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**Powerful suite of high performance blade measurement and analysis tools**

Renishaw is highlighting a developing family of high performance hardware and software products for co-ordinate measuring machines that are specifically designed to aid the measurement and manufacturing of aerospace blades.

All products complement the multi-award winning REVO® 5-axis measurement system and include APEXBlade™ planning software for REVO sweep scanning and DMIS programming, MODUS™ airfoil analysis for the calculation and reporting of blade section profile and airfoil characteristics, and SurfitBlade™ to aid reverse engineering of the complete airfoil.

Historically blades have been measured in sections due to the limitations of measurement techniques. Now, the new family of Renishaw products enables the whole blade to be inspected quickly and accurately allowing unlimited section or full surface analysis based on high precision contact probe data.

APEXBlade is a software package designed to quickly generate collision free programs that drive the REVO measurement system to carry out complex ‘sweep scans’ that will collect point cloud data from across the complete blade surface. The CAD model is imported into the virtual REVO CMM environment prior to the automatic generation of the measurement plan. Both transverse and longitudinal scans are supported and each sweep can be split, which is useful for edges where the actual position is expected to be significantly different from the nominal CAD. Once the user is happy with the program, a DMIS file is generated that can be executed within Renishaw’s MODUS metrology software.

A key advantage of the new Renishaw approach to blade measurement is that a cloud of tip centre data points is generated over the entire airfoil and root surfaces. The MODUS point cloud sectioning (MPCS) functionality then allows ‘on surface’ sections to be constructed by intersecting any defined plane with the captured point cloud. This can be carried out at the time of measurement, or in the future if further sections at different locations are required, without the need for re-measurement of the blade.

The MODUS airfoil module then allows the user to take the nominal aerofoil sections available from the CAD model and the actual sections from the MPCS to provide blade fitting functionality for the reporting of blade section profile and aerofoil characteristics. MODUS offers comprehensive graphical reporting tools and the profile measurement results, which are fully integrated with all other feature measurement reports, can be output in pdf file format.

For users requiring a reverse engineering capability, Renishaw’s SurfitBlade software is an offline application used to generate NURBS blade surface forms for use in downstream processes such as computational fluid dynamics and finite element analysis. It also allows average blade geometry to be established from a series of blade results.

In summary, the Renishaw airfoil inspection suite provides automatic generation of the CMM program, rapid, high accuracy REVO data collection and comprehensive tools for cross section or full surface analysis.

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