RENISHAW®

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Productivity+™ Scanning Suite

SPRINT™
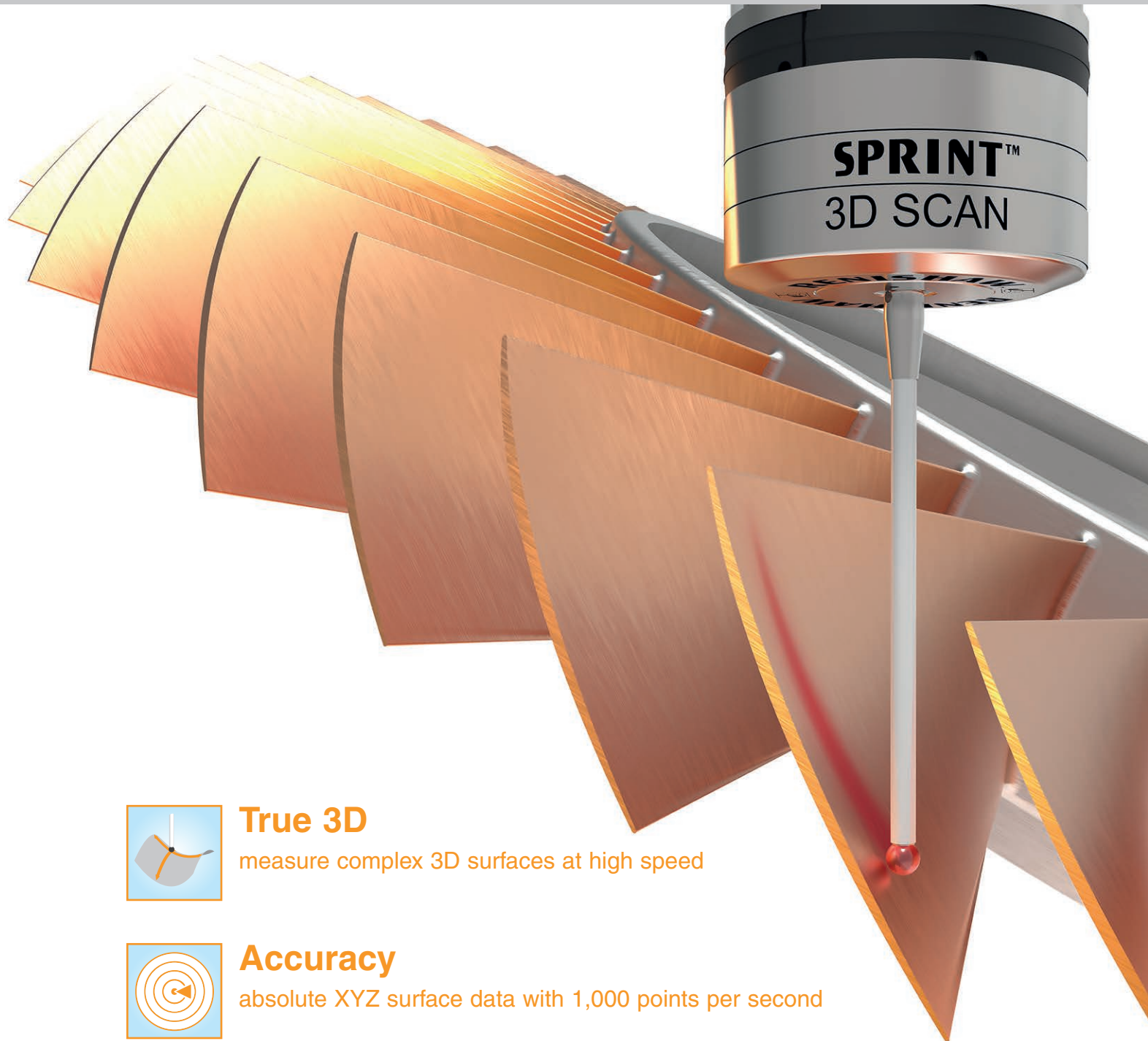**3D SCAN**

True 3D
measure complex 3D surfaces at high speed

Accuracy
absolute XYZ surface data with 1,000 points per second

Capability
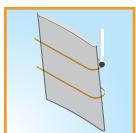analysis tools optimised for industrial applications

Productivity+™ Scanning Suite

Inspect complex 2D and 3D surfaces

Utilising an OSP60 probe with SPRINT™ technology, the Productivity+™ Scanning Suite can measure complex 2D and 3D surfaces at high speed. As standard, exceptionally fast scans of prismatic features, such as circles, arcs and planes can be performed.

