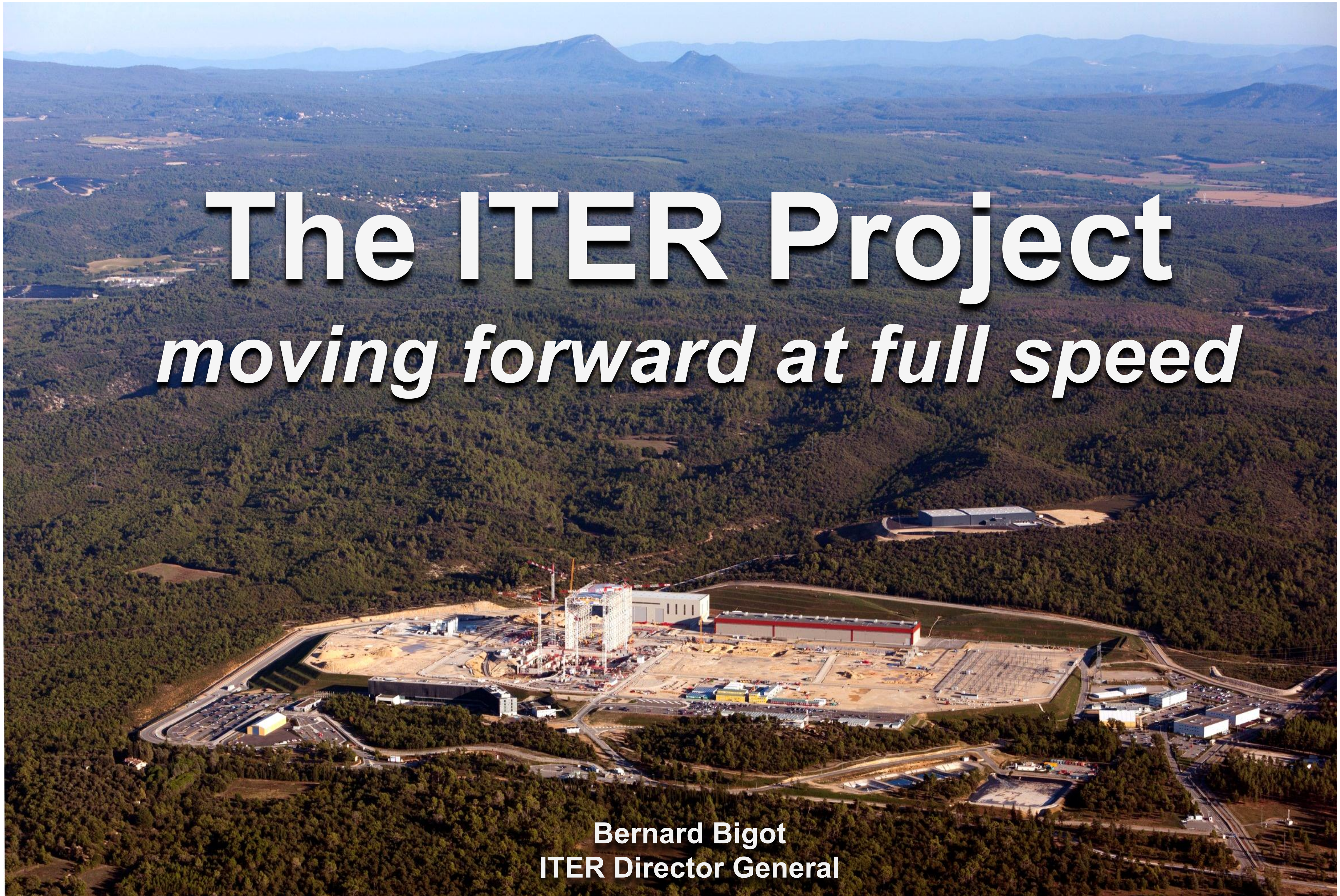
The ITER Project

moving forward at full speed

Bernard Bigot
ITER Director General



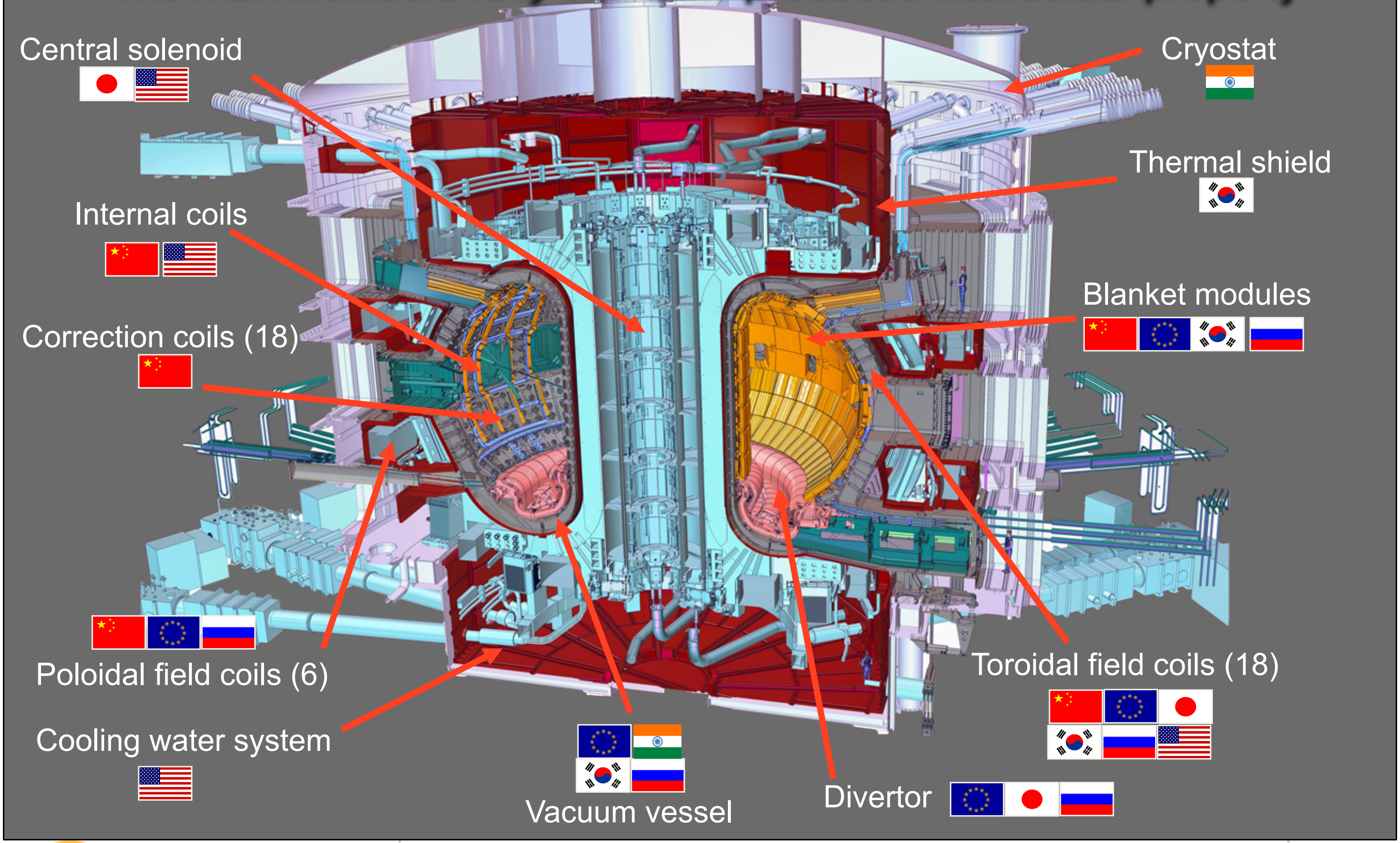
ITER

A multinational scientific collaboration without equivalent in history

A large-scale experiment to demonstrate the feasibility of fusion energy

Who manufactures what?

