

**DATA ACQUISITION, CONTROL, AND IMAGING FOR PELLET FUELING
SYSTEMS BASED ON LABVIEW***

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An automated pellet injection control system that provides pellet formation, precise firing control, data collection and video diagnosis of multi-barrel pipe-gun injectors has been developed at ORNL. The system is based on a personal computer running LabView and allows the user to setup and control the pellet injector for fast pellet formation and highly repeatable results. The control system is capable of controlling valves and heaters to form each pellet for up to four pipe guns. The pellet firing from both a fast acting propellant valve and mechanical punch is controlled with microsecond precision. Data is collected by 8 fast digitizer channels at a rate of up to 10 MHz and 16 slower channels at a rate up to 333 kHz. Four 240 frame/s cameras are triggered to capture individual high resolution video frames of each pellet in flight. The video images are stored in JPEG format and are used to analyze the pellet size and integrity. After each pellet shot the data collected from microwave cavity, light gate, and shock diagnostics are displayed on the users screen along with the pellet's calculated speed and mass. This data along with the pellet pictures are automatically archived and printed out after each shot if selected by the user. The control system also has the capability of running different experiment templates with unique setup and output characteristics by simply changing the experiment variable. An overall description of the system and examples of its use on different pellet injectors will be presented.

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