Modifications: Toroidal Support Structure (TSS)

- **Main constraints**
  - Varying thickness of sealing surface
  - Non-planar sealing surface
  - Toroidal and poloidal sealing surfaces across each other
  - Only 5 mm gap (Sealing + Insulation)

- **New requirements**
  - Vacuum tightness;
  - Electrical insulation at two poloidal cuts and at least one toroidal cut;
  - Supporting the stabilising shell and the FW

**Internal equatorial cut**
- (Vacuum sealing, Elect. continuity)
  - Thin resistive plate configuration
  - Thin resistive plate (TRP) to provide fully welded sealing
  - 1 mm thickness and 400 mm length along poloidal direction

**External equatorial cut**
- (Vacuum sealing, Elect. continuity)
  - Fully welded configuration
  - Most suitable configuration considering port openings, which make surface non-planar
  - 5 mm thick spacer of SS304L will be welded to top and bottom TSS
  - Lip weld will be done at inner edge (plasma side) of spacer TSS to avoid trapped air
  - Intermittent structural weld at the ex-vacuum side will provide mechanical stiffness

**Technological feasibility: Mock-up**
- The designed solutions need to show technological feasibility for its critical requirements.
- Prefabrication and assembly steps need to be manufactured by fabrication of mock-up
- A simplified mock-up on cylindrical pipe is proposed as shown in Fig. a. fully welded solution (vacuum sealing).
- b. thin resistive plate (vacuum sealing, electrical insulation), c. ceramic-metal brazed ring (vacuum sealing, electrical insulation, mechanical continuity). d. Ceramic plate for insulation, e. Bolted connection with insulating bushings

**Conclusion**
- Vacuum sealing techniques are identified for TSS
- Supporting rings are designed for In-TSS components
- New assembly sequence proposed
- Mock-up is designed to qualify proposed technological solutions
- Structural behaviour of RFX-mod2 assembly is estimated and verified