

Headline

Celebration of TF coil assembly start



Figure 1: Group photo of the attendees to the celebration

On 12 January 2017, QST held a “Celebration of the start of the assembly of TFCs for JT-60SA fabricated by French and Italian Contributors” to report the progress of JT-60SA device development and to promote further partnership among the governments, the related organizations, institutes and companies in both Europe and Japan as well as local governments, which strongly support and contribute to the JT-60SA project. More than 120 guests attended (Figure 1). The following people (listed in programme order) delivered speeches:

Mr. Toshio HIRANO	President of QST
Mr. Johannes SCHWEMMER	Director of F4E
Mr. Toshiei MIZUOCHI	State Minister of MEXT, Japan
Mr. Gerassimos THOMAS	Deputy Director-General, DG Energy, European Commission
Mr. Eisuke MORI	Member of the House of Representatives of Japan, Chairman of LDP's union to help promote nuclear fusion R&D (The message read, on his behalf, by the MC)
Mr. Daniel VERWAERDE	Administrator General of CEA, France
Mr. Hiroshi KAJIYAMA	Member of the House of Representatives of Japan
Mr. Domenico GIORGI	Ambassador of the Italian Republic to Japan (The speech given, on his behalf, by Mr. Alberto MENGONI, Science and Technology Attaché, Embassy of Italy)
Mr. Mikito KUSUDA	Vice-Governor of Ibaraki Prefecture, Japan
Mr. Federico TESTA	President of ENEA, Italy
Mr. Toru UMINO	Mayor of Naka City, Ibaraki, Japan

Since the JT-60SA construction started on 28 January 2013, the project has been making steady progress toward the start of fusion plasma experiments. In Japan, the assembly of the 340° vacuum vessel (VV) and vacuum vessel thermal shields (VVTS) were completed at the QST Naka site in August and November 2016, respectively. Those assembly are being carried out by QST through a contract with Toshiba Corporation (Japan). In Europe, a total of 20 toroidal field (TF) coils (10 each for French (CEA) and Italian (ENEA) contributions) are being manufactured. The TF coils, D-shaped superconducting coils to confine plasma, with a height of 7.5 m, a width of 4.6 m and a weight of 22 t each, are one of the major tokamak components. A single coil consists of a winding pack (WP) inserted in a stainless steel casing and an outer intercoil structure (OIS) mounted on its curved part. The WP is composed of 6 double pancakes, each of 12 turns, making 72 turns of niobium-titanium cable-in-conduit conductors, with a total length of 1368 m, supplied by F4E utilising strand produced by the Furukawa Electric Co., Ltd.

(Japan) and cabling/jacketing by the Italian Consortium for Applied Superconductivity S.C.r.l. (Italy). General Electric Company (France) and ASG Superconductor S.p.A. (Italy) manufacture the WPs and integrate into the coil casings provided by ENEA through a contract with Walter Tosto S.p.A (Italy). Then, the coils are delivered to CEA Saclay in France. After the cold test, an OIS, produced by SDMS (France), is mounted to the coil. So far, 5 TF coils have been completed at CEA Saclay, and 4 of them have been delivered to the QST Naka site. 2 of them were installed onto the torus in the past 2 months. In addition, the gravity supports, which will be installed between the coil and cryostat base to support the TF coils, have already been completed by Alsylom (France) and delivered to the Naka site. The celebration was held to congratulate those achievements and to commit to an even more close collaboration among the parties.

After the celebration, representatives of QST and F4E guided the celebration attendees on a tour of the JT-60SA device and support systems, including the VV and VVTSS in the torus hall (Figure 2 and 3), the TF coil and high temperature superconductor current leads (HTS-CLs) in the engineering experiment building (Figure 4), and the cryogenic system in the cryogenic hall and compressor building (Figure 5 and 6).

In the evening, a party was held and the attendees deepened their mutual friendship (Figure 7 and 8).

