

The ITER Project: *Opening the way to a new energy future*



Bernard Bigot
Director-General
ITER Organization

ITER Project Progress



According to the stringent metrics that measure project performance, *> 71 % of the "total construction work scope through First Plasma" is now complete.*

Construction Progress

Cryostat upper cylinder (temporary storage)

Cryostat workshop

Coil winding facility

400 kV switchyard

Assembly Hall

Cryoplant

Transformers

Heat rejection system

Tokamak Complex

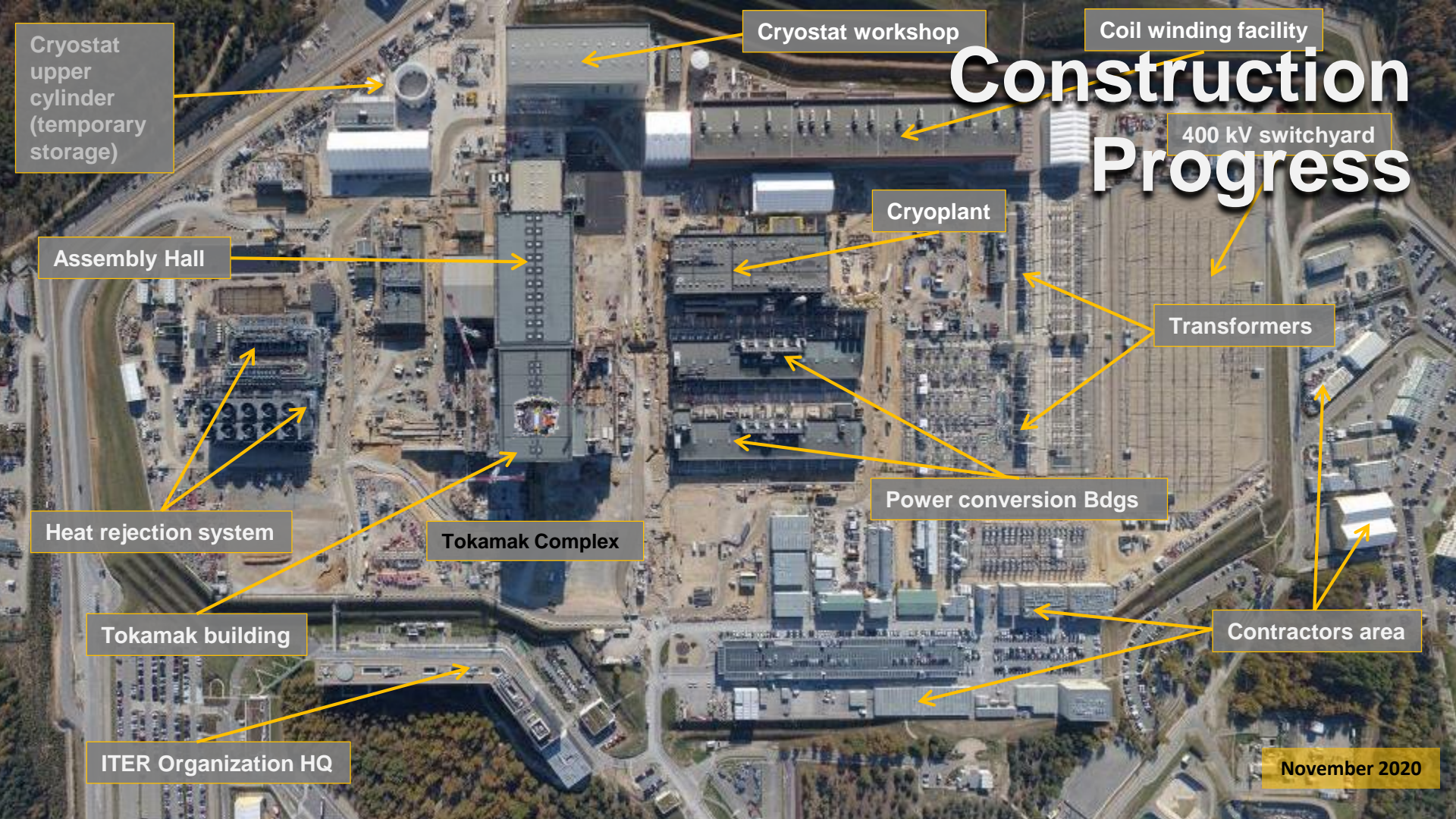
Power conversion Bldgs

Tokamak building

Contractors area

ITER Organization HQ

November 2020



Six years of steady progress



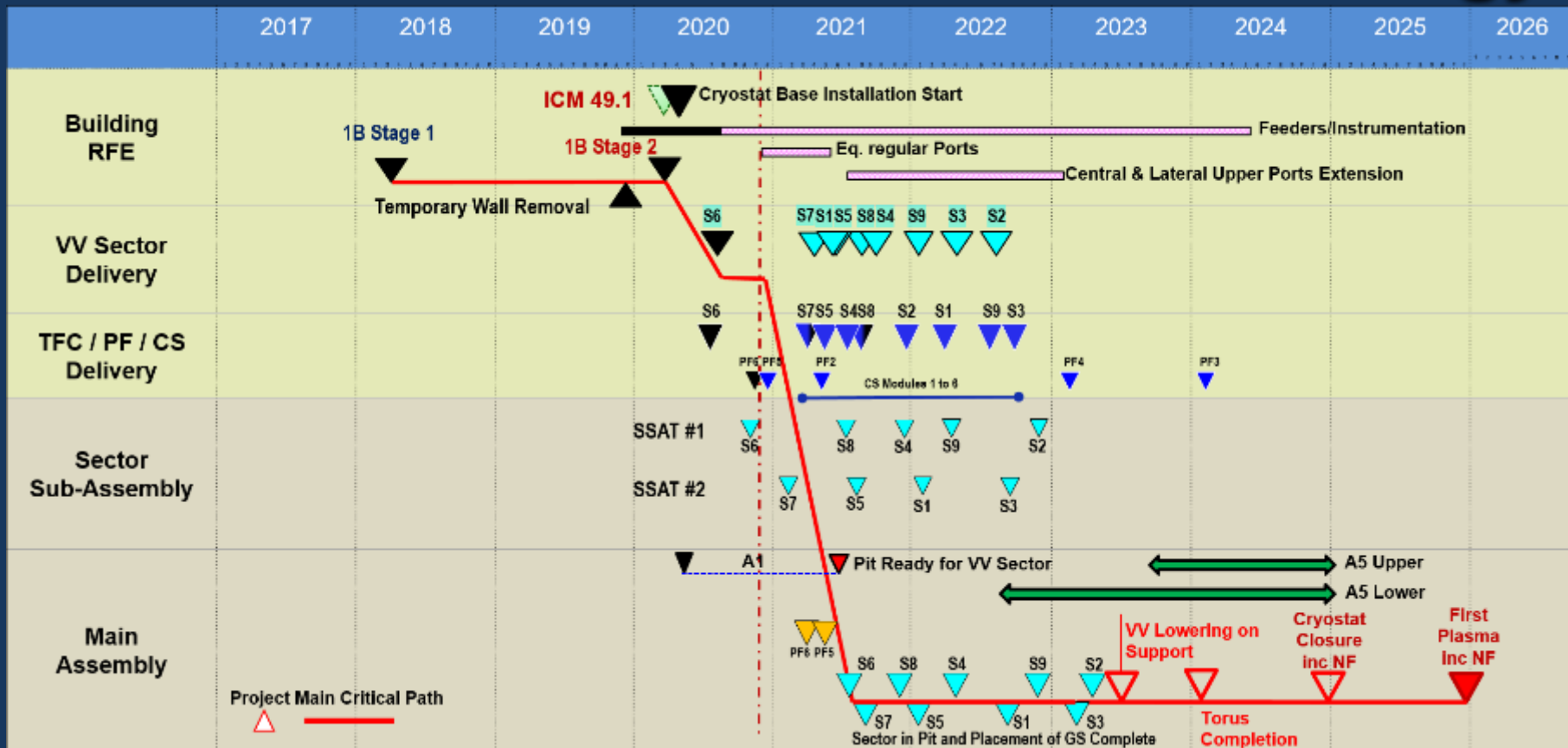
November 2014



November 2020

More than 75% of the installation's civil works are now completed.

