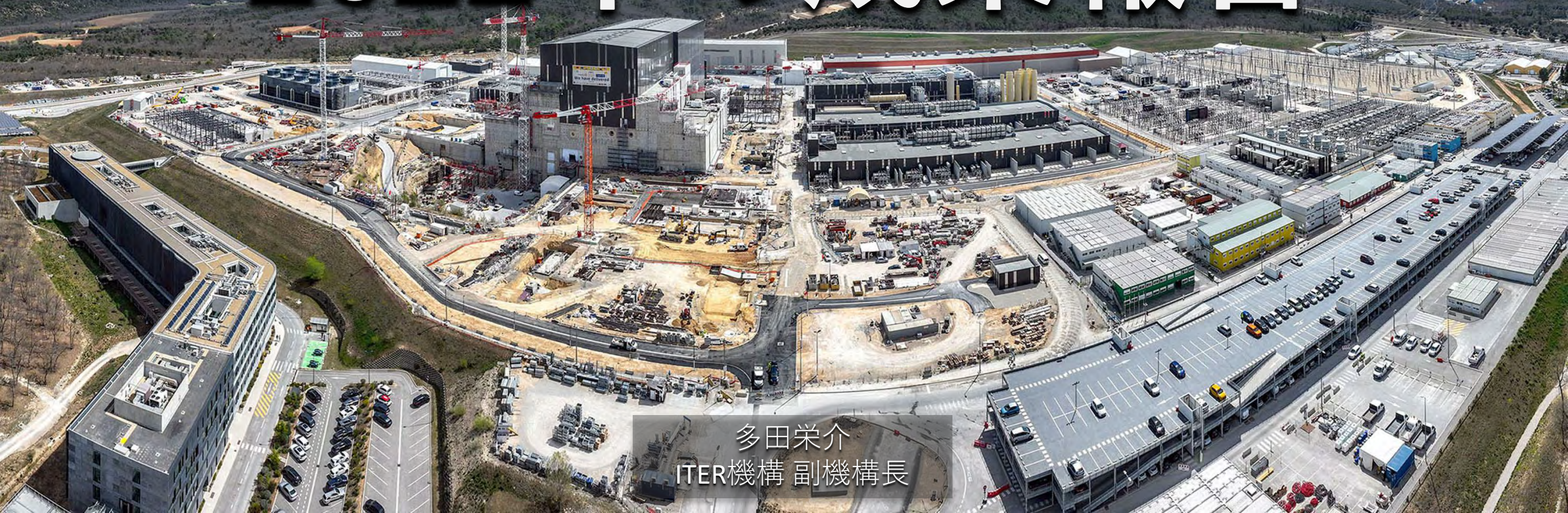


ITER計画 2022年の成果報告



多田栄介
ITER機構 副機構長

Eight years of steady progress 2014 –2022



More than **85%** of the installation's **civil works** are now completed.

Worksite progress

Cryostat upper cylinder
(temporary storage)

Tokamak Assembly
preparation Bdg.

Radiofrequency Bdg.

Assembly Hall

Heat rejection system

Control Room
(Under construction)

ITER Organization HQ

Hot Cell Complex
(Conceptual Design Phase)

Neutral beam power supply
(Under construction)

Cryostat workshop

Cryoplant

Power conversion Bdgs.

PF Coils winding facility

ITER switchyard

RTE (France) 400 kV switchyard

Transformers

Contractors area

May 2020

Ongoing construction works



◀ High Voltage
Supply Building
for neutral beam
injection system



Tritium Building ▶



◀ Control building



▶ Bridge to support
cryolines between
Cryoplat and
Tokamak Bldg.

Towards commissioning Cryoplant



Helium compressors to be started in mid-December 2022.



