

Headline

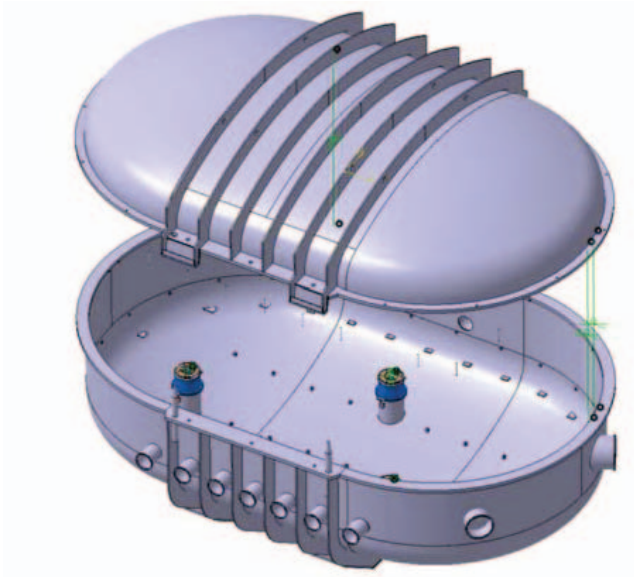
Fabrication of Cryostat for TF Coil Test progressing well



Cover of the cryostat (courtesy of ALM SA)



Lower part of the cryostat (courtesy by ALM SA)



Bird's eye view of the cryostat

The Belgian contribution to the JT-60SA project is a large stainless steel cryostat which is being designed and constructed by the company ALM (Les Ateliers de la Meuse) in Liège, Belgium. The cryostat is approximately 11 m long, 7 m wide and 5 m high. When completed this cryostat will provide the high vacuum insulation for the Toroidal Field (TF) coils to allow them to be tested at the temperature of liquid helium. All inner surfaces will be covered by a protective shroud which will be cooled with liquid nitrogen at a temperature of -200 °C. In order to reach the specified performance the vessel must be extremely tight and must not show any measurable leak.

The construction of the vessel made good progress as can be seen from the pictures above. The thermal shroud is expected for integration in May so that the cryostat can be delivered in June to Saclay in France where CEA (French Alternative Energies and Atomic Energy Commission), another partner in the JT-60SA project, is assembling the test facility for the TF coils. In addition to the cryostat, ALM is also in charge of the high vacuum pumps, a valve box vessel, and steel structures needed to handle and support the TF coils, each of whose weight is about 14 t.

News

First double pancake for EF4 completed



The first double pancake for the Equilibrium Field Coil No.4 (EF4), with an inner diameter of approximately 3.3 m, was manufactured at the company's factory in Japan. Nine more pancakes will be manufactured for the EF4 after this.

The EF4, designated the divertor coil, has the lowest elevation of all the EF coils and makes the largest contribution to forming the magnet configuration for the Divertor, which is to be installed at the bottom of the Vacuum Vessel (VV).

News

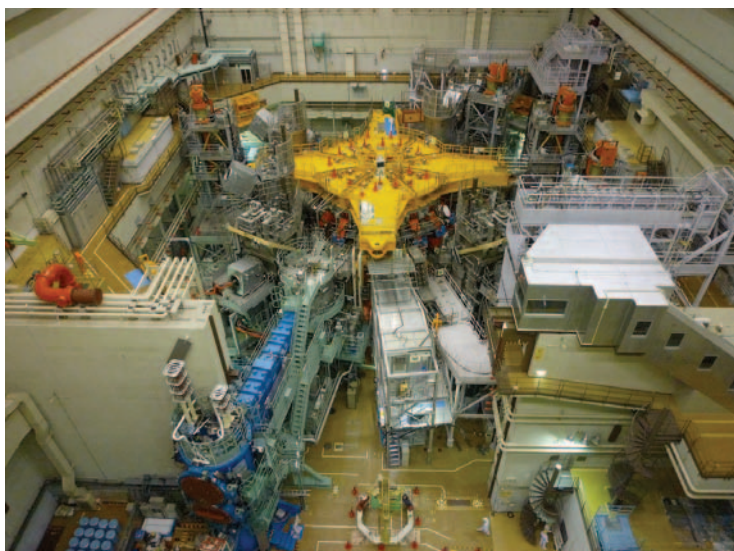
Upgrading of existing Inverter Building for N-NBI



