

Directed Energy



Key Features

- SWaP-optimized; the most power-dense capacitors in the industry
- Compact size allows our capacitors to be placed close to the emitter, minimizing losses due to long wires or traces
- Ultra-low ESR; minimizes voltage droop
- No current limit; can be discharged into a dead short repeatedly without damage
- Reliable across a wide temperature range
- Ruggedized to withstand high altitude, extreme shock, and vibration
- Hermetically sealed—RAD hard
- High reliability; very low mean time between failure (MTBF)
- Long service life with unlimited shelf life

Supported Platforms

Peta-watt Lasers for Fusion Energy

High Power Pulse Microwave (HPM)

Electromagnetic Pulse (EMP)

Laser Targeting, Range-finding & Weapons Systems

LIDAR

Design Challenge

Military and aerospace engineers of directed-energy applications—including high-power pulse microwave, electromagnetic pulse, laser targeting systems and weapons, LIDAR, and more—must design systems capable of storing a large amount of power that can be dispersed quickly in SWaP-optimized and ruggedized packages.

Our Solution

Quantic™ Evans capacitors are perfectly suited to power today's cutting edge directed energy applications. SWaP-optimized and the most power dense in the industry, their compact size allows them to be placed close to the active elements, thereby minimizing losses due to long wires or traces. Their ultra-low ESR minimizes droop during the transmit pulse cycle. They have no current limit and can be discharged into a dead short repeatedly without damage.

Quantic™ Evans

About Quantic Evans—Quantic Evans, a Quantic® Electronics company since 2020, is an AS9100/ISO 9001 certified, ITAR registered, developer and manufacturer of high-reliability, power dense capacitors. Its products provide superior size, weight, power, and reliability, enabling customers to develop next-generation electronic systems for aerospace, defense, and industrial applications.

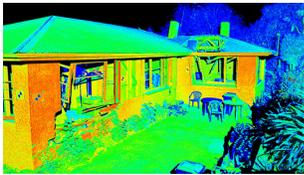
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Our Directed-Energy Legacy



HAPLS—Laser Fusion

The L3-HAPLS Laser was designed, developed and constructed by Lawrence Livermore National Laboratory. Development of the HAPLS required high power in the pulser. Each pulser contains its own local energy storage capacitor bank consisting of Quantic Evans capacitors.



LIDAR

Quantic Evans' capacitors support numerous LIDAR sensors. LIDAR stands for *Light Detection and Ranging*, a

remote sensing method that uses light in the form of a pulsed laser to measure ranges (variable distances) above the earth and undersea.



Drone Defense—High-Power Microwave (HPM) and Electromagnetic Pulse (EMP)

Quantic Evans hybrid capacitors are providing support to a recently developed C-UAS pulse system which provides static and mobile C-UAS defense capabilities. Using electromagnetic pulse technology, the CUA pulse system detects and disables unwanted drones and unmanned aerial vehicles (UAVs).

The platform is a high-power microwave (HPM) technology-based directed energy weapon system developed to provide counter-unmanned aerial system (C-UAS) capabilities. Quantic Evans replaced aluminum polymer capacitors on the CUA pulse system with its TDD capacitor. One Quantic Evans TDD capacitor did the job of an entire string of the aluminum polymer capacitors.



Laser Defense Weapons

Quantic Evans capacitors have been designed-in and currently support dozens of cutting edge and classified directed energy laser defense weapons systems for numerous U.S. national labs and tier-1 defense and aerospace contractors.



LTD (laser target designator) is a multi pulse high power system.



Rangefinder

A lower power single-pulse system used on the MIV and Challenger 3.

"RAPID—Lidar Scan" by UW News <http://www.uw.edu/news>; "Light Dragons Firepower on Warcop Ranges" © Crown Copyright 2014, Photographer: Sgt Jamie Peters RLC

What is Directed Energy?

Directed Energy (DE) covers a wide range of technologies, including High Power Microwave (HPM), Electromagnetic Pulse (EMP), and LASER, to name a few. There are also several subsets of each of these DE technologies. Each technology is different, but they all serve the same basic purpose: performing tasks on a target with highly focused energy.

The premise of DE is using a large amount of energy in a short period of time to execute a task. Power is defined as energy over time. The more energy that can be delivered within a given time frame, the higher the power. In other words, DE systems require a significant amount of power.

While batteries store a considerable amount of energy, they are unable to deliver it quickly. Similarly, generators are inefficient in delivering high levels of power. But capacitors are the ultimate high-power devices because they deliver large amounts of stored energy rapidly and repeatedly. As a result, capacitors play a vital role in DE systems, and Quantic Evans hybrid wet tantalum capacitors are particularly well suited for these applications.

Traditional weapons technologies relied on kinetic weapons and explosives to disable targets. But the modern battlefield has changed. Now, with advanced DE weapons and surveillance-and-threat-

protection technologies, we have significantly advanced our ability to keep war fighters safe, and improve their ability to execute missions accurately while minimizing collateral damage.

DE applications are not limited to the battlefield. Several research projects use high-power lasers to study nuclear fusion, and new medical treatments, among others. Light Detection and Ranging (LIDAR) systems use lasers to create 3D mappings of the environment. This technology is increasingly being used in autonomous vehicles.

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