Fusion Business
tomorrow's technology for today

UKAEA

Fusion Working in Europe

Culham Science Centre

www.fusion.org.uk/industry

April 2007 Issue 38

MG Sanders Wins its First Fusion Contract

UK Company, MG Sanders a world-class manufacturer of precision engineered components, has won its first fusion contract to manufacture and supply machined components for prototype assemblies for the JET ITER-like wall (ILW) project.

The EFDA-JET ITER-like Wall (ILW) project aims to test materials (beryllium and tungsten) which may form the plasma-facing wall of ITER. Its scope not only includes the complete redesign and remote placement of over 5,000 tiles on JET, but also the manufacture of a second remote handling arm. When combined with other enhancements ILW will provide a test bed for integrated plasma scenarios with ITER relevant edge conditions.

The project involved the construction and machining of pre-production prototypes of three pairs of tile assemblies to assess ease of manufacture and identify any design and production issues. The dummy assemblies used aluminium mounted on an Inconel casting supplied to MG Sanders.

The project was a steep learning curve for the company. "We had to produce a large amount of detailed manufacturing drawings from what was an almost conceptual design in order to prove the design and manufacturing process for the tile and carrier assemblies," says Ian Warrington, Business Development Manager, MG Sanders.

Oliver Croft who co-ordinated the project said, "We learnt a lot from working with MG Sanders. The computer model of the tile assembly is the contract defining entity and was the only way to define the intricate surface profile of the tiles. However it is also difficult to machine inconel castings to the very high tolerances and in some cases design changes were required to achieve the requirement. This is why the project with MG Sanders was so important."

"We came across Fusion from an industry colleague's recommendation to look into the ITER project and possible sales opportunities. By visiting the Fusion and Industry web site we were able to register on the ITER suppliers' database. Shortly after we received an e-news with details of the prototype assemblies contract, expressed an interest and were eventually awarded the contract. At present we are waiting to hear about our bid for another much larger project for tungsten wall tiles."

Ian Warrington, Business Development Manager, MG Sanders.

"Good communication was vital to the project's success, we were both learning as we came across manufacturing issues. It was especially useful that MG Sanders was able to bring their Formula 1 automotive experience to achieve the tight tolerances and were also able to suggest ways of overcoming the lower tolerances of the investment cast carriers."

"This is an excellent example of UK companies/individuals working together to ensure companies benefit from the fusion programme. Our message to all UK companies is to register your interest immediately on the two databases," said Dan Mistry, Fusion and Industry Manager.

The picture shows two prototype outer poloidal limiter tile assemblies which stack together to hide the remote handling bolts and carriers thereby maximising the power handling. Tile surfaces are segmented to relieve the stresses caused by thermal expansion and to reduce electromagnetic forces.

EFDA Database - Have You Registered?

If you are not on the database you may miss out!

UK companies seeking opportunities from both the central ITER organisation and the European contribution to the ITER programme should immediately register their interest on https://www.efda.org/eidi/ and on our database http://www.fusion.org.uk/industry.

In future Fusion Business will be produced as an e-zine. Paper copies will no longer be available. If you do not require the Fusion Business e-zine please contact Janet Browning on 01235 466609 or e-mail: janet.browning@ukaea.org uk

Inside This Issue:

Work Begins to Clear ITER Site 2
Sensors KTN Business Briefing at Culham 3
UKAEA Challenge Drives New Product 3
Industry Liaison Officers meet in Finland 4

ITER UPDATE

The ITER Organisation was established following signature of the international agreement on 21st November 2006. The team is growing rapidly at the site, Cadarache in France, comprising secondments from around the world (including some from Culham) and now its own employees (vacancies are posted at http://www.iter.org/). A Design Review is under way involving fusion and other experts from around the world. Site clearance work has begun, supervised by Agence ITER France on behalf of the European host. A zone of 90 hectares, about half the total ITER site, is being cleared by a consortium of three regional companies employed by the National Office of Forests, with the rest remaining woodland (see photo).

Most of the ITER equipment will be provided 'in-kind' by the 7 ITER partners and not purchased directly by the central team. The European Council of Ministers has approved a new organisation in Barcelona which will be responsible for the European procurement; the post of Director has been advertised and an appointment is expected in early summer. Meanwhile, the European fusion programme continues to provide technical contributions to ITER and further contracts with industry are expected as part of this. The central ITER organisation is also now placing some small contracts, mainly for technical/consultancy services, and is likely to consult the EFDA's industry database for suitably qualified companies.

UK companies seeking opportunities from both the central ITER organisation and the European contribution to the ITER programme should immediately register their interest on https://www.efda.org/eidi/ and on our database http://www.fusion.org.uk/industry.

