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Sky Harbor Unveils First Phase of Terminal Makeover

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Group Hug for TSA

These days much of what you see in the press is negative. And part of the blame lies squarely on the shoulders of my brothers and sisters in the media. Some feel that it's easier to sell subscriptions and ads with outrageous or negative headlines, stories and images. I think that's just lazy.

TSA, in particular, has gotten plenty of negative coverage—and not just from the press. Congress and the aviation industry pick on it as well. While some criticism is deserved, most is not; and it's certainly not positive.

Two articles in this issue provide some balance to all that negativity. While the specifics of the projects are different, the message about TSA's level of performance and initiative is similar. The agency has proven that it can be a great partner and has collaborated with key stakeholders to make our industry better.

The first story (Page 24) comes to us from DTW and involves the development of Mobile Inspection Tables to improve the checked baggage screening process. Working with the airport and manufacturer Daifuku Airport Solutions, TSA assisted to test and implement the automated cart. While early, results regarding this laborsaving device are promising and have potential to be used elsewhere in the industry.

PAUL BOWERS, PUBLISHER

Also deserving recognition is TSA's work at ORD (Page 74). The Chicago Department of Aviation and TSA recently partnered with United Airlines and American Airlines to deploy five automated screening lanes that have improved operational efficiency and reduced wait times at two different checkpoints. Working collaboratively with the airlines, equipment manufacturer MacDonald Humfrey and the airport, TSA was instrumental in adding new automation to help improve the passenger experience at ORD.

Come on; let's give TSA a group hug. It deserves one.

Cheers,

Paul

Sky Harbor Unveils First Phase Terminal Makeover

BY VICTORIA SOUKUP

Passengers traveling through Terminal 3 at Phoenix Sky Harbor International Airport (PHX) are getting through check-in faster, navigating the TSA screening process more easily and relishing new views of the desert and city—and more improvements are on the horizon.

Projects largely focused on departing passengers dominated the first phase of a terminal-wide modernization program that is scheduled to run through 2020. The recently completed Terminal Processor Component began in February 2015 and finished on time and on budget in December. Two more phases are still to come, with airport revenue funding the entire $590 million program.

JIM BENNETT

"Phoenix Sky Harbor is the largest economic engine in the state of Arizona," says PHX Director of Aviation Services Jim Bennett. "We are offering updated facilities to our airlines and we are providing our customers with an enhanced travel experience that is more efficient and convenient. It is critical to offer world-class service to every customer every day. This project is enabling us to do just that."

Originally built in 1979, Terminal 3 was typical of that era: heavy concrete and steel. Airport officials opted to update the existing building instead of constructing a new one despite associated design complications.

STEVE RAO

"It was a challenge to take a 38-year-old terminal and modernize it," explains Steve Rao, president of DWL Architects + Planners and design team director. "We did a lot of thinking and scrutinizing about the structure."

The building was essentially gutted to accommodate mechanical and electrical system upgrades. The demolition of precast T members and beams required specialized

of $590 Million

PHX
PHOENIX SKY HARBOR

equipment that was designed and built specifically for the project, Rao notes. "There was a lot of steel," he emphasizes. "The contractors joked that steel must have been cheap back in the '70s because of the amount of steel in the concrete columns. As crews drilled into the concrete, they would often hit steel. Workers were constantly adjusting drilling sites. It was good that we knew all along what we were getting into."

HuntAustin, a joint venture member of the design team, estimates that work crews removed 4.5 million pounds of concrete from the structure. "We did that while keeping the building structurally sound so it could still carry a load for its intended use because we kept the facility open," explains James Augustyn, project deputy director with HuntAustin.


JAMES AUGUSTYN

Keeping the terminal's mechanical and electrical systems operating until new systems were activated was another key challenge. "Staying operational was very important," says Augustyn. "It was a pretty well-choreographed dance to keep the old systems online while installing the new systems."

FACTS&FIGURES

Project: Terminal Modernization

Location: Phoenix Sky Harbor Int'l Airport

Scope: Terminal 3 (2 concourses)

Cost: $590 million

Timeline: Phase 1 completed in Dec. 2016; Phase 2 scheduled to end in late 2018 /early 2019; Phase 3 slated to run through 2020

Phase 1

Design-Build Team: Corgan; DWL Architects + Planners; HuntAustin (joint venture); SmithGroupJJR

Demolition: BCS Enterprises

Common-Use Ticket Counter: Common-Use Self-Service Kiosks: SITA Information Network Computing USA

Checkpoint Wait Time Technology: SITA Information Network Computing USA; iinside

Security Screening Machines: Rapiscan Systems (procured by TSA)

Paging System: SITA Information Network Computing USA

Flight Information Display Boards: Samsung (operating on SITA platform)

Conveyance: ThussenKrupp Elevator Corp.

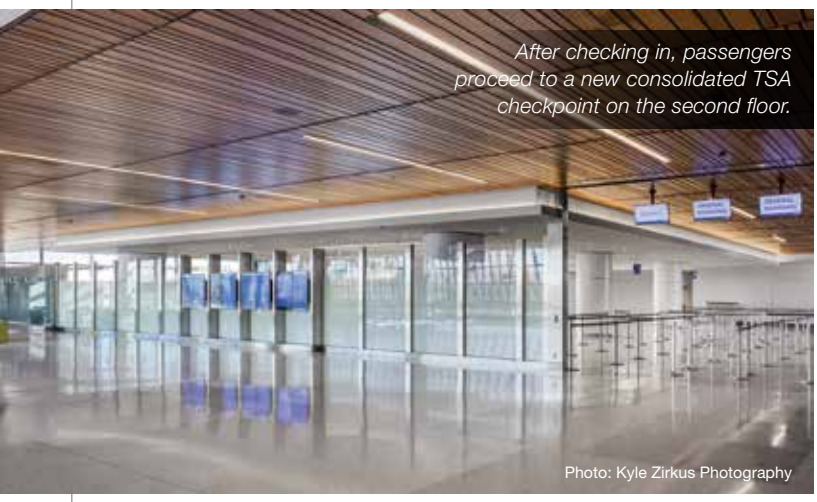
Baggage Handling Systems: Pteris Global

Terrazzo: Advance Terrazzo Co.

Environmental Elements: LED lighting with sensors that activate lights only when sunlight is insufficient

Environmental Accomplishments: 81% of construction waste was diverted from landfills; concrete will be crushed & repurposed for new concourse aprons; silver certification from U.S. Green Building Council is anticipated

Of Note: 2 previous security checkpoints were combined into 1 new checkpoint on another floor for faster throughput; all mechanical & electrical systems remained operational until new systems were brought online



After checking in, passengers proceed to a new consolidated TSA checkpoint on the second floor.

Photo: Kyle Zirkus Photography

Consolidating Checkpoints

One of the most substantial updates involved passenger screening. Previously, the terminal had two cramped TSA checkpoints on the third level—one for the North Concourse and another for the South Concourse. "The areas were designed in the late 1970s (opened in 1979) when checkpoints were just getting started," explains Rao. "They were on 30-foot-wide passenger bridges and were very tight. There was an almost claustrophobic feeling when going through Security."

As a fix, the design team moved screening operations to the second level (previously a service area closed to the public) and consolidated the two separate checkpoints into a single 90,000-square-foot checkpoint. The new area currently has six lanes but is designed to accommodate up to 12 lanes. "Half of the second level is now nothing but a large and comfortable security checkpoint," Rao says. "It's very clean and consolidated, and the TSA is pleased with it."

The team that designed the new screening area included DWL Architects, SmithGroupJJR and Corgan.

After travelers clear the new consolidated security checkpoint, they can take an escalator or elevator to the fourth level, where the terminal's two concourses are located. Currently, the North Concourse is in use, but the South Concourse is closed because it will be demolished and rebuilt during the next phase of the program. The North Concourse will be renovated during the third and final phase.

To streamline movement and enhance passenger comfort, the new checkpoint includes large composure areas outfitted with seating and flight information displays. The areas, located before

and after the screening area, also feature exhibit cases and expansive views of Piestewa Peak and the city of Phoenix.


ART FAIRBANKS

Beyond efficiency and passenger comfort, the new checkpoint was also designed to maximize the terminal's concessions program. "Previously, once a passenger went through his or her designated checkpoint, the passenger was left with the retail and dining options only on that concourse," relates Art Fairbanks, PHX's special project administrator who is overseeing the project. "With the new consolidated security checkpoint, travelers can enjoy all of the amenities in either concourse."

One of those amenities is a new post-Security art gallery. "Terminal 3 had several exhibition spaces but no gallery," Fairbanks notes. "With the enhancements to Terminal 3, we added a gallery to showcase even more pieces highlighting Arizona's cultural and artistic heritage. Travelers can get through Security and easily enjoy the art before their flight."

Less Wondering

PHX also added a system that analyzes and predicts checkpoint wait times. The QueueAnalyzer, implemented by SITA USA and its partner iinside, uses two different technologies: infrared cameras that depict movement and iinside's Bluetooth Nodes, which detect both Bluetooth Classic and Bluetooth Low Energy devices (wearables) as they move through queues.

"The sensors track the entire process, and the infrared cameras give the system the ability to determine if a group of people is just a group of people waiting near the TSA line or if they are actually part of the line," explains Edward W. Bauer, senior account manager for SITA.

Real-time information coupled with historical data is then used to determine wait times, which are displayed on monitors throughout the airport.

"The system combines Bluetooth and infrared visual analytics to best report accurate wait times," notes Bauer.

Common-Use Counters & Kiosks

Ticketing and Baggage Claim remain on the first level, but designers reoriented the ticketing area from east-west to north-south to improve pedestrian flow. In addition, all 31 ticket counters are now common-use to allow PHX more flexibility deploying its frontline space.

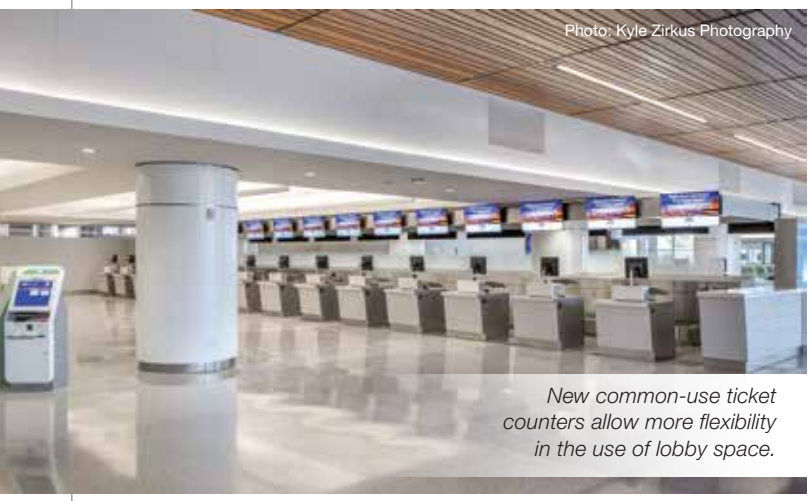


Photo: Kyle Zirkus Photography

New common-use ticket counters allow more flexibility in the use of lobby space.

"When an airline employee walks up to a counter and logs in, the monitors behind him or her bring up the airline logo," Bauer relates. The new arrangement preserves branding/marketing opportunities for airlines, while providing the airport with new flexibility to shift use of valuable counter space as needed, he explains. "It does not have to dedicate counter space to a specific airline that might not be using that counter at all times."

Seventeen of the 31 ticket counters are assigned for preferential use by Delta Air Lines, since it has such a big presence at PHX. Because the counters are common-use, however, it would be easy to make more slots available to other airlines if Delta were to scale back its schedules, notes Bauer.

From PHX's perspective, common-use technology also supports flexibility in service development. "This technology at every counter makes it easy to initiate seasonal flight additions or try new routes without expensive capital investments," Fairbanks explains.

Common-use technology, along with SITA's Airport Management system, can help airports manage their resources, adds Bauer. For instance, gate assignments for airlines can flex depending on varying factors such as arrival time, aircraft type and turnaround time. "It allows for an airport to get multiple inputs from different sources so that the appropriate fixed resources can be assigned such as ticketing counters, gates and baggage carousels," he elaborates.

In addition to common-use counters, PHX also deployed 32 of SITA's newest generation common-use self-service (CUSS) kiosks for passengers. The new stations allow travelers to print their own boarding passes, and in some cases, also their own baggage

tags. “Any passenger can go up to any kiosk and click on their participating airline logo, and it pulls up the specific airline’s actual check-in application,” Bauer explains. “This technology gives the airport the ability to make better use of [its] real estate and allows for airlines to have access to all 32 kiosks.”

The kiosks can also print baggage tags for airlines that opt into the system. As of early February, Hawaiian Airlines was the only carrier using the self-tagging capabilities.

The Terminal 3 baggage system was upgraded with a new inbound system that added two new claim carousels at street level, bringing the terminal’s total to five. The airport also installed new outbound belts at the ticket counter and extended the baggage tunnel.

The ticket counter belts drop into tunnels to traverse the facility before going up to the second level, where bags are then moved onto existing runout piers for collection. New devices to replace the piers are slated for installation during the second phase of the project.

The structure’s fourth floor—or mezzanine level—was restructured to allow for expansive vertical views from the passenger level below. Previously, the fourth floor was used for airport offices, which were relocated to an office structure elsewhere on the property. Currently, it houses airline ticket offices and support spaces for terminal tenants.

Improvements Inside & Out

Because wayfinding from the street had been a challenge in the old structure, designers replaced heavy concrete exterior walls with a vertical glass curtain wall to provide visual assistance for drivers. “We wanted people to be able to see into the building and know where they are going,” says Rao. “Before, when you drove down the curb you really couldn’t tell what was behind the doors. They were tinted dark brown. You didn’t know where to stop. We completely opened it up. Now, when you drive down the street, you can see into the building, you can see where the ticket counters are, you can see where the baggage areas are.”

Curb space was also widened to make room for people entering and exiting vehicles.

Just outside the ticketing area is the new West Plaza, a desert landscape garden featuring native Arizona plants and benches. It also has a designated relief area for service animals and pets.

Inside the terminal, leveraged neutral colors, high ceilings and natural lighting form a large expanse of glass. “The transformation of the existing building into something very different was part of

Large expanses of glass help infuse the terminal with natural light.

Photo: Kyle Zirkus Photography

JEFF MANGELS

the overall design theme and concept where transparency, light, views and a sense of orientation were critical," says Jeff Mangels, Corgan aviation practice principal.

Durability and maintenance were also key considerations, Mangels adds. On a detail level, stainless steel bases and corner guards were used to protect walls against damage from carts and luggage.

Windows include shade screens to help control the building's interior temperature from extreme summer heat. "Glazing has come a long way in the last 34 years," notes Rao. "It is so much more efficient as far as heat resistance and heat transmission. We were able to provide the glass and get the views out to the beautiful desert without heat transmission."

The screens also offset harsh daylight on computer monitors—a particular concern for airline and TSA employees. "We allow some sunlight in, but it is controlled," Rao explains.

The design team opted for terrazzo flooring on the first, second and third floors. "The airport had good success with terrazzo in a previous revitalizing program in another terminal, and we have had a lot of success with it in other airports," reports Rao. "In fact, we installed terrazzo at another airport 15 years ago and the floors still look great."

Because it is a smooth surface, terrazzo also helps keep noise down, he adds.

The new flooring does not include intricate designs or artwork. "The design is a simple geometric pattern to reinforce the overall architectural theme of a clean, crisp aesthetic," says Mangels. "We did not want to overcomplicate it."

Two More to Go

During the next phase of Terminal 3's makeover, PHX will replace its existing South Concourse with a new 15-gate facility. The new concourse, complete with new customer amenities, is expected to open in late 2018 or early 2019. The final phase of the $590 million project will focus on the North Concourse, with plans for new food and beverage outlets, retail areas and other amenities. It is expected to open in 2020.

When the entire project is finished, Terminal 3 will have 25 gates, and nearly every seat will be equipped with power.

Rao says he's pleased with the way Phase 1 has turned out. "What a transformation it's been," he notes. "It's almost black and white, night and day from what it was before to what it is today. It was very dark and dreary and heavy. Now, it's modern, open, light and airy. There are great views out, where before you had none, and great views in."

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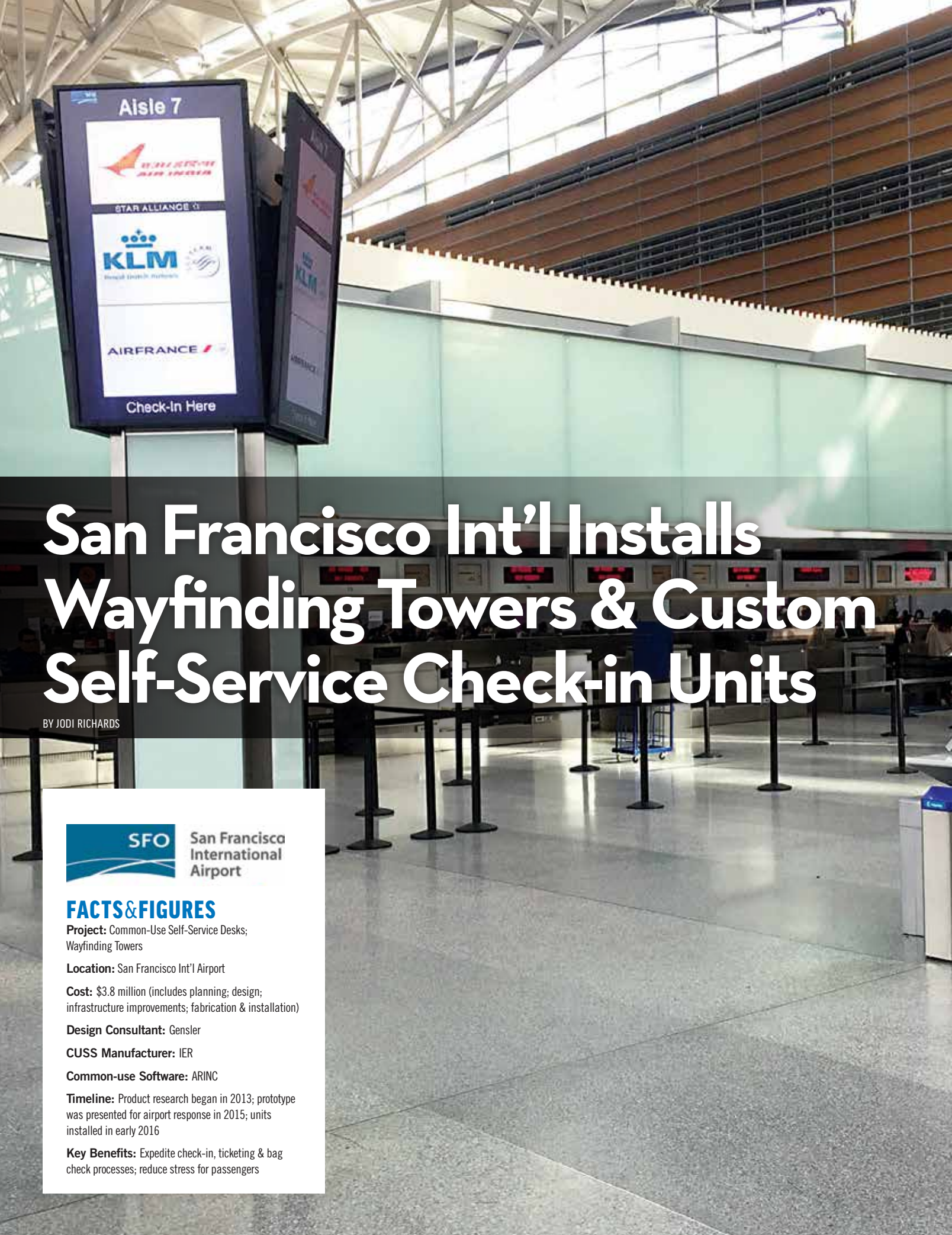


San Francisco Int'l Installs Wayfinding Towers & Custom Self-Service Check-in Units

BY JODI RICHARDS

SFO San Francisco International Airport

FACTS&FIGURES

Project: Common-Use Self-Service Desks; Wayfinding Towers

Location: San Francisco Int'l Airport

Cost: $3.8 million (includes planning; design; infrastructure improvements; fabrication & installation)

Design Consultant: Gensler

CUSS Manufacturer: IER

Common-use Software: ARINC

Timeline: Product research began in 2013; prototype was presented for airport response in 2015; units installed in early 2016

Key Benefits: Expedite check-in, ticketing & bag check processes; reduce stress for passengers

As part of an ongoing effort to improve the passenger experience, San Francisco International Airport (SFO) recently debuted more than 80 new common-use self-service units (CUSS) in its International Terminal.


RICK THALL

Rick Thall, project manager at SFO, explains that the form and function of the custom units were heavily influenced by the airport's Revenue Enhancement And Customer Hospitality (REACH) initiative, a program designed in part to guide consultants in shaping SFO's long-term passenger experience (see sidebar on Page 22 for more details). Gensler, the airport's long-time design partner, helped develop the program.

