

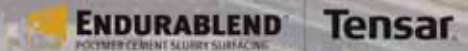
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May 2011

# AIRPORT AIRFIELD OPERATIONS





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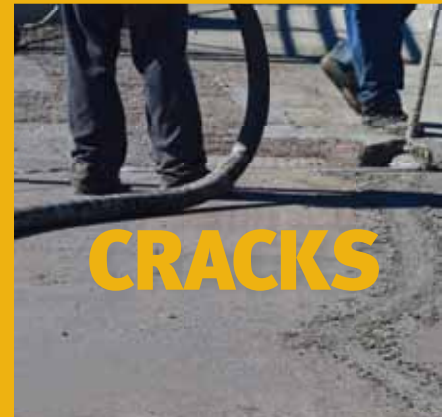
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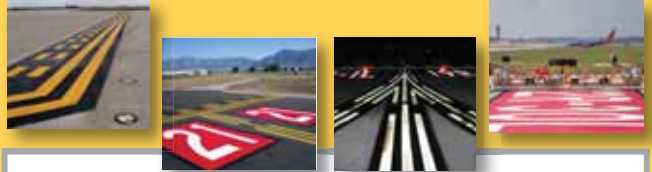
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# Innovations in Airfield Lighting

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## False River Regional Airport in Louisiana Installs First Solar-powered Airfield Lighting Circuit in the World

LED Solar Test Program went live at False River Regional Airport in May 2010. It's an all solar-powered airfield taxiway circuit using LED lighting products from ADB Airfield Solutions and a solar energy management system from Carmanah Technologies Corporation.

The test system is also using ADB's 1 kW Advanced Power Supply (APS), a new generation of power equipment that has been designed specifically for LED circuits. ADB's new power supply was designed around Pulse Width Modulation technology, which is the most efficient method to drive LED fixtures.

The APS concept has been proven at Atlanta Hartsfield-Jackson International Airport where it was installed in late 2006, and APS Systems have also been recently installed at RAF Mildenhall, Denver International Airport, and Orlando International Airport. Both Windsor International Airport, Ontario, and Calgary International Airport, Alberta, have installed APS with LED taxiway edge lights. Niagara District Airport in Ontario will be the first one to install a full medium-intensity runway and taxiway with APS fixtures in Canada.

Capable of running for 3.5 days at full load off of batteries charged by the sun, the False River system uses a single large solar panel to run 164 LED taxiway edge lights. The old system used a 15kW CCR and 164 45-watt lamps and required more than 7400 watts of power every day compared to the new system, which requires 742 watts. The change to new technology has resulted in a cost savings of 90% before the solar portion of the project was implemented. The addition of solar has made the taxiway circuit completely autonomous – no grid power is used.

The new system at False River has triple redundancy plan in place, a requirement from Allen Taylor, airways systems manager for the Louisiana Department of Transportation and Development. The taxiway circuit uses solar as its primary power, but the system will automatically switch to traditional electrical power if necessary and also has a diesel generator as backup. "ADB has developed a good, robust piece of industrial quality equipment," Taylor says. "We haven't had a system failure since the solar-powered APS system was put in service in mid May. I am very happy with it."

*For more in-depth information about False River, visit our website: [www.adb-airfield.com](http://www.adb-airfield.com) to read magazine articles and a case study.*



False River Regional Airport is the first airport in the U.S to have both taxiway and runway airfield lighting circuits on an APS system.



### RDU Decides to Build for the Future and Installs First All LED Airfield in the World

Over the last few years, Raleigh-Durham International Airport (RDU) in North Carolina, has been busy overhauling its airfield lighting system. The airport has replaced as many of its incandescent fixtures as possible with ETL-certified LED fixtures. It also installed a new airfield lighting control system and switchgear regulator system.

