Pulsed Power and Power Electronics

PURPOSE
Military forces are faced with new and unpredictable enemy attacks in the battlefield. The Center for Pulsed Power and Power Electronics utilizes its expertise in generating very high power electrical pulses to provide troops on the battlefield with effective, innovative technology. This effort is complemented by investigating the physical phenomena associated with pulsed high voltage and the development of compact solid state power supplies.

RESEARCH FOCUS
Texas Tech University engineers and scientists develop compact, repetitive, high voltage generators that can drive a wide range of devices and systems for military applications. These devices and systems include directed energy devices, electronic jammers, electronic upset devices, car immobilizers, non-lethal crowd control systems, and power electronics.

RECENT DEVELOPMENTS
- Developed novel, high-efficiency, high-energy density, solid state power supplies for DoD and NASA.
- Developed and demonstrated one of the first U.S. examples of all-explosive pulsed power generators.
- Developed a unique university explosives research facility.
- Developed unique high-speed diagnostics with optical and electrical capabilities.
- Investigated novel methods leading to electronically-triggered equipment defeat.
- Developed multi-university cooperative research programs.
- Developed the world’s best-equipped university high voltage, pulsed power, power electronics laboratory.
- Established the IEEE International Pulsed Power Conference that now has more than 600 participants.
- Largest producer of graduate students in the area of Pulsed Power. Majority of students finds employment at national laboratories such as LANL, Sandia, Los Alamos, NRL, and defense industry.
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SAMPLE PUBLICATIONS


MAJOR RESEARCH GRANTS

Pulsed Ring-Down and EMP Generators for IED Neutralization and Controlled Destruction, $995,000.

Advanced Railgun Materials Development, AFOSR, $466,000.


Counter IED Diagnostics $240,000.

The Nanophysics of Electron Emission and Breakdown for High Power Microwave Sources, $1.25 million.

Development of Marx Generator and Triode Vircator, FMV, Sweden, $280,000.

Development of Novel RF Transmitters, LMC, $680,000.

Explosive-Driven Power Generation for Directed-Energy Munitions, AFOSR, $1.5 million.

RESEARCH TEAM

Dr. M. Kristiansen  Dr. J. Krile
Dr. J. Dickens  9 Support Staff
Dr. M. Giesselmann  22 Graduate students
Dr. H. Krompholz  (all US citizens)
Dr. L. Hatfield  15 Undergraduate students
Dr. A. Neuber
Dr. S. Bayne

Faculty and Staff preparing an explosively driven flux compression generator.