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Publisher
Paul H. Bowers
paulbowers@airportimprovement.com
262.510.7832

Editorial Consultant
Rebecca Douglas
rebeccadouglas@airportimprovement.com
815.621.4525

Creative & Production Director
Becker 505, LLC – Chad Becker
chad@becker505.com

Circulation Director
Lisa Monday
lisamonday@airportimprovement.com

Webmaster
Matt Tews
matttews@airportimprovement.com

Contributing Writers
Jennifer Bradley, Victoria Soukup Jensen, Nicole Nelson, Robert Nordstrom, Jodi Richards, Kathy Scott, Michael Schwanz, Dan Vnuk, Ken Wysocky

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Advertising
Paul H . Bowers
paulbowers@airportimprovement.com
262.510.7832

Adrienne Gibson
adriennegibson@airportimprovement.com
262.844.4368

Carie Grall
cariegrall@airportimprovement.com
608.770.6899

Tom Novotny
tomnovotny@airportimprovement.com
414.702.0678

Reprints
Paul H. Bowers
paulbowers@airportimprovement.com
262.510.7832

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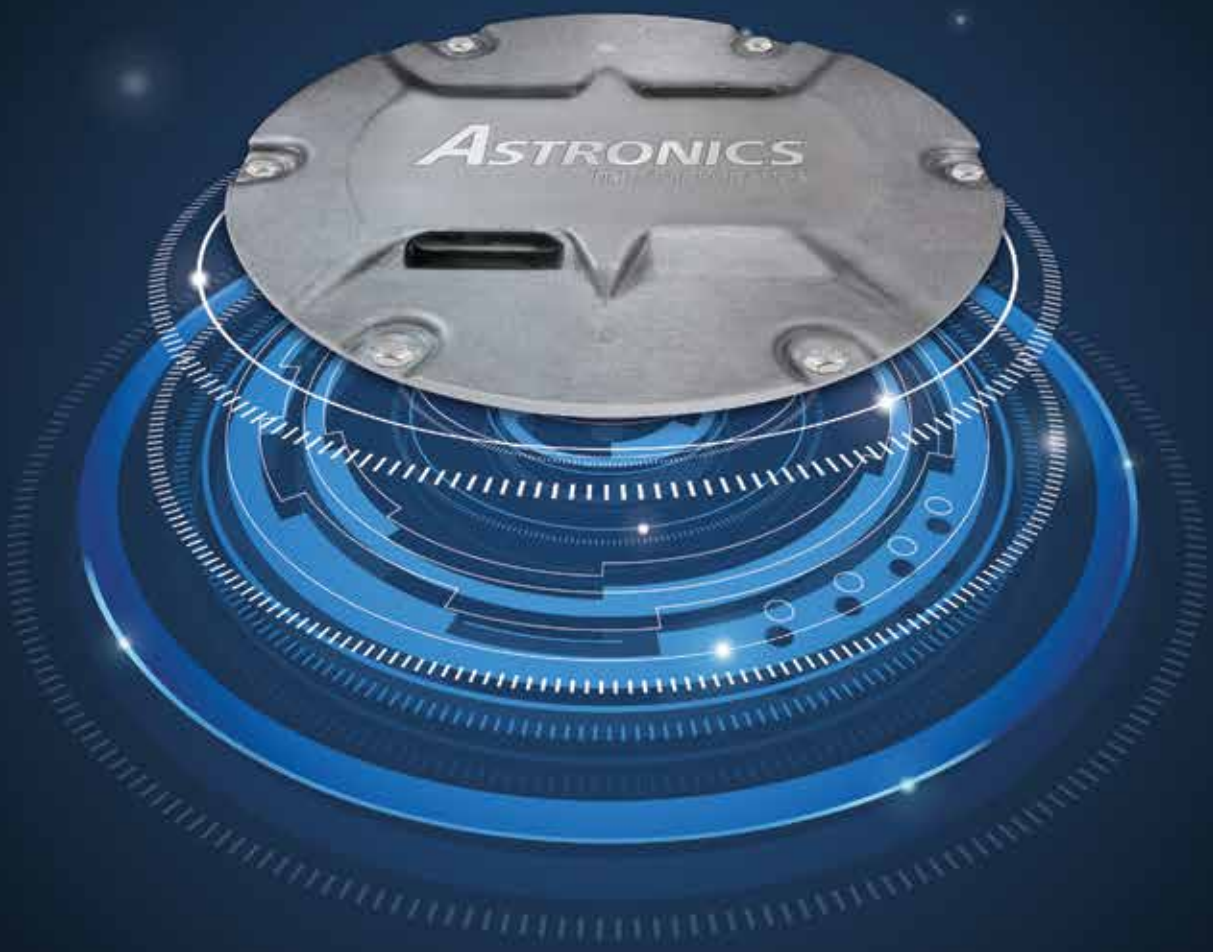

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Last month, Hartsfield-Jackson Atlanta International launched free Wi-Fi service at the world's busiest airport. It wasn't cheap, but that didn't deter airport officials. They felt that a lack of free Wi-Fi was putting their airport at a competitive disadvantage. It was, indeed, their number one source of customer complaints. "Wi-Fi is no longer considered an amenity; it is a necessity for today's travelers," said the airport's press release. Kudos to the leadership at Atlanta International for taking action.

Soon after, I was at another airport that also recently began offering free Wi-Fi. While I was happy to have free Wi-Fi, it was a struggle to find it on the airport's website, fill out the form and log on. The "price" of the free Wi-Fi, in terms of the effort needed to get it, just wasn't worth it. I suspect that many time-pressed travelers will simply opt to log on elsewhere.

My point is that free is good, but only to a point. Why invest anything in a product or service if using it is a hassle?

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Cheers!

Paul

Fort McMurray Int'l Opens New Terminal

factsfigures

Project: New Terminal

Location: Fort McMurray (Alberta) Int'l Airport

Cost: $258 million

Funding: Airport Improvement Fees

Consultant Team

Project Management: Stantec Consulting Ltd.

Architectural Design: office of mcfarlane biggar

Site Works Design: WSP Canada (formerly Genivar)

Concessions Planning, Admin. & Project Mgm't: SNC-Lavalin Airport & Aviation Group

Commercial Tenant Guidelines: Architectural Alliance

Site Works Team

General Contractor: E Construction Ltd.

Grading: Prairie North Construction Ltd.

Underground Services: In-Line Contracting Ltd.

Electrical: Signal Electric Ltd.

Revenue Parking System: Precise Parklink (West) Ltd.

Terminal Team

General Contractor: Ledcor Construction Ltd.

Electrical: Powermax Contracting Ltd.

Mechanical: Strathcona Mechanical Ltd.

Glazing/Curtain Wall: NRK Group

Airport LAN & VoIP Systems: optiNet Systems

Specialty IT Systems: Infax Inc.

Cross-Laminated Timber: Structurlam

Baggage Handling System: Vanderlande Industries

Passenger Boarding Bridges: John Bean Technology Corp. (Jetway Systems)

Seating: Arconas

Millwork: McMurray Interiors

Awards: 2013 Award of Excellence from *Canadian Architect*

Of Note: New terminal is 5 times larger than old facility; built to handle dramatic traffic increases fueled by the area's oil sands

After years of planning, a false start in the wrong location and a major shift in airport governance, Fort McMurray International Airport (YMM) in Alberta finally has the terminal it needs to process the 1.3 million passengers projected to move through its facilities this year.

In early June, YMM celebrated the grand opening of its new $258 million terminal, with Canadian astronaut Chris Hadfield serving as master of ceremonies. Winnipeg rockers Bachman & Turner performed at the event, with the 1970s Bachman Turner Overdrive hit "You Ain't Seen Nothing Yet" providing a fitting anthem for the airport's new terminal.

At nearly 160,000 square feet, the new facility is about five times larger than its predecessor and includes eight gates — four on the ground and four bridges. In the next three to five years, airport officials plan to add another four gates and two bridges. And preliminary planning is in the works for various airfield enhancements and a terminal expansion.

When the airport's previous 32,000-square-foot terminal was built in 1985, it was designed to process 250,000 annual passengers. The Fort McMurray community never envisioned the exponential growth it would experience thanks to the recent oil sands boom. These days, YMM is the 16th busiest and one of the fastest growing airports in Canada.


Scott **Clements**

YMM President and Chief Executive Officer Scott Clements led the airport through the rapid expansion. "When I got here, the airport was handling just under 700,000 passengers a year," Clements reflects. "We've grown almost 75% in four years."

& Begins Planning Next Expansion

By Robert **Nordstrom**

During the project's planning phase in 2010, the new terminal was designed to handle 3% growth over the next 20 or so years. Upon opening in June, the terminal had already met traffic projections for 2030.

"The good news is we have the old terminal where we can divert charter traffic and a plan to easily expand the new terminal to handle a couple million passengers," Clements notes.

From Municipal Commission to Airport Authority

When Clements assumed leadership at YMM in 2009, the Regional Municipality of Wood Buffalo governed the airport. In December 2009, governance was transferred to an airport authority model.

In Canada, airports are typically governed by independent airport authorities, because local and regional governments are not able to manage them to their full potential, Clements informs.

"Fort McMurray city council was being challenged by its own problems and ability to meet growing infrastructure demands fueled by the oil sands boom," he explains. "The council was consumed by the need for water and sewage systems, roads, bridges, schools, fire halls and was at the edge of its ability to borrow money to pay for all that infrastructure work."

As a result, the city told the airport commission what it could spend on a new terminal and essentially stepped aside. "The airport commission was confounded, because they knew they needed to build the right building. The airport authority model was the solution," Clements relates.

The new airport authority was created under Canada's Regional Airports Act, which, in turn, allowed the airport to qualify for funding from the Alberta Capital Finance Authority. Unlike municipal commissions, airport authorities are shielded from political and bureaucratic interference, notes Clements. An airport authority can make business decisions and take risks that governments can't afford to take, he elaborates. In addition, banks are more apt to loan money to entities such as airport authorities that can institute user fees.

With the new board in place, Clements convinced members that the proposed 80,000-square-foot terminal was about half the size and half the cost of what was needed. Moreover, it was set in the wrong place and oriented in the wrong direction.

Each and every holdroom seat

Consequently, work was halted on the muskeg tundra excavation and the sand/gravel preloading work that began in 2009 to stabilize the new terminal's footprint — ultimately amounting to $8 million of sunken costs. New plans were then drawn up based on a conservative 3% annual growth rate over 20 years, and the airport broke ground in August 2011 for its recently completed three-level terminal. With almost 160,000 square feet, the new facility is designed to handle more than 1.5 million passengers per year.

Bruce **Ferguson**

"This is a dynamic marketplace and things change very quickly," says Bruce Ferguson, managing senior principal and project director for Stantec Consulting. "With development northwest of the airport, the road patterns had to be changed, and water and sanitary services needed to be put in place very quickly."

At the same time, the airport had to expand its organizational structure to be equipped to manage its dramatically larger new terminal. "You have a complex building in a challenging construction environment governed and managed by an organization that is also growing from a human resource perspective to meet demands," Ferguson summarizes. "It all had to come together at the end."

Reflecting the Region

Built on a greenfield site across the airfield from the previous terminal, the new structure's predominant materials — wood, steel and precast concrete — reflect Fort McMurray's rugged and burgeoning industrial nature. In a nod to the area's energy industry, one of the terminal's major artworks — a large painting of a floatplane taking off over a local river tributary — was created with oil sands bitumen. Out of respect for the local climate, the airport's new 2,200-stall outdoor parking lot includes plug-in outlets to help vehicles ward off the extreme cold of Alberta winters.

The airport also decided to end passengers' search for a place to charge their phones or plug in laptops. Each and every Arconas holdroom seat is equipped with a dual USB port, electrical outlet and cup holder. "This is the first airport in North America and possibly the world that has 100 percent powered seating throughout the entire airport," says Lynn Gordon, vice president of airport solutions for Arconas. "Every passenger has the best seat in the house."

The airport also provides free Wi-Fi service.

Visitors enter the terminal into its arrivals hall, which houses baggage collection, car rental and Canadian Customs. Baggage handling, mechanical rooms and building support systems also reside on the ground level.

Escalators and elevators transport travelers up to ticketing counters and security check-in areas. Passenger holdrooms, along with pre- and post-security shops and restaurants, are also located on the second level. A large light display evokes the aurora borealis, a popular tourist attraction for travelers from around the globe. The 20-foot-tall, 140-foot-wide screen wall is made of powder-coated bent steel plates lit by computer-controlled LED lights.

The third level features a public observation deck filled with regional artifacts. Steve McFarlane, principal with the office of mcfarlane biggar (omb), enthusiastically describes the deck as an amazing space that allows travelers and airport visitors alike to "put their nose to the glass and observe the activity on the apron and runway."

Steve **McFarlane**

at Fort McMurray Int'l includes a dual USB port and power outlet — a first for any North American airport.

The airport authority offices and boardroom, also on the third level, include similarly expansive views of the tarmac.

