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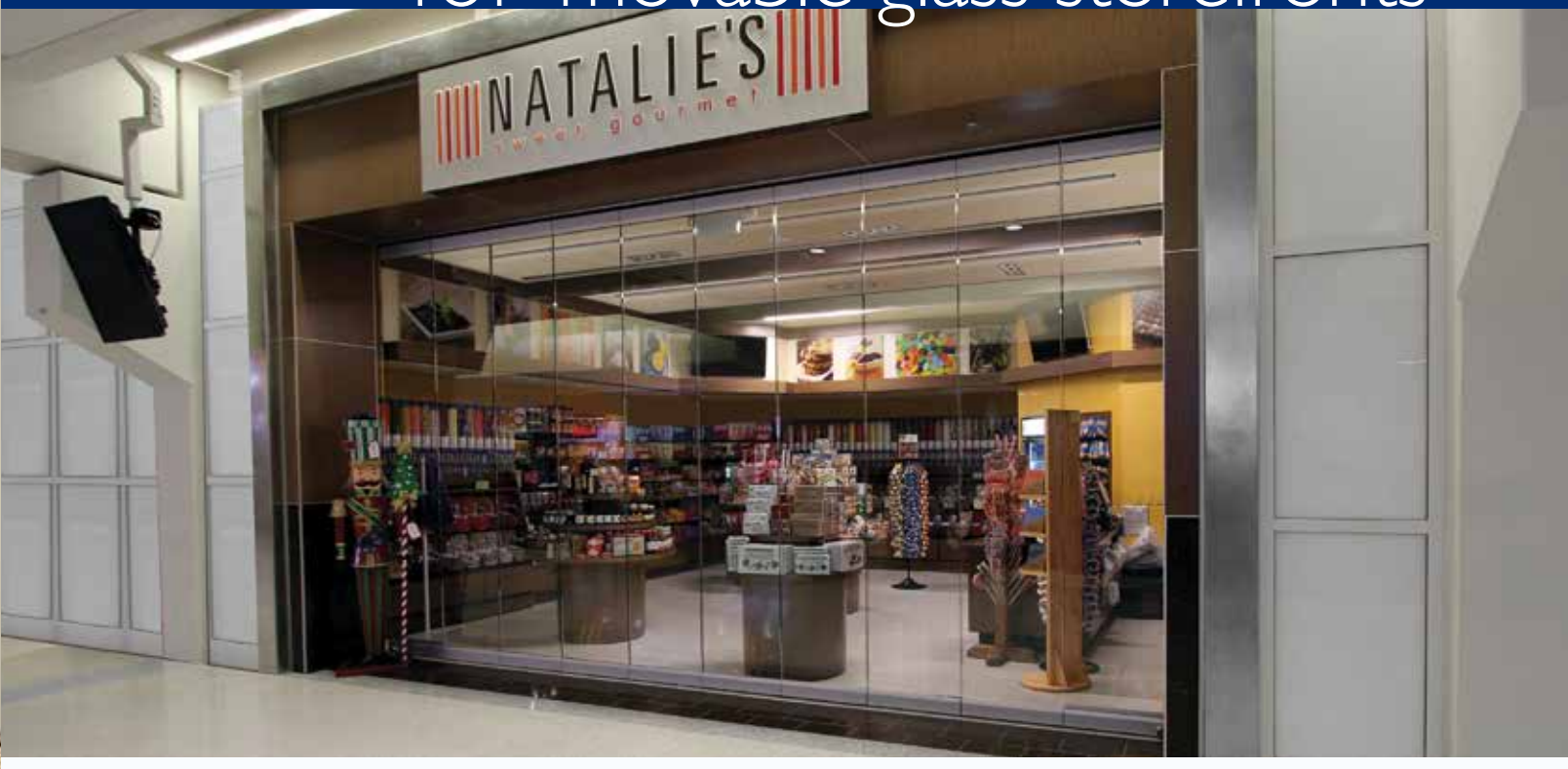
Airport concessionaires' clear pick for movable glass storefronts



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Carpe Diem

Recently, I had a spirited discussion with a friend about a particular airport. After quite a bit of back and forth about what is good and not so good about the facility, my friend finally said, "I don't know what the big deal is. It's very functional."

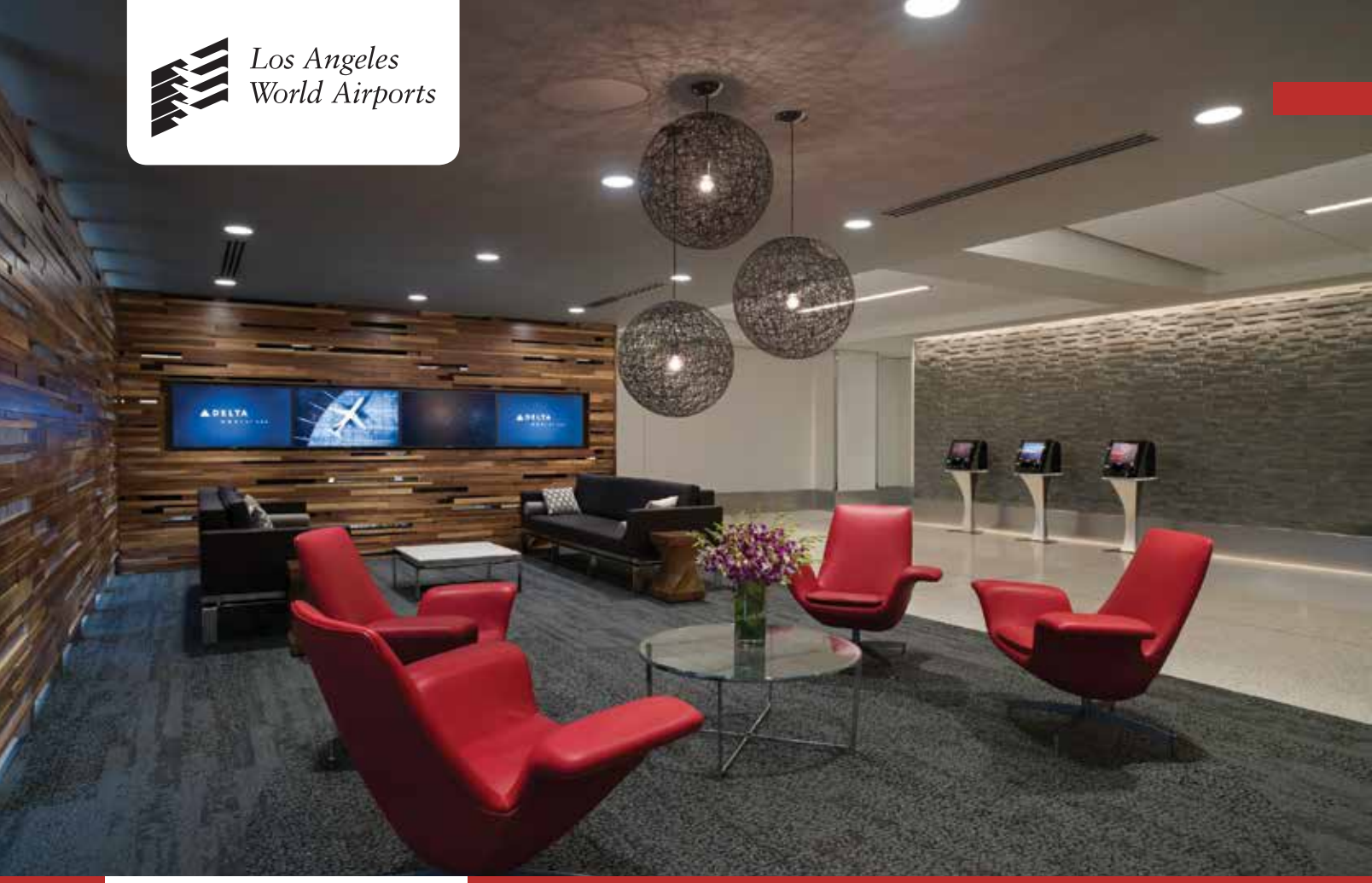
Whether you call it functional, comfortable or even gently used, the status quo at airports today doesn't cut it. Given our current robust market, passengers are traveling in ever-increasing numbers and spending more discretionary dollars inside the terminal than ever before. But there's a catch: They spend when airports give them a *reason* to spend. It's not enough to have a parking space and a $5 bottle of (sometimes) cold water for them. Passengers are spending big bucks when airports cater to their needs and wants.

What I find sad is the hesitation to pull the trigger on infrastructure improvements. The ratio of successful to failed projects is huge. The lead time needed to plan and build is long, and success requires strong leadership and vision. It also requires faith and the experience to know that sustainable growth is always there despite isolated blips in the growth curve. We should expect that, plan for it and never become complacent.

In this issue, we have a number of terrific examples of airports that are stepping up. MSP's new golf concession and the investments in upgrading Wi-Fi at MCI, LAX and SEA head the list. GEG and YVR have successfully tapped into landside development in very different ways. And officials at YXE and LAX's Terminal 5, as well as our Industry Insider columnist, address the importance of providing outstanding customer service *during* airport construction.

There's no doubt about it, we're living in and enjoying a wonderful time to be in the airport industry. Let's not settle for functional. Carpe Diem!

Paul



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Project: Terminal Redevelopment
Location: Los Angeles Int'l Airport
Terminal: 5
Cost: $229 million
Owner: Delta Air Lines & Los Angeles World Airports
Program Duration: 60 months
Project Management: PM Technologies
Architecture & Design: Corgan Associates
Prime Construction Contractor: Swinerton Builders
Structural Engineer: Beuhler & Beuhler
Mechanical/Electric/Plumbing: PBS Engineers
Passenger Boarding Bridges: JBT AeroTech
Boarding Bridge Design/Installation: Aero Bridgework
Baggage Handling & Security Screening Systems: Siemens
Skyclub Upgrades: Nextstep Design; IA; Clark Construction
Primary Elements: Aesthetic enhancements; improved layout; Delta ONE lounge & upgraded Sky Club; expanded Customs & Border Protection facility; new outbound baggage handling system; expanded security checkpoint queuing; new passenger boarding bridges; renovated ticketing lobby; new HVAC system; seismic enhancements; restroom renovations; new elevators & escalators
Key Benefits: Improved passenger experience; refreshed appearance; additional service benefits for premium passengers

Los Angeles Int'l & Delta Unveil $229 Million Terminal 5 Renovation

By Jodi **Richards**

The $229 million renovation of Terminal 5 in Los Angeles International Airport (LAX) wrapped up this summer on time and on budget, with optimism high about how it will enhance the travel experience for about 6.6 million domestic passengers who use the facility each year. With Delta Air Lines as the terminal's sole airline tenant, the initiative was cooperatively funded by Delta ($11.2 million to renovate its proprietary areas and equipment), a TSA grant ($25 million for inline baggage screening) and nearly $193 million by Los Angeles World Airports (LAWA), which owns and operates LAX, Los Angeles Ontario International and Van Nuys Airport.

The Terminal 5 overhaul is just a portion of an $8 billion improvement program that spans the entire airport. LAWA is undertaking the massive initiative to "transform and modernize LAX into a facility befitting the hundreds of thousands of people who fly in and out of our region each day," says Roger Johnson, director of LAWA's Airports Development Group.

Renovations in Terminal 5 were specifically designed to develop a guest experience that truly caters to the modern traveler. "These upgrades are transforming millions of visitors' first and last impressions of Los Angeles," Johnson notes.


Roger **Johnson**

Jacobus Claassens, Delta's regional director, notes that the recently completed project was necessary mainly to update the facility. The terminal's last renovation


Jacobus **Claassens**

The newly expanded ticketing lobby includes 40 ticket counter locations and 39 self-service kiosks.

was in 1986, with smaller updates following, but "nothing big enough that would upgrade the building," he relates.

"We wanted to really enhance the customer experience while supporting the significant growth that we've had (in flights and passengers) since 2011," Claassens explains.

In 2008, various consultants surveyed the building and its systems to help determine what would need to be replaced and/or upgraded. Planners and architects used the results of a facility assessment study and modeling studies to increase the terminal's processing capabilities and improve its building systems and aesthetic properties.

Improving Passenger Flow

Construction on the 140,000-square-foot terminal began in 2011. Upgrades focused on supporting the reliability of Delta's operations, increasing the efficiency of passenger and baggage processing and improving the overall passenger experience, details Claassens.

Jeff **Mangels**

Without adding square footage to the terminal, architects managed to double the size of the ticketing lobby. Personnel from architect of record Corgan Associates explain that the terminal's new design reconfigured the available square footage in a way that accommodates a more efficient ticketing process. Instead of a traditional linear check-in process, Terminal 5 now features a pod concept, which allows for different levels of service and processes customers much more quickly, details Corgan principal Jeff Mangels. The newly configured lobby features 40 ticket counter locations and 39 self-service kiosks.

The airport recaptured a significant amount of space by using the alternative approach, notes Charles Henning, AIA, program design executive with project management firm PM


Charles **Henning**

Technologies. The reclaimed space is used for additional queuing areas in the ticket hall and security checkpoint. The new allocation and orientation of space provides more intuitive wayfinding and a more open feel — particularly in the atrium, Henning specifies.

Additional efficiencies were gained by expanding the TSA checkpoint from seven lanes in one location to nine lanes in two separate areas. The new system helps passengers get to their gate in a more timely manner, reports Claassens.

Increasing the queuing depth of the security checkpoint required structural modifications. Before the changes, lines of Delta customers waiting to clear Security often extended out onto the sidewalk, Mangels recalls. “Increasing that queuing area was important to increasing that level of service,” he notes.

On the arrivals level, the new design considerably opens up the area out to the curbside. The change not only improves the sense of orientation for travelers, but also accommodates other functions, like valet drivers and meet-and-greeters, says Mangels. Other enhancements to the arrivals process include a completely renovated bag claim area, a larger and more functional Customs and Border Protection area and new baggage carousels and international baggage recheck facilities.

Changes to wayfinding played a central role in the renovation project, Claassens notes. He describes Terminal 5’s new system as more sensible and better suited to the way people currently travel through airports. Elevators and escalators were relocated near Baggage Claim, the ticket lobby and security checkpoint transitions — “where passengers would normally look for them,” he comments.

Moving the vertical circulation in the ticketing lobby out to the exterior perimeter provides a clear sense of direction and orientation for passengers, explains Mangels. “They now have a better sense of direction once they finish the ticketing process as to where to go for Security,” he notes.

The renovation also includes new LED lighting; a high-efficiency heating, ventilation and cooling system; energy-efficient windows and low-flow water fixtures in the aging facility. Restrooms throughout the terminal also received other upgrades.

Airside, new passenger boarding bridges were added to support the reliability of Delta’s operations, Claassens notes.

Premium Passenger Perks

Some of the upgrades in Terminal 5 exclusively focus on Delta’s upper tier customers. Delta ONE at LAX is designed to provide a premium experience, personalized service and additional privacy for the airline’s premier travelers, explains Anthony Black, general manager of corporate communications for the airline.

The renovation added special facilities just for Delta's premier passengers.

Customers who purchase upgraded Delta ONE tickets are allowed to enter through a dedicated curbside entrance, which leads to a private 3,200-square-foot check-in lounge with personalized bag check and other special amenities. The lounge also provides access to a dedicated TSA checkpoint. The Delta ONE at LAX lounge is the first of its kind for the airline, but similar facilities are expected in other Delta hubs cities, including New York, Atlanta and Minneapolis.

Delta's Sky Club lounge in Terminal 5 also received a facelift. The airline added more space, an additional 100 seats, new shower suites and renovated bathrooms, an updated food area with café seating and new furnishings and fixtures.

Modern Design

Many of the enhancements to Terminal 5 came in the form of aesthetic upgrades. Crisp, clean white finish materials were used throughout the space to give the terminal a more modern feel. Mangels describes the look as contemporary and clean, thanks to the use of durable and light materials, including wall tile and terrazzo flooring.

Incorporating more glass added to the modern look and opens up the space, Claassens adds. Beyond its aesthetic appeal, the glass is also more durable and easier to maintain than some other products, he notes.

The palette also features Delta's white, red and blue color scheme. The airline wants guests to know they're in a Delta environment as soon as they walk in, says Claassens.

Seismic Enhancements

In addition to aesthetic and operational enhancements, the ticketing building in Terminal 5 also received a full seismic upgrade that affected every level of the structure, from new foundation elements all the way up to the roof. The building's age and

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complexity made the project upgrade particularly challenging, Claassens recalls.

Additionally, the construction team did not have the luxury of shutting down the terminal during the project. "Most of the work happened while we were running an operation pretty much 24 hours a day, seven days a week," he explains.

Mangels recalls the seismic retrofit as a "pretty big challenge." A buckling restrained brace frame was used to minimize impact to the facility and contain costs. "The brace frame strategy really did help to achieve the performance objectives without invasive surgery within the existing structure," he notes.

On Time, On Budget

Planners divided the facility into sections, and construction "marched down" the length of the building in phases, Mangels explains. "It was a very detailed, strategic approach," he comments, noting that phasing was especially crucial as workers neared the security checkpoint. "It was important to segregate spaces for safety and convenience and try to maintain as much capacity as we could during those times," Mangels recalls, noting that there weren't many options for moving passengers through that area of the building.

Claassens agrees that following the plan was critical to finishing the $229 million renovation on time and on budget. "Phasing is absolutely what would make or break us," he reflects.

Throughout the project, team members made concerted efforts to insulate passengers from the hubbub of renovations with construction barriers and other strategies. "Working with LAWA, we did a really good job to ensure that it always felt like you weren't in a construction area, but just walking down a corridor," reports Claassens.

Complete Concessions Overhaul

In concert with Delta's renovations, LAWA replaced *all* concessions in Terminal 5 with concepts that focus on local Los Angeles brands. Johnson reports that travelers now have plenty of healthy food options such as Loteria Grill, Monsieur Marcel's Gourmet Market & Bistro and T&TY Bakery. LA-based eateries with their first airport operations include: Lemonade, featuring organic options; Rock 'n Brews Concert Bar & Grill, owned by KISS musicians Paul Stanley and Gene Simmons; Chef Ben Ford's Filling Station; and Iron Chef Masahara Morimoto's Skewers.

On the retail side, Terminal 5 guests will find Magic Johnson Sports; Mattel Experience (toys), RipCurl (beachwear), See's Candies and *Los Angeles Times* News and Gifts.

