VICOR

Case study: Unmanned aircraft for communications

High-efficiency, high-density modules free up space for advanced communications and extend range

Customer's challenge

This class of UAV depends on solar power to meet its long flight time requirements. Solar power systems rely on the use of maximum power-point tracking (MPPT) circuitry to ensure that solar energy is harvested at the optimum voltage before conversion to a voltage suitable for charging a secondary battery, or delivery to the power system's intermediate bus network. The key goals were:

- Efficient high voltage to SELV conversion
- A compact and lightweight solution to keep the drone as light as possible
- A robust and reliable solution

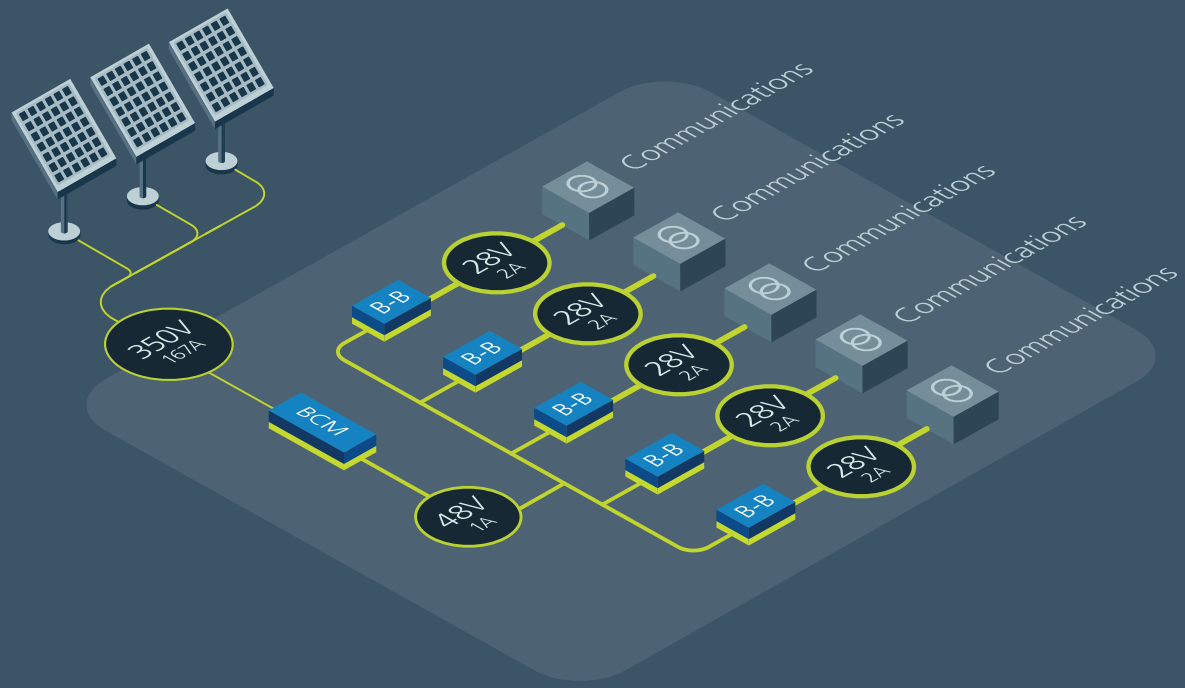
The Vicor solution

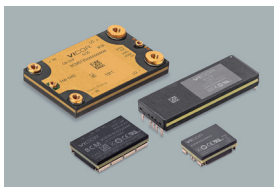
As this class of UAVs develops, high-efficiency power-conversion topologies such as Zero-Voltage Switching and Zero-Current Switching (ZVS/ZCS) which are used in Vicor BCMs® are important to enable the widening variety of fuel sources and applications with increasing power challenges. Key benefits were:

- Efficiently convert high voltages to SELV
- Lightweight power delivery network
- Wide input range at point-of-load conversion

The Power Delivery Network

A combination of the BCM6123 providing the isolated conversion of the 350V to a 48V intermediate bus and the PI3741 ZVS Buck-Boost regulator with a very wide range input voltage operating capability provides a tightly regulated 28V output for various UAV loads.





BCM bus converter modules

Isolated fixed-ratio

Input: 800 – 48V

Output: 2.4 – 55.0V

Current: Up to 150A

Peak efficiency: 98%

As small as
22.0 x 16.5 x 6.7mm

vicorpower.com/bcm

ZVS buck-boost regulators

Non-isolated regulated

Input: 8 – 60V

Output: 10 – 54V

Power: Up to 150W continuous

Peak efficiency: 98%

10.5 x 14.5 x 3.05mm

vicorpower.com/buck-boost

