

Current Status of ITER Broader Approach Activities within the Framework of Japan-EU Collaboration

- IFMIF/EVEDA & IFCRC Projects in Rokkasho and Satellite Tokamak JT-60SA Project in Naka -

The Implementing Teams of IFMIF/EVEDA and IFCRC, and the JT-60SA Team

Mission: The Earliest Realization of Fusion Energy

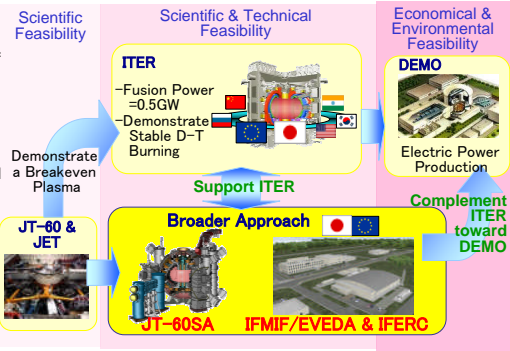
The Broader Approach (BA) is a Japan-EU collaborative project aiming at supporting the ITER Project and complementing developments toward a fusion DEMO reactor on the same period of ITER construction.

The major objective of ITER validate the scientific and engineering feasibility of fusion energy, by demonstrating a stable D-T burning operation. This, however, is considered insufficient for the earliest achievement of fusion energy.

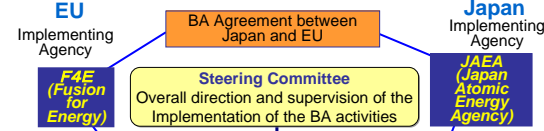
In parallel with the ITER project, additional and supplemental R&Ds are considered necessary as follows: (a) fusion materials development and their irradiation tests, (b) conceptual design and engineering assessments for the DEMO, (c) engineering developments of the breeding blanket including materials for tritium breeding, neutron multiplier, and also (d) research and developments of plasma to support ITER with exploring advanced tokamak scenarios.

On such a mutual understanding of fusion energy R&D strategy common to both Japan and EU, they agreed to initiate the BA Activities together with the ITER project.

Strategy toward Fusion Power



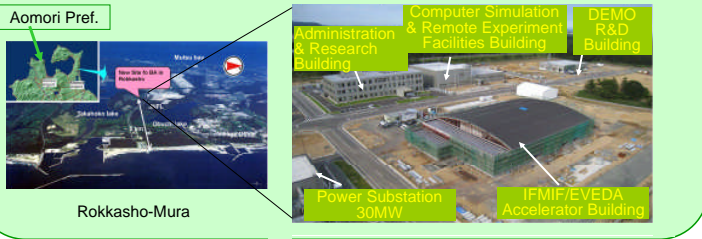
Management Structure for Broader Approach



Three Projects in BA:

- 1) Engineering Validation and Engineering Design Activities for the International Fusion Materials Irradiation Facility (IFMIF/EVEDA)
- 2) International Fusion Energy Research Center (IFERC),
 - a) DEMO Design and R&D Coordination Center
 - b) Computer Simulation Center
 - c) ITER Remote Experiment Center
- 3) Satellite Tokamak Program
 - Participation to Upgrade of JT-60 Tokamak to JT-60SA and Its Exploitation to Contribute to the Earliest Realization of Fusion Energy by Addressing the Key Physics Issues in ITER and DEMO.

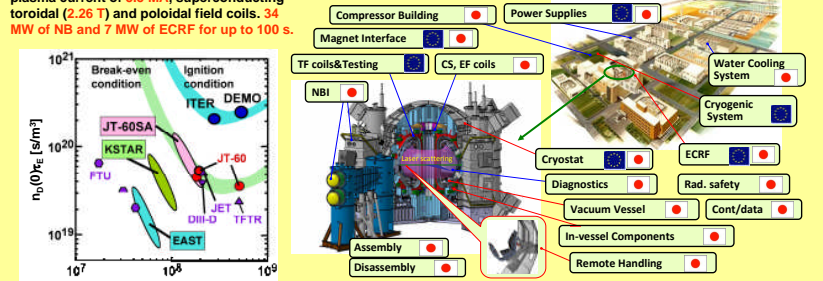
Building Construction Status of International Fusion Energy Research Center in Rokkasho-mura, Aomori Pref.



Satellite Tokamak JT-60SA Project

The mission of JT-60SA is capable of confining breakeven-equivalent class, high-pressure deuterium plasmas with the max. plasma current of 5.5 MA, superconducting toroidal (2.26 T) and poloidal field coils. 34 MW of NB and 7 MW of ECRF for up to 100 s.

Complete reconfiguration of the JT-60 by reusing as many existing infrastructure such as the power supplies, heating devices, cooling systems, etc., as possible. In-kind contributions for construction and financial contributions for exploitation are shared by EU and JA.