In addition, using the Freeform Surface Toolkit, complex surfaces with single and double curvature can be scanned; far outperforming the speed of traditional probing solutions.

Exceptional measurement accuracy

High-accuracy measurement is ensured when using Productivity+™ Scanning Suite, due to the integrated nature of the system providing absolute confidence in inspection results.

Renishaw has worked in collaboration with major machine tool builders and controller manufacturers to use the machine's position feedback to deliver outstanding performance.

High-speed inspection and workpiece set-up

Scanning using Productivity+ allows measurements to be performed up to six times faster than touch-trigger systems: scanning speeds as high as 15,000 mm/minute are possible.

High-speed scanning results in reductions in component set-up and inspection time, leading to an increase in the proportion of profitable, productive machining time available.

Process control

Processes can be kept under control by writing measurement results to machine variables, and using the results for on-machine process control.

Real-time results displayed on machine provide instant feedback and process confidence. The Productivity+™ CNC plug-in software produces on-screen measurement reports, so results can be reviewed as they are captured.

Measurement results can be exported to a file for analysis, or used for quality assurance purposes, by external systems.
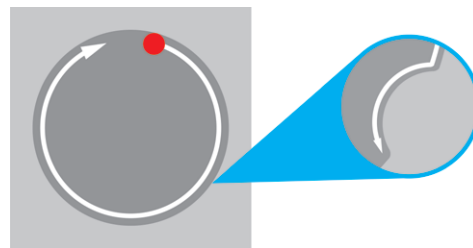
Form determination

A scanning system, such as Productivity+, can detect defects in feature form that would be missed by touch-trigger systems, delivering extremely fast form determination on simple features and components.
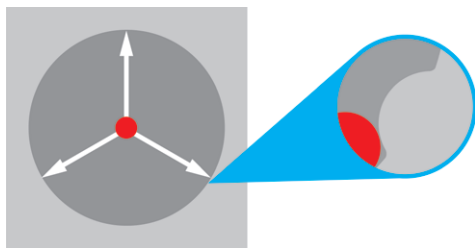
Defects missed with touch-trigger probing

Improved form detection when scanning

Program with ease

Inspection programs can be generated quickly and easily from component solid model geometry using simple-to-use graphical programming tools such as Productivity+™ Active Editor Pro. Measurement results are used to update the process running on the CNC controller.