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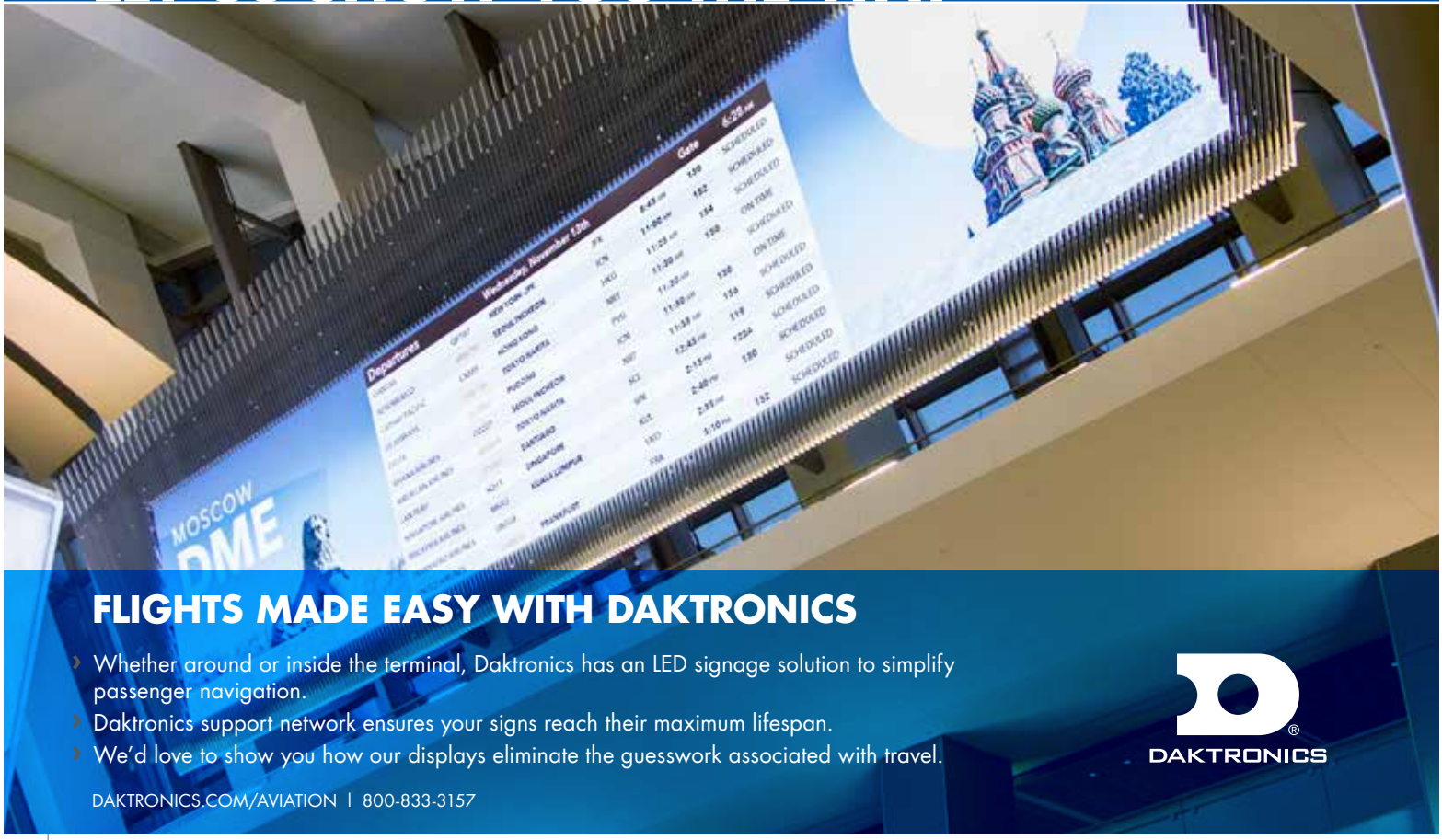

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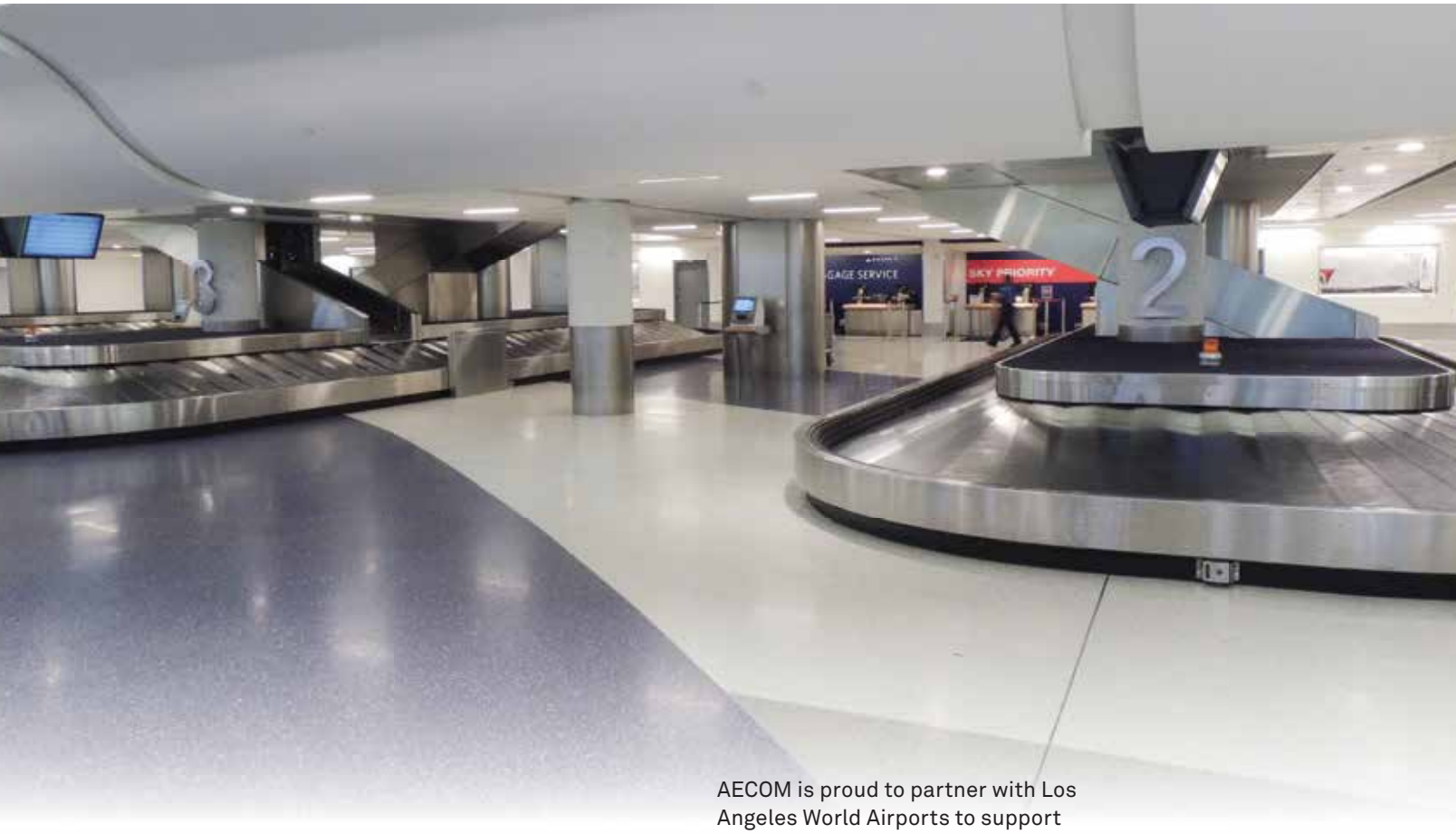

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Project: Inline Baggage Handling System

Location: General Mitchell International Airport

Cost: $28 million

Funding: TSA: $21 million; passenger facility charge revenue: $7 million

Construction Timeline: August 2011 – June 2014

Design Team Lead & Project Management: GRAEF

Architect: Continuum Architects + Planners

Construction Management: American Design and Build

Baggage Handling System Design: VTC

Conveyor System: Jervis B. Webb

Explosive Detection Systems: L-3 Security & Detection Systems

Control Hardware: Allen-Bradley

Gear Motors & Reducers: Sumitomo

Baggage Movers: Vaculex

Baggage Handling System Modeling & Simulation: TransSolutions

Electrical: JDR Engineering

Cost Estimating: Construction Cost Systems Building Construction

Civil Engineering Consultant: Spann & Assoc.

Geotechnical Engineering: Wagner Komurka Geotechnical Group

Drilling Services: Soils & Engineering Services

System Testing: Raytheon

TSA Testing & Certification: Battelle

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Noteworthy: Complex, multiphase construction of new building to house inline baggage handling system & allow removal of bulky explosives detection machines from ticketing lobby

Mitchell Int'l Moves Explosives Detection Behind the Scenes

By Robert **Nordstrom**

The ticketing lobby at Milwaukee's General Mitchell International Airport (MKE) is once again more open and spacious. Gone are the seven SUV-sized explosives detection system machines that invaded the entry space after 9/11 changed screening requirements. And travelers no longer have to maneuver their luggage to the large, intimidating machines.

The old bulky screening equipment has been replaced with a new baggage system with inline screening. Four new L-3 explosives detection machines now do their work in a new 24,000-square-foot building located on the secure side of the airport, out of customers' sight.

The $28 million project was completed last June, $4 million under budget.

MKE got the ball rolling on its complex, time-consuming initiative with the completion of a separate project several years before. "Prior to 2006, we had eight walled off areas in the baggage makeup area," explains Milwaukee County Project Manager Tim Kipp. "Each airline in the garage-like area did their own thing: putting bags on a belt, then on a cart to be transported to the aircraft. For years, airport administration tried to secure TSA money to move the L-3s out of the ticket lobby, but at that point there was little or no funding available for medium-hub airports."

Tim **Kipp**

With no quick solutions in sight, MKE airlines prepared for the time funding would become available and renovated the backroom space to accommodate an inline system at a cost of approximately $8.5 million. Work crews tore down the walls separating the spaces to create two common-use rooms, each with two baggage carousels. During the two-year project, each airline took its turn temporarily running baggage makeup operations out of a large tent. After each airline's area of the building was completed, personnel moved back inside the newly renovated space.

The first phase was definitely the most disruptive for carriers, Kipp recalls. "We had to put airlines into the tent in the middle of the winter," he details. "We even had to move their operations offices out of the building into trailers … We knew that eventually we would get the money to construct a new baggage handling system; we just didn't know when. But at least the preparatory work would be done when the funding did become available."

Patience Pays Off

In August 2010, the airport finally entered into a transactional agreement with TSA to construct an inline baggage system. Under the agreement terms, TSA would fund $21 million of the $28 million project and passenger facility charges would pay for the remaining $7 million.

With funding in place, the airport hired GRAEF to lead the design team and manage the project. American Design and Build, in turn, managed the construction

Chris **Schmidt**

portion, which required a non-traditional approach. "The design approval was dragging out, so we initiated work on the infrastructure for the new building," informs Chris Schmidt, the firm's project manager. "Existing airport functions were relocated, the sheriff's checkpoint to access the secure airside was moved, a new security gate was installed and some fuel hydrant work was performed. We also reconfigured the loading dock area to accommodate the new addition. So when TSA signed off on the plans, we were ready to go."

Lori **Rosenthal**

GRAEF Vice President Lori Rosenthal explains the reason behind the delay: "We were all trying to come to terms with what the correct capacity numbers should be by looking at current capacity needs in relation to projected needs."

The final design settled on four L-3 machines, each with a capacity of 750 bags per hour — plenty to handle the airport's current peak need of approximately 1,500 bags per hour. The airport regularly uses three machines; the other one serves as a backup. The new system provides MKE with approximately the same capacity as the previous seven machines that resided in the ticketing lobby, notes Kipp.

Today, when travelers check in, staff place their bags on a conveyor belt behind the ticket counter. The bags are then transported for screening to the new matrix on the secure side of the airport. Bags requiring manual screening are hand checked in the Checked Bag Resolution Area, where TSA personnel use a hand-operated suction machine, which transfers bags from the suspect line to the cleared line.

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The most measurable and significant result of the new baggage handling system is lower labor costs. Fewer TSA personnel are needed to screen bags, and those on duty experience fewer injuries.

"Under the old system, everything was done by hand," Kipp explains. "Each of the seven machines in the lobby was staffed by up to four TSA employees. It was labor-intensive, with a higher risk of back injuries. The new system streamlines the baggage screening operations, which allows TSA to reduce staff. From the TSA's perspective, that was a major driver to get this project done."

Infrastructure Challenges

An early conceptual design for MKE's new checked baggage system took a two-building/two matrix approach — one set at the north end of the terminal and another at the south end — with a total of six medium-volume explosives detection machines. The two-building design was originally considered because a single-building design required bags to travel by an elevated conveyor from ticket counters on the far south end of the terminal to a new building on the north end for screening, then back again to the south end to the baggage makeup carousels. The obstacle to that approach was a 60-inch deep, 50-foot span plate girder stretching east and west near the center of the terminal. The girder supported a significant portion of the connector bridge to Concourse D, including the floor, roof, precast walls and over 20 beams. It also blocked the way of the proposed conveyor route.

To make a single-building design work, 2 feet of girder depth needed to be removed to allow conveyor passage and the 8-foot clearance needed for baggage tugs below. System designers resolved this problem by placing a 2-inch by 20-inch by 20-foot long bottom flange welded to the girder to allow for removal of the bottom 2 feet of the girder.

"The girder is a major beam. It probably supports 240,000 pounds," explains Rosenthal. "We shored it up, made the cuts and reinforced it. We made it work. Without that modification, the single-building strategy would not have worked."

The modifications also saved millions of dollars in construction costs and ongoing operational and maintenance expenses, she adds.

Kipp recalls the break-though moment clearly: "Everyone was thinking that it would be too difficult to go around the beam. Then GRAEF assured us that we could cut through the beam and keep the structure upright. That helped tremendously. At that point, we could further help TSA reduce staffing needs by concentrating its workforce in one building instead of two."

The new baggage handling system/inspection matrix building was sized to be constructed over the tug passage next to the existing bag makeup building and over the basement tug tunnel access ramp. The narrow tug passage and ramp allow just enough room for two-way tug traffic. The addition of new building columns would have restricted tug passage to one-way traffic.

Pressure-meter soil testing not available when the terminal was built in the 1980s

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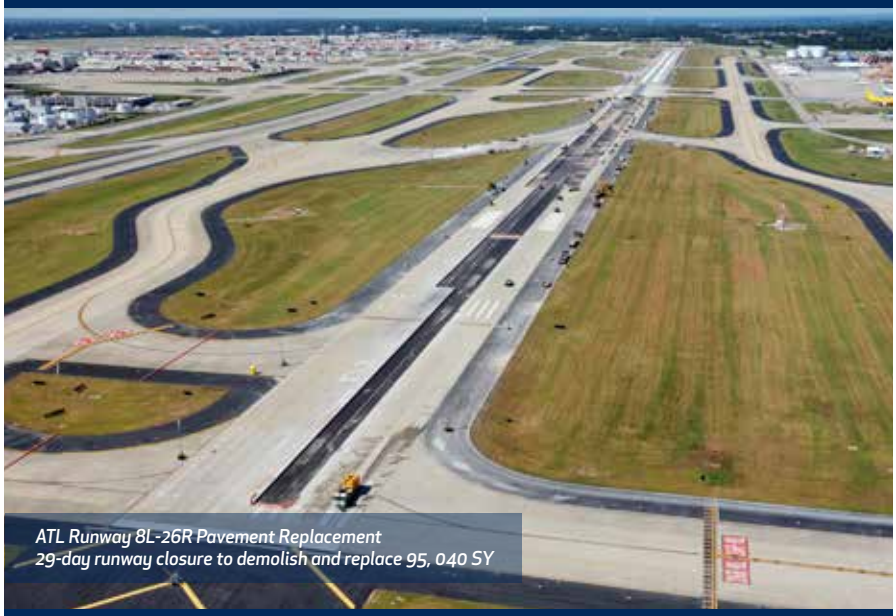

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determined that the soil could support 5,000 pounds per square foot with the existing footings, as opposed to the 2,000-pounds-per-square-foot determination in the original design. Crews also analyzed the existing tug ramp retaining walls and footings for baggage handling system column loads. The new soil capacity figure was found adequate as long as column spacing was kept close to reduce local loads on the wall. The tug passage clearances were maintained, saving several hundred thousand dollars in foundation work.

Construction Challenges

Proper phasing and schedule coordination was a major focus to ensure ongoing airport and airline operations during the project. Primary stakeholders met weekly for phasing and construction activity updates.

During the first "make-ready" phase, crews relocated a portion of the airport's underground fueling system to allow for setbacks on the new building. They also added a new electrical duct package to serve the loading dock area. The duct had to cross the road that serves the loading area and pass through each of the respective loading dock positions, which affected daily airport deliveries. A new airside checkpoint was established while workers removed the existing checkpoint within the new building's footprint.

Phase two included construction of the new baggage handling system building, with planners sequencing work to allow for airline vehicle and pedestrian traffic. Because the new building was located on the secure side of the airport, workers had to be badged and pass through security to be allowed onsite. Contractors also had to have material deliveries inspected; secure tools, materials and equipment at all times; and keep construction debris within a defined area.

Baggage handling conveyors and in-line screening equipment were installed during phase three. MKE retained existing ticket counter conveyors and carousels at the passenger pickup locations for use with the new system to reduce costs.

New conveyors and screening equipment needed to be installed while bags continued to move through the system. To accomplish this, planners divided demolition of the existing baggage handling system and installation of the new system into 20 detailed sub-phases. An intricate schedule allowed design and construction teams to work around airline operations to connect each of the four ticket counter lines to the new single-line system.

"Communication was key to this project's success," emphasizes Schmidt. "We made a concentrated effort to keep everyone informed about what was going on. We met with the stakeholders on a daily basis and held weekly meetings where we discussed what work was taking place and what work was coming up. Getting all of the stakeholders buy-in every step of the way really streamlined the construction process."

The new system includes four L-3 explosives detection machines, each with a capacity of 750 bags per hour.

Jeff **Callaghan**

Personnel from VTC, the GRAEF subcontractor that designed the baggage handling system, enthusiastically agree. "The success of this project had everything to do with the great communication and coordination between TSA, the airport, the design team and the contractors," says VTC Project Manager Jeff Callaghan. "It's truly one of the best projects we have been part of."

Up & Running

Before MKE's new system went online last June, it underwent three months of testing. Airport and design personnel agree that the testing process is one of the toughest components of adding a new baggage handling system.

After construction was complete, the project team conducted an initial test of the system, and then the design team tested it and signed off. In addition, TSA brought in Raytheon to conduct independent testing. After Raytheon signed off, Battelle tested and certified the system for use by TSA.

Chris **Norton**

VTC Chief Executive Officer Chris Norton explains the long process: "During preliminary testing, we worked with Jervis B. Webb to try to break the system, so that by the time Raytheon and Battelle show up, testing runs pretty smoothly. We have a testing facility and we are very good at finding the limits of a system. By the time we finish, we are confident that it will stand up to Raytheon and Battelle."

With bulky explosives detection machines tucked behind the scenes, the ticket lobby is now more spacious and better facilitates passenger flow, reports Kipp. Airlines have added kiosks in front of the ticket counters, and the space available for leasing has increased.

"This is the latest in a series of investments we are making in Mitchell Airport to ensure that we provide the best possible experience for passengers," states Milwaukee County Executive Chris Abele proudly.

Personnel from Jervis B. Webb, the firm that manufactured and supplied the conveyor system, characterize MKE's new baggage screening and handling method as a very clean system. "I've been doing this since 2001, and this is probably the best closeout on a project I've ever experienced," reflects Senior Project Manager Bernie MacDonald. "I can say with sincerity that they are great people in Milwaukee."

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NJPA AWARDED CONTRACT

Indoor Golf Concession is Par for the Course at Minneapolis-St. Paul Int'l

By Kathy **Scott**

Minneapolis Saint Paul INTERNATIONAL AIRPORT msp

factsfigures

Project: New Golf Concession

Location: Minneapolis-St. Paul Int'l Airport

Name: PGA Experience

Partners: Wexford Golf; PGA of America; HMSHost

Size: 12,000 sq. ft.

Primary Elements: 84-seat bar/restaurant; retail shop; indoor putting green & simulated driving range: PGA instruction; simulators that allow golfers of all levels to "play" world-class courses such as St. Andrews

Unique Challenge: Because facility is located on secure side of airport, facility had to add security system that locks doors if golf clubs approach exits

Public Access: Non-ticketed customers can arrange for special checkpoint passes to access facility

"Airports are more than simply points of departure and arrival. They are complex businesses in their own right," said Angela Gittens, director general of Airports Council International World, at this year's Airport Service Quality Awards ceremony.

The *Future of Airports*, published by management consulting firm Oliver Wyman, develops similar observations in its discussion of the entrepreneurial streak that is emerging within the industry. According to the article, airports are becoming equal players in the passenger experience vs. allowing the airlines to "own" the process as in the not-too-distant past. "Non-aviation services, like food and beverage and retail, are a key differentiator, as they have a strong impact on the airport's market positioning and on public perception," note authors Niko Herrmann and Bob Hazel.

Minneapolis-St. Paul International Airport (MSP) exemplifies this trend with the PGA Experience, a golf-oriented concession that opened in Terminal 1 last March. Described as a "golf lifestyle facility," MSP's new offering encompasses food/beverage and retail elements as well as hands-on services such as simulators and onsite PGA instruction.