ITER site clearance at Cadarache, France. Photo courtesy CEA/Agence, ITER France

ITER LIDAR Development Cluster meets at Culham

Representatives from laboratories of European Fusion Associations EFDA and ITER met recently at the Culham Science Centre for the inaugural meeting of the cluster developing the design of the LIDAR (Light Detection And Ranging) Thomson scattering system.

The core-plasma LIDAR system will measure the electron temperature and density of the very hot plasma needed for fusion. In the ITER plasma the temperature of the electrons will range from 2 million degrees near the edge to 400 million degrees in the centre. Thomson scattering works by shining an intense laser pulse into the core of the plasma and detecting the back scattered light from the electrons produced. Briefly, the LIDAR project concerns the development of this Thomson scattering diagnostic, including its mirrors, lenses, lasers and spectrometers, and the equatorial port plug that will contain much of this equipment.

"The design of a Thomson scattering system for the environment of ITER is providing many new challenges. The formation of the European Cluster is a very important step in drawing on the expertise of our many colleagues across Europe," said William Morris, Experimental Department Manager, who is overseeing the work on ITER diagnostic design at Culham.

The photo shows scientists and engineers from the various Associations including, CIEMAT-Spain, ENEA RFX-Italy, FOM-Holland, FZJ-Germany, HAS-Hungary, IST-Portugal, RISO-Denmark, UCC-Ireland and UKAEA-Great Britain, from EFDA-Germany and from the ITER organisation in France.

'Engineer's Profile' Introducing Fusion Engineers to UK plc

Neil Mitchell - Mechanical Engineer

Dr. Neil Mitchell is a mechanical engineer with a degree in Engineering Science and a PhD in Fluid Flow in Turbomachinery from Cambridge University. After starting work in the gas turbine industry he moved into fusion research at Culham Laboratory and the JET project in 1981. He has since gained wide experience in the mechanical engineering problems of fusion experiments, and their interfaces with electromagnetics, fluid mechanics and nucleonics. He worked at the Max Planck Institute for Plasmaphysik in Garching, Germany from 1983 to 1994 before moving to Japan and joining the early phase of the ITER project. He specialised in superconducting magnets during the 1990s, being responsible for the conductor for the ITER model coil project - in terms of stored energy one of the largest single coils ever made. He has become an acknowledged expert in the behaviour of low temperature, high current superconducting cables.

He was finally Head of ITER Naka Site in Japan and Head of ITER Magnets Division with responsibility for design and analysis of the ITER superconducting coils and power supplies during the time that negotiations on the construction agreement were underway. He was responsible for moving the section of the ITER team in Japan to the ITER construction site at Cadarache, France, in 2006 and is now Head of the ITER Magnet Division at Cadarache.

Neil is a member of the Institution of Mechanical Engineers and has published over 100 papers in the fields of fluid flow, gas turbine performance, magnet coil and conductor design, plasma engineering and Tokamak design.

UKAEA Diagnostic Challenge Drives New Product Development

The search for a calibration light source for MAST optical diagnostics has led UK company Bentham Instruments to expand its product range and win new business as a result. The project resulted in the development of the Bentham Instruments ULS300, a uniform light source providing variable luminance at constant colour temperature along with the uniformity needed to calibrate wide-angle optics.

Neil Conway, Fusion Research Physicist at Culham has been working with Mike Clark, Sales Director at Bentham Instruments to develop the new integrating-sphere source. "The ULS300 gives UKAEA researchers a compact light source with excellent uniformity and as such it is a significant improvement on other techniques for calibrating our wide angle optics" explains Neil, "and we can further improve the uniformity by modifying the optical fibre bundles so that they launch light into the sphere obliquely."

Mike Clark and his team are currently working on the refinement. "We've learnt a lot from working with the UKAEA. Achieving high uniformity and high luminosity across a large window without it being expensive and over-large is quite a technical achievement. The ULS300 is a highly specialist instrument but we've already sold several to non-fusion customers and have prospects from around the world for further sales," said Mike.

For further information visit www.bentham.co.uk

Sensors KTN Business Briefing at Culham

Advanced Metals, Welding, Polishing & Plating

The Sensors Knowledge Transfer Network (Sensors KTN) held a Technology and Business Briefing on Advanced Metals, Welding, Polishing and Plating at UKAEA Culham on 22nd January. Craig Sawyers from Qi3 told Fusion Business, "At this meeting our aim was to introduce problem stakeholders at the CCLRC and Culham to industry. There are common needs in the particle physics community and at Culham, relating to accurate metals forming, leading edge welding technologies and polishing and plating."

