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Broadband laser ranging precision and accuracy experiments with PDV benchmarking JARED CATENACCI, ED DAYKIN, MARYLESA HOWARD, BRANDON LALONE, KIRK MILLER, Natl Security Technologies LLC
— Broadband laser ranging (BLR) is a developmental diagnostic designed to measure the precise position of surfaces and particle clouds moving at velocities of several kilometers per second. Recent single stage gas gun experiments were conducted to quantify the precision and accuracy possible with a typical BLR system. For these experiments, the position of a mirrored projectile is measured relative to the location of a stationary optical flat (uncoated window) mounted within the gun catch tank. Projectile velocity is constrained to one-dimensional motion within the gun barrel. A collimating probe is aligned to be orthogonal to both the target window and the mirrored impactor surface. The probe is used to simultaneously measure the position and velocity with a BLR and conventional Photonic Doppler Velocimetry (PDV) system. Since there is a negligible lateral component to the target velocity, coupled with strong signal returns from a mirrored surface, integrating the PDV measurement provides a high fidelity distance measurement reference to which the BLR measurement may be compared.

Jared Catenacci
Natl Security Technologies LLC

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