One of REACH's underlying goals is to reduce stress for passengers. The new CUSS stations help travelers save time and feel at ease when navigating through check-in, ticketing and baggage check processes, explains Thomas Horton, senior associate and design director with Gensler's brand design group.

When the previous standalone CUSS units in the International Terminal were nearing the end of their five- to seven-year lifespan in 2013, airport personnel began looking for replacements. John Martin, SFO's director at the time, guided the process by pushing the project team to consider new options and question prevailing design assumptions, notes Thall.


THOMAS HORTON

Although the airport's previous kiosks (made by IER) provided a simple, straightforward check-in process for passengers, officials were unhappy with their "cold" look, Horton recalls.

After research efforts failed to find an acceptable alternative that provided the right user experience, the airport partnered with Gensler and IER to design and construct an entirely new custom CUSS unit. The end result provides passengers with a high level of customer service, while also fitting in with the aesthetics of the terminal and the airport as a whole, says Horton.

"We wanted to create a design that was complimentary to the International Terminal environment, but also didn't look like a piece of machinery," he explains. "It was rethinking how this technology could fit into an architectural environment."

That meant designing a furniture-like unit that resembled a hotel counter more than an automated teller machine, notes Horton. Taking cues from the architecture of the terminal, designers incorporated glass and metal tones into the new CUSS desks. In addition, they used Corian countertops and wood to soften the look and give the units what Horton calls a "hospitality vibe."

Every detail was carefully analyzed, says Thall—from the overall dimensions and number of check-in stations to the colors and materials.

In the end, designers made the units 46 inches wide and 140 inches long, with six check-in stations—three on each side. An edge-lit piece of acrylic glass running down the center serves as a privacy screen between the two sides and also helps attract the attention of passengers. “It acts almost as a beacon to guide or draw customers toward the check-in environment,” Horton notes.

Designers also considered what travelers typically carry with them and what they do when checking in. The large Corian countertops are not only attractive, but also extremely functional, Thall notes. Passengers have space to rest a beverage and briefcase, backpack or purse and organize their belongings, without encroaching on the people next to them.

All the technology is located under the counter. “So it’s there when you need it, but it’s not something that’s staring you in the face,” Horton explains.

Creating a streamlined and simple design aesthetic fit with the airport’s REACH goal of improving the passenger experience, Thall notes. Because the self-service check-in process is relatively new—especially the self-bag tag aspect—it was critical to keep the look and feel of the CUSS units as intuitive as possible. “It’s important that it’s clearly understood what these units are for when [frequent and first-time travelers] see them,” he says.

“Passengers are used to walking up to a gate agent or check-in counter and having everything taken and done for them,” Horton says, noting that some passengers are intimidated by the prospect of checking themselves in for flights. “The design of the unit was really intended to be welcoming and make them feel at ease, and diffuse that sense of foreboding that they’re going to have when confronted with this new process that they’re unfamiliar with,” he explains.

The way travelers interface with the self-service units also guided practical design elements. For example, passengers tagging their own bags are left with strips of paper from the self-adhesive labels. Originally, the CUSS units included built-in trash bins; but that created logistical challenges for janitorial staff to empty them, because the units need to remain secure. The final design includes trash bins next to the check-in stations.

“This was examining how people behave within this check-in environment and learning to create a unit that responded to that behavior,” Horton says.

Location, Location, Location

The layout of the new CUSS units was designed to address the architectural makeup of the ticketing/check-in area and the way passengers arrive and interact in that space. “It’s a very big space with large queuing areas,” Horton notes.

As such, planners used circulation analysis to determine the best setup for the new self-service desks. Layout was a particular challenge because passengers enter the ticketing hall from four different directions. "If you only distribute the units in one particular part, then a good percentage of the population is going to either miss them or have a long walk to find them," Horton explains.

Previously, passengers tended to stumble upon the CUSS kiosks rather than be directed toward them, he notes. To remedy that situation, designers established identifiable check-in zones by placing long banks of the new CUSS units down the middle of the most prominent passenger thoroughfares. They also created separate "islands" of stations around the perimeter—particularly at the entrance from the Bay Area Rapid Transit (BART) station.

Concentrating CUSS stations in well-defined locations helps passengers find them and also makes it easier for airline staff to assist customers through the on-screen process, comments Horton.

Previously, self-service kiosks blended into the lobby environment due to their small size and gunmetal grey finish. By creating a unit with more mass that compliments the surrounding aesthetics, passengers are now attracted to the check-in stations, says Horton.

Infrastructure planning and upgrades were another key piece of the project. When CUSS technology was first introduced in the International Terminal, individual kiosks were placed somewhat haphazardly, Thall relates. The layout of individual units was based on wireless connections or the location of power and data in the floor. "We wanted to figure out how we could be deliberate to put these in the locations where we thought they would be best located and make sure that we had a reliable data and power connection," Thall says.

Design Challenges

Creating the custom CUSS desks was a tall order. Boarding pass and baggage tag printers, along with scanners for identification documents and a computer interface, all needed to fit inside. The equipment that IER ultimately manufactured is sophisticated and performs many important functions in a very compact unit, relates Horton.

The stations also had to comply with accessibility requirements per the Americans With Disabilities Act, be secure (but easily serviceable by maintenance staff) and meet the aesthetic and customer service expectations of SFO officials.


MONTEE FIELY

The design and conceptual phase was a "major effort," recalls Montee Fiely, director of North American sales for IER. Despite their sleek design, the new CUSS stations had to include the same operating components as their less-attractive kiosk predecessors. "There's only a small space where you can place the motherboard, printers and all the components," Fiely explains. "You have to keep them in the same assembly formation whether they are inside of a kiosk or not."

Placing a countertop for passengers near expensive technology created additional challenges. To prevent coffee or other liquid spills from running down into the unit, designers sealed the opening along the edge-lit acrylic and positioned the counter so it overhangs the technology below.

Shipping and installation were carefully orchestrated as well, Horton adds. At roughly 1,500 pounds each, the CUSS desks are fairly substantial pieces of furniture, he quips. Units were manufactured in Atlanta, shipped in modules and assembled on the terminal floor during non-passenger hours.

Learning From Prototypes

The team built "crude but effective" full-size prototypes and placed them in the terminal in January 2015 to provide airport officials with a preview of what was to come.

"It gave them the opportunity to kick the tires before committing to the design," Horton explains. "It was a very successful way of helping SFO management feel comfortable about how these units were going to feel in the space, that the scale was correct as you walk up to it, that the height for all equipment was adequate."

Because the design of the new CUSS unit was unique, there were functional elements such as cooling units and a rail system to slide the technology components out for maintenance that could not be anticipated without using a prototype, Horton says.

After the mock-up stage, IER constructed a fully functional unit, which SFO officials and the design team tested before placing it on the floor for passengers to interact with.

The prototyping strategy was "really advantageous," Horton relates. "It gave us a considerable amount of user data that informed the final units."

Messages on new wayfinding towers change to reflect the carriers operating in the immediate vicinity.

Wayfinding Towers

During the CUSS project, SFO also installed new wayfinding towers along the main pedestrian path of the International Terminal—addressing yet another touch point of the REACH program, notes Horton.

"People are, in most cases, very time sensitive when they travel through airports," he explains. "Effective wayfinding goes a long way toward both reducing their stress and bringing about a higher sense of customer satisfaction."

The new towers stand nearly 12 feet tall, and the content displayed on 46-inch LED monitors that cover all four sides can be changed in real-time to reflect the carriers operating at that check-in area. Because of their size and location, the towers provide long-distance assistance for passengers and guide them to specific airlines once they get closer, Horton relates.

Like the CUSS units, the new wayfinding towers also went through several design iterations. Thall describes initial executions as much larger and clunkier than the final design, which includes materials that coordinate with the rest of the terminal.

"All of these things work with the aesthetic of the building and feel like they could have been there from the original construction," he adds. "They look modern, yet fit in with the aesthetic of this building that's now 15+ years old."

Although the new wayfinding towers are able to display marketing information, Horton notes that SFO is proceeding cautiously to maintain a careful balance. "We've learned from various wayfinding exercises that visual clutter and changing some of those dynamic signs can potentially add to increased confusion with passengers," he explains.

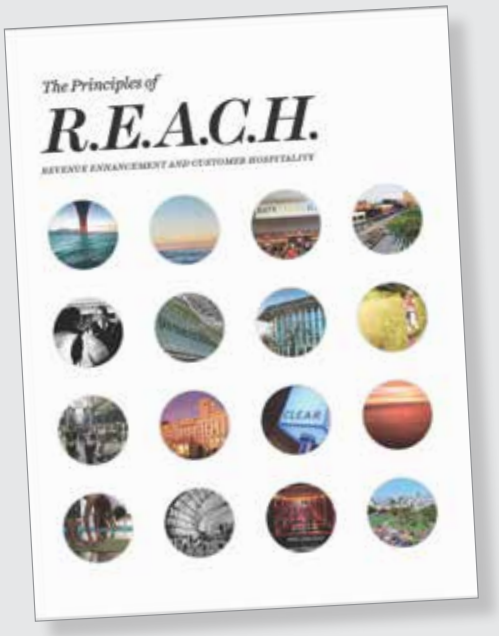
Industry-Changing Results

From the airport's perspective, the CUSS project was a good opportunity to challenge the industry. "It was a unique process being able to work with a manufacturer and designer to collaborate and create something that hopefully pushed the envelope a little bit more of what amenities in an airport can be," says Thall.

According to Horton, the most important lesson his team learned was that projects that involve dramatic changes do not develop in a linear process. "We had to rethink some of our assumptions—go back to the drawing board a couple of times, and a lot of it was driven by the prototyping process," he reflects.

After watching the custom CUSS units operate for about one year, Thall reports that the new stations facilitate faster, more efficient check-in and provide flexibility for how the airport uses its terminal space. Currently, SFO has 12 CUSS units in each of the seven aisles in its International Terminal, and team members expect to procure more within the next year to 18 months.

REACHing for Higher Service & Revenue Levels



The new wayfinding towers and self-service check-in stations at San Francisco International (SFO) are just two of many projects influenced by the airport's Revenue Enhancement And Customer Hospitality (REACH) initiative.

From a customer service standpoint, the program was developed to guide airport and airline staff, tenants and design consultants in shaping SFO's long-term passenger experience. To support revenue and process goals, REACH is designed to facilitate growth, improvement strategies, operational innovations and efficiency.

The roots of the program date back to the redevelopment of Terminal 2, completed in 2011. SFO Project Manager Rick Thall explains that after the huge project, officials wanted to document the design qualities that enhance the passenger experience and create a program that would provide guidance and standards for future projects. To develop the program, SFO enlisted the help of its long-time design partner, Gensler.

"It's not a rigid set of guidelines that prescribe a particular design direction," stresses Thomas Horton, senior associate and design director with Gensler's brand design group. "It's an informative and inspirational perspective to help guide designers and consultants as they're developing projects."

REACH highlights 10 specific focus points:

- locality/sense of place
- revenue generation
- convenience and hospitality
- wayfinding
- time and efficiency
- arts and culture
- health and wellbeing
- look and feel
- sustainability
- technology

The list, which Thall describes as the "true values of SFO," was developed to guide improvement efforts throughout the airport. "We take an opportunity with each project to evaluate the different values of the program and look to optimize the passenger experience," notes Thall.

Toward that end, the REACH guidebook addresses the passenger experience from arrival at the airport to boarding the plane. To enhance effectiveness, it subdivides passengers into five categories—leisure, assisted, business, unique and family—and addresses values and expectations specific to each type of passenger. Further, it identifies opportunities to improve the experience for category of passengers during crucial "journey moments" at various locations:

- approaching the airport
- ticketing/check-in
- security checkpoints
- recomposure areas
- plazas
- concourses
- concessions
- waiting areas and lounges
- play areas
- restrooms
- passenger amenities
- art and exhibits
- meet and greet areas
- baggage claim
- arrivals curb
- connectors and tunnels

"REACH is a dynamic program that really represents the personification of some of the values in the journey moments along the way for passengers," Thall explains. [The CUSS project] is just one example [where] REACH can help with improving the guest experience."

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MAG USA

Detroit Metro Pioneers Ergonomic Improvements in Checked Baggage Screening

BY KRISTIN VANDERHEY SHAW

DETROIT METRO • WILLOW RUN
WAYNE COUNTY AIRPORT AUTHORITY

FACTS&FIGURES

Project: Automated Carts in Checked Baggage Resolution Area

Location: Detroit Metropolitan Airport – North Terminal

Project Design Consultant: Logplan

New Equipment: Mobile Inspection Tables, from Daifuku Airport Technologies

New Process: Battery-operated carts follow magnetic tape on floor to deliver flagged bags to resolution room; TSA officers inspect bags on cart tabletops; carts return bags to system conveyor

Timeline: 11 Mobile Inspection Tables implemented Dec. 2016; 11 more scheduled for 3rd quarter 2017

Electrician: Bayview Electrical

Operations & Maintenance: DANTeC

System Acceptance Testing: TSA

Customer Acceptance Testing: Logplan

Primary Benefit: Less manual labor/improved ergonomics for TSA officers who manually inspect checked baggage

Associated Benefits: Increased screening productivity; decreased energy usage; minimal associated infrastructure changes

Who would have thought that Detroit Metropolitan Airport (DTW) and Harley-Davidson could have much in common? As it turns out, the Motor City airport and famed motorcycle-maker use the same robotic delivery carts to improve ergonomic safety for their workers.

Harley and other large manufacturers have used high-tech carts from Daifuku for years; but the idea didn't transfer to the airport industry until well after 2007, when the material handling system manufacturer purchased Jervis B. Webb, which specializes in airport baggage systems.

Daifuku Airport Technologies proposed its self-propelled carts to the Systems Optimization and Support branch of TSA, and one of the agency's engineers helped fine tune and vet the concept for use by TSA officers who lift heavy checked bags and drag them to inspection tables for manual screening. (Essentially, the company attached a TSA inspection table to the top of one of its existing automatic guided carts.) When Daifuku took TSA headquarters staff to see its equipment in action at Harley and other manufacturing sites, that set the wheels in motion for 11 of its Mobile Inspection Tables to be deployed at DTW late last year.

"Automated carts have been used in other industries for 15 years or more," says Todd Alderman, director of Business Development for Daifuku Airport Technologies. "It's not new technology, but it's a new application for aviation. Harley-Davidson has been using it to build motorcycles for quite a while."

DTW became aware of the laborsaving technology when planning recent improvements to the baggage handling system in its North Terminal. Working under another transaction agreement from TSA, the airport hired Logplan to create a design that integrates updated equipment into its conventional conveyor system. After Jervis B. Webb won the contract to construct/install the improvements, it proposed using Mobile

Inspection Tables in the checked baggage resolution area; and the project team subsequently agreed.

"The technology has been in use for many years, and its strong track record is well documented," says Tom McCarthy, vice president of Planning, Facilities, Design and Construction for Wayne County Airport Authority.

Logplan Project Manager Michael Blanton was similarly comfortable: "Based on other uses of this technology, we didn't have any concerns it could function." Instead, project designers and engineers focused on ensuring that the mobile tables would interface properly with TSA computer screens and facilitate officers' various responsibilities.

MICHAEL BLANTON

As McCarthy describes it, DTW likes to be on the leading edge of new technology, but doesn't take unnecessary risks to be first to adopt it. As such, there were lengthy discussions about equipment performance and lifecycle costs. Since Jervis B. Webb is located in Detroit, it was easy for the company to arrange local demonstrations and testing opportunities for a mockup of the proposed system.

Adding Automation

The demonstrations highlighted how much the carts could improve the ergonomics of a traditionally labor-intensive portion of the checked bag screening process. After luggage is screened by an explosives detection system, bags flagged for additional scrutiny are delivered via conveyors to the checked bag resolution area for manual inspection. Typically, TSA officers have to pull each bag from a conveyor, transfer it to a table, inspect the bag, and then lift it back onto a conveyor. Too often, the associated lifting and twisting motions cause back problems.

TODD ALDERMAN

"The conveyor process led to an overall inefficient work environment in terms of injuries," explains Alderman. "Mobile Inspection Tables are designed to improve ergonomics and efficiency. They eliminate any lifting, twisting or turning that has to be done by the TSA agents."

Now, officers working at five inspection locations in DTW's North Terminal stay at their stations, and automated carts deliver baggage to and from them. When a bag is flagged for manual screening, it is transferred directly from the system's conveyor onto a cart, which delivers it to a TSA officer. The officer inspects the bag directly on the cart tabletop and then prompts the cart to return it to the conveyor.

The self-propelled tables follow tracks of magnetic tape applied on the floor to make the trips back and forth. Traffic patterns for the magnetic tape are specifically designed for maximum efficiency and to accommodate TSA officers in checked bag resolution room.

"The system is quite flexible," reports McCarthy. "Because the tracks are magnetic tape, we didn't have to modify the floor or the room at all to accommodate the MITs (Mobile Inspection Tables). If we need to make changes, the manufacturer has assured us it will require very little modification to the infrastructure."

The carts operate on battery power (to eliminate tripping hazards of extra cords in work areas), and charge briefly when they stop to allow TSA officers to inspect their payload. The carts are also programmed to automatically charge during off-hours.

Implementing the New System

When DTW's North Terminal originally opened in 2008, the baggage system was designed with two mirror-image systems. Each half can operate independently, and each can handle the entire terminal's baggage capacity in the event of a failure. Because TSA typically upgrades such systems every five to 10 years, DTW wanted to make sure it was adopting a system that didn't require a great deal of capital or downtime, notes McCarthy. Having duplicate checked bag resolution systems served DTW well when it added 11 Mobile Inspection Tables to half of the system in late 2016. The airport plans to add 11 more units to the other checked bag resolution area later this year.

"We essentially shut down half of the operation in order to do the work on the first phase," explains Dale Walker, the airport authority's deputy director of Facilities Planning, Design and Construction. "We had to keep the bag system operating through the whole process."

DALE WALKER



Automated carts transport flagged bags from the conveyor system (left), to screening inspectors, and back again (right) to eliminate lifting and carrying.

Once the Mobile Inspection Tables were operational, DTW tasked Logplan with ensuring that the new technology interfaced properly with all aspects of the checked bag resolution operation. It also performed independent customer acceptance testing.

"Logplan inspected and tested the system to TSA standards," specifies Blanton, the company's project manager. "Once testing was completed, [we] submitted results to TSA, and based on those results, they scheduled their own follow-up set of tests."

During its initial tests, Logplan verified that if a TSA officer is standing in an unexpected spot, carts will stop and wait for the agent to move. (Each cart is equipped with a laser sensor that detects objects in its path to prevent it from running over workers' toes or objects lying on the floor.) Personnel from TSA's Office of Occupational Safety, Health and Environment have also been working with the project team to satisfy potential concerns about the safety of employees working with Mobile Inspection Tables.

Other Deployments?

Walter Dickey, acting manager for TSA's Electronic Baggage Screening Program, encourages airport officials to assess how new technologies such as the Mobile Inspection Table fit their specific needs. Moreover, he reminds them that TSA is not mandating use of automated carts.

"We want airports to know that it's an option, but it may not be a good fit for every facility," says Dickey. "[Airports] need to understand the application to their environment to see if this would improve their operation."

The implementation of automated carts at DTW demonstrates that it's possible to

improve manual baggage screening operations with minimal modifications to existing infrastructure, notes McCarthy. “You don’t have to cut the floor or run new power, and you have flexibility for the future,” he explains. “If the TSA adds additional officers and equipment, you can easily move or add new tape without a lot of change at all.”

One company keeping an eye on the new technology is VTC. Chief Executive Chris Norton reports that she is already talking to Daifuku, and the firm’s project designers are considering Mobile Inspection Tables for baggage systems at several airports. The company is excited to see airport equipment manufacturers incorporating technology from other industries, notes Norton. “We’re also happy that TSA is clearly getting behind this project,” she adds.

Logplan’s advice to consultants and airports interested in implementing the new technology? Work through the design thoroughly and allow plenty of time for integration and testing. “The design and function for this type of technology could differ greatly depending on the design and spatial constraints of each airport,” cautions Blanton.

Based on the success of Daifuku carts at Harley-Davidson and other manufacturing sites, company officials expect similarly positive results for DTW. Specifically, they predict that the airport and TSA will enjoy improved ergonomics, flexibility, productivity, room accessibility, noise reduction, energy usage and space reduction.

Officials from the airport and its project team report that so far, the tables are working well and reaction from personnel using them is positive. “The primary benefit is improving the safety and health of the TSA officers doing the screening,” emphasizes McCarthy.

TSA Forms Task Force to Foster Innovation

There’s a new pipeline for products like the self-guided robot carts recently introduced at Detroit Metropolitan Airport: the TSA Innovation Task Force.

TSA created the program in 2016 to receive, review and recommend new ways to improve screening operations at U.S. airports. Its intent is to provide a format for industry partners such as airlines, airports and manufacturers to develop emerging technologies in operational environments. In essence, the task force hopes to help entities vet and hone their developments by providing them with a better understanding of real-world screening challenges and TSA requirements.

