Abstract Submitted for the DPP10 Meeting of The American Physical Society

High Current Systems for HyperV and PLX Plasma Railguns SAMUEL BROCKINGTON, ANDREW CASE, SARAH MESSER, RICHARD BOMGARDNER, LINCHUN WU, RAYMOND ELTON, F. DOUGLAS WITH-ERSPOON, HyperV Technologies Corp. — HyperV has been developing coaxial pulsed, plasma railgun accelerators for PLX and other high momentum plasma experiments. The full scale HyperV coaxial gun accelerates plasma armatures using a contoured electrode gap designed to mitigate the blow-by instability. Previous experiments with the full scale gun successfully formed and accelerated annular plasma armatures, but were limited to currents of up to only ~ 400 kA. In order to increase full scale gun performance to the design goal of 200 μ g at 200 km/s, the pulse forming networks required upgrading to support currents up to ~ 1 MA. A high voltage, high current field-effect sparkgap switch and low inductance transmission line were designed and constructed to handle the increased current pulse. We will describe these systems and present initial test data from high current operation of the fullscale coax gun along with plans for future testing. Similar high current accelerator banks, switches, and TM lines will also be required to power PLX railguns which are planned to operate at 8000 μg at 50 km/s. The design of that experiment may require the capacitor banks to be located as much as 10 feet from the gun. We discuss the available options for low inductance connections for these systems.

> Samuel Brockington HyperV Technologies

Date submitted: 03 Sep 2010

Electronic form version 1.4