

## Headline

### TF coil - “Roberta” - arrives at Naka site

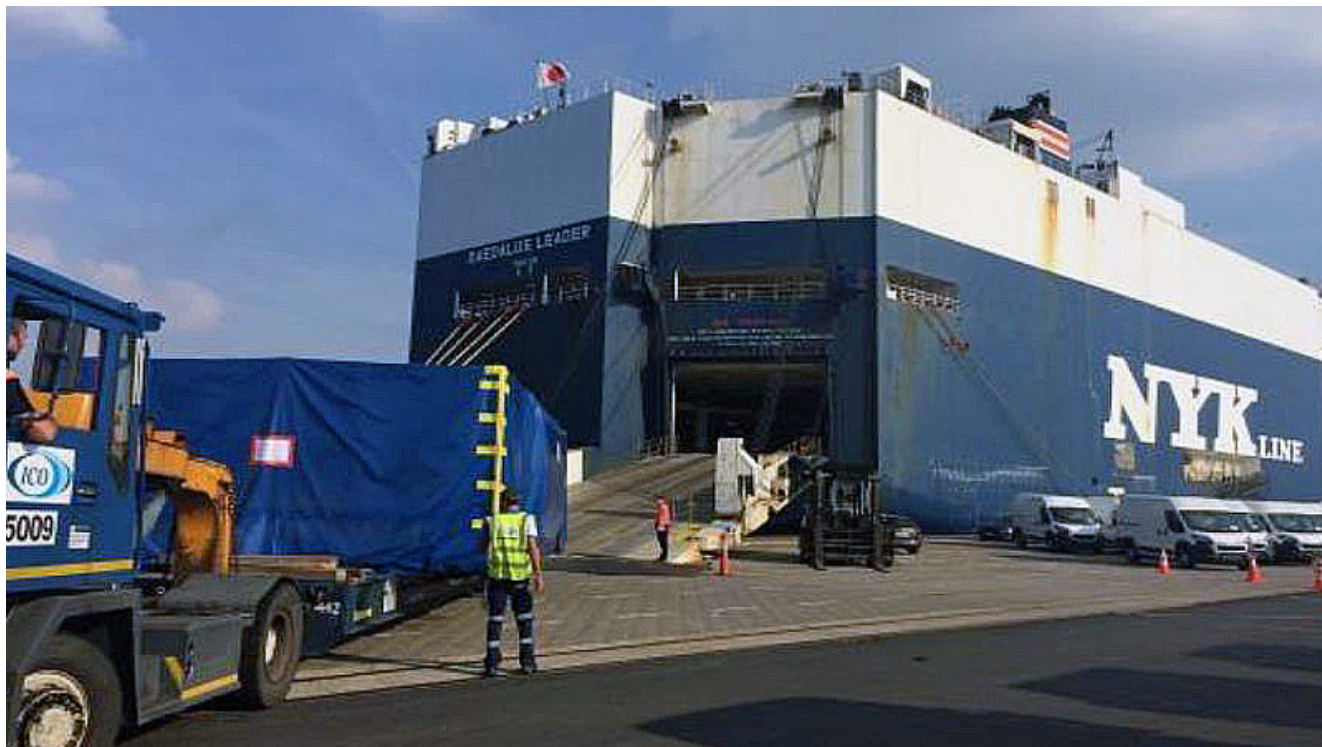


Figure 1: Loading the first TF coil produced by ENEA/ASG on board at the port of Zeebrugge

On 15 November 2016, the first toroidal field (TF) coil of the Italian in kind contribution to the JT-60SA project arrived at the JT-60SA site in Naka, Japan.

Coil number 1 (in the overall TF coil numbering system of JT-60SA) is one of the 18 D-shaped superconducting coils which together constitute the toroidal magnet system of the JT-60SA tokamak, and whose supply is shared between Italy and France under the coordination of F4E. It is composed of a winding pack (WP) inserted in a stainless steel casing and an outer intercoil structure (OIS) mounted on its curved part. Its WP and casing were provided by ENEA through contracts respectively with ASG Superconductors S.p.A. (ASG) and Walter Tosto S.p.A. in Italy, whereas its OIS was provided by CEA through a contract with SDMS technologies in France.