The ITER Members fully share the produced intellectual property



Addressing present ITER challenges (1)

- March 2015: facing external scrutiny of the ITER project for escalating costs, unrealistic schedule commitments, a lack of transparency, and failure to provide coherent management *(Management Assessment Report 2013)*
  - Agreed to take the position of Director General, based on an Action Plan and a pledge of ITER Members' support

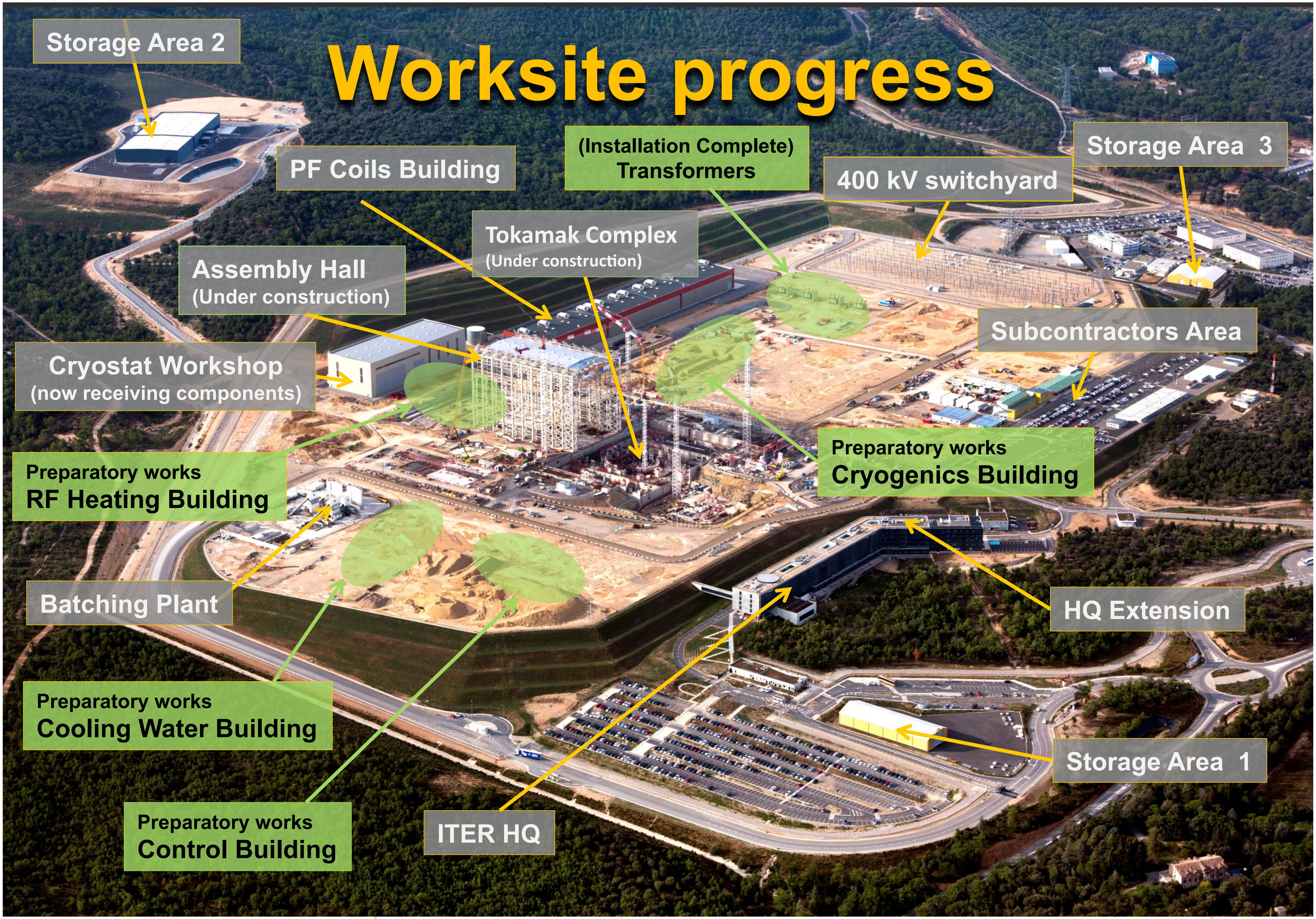
- Set clear priorities and aggressive timeline for reform **by end 2015**
  - Reorganization and integration of the ITER Central Team with Domestic Agencies (DG/DDG, Executive Project Board, Reserve Fund, Project Teams)
  - Finalization and stabilization of ITER critical component design
  - Comprehensive integrated bottom-up review of all activities, systems, structures, and components to build the ITER machine
  - Creation of an optimized resource-loaded schedule for timely, cost-effective construction and operation through start of D-T plasma.
  - Development of a strong, organization-wide project culture

