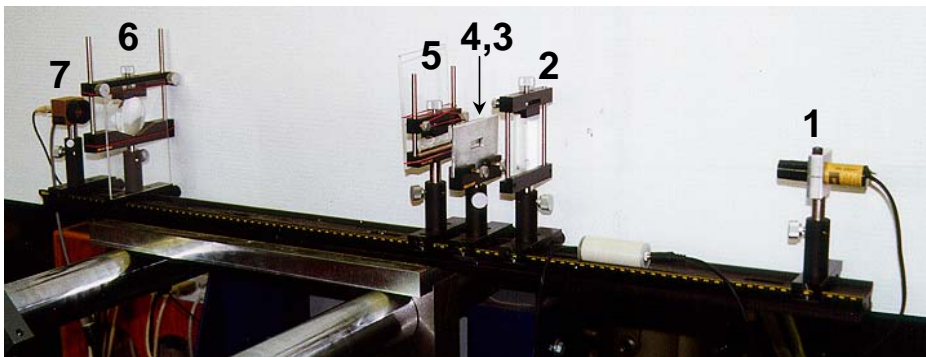


The Enhanced Laser Velocity System (ELVS)

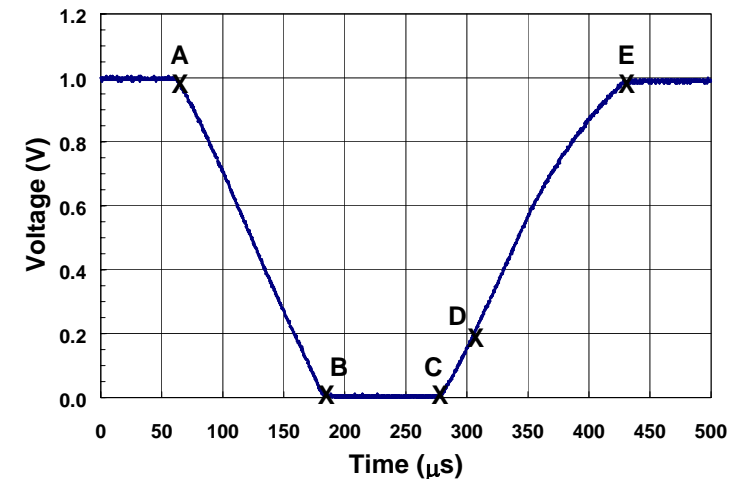
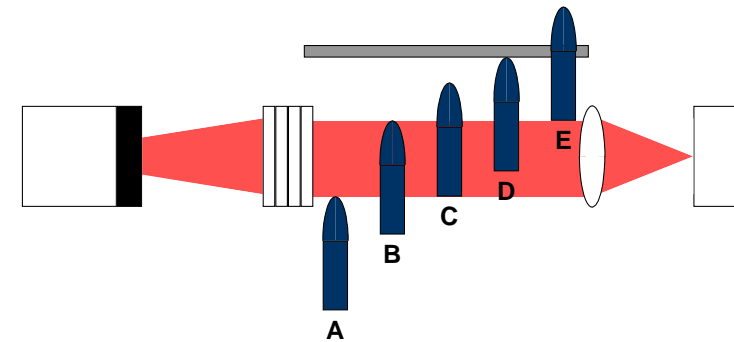
- Non-contact measurement of projectile motion in ballistic impact
- Capable of tracking small, light projectiles
- Outputs include velocity, force and energy-time histories; force and energy-displacement plots
- Cost-effective, reliable, easy to use

Hardware

- 1 Diode line laser
- 2,5 Plano-cylindrical lenses
- 3 Aperture
- 4 Neutral density filter
- 6 Symmetric-convex collector lens
- 7 Silicon PIN photo-detector

