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Progress of the CEA Contributions to the Broader Approach Projects

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The Broader Approach Agreement (BA) to ITER was signed jointly by Europe and Japan, in February 2007, for a period of ten years. The BA comprises three projects: IFERC, the International Fusion Energy Research Center, including the Computational Simulation Center, CSC, IFMIF-EVEDA, Engineering Design and Validation of a 14MeV neutrons irradiation facility for material testing and STP, the ITER Satellite Tokamak Program, with the JT-60SA project. CEA is participating respectively for 85%, 33% and 42% of the EU contribution to the three projects. The purpose of the BA is to support ITER operation and to contribute to DEMO design and studies. For IFERC-CSC, CEA provided the "Helios" supercomputer, having a performance of 1.5 Petaflop/s peak (1.2 Petaflop/s Linpack). During the last period 2012-2013, the operation feedback exhibits an overall utilization exceeding 85% summarized in effective computation approaching 30 Mnodes.hours/y and in several hundreds of associated scientific publications. The IFMIF/EVEDA project consists in Design and Validation Activities aiming at providing the IFMIF Intermediate Engineering Design, IIED which is now completed and in developing the Linear IFMIF Prototype Accelerator (LIPAc). The LIPAc injector, developed, built and tested at CEA is now being installed at Rokkasho. The prototype of the superconducting Half Wave Resonator (HWR) is now validated, and the Engineering Design for the SRF-LINAC proposed jointly by CEA and CIEMAT was approved. For JT-60SA, CEA is responsible for procuring the full Cryogenic System, 9 of the 18 Toroidal Field Coils, TFC, (the other 9 by ENEA) and the whole Magnet Supporting Structures, the TFC Cold Test Facility, CTF, and the cold test performance, as well as 5 Superconducting Magnet Power Supplies. Since the last IAEA conference, specification and contractual phases have been ended. All the related industrial contracts were placed to European manufacturers well renowned in the fusion field. Industrial designs as well as industrial qualifications for manufacturing processes are now achieved and manufacturing are ongoing. At about 3 years to the end of the BA agreement, this report synthesizes progress and status of the CEA contributions which, at various degrees have entered the realization or operation phases and are still progressing or working well.

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