New inverter circuits will be added to the existing acceleration power supply of the negative-ion-based neutral beam injector (N-NBI) to extend the rated operating time from 10 s to 100 s while keeping the same power of 500 kV, 64 A. The upgraded inverter building at the Naka site in Japan has been altered in order to install the additional inverter circuits.

News

Disassembly: star-shaped yellow truss removed



The star-shaped yellow truss of the JT-60 experiment at the Naka site was disassembled and removed by the beginning of March, and the VV and the TF coils have now been disassembled. Welded lower parts of the TF coils will be cut, and two NBI tanks will be taken out.

Meetings

Design Review Meetings on HTS-CL and on Cryogenic System



3rd Design Review Meeting on Cryogenic System

On 29 March, the 2nd Design Review Meeting (DRM) of the High Temperature Superconductor Current Lead (HTS-CL) was held by video conference, and 10 experts in total attended the meeting remotely from Germany (KIT: Karlsruhe Institute of Technology and F4E: Fusion for Energy) and Japan (Naka Fusion Institute). The main issues of the meeting, the seismic analysis and interface issues, were discussed and mostly resolved at the meeting, and it was agreed that KIT, the contributor of the HTS-CL, would launch the procurement process.

The 3rd DRM of the Cryogenic System was also held by video conference on 12 April, and 14 experts in total attended the meeting remotely from France (CEA Cadarache), Germany (F4E) and Japan (Naka Fusion Institute). Action items were discussed, and its Technical Specification and Procurement Arrangement were reviewed and mostly agreed among the experts.

Meetings

11th Technical Coordination Meeting



From 13 to 14 April, the 11th Technical Coordination Meeting (TCM-11) was held by video conference. It was originally

scheduled to be held at the Naka site. However, due to the great earthquake, the meeting was held using video conferencing by limiting its scope to the urgent matters and hence rearranging the duration of each session. The Integrated Project Team members concerned, 75 in total, attended the meeting remotely from Germany (F4E and KIT), France (CEA Cadarache and Grenoble), Spain (CIEMAT: Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas), Italy (Consorzio RFX, ENEA: Italian National Agency for New Technologies, Energy and Sustainable Economic Development) and Japan (Naka Fusion Institute).

The results of the DRMs on the HTS-CL and Cryogenic System were reported and discussed further at TCM-11. The following issues for example were also reported and reviewed at the meeting: gravity supports of the TF coil, latest procedure for the TF coil assembly, basic policy of grounding for the equipment in the Torus Hall, structural analyses of the Cryostat and VV, detailed designs of the Power Supplies and test results of circuit breakers, following which interfaces among the components were carefully examined.