Addressing present ITER challenges (2)

- November 2015: pivotal presentation to the ITER Council (IC-17)
  - Decisions taken by IC will enable establishment of new baseline by mid-2016
- Organizational changes completed to achieve a project culture
  - Completed hiring of senior management team
  - Integrated operations across departments, and across all Domestic Agencies
  - Created project teams in critical areas: Vacuum Vessel and Buildings
- Design finalized; Integrated Review completed
  - Full understanding of complexity: more than 1 million parts, more than 150,000 sequenced activities, 1200 suppliers
  - On the way to establish new baseline (scope, schedule, costs, risks)
- Prepared to set ITER on the right course for timely realization in the coming years

- *At the same time,* ***construction and component manufacturing at full speed***

Worksite progress



Recent on site achievements:

Tokamak Complex

Resting on 493 seismic pads, the reinforced concrete “B2” slab bears the 440 000 ton Tokamak Complex. Concrete casting of the B2 slab was finalized on August 27, 2014. Ongoing: installation of interior walls, formwork of B1, reinforcement of BioShield.

Recent on site achievements:

Assembly Hall

Before being integrated in the machine, the components will be prepared and pre-assembled in the building of 6000 m2 up to 60 meters. The 730-ton roof was put in place September 10-11, 2015 .

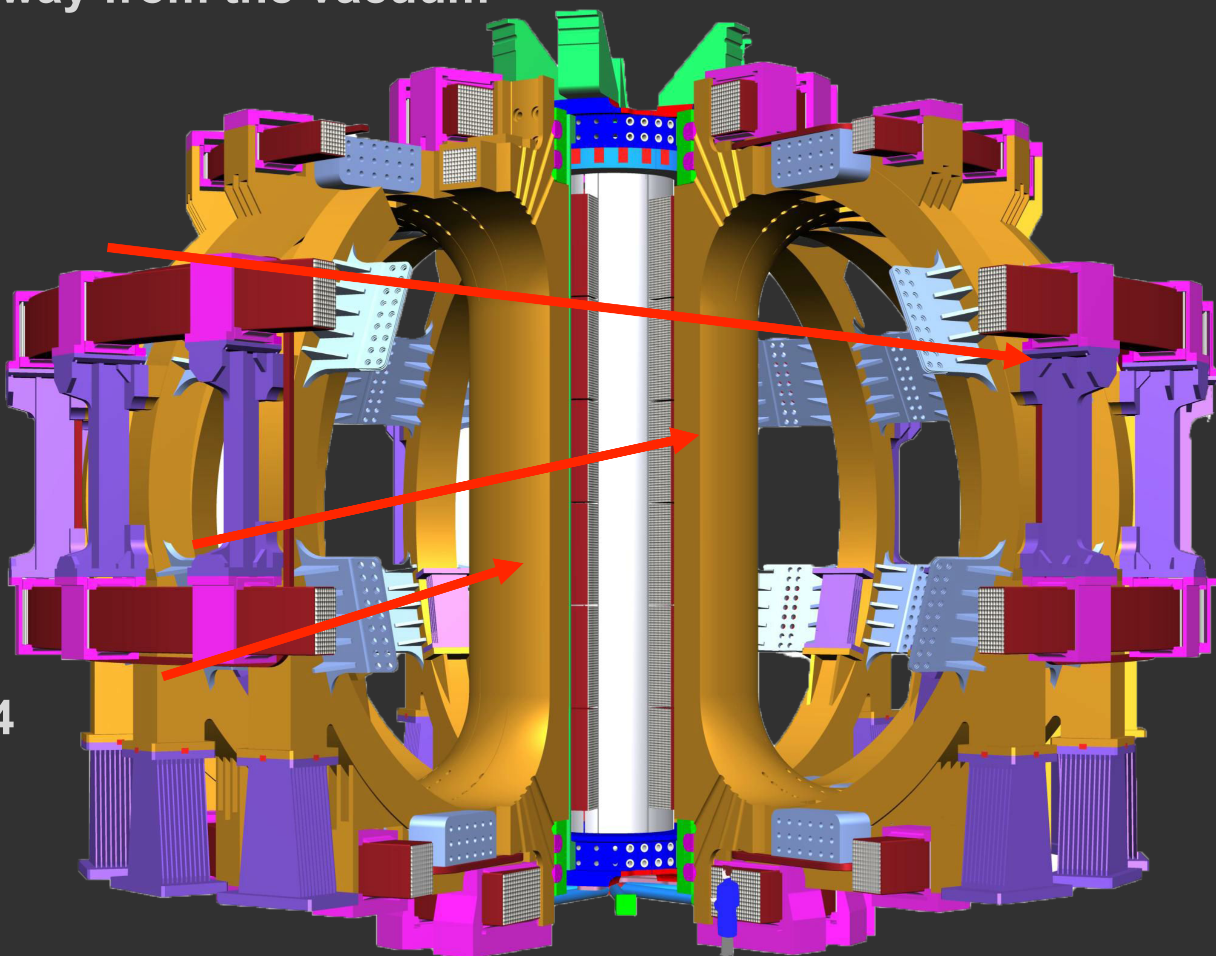
Cladding and Insulation of Assembly Hall

First components installed on site

Four US-procured 400 kV transformers have been positioned on the ITER platform. They are the first ITER plant components to be installed on site.

The largest magnetic cage!

An intense magnetic field, generated by powerful superconducting magnets shapes and confines the hot plasma, and keep it away from the vacuum vessel wall.



1 central solenoid, 31-metre high, powerful enough to lift an aircraft-carrier out of the water.

18 Toroidal Field Coils, 360 tons each.

6 Poloidal Field Coils, 8 to 24 m. in diameter.

A multinational success

200 km, 2,800 tons of superconductors (70% of the total required) have been manufactured and validated

- The single largest superconductor procurement in industrial history is drawing to a successful close.
- An eight-year campaign to produce the superconductors for ITER's powerful magnet systems is in its final stages, with nearly 70 percent of the conductor unit lengths accepted by the ITER Organization.
- Six ITER Members—China, Europe, Japan, Korea, Russia and the United States—have been responsible for the production of 200 kilometres (2,800 metric tons) of cable-in-conduit conductors, worth an estimated EUR 610 million.

