JT-60SA Newsletter

No.23, 30 November 2011

Headline

Joint JA-EU research activities in full swing – RCM-1

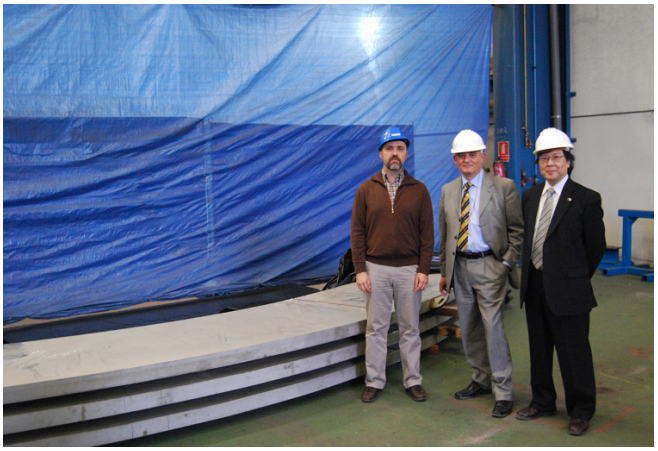
The first JT-60SA Research Coordination Meeting (RCM-1) with the participation of the members of the JT-60SA Research Unit, including the Technical Responsible Officers of the JT-60SA Research Plan, was held on 24-27 October at the JAEA Naka Fusion Institute, and 30 participants in total joined on site (12 from EU, 18 from JA), and 7 participants joined by videoconference. The meeting was organized in two parts: discussion on the JT-60SA Research Plan, and information exchange on research collaborations between the EU and JA for scientific research activity using JT-60SA.

Since EFDA, collaborating with F4E, officially started a broad activity on revision of the JT-60SA Research Plan with a large number of leading scientists from European institutes (70 scientists from 18 institutes in 9 countries) in May 2011, the EU and JA fusion communities are now closely collaborating with each other towards completion of the JT-60SA Research Plan Version 3, based on Version 2.1, which was developed by the JA fusion community (70 scientists from JAEA and 66 scientists from 13 universities/institutes). The RCM-1 participants contributed actively to the constructive discussion on both the JT-60SA Research Plan and the research collaborations.

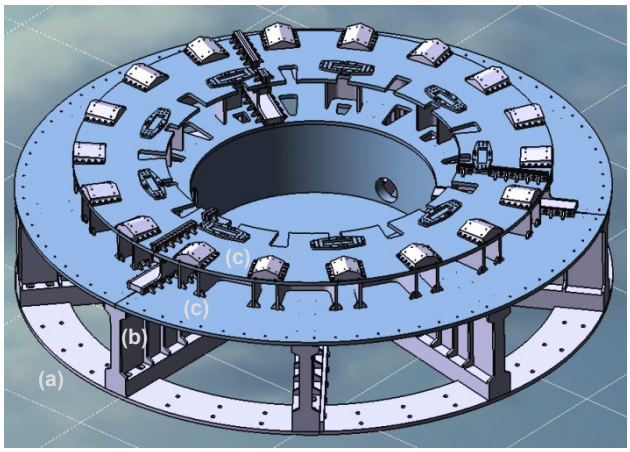
The JT-60SA Research Plan Version 3 (EU-JA plan) will be completed by the end of December.

News

PL views cryostat base manufacture



Rings to be connected to those embedded in the ground floor of the tokamak building (a)



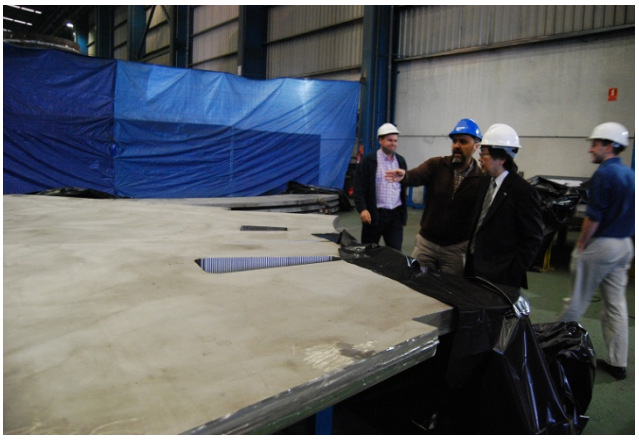
Cryostat base

On October 27, the Project Leader, S. Ishida, along with members of F4E (E. Di Pietro and S. Davis) and CIEMAT (J. Alonso and J. Botija) visited IDESA, the manufacturer of the cryostat base, in Avilés (Asturias, Spain). This was followed in the afternoon by a visit to the main IDESA subcontractor for the cryostat base machining (ASTURFEITO), only a few hundred metres away.

