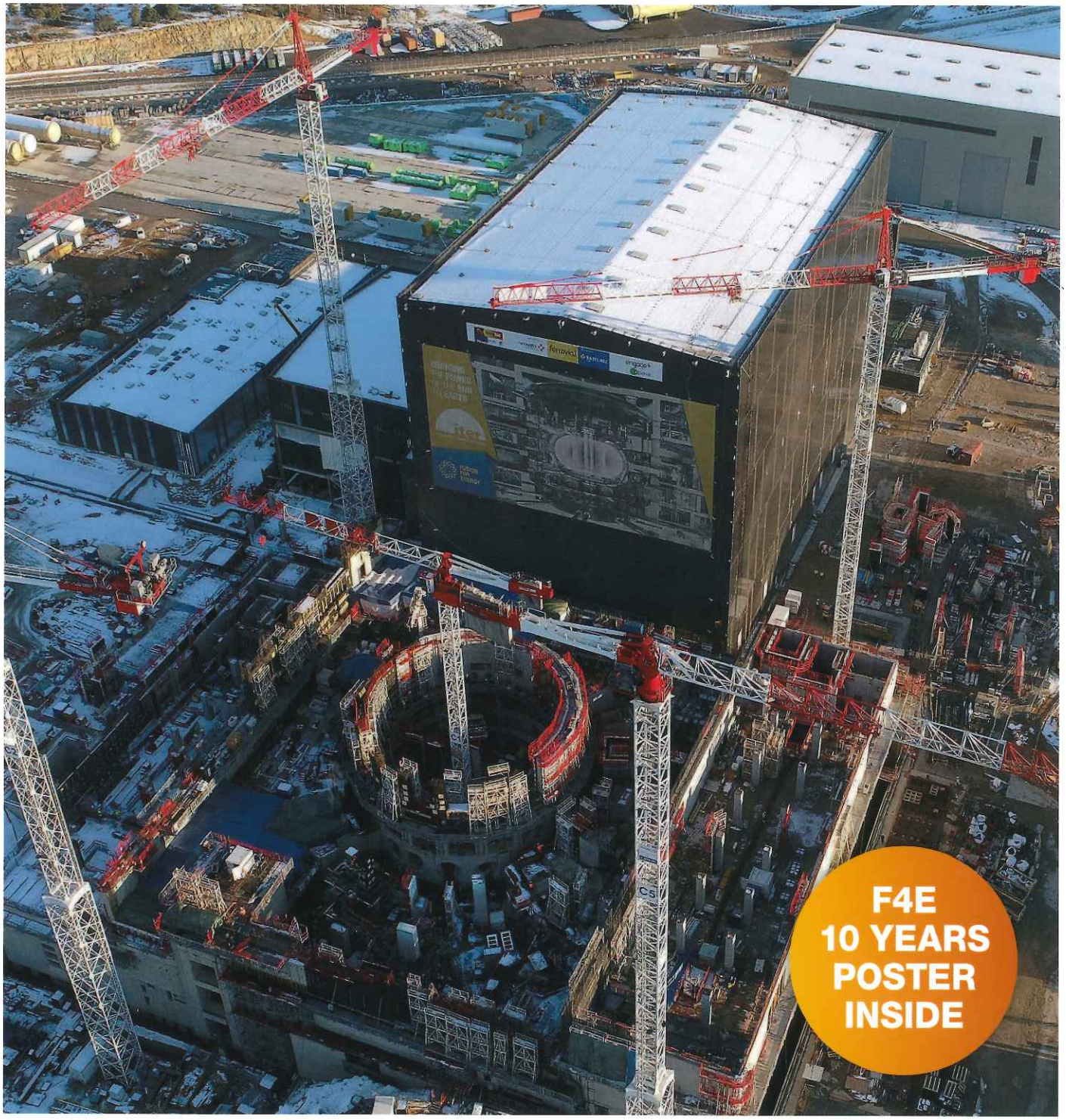
F4E NEWS

Fusion for Energy Magazine

No. 23 / February 2018



Aerial view of the ITER Tokamak Complex December 2017, © ITER Organization/EJF Riche

Europe's first ITER Toroidal Field magnet enters final manufacturing stage

The world's most high-tech magnet has departed from the ASG factory, La Spezia, where Europe is manufacturing its share of the ITER Toroidal Field coils. It is the first out of the 10 TF coils that will be produced in this factory and will eventually be installed in the machine in order to confine the super-hot plasma.

The case containing Europe's first magnet departing from the ASG factory, La Spezia, Italy

The component weighing 120 T, and measuring 9 x 16 m, has been transported by a remotely controlled truck to the harbour of La Spezia to reach the port of Marghera. The magnet will be delivered to SIMIC, where the cryogenic tests will be performed and finally, it will be inserted in its coil case. Then, the impressive component, weighing with the case a total of 300 T, will head to its final destination, the ITER site in Cadarache, France.

The magnet is the result of accurate design and manufacturing, combining robotised and computerised machining with limited manual intervention. F4E is financing the production of the ten magnets. At least 26 companies, counting more than 600 employees, have been involved in their fabrication.

A superconducting cable of 5.5 km length has been used to manufacture this first magnet. This special cable has undergone various fabrication procedures using state-of-the-art robotics such as automated welding, "vacuum chamber" testing phases so as to check the high quality of the component under operating conditions. The coil contains superconductive cables, made by the Italian Consortium for Applied Superconductivity (ICAS), coordinated by ENEA, involving the Italian companies Criotec Impianti and TRATOS Cavi. The steel plates, where the superconductive cable is inserted, have been manufactured by CNIM and SIMIC. The winding of the conductor and the manufacturing of the entire magnet has been carried out by ASG, Iberdrola Ingeniería y Construcción and Elytt for a cost of 158 million EUR awarded by F4E.

Alessandro Bonito Oliva, Head of Magnets for F4E, explains that: "the departure of Europe's first magnet from the ASG factory is a milestone of symbolic importance. This factory has been its "home" during the last five years. Various companies and their workforces have been daily working to reach this objective and I am proud to say that we are entering into the final manufacturing stage. Congratulations to all!"

ASG Superconductors Chairman and Shareholder, Davide Malacalza, said: "our company collaborates daily with the leading companies in the industry as well as with the main scientific research institutes and centers like CERN, ENEA, INFN, Fermilab, GSI. Working for the ITER project with F4E is another example of a virtuous partnership between the public and private sectors. ASG Superconductors CEO Sergio Frattini stated: "Today an impressive magnet left our factory. This confirms our leading position among the world leaders in the sector of superconducting magnets. We are extremely proud of the work we have put in collaboration with other companies. Many thanks to all the people who made this achievement possible. As we still have to deliver nine more magnets by 2019, we can't stop working and some of the remaining nine units are already at the final phases of the manufacturing."