

Summary Technical Specification

Blanket Support System Customisation

IO/10/3287/CFN

Objectives

The alignment of the ITER blanket modules to each other and to the magnetic centre of the tokamak must be ensured to very demanding tolerances by **custom-machining the blanket module support system**. The IO intends to place a contract for the design, manufacture and exploitation of a mock-up to qualify the customisation process

The customisation process will involve precise 3D measurements with an uncertainty of better than 0.05mm and machining of the support system components to better than $\pm 0.05\text{mm}$. Materials to be machined include 316L stainless steel, inconel 718, titanium / vanadium alloy and aluminium bronze. As several measurement processes, including laser tracker and photogrammetry, shall be assessed and qualified a temperature controlled metrology laboratory to $\pm 2^\circ\text{C}$ shall be required.

The objectives of the proposed contract are:

- Design and manufacture a mock-up of the blanket module support system, including a representation of the appropriate section of the ITER vacuum vessel wall. The mock-up should be designed to minimise cost while ensuring an accurate representation of the critical physical and functional interfaces. The mock-up should include removable representations of blanket manifolds, and in-vessel coils (for future trials outside the scope of this contract). The design phase shall include design of the measurement process, including establishing datum systems and references.
- Manufacture of the mock-up to the design approved by the IO
- Exploitation of the mock-up to qualify the blanket support system customisation process, specifically to assess the uncertainties of the measurement, custom-machining and assembly processes. The study should foresee at least 10 cycles of the complete process. The study should enable a comparative analysis between Articulated CMM arm, V-STARS digital photogrammetry, laser tracker with and without probing system. At least one set of measurements shall be performed using the equipment above benchmarked against a CMM (Coordinate Measuring Machine) accurate to 0.01mm and capable of measuring a 2m x 1.5m component in one measurement set-up.

ESTIMATED DURATION

Anticipated contract start mid-December 2010

Total duration: 36 weeks

Phase 1: 8 weeks

Phase 2: 10 weeks

Phase 3: 14 weeks

Final report 4 weeks

The Contractor should have extensive experience in precision machining, with well equipped facilities including appropriate machine tools capable of delivering components to the requirements of this specification.

The Contractor shall have extensive experience of precision metrology and have access to the specific measuring equipment mentioned above operating in an environment temperature-controlled within $\pm 2^\circ\text{C}$.

The Contractor shall have an ISO 9001 accredited quality system.

The Contractor shall be capable of importing CATIA v5 CAD models.

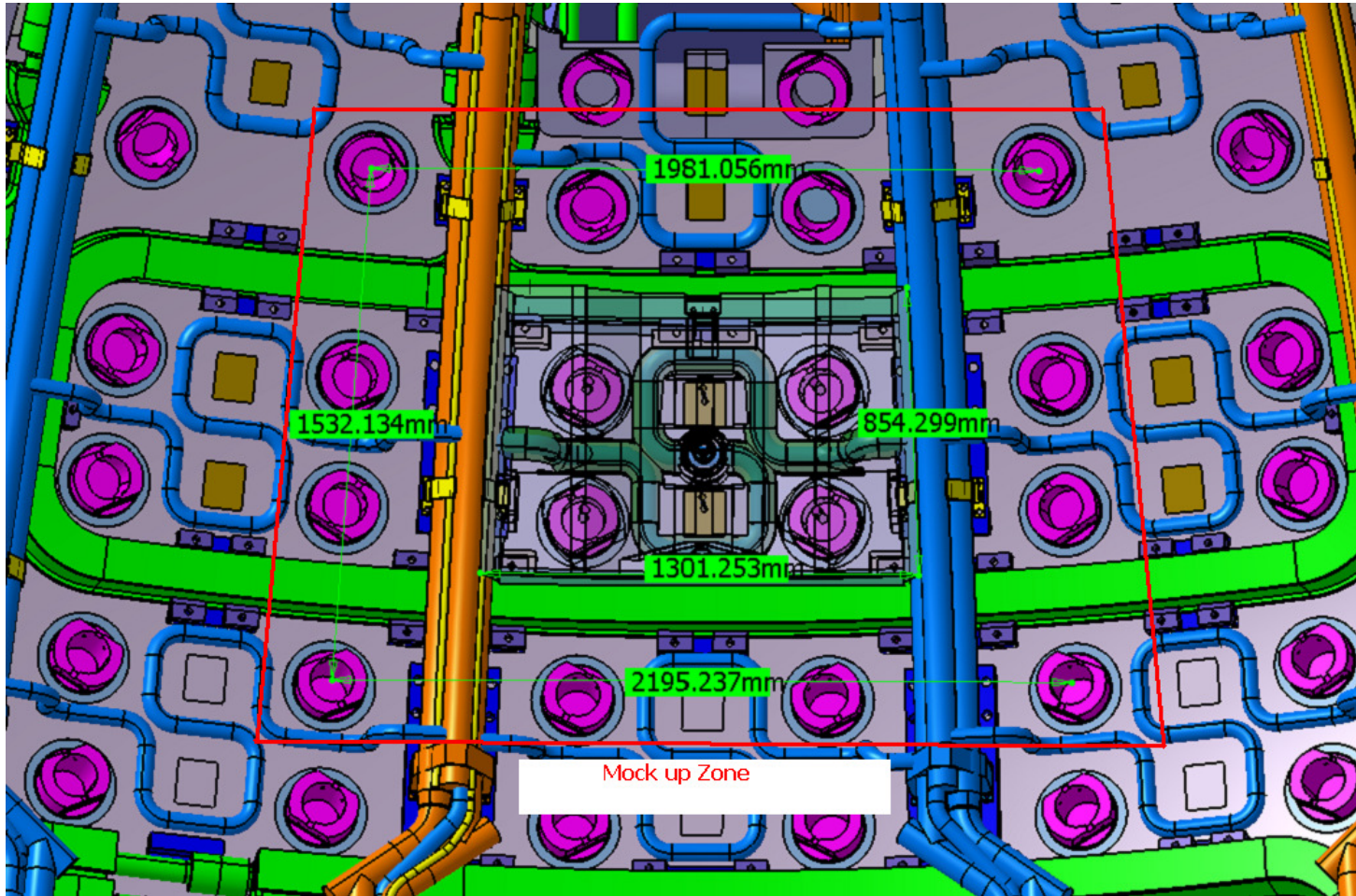


Figure 1 Support system zone to be included in mock-up