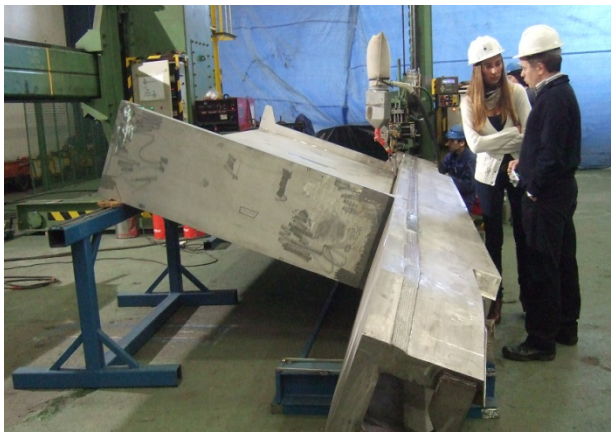
Overall progress in the cryostat base manufacture is in agreement with the schedule. During the visit to the manufacturing workshop, the group was able to monitor the progress on the manufacturing of the different parts of the cryostat base lower structure and double ring sectors.

U radial beams of the lower structure were almost finished, and some of them were already assembled with the main radial plate plus the front and rear vertical plates. Outer rings of the lower structure were being assembled and welded. The cryostat base double ring, mainly the upper and lower horizontal plates, were also being assembled. Machining of the first sector of the cryostat base will start, at the ASTURFITO workshop, in January 2012.

The JT-60SA cryostat base is the key component to beginning the tokamak assembly on site. The Project Leader confirmed that the manufacturer of the cryostat base had made great progress and was confident of its completion as planned.



Large double ring (c)



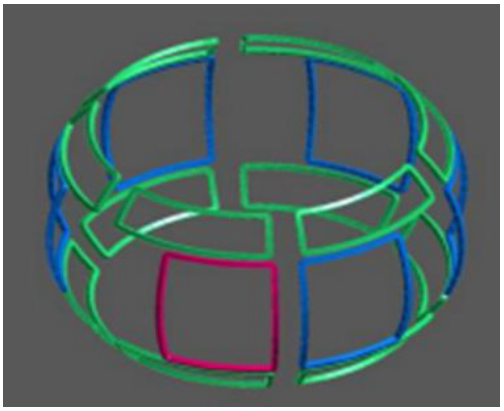
Rigid radial leg (b)

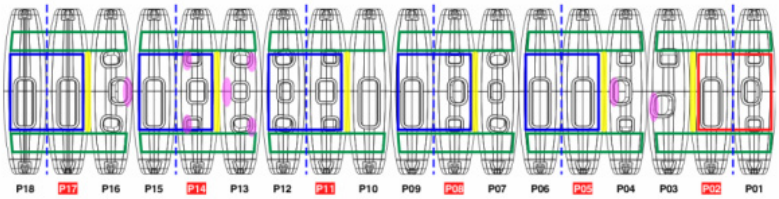
Large double ring (c)

Large double ring (c)
and rigid radial legs (b)

News

Specification of error field correction coil decided





Layout of error field correction coil on vacuum vessel

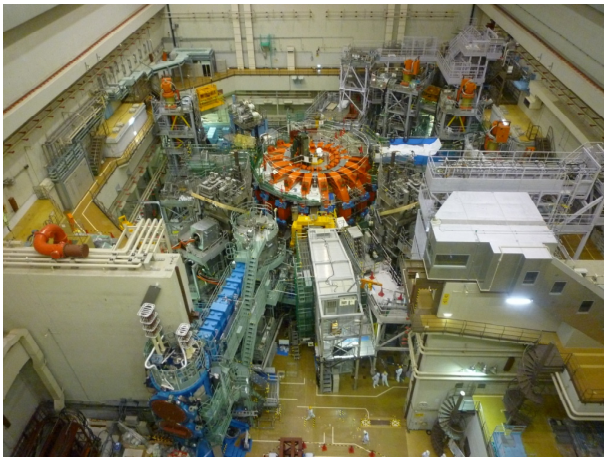
Although every effort is being made in the manufacture of the JT-60SA components to maintain the highest possible accuracy, the consequences of any inaccuracies in manufacture and assembly can have an effect on the plasma, introducing “error fields” which can lead to plasma instabilities and disruptions. To avoid this, JT-60SA is to be equipped with a set of saddle coils able to control these fields.

For the design of the error field correction coils, a magnetic field calculation was implemented considering the effects of magnetic shielding materials and bending magnets to be installed in the neutral beam injectors. In order to meet the target of error field correction of 0.2 mT, the specification of the error field correction coil with 30 kAT and 35 turns was decided.

News

Disassembly: preparation completed for toroidal field coil installation at storage building

Disassembled upper support structure and spacers in storage building



JT-60 in torus hall

All of the upper support structure was disassembled and stored upside down in the JT-60 storage building at the JAEA Naka site, and the upper spacers for the toroidal field coils were also disassembled and stored upside down on the support structure for the toroidal field coil installation.

As for the vacuum vessel in the torus hall, cutting of some sections to allow removal of the toroidal field coils was finished. The poloidal field coils in the opened sections will be cut next, and then removal of the coils will begin in late December.

In parallel with the above activities, disassembly work was also started for the power supply equipment installed in the rectifier building, making space for installation of the quench protection circuit and the switching network units being procured by the EU.

