

DEVELOPMENT OF A DOPPLER RADAR DIAGNOSTIC FOR MEASURING THE VELOCITY SPECTRUM OF DYNAMICALLY DISPERSED FRAGMENTS AND MATERIAL

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A compact, low cost velocimetry diagnostic based on continuous wave (CW) Doppler radar is being developed for tracking material thrown by dynamic experiments. The technique can be used to obtain information on the velocity distribution of explosively driven fragments and two-phase granular material over distances of tens of centimetres to tens of metres. It has also been shown to capture the initial shock wave.

Results will be presented from preliminary field trials, showing that the system is capable of resolving the time-varying velocities of individual fragments travelling in the kilometre per second range, as well as the velocity spectrum of more diffuse material carried by the blast wave. Observations will be made concerning the optimal positioning of the radar system with respect to the experiment and surrounding structures.

The technology is being developed to assess the momentum distribution and dynamic fragmentation of granular blast mitigants as well as natural fragmentation from cased munitions. Other potential applications in dynamic experiments will also be discussed.