

Headline

Every piece of ENEA SCMPs now at Naka site



Figure 1: With the delivered ENEA SCMPs upon receipt at the QST Naka site

The superconducting magnet power supplies (SCMPs) for the central solenoid (CS) modules 1 to 4, equilibrium field (EF) coils 1, 6, and fast plasma position control (FPPC) coils are procured by ENEA through a contract with POSEICO-JEMA, a temporary joint venture between Poseico S.p.A. (Italy) and Jema Energy S.A. (Spain). While installation activities, started in October 2017, were proceeding well at the QST Naka site, several important pieces were still missing. In fact, after having passed the Factory Acceptance Test in May 2017, the CS2, 3 and EF1, 6 PSs were still waiting to be sent to Naka.

However, finally, in October 2017 the above-mentioned PSs left Genoa for Japan. And, it was on 13 December 2017, a beautiful sunny day with a clear view of Mt. Fuji from Tokyo, when F4E and QST representatives attended the reception of 5 containers, containing a total of 37 crates, at Yokohama port (Figure 2).

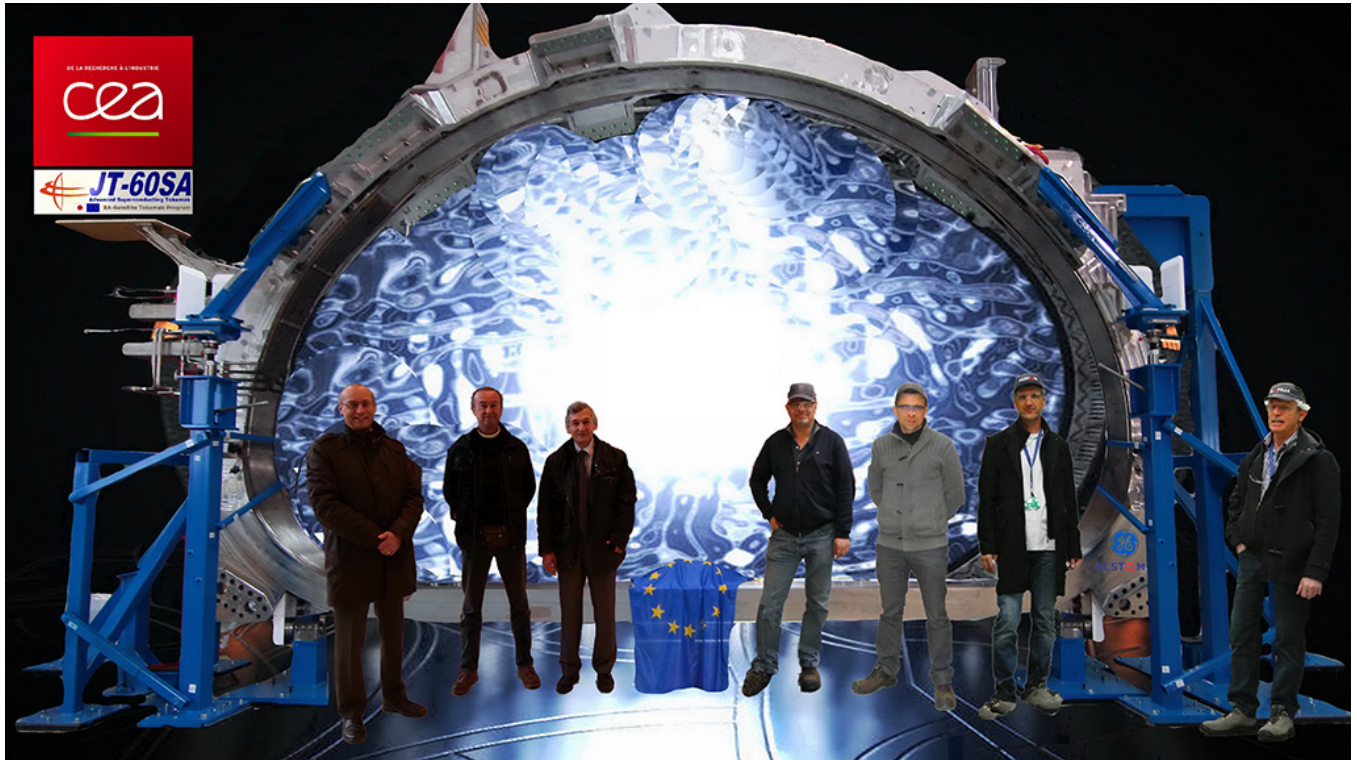
The box reception was performed in a smooth manner, and all crates were inspected with no particular issue highlighted. The excellent job performed by the inland transportation contractor made it possible to have the crates safely delivered to the Naka site over the following 2 days. A small welcome ceremony was then conducted (Figure 1).

