Triggered-lightning interaction with a lightning protective system: Current distribution and electromagnetic environment

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ABSTRACT: A new comprehensive lightning instrumentation system has been designed for Launch Complex 39B (LC39B) at the Kennedy Space Center, Florida. This new instrumentation system includes the synchronized recording of six high-speed video cameras; currents through the nine downconductors of the new lightning protection system for LC39B; four dH/dt, 3-axis measurement stations; and five dE/dt stations composed of two antennas each. A 20:1 scaled down model of the new Lightning Protection System (LPS) of LC39B was built at the International Center for Lightning Research and Testing, Camp Blanding, FL (see Figure 1). This scaled down lightning protection system was instrumented with the transient recorders, digitizers, and sensors to be used in the final instrumentation installation at LC39B. The instrumentation used at the ICLRT is also a scaled-down instrumentation of the LC39B instrumentation. The scaled-down LPS was subjected to seven direct lightning strikes and six (four triggered and two natural nearby flashes) in 2010. The following measurements were acquired at the ICLRT: currents through the nine downconductors; two dH/dt, 3-axis stations, one at the center of the LPS (underneath the catenary wires), and another 40 meters south from the center of the LPS; ten dE/dt stations, nine of them on the perimeter of the LPS and one at the center of the LPS (underneath the catenary wire system); and the incident current. Data from representative events are presented and analyzed in this paper.

Figure 1. Scaled-down model of the lightning protection system of Launch Complex 39B, built at the ICLRT, Camp Blanding, FL.