The on-machine Productivity+ CNC plug-in software provides users with an interactive front end for editing and running probe routines, using easy-to-understand screens instead of complex NC codes to display the program to the user.
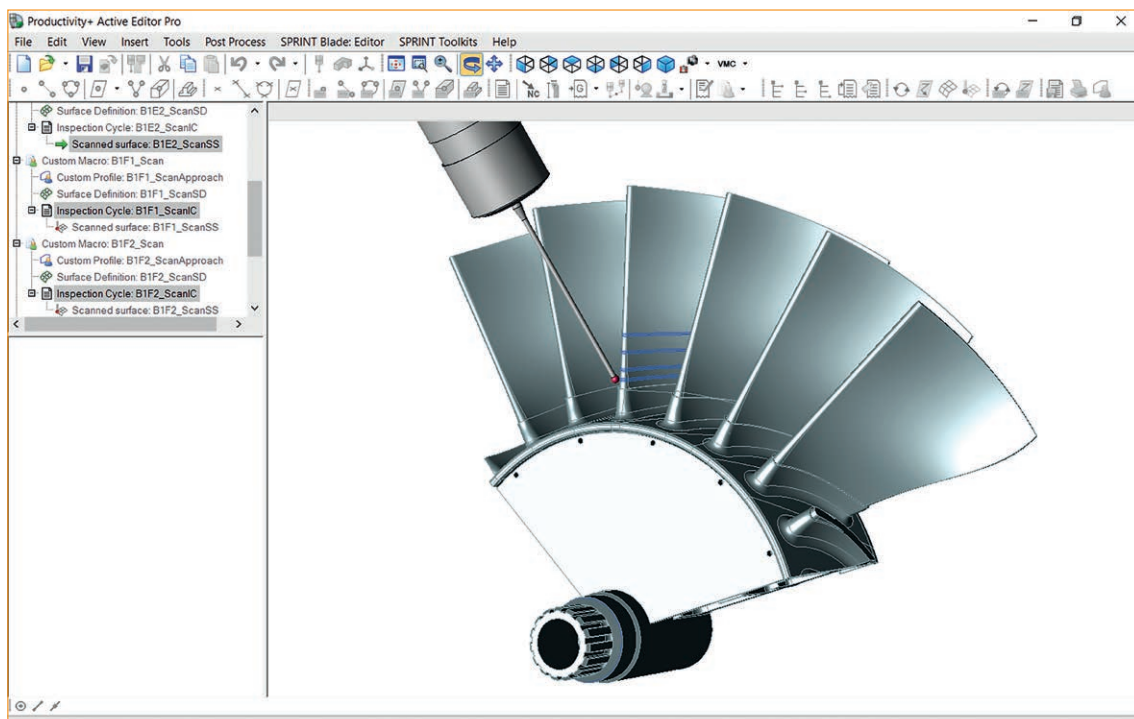
Game-changing applications

Prismatic scanning as standard

As standard, Productivity+ can accurately measure circles, lines, arcs and planes. The results can be used for part setting or for post-process inspection.

Game-changing applications

The game-changing capability of Productivity+ allows organisations to completely re-think the use of on-machine process control measurement across a range of CNC manufacturing tasks. Working in conjunction with manufacturing organisations in key industries, Renishaw continues to develop specific application capability to improve manufacturing processes.

Based on this experience, the Productivity+ Scanning Suite comprises a variety of software toolkit packages for data processing, each focused on an individual task or industry sector.
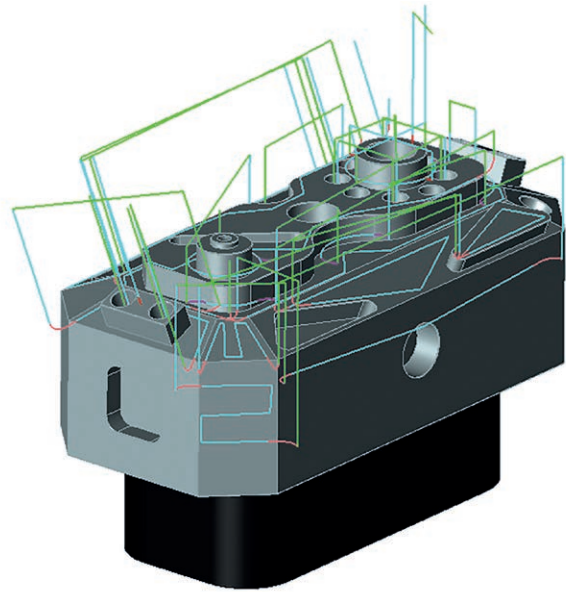
Freeform Surface Toolkit

Free-form 3D geometry can be measured at high speed using the Freeform Toolkit, enabling the rapid inspection of complex surfaces with single and double curvature.

Absolute XYZ surface positional data can be reported from free-form surfaces using the Freeform Toolkit. Results can be output to a file for further analysis or stored in machine variables for process control.