Ironically, the very reason the community needed a new terminal would also impede the airport's ability to build it. The oil sands boom, and subsequent development it spurred, quickly drained skilled workers from the area's labor pool, making it difficult to find crews for the terminal project. "The vast majority of skilled labor has been absorbed by local industry," explains McFarlane. "We can design all we want; but if there is no one there to build, it becomes a real challenge."

As a result, omb's designers and architects specified materials that were prefabricated offsite and shipped to the jobsite ready for assembly. Prefinished cross-laminated timber — lumber-sized pieces of wood glued together to form large panels — was used extensively throughout the project.

"Mass timber has the benefit of not only being one of the best structural materials available, but the finish is beautiful as well," McFarlane informs. "It not only holds up the roof, but its underside imparts a warm ambiance throughout the terminal. It shortens construction time, because the structure and finish are combined in one product. Once it's assembled, you just peel away the protective wrapper to reveal a beautiful finish that speaks to the region's history of forestry and lumber production."

With approximately 100,000 cubic feet of wood volume throughout the structure, YMM boasts the most extensive use of mass timber in any North American building. Laid end to end, the lumber would cover almost 14 football fields. It's also the approximate volume of wood that North American forests grow in approximately eight minutes, notes McFarlane.

Much of the wood was harvested from soft wood forests decimated by the mountain pine beetle. By harvesting the wood, mass timber manufacturers sequester carbon that would otherwise be released into the atmosphere, he adds.

In back-of-house areas on the lower level, where aesthetics were a secondary concern, architects used hollow core planks made of precast concrete set on a frame made of recycled steel.

McFarlane considers the new terminal an ambassador for the Wood Buffalo Region. "It was important that the building resonate with the community, that it would strike a balance among the various needs of all of the stakeholders," he relates. "I think we have been successful. It's a building that is robust and tough, not afraid to think big, and truthfully that's what the Fort McMurray and Wood Buffalo community are about. There's a pioneering spirit here that is captured in the look and feel of the building. We weren't looking to create a precious building. We wanted a building that was hardy and robust and just got better over time."

The new terminal contains considerably more food/beverage options than its

A Concessionaire's Dream

At the end of its service life, YMM's previous terminal was serving more than 1 million annual travelers with a paltry three concessions: a Subway sandwich shop, a small bar and a gift shop. In contrast, the new terminal has 16 concessions, with full-service restaurants and a much wider variety of grab-and-go food vendors and retail shops.

Jim **Meyer**

Jim Meyer, senior director of airport development at SNC-Lavalin Airports and Aviation Group, headed concessions planning, development and implementation for the new terminal. Three years of focused surveys quantified travelers' spending habits and identified the national and local brands they wanted at the new terminal. Meyer also met with major brands early in the process to generate interest and encourage vendor participation. When requests for expression of interest were issued, proposals came in three-deep for each available space.

predecessor.

Running in direct contrast to the current industry trend, SNC-Lavalin located the majority of YMM's concessions before rather than after its passenger screening checkpoints. The strategy reflects the airport's unusually long dwell times.

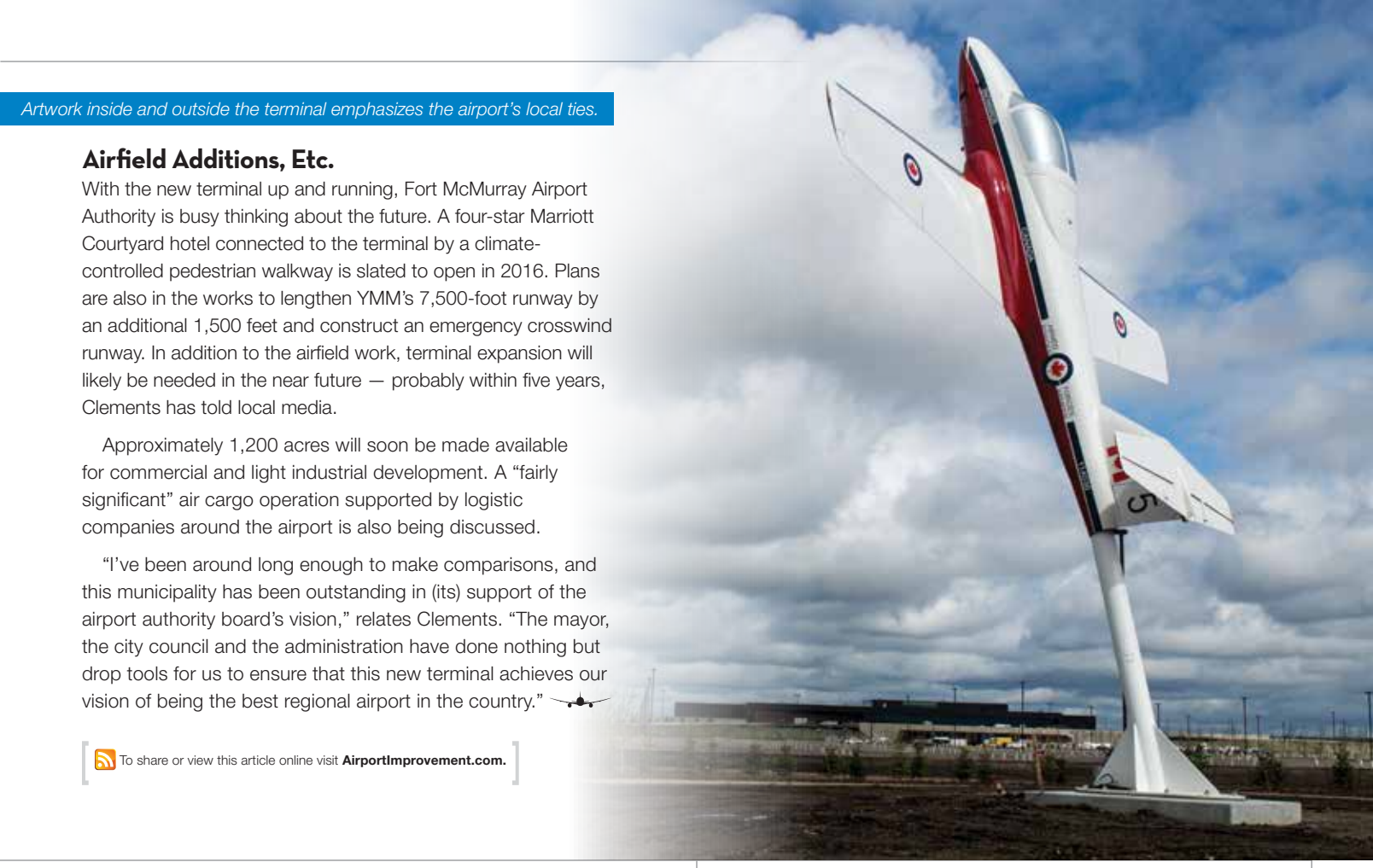
More than 40,000 people reside in work camps north of Fort McMurray, flying in and out of YMM for rotating two-week shifts. Employers that transport the workers typically drop them off extra early so they don't miss their flights. This leaves passengers with ample time to eat and shop. Pre-security concessions also allow easy access for airport employees and the non-traveling public.

YMM's unique customer dynamics make it an ideal location for vendors, notes Meyer. "It's a captive market," he explains. "The average traveler is a 31-year-old male with a lot of cash in his jeans. (Often) it's his first opportunity in a while to spend money. From an economic perspective, it's a market that most airports across Canada are envious of … the airport is not only the fastest growing in the country, but Fort McMurray is the fastest growing city in Canada. The average annual family income is over $190,000 — more than double the average for Canadian families. It's a perfect storm for doing good business."

Lower level concessions include a Nicholby's convenience store, retail kiosks and Famoso Neapolitan Pizzeria, a full-service restaurant with an island bar and grab-and-go case. Pre-security options on the second floor include a gift store that features chocolates and candles, plus a food court with four vendors: Burger King, Mary Brown's Famous Chicken & Taters, Subway and Tim Horton's. After travelers clear the security checkpoint, there is another full-service dining option — Earl's Kitchen & Bar — and Jugo Juice, Best Buy Express and a Nicholby's convenience outlet with duty-free offerings. Another specialty retailer that has yet to be named is also planned for the post-security area.

A post-security Starbucks features a 20-foot floor-to-ceiling window overlooking the apron area. "It's their latest design, and quite different looking in terms of design and finishes than any other Starbucks in Canada," Meyer informs. "Their corporate planning people have indicated that it is probably their best location of any airport in North America."

Finding employees to staff the new concessions has been difficult, and the recent federal moratorium on hiring foreign food service workers made it even harder. Just as it did during construction, the scarcity of local labor is presenting the airport with ongoing challenges now that it's open.



Artwork inside and outside the terminal emphasizes the airport's local ties.

Airfield Additions, Etc.

With the new terminal up and running, Fort McMurray Airport Authority is busy thinking about the future. A four-star Marriott Courtyard hotel connected to the terminal by a climate-controlled pedestrian walkway is slated to open in 2016. Plans are also in the works to lengthen YMM's 7,500-foot runway by an additional 1,500 feet and construct an emergency crosswind runway. In addition to the airfield work, terminal expansion will likely be needed in the near future — probably within five years, Clements has told local media.

Approximately 1,200 acres will soon be made available for commercial and light industrial development. A "fairly significant" air cargo operation supported by logistic companies around the airport is also being discussed.

"I've been around long enough to make comparisons, and this municipality has been outstanding in (its) support of the airport authority board's vision," relates Clements. "The mayor, the city council and the administration have done nothing but drop tools for us to ensure that this new terminal achieves our vision of being the best regional airport in the country."

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YYC CALGARY AIRPORT AUTHORITY

factsfigures

Project: Runway Development Program

Location: Calgary (Alberta) Int'l Airport

Program Components: Parallel Runway; 2 Full-length Taxiways; 2 Cross-field Taxiways; Concrete Apron; 2 Underpasses

Total Cost: $620 million

New Runway: 17L-35R (Category III)

Length: 14,000 ft. (4,270 m)

Taxiways: 2 partial -length (4,267 m) parallel taxiways; 2 cross-field taxiways running perpendicular to new & existing runway

Rapid Exit Turns: 3 in each direction

Ground Broken: April 2011

Runway Opened: June 28, 2014

Earthwork: Crews moved roughly 7.5 million cubic meters of dirt

Peak Labor: 500 workers simultaneously onsite

Of Note: New runway is longest runway in Canada; first LED High-Intensity Runway Edge Light for a 60-meter wide runway in the Americas; first low-protrusion DTS/DTC 8-inch taxiway centerline in the Americas; first Gen IV ALCS Graphical User Interface in Canada; first Surface Movement Guidance and Control System operation with BRITE III in Canada.

Project Team

Program Manager/Engineering Design Manager: AECOM/Hatch Mott MacDonald

Principal Consultant: Associated Engineering/ CH2M HILL

Construction Manager: PCL/Parsons/Dufferin Joint Venture

Earth Moving Contractor: North American Rock & Dirt

Storm Drain & Utility Installation: Volker Stevin Contracting

Duct Bank Contractor: Somerville/Black & McDonald Ltd. Joint Venture

Concrete Paving Contractor: Dufferin Construction

Underpass Form/Place/Finish: PCL Construction

Aggregate Supply: Lafarge Canada

Airfield Lighting, Control & Power: ADB Airfield Solutions

Airfield Electrical: TRISTAR/Black and MacDonald Joint Venture

Emergency Trucks: Oshkosh Corp.

LED Guidance Signs: Liberty Airport Systems

Runway/Taxiway Base Cans: Jaquith Industries

Photometric Testing: Tailor Made Systems

Airfield Pavement Markings: Hi-Lite Canada ULC

Standby Generators: WAJAX

Calgary Int'l Builds Canada's Longest

Stretching for a full 14,000 feet (4,270 meters), the new parallel runway at Calgary International Airport (YYC) in Alberta is the longest runway in Canada. But Runway 17L-35R is just one component in YYC's $620 million Runway Development Project (RDP). Other key elements include four taxiways, a concrete apron and two underpasses. Putting it modestly, the airport's RDP has been a major undertaking. After a year of design and three years in construction, Runway 17L-35R opened in late June.

Planning for the airport's newest runway began as far back as the 1970s. By zoning the land and protecting airspace back then, Transport Canada, which owned and operated all Canadian airports at the time, was decades ahead of current traffic increases spawned by the Canada's booming oil industry. While Transport Canada still owns the land, the Calgary Airport Authority now manages the facility under a long-term lease.

Located in the booming city of Calgary, YYC welcomed over 14.3 million passengers in 2013 and ranks as one of the country's fastest growing airports. But its altitude — 3,557 feet (1,084 meters) above sea level — and corresponding reduced air density require it to have longer runways for fully loaded aircraft to take off, especially on hot summer days.

After feasibility studies were completed in the mid 2000s, the airport hired AECOM, in partnership with Hatch Mott MacDonald, in 2009 to manage the huge project and conduct the environmental assessment and preliminary design. Next, it selected a joint venture of Associated Engineering and CH2M Hill as the engineering design firm of record, and a joint venture of PCL/Parsons/Dufferin was then retained to serve as the construction manager. Sig Undheim, YYC's RDP director worked closely with YYC management staff and the assembled RDP team.

