JT-60SA Newsletter
No. 101, July 2018

Headline

Completion of installation of all 18 TF coils

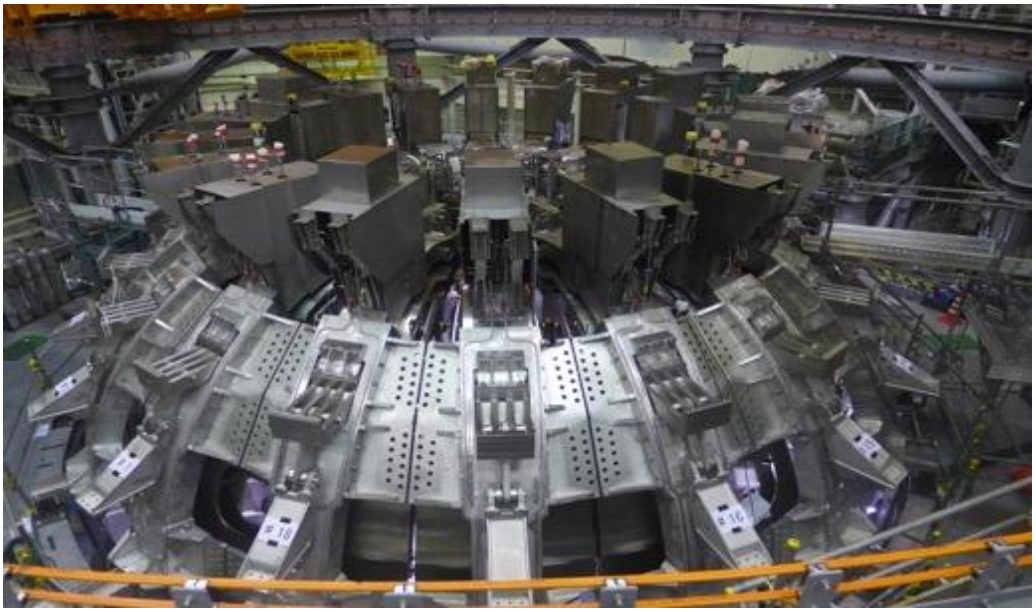

Figure 1: Completion of installation of all 18 TF coils

Figure 2: Final sector of integrated TF coil, VV sector and VVTS

The assembly of the JT-60SA tokamak, including toroidal field (TF) coils, vacuum vessel gravity supports (VVGS) and port thermal shields (PTS) has reached a new milestone recently.

Following the 16 TF coils installed by March 2018, the remaining 2 TF coils were installed in April. Now, all 18 TF coils have been mounted on the JT-60SA torus (Figure 1).

For the installation of the last 18th TF coil, the TF coil, vacuum vessel (VV) sector and vacuum vessel thermal shields (VVTS) were integrated with it (Figure 2). Before their integration, the 18th TF coil was temporarily located in the torus, and the gaps between the 18th TF coil and the adjacent TF coils as well as those between the adjacent VV sectors were measured. Based on the result, the gaps between the 18th TF coil, the VV sector and the VVTS were adjusted. At present, this now integrated final sector is being connected to the adjacent TF coils and the adjacent thermal shields. After that, it will be welded to the adjacent VV sectors.

Eight out of 9 VVGSs have been installed on the lower part of the torus, and there is only the one of the final sector left to be fitted.

All 16 lower port thermal shields (LPTSs) except the two of the final sector have been installed.

For fixing the adjacent TF coils at their outer intercoil structure (OIS) shear panels, each set of shear panels is sandwiched by 2 OIS splice plates.
The splice plates of the final sector (between the 15th and 16th TF coils and between the 18th and 1st TF coils) have already arrived from Fusion for Energy (F4E), and they are being prepared for installation.

Thus, the torus assembly is continuing according to schedule.

Installation of magnet power supplies

Figure 1: The installation of the power supplies procured by ENEA is essentially completed.

Figure 2: FPPC1 under testing

Figure 3: FPPC2 ready for testing

Figure 4: Test operations by JEMA and F4E engineers in progress

Nine months after the beginning of the on-site activities concerning the power supplies procured by ENEA, it is time to look forward as the related installation activities are considered to be essentially complete. In fact, on 30 May 2018, a long while after the completion of the site acceptance tests of the equilibrium field (EF) 2–5 power supplies procured by CEA, the heating motor generator (H-MG) was again put into service for the beginning of commissioning of the Fast Plasma Position Control Coils power supplies (FPPC-PSs). On 14 June 2018, the site acceptance tests of the FPPC1-PS were completed (Figure 1).