The delivery of the coil 1 represents an important milestone in the contract ENEA made with ASG in 2011. The first WP, which has been enclosed in this coil, was completed at ASG in autumn 2014, the subsequent casing integration activity started with the casing delivery to ASG in spring 2015, and the coil was finally completed in March 2016. Based on the experience acquired in each step in the coil 1 production and integration, the rest of the Italian coil contribution, consisting of 8 production plus 1 spare coils, is foreseen to be produced smoothly.

Coil 1 was sent to the TF coil cold test facility at CEA Saclay in France for the cryogenic acceptance tests in April 2016, where it underwent a quench test and a nominal current plateau test to measure the internal joint resistance. It was then named “Roberta” after passing the tests successfully.

Roberta was then packed and shipped to Japan from Zeebrugge, Belgium on 21 September 2016 (Figure 1). She travelled through the Atlantic and then the Pacific Oceans, and finally arrived at Hitachi port in Japan on 9 November 2016.

She was safely placed in the engineering experiment building at the QST Naka site on 15 November (Figure 2), and underwent incoming acceptance tests. She is now in preparation for assembly on the JT-60SA tokamak.



Figure 2: TF coil 1 - "Roberta" - arrived at the QST Naka site

## News

### TF coil - "Annie" - stands up



The ownership of the first toroidal field (TF) coil of the French in kind contribution to the JT-60SA project (TF coil 10 - "Annie" - produced by CEA/GE) was transferred from F4E to QST on 24 October 2016.

Subsequently, it was moved from the engineering experiment building to the JT-60 assembly hall at the QST Naka site. Then, it was stood up with a special jig, as shown in the figure, on 19 November 2016. Annie kept her shape with high accuracy even when orientated vertically.

This marked one of the most important milestones for the project, giving a green light for the first installation of a TF coil on the JT-60SA tokamak.

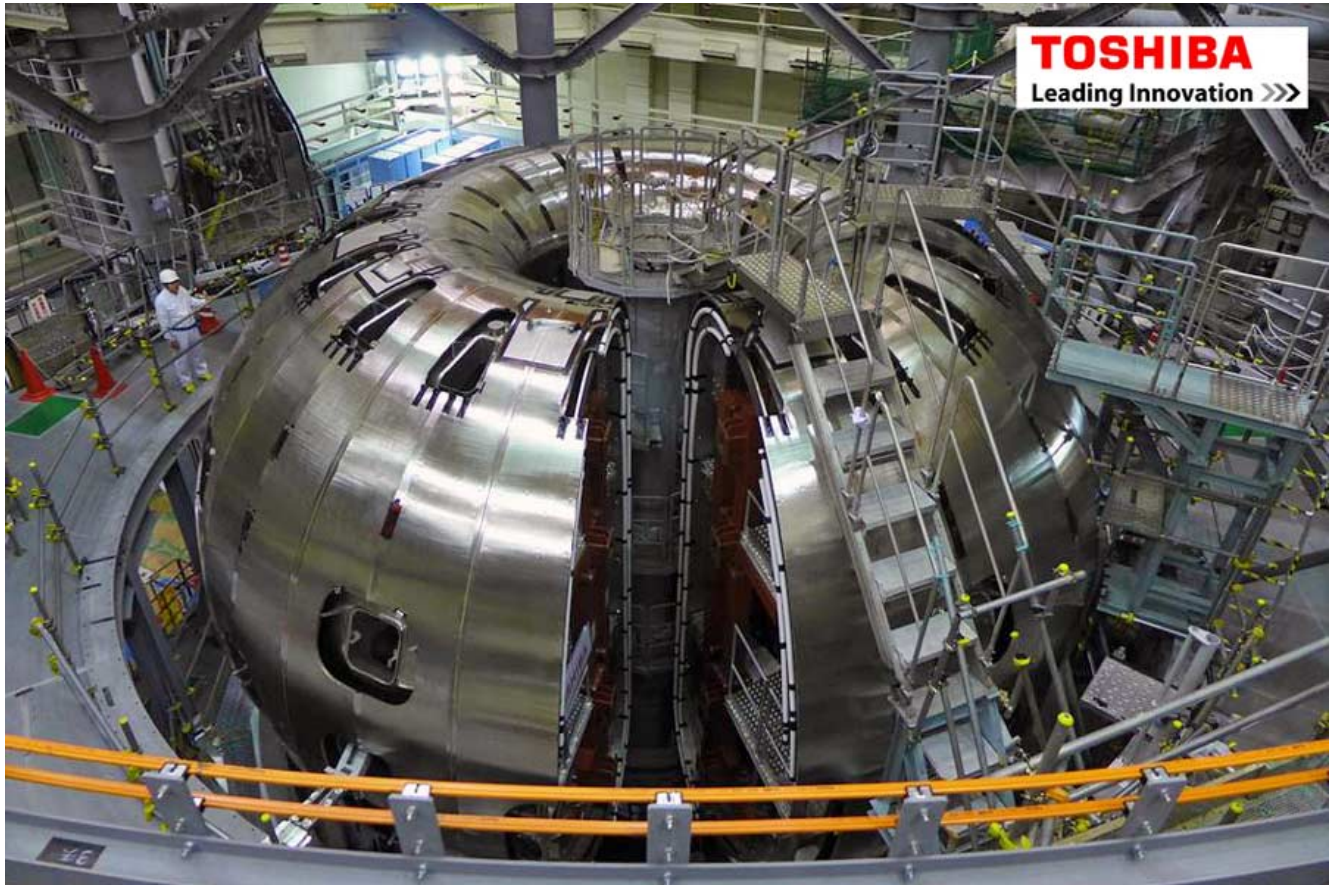
The installation of Annie was successfully carried out on 20 December 2016. This achievement will be reported in the next newsletter.