Welcome to the Team, Red

YYC made a significant effort to assemble the best team, and then fostered a team approach among the various players, notes Dave Anderson, head of the project's prime consultant joint venture. "That was part of their plan from the start, and they implemented it in order to be successful and get the project done within the time and overall project budget," he explains.

The team, in turn, took a team approach to solving problems, adds AECOM Project Manager Marty Shenfield. The tools YYC used to engage team members made people feel welcome and broke down barriers right away, which created a very positive work environment, he relates.

Runway

By Jennifer **Bradley**

"We have our share of differences," Shenfield acknowledges. "The way we resolve those differences includes a mutual respect for the various personality types, needs and interests. Understanding what people bring to the table helps you be more effective in your communication."

The collaboration that resulted allowed the team to complete the enormous project on time and on budget, he emphasizes. "By all means, there were things we didn't anticipate," recalls Shenfield. "But the team approach is what allowed us to progress through those challenges."

Having all the major team members share office space onsite in Calgary for the duration of the project was vital to its success, he adds: "It goes a long way for effective communication and allowed us to really focus on the project needs."

Dealing With Dirt, Weather & Surprises

After crews moved utilities, communications and high-pressure gas lines, excavation began in April 2011. Balance was the key during excavation operations, notes Anderson. With crews digging up 7.5 million cubic meters of dirt and distributing it elsewhere onsite, ensuring there wasn't a huge surplus or deficit in any given area was no easy task. Since ground stability was another key issue, the runway embankment was built early to allow adequate time for consolidation settlement to occur prior to installation of pavement on top.

AECOM's Shenfield agrees: "Just those simple secrets of how to deliver mass quantities of materials is a big challenge. It was a huge effort to accommodate the logistics of temporary roadways, haul roads, permanent roads and permanent construction."

YYC's Undheim characterizes the overall project schedule as "aggressive." Two consecutive wet springs complicated matters for crews working in the airport's clay soils, and a major flooding event in the Calgary region last June shut down water supply and cement powder delivery to the on-site concrete batch plant for a week during the summer construction season.

"We had challenges, and we overcame them," reflects Undheim. "There were times last year one could really question whether or not we'd make our planned opening day in 2014.

The short construction seasons imposed by Canada's cold winters proved to be a bigger issue than usual, notes Anderson. For the first two years, 100 pieces of earth-moving equipment worked around-the-clock. At the peak of construction, 500 workers were onsite simultaneously.

Due diligence and research preceded the airport's decision to build a concrete runway, notes Undheim. "We did a lifecycle assessment on asphalt versus concrete as our surfacing material and established concrete as a more enduring product with lower lifecycle costs," he explains. Last year alone, more than 300,000 cubic meters of 435 mm-thick concrete was placed above a 200 mm cement-stabilized base. Up to 1,000 truck movements a day delivered base gravels to the site, to meet the 500,000 cubic meters of granular materials required, Undheim chronicles. Products that don't significantly change volume during freezing temperature were used to stabilize materials and prevent frost damage from the cold Calgary winter.

Completing the massive concrete work from June through October, when the weather was best, was an "absolute incredible

(Left) The new LED low protrusion taxiway centerline fixtures project only 6.35mm (1/4") above the surface. The light window of the new fixtures have no negative slope, meaning that no part of the prisms are below ground level providing the same performance during all conditions without the buildup of water or other debris within the window cavity.

(Page 20) Shown are the LED runway centerline lights near the end of the runway. LEDs provide much better color clarity as seen here with the alternating red and white LEDs indicating to pilots that they are at the last 900 m (2952.75 ft) of the runway.

Both photos courtesy of ADB Airfield Solutions

achievement," says Anderson. "There certainly isn't a concrete project in Canada that has that magnitude of work done in a single construction season."

Lights in LED

As a Category III runway, 17L-35R requires inset lighting and offers a zero-decision height for pilots. This feature allows aircraft to land safely in any weather condition, explains Undheim. "It's almost becoming a requirement to stay competitive in the industry," he notes. "Airlines want to know they have the ability to land under all weather conditions."

Anderson considers the new runway's electrical and lighting stand-out aspects" of the project. In total, more than 435 miles (700 kilometers) of electrical and communication cables were laid.

Winter weather conditions were "absolutely horrendous" for the crews pulling cables and installing lighting fixtures, recalls Undheim. Many of the base cans for in-pavement light fixtures froze, and technicians had to thaw them to connect the cables and install the fixtures.

The LED units not only reduce YYC's energy costs by more than 50%, they also eliminate monthly re-lamping expenses, note project team members.

The View From Below

Two new underpasses (beneath Taxiways J and R) were significant projects on their own. Design and geometry were critical, as the underpasses must support the world's largest aircraft and the load transfer between the runway and taxiways.

One underpass includes a unique ramp heating system that allows facility residents to use the underpasses 365 days per year, notes

Two taxiway underpasses were key elements in the airport's $460 million runway development program.

Anderson. The system includes built-in snow melting components that automatically turn on and off based on readings relayed from temperature sensors.

Between the underpass projects, runway construction and other significant airside work, life has been anything but boring at YYC. (Nav Canada also opened a new control tower in May 2013.) Soon, attention will shift to the passenger terminal, which is slated to nearly double in size. Plans include a $1.4 billion concourse that will be five stories high and cover 2 million square feet when complete. What better way to accommodate the Canadian and international passengers landing and taking off from the airport's new runway?

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MALMS PRODUCTS

MAKING CANADA'S RUNWAYS SAFER

Transport Canada (TC) puts rules and regulations in place to keep the flying public safe in Canada. TC requires operators to perform inspections and conduct regular and preventative maintenance in order to prevent safety issues related to airfield lighting.

To support this Tailor Made Systems (TMS) Ltd range of infield photometric measurement system MALMS (Mobile Airfield Light Monitoring Systems) are now in use with many airports around the world including two major airports in Canada – Vancouver International Airport and Aéroport de Montréal. Both airport companies took delivery of their systems in 2013 with the Aéroport de Montréal mobile system in use at both Montréal-Mirabel and Montréal-Trudeau Airports. Both airports use the trailer mounted system for testing of the runway lighting, while the workshop based Photometric Bench Tester tests the refurbished light fixtures before installation back on the runway. "Photometric testing is now an important part of our preventative maintenance system at YVR. Being able to collect accurate data helps us to ensure our runway lights remain in compliance with Canadian regulations." Matthew Levesque, Manager, Airfield Lighting, Vancouver Airport Authority.

Transport Canada stated "The Mobile Photometric Measurement Unit is described in the Transport Canada advisory circular AC 302-010. The use of this unit enables the airport operator to show, under the SMS program, that they have a means of demonstrating conformance to TP312 "Aerodrome Standards and Recommended Practices" inset lighting requirements.

The MALMS range of products has now been enhanced by the development of MALMS Engineer system, which allows airfield engineers to plan and record maintenance activities electronically on the airfield, replacing the need for paper based systems.

MALMS Engineer utilises a touch screen Windows tablet with an airfield map showing all airfield assets that require inspection and maintenance. Each asset has its own record in the database showing attributes such as manufacturer type, make, model, colour, number of fasteners, torque requirement, location ID, circuit numbers, transformer type, zone number and any other description or terminology used by the airport.

Vancouver Airport Authority MALMS trailer.

The airfield engineer is able to navigate utilising GPS and the airport map to identify their position on the airfield as well as individual assets. Furthermore each asset can have a unique RFID tag installed next to it for positive identification purposes useful where assets are in close proximity to each other.

Electronic torque measurement device M-Torque in use.

MALMS Engineer is designed to record faults identified from visual and/or MALMS photometric inspections of the runway lighting. Any faults found will be recorded in the database and shown on the airfield map for use by the airfield engineer for maintenance purposes.

A work scheduling tool that may be used on its own or integrated with an airports asset management system is included.

MALMS Engineer offers an integrated torque management option (M-Torque). This has been developed following a number of incidents where airfield lights have become dislodged through loosening of the retaining bolts or studs as the result of vibration and negative air pressure from passing aircraft. The use of M-Torque allows the adjustment and measurement of the AGL fasteners thus confirming that such assets are secure on the airfield. Any further faults such as damaged fasteners or studs can be recorded electronically for further maintenance.

All data can be transferred either by LAN or WIFI to an office based PC or CLOUD based server. This will allow the Airfield Maintenance Manager to look at maintenance activities by date, asset type, location and engineer, as well as identify assets that keep being 'red flagged' as having a persistent problem. Specific asset trend analysis can be undertaken by the Manager to proactively enhance the maintenance of the airports airfield assets. The system also provides a database to evidence that the airport is operating safely to both management and regulators.

YVR who will be installing the system in September 2014 said "The ability to track maintenance activities on individual light fittings provides insurance that nothing is over looked," said Levesque.

San Juan Int'l Forges New Territory with Public-Private Partnership

By Jodi **Richards**

Luis Muñoz Marín International Airport (SJU) in San Juan, Puerto Rico, is forging new territory for a U.S. or U.S territory airport with its public-private partnership (P3). In July 2012, Aerostar Airport Holdings, a joint venture between Highstar Capital and Aeropuertos del Sureste (ASUR), was awarded a 40-year lease to operate SJU via a request for proposals process. Last February, Aerostar received its operator certificate from the FAA and assumed control of the northeastern Caribbean airport.

Since the inception of FAA's Privatization Pilot Program (originally established under the 1996 Reauthorization Act), several airports have expressed interest in the business model, but only SJU and Hendry County Airglades Airport in Clewiston, FL, are currently enrolled. Puerto Rico Ports Authority (PRPA), which owns and previously operated SJU, was approved for the FAA Privatization Pilot Program in December 2009.

Airport privatization is, however, more common outside the United States — for instance Fraport at Frankfurt Airport in Germany, Ferrovial at London's Heathrow and Aeropuertos Argentina 2000 in Buenos Aires. Additionally, there is continued interest from the private sector in such partnerships.

San Juan's government was very aggressive on privatization, says Ismael Bonilla, manager of SJU under Aerostar. "The economics were not sustainable for the airport," says Bonilla. "They (PRPA) saw that the airport needed some vast improvements both infrastructure-wise and operational-wise that at that time the Ports Authority was not able to do."

Ismael **Bonilla**

More than six private operators responded to the Ports Authority's request for proposals, he adds.

Andy **Wilson**

Andy Wilson, chief development officer with Aerostar, notes that the private operator's executives saw the opportunity both as a good investment and an opportunity to improve the airport and region. Aerostar not only brings an infusion of funds to improve SJU, but also best practices and the experience necessary to bring SJU into the future. "Aerostar addressed the P3 process with a very solid core group of professionals from the aviation and financial industry," Wilson explains. "That permitted them to put together a well-thought out, comprehensive improvement program."

ASUR, which is part of the Aerostar joint venture, also operates nine airports in Mexico, including Cancun International.

Aerostar officials are determined to establish the airport as a world-class facility and prove

AEROPUERTO INTERNACIONAL LUIS MUÑOZ MARÍN PUERTO RICO

factsfigures

Project: Public-Private Partnership

Location: Luis Munoz Marin Int'l Airport

Airport Owner: Puerto Rico Ports Authority

Airport Operator: Aerostar Airport Holdings

Contract Length: 40 years

SJU Airline Consortium Rep: Morrison & Foerster

Sell-side Advisory Services to Puerto Rico Public-Private Partnership Authority: LeighFisher

Consultant: Jacobs Consultancy

Puerto Rico Ports Authority Financial Advisor: Credit Suisse

that P3 programs can be beneficial to both the private operator and the public. “We’re not just here to make money,” stresses Aerostar’s chief executive officer, Agustin Arellano. “We’re here to govern an airport and prepare an airport for the future. We’re providing good services and bringing the airport to a level of competitiveness that will match Santa Domingo or Panama or other competitors.”


Agustín **Arellano**

A private operator can be more flexible and responsive in executing work — especially with federal agencies, Wilson notes. Aerostar, in particular, also brings continuity and stable leadership, Arellano adds. Before Aerostar assumed operations at SJU, there were years of constant changes in the executive level of the Ports Authority. The instability limited a team environment from forming — something Aerostar officials say is in place now. “We’ve proven it works,” says Bonilla. “And that has allowed us to gain the trust of those who opposed it initially.”

The P3 relationship is good for the government, because it ensures that a professional team will be in place for a long time and will operate SJU in a manner that makes it a modern and competitive facility, summarizes Arellano.

40-Year Investment

Under the terms of the lease agreement, Aerostar made an upfront payment of $615 million to the PRPA. Throughout the 40-year lease, Aerostar’s capital improvement program is projected to invest more than $1.4 billion at SJU, $240 million during the initial years of operation. The Puerto Rican government estimates it will receive more than $2.6 billion in revenue and other benefits from the P3 transaction over the term of the lease.

In addition, the PRPA will receive annual lease payments of $2.5 million for the first five years of the contract, 5% of the airport’s gross revenues during the next 25 years, and 10% of its gross revenues during the final 10-year period. In addition to the leasehold fee, the Airport Use Agreement requires Aerostar to establish the Puerto Rico Air Travel Promotion and Support Fund and provide $6 million in an escrow account to reward signatory airlines that increase their international service during the first three years of the Airport Use Agreement.