Access to the lounge, which includes a putting green and "business class" Wi-Fi, costs $10; time on a simulator costs $30 for 30 minutes or $50 for 60 minutes. Prices for the facility's simulated driving range run from $20 for 15 minutes to $35 for 60 minutes; and lessons start at $15 for a 15-minute "tune-up" to $120 for an hour-long session, including simulator time. There is no entry fee for the associated retail store and bar/restaurant.

According to developers, MSP's "indoor golf experience" is the first and only facility of its kind at a U.S. airport.

The new 12,000-square-foot concession was nearly six years in the making, beginning with a general request for proposals from the Metropolitan Airports Commission in 2009. The original goal was to fill a large area on the mezzanine level of Terminal 1.

The facility's lounge includes a putting green and upgraded Wi-Fi service.

"We needed a unique concept to drive people up to that level," explains Liz Grzechowiak, assistant director of Concessions and Business Development for the airports commission.


Liz **Grzechowiak**

Wexford Golf, a local boutique golf services company, submitted the winning proposal; and its president, Joel Burger, teed up a new airport concessions concept. As a PGA professional member, Burger's connections with the organization were instrumental in bringing the strong PGA brand to MSP.

No Mulligans

Before opening the new golf concession, Burger and MSP had to reconcile a major security issue: Golf clubs are a TSA-prohibited item; and the space available for development was located just inside the airport's screening checkpoint.

The Wexford team cleared the potential hazard by developing proprietary technology that satisfied TSA, the Department of Homeland Security and airport officials. "If a golf club gets close to an exit, the doors will lock," Burger explains.

The custom security system adequately addressed concerns regarding unnecessary risk for MSP's 35 million annual travelers, and the project proceeded on pace.

Playing Partners

With the PGA, Wexford Golf and MSP all on board, one more player was needed to make the PGA Experience a reality. The team rounded out its foursome by tapping HMSHost, a mainstay in 114 airports around the globe, to provide industry-specific guidance food and beverages.

HMSHost tweaked the menu at Ike's, one of its existing MSP properties, to mimic golf course fare and worked to create a "country club feel" inside the 84-seat bar/restaurant. Michael Price, vice president of Business Development for HMSHost, notes that it was important to align food options with the golf experience, which includes limited time for snacks and drinks. Price and Derryl Benton, HMSHost's executive vice president, worked with company's culinary team to develop selections with a 10-minute turn-time — the maximum amount of time many courses recommend players take between rounds.

Benton, who has witnessed the expansion of numerous concepts and brands in the industry, notes that HMSHost had created several other themed concessions before its golf project at MSP. "Airports are like small cities," he comments, noting that increased TSA regulations leave airport visitors with more time for shopping, eating and drinking after clearing security checkpoints.


In addition to a putting green, the facility includes simulators that portray world-class golf courses.

The continuing trend of airlines cutting inflight meal service further adds to the stream of hungry travelers.

Boarding Passes Optional

Not surprisingly, passengers with layovers are the new facility's primary customers. MSP is a Delta hub with an average dwell time of 90 minutes, explains Grzechowiak.

Currently, connecting passengers account for fully 80% of business at the PGA Experience; but that may change. Phoebe Larson, marketing strategist for the Metropolitan Airports Commission, believes the facility could expand its reach by promoting its unique services to local residents as pre-flight entertainment.

Customers with no intention of boarding a flight can also patronize the facility. Burger worked with TSA to allow non-ticketed airport visitors to enjoy the PGA Experience. Non-traveling patrons simply call the facility 24 hours in advance and provide their name, birthdate and arrival time to receive a special pass that gets them through the security checkpoint.

In coming months, the PGA Experience plans to begin co-marketing the 2016 Ryder Cup, which will be played at Hazeltine National Golf Club in Chaska, MN. Interest in the popular U.S. vs. Europe competition is expected to bring even more traffic into the MSP facility, which is already selling a variety of merchandise bearing the distinctive Ryder Cup logo.

Golf Anyone?

Despite its notably cold weather, MSP is actually a logical place for a golf-themed concession. Minnesota may be best known as the "land of 10,000 lakes," but it also has a high population of golfers — more per capita than any other state, reports Grzechowiak.

If this winter is anything like last year's, travelers can wait out weather-related flight delays at the PGA Experience by hitting balls on its virtual driving range or "playing" one of the world's top courses on a high-tech simulator. Among the dozens of options available, the Old Course at St. Andrews (which recently hosted the British Open) is currently the most popular, reports Burger.

Passengers can also shop for new golf wear or even custom-fit clubs without worrying about lugging their purchases onto an aircraft. Clerks will gladly ship merchandise purchased at the PGA Experience.

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Passengers in the Tom Bradley International Terminal, and elsewhere at LAX, are in for faster Wi-Fi speed.

3 Strategies for Keeping Customer Wi-Fi Humming at Peak Performance

By Kristin Vanderhey **Shaw**

factsfigures

Project: Upgrading Wi-Fi Service
Location: Los Angeles Int'l Airport
Cost: $1.5 million
Key Vendor: Boingo Wireless
Contract Scope: Upgrade, manage & operate network
Key Benefits: Speed of free Internet service will increase from 1.2 – 5 Mbps; users can pay for 10 Mbps & 20 Mbps service
Time Limit for Free Access: 45 min. (repeatable)
Anticipated Rollout of Upgrades: Later this year

Project: Upgrading Wi-Fi Service
Location: Seattle-Tacoma Int'l Airport
Est. Cost: Nearly $10 million
Network Provider: Cisco
Heat Map Contractor: Aeropath
Key Benefits: Faster service speed; easier for customers to connect; new service on ramp & apron
Est. Completion of Initial Components: Mid-2016

Project: Upgrading Wi-Fi Service
Location: Kansas City Int'l Airport
Cost: $300,000 - $400,000
Total Access Points: 60 (vs. 18 previously)
ID Management: Alexander Open Systems
New Access Points: Cisco
Unique Challenge: Horseshoe-shaped concrete terminals complicated expanding coverage
Time Limit for Free Access: 1 hr (repeatable)
Avg. Current Network Load: No more than 650 concurrent users
Early Adopter: One of first U.S. airports to provide free customer Wi-Fi

There's no denying it: cell phones, laptops and tablets are officially ubiquitous. According to SAP, there were more mobile devices than people on Earth at the end of 2013.

Travelers, in particular, have come to expect free Wi-Fi wherever they go — and not just free Wi-Fi, but fast Wi-Fi. They demand continuous coverage and want charging outlets available everywhere. Often, they carry two, three and even four mobile devices at a time.

Research by Accenture found that more than 60% of U.S. hotels now offer customers free Wi-Fi. Room cost is the only competitive factor that customers consider more important than free in-room Internet.

Dom **Nessl**

Like hotels, airports are also feeling the pressure to keep travelers digitally connected. "The bottom line is that if people don't have good Wi-Fi, they will complain about the airport," says Dom Nessi, chief information officer at Los Angeles International Airport.

Operators throughout the United States are consequently considering network upgrades to handle the explosion of mobile devices and bandwidth usage. Los Angeles International Airport (LAX), Kansas City International Airport (MCI) and Seattle-Tacoma International Airport (SEA) have all recently publicized details about system-wide enhancement projects, and each has a different strategy for meeting customer expectations.

"The airline industry is going mobile," says Dave Wilson, SEA's chief aviation technologist. "IATA's Fast Travel initiative takes advantage of smartphone technology to support the passenger processing experience, and we support that."

Dave **Wilson**

The airport's most recent annual survey about customer devices found that 34% of SEA passengers use a smartphone to board flights. "In 2011, about 70% of our passengers had a smartphone. In 2014, it increased to 88%," Wilson reports. "We have to continually improve to be ready to handle the traffic."

Like airports, airlines are being pressured to keep pace. John Walton, on RunwayGirlNetwork.com, observes that some early air-to-ground Wi-Fi technologies were considered pretty fast back in 2008, when they were first introduced; but some of those initial versions of the popular amenity "haven't aged well in terms of passenger experience as devices have gotten hungrier."

LAX Plans for 4x Faster Speed

A $1.5 million upgrade to significantly boost the speed of free Wi-Fi at LAX is currently in the works. The airport signed a multi-year

contract with Boingo Wireless to upgrade, manage and operate its Wi-Fi network. And in late July, the two organizations were in the technical planning phase of the project. Reconnaissance work will be required to determine what is needed for the large and complex upgrade that will span nine terminal areas.

The upgrade is designed to increase free Internet speeds from 1.2 megabits per second (Mbps) to 5 Mbps. Travelers will also have the option to pay for faster connections of up to 10 and 20 Mbps. According to planners, the faster new free Wi-Fi will support the average user, and the premium services will satisfy the needs of even the most intensive users.

"There are a variety of passengers who travel through our terminals: families downloading email; businesspeople wanting to do webinars and downloading large documents; the younger generation downloading movies and video," says Nessi. "We know we're not going to be able to satisfy the most demanding users all the time, but we want to be able to satisfy the majority of our customers. We know there will be high-saturation days when the Wi-Fi slows down, and we'd like to minimize this as much as we can."

In order to maximize efficiency of the new system, the LAX team commissioned a heat map to visually portray the signal strength in various terminal locations. The wireless heat map will help planners identify dead zones where additional access points are needed, make adjustments elsewhere and improve overall coverage.

The Wi-Fi system will need to continue to evolve as the airport raises ceilings, moves walls, adds concessions and changes office locations throughout its terminals, says Nessi. When the physical environment changes, people congregate in new places, and coverage needs to adjust accordingly.

"It's a never-ending process," he comments. "You must constantly tweak your Wi-Fi areas as your traffic changes. You don't want to rely on customer complaints before you start improving your service."

With apps using much more bandwidth than in the past, additional users streaming larger files, and much more data being held in the cloud, Nessi believes that Internet service is starting to be considered a necessity rather than a luxury. Airports must consequently decide if their Wi-Fi will take on "utility" status like electricity and water, or "amenity" status.

"Generally speaking, in the days when airport Wi-Fi required a fee to access it, 2 to 3% of enplaning passengers were utilizing the service," says Boingo Vice President of Business Development Scott Phillips. "Now, with complimentary Wi-Fi having matured, we typically see about 30% of enplaning passengers using the Wi-Fi in a tier one airport with associated post-security dwell time. That's 10 to 15 times the number of users than when it was first installed. But the real challenge is that those customers are now consuming 30 times the amount of bandwidth. That exponential upward trend is driving the need for continuing upgrades."

How Fast is Fast Enough?

While the LAX team realizes that Wi-Fi service will slow down on high saturation days, it wants to minimize those occurrences. Phillips recalls that in the early days of paid airport Wi-Fi, 512 kilobits per second (Kbps) was standard speed. Now, passengers expect 5 Mbps, which is 10 times faster.

"Customers expect that they will get the same level of service as they do at home," says Nessi. "When I enter a public area, my Wi-Fi connect rate drops significantly, and it's frustrating. We are users, too; and we understand that it's frustrating for passengers. But since it's a free service, we have to find some middle-ground."

Phillips predicts that the demand will continue to remain high. "I think when you offer people something for free, and they believe it could be better if enough people ask the airport for it, then they will ask for it," he explains. "That the airport is offering this level of service for free is tremendous when you consider that in most hotels and other public venues, you are lucky to get 1 Mbps for free."

Consumer perception and education are consequently new public relations challenges for airport operators.

"Consider that most home cable providers offer paid service plans ranging from 15 Mbps to 100 Mbps," says Phillips. "At a glance, it's easy to say that the 5 Mbps at the airport is much slower than home service. In reality, there are cases when the airport service will be better than the home service.

"At the low end, home internet customers are paying roughly $30 per month for 15 Mbps," he explains. "For a family of four, let's assume all of them are using the service concurrently, streaming Netflix, etc. Now divide that shared 15 Mbps paid

service by four, and each family member is theoretically getting 3.75 Mbps for an average cost of $7.50 per person per month. In comparison, if that family had been accessing the Internet at LAX, they would each get a guaranteed 5 Mbps connection for free."

Coordination of concurrent systems is also an important factor. "We have two systems: one for passengers and one Los Angeles World Airports-owned system for airlines and tenants," explains Nessi. "Currently, we're looking at ways to give airlines and tenants more Wi-Fi access where it is part of the passenger processing system. Airlines have a need for Wi-Fi the moment the aircraft comes in, and they purchase their own Wi-Fi through local providers. The airport wants to move away from that model; we don't want a lot of different signals in the airport interfering with each other."

In July, LAX was preparing to issue a request for proposals for a distributed antenna system to increase cell coverage in its terminals.

"The industry is changing rapidly, and there are occasions where the cell carriers move their signals over to Wi-Fi; but there is also new technology," says Nessi. "Today it's 802.11; three years from now the technology may be completely different. One of the most important things is to be flexible. We count on the Wi-Fi experts to keep us abreast of what is going on and what is coming up so we can adjust."

Boingo officials appreciate the opportunity to assist their "hometown airport" through the industry-wide transition to free customer Wi-Fi. (Boingo headquarters is just down the road from LAX.) "In airports that didn't have free Wi-Fi, that was the number one passenger complaint. Now the number one complaint is that there aren't enough power outlets to support all of their devices," chronicles Phillips. "The next question for Boingo and airports is: Now that we offer free Wi-Fi, will it be good enough for passengers?" He further encourages airport operators to consider what "good enough" means.

Passengers who use LAX's new free Internet service will be limited to 45 minutes and will see advertisements that help defray the cost of offering the service. For premium ad-free service, Boingo offers airport visitors "As You Go" plans of $4.95 for one hour and $7.95 for 24 hours with 10 Mbps speed. The company also offers monthly subscription plans that provide users with 20 Mbps speeds at LAX and up to 20 Mbps speeds and other airports with Boingo service.

LAX's new service is slated to launch later this year.

SEA Quadruples Access Points

The Port of Seattle is investing nearly $10 million from its capital improvement program to upgrade the Wi-Fi network at Seattle-Tacoma International Airport (SEA). Improvements will benefit customers, airlines and airport operations personnel. Dramatic speed increases and easier connection procedures are reportedly in store for customers using the airport's free Wi-Fi. Airline and airport operations personnel will benefit from the extension of high-performance service onto the ramp and apron.

TOP: Van Nuys Airport – Runway Rehabilitation, *Calif.* | LEFT: Denver International Airport – DIA Hotel and Transit Center (rendering courtesy of Gensler)
RIGHT: Louisville International Airport – UPS Worldport Expansion, *Ky.*

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During the project, SEA is adding a significant number of access points and divorcing from its old distributed antenna system. "In 2004, we had poor cell coverage, and putting in the distributed antenna system helped significantly," recalls Dave Wilson, the airport's chief aviation technologist. "Basically, the new access points have three to six antenna instead of two. Today, we can only support Wi-Fi 802.11a, b, and g. The new access point antenna are closer together with the correct geometry, which provides more frequency and faster connection because they will support 802.11n and 802.11ac at 5 Ghz."

After the upgrade is complete, the airport will have four times more access points. Individual passenger boarding bridges will have three access points; but access points are relatively inexpensive components, notes Wilson. Wiring is the more significant expense project, which includes installation of a fiber backbone on the ramp for the Wi-Fi expansion and future use.

"We have seen the demands for free Wi-Fi via social media mentions and passenger survey scores," reports Wilson. "As we made updates to our Wi-Fi, we also increased the number of power outlets, because once people were using the Internet more often, they also needed power to support multiple devices. As a result, we added 2,400 power outlets to support the demand."

SEA now offers under-seat power outlets at nearly every A, B, D, and S gate; additional outlets for C, D and N gates are planned for the near future. The airport provides a list of power outlet locations for customers at PortSeattle.org. The website also includes a detailed description of SEA's free Wi-Fi service and directions to access it.

Like LAX, SEA is also in the process of securing a heat map. "A big part of the project is figuring out the proper locations for the access points," advises Wilson. "It's a combination of factors: You have to know where the people are and where are the holdrooms. Then, you have to figure out how many access points (are needed) for that number of people. You (also) have to look at interference points, like columns."

LAX works with Cisco, its network provider; and Boingo sells advertising for the airport's free service. Currently, airport officials are not considering adding a premium service. Instead, they say their goal is to provide a premium experience for everyone.

"Good Wi-Fi is good customer service, and it's a key part of the passengers' boarding experience," asserts Wilson.

Other wireless projects under consideration at SEA include the development of a smartphone app and private Wi-Fi networks for tenants and airlines.

"If you think about it, the big aluminum airplanes block the Wi-Fi signal on the ramp," says Wilson. "We put an access point under the wing, then another one on top of the passenger bridge, and one on the mast of the building to get to the tail of the plane. Passengers board to the left and cargo (is loaded) to the right; and the adjacent access points provide a way for everyone who needs Wi-Fi to be able to use it."

Project designers believe that they've addressed all known coverage gaps and expect passengers to experience high

performance and high connectivity when the upgrade is complete. They planned for an initial maximum of 40 passengers per access point even though a single point can serve up to 200. The excess capacity is intended to allow for growth without overtaxing the system.

Design for the project began in July, and Wilson expects the team to request construction authorization in the first quarter of next year. The first components of the project are slated for completion in mid-2016.

"We know it's going to be an incredible improvement for our passengers, and the airlines are excited as well," says Wilson.

MCI Expands Coverage

Kansas City International Airport (MCI) was one of the first U.S. airports to offer free Wi-Fi to customers. In 2005, MCI provided paid Wi-Fi through Sprint, but subsequently found that collecting payment was not worth the trouble, recalls David Jacobus, the airport's information technology manager. By 2008, MCI had converted to free Wi-Fi.

"When we first offered it free, the majority of people were carrying laptops, and not that many people were connected," Jacobus relates. "But in the last few years, the proliferation of tablets and mobile devices has required an upgrade."

MCI officials also knew that some airline tenants were feeling the brunt more than others, and realized an upgrade was needed. The majority of available bandwidth was being used by airport employees, and there wasn't enough for passengers.

Working with Alexander Open Systems, the team began by completing a heat map. The map revealed that the airport's concrete horseshoe-shaped terminals caused more dead zones than they expected. What Jacobus and his team thought was a simple layout was actually rather difficult. The terminal's walls constantly curve; but access points radiate coverage in straight lines.

As a result, the airport increased its access points from 18 to 60. The new Cisco access points are managed with a Cisco controller and provide speeds up to 5 Mbps. In addition, they are capable of accommodating 2,000 people on the network at the same time, with the possibility of upgrading to a maximum of 4,000 users. Currently, no more than 650 people use the system concurrently.


Mark **VanLoh**

Mark VanLoh, director of aviation at MCI, explains that the airport started considering the upgrade about one year ago. Once team members received the go-ahead, they had the new system up in about three weeks, ready for the busy summer season.

"It's much more robust than it was," reports Jacobus. "Now we have backup to the primary system. On average, we have 500 to 600 people connected at one time on our system. We had a limit on the previous system and couldn't go over 250, and we would field a complaint per day via phone or Twitter."

These days, the airport has full coverage — there's nowhere inside the two terminals without a signal for passengers, and the signal is much faster and more reliable, notes Jacobus.

"We saw the trend, and more people were more dependent on their devices," adds VanLoh. "They come to the airport with time to kill. It was a great opportunity for us to give them the time to work and download what they need."

To maximize the system's speed, MCI blocks Android and Apple updates, which typically hog bandwidth. "If someone wants to jump on and do a whole iOS upgrade on their iPhone, that is probably something they should do at home," explains Jacobus. "We provide 2 Mbps, which is enough to stream a movie, use email, stream Netflix and YouTube, and complete other normal, everyday tasks. We have tested it at peak times to make sure there is enough bandwidth to accommodate demand."

MCI also opted to remove the end-user agreement for Internet access to provide faster and more convenient connections for passengers. Now users don't have to make any stops on the way to the Internet; the connection pushes them straight into the stream.

"Out of the dozen or so airports we contacted, less than half (have) a user agreement anymore," Jacobus reports. "It was a passenger inconvenience we wanted to avoid, and now it's a much more streamlined process."

"Passengers seem to love our service," VanLoh informs. "Rarely, complaints are voiced via Facebook and Twitter, and we are notified right away."

