Abstract Submitted
for the SHOCK11 Meeting of
The American Physical Society

Simulations of Heterogeneous Detonations and Post Detonation Turbulent Mixing and Afterburning[1] SURESH MENON, KALYANA GOTTIPARTHI, Georgia Institute of Technology — Most metal-loaded explosives and thermobaric explosives exploit the afterburning of metals to maintain pressure and temperature conditions.The use of such explosives in complex environment can result in post detonation flow containing many scales of vortical motion, flow jetting and shear, as well as plume-surface interactions due to flow impingement and wall flows. In general, all these interactions can lead to highly turbulent flow fields even if the initial ambient conditions were quiescent. Thus, turbulent mixing can dominate initial mixing and impact the final afterburn. We conduct three-dimensional numerical simulations of the propagation of detonation resulting from metal-loaded (inert or reacting) explosives and analyze the afterburn process as well as the generation of multiple scales of mixing in the post detonation flow field. Impact of the detonation and post-detonation flow field on solid surface is also considered for a variety of initial conditions. Comparison with available data is carried out to demonstrate validity of the simulation method.

[1]Supported by Defense Threat Reduction Agency

Suresh Menon
Georgia Institute of Technology

Date submitted: 17 Feb 2011 Electronic form version 1.4