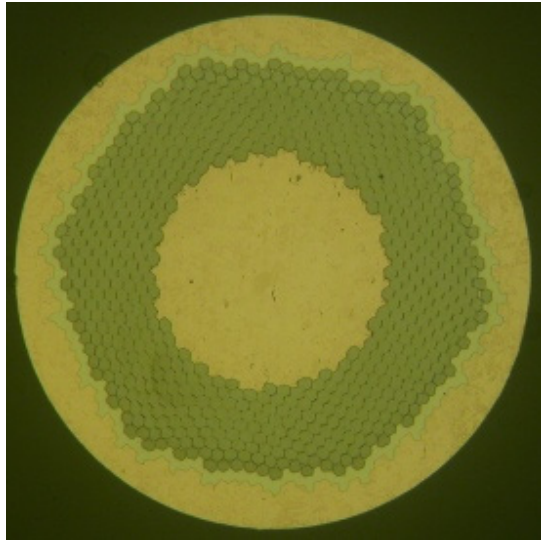
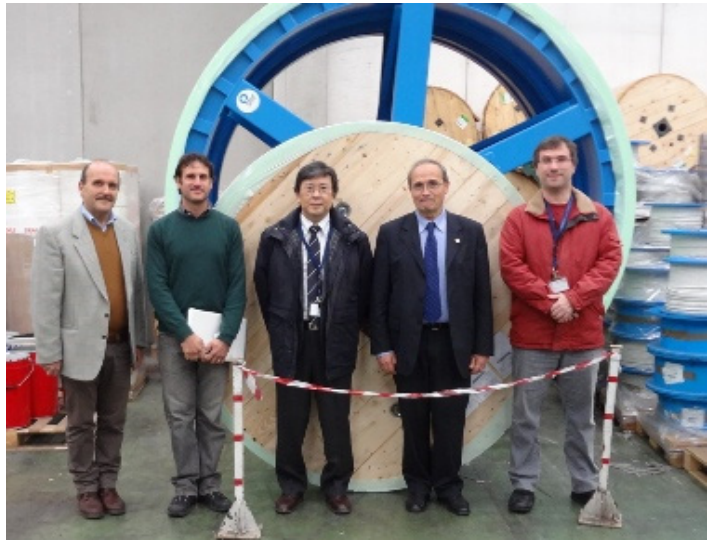


Headline

EU production progressing for TF strand, cabling & jacketing



Cross-section of K006 billet
with monolithic CuNi barrier



TFSL cable (small spool at the back) with ICAS team,
PL and Fusion for Energy technical responsible officer

Fusion for Energy's main direct in-kind contribution to JT-60SA is the complete supply of the toroidal field (TF) conductor to be included in the TF coils.

For the TF strand, after the first billet aimed at validating the NbTi performance, a change was implemented to cope with production problems, switching from a bimetallic CuNi/Cu barrier to a monolithic CuNi barrier design (see the figure on the left above). The first billet with this design was quickly produced, and showed very good performances ($T_{CS} > 6.2$ K in JT-60SA operation conditions). The strand was immediately sent to the cabling company (ICAS, Italian Consortium for Applied Superconductivity) to make the first TF conductor short lengths aiming at manufacturing SULTAN (SUpraLeiter Test ANlage) samples (see the figure on the right above). The first 240 km NbTi manufacturing milestone was passed successfully, and the next 480 km NbTi manufacturing milestone is currently under approval. The total copper production approved is about 2000 km, a little slower than expected due to the need to check RRR (Residual Resistivity Ratio) properties.

For TF cabling & jacketing, ICAS has successfully cabled and jacketed the first two deliverables included in the qualification phase. The first one is the TFQL (TF qualification length, ~100 m including SC strands, for pre-production R&D purposes), the second one is the TFSL (TF SULTAN length, 26 m short length to be used to manufacture two SULTAN samples, to be tested as soon as possible in 2012). Those two lengths were completed on 14 December, and are to be delivered to CEA in France for hydraulic tests (for the TFQL) and assembly into short samples (for the TFSL).

A visit by the JT-60SA Project Leader (PL) took place on 2 December at Tratos premises (Pieve Santo Stefano, Italy), after completion of the TFSL cabling and before the jacketing process.

News

Second 40° sector of vacuum vessel arrives at Naka



Welding of inboard and outboard segments

The inboard and outboard segments forming the second 40° sector of the vacuum vessel were delivered to the JAEA Naka site in November. After the inner surfaces and outer surfaces of the segments were welded, the completed second 40° sector successfully passed a pressure test, an air tightness test, and a helium leak test in December.