Aerostar financed the upfront leasehold fee through a combination of debt financing of $350 million in investment grade bonds and $265 million of equity.

During the first five years of the 15-year Airport Use Agreement, the total annual aggregate airline fees are capped at $62 million. After the sixth year, the total annual airline fees may be increased annually by a percentage not to exceed the rate of core inflation.

Under the lease, Aerostar is required to complete certain capital improvement projects within 18 months of closing at no additional costs to the airlines (loading bridges, elevators, escalators, deteriorated flooring and deficient lighting), in addition to adding Wi-Fi service and making electrical upgrades. These projects are well underway, notes Wilson.

The Airport Use Agreement also requires Aerostar to invest at least $34 million to complete the Initial Capital Projects to the extent not completed by the PRPA before the transfer (construction of new access road to the general aviation area, relocation of some existing baggage inspection facilities, etc.).

The Ports Authority is required to oversee all of the improvements at SJU, as stated in the FAA Record of Decision, including the investments Aerostar was mandated to make. The upfront cash payment was segregated into several “pots,” says Wilson. Much of it went toward outstanding debt the PRPA had accumulated in the last 20 years, he specifies. Other portions are earmarked for support development and operation of the airports that the Ports Authority continues to oversee, air service development and to compensate the various agencies that participate in the privatization process.

Transition Challenges

Converting from public to private has included some difficulties. “We knew it would be a challenge; we knew there would be things we weren’t aware of,” Arellano reflects. “We are going strong and committed to complying with the agreement of having a modern, very efficient airport in years to come.”

The first challenge came shortly after Aerostar was announced as the preferred bidder. A new government was voted in “that was not really positive of us,” Arellano recalls. Aerostar did, however, receive the new party’s approval after presenting a “clear vision” of the benefits the company would provide to the airport and Puerto Rico, he explains. Company officials also described how its team would remodel and transform SJU into a “world-class airport.”

The transition period was a demanding time, agrees Wilson. “All of a sudden, all of the Ports Authority employees were suddenly employees of Aerostar,” he explains. According to Bonilla, less than 20 of about 400 airport employees remained through the transition.

“We opened the doors for everyone that would like to participate, as long as they comply with the profile that we were requiring and the expertise and skills,” Arellano explains. In addition to bringing in talent from outside the airport community, Arellano says the firm was fortunate, because it had access to workers who had been laid off by American Airlines when it dehubbed at SJU. “So we could take the opportunity of having these well-trained and skilled people to be a part of Aerostar,” he notes. Currently, the airport has a strong team of 310 employees, Arellano reports.

Security was another challenge area. It was, after all, the first time a private operator took over an airport security program, Wilson points out. “Everyone faced a learning curve, including TSA,” he recalls. Improving the outdated security program that the Ports Authority had in place at the time of the transition was one of the requirements of the Record of Decision, he adds. The Airport Security Program had to be updated and approved by TSA before operations were transferred to Aerostar, specifies Wilson. “That, in and of itself, became a fairly challenging exercise,” he recalls.

The conversion from a public agency to a private company was difficult, Wilson acknowledges. Issues ranged from the change in business practices and creating a capital improvement program to developing new relationships with the FAA and creating FAA-compliant guidelines for selection of professional services, a competition plan and new passenger facility charge application.

When Aerostar took over operations at SJU, it also took control and became the sponsor of several major projects in various stages of completion, such as NAVAID upgrades, runway safety area improvements and taxiway construction. The challenge was in documenting or developing the financial processes in-house to assume the responsibility for grants that were to be jointly held between the Ports Authority and Aerostar, including a contractual obligation to consult with engineers and construction firms that were on board executing these projects, Wilson relates.

Cultural issues also complicated the transition. Because Aerostar was an off-island firm taking over the airport, there was "quite a bit of suspicion" among the citizens of Puerto Rico, Wilson explains. "We've had to work hard to gain that trust, and I think we have," he reflects.

Building Traffic

Per its operating lease, Aerostar has partnered with the Puerto Rico government to promote tourism and increase traffic at SJU. When American Airlines dehubbed the airport in 2008, passenger numbers dropped, Bonilla explains. In addition, after 9/11, the U.S. Department of Homeland Security closed down SJU's in-transit facility, which resulted in a direct decline in its overall traffic of about 1 million annual passengers. "We've committed with the government of Puerto Rico working hand-in-hand, because an airport can't do it by itself," he says.

During the first 12 months Aerostar operated SJU, growth exceeded the firm's projections, Wilson reports. Currently, SJU serves more than 8 million annual passengers from 15 airlines.

Another portion of the uptick is attributed to the return of the cruise industry traffic, Bonilla adds.

Under the partnership, the participants are marketing Puerto Rico as more than a beach location, he explains. "Puerto Rico is one of the most advanced islands in the Caribbean when it comes to medicine, banking, business and shopping," Bonilla elaborates. "There's a lot of things that are very attractive to Puerto Rico besides the beach, sand and sun."

"We're improving the facilities; we're improving the operations of the facility; we're bringing professionalism in here that companies and the traveling public are noticing," he continues. "And even though we're in the middle of infrastructure upgrades, people are seeing the difference already."

The addition of new service is another kind of fruit SJU has been cultivating. Last year, service was added to Bogota, Colombia, and scheduled service to Madrid began in late May. SJU is more attractive to airlines and some are even considering it as a hub location, Bonilla reports.

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Reviews Are Glowing & Expectations High for Terminal Renovations at O'Hare

By Victoria Soukup **Jensen**

CHICAGO CDA DEPARTMENT OF AVIATION

factsfigures

Project: Terminal Redevelopment
Location: Chicago's O'Hare Int'l Airport
Terminal: 5
Cost: $26 million
Project Duration: 2 yrs
Developer: Westfield
Additional Space Created for Concessions: About 16,000 sq. ft.
Food and Retail Concessions: 24
Redesign: Westfield Airport Design
Design Implementation: Epstein
Design/Sustainability Implementation for Hudson Group: TranSystems
Graphic Design: Thirst
Walk-Through Duty Free Shop: 8,300 sq. ft.
Owners/Operators of Terminal Food Concessions: Areas USA; Robinson Hill
2013 Concession Sales (during construction): Record $32 million - $18.99/enplanement
Projected 2015 Sales: More than $50 million

Chicago once again proved its "City of Big Shoulders" attitude with a $26 million renovation of international Terminal 5 at O'Hare International Airport (ORD). The development program doubled concession space and brought in high-end retail and dining options that showcase Chicago as a global business and tourist destination.

The two-year transformation, which was completed this spring, already appears to be paying off. The developer, Westfield, reports that concession sales reached a record $32 million ($18.99 per enplanement) last year and are set to exceed $50 million in 2015 — fully double pre-development levels.


Rosemarie **Andolino**

"This redevelopment makes us more competitive," says Chicago Department of Aviation Commissioner Rosemarie S. Andolino. "The improvements in Terminal 5 will help us achieve Mayor Rahm Emanuel's goal to host 55 million visitors by 2020."

Andolino says the development reflects one of the department's core missions, which is to promote Chicago's "rich, diverse and unique character."

"Sixty-seven million passengers travel through O'Hare annually," Andolino relates. "About 50 percent of these visitors are connecting passengers who never leave the airport. This means their only experience of Chicago is at our airport. This was a tremendous opportunity to create a favorable impression of Chicago and to showcase what makes it a world-class city."

Ready for Change

Redevelopment of the international terminal was a long time coming. Since it opened in 1993, the single-concourse terminal had become physically outdated and was in desperate need of an overhaul. Even so, it served nearly 62,000 air carrier operations last year.

Before the renovation, Terminal 5 had 17 concessions; but 95% were located on the pre-security side, making it inconvenient for passengers to eat, shop or even get a cup of coffee while waiting for flights. Now, almost all of the 24 dining and retail outlets are located beyond the security checkpoints.

"Chicago Terminal 5 was attractive, in that it gave us the opportunity to unleash our resources to transform not only the retailing but really make a difference in the consumer experience and the consumer journey," says Dominic Lowe, Westfield's executive vice president. "The international traveler's average dwell is anything from two to four hours, and that can be a painful experience if there aren't good amenities to enjoy. We've improved the gateway in and out of Chicago."


Dominic **Lowe**

The sleek terminal, which features wide, open spaces, showcases 11 Chicago brands and includes duty-free shops designed to cater to international travelers. There are also boutique shops featuring internationally known brands such as Salvatore Ferragamo, Michael Kors and Emporio Armani, operated by Dufry North America.

Dining options include both sit-down restaurants and a dining lounge with faster, more casual options for on-the-go travelers.

Given the record enplanement spending figures during construction, Westfield's Lowe is optimistic about the development's return. "With a robust retail and dining program, we're projecting sales of $50 million – double pre-development numbers – during our first stabilized year," he notes.

Checkpoint Shift

After winning a 20-year contract to operate the terminal's concessions program in 2011, Westfield set out to overhaul the terminal's footprint, which hadn't been touched since 1993. The redesign focused on doubling concession space to 32,000 square feet, relocating the TSA checkpoint to improve passenger flow and offering first-class amenities to provide an upscale, international feel. The Westfield Airport Design team headed the program, which was implemented by Chicago-based Epstein, an architecture, planning, design and engineering firm.

Moving the TSA checkpoint from the concourse to the terminal entrance changed the way travelers entered and experienced the terminal and essentially drove the entire redesign, explains Ziba Ghassemi, senior director at Westfield Airport Design. A two-story, semi-transparent glass wall channels travelers to the TSA checkpoint. Changes in queuing configurations and additional inspection areas have shortened security lines, reports Mark Fischer, senior vice president at Epstein.


Ziba **Ghassemi**


Mark **Fischer**

"The end result really upgrades the appearance and the personality of the airport," Fischer notes. Materials typically found in hotels

rather than airports were used in restrooms to create a warmer, more luxurious experience for travelers, he adds.

Height was used to make spaces feel larger throughout the project – from the glass entrance wall to the two-story dining lounge and in each individual retail establishment, Ziba notes. High-end finish materials and furniture give the terminal an upscale appearance while little touches add a bit of luxury, she adds. Large, graphic art installations on glass walls in the terminal entry, restrooms and dining area highlight Chicago's commitment in public art.

Renovations were executed incrementally to minimize disruption to traffic, and all 21 of the terminal's gates remained open during the work. Thanks to deliberate phasing, concessions options actually increased during the project, Lowe notes.

"We built incremental concession space before we took down existing space, so there were actually more spaces, products and services throughout the construction than there were before we started the work," he explains.

Hudson Group hired TranSystems to help ensure that its Terminal 5 retail stores met Westfield's design criteria and adhered to the city of Chicago's Sustainable Airport Manual. TranSystems used a mix of fluorescent and LED lighting to reduce energy consumption and environmentally conscious building materials such as recycled glass tile to boost sustainability of the renovations.

"By using durable materials for our flooring and countertops, we maximized the materials' useful life and reduced maintenance and replacement costs," explains Rosi Rawson, master professional/architect and vice president at TranSystems. "We sourced local stones where possible and are dedicated to reducing pollution by using non-toxic paints and adhesives."

New Flow for Duty-Free

The recently redesigned terminal features a walk-through duty-free shop — the first of its kind at a U.S. airport. When travelers clear security, they find themselves inside a modern 8,300-square-foot store, with flight information display system screens to keep them updated about their flights while they shop.

Dufry North America operates the large walk-through duty-free shop, while Hudson Group operates its namesake news/travel convenience retail stores. Both companies report to Joe DiDomizio, president/chief executive officer of Hudson Group.


Joseph **DiDomizio**

"When customers are actually walking through your store, they are much closer to the merchandise, promotional materials, product displays and special values areas, and therefore far more compelled to stop and shop than if they were merely walking past your store," says DiDomizio. "Customers in a walk-through setting are also available

Designers opted for hotel styling and materials when upgrading restrooms.

to beauty consultants and sales associates, who are trained to engage them to sample fragrance, cosmetics, alcohol and confectionery products."

Although the concept is new for a U.S. airport, it's very prevalent in northern Europe and Asia, says Lowe.

Adjacent to the large walk-through store are four duty-free boutiques with separate storefronts: Luxury Watches, Salvatore Ferragamo, Michael Kors and Emporio Armani. A second, smaller duty-free shop is also located in the concourse, bringing the terminal's total duty-free area to 10,000 square feet— all operated by Dufry.

After passengers flow through the duty-free shop, they are presented with additional retail options plus food/beverage concessions. "It ensures the consumer gets to experience everything before they get to the gates," Lowe explains.

