Low Weight | Small Size, Low Profile | Wide Input Range

Tethered Inspection UAV

Light, Compact Power Supply Increases UAV Payload

The Customer's Challenge

A customer was developing an unmanned aerial vehicle (UAV) carrying cameras to inspect the decks of incoming ships prior to entering a port. Primary power for the UAV comes from a ground-based generator and was distributed to the UAV over a 30m tether, enabling it to be on station for many hours at a time, yet carry a significant payload. An onboard battery provided back-up should the primary supply fail.

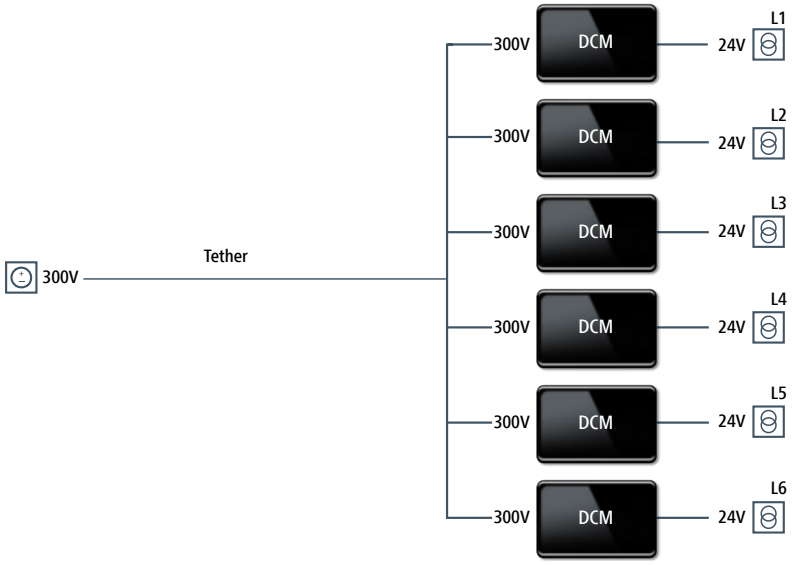
The power solution also needed to support the backup battery and, as the weight of an aircraft increases the payload capability decreases, so the power had to be as light as possible to allow higher carrying capacity.



The Solution

To minimize transmission losses due to the resistance of the cable, and reduce the size and weight of the cable itself, a high voltage transmission solution was designed. The supply to the UAV could vary from 160 – 420V depending on load, so six 300 V_{IN} DCM DC-DC Converter Modules were used on the UAV to stabilize the voltage, with each powering one of the rotor motors. Each of these DCMs weighed just 29.2g, and measured 47.91 x 22.8 x 7.26 mm.

Link to Whiteboard »



The Results

The DCM output voltage was adjusted to optimize battery charging and to control for reliable start-up of the motors. High power density, low profile and light weight DCMs ensured the UAV and the tether cable's size and weight were minimized.

With its high frequency zero voltage switching (ZVS) topology, the DCM converter consistently delivers high efficiency across the input line range. When combined with the thermal and density benefits of Vicor's ChiP packaging technology, the DCM module offers flexible thermal management options without the need for heavy and chunky heat sinks or other thermal management devices.

Product Family Key Specifications	
DCM™ DC-DC Converter Module	
Input Voltages	9 – 50V_{DC}, 16 – 50V_{DC}, 18 – 36V_{DC}, 36 – 75V_{DC}, 120 – 420V_{DC}, 160 – 420V_{DC}, 200 – 420V_{DC}
Output Voltages	5V, 12V, 13.8V, 15V, 24V, 28V, 36V, 48V
Output Power	4623 ChiP: Up to 600W 3623 ChiP: Up to 320W
Efficiency	Up to 93%
Dimensions	4623 ChiP: 47.91 x 22.8 x 7.26 mm 3623 ChiP: 38.72 x 22.8 x 7.26 mm

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