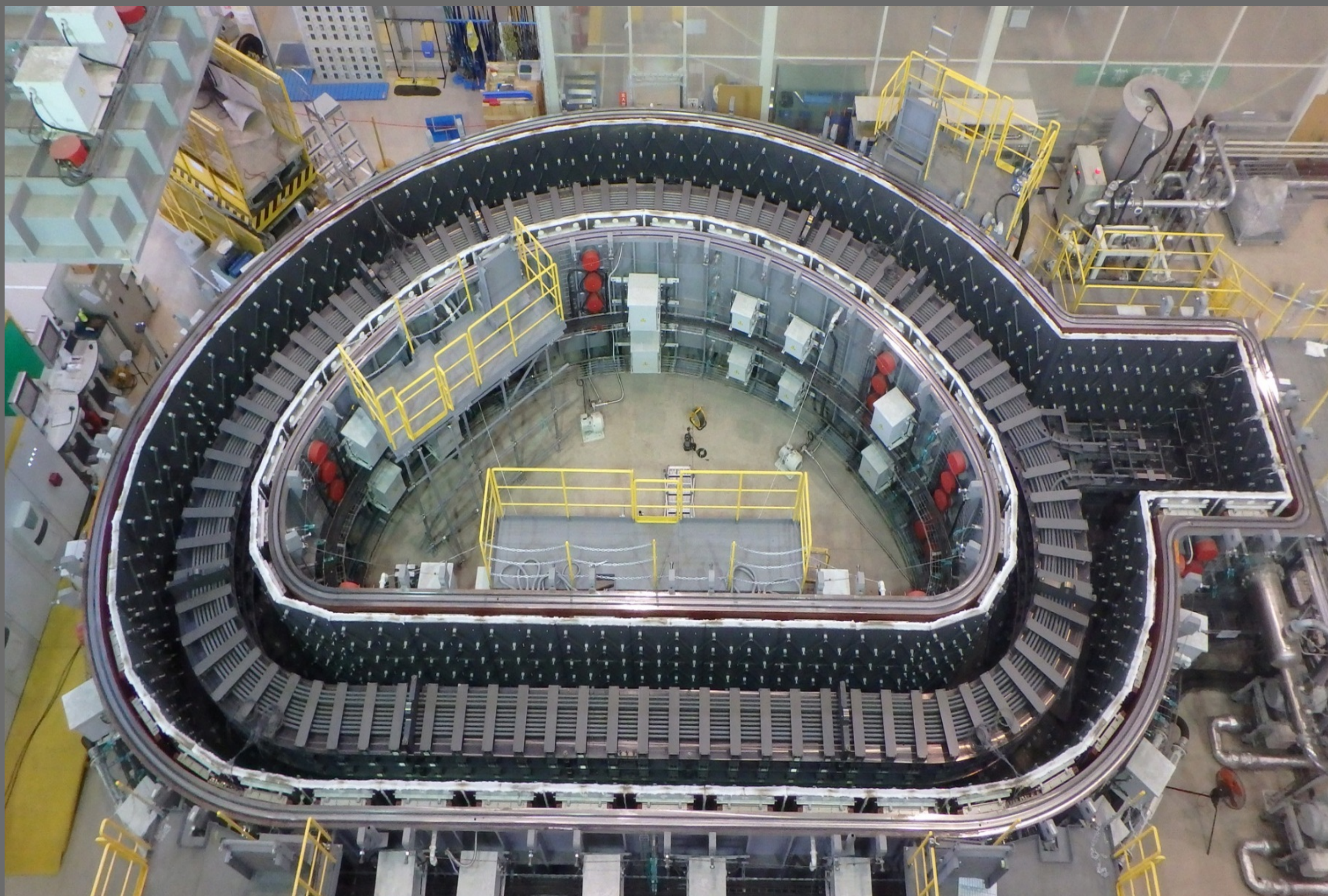
Manufacturing progress

USA

The US is responsible for the design, R&D, and manufacturing of the main central solenoid magnet (using conductor supplied by Japan), as well as the associated structure and tooling. At General Atomics' Magnet Technologies Center in Poway, California, winding operations began in April 2015 on a mockup module.

