

# ASSESSING AND BENCHMARKING HIGH-FIDELITY AIRBLAST CODES<sup>1</sup>

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## ABSTRACT

High-fidelity numerical codes employed to simulate airblast have a variety of computational methods that are used to calculate those events as they progress over time. The Defense Threat Reduction Agency (DTRA) tasked ERDC to evaluate and assess several of these codes, beginning with simple airblast waveforms and increasing in complexity to determine how well the codes were able to reproduce those waveforms in a predictive fashion. ERDC's Blast Load Simulator (BLS) was used to generate relatively simple waveforms without actually performing explosive experiments. These tests were shown to be very repeatable, and uncertainty levels were quantified based on the multiple experiments performed.

The codes assessed were SHAMRC, CTH, DYSMAS, and Loci/BLAST. Several different methods were used across these codes. Multiple comparison metrics were considered, and several used to show the difference between numerical and experimental results. A data comparison procedure that could be associated with a validation effort was followed, but as the study did not compare the results of the metrics against some criteria for acceptance, validation was not actually performed. This study only generated what the difference was between numerical and experimental results without considering how good those results were. Some usability issues will also be discussed, including run times, and difficulties some codes had simulating the BLS.