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Electron-Beam Generated Air Plasma: Electrical and Optical Diagnostic Details ROBERT VIDMAR, University of Nevada, Reno, KENNETH STALDER, Stalder Technologies and Research — Diagnostics associated with a pulsed 1-ms 100-keV 20-mA electron beam that generates air plasma are discussed. A mesh sensor measures the beam current up-stream to an electron-beam transmission window. The transmission window separates the electron source from a 400-liter test cell, operated from 1 mTorr to 635 Torr using laboratory air. 10-GHz RF amplitude and phase measurements quantify electron density. A diode array spectrometer is used to measure optical emissions from the plasma typically dominated by neutral and ionic nitrogen emissions. UV absorption at 254 nm is used to detect ozone. Concentrations of other species such as H_2O , CO_2 , CO, NO, and N_2O are monitored by tunable diode laser absorption spectroscopy. Data from these diagnostic systems, obtained during a single shot, will be discussed and compared. This work is supported by the Air Force Research Laboratory under grant numbers FA9550-04-1-0015 and FA9550-04-1-0444; and State of Nevada matching funds.

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