"Twitter is a great real-time communication channel for us," agrees MCI Senior Manager of Marketing and Communications Joe McBride. "When we received complaints, we could answer and ask the customer the location of the weak or nonexistent Wi-Fi. We reported it immediately to the IT department, and they were on it."

Ad-free surfing space is likely one of the most appreciated aspects of the upgrade. "We have looked into adding advertisements, but we want to get used to what we're doing now and see how it goes," says VanLoh. "We knew this initial cost of $300,000 to $400,000 would be hard to swallow, but it needed to be done. This is what works for our passengers."

"Most of the complaints we heard in the past were about dead spots," he says. "The old proverbial answer — 'It's free. What do you expect?' — is not acceptable."

MCI recently added more than 40 new access points to improve Wi-Fi coverage for customers.

Looking ahead, VanLoh acknowledges the benefits of adding advertising to help defray the costs of system expenses — especially as more passengers download movies and other entertainment before boarding their flights. And while he hopes MCI will get 10 years out of its new system, he's also optimistic that a new service launched in Kansas City may provide even more options.

Power in a Pinch

Kansas City International Airport (MCI) has a way to provide passengers with individualized or emergency power for their mobile devices and earn a little concession revenue in the process.

Customers can purchase a FuelRod™ kit for $20 at the airport, use the unit to power their cell phone and/or tablet, and then recharge it or return the depleted FuelRod for another fully powered unit at no additional charge. The starter kit includes a fully charged FuelRod, connection cable and four adapters for use with a variety of Apple and Android devices. When customers trade in spent FuelRods, they receive a fully-charged unit, without additional cables and adapters.

According to the manufacturer, each "full" FuelRod powers up to eight hours of talk time on a smartphone or nearly four hours of tablet use. There is no limit to how many times customers can trade in "empty" FuelRods for "full" replacements.

MCI has eight unstaffed FuelRod kiosks — four in Terminal B; four in Terminal C — where customers can purchase starter kits or swap empty units for full ones. The airport earns 10% of the kiosks' sales, and devotes minimal floor space to the new vending-style concession.

While it's too soon to analyze FuelRod sales or gauge customer reception, MCI appreciates the value of providing a new option for tech-toting guests. "We see this as a convenience to the traveler, as they can take these on the airplane and power their devices on the go," explains Judith O'Donnell, senior properties specialist - aviation manager.

Joe Yeagley, co-founder and chief operating officer of FuelRod, reports that sales have been "very strong at most every airport we have put them."

As of early August, nine U.S. airports have FuelRod kiosks in their terminals (see list at right). That means if a passenger departing MCI for Minneapolis-St. Paul International Airport (MSP) discovers that her iPad battery is dead; she can buy a FuelRod near her departure gate at MCI, use it inflight, and then exchange it for a full unit at a kiosk in MSP's baggage claim area. The passenger not only has a source of power to use while in the Twin Cities, she can also swap for a freshly charged FuelRod before flying back to Kansas City.

"We see a dramatic increase in sales if FuelRod is at each end of a route," notes Yeagley.

Beyond MCI and MSP, the following airports currently have FuelRod kiosks: Cincinnati/Northern Kentucky International, Hartsfield–Jackson Atlanta International, Minneapolis-Saint Paul International, Oakland International, Port Columbus International, Philadelphia International, Sacramento International and San Diego International.

"Airports like the idea of mobile charging, because they expect to provide higher levels of service to the customer," comments Yeagley. "People can't take advantage of concessions if they are tethered to an outlet; both services are of great benefit."

FuelRod kiosks are also popping up in shopping centers, convention centers and other high-traffic public venues.

"They say Google Fiber is a hundred times faster than normal Internet," says VanLoh. "We hope they'll come up this way."

With a new terminal in the crosshairs of the Kansas City Aviation Department, there is likely little that is completely off the table.

Big Changes Ahead

Remember the days of hotspots, when mobile users were acutely aware of where they could pick up a signal? The advent of paid data plans via 3G and now 4G changed that; but a new issue of transitioning between individual paid service and free public use Wi-Fi soon emerged. It's a "moment of truth" that happens all the time at airports.

The Wi-Fi Alliance, a group of companies that provide Wi-Fi service, developed an industry-wide standard network protocol to facilitate that transition. The group branded its creation as Passpoint and introduced it in 2012. As a member of the Wi-Fi Alliance, Boingo provides the conveniences of Passpoint to airport partners.

"Passpoint eliminates the need for users to find and authenticate a network each time they connect," explains Phillips. "In Wi-Fi networks that do not support Passpoint, users must search for and choose a network, request the connection to the access point each time and, in many cases, must re-enter their authentication credentials. Passpoint automates that entire process … enabling a more cellular-like service."

For instance, if a passenger is streaming a basketball game via 4G on his phone in a cab, Passpoint prevents a service disruption when the cab pulls up to the curb at LAX. Working in in the background, the phone "shakes hands" with Boingo, LAX's mobile carrier, and automatically switches the passenger to Wi-Fi.

"The additional benefit of Passpoint that doesn't get as much attention is that it's a secure connection with WPA (Wi-Fi protected access) encryption," advises Phillips. "We've seen interest in the market not only from cellular carriers but other service providers, and a host of different people who want to leverage automatic, seamless Wi-Fi connectivity."

Boingo officials are currently focused on the exponential increase in Wi-Fi network demand they predict Passpoint will trigger. Phillips compares the potential magnitude of the previous spike that occurred when the public business model shifted from paid to free usage. Until recently, using Wi-Fi had been a conscious decision that required multiple steps by users: opening their device, adjusting network settings to connect to the Wi-Fi SSID, opening an Internet browser, and then following other steps to get online.

"Passpoint's seamless authentication eliminates all of that and takes that conscious decision out of the hands of the consumer," says Phillips. "It doesn't matter if they are walking down the concourse or exiting the aircraft via the Jetway; Passpoint is in place to automatically activate the mobile device's Wi-Fi connection."

He encourages airport operators and their consultants to consider that 32% of enplaning passengers and 16% of total passengers currently use airport Wi-Fi. "Because of Passpoint, we are now designing our systems to be able to expand support to 100% of total passengers in the airport," he emphasizes. "It's huge."

Beyond enormous future growth in Wi-Fi usage, Phillips notes that the lines between traditional distributed antenna systems and Wi-Fi will continue to blur. "As an airport-focused businessperson, I care about the next sea change in demand," he comments. "It happened when we went from paid to free, when demand grew from 2% to 30% of enplaning passengers, or 15% of total passengers. Now, with Passpoint, we'll need to be able to scale from 15% to potentially 100% of total passengers at the airport and be able to adapt to that quickly as the demand presents itself."

Nessi echoes the importance of maintaining pace with industry changes. "Airports must adapt to and adopt new technologies," he advises. "Pay close attention to what your community is expecting from the airport in terms of what they provide for communications, and react accordingly."

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- Both sides fuel cap
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  - Separated by functionality for quick reading
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  - Automatic fast idle setting for engines, selectable
  - Pre-programmed electrical power outputs all around
  - Maintenance reset hour
- Multi-functional joystick: ⓰
  - All hydraulic functions
  - Automatic rear steering (ARS)
  - Auxiliary engine RPM up and down
  - Attachment engagement via display selection
  - Chassis automatic transmission F-N-R
- Moving direction of joystick corresponds to components direction
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New Solar Array Cuts Energy Bills at Burlington Int'l

factsfigures

Project: Solar Array

Location: Burlington (VT) Int'l Airport

Array Site: Rooftop of parking garage

Size of Array: 2,000 315-watt panels

Cost: $1.5 million

Primary Goals: Reduce airport's electricity consumption & costs; provide backup energy source

Anticipated Savings: $3.5 million over next 30 yrs

Project Manager: Burlington Electric Dept.

Contractor: Encore Redevelopment

Ancillary Benefits: Rooftop garden adjacent to solar panels is popular visitor attraction; revenue from groups renting the area for special events

"Going Green" is more than a slogan at Burlington International (BTV); it's a literal description of the Vermont airport's recent environmental project. The 500-kilowatt solar array BTV installed on top of its parking garage last year includes a verdant rooftop garden — a fitting feature for the busiest airport in the "Green Mountain State."

The solar array reduces the airport's energy consumption and utility bills, and the associated green space has become a popular destination for airport visitors. Some groups even rent the scenic venue for special occasions.

BTV Aviation Director Gene Richards reports that the solar feature is expected to reduce the airport's energy costs by approximately 3% per year for the next three decades.


Gene **Richards**

Planning for the project started when BTV expanded its parking garage in 2010. While preliminary work such as installing cable conduits was completed at that time, construction of the array didn't begin until last October. The project was undertaken in partnership with the Burlington Electric Department; Encore Redevelopment, also based in Burlington, performed the installation.

Crews installed approximately 2,000 315-watt solar panels on fixed, ballasted racking systems. The project was finished in December 2014, at a cost of $1.5 million.

Green Gains

The Burlington Electric Department owns and operates the system. Power generated

A garden built on top of the parking garage in conjunction with the solar project is a picturesque spot for airport visitors.

By Mike **Schwanz**

by the solar panels immediately connects with the utility company's existing distribution system that serves the airport. In the first half of 2015, the solar array reportedly produced more than 325,000 kilowatt hours of electricity. Utility officials predict that BTV will save approximately $117,000 annually, which amounts to $3.5 million over the next 30 years.

"Besides saving money, the solar array will give us another source of backup energy, to go along with our generator," Richards notes.

As one might expect, most of the airport's gains will be made during summer. "The panels are most effective from April to November," he explains. "In winter, the sun is very low, and the panels are not as effective."

The new 13,000-square-foot rooftop garden helps minimize stormwater runoff from the roof, and also provides airport visitors with a scenic place to enjoy some of the best vistas in New England, Richards says.

Photo credit: Julie Richards Photography

"As part of the deal for this project, we had to commit to spend about $300,000 on landscaping," he explains. "So instead of just adding some trees around the property, we decided to install the rooftop garden."

Party-Perfect Setting

The garden inspired by the solar project is located on the sixth floor of the parking garage and is accessible via stairs and an elevator. The outdoor space features a manicured lawn with a variety of alpine flowers, along with a picnic table and several benches.

"It has been very well-received," Richards reports. "You can see some of the most prominent mountains in the Green Mountains, including Stowe, Mount Mansfield and Camel's Hump. The garden faces east, so you can see the sunrise. And on balmy summer evenings, it offers excellent star-gazing — and a perfect perch for watching planes land."

BTV's rooftop oasis has proved to be so popular that groups rent it for special events, providing the airport with a new source of non-aeronautical revenue. "We had a wedding there and also various fundraisers for charity events," Richards relates. "The garden can easily accommodate up to 150 people."

The rooftop feature is open year-round, 24 hours a day. Even on moderate days during winter, travelers can enjoy stunning views of snow-capped mountains.

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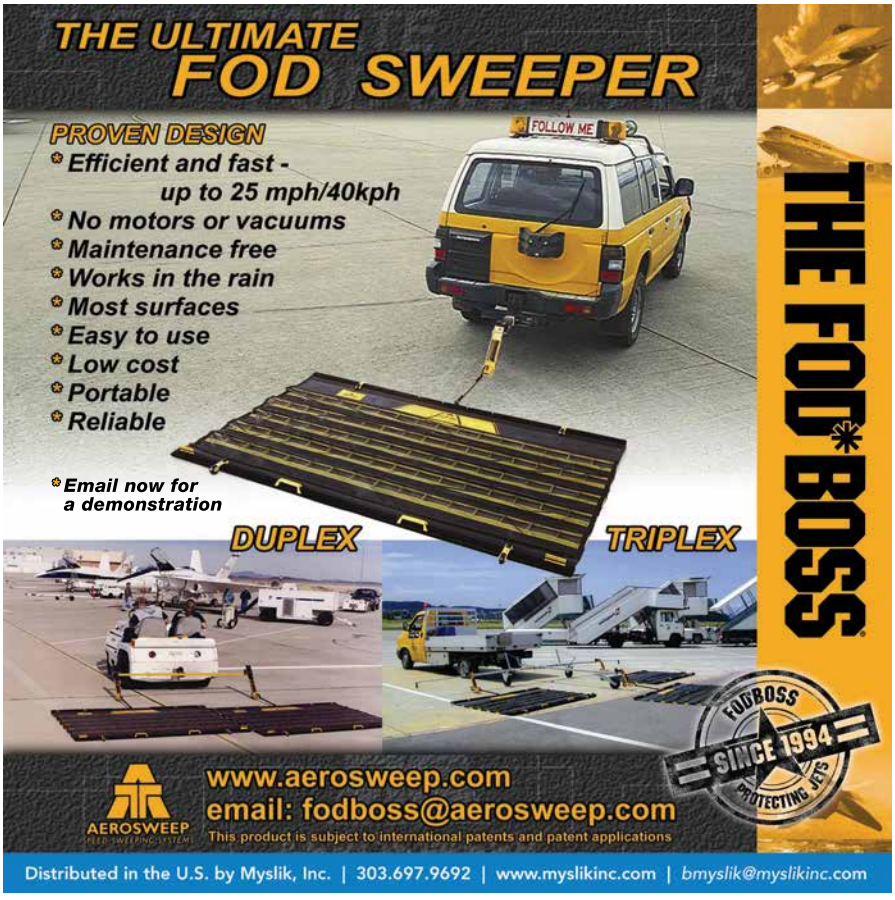

Vancouver Int'l Centers Landside Development Project on Designer Outlet Shopping

By Victoria **Soukup**

YVR VANCOUVER INTERNATIONAL AIRPORT
Beyond, Every Day.

factsfigures

Project: Joint Venture Retail Outlet

Industry Participant: Vancouver (British Columbia) Int'l Airport

Retail Developer: McArthurGlen Group

Location: On airport property; 2 train stops from terminal

Outlet Size: 240,000 sq ft

Current Stores: 65

Sample Retailers: Armani; Hugo Boss; Coach; Polo Ralph Lauren

Visitors Opening Weekend: 160,000

General Contractor: Strabag

Est. Jobs Created: 600

Unexpected Challenge: Temporary roadway congestion due to heavy shopping traffic

A new stream of non-aeronautical revenue began flowing for Vancouver International Airport (YVR) when an upscale outlet shopping center opened on airport property in July. The landside development includes 65 stores for designers such as Coach and Armani, and is located just two stops from YVR on Canada's popular rapid transit system.

The 240,000-square-foot retail center was developed via a 50/50 joint venture between the British Columbian airport and McArthurGlen, a UK-based company that operates 20 similar outlets in Europe. The two partners split development costs equally and will divide subsequent profits in a similar manner. YVR subleases the land to McArthurGlen.

The idea behind the recent retail foray began several years ago, when the Vancouver Airport Authority decided to develop some of YVR's vacant land that runs along the rail line. "After years of planning and construction, it's very exciting to welcome the community to McArthurGlen Designer Outlet Vancouver Airport," says Craig Richmond, the authority's president and chief executive officer. "Not only will the center become a key tourism destination in our region, it's also important to YVR's role as a key economic driver."


Craig **Richmond**

In addition to creating local jobs, the designer outlet center also adds a new source of non-aeronautical income for YVR. Like other Canadian airports, YVR operates as a not-for-profit entity that reinvests its earnings back into airport development. Revenue from the shopping center will help the airport keep its airline costs low while maintaining high customer service standards, Richmond explains.

This designer outlet is half YVR's, thanks to a joint venture with a European retail developer.


Tony **Gugliotta**

Tony Gugliotta, YVR's senior vice president for business development, notes that the airport received several proposals for various commercial options to develop its rail-side land. "We were attracted to the concept McArthurGlen brought forward and to partnering up and working with them," Gugliotta explains. "The designer outlet center was the development that made the most sense because we thought this would be a good regional draw."

Robert Thurlow, general manager of the shopping center, notes that the new airport property is the only designer outlet in the area. "A lot of the brands that are at our center have had no representation in western Canada — or in some cases, no representation in Canada at all," he notes.

Last year, YVR earned $210 million in non-aeronautical revenue — $20.5 million more than in 2013. Airport officials declined to reveal revenue projections or development costs for the new shopping center.

Temporary Traffic Snarls

Having only opened in July, the outlet center at YVR is already making a name for itself. Officials report that more than 160,000 people visited during its opening weekend; and initial sales beat their original targets.

Thurlow considers the opening day performance a success based on sales at a similar center — Toronto Premium Outlets — that opened two years ago. "Since then, everybody has been trying to beat Toronto's numbers, and we actually achieved that," he relates. "All of the retailers I spoke with reported having had their best Canadian opening performance. It's been thrilling."

The YVR property is McArthurGlen's first move into North America.

Unfortunately, the center's successful debut included a few surprise complications. An estimated 45,000 first-day visitors caused traffic to back up on the road that connects the mainland to Sea Island, where YVR is located. Some departing passengers were caught in the traffic snarl, and three flights were delayed by 5 to 10 minutes each.

"We quickly adjusted the traffic plan, and we've since been able to accommodate both the passengers going to the airport as well as the shoppers going to the design center," Gugliotta reports. "We had a very comprehensive traffic plan that we were able to tweak."

Despite the outlet center's 2,000 parking spaces, officials encourage shoppers to use public transportation to prevent future traffic

problems. "That's a real big issue for us because we want to make sure the airport stays operational," Gugliotta says.

Ensuring that YVR can operate smoothly and efficiently while further developing the new shopping center will be an ongoing effort. "There has to be a balance," explains Gugliotta. "For an airport to be successful, you have to have the infrastructure and facilities in place to accommodate the airlines and passengers in efficient ways. At the same time, you have to be on the lookout for commercial development opportunities that allow you to generate revenues that you can reinvest in the airport to attract more airlines and make the airport more successful."

The new shopping center was built on airport property, near existing rail lines and roadways.

Don't Use the M Word

Architects and designers outfitted the YVR/McArthurGlen shopping center with cobblestone walkways, trees, gentle landscaping, a large piazza and a variety of facades to create an intercontinental atmosphere. "We didn't build a mall; we built a village," Thurlow insists. "It's a beautiful outdoor center. It feels like you're in Europe."

Strabag, the development's Belgium-based general contractor, broke ground on the project in January 2014. "Strabag understands us and understands the level of detail and quality we wanted," Thurlow notes. "It was great to be working with somebody that has built and has known the McArthurGlen standard for a number of years."

The recently completed shopping center occupies about 15% of Sea Island and includes several architectural references to the property's Pacific Northwest locale. Its main entrance, for instance, resembles the roofline of the historic Hotel Vancouver. The design reminds shoppers they are in Vancouver as soon as they walk in, says Thurlow.

In addition to retail outlets, the new shopping center also includes a variety of restaurants with table service rather than grab-and-go food court options, specifies Thurlow. "We like to work with local restaurateurs," he relates. "Everything we do is dining, so everything is restaurant style."

Shop On

With 50 stores ready for opening day, officials anticipate opening 15 more by November. The second phase of the project, which will expand the center to about 100 stores and 400,000 total square feet, is scheduled to begin in early 2017, depending on sales outcomes and demand.

Given the designer outlet center's strong initial showing, airport authority officials are optimistic about how YVR's landside development will affect the overall Vancouver area, which has an estimated population of 2.3 million. The project has already created more than 600 jobs, and the second phase will add even more.

"Our whole focus is on the economic development," Gugliotta relates. "Part of the mandate of the airport authority is to be an economic generator for the region."