TF coil - "Annie" - standing in the JT-60 assembly hall



## News

### Vacuum vessel thermal shield assembly completed



Completed 340° VVTS sector

The assembly of the vacuum vessel thermal shield (VVTS) 340° sector was completed on 30 November 2016.

The 360° VVTS torus consists of eighteen 20° sectors. Each sector, except the final 20°, has been connected with the adjacent sector with couplers attached to the VVTS body with welding. Then, the gaps between the sectors were covered with thin stainless steel sheets (radiation cover sheets) from inside and outside.

The 20° space for the final VVTS sector will be used for the insertion of the toroidal field (TF) coils. The VVTS is now ready for the assembly of the TF coils.

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## News

### VIPs visit QST Naka site

In October 2016,

- Ms. Meera Venkatesh, Director, Division of Physical and Chemical Sciences, Department of Nuclear Sciences and Applications, IAEA (19 October 2016);
- Mr. Ikuo Sasaki, Vice Governor of Aomori prefecture, Japan (25 October 2016);
- Mr. Adam Cohen, Deputy Under Secretary for Science and Energy, U.S. Department of Energy,  
Mr. Jonathan Margoils, Deputy Assistant Secretary for Science, Space, and Health, Bureau of Oceans and International Environmental and Scientific Affairs, U.S. Department of State (31 October 2016),

visited the QST Naka site to see the progress of JT-60SA construction, which has been supported by European and Japanese collaboration.

Representatives of QST and F4E welcomed and guided them on a tour of the JT-60SA device and components under assembly, such as the vacuum vessel (VV) and VV thermal shields in the torus hall, the equilibrium field coils in the superconducting coil winding building, the toroidal field coils in the engineering experiment building, the cryogenic system in the compressor building and cryogenic hall, and the magnet power supplies in the rectifier building.





Ms. Meera Venkatesh (left) & her husband



Mr. Ikuo Sasaki



Mr. Adam Cohen (left) and Mr. Jonathan Margoils

## Meeting

### 26th Technical Coordination Meeting held in Naka



Group photo in front of TF coil 11 - "Brigitte" - in the engineering experiment building

The 26th Technical Coordination Meeting (TCM-26) took place on 9 and 10 November 2016 at the QST Naka Fusion Institute. A total of 61 experts attended the meeting in person or via videoconference: 23 from the EU Home Team (France, Germany, Italy and Spain), 30 from the JA Home Team (JA HT), 6 from the Project Team, and 2 invited from Japan.

At the beginning of the meeting, H. Shirai, the Project Leader (PL) of the Satellite Tokamak Programme (STP), explained the results of the 19th meeting of the STP Project Committee (STP-PC 19) held in October 2016, the Work Programme 2016, the overall project progress, and so forth. He also expressed satisfaction with the successful achievements and steady progress in both EU and JA procurements, in particular the delivery of the toroidal field (TF) coils to the Naka site.