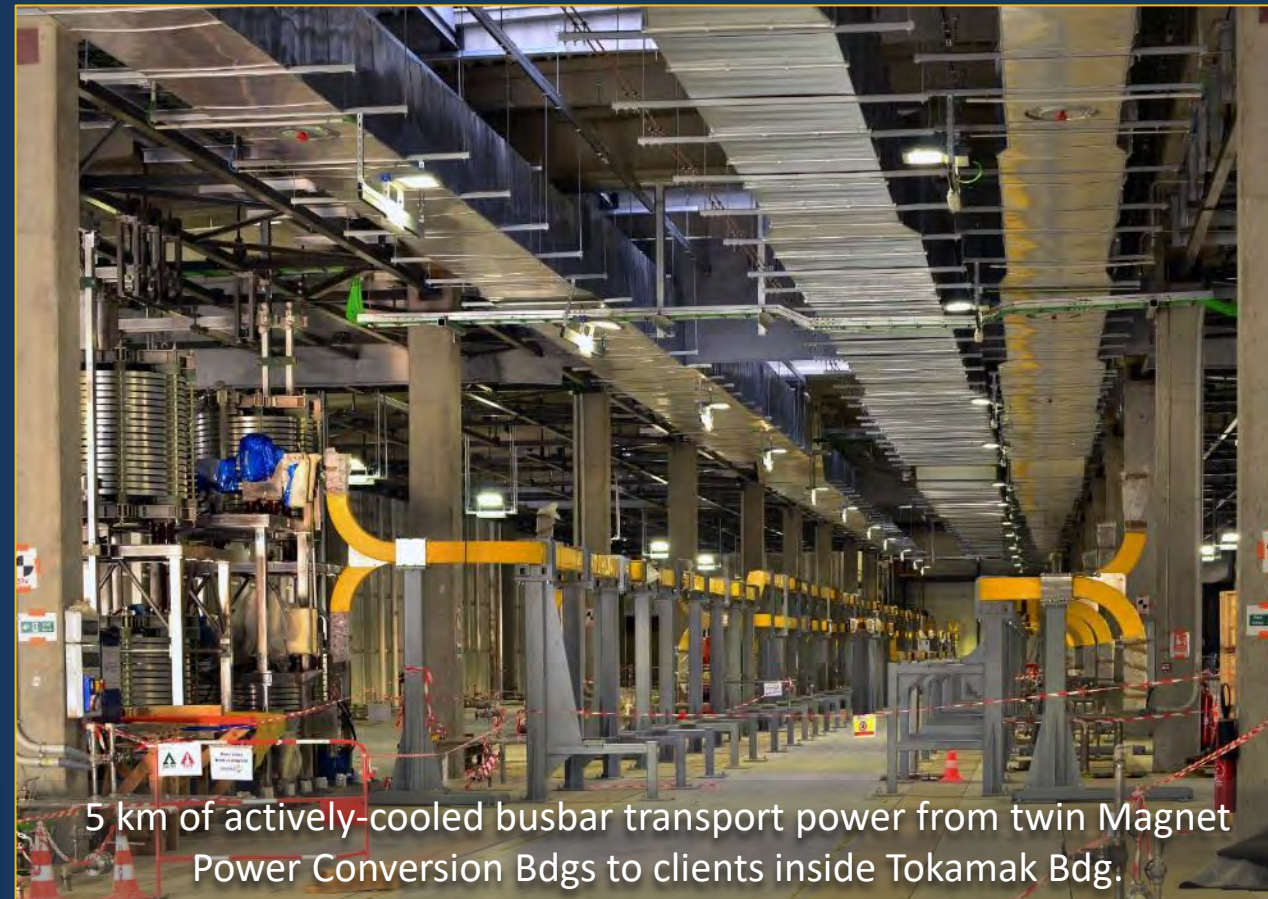
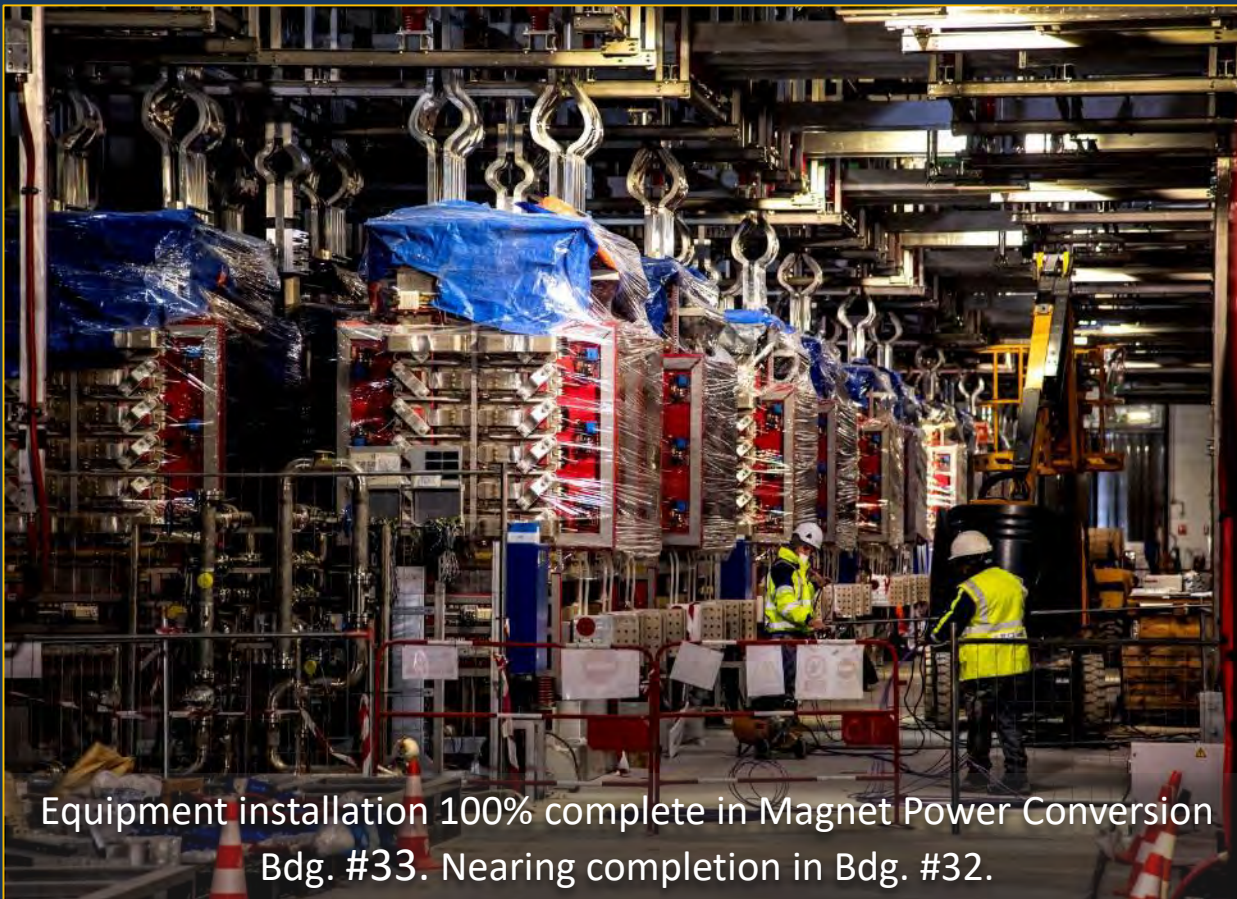
Cold boxes are being readied for « cold trials ».

