VICOR

Case study: Advanced C5ISR capabilities



Supporting advance C5ISR functionality, increased payload and longer run time

Customer's challenge

Tethered drones provide war fighters with the unique ability for rapid deployment with greater flexibility and C5ISR capability than legacy solutions. The provide the capabilities of today's advanced tethered drones and allow for greater payload options to support mission success. Key goals were:

- Advanced C5ISR capabilities that can be transported by smaller or fewer vehicles
- Provide increased payload
- High efficiency for more extensive missions

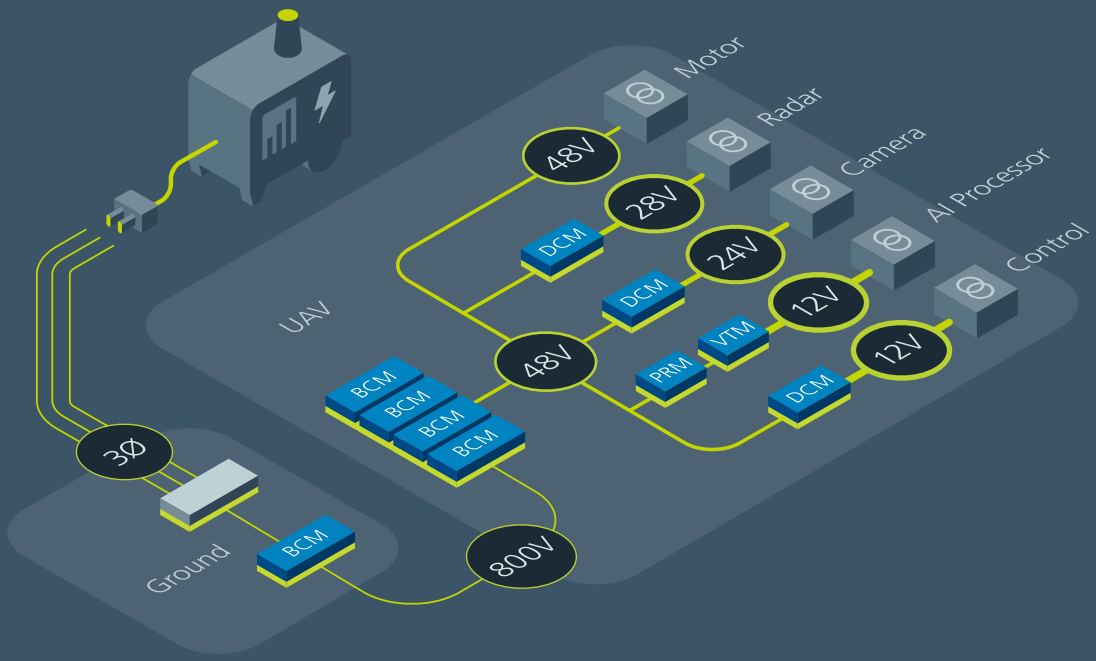
The Vicor solution

Vicor compact, high-performance power modules significantly reduced weight and size both in the ground power supply as well as on board the UAV. This allows for more complex missions with longer time in the air. Utilizing an efficient 48V bus on board the UAV, the power delivery network employs high density power modules to power the various reconnaissance capabilities. Key benefits were:

- Smaller ground supply unit and thinner, lighter tether
- High-performance power conversion to and from high voltage and SELV – on the ground and in the air
- Lightweight, high-density solutions power on board loads

The Power Delivery Network

To use a thinner, lighter high voltage tether, a BCM® bus converter module converts a single-phase or 3-phase AC ground supply to either 400 or 800V. The high voltage to SELV BCM provides 1.8kW and is 98% efficient, operating from a 500 – 800V bus to deliver an isolated 31.3 – 50.0V in a remarkably small 4.4 x 1.4 x 0.4in package. On board the UAV, a second BCM utilizes its bidirectionality to convert the high voltage of the tether back down to a 48V bus in the UAV. High density DCM™ DC-DC converters are used to power downstream function loads, and a PRM™/VTM™ combination is used to power high current on board computing.





MIL-COTS BCM® bus converter

Isolated fixed-ratio

Input: 200 – 400V, 400 – 700V, 500 – 800V

Current: Up to 35A

Peak efficiency: 98%

As small as 1.28 x 0.86 x 0.26in

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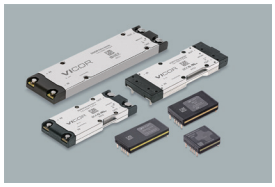

MIL-COTS DCM™ DC-DC converter

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

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MIL-COTS PRM™ regulator / VTM™ current multiplier

Isolated regulated

Input: 14 – 50V, 38 – 55V

Output: 1.08 – 50V

Current: Up to 80A

Peak efficiency: 96.5%

As small as 22.0 x 16.5 x 6.7mm (each)

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