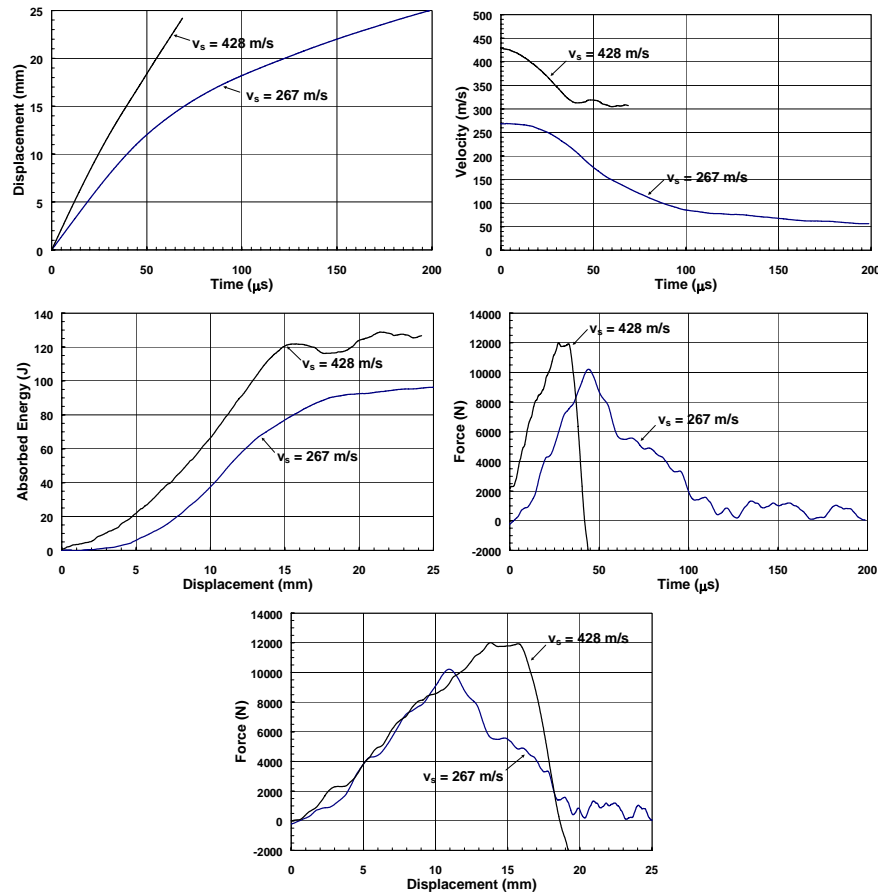


Principle of Operation



While the projectile is outside the sheet (up to position A) the oscilloscope shows full voltage, or 100 % intensity. As the projectile moves from position A to B, it blocks out the sheet and the intensity drops in proportion to the amount of light blocked. Since the projectile is longer than the sheet in this case, it continues to block out the sheet until the back end of the projectile reaches the front of the sheet, from B to C. This results in a “null” period where the intensity of the sheet is at 0 % intensity. From position C to E the projectile leaves the sheet causing the intensity to rise with a corresponding rise in voltage. Position D is the point at which impact occurs, which is found from the projectile length and the known distance between the laser sheet and target. Beginning at this point and until the end of the voltage-time curve, the data recorded provide a continuous measurement of the impact event.

Output



Impact of 8 plies Kevlar[®] fabric by 2.8 gram RCC projectile

ITEM #	COMPONENT	SPECIFICS
1	Diode laser with specialized line-generating optics	<ul style="list-style-type: none"> 670 nm wavelength produces 1 mW of power classified as a Class II, eye safe laser by The United States Center for Devices & Radiological Health (CDRH).
2	First cylindrical lens	<ul style="list-style-type: none"> 250 mm focal length 60 x 50 mm
3	Aperture	<ul style="list-style-type: none"> 25.4 x 10.0 mm
4	Neutral Density Filter	<ul style="list-style-type: none"> 50 mm square
5	Second cylindrical lens	<ul style="list-style-type: none"> 40 mm focal length 60 x 15 mm
6	Collector lens	<ul style="list-style-type: none"> bi-convex lens 100 mm focal length 50 mm diameter
7	Photodetector	<ul style="list-style-type: none"> silicon PIN photodetector rise/fall time of ≤ 7 ns sensitive up to a bandwidth of 50 MHz
---	Mounting equipment	<ul style="list-style-type: none"> optical rail, rail carriers, post holders, lens holders

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