Towards commissioning Heat Rejection System

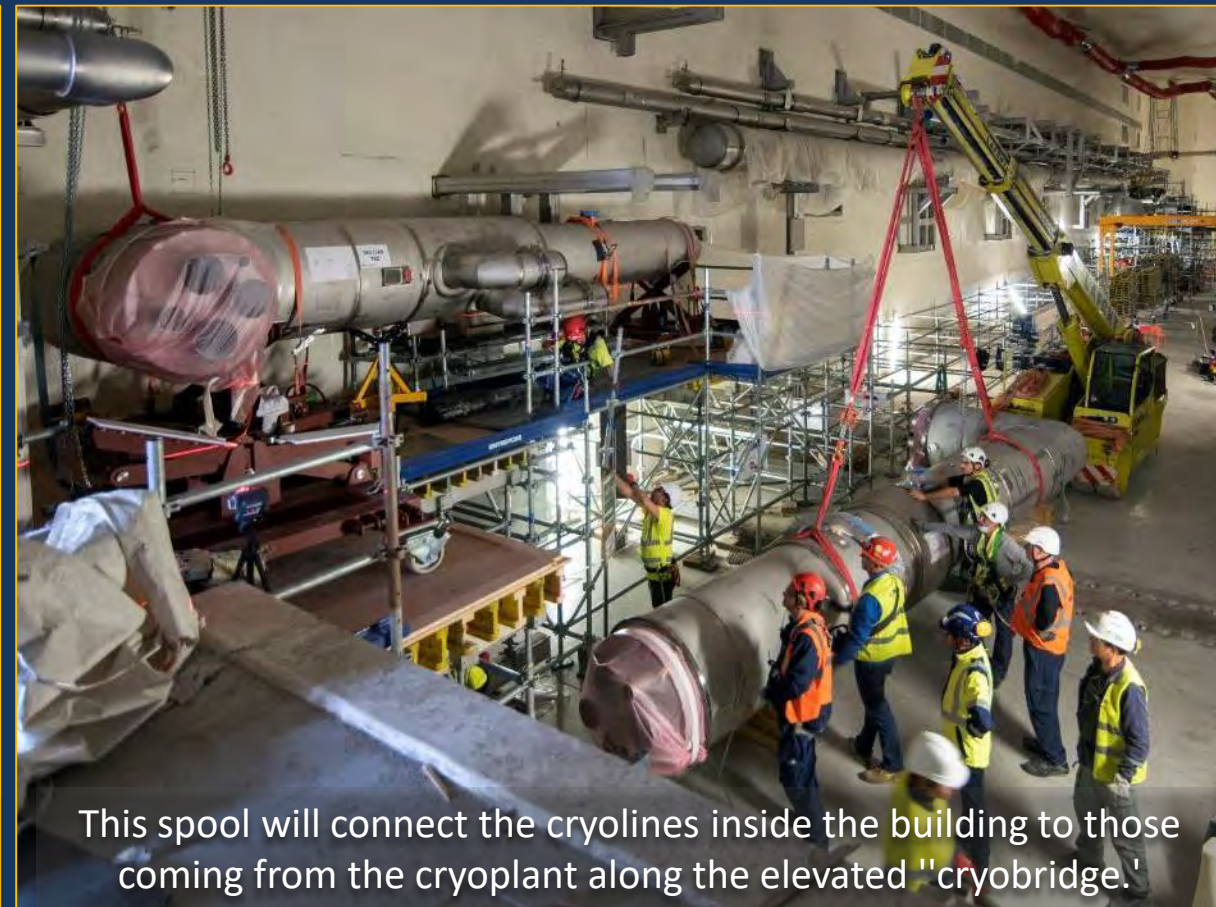


Towards commissioning

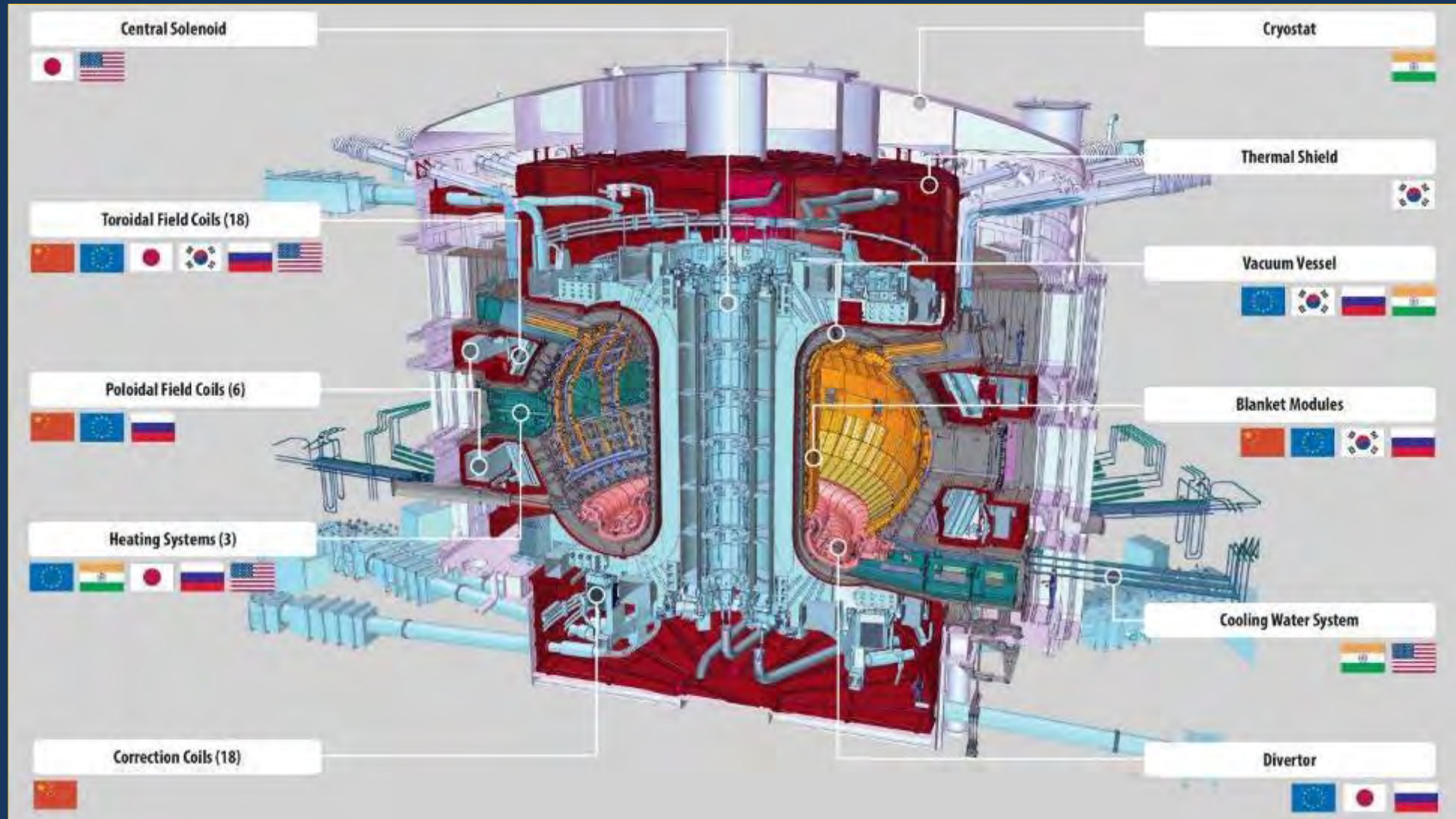
Electrical conversion & distribution



Towards commissioning Cryolines installation



Who manufactures what?



