

STATUS OF DTP2 - DEVELOPMENT PLATFORM FOR ITER

M. Siuko¹, H. Saarinen¹, J. Järvenpää¹, H. Mäkinen¹, K. Salminen¹, J. Mattila²,
A. Muhammad², P. Valkama², L. Aha², C. Damiani³, L. Semeraro³, S. Esque³, J. Palmer⁴

¹ VTT Technical Research Centre of Finland, P.O. Box 1300, FI-33101 Tampere, Finland

² Tampere University of Technology, Department of Intelligent Hydraulics and Automation, P.O. Box 589, FI-33101 Tampere, Finland

³ Fusion for Energy, Torres Diagonal Litoral B3, Josep Pla 2, 08019 Barcelona, Spain

⁴ ITER International Organization, Cadarache, 13108 St. Paul Lez Durance, France

Corresponding author: mikko.siuko@vtt.fi

A major issue for the successful multi-technological R&D -work and long term availability of ITER reactor is the ITER reactor maintenance. Also, all the in-vessel components should be able to be replaced when seen necessary, due to maintenance, or due to experimental reasons. All the in-vessel operations have to be done by remote controlled devices.

Therefore, careful assessment of the associated RH equipment and their operation and the operation sequences by way of full-scale prototypes and mock-ups is considered an essential activity.

The use of virtual techniques and virtual prototyping are the most useful first steps for developing maintenance cycles and devices. However, the virtual prototyping shows just the behavior considered and modeled by designers. Therefore, the real hardware is needed to expose the clearances, show the flexibility of structures, to point out the remaining weak points of the proposed design.

The ITER divertor maintenance equipment will be tested in a test facility designated for that, DTP2, Divertor Test Platform, located in VTT facilities in Tampere, Finland. The development and testing work is carried out by researchers of VTT and TUT.

The test facility consists of 27 deg. segment of vessel and radial maintenance tunnel, the divertor component transporters and various tools used for refurbishment. Essential element for the remote handling system is an operator control and command system with combination of graphical user interface, visualization system and camera vision system. The first experiments of ITER divertor maintenance are concentrating on replacement of so called "Second Cassette". For that, a heavy transportation robot, CMM and assisting manipulator arm WHMAN are used. The work includes development of the operation sequences, development of device mechanics, sensors and control, development of operator interfaces.

Same time, the next experiments are prepared by planning extension for the DTP2 mechanical structure and preparing procurement of next divertor component handling devices.

In the paper the DTP2 current status is presented and future activities are discussed. The experiments done are explained and the results obtained are presented.