What prompted these changes? A suggestion by the Federal Aviation Administration (FAA) for RDU to replace their airfield signage was part of the impetus, but the airport also wanted to address some existing concerns:

1. Maintenance costs were increasing yearly due to aging airfield electrical systems, both in the electrical lighting control vaults and in field circuits and fixtures
2. The increased airfield lighting maintenance requirements were causing a backlog in other areas of the airport
3. The existing system needed to be replaced with one that would provide the function, economy, reliability, and service longevity the airport needed

Before proceeding, RDU did its homework and determined that LED technology held merit and was fast becoming a major player in the airfield lighting market. The airport discovered that changing from incandescent lighting to LEDs would save approximately \$400,000 through reduced airfield lighting maintenance costs (both labor and parts), reduced electricity use and reduced vehicle miles driven on the airfield. It would also increase safety and virtually eliminate the need to shutdown parts of the airfield for maintenance work.

In addition to LED lighting on the airfield, the new system design included replacing old regulators in the lighting control vaults with modular SwitchGear Regulator Systems that offered removable power packs. These solid-state

units promised superior reliability, constant system monitoring, and reduced maintenance headaches. RDU also included a state-of-the-art upgrade of the existing airfield lighting control system as part of the project. With the new technology, the air traffic control tower and the maintenance shop would have “touch screen” control of airfield lighting.

The airport also favored the green aspect of LEDs. According to Steve Pittman, deputy airport director of Facilities, Engineering, and Maintenance, at RDU, “We’re using less fuel to move around the airfield for repairs, and we don’t have to buy manufactured parts the way we used to. The (new) fixture life is estimated at 10 to 12 years,” he explained. “In the two years since we installed the LEDs on the east side, we haven’t had a single failure. That’s phenomenal.”

By the time Phase II was completed in late summer 2010, RDU had replaced every incandescent airfield light with an approved LED fixture – except for runway edge lights – for a grand total of 3,200 fixtures. This included all of the airport’s taxiway edge and centerline, runway guard, touchdown zone, obstruction, runway centerline and runway end identifier lights. In addition, all 266 guidance signs and distance to go signs were replaced with new LED signs.

Why is RDU so impressed with its new LED airfield lighting fixtures? The reason is simple, explains Pittman. Based on actual experience, not projections or estimates, the cost of maintaining the fixtures is phenomenally small, pilots are enthusiastic about the quality of the lights, and airfield lighting system reliability is the best ever.

RDU recently installed medium-intensity runway edge LED fixtures on its general aviation (GA) runway, and plans to install high-intensity runway edge LEDs once approval is received, making RDU very possibly the first airport in the U.S. to go completely LED on the airfield.

## Orlando International Airport Installs ADB's Advanced Power Supply (APS) System on Taxiway F

When ADB Airfield Solutions heard that Orlando International Airport wanted to install a test circuit for its Advanced Power Supply (APS) system on Taxiway F, the company jumped at the chance, because the airport has a very rugged environment that would make it an excellent test site. The airport has high ground water, high temperatures and humidity, heavy aircraft, interleaved circuits exposed to EMI, and the state of Florida has the highest density of lightning strikes in the U.S. At the time, it was also the longest circuit using an APS system, all of which provided a great opportunity to determine the robustness of the APS design.

But why did Orlando want the APS test circuit on Taxiway F? Because Frank Barczak, Electrical Systems Manager for the Greater Orlando Aviation Authority, was looking to achieve even more energy efficiency than he was currently achieving with the 6.6 A LED fixtures. He'd heard that ADB's APS system was designed around Pulse Width Modulation (PWM) technology, which is the most efficient method to drive LED fixtures, and is a proven, reliable technology that's been used in other applications since the 1960s.

The APS system is a plug and play system. The existing infrastructure readily accepts the APS components. The APS system allowed the airport to reuse its existing electrical infrastructure – its existing base can and conduit system, L-824 cable, and L-823 connectors were all recycled for the new system. The APS test circuit was installed by the airfield lighting maintenance electricians led by Jeff Pace, Airfield Electrical Supervisor. Local engineering support was provided by Carl Johnson of AVCON, INC.

The APS system offers improved safety because the maximum output voltage for a 2 kW APS, which is what Orlando chose to use for Taxiway F circuit TFC1, is

1,000 V. In addition, the 19-inch rack-mounted APS unit is much smaller than the constant current regulator (CCR) it replaces, and multiple APS units can be stacked in a cabinet, allowing the airport to repurpose its existing vault space.