Before the program was formed, new projects tended to be treated as one-off requests, notes Innovation Task Force Branch Manager Mara Winn.

MARA WINN

Airports Turn to Equipment Vendors for Crew Training & Maintenance

BY KEN WYSOCKY

FACTS&FIGURES

Project: Snow Removal Equipment Training & Maintenance

INDIANAPOLIS INTERNATIONAL AIRPORT

Location: Indianapolis Int'l Airport

Scope of Removal Operations: 6 miles of runways; 12 miles of taxiways; ramps & landside roads

Strategies: Include extra manufacturer training in equipment purchase agreements; outsource major repairs on complex multifunction vehicles to keep airport mechanics focused on maintaining other equipment

Equipment Fleet: 9 Multifunction M-B5s; 21 pieces of conventional snow removal machines

Equipment Manufacturers: Batts; Kodiak America; M-B Companies; Oshkosh Airport Products

Clearing Time: 12 min/runway

DENVER INTERNATIONAL AIRPORT DEN

Location: Denver Int'l Airport

Scope of Removal Operations: 6 runways; 90+ million total sq. ft. of airside pavement; 300 lane miles of landside roads; 30 acres of parking lots

Equipment Fleet: 250 pieces for airfield maintenance; 120 for landside maintenance

Equipment Manufacturers: Boschung; Caterpillar; John Deere; M-B Companies; Monroe Truck Equipment & Fabrication; Oshkosh Airport Products; S. Houle; Ventrac

Type of Equipment: Snow blowers; brooms; blades; plows; runway sanders; snow melters; chemical trucks; loaders with box plows; skid-steers

Clearing Time: 12 min/runway

Strategies: Incorporate material from vendor training into year-round curriculum; purchase additional training from manufacturers for specialized equipment; 40+ hours of yearly in-house training

Purchased Vendor Training: $15,000 in 2016

As snow reoval equipment continues to become more sophisticated and complex, more airports are relying on manufacturers to help train their crews to operate and maintain it. Some are even contracting equipment makers to perform major repairs for them.

A good example of this trend is unfolding at Indianapolis International Airport (IND), which invested about $6 million in nine multifunction snow removal machines several years ago. As part of the purchase agreement with M-B Companies, IND required the vendor to provide seven days of comprehensive operations and maintenance training instead of the usual two days.

IND's desire for more training reflects an ongoing evolution from conventional, single-function vehicles that blow, plow or sweep snow off runways to multitasking machines that can perform all three functions. Increased functionality dramatically improves snow removal efficiency, but also poses training challenges, explains Mike Medvescek, senior director of operations and public safety at IND. Technological advancements in electronic, hydraulic and computer systems are driving many of the equipment improvements, and some staffs are simply not equipped to troubleshoot and maintain the new systems.

In terms of removal efficiency, IND crews now use nine M-B5s to clear runways instead of 18 machines, which significantly improves operator safety. In addition, clearing time is down from 18 to 20 minutes per runway to 12 minutes. "It's been a huge improvement," reports Medvescek. "In fact, we haven't had to close a runway for the last couple of years because this equipment is so effective."

While removal crews were spending less time clearing the airfield, IND mechanics were spending more time maintaining and repairing the newer, more complicated machines. That made it difficult to maintain the airport's other 500 pieces of rolling stock—everything from lawn mowers and tractors to backhoes, pickup trucks and shuttle buses.

To resolve the problem, the airport contracted M-B Companies to perform all major repairs on its multifunction vehicles, freeing up IND mechanics to keep the airport's snow blowers, plows and other equipment up and running. "If we're in the middle of a snow fight, we can't afford to have our mechanics tied up for two days on

Training for operators and mechanics is crucial as equipment continues to become more complex.

a major repair," Medvescek explains. "It helps us keep our smaller units out on the road. It's all about how well we can manage our mechanics' time."

Airfield crews use the fleet of M-B5s to clear about six miles of runway and 12 miles of taxiways, while other workers use 21 pieces of conventional snow removal machines to clear ramp areas and roadways.

Expediency & Efficiency

During the seven days of manufacturer training, IND mechanics not only received instruction about maintaining the airport's new multifunction equipment, they also learned how to operate it. Why? Because when something goes wrong out on a runway, for example, mechanics must be able to communicate effectively with equipment operators via radio or cellphone to access on-screen diagnostic information.

"If a mechanic knows how to operate the equipment as well as repair it, he can troubleshoot more effectively," Medvescek points out. "Moreover, they might be as much as two miles apart. So if troubleshooting by radio works, the mechanic knows in advance what tools to bring out to the runway. That's

more efficient than going all the way out, then having to go back to the shop [for] the right tools or parts."

IND's contract also requires the manufacturer to perform regular equipment inspections and updates to optimize performance and prolong the fleet's lifecycle. "M-B Companies comes in after the snow season, plugs in their computers and updates the software…and also make suggestions for what should be replaced or repaired," Medvescek explains. "They're the pros–they know their equipment better than anyone and can address issues much quicker than our mechanics."

When a major breakdown occurs after warranty coverage expires, IND pays the manufacturer on a per-job basis to send repair technicians to the airport. Because M-B Companies' airport products division is located in Wisconsin, about 350 miles from IND, mechanics can usually arrive the same day and either bring parts with them or have them shipped overnight.

That may sound like an expensive arrangement, but not when measured against the cost of closing the airport because the runways can't be cleared. "What's the cost of that compared to having someone come down quickly and get things up and operating?" Medvescek asks. Moreover, he considers it more cost-effective to have a manufacturer's technician repair a machine quickly than have an airport mechanic occupied for days.

"Our goal is to give our mechanics an opportunity to keep 100 percent of everything else up and running," Medvescek says.

STEVE KARLIN

It's Complicated

IND's response to dealing with increasingly complex machines reflects a larger trend, says Steve Karlin, vice president and general manager of M-B Companies. Some airports need extra help because they're short-staffed. At other airports, especially smaller facilities, personnel

Photo: Denver International Airport

Crews at DEN maintain more than 90 million square feet of airside pavement, plus landside roads and parking lots.

simply can't keep up with all the new technology. "You might have a guy who cuts lawns and maintains a snow plow in winter," he points out.

Often, financial constraints prevent airports from replacing knowledgable veteran mechanics when they retire. "That's a very visible trend right now," reports Karlin. "The labor force at some airports just isn't what it used to be."

Then there's the complexity of the equipment itself. "Airport snow removal equipment has evolved just as much as your personal automobile," says Matthew McKibbin, an agency trainer at Denver International Airport (DEN), which also is partnering more extensively with manufacturers for equipment training. "And just like today's automobiles, this equipment utilizes computer-controlled components that work together on computer area networks to maintain emissions standards and optimal implement performance."

MATTHEW McKIBBIN

To better understand the complexities of repairing newer machines, consider a typical older truck-mounted broom sweeper. To swing the broom, the operator pulls a handle that, in turn, pulls a cable that opens a valve, releasing oil for the hydraulic system. "When you release the handle, it goes back to a neutral position and the oil stops flowing," Karlin explains. "The (broom) head moves hydraulically, but it relies on a mechanical cable to pull the valve and allow oil to flow—kind of like a physical extension of your hand."

In newer machines, components such as engines, transmissions and hydraulics are all electronically controlled. As such, if an operator pulls the handle and nothing happens, fixing it is far more complicated than simply checking a cable or hydraulic line.

"Now, the handle in the cab and the hydraulic valve on the back of the truck are connected by an electric wire, with a solenoid on the valve," Karlin says. "So instead of just one thing going wrong, it could be three or four different things, like the electrical connection, the solenoid or the joystick itself. We provide on-board diagnostics to help them troubleshoot, but the mechanics often forget how to use them in the off-season."

Moreover, today's engines feature sophisticated electronic controls in order to meet federal emission standards. As such,

New Runway Reporting Requirements

In an effort to help pilots predict aircraft braking performance and reduce the risk of runway overruns during adverse winter weather, the FAA implemented new Takeoff and Landing Performance Assessment (TALPA) requirements last fall.

The new reporting standards include codes designed to help aircraft operators, pilots and flight planners more accurately determine how much distance is needed to stop on a wet or contaminated runway. Released in October 2016, the guidelines were developed by an FAA aviation rulemaking committee that was formed after a jet skidded off a runway at Chicago Midway International Airport in December 2005. The plane hit several cars and killed a 6-year-old boy.

"The [committee] determined that the industry needed to communicate actual runway conditions to the pilots in real time and with information that would accurately correlate an expected aircraft braking performance," explains Carl Braley, assistant airport director at snow-prone Manchester-Boston Regional.

The new system uses a scale of one to six to convey runway conditions—with six indicating perfectly dry pavement. The worse conditions are (snow depth and compaction, for instance), the lower the assessment code. "Zero is not a reportable code. At that point, the runway would be closed," notes Braley, who recently explained the new reporting requirements during a Snow Academy class at Roanoke-Blacksburg Regional Airport. (Snow Academies are an extension of the annual NEC/AAAE International Aviation Snow Symposium.)

To determine a runway's condition code, airport personnel input data such as pavement type, depth and type of surface contamination, ambient temperature, etc. into a web-based software program. The program then computes the data and provides a condition code for the airport to communicate to pilots.

In the past, runway condition reports included a braking co-efficiency that used a numerical code called a Mu number (a measurement of drag and deceleration determined by a device called a decelerometer.) Airports were responsible for determining Mu values for the touchdown, midpoint and rollout areas of their runways to provide pilots with information about how much brake to apply while landing.

"The basic problem was that the Mu number did not directly correlate the performance for different kinds of aircraft at different airports," Braley explains. "In other words, a report of 40 at one airport, for example, could be different than a report of 40 at another airport, due to different kinds of equipment used and subjective scoring by the operators."

The new condition codes are designed to correct those shortcomings.

For more information, visit www.faa.gov and search for "new TALPA requirements." The new assessment system will also be explained at Snow Academy classes during the Snow Symposium in Buffalo (April 22 to 26) and at subsequent Snow Academy classes held around the country. For details, visit www.snowsymposium.org/attend/i-a-s-s-snow-academy or www.aaae.org.

all of a machine's components must be able to communicate with the engine. "Once the engine is electronic, we have to match it with electronic controls so they can talk to each other," he says. "There's no longer such a thing as a mechanical truck."

Hybrid Approach

At DEN, officials combine manufacturer training with their own in-house curriculum. "Typically, the process involves annual vendor training for our operators and repair technicians, which then is included in our operating/repair policies and procedures that we teach throughout the year," McKibbin says.

While annual vendor training for most equipment is free, training for more specialized equipment is not. Last year, DEN used $15,000 from general revenue funds to pay for extra training.

The airport schedules five weeks of vendor training for equipment operators during their off-season, in September and October. Classes range from

IND has reduced its clearing time to about 12 minutes per runway.

two to eight hours each, depending on the equipment. These sessions complement an additional 40+ hours of yearly in-house training, McKibbin notes.

"A highly trained staff offers many benefits, such as reduced maintenance costs, faster vehicle turn-around times and more efficient snow removal," he explains. "In fact, we have one of the quickest snow-removal times for cleaning a runway in the country—about 12 minutes. With good training, everybody wins, especially the airlines and our passengers."

In addition to clearing six runways and more than 90 million total square feet of airside pavement, crews at DEN also maintain 300 lane miles of landside roads and 30 acres of parking lots. During snowstorms, more than 430 employees are deployed each day for various snow removal duties, McKibbin reports.

Given its high traffic volume as one of the busiest U.S. airports and its snowy local weather, DEN maintains a large inventory of removal equipment: 250 pieces for clearing the airfield and 120 machines for landside maintenance. Its fleet includes blowers, brooms, blades, plows, runway sanders, snow melters, chemical trucks, loaders with box plows and skid-steers.

Future Outlook

It's difficult to predict how far the trend toward more vendor training and repair support will evolve. But one thing is certain: It's an attractive proposition for airports trying to cope with staffing constraints *and* tougher snow removal standards (see sidebar 33).

Karlin's take is this: "If you used to have 20 guys to maintain equipment and plow runways five years ago and now have 14, and the FAA is raising standards about how clean your runway needs to be, it affects your operation. When you have fewer resources to do a bigger job, the main question airports will be facing is how the hell to get the job done.

"On the other side of the equation, the equipment is much more complicated and most airport mechanics only work on them for three or four months a year," he continues. "So in the middle of a snow storm, how do they repair equipment in a timely manner?"

Karlin acknowledges that more involvement from equipment manufacturers isn't a good fit for every airport, but it works well for a growing number of facility operators. "Indy and Denver are two airports that, in their own ways, are really into it," he says. "They're very conscientious about doing what they tell the public they're going to do—keep airports open and safe."

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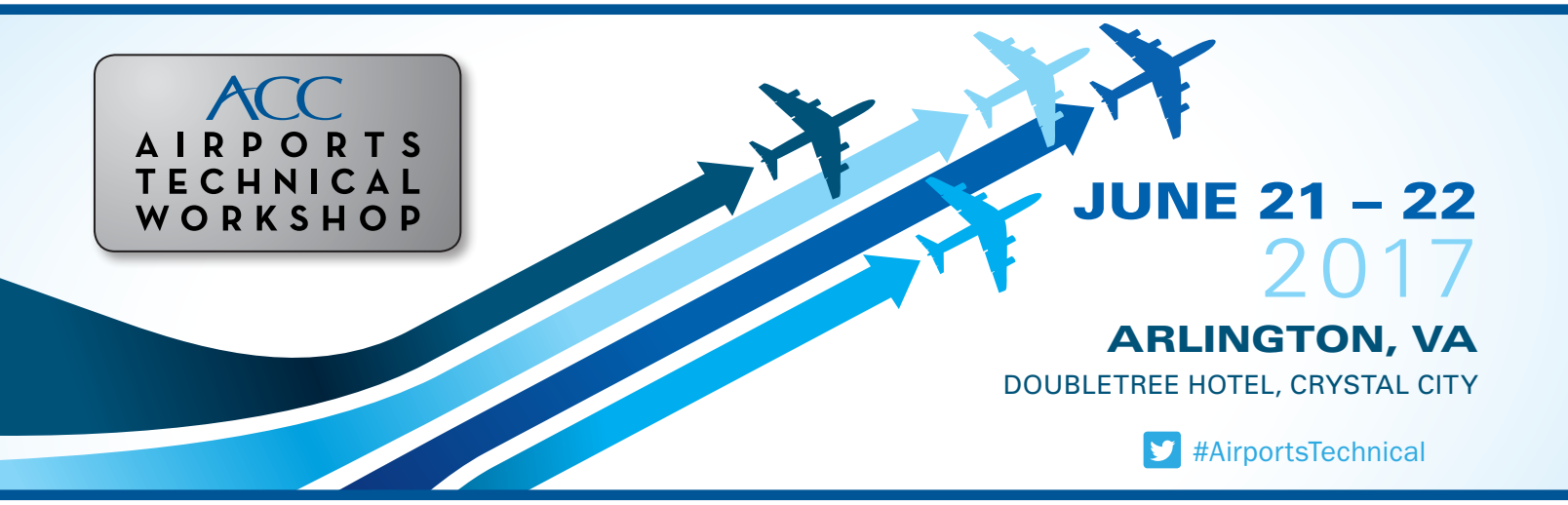

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AÉROPORTS DE MONTRÉAL

Trudeau Int'l Invests in Deicing Services and Glycol Recycling Facilities

BY ROBERT NORDSTROM

Montreal-Pierre Elliott Trudeau International Airport (YUL) has spent the past two decades honing its aircraft deicing operations into a centrally located eight-pad facility that recycles and reuses spent deicing fluids. It also transitioned to using a single common-use service provider. Together, the two entities have invested approximately $61 million since 1997 to improve the safety, efficiency, cost effectiveness and environmental sustainability of deicing operations at the Quebec airport.


CHRISTIANE BEAULIEU

"Aero Mag is more a partner with the airport than simply a service provider," qualifies Christiane Beaulieu, YUL's vice president of Public Affairs and Communications. "Over the years, we have perfected the system."

A couple decades ago, airport officials understood that YUL's deicing operations were neither ecologically responsible nor sustainable, she elaborates. Taking the bull by the horns, the airport partnered with Aero Mag to construct five deicing bays, an underground system to collect glycol and a central facility to store used glycol. The $40 million investment was "huge at the time," notes Beaulieu.

Efforts continued in 2012, when YUL invested an additional $11 million to add three more deicing bays. In 2013-14, Aero Mag and the airport added a $10 million state-of-the-art facility that recycles ethylene glycol for reuse at the airport. Using sophisticated methods, the facility purifies and concentrates used glycol for certified reuse at the airport. In doing so, YUL became the first airport in the world to recycle used deicing fluid at a minimum of 99.5% glycol concentration for subsequent aircraft deicing operations.

While the capital investments have been substantial, the benefits to YUL's airlines and the environment are significant, reflects Beaulieu. In addition to improving safety and efficiency as aircraft move through the deicing process and onto runways for departure, the system has reduced YUL's use of potable water by 2 million liters a year and lowered ethylene glycol costs for airlines by up to 30%.

Not surprisingly, the system is studied and admired by airport operators throughout the world.

Cost & Environmental Considerations


SAM CHARBEL

YUL takes a very aggressive approach regarding environmental initiatives, emphasizes Sam Charbel, Aero Mag's regional director for Eastern Canada. From the beginning, airport officials were intent on moving deicing operations away from the terminal gates and capturing spent glycol and water, he explains. The system in place today

Photo: Claude de la Sablonnière

FACTS&FIGURES

Project: Aircraft Deicing & Glycol Recovery/Recycling

Location: Montreal-Pierre Elliott Trudeau Int'l Airport

Sole Service Provider & Facility Management: Aero Mag

Total Cost: $61 million

1997 Construction: 5-bay deicing pad & glycol recovery drains

2012 Construction: 3 additional pads

2013-14 Construction: Glycol recycling facility

Funding: Airport capital improvement funds; Aero Mag

Staffing: 3 operations managers; 3 supervisors; 120+ seasonal employees

Maximum Capacity: 48 aircraft/hour

Aircraft Deiced: 9,100 (2015-16)

Deicing Fluids Applied: 6.45 million liters (2015-16)

Glycol Recycling Center Design & Construction: Aero Mag

Recycled Glycol Certification: LNT Solutions

Deicing Vehicles: Vestergaard Co. (14 Elephant Beta; 10 Elephant MY)

Glycol Distillation Equipment: Vilokan-Sweden

Glycol Recovery Vehicle: Beam (A8000)

Beam Distributor: Fortbrand Services

Awards: Finalist Mercuriades 2015 & 2016, Quebec Chamber of Commerce; Accolades 2015, West Island Montreal Chamber of Commerce; Environmental Merit 2016 for I'm On Board Program, Montreal Airport-ADM; Safety/Security 2016 for I'm On Board Program, Montreal Airport-ADM; Environmental Award 2000, ADM; EY Entrepreneur of the Year 2015 award in Quebec clean-tech category

Of Note: First airport in world to achieve a 99.5% concentration of recycled glycol for certified reuse as aircraft deicing fluid

Photo: Claude de la Sablonnière

A $10 million facility purifies spent deicing fluid and recycles the ethylene glycol for reuse at the airport.

collects used glycol and water through an underground drainage network and stores it in five tanks capable of holding 227,300 liters each.

Recovered fluids are segmented for storage according to glycol concentration, and then run through a two-step refining process. During the first step, the system removes impurities such as jet fuel, oil, dirt and gravel from the deicing pad surface that were collected with spent fluids, and the remaining liquid is processed to achieve a 50/50 mix of glycol and water.

During the second step, the reconcentrated glycol solution is refined further in the newly built distillation tower to a minimum concentration of 99.5% pure glycol, which is then certified and blended for two distinct product specifications. Type I deicing fluid is stored in four 91,303-liter tanks; Type IV anti-icing glycol is stored in two 91,303-liter tanks and two 22,781-liter tanks.

The recycling process translates into savings of up to 30% savings for airlines—"the cheapest in Canada for Type I deicing fluid," notes Charbel. "It's important for us to make sure that the quality of the product remains excellent and that liability issues and lines of responsibility are clear," he adds.

Efficiency & Safety

Prior to 1997, eight separate agents provided deicing services to airlines at YUL's gates. Each carrier had its own deicing operation, which created vehicle and aircraft congestion as well as environmental hazards from glycol and water runoff entering streams on airport property.

These days, Aero Mag is the only aircraft deicer operating at YUL, and it works away from the terminal.

In total, the company operates at 15 airports throughout Canada, the United States and the United Kingdom, and it definitely prefers being the only deicing agent on the field. "At some airports, we are the single service provider," Charbel explains. "At others, we are one of multiple providers, which can

create a lot of congestion because all the trucks have to go to a single-source location and often at the same time to replenish their glycol. In addition, some airports allow deicing at gates. You need to be able to capture the glycol dripping from the aircraft. It creates logistical complications as well as environmental hazards."

The deicing pads and facilities at YUL are located closer to the runways, which helps make operations very efficient, he explains. "The goal is to get the aircraft in the air as quickly as possible. An efficient aircraft is one that is flying and not idle on the ground."