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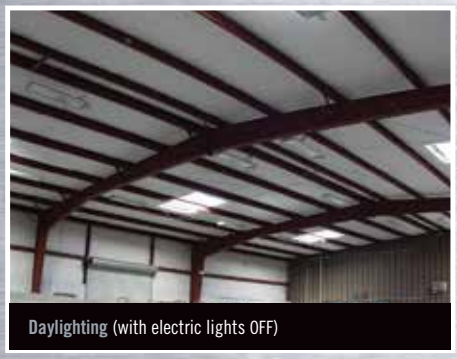

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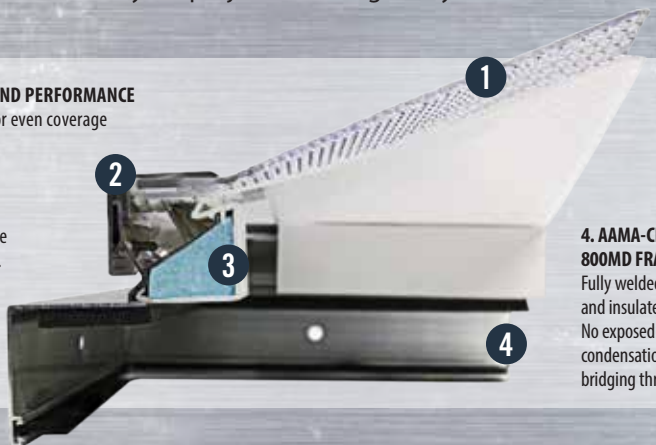

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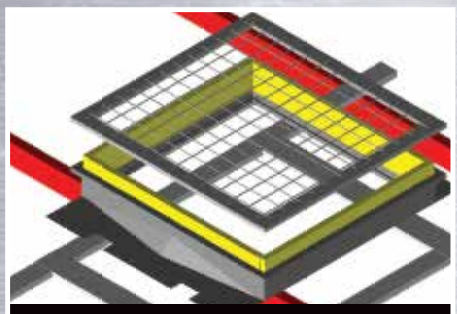

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* According to Jon McHugh, PE, LC, and technical director with the energy consulting and research firm, Heschong Mahone Group, Inc., America could reduce its peak load electrical demand by 24,000 megawatts just by daylighting existing buildings that could utilize daylight using toplighting or skylights.

WWW.NUCORBUILDINGSGROUP.COM/DAYLIGHTING

Gulfport-Biloxi Int'l Fixes Deteriorating Touchdown Zones

By Ken **Wysocky**

factsfigures

Project: Touchdown Zone Renovation

Location: Gulfport-Biloxi (MS) Int'l Airport

Runway: 14-32

Cost: $13.6 million

Funding: Airport Improvement Program grant; Air Nat'l Guard; airport funds

Timeline: July 2014 – Dec. 2014

Scope: 3,500 ft of concrete, plus two 1,000-ft temporary overruns

Ancillary Components: New aircraft-arresting system; upgraded runway overrun & medium-intensity approach lighting system

Design & Supervision: Neel-Schaffer

Quality Assurance: Soiltech Consultants

Primary Paving Contractor: R.C. Construction

Pavement Analysis/Quality Control: Burns Cooley Dennis

Aircraft Arresting System: Landmark Construction

Concrete Removed: About 18,000 cubic yards

Concrete Installed: About 19,000 cubic yards

Incandescent Runway Edge & Threshold Lights, PAPIs: ADB Airfield Solutions

Despite extra challenges from a mid-project military event and an unusually large pool of stakeholders, Gulfport-Biloxi International Airport (GPT) finished a $13.6 million runway reconstruction project last year – on time, on budget and without any interruptions to commercial airline service.

The main component of the project was replacing two deteriorating touchdown zones on the airport's concrete primary runway – a 2,000-foot section on the northwest end and 1,500 feet on the southeast end. At 9,002 feet long, and 150 feet wide, Runway 14-32 accommodates commercial airliners, heavy cargo planes and military aircraft. GPT's other 4,935-foot runway handles only general aviation traffic, because it's too short for commercial traffic.

"It was a very complicated project with a lot of moving parts," reflects Jim Foster, assistant executive director for the Mississippi airport.

Jim **Foster**

"A lot of people came together to make it happen."

During the project, work crews:

- removed roughly 18,000 cubic yards of concrete;
- repaired 22,000 feet of runway joints and cracks;
- hauled in 14,000 cubic yards of soil to re-grade the runway safety area;
- installed about 19,000 cubic yards of new concrete; and
- applied 315,000 square feet of new runway markings.

"There were so many critical points where had something gone wrong, it would have thrown us off our timeline and interrupted airline operations," Foster recalls. "But in the end, we experienced no flight delays. We opened up the runway on time every day."

Team members from Neel-Schaffer, the engineering company that designed and coordinated the project, recall the effort it took to pull that off. "It was one of the most complicated projects we've ever worked on, in terms of the logistics involved with doing

Crews replaced failing concrete in two touchdown zones and installed a pair of temporary overrun areas.

the work and keeping the airport running at the same time," says Kreg Overstreet, the company's senior project manager.

The airport maintains schedules with four major airlines and served more than 662,000 passengers last year. It's also home to the Air National Guard Combat Readiness Training Center and the Mississippi Army National Guard 1108th Theater Aviation Sustainment Maintenance Group.

As such, the military paid for $6.6 million of the project, which covered all costs for two new aircraft arresting systems and 43% of the runway reconstruction. (Research showed that military aircraft account for 43% of the runway's annual traffic.) A grant from the FAA Airport Improvement Program funded the remainder of the project, with GPT footing 10% of that portion, Foster reports.

Lots of Moving Parts

The magnitude and complexity of the project's original scope ramped up considerably during the planning stages. For starters, discussions with the Air National Guard revealed that the military planned to upgrade the runway's two aircraft-arresting systems to meet updated safety requirements. Waiting to do that work would have meant displacing the thresholds as well as tearing up and reinstalling the concrete in the touchdown zones, so it made more financial sense to do both projects simultaneously.

"Combining the projects killed two birds with one stone," Foster explains. "Replacing the arresting systems as a stand-alone project would have required doing all this coordination between agencies twice. It would've doubled the complications, and cost more, too."

Further complicating matters, the Air National Guard was holding a large-scale operations exercise October 27 to November 7 – near the middle of the project's timeline. The event would include more than 51 military units from 23 states and one allied nation, including a large number of aircraft that engage in simulated warfare operations. Given the huge economic benefit that the annual Operation Southern Strike brings to the surrounding region and GPT, it was critical to phase the project so a full-length runway was available during that 11-day span, Foster explains.

Another challenging factor was the large contingent of stakeholders involved. GPT, the Air National Guard, commercial airlines, general aviation tenants, contractors and about a half-dozen offices and divisions of the FAA had to communicate and cooperate to make the multi-phase initiative possible.

Changing the runway grades to bring them into compliance with FAA regulations introduced yet another project element: upgrading the medium-intensity approach lighting system.

Foster knew it was crucial to move quickly, because the FAA normally programs projects of this magnitude three to five years in advance. "The key was starting early," he recalls. "From the time we identified what the problem was, we had well over a year of planning before we bid the project and got the funding lined up — and coordinated with the FAA, the airlines, general aviation tenants and the military."

In retrospect, Foster says that getting ample lead on the project and planning it in phases were critical factors to success. So was sticking to the plan.

"This is the first time I've seen a plan follow the timeframes laid out with minimal problems," he reflects. "Issues always crop up in major projects; but this one was well thought out. We stuck to the plan and got it done on time."

Foster also notes the value of partnering with an engineering firm that was knowledgeable about GPT, hiring contractors that had specific experience with airport projects and maintaining good communications with all the stakeholders.

Problem Areas

Deteriorating concrete in the main runway's touchdown zones, which were about 15 years old, spurred the project. Airport operations personnel first noticed the problem in early 2012, when a slight hump appeared in each touchdown zone, where the asphalt and concrete sections abutted. "We thought it was a construction defect with the way the joint was designed," Foster recalls.

Actually, a condition called alkali-aggregate reactivity – a chemical reaction between the aggregate and the highly alkaline cement used to make the concrete – caused the problem. The reaction causes the concrete to expand, which eventually leads to cracking and spalling. While both results are negative, the latter generates unacceptable levels of debris on runways, Overstreet notes.

"When the concrete touchdown zones were installed around 1999, no one knew this was a problem," Foster explains. "But we've come to find out that this problem has occurred at airports all over the country. Now, they test aggregate to make sure it will not react."

After considering six strategies for resolving the problem, project stakeholders agreed that a two-step plan would be the most cost-effective and least-disruptive option. First, GPT would temporarily extend the available runway length by rehabilitating 14-32's two 1,000-foot-long overrun sections, which were in poor condition and no longer met FAA safety standards. Contractors would perform as much work as possible at night to minimize disruptions. Typically, commercial flights landed before 11 p.m.; but if any arrived later, contractors had to wait to start working.

To hold costs down, the temporary overruns were installed with a thinner concrete section, designed to support aircraft operations projected for the 143-day project vs. a longer typical lifespan. After construction, the paved overruns were left in place to serve as an extended runway safety area. "Since we were replacing the touchdown zones, we decided to upgrade our overruns at the same time," Foster explains. "Had we decided to do that in a different year, we would have had to displace the end of the thresholds again."

The selected option also allowed the airport to maximize available runway length – which varied from 7,000 to 7,500 feet during the project – through the use of declared distances for commercial takeoffs and landings on the runway. (Declared


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distances allow airlines to calculate the baggage and passenger restrictions required to enable safe takeoffs and landings on shorter runways.)

Temporary navigational aids were required during phases when a runway threshold was displaced. Commercial airlines require some form of vertical guidance in order to use the runway. Because the glide slope antennas were temporarily decommissioned during construction, the airport used temporary precision approach path indicators to provide vertical guidance.

Step By Step

Planned in six phases, the project ran from mid-July to mid-December. Daily coordination among all the affected parties was required to stay on schedule; for the most part, work progressed without a hitch, Foster reports. The biggest hiccup occurred when crews pulled up more asphalt sub-base than expected while removing the runway's nearly 1-foot-thick concrete. "But we reworked things on the fly and dealt with it," Overstreet relates. "We ended up putting down more econocrete, which is a lean concrete used as a leveling course."

Overstreet praises the cooperation exhibited by all the parties involved with GPT's runway renovation, noting that when large projects like it unravel, an uncooperative team member is usually the culprit. "If you don't have everyone pulling together … it can wreck the whole show," he notes. "From the airport, R.C. Construction (the primary paving contractor) and the Air National Guard to the airlines, the general aviation tenants and the FAA, everyone worked together. That's the number one reason we were able to keep this thing moving and finish on time and on budget."

Another key to success: effective communications across-the-board. "With as much communication as we had and as much planning as we did, you can always do even more communicating," he reflects. "You need to communicate as much as you can and as often as you can to as many people as you can – make sure everyone is in the loop."

While Forster acknowledges that the project was stressful, he also considers it a great experience. "My old boss said you should only have to do something like this once in a career," he says. "It's the kind of thing that's really a challenge, but by the time it's finished, you're glad you were able to participate in it. It's always great to overcome a good challenge."

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Outsourcing Facility Management of Rental Car Center Bodes Energy Savings for Atlanta Int'l

By Nicole **Nelson**

Hartsfield-Jackson Atlanta International Airport

factsfigures

Project: Operation & Maintenance of Consolidated Rental Car Facility

Location: Hartsfield-Jackson Atlanta Int'l Airport

Strategy: Outsourcing

Contract Value: $21 million

Contract Terms: 5 yrs

Winning Bidder: Joint Venture of Cofely Services & MiJoy Industrial Services

Winning Proposition: Commitment to reduce energy consumption by 5%

An emphasis on sustainability helped land Cofely Services a $21 million, five-year facility management contract as a strategic partner overseeing the Consolidated Rental Car Center at Hartsfield-Jackson Atlanta International Airport (ATL).

In addition to being one of the world's largest integrated facilities management firms, Cofely is also under the umbrella of GDF SUEZ Energy Services, which specializes in energy efficiency solutions for clients throughout North America.

Cofely was very aggressive with energy savings," explains Christopher Madura, the airport contract manager at ATL's Rental Car Center complex. "(They) stated that they would reduce our energy consumption by 5% per year of the contract, and I found that to be very compelling.

Attention to sustainability at the Rental Car Center complements a variety of other "green" initiatives at ATL, including water conservation/reclamation, recycling and concerted efforts to reduce the airport's carbon footprint.

"The Department of Aviation here in Atlanta wants to be one of the greenest airports — not only in the United States, but also throughout the world," notes Madura.

Since Cofely's contract began last January, personnel have been both mindful and aggressive auditing every aspect of the facility's electro-mechanical systems, he

reports. In addition to technical responsibilities ranging from the ventilation system to lighting elements, the contract also includes services related to maintaining the building's aesthetics. Cofely partnered with locally owned MiJoy Industrial Services to provide the janitorial, landscaping and customer service aspects of the contract.


Pierre **Loyer**

Pierre Loyer, vice president of business development for Cofely, addresses the interplay between the various contract elements: "We will endeavor to have a reduction in energy by about 5% every year. So there is an added challenge to not only supply good technical maintenance and good janitorial support … but there's also a real focus on saving energy in order to make sure that the airport achieves [its] environmental objectives. This is a target that we wanted to aim for, and we are pretty confident that we're going to be able to achieve it."

Joint Effort

ATL is partnering with Cofely in a collaborative approach to reducing energy use at the Consolidated Rental Car Center. To date, the airport has replaced incandescent and fluorescent lighting with LED bulbs throughout the facility and installed dimmer switches to offset the modulation of the building's natural lighting.

Switching to a dynamic strategy for escalator use is also under consideration. Traditionally, the facility's electric stairs have run 24/7, but Cofely advocates reducing the speed or halting some units altogether to help decrease energy consumption.

"We are looking at the possibility of turning escalators off at night, when it is not nearly as busy as in the daytime," Madura explains. Tests are being run to gather specific use rates of various escalators to help make the decisions.

Proper and regular maintenance of elements such as motion-sensor faucets in restrooms have also been key in reducing costs and natural resources. "When our faucets are not maintained, they tend to run a lot; and that is not cost-efficient nor energy-efficient," Madura comments. "We use a lot of water, and we are currently utilizing faucets that do not run continuously."

Facilitating Focus

Aside from the anticipated energy and cost savings, ATL's facility management contract with Cofely allows airport personnel to maintain focus on other landside and airfield responsibilities, notes Madura.

"From the beginning, we felt there was a strong need to have an outside vendor come in to manage the Rental Car Center and not divert our team from operations," he explains.

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Cofely, in fact, is the second contractor to take on this role. Meridian Management Company was the first.

According to Cofely personnel, ATL is among a growing number of airports that are benefiting from public-private partnerships at a contractual level. "There are airports in North America that prefer to keep their services in-house, while many airports out there are farming out those services," Loyer remarks.

In terms of contract structure, he advocates outsourcing rather than subcontracting, which is often awarded on a low-bid basis. "We really prefer outsourcing, which is more of a partnership agreement with the customer," Loyer elaborates. "The customer is transferring the responsibility of criteria and service levels; and that is where we excel because we typically are better equipped and we have more experience than the customer to understand how to deliver the services in order to achieve the results."

He further emphasizes the mutual benefits of outsourcing operations and maintenance: "We are a partner with the customer in trying to find ways of saving money. In that sense, it's providing more opportunities for us to become a strategic partner as opposed to a subcontractor. The customer is obviously getting a financial benefit when we achieve those savings and getting a more dedicated partner in us when those type of arrangements are done."

Eye on the Prize

Loyer reports that cost reductions at ATL have been outstanding during the beginning stages of Cofely's contract. The joint venture has been fully staffed since the end of January.

"We are invested in making operational changes and better managing the equipment that's already installed," he comments, noting that changes necessary to achieve savings should begin by the end of this year. "In our opinion, there are multiple opportunities for savings that typically do not require significant investment in get-go money. It just requires better management of the actual existing system."

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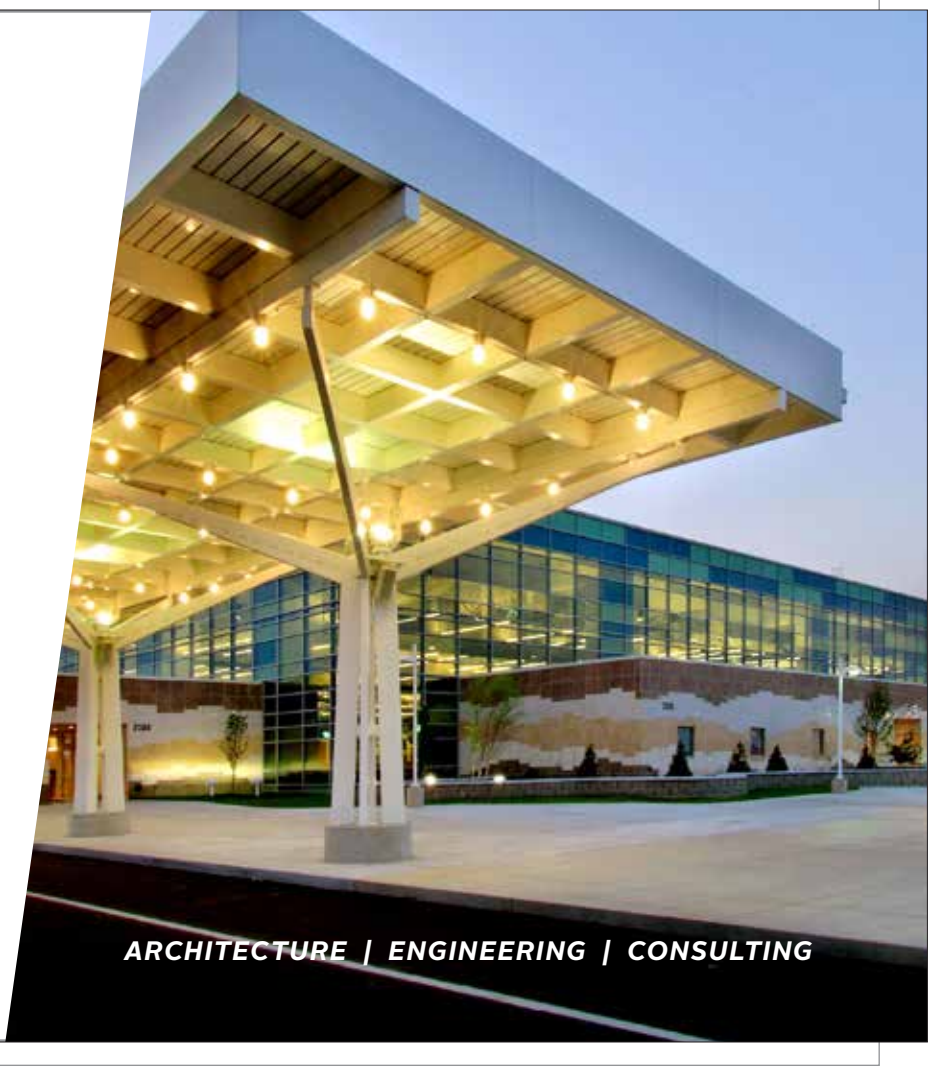

Vehicle Simulator Reduces Risk During Firefighting & Rescue Training at O'Hare Int'l

By Ken **Wysocky**

factsfigures

Project: Simulated Aircraft Rescue & Firefighting Training

Location: Chicago's O'Hare Int'l Airport

Equipment: Striker 4500 Simulator

Supplier: Oshkosh Airport Products

Est. Cost: $400,000

Purchased: Fall 2014

Funding Source: Airport

Main Components: Vehicle dashboard; seven 55-inch high-definition wide-screen monitors; steering wheel & equipment controls

Full-time ARFF Personnel: 250 (50 always onsite)

Equipment Fleet: Roughly 2 dozen firefighting & emergency rescue vehicles

Equipment Manufacturers: American LaFrance (now defunct); Emergency Vehicles; E-ONE; Oshkosh Airport Products; Pierce Manufacturing; Reeves EMS; Spartan ERV; Stinar; Tempest Technology; Wheeled Coach

Emergency crews at O'Hare International Airport (ORD) can now train without the omnipresent danger of blazing flames and structural collapse. There's no smoke and mirrors involved, just a customized aircraft firefighting and rescue (ARFF) simulator that safely replicates actual emergency situations with virtually no risk to equipment or personnel.

Thomas **Wagner**

The high-tech simulator mimics the cockpit of a Striker 4500 ARFF vehicle by Oshkosh Airport Products — the predominant unit in ORD's fleet. The airport purchased the training device last fall for about $400,000. The simulator provides the 250 full-time ARFF personnel assigned to ORD with a safer and more cost-effective way to train for calamitous events, says Lt. Thomas Wagner, live-fire training specialist for the Chicago Fire Department.

