

## Aerospace and defense

# TMD Technologies

NX and Teamcenter help radar transmitter components developer cut time for concept design and first build by 50 percent

### Products

NX, Teamcenter

### Business challenges

Expand range of products offered to the market

Make products lighter, smaller and more reliable

Integrate technical data with ERP system

### Keys to success

Provide customers with a clear view of design

Use the same tools for design and manufacturing

Store all product data in one location

Easily share CAD files with specialist suppliers

### Results

Reduced time for concept design and first build by 50 percent

Cut power supply build time by 33 percent

Decreased manufacturing time for modular product by 75 percent

Used library of standard parts to facilitate re-use

Eliminated manually produced reports



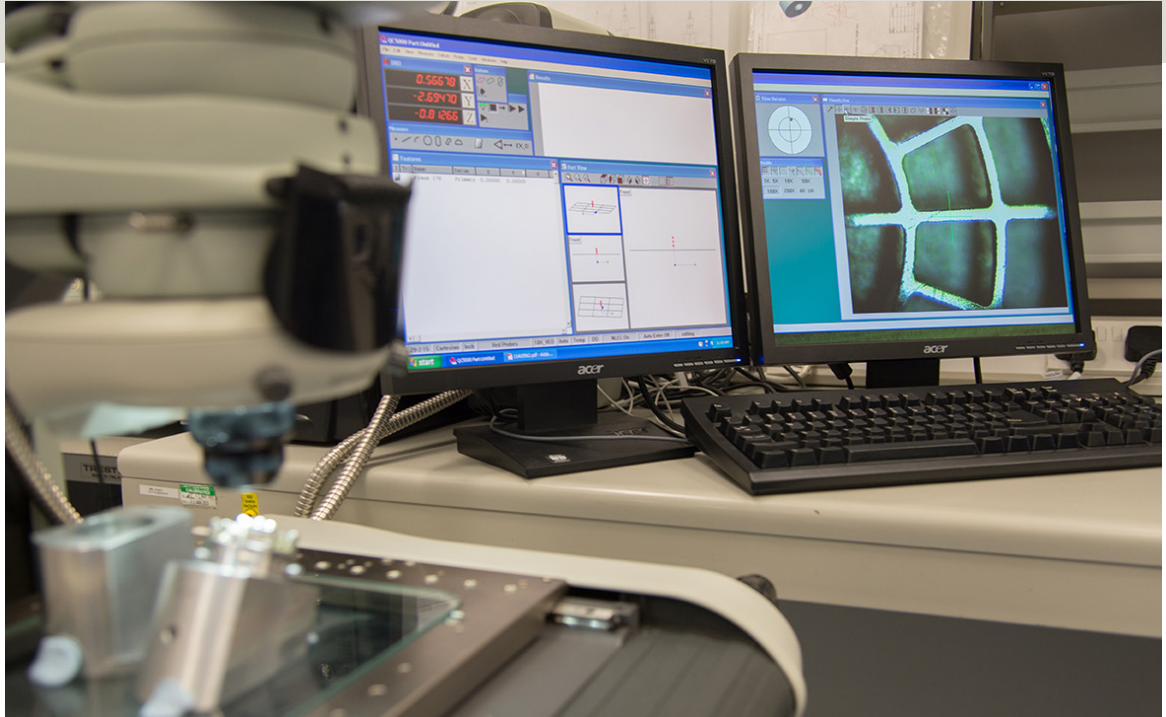
### TMD Technologies uses Siemens PLM Software solutions to improve innovation, contain costs and speed time-to-market

#### Building on the power of microwaves

When a search-and-rescue operation is underway at sea, the power to detect an object measuring only four inches can lead to a significant breakthrough; and in the aftermath of an earthquake, an unmanned aerial vehicle (UAV) may be the only means of surveying damage to critical

infrastructure. It is such situations that showcase TMD Technologies Ltd.'s (TMD) expertise in the design and manufacture of microwave tubes, amplifiers and power supplies for radar transmitters.

From its base in London, United Kingdom, TMD exports 80 percent of its products, many of them made-to-order for global companies in defense and aerospace. The company also supplies test and research laboratories with electromagnetic compatibility (EMC) testing equipment.



The rugged metal boxes that emerge from TMD's assembly line may look simple, but inside are solutions for some of the most difficult design challenges in microwave technology. Thermal management, noise, cathode size, control, speed, safety and reliability are all of concern to customers, and TMD's scientists and engineers are continually responding to the demand for products that are lighter, smaller and operationally faster. In 2005, for example, TMD won a United Kingdom Queen's Award for Innovation by providing a long-sought, high-performance radar for the United States Army.

"We develop world-leading products yet we face continual pressure to reduce costs, cut timescales and improve reliability," says David Brown, managing director, TMD. "Bringing new products to market at the right price within the right timescale is crucial. Our focus is therefore on establishing world-leading processes and investing in our tools."