At YUL, crews deice aircraft with engines running, so planes can move directly to the runway threshold for takeoff. Because the pads are centrally located, aircraft consume less fuel getting to the runway.

Beaulieu describes the operation as very efficient and very secure. "There's one way in and one way out," she details. "It eliminates a lot of back and forth movement of vehicles and aircraft, which can create hazards."

Last season at YUL, Aero Mag deiced 9,100 aircraft and applied 6.45 million liters of glycol. Eight aircraft can be serviced simultaneously, for a total capacity of up to 48 aircraft per hour, depending on weather conditions.

Equipment & Material Strategies

To handle the volume, Aero Mag uses a fleet of 24 deicing trucks operated by more than 120 seasonal employees. Notably, it is the first company in North America to use deicing vehicles that require just one operator, Charbel informs. Operators drive their vehicles to aircraft—close enough to minimize material waste but far enough to prevent direct contact with aircraft and protect the trucks from jet blast—and spray deicing fluid from an overhead basket.

Aero Mag personnel stationed in a control tower built specifically to accommodate the layout of this particular deicing pad communicate with air traffic controllers and personnel in the apron tower to facilitate safe and efficient aircraft movement from gates to deicing pads to runways. The goal is to avoid lineups and to move aircraft efficiently to runway thresholds immediately after deicing.

Three separate radio frequencies are used to manage the process. Aero Mag personnel use one to direct aircraft, service vehicles, snow removal equipment, etc. moving in and out of the pads; another to speak with pilots on the pad; and a separate channel to communicate with truck operators performing the deicing.

"As part of our deicing protocol, we perform a tactile inspection of the aircraft," notes Charbel. "Trucks with open-air

baskets allow operators to touch the aircraft at three different locations to ensure no clear ice or other contaminants are present. Six of our trucks are equipped with forced air equipment to remove snow and other contaminants."

All of the trucks carry water, Type I deicing fluid and Type IV anti-icing fluid. Online software blends glycol and water to the appropriate concentration levels depending on weather conditions. When adjusting glycol concentration levels, Aero Mag uses a buffer of 12° C to allow for temperature fluctuations and to prevent the need to adjust the glycol mix on an hourly basis.

"We used to purchase Type I fluid at a 55 percent glycol concentration level (55 percent glycol, 45 percent water). Today we produce fluid at 88 percent concentration, then use the trucks' blending software to determine the appropriate mix of water and glycol based on weather conditions," explains Charbel. "This has financial as well as environmental benefits. Depending on the season's weather conditions, online blending saves airlines between $1 million and $1.5 million a year."

Staffing

Three operations managers, three supervisors and more than 120 seasonal employees direct and perform deicing and glycol recovery operations. All operators undergo stringent classroom and on-the-job training, Charbel stresses. "During the summer months, we do extensive training simulation using water. When the season starts in October, trainers sit with new and recurrent hires to make sure they are applying what they have learned in the classroom."

Aero Mag boasts a retention rate of more than 80% among its seasonal employees. "We have a lot of retirees who work for us—a lot of firemen, military folks, students, as well as pilots in training for their commercial license," he elaborates. "The work schedules by necessity must remain flexible. For students, in particular, that works well."

From deicing aircraft to snow removal on the airfield, YUL has developed an excellent worldwide reputation for winter operations, Beaulieu proudly states. "We even offer insights to and advise airports around the world," she adds. "Airlines know that they won't suffer needless delays when they land in Montreal."

Beaulieu attributes the success to YUL's investments in innovative technologies and its focus on environmental, cost and political factors. "Airports must think about the environment; we need better methods and systems," she reflects. "Of course, there are capital expenditures, but in the long run, everyone gains."

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Rhode Island Airport Corporation

T.F. Green Airport Combines Science & Nature for Green Deicing Treatment

FACTS&FIGURES

Project: Deicing Fluid Treatment Facility

Location: T.F. Green Airport (Warwick, RI)

Airport Authority: Rhode Island Airport Corp.

Cost: $26 million

Building Size: 11,000 sq. ft.

Storage Capacity: 5.8 million gallons

Key Components: $9 million passive collection system; $17 million anaerobic fluidized bed reactor facility

Lead Engineer Planning, Design, Construction & Operations Startup: Gresham, Smith and Partners

Airfield Pavement Engineering: HNTB

Electrical Engineering & Process Assistance: D&B Engineers and Architects

Instrumentation & Controls Engineering: Dmytryka Jacobs Engineers

Geotechnical Engineering: GZA Geoenvironmental

Structural Engineering: Odeh Engineers

General Contractor/Construction Manager for Airfield Components: Cardi Corp.

General Contractor/Constructions Manager for Treatment Facility & Storage Tanks: The Hart Companies

Subcontractors & Suppliers: Aero Mechanical; Barker Steel; Boydco; Concrete Systems; EJ USA; Equality Construction Works; EW Audet; Insituform; DN Tanks; MON Landscaping; Moretrench; RE Erickson; Safety Marking; Trecan; Underground Solutions

Timeline: Facility construction substantially completed Oct. 2014; treatment began Nov. 2015; nearly 2.6 million gallons of collected fluids treated by May 2016

Key Benefits: Better accuracy of material flow; increased community confidence

Accolades: 2017 Honor Award from American Council of Engineering Companies of Ohio; 2016 Award of Merit in Water/Environment category from *Engineering News-Record New England*; 2016 Award of Merit for Excellence in Safety from *Engineering News-Record New England*

As manager of environmental programs for the authority that operates T.F. Green Airport (PVD), Jay Brolin is intimately familiar with all things, well, "green." Broadly versed in a wide variety of sustainability methods, his vast knowledge base recently expanded to include a thorough understanding of—and unique alliance with—bugs.

But the bugs that captivate Brolin's attention aren't the pesky insects that fly or crawl around the Rhode Island airport or splat on the windshields of tenants' aircraft. Instead, they are prolific anaerobic bacteria that have proved to be a game-changer for PVD's deicing treatment system. (They're also the same kind of bugs that treat wastewater from breweries such as Anheuser-Busch and foodmakers such as Smuckers.)

JAY BROLIN

Microscopic Workhorses

When appropriately stimulated in the airport's new $17 million anaerobic fluidized bed reactor treatment facility, Brolin's prized bugs/bacteria biologically degrade glycols from deicing fluid by splitting complex organic compounds into simple oxidized compounds. Methane, a byproduct of the reaction, is then captured and reused to heat the influent water and the building.

BY NICOLE NELSON

Even though these bugs are found under the microscope in biological chemistry, Brolin's caring manner toward them is akin to the affection pet owners show their dogs or cats.

"The bugs really like a pH of just about seven," Brolin emotes, adding that they also like to be warm. About 90° F is apparently optimal.

Unlike traditional wastewater treatment plants, PVD's facility uses a variety of chemicals to ensure that the pH remains neutral, or as close to neutral as possible. Then, the bugs are supplemented with food.

"We give them macro- and micro-nutrients to keep the bugs happy," Brolin explains. "We have to give them a little bit more than just the carbon food source they are getting from glycol. Just as man cannot live on steak alone, bugs need a balanced diet, too."

Beyond this minimal tender loving care, little else is needed to anaerobically mitigate glycol in deicing fluids recovered from an airfield, explains Brolin.

"Once you start it, the bugs do the work; and you just sit back and watch," he says. More specifically, trained personnel wait for glycol concentrations to fall to levels that the local sewer authority will accept. To pinpoint that level, the airport's new $9 million passive collection system includes a glycol content sensor. When the reading falls below the magic number, fluid from the facility flows directly into the stormwater system.

If the sensor detects an actionable concentration of glycol, fluid is diverted to PVD's new 5.8 million gallon storage facility for precise bleeding into the 11,000-square-foot treatment facility, and Brolin's bugs go to work.

The microscopic bacteria proved their worth in May 2016, when the new facility completed the successful treatment of all spent deicer fluid collected during the previous two years. Officials now consider the state-of-the-art system to be the new pinnacle in the airport's long history of exceeding expectations for managing deicing agents in an environmentally sensitive manner.

Evolution of Ideas

As a city airport surrounded by a host of low-flow groundwater resources, PVD has always been held to high standards by Rhode Island's Department of Environmental Management, notes Brolin.

The department has historically protected tributaries that surround the airport (Tuscatucket Brook, Buckeye Brook, etc.), and the airport has taken active measures to comply accordingly with the dedicated collection of propylene glycol and ethylene glycol products.

In the late 1990s, the state agency suggested deicing pads as the solution. Instead, PVD proceeded with what the airport authority considered to be a more effective active collection program that balanced aircraft operations and environmental protection. The airport's strategy included closing the valves in storm drains near the terminal and cargo operations to allow spent deicing fluid to pool in low areas so it could be collected by glycol recovery vehicles. Airport personnel affectionately referred to the labor-intensive process as the "plug it up, suck it up" method.

Fluids captured by the recovery vehicles were transported as far as Michigan and Indiana for recycling, and reprocessed product was sold on the secondary market as industrial antifreeze.

While the active collection process proved to be effective at the time, the state's environmental agency continued to encourage the installation of deicing pads as the EPA began developing Effluent Limitation Guidelines in the mid-2000s.

Microscopic bacteria are kingpins in the airport's 11,000-square-foot treatment facility.

"[The Department of Environmental Management] actually wanted to get ahead of the effluent guidelines," Brolin recalls. "They wanted us to be beyond compliance, for lack of a better term."

Getting Buggy With It

The airport adopted the department's "beyond compliance" philosophy, but chose not to install deicing pads to achieve it. With the help of Gresham, Smith and Partners, PVD successfully made the case for a passive collection system mixed with a cutting-edge anaerobic digestion treatment as a superior methodology.

Total cost for the new system was nearly $26 million—$9 million for the collection system and $17 million for the treatment facility.

JOHN LENGEL

GS&P Executive Vice President John Lengel recalls negotiating with regulators as early as 2006 regarding permit terms for a complete system design consisting of gate collection, pumping systems, storage and treatment. Planning began in earnest in 2011. Subsequent to regulatory approval in 2012, the airport solicited bids for construction in two distinct phases, and construction commenced in July 2013. After construction was substantively completed in October 2014, the airport began collecting glycol-laden stormwater in a pair of 2.9 million-gallon aboveground storage tanks.

After the system achieved full compliance with Warwick Sewer Authority requirements in November 2015, PVD began using its carefully cultivated anaerobic bugs to treat the nearly 2.6 million gallons of fluid collected during the 2014-2015 deicing season and fall 2015.

Lengel describes the new deicing management system as optimal, because PVD can operate it with minimal to no impact on airline operations.

"(T.F. Green) can deice at the gates, and no one is the wiser as to how the runoff is being handled," he remarks. "It's working very well in that regard."

In addition, Lengel praises the system's ability to evolve with the airport. "It allows them to maintain compliance today and offers flexibility for change in the future with either a permit condition or operational change," he explains. If needed, for instance, PVD can add another onsite tank to dramatically increase its storage capacity.

On a less tangible but critically important level, Lengel believes the completed project has also helped the community see that the Rhode Island Airport Corp. (RIAC) is committed to improving and reducing the airport's impact on the environment. RIAC is a semi-autonomous subsidiary of the Rhode Island Commerce Corp. (previously the Rhode Island Port Authority) that operates and maintains PVD and other airports throughout the state.

"It was a demonstration of RIAC's commitment, which was very, very important," Lengel comments. "RIAC has demonstrated that they are willing to do what it takes to protect the environment, and to do it in a manner that has minimal impact on their primary customers."

Deicing fluid collected from the airfield is stored in aboveground tanks for subsequent treatment.

Brolin concurs, noting that the nearly $26 million system provides superior accuracy of material flow. Previous methods are now outmoded because they were more open to interpretation and subject to human error, he explains. "We now have all sorts of monitoring and meters on this system."

From a community relations standpoint, he senses more confidence among local watershed advocates that PVD is "stepping up" and doing right by the environment.

"It seems like they trust us a little more," he reflects, "and that is something you cannot buy."

PORT OF PORTLAND

Portland Int'l Assembles Pieces of $53 System Upgrade

BY RONNIE GARRETT

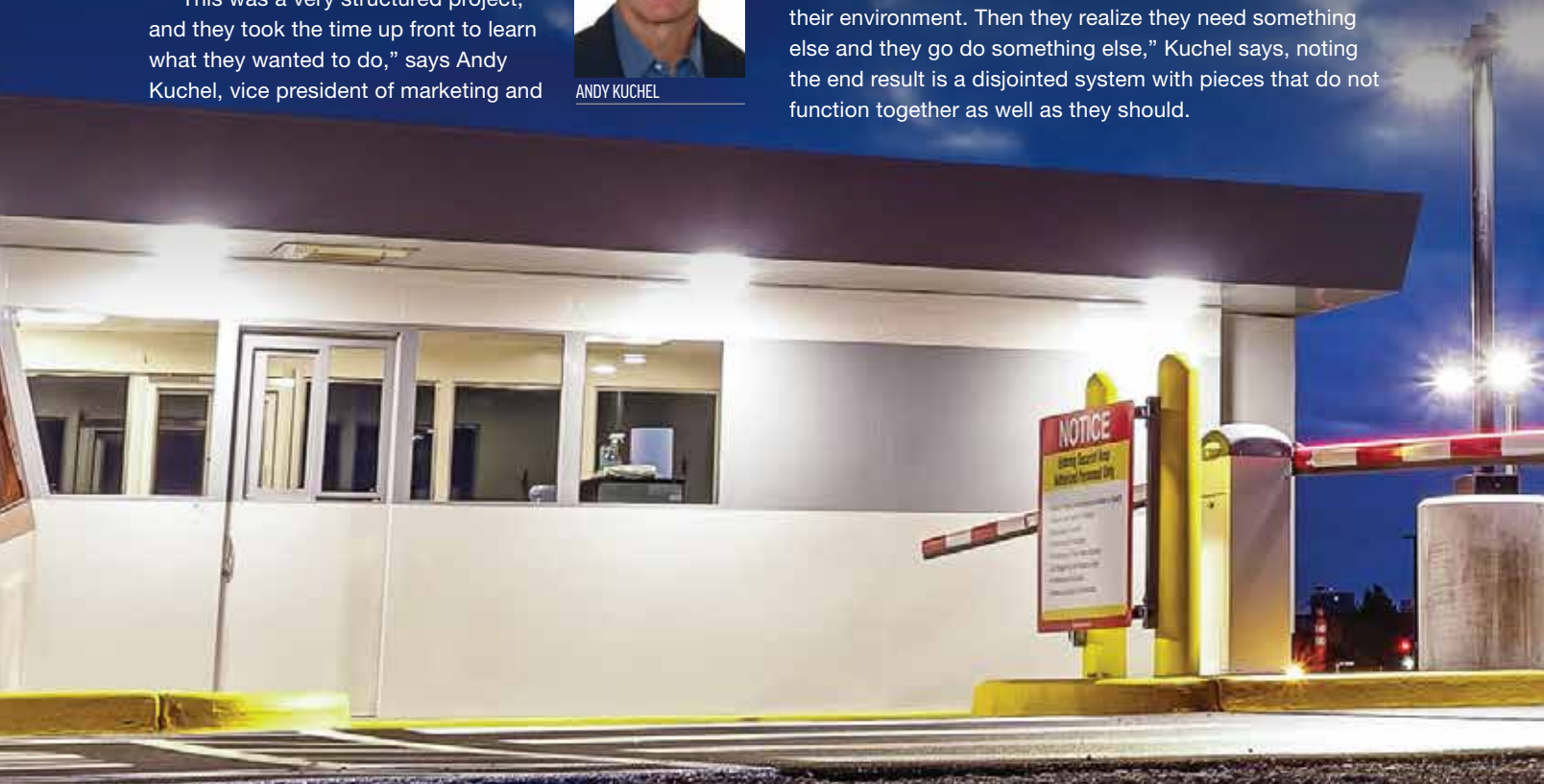
Airport security is like a vexing jigsaw puzzle: There are many unique pieces, and all must fit together seamlessly to achieve a cohesive overall design.

Officials at Portland International Airport (PDX) spent years studying the various pieces of their security puzzle before embarking on the largest security upgrade the airport has ever seen.

ANDY KUCHEL

"This was a very structured project, and they took the time up front to learn what they wanted to do," says Andy Kuchel, vice president of marketing and business development for Quantum Secure, the software company that supplied the access identification system for the $53 million project. "They followed the old carpenter's adage: Measure twice and cut once."

Too often, he adds, airport officials design security systems in a vacuum without considering the many pieces that go into creating the overall security picture. "If the burning issue is the need for a new access control system, they get a new access control system and rejigger it for their environment. Then they realize they need something else and they go do something else," Kuchel says, noting the end result is a disjointed system with pieces that do not function together as well as they should.



FACTS&FIGURES

Project: Access Control System & Security Upgrades

Location: Portland Int'l Airport

Traffic Volume: Nearly 20 million passengers/year

Project Cost: $53 million

Facility Improvements: 160 additional cameras; RFID- and biometrics-enabled card readers; fiber optic network to support new card readers & high-definition CCTV cameras; upgraded vehicle gates; on-airfield security stations; automated/relocated exit lanes; new security badging office

System/Process Improvements: Transitioning from badge-centric software system to identity management system for employee badging; rebadging 9,000 employees

Project Consultant: Airport Security Consulting

Construction General Manager: Hoffman Construction Co.

Subcontractors: Convergent (software); Amag (hardware); Oregon Electric Group

Identity Management Software: Quantum Secure

Million Security

PDX officials, however, took time upfront to think the project through, with research beginning in 2009. Staff then moved forward with the Access PDX project in 2012, and the design phase occurred from 2013 to 2015. When the extensive upgrade was completed in January 2017, not a piece of the airport's security system was left untouched.

The project included:

- building a modern security badging office with space for future growth;
- transitioning from a badge-centric software system to an identity management system for employee badging;
- rebadging 9,000 employees;
- installing a fiber optic network to support new card readers and high-definition closed-circuit television (CCTV) cameras inside the terminal and around the airfield perimeter;
- replacing legacy card readers with RFID- and biometrics-enabled readers;
- rebuilding vehicle gates and removing unnecessary vehicle gates from the fence line;
- building permanent stations on the airfield for security officers;
- adding more than 160 cameras to key locations for a new total of 760 cameras; and
- relocating and automating exit lanes (a feature that will be covered in Part II of this article in the May/June issue of *Airport Improvement*.)

Though numerous, the various elements were designed to work together to create a state-of-the-art system that positions the airport for a secure future. "There are a lot of pieces to this project, and each one of them brings its own benefits from an overall security standpoint," says Scott Shepler, information technology (IT) manager of security and access systems for the Port of Portland, which oversees the operational systems of the joint civil-military airport.


SCOTT SHEPLER

Time for an Upgrade

As with many other technical projects, the need for a security update at PDX was born out of necessity. "We had some really old equipment from an access control standpoint that the manufacturer could no longer support," explains George Seaman, engineering project manager for the Port of Portland. "We couldn't get parts and we couldn't get repairs made; so we had to do a full-scale replacement of our access control system in the terminal."

The airport also replaced 24 gates around the airport because communication to the gates was handled through an antiquated 20-year-old dial-up modem system. "We could not get live updates [to the gates] if there ever was an issue," he says.

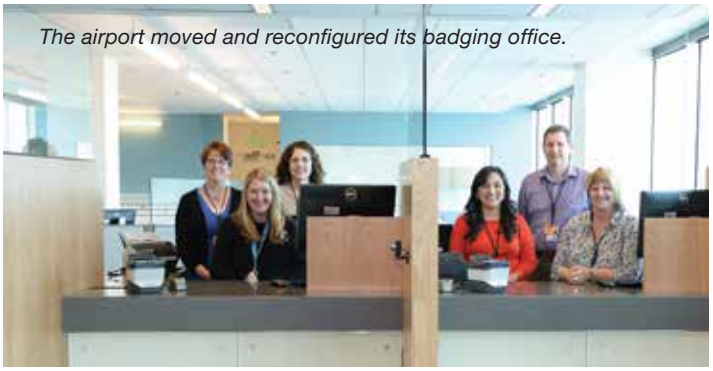
As PDX officials explored various options, they realized nothing could change until they finished upgrading the airport's IT infrastructure, including running approximately 30 miles of fiber optics around the airport perimeter.

And, as they considered installing a new access control system, they quickly realized that would be an opportune time to replace the facility's outdated magnetic strip card readers with readers that use contactless smart cards that leverage RFID and biometrics.

"Then, as we looked at upgrading the card technology, we considered our badging software and decided we should also upgrade that to an identity management system," says Shepler. "Like so many projects, by the time we actually defined the scope of the project in its entirety, it ended up being a little bigger than what we started with."

New Badging Office

A key part of the project involved relocating the airport's security badging office to the third floor of the terminal building, across from the TSA office. The 2015 move also combined the security training



The airport moved and reconfigured its badging office.

room with the badging office, which provided badge holders with more hours for security training classes and a one-stop location for all badging activities.

