

# **FIRST-PRINCIPLES BLAST DIFFRACTION SIMULATIONS ON A NOTEBOOK: ACCURACY, RESOLUTION AND TURN-AROUND ISSUES**

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## **ABSTRACT**

Terrorist threat to US government facilities worldwide has forced extensive survivability and vulnerability analysis of many facilities, some too remote to be connected to a supercomputer via a secure line. In response, blast analysis simulations had to be conducted in the field on Notebook computers. Operational requirements typically enforce fast turn-around, and hence, coarser mesh resolution analysis. The reduced simulation fidelity has posed a dilemma: how low can we reduce resolution without significantly affecting solution accuracy? How much inaccuracy can we tolerate under field studies and how shall we account for this?

Solution accuracy and convergence issues are addressed in this study by examining blast wave diffraction about a typical facility in an urban environment. As the investigation has shown the need for accuracy improvement, a new procedure, “coarse-grain adaptation”, has been developed for optimizing the number of elements in the relevant solution domain.