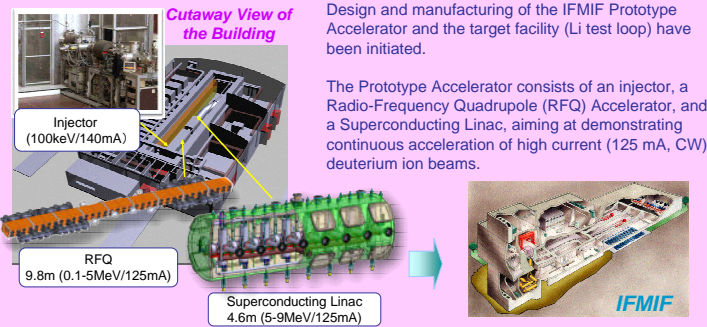


Japan-EU Sharing of Tokamak Facilities in Naka

IFMIF/EVEDA Project



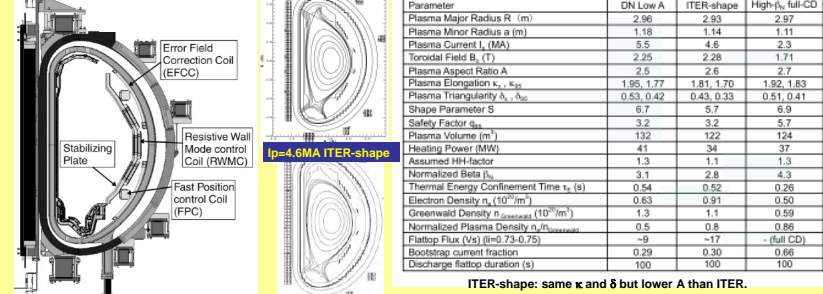
Cutaway View of the Building



Design and manufacturing of the IFMIF Prototype Accelerator and the target facility (Li test loop) have been initiated.

The Prototype Accelerator consists of an injector, a Radio-Frequency Quadrupole (RFQ) Accelerator, and a Superconducting Linac, aiming at demonstrating continuous acceleration of high current (125 mA, CW) deuterium ion beams.

In-vessel Components



ITER-shape: same κ and δ but lower A than ITER.

IFERC Project

DEMO Design and R&D Coordination Center



Computer Simulation Center & ITER Remote Experiment Center



For DEMO design and R&D activities, the first three years of 2007-9 as the first phase have been devoted to workshops and preparation for activities.

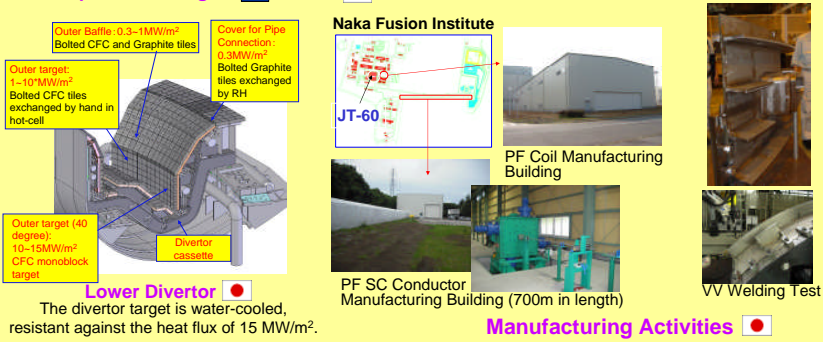
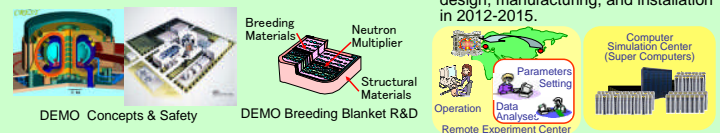
The following years will be planned for full-fledged activities in collaborative design and R&D works.

- Establish Common Conceptual DEMO Design (Assumption: Cost, Time Schedule, Safety Concept)
- Physics and Engineering Issues in R&D should be identified, and Preliminary R&D (Low Activated Materials, Breeding Blanket, Tritium Management, etc.)

For the Computer Simulation Center, selection of the high performance computer (the next-generation supercomputer) is now going for operation of early in 2012.

- D-T burning plasma simulation for ITER
- Advanced plasma behavior simulation for JT-60SA
- DEMO reactor design
- Advanced material simulation

The Remote Experiment Center will be tested in 2015 using JT-60SA, after design, manufacturing, and installation in 2012-2015.



ITER Broader Approach

ITER BA Activities, IFMIF/EVEDA, IFCRC, and Satellite Tokamak JT-60SA, are now being implemented within a tight active collaboration between Japan and EU, toward the earliest realization of fusion energy for human beings.