TMD's vision is to have all the company's technical data on one platform and integrate that with its enterprise resource planning (ERP) tool, streamlining its entire business. In addition to achieving contract wins for custom-made products, TMD would like to expand the range of products that it initiates and brings to market. TMD is using NX™ software and Teamcenter® software from product lifecycle management (PLM) specialist Siemens PLM Software to help achieve its plans.

**“Teamcenter is helping us to define our build process, control configuration and manage our releases.”**

Gary Henderson  
Head of Equipment Engineering and Central Engineering Services  
TMD Technologies Ltd.

### Visualizing customer requirements

"The clarity that NX provides is a huge benefit as we develop a product," says Tracey Lofts, director of engineering and programs, TMD. "In addition to enabling us to design for extremely awkward space shapes, we use it to present concepts to the customer, verify the design through peer reviews and discuss manufacturability with the production engineering team."

The design team produces renderings from all models created with NX. These are included in bids and proposals and are used by marketing and sales staff to attract interest prior to manufacture. The NX files for a new microwave power module (MPM) were sent to a supplier that made a realistic yet low-cost acrylic model, and this was used extensively to give customers a true appreciation of just how small the unit was before the final product was available.

By using NX, TMD is finding that new concept designs covering the fundamentals of the space envelope, thermal management and manufacturability typically take half the time they used to take. As a result, customers receive a much quicker initial response. In addition, the design team can accurately quote lead times, which improves TMD's submissions.

### Seeing the way to innovation

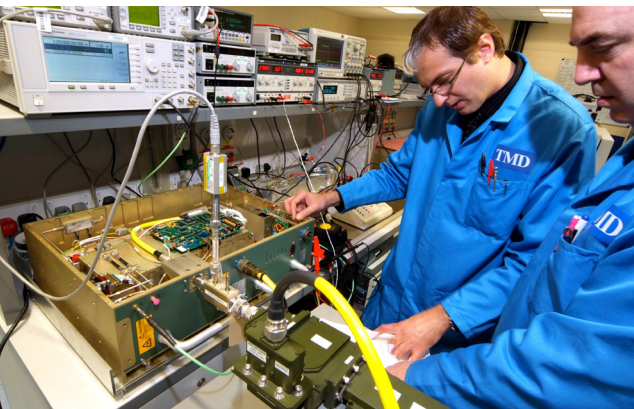
NX was a key factor in the design of the latest innovative MPM. Fitting into an existing family of products, this MPM is a compact, high-power microwave-power amplifier and a direct response to the market's desire for a smaller, lighter and cheaper solution. It is designed in three discrete sections so that it is easier to test, requires no point-to-point wiring during assembly so it is cheaper to manufacture, and can be reconfigured quickly to suit different specifications.

Nick Ranzetta, mechanical design engineering manager, TMD, comments, "With NX, it is easy to validate and optimize a design; we can quickly check tolerances, identify potential clashes, ensure holes are fully lined up and confirm that high-voltage distances are maintained. We can conduct stress analysis with NX, verify that heat can escape and easily transfer digital data into our computational fluid dynamics application."

Gary Henderson, TMD's head of equipment engineering and central engineering services, adds, "NX allows the design team to see fine detail without losing the big picture and that is an aid to innovation. If we did not have that option, we could get bogged down in complexity."

**"Our intention is to expand the business by offering a wider range of products in more countries. NX and Teamcenter are fundamental to that goal because they draw people together, allowing them to access data, appreciate other disciplines and follow a clear system."**

Howard Smith  
Engineering Director  
TMD Technologies Ltd.





**“With Teamcenter as the access point for all teams, designers and production engineers can work together on ease of build, efficient metal cutting and manufacturing methodology.”**

David Pike  
Operations Director  
TMD Technologies Ltd.

#### **Eliminating unnecessary activities**

The design office used to be a critical function as well as a huge bottleneck. Manual administration of drawings has now been eliminated.

“I estimate that drawings had to travel a quarter of a mile around different departments for signing,” says Helen Anderson, head of business improvement at the company. “They were physically stored in different locations, the scans we filed electronically were poor quality and it was not always possible to see how one

component linked to others within an assembly. We often had to deal with inquiries from suppliers seeking clarity and that caused delays as we tracked down drawings. The cost savings on engineering time are immense.”

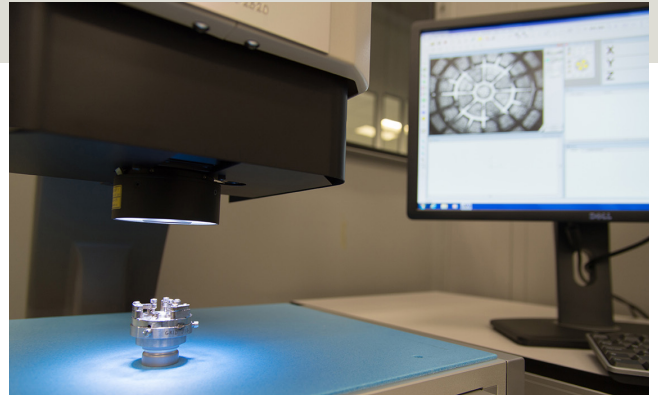
Similarly, product information such as specifications, marketing data, test procedures and regulatory industry standards used to be spread across the company. All design, bills of materials (BOMs) and associated information for each product are now quickly retrievable with a unique number via Teamcenter.