The briefing attracted 25 delegates from academia, research laboratories and industry. They heard presentations on the problems and opportunities in superconducting RF cavities, RF and neutral beam heating, relevant to JET and ITER experiments, and opportunities for technology transfer from CERN. Craig continued, "Two classes of opportunity emerged - upcoming particle accelerators require tens of thousands of superconducting RF cavities which require a product engineering and serial manufacture approach. For ITER the opportunities relate to high value, one off machines. This in particular requires a coordinated approach between Government, the UKAEA and Industry to ensure that UK industry enjoys maximum engagement in addressing the opportunity. UKAEA generously provided a tour of Culham's facilities to round off the day."

Join the Sensors KTN Community Directory

Registration is FREE at http://www.qi3.co.uk/sktn/registration.asp. The Directory will enable you to identify and be identified as potential partners for collaborative technology development.

Further events are planned around the country for 2007. For further information please e-mail: craig.sawyers@qi3.co.uk. In addition, all presentations can be downloaded from the Qi3 website http://www.qi3.co.uk/events.

Martech Wins SMADS Contract

Martech Systems, based in Weymouth, Dorset have recently won a design and manufacturing contract for JET in support of the Scattering Matrix Arc Detection System (SMADS) which is designed to address the vulnerability to arcs in low voltage areas of JET's ITER-like RF antenna which are not detected by the existing protection systems.

Project Manager, Dr. Alan Kaye said, "This is a key protection system and the requirements on quality and integrity of the design and manufacture are stringent. During the tender evaluation, it was clear that Martech had fully understood our requirements for the SMAD system and proposed some improvements. They also had relevant experience in the necessary technology and the required management and production quality assurance processes in place. Their proposal fully met our requirements and we were pleased to select them for this contract."

"This is the second contract we have won at Culham in the last 18 months, and we are delighted that the Project Team have recognised our FPGA (Field Programmable Gate Array) and real-time software skills, by selecting us for this challenging design."

Lawrence Short, Director, Martech

Europe's Industry Liaison Officers meet in Finland

The first meeting of Europe's Industry Liaison Officers (ILOs) was held in Finland in February. Despite freezing temperatures of -25C and lots of snow the meeting proved to be a great success with agreement that ITER should have the input from companies that can supply the 'best value' no matter where they are located in Europe. Regular meetings are being planned to share information and where possible help to try and form consortia.

Enrico De Pietro, from (EFDA) Barcelona, gave an update on how Europe will procure its 'in-kind' contribution to the ITER programme to ensure fair and transparent competition among European companies. This was followed by several presentations from various ILOs of their activity to engage industry from their countries. Concerns were raised by ILOs that many of the ITER work packages will not be delivered by a single organisation and so discussion took place on how best to share information and also encourage the formation of national/European consortia. Further meetings are being planned although the next location may not be as grand and as cold as Sariselka!

Technology & Innovation Exhibition 2007

The Technology & Innovation Exhibition which is devoted to promoting 'Engineering Equipment and Associated Services' to the UK nuclear industry will be visiting UKAEA Culham on Thursday 28th June 2007. 35 companies are already exhibiting and exhibition space is still available. For more information about exhibiting, please contact the exhibition organisers, Nu-Tech Associates. Tel 01946-695554 or e-mail sales@nu-techassoc.co.uk

UKSPA Delegates Learn More About Fusion Research

In a bid to engage UK Science Park based companies with the business and technology transfer opportunities arising from fusion research, Fusion and Industry Manager, Dan Mistry, presented a paper to 250 delegates at this year's UK Science Park Association (UKSPA) conference at Heriot-Watt University in Edinburgh.

The paper highlighted the immediate need for UK companies to participate in the ITER projects and touched on other projects including JET and UKAEA's MAST experiment. "Unlocking the potential of Science Park companies to contribute to fusion research is one of the biggest challenges we face. The UKSPA paper allowed us to motivate the Science Park managers to relay the fusion message to their client companies," said Dan Mistry. Given the interest among Science Park managers in developing new ways of assisting the development of their client companies, Dan Mistry described the success of the Technical Support Package (TSP) as a proven model for technology transfer at Culham. "We currently have 7 small companies who are using our TSP which includes advice and access to UKAEA's technical services. Our TSP has been a great success for both the users and our staff and so we see this as a model that other Government Laboratories at, or close to, Science Parks should consider adopting."

New Industry Administrator for Fusion & Industry Team

The Fusion and Industry team has been strengthened following the appointment of Janet Browning to the position of Industry Administrator. Janet had previously worked as an Administrator for the JET Secondee Assistance Team for the last five years.

Janet's role within the team will be amongst other things to co-ordinate the Fusion and Industry website and ITER Suppliers database. "We are delighted that Janet has chosen join the team as she has a great deal of experience from working at Culham and will be asset to us" said Deniese Willis, Industry Events Manager.

'Fusion Business' is produced by WORDSMITH PO Box 6546, Poole, Dorset BH12 9DL Tel: 01202 466527 E-mail: gill.wordsmith@ntlworld.com