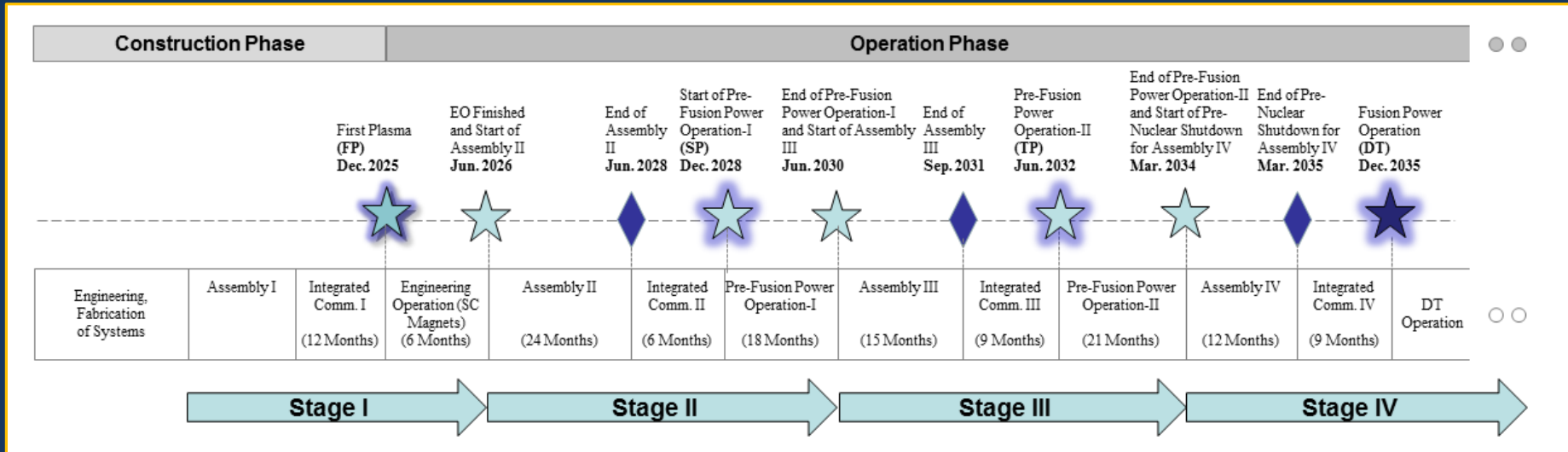
Details of Revised Construction Strategy



A staged approach to DT plasma

Extensive interactions among IO and DAs to finalize revised baseline schedule after COVID-19

- ✓ Schedule and resource estimates through First Plasma (2025) consistent with Members' budget constraints
- ✓ Proposed use of 4-stage approach through Deuterium-Tritium (2035) consistent with Members' financial and technical constraints



