Case Study

Mil/Aero Applications

"As a major systems integrator serving government organizations, I knew our latest project involving the upgrade of a communication switch node system inside two state-of-the-art Theater Air Traffic Control Radar Sets would be no small feat."

- Lead Project Engineer

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U.S. Military Turns to Falcon Electric for Rugged, On-Line **Uninterruptible Power Protection of its Air Traffic Control Systems**

The AN/TPN29 and MPN14K Landing Control Central Radar Sets, used by the U.S. Army, the Air Force and the National Guard, are designed for tactical mobility and can serve as complete Airport Surveillance Radar (ASR) Sets or Radar Approach Control (RAPCON) Shelters. The ASR/RAPCON, with its primary air search radar and secondary air traffic control radar set along with ancillary communications equipment, provides detection, identification and control of aircraft to support the military's strategic air traffic control operations. Depending on the situation in which the radar set is deployed – combat limited conditions or remote operations for example, assembly can be completed in less than 16 hours with minimal personnel assigned to the task.

The radar sets, which have a range of 200 nautical miles and are synchronized to provide data with participating aircraft, are used by air traffic controllers to perform a variety of functions. These functions include sequencing and separating participating aircraft, providing final approach direction, and offering guidance through air defense corridors and zones. In addition, the radar sets coordinate status with local air defense units at pre-determined airports, air bases and bare bases. Communication between the radar and the pilot is secure in all types of weather with little to no affect on the equipment in operation at air traffic control stations. The precision approach radar (PAR) provides azimuth and elevation information from 15 nautical miles to touchdown, and both the PAR and ASR can be used as final approach aids. This robust system – when all indicators and communications equipment are in operation – is even capable of taking over air traffic control operations at busy airports.

In order to increase range, security and stability of the ASR system, the communications switch node system needed to be upgraded. "As a major systems integrator serving government organizations, I knew our latest project involving the upgrade of a communication switch node system inside two state-of-the-art Theater Air Traffic Control Radar Sets would be no small feat," commented the lead project engineer.

"The communications switch node system is powered by its own uninterruptible power supply (UPS), which was originally specified at 1.5kVA. Because the primary power source inside the ASR can be from a diesel generator or from the local utility, we specified an on-line UPS." Unlike an off-line or line-interactive UPS, on-line technology continuously conditions the incoming AC power and regenerates a clean sinewave at all times. This is important, since the power from the gen-set is usually dirty yet stable, and the power coming off a nearby utility can be both dirty and unstable, with chronic under- and over-voltage conditions depending on the location of the theater.

"Our systems are designed to operate in extreme environments, so we knew we needed a rugged, double-conversion on-line uninterruptible power system," explained the lead project engineer. Knowing that not all types of UPSs offer the robust feature set needed for their demanding environment, engineers began looking for a UPS that offered a rugged on-line topology as well as a compact form factor, as space inside the ASR is at a premium. In their search, the team learned that the waveform produced by a UPS generating a pure sinewave with a high crest factor (peak versus RMS voltage values) can translate to more power. This means one vendor's 1.25kVA unit provides roughly the same amount of usable power as Falcon's SG SeriesTM 1 kVA, a unit smaller in capacity but lighter and more compact than other products they considered.

"After testing several systems, it became clear that the Falcon SG 1kVA was one of our favorite units. Another important consideration we had was to find a UPS supplier that had vast experience working with the U.S. military. In addition, lead time was also very important. Lead times for some gear can extend several weeks or months, common among many of the components we order.

"However, we were a little surprised to learn that even in the competitive UPS market, lead times were slightly longer than we anticipated, perhaps because most suppliers build mil-spec units to order. Falcon, among the few UPS companies to assure us short lead times, met all our extensive requirements.

"We selected Falcon Electric and continue to be extremely pleased with the high level of quality we experience from the SG 1kVA – in terms of performance and overall reliability. If all the equipment we ordered from our various vendors worked as well as the SG 1kVA, my job would be a lot easier. The Falcon team has been exceptionally responsive in every aspect of support from pre-sales to customer service."