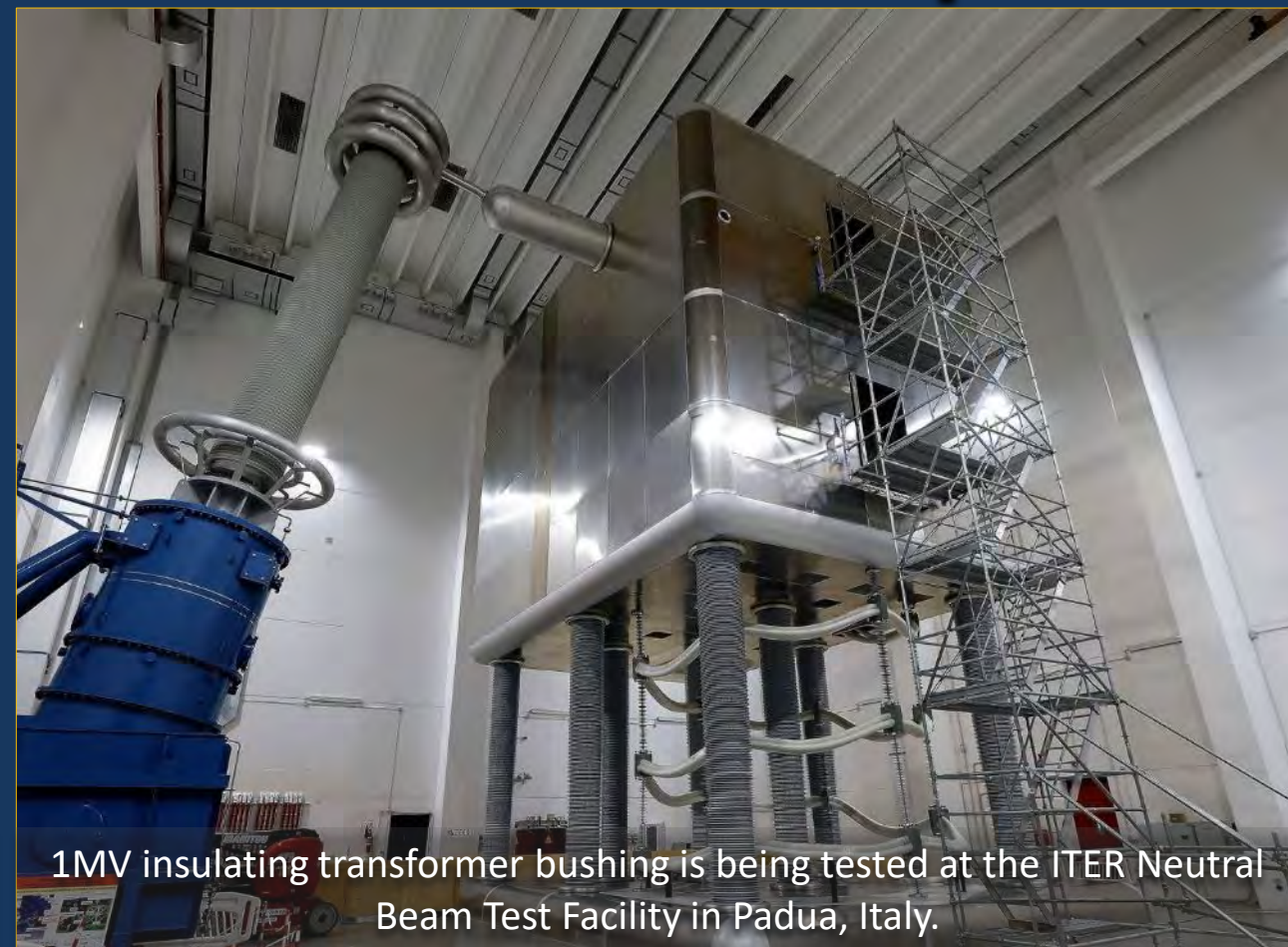
The ITER Members share all intellectual and industrial property

Manufacturing progress

Japan



The seventh of the nine Japan-procured toroidal field coils (TF # 15) began its voyage to ITER on 27 September 2022.

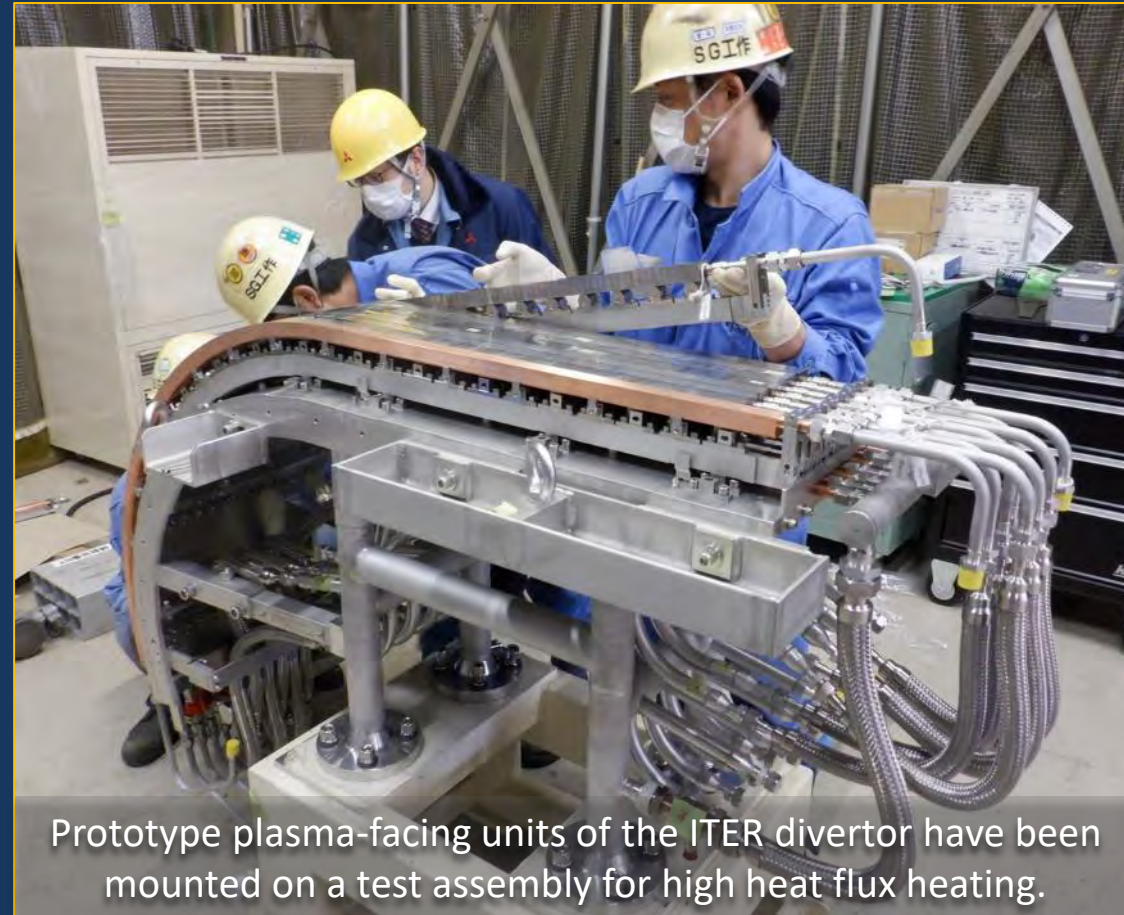


1MV insulating transformer bushing is being tested at the ITER Neutral Beam Test Facility in Padua, Italy.