Passengers can also relax in common areas equipped with charging stations for electronic devices. "It is very easy to suggest that this was all about adding shops, services, food and amenities; but passengers need time and space for themselves,"

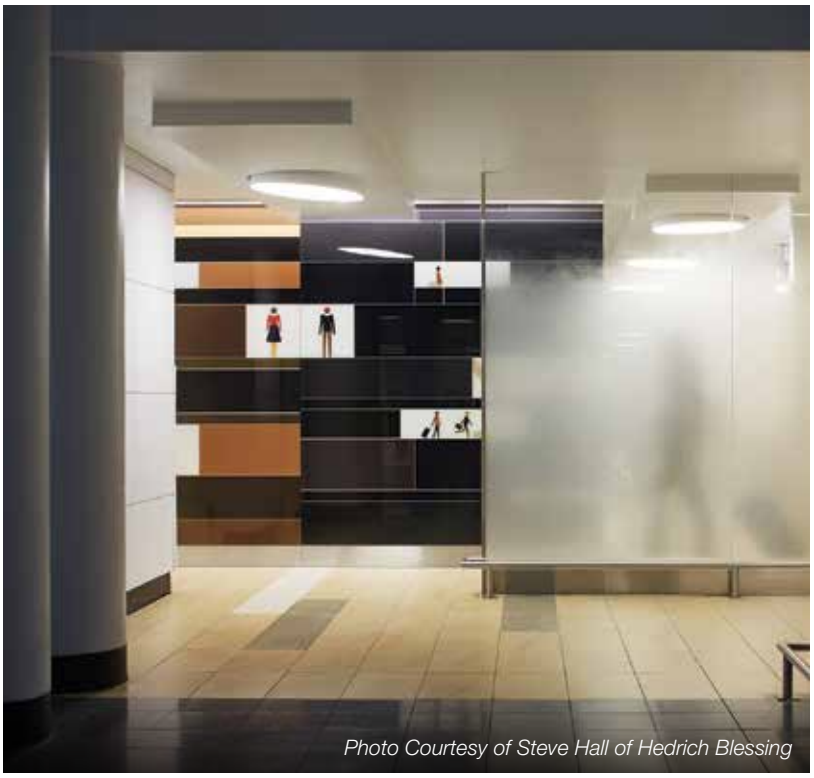

Photo Courtesy of Steve Hall of Hedrich Blessing

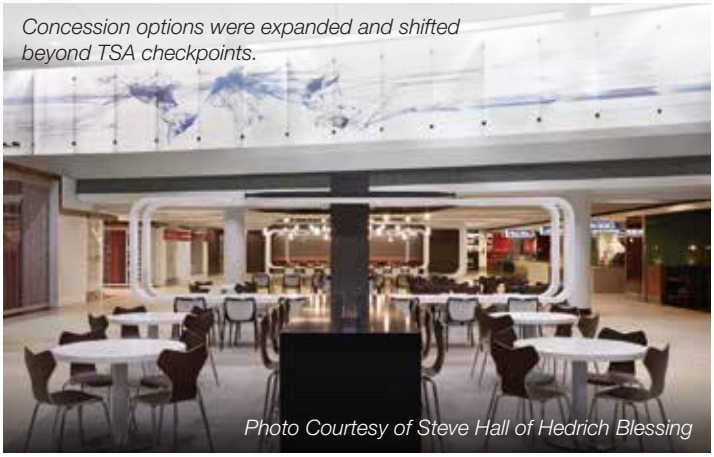
Concession options were expanded and shifted beyond TSA checkpoints.

Photo Courtesy of Steve Hall of Hedrich Blessing

he notes. “They need areas where they can relax, make choices, do a little work, hang out, be calm; or areas where they can socialize, eat or shop. Creating incremental space that isn’t just relying on concessions is a critical part.”

Showcasing Local Brands

Terminal 5 now has nine dining options, all featuring local brands and local chefs. Eateries include Big Bowl; R.J. Grunts Burger & Fries; Tocco; Kofe Powered by Intelligentsia; The Goddess and Grocer; and Rick Bayless’ Tortas Frontera.

Local brands are also featured in the terminal’s retail lineup. Chicago merchants Vosges Haut-Chocolat and I Love Chicago are expected to be popular with international travelers.


Kevin **Reynolds**

Lettuce Entertain You Enterprises (LEYE), a highly acclaimed Chicago restaurant group, surprised some by licensing its concepts to terminal concession operators. “Lettuce is a huge part of the Chicago community,” explains Kevin Reynolds, partner in LEYE-Airport Concepts. “Moving into T5 has allowed us to showcase our brands.”

Dee Robinson, of Robinson Hill, notes that featuring local brands at ORD reflects a national trend. Robinson Hill and Areas USA oversee, own and operate the food concessions in Terminal 5.

“Sometimes, an airport is the first and only glimpse travelers get of a cuisine that a city has to offer,” says Robinson. “The hope is that as we showcase them in the airports, these culinary gems promote the city and the quality of food we have here.”

Eduardo Uribe Mesta, vice president of business development for Areas USA, encourages airports considering similar redevelopments to take note of traveler demographics when determining their mix of local and national brands. “People need to have different options, and the airports need to understand their customers to determine the right percentage of local versus national,” says Mesta. “It’s different for every city and every airport.”

In Chicago, Andolino expects recent renovations at ORD to provide international travelers with a world-class experience that is fitting of a world-class city. “The CDA (Chicago Department of Aviation) wants all travelers at Terminal 5 – whether they’re about to begin a trip abroad or are here for a visit – to know that they’re in Chicago.”

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Chicago Mayor Rahm Emanuel, Department of Aviation Commissioner Rosemarie Andolino and Alderman Michael Zalewski (left to right) helped unveil the newly renovated terminal.

O’Hare is the first U.S. airport to use a walk-through layout for its duty-free shop.

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Customized Security System Helps Aspen/Pitkin County

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Project: Movement Area Security
Location: Aspen/Pitkin County (CO) Airport
Cost: $325,000
Funding: Airport Revenue
Project Timeline: July 2012 - March 2013
Components: 6 thermal-sensor cameras; 2 monitors; 2 servers; customized software
System Design: Searidge Technologies
Camera Installation: Alpine Technologies
Camera Manufacturer: FLIR Systems
Network Integration: Mitchell and Co.
Benefits: Real-time taxiway incursion detection & video tracking; automated alerts to airport personnel

A new security system at Colorado's Aspen/Pitkin County Airport (ASE) is helping the general aviation airport mitigate its previously recurrent problem of taxiway incursions.


Dustin **Havel**

The system, designed by Searidge Technologies, uses thermal-sensor cameras and customized intelligent-video software to instantly alert operations staff when pedestrians and vehicles deviate onto a taxiway. The awkward location of ASE's terminal ramp — immediately adjacent to its sole taxiway — makes the taxiway prone to accidental entry, explains Dustin Havel, the airport's assistant aviation director - operations and facilities.

"The ramp and taxiway are essentially all the same pavement, just delineated by painted lines," Havel elaborates. "Planes are parked 26 feet away from the taxiway. As a result, we were faced with a number of pedestrian and vehicle deviations in this area, especially during times of high traffic flow."

Some of the deviations occurred when customers unwittingly walked from the 437,231-square-foot ramp onto the taxiway to take pictures of nearby parked aircraft, lured by the beautiful Rocky Mountains as a majestic backdrop. In other instances, passengers who dropped their cars off for valet parking service inadvertently took wide turns onto the taxiway.

Between pedestrians and vehicles, the airport recorded 19 taxiway incursions from 2010 through 2012 — the last three years before the new equipment was installed. "Fortunately, none of them created real safety issues or any close calls (with taxiing airplanes), but the FAA had identified this as an issue that we needed to address," reflects Havel. "I'm pleased to say that in this past year since the system went online (in March 2013), we've had no vehicle or pedestrian incursions."

With space constraints making it impractical to change the cramped ramp/taxiway configuration and unwanted attention from the FAA, the new security system has relieved pressure for both frontline employees and airport management. Because the system automatically alerts personnel about taxiway incursions, staffers no longer have to actively monitor security cameras, notes Havel.

Customized Technology

ASE used airport revenue to purchase its $325,000 intrusion-detection system. The system uses off-the-shelf hardware and

Airport Address Taxiway Incursion Issue

By Ken **Wysocky**

proprietary Searidge software to run a surface management system called IntelliDAR. Alpine Technologies installed the cameras, and Mitchell and Co. integrated the camera system communications network with the airport's existing network.

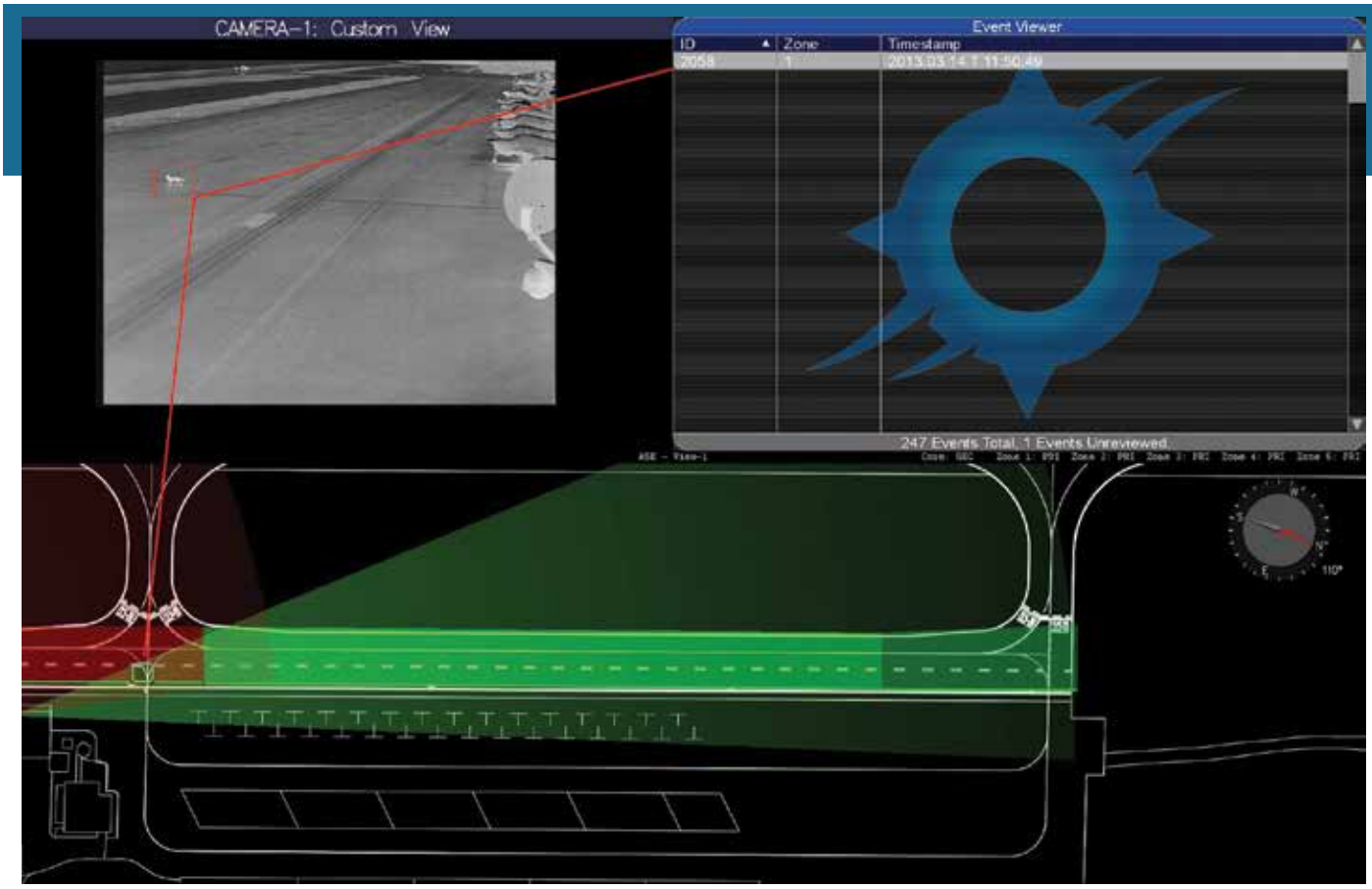
The system's customized software represents a novel application of existing Searidge technology, says Rick Koller, the company's business development manager. "This is the first time we've customized our software platform to function solely as a security application," Koller explains. "It utilizes the same technology platform we use at other airports to detect, position and track aircraft on runways and taxiways … we've just configured tracking system algorithms to identify and send automated alerts for all non-aircraft targets."

The surveillance system includes six FLIR thermal-sensor cameras that monitor the line between the movement and non-movement areas. Because the cameras are mounted on existing airport buildings and a light pole, costs were minimal for infrastructure improvements such as installing electric cables and the system's overall exterior footprint is small, notes Koller.

The other main hardware is a pair of monitors in ASE's operations center. One shows views from all six cameras; the other provides real-time information when a deviation occurs.

Automated Alerts

When the software detects an incursion into the movement area, it automatically sends an alert to one of the monitors in the operations center. At the same time, it alerts key personnel via email. Personnel can receive alerts on their computers, smart phones or any other mobile device with email capabilities, Koller notes.



In the operations center, the lower half of the monitor displays a customized two-dimensional map of the airport, with each pixel on the map tied to a real-word global positioning system coordinate. When a deviation occurs, its location is highlighted in red on the map.

