

State-of-the-Art Technology and Applications by Magnet Expert

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Permanent magnets have been used in many applications including hybrid electric vehicles, power generator for wind turbines, high performance industrial motors, hard disk drives for computers, travelling wave tubes for satellite communications, headphones and speakers, washing machines, and most consumer electronic devices. As the world's first producer of rare earth magnets and U.S. last-remaining magnet producer, Electron Energy Corporation has led to new levels of technological advances for innovative and creative applications. In this presentation we will review the overview of rare earth magnet materials, sintered permanent magnet production, and some of the lesser known applications, including

- NASA high temperature motor and magnetic bearing operating up to 1,022°F (550°C).
- Gyro guidance system for NASA curiosity rover and commercial oil exploration.
- Mass spectrometer for NASA JUICE mission and commercial methane detector.
- Halbach oriented quadrupole focusing magnets for Proton radiosurgery and collider.
- NIST Watt balance to define a kilogram mass.
- Magnetocaloric refrigeration system to generate the cooling.
- World's first THz-class traveling wave tube amplifier for Active Denial System.
- Circulator and isolator for radar and jammer.
- Particle isolation and cell separation for molecular diagnostic system.
- MEMS.

During the presentation, it is also noted that how the theoretical approach of magnetic circuit design using Maxwell equation is applied to real applications. In addition, some useful tips and hints for rare earth magnet basics are introduced.