World of Fusion – Belgium

Belgian fusion R&D and the skills for manufacturing large fusion equipment

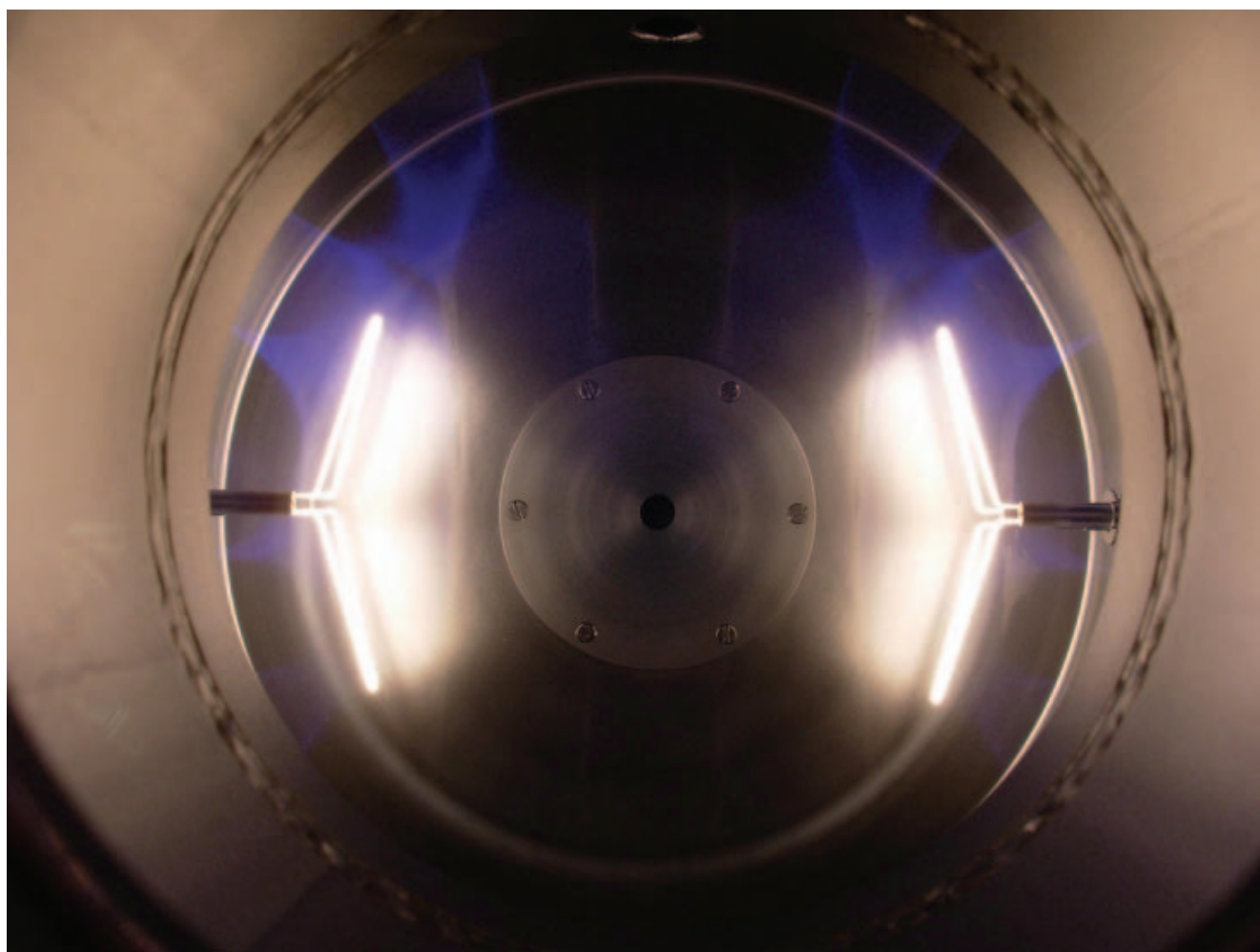


Figure 1: Plasma chamber of the Plasmatron VISIONI used for studying plasma-wall interaction effects on target materials, in tritiated plasma and on toxic or radioactive materials (courtesy of SCK•CEN)

Belgium has been participating, for more than 40 years, in fusion energy development, mainly through the Association Euratom - Belgian State grouping the labs involved in plasma physics and fusion technology research. Within this Association, the Royal Military Academy has developed very important skills in plasma heating and in particular in ICRH, involving experiments in TEXTOR and JET. ULB's (Université Libre de Bruxelles) research is mainly oriented towards MHD studies as well as liquid metal flow computations for various fusion applications. Finally the SCK•CEN (Belgian Nuclear Research Centre: one of the contributors for JT-60SA) is mostly involved in fusion technology development, with particular emphasis on materials (with a recent further development in plasma wall interaction investigations, see figure1), optical diagnostics and

waste management. SCK•CEN will also be the central organizer of the SOFT-2012 conference which will take place in Belgium.