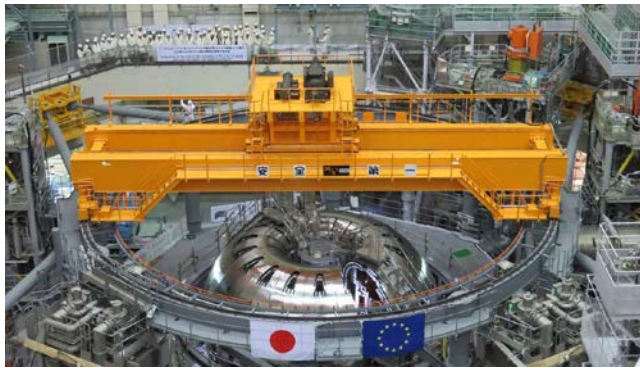


Figure 2: Overlooking the 340° torus in the torus hall



Figure 3: Participants in the torus hall tour



Figure 4: With the TF coil - "Cécile" - and HTS-CLs



Figure 5: With a refrigerator of the cryogenic system



Figure 6: VIPs signed on the memorial panel for the cryogenic system completion



Figure 7: Participants in the party



Figure 8: Making a wish for the project success

News

TF coil assembly started



Figure 1: First TF coil (coil 10) lift

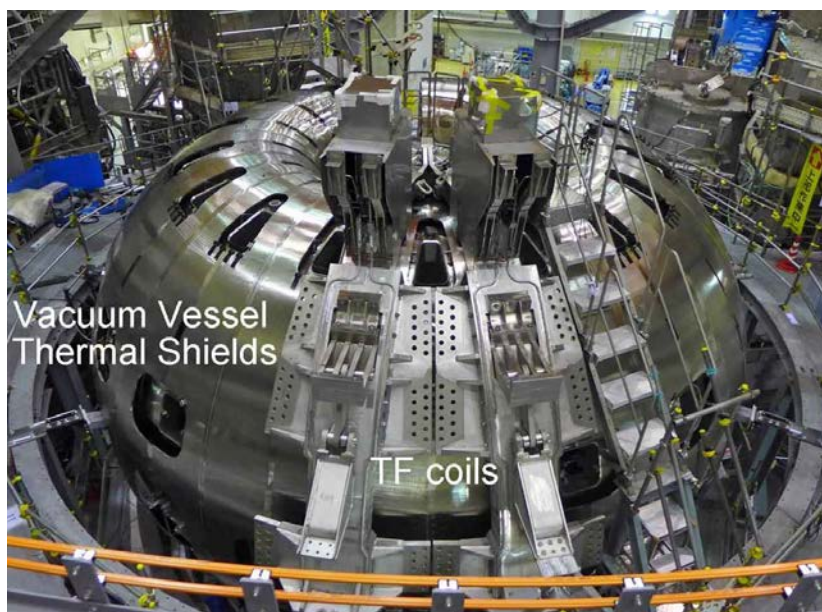


Figure 2: TF coil 10 and 11 set in place on the torus

The assembly of the toroidal field (TF) coils began on 19 December 2016.

As the first coil to be installed, TF coil 10 - "Annie" - was transported from the assembly hall to the torus hall. There, the coil was lifted up to a height of about 14 m with the overhead travelling crane in order for it to pass over the assembly frame around the 340° torus (Figure 1). Then, it was inserted through the 20° opening space for the final sector.

The coil rotation to the mounting position, one of the most important critical paths, was carried out successfully on 20 December. The coil was carefully and slowly threaded around the torus with the rotary crane. It took about 2 hours to move it to the appropriate position (opposite to the 20° opening space). Finally, the first TF coil was successfully unloaded onto its mounts.

The installation of the second TF coil 11 - "Brigitte" - was also completed successfully on 6 January 2017, just before the celebration of TF coil assembly start (Figure 2).

News

Signing ceremony of cryogenic system ownership transfer

The quadripartite signing ceremony (among Air Liquide Advanced Technologies (ALAT), CEA, F4E and QST) on the documents allowing the ownership transfer of the JT-60SA cryogenic system took place in Saclay, France on 12 December 2016.

This major milestone was not achievable without the successful commissioning of the cryogenic system and the brilliant performance of it, which was recorded in the acceptance test in October 2016. Indeed, the acceptance tests, demonstrating the full compliance of the cryoplant with the performance specifications, were all performed with success.

The ownership of the plant released by ALAT, the manufacturer, was briefly passed to CEA and then to F4E within a few minutes, before being definitely and fully transferred to QST, the final owner of the JT-60SA device. This event potentially also opened a new phase for collaboration among the parties, as warmly expressed by every stakeholder at the end of the signature process.

More than one and a half hours was needed to complete the signing of the 3 or 4 copies of each of the 6 documents, which constituted the ownership transfer folder. Each document required 3 or 4 signatures and, moreover, 18 times 3 for one of them! This very lengthy and serious work was performed as usual in the friendly and cooperative spirit that has been fostered through the great success of the associated technical achievements which now characterise the JT-60SA activities.



At the end of the event, every participant acknowledged the quality of the project organization, partnership and achievements, as well as of the human relationships that were developed among the members of the different teams involved, during the period of almost 6 years required for the full development of this innovative cryogenic system. All of the team leaders who participated in this signature process warmly acknowledged and thanked each team member also for the personal commitment.