Manufacturing progress

Japan



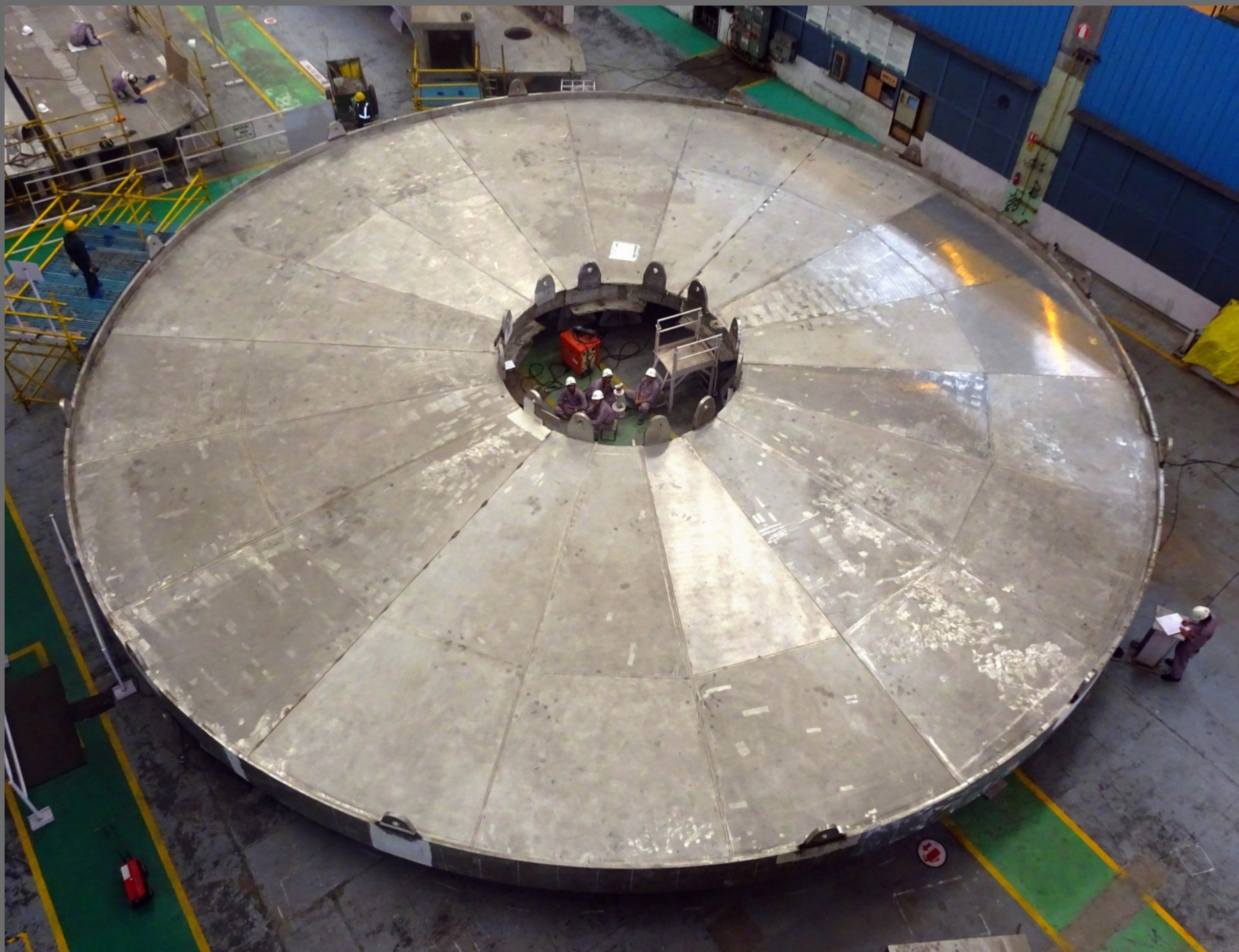
Japan is manufacturing half of the 18 giant toroidal field coils needed for ITER. Here, the D-shaped pancake windings are heat treated at 650 °C for 100 hours to react tin and niobium to form the superconducting compound niobium-tin.