News

N-NBI upgraded inverter building completed



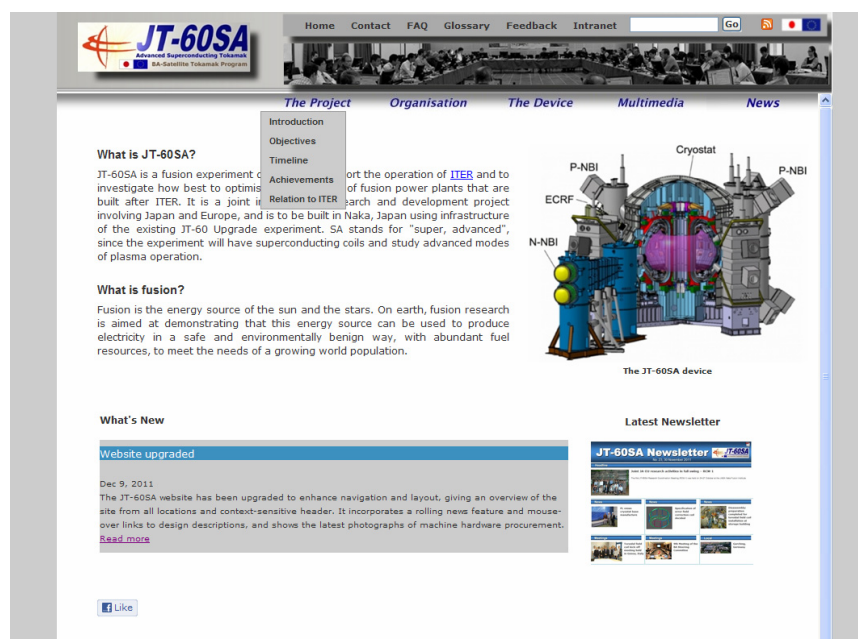
The upgraded inverter building was completed at the JAEA Naka site in December for the upgrade of the power supply system in order to extend the duration of the negative-ion-based neutral beam injector (N-NBI) from 10 s to ~100 s (see Newsletter [No.16](#) and [No.20](#)).

The NBI system to be upgraded for JT-60SA consists of 12 positive-ion-based NBI (P-NBI: #1-6 units for perpendicular beams, #7-8 for counter-tangential beams, #9-10 for co-tangential beams) units and one N-NBI unit. In JT-60SA, the beam

line of the co-tangential N-NBI unit is shifted downwards from the equatorial plane by $\sim 0.6\text{m}$ to drive off-axis plasma current, and hence to produce a reversed magnetic shear profile with a high bootstrap current fraction for a long duration.

News

JT-60SA website upgraded



As a result of a collaborative effort between the EU Home Team headquarters and the Project Team the JT-60SA website with a new appearance was launched on 9 December.

The website has been upgraded to improve the navigation with drop-down menus on mouse-over, to give an overview of the site on all of the pages. The main page has been redesigned to better fulfil the needs, having a direct link to the latest newsletter, and including a rolling „What’s new“ section. The new header contains context-sensitive photographs to enhance the user experience.

The technical part has also been updated. The picture of JT-60SA now contains labels which link to the design descriptions when the user places the mouse over the component. Recent photographs of machine hardware procurement have also been added.

If you are a Facebook user and like the website, feel free to click on the Facebook “Like” button on the main page to help increase the site’s visibility.

We hope that users will enjoy the new website, and will be encouraged to give feedback for its further development.

Meetings

13th Technical Coordination Meeting held in Karlsruhe, Germany



The 13th Technical Coordination Meeting (TCM-13) was held at Karlsruhe Institute of Technology (KIT) from 6 to 7 December 2011. 79 experts in total (46 from the EU Home Team, 22 from the JA Home Team, 5 from the Project Team, and 6 invited attendees) participated in the meeting including some experts from France, Germany, Italy, Japan and Spain via videoconference.

The Project Leader emphasized that the JT-60SA project would enter the “assembly phase” after delivery of the cryostat base to the JAEA Naka site in December 2012. Present status and issues on each component were reported including the results of the Design Review Meetings on the cryostat base, magnet power supply and toroidal field coil held prior to the TCM-13. Updates were agreed to the Action List, and Plant Integration Document. After the TCM-13, the participants joined a technical tour at KIT, and visited major facilities including the Cryogenic Material test facility Karlsruhe (CryoMaK), the Current Lead Test facility Karlsruhe (CuLTka) which is under construction for the test of the high-temperature superconductor current leads (HTS-CLs), the Tritium Laboratory Karlsruhe (TLK), and the Test facility for the ITER Model Pump (TIMO).

The date of the next TCM (TCM-14) was confirmed as 18 and 19 of April 2012 at the Naka site. The TCM-15 will be held in September 2012 at Consorzio RFX in Padua, Italy.