The signing was carried out by:

- | | |
|-----------|---|
| For ALAT: | Vincent Pudys, Project Leader
Jérôme Legrand, On Site Manager and Safety Responsible Officer |
| For CEA: | Christine Hoa, Project Leader, On Site Manager and Safety Responsible Officer
Jean-Claude Vallet, CEA Program Manager for the JT-60SA Activities |
| For F4E: | Enrico Dipietro, Deputy Project Manager of the JT-60SA EU Home Team
(By remote participation, the documents having been pre-signed) |
| For QST: | Yutaka Kamada, Project Manager of the JT-60SA JA Home Team |

Signatures were made also in the presence of Bernard Salanon (BA-CP representative for CEA), Didier Magnet (VP-ITER for ALAT) and Manfred Wanner (JT-60SA Technical Expert for F4E).

To celebrate the accomplishment of the cryogenic system procurement, the pupil of the blank second eye of a Daruma doll was filled in (see the last figure and the explanation of this traditional Japanese custom).





News

Second inspection of EFCC fabrication at TESLA



First EFCC in preparation for a bell jar leak test

18 error field correction coils (EFCCs) will be installed in the vacuum vessel of the JT-60SA device to correct error fields caused by potential unavoidable misalignment of the superconducting coils and so forth. The EFCCs are being manufactured by Tesla Engineering Limited (TESLA) in the United Kingdom, under a contract concluded by QST in November 2014.

On 15 and 16 November 2016, a QST representative, D. Tsuru, visited TESLA to have technical discussions and to inspect the manufacturing processes of the EFCCs, which consist of winding, vacuum impregnation, welding of coil cases and clamps, and final tests.

This was his second visit to TESLA. On the last visit, he viewed the winding process of the first EFCC. This time, the first EFCC was nearly completed and he witnessed preparations for its final test. The first EFCC was placed in a vacuum chamber for a leak test (see figure). The vacuum chamber is the same vessel that was used for a vacuum test of a model central solenoid module for ITER more than 10 years ago.

He also viewed the welding of cases and clamps, vacuum impregnation and winding processes. He and TESLA members had fruitful discussions especially on schedule, transport of the EFCCs and financial matters.

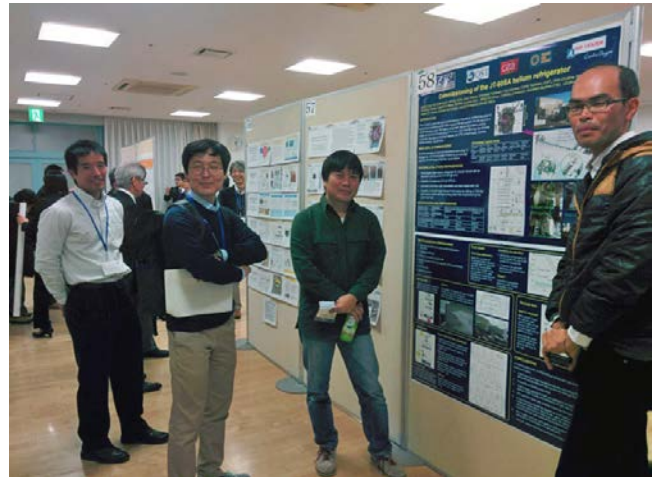
TESLA is now putting on a final spurt in the EFCC manufacturing towards delivery to the Naka Fusion Institute in March 2017.

Meeting

1st Asian ICMC and CSSJ 50th Anniversary Conference



H. Murakami (left) and his poster presentation



K. Kamiya (centre) and his poster presentation



Entrance of the conference venue - "Kanazawa Theatre" -



"Kenroku-en" garden near the venue (one of the 3 great landscape gardens of Japan)

A joint conference of the new International Cryogenic Materials Conference (ICMC) series in Asia and the 50-year-celebration of the Cryogenics and Superconductivity Society of Japan (CSSJ) was held in Kanazawa, Japan from 7 to 10 November 2016. The conference scope was the research and development on cryogenic materials, superconducting materials, wires and tapes, magnets, power devices and systems, and superconducting electronics. The programmes consisted of plenary, oral and poster sessions. A total of 280 participants attended the conference.

There were 2 poster presentations by members of the JT-60SA JA Home Team as follows:

- H. Murakami, on "Completion of first CS module for JT-60SA and the plan of cold test";
- K. Kamiya, on "Commissioning of the JT-60SA helium refrigerator".

H. Murakami showed the manufacturing procedure of the JT-60SA central solenoid (CS) module, especially the vacuum pressure impregnation (VPI) process. In addition, he reported that all of the CS1 module manufacturing processes had been successfully finished and the module was installed in the test facility for cold testing.

