Case Study

Mil / Aero Applications

"Other frequency converters were larger, heavier and more expensive than the Falcon UPS."

– Charles Vatcher,
Mechanical Engineer
412 Test Wing / Test & Eval,
Edwards AFFTC

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C-130 Hercules Powers-Up with Falcon Electric's Innovative Frequency Converter

The task of keeping the C-130 Hercules aircraft in top condition involves a steady cycle of system upgrades to incorporate new technology and instrumentation. Accumulating to date over 20 million flight hours, the turbo-prop, high-wing C-130 Hercules is the preferred transport aircraft for numerous U.S. government agencies and over 60 foreign countries, as it has unsurpassed versatility, performance, and mission effectiveness. The basic airframe has been modified to hundreds of different configurations to meet ever-changing environments and mission requirements.

A recent project required an upgrade to the trailing cone assembly – a probe-like instrument that measures the airspeed, air pressure and altitude while the aircraft is in flight. After the aircraft is airborne, the trailing cone assembly extends out of the fuselage (near the dorsal) and remains extended during flight. "In order to extend and retract the assembly, I considered a motor that was specified for 400Hz in and 400Hz out. This unit met military specifications as well as an additional specification regarding explosion-proof properties. However, a long lead time would throw off our schedule, and we'd miss our delivery date. We found an excellent one-horsepower motor that met a majority of our criteria – military and explosion specifications as well as size and weight requirements; however the motor ran on 60Hz, and the aircraft's power system generates 120V/400Hz on board. We had to find a frequency converter to step the 400Hz down to 60Hz, which like the motor, had to meet stringent requirements.

"During our research, we looked at several devices and found that three companies made frequency converters matching our mil-spec, anti-explosion and lead time requirements. The Falcon ED4KRM-1 stood out. We found that the unit itself was much smaller and lighter than the other frequency converter units we identified. Another factor that caught our immediate attention was the lower cost of the Falcon unit, which included a DC backup feature. We found that the Falcon units have an exceptionally clean sinewave output, even with a 3:1 crest factor load, meaning that the Falcon frequency converter can deliver more power than a similar-sized competitive unit that produces a typical sinewave or a stepped sinewave output. Finally, Falcon Electric's small company size is an advantage, as a portion of our suppliers must be U.S.-owned small businesses in order to comply with Department of Defense (DOD) guidelines.

"The technical experts at Falcon, their very high level of support, and enthusiastic "can-do" attitude and follow-through is very comprehensive and refreshing. We were impressed with the extensive background Falcon's engineering staff brought to the table, including experience gained from past projects in which they've been involved for other branches of the military including the U.S. Navy, U.S. Army and the U.S. Coast Guard. When we needed on-site support, Falcon's engineering manager came to our testing facility and worked with me to make a final determination of the load and ensure the application was clear to Falcon's engineering staff.

"In addition, Falcon's account representative, responsible for logistic coordination and meeting our demanding delivery deadlines, went above and beyond to ensure there were no surprises. A good example is the unprompted updates I received, along with the extra effort required to perform a final on-site inspection when we did take delivery.

"Falcon's ED Series gave me the ability to provide my customer with a safety feature that I would not be able to offer with the other models I considered – the battery back-up option. This emergency power source will save the trailing cone assembly from being damaged in case of local power failure – an option I wanted to include for the air force that was not possible with the other models we evaluated. Most important, though, was the unit's size and field-tested reliability. When the staff at Falcon Electric asked me if I was interested in letting others know about this remarkable solution, I said yes, as this may help others solve their power conversion challenges," commented Charles Vatcher, Mechanical Engineer, 412 Test Wing / Test & Eval for Edwards AFFTC.