During the meeting, the status and actions in the following areas were reported and discussed: manufacturing of the in-vessel components, TF coils, cryostat, central solenoid, high temperature superconductor current leads (HTS-CLs), power supply (PS) systems, assembly of the vacuum vessel thermal shields (VVTSSs), commissioning of the cryogenic system, and integrated commissioning and initial operation of the JT-60SA device.

On the first day, a technical tour was organized by the JA HT to inspect assembly of the VVTSSs in the torus hall, installation of the switching network units in the rectifier building, completed cryogenic system in the compressor building and cryogenic hall,



completed equilibrium field (EF) coils and delivered HTS-CLs in the superconducting coil winding building, and delivered TF coils in the engineering experiment building, where the participants took group photos just in front of "Brigitte", which had just been delivered to the QST Naka site as the second TF coil.



VVTs in assembly in the torus hall



HTS-CLs in the superconducting coil winding building



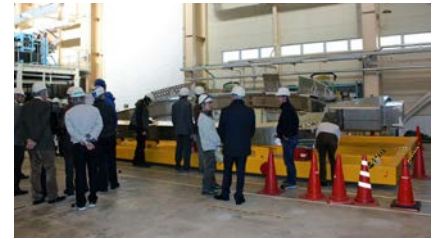
EF coil in the superconducting coil winding building



Hearing about the PS systems in the rectifier building

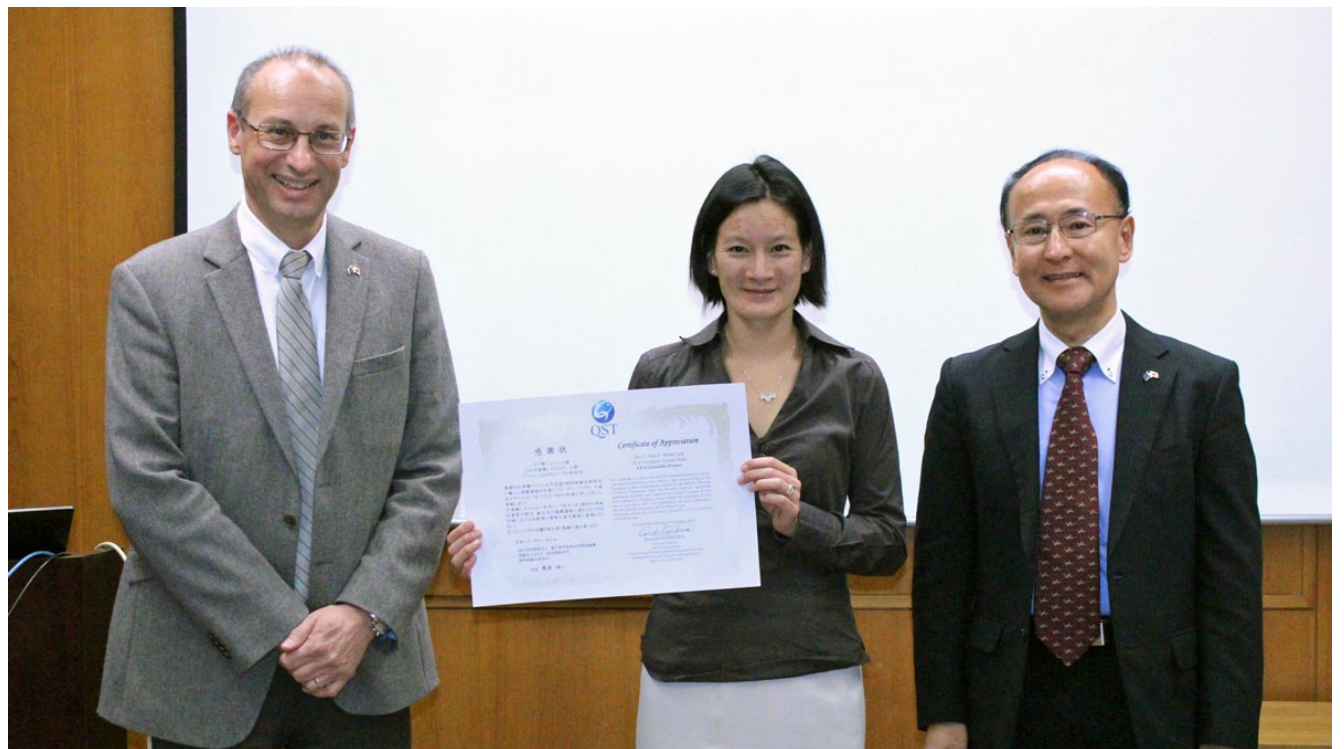


Refrigerators in the cryogenic hall



TF coil - "Brigitte" - in the engineering experiment building

Between the technical sessions, a certificate of appreciation for the completion of the cryogenic system was presented to C. Hoa (centre) on behalf of the CEA Cryogenic System Team by Kenichi Kurihara (right), Director General of the QST Naka Fusion Institute.



