This paper describes the current status of real-time digital plasma control on the DIII–D tokamak fusion experiment. The digital plasma control system (PCS) has been in place at DIII–D since the early 1990's and continues to expand and improve in its capabilities to monitor and control plasma parameters. The PCS monitors over 200 tokamak diagnostics using a real-time data acquisition system capable of acquiring a new set of samples once every 60 μs. This information is then used to feedback control a variety of parameters including plasma shape and position.

Several improvements to the PCS have contributed to the advancement and understanding of fusion energy science at DIII–D. Among the more recent of these improvements has been the successful incorporation of advanced techniques for reconstruction of plasma equilibrium parameters in real-time. An isoflux control method using these improved plasma parameter calculations has greatly enhanced the ability of achieving desired plasma targets on the DIII–D tokamak.

Future plans for the system include possible upgrades of the real time computers, further links to other DIII–D diagnostics, and joint collaborations with other tokamak experiments including Princeton's NSTX.