Meetings

Design Review Meetings



2nd Design Review Meeting on the toroidal field coil

The 8th Design Review Meeting (DRM) on the superconducting magnet power supply was held by videoconference on 14

November with attendance of 15 experts from Germany (Fusion for Energy), Italy (ENEA and Consorzio RFX), France (CEA) and Japan (Naka Fusion Institute). The results of the thermal analysis performed on reference current waveforms proposed during the TCM-12 were presented, and it was agreed to adopt them into the technical specifications.

On 5 December, before the TCM-13, the 2nd DRM on the toroidal field (TF) coil was held at Karlsruhe Institute of Technology (KIT) by videoconference, and over 30 experts attended the meeting, and the detailed designs for the gravity support and intercoil structures, and overall structural assessment and thermo hydraulic analysis, were discussed.

Local

Karlsruhe, city of research and justice



Karlsruhe is located in the south-west of Germany in the Rhein-valley. It is one of the warmest and sunniest places within Germany, located between the Black Forest, the French Alsace region and the hills of Pfalz (60 km south of Heidelberg).

Key figures

- Karlsruhe was founded approx. 300 years ago by Markgraf Karl Wilhelm of Baden
 - Karlsruhe is well known for unique architecture and green suburbs close to the city
 - Population 300,000
 - Domicile of the highest court of justice in Germany
 - City of science and invention
-
- ✧ Karl Drais invented the bicycle principle in Karlsruhe in 1817
 - ✧ Founding of Polytechnic school in 1825 in Karlsruhe, later converted to the University of Karlsruhe
 - ✧ Heinrich Hertz showed the existence of electromagnetic waves in 1886 in Karlsruhe
 - ✧ Carl Benz invented the automobile in 1888 in Karlsruhe
 - ✧ Founding of Nuclear Research Centre Karlsruhe 1956, later converted to the multidisciplinary research centre Forschungszentrum Karlsruhe
 - ✧ Merge of the University of Karlsruhe and Forschungszentrum Karlsruhe in 2009 forming KIT (Karlsruhe Institute of Technology)
 - ✧ Currently 30000 students in 8 high schools within Karlsruhe, and currently 17000 students within KIT

United into the Future – Karlsruhe Institute of Technology (KIT), the Merger of Universität Karlsruhe and Forschungszentrum Karlsruhe

Karlsruhe Institute of Technology (KIT) is the merger of Forschungszentrum Karlsruhe GmbH and the Universität Karlsruhe (TH). The two partners of equal strength have merged into KIT with 9000 employees and an annual budget of €732M.

KIT is an institution with two missions, the mission of a state university with research and education, and the mission of a research centre of the Helmholtz Association with programmatic provident research. KIT's three defined tasks are research, teaching, and innovation.

Research

By tradition, research is structured differently at the two institutions forming KIT. Nevertheless, it has one common feature: it is mainly based on the skills and knowledge of the scientific and technical employees. In KIT, scientists now work in fields of competence depending on their expert know-how, which is bundled in six areas:

Matter and Materials; Earth and Environment; Applied Life Sciences; Systems and Processes; Information, Communication and Organization; Technology, Culture, and Society.

In dedicated KIT Centres, research projects are taking place in the fields of:

Energy; NanoMicro; Elementary Particle and Astroparticle Physics; Climate and Environment and Mobility Systems. In addition COMputation, Optics and Photonics, Humans and Technology and Anthropometrics and Robotics are main topics.

Teaching

Teaching and the promotion of young scientists are at the focus of KIT. As a result of the joint competence portfolio, the number of scientists and engineers available for teaching has increased. Promotion of young scientists at KIT starts already during their studies. The students are introduced to (large) research projects in research- and application-driven teaching modules very early during their studies.

Innovation

KIT innovation starts with the classical transfer of research and development results to application and innovative products, for example by cooperation with industry. In addition, spin-offs are supported. In the past ten years, Forschungszentrum and Universität founded more than 250 start-ups, of which only 10% were not successful. Another major component is a career service, the transfer of persons with pertinent know-how from research to industry and vice versa.

KIT contribution to JT-60SA

The Institute for Technical Physics (ITEP) in KIT has designed the CS, TF and EF High Temperature Superconductor Current Leads (HTS-CL) for JT-60SA. During 2012 all necessary materials will be procured to build the HTS-CL starting in 2013. Using a short circuit jumper that will be constructed by JAEA, the current leads will be tested within KIT in 2013 - 2015.



Karlsruhe with Castle in the center



KIT Campus South with castle in background



Karlsruhe Castle

Calendar

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

May 14-18, 2012
International Cryogenic Engineering Conference 24-International Cryogenic Materials Conference 2012
(CEC 24 - ICMC 2012)
Fukuoka, Japan

July 2-6, 2012
39th European Physical Society Conference on Plasma Physics & 16th International Congress on Plasma Physics
(EPS/ICPP)
Stockholm, Sweden

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/>