

### Author

Nam Paik  
TSi Power Corp

## TSi Power Case Studies

Mission-critical solutions



TSi UPS systems back-up signal transmitters that send critical flight information to all airplanes approaching any airport for landing.

### TSi Power supplies Federal Aviation Administration with UPS

Since 1991, TSi Power has been providing the Federal Aviation Administration (FAA) with UPS systems designed to provide 6 to 8 hours of battery back-up time in hostile environments. The TSi UPS systems back-up signal transmitters that send critical flight information to all airplanes approaching any airport for landing. The transmitters & UPS systems are housed in unmanned and non-air-conditioned equipment huts that are subject to extreme temperature swings between winter and summer. Several hundred systems were installed nationwide and have been operational since 1991 with minimal field problems. The FAA was so impressed with their performance that they have continued to install our UPS systems at hundreds of sites. So if you have a system that is exposed to harsh conditions, then a rugged TSi UPS is your solution!

### TSi Power backs up White House telecommunications system with UPS and ARm-1000 automatic transfer switches

There is no more mission critical communications system than the Presidential telecommunications system run by the State Department. It is responsible for routing and tracking all telecommunications between the White House and the world. This system is backed up with both a TSi Power UPS system and a large generator UPS system to provide back-up power redundancy. In case of a problem with the primary ac source, TSi Power's ARM-1000 Automatic Redundancy Module automatically detects the failed ac line and seamlessly transfers to another ac source without interruption. In the most unlikely event that even the back-up ac source is also defective, a second ARM-1000 can automatically select the second back-up ac source. There is no limit to the levels of redundancy that can be applied to these mission critical systems. By using multiple ARM-1000 units, as many layers of independent power back-up can be achieved as there are power sources available. Independent power sources include battery back-up, alternate utility circuit (from a different power grid), and emergency ac generator sets to name a few. If your system is truly mission critical, then TSi Power has the solution!



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The drug stores' point-of-sale (POS) computers equipped with these UPS systems continued to operate and record unprecedented sales because all the other drug stores were shut down.

## The United States Army relies on TSi Power ac line conditioners for demanding international applications in the field

Having access to accurate and timely information is the key to success in any field in the world, and the Armed Forces are no exception. In 1997, the U.S. Army was dispatched to Bosnia to serve as part of a peacekeeping force to help end the brutal conflict engulfing that region. Army Intelligence, which was responsible for gathering, disseminating and forwarding vast quantities of information to the peacekeeping forces, ran into some problems. During much of their operation, utility power was unavailable. They also found that their UPS technology was not capable of handling the large numbers of spikes, surges, sags and brownouts that were present on the AC line. As a result, the back-up UPS systems they relied on to maintain their computer networks were actually burning out. When all their UPS were gone, they hooked their computers directly into the field generators set up in their camps. This caused catastrophic computer failure. Since an army with no information is no army at all, the U.S. Army turned to TSi Power to create a quick solution. Within a few weeks, the U.S. Army Intelligence was up and running without fear of burning up their UPS systems or their computers after installation of rugged, generator compatible line conditioners from TSi Power.

## Major drug store chain powers through an earthquake with TSi UPS

In 1989, a significant earthquake hit the San Francisco area causing millions of dollars in damage and interrupting the basic utilities for the area residents. Panic gripped many of the residents who immediately went to buy emergency food supplies, candles, flashlights, batteries, etc. TSi Power's UPS systems were backing up three drug stores in San Francisco at the time of the earthquake. These drug stores were open a full eight hour business day entirely on TSi back-up power. The drug stores' point-of-sale (POS) computers equipped with these UPS systems continued to operate and record unprecedented sales because all the other drug stores were shut down. This incident convinced the drug store's corporate executives that extended battery UPS systems were a necessity for uninterrupted operation of retail stores during emergency situations. TSi has the solution for all retail and service industry power protection and back-up power problems!

## Medical equipment manufacturer utilizes TSi Power UPS and battery extension units for patient respirators

A leading manufacturer of medical technologies for critical care patients. Since 1990, a leading intensive patient care respirator manufacturer has been using a customized version of TSi Power's UPS and Battery Extension Units to provide continuous ac power to respirators of critically ill patients. The respirator and UPS system are attached to the patient's portable bed and moved around inside the hospital (e.g. from the operating room to the recovery room) by simply unplugging the UPS from the ac socket. In order to meet the stringent European medical equipment safety standards, TSi Power's engineers worked closely with manufacturer's engineers to implement the necessary modifications to the existing models.

## Applied Energy Concepts, a partner of TSi Power, solves telecommunication problems in emerging markets

In January 1998, TSi Power joined with Applied Energy Concepts to increase its range of power quality products and applications on the market today. Applied Energy Concepts develops solutions that control electrical surges and regulate voltage for mission-critical electronic systems.

These international applications have included protection for switchmode rectifiers, power supplies and uninterruptible power systems. A major cellular infrastructure supplier's experience has revealed that conventional surge protection devices have little impact on equipment failures and often fail themselves as a result of inadequate power generation and distribution infrastructures. In thousands of installations worldwide, AEC equipment has proven to consistently reduce high failure rates of telecom rectifiers, UPS, and other equipment connected to the power line. Critical loads such as base transceiver stations (BTS) and nodes for wireless-in-the-local-loop applications as well as other outdoor enclosure installations often require this additional protection.

## Constant voltage and isolation of TSi Premium Series UPS key to smooth manufacturing control systems

In 1996, TSi Power was asked to assist a large farming product manufacturer in the middle of Georgia. Nearly one hundred cabinets that control the automated manufacturing equipment had to be manually reset after each power outage (even though they were protected by a well-known, national brand UPS). Each manual reset operation meant a down-time of over one hour for the entire plant and financial losses were piling up quickly, especially during summer months when a number of power outages can occur in a week.

After careful analysis of the problem, TSi engineers concluded that the problem was caused by a lack of voltage regulation, lack of isolation, power conditioning, and long transfer time (to 8 milliseconds) of existing standby UPS units. They recommended the Premium Series UPS-16000 with built in CVT (constant voltage transformer with 100% input/output isolation) and zero transfer time. The result was spectacular. The controller cabinet protected by the TSi Power Premium Series no longer required a manual reset after a power outage while the identical control cabinet powered by the original standby UPS needed a manual reset after each power outage.

By the middle of 1997, the manufacturing plant management decided to replace all of their existing UPS units with TSi Power Premium Series UPS-16000 units. TSi Power is also helping in the disposal of the old standby UPS units that are being replaced since the lead-acid batteries inside the old UPS units must be recycled properly.

## Internet service provider keeps the world connected with TSi Power rack-mounted UPS and battery extension units backing them up

In 1996, a leading Internet Service Provider (ISP) began to realize that with increasing frequency of power outages and transients damaging the sensitive equipment in one of their Cisco 7513 routers and other critical communications equipment, it was time to take action. After careful evaluation, they chose TSi Power's Premium Series rack-mounted UPS, Battery Extension Unit and Automatic/Manual Bypass Unit. In 1998, the ISP is in the process of installing several hundred Premium Series UPS systems in equipment rooms located in all of the major cities in the U.S. This again proves that for Premium Power Protection, customers turn to TSi Power.

## About the author

### ***Nam Paik ~ Director of Engineering, TSi Power Corporation***

*Mr. Paik has over 15 years experience in the power electronics industry. He was with Northern Telecom (now Nortel Networks) for 4 years prior to joining TSi Power in 1988. Nam has focused on UPS, Line Conditioner and dc to ac inverter products and most recently has developed a number of customized power protection and conversion systems for several U.S. government agencies and international applications.*



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