STATUS OF DESIGN AND PROCUREMENT ACTIVITIES IN JT-60SA

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The JT-60SA experiment is one of the three projects to be undertaken in Japan as part of the Broader Approach Agreement, conducted jointly by Europe and Japan, and complementing the construction of ITER in Europe. It is a fully superconducting tokamak capable of confining break-even equivalent deuterium plasmas with equilibria covering high plasma shaping with a low aspect ratio at a maximum plasma current of I_p=5.5 MA.

Plasma Parameter	High Ip	ITER-shape	High-β_N full-CD
Major Radius R (m)	2.96	2.93	2.97
Minor Radius a (m)	1.18	1.14	1.11
Plasma Current I_p (MA)	5.5	4.6	2.3
Toroidal Field B_o (T)	2.25	2.28	1.71
Plasma Aspect Ratio A	2.5	2.6	2.7
Plasma Elongation κ_x	1.95	1.81	1.92
Plasma Triangularity δ_x	0.53	0.43	0.51
Shape Factor S	6.7	5.7	6.9
Safety Factor q_{95}	3.2	3.2	5.7
Plasma Volume (m^3)	132	122	124
Heating Power (MW)	41	34	37
Assumed HH-factor	1.3	1.1	1.3
Normalized Beta β_N	3.1	2.8	4.3
Thermal τ_E (s)	0.54	0.52	0.26
Electron Density ($10^{20}/m^3$)	0.63	0.91	0.50
Normalized Density n_e/n_{GW}	0.5	0.8	0.86
Bootstrap current fraction	0.29	0.30	0.66
Flattop duration (s)	100	100	100

In late 2007 the BA Parties, prompted by cost concerns, asked the JT-60SA Team to carry out a re-baselining effort with the purpose to fit in the original budget while aiming to retain the machine mission, performance, and experimental flexibility. Subsequently the Integrated Project Team has undertaken a machine re-optimisation followed by engineering design activities aimed to reduce costs while maintaining the machine radius and plasma current. This effort led the Parties to the approval of the new design in late 2008 and hence final design and procurement activities have commenced. Due to the close linkage of all system parameters in a Tokamak, design changes have resulted in the TF magnet, plasma, vessel and in-vessel components, thermal shield, and cryoplant, allowing an improvement in the design of these components.

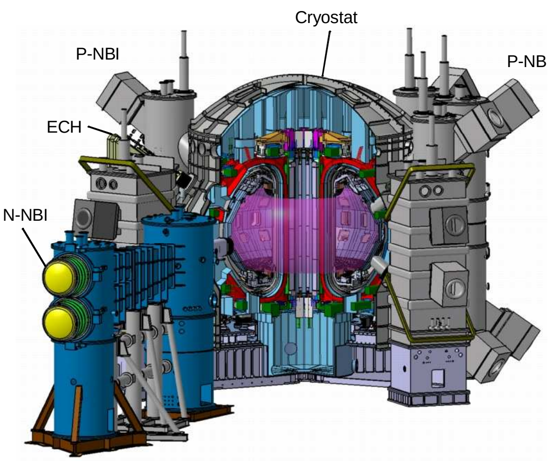

Fig.1 Bird's eye view of JT-60SA

The magnet system of JT-60SA consists of 18 Toroidal Field coils, a Central Solenoid with four modules, six Equilibrium Field coils. The vacuum vessel (VV) is composed of 18 double walled toroidal sectors. The divertor consists of inner and outer vertical targets with a V-shaped corner to enhance particle recycling. Three sets of copper coils consisting of a pair of fast plasma position control coils, 18 error field correction coils and 18 RWM control coils will be installed inside the VV. The cryostat consists of a vessel body and a base used for the gravity and seismic support of the machine. Other components such as thermal shield, power supplies, cryogenic system, water cooling system, N-NBI/Positive ion NBI (P-NBI)/ECH systems have also been re-designed.

The paper will describe the process leading to the re-baselining, the resulting final design and technical solutions and the present status of procurement activities.