The commissioning activity of FPPC1 was particularly carefully carried out. In fact, this was the very first power supply developed for the project, and some optimisations developed during the factory tests on the following units were not yet implemented. After an update of the control software and an accurate check of the correct operation, the power tests on the FPPC1 have been successfully performed (Figures 2 and 4).

Meanwhile, the pre-commissioning activities of FPPC2, central solenoid (CS)2 and CS3 power supplies are going on, as the FPPC2-PS is the next unit that will undergo the on-site power tests (Figure 3).

The installation activities on the remaining CS1, CS4, EF1 and EF6 power supply units have been almost completed, and the minor remaining cabling activities are expected to be completed by the end of June 2018.

Completion of last central solenoid module

Figure 1: Completed CS3 module

The manufacturing of the last central solenoid (CS) module (CS3) was completed in March 2018 (Figure 1).

To prepare for integrating the 4 completed CS modules, extension conductors were installed on the terminals of each CS module.

The manufacturing of the jigs used for stacking the modules and transporting the integrated CS, and the supply of the support structures such as tie plates have been completed. Stacking of the 4 CS modules is being carried out now.

The integrated CS will be transported from the port of Hitachi to the JT-60SA assembly hall at the QST Naka site in December 2018 and will be installed inside the Tokamak at the beginning of 2019.

22nd STP Project Committee Meeting

Figure 1: Participants in the STP-PC held on 7 March 2018

The 22nd Meeting of the Satellite Tokamak Programme Project Committee (STP-PC) was held on 7 March 2018. A total of 31 participants joined the meeting also by videoconference. There were 6 members from the Project Committee, the PL, 5 experts from the Project Team, and 19 experts from the EU and JA Home Teams (HTs).

At the meeting, the PL overviewed the project status and presented the “Annual Report 2017” and “Project Plan” to be submitted to the 22nd Steering Committee Meeting (SC-22) on 26 April 2018.

He also presented the “Update of Value Estimates and Allocation of Contribution of the Parties”, “Amendment to the ‘STP - Common Fund for Commissioning’ ” and “Update of Work Programme 2018” to be submitted for approval by the Steering Committee (SC) by written procedure. The latest status of procurement and assembly was also reported in detail by the Project Managers of the EU and JA HTs.

The STP-PC expressed satisfaction with the achievements and the progress in both European and Japanese procurements as well as the assembly activities since the last STP-PC.

This progress includes completion of cold test, preassembly with outer intercoil structure (OIS) and shipment from EU for the 18 TF coils. Also delivery of all high-temperature superconductor current leads (HTS CLs), all sectors of the cryostat vessel body cylindrical section (CVBCS) and all components of the Superconducting Magnet Power Supplies (SCMPSs) to the Naka site, as well as steady progress in the fabrication of components of the Resistive Wall Mode Control (RWM) PS and electron cyclotron range of frequency (ECRF) PS, the last CS module, Coil Terminal Boxes, Cryostat Thermal Shields and Port Thermal Shields, ECRF system components, and the assembly work of TF coils, Vacuum Vessel, thermal shields and supports into the torus.

The STP-PC commended the fact that the major milestone of TF coil fabrication and delivery had been almost achieved, which opened up the clear prospect towards the completion of Tokamak assembly work in March 2020.

The STP-PC recommended the “Annual Report 2017” and “Project Plan” for approval by the Steering Committee (SC).

The STP-PC decided that the next STP-PC meeting (PC-23) will be held on 19 October 2018.

News

22nd BA Steering Committee Meeting

On 26 April 2018, the 22nd Broader Approach Steering Committee (BASC) meeting was held at the QST Naka Fusion Institute with representatives and experts from Europe and Japan in attendance. In the meeting, the Annual Report 2017 and update of the Project Plan of the 3 projects (IFMIF/EVEDA, IFERC and the Satellite Tokamak Programme (STP)) implemented under the Broader Approach Agreement were submitted and approved.

Concerning the STP Project, the Project Leader (PL), H. Shirai, mentioned that the project had achieved steady progress in both European and Japanese procurement in manufacturing, delivery, assembly and commissioning activities since the last BASC.