Coping with COVID-19

Maintain critical activities – ensure personnel health and safety

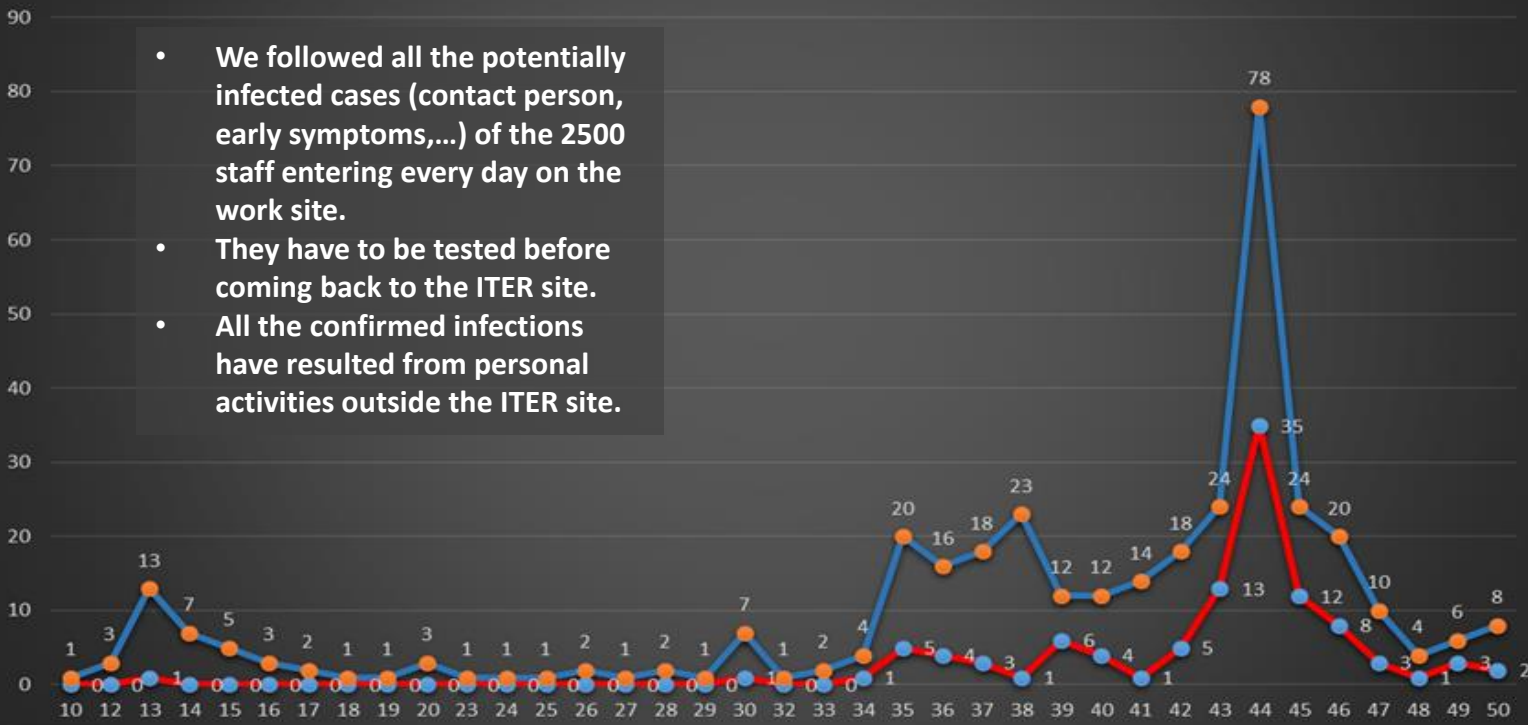
- Anticipation (network tests, worksite reorganization as early as March, etc.)
- Strict observance of sanitary authorities recommendations;
- Telerworking
- Strong support from ITER Members and staff
- No productivity loss
- Establishing a « New Normal »:
 - ✓ Minimum 2 days onsite for non-worksite staff and contractors

Coping with COVID-19

Covid management

Values

Count Confirmed Count Cases



- We followed all the potentially infected cases (contact person, early symptoms,...) of the 2500 staff entering every day on the work site.
- They have to be tested before coming back to the ITER site.
- All the confirmed infections have resulted from personal activities outside the ITER site.

Recent progress: Tokamak Complex



Tokamak Complex, November 2020



First crane access from Assembly Hall
to Tokamak Building,
28 March 2020

Recent progress: A crucial milestone

On May 26-27 2020, the base of the Cryostat (1,250 t; procured by India) was successfully inserted into the Tokamak Assembly Pit.

