

## STATUS OF DIII-D PLASMA CONTROL\*

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A key component of the DIII-D Advanced Tokamak and Radiative Divertor Programs is the development and implementation of methods to actively control a large number of plasma parameters. These parameters include plasma shape and position, total stored energy, density, RF antenna loading resistance, radiated power and more detailed control of the current profile. To support this research goal, a flexible and easily expanded digital control system has been developed and implemented.<sup>1</sup> We have made parallel progress in modeling of the plasma, poloidal coils, vacuum vessel, and power system dynamics and in ensuring the integrity of diagnostic and command circuits used in control. Recent activity has focused on exploiting the mature digital control platform through the implementation of simple feedback controls of more exotic plasma parameters such as enhanced divertor radiation, neutral pressure and MARFE creation and more sophisticated identification and digital feedback control algorithms for plasma shape, vertical position, and safety factor on axis [ $q(0)$ ]. A summary of recent progress in each of these areas will be presented.

<sup>1</sup>J.R. Ferron, A.G. Kellman, E. McKee, T.H. Osborne, P.E. Petrach, T.S. Taylor, J. Wight, E.A. Lazarus, "An Advanced Plasma Control System for the DIII-D Tokamak," Proc. of 14th IEEE/NPSS Symposium on Fusion Engineering, 761 (1994).

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