



VINCORION



FUTURE. ANTICIPATED.

HYBRID POWER SUPPLY FOR AIR DEFENSE SYSTEMS. DOUBLES RELIABILITY, HALVES LOGISTICS EFFORTS.

Powering the Patriot™ with global success for over 30 years.

Generating, controlling, and delivering electric power is crucial for the effective deployment of modern military forces. This is particularly the case for air defense systems, where reliable power generation is the prerequisite for the efficiency of highly sophisticated and life-protecting equipment. With its field-proven power systems, VINCORION has been part of Patriot's global success story for more than 30 years.

In order to support the future of Patriot, VINCORION has developed and implemented the next generation of energy

supply. Our Hybrid Power Genset, proposed for Patriot, features latest innovations for minimizing operating costs. Its **intelligent power management, peak-power super-cap storage, and commercial grid interface** allow for the use of a smaller, highly reliable, and more fuel-efficient engine-generator unit. VINCORION's new hybrid genset, proposed for Patriot, includes all electrical and mechanical interfaces to the Patriot system and is therefore completely interchangeable with existing units and ready to be integrated into the missile system, improving the economics of operation and the system operational readiness dramatically.

™ Patriot is a trademark of RAYTHEON COMPANY

PROVEN POWER SUPPLY SYSTEMS FOR AIR DEFENSE MISSIONS. READY TO REACT – ANY TIME AND ANY PLACE.

COMPLETE POWER SUPPLY SYSTEMS FOR THE PATRIOT.

The Patriot has now been deployed in 13 countries, with eight of them using the highly reliable VINCORION power supply system. VINCORION is your experienced, powerful partner. For more than three decades now, we have been providing state-of-the-art military energy supply solutions: VINCORION has been successfully developing and manufacturing various kinds of gensets, power units,

converters, and energy systems for civil and military vehicles, mobile platforms, and stationary systems. For the Patriot program we offer complete power supply systems for launchers, radar stations (RS), engagement control stations (ECS), and command posts (ICC and CRG). The product family includes, in addition to the power units, power converters for operation on the local power grid.

VINCORION was awarded the Raytheon Supplier Excellence Award in both 2015 and 2016.

A BROAD ARRAY OF POWER SUPPLY SYSTEMS TO CHOOSE FROM. REGARDLESS OF YOUR SPECIFIC NEED – WE HAVE YOU COVERED.



ELECTRIC POWER PLANT (EPP):

- Powers the Patriot Engagement Control Station
- Powers the Patriot Radar Station
- Generator set of 2 × 150 kW systems with 400 Hz
- For simultaneous and redundant operations



COMMAND GENSET:

- Powers the Patriot Information Coordination Central
- Powers the Patriot Communications Relay Group
- Generator set of 2 × 30 kW systems with 400 Hz
- For simultaneous and redundant operations



LAUNCHER GENSET:

- Powers the Patriot Missile Launcher
- Generator set of 15 kW with 400 Hz



FREQUENCY CONVERTER UNIT (FCU):

- Converters for powering Patriot systems on commercial grids
- Available for supplying Patriot Launcher, ICC, CRG, ECS, and Radar
- With options for 15, 30, and 150 kW power
- For 50 and 60 Hz commercial grid input

HYBRID GENSET PROPOSED FOR PATRIOT. NEXT-LEVEL POWER SUPPLY.

The Patriot Launcher requires the maximum generator power only in special operating conditions; regular operation requires only a small amount of power. However, the low power consumption leads to soot build up in the exhaust system, which necessitates a regular overhaul of the system. Our solution: the use of high-energy storage (super capacitors) to absorb peak loads and adaptation of the diesel engine (downsizing) to the average required power consumption of the starter.

- **Downsizing of the engine and constant operation** in the optimum performance range
- **Considerable fuel savings** (e.g., more than 50% with the Patriot Launcher)
- **Reduction of life-cycle costs** due to lower maintenance requirements and higher availability
- **Easily exchange existing systems** by maintaining the current system interfaces
- **Integrated power converter** for operation on public power lines worldwide (instead of a separate converter)
- **Designed for global use** in climatic zones according to MIL standard
- Use of modern supercapacitors as **effective energy storage** “Silent watch mode” and **absorption of load peaks** possible

THE BENEFITS SPEAK FOR THEMSELVES:

Modern user interface



- State-of-the-art user interface
- All information via display
- Good overview
- Modern bus technology
- Improved EMI design to comply with MIL-STD-461E

Integrated commercial power interface



- Designed for 50 / 60 Hz
- Permanent silent mode
- Great durability without refueling
- No additional commercial power interface or frequency converter required

Supercaps



- Hybrid technology
- Used for peak loads
- Silent watch mode for up to 15 min. without engine noise

Generator Set



- Reduced weight
- Reduced operating costs
- Acoustic noise improvement
- Sand/dust separators
- Improved IR signature
- Bigger fuel tank – up to 24 hours of operation
- Increased environmental toughness
- Meets EU Stage IIIA standards

THE CHALLENGE OF FUEL SUPPLY IN DEPLOYMENT, EXAMPLE: INTERNATIONAL SECURITY ASSISTANCE FORCE (ISAF).

During their mission in Afghanistan, the ISAF demanded 1.8 million gallons (6.8 million liters) fuel every day for their equipment¹. With fuel costs of 100 to 400 USD per gallon applying the fully burdened cost of fuel², smart energy-saving solutions are essential.

Thanks to reduced fuel and operating costs in deployment, the VINCORION hybrid power supply pays for itself after less than eight months and we provide operational forces more flexibility and make them less dependent on the logistics infrastructure.

¹ Dr. Arūnas Molis, NATO Energy Security Centre of Excellence http://www.act.nato.int/images/stories/events/2012/cde/mil_en_02.pdf
Accessed: 09.14.2017

² Pentagon via The Hill <http://thehill.com/homenews/administration/63407-400gallon-gas-another-cost-of-war-in-afghanistan->
Accessed: 09.14.2017

Comparison between current US Army Patriot generator and VINCORION hybrid power supply



INCREASED:

- Environmental toughness (from -51°F / -46°C to 131°F / +55°C operating)
- Fuel capacity (12 gal / 45 l of F54 or F34 and mixtures) sufficient for up to 24 hours of operation
- Flexibility: Integrated commercial power interface (CPI) option (for grids 200 V – 480 V / 3-phase / 50 Hz – 60 Hz)

REDUCED:

- Dimensions because of smaller engine and generator
- Fuel consumption (0.47 gal/h)
- Maintenance and infrastructure costs (reduced by ~ 50%)
- Environmental footprint (engine meets EU Stage IIIA standards)

IMPROVED:

- EMI design (designed to meet MIL-STD-461F)
- State-of-the-art and optimized human-machine interface (HMI)
- Reliability and readiness