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*"As quick as accurate as a micrometer,  
as accurate as a CMM"*



**The  
FARO GAGE**

# Airbus A380 quality

Airbus 380 programme benefits from development of computer-aided quality system at Magellan Aerospace



Magellan has invested substantially in modern CAD/CAM technologies in order to undertake contracts on the latest A380 airliner programme. One of the critical drivers for this investment was the need to reduce the lead time from the design scheme to the satisfactory delivery of first article parts to customers.

A new quality system introduced as part of this initiative allows Magellan's engineers to share data in order to measure, understand and document the quality of its finished

**H**ow much can a company's quality engineers do to solve problems once a product has left its place of manufacture?

By sharing inspection data, Magellan Aerospace can now handle issues about a product's quality regardless of where it was originally manufactured. And this is done with the help of a new quality system that has also significantly reduced the company's CMM programming lead times. These benefits have been important in its work on the new Airbus A380.

Today's suppliers are increasingly expected to take responsibility for the quality of their products. In a world where OEMs now routinely use techniques such as just-in-time, the need to combine product consistency and reliability with precise timing of deliveries presents a huge challenge for multi-location or multinational manufacturers.

Aerostructures manufacturer Magellan Aerospace has a particular interest in guaranteeing the timing and quality of its products. The company is a major supplier of components for the Airbus programme, with manufacturing sites in Poole and



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Wrexham and design sites in Filton and Biggleswade. All these facilities are undergoing consolidation and re-organisation into specialist units for machined and fabricated components. The aim is to build a comprehensive Tier 1 supplier to the aircraft industry, offering a one-stop capability for design to manufacture and sourcing.

products. The effect on new product introductions has already been marked. At the corporate level, the system has given Magellan an important geographical advantage by facilitating better-informed discussions with OEMs. Its advanced communications capabilities mean that the company can now deal efficiently with queries arising once compo-

nents have arrived at the customer's premises. Inspection results can be viewed locally regardless of where the components were manufactured, so buy-off queries can be resolved quickly and any discrepancies dealt with promptly. This is particularly significant for Magellan's facility close to the Airbus wing assembly line in Chester. No other aerostructures supplier in Europe has this flexibility.

In addition, state-of-the-art off-line NC and CMM programming tools, a key component of the new system, have significantly reduced Magellan's CMM programming times. These are linked to a central database and communications system that allows the electronic delivery of all measurement work instructions at the Poole facility, which writes 100% of its CMM programs with the new software and has completed 244 new programs since September 2003. Some of these programs are sent to Magellan's Wrexham plant for use with two CMM machines.

In future, it should be possible to achieve even more savings in the lead times and costs involved with new product development. According to David Stewart, Magellan's group quality manager, "Exploiting the benefits fully will require greater awareness and a major shift in thinking at all levels. Simply applying new technology is not enough. We have begun to change our working practice to achieve greater integration. As well as doing this within our own extended enterprise, we are setting up for greater integration with our customers - the large aerospace OEMs, and this could well give us a unique competitive advantage in the future." CMM programming: the underlying technology

Magellan sees off-line NC programming and CMM programming as an essential element of the new, standard 3D geometry environment. Inspection programs have to be ready ahead of the first-off machined parts or there is no way to inspect them.

The main design and engineering tool is Catia, selected because it is the standard tool used by Airbus. Tecnomatix' eM-Quality shop floor solution for CMM programming was chosen as the off-line programming tool, partly because Magellan's engi-

neers already had experience of its forerunner, Tecnomatix' Valisys software, and also because eM-Quality is embedded as standard in Catia, so there would be no translation problems.

These tools sit over a central database that allows the electronic storage and retrieval of data. This is based on Tecnomatix' eM-Insight software, which uses network explorer technologies to provide data access across multiple sites. Staff anywhere across Magellan can use it to view Catia-based design and inspection data taken from any CMM on any site. They can do this on-line,

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from a basic PC, without tying up valuable CAD terminals, at the same time as holding a telephone conversation. Whilst it is still necessary to use a high level workstation for more complex analysis, the majority of routine queries tend to be less complicated and can be dealt with within a PC environment.

At the pre-production stage, computer-aided coordinate measurement machines (CMM) are used to analyse inspection results and adjust the programming of computer controlled machine tools. This process requires highly skilled personnel and access to high-level CAD workstations. These resources can be pooled for use across different sites.

During production, inspection data is used to ensure continuing compliance, normally through on-going Statistical Process Control (SPC) methods. Measurements are obtained manually, by in-cycle gauging or by a CMM. For complex parts, the CMM undertakes a 100% check of the first-off from a new set-up. In the future the CMM will be set up by the machine tool operator and operated automatically, providing a pass/fail result.

In the case of a request for an engineering concession, the applicant can now send a picture down the wire in a PC environment. There are no issues with licences, since only

information is transferred, but the effect is to extend the use of the CAD capability. eM-Insight has effectively provided a solution that takes complex data and makes it simple and transportable.

Currently, 90% of inspection programs are available on time. Production departments are all reporting inspection data, collecting historical data and saving that data automatically. From this information, the company has started to generate SPC (statistical process control) and key characteristic data automatically. Furthermore, because information is more readily available, eM-Insight

helps with the interpretation of inspection results and buy-off decisions on whether a part is scrap, rework or a concession.

Progress so far has been governed by the customer's delivery schedule and quality requirements, some of which are still paper-based. In order to close the loop more effectively, Magellan next needs to implement a strategy for recognising and using this data internally for its own benefit.

David Stewart says: "Our move towards more integrated design-to-manufacturing processes has highlighted the need for a change in culture throughout the supply chain. CAD/CAM within our customers' operations is still very fragmented and therefore not particularly sophisticated in what it is asking from the extended enterprise."

"The overall benefit lies in our ability to provide better service. By improving the standard of our internal information, we can now do work that we couldn't tackle before. Essentially, it is this requirement to change the nature of the business and move up a gear that has justified the investment in the new tools. Magellan has capitalised on its investment because it has committed to a progressive strategy based on the need for change."

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