An existing touch-trigger inspection process, for the inspection of free-form surfaces, can be easily replaced by the Freeform Toolkit.
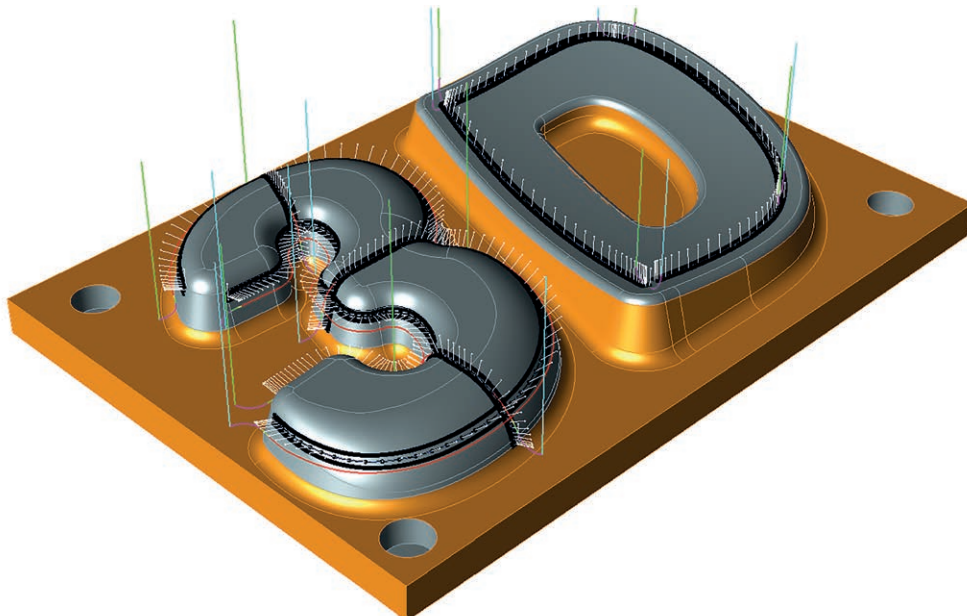
Blade Toolkit

The Blade Toolkit offers high-speed, accurate measurement, with exceptional definition of high-curvature surfaces, such as leading and trailing edges. Several high-precision applications including blade tip refurbishment, in-process blade measurement and root blending of bladed disks can be enhanced through implementation of the Toolkit. By scanning the blade, the inspection cycle time is significantly shorter than an equivalent traditional probing solution.

The Blade Toolkit offers a drop-in replacement for an existing touch-trigger process; allowing for easy adoption of scanning technology.
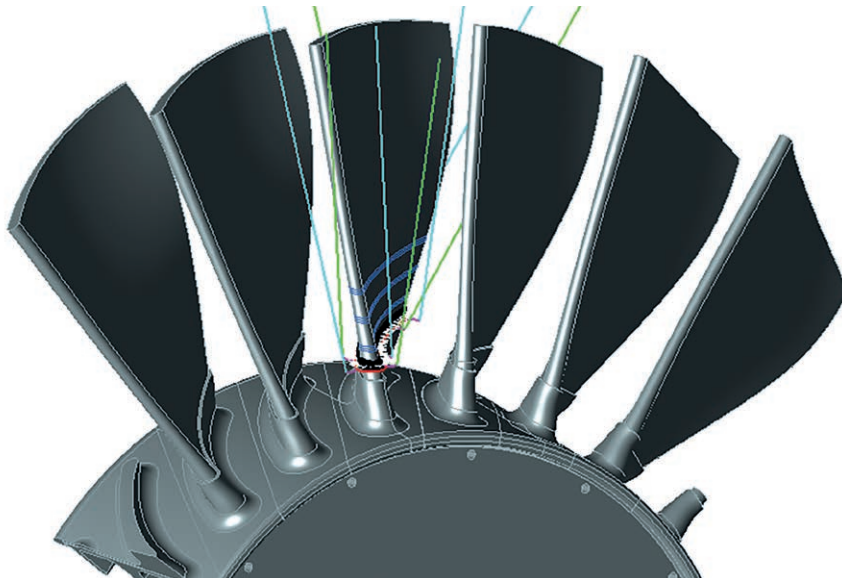
Customised applications

MTM (Multi-Tasking Machining)

The MTM application offers exceptionally repeatable diameter measurement to machine tool builders who produce Y-axis multi-task machine tools for use in the machining of highly accurate diameters. Single sided diameters, part run-out, machine centre-line and circularity can be measured with high repeatability on multi-task machines.