Manufacturing progress
Russia

Russia completes its share of toroidal field conductor in June 2015. The milestone marks the end of a five-year campaign to manufacture 28 production lengths (more than 120 tons of material).

Manufacturing progress

India



India is responsible for the fabrication and assembly of the 30 x 30 meter ITER cryostat. Pictured, six 60° base plates are temporarily assembled at the factory in order to check tolerances prior to shipment to the ITER site.

Unloading of the first cryostat part

Unloading of the first cryostat part

Cadarache Cryostat Workshop

The Indian Domestic Agency has erected the Cryostat Workshop for assembly of the 30 x 30 metre cryostat,that will completely enclose the ITER Tokamak. The first cryostat elements, shown here, arrived at ITER last week. The remainder of the cryostat base will arrive tomorrow, 17 December, achieving the first Milestone ahead of schedule.

Manufacturing Progress
Europe

In February 2015, the final demonstration of the remote handling system for the divertor cassettes (an essential piece of the ITER Tokamak) was conducted at VTT Research Centre of the University of Tampere , Finland.

Manufacturing progress

China

China is responsible for the procurement of 14 poloidal field AC/DC converter units that will provide reliable, controlled DC power to the ITER poloidal field magnetic coils. The testing of a prototype converter unit opens the way to future batch production.

Manufacturing progress

Korea

In Korea, where two of nine vacuum vessel sectors are under construction, welding is carried out on the upper section of an inner shell—only a small piece of the full component.

Door-to-door delivery

14 January 2015:	First of four 90-ton transformers procured by the US and manufactured in Korea
20 March 2015:	Detritiation tank (20 tons), procured by Europe
2 April 2015:	Detritiation tank (20 tons), procured by Europe
20 April 2015:	Second of four 90-ton transformers procured by the US and manufactured in Korea
7 May 2015 :	Two 80-ton, 61,000-gallon drain tanks for the tokamak cooling water system, procured by US
21 May 2015:	Three 90-ton transformers procured by the US and manufactured in Korea
17 Sept 2015:	Two drain tanks (79t.) for the cooling system, one (46 t.) for the neutral beam system

ITER Council Commitment: results of IC-17

- Council expressed appreciation for organizational reform, focus on project culture, and progress on construction and manufacturing
- Took decisive steps to ensure ITER Organization can ***keep the momentum***
  - Approved schedule for 2016-17, referenced to "Best Technically Achievable Schedule"
  - IO Central Team and Domestic Agencies committed to a series of 29 milestones for 2016-17, referenced to this schedule
  - Council will monitor achievement of these milestones to verify ITER is staying on track
  - Council approved re-allocation of existing funds to ensure capability of meeting this schedule
    - Includes recruitment of 148 additional staff through end of 2017
- Council will commission an independent review of the proposed schedule, budget and staffing plan
  - Will use this review to validate or amend the Best Technically Achievable Schedule, and to establish a new consolidated ITER baseline by the next Council meeting (June 2016)

ITER is moving forward!

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Thank you for your attention
www.iter.org

ITER: effective organization for reliable results

1. *Director General given full authority to take technical decisions in best interest of the ITER Project*
   - ➢ *Pending technical issues jointly addressed for sensible coordinated resolution.*
2. *Simplified project-oriented organization with profound integration of IO Central Team and Domestic Agencies*
3. *Executive Project Board empowered to take timely decisions for effective global project management*
4. *Cost-effective "Central Reserve Fund" under DG's control to cover specific operations*
5. *Tight coordination of activities of joint IO-CT and DA Project Teams*
6. *Implementation of powerful coordinated tools for establishing a nuclear project culture*
7. *Human Resources optimized for improved efficiency and cost effectiveness*