Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Simulations on shock focusing effects of multiple munitions using Euler equations and geometrical shock dynamics SHI QIU, VERONCIA ELIASSON, USC — Shock propagation effects from single or multiple munitions onto a specified target and its surroundings have been explored. The results of a single blast wave with fixed energy, E, was compared to that of N multiple blast waves, each with energy E/N and placed in specific geometrical patterns around the intended target. The intention is to increase the severe conditions at the target area while simultaneously reduce collateral damage. Simulations using the Euler equations with a Godunov scheme have been used to study the dynamics of the shock waves. Results show that multiple munitions generate a coalesced shock front that eventually forms a polygonal converging shock, which reconfigures during propagation towards the target. In order to further study this phenomenon, an approach based on Whitham's theory of geometrical shock dynamics (GSD) has been implemented. In GSD, the motion of the converging shock is computed independent of the flow field behind the shock. Hence, the scheme is efficient and inexpensive and can be used to further analyze the shock focusing effects based on initial location of individual munitions. Results from both simulations will be presented and optical configurations will be discussed.

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Date submitted: 29 Jul 2014 Electronic form version 1.4