## 2018 IEEE International Power Modulator and High Voltage Conference



Contribution ID: 230

Type: Poster Presentation

## HIGH-SPEED IMAGING OF EXPLODING DETONATORS

Wednesday 6 June 2018 13:30 (1h 30m)

This paper describes a high-speed imaging setup for capturing exploding detonators with short exposure time cameras. With three, commercially available, high intensity, pulsed xenon light sources (> 107 candela intensity) satisfactory image quality was achieved for a minimum exposure time. Beyond that the combined flash lamp output was too dim at desired shorter exposure times. As such, an alternative lamp system was pursued that would provide the higher required light intensity output.

Two types of lamp arrays were designed and tested. A large lamp array comprised of a few high energy flash lamps and small lamp array comprised of many low-energy flash lamps. The large lamp array is intended for multiple shot use and is placed behind a protective sheet of polycarbonate far from the detonator. The small lamp array with low cost flash lamps is intended for one time use and will be placed within much closer to the detonator. As such, these small lamps were driven beyond the manufacturer's specified energy limit to maximize the light intensity output. Multiple six stage, Rayleigh line PFNs were constructed to deliver the lamp energy. The PFN is modeled using LTSpice to verify circuit operation. Experimental measurements on the voltage and current were collected and compared to simulated results. A photodiode is used to measure relative light intensity from the different light sources. Finally, images are shown of the exploding detonator at various frame rates.

Author: Mr GAUS, Henry

**Co-authors:** BARNETT, David (Texas Tech University); NEUBER, Andreas (Texas Tech University); MANKOWSKI, John (Texas Tech University)

Presenter: Mr GAUS, Henry

Session Classification: Poster 3 - Power Modulator Systems and Applications