The toolkit provides users with the potential for extremely accurate automatic 'cut-measure-cut' operations with tolerances of a few microns.

Machine Health Check

The Machine Health Check application provides machine tool performance verification in less than one minute, preventing scrap caused by poor machine condition. The machine test that the application generates can be integrated into a CNC machining cycle, providing confidence in machine health just before machining.

Machine Health Check can test:

- 3-axis machine linear axis capability

- 5-axis kinematic centre point location

Results are stored in CNC variables, allowing for instant Go/No-go decision on continued running of the machine.

Components of the system

Productivity+™ Scanning Suite components

Productivity+™ CNC plug-in

The Productivity+™ CNC plug-in controls the OSP60 scanning probe, the machine tool, and the PC-based data tools, enabling more advanced data processing than traditional methods. Real-time data processing during measuring or cutting minimises cycle time and results in a high-speed, accurate, and capable process.

The software provides exceptional ease-of-use for machine operators and programmers, with its on-line editor allowing the measurement program to be updated on the machine.

OSP60 probe

The OSP60 scanning probe has an analogue sensor with exceptional resolution in three dimensions to provide high-accuracy data and the greatest understanding of workpiece form.

OMM-S receiver: optical transmission for high-speed communication

The OSP60 probe and OMM-S receiver unit communicate via a high-speed optical link. The unique communication protocol provides reliable, high-speed and robust data communication

Productivity+™ Active Editor Pro

Productivity+™ Active Editor Pro provides a simple-to-use environment for incorporating measurement and inspection probe routines and in-process decision making into machining cycles.

OSI-S interface: data link to machine control

The OSI-S interface passes data between the OSP60 and the Productivity+ CNC plug-in software.
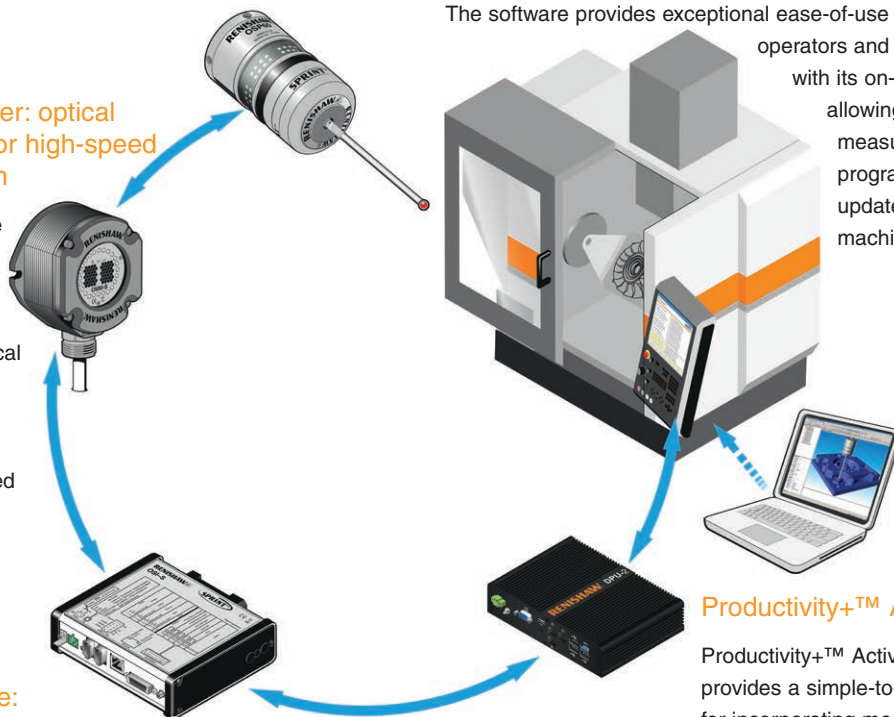
DPU-2 data processing unit

The DPU-2 data processing unit optionally hosts the Productivity+™ CNC plug-in software and any associated application toolkits.