Manufacturing progress Japan



QST has procured eight gyrotrons for ITER's electron cyclotron external heating system.

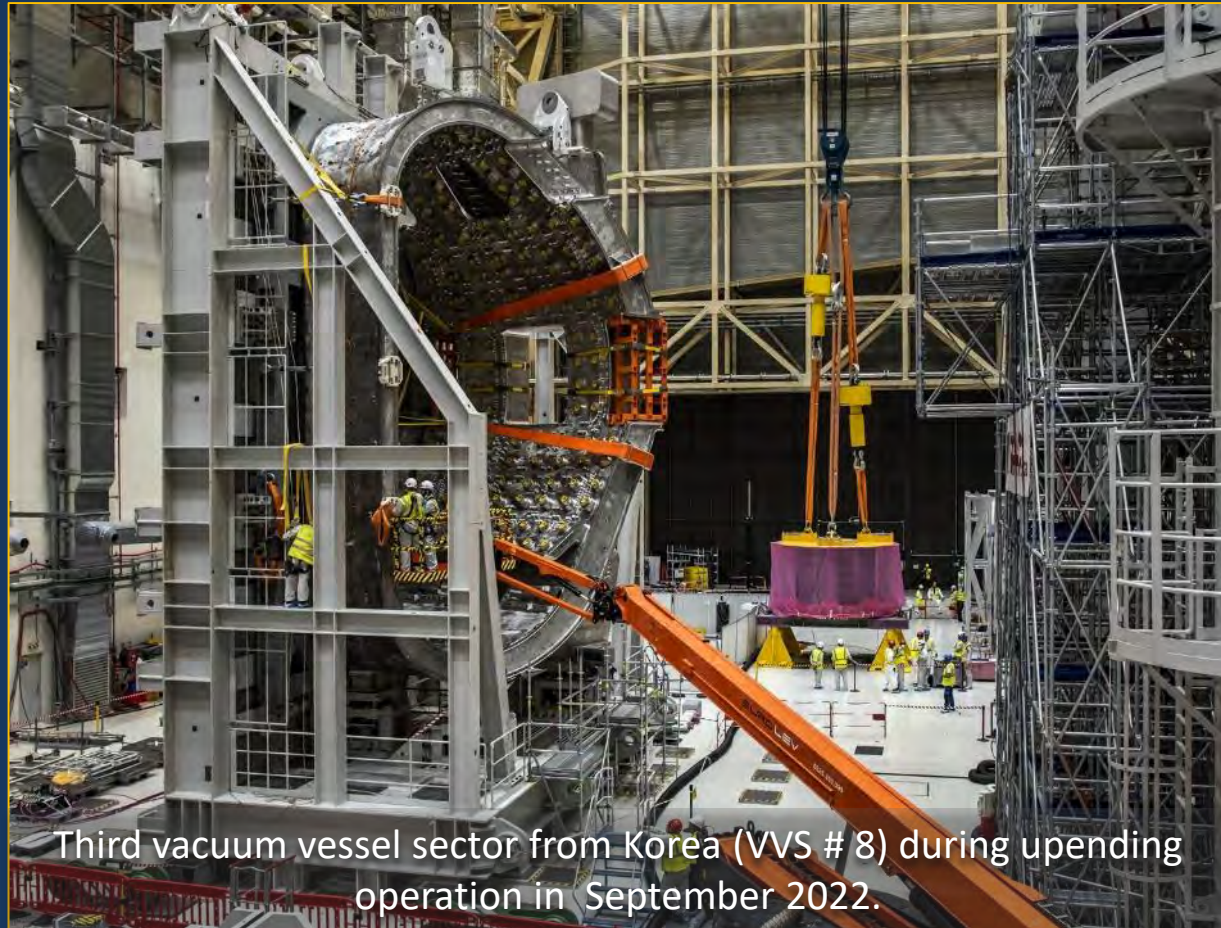


Prototype plasma-facing units of the ITER divertor have been mounted on a test assembly for high heat flux heating.

Manufacturing progress

Korea

Russia



Third vacuum vessel sector from Korea (VVS # 8) during upending operation in September 2022.