"In essence, the camera's software knows that each pixel correlates with a real-world point on the ground, which provides a high level of accuracy in tracking and positioning capability," Koller explains.

As the location is highlighted, a pop-up window simultaneously appears in the upper left corner of the screen, producing a real-time thermal image of the intruder as the camera continues to track it. In the upper right-hand corner of the screen, an event log appears that records the date and time of the intrusion and the location of the camera that sent the alert.

To eliminate time-consuming nuisance alerts, the system can be configured to distinguish between aircraft, people, vehicles and even wildlife, Havel specifies.

"During the brainstorming phase of the project, there was hope that this system could allow us to be a little more proactive by alerting us as something approached the line," he says. "But there was not enough space to work with to achieve this goal."

When a camera in ASE's custom security system detects an intruder moving from the non-movement area to the movement area, the location is highlighted in red on a map of the airport (lower left) and a black-and-white video appears (upper left) that tracks the intruder and allows staff to determine who or what it is. In this case, it was a fox. An event log (upper right) also records the time and date of the intrusion and the location of the camera that detected it.

The airport has, however, discovered an unanticipated benefit. "The system has alerted and recorded some wildlife – foxes and coyotes – coming onto our airfield," Havel reports. "The technology allowed us to track their movements and determine where they entered and exited … then we took the necessary steps to eliminate this access."

Real-time vs. Reactive

With conventional systems that use surveillance cameras, operators must constantly watch monitors to detect intrusions. As a result, operator fatigue or even a routine bathroom break can lead to undetected intrusions, Koller notes.

"Most times, perimeter security is reactionary, not proactive," he continues. "Our system provides a proactive approach to security by alerting users of intrusions. Alerts happen in real time and are sent to a mobile device or any device with e-mail. Clients can customize the distribution list of people to alert … there's no limit to how many people can be on the list."

The system's archiving capability is another key feature. Because the event log archives all deviations, operators can perform what Koller refers to as "after-forensics" — reviewing a previous intrusion by clicking its log entry to see a photo of what caused the alert.

Welcome Change

Havel describes the system's installation as "smooth." The only hiccup occurred when the cameras' original positions did not provide adequate coverage. "After we relocated the cameras, the accuracy of the system improved significantly," he reports, noting that most airport projects include such unexpected elements.

Aspen's cold weather added a challenge for Searidge. "We overcame it by using thermal camera sensors that work well in low-visibility conditions, such as heavy fog and snow," says Koller. "The thermal cameras detect and present images of heat radiation, which means we can see baggage carts, humans and even wildlife in adverse weather conditions where visibility would be severely limited by using a traditional video camera."

After more than a year of experience with the customized security system, Havel is glad ASE looked "outside the box" for a solution to its taxiway incursion issue. He's especially glad to have found an automated system that helps minimize the chances for human error.

Koller reports that automated security systems are trending upward in the aviation industry, because they allow users to focus more fully on other tasks by eliminating the need for active monitoring.

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Abu Dhabi Int'l Uses Artificial Turf for Airfield Safety & Marketing

By Kathy **Scott**

factsfigures

Project: Artificial Turf Installation

Location: Abu Dhabi Int'l Airport

Applications: 25 x 75 meter airport logo; along edges of runway, high-speed exits & taxiways for visual delineation & soil stabilization

Product Supplier: AvTurf

Volume Installed: 120,000 sq. meters

Something special occurs as passengers gaze out the aircraft window when landing at their destination and taxiing to the terminal. An inherent optimism and enthusiasm about things to come takes over visitors, and the warm embrace of returning home floods locals.

Abu Dhabi International Airport (AUH) appears to be tapping into the timeless, visceral emotions that affect even the most jaded frequent fliers by emblazoning a giant logo of Abu Dhabi Airports onto its airfield. (Abu Dhabi Airports is the entity that manages AUH and four other airports in the Emirate of Abu Dhabi.)

Etched into AvTurf along the ramp area, the 25-meter tall, 75-meter long logo essentially serves as an airside welcome mat for millions of passengers as they land at AUH. The monogramed turf was installed earlier this year to coincide with several capital initiatives launched in 2012 to meet the growing demands of the five Abu Dhabi Airports facilities.

The airport operators' logo serves as an airside welcome mat for millions of arriving passengers.

The turf logo is an enticing element for passengers and travel professionals alike, and not the first at AUH. For years, the sprawling facility has captured the airport industry's attention with rapid expansion of its passenger base, airline operators and terminal infrastructure. Currently, it supports flight operations for 44 airlines serving 93 destinations in 54 countries and accommodates more than 12 million annual passengers. Within a few years, the airport expects to serve more than 20 million annual passengers.

In June, Airports Council International named AUH the "Best Airport in the Middle East." The award was based on customer feedback, as measured by the association's Airport Service Quality program.

When asked to comment on the award, H.E. Majed Al Mansoori, chairman of Abu Dhabi Airports, assured his airport peers that the team at AUH will continue to work tirelessly to maintain its service levels "throughout the current period of challenging developments and projects."

Promotional or Practical


Daniel **McSwain**

Beyond airport logos, the possibilities for other custom designs in aviation turf are nearly limitless, notes AvTurf President Daniel McSwain. While AUH uses specially marked AvTurf to market its own brand, McSwain suggests another thought-provoking idea: airports selling the naming rights to their facilities or displaying other paid images/messages on their airfields. AvTurf sees enough potential in the idea that the company applied for and obtained a patent for the specific marking method it uses for artificial turf in airport environments.

The product also has practical, safety-oriented applications. "It can be for any markings," McSwain specifies. "It's not limited to logos." The etchings can be applied to extend short lines, form segmented circles or create other airfield markings. They can also be used to add runway designators on general aviation runways and helipads made of artificial turf.

Temporary turf can be used when airports are inundated with additional traffic during high-profile, short-term events such as the Masters, Super Bowl or World Series, notes McSwain. Marked turf can help enhance safety in high-traffic areas such as ramps and aprons.

In addition to using AvTurf to display the airport operator's logo, AUH also uses it for more practical, everyday purposes. By installing it along the edges of Runway 13L-31R and around the edges of high-speed exits and taxiways, the airport provides visual delineation for pilots and increases soil stabilization to prevent erosion. In total, AvTurf installed 120,000 square meters of its product at AUH.

Other Applications

Artificial turf emerged in the United States in the early 2000s as a new way to eliminate soil erosion from jet blast, reduce foreign object damage to aircraft engines, discourage wildlife, improve drainage and enhance visual and operational safety.

McSwain has been working on the development of turf for various aviation applications and safety enhancements since the product's early days. His background in safety with the U.S. Air Force made transitioning to the civilian sector an easy one. Since 2003, he has sold and managed the installation of artificial turf at airports around the world, beginning with the first military aviation artificial turf installation in 2004 at the United States Air Force Academy.

In 2012, AvTurf installed the largest single area of aviation turf in the world — 1.4 million square feet at the Academy Airfield, a facility that averages more than 17,000 sorties and 5,700 hours of combined flight time per year. According to company officials, the artificial turf provides a better landing surface than the natural grass that was there before by reducing the effects of vibration from landing impact and roll, which are prime causes of material failure in fiberglass and carbon-fiber gliders that use the field.

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Madison Municipal Seeks Relief from FAA

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Project: Bird Management

Location: Madison (SD) Municipal Airport

Annual Operations: 32,000

Bird Mitigation Strategies: Draining wetlands; changing crops; planting prairie grass

Annual Income from Renting Land to Farmers: $38,000

Other Income: Hangar rental ($3,500); fuel sales ($12,000)

Crops Currently Grown: Corn; soybeans

Proposed New Crop: Alfalfa

Other Wildlife Attractants: 20 acres of wetlands

Project Goals: Reduce potential risk of bird strikes by making airport grounds less attractive to geese & ducks; preserve land rental income by having renters grow alfalfa vs. corn & soybeans

It has been more than five years since US Airways Flight 1549 was forced to make an emergency landing in the Hudson River after running into a flock of geese shortly after taking off from New York's LaGuardia Airport. But the airport industry is still feeling the effects of the incident.

Not surprisingly, the "Miracle on the Hudson" prompted more FAA scrutiny of bird activity at airports throughout the United States. While much of the agency's attention has been focused at large airports on the East and West coasts, even small airports in the central part of the country are being affected.

One such facility is Madison Municipal Airport (MDS), a general aviation field in southeastern South Dakota with approximately 32,000 operations per year. Airport Manager Morris Riggin is grappling with how to keep the small airport financially solvent while complying with stricter FAA wildlife management regulations.

Riggin's challenge is two-fold: the cost of paying for new measures to discourage waterfowl from nesting at MDS, plus the potential loss of its primary revenue source. "Last fall, the FAA told us we should not farm the land on airport property anymore, because it would continue to attract waterfowl," he explains. "That was a big problem, because renting out our land to farmers was the chief source of income for us."

Currently, MDS earns about $38,000 per year renting land to local farmers for corn, soybean and hay crops at about $225 per acre. In contrast, it earns about $12,000 per year in fuel sales and $3,500 annually from hangar rental.

Seeking a compromise, Riggin appealed to the FAA. "They told us that if we could prove an economic hardship, we could plant alfalfa instead," he reports. Although switching to alfalfa, which is less compelling to birds, would still prompt a $3,000 revenue loss, Riggin considers that amount "more manageable." Fortunately, the farmer who rents most of the airport land raises cattle, so he is willing to raise alfalfa for livestock feed. Few farmers in the area still raise cattle.

Photo Courtesy of: Striped Banana Photography

Ruling on Crops

By Mike **Schwanz**

Photo Courtesy of: Striped Banana Photography

This summer, corn and soybeans are still being grown on airport property. However, once these crops are harvested, the airport will prepare the land for growing alfalfa next year.

Finding Safe Middle Ground

The cost side of the wildlife issue at MDS includes wetlands and prairie grass.

Last fall, the FAA instructed the airport to drain several natural sloughs (wetlands) on its property to prevent bird/plane collisions. Migrating birds, however, have used the sloughs for generations — without interfering with aircraft operations, notes Riggin. While he shares the FAA's safety concerns and understands the sensitivity surrounding the issue of bird strikes, he questions whether *all* of the associated regulations should apply to *all* airports. "I probably fly in and out of this airport more than anyone, and I would be the first one to complain if I thought birds were a threat," he emphasizes. "But birds are not really an issue at this airport, and I have been flying out of here for 40 years."

Beyond bearing the expense of draining the sloughs, the airport would also need to demonstrate to the state Department of Natural Resources that waterfowl have enough other wetlands nearby.

Besides managing the airport, Morris Riggin also gives flying lessons, provides crop dusting services and performs in various air shows.

Photo Courtesy of: Striped Banana Photography

The FAA has also instructed the airport to plant prairie grass, which needs to be 6 to 12 inches high. "That would be about 230 acres we would have to mow," Riggin notes. "Our best bid for that job was $70 an acre. That comes to $16,000 a session, and it would probably have to be mowed three times a year. So the total cost to us would be about $48,000. The city of Madison, which owns the airport, could not afford that."

Riggin is eager to reach an agreement with the FAA about bird mitigation, because Madison officials want to build a new parallel taxiway during the next several years — a project that requires buildings to be moved so they don't block the line of sight for the new taxiway. Local officials also want to expand the airport's apron. Typically, the FAA provides about 90% of the funding for such construction; the city pays 6% and the state pays 4%.

Given the effect of federal budget cuts on the FAA, the airport is not certain that funds will be readily available for its construction plans. "They told us to prioritize our schedule for this construction," Riggin reports, noting that the projects may be split between 2015 and 2016 to help secure funding. "Everything is up in the air; but by the end of this summer, we hope to have a better idea from the FAA about how to proceed."

In the meantime, he remains hopeful about reaching an agreement with the FAA that ensures safety while preserving the airport's ability to generate revenue by renting its land. "Up until this spring, the FAA was adamant on their rulings," he recounts. "Now that they understand our situation, they seem more willing to compromise."

The dialog MDS is having with the FAA may help other airports struggling with the economic realities of complying with stricter bird management requirements. "There are a lot of little airports that depend on renting out land. No one has ever challenged the FAA before, so perhaps they will ease their restrictions a bit," theorizes Riggin.

His optimism may be warranted. FAA Spokesperson Elizabeth Isham Cory stresses the cooperative nature of developing wildlife management plans. "The FAA is always concerned about anything that can attract wildlife to an airfield," Cory explains. "The FAA inspects all airports, and any airport with a potential wildlife hazard would be required to develop a plan.

"Our agency has planners and inspectors assigned to each airport," she continues. "And the development of a plan is part of a cooperative process. In the case of the Madison airport, we continue to work with them to develop their wildlife mitigation plan. There is no hard-and-fast deadline, so long as it remains a progressive process."