In particular, major outcomes such as the installation of 18 TF coils on the cryostat base, the completion of Central Solenoid module fabrication, the delivery of all components of the Superconducting Magnet Power Supply to Naka, the delivery of the Cryostat Vessel Body Cylindrical Section to Naka, the progress of manufacturing the Resistive Wall Mode control coil power supply and ECRF power supply, Cryostat Top Lid, Thermal Shields and so forth were presented.

The BASC expressed satisfaction with the progress of the STP Project. It was also proposed from Japan that Y. Kamada, Project Manager (PM) of the JA Home Team and Deputy Director General of QST Naka Fusion Institute, would take on the role of STP PL to replace H. Shirai as of 27 April 2018, which was approved by the BASC.

In the site tour after the meeting, participants visited the torus hall, rectifier building and poloidal field coil winding building, and directly witnessed the progress of the Project.

The next BA Steering Committee meeting will be held in Grenoble, France on 5 December 2018.

Figure 1: In BASC-22 meeting

Figure 2: Representatives from EU and Japan

Figure 3: In the torus hall

Meeting

5th IAEA DEMO Programme Workshop (DPW-5)

Figure 1: 5th IAEA DEMO Programme Workshop (DPW-5)

The International Atomic Energy Agency (IAEA) held the 5th IAEA DEMO Programme Workshop (DPW-5) from 7 to 10 May 2018 at LAON Convention Hotel in Daejeon, Republic of Korea. The workshop was hosted by the Government of the Republic of Korea through the National Fusion Research Institute. Previous workshops in the series were held in Los Angeles (2012), Vienna (2013), Hefei (2015) and Karlsruhe (2016).

During this meeting, a total of 35 presentations (4 invited special topic talks, 18 invited talks and 13 posters) were given.

There was an invited presentation on the JT-60SA Project as follows:

- Invited presentation (1) (special topic talk)
  - A. Sakasai from QST Naka, on “Status of JT-60SA Project and its Research Planning”

A. Sakasai, Sub Project Leader of the Satellite Tokamak Programme of the Broader Approach Activities from 27 April 2018, orally presented an overview of the JT-60SA construction including manufacturing and assembly of components which were shared by EU and Japan, and remarked that the JT-60SA project was progressing steadily towards the achievement of “first plasma” in 2020.

He also reported that the JT-60SA Research Planning had been strongly promoted with the European/Japanese research collaboration on JT-60SA, and summarised that JT-60SA was producing experiences of manufacturing and assembly of a large superconducting tokamak relevant for ITER and DEMO.

Figure 2: In technical tour of Korea Superconducting Tokamak Advanced Research (KSTAR)

Figure 3: Workshop banners displayed in front of the venue

Figure 4: Footbath at the square opposite the venue

Figure 5: Street plants in front of the venue (horse-chestnut trees in full bloom)

Meeting

DRM for Fast Wide Angle Video Diagnostic System

Figure 1: Participants in the DRM-EDICAM held on 30 May 2018

The Design Review Meeting (DRM) for the Fast Wide Angle Video Diagnostic System based on Event Detection and Intelligent Camera (EDICAM) (DRM-EDICAM) was held remotely on 30 May 2018. A total of 17 experts: 11 from the EU Home Team, 4 from the JA Home Team, and 2 from the Project Team, participated in the meeting.

The main objectives of the DRM were as follows.

- Review of the main technical requirements of EDICAM and its interfaces with the JT-60SA device and its periphery.
- Agreement on the main documents (Annex B, configuration model, share of work and supplies between EU and QST).
- Agreement on the schedule for the signature of the Procurement Arrangement (PA).

It was agreed as a conclusion of the DRM that the PA was ready for formal signature by both Implementing Agencies.

Calendar

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

22–27 October 2018
27th IAEA Fusion Energy Conference (FEC 2018)
Gandhinagar, India

12−17, November 2018
2nd Asia-Pacific Conference on Plasma Physics (AAPPS-DPP 2018)
Kanazawa, Japan

19–22, November 2018
The 27th International Toki Conference on Plasma and Fusion Research
& The 13th Asia Pacific Plasma Theory Conference (ITC & APPTC 2018)
Toki, Gifu, Japan

5 December 2018
23rd Meeting of the BA Steering Committee (SC-23)
Grenoble, France

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/.