Another goal of the APS system was to minimize complexity. The in-pavement and elevated APS fixtures each have a total of 5 parts: ratio transformer, 2 surge protection devices, bridge rectifier, and the LED. Because intensity information is present in the PWM signal, no active elements are needed in the LED fixture other than the LED(s).

Orlando's Taxiway F was originally built in 1989. The west half of Taxiway F is powered from the 18L Airfield Lighting Vault. The centerline circuiting for the western portion of Taxiway F uses two interleaved circuits: Taxiway F Centerline Circuit 1 (TFC1) and Taxiway F Centerline Circuit 2 (TFC2). TFC1 was the circuit converted to the APS System.

TFC1 originally consisted of 116 incandescent in-pavement fixtures and 22,000 linear feet of L-824, 5,000 V cable. Both T/W F centerline circuits were updated to LED fixtures in 2005. TFC1 used a 10 kW SCR-type CCR, tapped for a 7.5 kW load. TFC1 was then converted to an APS system in August 2010.

The original incandescent load on TFC1 was approximately 8.4 kVA. Once updated, the first generation 6.6 A LED fixture and transformer load on the TFC1 circuit was 6,500 VA. After the conversion to an APS system, the 10 kW CCR was replaced with a 2 kW APS. The 116 new APS fixtures operate on just 1,300 VA, and the airfield cable power dissipation is 55 VA, resulting in energy cost savings of 80% for TFC1.

After nine months of operation, the APS system has proven to be a reliable airfield lighting system. Frank Barczak achieved the Greater Orlando Aviation Authority energy goals with the APS System. While energy costs have continued to increase, Frank has been able to reduce energy usage while maintaining the safety of the traveling public.



Because intensity information is present in the PWM signal, the APS-specific LED fixture has no active elements other than the LEDs, meeting Orlando's goal of minimum system complexity, which translates into greater reliability.

To the left is a photograph of the new DC LED fixtures circuit TFC1 interleaved with the standard 6.6A LED fixtures circuit TFC2. From a visual perspective there is no perceivable difference in the lighting systems.

## Team Effort Helps ADB Win Punta Cana International Airport Project

The Punta Cana International Airport project in the Dominican Republic is centered on the addition of a new Cat I runway, associated taxiways, a new airport control tower, and a new airfield lighting electrical vault. The project includes an Airport Lighting Control and Monitoring System (ALCMS), a complete approach system, 12 CCRs, and more than 450 LED signs, LED wind cones, and LED runway/taxiway lights. The only incandescent fixtures on the runway are the edge lights. When the \$1.6M project is complete, Punta Cana will be a truly modern airfield. The installation began in July 2010 with the final phase of the project, the ALCMS installation, scheduled to be completed later this year.

ADB worked closely with the Punta Cana Engineering Group and IDAC, the Dominican Civil Aviation Institute to design the system and Touchscreen graphics to meet the needs of the airport. The Airfield Lighting Control and Monitoring System will allow full distributed control of the approach and runway lights for the new runway, as well as the lighting for the new taxiway segments. The tower will also have full control of several manual in-pavement stopbar locations associated with the runway. The electrical vault associated with the existing runway and ramp area will also be maintained and controlled by the new ALCMS system. This will allow airfield operations to continue while maintenance activities are carried out on the new runway.

Our partners on the project are very satisfied with ADB's quality products and support and our efforts to ensure the project ran smoothly. According to Franco Gomez-Ramirez, Technical Director at EPSA-LABCO Ingenieros Consultores, "The staff of ADB has given the Punta Cana Engineering Group their best efforts in presenting different viable alternatives within their sizable catalog to ensure the best value system for the project-specific long term plans. To take advantage of the significant savings in energy and maintenance costs, the Punta Cana Group has also incorporated the latest LED technology for all new taxiway AGL systems. As a leading LED manufacturer, ADB's catalog line offered ample assurance of the viability and expected performance."

