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Measurement system retrofit reduces inspection times and gains new business for world-class manufacturer

After Future Advanced Manufacture (Future AM) won a valuable contract to make Titanium blades for a new propulsion system in the US, it invested in a Renishaw REVO® five-axis measuring head and probe system to improve its validation process. The resulting increase in accuracy and efficiency not only ensured the project's success but also opened up new lines of business and cemented the Gloucestershire based company's reputation for precision with existing clients.

Mike Sullivan founded Future Advanced Manufacture Ltd (Future AM) thirty years ago and realised immediately that competing on price was not the way forward: "There's always a 'Fred in the shed' down the road who will offer to do any job cheaper," he says. "From the beginning, we decided we had to position ourselves so 'Fred' couldn't compete with us." Mike's solution was to focus on engineering work with specific attributes: high intellectual property (IP) values, safety critical applications and highly complex designs. "Put those three together and a buyer can't simply opt for the cheapest provider because they are putting their reputation on the line – and possibly the lives of their customers."

Future AM (www.futuream.com) now specialises in precision engineering for clients in the medical, aeronautical, space and oilfield exploration sectors – some of the world's most demanding industries with a need for ongoing research, development and testing. The firm's managing director Craig Peterson, who is halfway through a five-year management buyout, explains: "Our clients demand excellence both in the accuracy of the design and build and also in the efficiency of the operation. Long-term success comes from continuous improvement in our systems and technology, and investment in highly skilled engineers. The acquisition of Renishaw's REVO 5-axis system in July 2010 is just the latest example of that process."

REVO has reduced inspection time on this high precision imaging drum from 1 hour to just 10 minutes

The firm has developed a particular expertise in the aerospace industry, gaining AS9100 certification towards the end of 2009 for its capabilities in producing 'high complexity components and assemblies for aerospace applications'. "We are one of Europe's leading designers and manufacturers of aerodynamic models used in wind-tunnel tests," says Craig, "and we have worked with Airbus & The Aircraft Research Association in Bedford for a number of years."

This world-class reputation helped the firm win its first significant contract in the US, in early 2010. "We can't say much about it," confides Craig, "except that making Titanium blades for a new propulsion system requires a very stringent validation process. Our existing metrology tools were not up to the job, so we turned to Renishaw (**www.renishaw.com**) and their REVO 5-axis system for help."

REVO is a dynamic new measuring head and probe system, designed to maximise the throughput of new and existing coordinate measuring machines (CMMs) by providing greater accuracy, faster measurement, more automation and new capabilities. It uses synchronised motion and Renscan5™ measurement technology to minimise the dynamic effects of CMM motion at ultra high speeds. It also uses Renishaw's new MODUS™ software (which works with standard industry programming languages) to take full advantage of CAD-driven programming.

"We chose Renishaw's REVO and MODUS package," says Mike, "because we were developing a Digital Product Definition (DPD) cycle based on the secure transfer of data using Dassault Systèmes' CATIA®. This allows us to share information, including CAD files, with customers and suppliers quickly and safely. However you need a system that can pick up and directly interrogate the CATIA V5 files, so that you know you are working on the same CAD throughout the production process; MODUS does just that. We could also retro-fit the REVO head to our existing CMM, which speeded up the installation."

At first, because of the tight project timings, Future AM used a REVO at Renishaw's facility (also in Gloucestershire) to validate the work while they had their own system installed. "Renishaw were a great help," says Craig. "We succeeded in getting every blade out on time, on budget and with no rejections; even the spare test blades were validated OK. As a result our US client is considering offering us further work. But, that's not the only good thing to come out of this $250,000 project."

Investing in the REVO and MODUS systems has paid dividends in other areas of the business already. "It has improved our metrology department's final validation service by 80%," says Craig. "For instance, to validate work on say a high precision imaging drum for our customer Highwater Products could take an hour on the old machine. Whereas the new REVO only takes about 10 minutes, and the Modus software has improved the accuracy of our post-machining operation because of the level of detail in its reports."

Future AM's Managing Director, Craig Peterson believes that the combination of Renishaw's REVO five-axis system and MODUS metrology software offers one of the most sophisticated reporting and validation systems available

This improvement in efficiency and accuracy has enabled the company to offer reverse engineering services. As Craig explains: "Customers often ask 'Can you make this item when we have no CAD (usually because it was made pre-CAD)? ' Well, now we can. First we laser scan the component and turn the data into a point cloud, which we run through SolidWorks® & Visi Reverse software to create a virtual 3D surface. We then use the REVO to compare the new virtual surface with the original part to validate possible engineering processes before making the cloned parts."

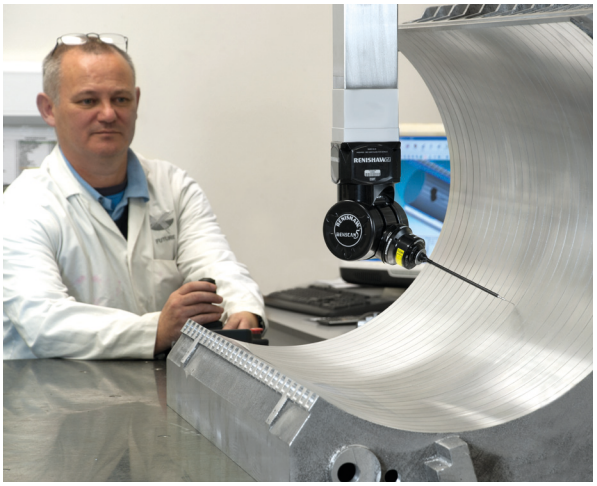
The new system is also helping Future AM keep ahead of its European competitors in aerodynamic testing. "You always run the risk of being left behind on technology," observes Craig, "but the combination of REVO and MODUS is one of the most sophisticated reporting and validation systems available, so it provides good future proofing and makes more sense than copying the technology used by our competitors.

It enables us to produce inspection data by direct comparison with the original CAD model – both in tabular and visual reports that meet our clients demanding standards. These include complete sectional scans, surface waviness and slope criteria."

The final surprise development has been a surge in demand from clients using Future AM as a sub-contractor for final inspection and validation, even when the firm hasn't been involved in making the original products. "We've only had the REVO/MODUS system for a few months and hadn't planned to market the fact until 2011 but, thanks to word of mouth, our existing clients are already aware of our new capabilities.

"They know that we don't just do design and manufacturing but offer a comprehensive, ISO 9001:2008 or AS9100 certified service. They also like the fact that our team can integrate seamlessly with their own, using secure pathways for the transfer of original data, so providing a virtual in-house facility." Although Craig is pleased that the REVO/MODUS investment has already made a significant contribution to the firm's success, he is left with one problem: "We're going to have to consider investing more in our metrology department in 2011, simply to cope with the new business!"

www.renishaw.com/CMM



Phill Smith from Future AM's Metrology Department, setting up the inspection of an imaging drum for customer Highwater Products using the five-axis REVO measurement system

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