Recent progress: Lower cylinder insertion

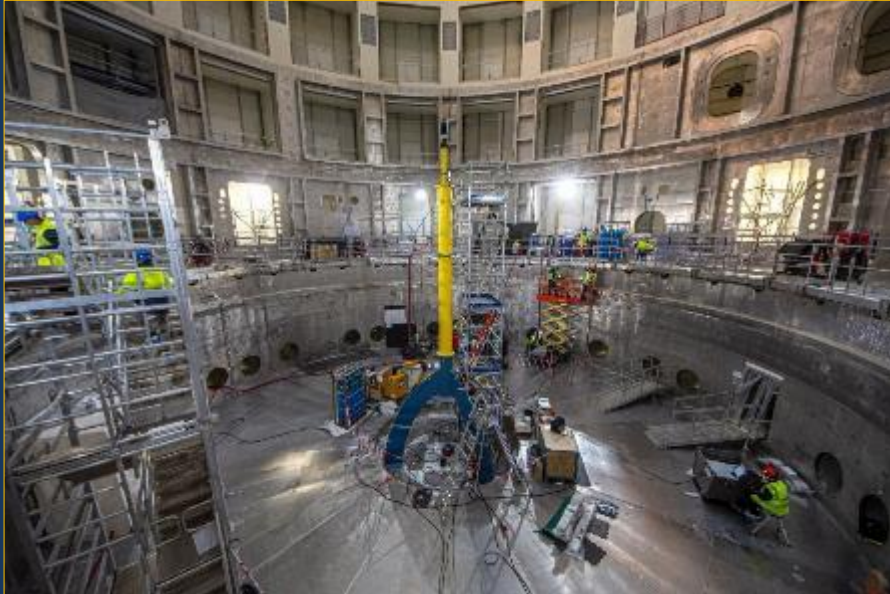


Cryostat Lower Cylinder lift,
31 August 2020



Inserting the Cryostat Lower Cylinder into the Tokamak Pit.
Perfect fit with the Base
31 August 2020

Recent progress: Welding the Lower cylinder to the Base



Following manual passes on both sides of the components, automatic welding operations began in late October. Whereas welding proper is now finalized, the non-destructive leak tests will extend into the coming months

Massive arrivals



Ready for first pre-assembly



Following delivery of thermal shield sections from Korea, two toroidal field coils from Japan, and Vacuum Vessel Sector 6 from Korea, the first pre-assembly can begin.

Balance of Plant Progress: Cryogenics

- ◀ Installation of cryolines in the Tokamak Building

Cold boxes and cryogenic termination cold box equipment



Balance of Plant Progress: Electrical network



Connection to the French grid (400 kV network) was effective
as of 26 Jan 2019



The reactive power compensators area accommodates reactors, capacitors, resistors and sensors that aim to smooth the flow of AC current both inside the ITER installation and in the immediate vicinity.



Balance of Plant Progress: Electrical conversion



Electrical components from China, India, Korea and Russia are being progressively installed inside the Magnet Power Conversion Buildings, exterior bays and Tokamak Building.

Balance of Plant Progress: Heat rejection system



ITER cooling water systems will be capable of removing ~ 1.2 gigawatt of heat



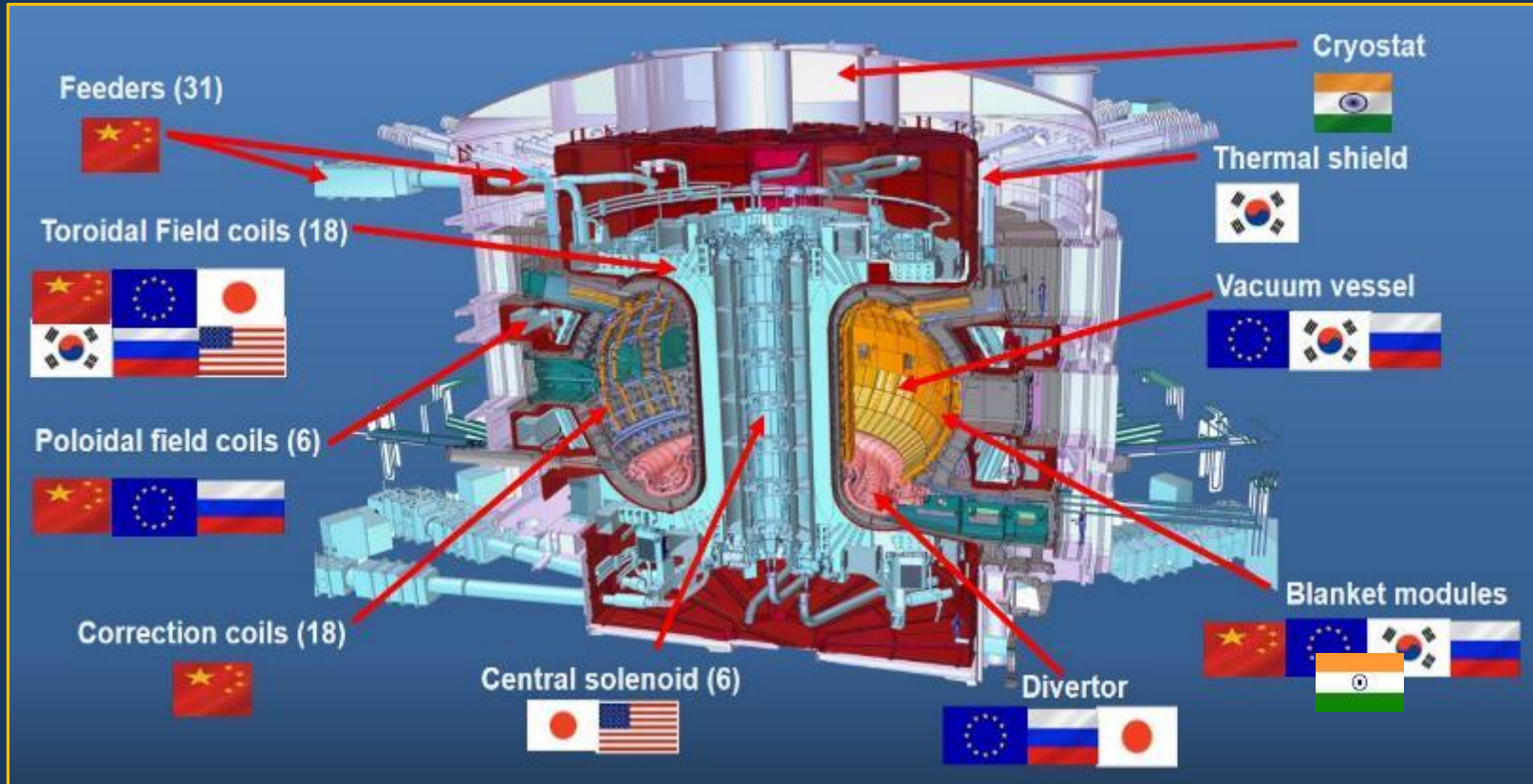
Leak-tests were successfully performed on 27,000 m³ basins