Punta Cana International Airport is the fastest growing airport in the Dominican Republic with almost a 20% increase in traffic annually. These airfield lighting improvements are designed to help the airport safely increase its capacity in the coming years.

## San Diego Wins 2010 Outstanding Award in Sustainable Technology from ASCE

San Diego International Airport recently converted all of its airfield signs, taxiway lights and runway guard lights to LED. LED airfield lights are more energy-efficient than traditional incandescent fixtures, and save even more in reduced maintenance labor and spares. As a result of this green effort, the airport and its project partners, which included Kimley-Horn and Ensley Electric as well as ADB, received the "Outstanding Award" in Sustainable Technology from the American Society of Civil Engineers for 2010. The project "Install Airfield Signs, Taxiway Lights and Runway Guard Lights" was completed September 2010, and involved the replacement of more than 900 incandescent fixtures and signs with LED products from ADB Airfield Solutions. A new PLC control system was also added for improved control and monitoring of the airfield lights and signs.

The installation of the LED airfield signs and taxiway edge lights increases safety of the airport by providing the pilots a uniform and brilliant appearance throughout the airfield. Additionally, the newly installed LED runway guard light system at every taxiway hold position provides increased pilot awareness in the vitally important effort to reduce runway incursions. Their purpose is to warn the pilots of the presence of an active runway and assist in preventing runway incursions, especially in conditions of reduced visibility. This airfield lighting project was just one more step forward in meeting the airport's goals in reducing its carbon footprint, plus reducing operation and maintenance costs.

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"First, the newsletter has a wealth of information on a daily basis. Second, the format allows me to quickly scan, if I want to, for subjects that might be of vital interest, and bypass things for later (or never). Thanks!"

- Terry Lloyd, director of aviation at  
Kissimmee Gateway Airport in Orlando, FL



