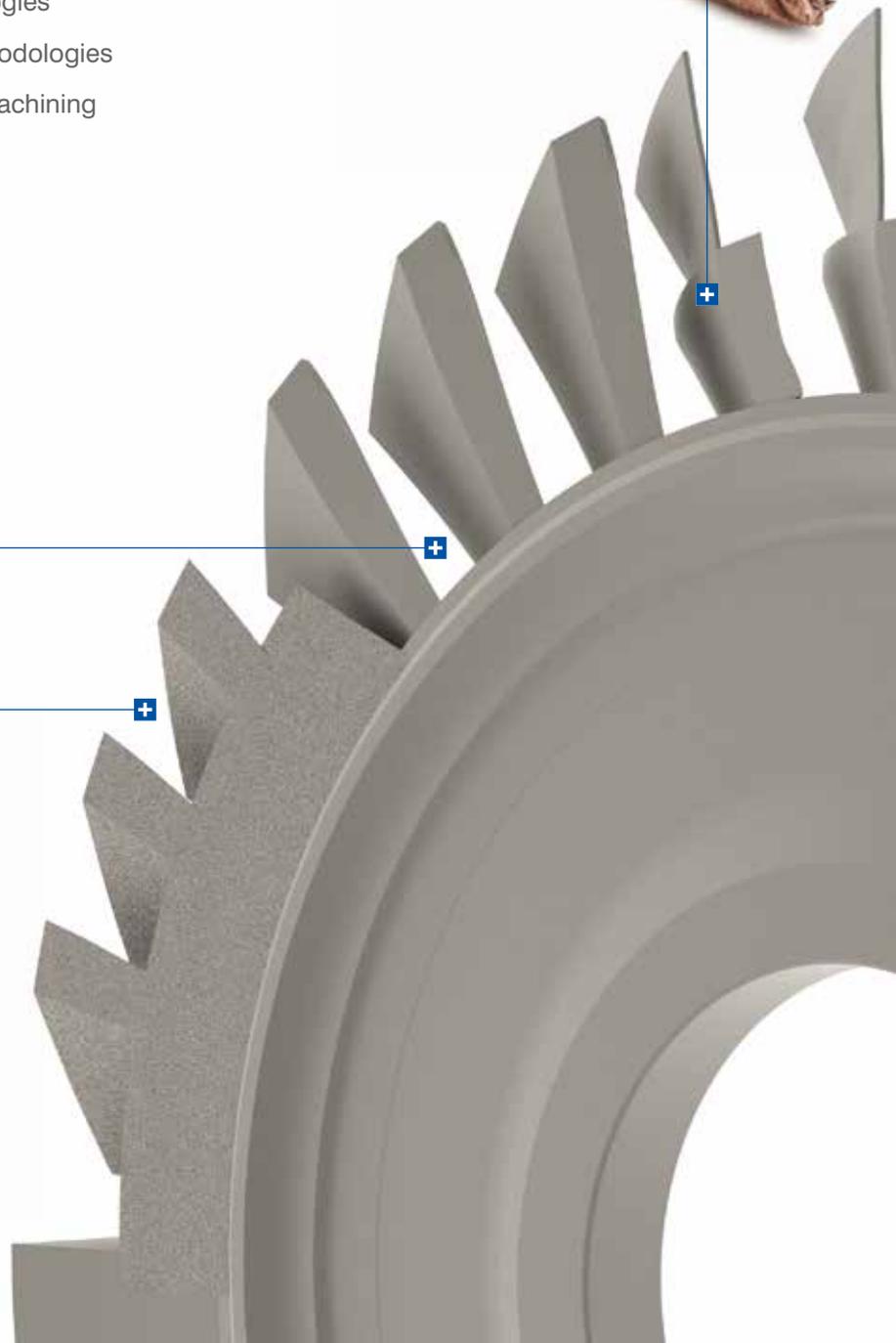
- Huge metal removal rates
- Capable of 10mm ap x 10mm ae cuts
- X-TREME shank technology
- Sinusoidal ripper form
- PowerMill tool-path smoothing around LE & TE



## TITAN X-TREME Ripper

Titanium roughing end mill optimised for blade slot milling.

