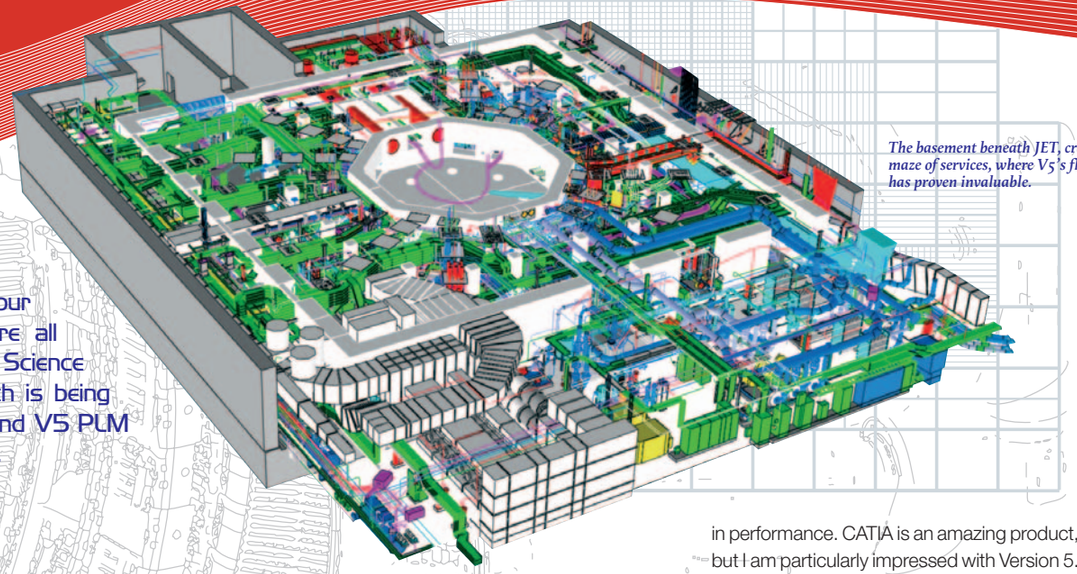
UKAEA Fusion

Applied



The basement beneath JET, crammed with a complex maze of services, where V5's flythrough capability has proven invaluable.

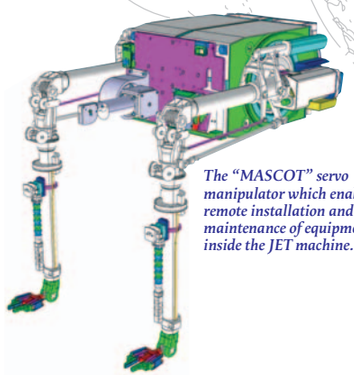
Our relentless consumption of fossil fuel, and our dependency on it, has created the need to explore all potential alternative energy sources. At the Culham Science Centre in Abingdon, Oxfordshire, pioneering research is being carried out into one such energy source - fusion - and V5 PLM Solutions are at the heart of this fascinating work.

V5 Solutions at the Heart of Fusion Research

By David Treacher

LEADERS IN FUSION ENERGY RESEARCH

The UKAEA, at its Culham site, has been responsible for pioneering research into fusion energy in the UK since the 1960s. Current research suggests it is feasible that, in about 30 years, fusion energy will be a widely available base-load energy source of unlimited supply that causes very little damage to the environment.



The "MASCOT" servo manipulator which enables remote installation and maintenance of equipment inside the JET machine.

European-wide research is carried out at Culham, as it is the home of the Joint European Torus (JET) project which is the flagship of Europe's integrated fusion programme. In 1991, this became the first facility in the world to achieve significant fusion power, and in 1997 it set new world records in fusion performance. JET now has an important role as the forerunner to the planned international fusion experiment, ITER.

CATIA USERS FOR OVER 20 YEARS

The first use of CATIA for this project was in 1985 when two seats of mainframe based CATIA V2 were installed as an automated drafting system. Today 35 seats of CATIA V5 are implemented, together with an equal number of ENOVIA SmarTeam licences as key components of a PLM strategy.

Mr Paul Carman is the CATIA Manager at Cullum and explains its use, "CATIA V5 is used to model the entire device itself, plus the building and facilities which house it. This is a huge Digital Mockup of JET which consists of over a million parts built, not only in CATIA V5, but also in previous versions of CATIA."

> Most of Culham's associates and partners are using CATIA V5. The overall PDM system at the 'extended enterprise' level is ENOVIA V5.