HOUSTON HICKENBOTTOM

Houston Hickenbottom, badging manager for the Port of Portland, explains that the change also enhanced efficiency for office staff. "Our previous badging office was split into two locations: the badging office was located on one floor and the security training was two floors above that," he notes. "With a staff of only five people, having them go between two floors in the airport to work at different shifts was very inefficient."

Another driver was space. The airport would need more room when it started rebadging all employees after the new card reader technology was brought online. "Before we could activate new card readers, we had to get new badges into every badge holder's hands," Hickenbottom explains. "The new badging office provided us with the space to be able to rebadge the entire airport population without having to build a temporary satellite badging office just for rebadging purposes."

New Badging Approach

"There's quite a bit of complexity about what a person must go through in order to be issued a badge," says Kuchel. "A person has to be trained, vetted, and his or her documents verified. That employee needs an authorized signer, who represents the company he or she will be working for, to state that he or she needs this badge, and what areas of the airport he or she needs access to. And, the airport has to continuously re-audit and re-vet these individuals."

To meet such challenges, the new badging office needed a system that allowed PDX to efficiently re-badge its entire population of about 9,000 employees.

Early on, officials decided to transition from the airport's existing badge-centric system to an identity management system from Quantum Secure.

With a badge-centric system, a record is created in a database when an employee applies for a badge. Properties are assigned to that badge, such as the person's name, the company he or she works for, specific doors he or she can access, etc. But if that person quits and later comes back,

the system creates a new badge record, assigns new properties to that badge, and the airport has two distinctly separate records assigned to the same person. "As you administer that person's background checks, this makes the security vetting process a little more complicated," notes Shepler.

"When you have a badge-centric system, every time someone applies for a badge, you have to vet their identity because you're associating that person's documentation and status to a badge, not a person," he adds.

With an identity management system, a record is not immediately created when an employee applies for a badge. The system first establishes that person's identity and vets the supplied information. A badge is then assigned after the employee completes his or her security training. As staff come and go, their badges no longer work, but the records about them remain in the database.

PDX selected the SAFE for Aviation software system, from Quantum Secure, which puts all airport personnel information in a common policy-based system that is fully aware of the security directives across the airport. As such, the system enforces TSA background check requirements and also simplifies and streamlines the application process of new badge holders, notes Kuchel.

Authorized signatory internet portals allow credentialed employers to access the system and enter information for a new employee, the type of badge needed and the associated access privileges, as opposed to submitting paper forms. After receiving the electronic request, the system ushers the prospective employee through the procedures and prerequisites of getting vetted, trained and badged.

"Airports typically are doing all of this by paper, so there is a lot of duplication and a lot of hand keying," Kuchel comments. "Our system sits as an overlay on top of the access control system and is embedded with the airport's policies and compliance requirements. Users are not plugging people into the door access system, they're putting them into the identity and credential management system, which has all these gates and procedures within it."

The new system ensures that employees have cleared all the necessary steps and obtained all the necessary approvals before allowing them into PDX's access control system, he summarizes.

Hickenbottom reports that the new system has greatly changed the way the badging office operates. Instead of having employees come in with paper applications, their information is already in the database and ready for badging personnel when they arrive. Moreover, it has changed the role of badging staff from data entry to process management and analysis.

Once the new software was in place, PDX began rebadging employees in a phased process—inviting various groups or companies to send their employees to the office during carefully scheduled time blocks. If companies struggled to send people over for badging, the airport supplied buses.


The airport had to issue new badges to about 9,000 workers.

Biometric readers provide an additional layer of verification.

"By having flexibility in our schedules and busing available, it was a lot less painful than companies initially thought it would be," Hickenbottom says.

Smart Badges

Beyond the process, the badges that employees use also had to change. Magnetic stripe cards were no longer enough. Though biometrics are not required by the FAA or TSA, airport officials decided to leverage the added technology to prepare for impending regulations and provide more control of badge usage within the airport in the meantime, relates Shepler.

"It positions us for the future, because TSA has been hinting at a biometric requirement for some time," he explains. "When that requirement shows up in the regulation, we will already be that much closer to compliance. And, we get the added security benefits of a biometric that make it harder for employees to share their badges with other people."

In addition, the new contactless smart cards use diversified encryption keys to protect information on the card and reduce the possibility of cloning and impersonation. "This increases the overall security of the credential itself," he adds.

"We can demonstrate and certify to the TSA that we're not just letting anybody in, anyplace," comments Dan Slauson, aviation security operations manager for the Port of Portland.


DAN SLAUSON

Implementing the new system, however, was a challenge, adds Seaman. "We had an existing access control system that was fully functional and had to remain fully functional," he explains. "Basically, we had to build the entire back end, essentially, all at once. Then we started cutting one door over at a time."

Because the airport had to maintain two separate access control systems during the transition, all employees had to be rebadged before the project team activated the first door on the new system. Likewise, new badges had to be able to open old and new doors, so every card had to be equipped with a magnetic strip and an RFID chip. "Once the old system is completely gone, which should be very soon, new employees will receive badges with just an RFID chip; they will no longer need the mag stripe," notes Seaman.

Adding Access Control Tech

While office personnel tackled the rebadging process, work crews replaced the airport's outdated access control systems. In addition to upgrading infrastructure technology to support 600 new card readers, workers rebuilt vehicle gates at 24 gate locations to add faster opening mechanisms and new card readers.


CRAIG REDLINGER

Craig Redlinger, construction manager for the Port of Portland, notes that the previous gates, which communicated via copper, phone lines and modems, had inherent weaknesses. "There was a risk, albeit not a large risk, but a risk, that if you ever lost communications to a gate from the head end, and at that same moment, somebody got their badge pulled for security reasons, the gate might not know that badge had been pulled and let that individual on to the airfield," he explains.

Though small, it was a risk the airport wanted to eliminate. Part of the project updated technology to provide a more consistent connection to the communications center and access control system. With the fiber optic network in place, the airport was also able to install high definition CCTV cameras, so personnel in the communications center can monitor the gates to see who is going through them. And, in an emergency such as a fire on the airfield, the communications center can close gates behind fire trucks, so they don't have to wait as is typically required.

None of these changes would have been possible without upgrading the IT infrastructure, emphasizes Shepler. The new infrastructure enabled the airport to completely rethink how the vehicle gates operate, he explains.

In addition to installing new high-speed vehicle gates, the airport replaced the gate controllers and added access control equipment and cameras to each one. "We changed our method of egress from the airfield to be controlled by card readers," he adds. "Before this project, you had to card swipe to get onto the airfield, but you had a 'free out.' Now, employees have to use their badges to get on *and* off the airfield."

The addition of CCTV cameras at every gate allows staff in the communications center to see the status of gates absent from the access control system. A wall of monitors allows them to select the camera views they want to monitor. "Key gates are always up there…the exit lanes, the major doors that lead from the public area and into the secure area," Seaman explains.

Access gates were rebuilt for higher security and faster operation.

"They can physically look and see if the gate is open, closed, partially open, partially closed," adds Slauson. "But it also gives you a recording of everyone who has come and gone through that gate. With the high-definition CCTV cameras we installed, you are able to distinguish faces, vehicle license plates, vehicle logos, etc. It gives us a situational awareness around our perimeter that we did not have before."

The changes also enabled the airport to add CCTV cameras in locations the communications center was previously unable to view. "It gives us more information to be more strategic about what's going on the airfield," he says.

Backup power systems were added to ensure that gates are always operational. Previously, gates could get locked in the open position during airfield power outages, unbeknownst to security staff. In such situations, the airport dispatched a police officer or airfield operations supervisor to physically check gates to make sure they were closed. "Now, with the cameras and uninterruptible power supplies, the communications center can quickly view the gates remotely," Seaman says.

The long-term project also equipped doors inside the facility with new card reader technology and cameras to build in an additional layer of security. "If a door goes into an alarm, an alert is sent to our communications center where dispatchers can pull a video to see what happened," Redlinger explains. "Generally speaking, they can see video footage 15 seconds before the alarm went off as well as a live video feed."

Although the airport previously had similar capabilities at select doors, the older-generation cameras provided pixelated images. "We added quite a bit and changed the cameras to high resolution, so you can actually get a better feel for who you're looking at on the screen," he explains.

In short, the new cameras, access control features, badging processes and other improvements are all individual pieces in PDX's ongoing security puzzle.

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Ogdensburg Int'l Takes Risk & Reaps Rewards

BY ROBERT NORDSTROM

FACTS&FIGURES

Project: Airportwide Redevelopment

Location: Ogdensburg (NY) Int'l Airport

Primary Elements: Runway & Taxiway Extension; Terminal Expansion; Parking Lot Construction

Cost: $25.6 million

Funding: $18.1 million from the FAA Airport Improvement Program; $6.78 million from the Ogdensburg Bridge & Port Authority; $725,000 from the Empire State Development Agency

Design, Construction Inspection and Environmental Assessment and Permitting: McFarland Johnson

Architect: Fennick McCredie

General Contractor for Terminal: Mumane Building Contractors

Airfield & Parking Lot Construction: Marcy Excavating Services

Plumbing & Heating/Venting/Air Conditioning: Norwood Plumbing

Electrical: Dow Electric

Mechanical Contractor: Hyde-Stone Mechanical Contractors

Airfield Lighting, Signs & Runway End Identifier Lights: ADB Safegate

Airfield Pavement Markings: Hi-Lite

Baggage Carousel: G&S Airport Conveyor

Departure Lounge Seating: Zoeftig

Of Note: Upstate NY airport redevelops facilities & adds air service to attract cross-border travelers from Canada; enplanements double in 4 yrs

It was a momentous occasion for Ogdensburg International Airport (OGS) when Allegiant Air Flight 1711 took off for Florida on New Year's Eve. The small upstate New York airport was finally breaking the critical 10,000-enplanement threshold to qualify for $1 million of Airport Improvement Program entitlement funding.

In 2012, however, OGS was operating in the red with only 5,000 annual enplanements, and service was limited to a few flights per week on small Cessnas operated by Cape Air, via the federally subsidized Essential Air Service program.

How did OGS double its passenger volume in four short years? By garnering community support for a $25.6 million redevelopment program to improve its terminal and airfield in hopes of attracting a major low-cost carrier. The infrastructure improvement plan worked, and also helped attract new passengers from across the Canadian border, just a stone's throw away.

In the end, OGS received $18.1 million in FAA Airport Improvement Program funds and another $725,000 from the Empire State Development Agency for the redevelopment project; but the airport's owner, Ogdensburg Bridge and Port Authority, assumed the upfront financial risk for the entire $25.6 million initiative.

Specifically, the project included:

- a 1,200-foot extension of the airport's sole runway;
- widening, extending and strengthening an associated taxiway;
- widespread terminal renovations, plus a 4,000-square-foot terminal expansion;
- realigning a state highway;
- relocating the runway's precision approach path indicator and installing runway end identifier lights;
- relocating the existing access road;
- expanding and strengthening the terminal apron;
- removing obstructions on and off airport property;
- improving vehicle access and circulation;
- constructing a 430-space parking lot; and
- relocating above-ground fuel storage tanks.

"For this project to work within the compressed time frame we were looking at, the Authority had to assume 100% of the risk upfront," notes Wade Davis, executive director of the Ogdensburg Bridge and Port Authority. "Under a typical scenario, this was a 10-year project. We got it done in three years."

In retrospect, Davis is glad the Authority took the risk. "It was clearly the right thing to do, and clearly a risky thing to do," he reflects.

Davis also credits OGS' redevelopment partners—in particular, its design and engineering team, the FAA and federal and state elected officials who supported the project. "All of us pulling in the same direction got it done," he comments. "But there were no guarantees along the way."


WADE DAVIS

Risks & Rewards

While the risks were significant, the potential rewards—including economic benefits for the entire region—were also significant. Prior to the expansion project, the airport was losing approximately $300,000 a year and "eating up" operating profits from an international bridge, industrial park and other business units also operated by the Authority, Davis laments. "Our choices were: do nothing, attempt to grow the airport or exit the business, which, of course, we couldn't do because of FAA grants and other obligations. Our only good alternative was to grow the airport."

Fortunately, the airport's location worked in its favor. The city of Ottawa, Canada's third largest air market, is a short 45-minute drive from OGS. In addition, the average wait time to enter the United States from Canada near the airport is just 35 *seconds*, emphasizes Davis. Despite having the highest throughput capacity, the border crossing near Ogdensburg experiences the least traffic of all crossing locations in the region, he adds.

When researching the market, Authority officials found that more than 5 million Canadians were crossing the border each year to take advantage of lower U.S. airfares. According to data from the Conference Board of Canada, approximately 15% of Canadian travelers cross the border to fly out of U.S. airports.

The potential increase in air traffic suggested major economic benefits for OGS and the surrounding region. A New York Statewide Airport Economic Impacts Study produced in 2011 (before the project began) reported that OGS created direct and indirect employment for 53 people and generated $3.5 million in income, $7.4 million in output and $427,000 in associated state and local taxes in 2010.

An analysis by McFarland Johnson conducted in 2015 estimated that the post-runway expansion project would create direct and indirect employment for 125 to 135 people and generate income of $5.4 million to $6.7 million, output of $13.4 million to $13.8 million and $793,000 in $945,000 in state and local taxes.

"We had some pretty good metrics as to what would happen once the runway and terminal expansion project was completed," Davis reflects. "And what we're finding is that the numbers are right on in terms of employment."

Fast-tracking the project, however, required the Bridge and Port Authority to assume significant upfront risk. And to assume such risk, the Authority needed local support and commitment from the local business community. "We weren't going to use a 'build it and they will come' approach. We needed to line up business support first," Davis explains. "We started pounding the pavement to garner community support, talking to airlines and working with McFarland Johnson on an airport expansion design.

"We had a lot of things going for us," he elaborates. "It was just a matter of putting the pieces together, making the case to attract an airline to our airport."


JEFFERY WOOD

Jeffrey Wood, transportation division manager for McFarland Johnson, recalls that the process began in 2013 with a feasibility study to determine what improvements OGS would need to accommodate Boeing A-320s. "We came up with a 1,200-foot runway extension and expansion of the terminal, apron and parking—in effect, an overhaul of the entire airfield and terminal facilities," summarizes Wood.

Warm Reception


ERIC FLETCHER

When Authority officials approached Allegiant Air about initiating service at OGS, they were pleased at the carrier's response. Interestingly, Allegiant had already performed a competitive analysis of the Ottawa market and, like the airport, realized its commercial potential.

"We were interested in Ogdensburg because of its proximity to the Canadian market, all the Canadians crossing the border for cheaper flights," explains Eric Fletcher, manager of airports for Allegiant.

In 2014, the Authority reached an agreement with the low-cost carrier to provide air service beginning in November 2016, contingent upon completion of OGS' expansion project. In addition, the carrier agreed to contribute up to $1 million to accelerate the project to help meet the timeline.

Although ultimately the money was not needed, Davis informs, "Allegiant's financial commitment demonstrated belief in the market and weighed heavily in the FAA's thinking about (and eventual support of) the project."

Today, Allegiant offers four departures per week from OGS: two to Orlando Sanford International and two to Ft. Lauderdale-Hollywood International. "While our focus today is on making the Orlando and Ft. Lauderdale routes successful, we hope for and expect more growth in the future," says Fletcher. "To get an idea of what we might mature this market into, all you have to do is look at our strong flight schedules out of Plattsburgh (PBG), Bellingham (BLI) or Niagara Falls (IAG). These are similar markets for us."


SAM LaMACCHIA

Bridge and Port Authority Board Chairman Samuel LaMacchia shares Allegiant's optimism. "This project has a vision that is just beginning; 10,000 enplanements is the first step," says LaMacchia. "We owe Allegiant a lot. They believed in us and without their support, there would be no expansion. The future has just begun at OGS."

More Prep

Moving forward, the Authority updated the airport's master plan and took its case to the community. By a 30-1 margin, the public voted to donate land owned by the Ogdensburg City School District to the airport for water and sewage requirements.

The Authority also reached out to county, state and federal officials and found support on both sides of the political aisle.

Environmental challenges, however, posed a problem. To satisfy a compensatory mitigation requirement necessary for a Department of Army permit, the Authority paid $559,300 to Ducks Unlimited for 7.99 wetland mitigation credits in the Western St. Lawrence River Service Area, per requirements of the New York In-Lieu Fee Program. Davis highlights the agreement as a "huge environmental win."

In addition, several obstructions had to be removed to facilitate the runway extension. The Authority worked with a community association to remove trees from an adjacent cemetery, and a local church sold OGS an island with trees that were problematic for the project.

On the airfield, some existing taxiway and apron pavements were not strong enough to accommodate A-320s. As a result, both had to be bolstered, and engineers also added a concrete parking position to the apron.

The existing 7,361-square-foot terminal was expanded to 11,326 square feet, with growth occurring to the north, where a new baggage carousel was added. Outside, crews installed new exterior sheathing and constructed a new roof. "From an aesthetics perspective, it's a pretty remarkable transformation," reports Wood.

Previously, about half of the terminal functioned as hangar space for Cape Air. During renovations, that area was converted into a holdroom, which now provides seating for up to 200 travelers. Cape Air moved to another hangar at the airport.

"The architect's treatment of the hangar door offers an interesting architectural feature in the new terminal," Wood notes. "The door was replaced with a glass wall, which gives the departure lounge an open, airy feel and offers a great view of the apron and airfield. The bifold hangar door was fully opened and pinned in place to create shade for the glass wall."

To contain costs, space planners left the TSA checkpoint in its original position at the center of the terminal. With the addition of larger aircraft and more travelers, OGS transitioned from a Category IV airport to a Category III, and its security plan changed accordingly. "We were going from three flights a day with eight-person Cessna 402s to an additional four flights a week with 177-passenger A-320s," recalls Airport Manager Patrick Sharrow. "We had to improve our entire security system, add closed circuit TV cameras and alarms on the doors—the entire security structure had to be beefed up and brought up to speed."


PATRICK SHARROW

Three Years Later

Davis attributes the project's overall success to several factors: the Authority's willingness to assume upfront financial risks, the FAA's ability to operate at the speed of business and the community's enthusiastic support for improving the airport.

Allegiant also recognizes the importance of local support for the project. "Without the Ogdensburg community's efforts to move this project forward, there's no way we would be serving Ogdensburg today," reflects Fletcher. "The Airport Authority worked very hard to make this happen, and we're extremely grateful."

At Spokane Int'l, the Travel Experience

Spokane International Airport

FACTS&FIGURES

Project: Improving Parking Operations

Location: Spokane (WA) Int'l Airport

Parking Facilities: 2 garages; 3 outdoor surface lots

Total Capacity: 7,200 vehicles

Key Initiatives: New parking operations nerve center; storage building for shuttles, deicing equipment, etc.; complimentary car wash; updated trip fees & tracking systems for commercial vehicles servicing airport customers

New Facility Costs: $5.7 million

Timeline: 2013-2016

Return On Investment: 7% annual revenue increases in 2015 & 2016

Geofence Reporting System: Transportation Security Clearinghouse Service

Parking & Revenue Control System: SKIDATA

Cab-Calling Contractor: Kodiak Security

It wouldn't be wise to manage a grocery store by stocking an impressive array of fresh produce while skimping on the quality and variety of meats or baked goods. *All* departments must be strong.

That's how officials at Spokane International (GEG) feel about managing an airport—and why they've been working to upgrade the airport's onsite parking. Elements of the Washington airport's multi-year improvement program include infrastructure additions, pricing changes and new perks for customers.

The program kicked off in late 2013, when GEG invested nearly $1.5 million to build an automatic car wash and extend associated infrastructure to the area. The new touchless car wash, which opened Thanksgiving weekend 2014, allows travelers parking in one of the airport's two garages or its main outdoor lot to clean their vehicles at no extra cost.

One year later, GEG built a $2.4 million parking operations building that now serves as the "nerve center" for all of its parking facilities. During construction, the airport also upgraded the software for its 2008 SKIDATA Parking and Revenue Control System and added two more exit lanes.

Last year, crews completed construction of a $1.8 million vehicle storage facility to shield shuttles, deicing equipment and other vehicles from inclement weather when not in use. More recently, the airport modernized the way it manages vehicles such as hotel shuttles that deliver passengers to/from the airport and contracted local company Kodiak Security for cab-calling servicesand general curbside assistance.

Throughout the multi-year process, the airport has made other system-wide improvements, such as increasing the focus on cleanliness.

In total, the airport has onsite parking for about 7,200 vehicles. With roughly 3.1 million passengers in 2015, GEG is the second-busiest airport in the state, behind Seattle-Tacoma International, which served 45.7 million last year.

Crafting a Better Option

Improving travelers' overall experience by enhancing parking facilities and services was part of the strategy to maximize *all* of the airport's assets, emphasizes GEG Chief Executive Larry Krauter.

LARRY KRAUTER

Because the municipal airport does not receive any taxpayer funds, management focuses on increasing non-aeronautical revenue to supplement earnings from rent and fees. "A lot of what drives us is maximizing our revenues," Krauter explains. "We take every dollar we get and invest it in the operation or capital improvement of the airport. We want to make sure our assets are fully utilized."