These shipments essentially complete the delivery of all SCMPs procured by ENEA. The crates have already been unpacked, and the newly arrived equipment is ready for installation.



Figure 2: F4E and QST representatives in the box reception area at Yokohama port

Last French TF coil passes gateway for cold testing



Composite photo of the last French TF coil likened to Stargate device (film) with the CEA TF coil team



TF coil - "Annie" -, the first TF coil manufactured by CEA-GE and delivered to Japan in July 2016

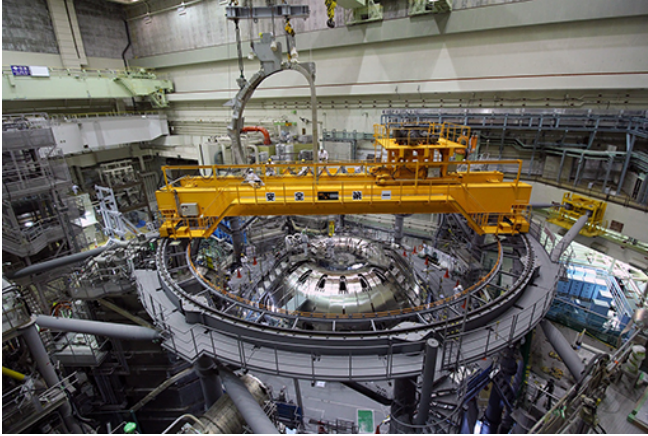
And now 10! Mission completed!

On 12 December 2017, the 10th and last^[1] French toroidal field (TF) coil, to be assembled into the JT-60SA superconducting tokamak in Naka, Japan, left the workshop of General Electric (GE, formerly Alstom S.A.) in Belfort, France. Just like her 9 sisters who set off on their journey before her, this coil travelled to CEA Saclay where she will be tested under nominal operating conditions, that is, an operating temperature of 4.5 K (-268.5°C) and a current of 27.5 kA, in the dedicated cold test facility. All members of the CEA team expect that this coil, like the preceding ones, will fully satisfy the final acceptance criteria, which also include securing the required operating temperature margin to be measured in a resistive transition test (a so-called "quench test"). The proper operation of those coils is the foundation of the future success of JT-60SA.

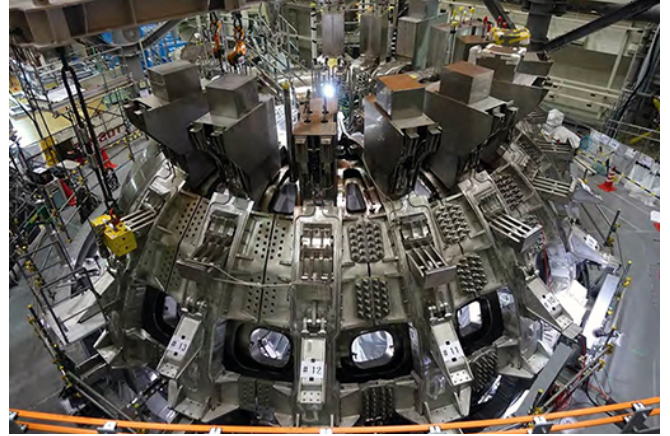
What is about to be completed in the days to come is also the fulfillment of a technical and human commitment over more than 10 years encompassing many stages of the development of specifications, design, contracting with the manufacturer, definition, qualification and validation of the manufacturing processes, and establishment of a very demanding quality control system before manufacturing started in December 2013.

Very close ties of mutual trust and friendship have been built over the years among QST (ex. JAEA), F4E, CEA and GE teams. And the team members have an element of regret about turning the page on an activity that, for some, covers almost a quarter of their career. However, each actor in this great technical and organizational success can legitimately be proud of having made a major contribution to the research and development of controlled fusion, with a strong feeling of having opened a new gateway towards the stars.

[1] The remaining TF coils are manufactured in Italy by ENEA-ASG Superconductors S.p.A .



Installing the TF coil - "Annie" - on the JT-60SA torus in December 2016



12 TF coils (including both French and Italian) have already been installed so far

News

13th TF coil delivered to Naka site



Figure 1: Panel of the TF coil - "Sandra" - displayed in the entrance hall of the JT-60 control building



Figure 2: Unloading - "Sandra" - at the QST Naka site



Figure 3: "Sandra" stored in the engineering experiment building



Figure 4: Mounting - "Sandra" - on the JT-60SA torus

The 13th toroidal field (TF) coil - "Sandra" (coil #8 in the overall TF coil numbering system of JT-60SA, produced by ASG Superconductors s.p.a under contract to ENEA as Italian contribution) - was delivered to the QST Naka-site on 12 December 2017 (Figure 2).