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Mobile Mapping Maximizes Efficiency of Pavement Program at Houston Intercontinental

By Nicole **Nelson**

HOUSTON AIRPORTS

factsfigures

Project: Digital Data Collection & Airfield Pavement Mapping

Airport: George Bush Intercontinental Airport

Authority: Houston Airport System

Primary Technology: Light Detection & Ranging; Mobile Mapping System Contractors: Ricondo & Associates; Woolpert; APTech

Integrated Systems: Infor™ Enterprise Asset Management Systems; Geographic Information System; PAVER™

Cost: 1.9 cents/sq. ft. of certificated pavement

To better define future pavement needs and to establish more effective asset management strategies, the Houston Airport System recently completed an assessment of 100% of the runways and taxiways at three locations: George Bush Intercontinental Airport, William P. Hobby Airport and Ellington Airport.

At George Bush Intercontinental (IAH), the project team opted to go mobile, and use Light Detection and Ranging (LiDAR) technology rather than traditional, manual site inspection. LiDAR harnesses the fundamental properties of laser light to perform precise detection by using mobile instrumentation that emits and detects laser light reflected back to the unit from the objects being documented.

The technology-based approach was used at IAH due to the airport's higher density of aircraft operations and more complex airfield pavement system, explains Robert Barker, CFM, assistant director for Houston Airport System Asset Management. Cost of the higher-tech strategy was within 10% of manual inspection costs.

Robert **Barker**

The geospatial analysis of airfield pavement LiDAR data on an airport Geographic Information System (GIS) map facilitates accurate assessment of pavement surface conditions, distresses and maintenance requirements, elaborates Barker.

"The digital data and mapping created through the Mobile Mapping System process supports the Houston Airport System's strategies of serving our customers and providing opening day fresh facilities and infrastructure," he relates. "More specifically, the Mobile Mapping System approach facilitates our overall asset management goals of minimizing the total cost of ownership and maximizing effective asset service lives."

Several considerations prompted Houston Airport System to choose LiDAR technology. The accuracy of airfield pavement distress data was a primary factor, explains Barker. But it was closely followed by the method's data collection speed, which limited the project's impact to ongoing airfield operations.

Working between aircraft operations, crews captured data stretching over 22 million square feet of pavement within a 12-day period. In all, they covered 286 drive-lane miles. Prime consultant Ricondo & Associates led a team that included principal sub-consultant Woolpert and APTech.

At the Airfield

Runways and taxiways were surveyed using the Woolpert Mobile Mapping System, LiDAR, and digital still image cameras. Woolpert technicians then assessed the imagery data and mapped all visible pavement distresses on workstations following ASTM D5340 standards. Lastly, APTech crews walked 100% of the runways and taxiways to validate and update the GIS-mapped pavement distresses.

Graphical Depiction – Pavement Condition By Panel and Slab

The entire process moved on a very fast track, recalls Woolpert Project Director Kevin Shirer. "We were 'boots on the ground' in January, and we had deliverables all turned in by the 14th of April," he reports.


Kevin **Shirer**

The precise information collected — both distress data and geospatial data — provides an opportunity for IAH to reduce long-term maintenance costs and potentially extend the useful service life of its pavement systems, Barker explains. The Mobile Mapping System data allows the airport system to effectively manage airfield maintenance and renewal requirements on an individual panel and slab basis vs. wholesale rehabilitation or renewal.

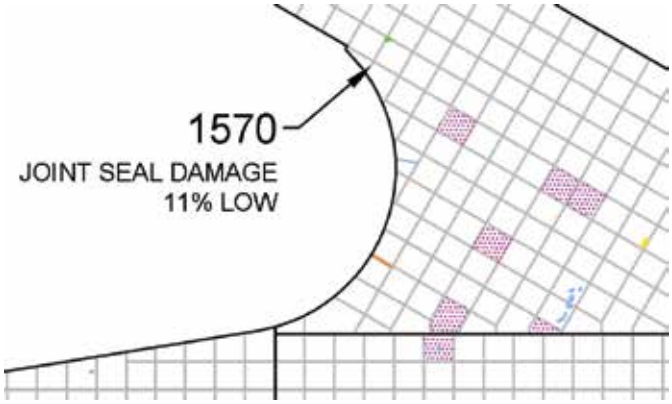
"The individual panels of pavement were mapped into GIS using a combination of record drawings and high-resolution aerial photography," Barker explains, noting that panels were validated and corrections were applied from the intensity images from the mobile LiDAR data collection. "Each pavement slab is entered into our Enterprise Asset Management System as an individual asset. The slab actual condition value changes when work orders are issued and repairs are made. A GIS map is color-coded based on the current slab actual condition – reflecting near real-time pavement conditions on a continuing basis."

Data Analysis

Pavement distress data were input into the airport's PAVER™ pavement maintenance management system, where it was used to develop Capital Improvement Programs for pavement replacement with a lifespan of five years or less, Shirer notes. It's also used to determine maintenance and repair cost data in conjunction with cost data appropriate for the region.

The cost and condition data were then used to generate the airport system's Financial Condition Index and Actual Condition Index. Repairs were prioritized into three categories: Priority, to be completed in three years; Near-Term, for completion in four to seven years; and Long-Term, to be completed in eight or more

Runways and taxiways at Houston Intercontinental were surveyed using the Woolpert Mobile Mapping System, LiDAR and digital still image cameras.



years. The condition assessment of entire runway/taxiway "systems" were developed as a whole to aid in capital improvement program planning, as well as condition assessment of each individual element and larger pavement sections, which was possible because data were collected for 100% of the pavement.

"The system is unique in that it will allow Houston to compare buildings and pavements and roadways all on the same scale," Shirer explains. "It also gives them the ability to determine if the asset is better to be replaced versus maintained from a condition standpoint using the Financial Condition Index."

In addition to providing an integrated platform for airport operations to accurately record day-to-day airfield pavement observations, the Mobile Mapping System data improves Houston Airport System operations and management by providing a seamless integration of data contained in multiple software platforms for specific needs. Accessibility and transparency of asset management data to all system users is achieved through PAVER for capital-level pavement management tasks; the Infor™ Enterprise Asset Management Systems for maintenance tracking and work order management; and the GIS for graphical representation and accessibility of airfield features and related record drawings.

In total, the systems integration was completed in approximately 180 days from start to finish — including data collection via LiDAR and the development of Mobile Mapping System data. Total costs for collecting and integrating the data averaged approximately 1.9 cents per square foot of certificated pavement.

"This cost compares favorably with, and is within 10% of, the pavement assessment cost using traditional 'manual' site inspection approaches," Barker concludes.

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Building on the huge international success of the 2012 event that saw just under 100 exhibitors, the 2014 exhibition is shaping up to be the largest yet, with a 20% increase in the outside GSE area.

A big hit at the last show was the live demonstration area where visitors can "try before they buy" – a unique feature of the International Airport Expo show. In addition, the outside area allows GSE manufacturers to demonstrate their equipment from their static display areas that allow controlled GSE operation. This in turn enables the visitor to get a real feel for the equipment in which they are interested.

But it's not just about the outside exhibits – there are also a substantial number of industry suppliers, GSE manufacturers and service providers that can be visited within the climate-controlled covered area that comprises over 20,000 square feet of display area.

Photo courtesy Tourism Vancouver

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United Upgrades Employee Break Rooms at Dulles & O'Hare

By Robert **Nordstrom**

UNITED

factsfigures

Project: Renovation of United Employee Break Rooms
Location: O'Hare Int'l Airport
Owner: United Airlines
Architecture & Design: Solomon Cordwell Buenz
General Contractor: Clune Construction Co.
Program Manager: Jones Lang LaSalle
Electrical Contractor: Gurtz Electric
Millwork: W.M. Huber Cabinet Works
Countertops: Solid Surface Corian
Water Bottle Filling Stations: Elkay
Rubber Flooring Tiles: Nora Systems
Of Note: The project at O'Hare is part of United's $20 million, 5-year project to renovate approximately 400 employee break rooms at U.S. airports

In April, United Airlines completed renovation of 35 employee break rooms spread throughout Terminals 1, 2 and 5 at Chicago's O'Hare International Airport (ORD). The six-month project is part of a $20 million, five-year program to upgrade approximately 400 similar facilities at airports throughout the United States.

With the airline prioritizing work at its oldest facilities, ORD was second in line, just behind Washington Dulles International Airport (IAD).


Rob **Walker**

"These break rooms have received sporadic investment over the past number of years," explains Rob Walker, managing director of design and construction, in United's Corporate Real Estate Department. "These spaces are used frequently, and I might say very robustly, by employees. With the (United-Continental) merger, we did not have a standard in place. So we took a step back to look at our aging, well-worn areas to see if we could come up with a cost-effective, durable and fresh product that would allow our employees to recharge as well as show them the dignity and respect they deserve."

The focus is on making the break rooms light, bright, durable and affordable, explains Walker. He is also intent on making the changes cost-effective and enduring. "If you're going to do it, do it right," he explains, quoting one of his mentors.

Design plans and amenities were standardized throughout the airline's U.S. system to leverage purchasing power on products and materials such as flooring, furniture and appliances. Standardization also gives employees, who are often transferred from one airport to another, the same break room experience regardless where they are stationed.

A Room to Call Their Own


Tom **Chambers**

The architecture and design firm of Solomon Cordwell Buenz redesigned the break rooms at ORD. "The idea was to create a pleasant environment for employees," explains Tom Chambers, the company's director of aviation services. "Many of the rooms, in Terminal 1, for example, were built in the mid-1980s and hadn't had any significant attention for the past 30 years. The rooms were run down, very dark and not very pleasant places. United really wanted to do something for their employees."

The 35 facilities vary in both size (150 to 3,000 square feet) and function. “I don’t think there was a single footprint that matched another,” Chambers recalls. Finish materials, furnishings and layouts are customized for three distinct user groups: customer service representatives, ramp workers and aircraft maintenance personnel.


Heather **Gould**

For instance, break rooms for ramp operations employees must be spacious enough to accommodate large crews needing to warm up after working outside during Chicago’s harsh winters. They also require durable furniture for workers to eat lunch or take a break between aircraft arrivals and departures. Because the rooms are also used to make work assignments, they include a lead desk with a good view of the entire area, notes Heather Gould, an interior designer with Solomon Cordwell Buenz. “They also required an outside visual connection to see planes coming in and out, as well as various monitors and information displays to track the status of aircraft,” she adds.

Customer service personnel break rooms, on the other hand, do not require the same level of durability and are furnished with lounge seating. Typically, they’re located closer to public spaces.

Designers generally didn’t change the various rooms’ square footage, infrastructure or utilities such as plumbing, mechanical systems and fire protection. Most, however, received durable rubber tile flooring, new acoustical ceiling panels and fresh paint. New millwork, solid-surface countertops and flexible shelving systems were installed. Lighting was changed to more energy efficient LED fixtures to brighten the rooms and decrease energy costs. Designers also included power and data connections for computers, personal devices, televisions and flight information displays.

The color scheme follows United’s corporate palette, with three off-white walls and a gold or blue accent wall, with multi-color flooring.

Improving the functionality of rooms without having the liberty to move fixed elements such as sinks was challenging, notes Chambers. “It was a limiting factor; but at the end of the day, it was not detrimental to the project.”

United made a concerted effort to involve employees by encouraging them to visit a room equipped with various furniture and appliance options that were being considered. Employees were also invited to browse catalogs being used to source products. Airline representatives asked for feedback about whether products fit their needs, were durable enough, met their design expectations, etc.

“We chose to be inclusive in our approach,” Walker explains.

Contractor or Choreographer?

United chose a design-build project delivery system to meet the tight six-month timetable for renovating the 35 rooms. This allowed construction to begin last October, and materials to be procured, before the designs were fully complete. It also allowed flexibility throughout construction for the contractor to influence the design as work proceeded.

Completing renovations at one of the busiest airports in the world required careful choreography, because United needed to provide break rooms for its employees throughout construction.

"We don't rent more space than what we need," Walker explains. "So we don't have 'flex space.' We need every square inch. That was one of the toughest challenges — closing a space that people have become dependent on, working on it quickly and returning it to them."

General contractor Clune Construction devised a carefully choreographed five-phase plan that closed six to nine rooms at a time for renovations, but ensured that no more than three rooms for any given user group were simultaneously out of commission.


Konrad **Dabrowski**

Konrad Dabrowski, Clune's project manager, describes the particular challenges: "With this project, we had 35 small, complicated projects within a single project. Each one was different because of the user group and what they needed to get out of the space."

Maintaining simultaneous work in Terminals 1, 2 and 5 was another unique challenge.

"Walking from Terminal 1 to Terminal 2 takes between 15 and 20 minutes, depending on one's urgency," Dabrowski explains. "If you're carrying tools, you can add on another 10 or 15 minutes."

To overcome this problem and enhance workflow, Clune Construction and electrical contractor Gurtz Electric purchased golf carts to move workers, materials and tools among the various work sites via the tarmac rather than fighting the high volume pedestrian traffic on the concourse levels.

"It was one of the smartest things we did," Dabrowski remarks. "We were a lot more efficient with our daily tasks and weekly walkthroughs with user groups … Our superintendent could get to all the break rooms throughout the day and make sure we were tracking correctly per the schedule."

With approximately 80% of the break rooms located airside, materials were delivered between 9 p.m. and 5 a.m. to prevent interference with airport operations.

