VICOR

Case study: Inspection UAVs



Lightweight power delivery networks enable maneuverable UAVs to inspect remote, wide operations

Customer's challenge

Inspection UAVs ensure that infrastructure is sound, safe, and functional. These UAVs must be able to be easily maneuvered and nimbly access hard-to-reach spaces to inspect vast terrains. To succeed in their mission, they must also operate reliably in harsh environments and withstand electrical interference from power lines and other high-energy sources. The key goals were:

- Extend range and flight time
- Minimize size and weight
- Reliability to minimize chance of failure during flight

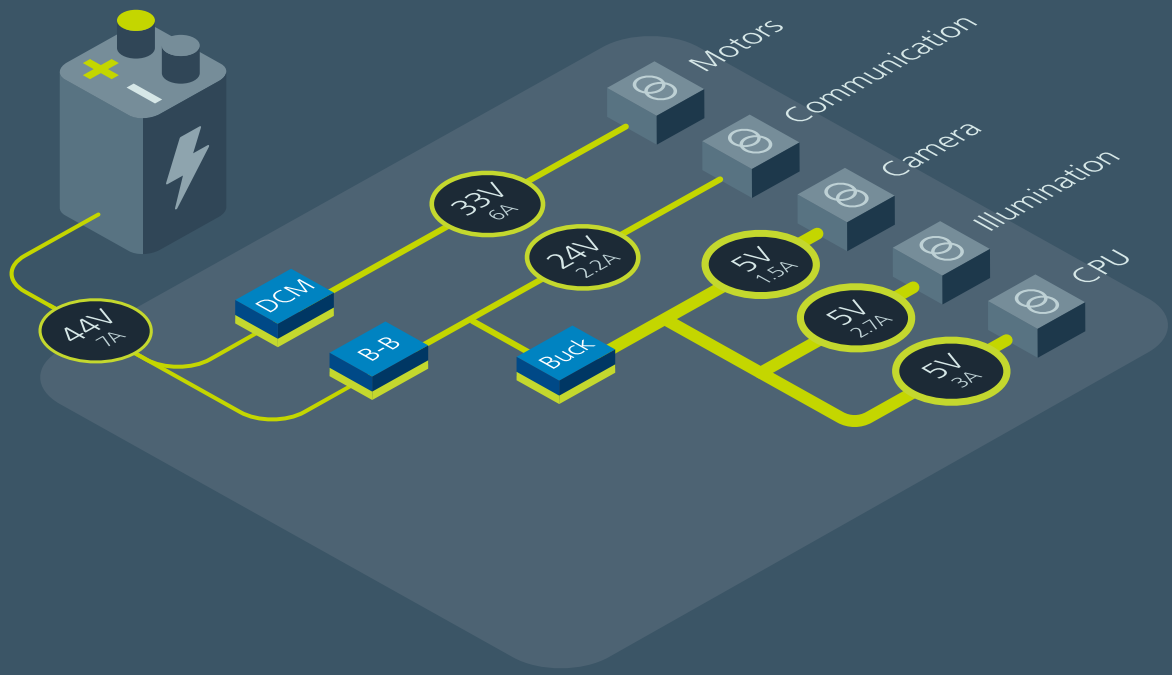
The Vicor solution

Vicor high-efficiency and high-performance power modules enable inspection UAVs to minimize size and weight to maximize the sensor payload required to perform the actual inspection. With enough power and high efficiency, they allow for an agile UAV with increased flight time, even in harsh environments. Key benefits were:

- High-power density to enable smaller form factor and lower weight
- Minimal electromagnetic interference (EMI)
- ZVS topology enables modules with up to 98% efficiency

The Power Delivery Network

Power dense Vicor DCM™ DC-DC converters and ZVS Buck and Buck-Boost regulator modules are ideal for inspection UAVs. The compact DCM delivers enough power to the motors, while the Buck and Buck-Boost regulators operate with a wide input range to allow loads to be powered by the full range of the battery, providing a reserve for safe landing and recovery. The compact modules allow for the use of a smaller magnetic shield, thereby reducing that weight in addition to the weight savings of the Vicor modules.





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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