DMU PERFORMANCE

Culham tend to work with CATIA V5 almost entirely in 'cache' mode with CGR files. Explains Mr Carman, "We have learnt how to tweak the cache and PC display settings to achieve an impressive performance. We are finding now that limitations come from outside of CATIA, for example from other traffic on our PC network. Of course, by moving from UNIX to Windows we gained another improvement in performance. CATIA is an amazing product, but I am particularly impressed with Version 5. We apply a material type to all our parts so that we can more easily visualize very complex 3D assemblies. We are starting to exploit the DMU sectioning and clash detection within CATIA V5 which is very impressive.

The arrival of 3DXML has been a real break-through for us and we have upgraded our release level specifically to be able to take advantage of it. Our people love the fact that they can grab CATIA V5 data with 3DXML and use it for their presentations and office applications. It is the bridge between two previously separate worlds.

We have tested and are planning to use add-on products for ray-tracing to design optical rays and associated mirrors. Each part is 100% represented in CATIA, and then sent out in one form or another to our suppliers for manufacture."

ENOVIA SMARTEAM PILOT PROJECT

SmarTeam was selected because it is scaleable and manageably for the size of the JET project. Culham were looking for revision control and help with the configuration processes. The aim is to stop designers working on the same part and having to worry about component interfaces.

SmarTeam is currently being implemented through a pilot project. The objective is to do configuration control and capture design intent without being too restrictive to users. Currently suppliers are being selected for the next major upgrade to JET which will occur in 2008. When those suppliers are known, the plan is to have all the associated CATIA files managed by SmarTeam.

SUPPORT FROM APPLIED-PLM

Mr Carman is very positive about his experiences of Dassault Systèmes Business Partner Applied-PLM. "In all my years of using different versions of CATIA, I think Applied's people are quite unique in the industry," he says, "They are in a different league and our excellent relationship with them has paid dividends. We have used them for training, consultancy and recently some of our users have been on their new 5 day foundation course. They have also written a macro for us to automatically export Bill of Materials information from CATIA. I can't sing their praises enough."

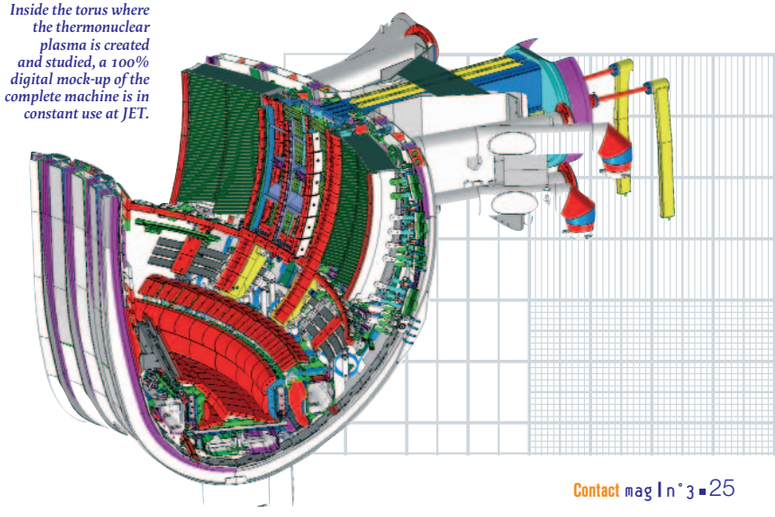
THE FUTURE

ITER, (International Tokamak Experimental Reactor) the next international fusion research device, will be twice the size of JET. The word ITER also means 'the way' in Latin, and is the step between today's studies of plasma physics and tomorrow's electricity-producing fusion power stations. ITER is to be constructed in France, at Cadarache, near Aix-en-Provence, in 10-15 years time. Nations involved in developing ITER represent more than half the world's population.

Most of Culham's associates and partners are using CATIA V5. The overall PDM system at the 'extended enterprise' level is ENOVIA V5. At Culham, they are already using the ENOVIA Portal to get access to the latest design data in Caderache.

Concludes Mr Carman, "We know we are only scratching the surface of the capabilities of the PLM tools we have available, so there is plenty of scope for us to exploit the power of V5 Solutions" •

For more information:
www.fusion.org.uk



Inside the torus where the thermonuclear plasma is created and studied, a 100% digital mock-up of the complete machine is in constant use at JET.