After the acceptance tests carried out in the engineering experiment building (Figure 3), it was transported to the assembly hall, then to the torus hall, and finally mounted on the JT-60SA torus at the end of December 2017 (Figure 4).

News

Large current feeder construction updates



Figure 1: Safety fences mounted around the feeders

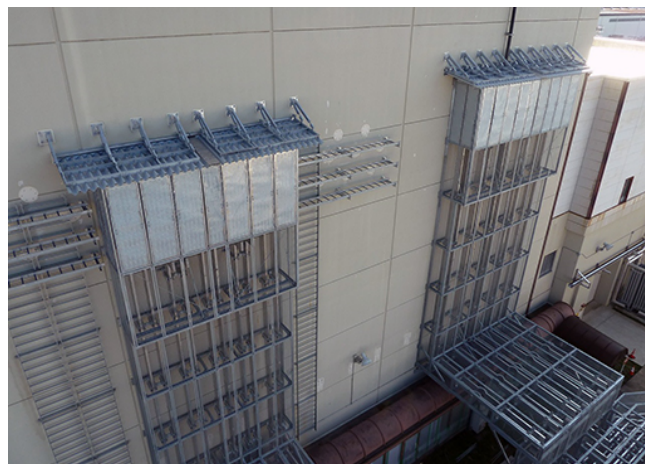


Figure 2: Eaves and panels covering the wall penetrations



Figure 3: Existing windows to be used as feedthroughs

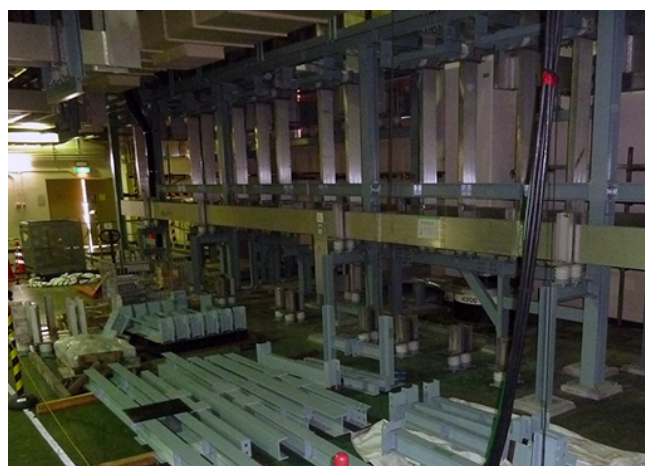


Figure 4: Feeder frames being assembled

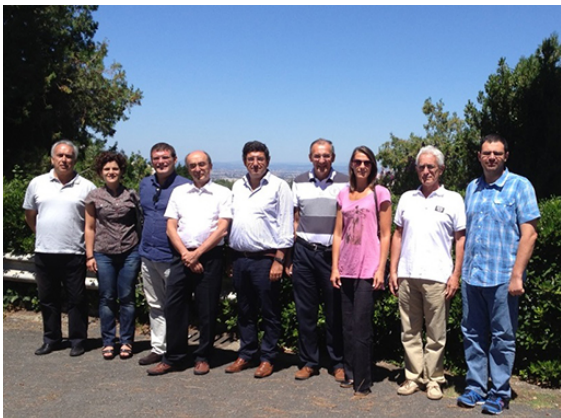
Subsequent to the installation of the outdoor DC feeders for the poloidal field (PF) coils, which run horizontally on the ground between the rectifier building and the JT-60 main building and climb vertically the main building wall, those feeders were covered by safety fences. In addition, the wall penetrations were hooded against the weather by eaves and side panels (Figure 1 and 2, also see the previous figures).

Inside the rectifier building, the outdoor feeder is being joined to the feeder which was extended to the ground floor wall in the phase 1 construction carried out up to February 2016. The existing panes in the south windows were removed so the windows could be used as feedthroughs. Now, the feeder ends are being joined by welding and the feeder frames are being assembled.

The construction work, including many supplemental tasks, is being steadily carried out with a view to completion in early 2018.

Meeting

Design review meeting for ENEA SCMPs



Memorable picture taken during the contract kick-off meeting in Frascati, Italy in August 2013



During the converter factory test at JEMA laboratory in July 2016

One of the final design review meetings (DRMs) for the superconducting magnet power supplies (SCMPs) procured by ENEA was held on 11 December 2017, with this procurement being substantially completed.

The recent arrival of the last converters for the equilibrium field coil 1, 6, and central solenoid 2, 3 modules, to the QST Naka site in Japan represented the crowning achievement of an effort started in August 2013 with the signature on the contract between ENEA and POSEICO-JEMA, a temporary joint venture between Poseico S.p.A. (Italy) and Jema Energy S.A. (Spain), for the procurement of 8 power converters and 6 power transformers.

