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Analysis of High Speed Jets Produced by a Servo Tube Driven Liquid Jet Injector ROCCO PORTARO, HOI DICK NG, Concordia University — In today's healthcare environment many types of medication must be administered through the use of hypodermic needles. Although this practice has been in use for many years, drawbacks such as accidental needle stick injuries, transmission of deadly viruses and bio-hazardous waste are still present. This study focuses on improving a needle free technology known as liquid jet injection, through the implementation of a linear servo tube actuator for the construction of a fully closed loop liquid jet injection system. This device has the ability to deliver both micro- and macro- molecules, high viscosity fluids whilst providing real time control of the jet pressure profile for accurate depth and dispersion control. The experiments are conducted using a prototype that consists of a 3 kW servo tube actuator, coupled to a specially designed injection head allowing nozzle size and injection volume to be varied. The device is controlled via a high speed servo amplifier and FPGA. The high speed jets emanating from the injector are assessed via high speed photography and through the use of a force transducer. Preliminary results indicate that the system allows for accurate shaping of the jet pressure profile, making it possible to target different tissue depths/types accurately.

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