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Non-Solenoidal Startup of the Ultra-Low Aspect Ratio Pegasus ST¹ N.W. EIDIETIS, D.J. BATTAGLIA, M.W. BONGARD, M.J. FROST, G.D. GARSTKA, A.C. SONTAG, B.J. SQUIRES, E.A. UNTERBERG, University of Wisconsin-Madison — Pegasus is an extremely low aspect ratio tokamak exploring quasi-spherical, high-pressure plasmas and developing plasma formation and control techniques for future ST/tokamak applications. Non-inductive startup has been demonstrated using washer gun current sources in the lower divertor region. The injected current initially follows the helical structure of the crossed toroidal and vertical fields, but at extremely low field applied field ($B_V \approx .005$ T, $B_T \approx .01$ T) relaxation to a tokamak-like plasma occurs. Toroidal currents of 50 kA have been driven by less than 4 kA injected current. $I_N > 12$ MA/m-T is observed in these plasmas. Compatibility with ohmic operation has been demonstrated by successful hand-off of gun-produced plasmas to ohmic current drive. A mid-plane gun system, easily implemented on any machine with mid-plane port access, is presently under development. The formation of non-inductive plasmas and hand-off to ohmic induction has been demonstrated using this system. Current drive experiments using PF induction of a mid-plane seed plasma are underway.

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