

## Lighter, stronger and faster across the toughest racing circuits

NX and Teamcenter create high-performance transmissions in racing time

XTRAC



Siemens PLM Software

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### ▶ Business initiatives

New product development  
Value chain synchronization

### ▶ Business challenges

Respond to demanding  
customer requirements

### ▶ Keys to success

Working concurrently  
Virtual testing

### ▶ Results

Fully optimized design and  
manufacturing process  
From computer screen to race  
track in 12 weeks  
Quality and innovation

### When the going gets tough

“A gearbox may not win a race but it can very easily lose one.” This is a motorsport saying, and given the high stakes of the racing industry, teams look for the lightest, strongest and most efficient transmission systems. Xtrac, a leading supplier of transmission technologies, designs and manufactures small quantities of high-specification, high-quality and high-value components. The company supports the world’s top manufacturers and motorsport teams in the toughest racing categories including Formula One, World Rally, Le Mans, World Touring Car and Indy Car. Thirty percent of its business is with Formula One and the company has a small but growing division in the United States.



At Xtrac’s purpose-built factory, skilled machine operators work around the clock with unique materials. Complex components are machined directly from CAD data. “We do actually make things; everything is done in the UK,” says CAE manager, Nick Moloney. “Our business is all about quality and delivery and we invest to gain even shorter time scales; one of the company’s latest purchases is a £1 million plus (\$1.74+ million USD) bevel grinding machine.”

Xtrac has been using Siemens PLM Software’s NX™ digital product development system and the Teamcenter® digital lifecycle management solution since 2000. “NX and Teamcenter are absolutely vital,” says Moloney. “They are well-established tools for our 50 engineers and for the factory machinists. They allow us to reduce the design process time, and any reduction we can gain there gives us greater visibility down on the shop floor.”

### From CAD directly to CAM

The CAD model file represents Xtrac’s master data. One single piece of data drives analysis and several other processes such as turning and milling so there is no risk of interpretation error or duplication. “NX and Teamcenter enable our short time scales,” comments Moloney. “Having one model means that everyone can be quicker. As soon as a design is finished it’s available for others to work on because it is in Teamcenter. We can work concurrently even if a

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model is not quite finished. The CAD model for drawing and dimensions is completely separate from the CAM files yet the CAD model drives information in the CAM files. So manufacturing can access the CAM file and begin to work with it before the CAD file is fully complete.”

Because manufacturing processes are carried out on site, designers are always able to talk to the operators on the shop floor. There is a lot of contact between design engineers and programmers, and for a particularly complex component there will be more discussion. “This is one of the main benefits of manufacturing on site. It is a huge advantage,” Moloney says.

“We have some extremely good engineers who can look at the CAD model in Ansys and see where something might fail,” Moloney adds. “We do as much design analysis as we can before physical testing.” In the past, Xtrac would build a prototype and deliberately break it. Now designers break parts in a virtual world because they have a visual idea of where the high stresses are and can then make changes if necessary.

He explains, “It is an iterative process to achieve the best balance between strength and lightness. We can, for example, make some extremely thin wall castings through a combination of better foundry production and design analysis. This process is becoming more important as customers are asking for even better performance and it is only possible with the CAD model because testing time is reduced.”

Engineering change management also takes place at an accelerated pace. “We introduce a part and changes can happen very quickly because it immediately goes in a test car and is driven to failure,” Moloney says.

Xtrac designs and manufactures from a concept, and also makes to order for some customers who have their own design engineers. “We specialize in the critical torque path components, and we also provide consultancy services,” Moloney adds.

It can take up to 12 weeks for the design and manufacture of a gearbox component. Xtrac begins designing for Formula One customers a year in advance, delivering parts months ahead of a new season. Production quantities are low. At the end of a season some components may be carried over while others will be completely redesigned.

### Continuous improvement

Xtrac stays ahead through a continuous process of improvement, which involves all 260 employees. The latest project is the implementation of a new enterprise resource planning (ERP) system. “Our current manufacturing resource planning (MRP) system holds the master bill of materials (BOM), which means that currently we have two BOMs for any assembly, one in Teamcenter and one in our existing MRP,” Moloney says. “We have found that



**Solutions/Services**

NX

Teamcenter

**Client's primary business**

Xtrac is a leading supplier of high-performance transmissions.  
[www.xtrac.com](http://www.xtrac.com)

**Client location**

Thattham, Berkshire  
 United Kingdom

***“NX and Teamcenter are absolutely vital.”***

*Nick Moloney  
 CAE Manager  
 Xtrac*

differences creep in because we are adjusting one file and not another, or making a mistake because of the double entry.”

With the new ERP system, the CAD model will be the master and information from this will be taken through an interface into the ERP system. Any assembly structure within NX and Teamcenter will also be the master, so information from a single source will be available throughout the company.

Xtrac looked for a new ERP system and settled on Vantage by Epicor in 2007. Moloney explains that one of the key criteria was the ability to integrate with Teamcenter, which will populate the ERP system. “We use a workflow package, which allows us to connect to Vantage and allows us to pass information across. NX and Teamcenter are well managed, which means that ERP is easier to implement.”

Xtrac is supported by UK Siemens solution partner Majenta PLM Solutions. Moloney notes, “We cannot afford any delay in our schedule and do not have time to wait if we hit any problems. We have found that Majenta has the technical knowledge and if necessary we are given access to specialists from Siemens, such as on the interface project.”

Xtrac works under very strict confidentiality agreements that enable it to support competing teams in the same season or year without conflict of interest. Moloney points out, “We are always very careful with data and drawings. For example we remove logos from any customer drawings used for inspection and we shred all drawings after use. We have gotten used to this level of security. There is a lot at stake. If our clients win, they gain a lot.”

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