VICOR

Case study: Electronic warfare portable ground radar



64% power reduction from power averaging

Customer's challenge

Upgrading the range and resolution of vehicle-mounted ground radar systems presents substantial power challenges. The 28V input may need to provide a peak output of 2.5kW. Given the limited space available and the need to make the equipment transportable, the power supply must be compact and lightweight. To achieve maximum radar range, the pulse must have minimal distortion. For optimal resolution, it is essential to minimize power supply noise during reception. The key challenges are:

- Minimize power supply noise during reception for maximum resolution
- Fit the new power solution within the fixed space available
- Reduce the overall weight to improve the portability of the radar

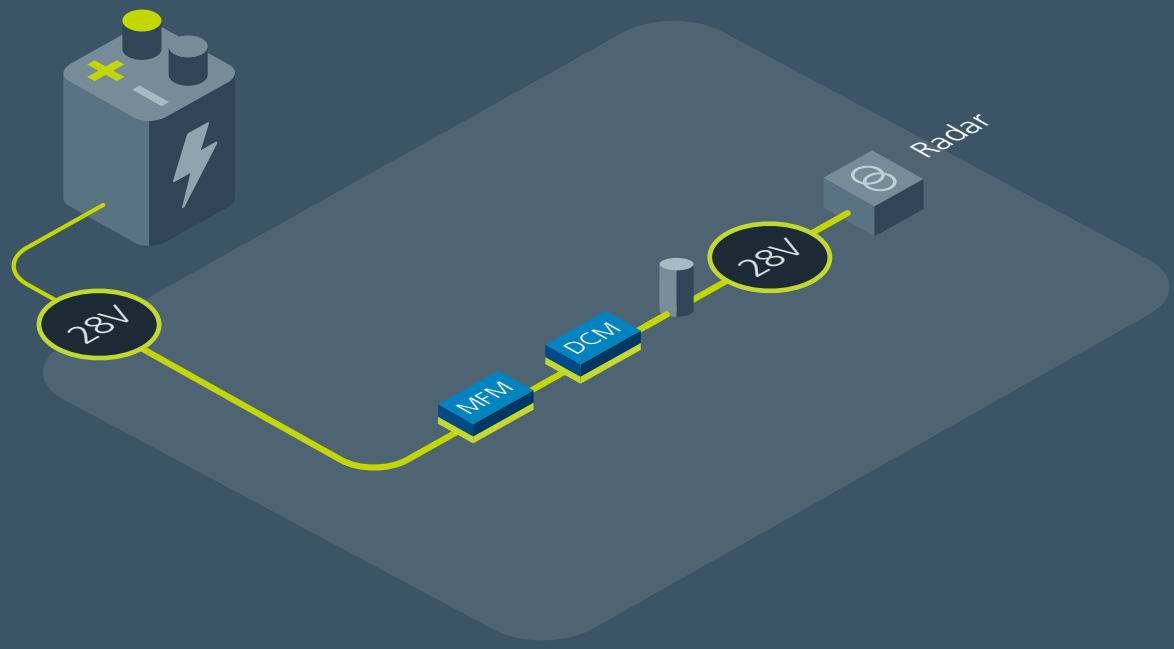
The Vicor solution

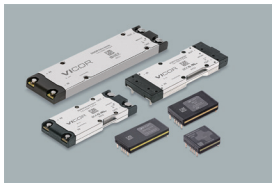
Leveraging high-frequency Zero Voltage Switching (ZVS) topology, Vicor DCM™ DC-DC converters minimize power supply noise during the radar's reception phase – crucial for maximizing resolution – by providing a clean, regulated output at high efficiency. Their compact, modular design address the challenge of space constraints, allowing for integration within the existing footprint. They also contribute to a reduction in overall weight, directly improving the portability of the radar system. Key benefits were:

- Compact high-density power modules optimize available design space
- Minimal electromagnetic interference and simple filter design
- Low weight increases portability

The power delivery network

The power delivery network for this application efficiently meets the system's demands by employing just three MIL-COTS DCM™ DC-DC Converters configured in a parallel array. This setup provides a stable 900W 28V output from a MIL-STD-704 input, effectively addressing the power needs while significantly reducing the design complexity and component count compared to a solution sized for the 2.5kW peak requirement. MFM™ DCM filters are DC front-end modules used in conjunction with DCMs and provide EMI filtering and transient protection to meet MIL standards.

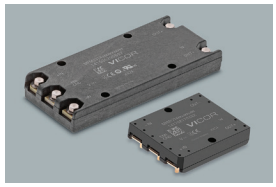




MIL-COTS DCM™ DC-DC converter

- Isolated regulated
- Input: 28, 30, 270V
- Output: 3.3, 5, 12, 15, 24, 28, 48V
- Power: Up to 1300W
- Peak efficiency: 96%
- As small as 0.98 x 0.90 x 0.28in

vicorpower.com/mil-cots-dcm



MIL-COTS MFM™ filter

- Input filter for DCMs
- Input: 28V (16 – 50V), 270V (160 – 420V)
- Current: Up to 22A
- As small as 44.6 x 35.5 x 9.2mm

vicorpower.com/mfm

©2017 – 2025 Vicor Rev 1.0 4/2025