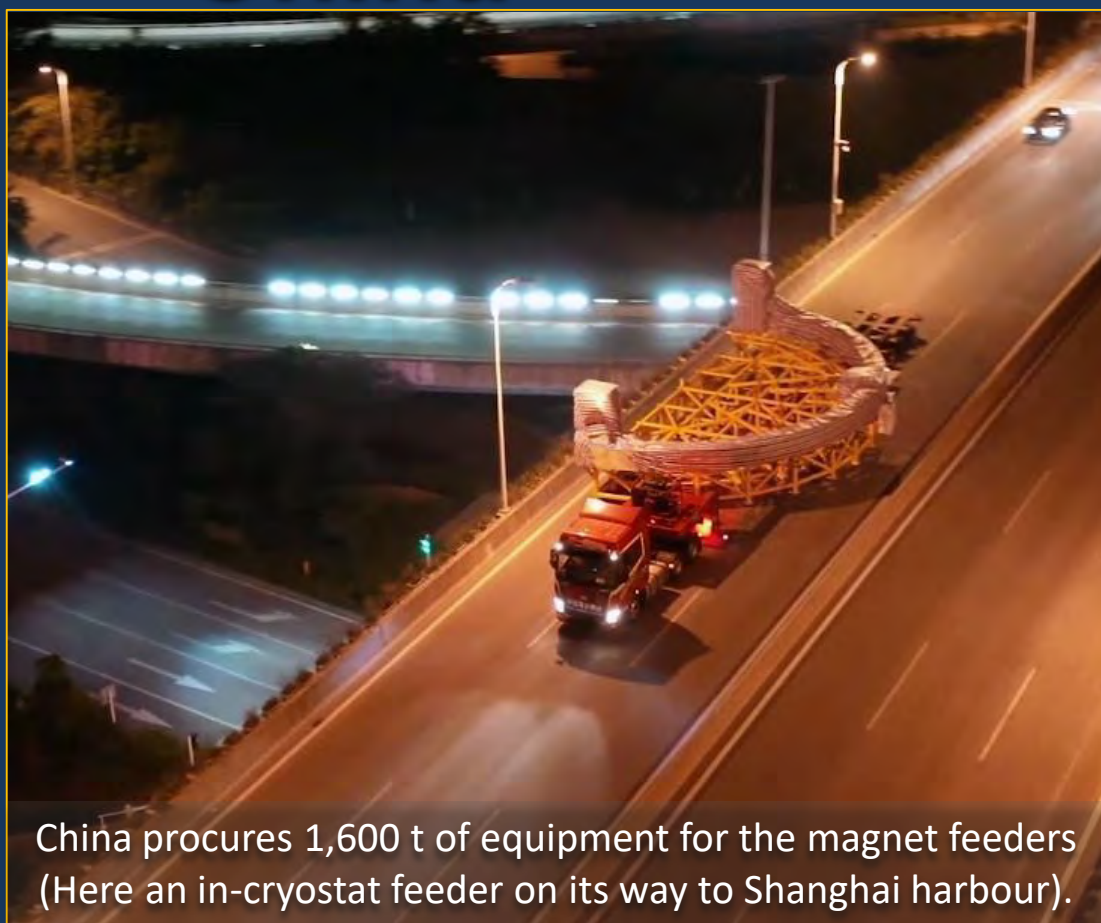


Poloidal field coil # 1 left its manufacturing site in Saint-Petersburg on 1 November 2022.

Manufacturing progress

China

EU



China procures 1,600 t of equipment for the magnet feeders
(Here an in-cryostat feeder on its way to Shanghai harbour).



Manufactured in an onsite facility PF # 2 (Ø 17 m) was moved to storage in
Dec 2021. PF # 5 is installed. Fabrication of PF # 4 and # 3 (Ø 24 m) is ongoing.

Manufacturing progress

India

USA



Component deliveries



Main components delivered since 2020:

- 14 TF coils (out of 18+1)
- 4 PF coils (out of 6)
- 3 vacuum vessel sectors (out of 9)
- 2 Central solenoid modules (out of 6+1)

TF# 12, Japan April 2020

Start of assembly: 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.