Celebrating Start of Machine Assembly



On 28 July, ITER celebrated the Start of Machine Assembly with a virtual ceremony, hosted by French President Emmanuel Macron, with contributions from 7 ITER Heads of State and multiple ministers

Who manufactures what?



The ITER Members share all intellectual property



Manufacturing progress: on-site coil fabrication



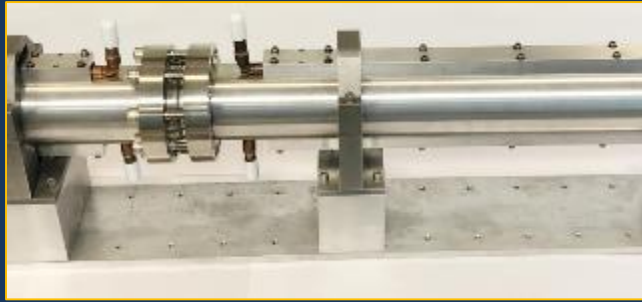
Due to their size (17 m – 24 m in diameter), 4 out of the 6 poloidal field coils required for the machine are manufactured on site by Europe; PF#5 is ready to enter cold testing; PF#2 ready to be resin-impregnated. Two double pancakes for PF#4 are completed.



Manufactured in China under a European contract, PF#6 is being warmed up following completion of cold tests.



Manufacturing progress: on-going globally



The US has completed the final designs for the high-power microwave transmission line, above, for electron cyclotron heating; and for the low-field side reflectometer (LFSR), below, which will gather data from the outer layers of the ITER tokamak plasma.



Six of the 7 central solenoid modules procured by the United States are in late stages of fabrication. The first module will be delivered next year.

Manufacturing progress: on-going globally



Most recent magnet feeder delivered to ITER site



First cryostat lid segments arrive at ITER



Five vacuum vessel sectors are under fabrication in Italy. Completion ranges from 65% to 81%.



Manufacturing progress: ongoing globally



3 more vacuum vessel sectors are in fabrication in Korea, with completion rates from 82% to 95%



Poloidal field coil #1 is entering the final stages of fabrication



TF #12 unwrapped.



Celebrating the arrival of TF coil #12 from Japan – the first ITER magnet to be completed– on 25 April 2020. Japan is producing 9 out of 19 TF Coils for ITER. TF#13 has also arrived on the ITER site.

Onward toward First Plasma!

Thank you for your attention

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