Meetings

Toroidal field coil kick-off meeting held in Genoa, Italy

ENEA – F4E – ASG Superconductors during the KOM for JT-60SA toroidal field coil manufacture

The kick-off meeting of the contract between ENEA and ASG Superconductors S.p.A for the manufacture of 9 toroidal field coils for the JT-60SA Tokamak was held on 14 October at the ASG premises in Genoa, Italy. ASG Superconductors S.p.A. has a strong experience in the production of superconducting coils for magnetic fusion reactors (ITER Pre-Compression rings mock up, ITER TF model coil, W7X TF coils) and for particle accelerators (CMS Compact Muon Solenoid, ATLAS barrel toroidal coil, LHC magnetic dipoles and quadrupoles).

The meeting was attended by ASG and ENEA (A. Cucchiaro, G. M. Polli, A. Pizzuto by videoconference) representatives and by a delegation of F4E (E. Di Pietro, V. Tomarchio, G. Philips). The meeting marked the official start of activities that will be completed on July 2016, 58 months after the signature of the contract, with the delivery of the last coil to the Saclay site for cold tests.

During the meeting, ASG representatives showed how they intend to schedule the activities. Specifically, it was illustrated that ASG, after the tooling procurement and a qualification program to validate special processes, would manufacture a dummy double pancake (whose conclusion is expected within one year) and then would start the production phase with an expected production rate of one coil every three months.
ASG introduced the members of the project team and discussed the contract management, describing the Project Team Organization Chart. ASG illustrated the project planning, the quality and control plan to manage the manufacturing activities, the frequency of reports and documents to be issued.

The meeting was concluded with a visit to the ASG workshop where the winding line and the subsequent phase of the production would be accommodated and where a toroidal field coil for W7X was shown to ENEA and F4E representatives.

Meetings

9th Meeting of the BA Steering Committee

The 9th meeting of the Broader Approach Steering Committee was held in Lausanne, Switzerland on 25 October. Representatives of the EU and Japan met at the École Polytechnique Fédérale de Lausanne (EPFL), and confirmed the sustained progress achieved despite the difficulties created by the Great East Japan Earthquake, and approved the 2012 Work Programmes for the three projects.

At the meeting, the report from the Project Leader, S. Ishida, for the Satellite Tokamak Programme (JT-60SA) project highlighted that Europe had placed a contract for the supply of the toroidal field coils, and Japan manufactured the first sector of the vacuum vessel and delivered it to the Naka Fusion Institute in Japan, and that the European and the Japanese fusion research communities had now come together to complete the JT-60SA Research Plan.

The 10th meeting of the Broader Approach Steering Committee will be held in Naka on 24 April 2012.

Local

Garching, Germany

Picture 1. Garching aerial view (Source: wikipedia.de)

Garching is a small town with 16 000 inhabitants, 15 km north of Munich. It was first mentioned in 915 AD but archaeological finds show that the area was inhabited over two thousand years before that. The first major step in the “scientific and technical” history of Garching, however, was the internationally acclaimed installation of the Research Reactor Munich (FRM) in 1957, the first research reactor in Germany. It started the process leading to today's accumulation of research institutes.

With more than 6 000 employees and 12 000 students on the research site, Garching is one of the biggest centre for science, research and education in Germany, with a unique combination of natural science and research institutions (see Picture 2). The Technical University of Munich, the Ludwig Maximilian University of Munich, several institutes of the Max Planck Society (Astrophysics, Plasma Physics, Extraterrestrial Physics, and Quantum Optics), the European Southern Observatory (ESO), and numerous other renowned institutions and companies (e.g. General Electric Global Research Centre), have their seats here. Their fields of activities vary from basic research to development of seminal high-tech applications. The research site is continuously growing: new institutes and companies are building here, and will enrich the technical diversity and cooperation on the site.

The Max Planck Institute of Plasma Physics hosts the offices of the Broader Fusion Development Department of Fusion For Energy, including the EU Home Team headquarters of JT-60SA. The Broader Fusion Development Department is responsible for the organisation of Europe’s contribution to the STP (Satellite Tokamak Programme), the IFMIF/EVEDA (International Fusion Materials Irradiation Facility – Engineering Validation and Engineering Design Activities) and IFERC (International Fusion Energy Research Centre) projects under the Broader Approach Agreement, and for managing European DEMO (demonstration fusion power reactor) activities.

Picture 2. Garching Research Centre (Source: www.forschung-garching.de)

Calendar

November 28 – December 1, 2011
21st International Toki Conference (ITC-21)
Toki, Japan

December 6-7, 2011
13th Technical Coordination Meeting (TCM-13)
Karlsruhe, Germany

March 28, 2012
10th Meeting of the STP Project Committee (PC-10)

April 18-19, 2012
14th Technical Coordination Meeting (TCM-14)
Naka, Japan

April 24, 2012
10th Meeting of the BA Steering Committee (SC-10)
Naka, Japan

Contact Us

The JT-60SA Newsletter is released monthly by the JT-60SA Project Team.
Suggestions and comments are welcome and can be sent to masayasu.sato@jt60sa.org.

For more information please visit the website: http://www.jt60sa.org/