Prior to construction of the new support facilities and other infrastructure improvements, GEG managed parking operations with a "public utility mindset," Krauter observes. These days, it treats parking as the important revenue-generator it is and focuses on improving the overall customer experience. Moreover, for the first time in the airport's history, it launched a marketing campaign to help capture a larger percentage of the overall parking pie.

Begins in the Car

BY PAUL NOLAN

For years, the airport had two off-site parking competitors. Diamond Park 'N Jet closed last fall, but Spotted Road Parking Express continues to operate.

"Parking is a significant touchpoint with our customers," says Krauter. "Understanding that customers have choices, we needed to pay attention to enhancing the customer experience we provide in order to retain the customers we have and also, ideally, bring new customers in."

Exhibit A: Free car washes.

GEG's new complimentary car wash proved so popular (nearly 37,000 washes last year alone) that the airport is considering adding a second one. Options being considered include a combination gas station/convenience store/car wash next to the airport's economy lot and a standalone wash that would be open to the public near the Terminal C lot.

Many Happy Returns

Prior to construction of the new parking operations building, customers parking at GEG often had difficulty finding assistance when they needed it. The new parking headquarters facility is a welcome resource for travelers whose cars won't start or need other help. "We average over 20 jumpstarts a day in the winter, so it's critical that people are able to find us," explains Jeff Collins, manager of parking and ground transportation for the airport.

JEFF COLLINS

After crews completed the parking services facility and car wash, GEG launched a marketing campaign to help capture a larger percentage of the overall parking pie. For the first time in the airport's history, it ran parking-oriented newspaper ads and purchased billboard space throughout the airport's catchment area, which includes the Tri-Cities (Richland, Kennewick and Pasco) and Coeur d'Alene, ID.

In addition, it announced a summer sale in 2014, lowering the price of its outer economy lot from $6 a day to $4 to make it competitive with off-site rates. Prices for the airport garages and adjoining lots range from $7.50 to $10 daily.

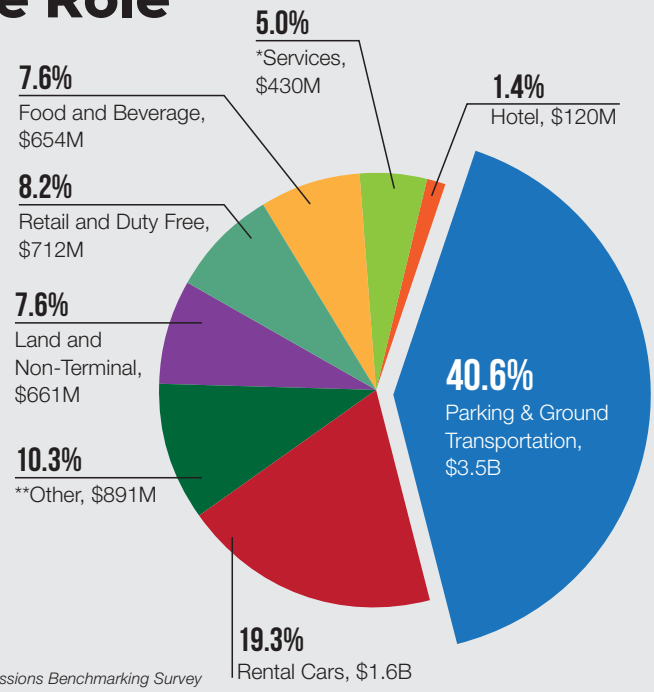
Response to discounted pricing at the economy lot was strong—so strong, in fact, that the airport extended it indefinitely. Dave Armstrong, GEG's director of finance, reports that the airport quickly made up in volume what it lost through the pricing reduction, and its other on-site lots also experienced bumps in volume. Total

Parking's VIP Revenue Role

As airports of all sizes continue to increase their focus on non-aeronautical revenue, parking continues to outshine retail, food/beverage and other in-terminal concessions as star of the overall category.

According to the *2015 Concessions Benchmarking Survey* by Airports Council International-North America, non-aeronautical revenue makes up 45.1% ($8.65 billion) of total revenue for U.S. airports. Parking and ground transportation account for fully 40.6% of total non-aeronautical revenue—more than twice the amount of the next-closest category, rental cars.

Another continuing theme when it comes to parking and other concessions: Optimizing per passenger sales is still the name of the game.



2015 ACI-NA Concessions Benchmarking Survey

parking revenue increased 7% in 2015 from the year before and jumped another 7% in 2016.

GEG is also outperforming airports of similar size. With total gross parking receipts approaching $11 million in 2016, it collected millions more in parking revenue than airports with comparable enplanements. Moreover, it posted higher per-passenger parking revenue, according to statistics published in *Airport Revenue News*.

21st Century Trip Fees

In addition to stepping up its business approach toward parking operations, GEG's management team enacted what Krauter describes as an overdue increase in the trip fees it charges cabs, limos, hotel shuttles and other commercial vehicles that pick up and drop off passengers at the terminal. Last July, the airport raised its per trip fee from 50 cents to $1.

When Diamond Park 'N Jet went out of business in October, local media reported that the off-site lot "succumbed to the airport's lower rates" after decades in operation. (Diamond charged $5.99 a day for self-parking and $10.99 a day for valet parking.) Company officials also cited higher trip fees for its customer shuttles as a contributing factor.

Krauter notes that Washington state law stipulates that trip fees must be uniform to all commercial users and must be tied to justifiable expenses. "It is not an arbitrary revenue source," he explains. "It is merely achieving cost recovery for providing the facilities for the businesses that profit from the airport, as well as maintaining and operating the facilities."

GEG also installed an automated vehicle identification (AVI) system to track registered commercial vehicles such as taxis, parking shuttles and hotel vans that pick up and drop off passengers at the terminal. To track private vehicles driving for transportation network companies such as Uber and Lyft, the airport contracted with Transportation Security Clearinghouse Service to provide it with a geofence reporting system that was developed in association with the American Association of Airport Executives.

To accommodate such drivers, the airport allows them to wait for ride requests from arriving passengers in a designated section of its cellphone lot. Taxis are staged in a separate area until they are hailed to the curb for pickups. Both types of vehicles are allowed to drop customers off at the curb.

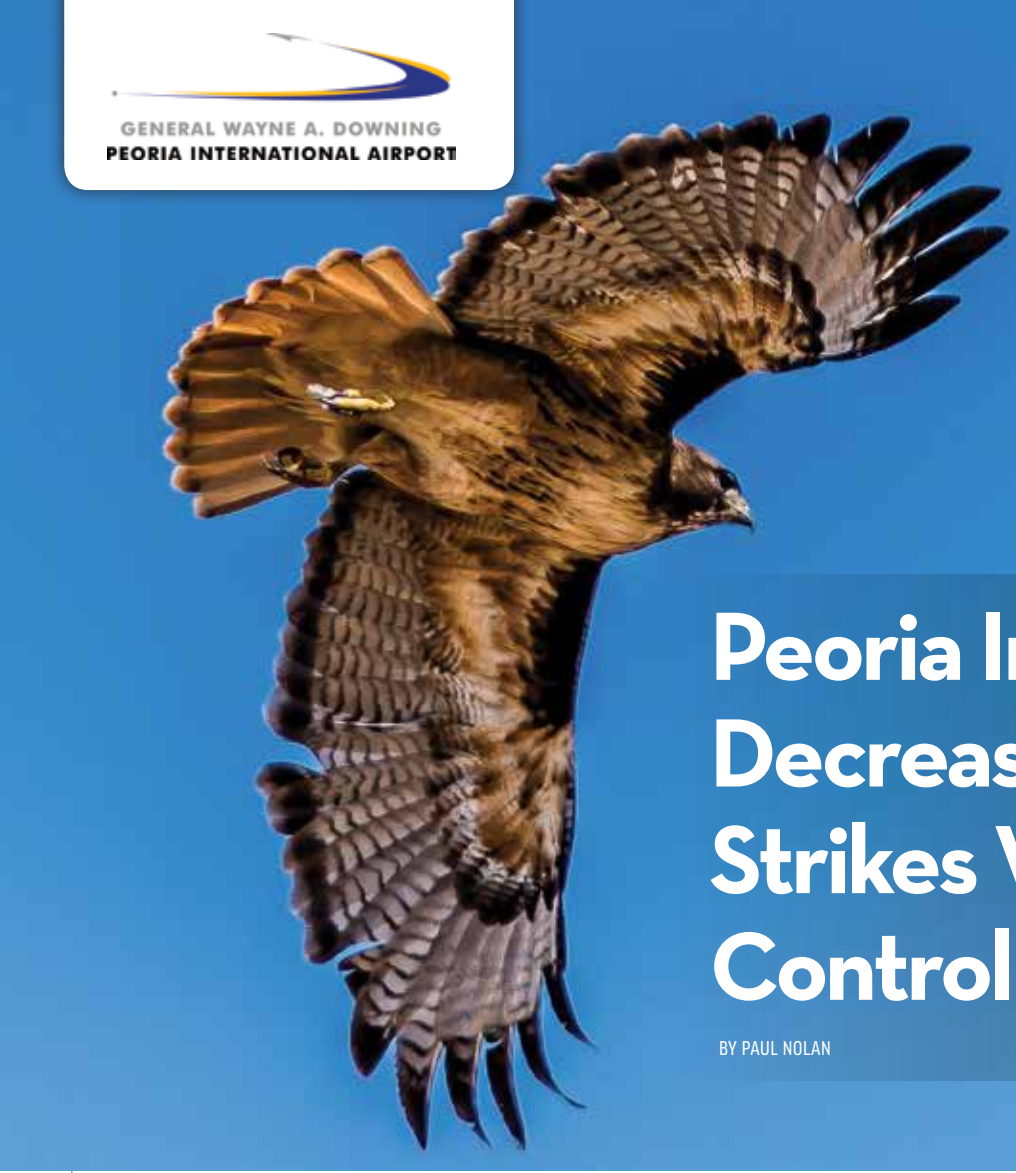
Between its AVI and geofence systems, the airport can now track drop-offs and pick-ups.

Room for Growth

While Krauter and his team are pleased with the initial results of GEG's various parking improvements, they say there is room for even more growth. Outside of peak travel seasons, the airport's parking facilities operate at about half of their full capacity on a monthly average.

According to Armstrong, the next steps include an online reservation system, valet parking and a system that directs customers to open spaces. "We're doing all of the things that we think will provide an exceptional customer experience when they come to our airport."

GENERAL WAYNE A. DOWNING
PEORIA INTERNATIONAL AIRPORT



Peoria Int'l Decreases Bird Strikes With Rodent Control Campaign

BY PAUL NOLAN

Gene Olson enjoys gazing from the sweeping windows in his office at General Wayne A. Downing Peoria International Airport (PIA). Too often, however, the picturesque view is spoiled by birds—more specifically by thoughts of the damage they could cause to aircraft operating at the central Illinois airfield.


GENE OLSON

In fact, a bird caught Olson's eye during the telephone interview for this article. "As we speak, I'm looking out over the airfield, and there goes a flipping hawk, flying right across the midfield area," comments the director of airports for Peoria's Metropolitan Airport Authority. "It's flying real low and just landed on a windsock."

Birds are a common sight for Olson, but not nearly as common as they were before PIA launched an initiative to manage the growing population of predator species in the area. Red-tailed hawks, American kestrels and other birds of prey were feasting on voles thriving in fields around PIA, and the airport was consequently experiencing increased bird strikes.

In summer 2015, however, PIA partnered with the USDA Wildlife Services' Airport Wildlife Hazards Program (AWHP) to eliminate the voles. Since then, the airport has reduced its population of problematic birds by more than 60%, and bird strikes have decreased by more than 20%.

According to the FAA Wildlife Strike Database maintained by AWHP, PIA has experienced 150 wildlife strikes in the last five years. However, only six have occurred since November 2015 (after the vole control program was in full swing). The most common bird strikes at the airport since 2011 involved American kestrels, the smallest falcon in North America. Others involved red-tail hawks and non-predators such as killdeer and barn swallows. FAA records also note strikes at PIA involving a bat and a great horned owl.

FACTS&FIGURES

Project: Wildlife Management

Location: General Wayne A. Downing Peoria (IL) Int'l Airport

Airport Operator: Metropolitan Airport Authority of Peoria

Strategy: Eliminating food source of predator birds (voles) with pesticides

Results: Reduced bird population by 60+%; decreased bird strikes 20+%

Approx. Cost: $10,000

Funding: Illinois Air National Guard; Metropolitan Airport Authority of Peoria

Timeline: Pesticide treatment July-Aug. 2015

Project Manager: Airport Wildlife Hazards Program, a division of U.S. Dept. of Agriculture, Wildlife Services

For Airport-Specific Incident Information: Consult the Federal Wildlife Strike Database at wildlife.faa.gov/database.aspx

Although the airport has had wildlife strikes that resulted in aircraft damage, Olson doesn't categorize any of the incidents as scary. "I don't recall anyone on the civilian side needing to make an emergency landing due to an air strike," he notes.

The airport serves four scheduled airlines as well as a steady flow of cargo planes that land and take off at all hours. It's also home to the 182nd Airlift Wing of the Illinois Air National Guard, which flies C-130s. In 2015, PIA serviced a record-high 642,000 passengers (321,000 enplanements).

Growing Problem

Olson says it became clear in recent years that PIA needed to address its predator bird population. "We would see raptors perched on anything that had a horizontal surface," he laments.

AWHP specialists note that because of their size, hawks and other raptors often cause damage if they strike an aircraft. Their behavior also makes them dangerous, adds Olson. "Hawks are the fighter pilots of the sky," he says. "They think they can outfly you, so they wait too long to get out of the way and then you smack [into] them. Seagulls are dangerous because they tend to flock, but they're stupid."

Per FAA regulations, PIA conducts wildlife hazard assessments after bird strikes and prepares a management plan to identify specific actions it will take to mitigate the risk of wildlife strikes on or near the airport. Like other airports, it goes to great lengths to minimize the attractiveness of open areas that provide food, water and cover to a wide range of animals. Preventive wildlife management measures at PIA include 10-foot fencing and endophytic grass, which tastes bad to geese.

"You'll hear the term 'integrated pest management' thrown about," Olson remarks. "There are a lot of contractors out there who throw the term around, but they don't know how to practice it."

Eliminating Sustenance

Hunter Ray, a Wildlife Services AWHP-qualified airport wildlife biologist stationed at PIA measured the bird population

Damage to this aircraft was caused by a red-tailed hawk.

HUNTER RAY

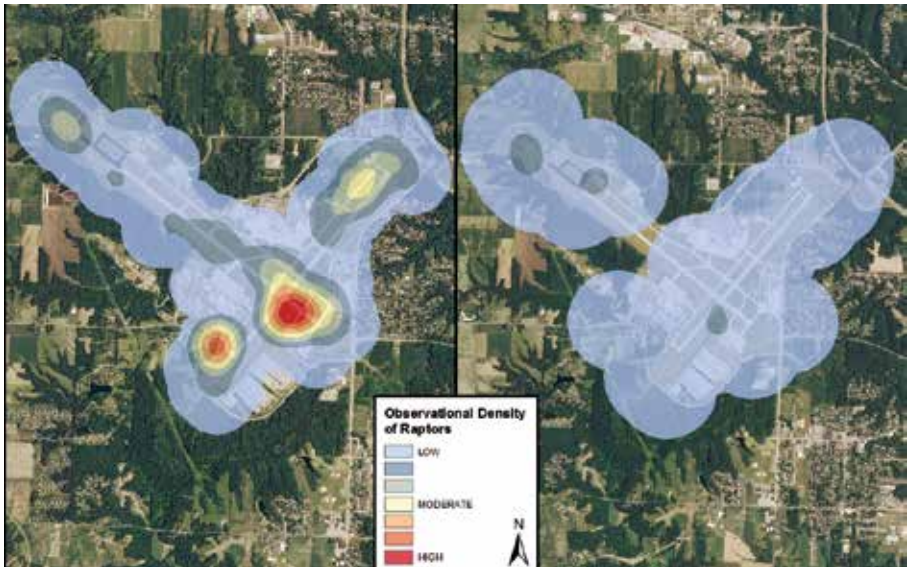
on and around the airfield and enacted a commonly used technique: encouraging predator birds to relocate by eliminating their food source. At PIA the targeted food source was voles, small rodents often mistaken for mice.

"There are a lot of things you can do with wildlife at airports," explains Michael J. Begier, national coordinator of AWHP. "The best and most efficient in terms of money and time is to change the habitat. If you can figure out why they're there and you can change the habitat to make it not attractive, that's the goal."

Other strategies employed by AWHP include eliminating or reducing trees, shrubs and other plants that provide food, shelter and roosting sites; scaring birds away with distress signals, pyrotechnics or other methods; and draining streams or wet grassland areas of standing water.

At PIA, the Air National Guard and the Metropolitan Airport Authority of Peoria shared the cost of the $10,000 bird management project. The airport authority purchased pesticide to exterminate the voles, and the Guard paid for the labor to apply it.

According to Ray's measurements 12 months before and after the pesticide treatment, the airport experienced a 64% reduction in raptors compared to the same time period the prior year. Wildlife strikes with raptors also dropped 21%. Before-and-after aerial mapping of the predator population was illuminating (see 64).



Depictions of survey data on aerial maps before (left) and after (right) a rodent control effort at PIA show a distinct reduction in raptor hot spots.

"A picture is worth a thousand words, but maps are worth a little bit more," says Jason Kougher, an AWHP staff biologist. Kougher oversees day-to-day geospatial data collection at airfields and provides wildlife mapping to identify "hot spots." At PIA, the hot spots pinpointed areas where raptors were observed.

"When you depict these surveys, you end up with large circles identifying where the raptors prefer to look for food," explains Kougher. "If we can show a map of the wildlife hazards story, whether they are habitat hazards or wildlife species hazards, then we can convey that story a lot better; and airport management can allocate those resources to fix the problem a lot more efficiently."

What Are the Odds?

According to SKYbrary, a British-based electronic repository of aviation safety information, aircraft damage from bird strikes differs according to the size of aircraft involved. Small, propeller-driven planes are more likely to experience structural damage, while larger jets are more susceptible to engine ingestion. Partial or complete loss of control may be the secondary result in either scenario. Bird strikes can also cause flight instruments to malfunction.

Interestingly, SKYbrary reports that military aircraft, like those flown out of PIA by the Air National Guard, experience more problems with damaging bird strikes than civilian aircraft, because military flights are more often conducted at low levels. It is not uncommon for large birds to shatter the windows of low-flying military aircraft, which is one of the reasons jet pilots' helmets have visors.

With military traffic and business jets carrying passengers to and from Caterpillar's corporate headquarters in Peoria, PIA incurs both types of risk.

AWHP reports that about three dozen bird strikes occur every day at U.S. airports, but only 6% to 7% result in aircraft damage.

Of course, the most famous incident forced Capt. "Sully" Sullenberger to perform a spectacular emergency landing in the Hudson River after multiple bird strikes caused both engines of a US Airways jetliner to fail. All 155 passengers and crew aboard the Airbus A320 survived the January 2009 incident, inspiring the nickname "Miracle on the Hudson" and a feature film.

PIA hasn't experienced any movie-worthy incidents, and Olson is intent on keeping it that way. He still vividly recalls a bird strike he experienced when flying as a commercial pilot in Indiana nearly 20 years ago. "I was flying at 10:30 at night about 5,500 feet up and hit a bird. My first thought was, 'What the heck is a bird doing a mile up at 10:30 at night?' Talking to a biologist later, I learned that is absolutely the worst altitude to pick during migratory seasons."

Frequently Asked Wildlife Management Questions

Q: When do most bird strikes occur?

A: About 60% of bird strikes with civil aircraft occur during landing phases (descent, approach and landing roll); 37% occur during takeoff run and climb; and the remainder occur en route.

Q: At what altitude do most bird strikes occur?

A: Approximately 92% of bird strikes with commercial civil aircraft in the United States occur at or below 3,500 feet above ground level. From 1990-2013, there were 21 strikes with commercial aircraft at heights of 20,000 to 31,300 feet above ground level.

Q: How many deaths are caused by wildlife strikes?

A: From 1990 to 2013, there were 25 human fatalities attributed to wildlife strikes with U.S. civil aircraft.

Q: What types of birds are the biggest problems?

A: Gulls (19 species) are the most common type of bird struck by civil aircraft in the United States, accounting for 15% of the birds identified in bird strikes between 1990 and 2012. Waterfowl (ducks and geese) account for 7% of overall strikes but are responsible for 30% of the strikes that cause damage to aircraft.

Q: What part of the airplane is most frequently damaged?

A: For civil aircraft, engines are the component most frequently damaged by bird strikes; engines accounted for 32% of all damaged components from 1990 to 2012.

Q: Are other animals besides birds involved in strikes?

A: Yes. While 97% of all strikes with civil aircraft in the United States involve birds, strikes with other animals such as deer, coyotes, turtles, skunks, bats and alligators have also been reported. White-tailed deer were the most common non-bird species to be struck between 1990 and 2012.