Henderson says, “Teamcenter is helping us to define our build process, control configuration and manage our data releases. The ability to search extensively and share data will drastically reduce the number of reports that we have been producing by hand.”

Ranzetta adds, “We are also building a library of standard parts in Teamcenter so we can re-use design data, and that is assisting us as we focus on modular products.”

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Gary Henderson  
Head of Equipment Engineering and Central Engineering Services  
TMD Technologies Ltd.



### Removing ambiguity around manufacturing

"It has been very interesting to map the way we do things," says David Pike, TMD's operations director. "With Teamcenter as the access point for all teams, designers and production engineers can work together on ease of build, efficient metal cutting and manufacturing methodology."

Production engineers can interrogate the 3D model, design jigs and fixtures around it and prepare comprehensive illustrated manufacturing instructions. These instructions and jig/fixture designs are then linked to subassemblies/assemblies via Teamcenter. This enables shop floor supervisors to obtain all required build information to correct build configurations more efficiently.

Teamcenter can be used to manage the transfer of computer-aided design (CAD) files to specialist suppliers, particularly those providing sheet metal, complex machinery, printed circuit boards (PCBs) and harness assemblies. Drawings, 3D CAD (.stp files) and zipped Gerber data (PCB data) are all exported directly using Teamcenter and sent to suppliers. It is also possible to clarify a dimension with a supplier using the visualization tool.

"The next step is to show machining cuts as part of the CAD model," says Pike. "We are also working with designers on better cable routing."

Screens and tablets are widely available on the shop floor, so hand-written notes from designers to the shop floor are no longer necessary. Any information that arises as new products are manufactured for the first time is entered directly into Teamcenter. One of the issues that TMD faced in the past was control of build standards; skilled workers occasionally made slight deviations that were beneficial but not necessarily recorded. Everyone is now aware that they have to follow the approved documents held in Teamcenter.

"We have many complex build processes, but we can now eliminate ambiguity with detailed product information," comments Luke Wetherell, tube manufacturing manager, TMD. "Teamcenter has a user-friendly interface and operators find it easy to use. We have reduced first build and self-inspection to about half of what it used to be for a new design."

Ed Correia, manufacturing manager at TMD, adds: "Seven or eight years ago we built high-voltage power supplies using manual printed notes. As we began to automate the process, build time was reduced by 40 percent. In the past two-and-a-half years, it has been further reduced by 50 percent, because everyone has the same clear instructions."

Moreover, the latest new MPM is expected to take significantly less time than other products in the same family.

"Our ultimate aim is reduce build time by 75 percent," says Robert Dent, production engineer, TMD.

**"We want to create new business from products that we have not supplied before. For that we need engineers who anticipate customer need and are using the best tools to design and build with speed, quality and consistency."**

Peter Butcher  
Executive Chairman  
TMD Technologies Ltd.

## Solutions/Services

NX

[www.siemens.com/nx](http://www.siemens.com/nx)

Teamcenter

[www.siemens.com/teamcenter](http://www.siemens.com/teamcenter)

## Customer's primary business

TMD Technologies Ltd. (TMD) is among the world's leading manufacturers of microwave tubes, high-voltage power supplies and transmitters for radar, electronic warfare, communications, electromagnetic compatibility radio frequency testing and other laboratory applications.

[www.tmd.co.uk](http://www.tmd.co.uk)

## Customer location

London

United Kingdom

## Partner

TEAM Engineering

[www.team-eng.com](http://www.team-eng.com)



### Sharing accurate knowledge for speed, quality and consistency

"Teamcenter is key in helping us establish peer review and signoff, including approval of our PCB designs, which we are continually improving," says Anderson. "Although we have removed the risk of referring to the wrong drawing, we still need to lock down various workflows. As TMD addresses business improvement on all levels, one of the next steps is to automate change control."

"Our intention is to expand the business by offering a wider range of products in more countries," explains Howard Smith, engineering director, TMD. "NX and Teamcenter are fundamental to that goal because they draw people together, allowing them to access data, appreciate other disciplines and follow a clear system."

Peter Butcher, TMD's executive chairman, concludes: "We want to create new business from products that we have not supplied before. For that we need engineers who anticipate customer need and are using the best tools to design and build with speed, quality and consistency."

# "The clarity that NX provides is a huge benefit as we develop a product."

Tracey Lofts  
Engineering and Programs Director  
TMD Technologies Ltd.

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