

Topic: Diagnostics, Data Acquisition, Control and Protection

LATEST ADVANCEMENTS IN THE DIII-D PLASMA CONTROL SYSTEM

B.G. Penaflor, J.R. Ferron, A.W. Hyatt, M.L. Walker, R.D. Johnson, D.A. Piglowski

General Atomics, PO Box 85608, San Diego, CA 92186-5608, USA
penaflor@ga.com

A number of important software and hardware changes have recently been made to the DIII-D Plasma Control System (PCS) to further its capabilities in support of Fusion research. The PCS is a highly customizable real-time control application developed at General Atomics used to manage the many parameters that affect plasmas produced on the DIII-D Tokamak. Included in the most recent updates to the PCS are refinements to the real-time Electron Cyclotron Heating (ECH) capabilities which have improved overall performance and reliability for fast and precise aiming of the mirrors used to control direct ECH power into the plasma. The introduction of new real-time streaming data acquisition hardware has provided a means for acquiring plasma electron temperatures and densities from the Thomson System along with data from the Electron Cyclotron Emission (ECE) diagnostic for use in PCS feedback control algorithms. The new fiber optically connected streaming digitizers allow PCS computers located in one part of the Tokamak facility to easily communicate with remotely located diagnostic systems in other parts of the lab, in addition to being able to transfer high frequency data (sampled at 500KHz) for a large number of channels in real-time. . Details of the most recent PCS enhancements will be provided along with a more thorough description of the latest software and hardware architecture.