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AUTOMATIC DATA PROCESSING AND DATA DISPLAY SYSTEM FOR THE HERMES III ACCELERATOR

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This paper describes the software changes made to the data processing and display system for HERMES III accelerator at the Simulation Technology Laboratory (STL) at Sandia National Laboratories, New Mexico. The HERMES III accelerator is a gamma ray simulator producing 100kRad[Si] dose per shot with a full width half max pulse duration of ~25 nanoseconds averaging six shots per day. For each accelerator test approximately 400 probe signals are recorded over approximately 65 digitizers. The original data processing system provided the operator a report summarizing the start of probe signal timings for groups of probes located within the power flow conductors. This timing information is indicative of power flow symmetry allowing the operator to make necessary adjustments prior to the next test. The report also provided data overlays concerning laser trigger light output, x-ray diode currents and x-ray source output. Power flow in the HERMES III accelerator is comprised of many circuit paths and detailed current and voltage information within these paths could provide a more thorough understanding of accelerator operation and performance, however this information was either not quickly available to the operators or the display of the data was not optimum. We expanded our data processing abilities to determine the current and voltage amplitudes throughout the power flow conductors and improved the data display abilities so data plots can be presented in a more organized fashion. We detail our efforts creating a software program capable of processing the ~ 400 probe signals together with an organized method for displaying the dozens of current and voltage probes. This process is implemented immediately after all digitizer data has been collected so the operator is provided timing and power flow information shortly after each accelerator shot.

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