# Commissioning of the 20-bit Vistec EBPG5000plus at the Melbourne Centre for Nanofabrication

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The Melbourne Centre for Nanofabrication (MCN) is a new multi-disciplinary facility, built with the purpose to serve the Australian research community in the rapidly evolving nanoscience and nanotechnology area.
In order to provide fast, accurate and repeatable writing at the nano-scale, a Vistec EBPG5000plus Electron Beam Lithography (EBL) tool has been installed in a purpose-built clean room. The machine, which is commissioned to run at 50 and 100 kV, is equipped with a 20 bit Digital-to-Analog-Converter (DAC) board on its pattern generator, running up to 50 MHz, and with a continuously variable field size up to 1 mm at both the acceleration voltages. The machine is theoretically able to provide a 2.5 nm spot size at 100 kV and 100 pA of current.

The aim of this paper is to present the results of the commissioning of the tool, in terms of stability, overlay and stitching accuracy. Particular emphasis will be devoted to sub-10 nm lines obtained on resist at full beam deflection, as shown in Figure 1. Results on a custom test pattern, highlight the positioning accuracy of the tool and its ability to handle many different, complex shapes in a single writing field.

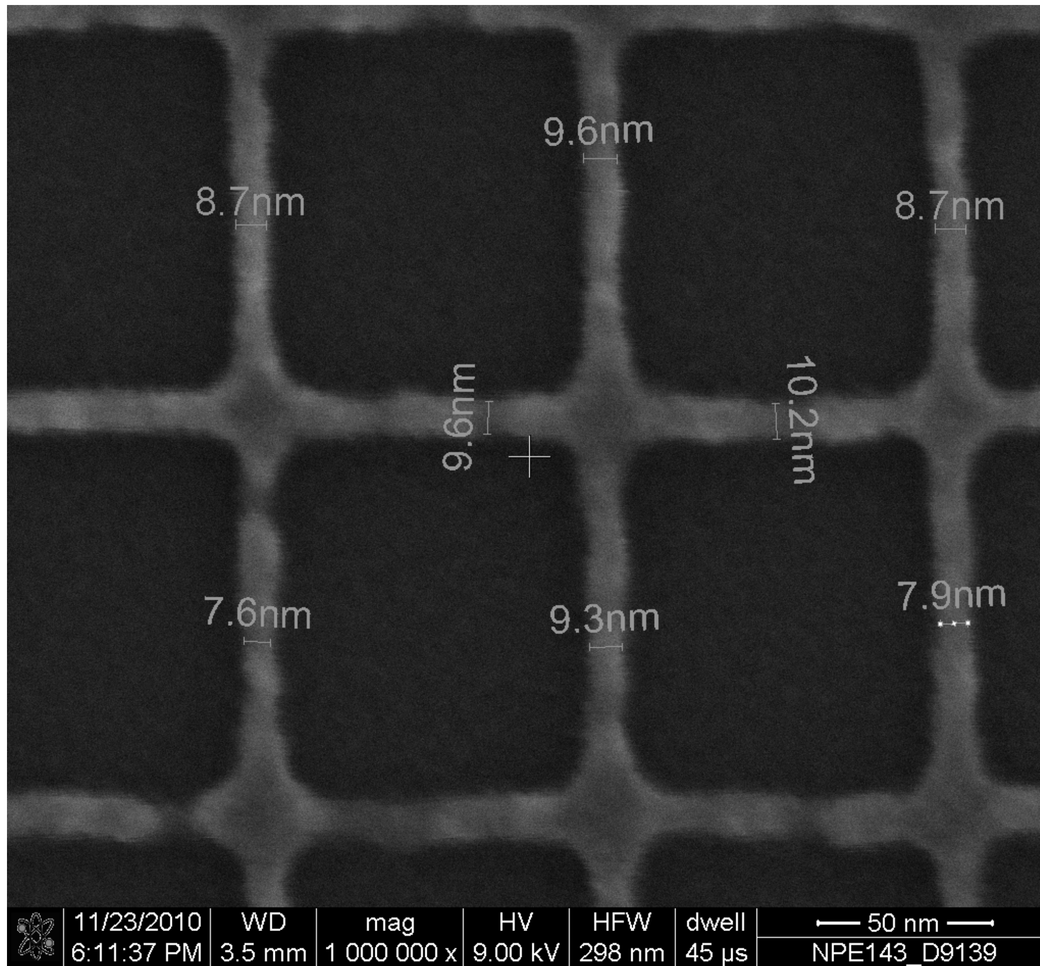


*Figure 1: sub-10 nm lines at 500 µm beam deflection:* the picture shows the standard Vistec resolution pattern, written at 100 kV, 200 pA of current, on Hydrogen Silsesquioxane (HSQ) and 1 mm field size. The image above has been taken at the corner of the written pattern, at full 500 µm beam deflection.