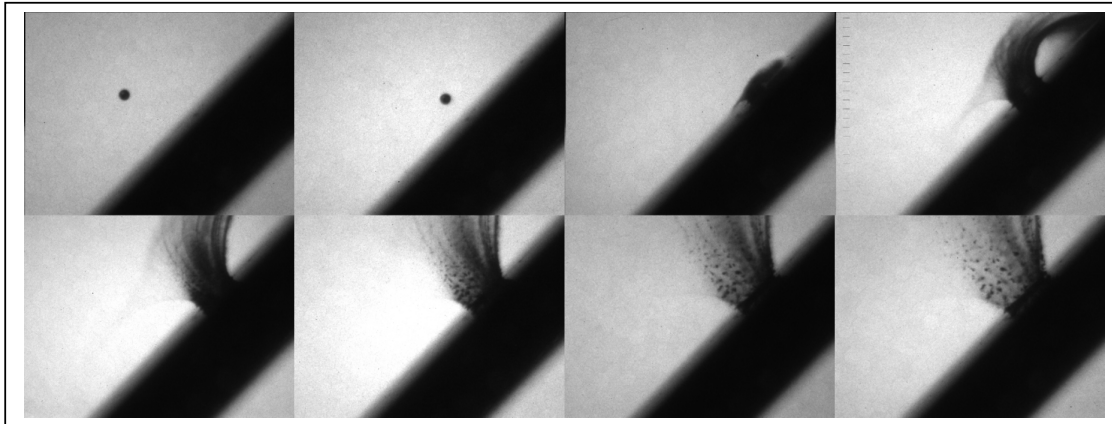


No. 3

Hypervelocity impact imaging of small projectiles travelling at 8 Km/sec



IMAGING PARAMETERS

A 80-200 mm f2.8 lens was used with the SIMX8 framing camera to give a 25mm x 20 m field of view. The camera stand-off distance was 50 cm. Data was acquired using the camera running at 800,000 fps, with 5 ns exposures. White back lighting was supplied from a Xenon flash source.

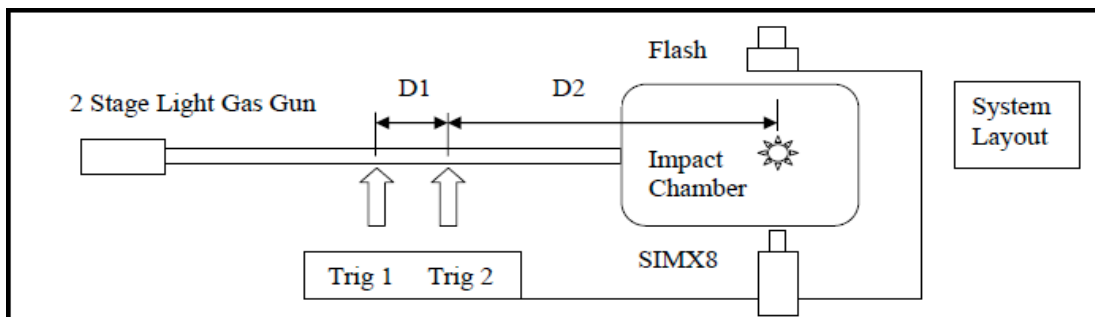
EQUIPMENT PARAMETERS

The SIMX8 was programmed to take an 8 frame sequence. The SURESHOT system with 2 triggers was used. The Xenon flash with 1.5ms duration was triggered 100µs prior to frame 1 to ensure full brightness backlighting at the time of recording. The camera's timing was set to have 12.5 µs interframe time and 5ns exposures on all frames.

OVERVIEW OF EXPERIMENT

The experiment was to record the hypervelocity impact of a 1 mm projectile travelling at 8 km/sec impacting an aluminium target. The image sequence was captured using the proprietary SURE-SHOT trigger built into all SIM cameras. Using two laser beam interrupt triggers up range from the target field of view. The distance between the triggers is entered into the SIM software. The distance from the second trigger to the point in the field of view where you want the projectile to be in the first frame is entered. Irrespective of velocity changes, in real time, the SIMX8 is able to measure the velocity between the two triggers and adjust the delay to the first frame for that velocity so that the projectile is always in that position in the first frame thereby assuring jitter free triggering of fast events in small fields of view.

Image Courtesy of NASA White Sand Test Facility.



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