In 2007 Belgium decided to contribute to the Broader Approach Agreement. Concerning the JT-60SA participation, the company ALM was chosen for its skills and capacity in manufacturing large scientific components, up to 300 t, for use in cryogenic conditions and in high vacuum (they are already involved in space applications, installations for testing of satellites, large telescope infrastructure etc.) and were also involved in fusion: they have manufactured the MAST spherical tokamak vacuum vessel used in the UK. Their skills allowed them also to work for CERN in Geneva, by delivering special cryostats for the ATLAS experiment (see fig.2). Therefore, Belgium and the Belgian industry, are participating actively in the development of this future energy source.

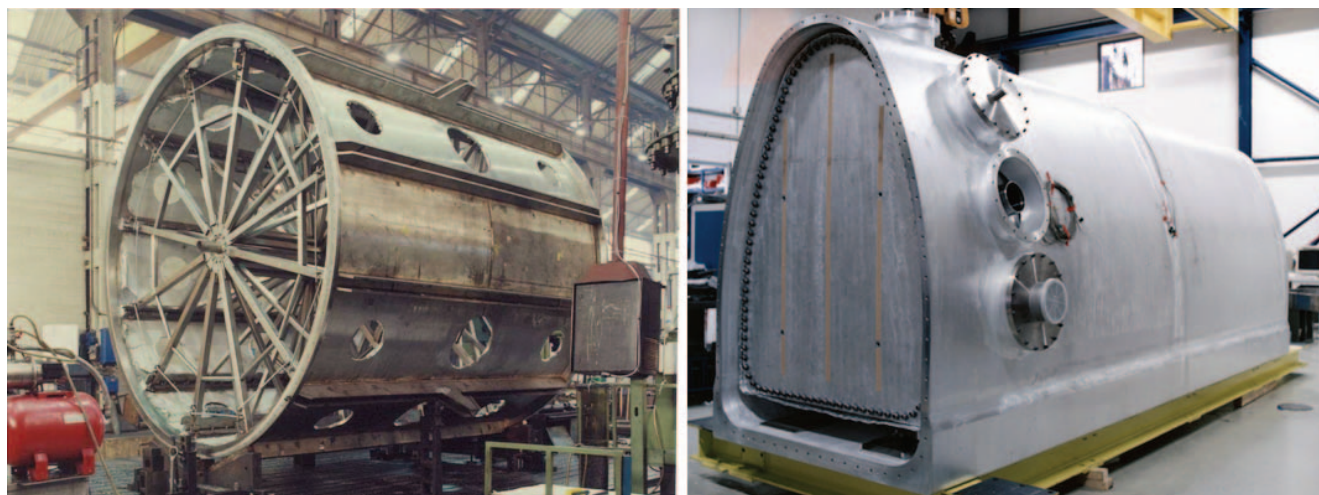


Figure 2: The MAST vacuum vessel during manufacture, and a view of the ATLAS cryostat ready for shipping (courtesy of ALM SA)

Calendar

June 26-30, 2011

38th IEEE Int. Conf. on Plasma Science (ICOPS2011) and 24th Symp. on Fusion Engineering (SOFE2011)
Chicago, USA

June 27-July 1, 2011

38th European Physical Society Conference on Plasma Physics (EPS2011)
Strasbourg, France

September 11-16, 2011

10th International Symposium on Fusion Nuclear Technology (ISFNT-10)
Portland, USA

September 12-16, 2011

22nd International Conference on Magnet Technology (MT-22)
Marseille, France

September 21-22, 2011

12th Technical Coordination Meeting (TCM-12)
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/>