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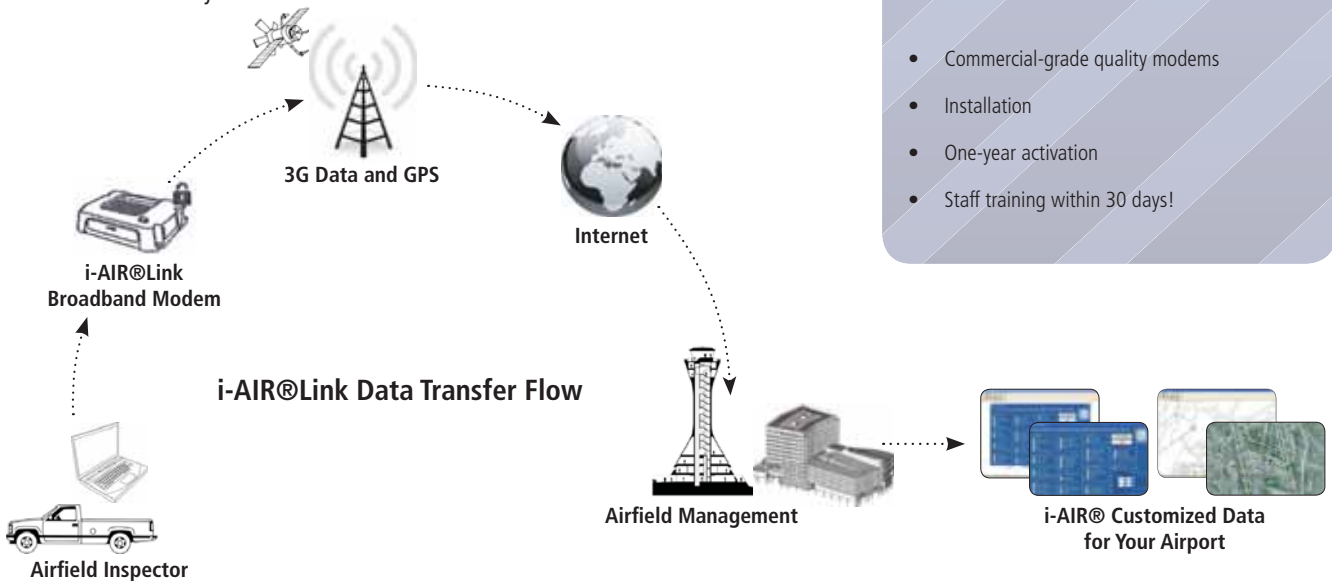
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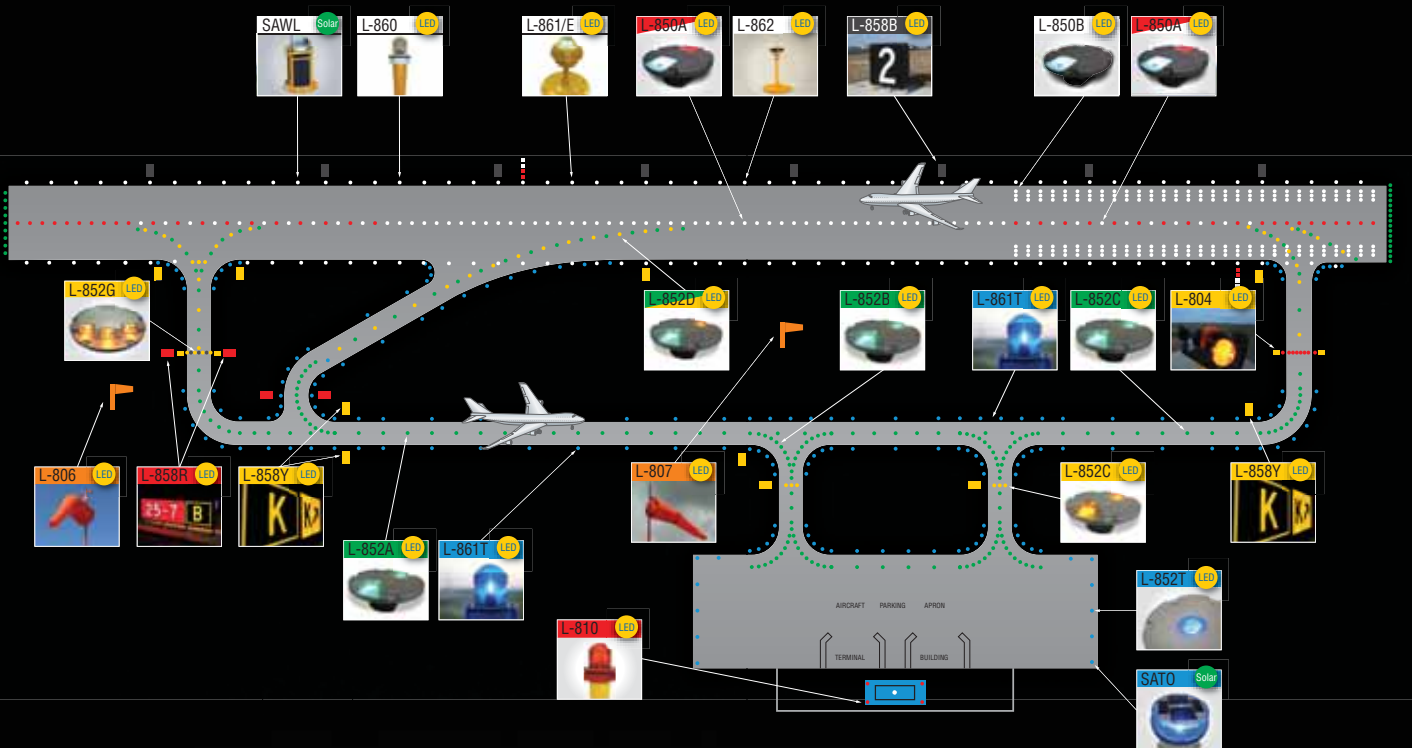
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ADB's LED lights offer longer maintenance intervals and require fewer spare parts, resulting in lower life cycle costs. LEDs can virtually eliminate runway shutdowns due to the long-lasting LED light source. And, many LED fixtures are a direct replacement for existing incandescent lights. LED products reduce energy and labors costs for airports around the world. The future is here. The future is LED.