"If you make a mistake using real firefighting equipment, you can damage the equipment," Wagner explains. "If you make a mistake with the simulator, you push a reset button. That's the bottom line."

Practicing skills on the new simulator is also "greener" and less expensive. "We're not spending money on fuel and emitting truck exhaust for training purposes," he adds.

Additionally, the simulator system allows ORD to provide intensive training more often than it might otherwise be able. "While a traditional ARFF firefighter may typically participate in real-world training once every year or every other year, the Striker Simulator allows on-going, virtual-reality training on a regular schedule," says Jeff Resch, vice president and general manager of Oshkosh Airport Products.

Believed to be the only unit of its kind in the United States, the customized simulator recreates the cockpit of a Striker vehicle by blending computer software with a truck dashboard and high-resolution wide-screen LG television monitors. A group of seven 55-inch monitors surround trainees and offer a 180-degree view from the driver's seat, just like the windows of an actual Striker. One of

The Striker Simulator combines an actual dashboard, steering wheel and controls with video and audio tracks of emergency operations.

the screens is mounted overhead so operators can practice using a high-reach extendable turret, notes Rich Voakes, government and regional sales manager for Oshkosh Airport Products.

"You're surrounded by monitors and sit on a truck (stage) set, with the same controls, joysticks and so forth – just like a real truck," Voakes explains. "It includes an actual dashboard from a Striker, along with an actual steering wheel, seat and firefighting controls; so it's exactly like getting into the cockpit of one of our trucks. With the monitors, it's like looking out the actual windows of a truck."

How real are the images? When trainees inside the cockpit look right and left, they can see the eyes blinking on virtual firefighters in other virtual trucks. "It's that detailed and that realistic," says Voakes.

"When you move the joysticks, they even move the boom up and down or extend it at the same speeds as a real rig," adds Wagner.

Virtual Reality

Software creates a variety of different firefighting scenarios — from an aircraft on fire to a field blazing in flames. Trainers choose specific emergency situations or scenarios via a drop-down menu. They can then add more fires or eliminate them at will, and can bring up to seven other virtual ARFF vehicles into the picture, so to speak, to simulate the congestion of an actual emergency scene. In addition, the simulator can portray up to 25 different aircraft for training purposes — from smaller regional jets up to an Airbus 380, Voakes says.

To create events that feel realistic, the system combines video footage and illustrated environments of Striker vehicles in action with a full audio track. A variety of weather and environmental conditions, such as rain, snow, fog, night and bright daylight can be depicted. And the system can also portray the delivery of firefighting agents such as dry chemicals, foam, water and even Halotron, a liquefied compressed gas that stops fires by disrupting the combustion process.

"You can even show them (virtual firefighters) getting out of their trucks to evacuate people or using hoses to fight a fire by hand," Voakes relates. "You can put up a ladder, too. The options are virtually limitless. Then, you can score the users (trainees) and rate how they performed."

ORD's Striker Simulator also allows firefighters to train for situations that would be difficult — if not downright impossible — to stage in real life. For example, it would be extremely complicated to tip a burning plane on its side for training; but the simulator can repeat such a scene as often as required.

"If you train with a truck and make a mistake, you can break something and incur expensive repairs," Voakes summarizes. "Plus, with a simulator, you're not putting anybody in harm's way. They're just sitting in a chair."

Driven to Succeed

The Striker Simulator is also a great tool for teaching personnel how to drive large ARFF vehicles, adds Voakes. "We spent more than a year taking videos getting the motion and feel of what you experience when you're driving a real truck," he remarks. "We have it down to the point where it feels exactly the same as driving a real truck."

Because ARFF equipment is so challenging to operate, Voakes considers it "super important" to use simulations for teaching and practice. A Striker 4500, for example, is nearly 45 feet long, about 10 feet wide and roughly 11 feet tall, with a gross-vehicle weight of 124,000 pounds. ARFF vehicles also carry water to areas of the airfield that don't have hydrants nearby, adds Wagner. At about 8 pounds per gallon of water, a full water tank adds another 36,000 pounds of weight for drivers to manage.

Even though the water tanks are baffled to minimize sloshing, many drivers tip over trucks during simulated training exercises. "You have to turn very slow ease into everything, just like with a flight simulator," Voakes advises. "You can't oversteer."

The simulator also allows firefighters to train on the Striker's technical apparatus, like the Snozzle, a 65-foot-long extendable articulated boom with a 3-foot-long tip that pierces aircraft bodies to deliver fire-repressing agents like foam.

Before ORD purchased its simulator, firefighters motored around the airfield in actual Strikers to learn how to drive the large ARFF vehicle. Apparatus instruction occurred inside training facilities.

Firefighters at ORD are not required to log a specific number of hours on the simulator, notes Wagner. They train until their instructor says they are ready for real equipment. Younger personnel who are more comfortable with video gaming generally take to the simulator very quickly, he adds. "It usually takes older guys a while to get used to it."

When instructors feel trainees have enough simulator experience under their belts, they test their prowess in a real Striker, typically with a mock-up of an airplane. "That way they can poke holes (with the Snozzle) in the side of a full-size steel mock-up of an aircraft," Wagner comments.

A Lot to Master

ARFF personnel at ORD must be proficient with a large complement of equipment. The airport sprawls over 7,200 acres, and last year ranked as the world's busiest in terms of passenger and cargo traffic (nearly 882,000 arrivals and departures).

The Chicago facility maintains 50 firefighters on airport grounds 24 hours a day, seven days a week, 365 days a year. Crews use a wide array of equipment, including:

- eight Striker 4500 ARFF vehicles;
- three pumper fire trucks — two E-ONE Cyclones; one by Crimson, now known as Spartan ERV;
- one tower ladder heavy-rescue vehicle and one squad company rapid-intervention vehicle, both by Pierce Manufacturing;
- 6 Oshkosh Striker 3000s;
- a hazardous material unit by American LaFranc, which is no longer in business;
- a mobile command-center communication unit by Emergency Vehicles;
- Three advance life-support ambulances by Wheeled Coach Industries;
- a stair truck by Stinar Corp.;
- a mobile ventilation unit by Tempest Technology Corp.; and
- a towable decontamination unit by Reeves EMS.

Striker training is the only instruction that occurs in a simulator. For all other vehicles, instructors and trainees use actual equipment at ORD's onsite training facility. "We bring engineers and drivers out to the facility, which includes a driver's training

course and a full-size aircraft mock-up, to be trained and evaluated on apparatus operations," Wagner says.

It's tough to top the convenience of the Striker simulator, Wagner relates. "It's great to be able to put brand-new personnel into the unit, before they go nuts on the real deal," he comments. "It saves us not only fuel, but basic wear and tear on the trucks. Plus, it keeps our trucks fire-ready during training. If there's an emergency, off they go."

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Saskatoon Airport Authority

Saskatoon Int'l Nearly Doubles Terminal Size Without Incurring Any Debt

By Jennifer **Bradley**

After nearly three years of construction, crews completed the $53 million terminal renovation at Saskatoon John G. Diefenbaker International Airport (YXE) in April, and the improvements are already receiving international recognition. Passengers ranked the Saskatchewan airport number one in North America for comfortable waiting spaces in gate areas via the quarterly Airport Service Quality awards administered by Airports Council International.


Lory **Sproxton**

The project expanded the footprint of YXE's terminal by full 90% and 130,000 square feet on three levels: basement, main floor and mezzanine. Increasing the amount of seating areas and improving overall passenger comfort were the main focus of the project, notes Lory Sproxton, manager of Airport Development at the Saskatoon Airport Authority. Given the survey results, it seems to have worked.

"The passengers are thrilled, but our tenants also are very pleased with what we've done," Sproxton reports. "The operating efficiency of the airport has improved substantially, too; and we have a much better ability to deliver an expedited process for everyone."

The project's design firm, Kindrachuk-Agrey Architecture, shares the airport authority's enthusiasm about results of the comprehensive expansion and renovation. "It's been a collective effort and it's nice to see the recognition at a higher level of a job well done, not just the local guys saying it," says Derek Kindrachuk, principle architect at the firm.


Stephen **Maybury**

Stephen Maybury, the authority's president and chief executive officer, emphasizes the underlying motivation for the project. "We have a vision to provide the most valuable airport experience in Canada," says Maybury. "That was the highlight for me: ensuring

factsfigures

Project: Terminal Expansion & Redevelopment

Location: Saskatoon (Saskatchewan) John G. Diefenbaker Int'l Airport

Owner/Developer: Saskatoon Airport Authority

Size: 130,000 sq ft of new construction

Cost: $53 million

Construction: April 2012 – April 2015

Architect: Kindrachuk-Agrey Architecture

Construction Manager: PCL Construction Management

Structural Consultant: Robb Kullman Engineering

Mechanical Consultant: Daniels Wingerak Engineering

Electrical Consultant: PWA Engineering

Est. Onsite Work Hours: 300,000

Avg. Workforce at Peak: Approx. 90 workers/day

Total Exterior Curtainwall, Windows & Glazing: 2,155 sq. meters

Total Interior Curtainwall, Windows & Glazing: 790 sq. meters

Drilled Cast-in-Place Concrete Piles: 407

Total Reinforced Concrete: 3,030 sq meters

New Roof: 6,390 sq meters

Suppliers

Glazing: Kawneer, installed by Clearlite

Metal Cladding & Roofing: Flynn

Elevators & Escalators: Kone

Baggage Conveyors: G & S Airport Conveyor

Aircraft Bridges: Thyssen Krupp

Stretched Fabric Ceilings: Clipso USA fabric; Snap-Tex acoustic mounting system, installed by Clipso USA & Alpine Interior Systems

Metal & Acoustic Ceiling Systems: Armstrong, installed by Alpine Interior Systems

Wood Ceiling Systems: ACGI Architectural Components Group, installed by Alpine Interior Systems

Epoxy Terrazzo Flooring: Alpine Interior Systems

Tile Flooring & Wall Finish: Olympia; Stone Tile; Primco; Ames Tile, installed by Alpine Interior Systems

Carpet Tile: Lees/Mohawk Carpets, installed by Alpine Interior Systems

Quartz Countertops & Millwork: Cambria Quartz, installed by FloForm

Rubber Flooring: Johnsonite, installed by Alpine Interior Systems

Roofing: Soprema Colvent System SBS Roofing, installed by Clarke Roofing

Wood Doors: Architectural Door Products, installed by Meridian Wood Technology

Metal Doors & Frames: CP Distributors, installed by PCL Construction Mgmt.

Overhead Doors: Richard-Wilcox Canada, installed by Creative Door Service

Toilet Partitions: Bobrick solid phenolic panels, installed by PCL Construction Mgmt.

Washroom Accessories: Bradley; Bobrick, installed by PCL Construction Mgmt.

Standard Seating: Arconas Public Seating, installed by Arconas/TradeWest

Lounge Seating: Business Furnishings; TradeWest; HBI Office Plus; Action Office; etc.

Graphics & Signage: Royal Sign Systems; etc.

Local Flavor

Stephen Maybury, president and chief executive officer of the Saskatoon Airport Authority, hails from Toronto; but he loves the prairie background and open sky of the Saskatoon area. When Maybury joined the Saskatoon John G. Diefenbaker International Airport (YXE) project in 2012, he was "blown away" by the local flavor that designers and contractors were building into the space.

One particular highlight is the Refuel Restaurant and Lounge, which features refurbished airplane parts such as a Cessna propeller and two full-size aircraft tail sections donated from a local "plane graveyard." The facility's aviation theme is underscored with wallpaper made of airplane manuals, a runway depicted on the flooring and a hand-drawn airplane artwork. An Otter wing with an end cap light that still works hangs above the bar, illuminated with LED lights.

Derek Kindrachuk, principle architect at Kindrachuk-Agrey Architecture, notes that the unique concession is just one of the ways YXE celebrates Saskatoon's personality and aviation heritage. The new concession provides a unique experience for travelers on the post-security of the facility, adds Lory Sproxton, manager of Airport Development for the Saskatoon Airport Authority.

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the decisions we were making while in construction would remain consistent with our vision and strategy."

Extreme Makeover

The authority's vision wasn't developed overnight. YXE has been in growth mode for more than a decade, and is still expanding. In 2001/2002, YXE doubled the size of its terminal during a renovation similar to its recent project.

The plan at that time was to accommodate 15 years of growth; but Saskatchewan's economy has been booming over the last five years, explains Kindrachuk. Mining (uranium and potash) is big industry, as are local oil reserves and farming. While the population of the province itself isn't overly large, investment in business and confidence in the regional economy has caused consistent 3% passenger growth per month — a staggering rate, notes Kindrachuk.

The recent extreme makeover will help YXE accommodate 2 million passengers per year, up 500,000 from the facility's current load. Now at 266,000 square feet, Maybury says the airport is a facility designed to stand the test of time.

To do so took highly diligent financial planning and functional decisions regarding facility size, supply and demand, he explains.

Notably, the entire $53 million initiative was funded by airport revenues, including Airport Improvement Fees; and the airport authority did not incur any debt throughout the two-phase project.

Both points were significant to Maybury, who felt that strategic alignment within YXE was the most important aspect of the project. In retrospect, he is proud of the team for finishing on time, on budget and without debt financing. "That is quite an achievement," Maybury notes.

Overall he describes the new terminal as very functional and sleek, but also flexible, as it is designed to expand easily the next time YXE's long-term vision is discussed.

Details of the recently completed renovation include new spaces for administration and offices; new pre-board screening, expanded hold bag screening incoming Customs primary processing; and a new arrivals/departures secure concourse that can accommodate eight gates with boarding bridges and two ground loading gates.

The 33-month construction project was completed in two phases. Workers built new domestic/international gates from April 2012 to October 2013. The remaining domestic gates were constructed between October 2013 and April 2015. As a destination airport that handles minimal layovers, it was important

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to complete the international gates first to accommodate winter vacationers leaving Canada, Kindrachuk explains.

Gregory Schmidt, project manager for PCL Construction Management, notes that crews also completed three new post-security food and beverage outlets during the second phase: Starbucks, Tim Horton's and Refuel Restaurant and Lounge (see Page 52 for more details). "Previously, the airport did not offer any full-service food and beverage options post-security, which was a common complaint among its users," he says. "These added vendors addressed those concerns, and the early response from the community is very positive."

Terminal Highlights

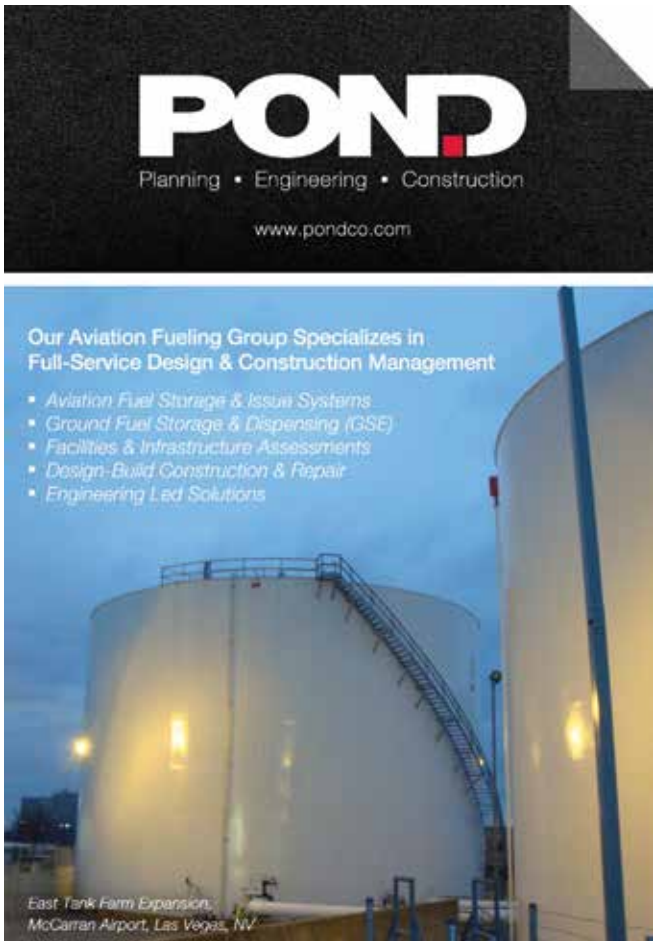
The new terminal is designed to incorporate the natural elements of Saskatchewan's landscape. Daylight is an important element that highlights panoramas of airplanes coming and going, the nearby prairie and more remote horizon. The terminal even provides passengers with perfect views of the sunrise on one end and sunset on the other end of the building, details Kindrachuk. "All day, the building internally evolves based on what's happening outside, which creates an interesting atmosphere inside," he relates. "We're all about celebrating what Saskatoon is, in an air terminal building. It's a real ambassador to our city and one that leaves a lasting impression once you go."

With passenger comfort as a key driver, architects also addressed more fundamental elements: ample washrooms in strategic locations, children's play areas throughout the facility and abundant electronic charging stations, casual sling chair seating, water refilling stations and business work areas. The team discussed each type of passenger's needs and worked them into the design, he explains.

When it came to wayfinding, minimizing signage was a guiding goal. When possible, designers used finish materials, elements and textures rather than additional signs to move guests in specific directions. The resulting design is simple and intuitive with a natural flow, reports Kindrachuk.

The center concourse features the largest fabric ceiling installation in Western Canada — a design feature that "takes off above your head like a jet stream," says Kindrachuk. "It's a white ceiling that continues to increase in height until it reaches the fireplace; but it gives direction as people walk, encouraging them to move down the concourse."

The very scale of the building was developed in a very conscientious manner, he continues. Textures such as wood ceiling panels and carpets that emulate a prairie landscape with grids are literal ways that designers help passengers experience simple and natural transitions.




Seamless terrazzo flooring eliminates noise from luggage rolling over grout joints.

Terrazzo flooring is another natural wayfinding element included in the design. New technology brought back an epoxy version of the product after it had previously been priced out of the market, reports Kindrachuk. The seamless terrazzo provides a natural stone feel without grout joints, which reduces noise inside the terminal. The overall acoustical design received in-depth attention to minimize "dead spots" and ensure that passengers can hear public address announcements, he explains.

Minimizing Operational Impact

According to Sproxton, the biggest challenge of the recently completed renovation and expansion was keeping the 24/7 facility humming throughout the nearly three-year construction phase. "A lot of effort and time went into making sure our airline partners and customers could still get to where they needed to and operate efficiently," he says.

The temporary infrastructure needed to keep operations running smoothly was extensive and costly, but it was necessary to achieve the final goal, relates Sproxton. During the cold Canadian winters, the airport was bustling with charter customers and extra heat was needed to ensure passenger comfort.

The project team and airport authority worked together extensively to determine the ideal layout and timeline for temporary infrastructure, and to separate the construction from the public whenever possible, adds Schmidt. Temporary partitions, lighting, electrical fixtures, heating and ventilation systems, flooring and passenger walkways were needed throughout the project. Personnel from PCL Construction Management and the airport authority took daily site walks together to review the project's potential impact to YXE travelers. "We consistently prioritized communication so that all affected parties received adequate notification when necessary shutdowns or disruptions were scheduled to occur," Schmidt remarks.

Such teamwork is what minimized the impact of the complex construction on YXE's 24-hour operations, he notes. Maybury agrees, adding that assembling a highly capable team and maintaining flexibility through construction and design

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uncertainties were also key elements to the large project's success. "When we opened Phase 1, we were all extremely proud," he recalls. "It was a day of walking the space and seeing all the hard work pay off."

To other airport executives undertaking similar projects, Sproxton emphasizes the importance of accurate scheduling and project updates. "If you tell a tenant in the building that construction will affect them for two months, be sure that's how long it will be," he advises. "Your integrity and the scheduling information you provide to tenants and other operating departments must be accurate."

Team members may not always like those in charge, but they must appreciate and respect what is being done, he muses.

As project manager, Sproxton kept in mind that the long project was affecting and disrupting daily operations for tenants and airport departments alike. Sharing accurate information and communicating openly with them led to a positive outcome, he reflects.

Looking back, Schmidt recalls the tremendous amount of excitement within the project team and overall city of Saskatoon about the completion of the project: "Although the airport was functional for its passengers before the expansion, there is a sense that this project has established Saskatoon International Airport as a modern airport with up-to-date amenities for travelers."

