VICOR

Case study: HALE UAVs

DCM DC-DC converters double the internal bus power and help keep the aircraft as light as possible

Customer's challenge

High-altitude long-endurance (HALE) UAVs are essentially flying satellites, designed to operate at extremely high altitudes for extended periods (weeks or even months). They are used in applications such as surveillance, data collection, and communication relay. HALE UAVs are typically equipped with various accessories such as high-resolution cameras, sensors, radars, antennas in order to perform their tasks. The key goals were:

- Scalable power to adapt to future needs
- A robust and reliable design to maintain continued operation
- A compact and lightweight power supply

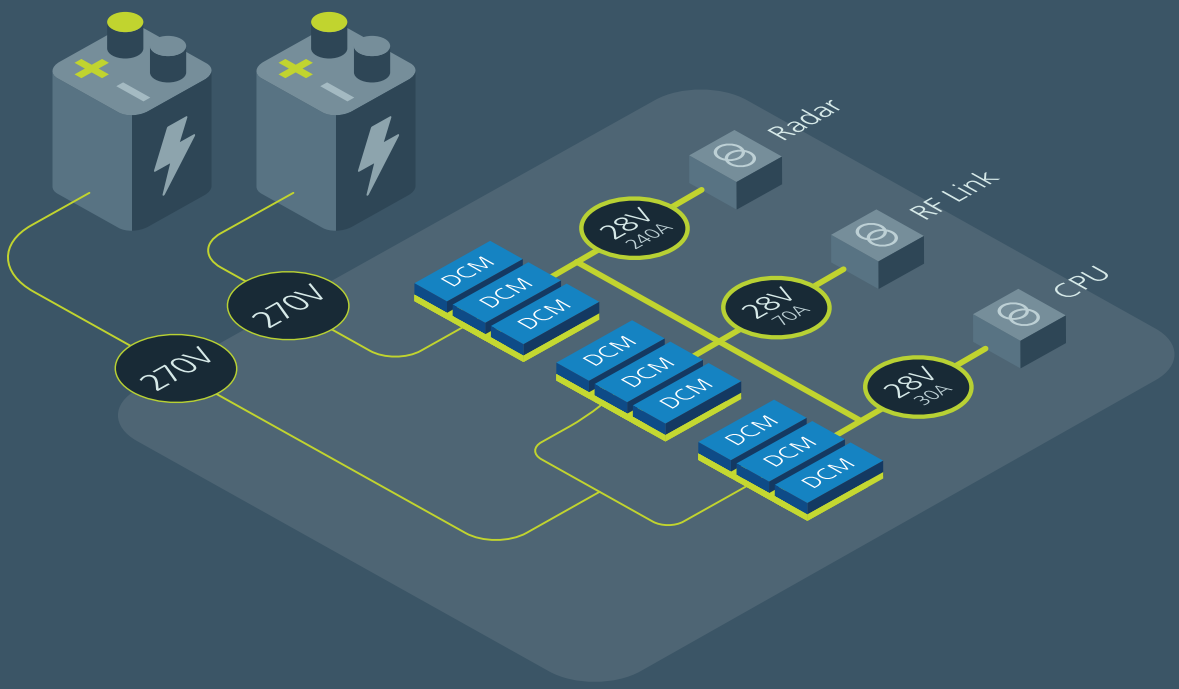
The Vicor solution

With Vicor high-performance power modules, HALE drones can achieve very high levels of power while saving space and weight and greatly increasing the period of operation. The Vicor modular approach makes it possible to accommodate new loads or changes in power needs within a design, simply by replacing or adding modules. Key benefits were:

- The DCM™ can be paralleled easily to accommodate additional system expansion
- Advanced packaging technology to manage thermal loads
- An 11kW solution the size of a tablet computer, weighing only 215g

The Power Delivery Network

The small size, low profile and low weight of the Vicor DCM™ DC-DC converter module allow for double the output power without exceeding allocated space constraints. The high efficiency (96%) reduced the size of the heat sink required, saving more space. DCMs easy to parallel for future increased power needs, low waste heat and reduced cooling requirements. Three arrays of three 1.3kW DCM5614 converters were paralleled to provide the regulated 28V bus. Inputs were split between two different generators to provide redundancy of power source. The arrays automatically power shared across all nine converters — though their input voltages differed — helping improve system reliability.



DCM DC-DC converters

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