Source: faa.gov

Miami Int'l Plans to Grow Cargo Business With New Foreign-Trade Zone

BY THOMAS J. SMITH

FACTS&FIGURES

Project: Cargo Development

Location: Miami Int'l Airport

Primary Components: Pharmaceutical hub operations; ocean-to-air shipping program; establishment of a foreign-trade zone

Pharma Hub

Designating Body: Int'l Air Transport Assoc.

Application Process: 6-10 months

Administration: In-house

Designation Received: 2015

Of Note: There are no other IATA-designated pharmaceutical hubs in the Americas

Ocean-to-Air Transfer

Governing Bodies: U.S. Dept. of Agriculture; U.S. Customs & Border Protection

Application: 3 years

Achieved: 2016

Administration: In-house

Growth Market: Shipping perishable products grown in Latin America for consumption in Europe & Asia

Foreign-Trade Zone

Governing Body: Foreign-Trade Zones Board

Application Submitted: April 2016

Approval Expected: Early 2017

Administration: In-house

Cargo Optimization, Redevelopment & Expansion Plan (CORE)

Goal: Increase cargo capacity from 2.5 million metric tons to 4 million metric tons

Timeline: 20 years

Consultant: Ricondo & Associates

Phase 1: Replace apron & ramps in cargo area

Est. Cost: $8 million

Funding: Federal grants

Phase 2: Modernize & redevelop existing cargo space

Timeframe: Begins in 5 years

Costs: To be determined

Already a dominant player in the cargo sector, Miami International Airport (MIA) is working to boost business further with three new initiatives. Two are up and running: a new ocean-to-air shipping program and specialized operations as a pharmaceutical hub. The third, a foreign-trade zone, is pending federal approval, with a decision expected early this year.

If zone status is approved, MIA will have a valuable new incentive to offer tenants: reduced, deferred or eliminated duties on materials and finished products they import, assemble, manufacture and export at MIA. Airport officials estimate that a foreign-trade zone at MIA will generate $5.5 million per year in airport revenue and create hundreds of jobs.

The airport's three-part business development program is tied to a capital improvement program to modernize and upgrade cargo facilities, with an ultimate objective of equipping MIA to handle 4 million metric tons of cargo per year within the next 20 years. The airport's current capacity is 2.5 million metric tons per year.

JOSEPH NAPOLI

"Worldwide growth in air cargo is relatively flat," notes MIA Chief of Staff Joseph Napoli. "We have been able to continue to grow, but at a very low, moderate pace. We are looking for innovative ways we can bring in new business. We are looking to increase our cargo throughput."

In 2015, MIA handled 2.2 million U.S. tons of airfreight (an increase of 0.3% over 2014.) Of that total, fully 1.9 million tons was international cargo.

Pharma Hub

In late 2015, MIA became the only airport in the Western Hemisphere to be designated an official pharmaceutical freight hub by the International Air Transport Association (IATA). Moreover, 10 of its carriers, freight forwarders and handlers were certified by IATA's Center of Excellence for Independent Validators for shipping cold-chain pharmaceuticals.

Napoli explains that IATA and the international pharmaceuticals industry developed the program because product shipment was a weak link in the otherwise very regulated industry. Per the program, pharmaceutical companies will use IATA-certified airlines and handlers to maintain safety and integrity as they ship drugs from factories to distributors.

MIA was the second airport to secure IATA designation (behind only Brussels Airport) and is still the only official pharmaceutical hub in the Americas. "We are working to establish several strategic international pharma routes," Napoli reports.

In the one year since it received the official IATA designation, MIA has increased its volume of pharmaceutical cargo by 7%. The value, however, has increased 35%. MIA's pharma business is now valued at $3.3 billion.

Sea to Air

Providing a link between perishable goods grown or produced in Latin America and customers in the Eastern Hemisphere is another area of focus for MIA.

Europe, Asia and the Middle East continue to demand more perishables every year, but their limited ability to produce such products locally or fly them in from other countries makes it difficult to meet demand, explains Napoli.

"The Latin America and Caribbean region is a dynamo in terms of producing perishables, and many of these products make their way to Miami via ocean transport," he continues, noting that MIA then facilitates final shipping to Europe, Asia and the Middle East.

"With its excellent connectivity with South Florida seaports, abundant freight logistics options, and its extensive direct air route network with major cities around the world, MIA offers a viable solution as a major trans-shipment hub for perishables," he elaborates.

Last September, the U.S. Department of Agriculture and U.S. Customs and Border Protection approved the shipment of fresh produce arriving at the Port of Miami and the Port of Fort Lauderdale from Latin America to be transferred to MIA's cargo facilities for direct shipment to Europe and Asia.

Shippers do not have to pay U.S. duties on produce transiting from the seaport to the airport, because it is not be considered an import into the United States.

Prior to winning federal blessing for this program, MIA was already handling nearly 160,000 tons of imported fresh fruits and vegetables annually.

Foreign-Trade Zone

The pending component of MIA's three-part cargo plan represents significant upside business potential. In its application for foreign-trade zone status, MIA projects that business within the airport zone would generate $5.5 million in additional airport revenues and create hundreds of new jobs.

The airport's total economic impact is estimated at $33.7 billion, with nearly 283,000 direct and indirect employees.

If MIA is granted foreign-trade zone status, it will be the last of the 10 largest U.S. cargo airports to be included in the program, according to records of the Foreign-Trade Zones Board, the federal agency responsible for the 296 existing zones.

MIA applied to become part of the Port of Miami's existing Foreign-Trade Zone #281. (Both the airport and the port are divisions of the Miami-Dade County government.)

If approved, all of MIA would be included in the zone—about 14 million square feet of office, hangar and cargo space spread over many buildings. Anticipating the designation, Napoli says the airport is working to fill about 523,000 square feet of currently empty space.

Businesses operating within the zone would be the main beneficiaries of the federal program. The airport, however, would enjoy increased rental values and gain new incentives to attract tenants. The local economy benefits from jobs created within the zone as well as rents and other local services.

From the federal government's perspective, the MIA zone would be viewed as a foreign territory for tax purposes. It would not assess duties on goods that arrive into the zone and are then exported to a foreign location or other U.S. foreign-trade zone. Duties would only be assessed when such goods enter the United States.


ERIK AUTOR

Erik Autor, president of the National Association of Foreign-Trade Zones, notes that the establishment of foreign-trade zones dates back to 1934, but the way companies leverage them has evolved throughout the decades. Using sites within zones to manufacture or assemble products became popular in the 1980s; and distribution centers started emerging inside zones about 20 years ago.

The airport is working to increase its total cargo capacity to 4 million metric tons per year.

Looking forward, Autor anticipates that the Trump administration will likely support the concept of foreign-trade zones. "Congress created the Foreign-Trade Zone program to promote manufacturing and distribution employment in the United States rather than have those jobs move to foreign countries," he explains. "Continuing a program that encourages the use of foreign and domestic parts in U.S.-based manufacturing in a U.S. foreign-trade zone…would be consistent with the president's goals."

Currently, the Foreign-Trade Zones Board reviews about 270 applications per year. According to Autor, MIA's request to expand and join an existing zone is somewhat rare. Most applications are from companies that want to establish operations within a current zone.

One of the primary purposes of foreign-trade zones is to encourage U.S.-based manufacturing by companies that assemble products from a variety of foreign parts and then export the completed products into the United States or to foreign countries. Duties are only paid when completed products enter the United States. Companies producing products with a zone pay either the applicable duty on the final product or the sum total of duties applicable to the imported components, whichever is lower.

The advantages are different for warehouse operations like those at MIA, which are designed mainly for distribution rather than large-scale manufacturing. In such cases, payment of duties can be delayed and consolidated when bulk shipments are re-packaged for domestic shipment, or avoided entirely if exported to another country, Autor explains.

In addition to MIA, businesses that want to participate in the zone will also need to be approved by the U.S. Department of Commerce and U.S. Customs and Border Protection. Businesses currently operating at MIA would not automatically enjoy the benefits of the new airport zone, and would need to apply to the Foreign-Trade Zones Board, notes Napoli.

Brinks Global Services USA, in fact, has already applied to include 17,000 square feet of warehouse space at the airport into the proposed MIA zone. While the warehouse space would be a new lease, the firm already rents 4,500 square feet of office space it also hopes to include in the zone, notes Jorge Valencia, the Brinks general manager in Miami.

The company's interest in more space builds on MIA's new pharma hub designation. Already an IATA-certified handler, Brinks plans to re-pack and store pharmaceuticals from both inbound and outbound shipments at the company's U.S. and Latin American hub. Valencia says that operating within a foreign-trade zone will increase the company's operating efficiencies and help develop new customers.

Because Brinks also plans to handle products other than pharmaceuticals within the zone, it will have to segregate the pharmaceuticals from general product shipments to maintain IATA standards.

Long-term Plans

Given the additional business expected from pharma hub operations, sea-to-air shipping and foreign-trade zone tenants, MIA officials worked with Ricondo & Associates to develop a new master plan for capital improvements to its cargo space.

Phase 1 of the Cargo Optimization, Redevelopment and Expansion Plan (CORE) will focus on improving airfield apron and ramp space. The airport hopes to fund the bulk of $8 million worth projects with federal grants and has already applied for FAA funding for design work.

Initial projects include extending taxiways that serve the cargo area and widening existing aircraft aprons to add parking for freighters with more cargo capacity—specifically, 10 positions for 747-8s.

The second phase, scheduled to begin in about five years, will concentrate on redeveloping and optimizing current space. No specific timelines or price estimates have been developed.

CORE will also include some new construction, but onsite space constraints will limit the amount of facilities that are built, notes Napoli.

"The goal is to stay competitive and modernize our facilities," he explains, noting the capacity target of 4 million metric tons. "We need to be ready."

FACTS&FIGURES

Project: Accommodating Irregular Operations

Location: Bangor (ME) Int'l Airport

Annual Passengers: 477,000

Daily Scheduled Flights: 12-20, depending on the season

Total Diversions Received: Nearly 1,200 since 2005

Avg. Diversions Per Year: About 100

Geographic Factor: Depending on direction of travel, Bangor Int'l is first or last major U.S. airport for trans-Atlantic flights needing to make emergency landings

Reasons for Diversions (in order of volume): Fuel-related problems; inclement weather; medical emergencies; mechanical problems; security threats

Financial Implications: Landing fees & other charges incurred during emergency landings range from $2,000-$5,000/diversion; airport uses revenue to help offset cost of providing emergency services

Key Partners: TSA; Customs & Border Protection; FBI; airport food concessionaire; local law enforcement agencies & firefighting agencies; nearby hospitals; local bus company

Joint Agreement: Air National Guard provides airport with aircraft rescue & firefighting service & equipment; BGR provides Guard with 24/7 ground services

Key Resources: 11,440-foot runway; 4 international gates to handle international diversions & sudden passenger influxes; 3 fuel tanks with total capacity of 3 million gallons; airport-owned FBO; cross-trained & on-call employees

How Bangor Int'l Stays Prepared for Unexpected Visitors

BY KEN WYSOCKY

Thanks to its location in south-central Maine and an extra-long runway from its early days as a military base, Bangor International Airport (BGR) plays a critical and high profile role in the worldwide aviation network. Depending on the direction of travel, BGR is the first or last major U.S. airport for trans-Atlantic flights to make emergency stops.

Ever since airport officials started keeping track in 2005, nearly 1,200 flights have diverted to BGR to address fuel problems, wait out inclement weather and a variety of other reasons. On average, that amounts to almost 100 flights a year, or eight per month, for the city-owned airport.

Annually, BGR handles about 477,000 enplanements, with 12 to 20 flights per day, depending on the season.

"It's certainly not something we try to market, but we're here for any carrier that transits over the Atlantic Ocean," says Airport Director Tony Caruso. "Given our geographic location, we are the first major airport for flights coming into the United States and the last resort for outgoing flights on the Great Circle route. They can depend on us to handle their aircraft and passengers in a variety of situations."


TONY CARUSO

BGR's role as the air system's safety net has grown throughout the years, he adds.

"I hate to say it's routine, but we do handle these kinds of flights regularly," observes Caruso. "It's all about teamwork with government agencies like the Transportation Security Administration, U.S. Customs and Border Protection, the FBI, local law enforcement agencies, the local fire department and the aircraft rescue and firefighting squad provided by the Bangor Air National Guard (which is based at BGR)."

From 2005 through 2016, the airport handled 1,191 emergency diversions: 709 for fuel-related issues, 254 because of bad weather, 95 for medical emergencies, 90 due to mechanical problems and 43 prompted by security threats.

The airport cross-trains many employees to ensure that it can provide a variety of support services on short notice.

One of the most memorable diversions occurred in May 2012, when a passenger aboard a US Airways flight from Paris to Charlotte, NC, announced that she was carrying a surgically implanted explosive device. "That, of course, was a major cause for concern—a very tense situation," Caruso relates. "In those cases, we play only a supportive role while law enforcement officials take the lead."

The airport's largest weather-related diversion occurred when a massive Nor'easter storm swept through the mid-Atlantic states on St. Patrick's Day in 2007, shutting down major airports in Boston, Philadelphia and New York City. "Our ramp was full of aircraft," Caruso recalls. "We hosted close to 1,000 passengers."

Over time, BGR has also developed a reputation within the industry as a go-to facility for technical stops. In addition, it still serves as a primary refueling hub for overseas military flights carrying personnel and cargo.

"We're really an aircraft pit stop—a gas station, if you will," Caruso says. "Whether it's corporate aircraft or international charter companies or domestic and foreign airlines, they all know they can rely on us and stop in Bangor for services."

At the Ready

BGR's military roots as a U.S. Air Force Base helped prepare the airport for its prominent role as a safe haven for stricken aircraft. Why? In order to accommodate B-52 bombers, military officials built an 11,440-foot runway. As such, BGR is equipped to handle today's biggest aircraft, including double-decked Airbus A380 wide-body jets and behemoth Antonov AN124 and AN225 cargo planes.

As such, the airport usually strives to keep about 1 million gallons of fuel on hand. "That's a lot for an airport our size, but we have the [storage] capacity because we used to be a military field," Caruso says. The airport has three fuel tanks: one that holds 2 million gallons and two others that hold 500,000 gallons each.

An extra-long runway and unusually large fuel reserves aren't the only factors that make BGR uniquely equipped for handling emergency landings. One is completely serendipitous: having two major hospitals within five miles of the airport. Other facilitating factors, however, are strictly by design. For instance, even though BGR doesn't offer any scheduled international departures, it has an international terminal with four gates. The terminal was built in 1974 for about $3.75 million and has been upgraded twice at a cost of roughly $15 million.

"The international gates are used only sporadically, but they're readily available for use at a moment's notice," says Caruso. While maintaining the largely unused terminal poses budgetary challenges, he considers such expenses a cost of doing business as the industry's "life preserver."

Landing and parking fees paid by diverted aircraft, plus associated fuel sales and ground handling revenue, help cover some of the costs of emergency services. Expenses vary according to aircraft size and the services needed, but usually range from $2,000 to $5,000 per operation, Caruso reports.

Local Resources

To offer a wide range of technical services and help entice airlines to use BGR as a hub, the airport owns and operates its own fixed-base operation (FBO). Financial support for the full-service facility comes from fees paid by airlines and other users.

"It's somewhat rare in the industry, although we're seeing more and more airports get into that realm," comments Caruso. "We're a one-stop shop for carriers…they fly the airplanes, and we take care of everything else. We do everything from ticketing and baggage handling to deicing and refueling aircraft.

"It saves the carriers money, because they don't have any initial start-up costs to hire personnel…they just contract with us for all their ground-handling," he continues. "We saw it as a strategic initiative to give carriers an incentive to come here."

The airport also benefits from a joint-use agreement with the local Air National Guard. Under the arrangement, BGR provides 24/7 operational services for the Guard; in return, the military unit provides the airport with aircraft rescue and firefighting support (equipment and personnel). "It's advantageous for both of us," Caruso explains. "We don't have to buy equipment, and they don't incur operational costs."

To further help it handle emergencies, BGR has established strong relationships with government agencies and local businesses. For example, Customs officers are available on short notice, and a standing agreement with a local bus company ensures that passengers on diverted flights have transportation to the terminal or local hotels.

Moreover, the airport concessionaire that provides in-flight catering also provides food for unexpected stranded passengers. "We have the ability to put the passengers in a large gatehold area that accommodates about 300 passengers," notes Caruso. "We can feed them there while they remain in a secure, sterile and comfortable location. And since we own and operate our own FBO, we can deploy resources faster to the right positions as needed…one radio call and we have everything in place in short order."

On-Call Staff

To ensure that it can meet sudden and unexpected demands associated with emergency diversions, BGR keeps 12 to 20 employees on call at all times. In addition, the airport cross-trains many of its 70 full-time employees so they can assume various responsibilities as needed. For instance, airfield maintenance workers might also offload baggage, or aircraft technicians might also be qualified to deice planes. Typically, about 30 of BGR's full-time employees are dedicated to FBO operations.

"We aim for staff cross-utilization as much as possible," notes Caruso. "Sometimes it's all hands on deck, and our senior team and I take off our ties and do what's needed."

Over the years, BGR has developed a communications/chain-of-command notification system to use when emergency landings occur. “Sometimes diversions are very dynamic in nature, so we work hard to be sure everyone is on the same page at the same time,” Caruso explains.

When the airport’s 24-hour dispatch office receives an emergency notification from an aircraft pilot or FAA control tower, dispatch personnel use a text messaging system that simultaneously sends pertinent information to predetermined personnel at select agencies and entities. The list of people who receive text messages varies according to the type of emergency.

“Things happen quickly,” Caruso relates. “For example, we’ve received calls about a sick passenger on an aircraft that’s only 20 minutes out, and we’ll have to get everything in place: crash/rescue teams, personnel to the lead aircraft to a parking spot, a medical team from one or both hospitals and Customs officers if it’s an international flight.”

To keep personnel prepared, the airport performs internal training exercises coordinated with its annual FAA emergency training. Additionally, airport managers meet once or twice a year to review a recent emergency diversion and evaluate staff performance. “We try to find out what we could’ve done better,”

Bangor Int’l is a crucial stopover for aircraft on trans-Atlantic flights that need to make unscheduled landings.

Caruso explains. “We always like to think we’re ready, but every situation is unique. That’s one thing all parties understand.

“There’s a routine nature to some of it. But since each operation is unique, it’s important to always know what to do and be sure you’re doing it when you should be doing it,” he continues. “It’s a collaborative and continuous effort…everyone here understands that we play a serious and important role and is very proud of what we do.”

Checkpoint Wait Times Plummet After Airlines Add Automated Screening Lanes at O'Hare Int'l

BY JODI RICHARDS

FACTS&FIGURES

Project: Automated Passenger Screening Lanes

Location: Chicago O'Hare Int'l Airport

Project Partners: Chicago Dept. of Aviation; American Airlines; United Airlines; TSA

United Lanes: Terminal 1, Checkpoint 3

American Lanes: Terminal 3, Checkpoint 7

Opened: Nov. 2016

Automated Screening Lane Equipment: MacDonald Humfrey

T1/Checkpoint 3/United Club Architect: Solomon Cordwell Buenz

Design Enhancements: Multiple divesting stations allow passengers to move through screening process at their own pace; automated system brings bins to X-ray tunnel when each passenger is ready for screening; bins are 25% larger & equipped with radio frequency identification tags

Results: Average wait times at peak travel periods dropped from 104 minutes in May 2016 to about 6 minutes over the last 6 months

Key Benefits: Improved operational efficiency; reduced wait times for passengers; less manual work for screening officers

Chasing away unpleasant memories from massive backups at TSA checkpoints last spring, Chicago's O'Hare International Airport (ORD) opened five new automated screening lanes in November.

Chicago Department of Aviation (CDA) and TSA partnered with United Airlines and American Airlines to deploy the redesigned lanes at passenger checkpoints in two terminals. The new options opened shortly before the busy fall/winter holiday travel season; and a few months later, officials from all four organizations seem pleased with the results.

JONATHAN LEACH

"The automated screening lanes improve operational efficiency, reduce wait times for passengers and enhance security," says Jonathan Leach, chief operating officer at CDA.

The new automated lanes serve United Airlines passengers at Checkpoint 3 in Terminal 1, and American Airlines passengers at Checkpoint 7 in Terminal 3.

CDA collaborated with the airlines, TSA and equipment manufacturer MacDonald Humfrey to review designs and coordinate efforts on both projects. "We're pleased that O'Hare was one of the first airports in the nation to have automated screening lanes installed in its terminals," Leach comments.

STEVE KAROLY

Steve Karoly, acting assistant administrator for TSA's Office of Requirements and Capabilities Analysis, notes that the strategy taken at ORD improves the screening process for passengers *and* Transportation Security Officers (TSOs). The new lanes enable "more effective passenger flow through the checkpoint and greater TSO focus on security screening rather than lane operation," explains Karoly.

During peak travel periods in early 2016, checkpoint wait times reached "unacceptable levels at Chicago airports," Leach acknowledges. "With more passengers coming through the airport, it's critical to utilize new technology to maintain a positive

customer experience and ensure the highest level of safety and security for passengers and employees."