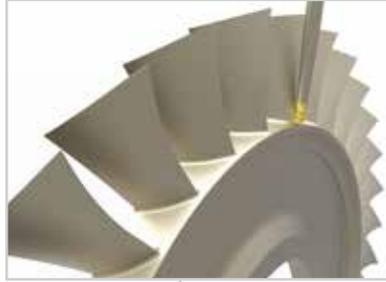
- Huge metal removal rates
- X-TREME shank technology
- Sinusoidal ripper form
- X-tra long series lengths for deep blade access
- Parallel or Tapered



## Ball Nose Ripper

Ball Nose ripper end mill for blade profiling and hub/annulus slot roughing.

- Heavy duty cutting
- X-TREME shank technology
- Sinusoidal ripper form
- Parallel or Tapered



## Barrel Finisher

Greater effective cutting, reducing extensive semi-finish & finishing operations.

- Increased surface finish quality
- Low-vibration machining
- Highly efficient roughing & finishing
- High accuracy form tolerances
- PowerMill tool-path smoothing



## Taper Ball Nose

Blade and annulus/platform semi-finish and finishing.

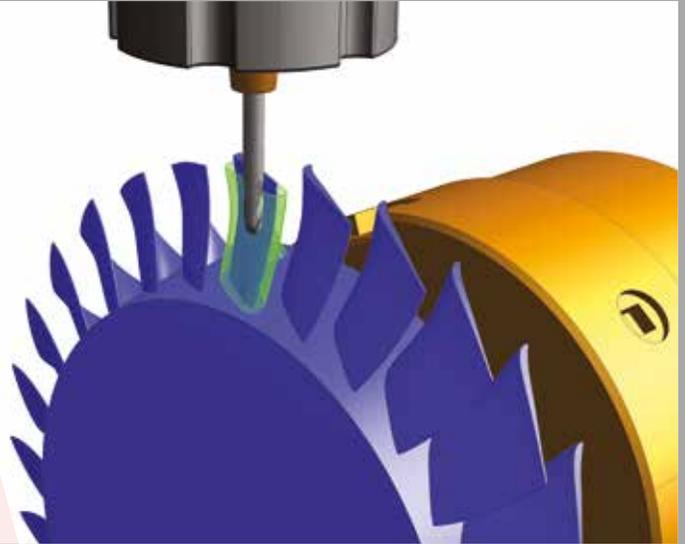
- Optimised multi-flute ball technology
- Ball radius tolerances of  $\pm 5\mu$  - coated



# Technology in Cutting

## DID YOU KNOW ?

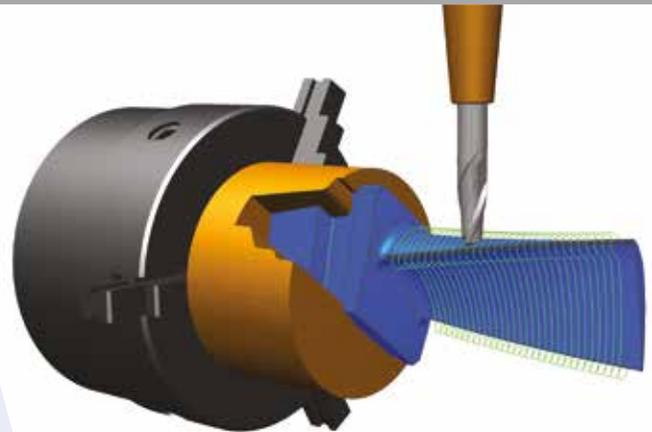
Through our Productivity Solutions we are able to demonstrate significant reductions in machining cycle times and total production costs for either current or planned components and deliver both optimised 'mini-turnkey' and 'green-button' packages for their complete manufacture.



## DID YOU KNOW ?

**Our blisk machining strategies utilise Delcam's PowerMill blade, blisk and impellor module.**

Making complex operations simple is at the core of PowerMILL's philosophy. This is particularly true for machining blades, blisks and impellers.



PowerMILL

## DID YOU KNOW ?

**Technicut's optimised titanium roughing solutions use X-TREME shanks in combination with Nikken Kosakusho's X-TREME Milling Chuck for ultimate work piece security.**

- For heavy duty cutting
- Highly accurate clamping technology
- 'Zero' tool pull out & tool micro-creeping elimination
- No damages to work piece or machine



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