K. Kamiya showed the results of commissioning of the JT-60SA helium refrigerator, especially those of the performance verification tests. He reported that the helium refrigerator was successfully operated under both situations of the pulse heat load (plasma operation mode) and the high heat load (baking mode).

The researchers on large-scale magnets and cryogenic systems listened to their explanations with interest, and the presentations were well received.

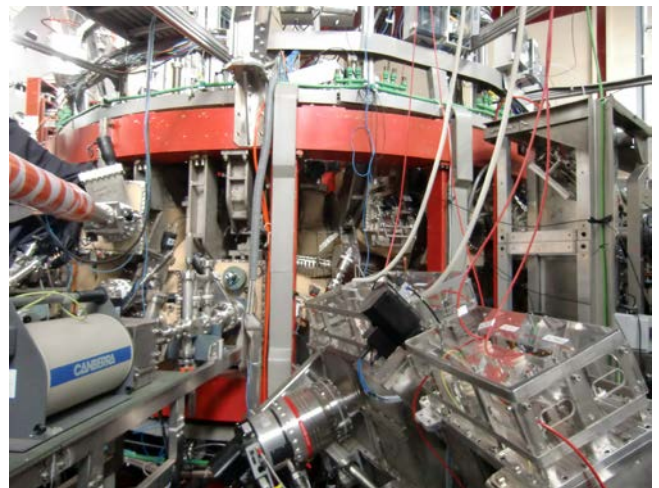
The next CSSJ meeting will be held in Tokyo, Japan, from 22 to 24 May 2017.

Meeting

19th BA Steering Committee Meeting



Site tour of TJ-II viewing the model



Closeup of the actual experiment

On 14 December, the 19th Broader Approach Steering Committee (BASC) meeting was held at CIEMAT in Madrid, Spain with attendance of representatives and experts from Europe and Japan. The Work Programme 2017 for the 3 projects (IFMIF/EVEDA, IFERC and the Satellite Tokamak Programme (STP)), which had been submitted to the BASC beforehand, were discussed and approved.

For the STP Project, the Project Leader, H. Shirai, mentioned that the project had been steadily progressing in both European and Japanese procurements as well as the assembly, installation and commissioning activities since the last SC, in particular the delivery of 3 toroidal field coils to the Naka site, the progress of vacuum vessel thermal shields assembly onto the 340° vacuum vessel torus, and the completion of the commissioning of the cryogenic system after more than 1 year's on-site work. The SC expressed satisfaction with the progress of the STP Project. On the occasion of the meeting, a site tour of the TJ-II heliac, a helical axis stellarator, was arranged.

The next BASC meeting will be held in Rokkasho, Japan on 27 April 2017.

Local

My stay in Japan



* This article was contributed by Dr. C. Hoa of CEA.

I have just arrived back in my country, France after a 14-month-tour of duty in Japan as Project Leader of the JT-60SA cryogenic system commissioning. I am pleased to be back home and to begin working again closely with my colleagues at CEA Grenoble. However, I also have a feeling that my experience in Japan has changed me deeply and that I will keep a “Japanese touch” to my way of life. More than one year in Japan left quite a mark.

I had the chance to live in Japan with my husband who agreed to follow me. As he is a brilliant engineer, he could find a good position in a Japanese-French Robotics laboratory at the National Institute of Advanced Industrial Science and Technology in Tsukuba, about a one hour drive from the QST Naka site. Together we could discover life in Japan, its beautiful language, culture and natural marvels.

It was an intense and very fruitful year in Japan. I was a bit workaholic on the cryogenic system, leading up to the final acceptance test last autumn. We could, however, find some time to travel around Japan and make new friends. Our family

came all the way from France to visit us and we were pleased to show them how surprising Japan is, for instance, full of contrasts: modern and traditional at the same time.

Japanese cuisine was a revelation for both my husband and me. We tasted delicious Japanese dishes, wherever we travelled in Japan. I also took some Japanese cooking classes and got some hints about how to make "sushi". We had some cheerful and memorable moments with Japanese colleagues and friends at "izakaya" (traditional Japanese taverns). We have tasted "sake (nihonshu)" (Japanese rice wine) and had some delicious "sashimi" (sliced raw fish) and meat with delicate spices, beautifully served on Japanese ceramics.

We studied Japanese, actually starting even before we arrived in Japan, and practiced as hard as we could, but mostly outside working hours. We will continue to learn Japanese. We are eager to keep in touch with Japanese culture. I will be very happy to come back to Japan for either work or fun!



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

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.

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