Working with TSA and the airlines, ORD has reduced average wait times during peak travel periods from 104 minutes in May 2016 to about six minutes over the last six months.

Improved Efficiency

In addition to its standard screening lane, Checkpoint 3 in Terminal 1 now also has three automated screening lanes. Checkpoint 7 in Terminal 3 currently has two automated screening lanes.

Multiple divest stations at the new automated lanes improve flow by allowing faster passengers to bypass slower ones, Karoly explains. With parallel divesting, passengers can move through the screening process at their own pace. Instead of waiting in line to push carry-on items to the X-ray machine, passengers have their own stations to place belongings in bins, and an automated system transports the bins to the X-ray tunnel when each passenger is ready.

"This provides a more comfortable experience for all passengers—infrequent travelers who need extra time or experienced business travelers who require less time for the same actions," says Leach.

Items that require secondary screening are automatically routed to a separate location, without stopping the movement of other bins through the system. The continuous flow makes for a more efficient screening process, while also maintaining a high level of security, he adds.

Smaller details were also improved. For instance, bins at the automated lanes are 25% larger than those used at standard lanes. (Travelers with oversized items that do not fit completely into the larger bins at automated lanes are routed to standard screening lanes to keep operations flowing.) Bins at the automated lanes also use radio frequency identification technology to expedite secondary screening and alarm resolution. Photos of bag exteriors are automatically linked to X-ray images of their contents.

From an ergonomic standpoint, automated lanes require less manual labor. Because TSOs no longer have to transport empty bins from the end of the checkpoint back to the beginning, they can maintain more focus on security screening.

Checkpoint Renovations


DAVID BILLINGS

When checkpoint wait times in early 2016 failed to meet United's expectations, the carrier jumped in to help. "We actively worked with TSA to find solutions for how to get our passengers through the checkpoint quicker, less stressed out, happier—so when they arrive on the plane, they have a better experience," explains David Billings, senior project manager for corporate real estate with United.

The new automated passenger screening lanes are, in fact, "dramatically different" from standard lanes, reports Billings. "They can process significantly more passengers per hour, while increasing the security throughout the whole system."

Renovations to the United Club guided the work schedule for checkpoint modifications one level below.

New automated technologies were integrated into the Terminal 1 checkpoint while it was closed for renovations and expansion of the United Club above it. “We’d been working with TSA as to whether that would open again or not,” Billings explains. “We all agreed it would be good to reopen that checkpoint.”

United collaborated with CDA and its local operations teams to coordinate the checkpoint closure with a non-peak travel period. It also worked with TSA to ensure that staffing levels at other checkpoints in the terminal were sufficient to accommodate higher volume during the closure. “While it was kind of annoying to have construction, we mitigated that as best as we could and did not see a huge impact on passengers,” Billings relates.

In addition to improving the “nuts and bolts” of the checkpoint, the airline also seized the opportunity to raise the bar of its aesthetics. The project’s architectural firm, Solomon Cordwell Buenz, was asked to brighten up the checkpoint and incorporate modern, but not trendy, materials and finishes.

To improve lighting levels, designers specified additional foot-candles to keep the space properly illuminated in early mornings and late nights. They also used a curved metal ceiling to further brighten the space and add visual interest overhead. The custom-made indirectly lit coffered ceiling brightens the area and creates the illusion of more height, explains Tom Chambers, director of Aviation Services at Solomon Cordwell Buenz. Even with a floor-to-ceiling height of 10 feet 3 inches, the size of the space would have felt somewhat claustrophobic without the special ceiling treatment, notes Chambers. “We wanted to address that architecturally.”

TOM CHAMBERS

Security cameras, diffusers and other necessary utilities were blended into the space in a visually pleasing way, he adds.

Subduing the overall “visual craziness” of the screening area was also integral, adds Billings. With the previous clutter gone, passengers can now focus on getting through the checkpoint “more calmly, without any sort of fear of missing a flight,” he explains.

Intuitive wayfinding cues were added to help guide passengers to and through the checkpoint. “The ceiling flows and helps you know that you’re headed into the secure side of the airport,” says Billings. The new design works in concert with TSA ticket/document checkers to direct passengers and make the screening process a better experience, he comments.

In order to execute such improvements, crews completely gutted the area, removing leftover wiring, patches in the floor and other remnants from years of previous security requirement changes. "We took everything out and started over," reports Billings.

Anticipating the need to accommodate future security requirements, United stressed the importance of flexibility with project architects. Toward that end, the new design uses just one row of columns to support the expanded United Club space above. "We tried to make it as universal a space as possible," explains Chambers. "Flexibility is a byproduct of having the open space."

Lessons Learned

While data about the new automated screening lanes at ORD is still being processed, Karoly says that TSA was pleased with their performance during the 2016 holiday season. Moreover, no significant issues were reported.

"This holiday season was significantly better—especially where we've installed the automated screening lanes," agrees Billings.

Given the promising results at ORD, Karoly reports that TSA is actively working with multiple airline and airport partners to introduce automated security lanes at some of the nation's largest and highest-traffic airports throughout the year. The goals, he adds, is to continue improving security effectiveness and the passenger experience. "Building upon the knowledge gained with these deployments, TSA is developing an acquisition program to provide for a long-term, sustainable solution to address these needs," says Karoly.

"The ASL [automated screening lane] effort is an important example of how TSA can effectively partner with multiple public and private stakeholders in the aviation ecosystem, including airlines, airports and vendors," he continues. "The Innovation Task Force is looking forward to advancing continued collaboration with all of these partners to continue to demonstrate innovative solutions in the field and apply important lessons learned from this effort. Most importantly, this effort has proven that the full ecosystem can work together to introduce solutions that improve security effectiveness and the passenger experience."

More in the Works

Other checkpoint enhancements at ORD include the addition of a standard screening lane to Checkpoint 9 in Terminal 3 for passengers with flights departing from Concourse L. According to Leach, the expansion has reduced checkpoint wait times and crowding in the ticketing area for passengers flying on American Airlines, Air Choice One, Spirit Airlines, JetBlue, Frontier Airlines and Virgin America.

CDA is also exploring an airside bus connection between Terminals 1, 2 and 3 and Terminal 5 for spring 2017. The new service would be structured to reduce congestion at Checkpoint 10 in Terminal 5 by keeping passengers airside and out of the checkpoint.

Bismarck Municipal Reaps Benefits & Developed Rental Car Facility

BY MIKE SCHWANZ

FACTS&FIGURES

Project: Consolidated Quick Turn-Around Facility

Location: Bismarck (ND) Municipal Airport

Main Components: Automatic car wash; 3 cleaning/hand-wash bays; 2-position fueling station; 1.6-acre ready lot; 3-acre staging area

Approx. Building Size: 6,400 sq. ft.

Cost: $5.9 million (including reserve funds)

Opened: June 2016

Resident Car Rental Companies: Avis; Enterprise; Hertz

Lot Capacity: 430 vehicles

Facility Developer & Operator: Conrac Solutions Project Delivery

Architect: PGAL

General Contractor: Greystone Construction

Local Property Management Firm: The Aspen Group

Of Note: Project was completely funded by private developer

Key Benefits of Private Development: Preserves airport's cash reserves for other projects such as runway reconstruction; mitigates financial risk; $6,500/year revenue from ground lease

Key Benefits of Facility: Increases operational efficiency for car rental companies; reduces traffic & vehicle exhausts

Like blind dates and family vacations, airport projects don't always go as originally planned. Case in point: the new rental car service center at Bismarck Municipal Airport (BIS) in North Dakota.


GREG HAUG

"We were thinking of building our own QTA [quick turn-around facility] for several years, and we even had some preliminary designs done," explains Airport Director Greg Haug. "Unfortunately, our primary runway needed a total reconstruction, with an estimated cost of $68 million. We just couldn't afford another big project."

Not wanting to kill the QTA project altogether, airport officials decided to turn to the private sector for help and issued a request for proposals. "Conrac Solutions Project Delivery made us an excellent offer, which we accepted," Haug says.

The $5.9 million facility that resulted opened last June, much to the delight of BIS officials. According to management, it's the first privately developed on-airport QTA in the United States.

Although the new car rental facility has been operating less than a year, Haug has been very pleased with how well it has worked. "The car rental companies and Conrac Solutions have given me very positive feedback," he says. "The only thing that was somewhat unsettling with this kind of project is that my staff and I are used to being very 'hands on' concerning airport projects. It is a bit different having a third party making the decisions as the project moved forward; but so far it has worked out great!"

Why the Interest?

Conrac Solutions was attracted to the North Dakota QTA project as a follow-up endeavor to on-airport consolidated rental facilities it has developed at Ted Stevens Anchorage International in Alaska and Austin-Bergstrom International in Texas. The company continues to operate those projects along with car rental facilities at Chicago Midway International, Salt Lake City International, San Diego International, San Francisco International and Seattle-Tacoma International.


AMY BARNES

"Our company has many years of experience in managing and operating such facilities," says Amy Barnes, vice president of client relations. At BIS, however, Conrac Solutions invested its own capital and financing to build the facility, thereby isolating the airport from project risk, explains Barnes. The company rents the site

Reduces Risk With Privately

from BIS through a 26-year ground lease, and manages the overall operation and long-term maintenance of the facility.

The company hired a local property management firm, The Aspen Group, for day-to-day maintenance. "Aspen is very familiar with the labor and vendor pool in the Bismarck area," Barnes says. "If something breaks down, they know who to contact locally to come in and fix it."

Conrac Solutions expects to recoup its initial investment of $5.9 million over the term of the agreement, says Barnes. The city commission approved an initial customer facility charge of $3.46 per transaction day, with annual 2% increases, to finance facility improvements, she notes.

In addition, volume at BIS continues to increase annually (271,022 passengers last year—up 4.49% from 2015). "Serving the state capital, this is an airport primarily used by business travelers, and we expect the demand for rental cars will grow accordingly," Barnes explains.

Consolidating Operations

Transitioning to a single QTA facility was a huge benefit for the airport's three car rental companies (Hertz, Avis and Enterprise), reports Haug. "In the past, the car rental companies each had their own service centers a few miles away," he says. "They had to have runners take cars uptown to wash them, and then get gas at a separate gas station. With one facility, they can do all of that right here. It allows them to turn cars over a lot quicker, so they can rent out more cars a year."

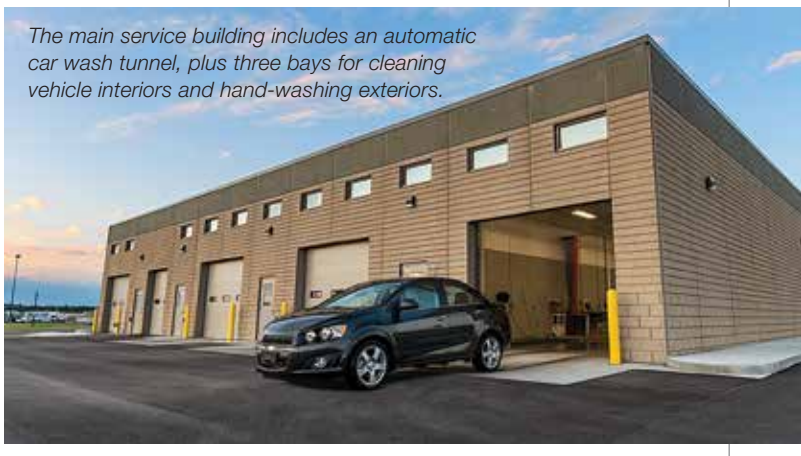
Barnes predicts that the trend toward consolidated rental car facilities on airport grounds is likely to continue. With positive results at BIS, Conrac Solutions is already talking with rental car providers and airport executives about developing similar facilities at other small non-hub airports throughout the United States.

Beyond new operational efficiencies, the facility at BIS is also providing big environmental advantages. "Eliminating the need to drive between the service centers and the airport significantly decreases vehicles exhaust, traffic and wear-and tear on our roadways," Haug explains.

The new QTA site occupies about 1.6 acres of what was once an empty field, and is adjacent to an existing vehicle staging area that was expanded to about three acres and newly paved during the project. The 6,400-square-foot main building includes three cleaning and hand-washing bays—one for each car rental company. There is also an automatic car wash tunnel, which the three companies share.

Due to the harsh nature of some North Dakota winters, the structure was outfitted with insulated walls, overhead doors and heated slabs.

The above-ground fueling station includes two gas nozzles and a usage tracking system that records how much product each



The main service building includes an automatic car wash tunnel, plus three bays for cleaning vehicle interiors and hand-washing exteriors.

The airport's three rental car companies share a new onsite fueling station.

company pumps. Employees enter company-specific codes to activate the pumps when refueling rental cars. The shared outdoor parking lot has spaces for 430 vehicles.

Although the main wash building was built primarily for function, the airport, Conrac Solutions and the project architect (PGAL) also considered the effect of its aesthetics. "We took care when designing the new QTA building that it matched the style of the terminal and other maintenance buildings," Haug relates.

Financial Matters

According to Haug, the economic advantages of partnering with a private developer for the new rental car service facility have been substantial. "While the income Conrac pays us for the ground lease is relatively modest, roughly $6,500 a year, we saved significant dollars by not incurring the upfront costs for design and construction of the facility and the general operating and maintenance costs of the QTA moving forward," he says. "We now can spend that money on projects such as our new runway."

From a customer service standpoint, the new QTA saves travelers time. Customers sign in at the rental car desks near Baggage Claim, pick up their keys and proceed to the ready lot, approximately 200 feet away via a well-lit sidewalk.

"Instead of waiting around for a shuttle bus to take them to a distant off-property lot, passengers can get to their car in two or three minutes," Haug estimates. "And when you return the vehicle, you just go to an adjacent return lot, and simply take your keys back to the same desk in the terminal where you originally checked in. It is very user-friendly."

Having Hertz, Avis and Enterprise share the same facility also prevented a potential problem down the road, adds Haug. "We had heard rumblings that some of the car rental companies were wanting to build their own facilities on the airport," he explains. "Space is at a premium here; there is only so much of it. We wanted to reserve the flexibility to have land available for future expansion."

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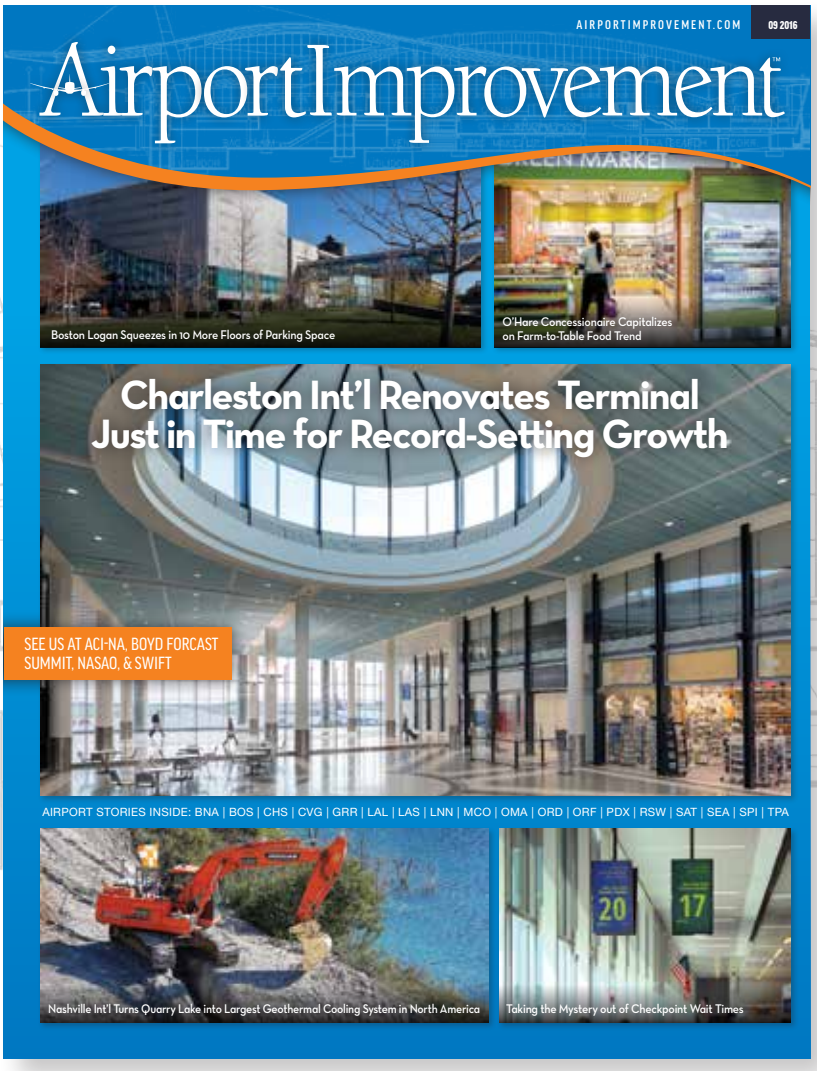

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The Show & Tell of Airport Project Work

Will Public-Private Partnerships Propel the Next Big Wave of Airport Improvements?

MARY SCOTT NABERS

Mary Scott Nabers is president and chief executive officer of Strategic Partnerships, a business development company specializing in government contracting and procurement consulting throughout the United States.

The United States may boast the world's top economy, but that's not evident when travelers arrive at our front door. Sadly, U.S. airports do not impress international travelers. In fact, not a single one made the top 25 in Skytrax's 2016 survey of the world's best airports. It is shocking how far down the list you have to go to find a U.S. airport.

Operational inefficiencies, passenger congestion, limited retail, cumbersome access in and out of terminals and the overall negative passenger experience found in too many U.S. airports is the result of outdated design, increasingly high demand, a lack of funding investment and a tendency to reject the concept of collaborating with private-sector experts. That, however, is changing.

Big improvements are occurring, and more are expected soon. In fact, modernization projects at U.S. airports are expected to outpace efforts at all other countries across the globe in the next few years.

Los Angeles International Airport (LAX), for instance, has launched a $14 billion modernization project. More gates are available to service the massive Airbus A380 jets, retail ranges from Armani and Porsche to KFC and passengers are treated to all types of new amenities at the Tom Bradley International Terminal. An automated people mover train will allow travelers quick access to terminals, a consolidated car rental center and parking garages.

New York's LaGuardia Airport has allocated $4 billion in funding to bring it facilities up to "first-world standards." John F. Kennedy International Airport (JFK) will also be renovated.

In the Midwest, Chicago's O'Hare Airport (ORD) has completed $4.26 billion of improvements in an airfield modernization program that is expected to total $5.5 billion. Last year, the Chicago Department of Aviation, airlines and FAA reached a $1.3 billion funding agreement to build a new runway, centralized deicing pads and other critical airfield infrastructure at ORD. The $1.3 billion initiative is intended to pave the way for subsequent improvements that will allow the airport to add more gates and modernize its terminals.

Major changes are coming to U.S. airports—but none too soon.

The improvement trend will reach smaller U.S. cities as well. The city of Houston has announced a major modernization project at George Bush International Airport, and San Antonio officials are hoping to do the same with their airport.

In Ohio, John Glenn International (previously known as Port Columbus International) finished an $80 million terminal modernization last year, and is currently designing a new consolidated rental car facility at a preliminary estimated cost of $150 million. Longer term, the airport is planning for a new terminal complex that is expected to cost more than $1 billion.

It will be interesting to see which cities follow a trend that has proved successful in other countries: the privatization of airport terminals and overall operations. Many cities have seen the success of collaborating with airport experts in other countries and have consequently engaged in public-private partnerships, also known as P3s or PPPs. Most airports using this method build a repayment revenue plan around the increased revenue that is generated inside the modernized terminals.

This year alone, Hartsfield-Jackson Atlanta International plans to spend $500 million on capital improvements—part of a 20-year $6 billion modernization effort known as ATLNext. In preparation for the 2017 portion, the airport is hosting an "industry day" in March to brief private-sector businesses about a variety of opportunities: central passenger terminal modernization, cargo expansion site preparation, facility maintenance, parking structures, a new hotel and travel plaza. Previous industry days for other projects have apparently yielded positive results.

Major U.S. airports are clearly in "catch-up" mode, and that process should move rapidly throughout the country to include smaller airports as well. Because of the widespread modernization projects, airport contractors and operators throughout the world now have a laser focus on what is happening at airports in U.S. cities. The amount of improvement they see and how it gets done is up to you and your governing officials.

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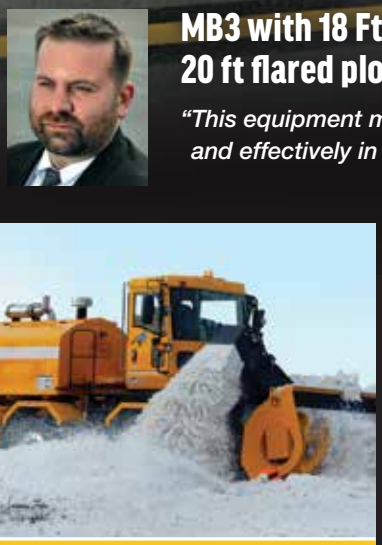

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