Cheers & Tears

Employee feedback about the new break rooms has been very positive. Walker reports that reactions at IAD ranged from cheers to tears — of gratitude, not sadness. "Some employees said they had been working there 10 to 15 years or longer and hadn't seen any investment in them," he elaborates. "The renovations were very well received."

Airlines have experienced a lot of stress over the past couple of decades, he adds: "It hasn't been an extremely profitable industry historically. Facility investments had to be prioritized and focused primarily on customer services and operational improvements. It was time to focus on our employees. Our real estate team really took this project personally; they really stepped into it."

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Memphis Int'l Finances Fuel Farm Upgrades

By Dan **Vnuk**

MEMPHIS INTERNATIONAL AIRPORT™

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Project: Fuel Facility Expansion & Renovation

Location: Memphis (TN) Int'l Airport

Owner & Operator: Memphis-Shelby County Airport Authority

Total Cost: $8 million

Funding: Interim financing supplied by airport authority o be repaid by airlines via fuel flowage fees

Construction Timeline: Winter 2012 – Summer 2014

Project Management

Main Construction Contractor: KEAR Civil Corp.

Engineering Design Contractor: Pond & Co.

Subcontractors: Southwest Tank & Steel; Southwest Specialty Coatings

Electrical Subcontractor: Mid-South Electric

Project Goals: Expand capacity & streamline operations of fuel storage & delivery system

Airport officials expect crews to finish an $8 million fuel facility initiative at Memphis International (MEM) by the end of summer. The project is designed to ensure an ample, reliable fuel supply for the Tennessee airport that accommodates more than 6 million annual passengers and serves as a hub for Delta Air Lines.

Averaging 80 flights per day, Delta is MEM's largest carrier and head of its airline consortium. When the Memphis-Shelby County Airport Authority proposed plans to expand and renovate the fuel storage and delivery system at MEM, Delta led consortium members in collaborating to make the project happen.

Scott **Brockman**

Scott Brockman, president and chief executive officer of the airport authority, describes the circumstances behind the initiative: "We had a fuel farm that consisted of a number of different operations that had been active over the years and managed by different entities and individuals … Several tanks were no longer in service, so there was a need to streamline the fuel storage operations.

"At the same time, new EPA guideline discussions were being held with the airlines as to how to bring the facility up to code and meet the new regulations. Delta took the lead and offered to refurbish the main tank, which could provide enough fuel storage for all of our main carriers. Even with the downsizing of Delta operations that had occurred, the airport authority and the carriers realized that we need to provide a reliable supply of fuel to maintain a reliable level of service. All of the signatory airlines – those that signed on to the airport lease – also signed the consortium agreement to purchase fuel and reduce the facility's debt at the same time."

With the airport board "on a mission" to protect fueling operations, the authority provided interim financing to the airline consortium during the project's design and construction phases, Brockman explains. The airlines will then repay the cost of the project through fuel flowage fees.

The primary hub for FedEx Corp. is also located at MEM; but the cargo giant does not belong to the airline consortium involved with current fuel farm project. FedEx receives its fuel from a separate off-airport facility. (See Page 56.)

Brockman notes that the timing of the fuel farm project was perfect, as the airport was able to combine it with a major ramp renovation and hydrant replacement effort, thus maximizing construction efficiency and minimizing operational disruption. "We're replacing 40+ year-old pavement that's beyond its useful life and was costing more to maintain than its value as an asset," he explains.

The airport was able to coordinate fuel farm renovations with a major ramp improvement and hydrant replacement project.

Anatomy of the Upgrade

Capacity was just one of the factors considered during the fuel farm project. Meeting Air Transport Association of America (ATA) standards, specifying the proper tank coatings, and complying with EPA and fire protection requirements were also key. Spill containment plans, for instance, included measures to address existing contaminated soil. And water treatment systems were upgraded to remove fuel and other contaminants from the wastewater stream, thus eliminating the cost of disposing petroleum contact water from the airport.

KEAR Civil Corp. headed construction efforts for the project. The existing fuel farm included three 5,000-barrel tanks referred to as Delta tanks 1, 2 and 3; plus two 10,000-barrel tanks known as MEM tanks 1 and 2. The scope of work was based on making Delta Tank 3 comply with current codes and boosting operating parameters required by the new and existing fueling systems. (The existing fueling system previously operated off the fuel capacity in MEM tanks 1 and 2 only. The three Delta tanks were inoperable when construction began.)

Extensive modifications were required for Tank 3 to meet current ATA 103 standards and subsequently come online. Southwest Tank & Steel, a KEAR subcontractor, facilitated the modifications by upgrading mechanical and electrical components, which required the installation of all new mechanical piping ranging in sizes from 2 to 20 inches. The company also connected MEM tanks 1 and 2 with the newly upgraded Delta Tank 3. According to KEAR, the new piping that connects the three storage tanks provides end-users with the flexibility and safety features to fully operate the fuel system between all three tanks while ensuring that the necessary fuel capacity is available at all times.

New Water Treatment System

Mike **Fossett**

While upgrading MEM's fuel farm, KEAR also installed a new water treatment system. "The Memphis area is prone to significant rainfalls, which creates a large capacity of ground and rain water," explains KEAR President Mike Fossett. "The water treatment system is equipped to handle large volumes of rainfall and will safely extract any residual fuel that can be present. The water is stored in an underground storage tank until it reaches a set level, and is then pumped through an oil/water separator (OWS). The OWS is used to separate any residual fuel from the water, dispose of the wasted fuel, and return the clean water back through the storm drainage system."

Fossett credits the company's subcontractors – Southwest Tank & Steel, Southwest Specialty Coatings and Mid-South Electric to name a few – for providing "exceptional service" and helping KEAR meet its schedule and budget targets.

Analyzing the Options

Pond & Co. managed the engineering design services and evaluated various fuel supply logistics, storage and distribution options as a parallel project to replacing the airport's parking apron. The apron project included the airport authority's plans to expand and upgrade the hydrant system to service all gate positions.

Pond personnel considered several ways to feed the hydrant system — including a new pipeline supply and new off-site tank storage and —

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Existing tanks were expanded and upgraded, instead of replaced.

before recommending that the existing tanks be expanded and renovated. Anticipated fuel demand, on-site storage capacity and cost projections for the various alternatives were analyzed to determine the final recommendation, which was subsequently selected by the airlines and airport authority. Pond was then selected to perform integrity assessments and corrosion engineering studies to ensure the physical integrity of the system components.

Upon completing the integrity studies, Pond designed upgrades that allow the existing facilities to comply with EPA's Spill Prevention, Control and Countermeasures regulations (40 CFR 112), ATA Standard 103 and other applicable codes and standards, while also expanding the capacity of the fuel facility to better satisfy fuel demand for the future.

J. Dean **Flessas**

"At the outset, the scope of the project was divided into two phases: assessment and design development," says J. Dean Flessas, vice-president, Pond & Co. "Assessment included American Petroleum Institute (API) 653 tank inspections and API 570 pipeline inspections to assess the integrity of the existing systems and develop specific recommendations for repair and/or upgrade to ensure the mechanical integrity of the tanks and piping. Recommendations made were based upon maintaining the existing infrastructure wherever possible.

"The design development was based on the findings of the assessments along within a code compliance review. Pond engineers next developed plans and specifications for completion of the upgrades to the fuel facility."

Upgrades to the MEM fuel farm include new secondary containment features, mechanical piping and electrical components.

FedEx's Fuel Farm

In addition to serving 6 million passengers per year, Memphis International Airport (MEM) is also the primary hub for FedEx Corp. and handles more cargo than any other airport in the United States. For about 25 years, MEM was the world's busiest cargo airport, until it fell to second place, behind Hong Kong International, in 2010.

While FedEx is a primary player at MEM, it is not part of the consortium involved with the airport's current fuel farm project. The shipping giant receives its fuel from an independent facility fed by an 18-mile pipeline that runs from airport property in Memphis, TN, across the Mississippi River to the Teppco pipeline system in West Memphis, AR.

A few years ago, MEM expanded the hydrant system used by FedEx. The project was part of a series of fuel farm expansions that has been a boon to both FedEx and the airport. Capacity increases in the system allowed crews to service up to 15 more large-body aircraft.

While FedEx alone accounts for a large portion of MEM's traffic, it also attracts other companies to the airport. The area surrounding MEM houses national and international distribution facilities for Flextronics, Hewlett-Packard, Nike, Sharp and many others that located in Memphis to be near the FedEx hub. Given the large network of nearby businesses with strong ties to the airport, MEM markets itself as "America's Aerotropolis."

Primary elements included upgrading the 5,000-barrel return tank 3 to comply with ATA 103 standards for interior and exterior coatings and modifying the mechanical/electrical systems required to connect Tank 3 to the operating system.

Secondary containment upgrades needed to meet EPA and National Fire Protection Association requirements included a flexible membrane liner in the tank containment area and spill containment improvements for truck loading/off-loading areas. Finally, valves were upgraded to allow for periodic integrity testing of the fuel system's underground piping.

The final phase of the project will determine what do with the old tanks that are no longer needed. Brockman expects them to be removed.

New Concourse Configuration

Earlier this year, the Memphis-Shelby County Airport Authority announced a $114 million plan to remove the south ends of concourses A and C, and then widen and modernize Concourse B. The mostly vacant portions of concourses A and C are being cleared to facilitate aircraft access to the airport's larger B concourse. MEM is retaining the balance of concourses A and C to use in the future.

Demolition in Concourse A is expected to begin later this year, with similar Concourse C work following in 2015. The reconfiguration will leave the airport with about 60 gates. Renovations to Concourse B are planned for three phases, from 2016 to 2020.

"We have begun the process of reinventing the Memphis Airport," Brockman explained, when plans were unveiled in February. "Part of that reinvention involves consolidating operations so we can better serve our passengers, airlines, concessionaires and employees. More importantly, we're going to modernize the B concourse, giving our passengers more room to move, better lighting and more convenience."

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THE SHOW & TELL OF AIRPORT PROJECT WORK

Using Community Involvement to Grow Air Service

Bonnie Allin

Bonnie Allin, AAE, has been president and chief executive officer of the Tucson Airport Authority since 2002. Allin began her aviation career with the Tucson Authority in 1976, then worked for Corpus Christi International Airport, where she ended her tenure as director of aviation before returning to Tucson.

It's a rare airport these days that hasn't been hit with capacity cuts from the airlines. At Tucson International Airport (TUS), our seat capacity was down 12.9% at the end of 2013 from its peak in 2008 – slightly better than the average for medium- and small-sized airports in the United States.

It's also no secret that medium- and small-sized hubs have taken a disproportionately large share of overall capacity cuts. In real numbers, more than 62% of seat capacity cuts were at our sized airports, according to a Government Accountability Office report presented to the Aviation House Subcommittee in April.

How do we explain this to our business leaders and communities? As airport operators, we understand that airlines adjust capacity to achieve their financial goals. We're also, however, challenged locally to improve air service in our markets.

In an effort to achieve both goals, Tucson Airport Authority has launched focused initiatives to involve our community in efforts to improve air service.

One issue is that TUS is in the shadow of a larger airport. It's 120 miles away; but in the Western United States, that's close enough to syphon off nearly 30% of passengers coming from, or destined for, the Tucson marketing area.

Our research has found varying reasons for this. Some passengers are looking for less expensive flights, although the added time and expense of commuting usually negates the cost-savings on airfares. Others go elsewhere for nonstop flights, though again, the time spent on our interstates can "zero out" the airline connection. We're also learning that business travelers who purchase short-lead tickets are finding it difficult to find a seat from TUS.

Whatever the reason, it hurts us — as an airport and community — when passengers don't choose TUS. It's especially difficult for our tourism industry and Visit Tucson, our convention and visitors bureau. What makes it worse is that airlines get the passengers, regardless of which airport they use.

TUS is consequently working with our economic development organization, Tucson Regional Economic Opportunities, to collect travel data from local businesses. This information will not only help us develop our story, but also help the companies better use their travel dollars to support *their* airport and community.

We don't know yet where this will lead, but we see more collaboration with our business and community leaders. It could take the form of a local airport support group. Another possibility is a pact among businesses to pre-purchase tickets on new airline flights. There might even be a revenue guarantee to help incentivize airlines to establish new service.

One encouraging sign is that Tucson businesses are setting policies that require employees to use TUS to be eligible for business expense reimbursement, except in extraordinary circumstances.

The Tucson region has a positive story to tell and a history of growth. We draw tourists to unique scenery and renowned resorts and spas. The thriving University of Arizona has more than 40,000 students and is among the National Science Foundation's top 20 U.S. public research universities for spawning successful bioscience and technology startups. Our region has growing industries with key businesses such as Roche Group, Sanofi, Raytheon and IBM. And Tucson stores are setting sales records for top retailers including Best Buy, Costco Wholesale, Tiffany, Williams-Sonoma and In-N-Out Burger.

There are some who might suggest we're spinning our wheels trying to sell our case to the airlines for improved air service at TUS. "You should be happy with the air service you've got," they say.

We think we can do better. Our challenge is to unite the community and region to work together toward goals that will benefit our airport, community and airlines.

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