Abstract Submitted for the SHOCK13 Meeting of The American Physical Society

Mesoscale Probing of Local Perturbations in PBX-driven Liners¹ IGOR PLAKSIN, ADAI, Univ of Coimbra, Portugal, RAAFAT GUIRGUIS, NSWC-IH, LUIS RODRIGUES, RICARDO MENDES², SVYATOSLAV PLAKSIN, ADAI, Univ of Coimbra, ADAI, UNIV OF COIMBRA AND NSWC-IH COLLABORA-TION — Efforts are aimed on experimental studies of how to improve a dynamic performance of the shaped charge jet. We postulated four basic elements to the problem: (1) The fluctuations in properties inherent in PBXs cause kinetic localizations in the detonation reaction zone (DRZ) structure, which cause (2) perturbations in the detonation products velocity and pressure, which induce (3) Perturbations in the response of the PBX-driven liner; and (4) Local perturbations/instabilities in liner are amplified during its collapse phase causing micro-fragmentations and ejected debris from the cumulative jet at initial stage, and then the incoherence and premature breakup of the resulting shaped charge jet. Spatially-resolved scenarios of each of phenomena (1-4) were obtained in experiments with copper-liners and HMX-based PBXs fabricated on maximum packing density of crystalline constituents, in which the DRZ-induced perturbations were recorded and quantitatively measured in the mesoscale range with application of the 96-channel optical analyzer MCOA-UC. Obtained experimental evidence is indicative that ejecta from the DRZ and ejectadriven detonation cells are dominating in wide spectrum perturbations translated to a PBX-driven liner.

¹This work was supported by the Office of Naval Research under the ONR and ONR Global Grants N00014-12-1-0477 and N62909-12-1-7131 with Drs. Clifford Bedford and Shawn Thorne Program Managers. ²ADAI, Univ of Coimbra, Portugal

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Date submitted: 22 Feb 2013

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