**An automated system for flow and pressure control at NMIA’s liquid hydrocarbon flow facility**

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NMIA’s liquid-hydrocarbon flow facility at Londonderry has the capability to calibrate flowmeters in Propane and Butane up to 1700 L/min with an uncertainty of 0.04%.(k=2), using a flow loop equipped with a 40 L prover, 4000L LPG tanks and mechanically variable 30 kW pumps. Flow rate and line pressure are set by the adjustment of pump speed and throttling and pump bypass valves. Although the collection of calibration data is fully automated, adjusting the system to a new set-point of pressure and flow has, until now, been performed manually, to ensure that the system does not inadvertently pass through an unsafe operational regime. Efforts to automate this process have been limited by the rapid changes in line impedances with flow-rate, temperature and the loading imposed by the meters and their associated pipework. For example: flow-rate under highly-throttled high-pressure conditions is strongly dependent on the throttle setting, potentially leading to meter overspin. NMI has developed an “intelligent ant” algorithm to safely walk the system through the parameter space of valve and pump settings and the resulting flows and line pressures, allowing full automation of calibration of flowmeters.