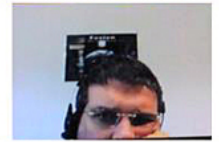
Certificate of appreciation presented to CEA Cryogenic System Team

In the last session of the meeting, the status of Configuration Control Models and the updated Action List were reviewed and discussed.

Finally, the PL announced that the next meeting, TCM-27, would be held in Karlsruhe, Germany on 22 and 23 February 2017, and the TCM-28 would be held in Naka, Japan on 5 and 6 July 2017.

## Meeting

### 3rd Design Review Meeting for switching network units



The switching network units (SNUs) for the central solenoid (CS) of JT-60SA were successfully delivered to the Naka site on 11 October 2016. This important milestone was the last ENEA activity in the procurement of the CS SNUs. In fact, the on-site installation, commissioning and performance of the acceptance tests are not included in the scope of Agreement of Collaboration (AoC) between F4E and ENEA, and such activities are currently being performed directly by F4E.

Before confirming the completion of the ENEA contribution of the CS SNUs, it was necessary to finalise the set of documents issued during the design, manufacturing and factory testing phases, the so-called “AoC Acceptance Data Package” (ADP). For this reason, a formal Design Review Meeting was held on 28 October 2016, with the participation of representatives from OCEM Energy Technology S.r.l. (OCEM, the SNU manufacturer), ENEA, F4E and QST.

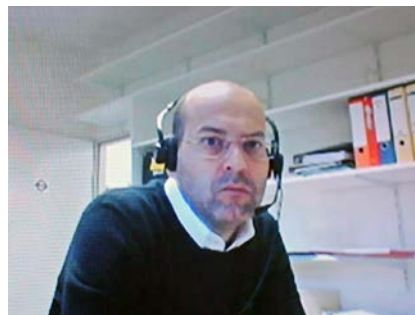
During the meeting, the ADP contents, in particular, the Final Design Report and the Operation and Maintenance Manual, were presented and reviewed. Only minor comments were highlighted at the meeting, and new revisions of the documents, composing the final ADP, were promptly released for formal approval in the few days following the meeting.

At the end of the meeting, the participants expressed their satisfaction with the successful completion of the ENEA activities for the SNU procurement, acknowledging the efforts made by ENEA and OCEM and the good collaboration with F4E and QST.

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## Meeting

### 1st Design Review Meeting for ECRF system components



The Design Review Meeting (DRM) for the electron cyclotron range of frequency (ECRF) system components (DRM-ECRF-SC01) was held at the QST Naka site on 26 October 2016 with 4 experts from the EU and JA Home Teams and 1 expert from the Project Team.

The main objectives of the meeting were to review the draft of the Procurement Arrangement (PA), plan, and design of the ECRF system components including a part of the ECRF transmission line, cooling system, and vacuum pumping system. No issues were raised at the meeting. After the discussion, it was agreed by F4E and QST to proceed with the PA approval process.

QST had a short presentation to report the result of this DRM at the Technical Coordination Meeting held in November 2016.

## Calendar

22 – 23 February 2017  
27th Technical Coordination Meeting (TCM-27)  
Karlsruhe, Germany

21 March 2017  
20th Meeting of the STP Project Committee (PC-20)  
Naka, Japan

27 April 2017  
20th Meeting of the BA Steering Committee (SC-20)  
Rokkasho, Japan

14 – 18 May 2017  
25th International conference on Nuclear Engineering (ICONE 2017)  
Shanghai, China

22 – 26 May 2017  
6th Research Coordination Meeting (RCM-6)  
Naka, Japan

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## Contact Us

The JT-60 Newsletter is released monthly by the JT-60SA Project Team.

Suggestions and comments are welcome and can be sent to [newsletter@jt60sa.org](mailto:newsletter@jt60sa.org).

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