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## Assessment of controllers and scenario control performance for ITER first plasma

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Assessment of Controllers and Scenario Control Performance for ITER First Plasma

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The ITER PCS is a key component of ITER operation, with performance requirements much more stringent than existing devices. We report on assessment of control algorithms and control scenarios comprising the prototype ITER PCS design, which is the starting point for development of the final design for first plasma operation. The scenarios assessed include commissioning of magnetics and gas systems using the PCS and the first plasma scenario, which includes neutral gas prefill, plasma breakdown/burnthrough, and initial evolution of equilibrium and plasma density. Systems involved in first plasma control include ECH, PF and CS coils and power supplies, gas valves, and magnetic, neutral pressure, and electron density diagnostics.

Assessment involves simulation of an ITER PCS model connected in feedback with an ITER plant model, both executing in the Plasma Control System Simulation Platform (PCSSP). PCSSP is presently undergoing upgrades as part of PCS development to provide support for algorithm development, PCS architecture evaluation, and control performance assessment. In particular, PCSSP provides general methods for extensive testing of performance in the face of multiple adverse events, such as plasma instabilities growth, disruptions, or plant system faults. Definition and application of performance metrics to control simulation results will be discussed.

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