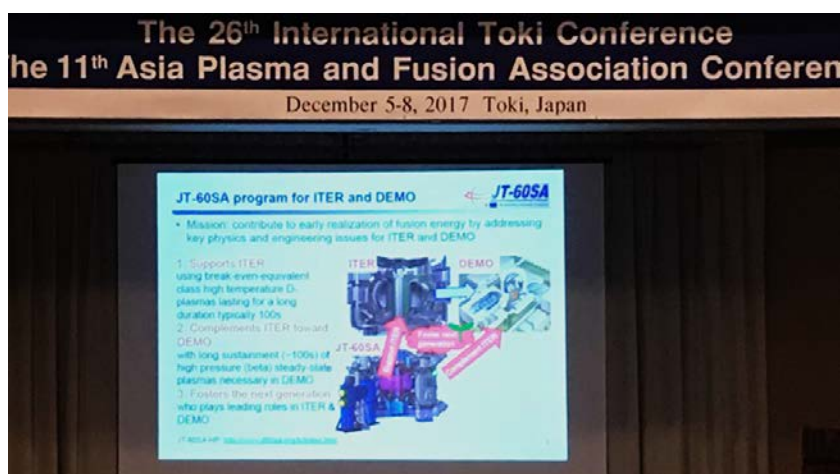
During these 4 years, many documents were produced through the design, manufacturing and factory test phases etc. More than 300 main documents, without taking the countless annexes and technical drawings into account, need to be included in the Acceptance Data Package (ADP), which has to be checked and approved before the contract completion.

To verify the updates in and proper preparation of this huge pile of documents, this dedicated DRM was held via videoconference with the participation of POSEICO-JEMA, ENEA, F4E, and QST representatives.

The documentation list was discussed and the preparation status of each document was verified, highlighting the necessary adjustments needed for the finalisation of the ADP, which took place in January 2018.

Meeting

26th International Toki Conference and 11th Asia Plasma and Fusion Association Conference



T. Suzuki making his invited talk

The joint conference between the 26th International Toki Conference (ITC) and the 11th Asia Plasma and Fusion Association (APFA) to explore the new era in plasma and fusion research was held in December 5-8 2017, Ceratopia Toki, Toki-city, Gifu, Japan. Over 200 participants attended the conference. There were 4 plenary talks, 18 invited talks, 11 oral talks and 219 poster presentations.

T. Suzuki from QST presented an invited talk entitled “Research activities for JT-60SA to challenge issues in the ITER and DEMO eras”, explaining the research activities that the JT-60SA team will perform in order to address issues related to ITER and DEMO operation. Amongst others, he showed a numerical simulation of real-time control of steady-state high-beta plasma in JT-60SA, using the integrated code TOPICS, as well as heat-load mitigation by seeding argon (Ar) gas under a constraint posed by the steady-state high-beta requirement, using the integrated code SONIC in JT-60SA. The talk was well received by the audience, especially the speaker’s message that JT-60SA operation is coming soon. A lively discussion followed the talk.

In total 2 contributions from the JT-60SA JA Home Team were presented, as follows (only presenters and titles are shown):

- Invited presentations (1)
T. Suzuki, Research activities for JT-60SA to challenge issues in the ITER and DEMO eras.
- Poster presentations (1)
M. Takechi, Optimization of Magnetic Sensor Configuration for JT-60SA Plasma Control.

Local

TOKAI - make a wish - ILLUMINATION



Tokai village neighbours Naka city where the QST Naka site is. “TOKAI - make a wish - ILLUMINATION” is being organised at a square near JR Tokai station by the Tokai village society of commerce and industry.

This event marked its 3rd anniversary this year and is displayed from 2 December 2017 to 17 February 2018 this time. The constructions in the square are beautifully illuminated with countless LED bulbs from dusk until midnight.

More people come and go to the station in the new year holiday season. So, they can stop by and enjoy beautifully coloured objects for a moment. Strips of paper are prepared and visitors can write and display their shiny wishes there.

Because 2018 is the year of the dog in the traditional calendars of eastern Asian countries, the bottom right photo is rather appropriate. In those countries including Japan, it is said that the year of the dog means late autumn, the harvesting season, in the 12-year-cycle. This augurs well for the achievements of the JT-60SA project this year.

Calendar

7 March 2018
22nd Meeting of the STP Project Committee (PC-22)
Naka, Japan

26 April 2018
22nd Meeting of the BA Steering Committee (SC-22)
Naka, Japan

1 - 6 July 2018
45th European Physical Society Conference on Plasma Physics (EPS 2018)
Prague, Czech Republic

27 - 28 June 2018
30th Technical Coordination Meeting (TCM-30)
Naka, Japan

16 - 21 September 2018
30th Symposium on Fusion Technology (SOFT 2018)
Giardini Naxos, Italy

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 newsletter@jt60sa.org.

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