VICOR

Case study: Agricultural UAVs



Enabling greater functionality for reliability and productivity

Customer's challenge

Drones in agriculture are uniquely challenged to carry heavy payloads for longer spraying times while flying in varying conditions. They must cover large areas reliably and safely for an industry that demands high productivity. These drones are equipped with GPS, pumps, radar sensors, vision systems, and fail-safe systems that have different voltage and power levels. The key goals were:

- Significantly reduce power supply weight and maximize space on-board for payload
- Extend flight time for more productivity
- Handle a wide range of input voltages

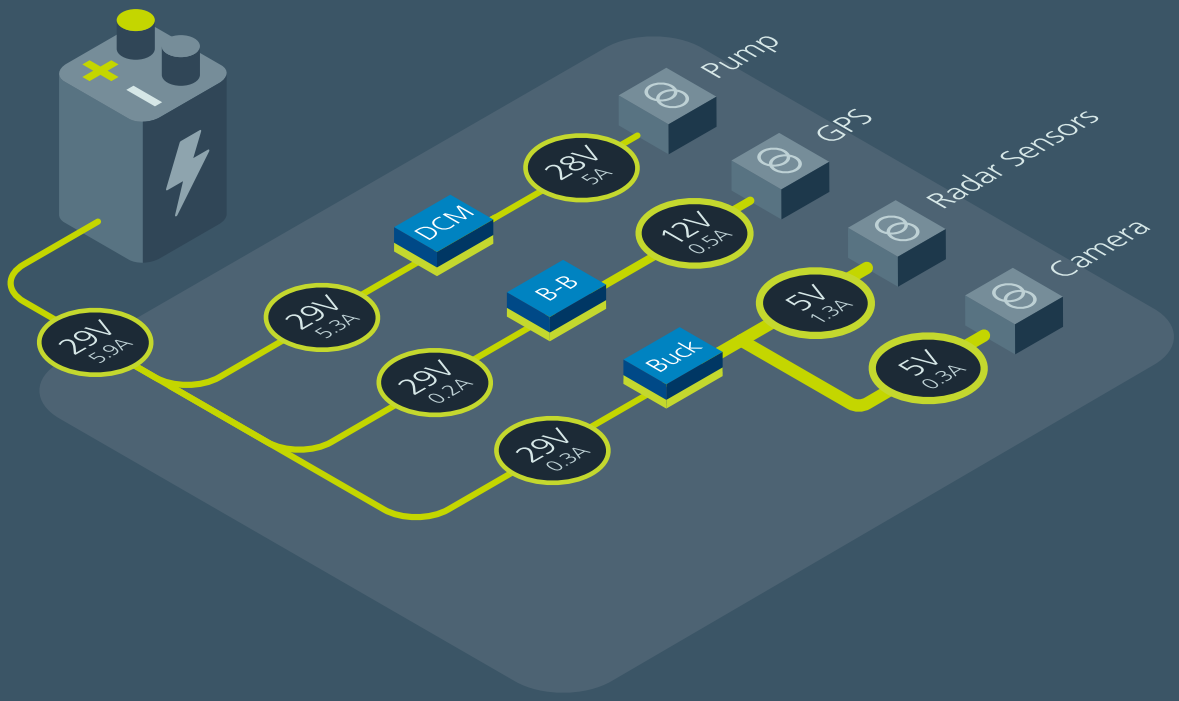
The Vicor solution

Vicor change to high-performance power modules are compact and lightweight, allowing the drone to carry the accessories needed to do its job such as pumps or sensors. At the same time, the high efficiency allows both increased flight time and a simplified thermal management that requires less space on board. Key benefits were:

- Higher efficiency to extend flight times and range of operation
- Power modules support a variety of input voltages for PoL devices
- Advanced packaging and topologies

The Power Delivery Network

The Vicor DCM™ power module is an isolated, highly efficient, regulated DC-DC converter utilizing a high-frequency Zero-Voltage Switching (ZVS) topology, operating from an un-regulated, wide range input to generate an isolated output. Modular DCM converters and downstream Vicor ZVS Buck and Buck-Boost products support efficient power distribution, providing superior power system performance and connectivity from a variety of unregulated power sources to the point-of-load.





DCM™ DC-DC converter

Isolated regulated

Input: 9 – 420V

Output: 3.3, 5, 12, 13.8, 15, 24, 28, 36, 48V

Power: Up to 1300W

Peak efficiency: 96%

As small as
24.8 x 22.8 x 7.21mm

vicorpower.com/dcm



ZVS buck regulator

Non-isolated regulated

Input:12V (8 – 18V),
24V (8 – 42V), 48V (30 – 60V)

Output: 2.2 – 16V

Current: Up to 22A

Peak efficiency: 98%

As small as
10.0 x 10.0 x 2.56mm

vicorpower.com/buck



ZVS buck-boost regulator

Non-isolated regulated

Input: 8 – 60V

Output: 10 – 54V

Power: Up to 150W continuous

Peak efficiency: 97%

10 x 14 x 2.56mm

vicorpower.com/buck-boost

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