Contribution ID: **610**   Type: **not specified**

P2.038 Concepts of the new ASDEX-Upgrade flight simulator

Tuesday, 18 September 2018 11:00 (2 hours)

Discharge scenarios and control schemes in ASDEX Upgrade (AUG) are evolving more and more complex. Especially in physics investigations for ITER and DEMO sophisticated scenarios exploit the operational space. This increases the probability of design flaws or human errors in the pulse configuration, but also aggravates the potential damage in the failure case.

The ASDEX Upgrade Flight Simulator, will provide a fast and efficient simulation tool for testing and validating discharge scenarios, as well as control and monitoring functions, during their development and immediately prior to experimental pulse execution. This ensures, that the scenarios and settings are adequate to reach the experimental goals and that the margins to operational limits are sufficiently large also during the dynamic evolution of the discharge.

Simplified physics and plant system "control" models combined with a representation of the ASDEX Upgrade Discharge Control System (DCS) allow for fast simulation runs with reasonable prediction quality. In the simulation an event generator can trigger plasma instabilities, technical failures and external events to test the resilience of the designed pulse against unplanned incidents. The granularity of modelling shall be customisable, such that the simulator can also be used for detail investigations with elaborate physics at the cost of longer simulation time.

As a basis for implementation the ITER Plasma Control System Simulation Platform (PCSSP) has been chosen. The flight simulator, extends PCSSP with an ASTRA co-simulator for the ASDEX Upgrade tokamak model and with custom modules for its actuators, diagnostics and control system. Plugins will enable reading original AUG discharge programs and configuration files, as well as storing the results in the AUG shotfile database.

Presenter: Dr TREUTTERER, Wolfgang (E1 Max-Planck Institute for Plasma Physics)

Session Classification: P2