Designers used finish materials such as floorcovering and vertical wood panels to assist wayfinding.

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Regional Development Spurs & Supports Hangar Construction at Spokane Airports

By Jodi **Richards**

Spokane International Airport
www.SpokaneAirports.net

factsfigures

Projects: Hangar Development

Locations: Spokane (WA) Int'l; Felts Field Airport

Owner: Spokane Airports (jointly owned by Spokane County & city of Spokane)

Operating Authority: Spokane Airport Board (includes 7 governmental appointees)

Est. Cost: $14 million

Funding: $1.2 million in grants & $7.2 million in loans from WA Dept. of Commerce's Community Economic Revitalization Board; $5.3 million cash from airport reserves

Spokane has a rich aviation/aerospace history, and the entity that owns and operates its airports is relying on that background to grow. Plans for growth, however, extend well beyond airport facilities and traffic to include the overall economy of Eastern Washington.

Between 2005 and 2012, Spokane Airports invested approximately $14 million in five hangar projects at Spokane International Airport (GEG). Of that $14 million, about $8.4 million came from the WA Department of Commerce's Community Economic Revitalization Board — $1.2 million in grants and $7.2 million in loans. The remaining $5.3 million was funded with the airport's cash reserves. Projects included a mix of new construction and renovations of existing hangars.

Larry **Krauter**

Larry Krauter, CEO of Spokane Airports since 2011, explains that two factors prompted the various hangar investments. In some cases, facilities needed to be replaced; in others, officials saw opportunities to make investments based on likely returns to the airport and the community in terms of job creation. "That was really one of the big poles in the tent for us," Krauter says. "How do we continue to grow the airport's overall economic impact in the community? We see that as attracting companies that are going to bring well-paying jobs to the area."

According to a 2013 report, Spokane's airports generate $754 million in economic impact annually.

Among GEG's projects was construction of a $2 million, 18,235-square-foot hangar to be leased by Absolute Aviation (an aircraft repair facility) and Empire Airlines, a feeder for FedEx.

The airport also rebuilt an 80,000-square-foot former military hangar to help attract Cascade Aerospace, a heavy maintenance repair and overhaul company from Abbotsford, British Columbia. Cascade was subsequently bought by Air-Tech, and the lease was assumed by Aero-Flite, a supplier of aerial fire retardant and suppression

Aero-Flite, a company that supplies fire retardant and suppression systems, occupies a former military hangar GEG rebuilt to attract new tenants.

systems from Kingman, AZ. Aero-Flite started with 30 employees and four aircraft in November 2014; currently, it operates nine aircraft and employs more than 60 people. "And that could double within the next 12 to 18 months," notes Todd Woodard, airport spokesperson.

Growth is occurring elsewhere at GEG as well. Airport-based businesses have increased their employment levels and expect to add even more jobs within the next few years — providing the very type of return Spokane Airports was hoping for from its investments.

Todd **Woodard**

"Employment is a big deal to us," comments Woodard. "Growing great aerospace jobs — which are sustainable, living-wage jobs — helps our airfield with the services; but it also helps the local economy grow."

Ample, qualified labor is also part of the plan. Spokane Community College runs the state's oldest aircraft maintenance program, and Fairchild Air Force Base provides a steady supply of skilled veterans. "We have a good supply of talent now and into the future for these jobs," Woodard notes.

In mid-2012, Spokane Airports invested $1.1 million in a 32,000-square-foot hangar remodel, performed by Meridian Construction. Horizon Air leases about 19,000 square feet of the structure for its operations. The project was funded by airport general revenues and a $40,000 state grant.

The airport's largest investment was a $7 million paint hangar for Associated Painters, which relocated some of its business from Everett, WA, to Spokane. Associated Painters is a division of Leading Edge Aviation Services, a commercial, military and executive aircraft painting company headquartered in Costa Mesa, CA. After the airport completed its 42,000-square foot-hangar project, Associated Painters funded construction of a mirror-image structure that opened in summer 2014. After undergoing a series of mergers, the company is now part of EirTech, based in Ireland.

"There is a high demand for narrow-body aircraft painting in the region, which we plan to meet with this new hangar," says Chris Harano, president of Leading Edge. The company expects to grow its local workforce by 50% in the next year.

Tandem Growth

The focus on airport investment and regional economic growth extends to GEG's general aviation cousin, Felts Field Airport (SFF). "We've been focusing on rebuilding the infrastructure there, and it's really paid off," says Krauter.

SFF recently announced construction of a $2.8 million general aviation flight center, funded entirely by private interests. The 40,000-square-foot multi-tenant complex is owned by EFT and will be home to the field's fixed-based operator — Western Aviation — as well as Honor Point Military and Aerospace Museum. "You just don't see that kind of investment at general aviation airports these days," he remarks.

SFF includes two parallel runways plus another turf runway when weather allows. Additionally, seaplanes land on the Spokane River, just north of the airport. "We've got something for everybody," Krauter muses.

From an airspace aspect, SFF plays an important role by allowing separation of general aviation flights from commercial and larger business jet traffic at GEG, just eight miles away. GEG is served by six airlines and two cargo carriers; SFF's location makes it ideal for those looking to base businesses or aircraft for easy access to the Spokane metropolitan area, explains Krauter.

Despite recent years of investment, he sees more room for development and reports that GEG, in particular, is in an "aggressive growth mode." Over the past several years, the airport has made substantial airfield upgrades and investments, including a recently completed taxiway reconfiguration project that included construction of three new taxiways on the northwest side of Runway 3-21. The curved taxiways (high-speed exits) are designed to allow aircraft to reach the gate area more efficiently and meet new FAA requirements, putting GEG ahead of many other airports. "We've got a lot of capacity, so there's room for opportunity here," Krauter reports. "We're looking to fill gaps in our services menu as well as to create additional jobs wherever we can."

Woodard adds that GEG has been successful consulting current tenants about potential businesses and services to complement the airport's existing mix. Case in point: Two tenants suggested seeking out a paint company and helped airport personnel identify and recruit Associated Painters.

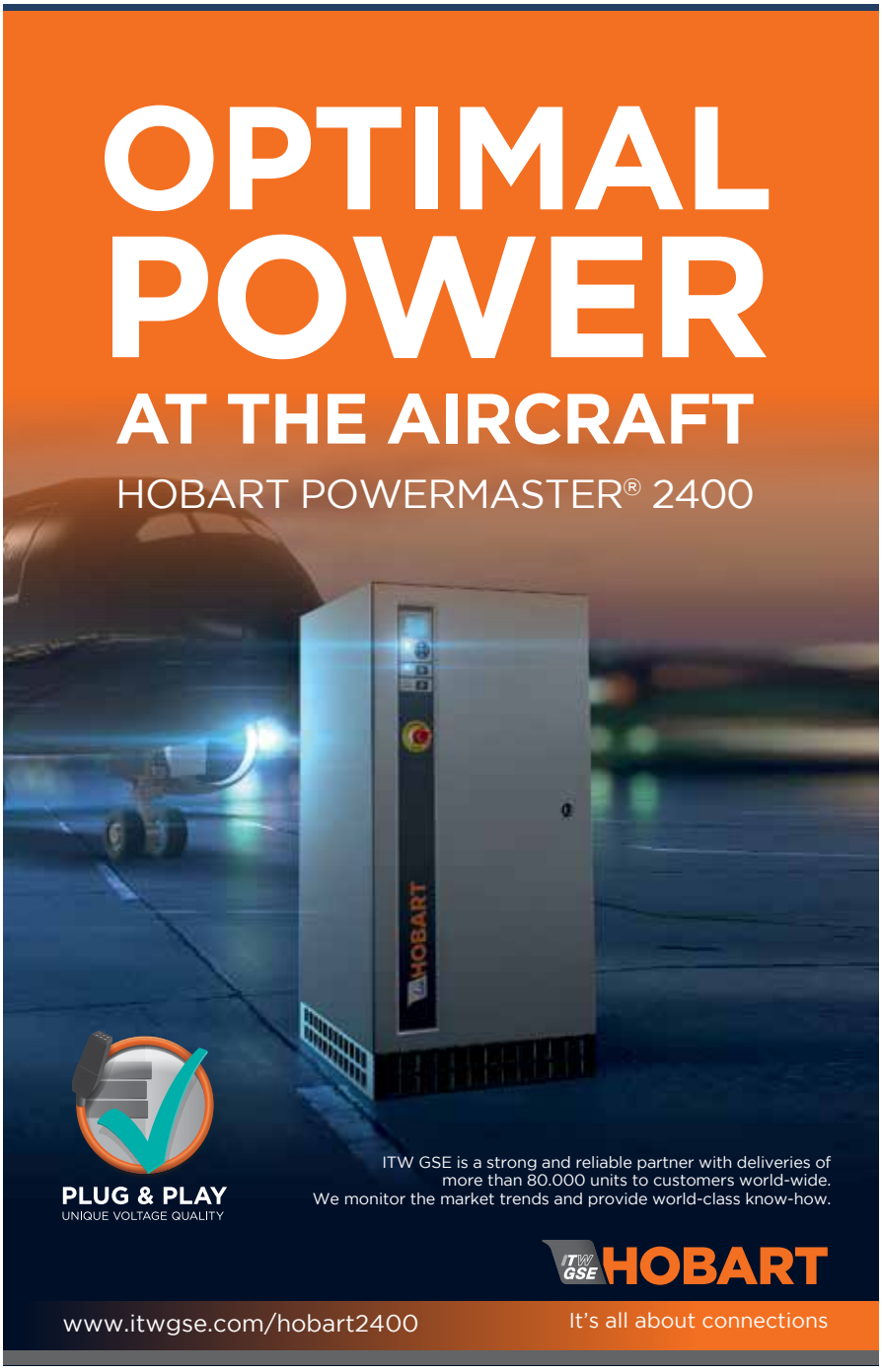
"We have a target list, and we are going after those companies," Krauter advises.

Typically, the airport does not have competing companies on the airfield. Instead, it seeks to attract complementary businesses that "cross-pollinate" by sharing ideas and using each other's services. "Getting the [tenant] community to work together really bodes the whole place well," Woodard comments. "(That) was always the goal — making everybody stronger."

Regional Support

Partnering with organizations that share GEG's objectives for economic development is critical to the success of the airport and region, Krauter emphasizes. In 2011, the airport joined forces with the Spokane Chamber of Commerce, the local community college system, the city of Spokane, Spokane County and Avista, the electric and gas utility company that serves the region. The various entities formed Aerospace Initiative for Recruitment (AIR) Spokane to develop a proposal that would attract Boeing's 737-Max facility to the area.

Ultimately, the aircraft manufacturer decided to keep that work in Puget Sound; but AIR



GEG's commercial traffic includes 23 flights per day to and from Seattle-Tacoma International Airport on Alaska Airlines and Delta Air Lines.

Spokane stayed intact. "What we learned from that process is that we needed to keep that group together to continue to work on targeted aerospace supply chain company recruitment," Krauter relates.

AIR Spokane subsequently funded a study to identify the strengths, weaknesses and opportunities of the area's workforce, existing aerospace companies, infrastructure, etc. The study's results were then used to create a recruiting strategy. "It's a much more focused approach [to economic development]," Krauter comments, crediting the increased power of pooled resources.

In summer 2014, GEG announced a win: Exotic Metals Forming Company, a Boeing supplier, purchased 56 acres of airport land to build a 150,000-square-foot plant that is scheduled to open in summer 2015 and employ 150 people. "We are able to use our resources to leverage the attraction of businesses like that," Krauter explains.

Complementary businesses like Exotic Metals Forming — those that benefit from proximity to the airport but don't necessarily need access to its taxiway and runway system — are key to GEG's plan for spurring regional growth. "We really look at what type of businesses are going to bring high-paying jobs to the region and generate more air travel demand for the airport," Krauter comments. "We have a very regional approach to aerospace business recruitment."

Located about 300 miles from Seattle, Spokane offers businesses less expensive real estate and labor costs, but is still close enough to Boeing's assembly lines to ease travel for executives, he explains. GEG operates 23 flights per day to and from Seattle-Tacoma International Airport on Alaska Airlines and Delta Air Lines.

GEG's total holdings include about 7,500 acres of land, including a former military base that was transferred to the airport under the Surplus Property Act and a business park. By Krauter's inventory, the airport has about 1,500 acres it could sell or lease for development. "We've been very aggressive with land acquisition and have a great inventory," he reports, noting that critical infrastructure is in place to help attract business.

"If an airport has land, it requires more than just putting a sign out there saying 'land for sale or lease,'" he advises. "You need to focus on the strengths of the area and what role the airport can play to attract the highest paying jobs for whatever sectors that community is building."

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APEX Program Provides Peer-to-Peer Safety Reviews Worldwide

By Robert **Nordstrom**

factsfigures

Program: Airport Excellence (APEX) in Safety Programme

Sponsor: Airports Council International

Format: Peer-to-peer safety reviews

Price: No cost for assessment services; airports being reviewed pay APEX team's travel, food/lodging & other administrative expenses

Reviews to Date: 46 airports worldwide

Pool of Assessors: 100+

Mission & Goals: Promote safer airport operations; facilitate int'l cooperation between ICAO, aviation stakeholders & airports

For More Info: dboutin@aci.aero

Airports Council International (ACI) forecasts that existing airport capacity will need to double by 2031 to handle more than 12 billion passengers and 136 million aircraft movements per year. The collective price tag for capital expenditures needed to service the increased traffic is estimated at more than $1 trillion. Yes, that's trillion with a "t."

Given these daunting projections, airports around the globe are under considerable pressure to monitor and improve their safety protocols and procedures. Research by the International Civil Aviation Organization (ICAO), however, reveals that the industry has plenty of work ahead. ICAO's Universal Safety Oversight Audit Programme assessed 165 states and found that as of August 2012:

- 58% had not established safety procedures and 72% had no guidance for airport certification and surveillance;
- 69% had not established a safety program regarding runway incursions;
- 65% had not established a mechanism to rectify safety issues in a timely manner;
- 83% had not implemented airport safety management systems; and
- 59% had not periodically reviewed aerodrome manuals.

ACI World, in turn, initiated the Airport Excellence (APEX) in Safety Programme in 2012. The program was specifically designed to encourage and facilitate communication among airports with the goal of helping airports share knowledge and best practices about safety.

Danny **Boutin**

The program began in response to a request from ICAO that the industry make changes to improve operational safety, explains APEX Senior Manager Danny Boutin. During the September 2011 pilot in West Africa, staff from ICAO, ACI and ACI airport members offered input about how Lomé-Tokoin Airport in Togo could improve

its safety protocols. "Through their recommendations, the airport ended up achieving certification from its civil aviation authority a year later," recalls Boutin. "ACI subsequently decided to create a peer-review program."

The pilot developed into ACI's current format, which allows airports throughout the world to request reviews from experts currently working at airports. Specially designated APEX assessors offer observations and suggestions from their particular fields of expertise.

The program is based on standards and recommended practices contained in ICAO Annex 14 and 19 as well as ACI best practices. Boutin emphasizes that APEX visits are not safety audits, but rather peer reviews of safety practices. In addition, each review is tailored to the individual needs of the host airport, with the goal of proposing effective solutions to improve safety practices, he elaborates.

Since 2012, APEX has conducted safety reviews at 46 airports throughout the world.

"We go everywhere," Boutin informs. "We don't want to leave any airport behind — particularly in those parts of the world where resources and support systems are scarce. But that being said, we have also conducted reviews at major North American airports in cities such as Toronto, Seattle and San Francisco."

Host airports cover the review team's travel, food and lodging, and other administrative expenses; but there is no charge for the professional services of ACI, ICAO and airport staff members who conduct the assessments.

Creating Community

While industry-wide cooperation may be key to ensuring that best safety practices remain a top priority, some airports tend to be islands unto themselves within their respective communities.


Jennifer **Sullivan**

Jennifer Sullivan, director of corporate safety and security for the Greater Toronto Airport Authority, describes the situation: "In many cases, cities have only one airport. It's not like manufacturing, where a person can move from one manufacturer to another within the same city. With airport professionals, if they change jobs they likely change the city they live in."

Not surprisingly, insularity can become a negative factor. "Airports don't have high turnovers among their workers," Sullivan

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explains. “As a result, the workers who were here before train us based on the training they received. We, in turn, train the next person based on our training; and so on down the line. In other words, we become photocopies of photocopies.”

APEX works to counteract this scenario by offering airports that request assessments the expertise of professionals from “Safety Partner” airports throughout the world. Each review team’s goal is to help the host airport improve safety performance, implement safety management systems and establish indicators and tools to reduce safety incidents. Recommendations are tailored to the host airport’s specific operating environment, regional aviation safety goals and certification requirements.

Prior to an APEX safety review, the host airport completes a self-evaluation questionnaire to help the review team identify specific areas of concern. Typically, six volunteer experts and an ACI team leader spend five days evaluating the airport. However, the number of assessors and review duration are adapted to each airport’s size and needs.

Usually, the APEX team works with professionals from the host airport from Monday through Thursday, reviewing various areas, protocols and procedures as they relate to safety. On Friday, the review team then reports initial areas identified for improvement and offers suggestions and recommendations to the host airport.

In addition to its onsite work, the APEX team sends a gap analysis and assessment of the host airport’s safety standing in a preliminary report within four weeks after the visit. Senior management at the host airport also receives a final report with recommendations to enhance safety levels eight weeks after the visit. Based on the final report, the host airport then drafts an action plan that identifies short-, medium- and long-term goals for improving safety.

“We try to include everybody at every level in the airport,” Boutin explains. “We want to reach out to the guy on the airfield as well as the person at the top. We try to summarize our review so everyone gets a feel of the safety areas for which they are responsible.”


Mark **Cozad**

Mark Cozad, airport certification safety inspector for the FAA Office of Airports, served as one of six members on the safety review team that visited Ouagadougou International Airport in the West African country of Burkina Faso last September. “ICAO Annex 14 Standards and FAA regulations are very similar,” Cozad notes. “The way we (ICAO

and FAA) conduct inspections are very similar. (For the review) we conduct an in-briefing, a movement area and administrative inspection. We review the training records and the aircraft rescue and firefighting and fueling standards. We visit the air traffic control tower and review the wildlife management program. At the end, we conduct an out-briefing where we go over our findings and offer suggestions for improvements. It's an opportunity for the FAA to help improve the safety of airports worldwide."

On a personal level, Cozad relished the opportunity to work with assessors and airport specialists from around the world.

Captain Patrick Lewis of the Miami Dade Fire Rescue Aviation Division at Miami International Airport has served as a volunteer assessor for numerous APEX reviews. "It's definitely a reciprocal relationship," Lewis emphasizes. "When you go into environments where they do not have access to the resources we have, airport workers come up with some pretty ingenious ways to mitigate some of the same issues we face here. I've learned quite a lot from the visits I've made."

At Beijing Capital International Airport, for example, Lewis noticed the unique way workers loaded Purple-K, a dry chemical fire suppression agent, into vessels. It was valuable to observe a

APEX Expertise

The Airport Excellence (APEX) in Safety Programme, sponsored by Airports Council International, draws on the services of more than 100 volunteer assessors from designated airport safety partners throughout the world. Individual assessors and safety partners provide expertise in aircraft rescue and firefighting, safety management systems, airport ground aids, airfield physical characteristics, visual aids and apron management.