Installation of these software applications to an external device provides high-speed data analysis of measurement results and ensures that the system runs quickly and smoothly.

Productivity+™ – innovative process control

Renishaw's Productive Process Pyramid™ provides a framework within which to identify and control variation in manufacturing. This framework, backed by innovative technology, proven methods of incorporating process control (documented in a series of Productive Process Patterns™) and an extensive, expert support network, mean that Renishaw can make your goal of 'green button' or 'lights out' manufacturing a reality.

The use of Productivity+ can assist applications across all layers of the Productive Process Pyramid.

Post-process monitoring
In-process control
Process setting
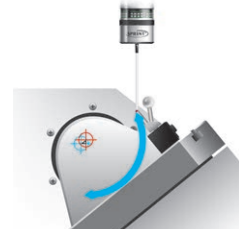Process foundation
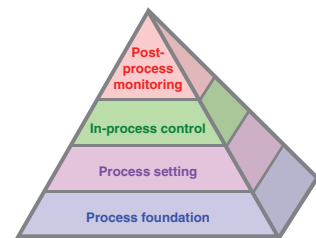
Process foundation

Check for sources of geometric error in a machine tool.

- Benchmark machine performance
- Schedule in-cycle checks as part of the production process
- Reduce machine down time

Dynamic machine checking

Machine rotary axis check-up

Process setting

Automate measurement of component position and alignment. Set datums or adapt cutting code according to the real component shape.

- Measure a complex surface and process the data on the machine
- Improve setting accuracy
- Minimise capital expenditure by eliminating the need for expensive fixtures and offline setting devices
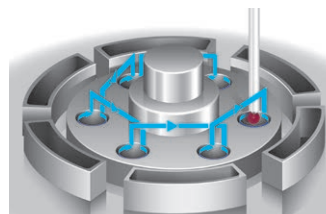- Adaptive machining processes
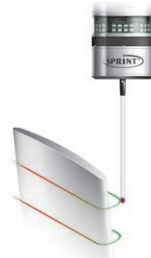
Adaptive machining

Blade section data collection

In-process control

Automate measurement of roughed and finished features.

- Implement measure/cut cycles for very high-accuracy turned diameters
- Update machine parameters
- Verify and update tool offsets
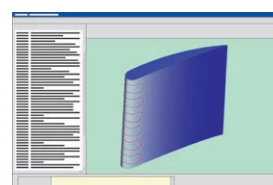- Optimise tool life

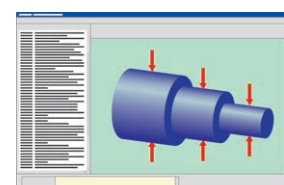High-speed data collection

Turned diameter updates

Post-process monitoring

Automate measurement of critical features.

- On-machine measurement
- Full feature definition
- Increase traceability

Blade inspection

Turned part inspection

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About Renishaw

Renishaw is an established world leader in engineering technologies, with a strong history of innovation in product development and manufacturing. Since its formation in 1973, the company has supplied leading-edge products that increase process productivity, improve product quality and deliver cost-effective automation solutions.

A worldwide network of subsidiary companies and distributors provides exceptional service and support for its customers.

Products include:

- Additive manufacturing and vacuum casting technologies for design, prototyping, and production applications
- Dental CAD/CAM scanning systems and supply of dental structures
- Encoder systems for high-accuracy linear, angle and rotary position feedback
- Fixturing for CMMs (co-ordinate measuring machines) and gauging systems
- Gauging systems for comparative measurement of machined parts
- High-speed laser measurement and surveying systems for use in extreme environments
- Laser and ballbar systems for performance measurement and calibration of machines
- Medical devices for neurosurgical applications
- Probe systems and software for job set-up, tool setting and inspection on CNC machine tools
- Raman spectroscopy systems for non-destructive material analysis
- Sensor systems and software for measurement on CMMs
- Styli for CMM and machine tool probe applications

For worldwide contact details, visit www.renishaw.com/contact

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