Assembly status 2020-2021



Cryostat Lower Cylinder - 31 August 2020



Lower cylinder thermal shield - 14 January 2021



Poloidal field coil # 6 - 21 April 2021



Poloidal field coil # 5 - 16 September 2021



1st bottom correction coil # 21 October 2021

Assembly status 2022



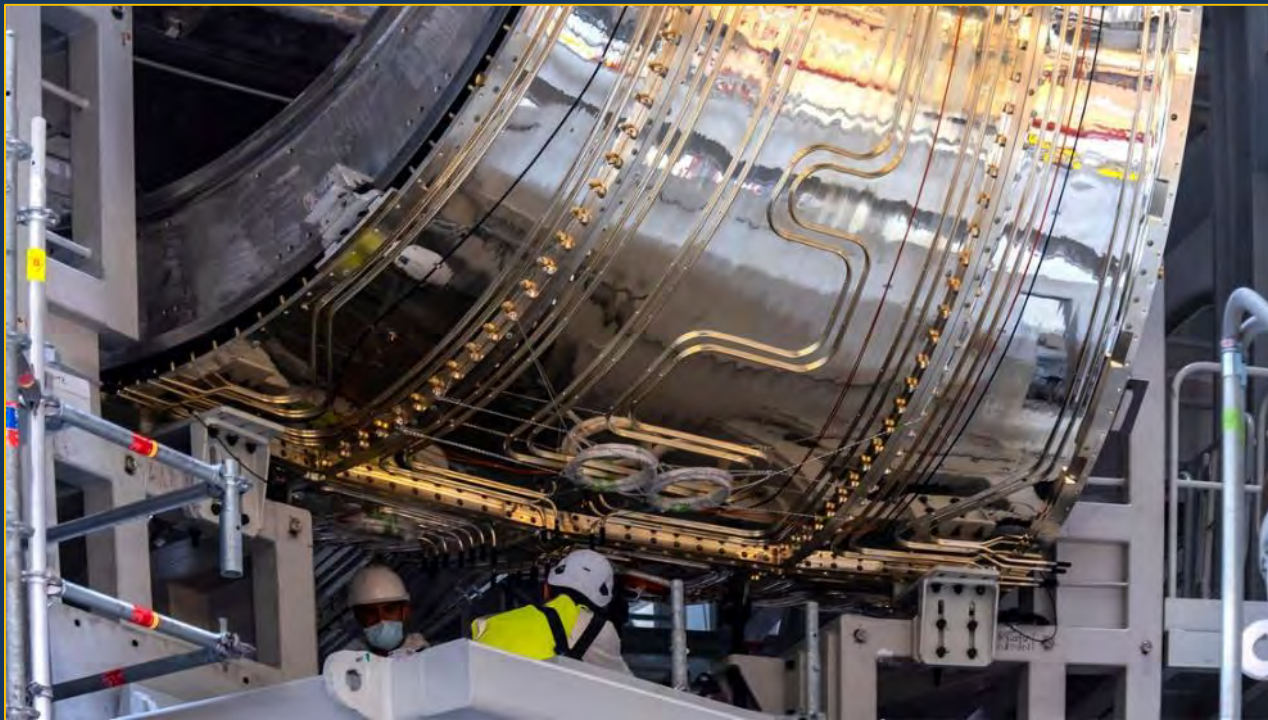
Vacuum vessel « sector modules » are the building bricks of the Tokamak's torus. They comprise one 40° vacuum vessel sector, two toroidal field coils and the corresponding thermal shield panels, and weigh in excess of **1,250 tonnes**.

Nine pre-assemblies are required to close the torus.

First sector module was installed in the assembly pit on **11-12 May 2022**.

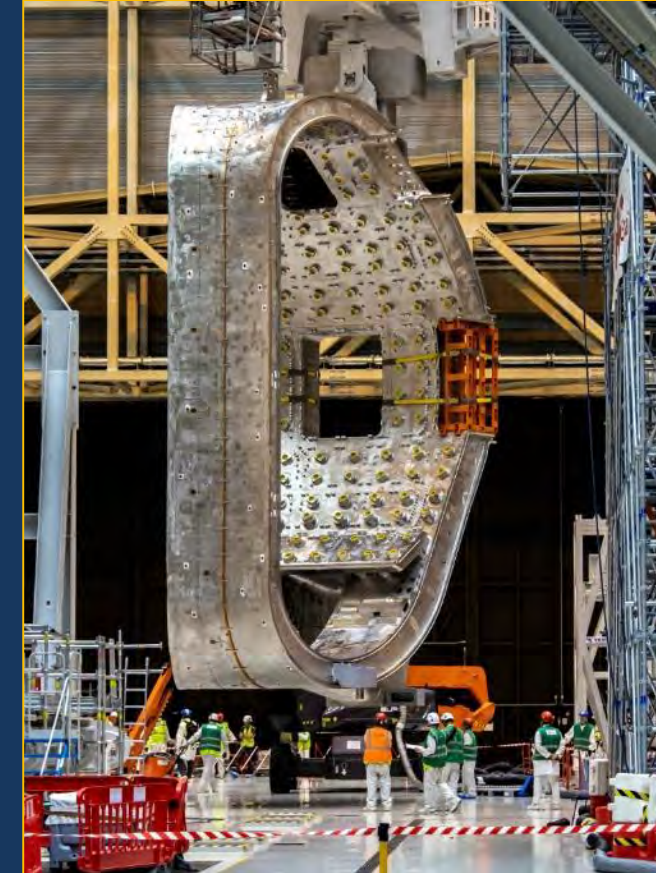
Issues were identified in thermal shield panels cooling pipes (stress corrosion cracking)

The challenges of FOAK components



Thermal Shield : stress corrosion identified in cooling pipes

Thermal Shield:
Repair plan being
investigated together
with repairs of Vacuum
Vessel sector bevels



Vacuum vessel sectors:
Dimensional non-conformities at
field joint bevel

Summary

The ITER Project has continued progressing in most areas in 2022:

- Assembly and installation: sector module assembly and plant commissioning;
- Project milestones: ~ 78% work completion toward First Plasma;
- Project/construction management: joint work by IO, DAs and suppliers to keep the Project on schedule and quality;

Several issues, such as Thermal Shield SCC, Vacuum Vessel sectors bevel repair and late deliveries will impact the First Plasma schedule, which is under assessment;

The new ITER Director-General is emphasising the importance of more IO and DAs joint work and close collaboration with industry to solve the technical challenges and proceed with tokamak assembly and plant installation as planned

Thank you for your attention



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