Specific areas/elements reviewed on request include:

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- Wildlife hazard management
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- Airside driver and vehicle management
- Management of ground handlers
- Contractual and legal issues
- Improving Aeronautical Information Publications documentation
- Low visibility procedures
- Obstacle management
- Winter operations
- Foreign object debris management
- Movement area maintenance and access
- Aerodrome work safety
- Apron safety management
- Disabled aircraft removal
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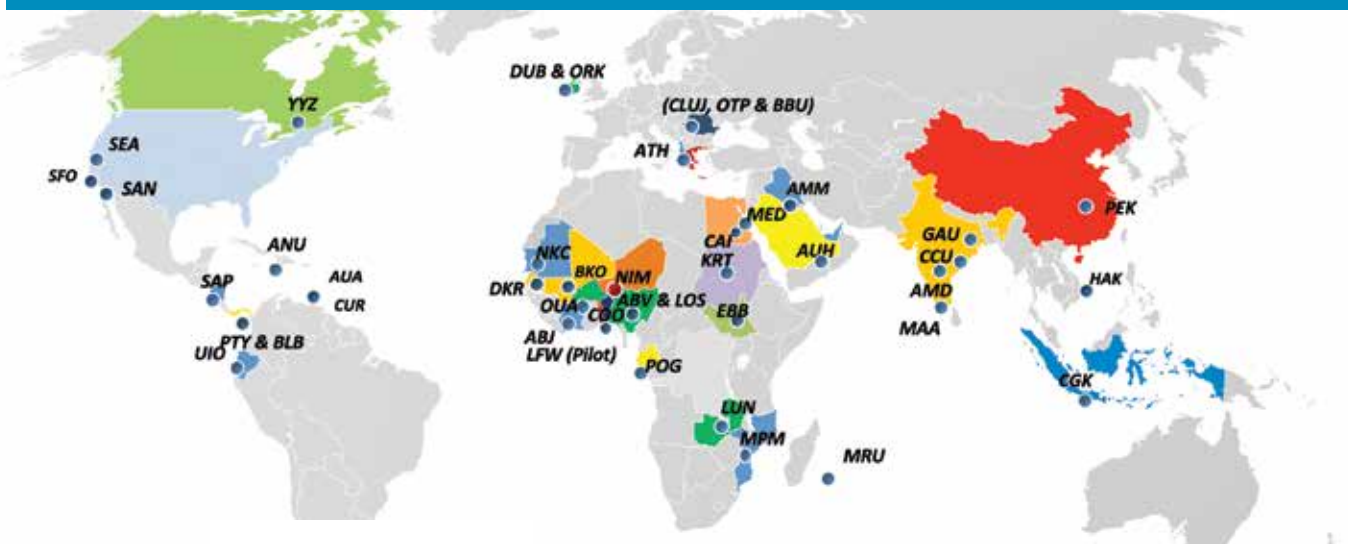

different loading method, because the process is always a risky, messy and labor-intensive challenge, he notes.

"I've enjoyed all of my trips," Lewis reflects. "When I come back, I tell my guys, 'You don't know what you have until you lose it; how good you have it until you see how some airports are forced to operate with much fewer resources.' It's humbling."

Making Good Airports Better

Toronto Pearson International Airport (YYZ) has participated in the APEX program as both a review subject and by sending personnel to review other airports. A total of seven YYZ employees have shared their expertise in various fields by acting as assessors for airports in Beijing, Dublin, Cairo, Abu Dhabi and other cities throughout the world. According to Sullivan, every employee

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who has participated in a review mission considers it the best professional development experience he or she has ever had.

In September 2013, the airport itself received an APEX safety audit; and YYZ's winter operations underwent a customized review in March 2014. Airport officials welcomed the chance to bring in specialists from other world-class airports to challenge YYZ management and staff on their safety procedures.

"It was a great opportunity to have experts come in and rattle our cages a bit," says Sullivan. "We think we're a great airport with a great safety record and high standards. But are we doing something just because we think it's the right thing to do and no one has ever challenged us on it?"

Airport officials approached the APEX reviews as valuable occasions to open dialogue about a variety of safety issues. "When a regulator comes in and asks similar questions, it's a very different kind of conversation," Sullivan explains. "This is peer on peer."

She further emphasizes the reciprocal nature of the relationship with the review team, characterizing assessment visits as an opportunity to initiate in-depth discussions on technical issues that serve as a learning experience for both APEX reviewers and host airports. Review results can also give airport professionals a level of confidence about their safety procedures and protocols, she adds.

YYZ asked its APEX team to focus on three particular issues of concern: safety management systems, runway safety and construction safety and management.

"The review helped ease our mind that we weren't missing something," Sullivan reports. "Sometimes you think that maybe you're not seeing the obvious. For example, with regard to the hotspot we had on a runway and instances of aircraft incursions, they agreed that we were facing a challenge, but importantly let us know we weren't missing something obvious. It's comforting to have 13 experts from airports such as Dublin, Vancouver, Miami, Brussels and Sweden poke into every corner of your airport and not find anything of concern. It gives you a level of confidence.

"We opened the books," she continues, noting that staff members were encouraged to engage the review team about areas of concern.

With the APEX program growing, ACI plans to expand the concept into other critical areas in the future. Currently, the association is running two pilot projects about security in Africa and hopes to launch APEX in Security next year.

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Mega-Makeover at Memphis Int'l Begins With Apron Upgrades

By Dan **Vnuk**

MEMPHIS INTERNATIONAL AIRPORT

Memphis International (MEM) is embarking on an ambitious, multi-faceted plan to right-size its passenger terminal for a better fit with present and future traffic. The current priority, however, is airside enhancements.

The Tennessee airport is nearing completion of an estimated $90 million of apron and airfield infrastructure improvements. In addition to replacing aprons that were built during the 1960s and 1970s, crews are upgrading the airport's stormwater management system.

The apron reconstruction was undertaken in three phases with approximately 75% of it funded by the FAA grant.

Rolling With the Punches

A few years ago, MEM was "de-hubbed" by Delta Air Lines, ending a long run of connecting flight operations that at one time included Northwest and Republic airlines (neither of which still exists in the same state). Most of the airport's connecting flights are now gone, leaving a core market of passengers traveling to or from Memphis. While airport officials don't expect another carrier to locate its hub at MEM, they note that the facility has ample capacity to accommodate one.

As a direct response to the de-hubbing, the airport is undertaking a $114 million renovation of Concourse B. The project is designed to shrink and modernize the facility while also improving the experience customers have when using it. The plan includes closing one-fourth of the concourse's existing gates and significantly upgrading much of what remains. The plan will consolidate nearly all of MEM's passenger flights into refurbished and expanded gates in Concourse B, and "mothball" remaining gates in the airport's other two terminals. Ticket lobbies will remain largely untouched.

The front of the airport won't change during this phase, but the 1964 vintage Concourse B will. The Y-shaped facility will double in width, gain moving walkways and receive an infusion of natural light. The sweeping project began with demolition of the south end of Concourse A and is scheduled to wrap up in 2020 or 2021.

Former Airport Authority Chairman Jack Sammons and Scott Brockman, current president and chief executive officer of the authority, stand ready to answer critics on both sides: those who question the decision to tear down facilities that are already paid for and those who

Scott **Brockman**

Jacks **Sammons**

factsfigures

Project: Apron Improvement

Location: Memphis International Airport

Primary Elements: Extensive upgrade of airside aprons.

Approx. Cost: $90 million

Funding: FAA (75%); airport fees 25%

Engineering & Design: Pickering, Memphis

Trench Drainage Systems: EJ, coordinated by Tennessee Branch Office

Project Management: APAC, Tennessee

Installation: GCM, Inc., local subcontractor

wonder why more money is being spent on an airport that has seemingly been in a nosedive since Delta started cutting flights three years ago.

"This is a giant step forward for the future of our region," asserts Sammons. "We think this is the highest and best use of our investment."

Sammons recalls being more than a bit skeptical when he first heard about the plan to tear down some gates and modernize others. Then, strong positive response support for the strategy from MEM's carrier changed his mind. "There is dynamic change here, but we are offering an enriched experience for our visitors," he relates. "The modernization project is designed to make the airport functional and competitive at least 20 years down the road. It has been endorsed by all passenger airlines serving the airport, and airport board members were briefed individually."

Sammons considers the modernization plan a "major bet" that MEM will rebound from the devastating blow it received from Delta, and that an upgraded facility will be a selling point to attract more flight operations as a non-hub location. "It will answer perennial complaints about a dated, cramped experience for passengers resulting from narrow aisles, low ceilings and small holding rooms at the gates," he adds.

Demolishing about 20 gates on the southward extensions of concourses A and C is expected to alleviate bottlenecks that prevent competing airlines from easily sharing Concourse B.

After demolition, the airport will retain about 40 gates in the B concourse for arriving and departing passengers. Areas slated for demolition include MEM's most recent addition, an expansion of 16 gates in Concourse A that was completed in 2000. The project was specifically designed to accommodate 50-seat regional jets, which were popular at the time. Since the project, many regional jets have been grounded by Delta and other airlines because of elevated jet fuel prices and efficiency issues.

MEM's current traffic of about 2 million passengers per year requires 22 gates, note airport officials.

Most of the construction for the modernization project will occur on the concourse side of the airport's security checkpoints. Ticket lobbies will initially be left as is, Concourse A security checkpoint would be closed, and baggage claim for all arriving flights will be consolidated in Terminal B.

"We're going to turn Memphis International into a modern terminal for airlines to operate out of," advises Brockman, who assumed the role of president and chief executive officer in January. "It will be a game-changing experience, and we currently expect to walk away from this project with no more debt than we have today."

Brockman describes the renovations now in progress as the kickoff for reinventing MEM. "Part of that reinvention involves consolidating operations so we can better serve our passengers, airlines, concessionaires and employees," he explains. "More importantly, we're going to modernize the B concourse, giving our passengers *way* more convenience."

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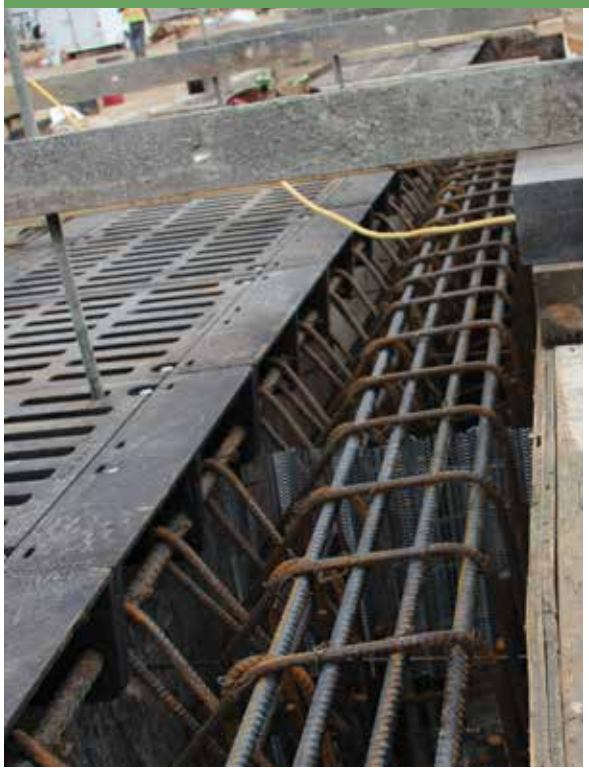
Managing stormwater drainage was a primary element of recent apron improvements.



Plans include consolidating all airline offices and concessions into Concourse B, in addition to adding moving walkways, widening corridors and expanding boarding areas. The project will also remove the entire south ends of concourses A and C to allow larger aircraft unobstructed access to gates in the updated B concourse.

Eventually, all of MEM's current airlines will join Delta in Concourse B — Southwest Airlines, American Airlines/US Airways, United Airlines, OneJet, Allegiant Air, SeaPort Airlines and Frontier Airlines. With more than 60 updated gates, the reconfigured B concourse is designed to accommodate more than 300 flights a day, the airport's high-water mark from more than a decade ago, and more than triple the current traffic of less than 100 flights a day.

Apron Upgrades

Before MEM can begin modernizing its passenger terminals, it must first complete a major airside project currently underway. Crews are replacing aprons outside the gates for arriving and departing aircraft on all sides of Concourse B. Many were four and five decades old.

During the three-phase project, workers have removed and replaced about 320,000 square yards of concrete around the perimeter of the concourse.

A new stormwater management system is another major component of MEM's airside infrastructure improvements. Pickering, a firm based in

Memphis, provided design engineering for the project, and APAC-Tennessee served as the onsite construction manager. GCM, a local subcontractor, installed the new stormwater management system.

The project required about 10,000 feet of linear trench drain assemblies, which were supplied by EJ. After the airport's consulting engineers finished the apron design plans, construction of the trench drainage began in 2012. Crews are expected to complete the final phase of the project this December.

Stormwater Drainage

Given the 50 to 60 inches of precipitation Memphis typically receives each year, what happens to rain after it falls is an important issue at MEM. The airport's stormwater drainage system is a gravity flow system (without pumping stations) that flows into Nonconnah Creek, just ¼ mile north of the airport. The creek flows west for approximately six miles into McKellar Lake, which is part of the Mississippi River.

The specifications for MEM's current project reference the airport authority's Comprehensive Storm Water Pollution Prevention Plan, administered by government agencies such as the Tennessee Department of Environment and Conservation.

One significant aspect of the apron reconstruction is that the trench drainage components used for the project are designed to contain or manage fuel spills as well as facilitate stormwater management. The airport consulting engineers configured a series of concrete firestops between each trench, and the sluice gates can be remotely opened and closed to prevent fuel from flowing into storm drains in the event of a spill. After workers removed massive amounts of existing apron concrete, contractors built a 2-foot wide, 4-foot deep reinforced concrete trench structure.

On top of the trench, crews positioned EJ 6908 top flange trench grate bolted assemblies in line to be poured integrally with the structure. The trench system was poured in place about 10 linear feet at a time. "EJ has provided quality products for this project, and was very helpful and responsive to any requests that we have had," says Walter Pearson, a project manager for APAC-Tennessee.

The products allow for slight but continuous elevation changes during construction of the trench system, adds Lee Veldboom, EJ's technical engineering manager. Because the drainage grate assemblies are placed in 2-foot increments, their position can be continually

Lee **Veldboom**

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realigned during installation to allow the trench system to follow the designed contours of the apron area. Alternative pre-formed trench components were reviewed and rejected during a product evaluation period because they weren't capable of easy elevation changes during construction.

Mike Morganthaler, a project manager with APAC-Tennessee during the work at MEM, appreciated EJ's support when the team realized that one of the specified end-piece frame components wouldn't be needed. "As our contractor began installation of the trench grates and observed some potential concrete forming issues, EJ worked with us to delete the end frames from shipment quantities and was a resource providing guidance or troubleshooting to help us adjust our method of installing each drainage assembly."

Engineers from Pickering designed the drainage system, including the trench drain system, and specified aircraft-rated frames and grates. "The contractor selected a product according to the specifications, and we reviewed the submittals for compliance," says Patrick Neal, principal/transportation project manager at Pickering.

The trench grate assemblies used at MEM are load rated by EJ as Airport Extra Heavy Duty using a testing method outlined in AASHTO (American Association of State Highway Transportation Officials) specification M306. The specification requires castings intended for H-20 traffic to hold a 40,000-pound proof load for one minute applied on a 9-inch square footprint in the center of the casting. For airport-rated products, EJ ups the load to 200,000 pounds to boost safety for end-users. Products that pass the more demanding load test receive the Airport Extra Heavy Duty Rating.

The linear trench drain assemblies from EJ feature a top-flange design to enhance the load bearing capabilities of the trench system. The design provides a better interface with the concrete structure by the flange protecting the structure's edges, which helps prevent structural failure beneath the trench frame, explains Veldboom.

Additionally, the assemblies include vertical gussets with openings positioned so crews can run rebar through the top flange frame and tie the unit into the reinforcing steel. The holes are also designed for bolting adjacent trench grate products together.

Frames using pockets for insertion of a replaceable threaded nut are another desirable feature, says Veldboom. "In the event that a drill and tapped location becomes stripped or cross threaded during construction/maintenance, the location can be easily retrofitted using a standard nut," he explains. "Prior to introduction of this innovative EON LOCK® feature by EJ, all

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Did You Know?

According to the Memphis-Shelby County Airport Authority, Memphis International Airport (MEM) is the centerpiece of the first true aerotropolis in the United States. Just as a metropolis includes suburbs branching out from a core city, an aerotropolis is built around an airport, with strings and clusters of airport-related businesses radiating from it.

MEM currently enplanes about 2 million passengers annually and is also one of the world's busiest cargo airports. Until a few years ago, it was the top cargo airport, serving as the primary "Super Hub" for FedEx Express. Today, MEM ranks a close second to Hong Kong International Airport in cargo.

The Tennessee airport encompasses 5,100 acres, with the airfield occupying about 40% of its total land. With four runways (three north-south parallel runways and one east-west runway), MEM is also home to the 164th Airlift Wing of the Tennessee Air National Guard, which operates C-17 Globemaster aircraft.

Last year, MEM's total net assets were $686 million.

bolting locations were simply drill and tapped, which was difficult to repair after construction. In addition, there are vent slots in the top of each trench frame. During construction, the vent slot allows air to escape while concrete is being poured and provides a visual check for inspectors to verify whether concrete has flowed completely under the trench frame."

EJ also provided airport-rated hatch assemblies designed to provide operations personnel access to the system's sluice gates. The 30-inch-square hinged hatches are located between sections of trench drain and corresponding storm drain inlets. They are frequently used in other applications with below-grade fire hydrants.

In retrospect, APAC is pleased with the EJ 8196 model hatch assemblies as an access solution for the sluice gates. Team members describe them as ideal, in part because they have the same design load rating as the trench grates (Airport Extra Heavy Duty) and similar flush mount profile.

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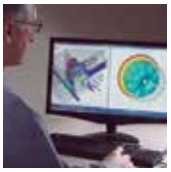

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Customers Rule — Even During Capital Improvement Programs

Perfecto M. Solis

Perfecto M. Solis is senior vice president, Americas, of Parsons' Aviation Division. Among his 25 years of industry experience, he previously served as vice president of Airport Development and Engineering for Dallas/Fort Worth International Airport.

The airport community universally agrees that customer service excellence is a critical component of an airport's success. We further concur that exceptional customer service can generate revenue not only from air travelers, but also from those sending off or greeting passengers.

Individual facilities work hard to exceed customers' expectations and become a preferred airport. Should operators have to give up that hard-earned customer loyalty during capital improvement programs? Not if they think smart, plan well and remember that customers rule. It *is* possible to deliver stellar customer service and maintain efficient, active operations in the midst of complex capital improvement projects.

Customer service satisfaction should be at the core of every airport business plan. A progressive and well-rated airport will use customer service metrics across all its customer touchpoints — from amenities such as restrooms, seating and charging stations for mobile devices, to revenue-generating operations such as concessions and parking. The goal throughout a capital improvement program is to mitigate as much as possible any decline in customer service satisfaction during construction.

Keys to Success

Two primary customer satisfaction categories require close attention when implementing a large-scale construction program within an active operating environment: airport awareness and customer needs.

Airport awareness consists of many dimensions and is best understood through the development of a business model that identifies elements unique to an individual airport. Recognizing the types of customers the airport serves and determining their required travel patterns within the airport are of paramount importance. For example: If an airport's traffic includes a high percentage of connecting passengers, a successful capital improvement program will ensure safe, expeditious passage between gates in an environment that is not only clean, but also reasonably attractive.

In addition to airport awareness, the ability to discern customer needs is equally important if an airport is to holistically maintain exemplary customer service during a large capital program. The airport environment typically includes transfer, domestic, international, business and transit passengers — each requiring a different type of customer experience. Passengers departing on the airside, for instance, may be looking for food amenities prior to boarding, whereas many arriving passengers will be primarily focused on finding restroom facilities. Connecting passengers may need the services of a business center between flights. Customers arriving on the landside to pick up or drop off passengers will likely be interested in quick food and beverage amenities while waiting on the non-secure side of the terminal.

Knowing what customers want will better position any capital improvement program for superior customer service, which in turn will make for a successful project.

It's Our Responsibility

As an industry, we need to invest in the modernization of aging airport facilities in order to meet increasing travel demands. Of course we scrutinize budget, schedule and cost; but attention to the customer experience is just as important to the success of any capital improvement program.

Traditionally, airports have not held customer service to the same high standards during construction that they maintain throughout more typical operating periods. Now, however, airports are extending the customer-centric philosophy of service excellence to onsite construction projects, requiring all facets of the airport organization to embrace the theory of exceptional customer service. In my opinion, this is the only way for an airport to truly position itself for success in our very competitive and low-margin market.

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